REGION L

SOUTH CENTRAL TEXAS REGIONAL WATER PLANNING GROUP

# 2026 South Central Texas (Region L) Regional Water Plan

## Final Plan



Prepared by the South Central Texas Regional Water Planning Group

With Administration by the San Antonio River Authority

**OCTOBER 2, 2025**

BLACK & VEATCH

# 2026 South Central Texas (Region L) Regional Water Plan

## *Final Adopted Plan*

*Prepared by the:*

South Central Texas (Region L) Regional Water Planning Group

*With funding assistance from the Texas Water Development Board*

*With administration by the San Antonio River Authority*

*With assistance from:*

Black & Veatch
TBPE No. F-258

Laura Raun Public Relations

Hoffpauir Consulting, PLLC
TBPE No. F-16220

SWCA
TBPE No F-16248




10/15/25

Lauren E. Gonzalez
Project Manager, Black & Veatch

Jaime Burke, P.E.
Technical Lead, Black & Veatch
Texas Serial No.: 92863
Date: October 15, 2025

**OCTOBER 2025**

**BLACK & VEATCH PROJECT NO. 411170**

# South Central Texas Regional Water Planning Group Membership for the 6th Planning Cycle

## *Officers*

*(2024 to Present)*

Curt Campbell, Chair
Humberto Ramos, Vice Chair
Gary Middleton, Secretary
Jason Ammerman, At-Large
Steve Metzler, At-Large

*(2021 to 2023)*

Tim Andruss, Chair
Adam Yablonski Vice Chair
Gary Middleton, Secretary
Humberto Ramos, At-Large
Glenn Lord, At-Large

## *Voting Members (2021 to Present)*

- Jason Ammerman
- Tim Andruss
- Ryan Bayle
- Amber Beard
- Darrell Brownlow
- John Byrum
- Curt Campbell
- Rey Chavez
- Will Conley
- Debbie Farmer
- Charlie Flatten
- Steve Graham
- Terrell Graham
- Vic Hilderbran
- Thomas Jungman
- Ryan Kelso
- Paul Kite
- Russell Labus
- Glenn Lord
- Gary Middleton
- Scooter Mangold
- Andrew McBride
- Steve Metzler
- Daniel Meyer
- Travis Pruski
- Robert Puente
- Vanessa Puig-Williams
- Humberto Ramos
- Weldon Riggs
- Roland Ruiz
- Diane Savage
- Darren Simmons
- Mitchell Sowards
- Jonathan Stinson
- Heather Sumpter
- Thomas Taggart
- Ian Taylor
- Aarin Teague
- Dianne Wassenich
- Andra Wisian
- Adam Yablonski
- Dan Yoxall

## *Non-voting Members (2021 to Present)*

- Carl Crull
- Iliana Delgado
- Ronald Fieseler
- Michele Foss
- Tony Franklin
- Tom Hegemier
- Marty Kelly
- Jami McCool
- Elizabeth McCoy
- Don McGhee
- Rusty Ray
- Carly Rotzler
- Charles Wiedenfeld

# Table of Contents

**Executive Summary** ..... **ES-1**
Background ..... ES-3
ES.1 Description of the South Central Texas Region ..... ES-5
ES.2 Population and Water Demands ..... ES-6
ES.3 Water Availability and Supplies ..... ES-7
ES.4 Water Needs ..... ES-9
ES.5 Water Management Strategies to Meet Needs ..... ES-10
ES.6 Impacts of the Regional Water Plan ..... ES-13
ES.7 Drought Response ..... ES-15
ES.8 Policy Recommendations and Unique Sites ..... ES-18
ES.9 Implementation and Comparison to the Previous Regional Water Plan ..... ES-19
ES.10 Public Participation and Plan Adoption ..... ES-19

**1.0 Description of the Regional Water Planning Area** ..... **1-1**
1.1 Introduction and Background ..... 1-1
1.2 Overview of the South Central Texas Region ..... 1-1
1.3 Climate ..... 1-3
1.4 General Geology ..... 1-6
1.5 Water Resources and Quality Considerations ..... 1-7
1.5.1 Groundwater ..... 1-7
1.5.2 Surface Water ..... 1-13
1.5.3 Reuse ..... 1-15
1.5.4 Major Springs ..... 1-16
1.5.5 Surface Water Quality ..... 1-17
1.5.6 Ecologically Significant and Ecologically Unique Stream Segments ..... 1-20
1.6 Natural Resources ..... 1-21
1.6.1 Vegetational Areas ..... 1-21
1.6.2 Fish and Wildlife ..... 1-24
1.7 Agricultural Resources ..... 1-24
1.8 Threats to Agricultural and Natural Resources ..... 1-26
1.9 Population and Demography ..... 1-27
1.9.1 Historical and Recent Trends in Population ..... 1-27
1.9.2 Demographic Characteristics ..... 1-28
1.10 Economy – Major Sectors and Industries ..... 1-32
1.10.1 Regional Economy ..... 1-32
1.10.2 Agricultural Production ..... 1-33
1.10.3 Livestock Production ..... 1-35

1.10.4 Mining ..... 1-36
1.10.5 Manufacturing ..... 1-36
1.10.6 Trades and Services ..... 1-37
1.11 Current Water Use and Major Water Demand Centers ..... 1-37
1.11.1 Current Water Use ..... 1-37
1.11.2 Major Water Demand Centers ..... 1-38
1.12 Major Water Providers ..... 1-38
1.13 Summary of Existing Plans ..... 1-38
1.13.1 2022 State Water Plan ..... 1-38
1.13.2 2021 Regional Water Plan ..... 1-39
1.13.3 2023 Regional Flood Plans ..... 1-40
1.13.4 Local Water Plans ..... 1-41
1.13.5 Current Preparations for Drought ..... 1-41
1.14 Drought of Record ..... 1-42
1.15 Water Loss Audits ..... 1-42

**2.0 Population and Water Demand Projections ..... 2-1**
2.1 Introduction ..... 2-1
2.2 Population Projections ..... 2-2
2.2.1 Water User Groups ..... 2-3
2.2.2 Counties ..... 2-3
2.2.3 River and Coastal Basins ..... 2-5
2.2.4 Major Water Providers ..... 2-6
2.3 Water Demand Projections ..... 2-6
2.3.1 Water User Groups ..... 2-7
2.3.2 Counties ..... 2-7
2.3.3 River and Coastal Basins ..... 2-9
2.3.4 Use Type ..... 2-10
2.3.5 Major Water Providers ..... 2-27
2.4 Contractual Obligations for Water User Groups and Wholesale Water Providers ..... 2-28
**Appendix 2A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27) ..... 2A-1**
**Appendix 2B: Passive Conservation Water Savings by Decade ..... 2B-1**

**3.0 Water Availability and Existing Water Supplies ..... 3-1**
3.1 Introduction ..... 3-1
3.2 Water Sources ..... 3-2
3.2.1 Surface Water ..... 3-2
3.2.2 Groundwater ..... 3-5

3.2.3 Reuse ..... 3-7
3.3 Hydrologic Assumptions ..... 3-8
3.3.1 Surface Water ..... 3-8
3.3.2 Groundwater ..... 3-11
3.3.3 Reuse ..... 3-15
3.4 Water Availability and Existing Water Supplies Identification ..... 3-15
3.4.1 Surface Water ..... 3-15
3.4.2 Groundwater ..... 3-20
3.4.3 Reuse ..... 3-26
3.5 Water User Groups ..... 3-27
3.6 Major Water Providers ..... 3-27
**Appendix 3A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27) ..... 3A-1**
**Appendix 3B: Hydrologic Assumptions Requests and Approvals ..... 3B-1**
**Appendix 3C: Technical Memorandum for the 2026 South Central Texas Regional Water Plan ..... 3C-1**
**Appendix 3D: Permitted Surface Water Rights and Reliability Assessment ..... 3D-1**

**4.0 Identification of Water Needs ..... 4-1**
4.1 Introduction ..... 4-1
4.2 Identified Needs ..... 4-1
4.2.1 Water User Groups ..... 4-2
4.2.2 Counties ..... 4-9
4.2.3 Use Types ..... 4-11
4.2.4 Major Water Providers ..... 4-25
**Appendix 4A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27) ..... 4A-1**

**5.0 Evaluation and Recommendation of Water Management Strategies ..... 5-1**
5.1 Potentially Feasible Water Management Strategies ..... 5.1-1
5.1.1 Process to Identify Potentially Feasible WMSs ..... 5.1-1
5.1.2 Potentially Feasible Strategies for the 2026 South Central Texas Regional Water Plan ..... 5.1-2
5.1.3 Potential for Aquifer Storage and Recovery Projects to Meet Significant Identified Needs ..... 5.1-18
5.1.4 Strategies with Flood Mitigation Benefits ..... 5.1-19
5.1.5 Implementation Status of Certain Recommended Water Management Strategies ..... 5.1-20
5.2 Water Management Strategy Evaluations ..... 5.2-1
5.2.1 Municipal Water Conservation ..... 5.2.1-1
5.2.2 Non-Municipal Water Conservation ..... 5.2.2-1

5.2.3 Drought Management ..... 5.2.3-1
5.2.4 Edwards Transfers ..... 5.2.4-1
5.2.5 Fresh Groundwater Development ..... 5.2.5-1
5.2.6 Brackish Groundwater Development ..... 5.2.6-1
5.2.7 Groundwater Conversions ..... 5.2.7-1
5.2.8 Facilities Expansion ..... 5.2.8-1
5.2.9 Reuse Water ..... 5.2.9-1
5.2.10 Brush Management ..... 5.2.10-1
5.2.11 Rainwater Harvesting ..... 5.2.11-1
5.2.12 Surface Water Rights ..... 5.2.12-1
5.2.13 Balancing Storage ..... 5.2.13-1
5.2.14 ARWA Carrizo-Wilcox Project (Phase 2) ..... 5.2.14-1
5.2.15 ARWA DPR Project (Phase 3) ..... 5.2.15-1
5.2.16 CRWA Expanded Brackish Carrizo-Wilcox Project ..... 5.2.16-1
5.2.17 CRWA Siesta Project ..... 5.2.17-1
5.2.18 CRWA Wells Ranch (Phase 3) Project ..... 5.2.18-1
5.2.19 CVLGC Carrizo Project ..... 5.2.19-1
5.2.20 GBRA Lower Basin New Appropriation ..... 5.2.20-1
5.2.21 GBRA WaterSECURE ..... 5.2.21-1
5.2.22 Medina County Regional ASR Project ..... 5.2.22-1
5.2.23 NBU ASR Project ..... 5.2.23-1
5.2.24 NBU Trinity Well Field Expansion ..... 5.2.24-1
5.2.25 SAWS Expanded Local Carrizo Project ..... 5.2.25-1
5.2.26 SAWS Expanded Brackish Groundwater Project ..... 5.2.26-1
5.2.27 SAWS Regional Wilcox Project ..... 5.2.27-1
5.2.28 SSLGC Expanded Brackish Wilcox Project ..... 5.2.28-1
5.2.29 SSLGC Expanded Carrizo Project ..... 5.2.29-1
5.2.30 Victoria ASR Project ..... 5.2.30-1
5.2.31 Victoria Groundwater-Surface Water Exchange ..... 5.2.31-1
5.2.32 Weather Modification ..... 5.2.32-1
5.3 Water Conservation Information and Recommendations ..... 5.3-1
5.3.1 Water Conservation in the 2026 South Central Texas Regional Water Plan ..... 5.3-1
5.3.2 Recent and Recommended Water Conservation Legislation and Policies ..... 5.3-7
5.3.3 Model Water Conservation Plans ..... 5.3-8
**Appendix 5A: Guiding Principles of the South Central Texas Regional Water Planning Group ..... 5A-1**
**Appendix 5B: Water Management Strategies Considered and Evaluated to Meet Identified Needs ..... 5B-1**

**Appendix 5C: Implementation Status of Certain Water Management Strategies ..... 5C-1**
**Appendix 5D: Threatened and Endangered Species and Species of Greatest Conservation Need by County ..... 5D-1**
**Appendix 5E: Miscellaneous Water Management Strategy Cost Estimate Summaries ..... 5E-1**

**6.0 Impacts of the Regional Water Plan and Consistency with Protection of Resources ..... 6-1**
6.1 Cumulative Effects of Regional Water Plan Implementation and Consistency with Long-Term Protection of the State's Water, Agricultural, and Natural Resources ..... 6-1
6.1.1 Hydrologic Models ..... 6-1
6.1.2 Water Resources ..... 6-2
6.1.3 Agricultural Resources ..... 6-30
6.1.4 Natural Resources ..... 6-32
6.1.5 Effects on Navigation ..... 6-51
6.1.6 Environmental Benefits and Concerns ..... 6-52
6.2 Socioeconomic Impacts of Not Meeting Identified Water Needs ..... 6-52
6.3 Description of Unmet Needs ..... 6-53
6.3.1 Boerne ..... 6-56
6.3.2 County-Other, Comal ..... 6-57
6.3.3 County-Other, Guadalupe ..... 6-57
6.3.4 County-Other, Hays ..... 6-58
**Appendix 6A: Texas Water Development Board (TWDB) Socioeconomic Impacts of Projected Water Shortages for the South Central Texas (Region L) Regional Water Planning Area ..... 6A-1**

**7.0 Drought Response Information, Activities, and Recommendations ..... 7-1**
7.1 Droughts of Record in the Regional Water Planning Area ..... 7-1
7.1.1 Current Drought of Record ..... 7-1
7.1.2 Potential Droughts of Record ..... 7-2
7.1.3 Drought Indicators ..... 7-2
7.2 Uncertainty and Droughts Worse Than the Drought of Record ..... 7-6
7.2.1 Planning Factors Associated with Uncertainty ..... 7-6
7.2.2 Measures to Plan Beyond Meeting Needs During Drought of Record ..... 7-7
7.2.3 Potential Measures and Responses Available During Droughts Worse Than the Drought of Record ..... 7-7
7.3 Current Drought Preparations and Response ..... 7-8
7.3.1 Overall Current Drought Preparations in South Central Texas Region ..... 7-8
7.3.2 Drought Response Triggers and Actions ..... 7-8
7.3.3 Regional Water Supplier Roles in Droughts ..... 7-9
7.4 Existing and Potential Emergency Interconnects ..... 7-10

7.5 Drought Water Management Strategies ..... 7-11
7.5.1 Municipal Drought Management ..... 7-11
7.5.2 Irrigation Drought Management ..... 7-14
7.5.3 Livestock Drought Management ..... 7-15
7.6 Emergency Responses to Local Drought Conditions or Loss of Municipal Supply ..... 7-15
7.6.1 Sole Source: Groundwater ..... 7-19
7.6.2 Sole Source: Surface Water ..... 7-20
7.7 Other Drought-Related Considerations and Recommendations ..... 7-21
7.7.1 Monitoring and Assessment ..... 7-21
7.7.2 Drought Preparedness Council Recommendations ..... 7-21
7.8 Region-Specific Drought Response Recommendations and Model Drought Contingency Plans ..... 7-23
7.8.1 Recommended Surface Water Triggers and Responses ..... 7-23
7.8.2 Recommended Groundwater Triggers and Responses ..... 7-26
7.8.3 Recommended Triggers and Responses for Irrigation and Steam-Electric Uses ..... 7-28
7.8.4 Model Drought Contingency Plans ..... 7-29
**Appendix 7A: Summary of Drought Response Measures ..... 7A-1**
**Appendix 7B: Existing and Potential Emergency Interconnection Information ..... 7B-1**
**Appendix 7C: Drought Preparedness Council Letter to Region L, Dated February 8, 2024 ..... 7C-1**

**8.0 Policy Recommendations and Unique Sites ..... 8-1**
8.1 Ecologically Unique River and Stream Segments ..... 8-1
8.1.1 Legislative Designation of Five Unique Stream Segments ..... 8-1
8.1.2 Recognition of Potential Additional Stream Segments of Unique Ecological Value ..... 8-1
8.2 Unique Sites for Reservoir Construction ..... 8-2
8.3 Other Policy and Legislative Recommendations ..... 8-2
8.3.1 Funding Water Projects for a Growing Region ..... 8-2
8.3.2 Sponsorship and Implementation of Irrigation Strategies ..... 8-3
8.3.3 Groundwater ..... 8-3
8.3.4 Surface Water ..... 8-4
8.3.5 Conservation ..... 8-5
8.3.6 Water System Capacity ..... 8-5
8.3.7 Innovative Strategies ..... 8-6
8.3.8 Water Quality and Data Collection ..... 8-7
8.3.9 Consideration of Climate Variability in Regional Water Planning ..... 8-7

**9.0 Implementation and Comparison to the Previous Regional Water Plan ..... 9-1**
9.1 Implementation of Previous Regional Water Plan ..... 9-1
9.2 Assessment of Progress Toward Regionalization ..... 9-1
9.3 Comparison to Previous Regional Water Plan ..... 9-2
9.3.1 Water Demand Projections ..... 9-3
9.3.2 Drought of Record and Assumptions ..... 9-5
9.3.3 Source Water Availability ..... 9-9
9.3.4 Existing Water Supplies ..... 9-11
9.3.5 Identified Water Needs ..... 9-13
9.3.6 Recommended and Alternative Water Management Strategies and Water Management Strategy Projects ..... 9-15
**Appendix 9A: Implementation Survey Results ..... 9A-1**

**10.0 Public Participation and Plan Adoption ..... 10-1**
10.1 Plan Enhancement Process ..... 10-1
10.2 Interregional Coordination ..... 10-2
10.3 Public Participation ..... 10-2
10.3.1 Regional Water Planning Group Meetings ..... 10-4
10.3.2 Workgroups ..... 10-5
10.3.3 Coordination with Water User Groups and Wholesale Water Providers ..... 10-6
10.3.4 Rural Outreach ..... 10-7
10.4 Initially Prepared Plan Adoption ..... 10-13
10.4.1 Public Hearing and Meeting on the Initially Prepared Plan ..... 10-13
10.4.2 TWDB Comments on the Initially Prepared Plan ..... 10-14
10.4.3 Public and Other Agency Comments on the Initially Prepared Plan ..... 10-14
10.5 Final Regional Water Plan Adoption ..... 10-14
**Appendix 10A: Texas Water Development Board (TWDB) Comment Letter on the Initially Prepared Plan (IPP) ..... 10A-1**
**Appendix 10B: Responses to Texas Water Development Board (TWDB) Comments on the Initially Prepared Plan (IPP) ..... 10B-1**
**Appendix 10C: Responses to Public and Agency Comments on the Initially Prepared Plan (IPP) ..... 10C-1**

FINAL PLAN

# EXECUTIVE SUMMARY

## South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**Executive Summary** ..... **ES-1**
Background ..... ES-3
ES.1 Description of the South Central Texas Region ..... ES-5
ES.2 Population and Water Demands ..... ES-6
ES.3 Water Availability and Supplies ..... ES-7
ES.4 Water Needs ..... ES-9
ES.5 Water Management Strategies to Meet Needs ..... ES-10
ES.6 Impacts of the Regional Water Plan ..... ES-13
ES.7 Drought Response ..... ES-15
ES.8 Policy Recommendations and Unique Sites ..... ES-18
ES.9 Implementation and Comparison to the Previous Regional Water Plan ..... ES-19
ES.10 Public Participation and Plan Adoption ..... ES-19

## LIST OF TABLES

Table ES-1 Population Projections for the South Central Texas Region (No. of People) ..... ES-6
Table ES-2 Water Demand Projections for the South Central Texas Region (acft/yr) ..... ES-6
Table ES-3 Water Availability by Water Source Type (acft/yr) ..... ES-9
Table ES-4 Identified Water Needs by Individual Use Types for the South Central Texas Region (acft/yr) ..... ES-10
Table ES-5 Strategies Identified by the SCTRWPG to be Recommended, Alternative, or Considered ..... ES-11
Table ES-6 Summary of Unmet Needs for the South Central Texas Region (acft/yr) ..... ES-14
Table ES-7 Yields of Drought Management Strategies in the 2026 SCTRWP (acft/yr) ..... ES-15

## LIST OF FIGURES

Figure ES-1 South Central Texas (Region L) Regional Water Planning Area ..... ES-4
Figure ES-2 Regional Water Planning Process ..... ES-5
Figure ES-3 River Basins, Major Reservoirs, and Rivers in the SCTRWPA ..... ES-8
Figure ES-4 Major Aquifers in the SCTRWPA ..... ES-9
Figure ES-5 Meetings Held to Develop the 2026 SCTRWP ..... ES-20

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft/yr | Acre-Foot per Year |
| ARWA | Alliance Regional Water Authority |
| ASR | Aquifer Storage and Recovery |
| BFZ | Balcones Fault Zone |
| CRWA | Canyon Regional Water Authority |
| CVLGC | Cibolo Valley Local Government Corporation |
| DB27 | 2027 Regional and State Water Planning Database |
| DCP | Drought Contingency Plan |
| DFC | Desired Future Condition |
| DPR | Direct Potable Reuse |
| GBRA | Guadalupe-Blanco River Authority |
| GPCD | Gallons per Capita per Day |
| IBT | Interbasin Transfer |
| IH | Interstate Highway |
| IPP | Initially Prepared Plan |
| MAG | Modeled Available Groundwater |
| MWP | Major Water Provider |
| NBU | New Braunfels Utilities |
| Region J | Plateau Region |
| Region K | Lower Colorado Region |
| Region L | South Central Texas Region |
| Region M | Rio Grande Region |
| Region N | Coastal Bend Region |
| RWP | Regional Water Plan |
| RWPA | Regional Water Planning Area |
| RWPG | Regional Water Planning Group |
| SAWS | San Antonio Water System |
| SB | Senate Bill |
| SCTRWP | South Central Texas Regional Water Plan |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SSLGC | Schertz-Seguin Local Government Corporation |
| SUD | Special Utility District |
| SWP | State Water Plan |

| | |
|---|---|
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| TPWD | Texas Parks and Wildlife Department |
| TWDB | Texas Water Development Board |
| U.S. | United States |
| USFWS | U.S. Fish & Wildlife Service |
| WAM | Water Availability Model |
| WCID | Water Control and Improvement District |
| WMS | Water Management Strategy |
| WSC | Water Supply Corporation |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |
| WWTP | Wastewater Treatment Plant |

# Executive Summary

The 2026 Regional Water Planning process continues the process set forth by the 2001 Regional Water Plans (RWPs) for the State of Texas. Beginning in 2021, the 6th cycle of Regional Water Planning gathered a wide range of expertise and interests to update the long-range water supply plans for the 16 unique planning regions within the state.

Each region's Initially Prepared Plan (IPP) was submitted to the Texas Water Development Board (TWDB) on March 3, 2025. IPPs were made available to the public for review, and comments on the IPPs were received from the general public and from state and federal agencies. After the comment period, all IPPs were finalized and adopted by their respective regional water planning groups (RWPGs) and submitted to the TWDB by October 20, 2025 as the final RWPs. The TWDB then compiles information in the RWPs and develops the 2027 State Water Plan (SWP). In order to provide consistency and facilitate the compilation of the RWPs, the TWDB requires incorporation of RWP data into a standardized online database, referred to as the 2027 Regional and State Water Planning Database (DB27).

The database reports from DB27 are available at https://www3.twdb.texas.gov/apps/SARA/reports/list.

Additional instructions include the following:

1. Navigate to the TWDB Database Reports application at https://www3.twdb.texas.gov/apps/SARA/reports/list.
2. Enter "2026 Regional Water Plan" into the "Report Name" field to filter to all DB27 reports associated with the 2026 Regional Water Plans.
3. Click on the report name hyperlink to load the desired report.
4. Enter planning region letter parameter, click view report.

Reports available include the following:

1. Water User Group (WUG) Population
2. WUG Demand
3. Source Availability
4. WUG Existing Water Supply
5. WUG Identified Water Needs/Surplus
6. WUG Second-Tier Identified Water Need
7. WUG Data Comparison to 2026 RWP
8. Source Data Comparison to 2026 RWP
9. WUG Unmet Needs
10. Recommended WUG Water Management Strategies (WMSs)
11. Recommended Projects Associated with WMSs
12. Alternative WUG WMSs
13. Alternative Projects Associated with WMSs
14. WUG Management Supply Factor
15. Recommended Water Management Strategy Supply Associated With a New or Amended Interbasin Transfer (IBT) Permit

16. WUG Recommended WMS Supply Associated with a New or Amended IBT Permit and Total Recommended Conservation WMS Supply
17. Sponsored Recommended WMS Supplies Unallocated to WUGs
18. Major Water Provider (MWP) Existing Sales and Transfers
19. MWP WMS Summary

The chapters and appendices of the 2026 South Central Texas (Region L) Regional Water Plan (SCTRWP) are as follows:

**2026 SCTRWP Chapters**

| | |
|---|---|
| Chapter 1: | Description of the Regional Water Planning Area |
| Chapter 2: | Population and Water Demand Projections |
| Chapter 3: | Water Availability and Existing Water Supplies |
| Chapter 4: | Identification of Water Needs |
| Chapter 5: | Evaluation and Recommendation of Water Management Strategies |
| Chapter 6: | Impacts of the Regional Water Plan and Consistency with Protection of Resources |
| Chapter 7: | Drought Response Information, Activities, and Recommendations |
| Chapter 8: | Policy Recommendations and Unique Sites |
| Chapter 9: | Implementation and Comparison to the Previous Regional Water Plan |
| Chapter 10: | Public Participation and Plan Adoption |

**2026 SCTRWP Appendices**

| | |
|---|---|
| Appendix 2A: | Relevant Reports from the 2027 Regional and State Water Planning Database (DB27) |
| Appendix 2B: | Passive Conservation Water Savings by Decade |
| Appendix 3A: | Relevant Reports from the 2027 Regional and State Water Planning Database (DB27) |
| Appendix 3B: | Hydrologic Assumptions Requests and Approvals |
| Appendix 3C: | Technical Memorandum for the 2026 South Central Texas Regional Water Plan |
| Appendix 3D: | Permitted Surface Water Rights and Reliability Assessment |
| Appendix 4A: | Relevant Reports from the 2027 Regional and State Water Planning Database (DB27) |
| Appendix 5A: | Guiding Principles of the South Central Texas Regional Water Planning Group |
| Appendix 5B: | Water Management Strategies Considered and Evaluated to Meet Identified Needs |
| Appendix 5C: | Implementation Status of Certain Water Management Strategies |
| Appendix 5D: | Threatened and Endangered Species and Species of Greatest Conservation Need by County |
| Appendix 5E: | Miscellaneous Water Management Strategy Cost Estimate Summaries |
| Appendix 6A: | Texas Water Development Board (TWDB) Socioeconomic Impacts of Projected Water Shortages for the South Central Texas (Region L) Regional Water Planning Area |
| Appendix 7A: | Summary of Drought Response Measures |

Appendix 7B: Existing and Potential Emergency Interconnection Information

Appendix 7C: Drought Preparedness Council Letter to Region L, Dated February 8, 2024

Appendix 9A: Implementation Survey Results

Appendix 10A: Texas Water Development Board (TWDB) Comment Letter on the Initially Prepared Plan (IPP)

Appendix 10B: Responses to Texas Water Development Board (TWDB) Comments on the Initially Prepared Plan (IPP)

Appendix 10C: Responses to Public and Agency Comments on the Initially Prepared Plan (IPP)

## Background

Since 1957, the TWDB has been charged with preparing a comprehensive and flexible long-term plan for the development, conservation, and management of the state's water resources. The current SWP, *2022 State Water Plan – Water for Texas*, was produced by the TWDB based on approved RWPs, pursuant to requirements of Senate Bill (SB) 1, enacted in 1997 by the 75th Texas Legislature. As stated in SB1 Section 16.053.a, the purpose of the regional water planning effort is to:

> *"…provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of that particular region."*

SB1 also provides that future regulatory and financing decisions of the Texas Commission on Environmental Quality (TCEQ) and the TWDB, respectively, be consistent with approved RWPs and SWPs.

The TWDB divided the state into 16 regional water planning areas (RWPAs) and appointed inaugural members to the RWPGs. As shown on Figure ES-1, the South Central Texas Regional Water Planning Area (SCTRWPA) includes all or portions of 21 counties.

The South Central Texas Regional Water Planning Group (SCTRWPG) has a total of 32 voting members, representing 12 stakeholder groups or interest categories (public, counties, municipalities, industry, agriculture, environmental, small business, electric generating utilities, river authorities, water districts, water utilities, and groundwater management areas). SCTRWPG members are volunteers who are responsible for the development of the SCTRWP.

The SCTRWPG adopted bylaws and Guiding Principles to govern its operations and decision making. As described in the bylaws, the San Antonio River Authority serves as the administrative officer for the Regional Water Planning Process. The Guiding Principles (refer to Appendix 5A) serve as a touchstone for which to reference when the SCTRWPG makes decisions. The Guiding Principles also seek to reconcile competing interests at the onset of the planning process, develop a shared understanding of the approach to regional water planning, and encourage consensus-based decision making throughout the planning cycle. The Guiding Principles are further described in Chapter 10 (refer to Section 10.1).

Pursuant to regional and state water planning guidelines (Title 31 of the Texas Administrative Code [TAC] §§357 and 358), the SCTRWPG developed the 2001, 2006, 2011, 2016 and 2021 SCTRWPs, which the TWDB then integrated into the 2002, 2007, 2012, 2017 and 2022 SWPs, respectively. The 2026 SCTRWP, of which this executive summary is part, represents the 6th, 5-year Regional Water Planning cycle. The TWDB will integrate the final, adopted 2026 SCTRWP with the other 15 RWPs into the 2027 SWP.

The Regional Water Planning Process is depicted graphically in Figure ES-2, which also shows the chapters for which each major task is associated. The process begins and ends with public participation, as it is a foundational element to the Regional Water Planning Process.

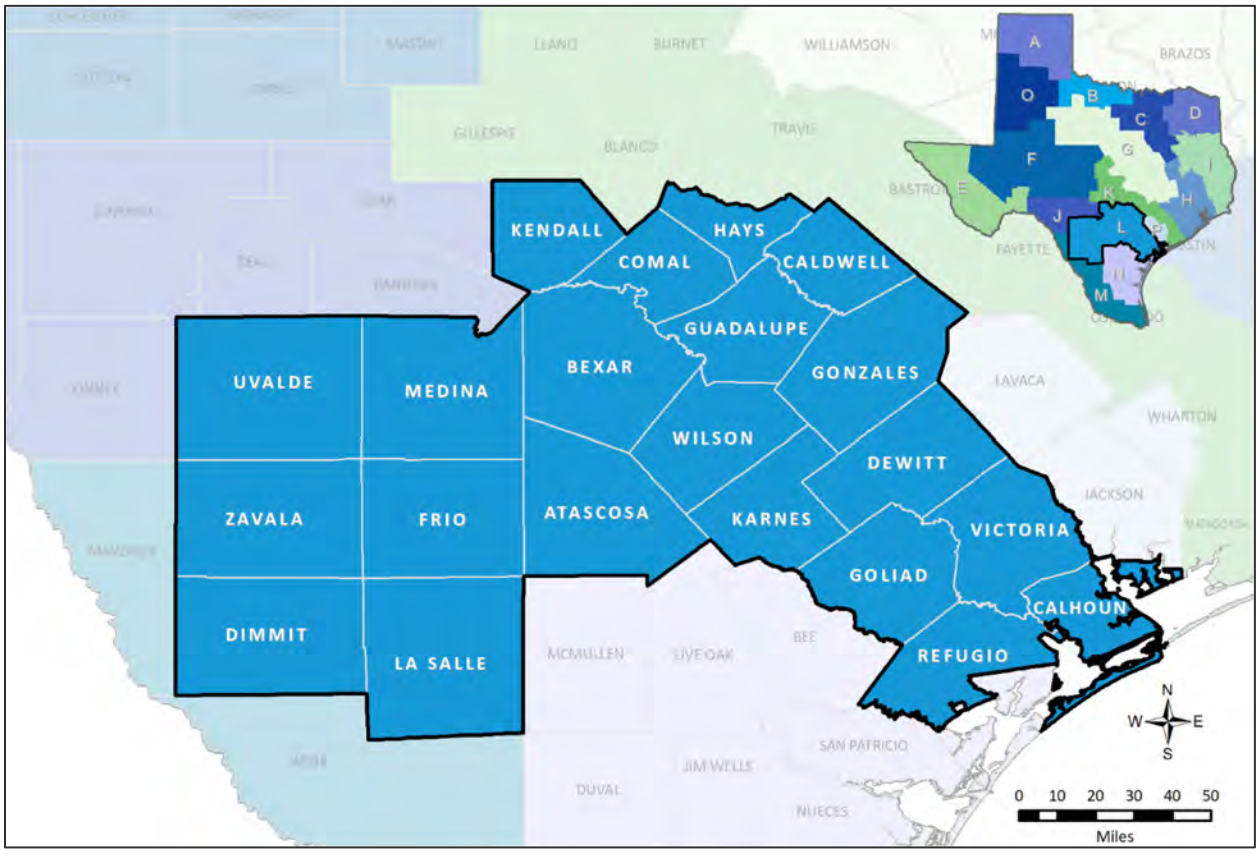



**Figure ES-1 South Central Texas (Region L) Regional Water Planning Area**

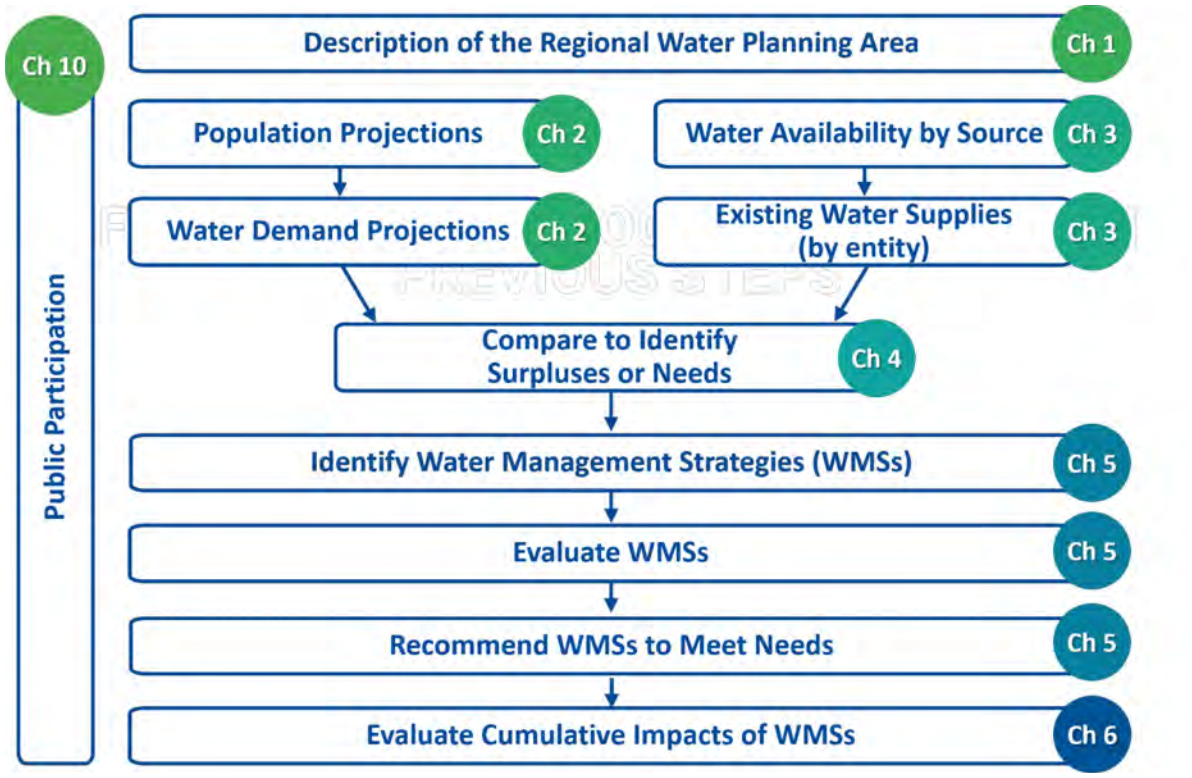



**Figure ES-2 Regional Water Planning Process**

## ES.1 Description of the South Central Texas Region

The SCTRWPA includes parts of six major river basins and three coastal basins: Rio Grande, Nueces, San Antonio, Guadalupe, Lavaca, and Lower Colorado River Basins; and Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins. In the SCTRWPA, there are four major water demand centers, including the Interstate Highway (IH)-35 corridor from San Antonio to San Marcos, the Edwards Aquifer region west of the City of San Antonio, the Winter Garden area south of the Edwards Aquifer area, and the coastal area. The IH-35 corridor includes many of the major urban population centers in the SCTRWPA, including San Antonio, New Braunfels, and San Marcos, which represent some of the fastest growing cities in Texas.

The regional economy is centered on agricultural production, livestock production, mining, manufacturing, and trades and services. Physical terrain of the region ranges from the Hill Country of the Edwards Plateau to the coastal plains. Vegetational areas include the Edwards Plateau, Southern Texas Plains, Texas Blackland Prairies, East Central Texas Plains, and the Western Gulf Coastal Plain. Many species occur within the region that are listed by the U.S. Fish & Wildlife Service (USFWS) or Texas Parks and Wildlife Department (TPWD) as threatened or endangered, or considered species of greatest conservation need. Mean annual precipitation ranges from a high of 41 inches per year in the Colorado-Lavaca River Basin in the southeastern part of the region, to a low of 23 inches per year in the Nueces River Basin in the west.

## ES.2 Population and Water Demands

To develop water plans that meet future water needs, it is necessary to first develop projections of future water demands for the region. Chapter 2 of the 2026 SCTRWP summarizes the guidelines, methodology, and results of the evaluation of population and water demand projections from 2030 to 2080 for the SCTRWPA.

The population projections in this plan were developed over the 50-year planning horizon (2030 to 2080), utilizing 2020 United States (U.S.) Census data and growth projections established by the Texas State Office of the State Demographer. These data were further refined on a county, subcounty, and water user group (WUG) basis by the TWDB in consultation with the TCEQ, Texas Department of Agriculture, and TPWD. RWPGs were provided an opportunity to review and suggest adjustments to population projections, as necessary, for municipal WUGs delineated by utility service area boundaries.

Population in the SCTRWPA is projected to increase by 93 percent (%) over the planning horizon (2030 to 2080), with the majority of growth anticipated to occur along the IH-35 corridor. Counties with the largest anticipated population growth over the planning horizon include Bexar, Comal, Guadalupe, and Hays Counties. Table ES-1 summarizes the population projections for the SCTRWPA.

**Table ES-1 Population Projections for the South Central Texas Region (No. of People)**

| Regional Projections | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Total** | 3,987,279 | 4,793,957 | 5,469,629 | 6,176,459 | 6,897,460 | 7,689,377 |

Total water demands (measured in acre-feet per year [acft/yr] [1]) in the SCTRWPA are expected to increase by 37% over the planning horizon. Water demand projections for the SCTRWPA are categorized by use type, including irrigation, livestock, manufacturing, mining, municipal, and steam-electric power. Table ES-2 summarizes water demand projections for each use type.

The municipal and manufacturing sectors are expected to increase over the planning horizon; whereas the irrigation, livestock, and steam-electric power sectors are expected to remain unchanged from 2030 to 2080. The mining sector is expected to experience a gradual increase between 2030 and 2070, then decrease significantly between 2070 and 2080.

**Table ES-2 Water Demand Projections for the South Central Texas Region (acft/yr)**

| Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation | 314,645 | 314,645 | 314,645 | 314,645 | 314,645 | 314,645 |
| Livestock | 24,641 | 24,641 | 24,641 | 24,641 | 24,641 | 24,641 |
| Manufacturing | 110,929 | 115,034 | 119,292 | 123,706 | 128,283 | 133,030 |
| Mining | 74,126 | 77,971 | 81,760 | 85,423 | 88,890 | 48,880 |

[1] One acft is approximately 325,851 gallons.

| Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Municipal | 530,751 | 616,476 | 691,969 | 773,195 | 856,949 | 956,362 |
| Steam-Electric Power | 79,879 | 79,879 | 79,879 | 79,879 | 79,879 | 79,879 |
| **Total** | **1,134,971** | **1,228,646** | **1,312,186** | **1,401,489** | **1,493,287** | **1,557,437** |

## ES.3 Water Availability and Supplies

The SCTRWPG performed an evaluation to estimate the quantity of water that could meet water demands within the SCTRWPA. The evaluation estimated availabilities and supplies for water sources within the SCTRWPA, including surface water, groundwater, and reuse. Chapter 3 reports results of the evaluation of the SCTRWPA's source water availability and existing supplies.

There are two terms used that are similar but distinct: water availability and existing water supply. Water availability refers to the maximum amount of raw water that could be produced by or at a water source during a repeat of the drought of record. Existing water supply is the maximum amount of water that is physically and legally accessible from existing sources for immediate use by a WUG or wholesale water provider (WWP) under drought of record conditions.

Surface water sources in the SCTRWPA include run-of-river, major reservoirs, and local surface water sources. As shown on Figure ES-3, the SCTRWPA includes parts of nine river and coastal basins, including the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins, and parts of the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins. Major reservoirs in the SCTRWPA include Canyon Lake, the Medina Lake System, and three cooling lakes for power generation facilities, including Calaveras Lake, Coleto Creek Reservoir, and Victor Braunig Lake. All major reservoirs within Region L are located in the Guadalupe-San Antonio River Basin.

There are five major aquifers located within the SCTRWPA (Figure ES-4), including the Edwards-Balcones Fault Zone (BFZ), Carrizo-Wilcox, Trinity, Gulf Coast, and Edwards-Trinity (Plateau) Aquifers. Other aquifers include the Sparta, Queen City, Ellenburger-San Saba, Hickory, and Yegua-Jackson Aquifers, Austin Chalk, Buda Limestone, San Marcos River Alluvium, and Leona Gravel Aquifers.

Treated effluent from wastewater treatment plants (WWTPs), called reclaimed water or reuse, is also considered as a water supply source. Table ES-3 summarizes water availabilities within the SCTRWPA by water source.

The SCTRWPG used the unmodified TCEQ water availability model (WAM) Run 3 and an alternative surface water model, the "Region L WAM" to assess surface water availabilities in the SCTRWPA. The Region L WAM was used to estimate surface water availabilities for certain reservoirs, including Canyon Reservoir, Victor Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir. The unmodified WAM Run 3 was used to evaluate firm yields for all other reservoirs in the SCTRWPA. Local surface water availabilities, or livestock local supplies, were estimated in the 2026 SCTRWP using the most current data. Livestock water demand is generally assumed to be met 50% by quantified groundwater and 50% by local surface water and unquantified sources like stock tanks, streams, and windmills, an assumption

supported by TWDB historic use data showing a regional average of 60% groundwater use from 2011 to 2021.

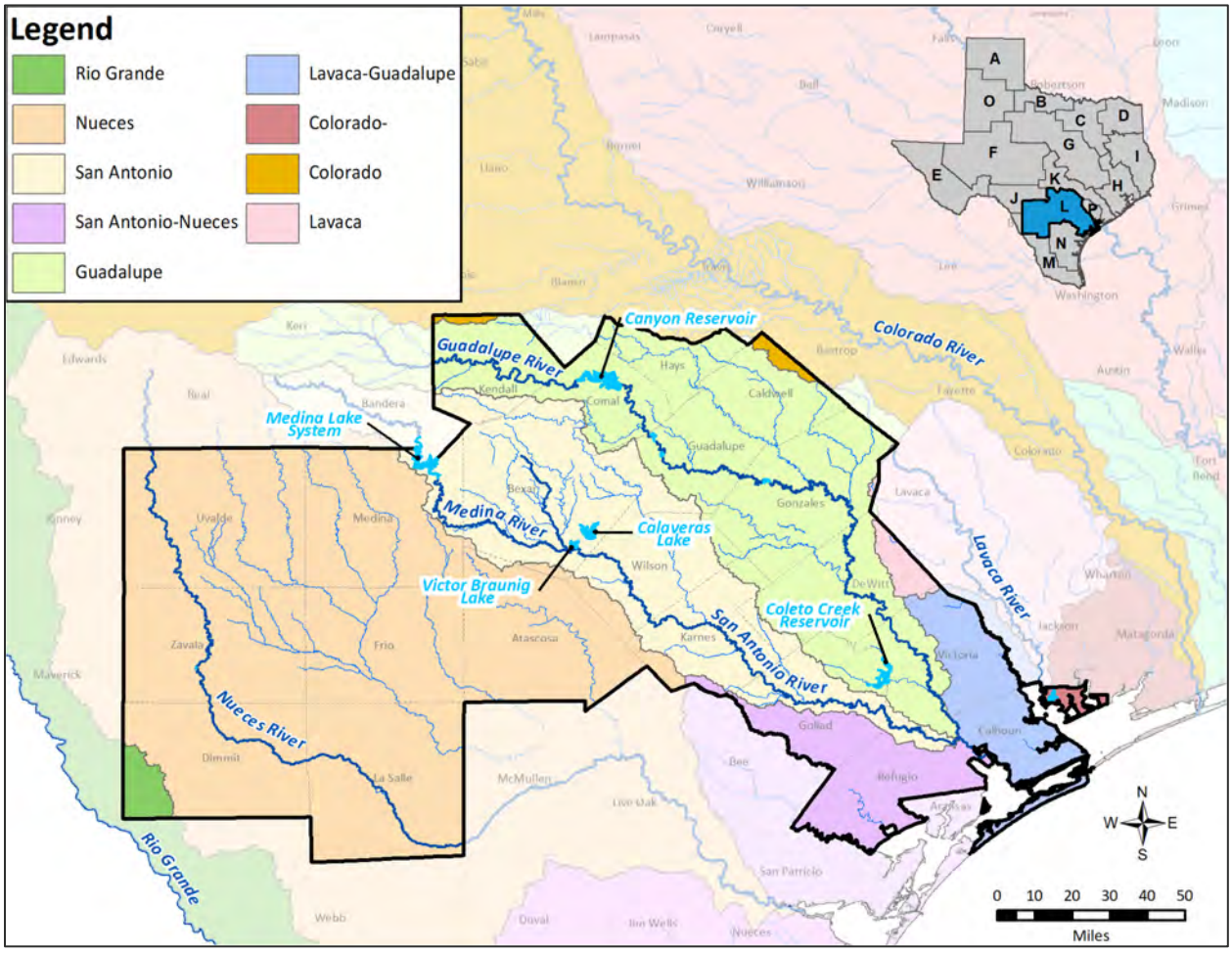



**Figure ES-3 River Basins, Major Reservoirs, and Rivers in the SCTRWPA**

Groundwater availabilities were determined using modeled available groundwater (MAG) estimates provided by the TWDB, desired future condition (DFC) compatible estimates provided by the TWDB, or RWPG estimates developed by the SCTRWPG.

The SCTRWPG determined reuse/recycled water availability based on the estimated amount of water returned to a utility's WWTP for each decade, less the amount of reuse water already being utilized as existing supply. Please note that the reuse availabilities are for existing water sources; they do not reflect availabilities for future sources of supply, such as availabilities that would enable a WUG to implement a reuse WMS.

For additional information regarding the determination of available water supplies, refer to Chapter 3. Existing water supplies for WUGs are provided in DB27 reports included in Appendix 3A.

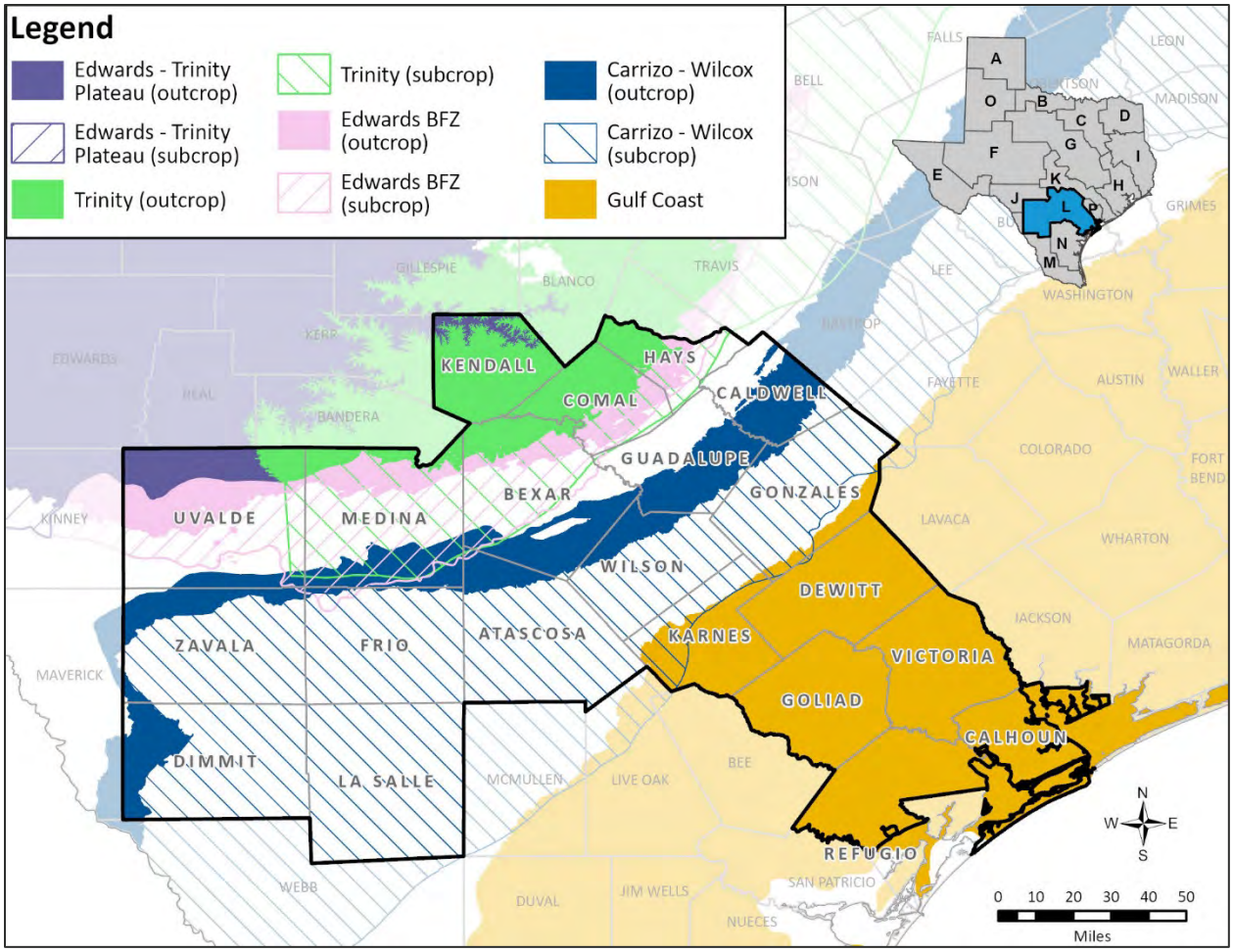



**Figure ES-4 Major Aquifers in the SCTRWPA**

**Table ES-3 Water Availability by Water Source Type (acft/yr)**

| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Run-of-River | 86,465 | 86,465 | 86,465 | 86,465 | 86,465 | 86,465 |
| Reservoirs | 164,064 | 163,918 | 163,774 | 163,630 | 163,251 | 162,846 |
| Local Surface Water | 11,118 | 11,118 | 11,118 | 11,118 | 11,118 | 11,118 |
| Groundwater | 1,224,662 | 1,245,107 | 1,291,601 | 1,329,171 | 1,352,029 | 1,343,597 |
| Reuse | 142,359 | 166,581 | 166,581 | 166,581 | 166,581 | 166,581 |
| **Total** | **1,628,668** | **1,673,189** | **1,719,539** | **1,756,965** | **1,779,444** | **1,770,607** |

## ES.4 Water Needs

Chapter 4 describes the evaluation and results of the identified water needs (shortages) analysis and secondary water needs analysis for WUGs. Table ES-4 includes a summary of water shortages/needs for the SCTRWPA.

**Table ES-4 Identified Water Needs by Individual Use Types for the South Central Texas Region (acft/yr)**

| Need Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation | 71,258 | 71,187 | 71,793 | 71,862 | 71,927 | 71,979 |
| Livestock | 12 | 12 | 12 | 12 | 12 | 12 |
| Manufacturing | 39,765 | 41,606 | 45,440 | 49,562 | 53,838 | 58,272 |
| Mining | 34,771 | 37,867 | 40,936 | 43,930 | 46,782 | 20,956 |
| Municipal | 38,660 | 69,433 | 111,065 | 184,152 | 264,266 | 361,827 |
| Steam-Electric Power | 666 | 666 | 666 | 666 | 666 | 666 |
| **Identified Water Needs Total** | **185,132** | **220,771** | **269,912** | **350,184** | **437,491** | **513,712** |

In all decades, municipal and irrigation needs comprise the majority of identified water needs in the SCTRWPA. In 2030 and 2040, irrigation has the highest needs of the use types; however, by 2050, municipal needs are expected to overtake irrigation and increase through the end of the planning horizon. The manufacturing needs are expected to increase gradually over the planning horizon. The livestock sector is anticipated to have minimal needs of 12 acft/yr, localized to Hays County. The mining sector is expected to experience a gradual increase in needs between 2030 and 2070 before declining sharply in 2080. Steam-electric power needs are expected to remain constant over the planning horizon.

The SCTRWPA has a projected total annual water need of 185,132 acft/yr in 2030, increasing to 513,712 acft/yr in 2080. All counties within the SCTRWPA, except DeWitt and Refugio Counties, have identified needs in at least one decade during the 50-year planning horizon.

The SCTRWPG evaluates various WMSs to meet identified water needs. These strategies are discussed in Chapter 5. After applying all recommended conservation and direct reuse WMSs, the secondary water needs are 172,427 acft/yr in 2030 and 298,169 acft/yr in 2080. For additional information regarding the determination of identified water needs, refer to Chapter 4.

## ES.5 Water Management Strategies to Meet Needs

Chapter 5 of the 2026 SCTRWP provides information on the identification and evaluation of WMSs. A WMS is a plan to meet an identified need for additional water by an entity, which can mean increasing the total water supply or maximizing an existing supply, including through reducing demands.

Chapter 5 is organized into three subchapters, summarized as follows:

- **Subchapter 5.1: Potentially Feasible Water Management Strategies.** Describes the process to identify potentially feasible WMSs, which strategies were identified as potentially feasible, which strategies were Recommended, and the implementation status of certain Recommended WMSs.
- **Subchapter 5.2: Water Management Strategy Evaluations.** Summarizes methodology and results of WMS evaluations for the 2026 SCTRWP, including a quantitative reporting for each

WMS of the net quantity of water, reliability, financial costs, effects on environmental factors and agricultural resources.

- **Subchapter 5.3: Water Conservation Information and Recommendations.** Consolidates and presents conservation-related recommendations.

Subchapter 5.1 provides information regarding how the RWPG considered and approved a process to identify potentially feasible WMSs. The SCTRWPG approved this process at a regular meeting on November 2, 2023. Using the documented process, the SCTRWPG identified potentially feasible WMSs for inclusion in the 2026 SCTRWP.

Each of the potentially feasible WMSs were evaluated by the SCTRWPG and considered for inclusion in the SCTRWP. Table ES-5 provides a summary of the potentially feasible WMSs and identifies which strategies were identified by the SCTRWPG as Recommended, Alternative, or Considered but not Recommended. WMS evaluations are described in Subchapter 5.2. The total volume of recommended and alternative strategies in the 2026 Plan for the final decade of the planning horizon (2080) is 894,127 acft/yr and 25,000 acft/yr, respectively.

**Table ES-5 Strategies Identified by the SCTRWPG to be Recommended, Alternative, or Considered**

| Water Management Strategies | Designation by the SCTRWPG | Strategy Evaluation Reference in the 2026 SCTRWP |
|---|---|---|
| Municipal Water Conservation | Recommended | 5.2.1 |
| Non-Municipal Water Conservation | Recommended | 5.2.2 |
| Drought Management | Recommended | 5.2.3 |
| Edwards Transfers | Recommended | 5.2.4 |
| Fresh Groundwater Development | Recommended | 5.2.5 |
| Brackish Groundwater Development | Recommended | 5.2.6 |
| Groundwater Conversions | Considered but not Recommended | 5.2.7 |
| Facilities Expansion | Recommended | 5.2.8 |
| Reuse Water | Recommended & Alternative [1] | 5.2.9 |
| Brush Management | Considered but not Recommended | 5.2.10 |
| Rainwater Harvesting | Recommended | 5.2.11 |
| Surface Water Rights | Considered but not Recommended | 5.2.12 |
| Balancing Storage | Considered but not Recommended | 5.2.13 |
| Alliance Regional Water Authority (ARWA) Carrizo-Wilcox Project (Phase 2) | Recommended | 5.2.14 |
| ARWA Direct Potable Reuse (DPR) Project (Phase 3) | Recommended | 5.2.15 |

| Water Management Strategies | Designation by the SCTRWPG | Strategy Evaluation Reference in the 2026 SCTRWP |
|---|---|---|
| Canyon Regional Water Authority (CRWA) Expanded Brackish Carrizo-Wilcox Project | Recommended | 5.2.16 |
| CRWA Siesta Project | Recommended | 5.2.17 |
| CRWA Wells Ranch (Phase 3) Project | Recommended | 5.2.18 |
| Cibolo Valley Local Government Corporation (CVLGC) Carrizo Project | Recommended | 5.2.19 |
| Guadalupe-Blanco River Authority (GBRA) Lower Basin New Appropriation | Recommended | 5.2.20 |
| GBRA WaterSECURE | Recommended | 5.2.21 |
| Medina County Regional Aquifer Storage and Recovery (ASR) Project | Recommended | 5.2.22 |
| New Braunfels Utilities (NBU) ASR Project | Recommended | 5.2.23 |
| NBU Trinity Well Field Expansion | Recommended | 5.2.24 |
| San Antonio Water System (SAWS) Expanded Local Carrizo Project | Recommended | 5.2.25 |
| SAWS Expanded Brackish Groundwater Project | Recommended | 5.2.26 |
| SAWS Regional Wilcox Project | Recommended | 5.2.27 |
| Schertz-Seguin Local Government Corporation (SSLGC) Expanded Brackish Wilcox Project | Recommended | 5.2.28 |
| SSLGC Expanded Carrizo Project | Recommended | 5.2.29 |
| Victoria ASR Project | Recommended | 5.2.30 |
| Victoria Groundwater-Surface Water Exchange | Recommended | 5.2.31 |
| Weather Modification | Recommended | 5.2.32 |

[1] The SCTRWPG considered and evaluated multiple projects under the Reuse Water WMS. At the request of SAWS, the SCTRWPG designated the Reuse Water – SAWS DPR Project as an Alternative Strategy; the remaining Reuse Water projects were designated as Recommended WMSs. .

Subchapter 5.3 is a consolidated resource that presents conservation recommendations, including per capita water use Goals, Recommended Water Conservation WMSs in the SCTRWP, Model Water Conservation Plans, and considerations of applicable best management practices appropriate for the SCTRWPA. The SCTRWPG strongly supports water conservation and generally recommends water conservation for all WUGs in every use category. For the 2026 SCTRWP, the SCTRWPG identified the Municipal Water Conservation WMS (refer to Section 5.2.1) and Non-Municipal Water Conservation WMS (refer to Section 5.2.2) as Recommended WMSs.

A key parameter of municipal water use within a typical city or water service area is the number of gallons used per person per day (per capita water use), measured as gallons per capita per day (GPCD). Per capita water use goals are recommended and described in the Municipal Water Conservation WMS in Section 5.2.1 of the 2026 SCTRWP. Goals are recommended for each planning decade and are based

on a WUG's projected 2030 per capita water use. The SCTRWPG established the following Municipal Water Conservation goals for the 2026 RWP:

- For municipal WUGs having year 2030 water use of 140 GPCD or greater, the goal is to reduce per capita water use by 10% per decade until 140 GPCD is reached; after which, the goal is to reduce per capita water use by 2.5% per decade for the remainder of the planning period;
- For municipal WUGs having year 2030 water use between 80 GPCD and 139 GPCD, the goal is to reduce per capita water use by 2.5% per decade for the remainder of the planning period or until 80 GPCD is reached; and
- For municipal WUGs having year 2030 water use less than 80 GPCD, the goal is to maintain per capita water use at or below 80 GPCD throughout the planning horizon.

Section 5.2.1 of the 2026 SCTRWP includes a table of GPCD goals by WUG for each decade of the planning horizon.

## ES.6 Impacts of the Regional Water Plan

Chapter 6 describes the impacts of the 2026 SCTRWP and how the 2026 SCTRWP is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. The chapter also includes a Cumulative Effects Analysis to assess the impact of the regional water plan on designated unique river or stream segments.

The cumulative effects of implementing the recommended WMSs described in the 2026 SCTRWP are quantified through long-term simulation of natural hydrologic processes including groundwater flow, precipitation, streamflow, aquifer recharge, springflow, and evaporation because they are affected by human influences such as aquifer pumpage, reservoirs, and diversions. Implementation of the 2026 SCTRWP is not expected to have an effect on the Nueces, Frio, and Sabinal River segments designated as having unique ecological value, as no WMSs are recommended within or upstream of these segments. Implementation of the 2026 SCTRWP, including full implementation of the Edwards Aquifer Habitat Conservation Plan, is expected to increase long-term average spring discharges, which should serve to preserve or enhance the unique ecological value of the designated Comal River and San Marcos River segments.

Chapter 6 also presents a description of unmet needs and the socioeconomic impacts of not meeting those needs. An unmet need is the portion of an identified water need that is not met by recommended WMSs. The 2026 SCTRWP includes unmet needs for the irrigation, manufacturing, mining, municipal, and steam-electric power use sectors. For the 2026 SCTRWP, there are four municipal WUGs with unmet needs, including Boerne and County-Other WUGs in Comal, Guadalupe, and Hays Counties. Table ES-6 summarizes the needs that remain unmet in the 2026 SCTRWP after implementation of Recommended WMSs. A TWDB report presenting the socioeconomic impacts of not meeting needs is included in Appendix 6A.

**Table ES-6 Summary of Unmet Needs for the South Central Texas Region (acft/yr)**

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Boerne | Kendall | 0 | 0 | 0 | 44 | 1,803 | 4,014 |
| 2 | County-Other, Comal | Comal | 0 | 0 | 0 | 5,034 | 8,048 | 11,677 |
| 3 | County-Other, Guadalupe | Guadalupe | 0 | 0 | 0 | 107 | 259 | 426 |
| 4 | County-Other, Hays | Hays | 0 | 0 | 0 | 854 | 5,120 | 11,918 |
| 5 | Irrigation, Calhoun | Calhoun | 9,025 | 8,946 | 8,867 | 8,787 | 8,716 | 8,643 |
| 6 | Irrigation, Dimmit | Dimmit | 4,251 | 4,200 | 4,148 | 4,096 | 4,052 | 4,009 |
| 7 | Irrigation, Goliad | Goliad | 136 | 0 | 0 | 0 | 0 | 0 |
| 8 | Irrigation, Guadalupe | Guadalupe | 6 | 0 | 0 | 0 | 0 | 0 |
| 9 | Irrigation, La Salle | La Salle | 331 | 279 | 229 | 176 | 134 | 91 |
| 10 | Irrigation, Medina | Medina | 19,527 | 18,945 | 18,384 | 16,686 | 15,279 | 13,858 |
| 11 | Irrigation, Uvalde | Uvalde | 15,526 | 14,845 | 11,063 | 10,382 | 9,822 | 9,261 |
| 12 | Irrigation, Victoria | Victoria | 179 | 167 | 155 | 143 | 133 | 122 |
| 13 | Irrigation, Zavala | Zavala | 13,422 | 12,954 | 12,485 | 12,016 | 11,618 | 11,222 |
| 14 | Manufacturing, Bexar | Bexar | 16 | 338 | 673 | 1,020 | 1,381 | 1,755 |
| 15 | Manufacturing, Caldwell | Caldwell | 9 | 0 | 0 | 0 | 0 | 0 |
| 16 | Manufacturing, Calhoun | Calhoun | 0 | 28 | 1,981 | 4,153 | 6,405 | 8,741 |
| 17 | Manufacturing, Kendall | Kendall | 43 | 45 | 47 | 49 | 51 | 53 |
| 18 | Manufacturing, Victoria | Victoria | 38,960 | 40,419 | 41,932 | 43,501 | 45,128 | 46,815 |
| 19 | Manufacturing, Wilson | Wilson | 5 | 7 | 9 | 11 | 14 | 17 |
| 20 | Manufacturing, Zavala | Zavala | 732 | 759 | 787 | 816 | 846 | 877 |
| 21 | Mining, Atascosa | Atascosa | 3,300 | 3,613 | 3,919 | 4,208 | 4,478 | 0 |
| 22 | Mining, Comal | Comal | 2,967 | 5,084 | 7,218 | 9,340 | 11,386 | 13,268 |
| 23 | Mining, Dimmit | Dimmit | 5,451 | 5,451 | 5,451 | 5,451 | 5,451 | 0 |
| 24 | Mining, Frio | Frio | 4,034 | 4,035 | 4,035 | 4,036 | 4,036 | 0 |
| 25 | Mining, Gonzales | Gonzales | 3,631 | 3,664 | 3,702 | 3,740 | 3,779 | 0 |
| 26 | Mining, Guadalupe | Guadalupe | 428 | 428 | 428 | 428 | 428 | 0 |
| 27 | Mining, Karnes | Karnes | 1,440 | 1,440 | 1,440 | 1,440 | 1,440 | 0 |
| 28 | Mining, La Salle | La Salle | 4,867 | 4,867 | 4,867 | 4,867 | 4,867 | 0 |
| 29 | Mining, Medina | Medina | 3,042 | 3,436 | 3,783 | 4,098 | 4,375 | 4,604 |
| 30 | Mining, Uvalde | Uvalde | 209 | 428 | 655 | 871 | 1,079 | 1,276 |
| 31 | Mining, Victoria | Victoria | 338 | 357 | 374 | 387 | 399 | 408 |
| 32 | Mining, Zavala | Zavala | 3,664 | 3,664 | 3,664 | 3,664 | 3,664 | 0 |
| 33 | Steam Electric Power, Victoria | Victoria | 666 | 666 | 666 | 666 | 666 | 666 |
| **All** | **Total** | **All** | **136,205** | **139,065** | **140,962** | **151,071** | **164,857** | **153,721** |

## ES.7 Drought Response

Drought preparations and response are described in detail in Chapter 7. Droughts are of great importance to the planning and management of water resources in Texas. Chapter 7 presents all necessary requirements for drought management and contingency plans, as well as a summary of information provided by water systems in the SCTRWPA regarding drought, including preparations and response throughout the Region.

In terms of severity and duration, the devastating drought of the 1950s is considered the drought of record for most of the state, including portions of the SCTRWPA. By 1956, 244 of the 254 counties were considered disaster areas. This drought lasted almost a decade in many places and affected not only Texas but other states throughout the nation as well. The 1950s drought has been used by water resource engineers and managers as a benchmark drought for water supply planning since the regional water planning process was implemented. The drought of the 1950s remains the drought of record for the Guadalupe-San Antonio River Basin. For the Nueces River Basin within the SCTRWPA, the 1990s drought was severe and prolonged enough that it is now considered the drought of record.

The 2026 SCTRWP includes drought management WMSs for municipal, irrigation, and livestock uses (refer to Section 5.2.3). Drought Management yields in acft/yr are summarized in Table ES-7.

**Table ES-7 Yields of Drought Management Strategies in the 2026 SCTRWP (acft/yr)**

| No | Water User Group | Drought Management Strategy Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Air Force Village II Inc | Municipal | 8 | 8 | 8 | 8 | 8 | 8 |
| 2 | Alamo Heights | Municipal | 88 | 88 | 88 | 88 | 88 | 88 |
| 3 | Aqua Water Supply Corporation (WSC) [1] | Municipal | 10 | 11 | 13 | 14 | 16 | 18 |
| 4 | Atascosa Rural WSC | Municipal | 100 | 117 | 132 | 145 | 159 | 176 |
| 5 | Benton City WSC | Municipal | 158 | 176 | 192 | 202 | 213 | 225 |
| 6 | Bexar County Water Control and Improvement District (WCID) 10 | Municipal | 71 | 80 | 88 | 95 | 103 | 113 |
| 7 | Boerne | Municipal | 213 | 293 | 396 | 516 | 653 | 810 |
| 8 | C Willow Water | Municipal | 7 | 8 | 8 | 9 | 10 | 11 |
| 9 | Canyon Lake Water Service (Texas Water Company) [1] | Municipal | 827 | 1,131 | 1,323 | 1,448 | 1,916 | 2,432 |
| 10 | Carrizo Hill WSC | Municipal | 3 | 4 | 4 | 5 | 6 | 9 |
| 11 | Castroville | Municipal | 59 | 64 | 71 | 82 | 92 | 99 |
| 12 | Cibolo | Municipal | 207 | 252 | 301 | 353 | 413 | 482 |

| No | Water User Group | Drought Management Strategy Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 13 | Clear Water Estates Water System (Texas Water Company) | Municipal | 8 | 11 | 15 | 21 | 27 | 34 |
| 14 | Converse | Municipal | 284 | 285 | 285 | 285 | 285 | 285 |
| 15 | County Line Special Utility District (SUD) | Municipal | 314 | 628 | 1,004 | 1,297 | 1,464 | 1,556 |
| 16 | Creedmoor-Maha WSC [1] | Municipal | 112 | 202 | 292 | 381 | 472 | 563 |
| 17 | Crystal Clear SUD | Municipal | 531 | 893 | 1,008 | 1,136 | 1,285 | 1,456 |
| 18 | Cuero | Municipal | 76 | 76 | 76 | 75 | 75 | 75 |
| 19 | East Central SUD | Municipal | 472 | 535 | 592 | 644 | 702 | 767 |
| 20 | East Medina County SUD | Municipal | 84 | 90 | 94 | 97 | 100 | 103 |
| 21 | El Oso WSC [1] | Municipal | 61 | 64 | 66 | 68 | 71 | 75 |
| 22 | Elmendorf | Municipal | 28 | 38 | 51 | 68 | 85 | 117 |
| 23 | Fair Oaks Ranch | Municipal | 74 | 88 | 95 | 98 | 99 | 99 |
| 24 | Fayette WSC [1] | Municipal | 0 | 0 | 1 | 1 | 1 | 1 |
| 25 | Fort Sam Houston | Municipal | 47 | 47 | 47 | 47 | 47 | 47 |
| 26 | Garden Ridge | Municipal | 211 | 261 | 311 | 368 | 436 | 517 |
| 27 | Goforth SUD [1] | Municipal | 359 | 569 | 845 | 1,218 | 1,646 | 2,135 |
| 28 | Gonzales | Municipal | 48 | 48 | 47 | 47 | 46 | 46 |
| 29 | Green Valley SUD | Municipal | 380 | 508 | 652 | 805 | 980 | 1,179 |
| 30 | Guadalupe-Blanco River Authority | Municipal | 91 | 127 | 123 | 119 | 115 | 110 |
| 31 | Hondo | Municipal | 59 | 57 | 55 | 56 | 56 | 56 |
| 32 | Karnes City | Municipal | 17 | 18 | 19 | 20 | 21 | 22 |
| 33 | Kendall West Utility | Municipal | 18 | 23 | 29 | 36 | 45 | 54 |
| 34 | Kirby | Municipal | 63 | 71 | 72 | 72 | 72 | 72 |
| 35 | KT Water Development | Municipal | 19 | 29 | 43 | 60 | 80 | 102 |
| 36 | Kyle | Municipal | 542 | 809 | 1,102 | 1,235 | 1,279 | 1,312 |
| 37 | La Coste | Municipal | 11 | 11 | 11 | 11 | 11 | 12 |
| 38 | Leon Valley | Municipal | 142 | 172 | 172 | 172 | 172 | 172 |
| 39 | Live Oak | Municipal | 85 | 85 | 85 | 85 | 85 | 85 |
| 40 | Lockhart | Municipal | 141 | 153 | 166 | 179 | 192 | 205 |
| 41 | Luling | Municipal | 38 | 38 | 39 | 41 | 42 | 44 |
| 42 | Lytle | Municipal | 25 | 26 | 28 | 29 | 31 | 33 |

| No | Water User Group | Drought Management Strategy Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 43 | Martindale WSC | Municipal | 33 | 44 | 49 | 54 | 60 | 66 |
| 44 | Maxwell SUD | Municipal | 197 | 265 | 356 | 479 | 644 | 711 |
| 45 | McCoy WSC [1] | Municipal | 73 | 77 | 81 | 85 | 90 | 96 |
| 46 | Natalia | Municipal | 11 | 11 | 11 | 12 | 12 | 11 |
| 47 | New Braunfels | Municipal | 1,529 | 2,177 | 3,004 | 4,010 | 5,161 | 12,958 |
| 48 | Oak Hills WSC | Municipal | 78 | 91 | 105 | 121 | 140 | 162 |
| 49 | Pearsall | Municipal | 74 | 85 | 92 | 93 | 95 | 96 |
| 50 | Picosa WSC | Municipal | 23 | 27 | 30 | 34 | 37 | 41 |
| 51 | Pleasanton | Municipal | 111 | 121 | 132 | 144 | 157 | 171 |
| 52 | Port Lavaca | Municipal | 79 | 76 | 72 | 68 | 64 | 60 |
| 53 | Runge | Municipal | 11 | 11 | 12 | 13 | 14 | 14 |
| 54 | S S WSC | Municipal | 165 | 191 | 216 | 238 | 264 | 294 |
| 55 | San Antonio Water System | Municipal | 26,865 | 29,834 | 31,670 | 33,099 | 34,211 | 35,879 |
| 56 | San Marcos | Municipal | 1,168 | 1,646 | 2,028 | 2,309 | 2,491 | 2,608 |
| 57 | Schertz | Municipal | 574 | 699 | 830 | 960 | 1,111 | 1,283 |
| 58 | Seguin | Municipal | 537 | 633 | 679 | 706 | 734 | 763 |
| 59 | Selma | Municipal | 108 | 131 | 153 | 173 | 197 | 224 |
| 60 | Shavano Park | Municipal | 73 | 83 | 91 | 99 | 108 | 118 |
| 61 | South Buda WCID 1 | Municipal | 47 | 77 | 116 | 168 | 229 | 298 |
| 62 | Springs Hill WSC | Municipal | 443 | 525 | 617 | 713 | 822 | 1,418 |
| 63 | Texas State University | Municipal | 42 | 42 | 42 | 42 | 42 | 42 |
| 64 | The Oaks WSC | Municipal | 15 | 17 | 19 | 20 | 22 | 24 |
| 65 | Universal City | Municipal | 184 | 194 | 197 | 198 | 199 | 199 |
| 66 | Uvalde | Municipal | 135 | 133 | 129 | 125 | 121 | 116 |
| 67 | Victoria | Municipal | 670 | 680 | 683 | 680 | 676 | 672 |
| 68 | Victoria County WCID 1 | Municipal | 11 | 11 | 12 | 12 | 12 | 12 |
| 69 | Ville Dalsace Water Supply | Municipal | 3 | 4 | 4 | 4 | 4 | 4 |
| 70 | Water Services | Municipal | 80 | 86 | 91 | 96 | 101 | 108 |
| 71 | Wimberley WSC | Municipal | 44 | 64 | 91 | 126 | 167 | 214 |
| 72 | Wingert Water Systems | Municipal | 14 | 16 | 18 | 19 | 19 | 19 |
| 73 | Yancey WSC | Municipal | 54 | 57 | 59 | 61 | 63 | 65 |

| No | Water User Group | Drought Management Strategy Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 74 | Irrigation, Caldwell | Irrigation | 34 | 34 | 34 | 34 | 34 | 34 |
| 75 | Irrigation, Calhoun | Irrigation | 1,046 | 1,046 | 1,046 | 1,046 | 1,046 | 1,046 |
| 76 | Irrigation, Dimmit | Irrigation | 189 | 189 | 189 | 189 | 189 | 189 |
| 77 | Irrigation, Goliad | Irrigation | 313 | 313 | 313 | 313 | 313 | 313 |
| 78 | Irrigation, Guadalupe | Irrigation | 28 | 28 | 28 | 28 | 28 | 28 |
| 79 | Irrigation, Karnes | Irrigation | 82 | 82 | 82 | 82 | 82 | 82 |
| 80 | Irrigation, La Salle | Irrigation | 394 | 394 | 394 | 394 | 394 | 394 |
| 81 | Irrigation, Victoria | Irrigation | 1,109 | 1,109 | 1,109 | 1,109 | 1,109 | 1,109 |
| 82 | Irrigation, Wilson | Irrigation | 1,223 | 1,223 | 1,223 | 1,223 | 1,223 | 1,223 |
| 83 | Irrigation, Zavala | Irrigation | 4,257 | 4,257 | 4,257 | 4,257 | 4,257 | 4,257 |
| 84 | Livestock, Hays | Livestock | 12 | 12 | 12 | 12 | 12 | 12 |
| **All** | **Total** | **All** | **48,229** | **54,989** | **60,425** | **65,384** | **70,453** | **83,238** |

[1] WUGs are split between Region L and other regions. Values in the table represent Region L portion of WUG's yield.

Drought contingency plans (DCPs) are required for certain entities. These documents have become integral to providing a reliable supply of water throughout the State. Drought management measures, represented by the drought triggers and responses in DCPs, are summarized for Region L entities in Appendix 7A.

## ES.8 Policy Recommendations and Unique Sites

Chapter 8 of the 2026 SCTRWP includes recommendations for designation of ecologically unique river and stream segments, unique sites for reservoir construction, and other policy and legislative recommendations that the SCTRWPG believes are needed and desirable to achieve the stated goals of state and regional water planning.

The 2026 SCTRWP does not propose any new river or stream segments for designation as having unique ecological value. However, it recommends that the Texas Legislature provide adequate funding to the TCEQ to support water quality monitoring in the five stream segments within the SCTRWPA that have already been designated as having unique ecological value. The SCTRWPG recommends the Texas Legislature adequately fund the TCEQ and other entities in monitoring the water quality of the five river and stream segments designated as being of unique ecological value. Additionally, the SCTRWPG recommends increased TWDB funding to be allocated for future planning cycles to conduct analyses necessary for designation of additional stream segments as segments of unique ecological value. The SCTRWPG makes no recommendations regarding unique sites for reservoir construction.

Chapter 8 outlines additional recommendations addressing the following topics:

- Funding water projects for a growing region;
- Sponsorship and implementation of irrigation strategies;
- Groundwater;
- Surface water;
- Conservation;
- Water system capacity;
- Innovative strategies;
- Water quality and data collection; and
- Consideration of climate variability in regional water planning.

## ES.9 Implementation and Comparison to the Previous Regional Water Plan

Chapter 9 documents the level of implementation of previously recommended WMSs, provides an assessment of progress toward achieving economies of scale, and summarizes the differences between 2026 SCTRWP and the 2021 SCTRWP.

To evaluate the level of implementation of the 2021 SCTRWP, the SCTRWPG distributed a survey to WUGs and WWPs that had WMSs and/or WMSPs included in the 2021 SCTRWP. The SCTRWPG received survey responses regarding 43 of these WMSs or WMSPs. In terms of progress toward regionalization, the prevailing approach for entities within the SCTRWPA is coordination and collaboration. Based on the array of collaborative projects and partnerships, the SCTRWPA has been successful in encouraging cooperation among WUGs for the purpose of achieving economies of scale or otherwise incentivizing WMSs that benefit the entire SCTRWPA. The SCTRWPG remains committed to encouraging and fostering continued cooperation among WUGs and consistently seeks opportunities to enhance regional and statewide benefits through economies of scale.

## ES.10 Public Participation and Plan Adoption

Public participation was integral to all phases of development of the 2026 SCTRWP. The SCTRWPG met all requirements under the Texas Open Meetings Act and Public Information Act in accordance with 31 TAC §§357.12, 357.21, and 357.50(f).

To develop the 2026 SCTRWP, the SCTRWPG held 65 public meetings between 2021 and 2025 ().  These meetings included quarterly RWPG meetings and workgroup meetings. Beginning in February 2021 until the Final Plan was adopted in October 2025, the SCTRWPG held 20 RWPG meetings. The meetings convened all members of the SCTRWPG to consider and act on items to develop the 2026 SCTRWP.




**Figure ES-5 Meetings Held to Develop the 2026 SCTRWP**

Similar to previous cycles, the SCTRWPG established workgroups that focused on issues of particular importance or concern within the SCTRWPA. For the 6th cycle of planning, the SCTRWPG established six workgroups, including the Groundwater Availabilities Workgroup, Modeling and Reuse Workgroup, Policy and Legislative Recommendations Workgroup, Population and Water Demands Workgroup, Rural Communities Outreach Workgroup, and the Staff Workgroup.

The Staff Workgroup comprises the SCTRWPG Executive Committee, representatives of the plan administrator, the TWDB, water suppliers, the technical consultant team, and any other person or entity wishing to attend. Meetings are convened at least one week in advance of each SCTRWPG meeting.

The SCTRWPA is bordered by five adjacent planning areas, including: Plateau (Region J), Lower Colorado (Region K), Rio Grande (Region M), Coastal Bend (Region N), and Lavaca (Region P). To the extent necessary, coordination with each of these regions was accomplished through chair correspondence, RWPG liaisons, and/or technical consultant collaboration. Subjects of coordination, correspondence, or collaboration included projected demands, confirmation of WUG allocations among regions, and specific WMSs of interest. The SCTRWPG is aware of no interregional conflicts involving recommended WMSs included in the 2026 SCTRWP.

The technical consultant met and/or corresponded with representatives of WWPs and WUGs throughout the development of the 2026 SCTRWP. All WWPs and WUGs were afforded opportunities to provide information and feedback regarding preferred contact information, population projections, water demand projections, existing supplies, DCPs, emergency interconnections, WMSs, and implementation status of WMSs. Most of the outreach activities were facilitated through emailed surveys, supplemented with direct emails, phone calls, meetings, and other methods.

All SCTRWPG meetings were preceded by required notice and open to the public. Opportunities for public comment were available at the beginning and end of every meeting, and summaries of public comments received were included in the approved minutes of each meeting. Communication was facilitated and supported by the Region L website (www.RegionLTexas.org) maintained by the San Antonio River Authority and by the TWDB website (www.twdb.texas.gov/waterplanning). Throughout the planning process, SCTRWPG members, San Antonio River Authority, and the technical consultant team provided responses to inquiries from the public.

The IPP was adopted by the SCTRWPG during a regularly-scheduled meeting on February 20, 2025. The approved IPP was submitted to the TWDB and made available for review and comment on March 3, 2025, in accordance with 31 TAC §357.21(h)(7).

The final 2026 SCTRWP was certified complete and adopted by a majority vote of the SCTRWPG at its regularly-scheduled meeting on October 2, 2025. The Final, Adopted 2026 SCTRWP and other final deliverables were submitted to the TWDB on October 20, 2025, for approval and integration into the 2027 State Water Plan.

FINAL PLAN

# CHAPTER 1: DESCRIPTION OF THE REGIONAL WATER PLANNING AREA

South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**1.0 Description of the Regional Water Planning Area ..... 1-1**
1.1 Introduction and Background ..... 1-1
1.2 Overview of the South Central Texas Region ..... 1-1
1.3 Climate ..... 1-3
1.4 General Geology ..... 1-6
1.5 Water Resources and Quality Considerations ..... 1-7
1.5.1 Groundwater ..... 1-7
1.5.2 Surface Water ..... 1-13
1.5.3 Reuse ..... 1-15
1.5.4 Major Springs ..... 1-16
1.5.5 Surface Water Quality ..... 1-17
1.5.6 Ecologically Significant and Ecologically Unique Stream Segments ..... 1-20
1.6 Natural Resources ..... 1-21
1.6.1 Vegetational Areas ..... 1-21
1.6.2 Fish and Wildlife ..... 1-24
1.7 Agricultural Resources ..... 1-24
1.8 Threats to Agricultural and Natural Resources ..... 1-26
1.9 Population and Demography ..... 1-27
1.9.1 Historical and Recent Trends in Population ..... 1-27
1.9.2 Demographic Characteristics ..... 1-28
1.10 Economy – Major Sectors and Industries ..... 1-32
1.10.1 Regional Economy ..... 1-32
1.10.2 Agricultural Production ..... 1-33
1.10.3 Livestock Production ..... 1-35
1.10.4 Mining ..... 1-36
1.10.5 Manufacturing ..... 1-36
1.10.6 Trades and Services ..... 1-37
1.11 Current Water Use and Major Water Demand Centers ..... 1-37
1.11.1 Current Water Use ..... 1-37
1.11.2 Major Water Demand Centers ..... 1-38
1.12 Major Water Providers ..... 1-38
1.13 Summary of Existing Plans ..... 1-38
1.13.1 2022 State Water Plan ..... 1-38
1.13.2 2021 Regional Water Plan ..... 1-39
1.13.3 2023 Regional Flood Plans ..... 1-40
1.13.4 Local Water Plans ..... 1-41
1.13.5 Current Preparations for Drought ..... 1-41

1.14 Drought of Record ..... 1-42
1.15 Water Loss Audits ..... 1-42

## LIST OF TABLES

Table 1-1 List of Counties within the Edwards Aquifer Authority Area and River and Coastal Basins ..... 1-3
Table 1-2 Precipitation by River and Coastal Basin ..... 1-5
Table 1-3 Temperature and Reservoir Evaporation by River and Coastal Basin ..... 1-6
Table 1-4 Watershed Protection Plans ..... 1-19
Table 1-5 Agricultural Resources ..... 1-25
Table 1-6 Historical Census Estimates by County (1960 to 2020) ..... 1-27
Table 1-7 County Population, Area, and Density (2020) ..... 1-30
Table 1-8 Summary of Economic Activity by County ..... 1-32
Table 1-9 Farm Production by County (2022) ..... 1-34
Table 1-10 Livestock Production by County (2022) ..... 1-35
Table 1-11 Current Water Use by Use Type (2021) ..... 1-37
Table 1-12 Water Loss Audit Reports Summary (2020 to 2022) ..... 1-43

## LIST OF FIGURES

Figure 1-1 Counties of the South Central Texas Regional Water Planning Area ..... 1-2
Figure 1-2 Climate Regions of the South Central Texas Region ..... 1-4
Figure 1-3 Mean Annual Precipitation in the South Central Texas Region (1981-2010) ..... 1-5
Figure 1-4 Groundwater Conservation Districts ..... 1-8
Figure 1-5 Major Aquifers ..... 1-9
Figure 1-6 Minor Aquifers ..... 1-10
Figure 1-7 River and Coastal Basins and Major Reservoirs ..... 1-14
Figure 1-8 South Central Texas Streams Designated by the Legislature as Having Unique Ecological Value and Segments Identified by TPWD as Being Ecologically Significant ..... 1-21
Figure 1-9 Ecoregions of the South Central Texas Region ..... 1-22
Figure 1-10 Population Centers ..... 1-29
Figure 1-11 Percent of Population Residing in Urban and Rural Areas (2020) ..... 1-29
Figure 1-12 Population Distribution by Age Group (2022) ..... 1-31
Figure 1-13 Level of Educational Achievement (2022) ..... 1-31

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft | Acre-Foot |
| acft/yr | Acre-Foot per Year |
| ASR | Aquifer Storage and Recovery |
| AWWA | American Water Works Association |
| BFZ | Balcones Fault Zone |
| cfs | Cubic Feet per Second |
| CPM | Critical Period Management |
| DCP | Drought Contingency Plan |
| EAA | Edwards Aquifer Authority |
| EAHCP | Edwards Aquifer Habitat Conservation Plan |
| EARIP | Edwards Aquifer Recovery Implementation Program |
| EPA | US Environmental Protection Agency |
| FRAT | Flow Regime Application Tool |
| GAM | Groundwater Availability Model |
| GBRA | Guadalupe-Blanco River Authority |
| GCD | Groundwater Conservation District |
| GMA | Groundwater Management Area |
| GPCD | Gallons per Connection per Day |
| HB | House Bill |
| IH-35 | Interstate Highway 35 |
| ILI | Infrastructure Leakage Index |
| MAG | Modeled Available Groundwater |
| mg/L | Milligrams per Liter |
| MWP | Major Water Provider |
| Region L | South Central Texas Region |
| Region P | Lavaca Region |
| RWPG | Regional Water Planning Group |
| SAWS | San Antonio Water System |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SUD | Special Utility District |
| SWIFT | State Water Implementation Fund for Texas |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |

| | |
|---|---|
| TDS | Total Dissolved Solids |
| TMDL | Total Maximum Daily Load |
| TPWD | Texas Parks and Wildlife Department |
| TSSWCB | Texas State Soil and Water Conservation Board |
| TSWQS | Texas Surface Water Quality Standards |
| TWDB | Texas Water Development Board |
| USFWS | US Fish and Wildlife Service |
| USGS | US Geological Survey |
| VPC | Variable Production Cost |
| WAM | Water Availability Model |
| WCID | Water Control and Improvement District |
| WMS | Water Management Strategy |
| WPP | Watershed Protection Plan |
| WSC | Water Supply Corporation |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |

# 1.0 Description of the Regional Water Planning Area

## 1.1 Introduction and Background

Sections 16.051 and 16.055 of the Texas Water Code direct the Executive Administrator of the Texas Water Development Board (TWDB) to prepare and maintain a comprehensive State Water Plan as a flexible guide for the development, management, and conservation of all water resources in Texas in order to ensure that sufficient supplies of water will be available at a reasonable cost to ensure public health, safety and welfare; further the State's economic growth; and protect agricultural and natural resources of the entire state.

In February 1998, the TWDB adopted rules establishing 16 regional water planning areas and designated initial members of each Regional Water Planning Group (RWPG), representing 11 interest categories. In 2011, the TWDB added a 12$^{th}$ interest category to represent Groundwater Management Areas (GMAs). Each RWPG has the option to add interest group categories and members. With technical and financial assistance from the TWDB, and in accordance with planning guidelines it set forth, the RWPGs prepared the inaugural consensus-based Regional Water Plan in 2001. The TWDB assembled the 16 Regional Water Plan into the 2002 State Water Plan. Since the first Regional Water Plan in 2001, there have been five subsequent cycles of planning in 5-year intervals, including the 2006, 2011, 2016, and 2021 Regional Water Plans, which were compiled by TWDB into the 2007, 2012, 2017, and 2022 State Water Plans, respectively. This document is the 2026 Regional Water Plan and represents the sixth cycle of regional water planning.

For the sixth cycle, the TWDB established deadlines for the Initially Prepared Plan to be adopted by RWPGs and submitted to the TWDB by March 3, 2025, and for the Final Plan to be adopted by the RWPG and submitted to the TWDB by October 25, 2025. The TWDB will compile the 16 Regional Water Plans to develop the 2027 State Water Plan.

This chapter summarizes the results of Task 1 of the current planning cycle and describes the South Central Texas (Region L) Regional Water Planning Area (SCTRWPA).

## 1.2 Overview of the South Central Texas Region

The SCTRWPA consists of all or portions of 21 counties located in the South Central portion of the state (Figure 1-1), including Atascosa, Bexar, Caldwell, Calhoun, Comal, DeWitt, Dimmit, Frio, Goliad, Gonzales, Guadalupe, Hays (partial), Karnes, Kendall, La Salle, Medina, Refugio, Uvalde, Victoria, Wilson, and Zavala Counties. The physical terrain of the region ranges from the Hill Country of the Edwards Plateau to the coastal plains. The most populous cities in the SCTRWPA include San Antonio, San Marcos, New Braunfels, and Victoria.

The SCTRWPA includes parts of six major river basins and three coastal basins: Rio Grande, Nueces, San Antonio, Guadalupe, Lavaca, and Lower Colorado River Basins; and Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins. Table 1-1 provides a list of the SCTRWPA counties located within each river or coastal basin.

The SCTRWPA relies primarily on groundwater, and to a lesser extent on surface water reservoirs. The SCTRWPA overlies the Edwards and Gulf Coast Aquifers, and southern parts of the Trinity, Carrizo-Wilcox, and Edwards-Trinity (Plateau) Aquifers. In addition to these water resources, the area also overlies minor and other aquifers. The Carrizo-Wilcox Aquifer provides nearly half of the region's

groundwater supplies, with the Edwards-Balcones Fault Zone (BFZ) Aquifer providing nearly 35 percent (%) of the region's groundwater supplies. The Edwards-BFZ Aquifer is regarded as one of the most prolific artesian aquifers in the world. With its karst and porous features, the Edwards-BFZ Aquifer is highly permeable and responds quickly to rainfall events. The aquifer is also characterized by its unique biodiversity and endemic species. As such, the Edwards-BFZ Aquifer is regulated by the Edwards Aquifer Authority (EAA), charged with managing, enhancing, and protecting the important natural resource.

Springs are significant water resources in the SCTRWPA. The two most noteworthy springs are the San Marcos and Comal Springs, which both emanate from the Edwards-BFZ Aquifer and contribute to flow in the Guadalupe River. Comal Springs, located in New Braunfels, are the source for the Comal River, which is a tributary of the Guadalupe River. In addition, numerous springs in northern Uvalde and Medina Counties provide surface flows that recharge the Edwards Aquifer, and a few springs, such as Leona Springs and Soldier Springs at Uvalde, flow from below the Edwards Aquifer recharge zone, providing surface flows for many miles downstream.

Details about these water resources are presented in Section 1.5 of this chapter and in Chapter 3.

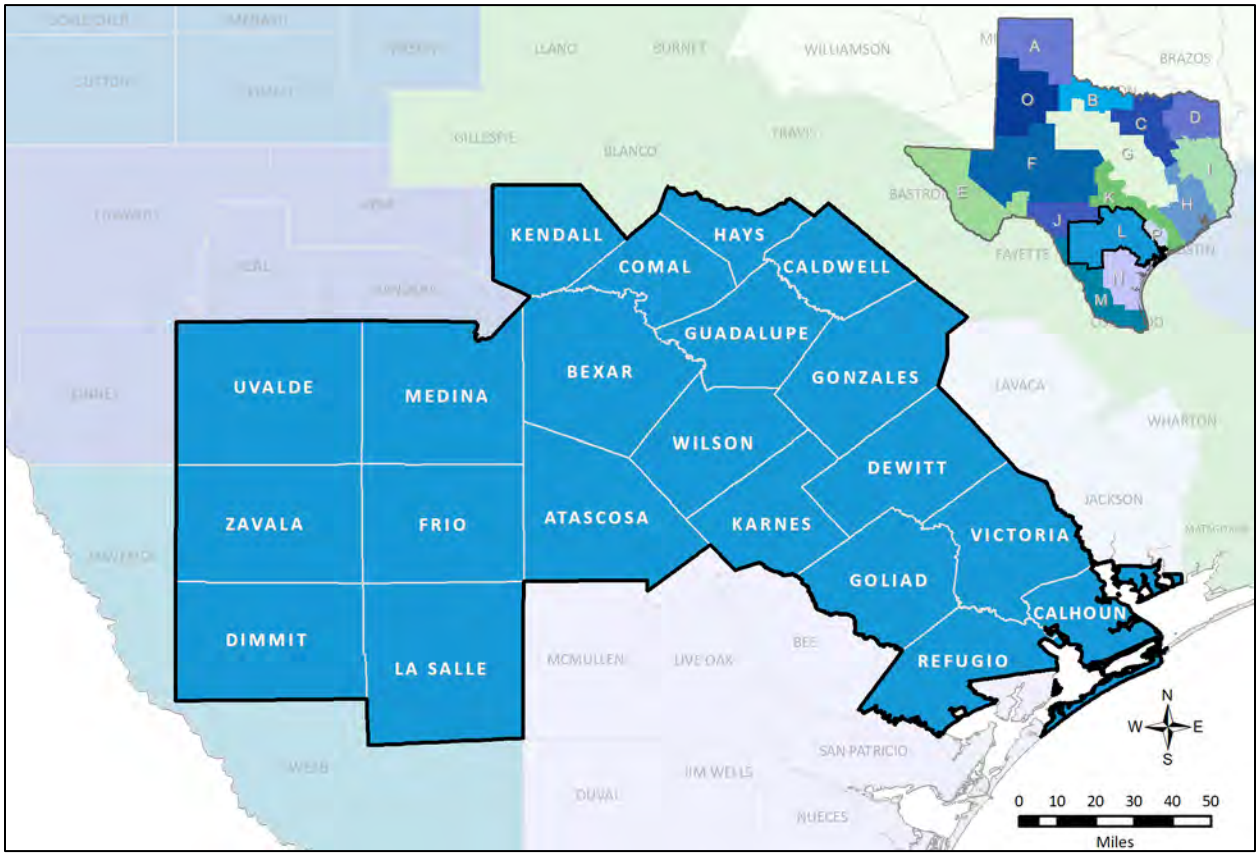



**Figure 1-1 Counties of the South Central Texas Regional Water Planning Area**

**Table 1-1 List of Counties within the Edwards Aquifer Authority Area and River and Coastal Basins**

| County | Edwards Aquifer Authority | Nueces | San Antonio | Guadalupe | Lower Colorado | Colorado-Lavaca | Lavaca | Lavaca-Guadalupe | San Antonio-Nueces | Rio Grande |
|---|---|---|---|---|---|---|---|---|---|---|
| Atascosa | ● | ● | ● | | | | | | | |
| Bexar | ● | ● | ● | | | | | | | |
| Caldwell | ● | | | ● | ● | | | | | |
| Calhoun | | | | ● | | ● | | ● | ● | |
| Comal | ● | | ● | ● | | | | | | |
| DeWitt | | | ● | ● | | | ● | ● | | |
| Dimmit | | ● | | | | | | | | ● |
| Frio | | ● | | | | | | | | |
| Goliad | | | ● | ● | | | | | ● | |
| Gonzales | | | | ● | | | ● | | | |
| Guadalupe | ● | | ● | ● | | | | | | |
| Hays (part) | ● | | | ● | | | | | | |
| Karnes | | ● | ● | ● | | | | | ● | |
| Kendall | | | ● | ● | ● | | | | | |
| La Salle | | ● | | | | | | | | |
| Medina | ● | ● | ● | | | | | | | |
| Refugio | | | ● | | | | | | ● | |
| Uvalde | ● | ● | | | | | | | | |
| Victoria | | | ● | ● | | | ● | ● | | |
| Wilson | | ● | ● | ● | | | | | | |
| Zavala | | ● | | | | | | | | |

Note: A bullet point indicates that all or part of the county is located in the area identified in the column heading.

## 1.3 Climate

The SCTRWPA lies in four climatic divisions of Texas: the Edwards Plateau, the South Central, Upper Coast, and Southern (Figure 1-2). The climate of the region is classified as humid subtropical. Summers are usually hot and humid, while winters are often mild and dry. The hot weather persists from late May through September, accompanied by prevailing southeasterly winds. Occasional summer thunderstorms produce much of the annual precipitation within the region. The cool season, beginning about the first of November and extending through March, is also typically the driest season of the year. Winters are ordinarily short and mild, with most of the precipitation falling as drizzle or light rain. Accumulation of snow is a rare occurrence. Polar air masses, which penetrate the region in winter, bring northerly winds and sharp drops in temperature for short periods of time. In the coastal region, the climate is

characterized by proximity to the Gulf of Mexico and prevailing southeasterly winds. During the long humid summers, high daytime temperatures are moderated in coastal areas by the Gulf breeze.

Mean annual precipitation in the region ranges from a high of 41 inches per year in the Colorado-Lavaca River Basin in the southeastern part of the region, to a low of 23 inches per year in the Nueces River Basin in the west [1] (Table 1-2). There is a general trend of decreasing precipitation from the eastern, coastal portions of the region to western inland portions. Figure 1-3 shows the mean annual precipitation from 1981 to 2010 [2].

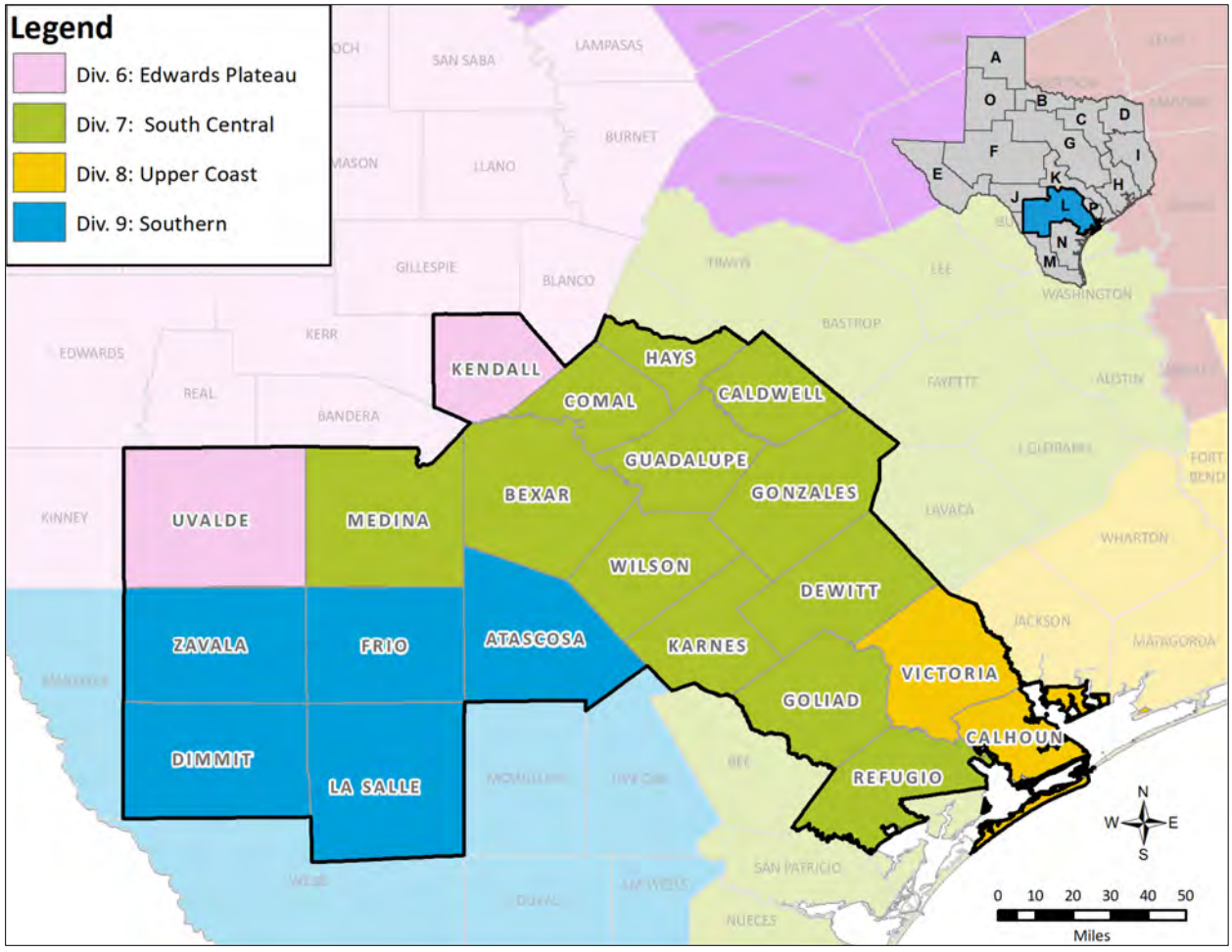



**Figure 1-2 Climate Regions of the South Central Texas Region**

[1] Texas Water Development Board (TWDB). "Continuing Water Resources Planning and Development for Texas." May 1977.

[2] Texas Water Development Board (TWDB) GIS Data. Texas Precipitation Data from the Natural Resources Conservation Service (NRCS). https://www.twdb.texas.gov/mapping/gisdata.asp.

**Table 1-2 Precipitation by River and Coastal Basin**

| Basin | Mean Annual Precipitation (inches) | Wettest Month(s) | Driest Month(s) |
|---|---|---|---|
| Rio Grande | 25 | September | March |
| Nueces | 23 | May, September | March |
| San Antonio | 30 | September | March, December |
| Guadalupe | 32 | May, September | March |
| Colorado | 34 | May, September | Jan. |
| Lavaca | 38 | May, September | March, July |
| Lavaca-Guadalupe | 37 | September | March, July |
| San Antonio-Nueces | 33 | September | March |
| Colorado-Lavaca | 41 | September | March, July |

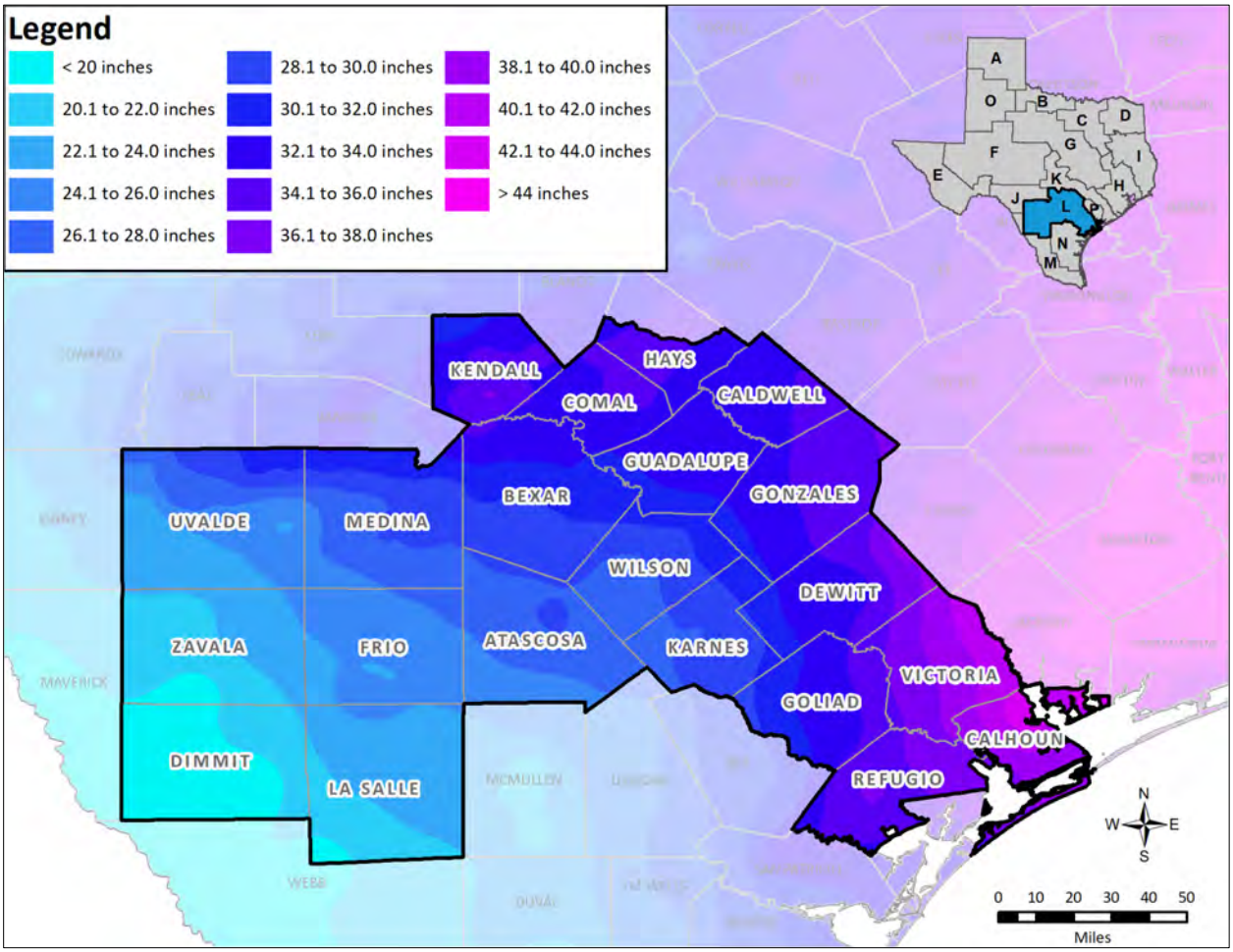



**Figure 1-3 Mean Annual Precipitation in the South Central Texas Region (1981-2010)**

Although mean annual temperatures are basically uniform throughout the region, there are some marked seasonal variations, which lead to widely varied values for annual net reservoir surface evaporation (Table 1-3). The values for annual net reservoir surface evaporation range from a high of 5.4 feet per year in the southwestern portion of the region to a low of 1.7 feet in the eastern portion of the region.

The SCTRWPA is subject to the threat of hurricanes each year from mid-June through the end of October, and, in those parts of the region along and near the coastline, the hazard of hurricane tides is prevalent. Although hurricane winds and tornadoes spawned by hurricanes cause extensive damage and occasional loss of life, surveys of hurricanes reaching the Texas Coast indicate that storm tides cause by far the greatest destruction and largest number of deaths. Elsewhere, in the inland areas of the region, the greatest concern with regard to hurricanes is the damage that results from winds and flooding. Records dating back to 1871 show that, on average, a tropical storm or hurricane has affected the region once every three years.

**Table 1-3 Temperature and Reservoir Evaporation by River and Coastal Basin**

| Basin | Mean Annual Temperature (° F) | Mean Daily Minimum Temperature, January (° F) | Mean Daily Minimum Temperature, July (° F) | Mean Daily Maximum Temperature, January (° F) | Mean Daily Maximum Temperature, July (° F) | Annual Net Reservoir Surface Evaporation (inches) |
|---|---|---|---|---|---|---|
| Rio Grande | 74 | 48 | 74 | 71 | 96 | 65 |
| Nueces | 71 | 40 | 72 | 65 | 98 | 45 |
| San Antonio | 70 | 41 | 74 | 64 | 96 | 31 |
| Guadalupe | 79 | 37 | 71 | 60 | 95 | 37 |
| Colorado | 68 | 39 | 74 | 60 | 96 | 35 |
| Lavaca | 70 | 41 | 72 | 65 | 98 | 24 |
| Lavaca-Guadalupe | 70 | 44 | 76 | 64 | 94 | 25 |
| San Antonio-Nueces | 71 | 43 | 73 | 65 | 96 | 30 |
| Colorado-Lavaca | 70 | 43 | 78 | 64 | 91 | 20 |

Source: Texas Water Development Board. “Continuing Water Resources Planning and Development for Texas.” May 1977.

## 1.4 General Geology

The Hill Country area of the SCTRWPA is underlain by Cretaceous Age limestone, which forms the Edwards Plateau. East and south of the plateau are upper Cretaceous chalk, limestone, dolomite, and clay, with the extensive Balcones Fault Zone System marking the boundary between the Edwards Plateau and the Gulf Coastal Region. The entire sequence dips gently toward the southeast.

A Tertiary Age sequence of southeasterly dipping sand, silts, clay, glauconite, volcanic ash, and lignite overlie the Cretaceous Age strata. The primary water-bearing unit of this sequence is the Carrizo Aquifer. A sequence of clay, sand, caliche, and conglomerate of the Pliocene Age Goliad Formation underlie the coastal areas of the region.

Overlying the Goliad Formation is the Quaternary Age Lissie Formation, which consists of sand, silt, clay, and minor amounts of gravel. Clay, silt, and fine-grained sand of the Beaumont Formation overlie the Lissie Formation. Throughout the region, alluvial sediments of Recent Age occur along streams and coastal areas.

## 1.5 Water Resources and Quality Considerations

### 1.5.1 Groundwater

Groundwater is regulated locally by groundwater conservation districts (GCDs) except in locations that do not have a district. In areas that do not have a district, water availability may be set by a county commissioners' court pursuant to Texas Water Code §35.019. There are 18 GCDs in the SCTRWPA, as shown on Figure 1-4. A GCD serves all or a portion of each county in the region. The responsibilities and authorities of these GCDs vary depending on legislation and governing law, and some districts are not responsible for all aquifers within the geographic boundaries of the district.

GMAs are a different concept in that every county in the State is in one or more of sixteen GMAs. For the most part, the major aquifers are not split across multiple GMAs, and the goal is to manage entire aquifer systems across political subdivisions in a consistent way. There are five GMAs located wholly or partially within the SCTRWPA, including GMA 7, GMA 9, GMA 10, GMA 13, and GMA 15.

There are five major and five minor aquifers supplying water to the SCTRWPA. The five major aquifers are the Edwards-BFZ, Carrizo-Wilcox, Trinity, Gulf Coast, and Edwards-Trinity (Plateau) (Figure 1-5). The five minor aquifers are the Sparta, Queen City, Yegua-Jackson, Ellenburger-San Saba, and Hickory Aquifers (Figure 1-6). Subsequent sections describe these major aquifers. A summary of other groundwater sources and estimated groundwater availabilities and supplies is presented in Chapter 3.

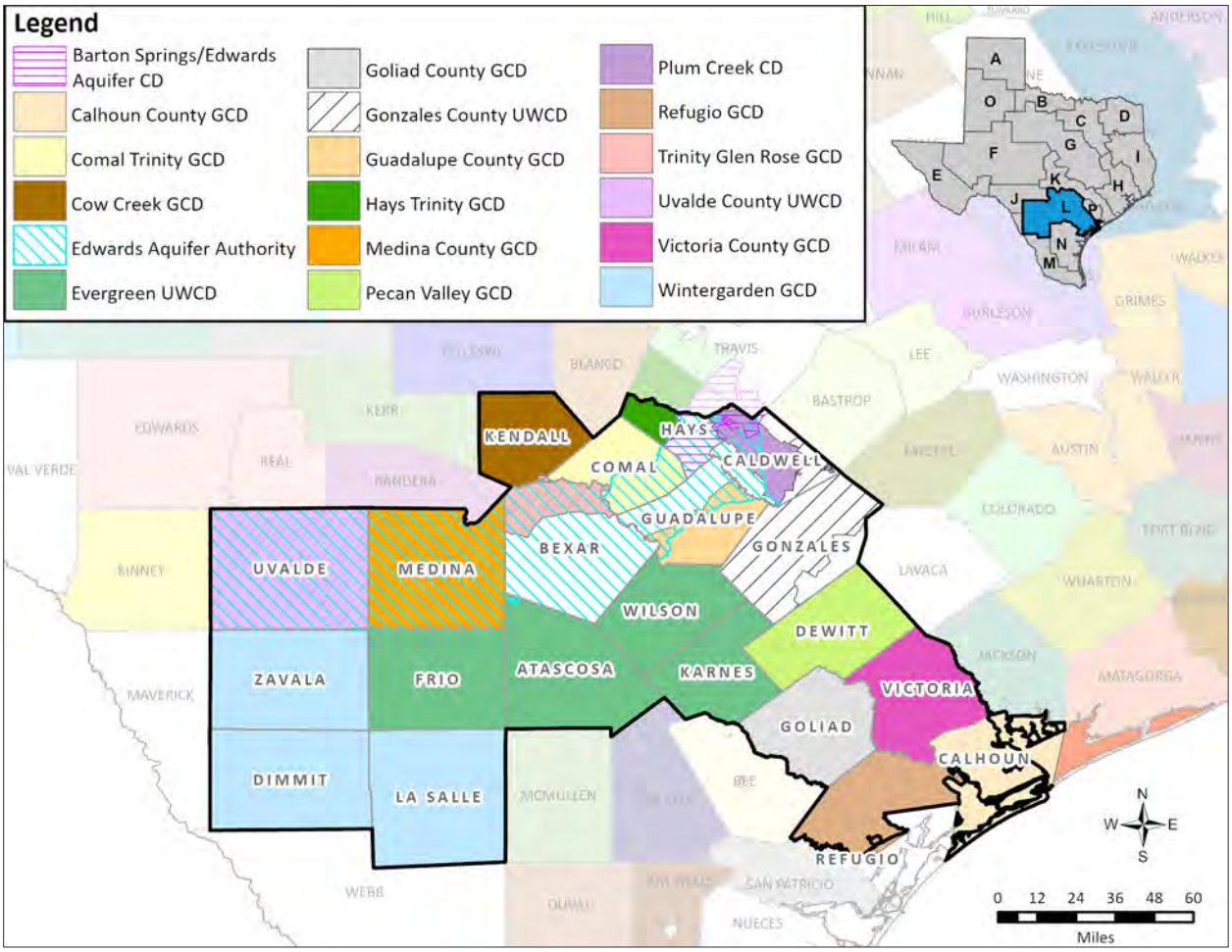



**Figure 1-4 Groundwater Conservation Districts**

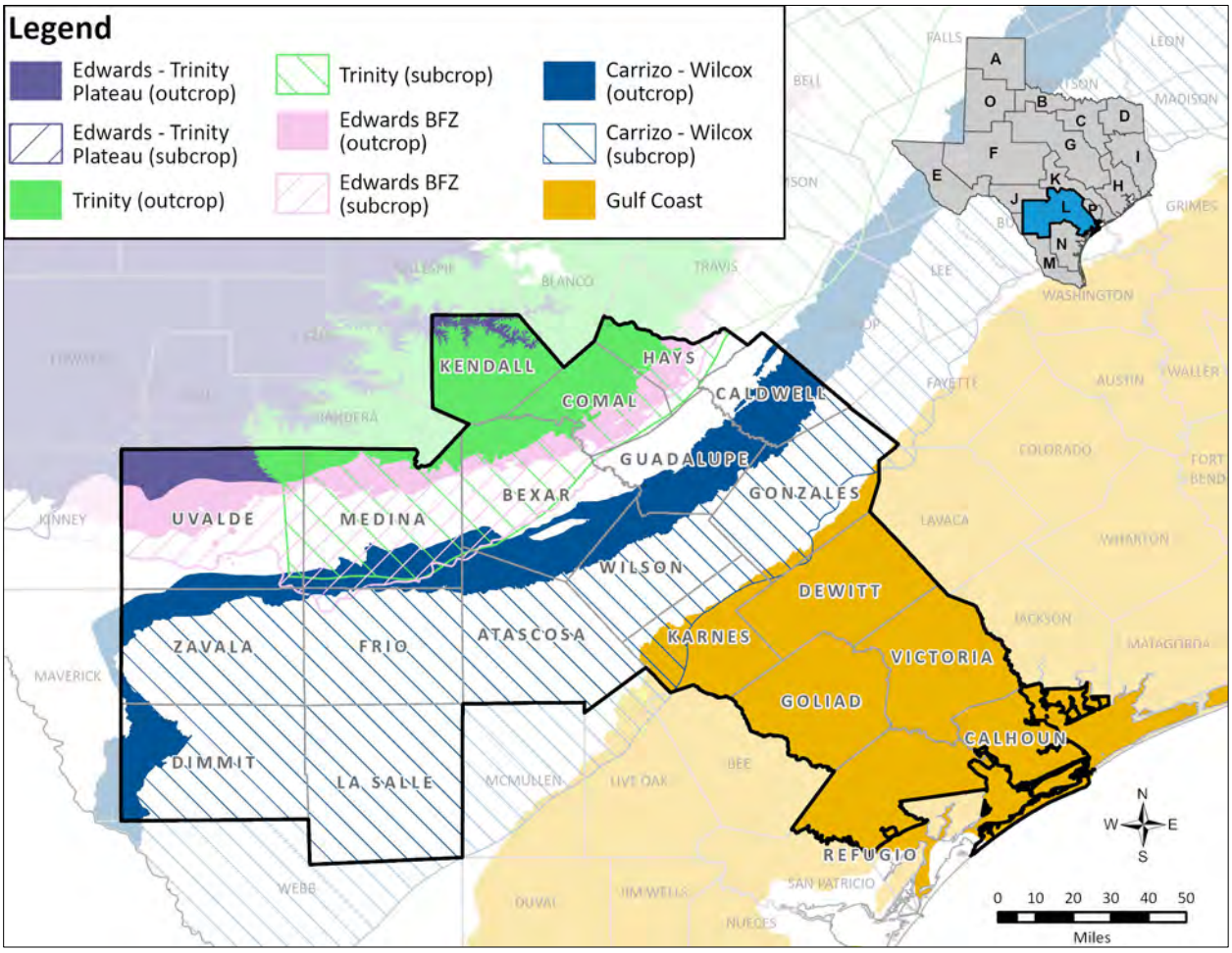



**Figure 1-5 Major Aquifers**

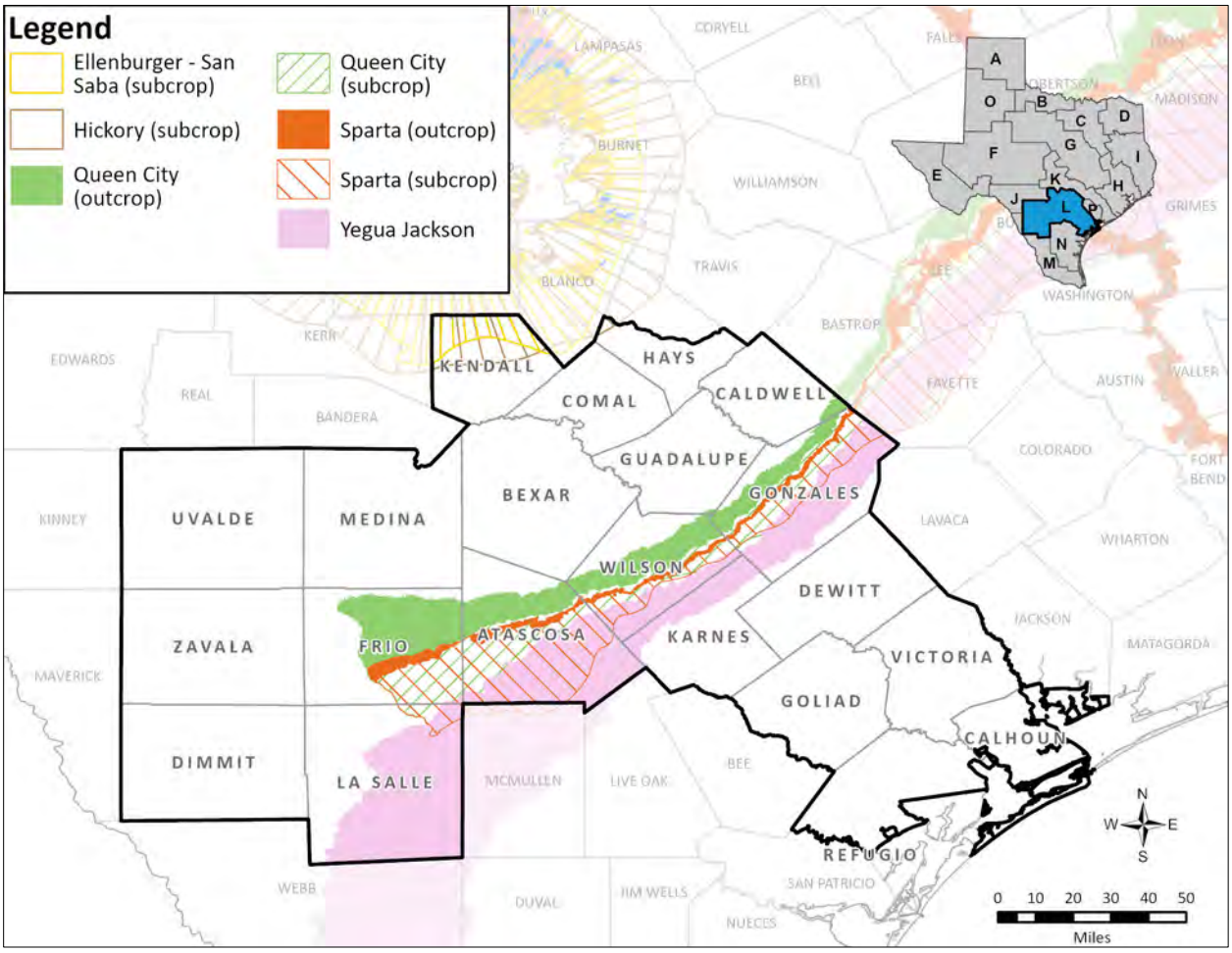



**Figure 1-6 Minor Aquifers**

### 1.5.1.1 Edwards-Balcones Fault Zone Aquifer (Edwards-BFZ Aquifer)

The Edwards-BFZ Aquifer underlies parts of nine counties (Uvalde, Medina, Bexar, Atascosa, Comal, Guadalupe, Hays, Frio, and Zavala) in the SCTRWPA. The aquifer forms a narrow belt extending from a groundwater divide in Kinney County through the San Antonio area northeastward to the Leon River in Bell County. A groundwater divide near Kyle, in Hays County, hydrologically separates the aquifer into the San Antonio and the Austin regions except during severe drought. The Edwards-BFZ Aquifer is distinct and different from the Edwards-Trinity (Plateau) and the Edwards-Trinity (High Plains) Aquifers; however, it is frequently referred to as simply the Edwards Aquifer.

The aquifer consists primarily of partially dissolved limestone having high permeability. Aquifer thickness ranges from 200 to 600 feet, and fresh water saturated thickness averages 560 feet in the southern part of the aquifer. The groundwater, although hard, is generally fresh and contains less than 500 milligrams per liter (mg/L) of total dissolved solids (TDS). The aquifer feeds several well-known springs, including Comal Springs in Comal County, which is the largest spring in the state, and San Marcos Springs in Hays County, which is the second largest. Hueco, San Pedro, San Antonio, and Leona springs also discharge from the aquifer. Because of its highly permeable nature, Edwards Aquifer water levels and springflows respond quickly to rainfall, drought, and pumping. Water from the aquifer is primarily used for municipal, irrigation, industrial, and recreational purposes.

#### 1.5.1.2 Carrizo-Wilcox Aquifer (Carrizo Aquifer)

The Wilcox Group, including the Calvert Bluff, Simsboro, and Hooper Formations, and the overlying Carrizo Formation of the Claiborne Group, form a hydrologically connected system known as the Carrizo-Wilcox Aquifer, which is sometimes referred to as the Carrizo Aquifer. The Carrizo-Wilcox Aquifer is a major aquifer extending from the Louisiana border to the border of Mexico. The aquifer is composed of sand locally interbedded with gravel, silt, clay, and lignite. Although the Carrizo-Wilcox Aquifer reaches 3,000 feet in thickness, the fresh water saturated thickness of the sands averages 670 feet. The groundwater, although hard, is generally fresh and typically contains less than 500 mg/L of TDS in the outcrop; whereas softer groundwater with TDS concentrations of more than 1,000 mg/L may occur in the confined zone. High iron and manganese content greater than secondary drinking water standards is characteristic of the deeper, confined portions of the aquifer. Parts of the aquifer in the Winter Garden area are slightly to moderately saline, with TDS concentrations ranging from 1,000 to 7,000 mg/L.

#### 1.5.1.3 Trinity Aquifer

The Trinity Aquifer provides water to all or parts of 55 counties in Texas, including six counties (Bexar, Caldwell, Comal, Guadalupe, Hays, Kendall, Medina, Uvalde, and Wilson) in the SCTRWPA. The Trinity Aquifer is composed of several smaller aquifers contained within the Trinity Group. Although referred to differently in various parts of the state, they include the Antlers, Glen Rose, Paluxy, Twin Mountains, Travis Peak, Hensell, and Hosston Aquifers. These aquifers consist of limestones, sands, clays, gravels, and conglomerates. Their combined fresh water saturated thickness averages about 600 feet in North Texas and about 1,900 feet in Central Texas. In general, groundwater is fresh but hard in the outcrop of the aquifer. TDS concentrations increase from less than 1,000 mg/L in the east and southeast to between 1,000 and 5,000 mg/L, or slightly to moderately saline, as depth to the aquifer increases. Sulfate and chloride concentrations also tend to increase with depth. The aquifer is one of the most extensive and widely used groundwater resources in Texas. Although its primary use is for municipalities, it is also used for irrigation, livestock, and domestic purposes.

#### 1.5.1.4 Gulf Coast Aquifer

The Gulf Coast Aquifer is a major aquifer paralleling the Gulf of Mexico coastline from the Louisiana border to the border of Mexico. It consists of several aquifers, including the Jasper, Evangeline, and Chicot, which are composed of discontinuous sand, silt, clay, and gravel beds. The maximum total sand thickness of the Gulf Coast Aquifer ranges from 700 feet in the south to 1,300 feet in the north. Fresh water saturated thickness averages about 1,000 feet. Water quality varies with depth and locality; it is generally good in the central and northeastern parts of the aquifer, where the water contains less than 500 mg/L of TDS but declines to the south, where it typically contains 1,000 mg/L to greater than 10,000 mg/L of TDS.

#### 1.5.1.5 Edwards-Trinity (Plateau) Aquifer

The Edwards-Trinity (Plateau) Aquifer is a major aquifer extending across much of the southwestern part of the state. The water-bearing units are predominantly composed of limestone and dolomite of the Edwards Group and sands of the Trinity Group. Although maximum saturated thickness of the aquifer is greater than 800 feet, fresh water saturated thickness averages 433 feet. Water quality ranges from fresh to slightly saline, with dissolved solids ranging from 100 mg/L to 3,000 mg/L, and the water is generally characterized as hard within the Edwards Group. Water typically increases in salinity to the west within the Trinity Group. Springs occur along the northern, eastern, and southern margins of the

aquifer, primarily near the bases of the Edwards and Trinity groups where exposed at the surface. San Felipe Springs, near Del Rio, is the largest exposed spring along the southern margin. Of the groundwater pumped from this aquifer, more than two-thirds is used for irrigation, with the remainder used for municipal and livestock supplies. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer.

#### 1.5.1.6 Sparta Aquifer

The Sparta Aquifer is a minor aquifer extending across East and South Texas, parallel to the Gulf of Mexico coastline and about 100 miles inland. Water is contained within a part of the Claiborne Group known as the Sparta Formation, a sand-rich unit interbedded with silt and clay layers and with massive sand beds in the bottom section. The thickness of the formation changes gradually from more than 700 feet at the Sabine River to about 200 feet in South Texas. Fresh water saturated thickness averages about 120 feet. In outcrop areas and for a few miles in the subsurface, the water is usually fresh, with an average TDS concentration of 300 mg/L; however, water quality deteriorates with depth (below about 2,000 feet), where the groundwater has an average TDS concentration of 800 mg/L. Elevated iron concentrations are common throughout the aquifer. Water from the aquifer is predominantly used for domestic and livestock purposes, and its quality has not been significantly affected by pumping. No significant water level declines have been detected throughout the aquifer in wells measured by the TWDB.

#### 1.5.1.7 Queen City Aquifer

The Queen City Aquifer is a minor but widespread aquifer that stretches across the Texas upper coastal plain. Water is stored in the sand, loosely cemented sandstone, and interbedded clay layers of the Queen City Formation that reaches 2,000 feet in thickness in South Texas. Average freshwater saturation in the Queen City Aquifer is about 140 feet. Water is generally fresh, with an average TDS concentration of about 300 mg/L in the recharge zone and about 750 mg/L in deeper portions of the aquifer. Although salinity decreases from south to north, areas of elevated iron concentrations and high acidity occur in the northeast. The aquifer is used primarily for livestock and domestic purposes, with significant municipal and industrial use in northeast Texas. Water levels have remained fairly stable over time in the northern part of the aquifer. Water level declines are more common in the central (10 to 70 feet) and southern (5 to 130 feet) parts of the aquifer.

#### 1.5.1.8 Yegua-Jackson Aquifer

The Yegua-Jackson Aquifer is a minor aquifer stretching across the southeast part of the state. It includes water bearing parts of the Yegua Formation (part of the upper Claiborne Group) and the Jackson Group (comprising the Whitsett, Manning, Wellborn, and Caddell formations). These geologic units consist of interbedded sand, silt, and clay layers originally deposited as fluvial and deltaic sediments. Fresh water saturated thickness averages about 170 feet. Water quality varies greatly because of sediment composition in the aquifer formations, and in all areas the aquifer becomes highly mineralized with depth. Most groundwater is produced from the sand units of the aquifer where the water is fresh and ranges from less than 50 mg/L to 1,000 mg/L of TDS. Some slightly to moderately saline water, with concentrations of TDS ranging from 1,000 mg/L to 10,000 mg/L, also occurs in the aquifer. No significant water level declines have occurred in wells measured by the TWDB. Groundwater for domestic and livestock purposes is available from shallow wells over most of the aquifer's extent. Water is also used for some municipal, industrial, and irrigation purposes.

#### 1.5.1.9 Austin Chalk, Buda Limestone, and Leona Gravel Aquifers

The Austin Chalk and Buda Limestone are Upper Cretaceous in age. The Del Rio Clay provides a confining layer between the deeper Edwards Aquifer and shallower Buda Limestone, and the Eagle Ford Group separates the lower Buda and upper Austin Chalk formations. There are limited areas where the Buda Formation and the Austin Chalk Formation are at favorable elevations and have sufficient hydraulic conductivity to produce significant quantities of water. Water quality in the Austin Chalk and Buda Limestone formations is similar to the Edwards Aquifer water quality, and there is likely some interconnectivity between the aquifers. While most wells completed in this formation are for domestic or livestock use, there are some higher flowing municipal wells.

The Leona Formation includes alluvial aquifers adjacent to the Leona, Nueces, Frio, and other rivers in Central and South Texas. These alluvial aquifers generally depend on associated streamflow, springs, and recharge from adjacent aquifers and are, therefore, subject to depletion during drought conditions. The majority of wells in this formation are small-flow domestic or livestock wells.

### 1.5.2 Surface Water

The SCTRWPA includes parts of the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins and parts of the San Antonio-Nueces, Lavaca-Guadalupe, and Colorado-Lavaca Coastal Basins (Figure 1-7). Existing surface water supplies of the region include those derived from storage reservoirs and run-of-river water rights. The TWDB defines major reservoirs as those having a storage capacity of 5,000 acre-feet (acft) or more. According to this definition, the SCTRWPA has five major reservoirs: Calaveras Lake, Canyon Lake, Coleto Creek Reservoir, Medina Lake System, and Victor Braunig Lake. The geographical characteristics of the various river basins are described in the following sections. Surface water availabilities and supplies available during drought are summarized in Chapter 3.

#### 1.5.2.1 Rio Grande Basin

The southwestern corner of Dimmit County, an area of approximately 164 square miles, is located in the Rio Grande Basin and in the SCTRWPA. The only surface water presently available to this area is that which can be captured in stock tanks and small stock ponds.

#### 1.5.2.2 Nueces River Basin

The Nueces River Basin is bounded on the north and east by the Colorado, San Antonio, and Guadalupe River Basins and the San Antonio-Nueces Coastal Basin, and on the west and south by the Rio Grande River Basin and the Nueces-Rio Grande Coastal Basin. The total drainage area of the basin is about 16,920 square miles above Calallen Dam, of which 8,973 square miles are located in the South Central Texas planning region. The Nueces River rises in Edwards County and flows 371 river miles from the gage at Laguna in Uvalde County to Nueces Bay on the Gulf of Mexico near Corpus Christi. Principal tributaries of the Nueces River are the Frio and Atascosa Rivers. Major population centers located in the basin include the cities of Uvalde (Uvalde County), Crystal City (Zavala County), Pearsall (Frio County), Pleasanton (Atascosa County), Hondo (Medina County), and Carrizo Springs (Dimmit County).

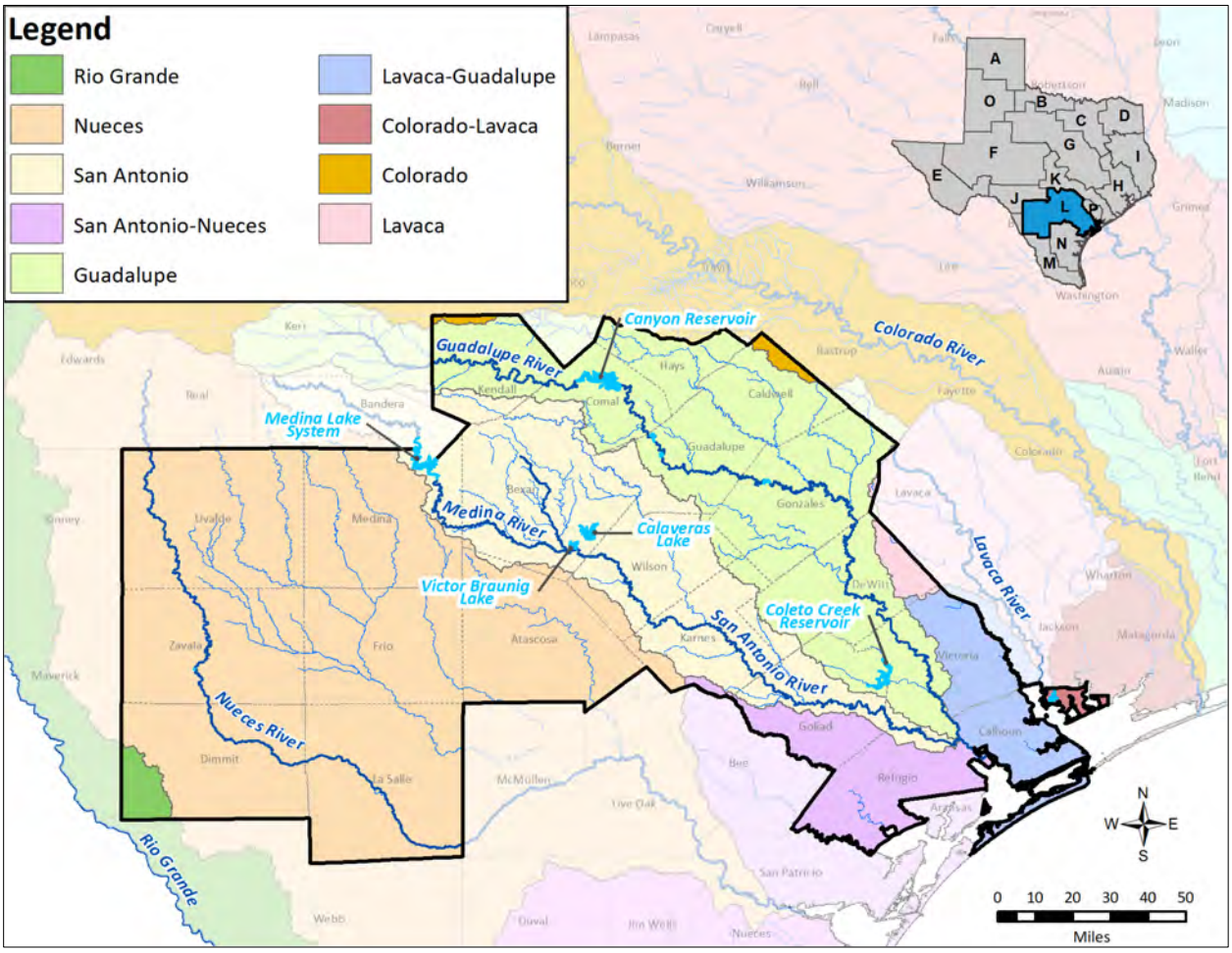



**Figure 1-7 River and Coastal Basins and Major Reservoirs**

### 1.5.2.3 San Antonio River Basin

The San Antonio River Basin is bounded on the north and east by the Guadalupe River Basin and on the west and south by the Nueces River Basin and the San Antonio-Nueces Coastal Basin. Total drainage area of the basin is about 4,180 square miles, of which 3,506 square miles are located in the SCTRWPA. The San Antonio River has its source in large springs within and near the city limits of San Antonio. The river flows more than 230 river miles across the Coastal Plain until it confluences with the Guadalupe River at the corners of Victoria, Refugio, and Calhoun Counties. Its principal tributaries are the Medina River and Cibolo Creek, both spring-fed streams. Major population centers located in the basin include the cities of San Antonio (Bexar County), Universal City (Bexar County), Schertz (Guadalupe County), Live Oak (Bexar County), Leon Valley (Bexar County), Converse (Bexar County), Kirby (Bexar County), Alamo Heights (Bexar County), and Floresville (Wilson County). Major reservoirs in the San Antonio River Basin include Calaveras Lake with authorized diversions of 36,900 acft/yr, Medina Lake System with authorized diversions of 70,750 acft/yr, and Victor Braunig Lake with authorized diversions of 12,000 acft/yr.

#### 1.5.2.4 Guadalupe River Basin

The Guadalupe River Basin is bounded on the north by the Colorado River Basin, on the east by the Lavaca River Basin and the Lavaca-Guadalupe Coastal Basin, and on the west and south by the Nueces and San Antonio River Basins. The Guadalupe River rises in the west-central part of Kerr County. A spring-fed stream, it flows eastward through the Hill Country until it issues from the Balcones Escarpment near New Braunfels. It then crosses the coastal plain to San Antonio Bay. Its total length is more than 430 river miles, and its drainage area is approximately 10,128 square miles above the Lower Guadalupe Saltwater Barrier and Diversion Dam, of which about 4,180 square miles are located within the San Antonio River Basin. Its principal tributaries are the San Marcos River, another spring-fed stream, which joins the Guadalupe River in Gonzales County; the San Antonio River, which joins it just above its mouth on San Antonio Bay; and the Comal River, which joins it at New Braunfels. Comal Springs are the source of the Comal River, which flows about 2.5 miles before joining the Guadalupe River. Major population centers located in the basin include the cities of Victoria (Victoria County), San Marcos (Hays County), New Braunfels (Comal County), Seguin (Guadalupe County), Lockhart (Caldwell County), Cuero (DeWitt County), Gonzales (Gonzales County), and Luling (Caldwell County). Major reservoirs in the Guadalupe River Basin include Canyon Reservoir with authorized diversions of 120,000 acft/yr and Coleto Creek Reservoir with authorized diversions from the Guadalupe River of 24,160 acft/yr.

#### 1.5.2.5 Colorado River Basin

Small portions of the Colorado River Basin are located inside the planning region, in Caldwell and Kendall Counties. The total drainage area of the Colorado River Basin is 41,763 square miles; of which, only 76 square miles are located in the planning region.

#### 1.5.2.6 Lavaca River Basin

Small portions of the Lavaca River Basin are located inside the SCTRWPA in DeWitt, Gonzales, and Victoria Counties. The total drainage area of the Lavaca River Basin is 2,309 square miles, of which 156 square miles are located in the SCTRWPA. The Lavaca-Navidad River Authority owns and operates Lake Texana (located in the Lavaca Region [Region P]) and has contracts to provide raw water to Region L entities, including Formosa Plastics Corporation, City of Point Comfort, and Calhoun County Navigation District.

#### 1.5.2.7 Coastal Basins

Parts of the San Antonio-Nueces, Colorado-Lavaca, and Lavaca-Guadalupe Coastal Basins are located within the SCTRWPA. Currently, none of these coastal basins has large surface water projects. Because of limited surface water availability from local runoff and groundwater quality considerations, these basins generally rely on adjoining river basins to provide surface water to meet their needs. The San Antonio-Nueces Coastal Basin obtains imported surface water supplied from the Nueces River Basin. The Colorado-Lavaca Coastal Basin obtains surface water from Lake Texana in the Lavaca River Basin. The Lavaca-Guadalupe Coastal Basin obtains surface water imported from the Guadalupe River.

### 1.5.3 Reuse

Reuse is the beneficial use of reclaimed water, which is municipal or industrial wastewater effluent that has been treated to levels that are safe and suitable for the purpose for which they are reused. In Texas, the Texas Commission on Environmental Quality (TCEQ) regulates the use of reclaimed water in Title 30 of the Texas Administrative Code (TAC), Chapter 210. Reuse may be categorized as direct or indirect,

and water can be used for potable and non-potable purposes. Examples of beneficial use of reclaimed water include irrigation, cooling, dust suppression, and augmenting water supplies.

There are two types of reclaimed water uses, each with varying water quality requirements: Type I and Type II. Type I reclaimed water may be used where public contact is likely, such as irrigation for public parks, school yards, residential lawns, and athletic fields. Type I water may also be used for fire protection, food crop irrigation, and pasture irrigation. Type II reclaimed water may be used in remote, restricted, controlled, or limited-access areas where human contact is unlikely. Type II reclaimed water uses include irrigation water not likely to contact edible portions of a crop, animal feed-crop irrigation, and supply to non-recreational water bodies.

Major providers of reclaimed water within the SCTRWPA include San Antonio Water System (SAWS), San Antonio River Authority, Guadalupe-Blanco River Authority (GBRA), Cibolo Creek Municipal Authority, San Marcos, and Seguin.

### 1.5.4 Major Springs

According to selected references [3, 4], six major springs are located within the SCTRWPA, including Comal, San Marcos, Hueco, Leona, San Antonio, and San Pedro. The following sections provide descriptions of each of these six springs.

#### 1.5.4.1 Comal Springs

Comal Springs is located in Landa Park, New Braunfels, in Comal County. Comal Springs discharges water from the Edwards Aquifer and associated limestones of the Edwards Aquifer and issues through the Comal Springs Fault. Unlike San Marcos Springs, Comal Springs is more responsive to drought conditions and ceased flowing in June of 1956 in response to groundwater withdrawals and severe drought conditions.

Senate Bill 3 of the 80th Texas Legislature limited the quantity of water that can be withdrawn from the Edwards Aquifer in each calendar year for the period beginning January 1, 2008, to no more than 572,000 acft, specified critical period withdrawal reductions and triggers, and established the Edwards Aquifer Recovery Implementation Program (EARIP) for protection of species listed as threatened or endangered under federal law and associated with the aquifer. As a result of the EARIP, EAA developed the Edwards Aquifer Habitat Conservation Plan (EAHCP), which was published in November 2012 and approved by the U.S. Fish and Wildlife Service (USFWS) in February 2013. Flow protection measures in the EAHCP seek to ensure a minimum monthly average discharge from Comal Springs in excess of 30 cubic feet per second (cfs) in a repeat of the drought of record. Long-term average discharge from Comal Springs is about 290 cfs.

#### 1.5.4.2 San Marcos Springs

The San Marcos Springs have the greatest flow dependability and environmental stability of any spring system in the southwestern United States. Constancy of its springflow is a key component of the unique ecosystem found in the uppermost San Marcos River. San Marcos Springs is located 2 miles northeast of San Marcos, in Hays County. San Marcos Springs discharges water from the Edwards Aquifer and associated limestones of the Edwards Aquifer and issues through the San Marcos Springs Fault. Senate

[3] Texas Water Development Board. "Major and Historical Springs of Texas (Report No. 189)." March 1975.
[4] Brune, Gunnar. "Springs of Texas," Volume I. Branch-Smith, Inc. Fort Worth, Texas. 1981.

Bill 3 and the EAHCP, as described in the Comal Springs text above, also apply to San Marcos Springs. Flow protection measures in the EAHCP seek to ensure a minimum monthly average discharge from San Marcos Springs in excess of 60 cfs in a repeat of the drought of record. Long-term average discharge from San Marcos Springs is about 170 cfs.

#### 1.5.4.3 Hueco Springs

Hueco Springs is located about 3 miles north of New Braunfels near the confluence of Elm Creek and the Guadalupe River in Comal County. Two main springs issue from a fault in the Edwards limestone at this location. Sources of water for these springs include the Edwards Aquifer and, possibly, underflow from the Guadalupe River. Long-term average discharge from Hueco Springs is about 40 cfs.

#### 1.5.4.4 Leona Springs

Leona Springs consists of three groups of springs located from 1 to 6 miles southeast of Uvalde, in Uvalde County. These springs discharge water from the Edwards Aquifer. Long-term average discharge from Leona Springs is about 25 cfs.

#### 1.5.4.5 San Antonio Springs

San Antonio Springs is located southeast of Olmos Dam and north of East Hildebrand Avenue in San Antonio, in Bexar County. San Antonio Springs discharges water from the Edwards Aquifer. Long-term average discharge from San Antonio Springs is about 20 cfs.

#### 1.5.4.6 San Pedro Springs

San Pedro Springs is located in San Pedro Park, San Antonio, in Bexar County. San Pedro Springs discharges water from the Edwards Aquifer. Long-term average discharge from San Pedro Springs is about 5 cfs.

### 1.5.5 Surface Water Quality

To support its charge to restore and maintain the quality of water in the state, the TCEQ establishes the Texas Surface Water Quality Standards (TSWQS) in30 TAC §307. The TCEQ distinguishes between classified and unclassified water bodies. Classified segments are listed and described in Appendix A of the TSWQS. Unclassified segments are water bodies not identified in Appendix A of the Standards. For each classified segment and for some unclassified segments, the TCEQ identifies site-specific uses and water quality criteria.

Within the SCTRWPA, site-specific uses and criteria for classified water bodies are identified for 15 segments in the Guadalupe River Basin, 12 segments in the San Antonio River Basin, 12 segments in the Nueces River Basin, four segments in the San Antonio-Nueces Coastal Basin, nine segments in the Bays and Estuaries Basin, zero segments in the Lavaca River Basin, one segment in the Lavaca-Guadalupe Coastal Basin, and one segment in the Gulf of Mexico Basin. Site-specific uses and criteria for unclassified water bodies within the region include five segments in the Guadalupe River Basin, one segment in the Bays and Estuaries Basin, three segments in the San Antonio River Basin, and two segments in the Nueces River Basin. With the exception of the Victoria Barge Canal, all of the classified and unclassified segments support contact recreation and most support domestic water supply. Aquatic life uses are characterized as exceptional in 33% of these segments and high in 63% of the segments.

Medio Creek and Mid Cibolo Creek, both in the San Antonio River Basin, are characterized as Intermediate Aquatic Life Use and Limited Aquatic Life Use, respectively [5].

Pursuant to Section 303(d) of the federal Clean Water Act, the TCEQ evaluates water bodies in the state and identifies those that do not meet the TSWQS. Every two years, the TCEQ compiles the Texas Integrated Report, which identifies water bodies with water quality impairments [6] and those with concerns for use attainment and screening levels [7]. Impaired segments are water bodies that do not meet one or more water quality standards. Segments with water quality concerns are water bodies that are near nonattainment of the water quality standards based on numeric criteria or that have water quality not meeting screening levels.

At the time of writing, the *2022 Texas 303(d) List* is the most recent, effective list that was adopted by the TCEQ and approved by the US Environmental Protection Agency (EPA). This list identifies 53 water bodies within the SCTRWPA as impaired: 10 in the Bays and Estuaries Basin, 11 in the Guadalupe River Basin, one in the Lavaca River Basin, six in the Nueces River Basin, 21 in the San Antonio River Basin, three in the San Antonio-Nueces Coastal Basin, and one in the Gulf of Mexico. Of these water bodies, 16 have one or more completed and approved Total Maximum Daily Loads (TMDLs). The most common impaired parameters are bacteria and depressed dissolved oxygen, consisting of 64% and 14% of impairments, respectively. The remaining impairments are for the following parameters: copper in water, impaired fish community in water, impaired macrobenthic community in water, mercury in edible tissue, PCBs in edible tissue, and TDS in water.

Surface water quality characteristics typical of streams and bays in the SCTRWPA are generally suitable for raw water uses in the industrial, steam-electric power generation, mining, irrigation, and livestock sectors as well as municipal and domestic potable uses after application of conventional treatment methods. Identification of impaired water quality parameters in some water bodies does not preclude development of proximate or upstream water management strategies (WMSs) but does point to the importance of appropriate wastewater treatment, management of non-point source pollutants, and compliance with environmental flow standards.

There are 12 Watershed Protection Plans (WPPs) for water bodies within the SCTRWPA. WPPs are community-developed documents aimed at preventing or managing nonpoint source pollution by identifying potential sources of water quality impairments and developing implementation strategies to reduce pollution and improve overall water quality. A local entity leads the development of the WPP; the TCEQ and Texas State Soil and Water Conservation Board (TSSWCB) support the local lead with development and implementation of WPPs. Table 1-4 summarizes the WPPs within the SCTRWPA and identifies the segments within the SCTRWPA that are addressed by each WPP.

[5] Texas Commission on Environmental Quality (TCEQ). *Texas Surface Water Quality Standards*. Effective September 29, 2022.
[6] Texas Commission on Environmental Quality (TCEQ). *2022 Texas Integrated Report - Index of Water Quality Impairments*. https://www.tceq.texas.gov/downloads/water-quality/assessment/integrated-report-2022/2022-imp-index.pdf.
[7] Texas Commission on Environmental Quality (TCEQ). *2022 Texas Integrated Report – Water Bodies with Concerns for Use Attainment and Screening Levels.* https://www.tceq.texas.gov/downloads/water-quality/assessment/integrated-report-2022/2022-concerns.pdf.

## Table 1-4 Watershed Protection Plans

| Watershed(s) with WPP | Basin | Local Lead | Sponsor | Region L Segment(s) and Name(s) Addressed by WPP |
|---|---|---|---|---|
| Arenosa and Garcitas | Bays and Estuaries | Texas Water Resources Institute | TCEQ | 2453C: Arenosa Creek;<br>2453A: Garcitas Creek Tidal |
| Cypress Creek | Guadalupe | Texas State University | TCEQ | 1815: Cypress Creek |
| Dry Comal/ Comal | Guadalupe | City of New Braunfels | TCEQ | 1811: Comal River;<br>1811A: Dry Comal Creek |
| Geronimo and Alligator Creeks | Guadalupe | Guadalupe Blanco River Authority | TSSWCB | 1804A: Geronimo Creek;<br>1804C: Alligator Creek;<br>1804D: Bear Creek |
| Lavaca River | Lavaca | Texas Water Resources Institute | TCEQ | 1601A: Catfish Bayou;<br>1602A: Big Brushy Creek;<br>1602B: Rocky Creek |
| Medina River below Medina Diversion Lake | San Antonio | Texas Water Resources Institute | TSSWCB | 1903: Medina River Below Medina Diversion Lake;<br>1903A: Polecat Creek;<br>1912: Medio Creek;<br>1912A: Upper Medio Creek |
| Mid and Lower Cibolo | San Antonio | Texas Water Resources Institute | TSSWCB | 1902: Lower Cibolo Creek;<br>1902A: Martinez Creek;<br>1902B: Salatrillo Creek;<br>1902C: Clifton Branch;<br>1902C: Clifton Branch;<br>1913: Mid Cibolo Creek |
| Mission and Aransas | San Antonio-Nueces | Texas Water Resources Institute | TCEQ | 2001: Mission River Tidal;<br>2002: Mission River Above Tidal;<br>2003: Aransas River Tidal;<br>2004: Aransas River Above Tidal |
| Plum Creek | Guadalupe | Guadalupe Blanco River Authority | TSSWCB | 1810: Plum Creek;<br>1810A: Town Branch |
| Upper Cibolo Creek | San Antonio | City of Boerne | TCEQ | 1908: Upper Cibolo Creek |
| Upper San Antonio River | San Antonio | San Antonio River Authority | TCEQ | 1911: Upper San Antonio River;<br>1911B: Apache Creek;<br>1911C: Alazan Creek;<br>1911D: San Pedro Creek;<br>1911E: Sixmile Creek;<br>1911I: Martinez Creek |
| Upper San Marcos | Guadalupe | Texas State University | TCEQ | 1814: Upper San Marcos River |

### 1.5.6 Ecologically Significant and Ecologically Unique Stream Segments

In 2005, the Texas Parks and Wildlife Department (TPWD) identified 21 water bodies within the SCTRWPA as being ecologically significant river and stream segments [8]. The TPWD used available studies, existing data, and in-house expertise to evaluate a segment's ecological importance based on factors related to biological or hydrologic function, presence of riparian conservation areas, high water quality or exceptional aquatic life or high aesthetic value, and threatened or endangered species or unique communities. Figure 1-8 shows the locations of the 21 river and stream segments identified by the TPWD as being ecologically significant.

31 TAC §357.43 specifies that RWPGs may choose to adopt recommendations in Regional Water Plans for all or parts of river and stream segments as being of unique ecological value, based on criteria defined in 31 TAC §358.2(6). The South Central Texas Regional Water Planning Group (SCTRWPG) used the TPWD's list of ecologically significant river and stream segments in Region L as a starting point to assess whether to recommend designation of any water bodies as ecologically unique stream segments. In the 2011 and 2016 Region L Regional Water Plans, the SCTRWPG recommended five stream segments as having unique ecological value for designation by the Texas Legislature (Figure 1-8). In 2015, the Texas Legislature passed House Bill 1016 (HB 1016, 84th Texas Legislature), which designated the following five river or stream segments as being of unique ecological value:

1. The Nueces River from the northern boundary of Region L [downstream] to United States Geological Survey (USGS) gauge #08190000 [at Laguna];
2. The Frio River from the northern boundary of Region L [downstream] to USGS gauge #08195000 [at Concan];
3. The Sabinal River from the northern boundary of Region L [downstream] to its intersection with State Highway 187 [located approximately 2.7 miles upstream of USGS gauge #08198000 near Sabinal];
4. The San Marcos River extending from a point 0.4 miles upstream from its intersection with State Highway Loop 82 [in San Marcos] to its intersection with Interstate Highway 35; and
5. The Comal River from its intersection with East Klingemann Street in New Braunfels to its confluence with the Guadalupe River.

In designating the five river or stream segments, HB 1016 further clarified the effect of designation of a river or stream segment as being of unique ecological value as follows:

1. Means only that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in the designated segment;
2. Does not affect the ability of a state agency or political subdivision of the state to construct, operate, maintain, or replace a weir, a water diversion, flood control, drainage, or water supply system, a low water crossing, or a recreational facility in the designated segment;
3. Does not prohibit the permitting, financing, construction, operation, maintenance, or replacement of any WMS to meet projected water supply needs recommended in, or designated as an alternative in, the 2011 or 2016 Regional Water Plan for Region L; and

[8] Texas Parks and Wildlife Department (TPWD). 2005. *Ecologically Significant River and Stream Segments of Region L (South Central) Regional Water Planning Area*. WRTS-2005-01.

4. Does not alter any existing property right of an affected landowner.

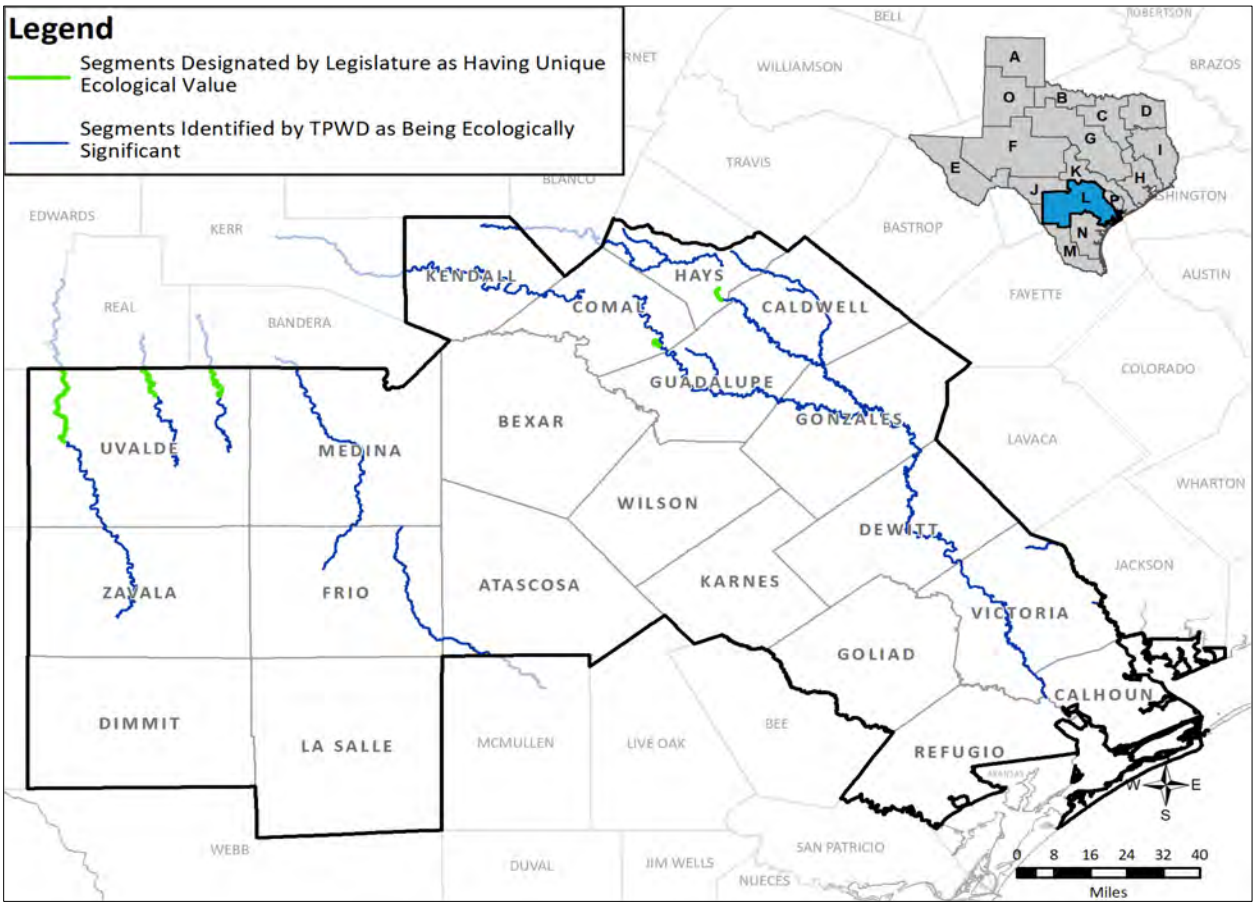



**Figure 1-8 South Central Texas Streams Designated by the Legislature as Having Unique Ecological Value and Segments Identified by TPWD as Being Ecologically Significant**

## 1.6 Natural Resources

### 1.6.1 Vegetational Areas

Biologically, the SCTRWPA is a region of transition from the lowland forests of the southeastern United States to the arid grasslands of the western uplands and thornscrub to the south. The landscape consists of dendritic networks of wooded stream corridors, typically populated by eastern species that dissect upland grasslands, and savannas that harbor western species. The vegetational areas or ecoregions containing portions of the SCTRWPA are the Edwards Plateau, Southern Texas Plains, Texas Blackland Prairies, East Central Texas Plains, and the Western Gulf Coastal Plain (Figure 1-9). Each ecoregion is described in subsequent sections.

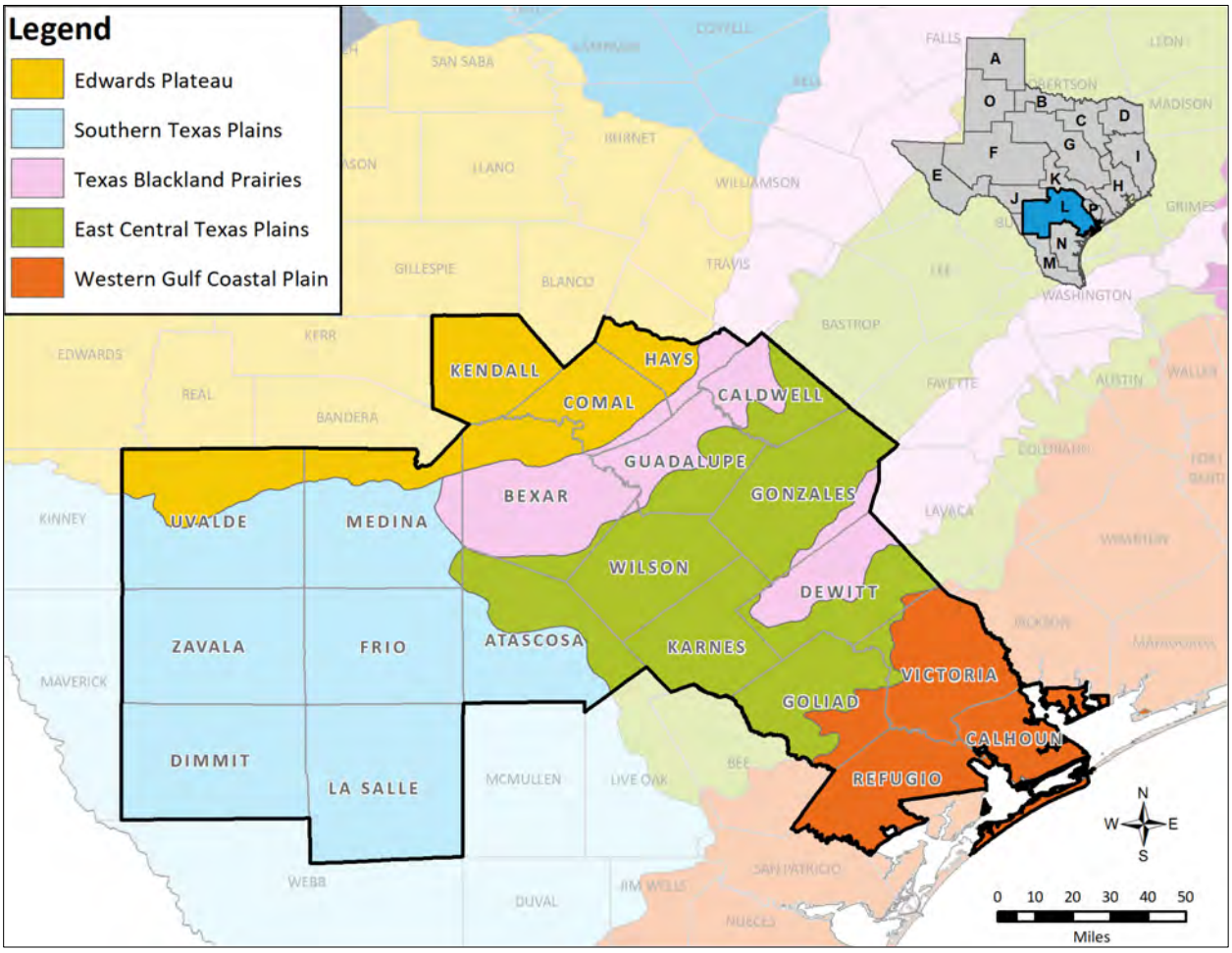



**Figure 1-9 Ecoregions of the South Central Texas Region**

### 1.6.1.1 Edwards Plateau

In the SCTRWPA, the Edwards Plateau vegetational area includes all of Kendall County, the northern portions of Uvalde, Medina, Bexar, and Comal Counties, and the western portion of Hays County. This limestone-based area is characterized by springfed, perennially flowing streams that originate in its interior and flow across the Balcones Escarpment, which bounds it on the south and east. This area is also characterized by the occurrence of numerous ephemeral streams that are important conduits of storm runoff, which contributes to the recharge of the Edwards Aquifer. The soils are shallow, ranging from sands to clays, and are calcareous in reaction. This area is predominantly rangeland, with cultivation confined to limited areas having deeper soils.

The bald cypress (*Taxodium distichum*) grows extensively along the perennially flowing streams. Separated by many miles from cypress growth of the moist Southern Forest Belt, they constitute one of Texas' several "islands" of vegetation.

The principal grasses of the clay soils include several species of bluestem (*Schizachyrium* and *Andropogon* spp.), gramas (*Bouteloua* spp.), Indiangrass (*Sorghastrum nutans*), common curly mesquite (*Hilaria belangeri*), buffalograss (*Buchloe dactyloides)*, and Canadian wild rye (*Elymus canadensis*). The rocky areas support tall or mid-grasses with an overstory of live oak (*Quercus virginiana*) and other oaks

(*Q. fusiformis, Q. buckleyi, Q. sinuata* var. *breviloba*), cedar elm (*Ulmus crassifolia*), and mesquite (*Prosopis glandulosa*). The heavy clay soils have a mixture of buffalograss, sideoats grama (*Bouteloua curtipendula*), and mesquite.

#### 1.6.1.2 Southern Texas Plains

The Southern Texas Plains ecoregion, also known as the Tamaulipan Thornscrub or brush country includes all or parts of Uvalde, Medina, Zavala, Frio, Atascosa, Dimmit, and La Salle Counties. The ecoregion is characterized by rolling or irregular plains with short trees, shrubs, and thorny vegetation. Principal plants are honey mesquite (*Prosopis glandulosa* var. *torreyana*), live oak (*Quercus virginiana*), post oak (*Q. stellata*), several members of the cactus family (Cactaceae), blackbrush acacia (*Acacia rigidula*), guajillo (*Acacia berlandieri*), huisache (*Acacia farnesiana*), and others that often grow very densely. The original vegetation was mainly perennial warm-season bunchgrass in post oak, live oak, and mesquite savannas. Other brush species form dense thickets on ridges and along streams. Long-continued grazing, as well as the control of wildfires, has contributed to the dense cover of brush. Most of the desirable grasses have persisted under the protection of brush and cacti. Dominant grasses are little bluestem, cane bluestem (*Bothriochloa barbinodis*), bristlegrasses (*Setaria* spp.), silver bluestem (*Bothriochloa saccharoides*), multiflowered false rhodesgrass (*Trichloris pluriflora*), Arizona cottontop (*Trichachne californica*), bristlegrasses, sideoats grama, lovegrasses (*Eragrostis* spp), and tobosa.

#### 1.6.1.3 Texas Blackland Prairies

This area includes parts of Medina, Bexar, Comal, Guadalupe, Hays, Caldwell, Wilson, Gonzales, and DeWitt Counties. While called a “prairie,” this ecoregion has timber along streams, including a variety of oaks, pecan (*Carya illinoinensis*), cedar elm, and mesquite. In its native state, it was largely a grassy plain. This region is distinguished from surrounding regions by its fine-textured, clay soils and predominantly prairie potential natural vegetation.

Most of this fertile area has been cultivated, and only small acreages of meadowland remain in original vegetation. In heavily grazed pastures, buffalograss, Texas grama (*Bouteloua rigidiseta*), and other less-productive grasses have replaced the tall bunchgrass. Mesquite and other woody plants have invaded the grasslands.

The original grass vegetation included big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium var. frequens*), Indiangrass, switchgrass, sideoats grama, hairy grama (*Bouteloua hirsuta*), tall dropseed (*Sporobolus asper*), Texas wintergrass, and buffalograss. Non-grass vegetation is largely legumes and composites.

#### 1.6.1.4 East Central Texas Plains

This secondary forest region, also called the Post Oak Savanna or the Claypan Area, includes all or parts of Bexar, Guadalupe, Caldwell, Atascosa, Wilson, Gonzales, Karnes, DeWitt, Goliad, and Victoria Counties. It is immediately west of the pine forests, with less annual rainfall and slightly higher elevation. Principal trees are post oak, blackjack oak (*Quercus marilandica*), and cedar elm. Pecans, walnuts (*Juglans* spp.), and other types of water-demanding trees grow along streams. The southwestern extension of this belt is often poorly defined, with large areas of prairie.

The original vegetation consisted mainly of little bluestem, big bluestem, Indiangrass, switchgrass, silver bluestem, Texas wintergrass, post oak, and blackjack oak. The area is still largely native or improved grasslands, with farms located throughout. Intensive grazing has contributed to dense stands of woody

understories of yaupon (*Ilex vomitoria*) and oak brush. In addition, the control of wildfires has led to the encroachment of brush species on savanna range lands. Plants such as broomsedge, broomweed, bullnettle, and western ragweed have replaced plants that are important for foraging and higher in nutritional quality.

#### 1.6.1.5 Western Gulf Coastal Plain

The Western Gulf Coastal Plain includes all or parts of DeWitt, Victoria, Goliad, Refugio, and Calhoun Counties. The principal, distinguishing characteristic of this ecoregion is the relatively flat coastal plain topography and mainly grassland potential natural vegetation. Oaks, elm, and other hardwoods grow to some extent, especially along streams, and the area has some post oak and brushy extensions along its borders. Much of the Western Gulf Coastal Plain is fertile farmland.

Principal grasses of the Gulf Coastal Plan are tall bunchgrasses, including big bluestem, little bluestem, seacoast bluestem, Indiangrass, eastern gamagrass (*Tripsacum dactyloides*), Texas wintergrass, switchgrass, and gulf cordgrass. Seashore saltgrass occurs on most saline sites. Heavy grazing has changed the range vegetation in many cases so that the predominant grasses are less desirable broomsedge (*Andropogon virginicus*), smutgrass (*Sporobolus indicus*), threeawns (*Aristida* spp.), and many other grasses of less nutritional quality for livestock grazing. Other plants that have invaded the productive grasslands include oak underbrush, huisache, mesquite, pricklypear (*Opuntia* spp.), ragweed (*Ambrosia psilostachya*), broomweed (*Xanthocephalum* spp.), and others.

### 1.6.2 Fish and Wildlife

The streams and reservoirs of the SCTRWPA encompass habitats that range from the clear, rocky headwaters of the Guadalupe and Nueces Rivers on the Edwards Plateau to the sluggish, turbid river reaches of the coastal plains, all supporting fish communities typical of warm, carbonate dominated hard waters. Typical species of the coastal plains streams include gar, minnows, topminnows, sunfishes, bass, catfish, and a few species of darters and suckers. Although strongly dependent on the physical habitat factors present, typical species in Edwards Plateau streams include the common carp, red shiner, blacktail shiner, topminnow, longear and bluegill sunfish, largemouth and Guadalupe bass, channel catfish, bullheads, dusky darter, bigscale logperch, and grey redhorse. The Guadalupe Estuary, at the mouth of the Guadalupe River, is habitat for brown and white shrimp, blue crabs, eastern oysters, red drum, spotted seatrout, black drum, flounder, mullet, Atlantic croaker, sharks, and kingfish.

Common types of wildlife found in the area include white-tailed deer, raccoons, ringtails, gray foxes, coyotes, bobcats, and several species of skunks. Wintering songbirds such as robins and cedar waxwings may also be found. In addition, a growing population of endangered whooping cranes winters in and near the Aransas National Wildlife Refuge, which is located on Blackjack Peninsula and Matagorda Island adjacent to San Antonio Bay.

The SCTRWPA is home to numerous species that are designated as threatened or endangered, or considered species of concern. Various species in the planning region are listed by the USFWS or the TPWD as threatened or endangered. These species are discussed in Chapter 5.

## 1.7 Agricultural Resources

Of the approximate 12.8 million acres of land area in the planning region, over 10.0 million acres (79%) are classified as farmland and ranchland (Table 1-5). In 2022, there were 24,531 farms and ranches in the region, with an average size of 659 acres. Of the 10.0 million acres of farmland, over 1.35 million

acres were classified as cropland, of which about 696,069 acres were harvested in 2022. Approximately 29% (204,499 acres) of the total cropland in the region was reported to be irrigated in 2022 [9]. The leading irrigation counties are located in the western part of the region and include Atascosa, Frio, Medina, Uvalde, and Zavala Counties. The sum of irrigated acres in these five counties decreased by 20.2% between 2017 and 2022. Medina and Uvalde Counties, which rely primarily on the Edwards Aquifer, demonstrated a decrease in irrigated acres by 9.2 and 15.8%, respectively, between 2017 and 2022.

Major irrigated crops in the SCTRWPA are corn, cotton, grain sorghum, wheat, rice, soybeans, and vegetables. Cow-calf operations are the predominant type of livestock industry, although beef cattle, hogs and pigs, sheep and lambs, and poultry are also produced. Agricultural production and livestock production are discussed in greater detail in Sections 1.10.2 and 1.10.3, respectively.

**Table 1-5 Agricultural Resources**

| County | Total Land Area (acres) | Number of Farms and Ranches | Farms and Ranches Land Area (acres) | Average Land Area (acres) | Total Cropland (acres) | Harvested Cropland (acres) | Irrigated Land (acres) |
|---|---|---|---|---|---|---|---|
| Atascosa | 780,506 | 1,673 | 688,382 | 411 | 81,698 | 33,387 | 15,614 |
| Bexar | 793,518 | 2,107 | 248,545 | 118 | 76,669 | 34,390 | 6,417 |
| Caldwell | 348,958 | 1,329 | 244,313 | 184 | 58,230 | 34,929 | 1,784 |
| Calhoun | 324,377 | 257 | 122,971 | 506 | 31,143 | 27,727 | (D) |
| Comal | 358,067 | 888 | 107,388 | 121 | 7,577 | 3,211 | 437 |
| DeWitt | 581,745 | 1,533 | 411,339 | 268 | 39,658 | 24,575 | 1,118 |
| Dimmit | 850,486 | 211 | 344,379 | 1,632 | 41,629 | 3,269 | 3,287 |
| Frio | 725,441 | 592 | 566,717 | 162 | 121,521 | 60,015 | 49,861 |
| Goliad | 545,286 | 1,092 | 416,291 | 381 | 48,073 | 16,900 | 3,586 |
| Gonzales | 682,680 | 1,870 | 630,773 | 337 | 65,113 | 40,921 | 7,651 |
| Guadalupe | 455,212 | 2,369 | 291,287 | 123 | 81,585 | 55,080 | 2,163 |
| Hays (part)[1] | 216,956 | 940 | 142,428 | 152 | 11,350 | 6,499 | 606 |
| Karnes | 478,443 | 958 | 389,854 | 407 | 68,844 | 40,933 | 1,891 |
| Kendall | 423,974 | 1,142 | 269,055 | 236 | 19,708 | 2,965 | 542 |
| La Salle | 951,482 | 344 | 552,478 | 1,606 | 11,484 | 3,199 | 1,643 |
| Medina | 848,230 | 2,204 | 634,224 | 288 | 160,659 | 55,599 | 35,754 |
| Refugio | 493,082 | 315 | 369,313 | 1,172 | 73,951 | 55,230 | (D) |
| Uvalde | 993,245 | 580 | 993,079 | 1,712 | 115,702 | 47,330 | 27,470 |
| Victoria | 564,571 | 1,412 | 526,006 | 373 | 106,033 | 81,132 | 10,140 |
| Wilson | 514,390 | 2,503 | 393,148 | 157 | 85,199 | 45,378 | 12,040 |

[9] *2022 Census of Agriculture*, Volume 1. Chapter 2: County Level Data. "Table 1: County Summary Highlights."

| County | Total Land Area (acres) | Number of Farms and Ranches | Farms and Ranches Land Area (acres) | Average Land Area (acres) | Total Cropland (acres) | Harvested Cropland (acres) | Irrigated Land (acres) |
|---|---|---|---|---|---|---|---|
| Zavala | 830,340 | 212 | 740,758 | 3,494 | 48,593 | 23,400 | 22,495 |
| **Total** | **12,760,989** | **24,531** | **9,082,728** | **13,840** | **1,354,419** | **696,069** | **204,499 + (D)** |

[1] Estimate is for the portion of Hays County located in Region L (~50%).

(D) – Withheld to avoid disclosing data for individual producers.

Source: 2022 Census of Agriculture, Volume 1. Chapter 2: County Level Data. "Table 1: County Summary Highlights."

## 1.8 Threats to Agricultural and Natural Resources

Pursuant to 31 TAC §357.30, the SCTRWPG has identified the following threats to agricultural and natural resources in the SCTRWPA due to water quantity problems or water quality problems related to water supply:

- A shortage of economically accessible fresh water of suitable quantity and quality for irrigation and for livestock drinking and sanitation purposes. For example, such a shortage could result from groundwater production at insufficiently sustainable rates and/or lack of control over groundwater production; and
- Deterioration of water quality, so that the quantities available are not usable for irrigation or livestock drinking and sanitation. Increased salinity is an example of a water quality threat to agriculture.

The SCTRWPG identified the following threats to natural resources in the planning region:

- Reductions of quantity and/or quality of fresh water available to fish and wildlife;
- Changes to aquatic and riparian habitats associated with use of water from streams and aquifers; and
- Temporary or permanent inundation of aquatic, riparian, and terrestrial habitats associated with surface water impoundment.

Technical evaluations of WMSs (Chapter 5) and/or assessments of the cumulative effects of plan implementation (Chapter 6) include quantitative and/or qualitative discussion of how identified threats to agricultural or natural resources are expected to be addressed or affected by a WMS and/or the plan. The following summarizes specific quantitative and/or qualitative measures used to meet this requirement:

- Reliance upon TWDB application of groundwater availability models (GAMs) to illustrate projected changes in regional aquifer levels (desired future conditions) consistent with modeled available groundwater (MAG) estimates and portray spring discharges and surface water/groundwater interactions at the end of the planning period;
- Comparison of the gross business effects (as provided by the TWDB) associated with failure to meet projected agricultural water needs with the costs of potential WMSs available to the region;
- Applications of surface water availability models (WAMs), along with the flow regime application tool (FRAT) (when necessary), for compliance with TCEQ environmental flow

standards in evaluating proposed new appropriations and quantifying projected changes in streamflow and/or freshwater inflows to bays and estuaries. Graphical and tabular summaries of projected changes focus on time series data, monthly medians, and/or frequency of occurrence;

- Qualitative assessment of potential changes in groundwater or surface water quality based on available information; and
- Acreage temporarily or permanently inundated by a planned reservoir and the frequency of such inundation.

## 1.9 Population and Demography

### 1.9.1 Historical and Recent Trends in Population

According to the US Census Bureau, the SCTRWPA population has increased from 1,014,752 people in 1960 to 3,023,291 people in 2020, a three-fold increase (Table 1-6). The largest percentage increase occurred between the years 2000 and 2010 (24.2%), while the smallest occurred between 1960 and 1970 (16.2%). During the period 1960 to 2020, 16 counties had a positive annual growth rate, while five counties (DeWitt, Dimmit, Karnes, Refugio, and Zavala) had a negative annual growth rate. Historically, the fastest growing counties in the region were Hays (4.24%), Kendall (3.42%), Comal (3.56%), and Guadalupe (3.02%), while the slowest growing counties were Gonzales (0.16%), La Salle (0.18%), Calhoun (0.32%), and Goliad (0.43%). Chapter 2 summarizes population projections through the year 2080 for the SCTRWPA.

**Table 1-6 Historical Census Estimates by County (1960 to 2020)**

| County | 1960 | 1970 | 1980 | 1990 | 2000 | 2010 | 2020 | Growth Rate [1] (%) |
|---|---|---|---|---|---|---|---|---|
| Atascosa | 18,828 | 18,696 | 25,055 | 30,533 | 38,628 | 44,911 | 48,981 | 1.61% |
| Bexar | 687,151 | 830,460 | 988,800 | 1,185,394 | 1,392,931 | 1,714,773 | 2,009,324 | 1.80% |
| Caldwell | 17,222 | 21,178 | 23,637 | 26,392 | 32,194 | 38,066 | 45,883 | 1.65% |
| Calhoun | 16,592 | 17,831 | 19,574 | 19,053 | 20,647 | 21,381 | 20,106 | 0.32% |
| Comal | 19,844 | 24,165 | 36,446 | 51,832 | 78,021 | 108,472 | 161,501 | 3.56% |
| DeWitt | 20,683 | 18,660 | 18,903 | 18,840 | 20,013 | 20,097 | 19,824 | -0.07% |
| Dimmit | 10,095 | 9,039 | 11,367 | 10,433 | 10,248 | 9,996 | 8,615 | -0.26% |
| Frio | 10,112 | 11,159 | 13,785 | 13,472 | 16,252 | 17,217 | 18,385 | 1.00% |
| Goliad | 5,429 | 4,869 | 5,193 | 5,980 | 6,928 | 7,210 | 7,012 | 0.43% |
| Gonzales | 17,845 | 16,375 | 16,883 | 17,205 | 18,628 | 19,807 | 19,653 | 0.16% |
| Guadalupe | 29,017 | 33,554 | 46,708 | 64,873 | 89,023 | 131,533 | 172,706 | 3.02% |
| Hays (part)[2] | 15,947 | 22,114 | 32,475 | 52,491 | 72,499 | 125,686 | 192,853 | 4.24% |
| Karnes | 14,995 | 13,462 | 13,593 | 12,455 | 15,446 | 14,824 | 14,710 | -0.03% |
| Kendall | 5,889 | 6,964 | 10,635 | 14,589 | 23,743 | 33,410 | 44,279 | 3.42% |
| La Salle | 5,972 | 5,014 | 5,514 | 5,254 | 5,866 | 6,886 | 6,664 | 0.18% |

| County | 1960 | 1970 | 1980 | 1990 | 2000 | 2010 | 2020 | Growth Rate [1] (%) |
|---|---|---|---|---|---|---|---|---|
| Medina | 18,904 | 20,249 | 23,164 | 27,312 | 39,304 | 46,006 | 50,748 | 1.66% |
| Refugio | 10,975 | 9,494 | 9,289 | 7,976 | 7,828 | 7,383 | 6,741 | -0.81% |
| Uvalde | 16,814 | 17,348 | 22,441 | 23,340 | 25,926 | 26,405 | 24,564 | 0.63% |
| Victoria | 46,475 | 53,766 | 68,807 | 74,361 | 84,088 | 86,793 | 91,319 | 1.13% |
| Wilson | 13,267 | 13,041 | 16,756 | 22,650 | 32,408 | 42,918 | 49,753 | 2.23% |
| Zavala | 12,696 | 11,370 | 11,666 | 12,162 | 11,600 | 11,677 | 9,670 | -0.45% |
| **Total** | **1,014,752** | **1,178,808** | **1,420,691** | **1,696,597** | **2,042,221** | **2,535,451** | **3,023,291** | **1.84%** |

[1] Compound annual growth rate.

[2] It is estimated that 80% of the total Hays County population resides within the SCTRWPA.

Source: United States Census Bureau. Decadal Censuses of 1960, 1970, 1980, 1990, 2000, 2010, and 2020. US Department of Commerce.

### 1.9.2 Demographic Characteristics

Population within the SCTRWPA is primarily distributed along the Interstate Highway 35 (IH-35) corridor, with more than 80% of the total population located within four counties: Bexar, Comal, Guadalupe, and Hays (partial). With the exception of the City of Victoria in Victoria County, the five most-populous cities in the SCTRWPA are located within these four counties. Figure 1-10 identifies the population centers located within the SCTRWPA.

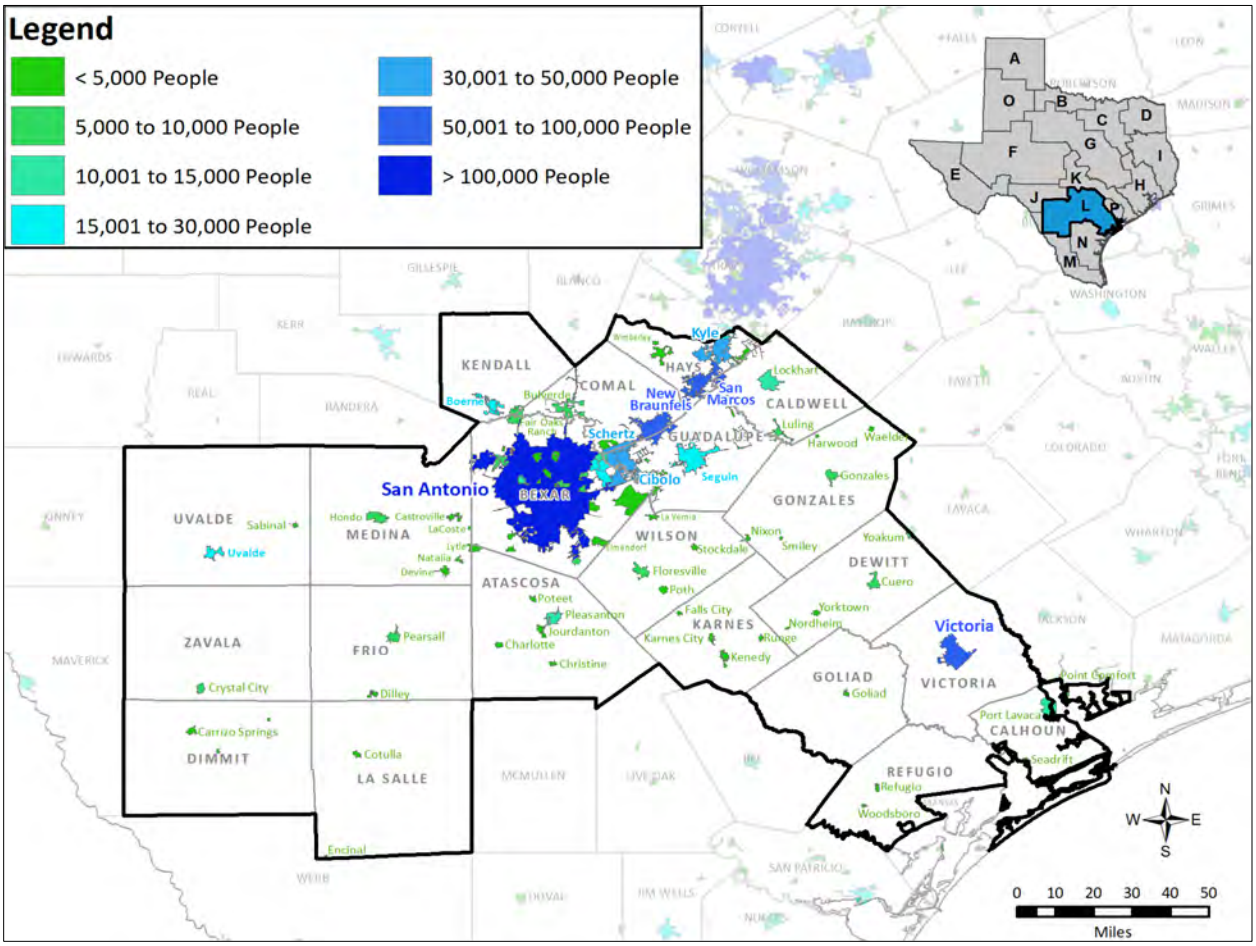



**Figure 1-10 Population Centers**

In 2020, 86% of the SCTRWPA population resided in urban areas, while only 14% resided in rural areas (Figure 1-11). La Salle County had the lowest population in 2020, with 6,664 residents (averaging 4.5 persons per square mile), while Bexar County had the highest population in the region with 2,009,324 residents (averaging 1,611.3 persons per square mile) (Table 1-7).

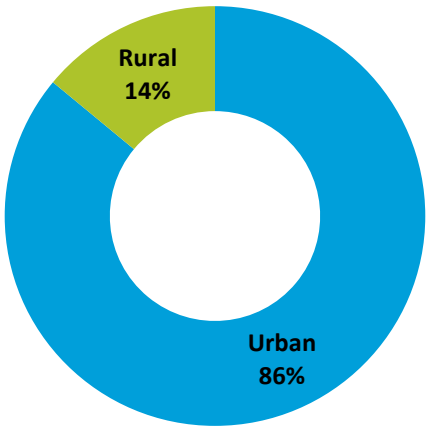



**Figure 1-11 Percent of Population Residing in Urban and Rural Areas (2020)**

**Table 1-7 County Population, Area, and Density (2020)**

| County | 2020 Census Population | Area (Square Mile) | Population Density (Persons per Square Mile) |
|---|---|---|---|
| Atascosa | 48,981 | 1,232 | 39.8 |
| Bexar | 2,009,324 | 1,247 | 1611.3 |
| Caldwell | 45,883 | 546 | 84.0 |
| Calhoun | 20,106 | 512 | 39.3 |
| Comal | 161,501 | 562 | 287.4 |
| DeWitt | 19,824 | 909 | 21.8 |
| Dimmit | 8,615 | 1,331 | 6.5 |
| Frio | 18,385 | 1,133 | 16.2 |
| Goliad | 7,012 | 854 | 8.2 |
| Gonzales | 19,653 | 1,068 | 18.4 |
| Guadalupe | 172,706 | 711 | 242.9 |
| Hays (part) | 192,853 | 374 | 515.6 |
| Karnes | 14,710 | 750 | 19.6 |
| Kendall | 44,279 | 663 | 66.8 |
| La Salle | 6,664 | 1,489 | 4.5 |
| Medina | 50,748 | 1,328 | 38.2 |
| Refugio | 6,741 | 770 | 8.8 |
| Uvalde | 24,564 | 1,557 | 15.8 |
| Victoria | 91,319 | 883 | 103.4 |
| Wilson | 49,753 | 807 | 61.7 |
| Zavala | 9,670 | 1,299 | 7.4 |
| **Total** | **2,535,451** | **20,025** | **151.0** |

Source: United States Census Bureau, US Department of Commerce.

Age distribution across the region is characterized by a relatively young population. The two age groups with the highest percentage of the population are under 20 years of age (27.5%) and from 25 to 34 years of age (14.5%). The age groups with the lowest percentage of the population are ages 20 to 24 (7.6%) and ages 55 to 64 (11.0%) (Figure 1-12).

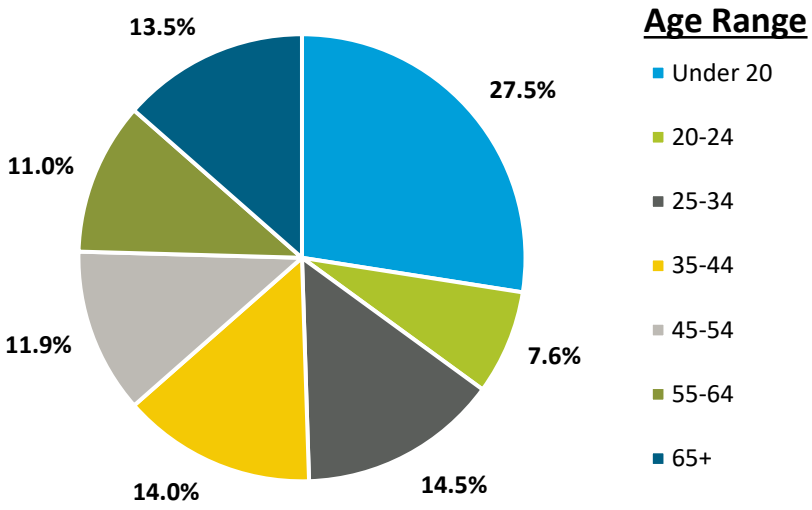



**Figure 1-12 Population Distribution by Age Group (2022)**

Of those residents in the SCTRWPA who are 25 years of age or older, 88.54% have at least a high school diploma, while 11.46% do not. The two largest groups rated according to educational achievement are those who have completed high school but have not attended college (27.07%) and those who have a bachelor's degree (19.29%). Only 10.18% of the population who are 25 years or older have a graduate degree (Figure 1-13).

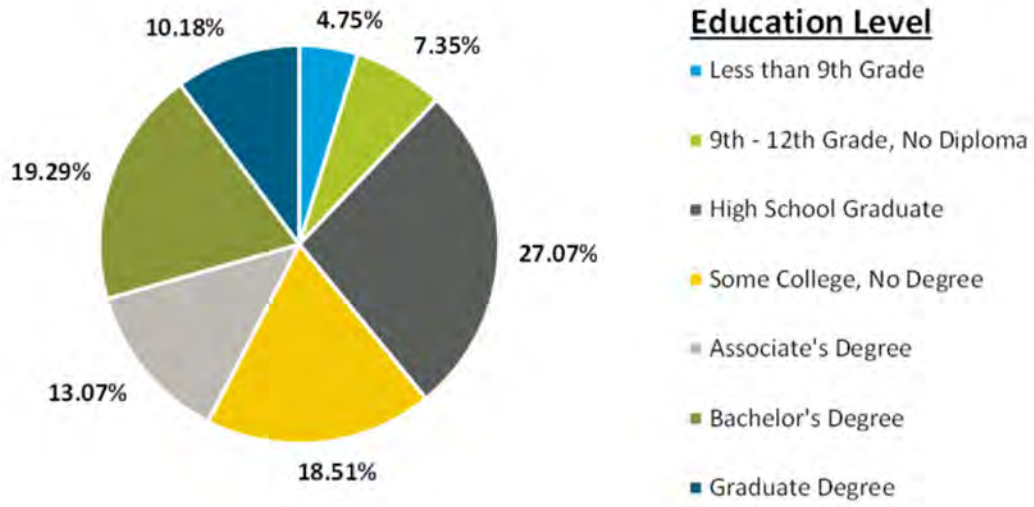



**Figure 1-13 Level of Educational Achievement (2022)**

## 1.10 Economy – Major Sectors and Industries

### 1.10.1 Regional Economy

The SCTRWPA has an economic base centered on agricultural production, livestock production, mining, manufacturing, and trades and services. The region has experienced economic ups and downs throughout the past decade, but all sectors of the economy have experienced growth in recent years. Table 1-8 provides a county-by-county summary of economic activity in the key sectors most significantly affecting the economy of the SCTRWPA. A strong trades and services sector, including a thriving tourism industry in San Antonio, comprises about 36% of regional economic activity (summarized in Table 1-8). Fabricated metal products, industrial machinery, petrochemicals, and food processing form the core of the manufacturing sector, which accounts for approximately 35% of regional economic activity. Beef cattle, corn, and grain sorghum are the dominant agricultural enterprises, although vegetables produced in the Winter Garden area add diversity to the agricultural sector. The agricultural sector, including both livestock and crops, accounts for about 2% of regional economic activity. Finally, oil and gas production dominates the mining sector of the economy and, together, represent about 22% of the regional economic activity summarized in Table 1-8. Additional information regarding the agricultural, livestock, mining, manufacturing, and trades and services sectors is presented in the following sections.

**Table 1-8 Summary of Economic Activity by County**

| County | Trades & Services Economic Activity (million dollars) [1] | Manufacturing Economic Activity (million dollars) [2] | Market Value of All Livestock (million dollars) [3] | Market Value of All Crops (million dollars) [3] | Value of Oil Production (million dollars) [4] | Value of Gas Production (million dollars) [5] | Total (million dollars) |
|---|---|---|---|---|---|---|---|
| Atascosa | 750 | (D) | 49 | 16 | 2,091 | 114 | 2,620 |
| Bexar | 40,554 | 18,293 | 25 | 48 | 4 | 0 | 36,716 |
| Caldwell | 475 | 177 | 54 | 9 | 78 | 0 | 671 |
| Calhoun | 272 | 7,398 | 21 | 11 | 9 | 5 | 7,782 |
| Comal | 2,979 | 963 | 4 | 1 | 0 | 0 | 3,653 |
| DeWitt | 243 | 83 | 28 | 3 | 1,739 | 276 | 2,058 |
| Dimmit | 161 | 5 | 4 | 7 | 2,741 | 949 | 2,840 |
| Frio | 197 | 17 | 81 | 87 | 595 | 67 | 926 |
| Goliad | 46 | (D) | 18 | 4 | 7 | 18 | 70 |
| Gonzales | 320 | 400 | 965 | 37 | 2,586 | 190 | 4,275 |
| Guadalupe | 2,339 | 4,583 | 69 | 25 | 63 | 0 | 6,705 |
| Hays (part) [6] | 2,958 | 1,414 | 7 | 22 | 0 | 0 | 3,292 |
| Karnes | 190 | 75 | 33 | 6 | 6,619 | 734 | 6,884 |
| Kendall | 1,705 | 395 | 13 | 1 | 0 | 0 | 1,558 |

| County | Trades & Services Economic Activity (million dollars) [1] | Manufacturing Economic Activity (million dollars) [2] | Market Value of All Livestock (million dollars) [3] | Market Value of All Crops (million dollars) [3] | Value of Oil Production (million dollars) [4] | Value of Gas Production (million dollars) [5] | Total (million dollars) |
|---|---|---|---|---|---|---|---|
| La Salle | 172 | 0 | 6 | 1 | 2,993 | 1,170 | 3,085 |
| Medina | 905 | 58 | 45 | 37 | 6 | 0 | 726 |
| Refugio | 94 | 1 | 10 | 28 | 173 | 63 | 292 |
| Uvalde | 481 | 120 | 45 | 46 | 0 | 0 | 694 |
| Victoria | 2,142 | (D) | 26 | 46 | 71 | 20 | 2,359 |
| Wilson | 627 | 73 | 133 | 13 | 307 | 8 | 776 |
| Zavala | 38 | (D) | 38 | 49 | 747 | 44 | 872 |
| **Total** | **$31,799** | **$34,055** | **$1,674** | **$497** | **$20,829** | **$3,658** | **$88,854** |

[1] Source: 2024-2025 Texas Almanac
[2] Source: 2023 Economic Census. US Department of Commerce.
[3] Source: 2022 Census of Agriculture, Volume 1 Geographic Area Series. "Table 1. County Summary Highlights: 2022."
[4] Determined by using the number of barrels produced in 2023 as reported to the Texas Railroad Commission, times $82.49/barrel (the average oil price for 2023).
[5] Determined by using the cubic feet produced in 2023 as reported to the Texas Railroad Commission, times $4.52/cubic feet (the average gas price for 2023).
[6] It is estimated that 70% of economic activity within Hays County takes place within Region L.

### 1.10.2 Agricultural Production

It is estimated that nearly 1.4 million acres in the SCTRWPA were used in crop production in 2022. Of this total, only 204,499 acres (15.0%) were irrigated; the remaining 85.0% of the total cropland was farmed using dryland techniques. The leading irrigation counties are found primarily in the western part of the region and include Frio, Medina, Uvalde, Zavala, and Atascosa Counties.

According to the 2022 Census of Agriculture, all crops grown in the SCTRWPA had a market value of over $497 million in 2022. The leading agricultural producing counties in the region, by market value of products, are Gonzales, Frio, Wilson, Guadalupe, and Uvalde Counties. The major crops grown in the region include corn, grain sorghum, wheat, and hay (Table 1-9).

Corn and grain sorghum are the leading crops grown in the SCTRWPA. In 2022, it was estimated that nearly 11 million bushels of corn were harvested in the region. The leading corn producing counties in the region are Victoria, Uvalde, Medina, Frio, and Guadalupe Counties (Table 1-9). Grain sorghum also contributes significantly to the agricultural sector in the SCTRWPA. In 2022, it was estimated that nearly 4 million bushels of grain sorghum were harvested in the region. The leading grain sorghum producing counties in the region are Refugio, Uvalde, Guadalupe, Gonzales, and Calhoun Counties (Table 1-9). Although wheat production is not as widespread as corn and grain sorghum production, it is still an important part of the regional agricultural production with over 1.5 million bushels of wheat harvested

in 2022. The leading wheat producing counties in the region are Uvalde, Frio, Medina, Zavala, and Bexar Counties (Table 1-9).

Because of favorable climatic and soil conditions, the Victoria County is capable of producing rice. In 2022, Victoria County produced over 500,000 hundredweight of rice (Table 1-9). Cotton production is widespread throughout the region. In 2022, 18 counties in the SCTRWPA produced cotton, totaling over 170,000 bales (Table 1-9). Leading counties for cotton production are Uvalde, Refugio, and Victoria Counties.

Soybean production in the region reportedly occurs in seven counties, but total production and leading counties are uncertain because data provided by the 2022 Census of Agriculture is withheld for some counties to avoid disclosing production data by individual producers.

**Table 1-9 Farm Production by County (2022)**

| County | Corn (Bushels) | Grain Sorghum (Bushels) | Wheat (Bushels) | Rice (100 Pounds) | Cotton (Bales) | Soybeans (Bushels) | Hay, Alfalfa, Other (Tons) |
|---|---|---|---|---|---|---|---|
| Atascosa | 291,363 | 167,607 | 67,213 | 0 | 3,298 | 0 | 58,244 |
| Bexar | 288,378 | 76,573 | 150,241 | 0 | (D) | (D) | 23,694 |
| Caldwell | 444,430 | 169,784 | 35268 | (D) | 2,808 | 432 | 20,805 |
| Calhoun | 703,107 | 301,764 | 0 | 0 | 11,480 | (D) | 2,807 |
| Comal | 7,800 | (D) | (D) | 0 | (D) | 0 | 2,210 |
| DeWitt | 46,218 | 32,337 | 0 | (D) | (D) | 0 | 34,151 |
| Dimmit | 322,995 | 0 | 0 | 0 | 24,433 | 0 | 2,955 |
| Frio | 1,061,046 | 103,326 | 254,515 | 0 | 12,602 | 0 | 98,169 |
| Goliad | 158,933 | (D) | (D) | 0 | (D) | (D) | 19,751 |
| Gonzales | 315,688 | 315,227 | (D) | 0 | 0 | 0 | 39,522 |
| Guadalupe | 966,236 | 394,895 | 131,125 | 0 | 751 | (D) | 26,653 |
| Hays (part)[1] | (D) | (D) | (D) | 0 | (D) | 0 | 8,119 |
| Karnes | 133,573 | 84,664 | 17,278 | 0 | (D) | 0 | 33,090 |
| Kendall | 0 | 0 | (D) | 0 | 0 | 0 | 3938 |
| La Salle | (D) | 0 | (D) | 0 | 0 | 0 | 2,050 |
| Medina | 1,249,475 | 128,422 | 247,426 | 0 | 9,107 | 0 | 98,344 |
| Refugio | 459,092 | 1,241,214 | 0 | 0 | 37,109 | 0 | 3,028 |
| Uvalde | 1,363,325 | 397,536 | 293,852 | 0 | 41,659 | 0 | 9,381 |
| Victoria | 2,348,608 | 182,956 | (D) | 505,454 | 26,078 | 36,275 | 47,138 |

| County | Corn (Bushels) | Grain Sorghum (Bushels) | Wheat (Bushels) | Rice (100 Pounds) | Cotton (Bales) | Soybeans (Bushels) | Hay, Alfalfa, Other (Tons) |
|---|---|---|---|---|---|---|---|
| Wilson | 271,133 | 109,332 | 76,083 | 0 | 2,498 | (D) | 66,372 |
| Zavala | 177,773 | 107,072 | 247,228 | 0 | 2,126 | 0 | 20,557 |
| **Total** | **10,609,173 + 2(D)** | **3,812,709 + 3(D)** | **1,520,229 + 7(D)** | **505,454 + 2(D)** | **173,949 + 6(D)** | **36,707 + 5(D)** | **620,978** |

[1] It is estimated that 50% of all farm production in Hays County occurs in Region L.
(D) – Withheld to avoid disclosing data for individual producers.
Source: 2022 Census of Agriculture, Volume 1, Chapter 2: County Level Data.

### 1.10.3 Livestock Production

According to the 2022 Census of Agriculture, livestock marketed in the SCTRWPA had a value of over $1.6 billion, or about 3.4 times the value of all crop production. Major types of livestock produced in the area include cattle and calves, beef cattle, and sheep and lambs. Layers, pullets, and broilers also contribute significantly to livestock production, with Gonzales County producing just under 99% of these types of chickens within the region. Table 1-10 provides a county summary of livestock production in the SCTRWPA. In 2022, the leading livestock producing counties in the region by market value were Gonzales, Wilson, Frio, Guadalupe, and Caldwell Counties (Table 1-8).

**Table 1-10 Livestock Production by County (2022)**

| County | Cattle and Calves (No.) | Beef Cattle (No.) | Milk Cows (No.) | Hogs and Pigs (No.) | Sheep and Lambs (No.) | Layers and Pullets (No.) | Broilers (No.) |
|---|---|---|---|---|---|---|---|
| Atascosa | 65,442 | (D) | (D) | 472 | 1,594 | 4,667 | 480 |
| Bexar | 31,702 | (D) | (D) | 2,361 | 7,240 | 9,061 | 2,495 |
| Caldwell | 35,822 | (D) | (D) | 144 | 1,802 | (D) | (D) |
| Calhoun | 12,737 | 8,388 | 0 | 95 | 431 | 863 | 0 |
| Comal | 7,011 | (D) | (D) | 138 | 2,231 | 4,137 | 614 |
| DeWitt | 67,343 | 44,239 | 0 | 157 | 1,206 | 2,716 | (D) |
| Dimmit | 9,447 | (D) | (D) | 0 | 95 | 295 | 0 |
| Frio | 52,999 | (D) | (D) | 11 | 171 | 1,241 | 156 |
| Goliad | 44,083 | 29,307 | 0 | 96 | 220 | 2,879 | (D) |
| Gonzales | 143,254 | (D) | (D) | 404 | 1,284 | 9,876,002 | 94,447,112 |
| Guadalupe | 44,026 | 24,461 | 15 | 1,258 | 3,258 | (D) | 5,100,433 |
| Hays (part)[1] | 3805 | (D) | (D) | 121.5 | 559 | 1745.5 | 470 |
| Karnes | 53,100 | (D) | (D) | 16 | 582 | 967 | 0 |

| County | Cattle and Calves (No.) | Beef Cattle (No.) | Milk Cows (No.) | Hogs and Pigs (No.) | Sheep and Lambs (No.) | Layers and Pullets (No.) | Broilers (No.) |
|---|---|---|---|---|---|---|---|
| Kendall | 13,015 | 7,093 | 0 | 360 | 8,327 | 4,568 | 136 |
| La Salle | 11,909 | 7,569 | 0 | 104 | 177 | 541 | 0 |
| Medina | 37,161 | 21,468 | 0 | 693 | 2,717 | 11,893 | 350 |
| Refugio | 24,249 | 15,564 | 0 | 0 | 242 | 1,447 | (D) |
| Uvalde | 37,831 | 16,858 | 0 | 101 | 5,160 | 966 | 35 |
| Victoria | 58,674 | (D) | (D) | 238 | 850 | 3,664 | 0 |
| Wilson | 110,390 | (D) | (D) | 259 | 2,886 | 7,108 | 2,050 |
| Zavala | 38,198 | 11,658 | 0 | (D) | 191 | 621 | 0 |
| **Total** | **902,198** | **186,605 + 11D** | **15 + 11D** | **7,819** | **41,223 + (D)** | **9,935,382 + 2(D)** | **99,554,331 + (2D)** |

[1] It is estimated that 50% of all livestock production in Hays County occurs in Region L.

(D) – Withheld to avoid disclosing data for individual producers.

Source: 2022 Census of Agriculture, Volume 1, Chapter 2: County Level Data. "Table 1: County Summary Highlights."

Source: 2022 Census of Agriculture, Volume 1, Chapter 2: County Level Data. "Table 11: Cattle and Calves"

Source: 2022 Census of Agriculture, Volume 1, Chapter 2: County Level Data. "Table 12: Hogs and Pigs"

Source: 2022 Census of Agriculture, Volume 1, Chapter 2: County Level Data. "Table 19: Poultry"

### 1.10.4 Mining

The SCTRWPA has numerous sand and gravel quarries and is also rich in petroleum products including oil, natural gas, and lignite. Much of the stone quarried is used in the production of cement. The leading cement producing areas in the region are located in Bexar and Hays Counties. Most of the stone, gravel, and sand mining activities are located in Bexar, Comal, Gonzales, and Victoria Counties.

The region also derives a significant portion of its mining income from oil and gas activities. All but four counties (Comal, Hays, Kendall, and Uvalde Counties) in the region had economic activity derived from oil or gas production in 2023. Oil and gas production in the remaining 17 counties generated nearly $24.5 billion in 2023. The leading oil and gas producing counties in the region were Karnes, La Salle, Dimmit, Gonzales, and Atascosa Counties (Table 1-8).

### 1.10.5 Manufacturing

In 2023, manufacturing facilities contributed over $34 billion in sales in the SCTRWPA (Table 1-8) [10]. The leading manufacturing counties in the region for which data are disclosed, by value of shipments, are Bexar, Calhoun, Guadalupe, Hays, and Comal Counties. Significant economic activity associated with manufacturing also occurs in Atascosa, Goliad, Victoria, and Zavala Counties, although data are withheld to avoid disclosing data for individual producers. Types of manufacturing plants and products in the

[10] Source: 2023 Economic Census. US Department of Commerce.

region include plastics, nylon intermediates, automobiles, printing and related support activities, fabricated metal products, miscellaneous products, and food products.

### 1.10.6 Trades and Services

In 2023, wholesale trade, retail trade, and services contributed nearly $31.8 billion in sales or receipts in the SCTRWPA (Table 1-8). The counties leading trades and services, by value of sales or receipts, in the region are Bexar, Comal, Hays, Guadalupe, and Victoria Counties.

## 1.11 Current Water Use and Major Water Demand Centers

### 1.11.1 Current Water Use

In 2021, total water use in the region was estimated to be 904,179 acre-feet per year (acft/yr). Water use in 2021 within the SCTRWPA as reported to or estimated by the Texas Water Development Board (TWDB) [11] is summarized by source for each of the use types in Table 1-11. Municipal use accounted for 485,732 acft/yr (53.2%), and irrigation use accounted for 245,948 acft/yr (27.2%) of the total water use within the region. Surface water use totaled 166,216 acft/yr (18.4%), groundwater use totaled 658,093 acft/yr (72.8%), and reuse totaled 79,870 acft/yr (8.83%). Surface water is the primary source for manufacturing uses. Surface water and reuse are the primary sources for steam-electric uses, and groundwater is the primary water source for other use types.

**Table 1-11 Current Water Use by Use Type (2021)**

| Use Type | 2021 Total Water Use | Surface Water Use | Groundwater Use | Reclaimed Water Use |
|---|---|---|---|---|
| Irrigation (acft/yr) | 245,948 | 30,437 | 214,538 | 973 |
| Irrigation (percent) | 27.20% | 12% | 87% | 0% |
| Livestock (acft/yr) | 24,960 | 10,521 | 14,439 | 0 |
| Livestock (percent) | 2.76% | 42% | 58% | 0% |
| Manufacturing (acft/yr) | 54,173 | 42,503 | 7,752 | 3,918 |
| Manufacturing (percent) | 5.99% | 78% | 14% | 7% |
| Mining (acft/yr) | 49,521 | 645 | 36,204 | 12,672 |
| Mining (percent) | 5.48% | 1% | 73% | 26% |
| Municipal (acft/yr) | 485,732 | 68,743 | 376,673 | 40,316 |
| Municipal (percent) | 53.72% | 14% | 78% | 8% |
| Steam-Electric Power (acft/yr) | 43,845 | 13,367 | 8,487 | 21,991 |
| Steam-Electric Power (percent) | 4.85% | 30% | 19% | 50% |
| **Total (acft/yr)** | **904,179** | **166,216** | **658,093** | **79,870** |
| **Total (percent)** | **100.0%** | **18.38%** | **72.78%** | **8.83%** |

[11] Source: 2021 Historical Water Use Summary Estimates. Texas Water Development Board.

### 1.11.2 Major Water Demand Centers

In the SCTRWPA, there are four major water demand centers. These centers are the IH-35 corridor from San Antonio to San Marcos, the Edwards Aquifer region west of the City of San Antonio, the Winter Garden area south of the Edwards Aquifer area, and the coastal area. The IH-35 corridor includes San Antonio, New Braunfels, and San Marcos, which represent some of the fastest growing cities in Texas. In the next 60 years, its water use will follow the same trend as population growth, with most of the demand being for municipal use.

The Edwards Aquifer region west of San Antonio, including Uvalde and Medina Counties, is a major demand center for water to be used for irrigated agriculture. The Winter Garden area, including Zavala, Dimmit, Frio, La Salle, and Atascosa Counties, is also a major water demand center for irrigated agriculture. The coastal area, including the cities of Victoria and Port Lavaca, are major demand centers for water for industrial purposes, with some demand for irrigation in Calhoun County.

## 1.12 Major Water Providers

A major water provider (MWP) is defined as a WUG or a WWP of particular significance to the region's water supply as determined by the RWPG. This may include public or private entities that provide water for any water use category. At the August 1, 2024, RWPG meeting, the SCTRWPG defined the following entities as MWPs for the sixth cycle of regional water planning:

- Canyon Lake Water Service (Texas Water Company)
- GBRA;
- New Braunfels;
- SAWS; and
- San Marcos.

## 1.13 Summary of Existing Plans

### 1.13.1 2022 State Water Plan

In Section 16.051 of the Texas Water Code, the Executive Administrator of the TWDB is charged with producing a State Water Plan that addresses the broad public interest of the state. [12] State Water Plans are to be developed every 5 years and incorporate the regional water plans. In accordance with Section 16.051, "The state water plan shall provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions, in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the entire state."

The goal of the State Water Plan is to identify policies and actions that may be needed to meet Texas' near- and long-term water needs, based on projected uses of water during a drought of record, affordable water supply availability, and the goal of conservation of the state's natural resources. The State Water Plan provides a statewide perspective that places local and regional needs within the state context. In formulating water supply solutions, the plan focuses on economic viability while taking environmental impacts into consideration.

[12] Texas Water Development Board (TWDB). 2022 State Water Plan: Water for Texas. 2022.

The current and most-recent State Water Plan was adopted in 2022. The 2022 State Water Plan includes approximately 5,800 WMSs statewide. If implemented, these strategies would provide 7.7 million acft/yr of water by 2070. Approximately one-third of this volume is from demand management strategies, such as water conservation and short-term drought management efforts. The remaining two-thirds is from projects that would develop new sources of water supply, including new reservoirs (37%), reuse (15%), groundwater development (12%), aquifer storage and recovery (3%) and seawater desalination (3%).

Another key component of the State Water Plan is that projects included in the plan may be eligible for financial assistance from the State Water Implementation Fund for Texas (SWIFT) program. The SWIFT program assists communities in developing and optimizing water supply projects at cost-effective rates by offering low-interest loans, extended repayment terms, and deferral of loan repayments. According to the TWDB's 2022 SWIFT Report to the 88th Legislature [13], the SWIFT program has committed nearly $10 billion to 68 projects included in the State Water Plan since its establishment in 2013. In 2023 and 2024, the TWDB committed an additional $1.5 billion and $3 billion, respectively, bringing the total SWIFT funding commitments to $14.5 billion.

For the SCTRWPA, the 2022 State Water Plan estimates the region's water demands to total 1,050,964 acft/yr in 2020, increasing to 1,320,000 acft/yr in 2070. In 2020, municipal use is the largest water demand category (433,481 acft/yr), followed by irrigation use (358,699 acft/yr). By 2070, irrigation demands are projected to decrease slightly by 0.1% over the planning horizon; whereas municipal demands are projected to increase by 162% to 700,477 acft/yr. The annual water needs (shortages) for the SCTRWPA are estimated to be 204,000 acft/yr in 2020, increasing to 268,000 acft/yr by 2040, and 401,000 acft/yr by 2070. This represents an increase in water needs by 200% over the planning period. In 2020, irrigation and municipal uses account for 64% and 12% of the total needs, respectively. By 2070, irrigation and municipal uses are projected to account for 35% and 54%, respectively.

To address these needs, the 2022 State Water Plan recommended a total of 244 WMSs for the SCTRWPA, which would provide an additional 199,000 acft/yr of water by 2020 and 737,000 acft/yr by 2070. Most of this volume is from groundwater projects and water conservation efforts, each representing 23% of the total WMS volumes by 2070. The total capital costs of recommended WMSs for the SCTRWPA are $4.122 billion.

### 1.13.2 2021 Regional Water Plan

The regional water planning process includes developing projections of population and water demands, identifying existing and future supplies, estimating water needs (shortages), identifying potentially feasible WMSs to meet identified needs, and evaluating such strategies in accordance with TWDB rules. Data associated with demands, population, supplies, needs, and WMSs are defined on the water user group (WUG) level.

The current and most-recent regional water plan for the SCTRWPA is the 2021 South Central Texas Regional Water Plan, adopted by the SCTRWPG in November 2020. The SCTRWPG subsequently adopted a minor amendment to the plan in May 2024.

[13] Texas Water Development Board (TWDB). 2022 Biennial Report on the Use of the State Water Implementation Fund for Texas. 2022 (Updated March 13, 2023).

The 2021 South Central Texas Regional Water Plan outlines the 401 WMSs recommended by the planning group to meet the identified needs in the region. Each potentially feasible WMS was evaluated on the basis of quantity of water, reliability, financial costs, and environmental impacts. Information regarding the methodology and results for the WMS evaluations can be found in Chapter 5, Volume 2 of the 2021 South Central Texas Regional Water Plan.

Selected WMSs contained in the 2021 South Central Texas Regional Water Plan are summarized, as follows:

- Municipal Water Conservation was a recommended WMS for 106 WUGs, with the goal of reducing per capita use to effectively increase supply through demand reduction. The total volume of the WMS is 167,148 acft/yr in 2070, with annual unit costs ranging from $600/acft to $770/acft.
- Recycled Water Strategies includes use of treated wastewater effluent for potable or non-potable purposes. The Recycled Water Strategies within the region are projected to supply 52,388 acft/yr in 2070 with an average annual unit cost of $862/acft.
- Local Groundwater is a WMS that involves the phased development or expansion of well fields in the Carrizo-Wilcox, Trinity, Gulf Coast, Leona Gravel, and Yegua-Jackson aquifers for the purposes of meeting local needs. Planned implementation of this strategy provides new dependable supplies totaling 28,240 acft/yr in 2070, with estimated annual unit costs ranging from $54/acft to $1,317/acft.
- New Braunfels and Victoria both have Aquifer Storage and Recovery (ASR) as a WMS. Both ASR strategies would divert excess treated drinking water to ASR wells for storage in an aquifer. The stored water would then be recovered during times of shortage or drought. The ASR systems would provide New Braunfels and Victoria 10,818 acft/yr and 7,900 acft/yr, respectively.
- Seawater desalination was not included as a recommended WMS because it was not requested for inclusion by WUGs and most needs in the region can be met by fresh water, groundwater, brackish groundwater, reuse, and conservation WMSs.

### 1.13.3 2023 Regional Flood Plans

In 2019, the Texas legislature passed Senate Bill 8 to establish a new regional and state flood planning process aimed at protecting against loss of life and property from flooding. The TWDB delineated 15 Regional Flood Planning Areas and appointed initial members to the Regional Flood Planning Groups. The Regional Flood Planning Groups then prepared and submitted Regional Flood Plans in January 2023 and submitted Amended Regional Flood Plans to TWDB in July 2023. The approved Regional Flood Plans were then incorporated into the state's first 2024 State Flood Plan. Similar to the regional water planning process, the regional flood planning process will occur in 5-year cycles.

Each Regional Flood Plan includes a Flood Hazard Risk Assessment, Flood Management Evaluations, Flood Management Strategies, Flood Management Projects, and administrative, regulatory, and legislative recommendations. Identification of evaluations, strategies, and projects in the Regional Flood Plan can enable sponsors to be eligible for certain types of funding from the TWDB, including the newly established Flood Infrastructure Fund.

The SCTRWPA is located within five Regional Flood Planning Areas, as follows:

- Region 10 - Lower Colorado-Lavaca;
- Region 11 – Guadalupe;
- Region 12- San Antonio;
- Region 13 – Nueces; and
- Region 15 Lower Rio Grande.

The five 2023 Regional Flood Plans include a total of 238 recommended Flood Mitigation Projects, totaling $1.5 billion. For more information about the regional flood planning process and for copies of the state and regional flood plans, visit https://www.twdb.texas.gov/flood/planning/.

### 1.13.4 Local Water Plans

During this planning process, the SCTRWPG worked with each local entity to develop a water management supply plan to meet any identified water needs (shortages) during the planning horizon. In some cases, the SCTRWPG incorporated data, projections, and other information from existing long-range water supply plans developed by local entities. Water management supply plans are reflected in Chapter 5 of this plan.

The TWDB is charged with the approval of groundwater management plans, which are required for all confirmed GCDs in Texas. A groundwater management plan describes a GCD's groundwater management goals, including how to address drought conditions. The districts use methods such as requiring wells in areas that are in danger of over producing groundwater and damaging the aquifers to restrict production by means of production permits, metering the amount of water produced, and working with water utilities, agricultural, and industrial users within the district to promote the efficient use of water.

### 1.13.5 Current Preparations for Drought

Water providers in the SCTRWPA prepare for drought by participating in the regional water planning process, which attempts to meet projected water demands during a drought of severity equivalent to the drought of record. Water providers that provide accurate information to TWDB and consider recommendations accepted by the regional water planning group should be able to supply water to customers throughout drought periods. In addition, all wholesale water providers (WWPs) and most municipalities develop individual drought contingency plans (DCPs) or emergency action plans to be implemented at various stages of a drought. All DCPs are required to set triggering criteria for initiation and termination of drought response stages and contain supply and demand management measures to be implemented during each stage. The retail and wholesale water suppliers' plans contain measures to limit or restrict the use of water for purposes such as to irrigate landscaped areas, to wash any motor vehicle, to fill or add water to any indoor or outdoor swimming pool, to operate any ornamental fountain, and to irrigate golf courses. DCPs are to be developed, updated, and submitted to the TCEQ every 5 years. Further information on DCPs and drought response measures can be found in Chapter 7 of this plan.

Throughout Texas, including the Guadalupe-San Antonio River Basin, water rights are issued under the prior appropriation system. Curtailment of water rights has become necessary in recent droughts. The South Texas Watermaster Program is responsible for managing surface water rights in an area in South

Central Texas according to "run-of-the-river" rights. The program has jurisdiction over the Guadalupe-San Antonio and Nueces river basins, as well as the Lavaca River Basin. Six watermaster deputies patrol the 50 counties in the jurisdictional area and enforce compliance with water rights.

To manage and sustain Edwards Aquifer levels and springflow during times of drought, the EAA developed a Critical Period Management (CPM) Plan. The CPM Plan is divided into five critical period stages, each with a trigger and corresponding temporary reductions in authorized withdrawal amounts for EAA permit holders. The triggers are based on ten-day averages of aquifer water level at the J-17 index well and springflows from the San Marcos Springs and Comal Springs. To protect unique species and their habitats from future water quantity concerns in the Edwards Aquifer, EAA and stakeholders developed the EAHCP, which establishes springflow protection measures. These provisions apply to all holders of regular permits, the customers of all permittees who are retail water utilities, and owners of exempt wells. Under these provisions, during times of drought, water use restrictions and other flow protection measures are engaged, as appropriate and necessary. More information on the EAHCP or EAA's CPM Plan is available at https://www.edwardsaquifer.org/.

Chapter 7 includes additional information and recommendations of the SCTRWPG regarding drought management.

## 1.14 Drought of Record

The historical drought of record for the Guadalupe-San Antonio River Basin of the SCTRWPA is that which occurred primarily in the 1950s. In the upper portions of the Guadalupe-San Antonio River Basin, the 1950s drought generally started in summer of 1947 and continued into early 1957. In the lower basin area near the Gulf Coast, the drought generally was a 3 year period between 1954 and 1956.

Although the drought of 2011 was quite severe in terms of combined gauged streamflows for the Guadalupe River at Victoria and the San Antonio River at Goliad, there were three consecutive years in the 1950s drought (1954 through 1956) during which streamflows in each year were less than those in 2011. Similarly, total Edwards Aquifer recharge in 2011 was twice that for 1956. Hence, it is appropriate to use the 1950s drought as the drought of record for the Guadalupe-San Antonio River Basin.

Until recently, the 1950s drought was the drought of record for the Nueces River Basin as well. However, the 1990s drought was severe and prolonged enough that it is now considered the drought of record for the Nueces River Basin within the SCTRWPA.

## 1.15 Water Loss Audits

In accordance with 31 TAC §357.30, the 2026 South Central Texas Regional Water Plan includes water loss information compiled by the TWDB from water loss audits performed by retail public utilities of the SCTRWPA pursuant to31 TAC §358.6 relating to water loss audits. In addition, in accordance with 31 TAC §357.30, SCTRWPG has considered strategies to address issues identified in the information compiled by the TWDB from the water loss audits performed by retail public utilities.

All retail public water suppliers are required to submit a water loss audit to the TWDB once every five years. Additionally, any retail water supplier with more than 3,300 connections or with an active financial obligation with the TWDB are required to submit an audit annually. The 2020 to 2022 water loss data presented herein were submitted to the TWDB by water utilities in Texas as required HB 3338 of the 78th Texas Legislature. HB 3338 requires the TWDB to compile the information included in water

audits by type of retail public utility and by regional water planning area, and to provide the information to RWPGs for use in identifying appropriate WMSs in regional water plans.

The TWDB provided the list of 73 WUGs within the SCTRWPA that filed a water loss audit report between 2020 and 2022. Table 1-12 shows the apparent and real losses and costs for the respective losses. Apparent and Real Water Losses are defined, as follows:

- **Apparent water losses** are non-physical losses; they result from unauthorized consumption (theft of service), inaccurate customer metering, and systematic data handling errors. It is typically measured in gallons per connection per day (GPCD).
- **Real water losses** are the physical losses through leakage on mains or service lines, or tank overflows. This includes all physical losses from the pressurized system between the point of distribution and the customers' meters. Variable Production Cost (VPC) is used to apply a value to the real loss volume. The VPC reflects the costs associated with, energy and maintenance costs for transmission and distribution pumping, and chemical treatment costs. It is typically measured in gallons per connection per day or the Infrastructure Leakage Index. The ILI is defined by the American Water Works Association (AWWA) as the ratio of current annual real losses to unavoidable annual real losses.

The water loss data were acquired as part of the 2020 to 2022 water loss audit reporting efforts. If a water utility is not listed in the table below, then there were no audit data available for 2020-2022. The methodology used relies upon self-reporting data provided by public utilities, and because of this, the self-reported data may need further refinement. Where available, the values presented are the TWDB-corrected values. Further information regarding the methodology can be found in the TWDB's *Water Loss Audit Manual for Texas Utilities* [14].

**Table 1-12 Water Loss Audit Reports Summary (2020 to 2022)**

| Water User Group | Most Recent Report Year | Real Loss (GPCD) | Apparent Loss (GPCD) | Total Water Loss (GPCD) | ILI* | Real Loss Cost ($) | Apparent Loss Cost ($) |
|---|---|---|---|---|---|---|---|
| Aqua Water Supply Corporation (WSC) | 2022 | 46.80 | 8.05 | 54.85 | | $990,442 | $276,169 |
| Atascosa Rural WSC | 2020 | 29.74 | 0.84 | 30.58 | 1.36 | $41,251 | $2,322 |
| Benton City WSC | 2022 | 44.49 | 13.44 | 57.93 | | $581,655 | $136,642 |
| Boerne | 2021 | 19.58 | 6.76 | 26.34 | 1.05 | $109,536 | $43,435 |
| C Willow Water | 2020 | 91.60 | 12.90 | 104.5 | | $25,008 | $3,523 |

[14] Texas Water Development Board (TWDB). 2008. *Report No. 367 – Water Loss Audit Manual for Texas Utilities.* March 2008. http://www.twdb.texas.gov/publications/brochures/conservation/doc/WaterLossManual_2008.pdf?d=1107885.7699999935.

| Water User Group | Most Recent Report Year | Real Loss (GPCD) | Apparent Loss (GPCD) | Total Water Loss (GPCD) | ILI* | Real Loss Cost ($) | Apparent Loss Cost ($) |
|---|---|---|---|---|---|---|---|
| Canyon Lake Water Service (Texas Water Company) | 2020 | 57.67 | 14.88 | 72.55 | 2.77 | $197,745 | $248,379 |
| Castroville | 2022 | 56.32 | 15.26 | 71.58 | | $8,293 | $70,405 |
| Cibolo | 2022 | 11.64 | 6.03 | 17.67 | 0.79 | $153,352 | $81,264 |
| Clear Water Estates Water System (Texas Water Company) | 2020 | 9.37 | 10.40 | 19.77 | | $227 | $2,616 |
| Concan WSC | 2022 | 10.08 | 5.01 | 15.09 | | $2,047 | $2,655 |
| Converse | 2022 | 49.35 | 1.84 | 51.18 | 3.05 | $450,955 | $22,761 |
| Cotulla | 2022 | 210.67 | 30.20 | 240.87 | | $324,807 | $54,126 |
| County Line Special Utility District (SUD) | 2021 | 21.92 | 9.38 | 31.3 | 1.27 | $36,199 | $56,304 |
| Creedmoor-Maha WSC | 2022 | 18.96 | 1.33 | 20.29 | | $7,135 | $10,862 |
| Crystal Clear SUD | 2022 | 84.33 | 1.22 | 85.55 | 2.63 | $807,627 | $27,103 |
| Devine | 2022 | 16.72 | 10.48 | 27.2 | | $37,157 | $40,231 |
| Dilley | 2020 | 353.47 | 20.98 | 374.45 | | $122,914 | $47,426 |
| East Medina County SUD | 2020 | 209.03 | 2.89 | 211.93 | | $16,285 | $6,060 |
| El Oso WSC | 2022 | 154.16 | 5.74 | 159.89 | | $74,978 | $22,358 |
| Elmendorf | 2022 | 16.50 | 7.27 | 23.77 | | $19,659 | $29,042 |
| Fair Oaks Ranch | 2020 | 15.36 | 0.98 | 16.34 | 0.82 | $34,762 | $4,219 |
| Fayette WSC | 2020 | 72.54 | 5.37 | 77.91 | | $258,731 | $19,908 |
| Floresville | 2021 | 70.50 | 1.35 | 71.86 | | $183,277 | $42,932 |
| Garden Ridge | 2022 | 11.48 | 14.29 | 25.77 | | $36,881 | $41,500 |
| Goforth SUD | 2022 | 24.88 | 11.82 | 36.7 | 1.34 | $105,634 | $100,342 |
| Goliad | 2022 | 100.01 | 22.91 | 122.91 | | $37,306 | $43,063 |
| Gonzales | 2021 | 18.72 | 6.70 | 25.43 | 1.24 | $65,379 | $23,561 |
| Gonzales County WSC | 2020 | 78.32 | 36.13 | 114.45 | | $275,306 | $129,657 |

| Water User Group | Most Recent Report Year | Real Loss (GPCD) | Apparent Loss (GPCD) | Total Water Loss (GPCD) | ILI* | Real Loss Cost ($) | Apparent Loss Cost ($) |
|---|---|---|---|---|---|---|---|
| Green Valley SUD | 2020 | 58.90 | 3.27 | 62.17 | 2.35 | $692,779 | $73,370 |
| Hondo | 2022 | 63.85 | 42.80 | 106.64 | | $194,862 | $130,668 |
| Jourdanton | 2021 | 23.11 | 10.70 | 33.81 | | $78,604 | $14,201 |
| Kendall County Water Control and Improvement District (WCID) 1 | 2020 | 34.97 | 3.32 | 38.29 | | $6,510 | $3,277 |
| Kendall West Utility | 2020 | 67.51 | 12.14 | 79.65 | | $256,129 | $50,295 |
| Kenedy | 2020 | 23.67 | 7.19 | 30.86 | | $8,515 | $11,674 |
| Kyle | 2022 | 20.04 | 6.13 | 26.17 | 1.43 | $266,511 | $271,559 |
| La Vernia | 2021 | 82.43 | 36.57 | 118.99 | | $84,054 | $44,864 |
| Lockhart | 2020 | 29.15 | 11.74 | 40.89 | 1.87 | $147,547 | $95,526 |
| Loma Alta Chula Vista Water System | 2020 | 187.94 | 8.41 | 196.36 | | $8,542 | $2,172 |
| Luling | 2022 | 42.36 | 4.23 | 46.59 | | $85,825 | $13,959 |
| Martindale WSC | 2022 | 18.97 | 3.62 | 22.6 | | $14,806 | $4,242 |
| McCoy WSC | 2020 | 64.97 | 6.51 | 71.47 | | $18,731 | $16,994 |
| New Braunfels | 2022 | 39.03 | 7.44 | 46.46 | 2.27 | $1,160,643 | $418,957 |
| Nixon | 2020 | 3.17 | 34.11 | 37.28 | | $2,923 | $31,442 |
| Oak Hills WSC | 2020 | 8.44 | 9.03 | 17.47 | | $17,686 | $10,085 |
| Pleasanton | 2022 | 24.64 | 7.67 | 32.31 | 1.59 | $22,563 | $43,309 |
| Polonia WSC | 2020 | 179.33 | 5.63 | 184.96 | | $16,285 | $3,705 |
| Port Lavaca | 2022 | 105.29 | 6.71 | 112 | 9.23 | $1,128,067 | $129,708 |
| Port Oconnor Improvement District | 2022 | 36.00 | 4.86 | 40.86 | | $96,232 | $129,873 |
| Poteet | 2020 | 127.16 | 11.46 | 138.62 | | $896,816 | $165,713 |
| Refugio | 2022 | 14.96 | 5.34 | 20.29 | | $13,593 | $6,062 |
| Sabinal | 2020 | 94.27 | 14.28 | 108.54 | | $7,164 | $10,083 |
| San Antonio Water System | 2022 | 59.03 | 3.41 | 62.44 | 3.56 | $118,648,119 | $8,723,927 |

| Water User Group | Most Recent Report Year | Real Loss (GPCD) | Apparent Loss (GPCD) | Total Water Loss (GPCD) | ILI* | Real Loss Cost ($) | Apparent Loss Cost ($) |
|---|---|---|---|---|---|---|---|
| San Marcos | 2022 | 61.70 | 3.25 | 64.96 | 2.81 | $465,769 | $76,851 |
| Schertz | 2022 | 44.50 | 4.02 | 48.52 | 2.61 | $514,740 | $86,231 |
| Seguin | 2022 | 38.95 | 22.67 | 61.62 | 2.16 | $219,053 | $350,758 |
| Selma | 2022 | 44.45 | 5.27 | 49.72 | 2.13 | $117,173 | $32,352 |
| South Buda WCID 1 | 2022 | 19.31 | 3.46 | 22.77 | | $52,357 | $10,568 |
| Springs Hill WSC | 2022 | 111.19 | 2.69 | 113.88 | 3.64 | $1,747,246 | $42,344 |
| Stockdale | 2020 | 79.05 | 6.44 | 85.49 | | $73,645 | $7,467 |
| Sunko WSC | 2022 | 27.53 | 1.84 | 29.37 | | $44,069 | $4,712 |
| The Oaks WSC | 2020 | 5.46 | 8.12 | 13.57 | | $6,138 | $12,344 |
| Three Oaks WSC | 2021 | 37.93 | 10.99 | 48.92 | | $2,928 | $92,337 |
| Tri Community WSC | 2020 | 27.27 | 16.76 | 44.04 | | $2,419 | $8,921 |
| Universal City | 2021 | 15.38 | 7.89 | 23.27 | 0.94 | $11,878 | $34,172 |
| Victoria | 2022 | 92.12 | 6.54 | 98.65 | 9.67 | $401,568 | $164,412 |
| Victoria County WCID 1 | 2022 | 74.45 | 11.42 | 85.87 | | $3,869 | $41,221 |
| West Medina WSC | 2020 | 221.36 | 9.22 | 230.58 | | $14,676 | $3,619 |
| Wimberley WSC | 2020 | 17.45 | 11.98 | 29.43 | | $3,693 | $23,764 |
| Woodsboro | 2022 | 16.25 | 6.58 | 22.83 | | $11,760 | $5,717 |
| Yancey WSC | 2020 | 116.02 | 7.59 | 123.61 | | $335,856 | $21,986 |
| Yoakum | 2021 | 10.25 | 9.96 | 20.21 | | $3,093 | $32,473 |
| Yorktown | 2021 | 109.49 | 7.50 | 116.99 | | $7,809 | $26,732 |
| Zavala County WCID 1 | 2021 | 239.19 | 17.45 | 256.65 | | $24,439 | $10,824 |

*ILI is only reported for WUGs with more than 3,300 connections

FINAL PLAN

# CHAPTER 2: POPULATION AND WATER DEMAND PROJECTIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**2.0 Population and Water Demand Projections ..... 2-1**
2.1 Introduction ..... 2-1
2.2 Population Projections ..... 2-2
2.2.1 Water User Groups ..... 2-3
2.2.2 Counties ..... 2-3
2.2.3 River and Coastal Basins ..... 2-5
2.2.4 Major Water Providers ..... 2-6
2.3 Water Demand Projections ..... 2-6
2.3.1 Water User Groups ..... 2-7
2.3.2 Counties ..... 2-7
2.3.3 River and Coastal Basins ..... 2-9
2.3.4 Use Type ..... 2-10
2.3.5 Major Water Providers ..... 2-27
2.4 Contractual Obligations for Water User Groups and Wholesale Water Providers ..... 2-28

## APPENDICES

Appendix 2A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)
Appendix 2B: Passive Conservation Water Savings by Decade

## LIST OF TABLES

Table 2-1 Population Projections for the South Central Texas Region (No. of People) ..... 2-1
Table 2-2 Water Demand Projections for the South Central Texas Region (acft/yr) ..... 2-1
Table 2-3 Population Projections for Individual Counties (2030 to 2080) (No. of People) ..... 2-4
Table 2-4 Population Projections for Individual River and Coastal Basins (2030 to 2080) (No. of People) ..... 2-5
Table 2-5 Population Projections for Major Water Providers (2030 to 2080) (No. of People) ..... 2-6
Table 2-6 Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr) ..... 2-8
Table 2-7 Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-10
Table 2-8 Water Demand Projections for Individual Use Types (2030, 2050, and 2080) ..... 2-11
Table 2-9 Irrigation Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr) ..... 2-12
Table 2-10 Irrigation Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-13

Table 2-11 Livestock Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr) ..... 2-14
Table 2-12 Livestock Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-15
Table 2-13 Manufacturing Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr) ..... 2-17
Table 2-14 Manufacturing Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-18
Table 2-15 Mining Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr) ..... 2-19
Table 2-16 Mining Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-20
Table 2-17 Passive Conservation Water Savings from Plumbing Code Savings for Individual Counties (2030 to 2080) (acft/yr) ..... 2-21
Table 2-18 Passive Conservation Water Savings from Plumbing Code Savings for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-22
Table 2-19 Municipal Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr) ..... 2-23
Table 2-20 Municipal Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-24
Table 2-21 Steam-Electric Power Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr) ..... 2-25
Table 2-22 Steam-Electric Power Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr) ..... 2-26
Table 2-23 Water Demand Projections for Major Water Providers (2030 to 2080) (acft/yr) ..... 2-27

## LIST OF FIGURES

Figure 2-1 Selected Migration Scenarios in the South Central Texas Region ..... 2-2
Figure 2-2 South Central Texas Region Population Projections (2030 to 2080) ..... 2-3
Figure 2-3 Population Projections by County (2030 and 2080) ..... 2-4
Figure 2-4 Water Demand Projections by Use Sector (2030 to 2080) ..... 2-7
Figure 2-5 Water Demand Projections by County (2030 and 2080) ..... 2-8
Figure 2-6 Water Demand Projections by River and Coastal Basin (2030 to 2080) ..... 2-9
Figure 2-7 Water Demand Projections by Use Type (2030 to 2080) ..... 2-11
Figure 2-8 Irrigation Water Demand Projections (2030 to 2080) ..... 2-12
Figure 2-9 Livestock Water Demand Projections (2030 to 2080) ..... 2-14
Figure 2-10 Manufacturing Water Demand Projections (2030 to 2080) ..... 2-16
Figure 2-11 Mining Water Demand Projections (2030 to 2080) ..... 2-19
Figure 2-12 Projected Per Capita Water Use and Municipal Water Demand ..... 2-23
Figure 2-13 Steam-Electric Power Water Demand Projections (2030 to 2080) ..... 2-25

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft/yr | Acre-Feet per Year |
| DB27 | 2027 Regional and State Water Planning Database |
| GBRA | Guadalupe-Blanco River Authority |
| GPCD | Gallons Per Capita Per Day |
| IH-35 | Interstate Highway 35 |
| MWP | Major Water Provider |
| RWPG | Regional Water Planning Group |
| SAWS | San Antonio Water System |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| TDC | Texas Demographic Center |
| TWDB | Texas Water Development Board |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |

# 2.0 Population and Water Demand Projections

## 2.1 Introduction

This chapter presents the results of Tasks 2A and 2B of the project scope, which is the development of population and water demand projections from 2030 to 2080 for the South Central Texas (Region L) Regional Water Planning Area (SCTRWPA). Additionally, the chapter outlines the guidelines and methodology used to develop the projections.

The Texas Water Development Board (TWDB) collaborated with the Regional Water Planning Groups (RWPGs) to develop the adopted population and water demand projections for the region's water users. The SCTRWPA consists of 20 full counties and part of Hays County. Table 2-1 summarizes the population projections for the SCTRWPA. Table 2-2 summarizes water demand projections for the following water use categories in Region L: irrigation, livestock, manufacturing, mining, municipal, and steam-electric power generation. Demands are presented in acre-feet per year (acft/yr) [1].

Population and municipal demands were estimated for utilities and rural areas for municipal water user group (WUG) projections. Water demand projections for non-municipal water users were aggregated into WUGs based on their geographical locations within a given county and river basin. TWDB estimated demands using historical data and recent studies for each water use category to establish the base year. The base year was used with a rate of change to project decadal estimates over the 50-year planning horizon.

**Table 2-1 Population Projections for the South Central Texas Region (No. of People)**

| Regional Projections | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Total** | 3,987,279 | 4,793,957 | 5,469,629 | 6,176,459 | 6,897,460 | 7,689,377 |

**Table 2-2 Water Demand Projections for the South Central Texas Region (acft/yr)**

| Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation | 314,645 | 314,645 | 314,645 | 314,645 | 314,645 | 314,645 |
| Livestock | 24,641 | 24,641 | 24,641 | 24,641 | 24,641 | 24,641 |
| Manufacturing | 110,929 | 115,034 | 119,292 | 123,706 | 128,283 | 133,030 |
| Mining | 74,126 | 77,971 | 81,760 | 85,423 | 88,890 | 48,880 |
| Municipal | 530,751 | 616,476 | 691,969 | 773,195 | 856,949 | 956,362 |
| Steam-Electric Power | 79,879 | 79,879 | 79,879 | 79,879 | 79,879 | 79,879 |
| **Total** | **1,134,971** | **1,228,646** | **1,312,186** | **1,401,489** | **1,493,287** | **1,557,437** |

[1] One acft is approximately 325,851 gallons.

## 2.2 Population Projections

The population projections in this plan were developed over the 50-year planning horizon (2030 to 2080) in accordance with TWDB guidelines, utilizing the 2020 US Census data and growth projections established by the Texas State Office of the State Demographer. These data were further refined on a county, subcounty, and WUG basis by the TWDB in consultation with Texas Commission on Environmental Quality, Texas Department of Agriculture, and the Texas Parks and Wildlife Department. RWPGs were provided an opportunity to review and suggest adjustments to population projections, as necessary, for municipal WUGs delineated by utility service area boundaries.

The 2026 Regional Water Plan population projections are based on county-level projections from the Texas Demographic Center (TDC), which used migration rates between the 2010 Census and 2020 Census to project future growth. These projections included associated updates in the TDC cohort model to reflect updated birth and mortality rates. The TWDB drafted WUG-level population and water demand projections using the TDC's full-migration scenario (1.0) projections and provided the half-migration scenario (0.5) projections by Region-County for the planning groups' consideration. The higher of the total regional populations is the allowable cap on total population for the region. For each county, the South Central Texas Regional Water Planning Group (SCTRWPG) reviewed migration scenarios and solicited feedback from water provider representatives, then selected the most appropriate migration scenario as shown on Figure 2-1.

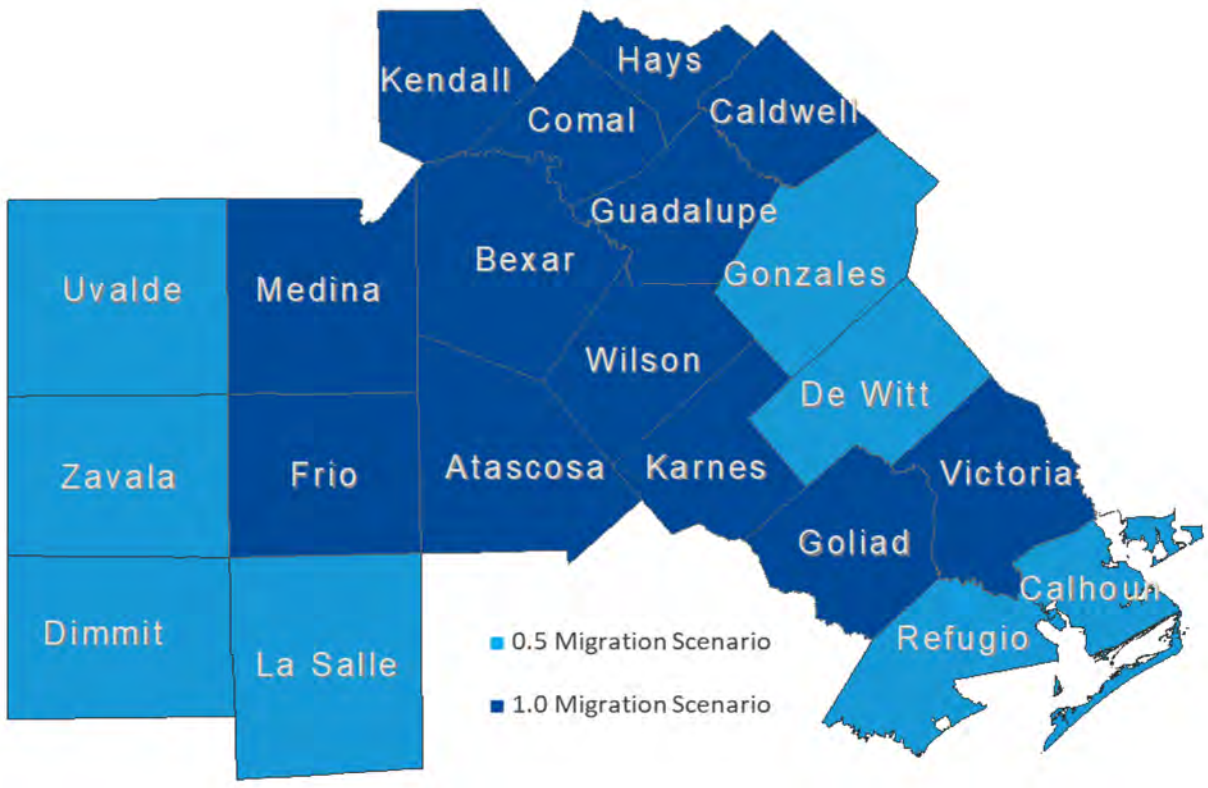



**Figure 2-1 Selected Migration Scenarios in the South Central Texas Region**

The population of the SCTRWPA is projected to increase from 3,987,279 in 2030 to 7,689,377 in 2080, an increase of 93% (Figure 2-2). Population is projected to increase by 11 to 20% each decade, with the largest decadal population growth of 20% between 2030 and 2040. Most population growth is expected to occur along the Interstate Highway 35 (IH-35) corridor. The following sections present population projections for each planning decade by WUG, counties, river and coastal basins, and major water providers (MWPs).

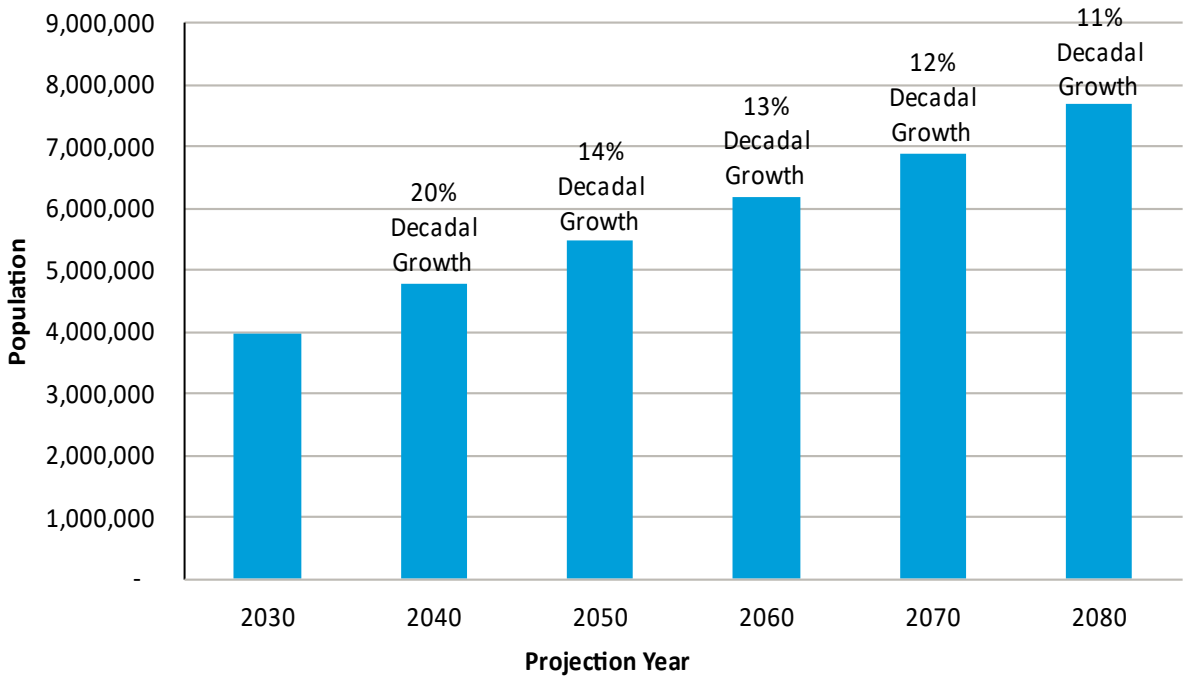



**Figure 2-2 South Central Texas Region Population Projections (2030 to 2080)**

### 2.2.1 Water User Groups

Population projections for each WUG within the SCTRWPA are provided in Appendix 2A, which includes relevant reports from the 2027 Regional and State Water Planning Database (DB27).

### 2.2.2 Counties

Approximately 64% of the SCTRWPA's population is projected to reside in Bexar County in 2030. By 2080, the Bexar County population is expected to increase by approximately 1,390,419 people and comprise 51% of the region's total population (Figure 2-3 and Table 2-3). In addition to Bexar County, Comal, Guadalupe, and Hays counties represent the counties with the largest anticipated population growth between 2030 and 2080, with population increases of 693,793; 446,600; and 904,630, respectively. However, many counties, primarily in rural areas, are projected to experience population declines between 2030 and 2080, including Calhoun, DeWitt, Dimmit, Goliad, Gonzales, La Salle, Refugio, Uvalde, and Zavala Counties.

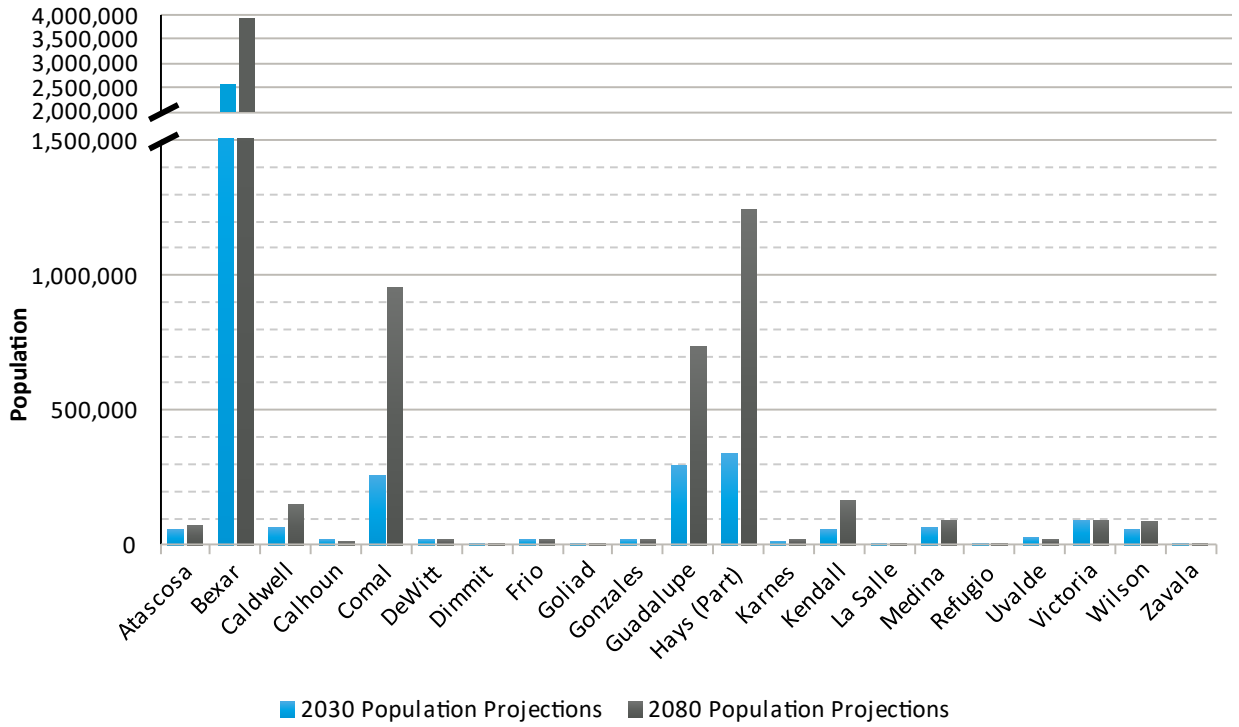



**Figure 2-3 Population Projections by County (2030 and 2080)**

**Table 2-3 Population Projections for Individual Counties (2030 to 2080) (No. of People)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 53,324 | 57,374 | 61,473 | 64,960 | 68,952 | 73,522 |
| Bexar | 2,555,076 | 2,951,404 | 3,222,978 | 3,470,641 | 3,699,975 | 3,945,495 |
| Caldwell | 67,191 | 83,988 | 100,497 | 116,808 | 134,861 | 151,345 |
| Calhoun | 19,449 | 18,619 | 17,599 | 16,571 | 15,483 | 14,332 |
| Comal | 259,280 | 350,779 | 447,841 | 584,380 | 756,273 | 953,073 |
| DeWitt | 19,716 | 19,687 | 19,565 | 19,482 | 19,394 | 19,301 |
| Dimmit | 8,175 | 7,818 | 7,383 | 6,983 | 6,560 | 6,112 |
| Frio | 19,512 | 20,540 | 21,269 | 21,643 | 22,071 | 22,561 |
| Goliad | 6,803 | 6,648 | 6,559 | 6,454 | 6,334 | 6,197 |
| Gonzales | 19,716 | 19,697 | 19,399 | 19,064 | 18,710 | 18,335 |
| Guadalupe | 292,903 | 385,703 | 462,052 | 542,643 | 634,587 | 739,503 |
| Hays (part)* | 336,064 | 500,806 | 683,104 | 877,560 | 1,051,675 | 1,240,694 |
| Karnes | 15,357 | 16,052 | 16,739 | 17,527 | 18,429 | 19,462 |
| Kendall | 56,306 | 70,896 | 89,665 | 111,448 | 136,387 | 164,940 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| La Salle | 6,723 | 6,766 | 6,690 | 6,529 | 6,359 | 6,179 |
| Medina | 60,936 | 79,204 | 83,631 | 87,079 | 90,594 | 92,654 |
| Refugio | 6,489 | 6,243 | 5,992 | 5,799 | 5,595 | 5,379 |
| Uvalde | 24,967 | 24,478 | 23,759 | 22,944 | 22,080 | 21,167 |
| Victoria | 93,954 | 96,082 | 96,608 | 96,168 | 95,664 | 95,087 |
| Wilson | 55,858 | 61,941 | 67,968 | 73,304 | 79,413 | 86,407 |
| Zavala | 9,480 | 9,232 | 8,858 | 8,472 | 8,064 | 7,632 |
| **Total** | **3,987,279** | **4,793,957** | **5,469,629** | **6,176,459** | **6,897,460** | **7,689,377** |

* Hays County is split between Region K and Region L; population projections shown above are for Region L. Hays County population totals including Region K are 431,531 in 2030; 638,523 in 2040; 876,457 in 2050; 1,146,428 in 2060; 1,406,124 in 2070; and 1,692,131 in 2080.

### 2.2.3 River and Coastal Basins

The South Central Texas Region includes portions of the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca river basins and portions of the San Antonio-Nueces, Lavaca-Guadalupe, and Colorado-Lavaca coastal basins. The most populous river and coastal basins in the SCTRWPA are the San Antonio, Guadalupe, and Nueces. In the year 2080, approximately 59% of the population of the South Central Texas Region is projected to reside in the San Antonio River Basin and 37% in the Guadalupe River Basin (Table 2-4).

**Table 2-4 Population Projections for Individual River and Coastal Basins (2030 to 2080) (No. of People)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado River | 12,675 | 20,877 | 29,346 | 37,655 | 46,383 | 55,527 |
| Colorado-Lavaca Coastal | 1,114 | 1,109 | 1,090 | 1,066 | 1,046 | 1,037 |
| Guadalupe River | 924,766 | 1,256,278 | 1,590,868 | 1,975,775 | 2,380,851 | 2,830,732 |
| Lavaca River | 3,508 | 3,492 | 3,455 | 3,405 | 3,349 | 3,288 |
| Lavaca-Guadalupe Coastal | 50,865 | 50,795 | 49,982 | 48,832 | 47,593 | 46,255 |
| Nueces River | 167,029 | 174,122 | 179,350 | 182,752 | 186,764 | 191,670 |
| Rio Grande River | 32 | 29 | 25 | 21 | 15 | 6 |
| San Antonio River | 2,820,266 | 3,280,481 | 3,608,988 | 3,920,623 | 4,225,334 | 4,554,951 |
| San Antonio-Nueces Coastal | 7,024 | 6,774 | 6,525 | 6,330 | 6,125 | 5,911 |
| **Total** | **3,987,279** | **4,793,957** | **5,469,629** | **6,176,459** | **6,897,460** | **7,689,377** |

Note: Populations shown are representative of portions located within the South Central Texas Region.

### 2.2.4 Major Water Providers

A MWP is defined as a WUG or a wholesale water provider (WWP) of particular significance to the region's water supply as determined by the RWPG. This may include public or private entities that provide water for any water use category. At the August 1, 2024, RWPG meeting, the SCTRWPG defined the following entities as MWPs for the sixth cycle of regional water planning:

- Canyon Lake Water Service (Texas Water Company);
- Guadalupe-Blanco River Authority (GBRA);
- New Braunfels;
- San Antonio Water System (SAWS); and
- San Marcos.

Table 2-5 provides population projections for MWPs in the SCTRWPA.

**Table 2-5 Population Projections for Major Water Providers (2030 to 2080) (No. of People)**

| Major Water Provider | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Canyon Lake Water Service (Texas Water Company) [1] | 94,804 | 129,631 | 151,722 | 166,056 | 219,685 | 278,860 |
| GBRA | 8,888 | 12,326 | 11,956 | 11,605 | 11,202 | 10,743 |
| New Braunfels | 140,358 | 199,891 | 275,870 | 368,213 | 473,912 | 594,914 |
| SAWS | 2,351,317 | 2,737,300 | 2,991,858 | 3,225,872 | 3,439,373 | 3,664,850 |
| San Marcos | 141,830 | 199,786 | 246,158 | 280,361 | 302,406 | 316,607 |
| **Total** | **2,737,197** | **3,278,934** | **3,677,564** | **4,052,107** | **4,446,578** | **4,865,974** |

[1] Canyon Lake Water Service (Texas Water Company) is split between Region K and Region L; population projections shown above are for Region L only. WUG population totals including Region K are 97,872 in 2030; 132,769 in 2040; 154,911 in 2050; 169,282 in 2060; 222,938 in 2070; and 282,113 in 2080.

## 2.3 Water Demand Projections

Water demand projections for the South Central Texas Region are summarized on Figure 2-4. Demands are also shown for each use type or sector. Water demands are measured in acft/yr.

In 2030, water demands for all use sectors in the SCTRWPA are projected to be 1,134,971 acft/yr. By 2080, total water demands for the region are expected to increase by 37% to 1,557,437 acft/yr.

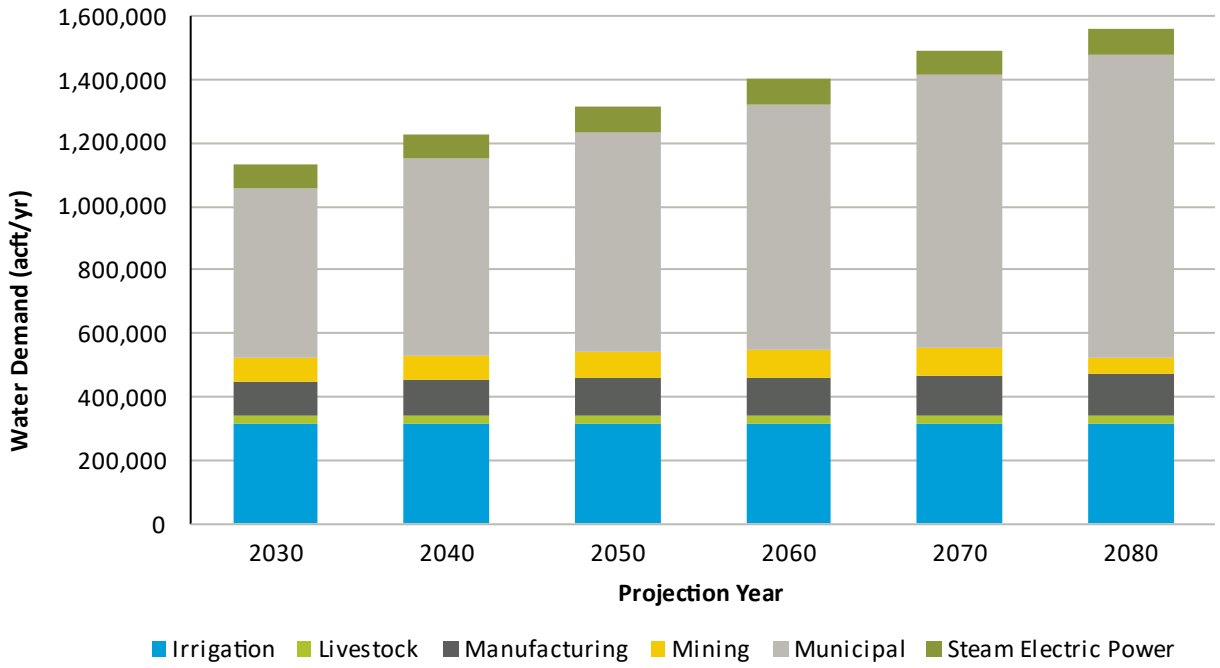



**Figure 2-4 Water Demand Projections by Use Sector (2030 to 2080)**

### 2.3.1 Water User Groups

Water demand projections for each WUG within the South Central Texas Region are presented in Appendix 2A. San Antonio Water System, New Braunfels, and Hays County-Other are projected to have the greatest growth in water demands between 2030 and 2080, with increases of 87,633 acft/yr, 70,904 acft/yr, and 23,209 acft/yr, respectively. The WUGs with the greatest percent increase in demands between 2030 and 2080 are Hays County-Other, South Buda WCID 1, and Comal County-Other with percent increases of 1,005%, 534%, and 525%, respectively.

### 2.3.2 Counties

Water demand projections are summarized by county on Figure 2-5 and in Table 2-6. Bexar, Comal, and Hays Counties are projected to have the greatest growth in water demand volumes between 2030 and 2080, with increases of 107,789 acft/yr, 135,589 acft/yr, and 96,517 acft/yr, respectively. Over the planning horizon, counties with the greatest percent increase in demands are Comal, Hays, and Kendall, growing by 232%, 223%, and 191%, respectively between 2030 and 2080.

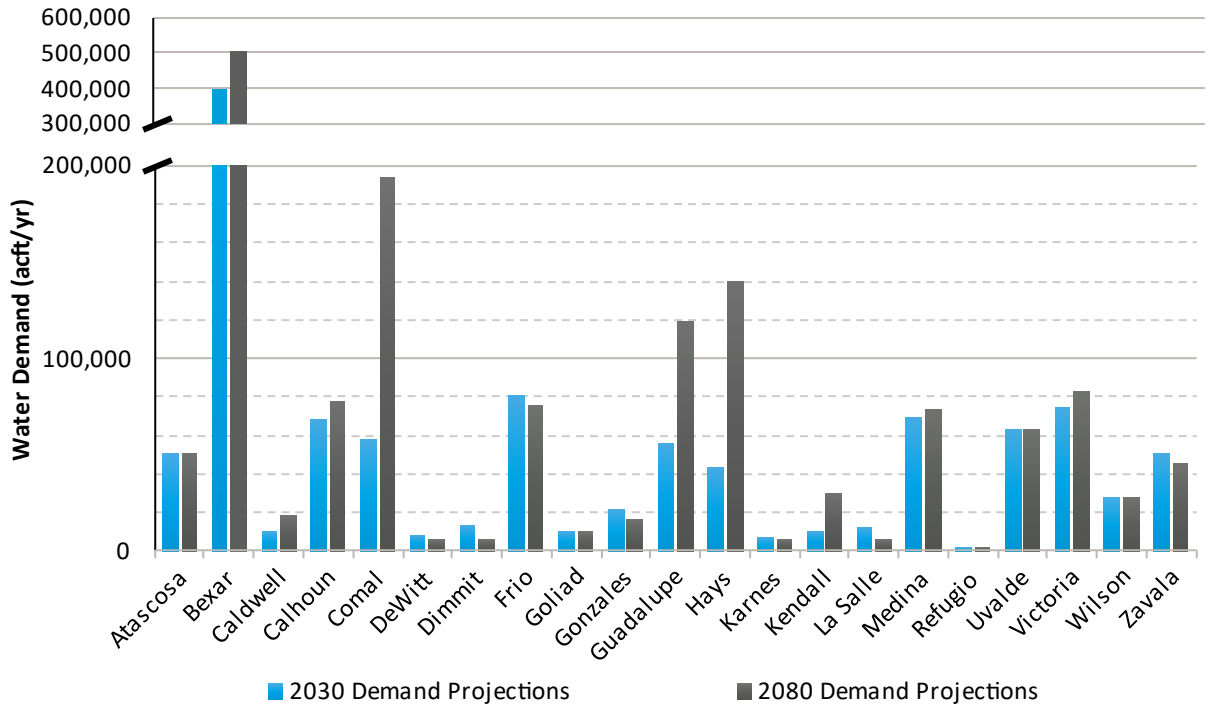



**Figure 2-5 Water Demand Projections by County (2030 and 2080)**

**Table 2-6 Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 51,026 | 51,869 | 52,764 | 53,584 | 54,455 | 50,215 |
| Bexar | 396,152 | 428,883 | 451,020 | 468,589 | 483,258 | 503,941 |
| Caldwell | 10,019 | 11,820 | 13,646 | 15,439 | 17,439 | 18,967 |
| Calhoun | 67,994 | 69,880 | 71,830 | 73,857 | 75,954 | 78,125 |
| Comal | 58,372 | 76,280 | 96,597 | 124,502 | 157,042 | 193,961 |
| DeWitt | 8,151 | 8,140 | 8,125 | 8,118 | 8,108 | 6,412 |
| Dimmit | 12,973 | 12,890 | 12,803 | 12,720 | 12,637 | 6,412 |
| Frio | 81,199 | 81,534 | 81,776 | 81,843 | 81,917 | 76,007 |
| Goliad | 9,836 | 9,814 | 9,803 | 9,791 | 9,777 | 9,761 |
| Gonzales | 22,035 | 22,136 | 22,196 | 22,250 | 22,302 | 16,183 |
| Guadalupe | 56,349 | 69,418 | 80,346 | 91,858 | 104,977 | 119,161 |
| Hays* | 43,189 | 60,339 | 78,814 | 99,478 | 118,291 | 139,706 |
| Karnes | 7,417 | 7,574 | 7,742 | 7,932 | 8,153 | 6,485 |
| Kendall | 10,284 | 13,140 | 16,545 | 20,445 | 24,885 | 29,962 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| La Salle | 11,768 | 11,760 | 11,756 | 11,750 | 11,754 | 6,376 |
| Medina | 68,856 | 71,174 | 71,959 | 72,637 | 73,273 | 73,731 |
| Refugio | 2,311 | 2,272 | 2,240 | 2,216 | 2,193 | 2,175 |
| Uvalde | 63,276 | 63,368 | 63,435 | 63,475 | 63,494 | 63,492 |
| Victoria | 74,612 | 76,401 | 78,019 | 79,511 | 81,048 | 82,624 |
| Wilson | 28,061 | 28,893 | 29,760 | 30,537 | 31,428 | 27,829 |
| Zavala | 51,091 | 51,061 | 51,010 | 50,957 | 50,902 | 45,912 |
| **Total** | **1,134,971** | **1,228,646** | **1,312,186** | **1,401,489** | **1,493,287** | **1,557,437** |

* Hays County is split between Region K and Region L; water demands shown above are for Region L. Hays County water demand totals including Region K are 62,581 acft/yr in 2030; 87,220 acft/yr in 2040; 115,456 acft/yr in 2050; 148,881 acft/yr in 2060; 181,784 acft/yr in 2070; and 219,173 acft/yr in 2080.

### 2.3.3 River and Coastal Basins

Water demand projections for the South Central Texas Region from 2030 to 2080 are summarized by river and coastal basin on Figure 2-6 and in Table 2-7. More than 90% of the water demands in 2030 are in the San Antonio, Nueces, and Guadalupe River basins. Compared to 2030 projected demands, the Guadalupe River Basin water demands in 2080 are expected to increase by 276,591 acft/yr, representing a 115% increase.

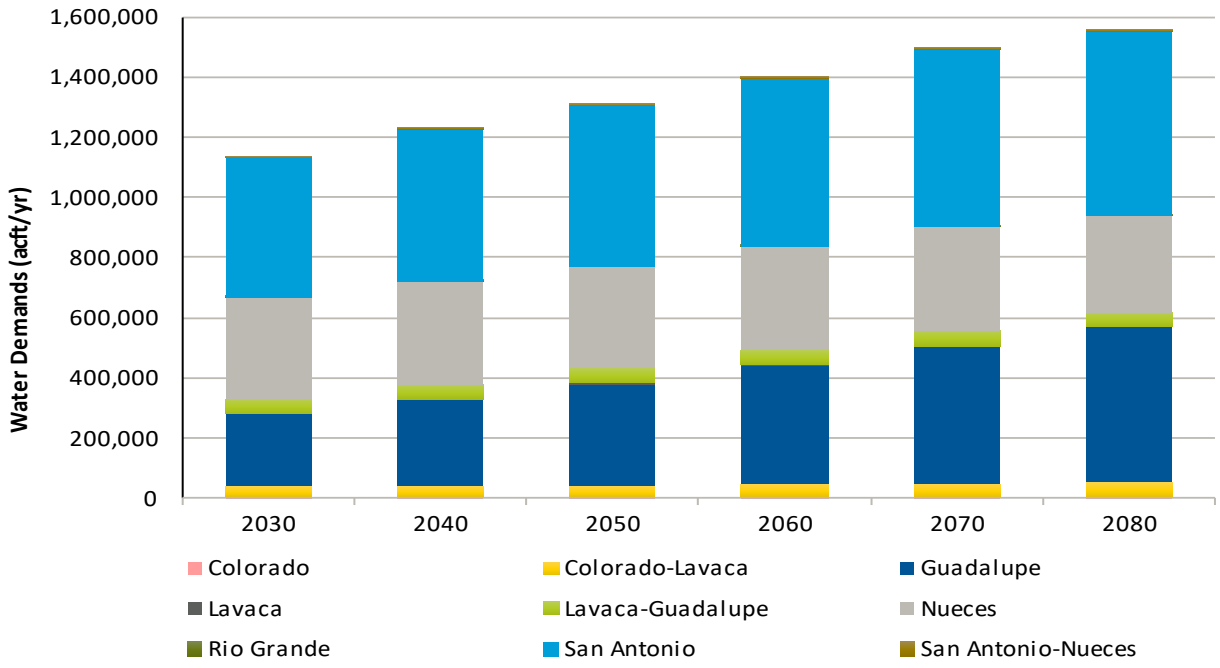



**Figure 2-6 Water Demand Projections by River and Coastal Basin (2030 to 2080)**

**Table 2-7 Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | 1,459 | 2,323 | 3,230 | 4,120 | 5,057 | 6,042 |
| Colorado-Lavaca | 37,227 | 38,576 | 39,974 | 41,426 | 42,929 | 44,492 |
| Guadalupe | 241,519 | 288,990 | 337,440 | 395,324 | 456,989 | 518,110 |
| Lavaca | 1,910 | 1,916 | 1,923 | 1,926 | 1,929 | 1,478 |
| Lavaca-Guadalupe | 46,794 | 47,408 | 47,958 | 48,471 | 48,997 | 49,530 |
| Nueces | 337,316 | 339,047 | 340,585 | 341,759 | 342,963 | 315,890 |
| Rio Grande | 1,177 | 1,177 | 1,176 | 1,176 | 1,175 | 521 |
| San Antonio | 463,648 | 505,296 | 535,988 | 563,368 | 589,316 | 617,427 |
| San Antonio-Nueces | 3,921 | 3,913 | 3,912 | 3,919 | 3,932 | 3,947 |
| **Total** | **1,134,971** | **1,228,646** | **1,312,186** | **1,401,489** | **1,493,287** | **1,557,437** |

### 2.3.4 Use Type

Water demand projections for the SCTRWPA are categorized by use type, which includes irrigation, livestock, manufacturing, mining, municipal, and steam-electric power. Figure 2-7 shows the water demand projections by use type over the planning horizon, and Table 2-8 shows the projected use sector water demands by volume and as a proportion of the total demands (percent) in 2030, 2050, and 2080. The municipal and manufacturing sectors are expected to increase over the planning horizon; whereas the irrigation, livestock, and steam-electric power sectors are expected to remain unchanged from 2030 to 2080. The mining sector is expected to experience a gradual increase between 2030 and 2070, then decrease significantly between 2070 and 2080. Further discussion of water demand projections for each use type is provided in the following subsections.

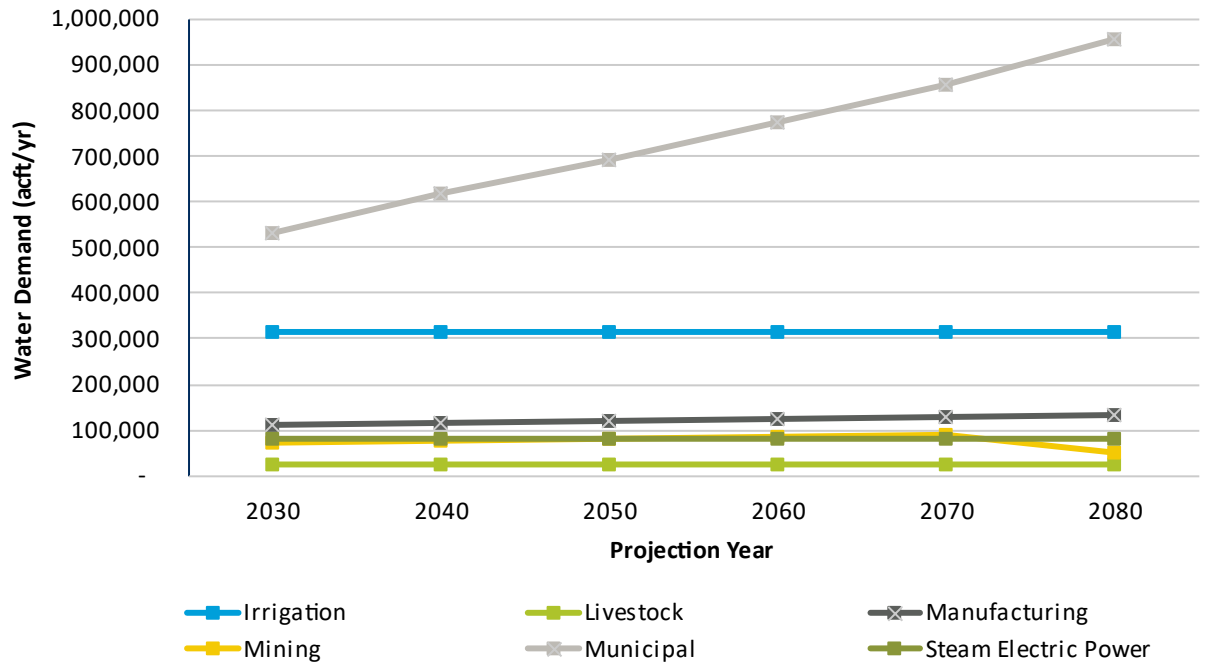



**Figure 2-7 Water Demand Projections by Use Type (2030 to 2080)**

**Table 2-8 Water Demand Projections for Individual Use Types (2030, 2050, and 2080)**

| Use Type | 2030 acft/yr | 2030 % Total | 2050 acft/yr | 2050 % Total | 2080 acft/yr | 2080 % Total |
|---|---|---|---|---|---|---|
| Irrigation | 314,645 | 28% | 314,645 | 24% | 314,645 | 20% |
| Livestock | 24,641 | 2% | 24,641 | 2% | 24,641 | 2% |
| Manufacturing | 110,929 | 10% | 119,292 | 9% | 133,030 | 9% |
| Mining | 74,126 | 7% | 81,760 | 6% | 48,880 | 3% |
| Municipal | 530,751 | 47% | 691,969 | 53% | 956,362 | 61% |
| Steam-Electric Power | 79,879 | 7% | 79,879 | 6% | 79,879 | 5% |
| **Total** | **1,134,971** | **100%** | **1,312,186** | **100%** | **1,557,437** | **100%** |

### 2.3.4.1 Irrigation Water Demand Projections

In 2030, irrigated agriculture is projected to account for approximately 28% of the total water use in the SCTRWPA. It is projected that approximately 314,645 acft/yr of water will be used to grow a variety of crops ranging from food and feed grains to fruits, vegetables, and cotton throughout the planning horizon. It is projected that water used for irrigation purposes will remain constant throughout the planning period.

Figure 2-8 provides a summary of irrigation water demands by decade. Table 2-9 and Table 2-10 summarize irrigation water demand projections for individual counties and for individual river and coastal basins, respectively.

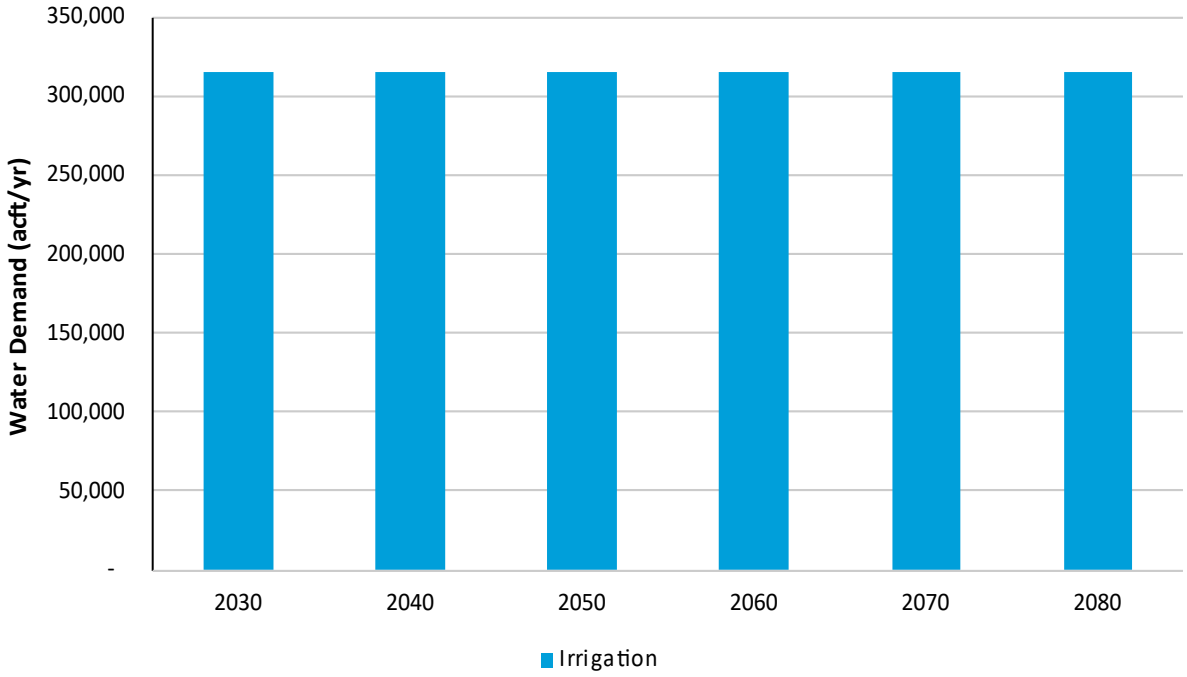



**Figure 2-8 Irrigation Water Demand Projections (2030 to 2080)**

**Table 2-9 Irrigation Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 25,441 | 25,441 | 25,441 | 25,441 | 25,441 | 25,441 |
| Bexar | 11,751 | 11,751 | 11,751 | 11,751 | 11,751 | 11,751 |
| Caldwell | 680 | 680 | 680 | 680 | 680 | 680 |
| Calhoun | 10,460 | 10,460 | 10,460 | 10,460 | 10,460 | 10,460 |
| Comal | 591 | 591 | 591 | 591 | 591 | 591 |
| DeWitt | 590 | 590 | 590 | 590 | 590 | 590 |
| Dimmit | 4,689 | 4,689 | 4,689 | 4,689 | 4,689 | 4,689 |
| Frio | 70,567 | 70,567 | 70,567 | 70,567 | 70,567 | 70,567 |
| Goliad | 3,126 | 3,126 | 3,126 | 3,126 | 3,126 | 3,126 |
| Gonzales | 4,478 | 4,478 | 4,478 | 4,478 | 4,478 | 4,478 |
| Guadalupe | 942 | 942 | 942 | 942 | 942 | 942 |
| Hays* | 130 | 130 | 130 | 130 | 130 | 130 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Karnes | 915 | 915 | 915 | 915 | 915 | 915 |
| Kendall | 461 | 461 | 461 | 461 | 461 | 461 |
| La Salle | 4,461 | 4,461 | 4,461 | 4,461 | 4,461 | 4,461 |
| Medina | 54,809 | 54,809 | 54,809 | 54,809 | 54,809 | 54,809 |
| Refugio | 867 | 867 | 867 | 867 | 867 | 867 |
| Uvalde | 52,703 | 52,703 | 52,703 | 52,703 | 52,703 | 52,703 |
| Victoria | 11,092 | 11,092 | 11,092 | 11,092 | 11,092 | 11,092 |
| Wilson | 13,318 | 13,318 | 13,318 | 13,318 | 13,318 | 13,318 |
| Zavala | 42,574 | 42,574 | 42,574 | 42,574 | 42,574 | 42,574 |
| **Total** | **314,645** | **314,645** | **314,645** | **314,645** | **314,645** | **314,645** |
| * Hays County is split between Region K and Region L; water demands shown above are for Region L. | | | | | | |

**Table 2-10 Irrigation Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | 19 | 19 | 19 | 19 | 19 | 19 |
| Colorado-Lavaca | 525 | 525 | 525 | 525 | 525 | 525 |
| Guadalupe | 9,073 | 9,073 | 9,073 | 9,073 | 9,073 | 9,073 |
| Lavaca | 337 | 337 | 337 | 337 | 337 | 337 |
| Lavaca-Guadalupe | 19,702 | 19,702 | 19,702 | 19,702 | 19,702 | 19,702 |
| Nueces | 254,046 | 254,046 | 254,046 | 254,046 | 254,046 | 254,046 |
| Rio Grande | 497 | 497 | 497 | 497 | 497 | 497 |
| San Antonio | 29,147 | 29,147 | 29,147 | 29,147 | 29,147 | 29,147 |
| San Antonio-Nueces | 1,299 | 1,299 | 1,299 | 1,299 | 1,299 | 1,299 |
| **Total** | **314,645** | **314,645** | **314,645** | **314,645** | **314,645** | **314,645** |

### 2.3.4.2 Livestock Water Demand Projections

In 2022, Texas livestock production was valued at approximately $24 billion, which was more than double the value of crops produced in the state during that year.[2] Although livestock production is a key component of the regional economy, the industry consumes a relatively small amount of water. In 2030, it is projected that water use in the South Central Texas Region for livestock purposes will be 24,757 acft/yr. It is projected that water used for livestock purposes will remain constant throughout the planning period.

Figure 2-9 provides a summary of irrigation water demands by decade. Table 2-11 and Table 2-12 summarize livestock water demand projections for individual counties and for individual river and coastal basins, respectively.

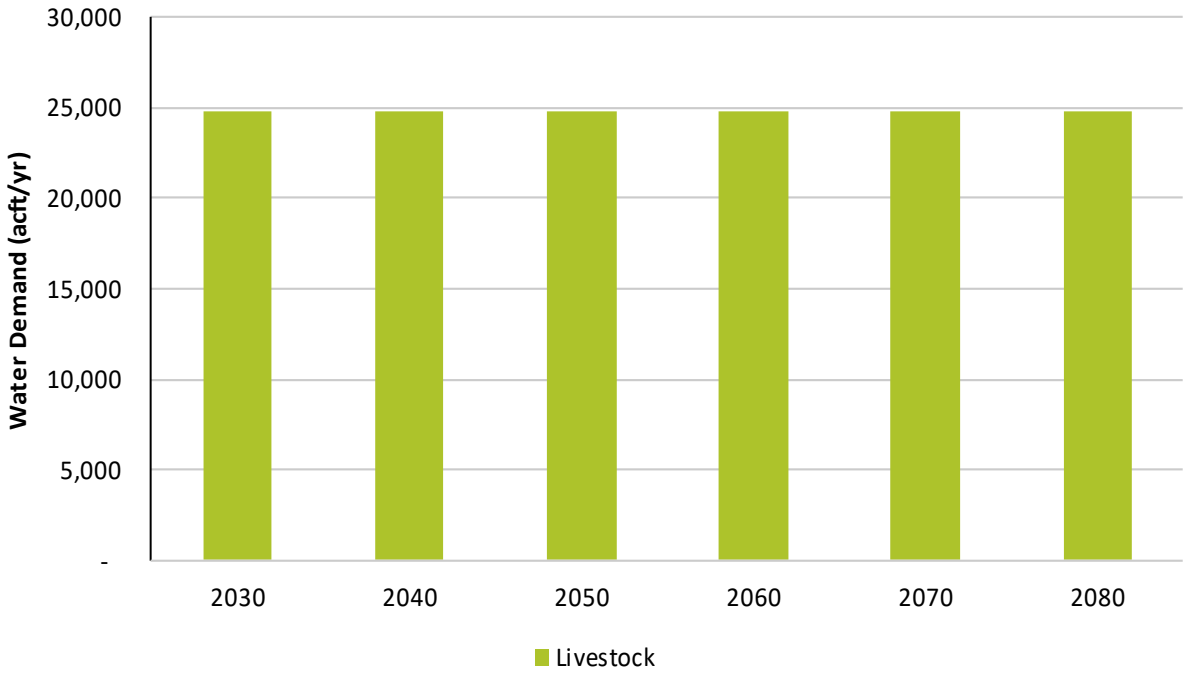



**Figure 2-9 Livestock Water Demand Projections (2030 to 2080)**

**Table 2-11 Livestock Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 1,537 | 1,537 | 1,537 | 1,537 | 1,537 | 1,537 |
| Bexar | 988 | 988 | 988 | 988 | 988 | 988 |
| Caldwell | 831 | 831 | 831 | 831 | 831 | 831 |
| Calhoun | 282 | 282 | 282 | 282 | 282 | 282 |
| Comal | 271 | 271 | 271 | 271 | 271 | 271 |

[2] https://www.texasagriculture.gov/About/TexasAgStats.aspx

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| DeWitt | 1,736 | 1,736 | 1,736 | 1,736 | 1,736 | 1,736 |
| Dimmit | 367 | 367 | 367 | 367 | 367 | 367 |
| Frio | 964 | 964 | 964 | 964 | 964 | 964 |
| Goliad | 789 | 789 | 789 | 789 | 789 | 789 |
| Gonzales | 4,138 | 4,138 | 4,138 | 4,138 | 4,138 | 4,138 |
| Guadalupe | 1,179 | 1,179 | 1,179 | 1,179 | 1,179 | 1,179 |
| Hays (part)* | 2,712 | 2,712 | 2,712 | 2,712 | 2,712 | 2,712 |
| Karnes | 954 | 954 | 954 | 954 | 954 | 954 |
| Kendall | 388 | 388 | 388 | 388 | 388 | 388 |
| La Salle | 394 | 394 | 394 | 394 | 394 | 394 |
| Medina | 1,058 | 1,058 | 1,058 | 1,058 | 1,058 | 1,058 |
| Refugio | 461 | 461 | 461 | 461 | 461 | 461 |
| Uvalde | 2,049 | 2,049 | 2,049 | 2,049 | 2,049 | 2,049 |
| Victoria | 979 | 979 | 979 | 979 | 979 | 979 |
| Wilson | 1,709 | 1,709 | 1,709 | 1,709 | 1,709 | 1,709 |
| Zavala | 855 | 855 | 855 | 855 | 855 | 855 |
| **Total** | **24,641** | **24,641** | **24,641** | **24,641** | **24,641** | **24,641** |
| * Hays County is split between Region K and Region L; water demands shown above are for Region L. | | | | | | |

**Table 2-12 Livestock Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | 43 | 43 | 43 | 43 | 43 | 43 |
| Colorado-Lavaca | 45 | 45 | 45 | 45 | 45 | 45 |
| Guadalupe | 11,252 | 11,252 | 11,252 | 11,252 | 11,252 | 11,252 |
| Lavaca | 307 | 307 | 307 | 307 | 307 | 307 |
| Lavaca-Guadalupe | 745 | 745 | 745 | 745 | 745 | 745 |
| Nueces | 7,371 | 7,371 | 7,371 | 7,371 | 7,371 | 7,371 |
| Rio Grande | 23 | 23 | 23 | 23 | 23 | 23 |
| San Antonio | 4,106 | 4,106 | 4,106 | 4,106 | 4,106 | 4,106 |

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| San Antonio-Nueces | 749 | 749 | 749 | 749 | 749 | 749 |
| **Total** | **24,641** | **24,641** | **24,641** | **24,641** | **24,641** | **24,641** |

### 2.3.4.3 Manufacturing Water Demand Projections

The use of water for the production of goods for domestic and foreign markets varies widely among manufacturing industries in Texas. Manufactured products in Texas range from food and clothing to refined chemical and petroleum products to computers and automobiles. Some processes require direct consumption of water as part of the products being manufactured, while others require little water consumption, but large volumes of water for cooling or cleaning purposes.

Manufacturing accounts for approximately 10% of the total water demands in the SCTRWPA. Major water users in the manufacturing sector in the SCTRWPA include chemical manufacturing, primary metal manufacturing, food manufacturing, and nonmetallic mineral product manufacturing. All industries in the region are projected to use 110,929 acft/yr of water in 2030 and 133,030 acft/yr in 2080, representing a 20% increase (Figure 2-10, Table 2-13, and Table 2-14).

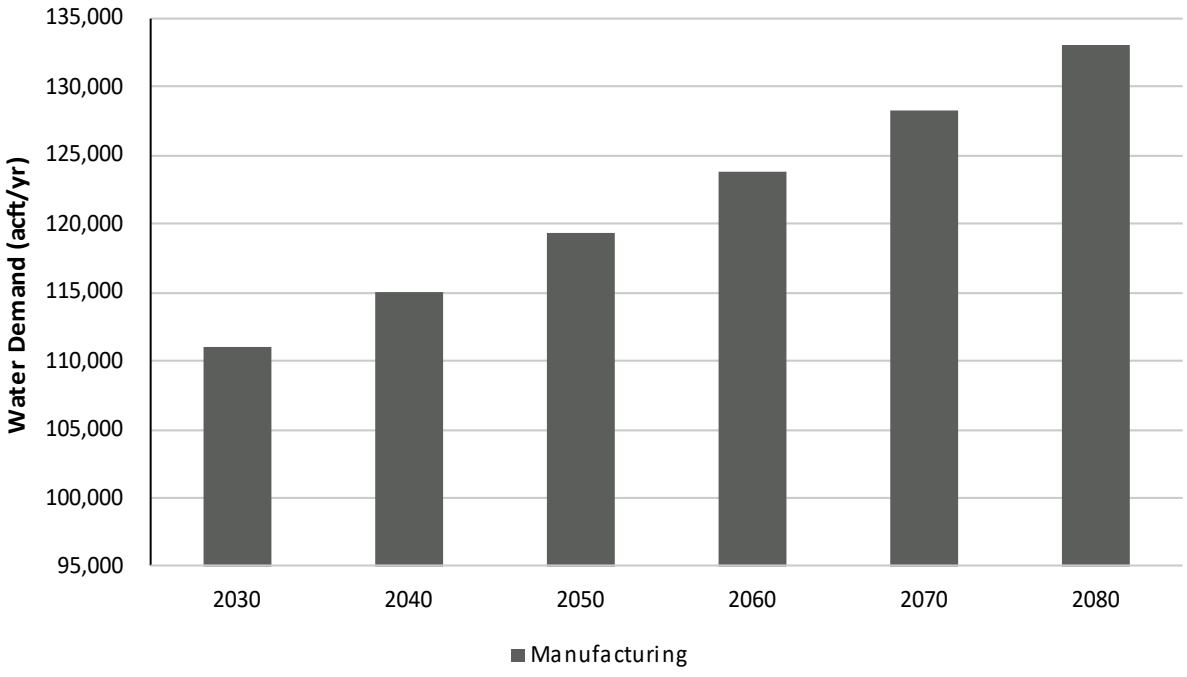



**Figure 2-10 Manufacturing Water Demand Projections (2030 to 2080)**

## Table 2-13 Manufacturing Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr)

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 56 | 58 | 60 | 62 | 64 | 66 |
| Bexar | 8,873 | 9,201 | 9,541 | 9,894 | 10,260 | 10,640 |
| Caldwell | 14 | 15 | 16 | 17 | 18 | 19 |
| Calhoun | 54,587 | 56,607 | 58,701 | 60,873 | 63,125 | 65,461 |
| Comal | 901 | 934 | 969 | 1,005 | 1,042 | 1,080 |
| DeWitt | 248 | 257 | 267 | 277 | 287 | 298 |
| Dimmit | - | - | - | - | - | - |
| Frio | - | - | - | - | - | - |
| Goliad | - | - | - | - | - | - |
| Gonzales | 2,311 | 2,397 | 2,486 | 2,578 | 2,673 | 2,772 |
| Guadalupe | 3,526 | 3,656 | 3,792 | 3,932 | 4,078 | 4,229 |
| Hays* | 57 | 59 | 61 | 63 | 65 | 67 |
| Karnes | 69 | 72 | 75 | 78 | 81 | 84 |
| Kendall | 46 | 48 | 50 | 52 | 54 | 56 |
| La Salle | - | - | - | - | - | - |
| Medina | 15 | 16 | 17 | 18 | 19 | 20 |
| Refugio | - | - | - | - | - | - |
| Uvalde | - | - | - | - | - | - |
| Victoria | 39,432 | 40,891 | 42,404 | 43,973 | 45,600 | 47,287 |
| Wilson | 62 | 64 | 66 | 68 | 71 | 74 |
| Zavala | 732 | 759 | 787 | 816 | 846 | 877 |
| **Total** | **110,929** | **115,034** | **119,292** | **123,706** | **128,283** | **133,030** |

* Hays County is split between Region K and Region L; water demands shown above are for Region L.

**Table 2-14 Manufacturing Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | - | - | - | - | - | - |
| Colorado-Lavaca | 36,503 | 37,854 | 39,254 | 40,707 | 42,213 | 43,776 |
| Guadalupe | 45,245 | 46,919 | 48,657 | 50,458 | 52,325 | 54,261 |
| Lavaca | 239 | 248 | 258 | 267 | 277 | 287 |
| Lavaca-Guadalupe | 17,262 | 17,901 | 18,563 | 19,250 | 19,962 | 20,700 |
| Nueces | 944 | 980 | 1,016 | 1,054 | 1,092 | 1,132 |
| Rio Grande | - | - | - | - | - | - |
| San Antonio | 9,914 | 10,280 | 10,660 | 11,054 | 11,464 | 11,889 |
| San Antonio-Nueces | 822 | 852 | 884 | 916 | 950 | 985 |
| **Total** | **110,929** | **115,034** | **119,292** | **123,706** | **128,283** | **133,030** |

### 2.3.4.4 Mining Water Demand Projections

Although the Texas mining industry is a leader in the production of crude petroleum and natural gas in the United States, it also produces a wide variety of important non-fuel minerals. Texas is the only state to produce native asphalt and is the leading producer nationally of Frasch-mined sulfur. It is also one of the leading states in the production of clay, gypsum, lime, salt, stone, and aggregate.

According to the TWDB Mining Water Use Report [3], water used for mining in Texas is projected to increase by 2060, because of steady demands for hydraulic fracturing water, gradual increases in demands for aggregates, and decreased coal mining use. In the SCTRWPA, the principal uses of water for mining are for the extraction of stone, clay, petroleum, and natural gas and for sand and gravel washing. Many counties in the SCTRWPA are part of the Eagle Ford Shale production area, which primarily relies of the Carrizo-Wilcox Aquifer as a source of freshwater. Water use associated with the SCTRWPA is projected to gradually increase through 2070 and then decline significantly in 2080. The growth in demand until 2070 reflects anticipated steady demand of hydraulic fracturing use, increases in aggregates industry demand as populations increase, and declines in coal use. The sharp decline in mining demands in 2080 represent declines in hydraulic fracturing water use demands as oil and gas plays mature.

Mining water demands in the South Central Texas Region are projected to be 74,126 acft/yr in 2030 and decrease to 48,880 acft/yr in 2080, a decrease of more than 34% (Figure 2-11, Table 2-15, and Table 2-16).

[3] TWDB. 2022 Mining Water Use Study.
https://www.twdb.texas.gov/waterplanning/data/projections/MiningStudy/index.asp

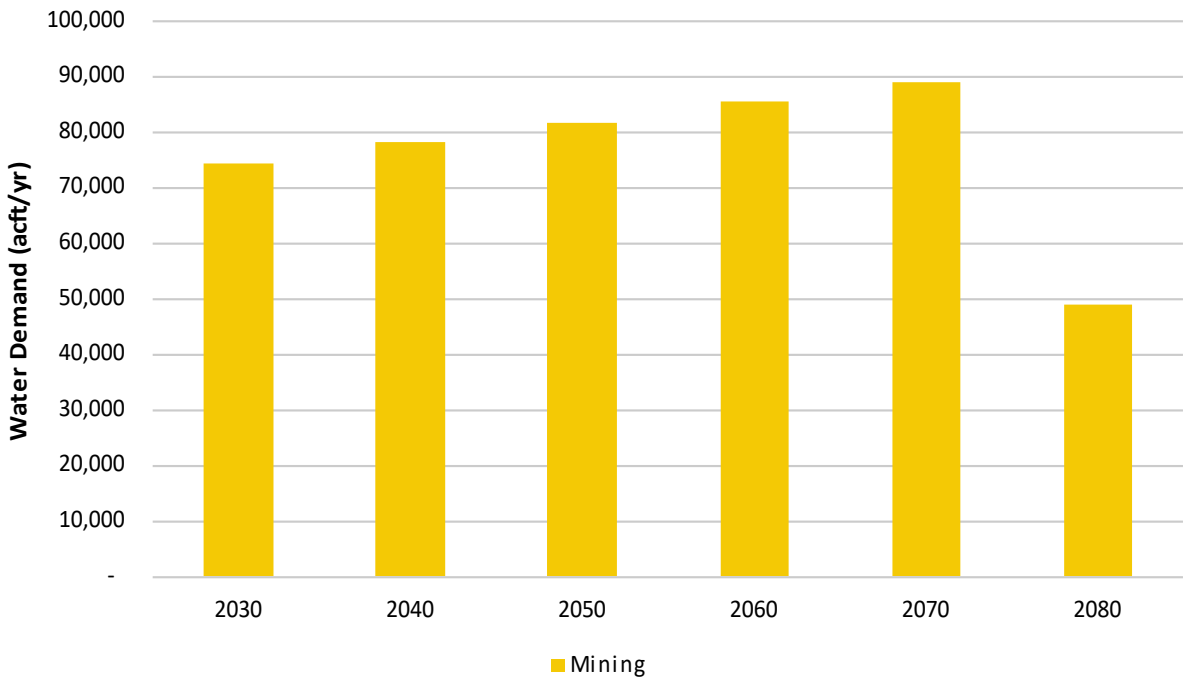



**Figure 2-11 Mining Water Demand Projections (2030 to 2080)**

**Table 2-15 Mining Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 8,039 | 8,352 | 8,658 | 8,947 | 9,217 | 4,281 |
| Bexar | 7,634 | 8,366 | 9,072 | 9,724 | 10,322 | 10,851 |
| Caldwell | 352 | 352 | 352 | 352 | 352 | 2 |
| Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| Comal | 12,013 | 14,130 | 16,264 | 18,386 | 20,432 | 22,314 |
| DeWitt | 1,695 | 1,695 | 1,695 | 1,695 | 1,695 | 8 |
| Dimmit | 6,146 | 6,146 | 6,146 | 6,146 | 6,146 | 3 |
| Frio | 6,002 | 6,003 | 6,003 | 6,004 | 6,004 | 10 |
| Goliad | 8 | 8 | 8 | 8 | 8 | 8 |
| Gonzales | 6,592 | 6,625 | 6,663 | 6,701 | 6,740 | 606 |
| Guadalupe | 770 | 770 | 770 | 770 | 770 | 0 |
| Hays (part)* | 30 | 37 | 43 | 51 | 61 | 71 |
| Karnes | 1,919 | 1,919 | 1,919 | 1,919 | 1,919 | 3 |
| Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| La Salle | 5,396 | 5,396 | 5,396 | 5,396 | 5,396 | 0 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Medina | 4,324 | 4,718 | 5,065 | 5,380 | 5,657 | 5,886 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 3,204 | 3,423 | 3,650 | 3,866 | 4,074 | 4,271 |
| Victoria | 390 | 409 | 426 | 439 | 451 | 460 |
| Wilson | 4,680 | 4,690 | 4,698 | 4,707 | 4,714 | 105 |
| Zavala | 4,932 | 4,932 | 4,932 | 4,932 | 4,932 | 1 |
| **Total** | **74,126** | **77,971** | **81,760** | **85,423** | **88,890** | **48,880** |
| * Hays County is split between Region K and Region L; water demands shown above are for Region L. | | | | | | |

**Table 2-16 Mining Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | 0 | 0 | 0 | 0 | 0 | 0 |
| Colorado-Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 21,276 | 23,449 | 25,641 | 27,819 | 29,923 | 23,422 |
| Lavaca | 482 | 484 | 487 | 489 | 492 | 42 |
| Lavaca-Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Nueces | 38,210 | 39,088 | 39,923 | 40,704 | 41,423 | 13,709 |
| Rio Grande | 653 | 653 | 653 | 653 | 653 | 0 |
| San Antonio | 13,505 | 14,297 | 15,056 | 15,758 | 16,399 | 11,707 |
| San Antonio-Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total, Region L** | **74,126** | **77,971** | **81,760** | **85,423** | **88,890** | **48,880** |

### 2.3.4.5 Municipal Water Demand Projections

Municipal water demand is primarily for drinking, bathing, dish and clothes washing, cleaning, sanitation, air conditioning, and landscape watering for residential and commercial establishments and public offices and institutions. Residential and commercial uses are categorized together under the Municipal Use Type because they are provided treated drinking water from a common system (e.g., a public water system). The projected quantity of water needed for municipal purposes depends on the size of the population of the service area, climatic conditions, and water conservation measures. In addition to these factors, per capita water use (gallons per person per day of water use) is a key municipal water planning parameter. Population and per capita water use are used to estimate

municipal water demand projections for each of the 144 municipal WUGs in the SCTRWPA. Appendix 2A provides water demand projections and per capita water use for individual WUGs in the SCTRWPA.

The objective of municipal water conservation programs is to reduce the per capita water use parameter without adversely affecting the quality of life of the people involved. For municipal water supplies, this is primarily achieved with use of passive water conservation efforts from plumbing code savings, such as low flow plumbing fixtures (e.g., toilets and shower heads that are designed for low quantities of flow per unit of use). Expected water-efficiency savings (passive conservation) are incorporated into the current TWDB municipal water demand projections and include estimated or anticipated savings due to state and federal specifications for fixture and appliance design. The savings projected by the TWDB include complete replacement of existing plumbing fixtures to water-efficient fixtures by the 2040 decade. The projections also assume that all new construction includes water-efficient plumbing fixtures. Table 2-17 summarizes county water savings due to plumbing code savings that were incorporated in the development of the South Central Texas Region's municipal water demand projections, and Table 2-18 summarizes water savings for individual river and coastal basins. Appendix 2A includes passive conservation water savings from plumbing code savings for each municipal WUG in the SCTRWPA.

**Table 2-17 Passive Conservation Water Savings from Plumbing Code Savings for Individual Counties (2030 to 2080) (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 263 | 349 | 395 | 444 | 496 | 544 |
| Bexar | 11,578 | 27,781 | 39,624 | 53,056 | 67,222 | 77,349 |
| Caldwell | 333 | 467 | 566 | 658 | 762 | 853 |
| Calhoun | 104 | 113 | 108 | 102 | 96 | 89 |
| Comal | 1,227 | 1,843 | 2,359 | 3,116 | 4,036 | 5,079 |
| DeWitt | 105 | 119 | 118 | 117 | 117 | 117 |
| Dimmit | 43 | 47 | 45 | 41 | 38 | 36 |
| Frio | 99 | 117 | 120 | 122 | 124 | 126 |
| Goliad | 36 | 40 | 39 | 37 | 37 | 37 |
| Gonzales | 101 | 114 | 113 | 111 | 110 | 105 |
| Guadalupe | 1,436 | 2,113 | 2,525 | 2,962 | 3,456 | 4,023 |
| Hays* | 2,368 | 4,111 | 6,044 | 7,769 | 9,306 | 10,455 |
| Karnes | 80 | 91 | 97 | 102 | 108 | 113 |
| Kendall | 279 | 394 | 496 | 619 | 757 | 916 |
| La Salle | 35 | 40 | 39 | 37 | 37 | 34 |
| Medina | 302 | 537 | 649 | 772 | 904 | 962 |
| Refugio | 35 | 37 | 35 | 34 | 33 | 33 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Uvalde | 132 | 146 | 143 | 137 | 133 | 125 |
| Victoria | 500 | 579 | 583 | 579 | 575 | 573 |
| Wilson | 275 | 341 | 376 | 403 | 435 | 472 |
| Zavala | 48 | 53 | 51 | 49 | 46 | 44 |
| **Total** | **19,379** | **39,432** | **54,525** | **71,267** | **88,828** | **102,085** |
| * Hays County is split between Region K and Region L; water savings shown above are for Region L. | | | | | | |

**Table 2-18 Passive Conservation Water Savings from Plumbing Code Savings for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | 67 | 126 | 179 | 229 | 283 | 338 |
| Colorado-Lavaca | 7 | 8 | 8 | 8 | 8 | 8 |
| Guadalupe | 5,265 | 8,238 | 10,987 | 13,753 | 16,526 | 19,061 |
| Lavaca | 19 | 21 | 21 | 20 | 20 | 20 |
| Lavaca-Guadalupe | 269 | 305 | 302 | 294 | 287 | 280 |
| Nueces | 840 | 1,062 | 1,157 | 1,247 | 1,350 | 1,432 |
| Rio Grande | 0 | 0 | 0 | 0 | 0 | 0 |
| San Antonio | 12,875 | 29,632 | 41,834 | 55,680 | 70,319 | 80,911 |
| San Antonio-Nueces | 37 | 40 | 37 | 36 | 35 | 35 |
| **Total** | **19,379** | **39,432** | **54,525** | **71,267** | **88,828** | **102,085** |

According to regional water demand projections adopted by the TWDB, per capita water use in the SCTRWPA is projected to decline over the planning period from 119 gallons per capita per day (GPCD) in year 2030 to 111 GPCD in 2080. However, because of projected population growth between 2030 and 2080, municipal water demand in the SCTRWPA is projected to increase from 530,751 acft/yr in 2030 to 956,362 acft/yr in 2080 (Figure 2-12, Table 2-19, and Table 2-20). Because Bexar County has the highest population (417,418 acft/yr in 2080), it also has the largest projected water demand, with almost 44% of the total projected municipal water demand for the region by the year 2080 (Table 2-19).

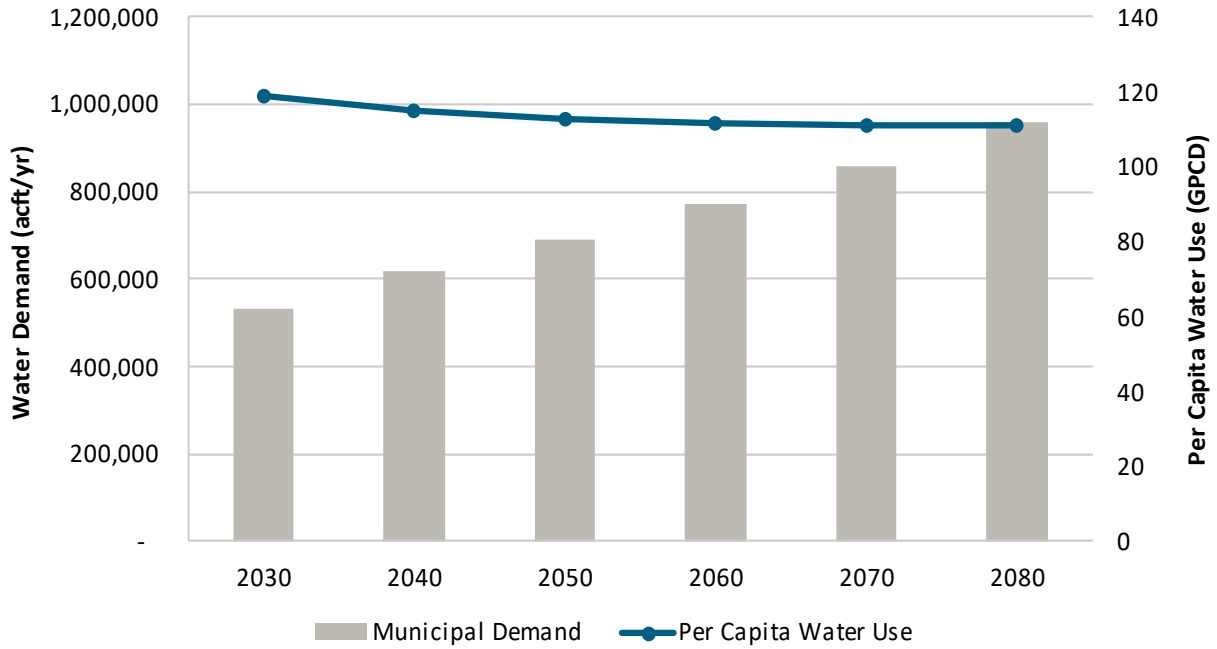



**Figure 2-12 Projected Per Capita Water Use and Municipal Water Demand**

**Table 2-19 Municipal Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 7,991 | 8,519 | 9,106 | 9,635 | 10,234 | 10,928 |
| Bexar | 314,613 | 346,284 | 367,375 | 383,939 | 397,644 | 417,418 |
| Caldwell | 8,142 | 9,942 | 11,767 | 13,559 | 15,558 | 17,435 |
| Calhoun | 2,628 | 2,494 | 2,350 | 2,205 | 2,050 | 1,885 |
| Comal | 44,596 | 60,354 | 78,502 | 104,249 | 134,706 | 169,705 |
| DeWitt | 3,882 | 3,862 | 3,837 | 3,820 | 3,800 | 3,780 |
| Dimmit | 1,771 | 1,688 | 1,601 | 1,518 | 1,435 | 1,353 |
| Frio | 3,612 | 3,946 | 4,188 | 4,254 | 4,328 | 4,412 |
| Goliad | 919 | 897 | 886 | 874 | 860 | 844 |
| Gonzales | 4,516 | 4,498 | 4,431 | 4,355 | 4,273 | 4,189 |
| Guadalupe | 40,540 | 53,479 | 64,271 | 75,643 | 88,616 | 103,419 |
| Hays* | 38,311 | 55,452 | 73,919 | 94,573 | 113,374 | 134,777 |
| Karnes | 3,560 | 3,714 | 3,879 | 4,066 | 4,284 | 4,529 |
| Kendall | 9,389 | 12,243 | 15,646 | 19,544 | 23,982 | 29,057 |
| La Salle | 1,517 | 1,509 | 1,505 | 1,499 | 1,503 | 1,521 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Medina | 8,650 | 10,573 | 11,010 | 11,372 | 11,730 | 11,958 |
| Refugio | 983 | 944 | 912 | 888 | 865 | 847 |
| Uvalde | 5,320 | 5,193 | 5,033 | 4,857 | 4,668 | 4,469 |
| Victoria | 19,521 | 19,832 | 19,920 | 19,830 | 19,728 | 19,608 |
| Wilson | 8,292 | 9,112 | 9,969 | 10,735 | 11,616 | 12,623 |
| Zavala | 1,998 | 1,941 | 1,862 | 1,780 | 1,695 | 1,605 |
| **Total** | **530,751** | **616,476** | **691,969** | **773,195** | **856,949** | **956,362** |
| * Hays County is split between Region K and Region L; water demands shown above are for Region L. | | | | | | |

**Table 2-20 Municipal Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2040 | 2050 | 2060 | 2070 | 2080 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | 1,397 | 2,261 | 3,168 | 4,058 | 4,995 | 5,980 |
| Colorado-Lavaca | 117 | 115 | 113 | 112 | 109 | 109 |
| Guadalupe | 135,140 | 178,764 | 223,284 | 277,189 | 334,883 | 400,569 |
| Lavaca | 545 | 540 | 534 | 526 | 516 | 505 |
| Lavaca-Guadalupe | 9,085 | 9,060 | 8,948 | 8,774 | 8,588 | 8,383 |
| Nueces | 28,729 | 29,546 | 30,213 | 30,568 | 31,015 | 31,616 |
| Rio Grande | 4 | 4 | 3 | 3 | 2 | 1 |
| San Antonio | 354,683 | 395,173 | 424,726 | 451,010 | 475,907 | 508,285 |
| San Antonio-Nueces | 1,051 | 1,013 | 980 | 955 | 934 | 914 |
| **Total** | **530,751** | **616,476** | **691,969** | **773,195** | **856,949** | **956,362** |

### 2.3.4.6 Steam-Electric Power Water Demand Projections

These changes range from increases in renewables capacity, mostly wind and solar, declines in coal fired and natural gas fired power plants, increased generation efficiency and cooling systems, carbon capture activities, and changes to federal environmental and regulatory policies. These shifts will likely impact how and where power is generated, and the quantities of water needed.

Water demand projections for steam-electric power include volumes consumed by operable power generation facilities that sell power on the open market. The demands exclude facilities or water use projections that are included in manufacturing water demand projections. In the SCTRWPA, the following counties have non-zero steam-electric power generation water demands: Atascosa, Bexar, Calhoun, Frio, Goliad, Guadalupe, Hays, and Victoria Counties.

It is projected that water used for steam-electric power purposes will remain constant throughout the planning period (Figure 2-13, Table 2-21, and Table 2-22). Water demand for steam-electric power generation in the SCTRWPA is projected to be 79,879 acft/yr in 2030 to 2080.

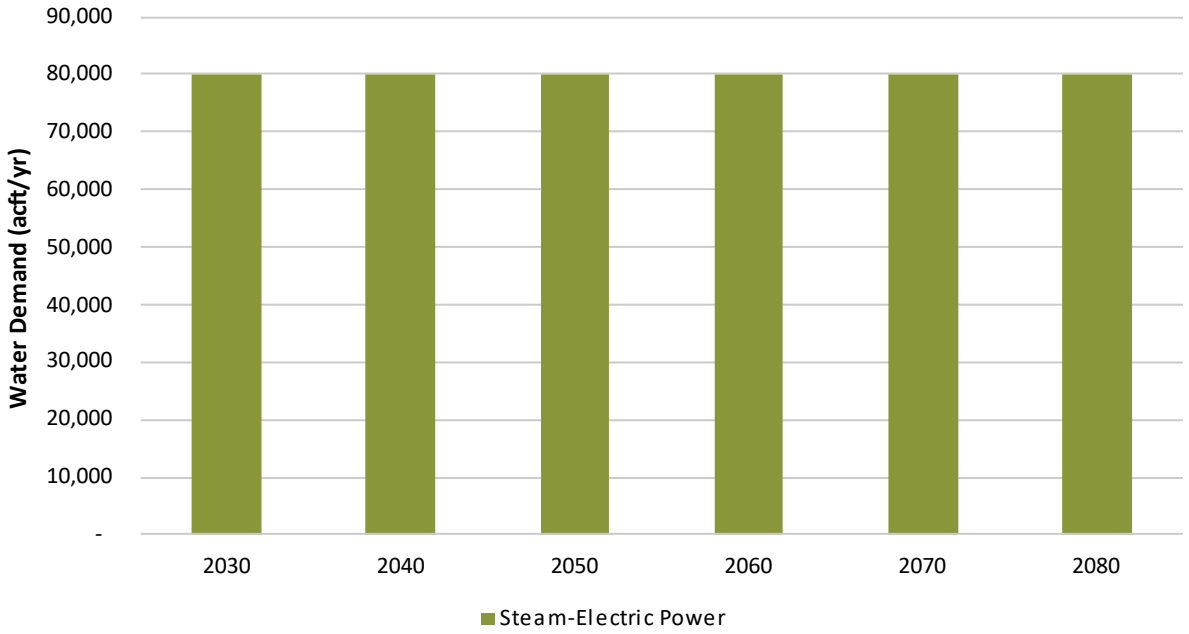



**Figure 2-13 Steam-Electric Power Water Demand Projections (2030 to 2080)**

**Table 2-21 Steam-Electric Power Water Demand Projections for Individual Counties (2030 to 2080) (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 7,962 | 7,962 | 7,962 | 7,962 | 7,962 | 7,962 |
| Bexar | 52,293 | 52,293 | 52,293 | 52,293 | 52,293 | 52,293 |
| Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| Calhoun | 37 | 37 | 37 | 37 | 37 | 37 |
| Comal | 0 | 0 | 0 | 0 | 0 | 0 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 0 | 0 | 0 | 0 | 0 | 0 |
| Frio | 54 | 54 | 54 | 54 | 54 | 54 |
| Goliad | 4,994 | 4,994 | 4,994 | 4,994 | 4,994 | 4,994 |
| Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 9,392 | 9,392 | 9,392 | 9,392 | 9,392 | 9,392 |
| Hays (part)* | 1,949 | 1,949 | 1,949 | 1,949 | 1,949 | 1,949 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Karnes | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| La Salle | 0 | 0 | 0 | 0 | 0 | 0 |
| Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 0 | 0 | 0 | 0 | 0 | 0 |
| Victoria | 3,198 | 3,198 | 3,198 | 3,198 | 3,198 | 3,198 |
| Wilson | 0 | 0 | 0 | 0 | 0 | 0 |
| Zavala | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **79,879** | **79,879** | **79,879** | **79,879** | **79,879** | **79,879** |
| * Hays County is split between Region K and Region L; water demands shown above are for Region L. | | | | | | |

**Table 2-22 Steam-Electric Power Water Demand Projections for Individual River and Coastal Basins (2030 to 2080) (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | - | - | - | - | - | - |
| Colorado-Lavaca | 37 | 37 | 37 | 37 | 37 | 37 |
| Guadalupe | 19,533 | 19,533 | 19,533 | 19,533 | 19,533 | 19,533 |
| Lavaca | - | - | - | - | - | - |
| Lavaca-Guadalupe | - | - | - | - | - | - |
| Nueces | 8,016 | 8,016 | 8,016 | 8,016 | 8,016 | 8,016 |
| Rio Grande | - | - | - | - | - | - |
| San Antonio | 52,293 | 52,293 | 52,293 | 52,293 | 52,293 | 52,293 |
| San Antonio-Nueces | - | - | - | - | - | - |
| **Total** | **79,879** | **79,879** | **79,879** | **79,879** | **79,879** | **79,879** |

### 2.3.5 Major Water Providers

As described in Subsection 2.2.4, the SCTRWPG identified five WUGs and/or WWPs as MWPs. Water demand projections for MWPs are provided in Table 2-23. Water demands are distinguished between WUG demands and contract demands. WUG demands represent the gross volume of water minus water that the WUG must provide to other entities. Contract demands represent contractual obligations to sell water to other entities.

MWPs may be classified as WUGs, WWPs, or WUGs/WWPs, and are distinguished as follows:

- WUG: Has only WUG demands and do not have contract demands.
- WWP: Has only contract demands and do not have WUG demands.
- WUG/WWP: Typically has both WUG demands and contract demands.

**Table 2-23 Water Demand Projections for Major Water Providers (2030 to 2080) (acft/yr)**

| Major Water Provider (Provider Type) | Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| **Canyon Lake Water Service (Texas Water Company) (WUG/WWP) [1]** | **Total** | **12,172** | **16,364** | **19,052** | **20,795** | **27,317** | **34,514** |
| WUG Demands | Municipal | 11,572 | 15,764 | 18,452 | 20,195 | 26,717 | 33,914 |
| Contract Demands | Municipal | 600 | 600 | 600 | 600 | 600 | 600 |
| **GBRA (WUG/WWP) [2]** | **Total** | **141,803** | **138,343** | **138,285** | **138,229** | **138,165** | **138,093** |
| WUG Demands | Municipal | 1,410 | 1,950 | 1,892 | 1,836 | 1,772 | 1,700 |
| Contract Demands | Irrigation | 464 | 464 | 464 | 464 | 464 | 464 |
| Contract Demands | Manufacturing | 29,584 | 29,584 | 29,584 | 29,584 | 29,584 | 29,584 |
| Contract Demands | Municipal | 91,303 | 87,303 | 87,303 | 87,303 | 87,303 | 87,303 |
| Contract Demands | Steam-Electric | 6,429 | 6,429 | 6,429 | 6,429 | 6,429 | 6,429 |
| Contract Demands | WWP | 12,613 | 12,613 | 12,613 | 12,613 | 12,613 | 12,613 |
| **New Braunfels (WUG/WWP)** | **Total** | **29,111** | **40,936** | **56,116** | **74,565** | **95,682** | **119,858** |
| WUG Demands | Municipal | 28,111 | 39,936 | 55,116 | 73,565 | 94,682 | 118,858 |
| Contract Demands | Municipal | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| **San Marcos (WUG/WWP)** | **Total** | **17,396** | **23,946** | **28,814** | **32,409** | **34,552** | **36,174** |
| WUG Demands | Municipal | 17,396 | 23,946 | 28,814 | 32,409 | 34,552 | 36,174 |
| Contract Demands | -- | -- | -- | -- | -- | -- | -- |

| Major Water Provider (Provider Type) | Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| **SAWS (WUG/WWP)** | **Total** | **321,119** | **349,309** | **367,669** | **381,961** | **393,080** | **409,761** |
| WUG Demands | Municipal | 268,649 | 298,339 | 316,699 | 330,991 | 342,110 | 358,791 |
| Contract Demands | Municipal | 2,470 | 970 | 970 | 970 | 970 | 970 |
| Contract Demands | Steam-Electric | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |

[1] Canyon Lake Water Service (Texas Water Company) is split between Region K and Region L; WUG demand projections shown above are for Region L only. Total WUG demand projections, including all regions, are 11,947 acft/yr in 2030; 16,145 acft/yr in 2040; 18,839 acft/yr in 2050; 20,588 acft/yr in 2060; 27,112 acft/yr in 2070; and 34,309 acft/yr in 2080. Contract demands are representative of contracts with entities in any region.

[2] GBRA WUG demands are all located within Region L; however, contract demands are representative of contracts with entities in any region.

## 2.4 Contractual Obligations for Water User Groups and Wholesale Water Providers

An evaluation of current contractual obligations of WUGs and WWPs in the SCTRWPA was performed to identify obligations of water to be supplied to other entities. The evaluation consisted of collecting information from all WWPs and certain WUGs regarding current contracts, volumes, and duration of those contracts. Results of the evaluation were incorporated into DB27 and used in subsequent chapters to estimate surpluses and needs, and to identify water supply plans to meet needs in the SCTRWPA. A summary of contractual obligations is provided in Appendix 2A.

# Appendix 2A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Atascosa County Total** | **53,324** | **57,374** | **61,473** | **64,960** | **68,952** | **73,522** |
| **Atascosa County / Nueces Basin Total** | **51,265** | **55,077** | **58,949** | **62,280** | **66,094** | **70,456** |
| Benton City WSC | 12,461 | 13,936 | 15,334 | 16,283 | 17,380 | 18,641 |
| Charlotte | 1,235 | 1,127 | 1,054 | 1,084 | 1,114 | 1,145 |
| El Oso WSC* | 106 | 128 | 148 | 158 | 170 | 185 |
| Jourdanton | 4,958 | 5,239 | 5,540 | 5,840 | 6,182 | 6,572 |
| Lytle | 2,628 | 2,779 | 2,941 | 3,100 | 3,282 | 3,489 |
| McCoy WSC* | 7,741 | 8,082 | 8,470 | 8,913 | 9,417 | 9,989 |
| Pleasanton | 12,414 | 13,521 | 14,726 | 16,038 | 17,467 | 19,025 |
| Poteet | 2,734 | 2,447 | 2,244 | 2,297 | 2,351 | 2,403 |
| San Antonio Water System | 6,103 | 6,634 | 7,037 | 7,603 | 8,118 | 8,695 |
| County-Other | 885 | 1,184 | 1,455 | 964 | 613 | 312 |
| | | | | | | |
| **Atascosa County / San Antonio Basin Total** | **2,059** | **2,297** | **2,524** | **2,680** | **2,858** | **3,066** |
| Benton City WSC | 1,965 | 2,197 | 2,418 | 2,568 | 2,740 | 2,939 |
| Lytle | 68 | 72 | 76 | 80 | 84 | 90 |
| San Antonio Water System | 26 | 28 | 30 | 32 | 34 | 37 |
| | | | | | | |
| **Bexar County Total** | **2,555,076** | **2,951,404** | **3,222,978** | **3,470,641** | **3,699,975** | **3,945,495** |
| **Bexar County / Nueces Basin Total** | **10,515** | **12,233** | **13,462** | **14,538** | **15,557** | **16,552** |
| Atascosa Rural WSC | 839 | 977 | 1,101 | 1,209 | 1,333 | 1,475 |
| Lytle | 242 | 273 | 300 | 325 | 352 | 385 |
| San Antonio Water System | 9,340 | 10,820 | 11,827 | 12,752 | 13,596 | 14,495 |
| County-Other | 94 | 163 | 234 | 252 | 276 | 197 |
| | | | | | | |
| **Bexar County / San Antonio Basin Total** | **2,544,561** | **2,939,171** | **3,209,516** | **3,456,103** | **3,684,418** | **3,928,943** |
| Air Force Village II Inc | 536 | 536 | 536 | 536 | 536 | 536 |
| Alamo Heights | 7,806 | 7,806 | 7,806 | 7,806 | 7,806 | 7,806 |
| Atascosa Rural WSC | 12,539 | 14,605 | 16,457 | 18,069 | 19,919 | 22,042 |
| Bexar County WCID 10 | 6,201 | 7,001 | 7,717 | 8,355 | 9,086 | 9,922 |
| Converse | 28,362 | 28,398 | 28,398 | 28,398 | 28,398 | 28,398 |
| East Central SUD | 45,458 | 51,420 | 56,763 | 61,513 | 66,950 | 73,173 |
| Elmendorf | 4,013 | 5,382 | 7,210 | 9,683 | 12,059 | 16,657 |
| Fair Oaks Ranch | 5,506 | 6,117 | 6,422 | 6,544 | 6,575 | 6,575 |
| Fort Sam Houston | 8,270 | 8,270 | 8,270 | 8,270 | 8,270 | 8,270 |
| Green Valley SUD | 1,776 | 2,164 | 2,511 | 2,808 | 3,149 | 3,541 |
| Kirby | 8,962 | 10,140 | 10,365 | 10,365 | 10,365 | 10,365 |
| La Coste | 17 | 19 | 21 | 22 | 24 | 27 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Lackland Air Force Base | 14,048 | 14,048 | 14,048 | 14,048 | 14,048 | 14,048 |
| Leon Valley | 15,085 | 18,291 | 18,291 | 18,291 | 18,291 | 18,291 |
| Live Oak | 9,829 | 9,829 | 9,829 | 9,829 | 9,829 | 9,829 |
| Lytle | 11 | 12 | 14 | 15 | 16 | 17 |
| Oak Hills WSC | 40 | 55 | 76 | 105 | 145 | 200 |
| Randolph Air Force Base | 1,280 | 1,280 | 1,280 | 1,280 | 1,280 | 1,280 |
| San Antonio Water System | 2,325,671 | 2,694,204 | 2,944,909 | 3,175,196 | 3,385,292 | 3,609,290 |
| Schertz | 9,641 | 13,665 | 17,272 | 20,265 | 23,714 | 27,687 |
| Selma | 10,477 | 13,541 | 16,288 | 18,599 | 21,258 | 24,318 |
| Shavano Park | 1,804 | 2,041 | 2,252 | 2,441 | 2,656 | 2,903 |
| The Oaks WSC | 1,277 | 1,445 | 1,595 | 1,729 | 1,881 | 2,057 |
| Universal City | 20,327 | 21,357 | 21,702 | 21,702 | 21,702 | 21,702 |
| Water Services | 3,642 | 4,119 | 4,547 | 4,928 | 5,364 | 5,863 |
| County-Other | 1,983 | 3,426 | 4,937 | 5,306 | 5,805 | 4,146 |
| | | | | | | |
| **Caldwell County Total** | **67,191** | **83,988** | **100,497** | **116,808** | **134,861** | **151,345** |
| **Caldwell County / Colorado Basin Total** | **12,323** | **20,537** | **28,935** | **37,155** | **45,779** | **54,803** |
| Creedmoor-Maha WSC* | 9,420 | 17,076 | 24,703 | 32,306 | 39,966 | 47,692 |
| Polonia WSC* | 2,740 | 3,244 | 3,841 | 4,549 | 5,386 | 6,378 |
| County-Other | 163 | 217 | 391 | 300 | 427 | 733 |
| | | | | | | |
| **Caldwell County / Guadalupe Basin Total** | **54,868** | **63,451** | **71,562** | **79,653** | **89,082** | **96,542** |
| Aqua WSC* | 1,143 | 1,319 | 1,485 | 1,643 | 1,825 | 2,032 |
| County Line SUD | 2,627 | 3,923 | 4,830 | 6,200 | 7,000 | 7,440 |
| Creedmoor-Maha WSC* | 1,149 | 2,082 | 3,013 | 3,940 | 4,874 | 5,816 |
| Goforth SUD* | 769 | 920 | 1,061 | 1,193 | 1,346 | 1,522 |
| Gonzales County WSC | 144 | 143 | 141 | 143 | 145 | 145 |
| Lockhart | 21,276 | 23,217 | 25,158 | 27,099 | 29,040 | 30,977 |
| Luling | 5,602 | 5,747 | 5,888 | 6,085 | 6,296 | 6,525 |
| Martindale WSC | 3,897 | 5,125 | 5,540 | 6,001 | 6,512 | 7,076 |
| Maxwell SUD | 9,631 | 11,048 | 12,632 | 14,277 | 16,714 | 16,494 |
| Polonia WSC* | 5,805 | 6,875 | 8,141 | 9,639 | 11,415 | 13,517 |
| San Marcos | 917 | 917 | 917 | 917 | 917 | 917 |
| Tri Community WSC | 1,368 | 1,416 | 1,463 | 1,521 | 1,585 | 1,655 |
| County-Other | 540 | 719 | 1,293 | 995 | 1,413 | 2,426 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Calhoun County Total** | **19,449** | **18,619** | **17,599** | **16,571** | **15,483** | **14,332** |
| **Calhoun County / Colorado-Lavaca Basin Total** | **1,114** | **1,109** | **1,090** | **1,066** | **1,046** | **1,037** |
| Point Comfort | 556 | 531 | 501 | 472 | 439 | 406 |
| County-Other | 558 | 578 | 589 | 594 | 607 | 631 |
| | | | | | | |
| **Calhoun County / Lavaca-Guadalupe Basin Total** | **18,286** | **17,459** | **16,457** | **15,453** | **14,384** | **13,240** |
| Guadalupe-Blanco River Authority | 3,669 | 3,326 | 2,956 | 2,605 | 2,202 | 1,743 |
| Port Lavaca | 11,546 | 11,088 | 10,524 | 9,954 | 9,358 | 8,725 |
| Port Oconnor Improvement District | 839 | 804 | 758 | 713 | 664 | 612 |
| Seadrift | 905 | 865 | 816 | 767 | 714 | 659 |
| County-Other | 1,327 | 1,376 | 1,403 | 1,414 | 1,446 | 1,501 |
| | | | | | | |
| **Calhoun County / San Antonio-Nueces Basin Total** | **49** | **51** | **52** | **52** | **53** | **55** |
| County-Other | 49 | 51 | 52 | 52 | 53 | 55 |
| | | | | | | |
| **Comal County Total** | **259,280** | **350,779** | **447,841** | **584,380** | **756,273** | **953,073** |
| **Comal County / Guadalupe Basin Total** | **227,956** | **311,261** | **401,228** | **526,428** | **682,700** | **861,662** |
| 3009 Water | 1,417 | 1,816 | 2,346 | 3,017 | 3,787 | 4,669 |
| Canyon Lake Water Service* | 77,802 | 106,365 | 124,520 | 136,314 | 180,503 | 229,262 |
| Clear Water Estates Water System | 898 | 1,253 | 1,725 | 2,325 | 3,010 | 3,795 |
| Crystal Clear SUD | 15,217 | 19,162 | 19,162 | 19,162 | 19,162 | 19,162 |
| Garden Ridge | 3,410 | 4,215 | 5,022 | 5,952 | 7,055 | 8,363 |
| Green Valley SUD | 1,315 | 1,956 | 2,811 | 3,893 | 5,131 | 6,549 |
| KT Water Development | 2,652 | 4,105 | 6,045 | 8,498 | 11,306 | 14,521 |
| New Braunfels | 103,841 | 147,327 | 205,331 | 278,735 | 362,773 | 458,988 |
| San Antonio Water System | 1,438 | 1,592 | 1,740 | 1,876 | 2,001 | 2,001 |
| Schertz | 1,371 | 1,912 | 2,634 | 3,549 | 4,595 | 5,793 |
| Wingert Water Systems | 1,638 | 1,847 | 2,126 | 2,178 | 2,178 | 2,178 |
| County-Other | 16,957 | 19,711 | 27,766 | 60,929 | 81,199 | 106,381 |
| | | | | | | |
| **Comal County / San Antonio Basin Total** | **31,324** | **39,518** | **46,613** | **57,952** | **73,573** | **91,411** |
| 3009 Water | 48 | 61 | 79 | 102 | 128 | 158 |
| Canyon Lake Water Service* | 16,606 | 22,703 | 26,578 | 29,095 | 38,527 | 48,935 |
| Fair Oaks Ranch | 1,893 | 2,259 | 2,442 | 2,515 | 2,533 | 2,533 |
| Garden Ridge | 2,376 | 2,937 | 3,500 | 4,148 | 4,917 | 5,828 |
| Guadalupe-Blanco River Authority | 3,500 | 3,500 | 3,500 | 3,500 | 3,500 | 3,500 |
| San Antonio Water System | 956 | 1,059 | 1,158 | 1,248 | 1,331 | 1,331 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Selma | 633 | 1,098 | 1,718 | 2,502 | 3,399 | 4,426 |
| Water Services | 1,620 | 1,609 | 1,592 | 1,576 | 1,558 | 1,538 |
| County-Other | 3,692 | 4,292 | 6,046 | 13,266 | 17,680 | 23,162 |
| | | | | | | |
| **DeWitt County Total** | **19,716** | **19,687** | **19,565** | **19,482** | **19,394** | **19,301** |
| **DeWitt County / Guadalupe Basin Total** | **15,668** | **15,656** | **15,574** | **15,536** | **15,500** | **15,464** |
| Cuero | 8,446 | 8,436 | 8,386 | 8,356 | 8,324 | 8,292 |
| Gonzales County WSC | 200 | 198 | 195 | 189 | 185 | 177 |
| Yorktown | 1,826 | 1,824 | 1,812 | 1,803 | 1,793 | 1,784 |
| County-Other | 5,196 | 5,198 | 5,181 | 5,188 | 5,198 | 5,211 |
| | | | | | | |
| **DeWitt County / Lavaca Basin Total** | **3,390** | **3,373** | **3,336** | **3,289** | **3,236** | **3,177** |
| Yoakum* | 2,019 | 2,002 | 1,970 | 1,921 | 1,865 | 1,802 |
| County-Other | 1,371 | 1,371 | 1,366 | 1,368 | 1,371 | 1,375 |
| | | | | | | |
| **DeWitt County / Lavaca-Guadalupe Basin Total** | **25** | **25** | **24** | **25** | **25** | **25** |
| County-Other | 25 | 25 | 24 | 25 | 25 | 25 |
| | | | | | | |
| **DeWitt County / San Antonio Basin Total** | **633** | **633** | **631** | **632** | **633** | **635** |
| County-Other | 633 | 633 | 631 | 632 | 633 | 635 |
| | | | | | | |
| **Dimmit County Total** | **8,175** | **7,818** | **7,383** | **6,983** | **6,560** | **6,112** |
| **Dimmit County / Nueces Basin Total** | **8,143** | **7,789** | **7,358** | **6,962** | **6,545** | **6,106** |
| Asherton | 684 | 652 | 614 | 579 | 539 | 498 |
| Big Wells | 418 | 398 | 375 | 352 | 329 | 300 |
| Carrizo Hill WSC | 663 | 752 | 854 | 981 | 1,202 | 1,678 |
| Carrizo Springs | 4,507 | 4,302 | 4,055 | 3,825 | 3,580 | 3,307 |
| County-Other | 1,871 | 1,685 | 1,460 | 1,225 | 895 | 323 |
| | | | | | | |
| **Dimmit County / Rio Grande Basin Total** | **32** | **29** | **25** | **21** | **15** | **6** |
| County-Other | 32 | 29 | 25 | 21 | 15 | 6 |
| | | | | | | |
| **Frio County Total** | **19,512** | **20,540** | **21,269** | **21,643** | **22,071** | **22,561** |
| **Frio County / Nueces Basin Total** | **19,512** | **20,540** | **21,269** | **21,643** | **22,071** | **22,561** |
| Benton City WSC | 1,287 | 1,693 | 1,974 | 1,990 | 2,008 | 2,028 |
| Dilley | 5,260 | 6,535 | 7,420 | 7,497 | 7,583 | 7,680 |
| Moore WSC | 588 | 686 | 754 | 763 | 774 | 787 |
| Pearsall | 8,550 | 9,781 | 10,640 | 10,787 | 10,952 | 11,139 |
| County-Other | 3,827 | 1,845 | 481 | 606 | 754 | 927 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Goliad County Total** | **6,803** | **6,648** | **6,559** | **6,454** | **6,334** | **6,197** |
| **Goliad County / Guadalupe Basin Total** | **2,606** | **2,530** | **2,486** | **2,434** | **2,375** | **2,309** |
| County-Other | 2,606 | 2,530 | 2,486 | 2,434 | 2,375 | 2,309 |
| | | | | | | |
| **Goliad County / San Antonio Basin Total** | **3,752** | **3,686** | **3,648** | **3,604** | **3,553** | **3,494** |
| Goliad | 1,495 | 1,495 | 1,495 | 1,495 | 1,495 | 1,495 |
| County-Other | 2,257 | 2,191 | 2,153 | 2,109 | 2,058 | 1,999 |
| | | | | | | |
| **Goliad County / San Antonio-Nueces Basin Total** | **445** | **432** | **425** | **416** | **406** | **394** |
| County-Other | 445 | 432 | 425 | 416 | 406 | 394 |
| | | | | | | |
| **Gonzales County Total** | **19,716** | **19,697** | **19,399** | **19,064** | **18,710** | **18,335** |
| **Gonzales County / Guadalupe Basin Total** | **19,660** | **19,642** | **19,345** | **19,012** | **18,661** | **18,288** |
| Fayette WSC* | 40 | 52 | 66 | 86 | 113 | 150 |
| Gonzales | 7,512 | 7,509 | 7,399 | 7,279 | 7,152 | 7,015 |
| Gonzales County WSC | 7,218 | 7,208 | 7,096 | 6,970 | 6,836 | 6,693 |
| Luling | 54 | 54 | 53 | 53 | 51 | 50 |
| Nixon | 2,249 | 2,247 | 2,211 | 2,171 | 2,129 | 2,084 |
| Smiley | 474 | 474 | 467 | 458 | 449 | 439 |
| Waelder | 1,016 | 1,015 | 999 | 980 | 962 | 942 |
| County-Other | 1,097 | 1,083 | 1,054 | 1,015 | 969 | 915 |
| | | | | | | |
| **Gonzales County / Lavaca Basin Total** | **56** | **55** | **54** | **52** | **49** | **47** |
| County-Other | 56 | 55 | 54 | 52 | 49 | 47 |
| | | | | | | |
| **Guadalupe County Total** | **292,903** | **385,703** | **462,052** | **542,643** | **634,587** | **739,503** |
| **Guadalupe County / Guadalupe Basin Total** | **189,085** | **259,159** | **310,078** | **363,831** | **425,052** | **494,802** |
| Crystal Clear SUD | 35,538 | 65,308 | 77,013 | 91,463 | 108,106 | 127,245 |
| Gonzales County WSC | 125 | 160 | 200 | 241 | 288 | 343 |
| Green Valley SUD | 13,814 | 18,473 | 23,689 | 29,189 | 35,481 | 42,683 |
| Martindale WSC | 557 | 861 | 1,072 | 1,303 | 1,556 | 1,836 |
| New Braunfels | 36,517 | 52,564 | 70,539 | 89,478 | 111,139 | 135,926 |
| Schertz | 4,321 | 5,029 | 5,819 | 6,655 | 7,613 | 8,711 |
| Seguin | 50,517 | 59,570 | 63,909 | 66,466 | 69,091 | 71,790 |
| Springs Hill WSC | 46,037 | 54,563 | 64,014 | 73,961 | 85,256 | 98,083 |
| Tri Community WSC | 28 | 31 | 34 | 37 | 40 | 44 |
| Water Services | 201 | 179 | 160 | 143 | 129 | 115 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| County-Other | 1,430 | 2,421 | 3,629 | 4,895 | 6,353 | 8,026 |
| | | | | | | |
| **Guadalupe County / San Antonio Basin Total** | **103,818** | **126,544** | **151,974** | **178,812** | **209,535** | **244,701** |
| Cibolo | 25,890 | 31,422 | 37,606 | 44,137 | 51,615 | 60,179 |
| East Central SUD | 1,417 | 1,719 | 2,057 | 2,414 | 2,822 | 3,291 |
| Green Valley SUD | 29,543 | 39,508 | 50,664 | 62,426 | 75,884 | 91,286 |
| Marion | 1,471 | 1,546 | 1,631 | 1,721 | 1,825 | 1,945 |
| Schertz | 35,687 | 41,534 | 48,064 | 54,968 | 62,881 | 71,944 |
| Selma | 5,251 | 5,251 | 5,251 | 5,251 | 5,251 | 5,251 |
| Springs Hill WSC | 4,079 | 4,835 | 5,673 | 6,554 | 7,555 | 8,691 |
| Universal City | 198 | 252 | 312 | 376 | 449 | 532 |
| County-Other | 282 | 477 | 716 | 965 | 1,253 | 1,582 |
| | | | | | | |
| **Hays County Total** | **336,064** | **500,806** | **683,104** | **877,560** | **1,051,675** | **1,240,694** |
| **Hays County / Guadalupe Basin Total** | **336,064** | **500,806** | **683,104** | **877,560** | **1,051,675** | **1,240,694** |
| County Line SUD | 34,873 | 71,077 | 115,170 | 148,761 | 167,956 | 178,513 |
| Creedmoor-Maha WSC* | 54 | 54 | 54 | 54 | 54 | 54 |
| Crystal Clear SUD | 8,777 | 15,573 | 16,746 | 16,746 | 16,746 | 16,746 |
| Goforth SUD* | 41,415 | 65,951 | 98,260 | 142,035 | 192,136 | 249,490 |
| Kyle | 61,050 | 91,138 | 124,117 | 139,145 | 144,092 | 147,735 |
| Maxwell SUD | 10,915 | 16,564 | 24,478 | 35,595 | 50,312 | 57,543 |
| San Marcos | 140,913 | 198,869 | 245,241 | 279,444 | 301,489 | 315,690 |
| South Buda WCID 1 | 4,066 | 6,633 | 10,014 | 14,592 | 19,832 | 25,829 |
| Texas State University | 9,400 | 9,400 | 9,400 | 9,400 | 9,400 | 9,400 |
| Wimberley WSC | 5,272 | 7,640 | 10,758 | 14,989 | 19,834 | 25,379 |
| County-Other* | 19,329 | 17,907 | 28,866 | 76,799 | 129,824 | 214,315 |
| | | | | | | |
| **Karnes County Total** | **15,357** | **16,052** | **16,739** | **17,527** | **18,429** | **19,462** |
| **Karnes County / Guadalupe Basin Total** | **68** | **70** | **73** | **77** | **81** | **85** |
| El Oso WSC* | 24 | 24 | 25 | 26 | 27 | 28 |
| County-Other | 44 | 46 | 48 | 51 | 54 | 57 |
| | | | | | | |
| **Karnes County / Nueces Basin Total** | **221** | **229** | **236** | **244** | **254** | **264** |
| El Oso WSC* | 197 | 203 | 209 | 216 | 224 | 233 |
| Three Oaks WSC | 18 | 19 | 20 | 21 | 22 | 23 |
| County-Other | 6 | 7 | 7 | 7 | 8 | 8 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Karnes County / San Antonio Basin Total** | **14,968** | **15,649** | **16,322** | **17,094** | **17,977** | **18,990** |
| El Oso WSC* | 5,637 | 5,811 | 5,983 | 6,186 | 6,418 | 6,686 |
| Falls City | 476 | 503 | 529 | 560 | 594 | 634 |
| Karnes City | 2,314 | 2,441 | 2,566 | 2,709 | 2,871 | 3,057 |
| Kenedy | 3,447 | 3,640 | 3,831 | 4,046 | 4,294 | 4,577 |
| Runge | 876 | 925 | 974 | 1,030 | 1,094 | 1,167 |
| Sunko WSC | 150 | 158 | 167 | 177 | 187 | 199 |
| Three Oaks WSC | 69 | 74 | 77 | 82 | 88 | 93 |
| County-Other | 1,999 | 2,097 | 2,195 | 2,304 | 2,431 | 2,577 |
| | | | | | | |
| **Karnes County / San Antonio-Nueces Basin Total** | **100** | **104** | **108** | **112** | **117** | **123** |
| El Oso WSC* | 53 | 54 | 56 | 58 | 60 | 62 |
| County-Other | 47 | 50 | 52 | 54 | 57 | 61 |
| | | | | | | |
| **Kendall County Total** | **56,306** | **70,896** | **89,665** | **111,448** | **136,387** | **164,940** |
| **Kendall County / Colorado Basin Total** | **352** | **340** | **411** | **500** | **604** | **724** |
| County-Other | 352 | 340 | 411 | 500 | 604 | 724 |
| | | | | | | |
| **Kendall County / Guadalupe Basin Total** | **17,218** | **20,766** | **24,156** | **28,296** | **33,135** | **38,708** |
| Guadalupe-Blanco River Authority | 1,690 | 5,409 | 5,409 | 5,409 | 5,409 | 5,409 |
| Kendall County WCID 1 | 2,873 | 3,114 | 3,939 | 4,896 | 5,992 | 7,247 |
| County-Other | 12,655 | 12,243 | 14,808 | 17,991 | 21,734 | 26,052 |
| | | | | | | |
| **Kendall County / San Antonio Basin Total** | **38,736** | **49,790** | **65,098** | **82,652** | **102,648** | **125,508** |
| Boerne | 25,482 | 35,084 | 47,445 | 61,796 | 78,225 | 97,031 |
| Fair Oaks Ranch | 2,519 | 3,440 | 3,901 | 4,085 | 4,131 | 4,131 |
| Guadalupe-Blanco River Authority | 29 | 91 | 91 | 91 | 91 | 91 |
| Kendall West Utility | 2,819 | 3,561 | 4,515 | 5,623 | 6,890 | 8,342 |
| Water Services | 215 | 192 | 170 | 151 | 135 | 120 |
| County-Other | 7,672 | 7,422 | 8,976 | 10,906 | 13,176 | 15,793 |
| | | | | | | |
| **La Salle County Total** | **6,723** | **6,766** | **6,690** | **6,529** | **6,359** | **6,179** |
| **La Salle County / Nueces Basin Total** | **6,723** | **6,766** | **6,690** | **6,529** | **6,359** | **6,179** |
| Cotulla | 3,404 | 3,346 | 3,337 | 3,360 | 3,428 | 3,558 |
| Encinal WSC | 1,043 | 1,085 | 1,146 | 1,221 | 1,318 | 1,449 |
| County-Other | 2,276 | 2,335 | 2,207 | 1,948 | 1,613 | 1,172 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Medina County Total** | **60,936** | **79,204** | **83,631** | **87,079** | **90,594** | **92,654** |
| **Medina County / Nueces Basin Total** | **35,389** | **36,875** | **37,778** | **38,072** | **38,583** | **39,496** |
| Benton City WSC | 5,897 | 6,266 | 6,536 | 6,710 | 6,910 | 7,139 |
| Devine | 4,318 | 4,374 | 4,430 | 4,507 | 4,594 | 4,692 |
| East Medina County SUD | 9,368 | 9,998 | 10,455 | 10,741 | 11,071 | 11,450 |
| Hondo | 7,907 | 7,586 | 7,407 | 7,448 | 7,491 | 7,534 |
| Lytle | 623 | 673 | 709 | 730 | 755 | 783 |
| Medina County WCID 2 | 446 | 431 | 421 | 425 | 428 | 431 |
| Medina River West WSC | 739 | 787 | 822 | 844 | 870 | 898 |
| Natalia | 1,134 | 1,101 | 1,155 | 1,187 | 1,192 | 1,162 |
| Ville Dalsace Water Supply | 211 | 230 | 244 | 252 | 261 | 271 |
| West Medina WSC | 1,003 | 1,079 | 1,097 | 1,122 | 1,161 | 1,095 |
| Yancey WSC | 474 | 504 | 525 | 539 | 555 | 573 |
| County-Other | 3,269 | 3,846 | 3,977 | 3,567 | 3,295 | 3,468 |
| | | | | | | |
| **Medina County / San Antonio Basin Total** | **25,547** | **42,329** | **45,853** | **49,007** | **52,011** | **53,158** |
| Canyon Lake Water Service* | 396 | 563 | 624 | 647 | 655 | 663 |
| Castroville | 6,496 | 7,081 | 7,930 | 9,120 | 10,214 | 10,929 |
| East Medina County SUD | 770 | 822 | 860 | 884 | 911 | 942 |
| La Coste | 1,310 | 1,290 | 1,281 | 1,296 | 1,313 | 1,330 |
| Medina River West WSC | 392 | 417 | 435 | 447 | 460 | 476 |
| San Antonio Water System | 7,783 | 22,963 | 25,157 | 27,165 | 29,001 | 29,001 |
| Ville Dalsace Water Supply | 199 | 217 | 230 | 237 | 245 | 255 |
| Yancey WSC | 5,842 | 6,202 | 6,467 | 6,638 | 6,834 | 7,060 |
| County-Other | 2,359 | 2,774 | 2,869 | 2,573 | 2,378 | 2,502 |
| | | | | | | |
| **Refugio County Total** | **6,489** | **6,243** | **5,992** | **5,799** | **5,595** | **5,379** |
| **Refugio County / San Antonio Basin Total** | **59** | **56** | **52** | **49** | **46** | **40** |
| County-Other | 59 | 56 | 52 | 49 | 46 | 40 |
| | | | | | | |
| **Refugio County / San Antonio-Nueces Basin Total** | **6,430** | **6,187** | **5,940** | **5,750** | **5,549** | **5,339** |
| Refugio | 2,549 | 2,521 | 2,506 | 2,524 | 2,594 | 2,749 |
| Woodsboro | 1,278 | 1,204 | 1,120 | 1,036 | 938 | 823 |
| County-Other | 2,603 | 2,462 | 2,314 | 2,190 | 2,017 | 1,767 |
| | | | | | | |
| **Uvalde County Total** | **24,967** | **24,478** | **23,759** | **22,944** | **22,080** | **21,167** |
| **Uvalde County / Nueces Basin Total** | **24,967** | **24,478** | **23,759** | **22,944** | **22,080** | **21,167** |
| Concan WSC | 294 | 286 | 278 | 266 | 254 | 240 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Knippa WSC | 495 | 485 | 469 | 450 | 430 | 405 |
| Sabinal | 1,292 | 1,262 | 1,220 | 1,170 | 1,116 | 1,056 |
| Uvalde | 16,762 | 16,457 | 15,999 | 15,482 | 14,949 | 14,411 |
| Windmill WSC | 1,516 | 1,385 | 1,249 | 1,114 | 960 | 784 |
| County-Other | 4,608 | 4,603 | 4,544 | 4,462 | 4,371 | 4,271 |
| | | | | | | |
| **Victoria County Total** | **93,954** | **96,082** | **96,608** | **96,168** | **95,664** | **95,087** |
| **Victoria County / Guadalupe Basin Total** | **61,271** | **62,638** | **62,972** | **62,680** | **62,347** | **61,964** |
| Quail Creek MUD | 1,319 | 1,365 | 1,378 | 1,371 | 1,363 | 1,354 |
| Victoria | 44,650 | 45,336 | 45,486 | 45,282 | 45,049 | 44,782 |
| County-Other | 15,302 | 15,937 | 16,108 | 16,027 | 15,935 | 15,828 |
| | | | | | | |
| **Victoria County / Lavaca Basin Total** | **62** | **64** | **65** | **64** | **64** | **64** |
| County-Other | 62 | 64 | 65 | 64 | 64 | 64 |
| | | | | | | |
| **Victoria County / Lavaca-Guadalupe Basin Total** | **32,554** | **33,311** | **33,501** | **33,354** | **33,184** | **32,990** |
| Victoria | 21,645 | 21,978 | 22,051 | 21,952 | 21,839 | 21,709 |
| Victoria County WCID 1 | 1,709 | 1,753 | 1,767 | 1,767 | 1,766 | 1,766 |
| County-Other | 9,200 | 9,580 | 9,683 | 9,635 | 9,579 | 9,515 |
| | | | | | | |
| **Victoria County / San Antonio Basin Total** | **67** | **69** | **70** | **70** | **69** | **69** |
| County-Other | 67 | 69 | 70 | 70 | 69 | 69 |
| | | | | | | |
| **Wilson County Total** | **55,858** | **61,941** | **67,968** | **73,304** | **79,413** | **86,407** |
| **Wilson County / Guadalupe Basin Total** | **302** | **299** | **290** | **268** | **243** | **214** |
| Sunko WSC | 20 | 23 | 25 | 27 | 29 | 32 |
| County-Other | 282 | 276 | 265 | 241 | 214 | 182 |
| | | | | | | |
| **Wilson County / Nueces Basin Total** | **814** | **903** | **991** | **1,068** | **1,157** | **1,257** |
| McCoy WSC* | 406 | 451 | 496 | 537 | 583 | 635 |
| Picosa WSC | 32 | 37 | 42 | 46 | 51 | 57 |
| Three Oaks WSC | 357 | 396 | 435 | 469 | 508 | 553 |
| County-Other | 19 | 19 | 18 | 16 | 15 | 12 |
| | | | | | | |
| **Wilson County / San Antonio Basin Total** | **54,742** | **60,739** | **66,687** | **71,968** | **78,013** | **84,936** |
| C Willow Water | 664 | 737 | 809 | 873 | 947 | 1,030 |
| East Central SUD | 1,368 | 1,525 | 1,674 | 1,803 | 1,900 | 1,900 |
| El Oso WSC* | 170 | 207 | 245 | 277 | 315 | 358 |
| Floresville | 5,859 | 6,166 | 6,482 | 6,762 | 7,082 | 7,448 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Population

| | WUG Population | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| La Vernia | 3,135 | 3,476 | 3,815 | 4,114 | 4,457 | 4,850 |
| Oak Hills WSC | 5,987 | 6,907 | 7,968 | 9,192 | 10,604 | 12,233 |
| Picosa WSC | 3,559 | 4,105 | 4,641 | 5,115 | 5,659 | 6,281 |
| Poth | 1,550 | 1,525 | 1,506 | 1,491 | 1,472 | 1,450 |
| S S WSC | 20,066 | 23,148 | 26,175 | 28,850 | 31,963 | 35,649 |
| Springs Hill WSC | 244 | 354 | 461 | 556 | 664 | 789 |
| Stockdale | 1,458 | 1,471 | 1,488 | 1,504 | 1,521 | 1,540 |
| Sunko WSC | 3,975 | 4,411 | 4,843 | 5,225 | 5,663 | 6,164 |
| Three Oaks WSC | 1,011 | 1,121 | 1,230 | 1,326 | 1,437 | 1,563 |
| County-Other | 5,696 | 5,586 | 5,350 | 4,880 | 4,329 | 3,681 |
| | | | | | | |
| **Zavala County Total** | **9,480** | **9,232** | **8,858** | **8,472** | **8,064** | **7,632** |
| **Zavala County / Nueces Basin Total** | **9,480** | **9,232** | **8,858** | **8,472** | **8,064** | **7,632** |
| Batesville WSC | 860 | 837 | 802 | 767 | 729 | 687 |
| Crystal City | 5,925 | 5,773 | 5,539 | 5,301 | 5,050 | 4,792 |
| Loma Alta Chula Vista Water System | 323 | 315 | 302 | 289 | 274 | 259 |
| Zavala County WCID 1 | 1,219 | 1,186 | 1,136 | 1,086 | 1,032 | 975 |
| County-Other | 1,153 | 1,121 | 1,079 | 1,029 | 979 | 919 |
| | | | | | | |
| **Region L Population Total** | **3,987,279** | **4,793,957** | **5,469,629** | **6,176,459** | **6,897,460** | **7,689,377** |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Atascosa County Total** | **51,026** | **51,869** | **52,764** | **53,584** | **54,455** | **50,215** |
| **Atascosa County / Nueces Basin Total** | **50,374** | **51,186** | **52,051** | **52,848** | **53,694** | **49,540** |
| Benton City WSC | 1,297 | 1,443 | 1,588 | 1,686 | 1,799 | 1,930 |
| Charlotte | 208 | 189 | 177 | 182 | 187 | 192 |
| El Oso WSC* | 21 | 26 | 29 | 31 | 34 | 37 |
| Jourdanton | 1,030 | 1,085 | 1,148 | 1,210 | 1,281 | 1,361 |
| Lytle | 498 | 525 | 556 | 586 | 620 | 660 |
| McCoy WSC* | 923 | 957 | 1,003 | 1,056 | 1,115 | 1,183 |
| Pleasanton | 2,660 | 2,889 | 3,147 | 3,427 | 3,732 | 4,065 |
| Poteet | 326 | 291 | 266 | 273 | 279 | 285 |
| San Antonio Water System | 697 | 723 | 745 | 780 | 808 | 851 |
| County-Other | 111 | 147 | 180 | 120 | 76 | 39 |
| Manufacturing | 56 | 58 | 60 | 62 | 64 | 66 |
| Mining | 7,863 | 8,169 | 8,468 | 8,751 | 9,015 | 4,187 |
| Steam Electric Power | 7,962 | 7,962 | 7,962 | 7,962 | 7,962 | 7,962 |
| Livestock | 1,534 | 1,534 | 1,534 | 1,534 | 1,534 | 1,534 |
| Irrigation | 25,188 | 25,188 | 25,188 | 25,188 | 25,188 | 25,188 |
| | | | | | | |
| **Atascosa County / San Antonio Basin Total** | **652** | **683** | **713** | **736** | **761** | **675** |
| Benton City WSC | 204 | 227 | 250 | 266 | 284 | 304 |
| Lytle | 13 | 14 | 14 | 15 | 16 | 17 |
| San Antonio Water System | 3 | 3 | 3 | 3 | 3 | 4 |
| Mining | 176 | 183 | 190 | 196 | 202 | 94 |
| Livestock | 3 | 3 | 3 | 3 | 3 | 3 |
| Irrigation | 253 | 253 | 253 | 253 | 253 | 253 |
| | | | | | | |
| **Bexar County Total** | **396,152** | **428,883** | **451,020** | **468,589** | **483,258** | **503,941** |
| **Bexar County / Nueces Basin Total** | **2,722** | **2,871** | **2,977** | **3,059** | **3,132** | **3,219** |
| Atascosa Rural WSC | 103 | 120 | 135 | 148 | 163 | 181 |
| Lytle | 46 | 52 | 56 | 61 | 67 | 73 |
| San Antonio Water System | 1,067 | 1,179 | 1,252 | 1,308 | 1,352 | 1,419 |
| County-Other | 12 | 20 | 29 | 31 | 34 | 24 |
| Manufacturing | 141 | 147 | 152 | 158 | 163 | 169 |
| Livestock | 62 | 62 | 62 | 62 | 62 | 62 |
| Irrigation | 1,291 | 1,291 | 1,291 | 1,291 | 1,291 | 1,291 |
| | | | | | | |
| **Bexar County / San Antonio Basin Total** | **393,430** | **426,012** | **448,043** | **465,530** | **480,126** | **500,722** |
| Air Force Village II Inc | 133 | 133 | 133 | 133 | 133 | 133 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Alamo Heights | 2,099 | 2,094 | 2,094 | 2,094 | 2,094 | 2,094 |
| Atascosa Rural WSC | 1,544 | 1,790 | 2,017 | 2,215 | 2,442 | 2,701 |
| Bexar County WCID 10 | 1,305 | 1,469 | 1,619 | 1,753 | 1,906 | 2,082 |
| Converse | 2,968 | 2,954 | 2,954 | 2,954 | 2,954 | 2,954 |
| East Central SUD | 6,233 | 7,018 | 7,747 | 8,395 | 9,137 | 9,987 |
| Elmendorf | 565 | 754 | 1,010 | 1,356 | 1,689 | 2,332 |
| Fair Oaks Ranch | 1,435 | 1,591 | 1,670 | 1,702 | 1,710 | 1,710 |
| Fort Sam Houston | 17,514 | 17,505 | 17,505 | 17,505 | 17,505 | 17,505 |
| Green Valley SUD | 197 | 239 | 277 | 310 | 348 | 391 |
| Kirby | 876 | 986 | 1,008 | 1,008 | 1,008 | 1,008 |
| La Coste | 2 | 2 | 2 | 2 | 2 | 3 |
| Lackland Air Force Base | 1,454 | 1,441 | 1,441 | 1,441 | 1,441 | 1,441 |
| Leon Valley | 1,779 | 2,145 | 2,145 | 2,145 | 2,145 | 2,145 |
| Live Oak | 1,700 | 1,691 | 1,691 | 1,691 | 1,691 | 1,691 |
| Lytle | 2 | 2 | 3 | 3 | 3 | 3 |
| Oak Hills WSC | 7 | 9 | 12 | 17 | 24 | 33 |
| Randolph Air Force Base | 86 | 86 | 86 | 86 | 86 | 86 |
| San Antonio Water System | 265,719 | 293,642 | 311,729 | 325,792 | 336,731 | 353,352 |
| Schertz | 1,518 | 2,142 | 2,707 | 3,177 | 3,717 | 4,340 |
| Selma | 1,687 | 2,172 | 2,612 | 2,983 | 3,409 | 3,900 |
| Shavano Park | 562 | 635 | 700 | 759 | 826 | 903 |
| The Oaks WSC | 217 | 245 | 270 | 293 | 319 | 348 |
| Universal City | 2,963 | 3,098 | 3,148 | 3,148 | 3,148 | 3,148 |
| Water Services | 570 | 643 | 709 | 769 | 837 | 915 |
| County-Other | 250 | 427 | 614 | 660 | 723 | 516 |
| Manufacturing | 8,732 | 9,054 | 9,389 | 9,736 | 10,097 | 10,471 |
| Mining | 7,634 | 8,366 | 9,072 | 9,724 | 10,322 | 10,851 |
| Steam Electric Power | 52,293 | 52,293 | 52,293 | 52,293 | 52,293 | 52,293 |
| Livestock | 926 | 926 | 926 | 926 | 926 | 926 |
| Irrigation | 10,460 | 10,460 | 10,460 | 10,460 | 10,460 | 10,460 |
| | | | | | | |
| **Caldwell County Total** | **10,019** | **11,820** | **13,646** | **15,439** | **17,439** | **18,967** |
| **Caldwell County / Colorado Basin Total** | **1,413** | **2,279** | **3,178** | **4,057** | **4,982** | **5,953** |
| Creedmoor-Maha WSC* | 1,004 | 1,805 | 2,612 | 3,415 | 4,225 | 5,042 |
| Polonia WSC* | 332 | 391 | 463 | 549 | 650 | 769 |
| County-Other | 19 | 25 | 45 | 35 | 49 | 84 |
| Livestock | 39 | 39 | 39 | 39 | 39 | 39 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Irrigation | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | | | | |
| **Caldwell County / Guadalupe Basin Total** | **8,606** | **9,541** | **10,468** | **11,382** | **12,457** | **13,014** |
| Aqua WSC* | 184 | 212 | 238 | 264 | 293 | 326 |
| County Line SUD | 227 | 338 | 417 | 535 | 604 | 642 |
| Creedmoor-Maha WSC* | 122 | 220 | 318 | 417 | 515 | 615 |
| Goforth SUD* | 84 | 100 | 115 | 129 | 146 | 165 |
| Gonzales County WSC | 39 | 38 | 38 | 38 | 39 | 39 |
| Lockhart | 2,967 | 3,225 | 3,494 | 3,764 | 4,034 | 4,303 |
| Luling | 774 | 790 | 810 | 837 | 866 | 897 |
| Martindale WSC | 400 | 523 | 566 | 613 | 665 | 723 |
| Maxwell SUD | 946 | 1,081 | 1,236 | 1,397 | 1,636 | 1,614 |
| Polonia WSC* | 703 | 829 | 982 | 1,162 | 1,376 | 1,630 |
| San Marcos | 112 | 110 | 107 | 106 | 105 | 105 |
| Tri Community WSC | 167 | 172 | 177 | 184 | 192 | 201 |
| County-Other | 62 | 83 | 149 | 114 | 163 | 280 |
| Manufacturing | 14 | 15 | 16 | 17 | 18 | 19 |
| Mining | 352 | 352 | 352 | 352 | 352 | 2 |
| Livestock | 792 | 792 | 792 | 792 | 792 | 792 |
| Irrigation | 661 | 661 | 661 | 661 | 661 | 661 |
| | | | | | | |
| **Calhoun County Total** | **67,994** | **69,880** | **71,830** | **73,857** | **75,954** | **78,125** |
| **Calhoun County / Colorado-Lavaca Basin Total** | **37,227** | **38,576** | **39,974** | **41,426** | **42,929** | **44,492** |
| Point Comfort | 55 | 52 | 49 | 47 | 43 | 40 |
| County-Other | 62 | 63 | 64 | 65 | 66 | 69 |
| Manufacturing | 36,503 | 37,854 | 39,254 | 40,707 | 42,213 | 43,776 |
| Steam Electric Power | 37 | 37 | 37 | 37 | 37 | 37 |
| Livestock | 45 | 45 | 45 | 45 | 45 | 45 |
| Irrigation | 525 | 525 | 525 | 525 | 525 | 525 |
| | | | | | | |
| **Calhoun County / Lavaca-Guadalupe Basin Total** | **29,940** | **30,446** | **30,966** | **31,509** | **32,069** | **32,642** |
| Guadalupe-Blanco River Authority | 582 | 526 | 468 | 412 | 348 | 276 |
| Port Lavaca | 1,569 | 1,500 | 1,424 | 1,347 | 1,266 | 1,180 |
| Port Oconnor Improvement District | 61 | 58 | 54 | 51 | 48 | 44 |
| Seadrift | 147 | 140 | 132 | 124 | 116 | 107 |
| County-Other | 147 | 149 | 153 | 153 | 157 | 163 |
| Manufacturing | 17,262 | 17,901 | 18,563 | 19,250 | 19,962 | 20,700 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | 237 | 237 | 237 | 237 | 237 | 237 |
| Irrigation | 9,935 | 9,935 | 9,935 | 9,935 | 9,935 | 9,935 |
| | | | | | | |
| **Calhoun County / San Antonio-Nueces Basin Total** | **827** | **858** | **890** | **922** | **956** | **991** |
| County-Other | 5 | 6 | 6 | 6 | 6 | 6 |
| Manufacturing | 822 | 852 | 884 | 916 | 950 | 985 |
| | | | | | | |
| **Comal County Total** | **58,372** | **76,280** | **96,597** | **124,502** | **157,042** | **193,961** |
| **Comal County / Guadalupe Basin Total** | **53,289** | **69,997** | **89,203** | **115,238** | **145,481** | **179,750** |
| 3009 Water | 387 | 494 | 638 | 821 | 1,031 | 1,271 |
| Canyon Lake Water Service* | 9,497 | 12,935 | 15,144 | 16,578 | 21,952 | 27,882 |
| Clear Water Estates Water System | 1,084 | 1,512 | 2,082 | 2,806 | 3,633 | 4,580 |
| Crystal Clear SUD | 2,122 | 2,661 | 2,661 | 2,661 | 2,661 | 2,661 |
| Garden Ridge | 1,186 | 1,464 | 1,745 | 2,068 | 2,451 | 2,906 |
| Green Valley SUD | 146 | 216 | 310 | 430 | 567 | 723 |
| KT Water Development | 892 | 1,379 | 2,030 | 2,854 | 3,797 | 4,877 |
| New Braunfels | 20,797 | 29,434 | 41,023 | 55,688 | 72,478 | 91,701 |
| San Antonio Water System | 165 | 174 | 184 | 193 | 199 | 196 |
| Schertz | 216 | 300 | 413 | 556 | 720 | 908 |
| Wingert Water Systems | 322 | 362 | 416 | 426 | 426 | 426 |
| County-Other | 2,794 | 3,236 | 4,558 | 10,001 | 13,327 | 17,460 |
| Manufacturing | 901 | 934 | 969 | 1,005 | 1,042 | 1,080 |
| Mining | 12,011 | 14,127 | 16,261 | 18,382 | 20,428 | 22,310 |
| Livestock | 236 | 236 | 236 | 236 | 236 | 236 |
| Irrigation | 533 | 533 | 533 | 533 | 533 | 533 |
| | | | | | | |
| **Comal County / San Antonio Basin Total** | **5,083** | **6,283** | **7,394** | **9,264** | **11,561** | **14,211** |
| 3009 Water | 13 | 17 | 22 | 28 | 35 | 43 |
| Canyon Lake Water Service* | 2,027 | 2,761 | 3,232 | 3,538 | 4,685 | 5,951 |
| Fair Oaks Ranch | 493 | 588 | 635 | 654 | 659 | 659 |
| Garden Ridge | 827 | 1,021 | 1,216 | 1,441 | 1,709 | 2,025 |
| Guadalupe-Blanco River Authority | 555 | 554 | 554 | 554 | 554 | 554 |
| San Antonio Water System | 109 | 115 | 123 | 128 | 132 | 130 |
| Selma | 102 | 176 | 276 | 401 | 545 | 710 |
| Water Services | 254 | 251 | 248 | 246 | 243 | 240 |
| County-Other | 608 | 704 | 992 | 2,177 | 2,902 | 3,802 |
| Mining | 2 | 3 | 3 | 4 | 4 | 4 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | 35 | 35 | 35 | 35 | 35 | 35 |
| Irrigation | 58 | 58 | 58 | 58 | 58 | 58 |
| | | | | | | |
| **DeWitt County Total** | **8,151** | **8,140** | **8,125** | **8,118** | **8,108** | **6,412** |
| **DeWitt County / Guadalupe Basin Total** | **6,255** | **6,241** | **6,222** | **6,214** | **6,204** | **4,744** |
| Cuero | 2,208 | 2,200 | 2,187 | 2,180 | 2,171 | 2,163 |
| Gonzales County WSC | 54 | 53 | 52 | 51 | 49 | 47 |
| Yorktown | 313 | 312 | 310 | 308 | 307 | 305 |
| County-Other | 688 | 684 | 681 | 682 | 684 | 686 |
| Manufacturing | 9 | 9 | 9 | 10 | 10 | 11 |
| Mining | 1,458 | 1,458 | 1,458 | 1,458 | 1,458 | 7 |
| Livestock | 1,319 | 1,319 | 1,319 | 1,319 | 1,319 | 1,319 |
| Irrigation | 206 | 206 | 206 | 206 | 206 | 206 |
| | | | | | | |
| **DeWitt County / Lavaca Basin Total** | **1,396** | **1,400** | **1,404** | **1,405** | **1,405** | **1,382** |
| Yoakum* | 351 | 347 | 341 | 333 | 323 | 312 |
| County-Other | 181 | 180 | 180 | 180 | 180 | 181 |
| Manufacturing | 239 | 248 | 258 | 267 | 277 | 287 |
| Mining | 23 | 23 | 23 | 23 | 23 | 0 |
| Livestock | 265 | 265 | 265 | 265 | 265 | 265 |
| Irrigation | 337 | 337 | 337 | 337 | 337 | 337 |
| | | | | | | |
| **DeWitt County / Lavaca-Guadalupe Basin Total** | **33** | **33** | **33** | **33** | **33** | **33** |
| County-Other | 3 | 3 | 3 | 3 | 3 | 3 |
| Livestock | 24 | 24 | 24 | 24 | 24 | 24 |
| Irrigation | 6 | 6 | 6 | 6 | 6 | 6 |
| | | | | | | |
| **DeWitt County / San Antonio Basin Total** | **467** | **466** | **466** | **466** | **466** | **253** |
| County-Other | 84 | 83 | 83 | 83 | 83 | 83 |
| Mining | 214 | 214 | 214 | 214 | 214 | 1 |
| Livestock | 128 | 128 | 128 | 128 | 128 | 128 |
| Irrigation | 41 | 41 | 41 | 41 | 41 | 41 |
| | | | | | | |
| **Dimmit County Total** | **12,973** | **12,890** | **12,803** | **12,720** | **12,637** | **6,412** |
| **Dimmit County / Nueces Basin Total** | **11,796** | **11,713** | **11,627** | **11,544** | **11,462** | **5,891** |
| Asherton | 136 | 129 | 122 | 115 | 107 | 99 |
| Big Wells | 65 | 61 | 58 | 54 | 51 | 46 |
| Carrizo Hill WSC | 113 | 127 | 145 | 166 | 204 | 284 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Carrizo Springs | 1,203 | 1,145 | 1,080 | 1,018 | 953 | 881 |
| County-Other | 250 | 222 | 193 | 162 | 118 | 42 |
| Mining | 5,493 | 5,493 | 5,493 | 5,493 | 5,493 | 3 |
| Livestock | 344 | 344 | 344 | 344 | 344 | 344 |
| Irrigation | 4,192 | 4,192 | 4,192 | 4,192 | 4,192 | 4,192 |
| | | | | | | |
| **Dimmit County / Rio Grande Basin Total** | **1,177** | **1,177** | **1,176** | **1,176** | **1,175** | **521** |
| County-Other | 4 | 4 | 3 | 3 | 2 | 1 |
| Mining | 653 | 653 | 653 | 653 | 653 | 0 |
| Livestock | 23 | 23 | 23 | 23 | 23 | 23 |
| Irrigation | 497 | 497 | 497 | 497 | 497 | 497 |
| | | | | | | |
| **Frio County Total** | **81,199** | **81,534** | **81,776** | **81,843** | **81,917** | **76,007** |
| **Frio County / Nueces Basin Total** | **81,199** | **81,534** | **81,776** | **81,843** | **81,917** | **76,007** |
| Benton City WSC | 134 | 175 | 204 | 206 | 208 | 210 |
| Dilley | 1,224 | 1,517 | 1,722 | 1,740 | 1,760 | 1,782 |
| Moore WSC | 112 | 130 | 143 | 145 | 147 | 149 |
| Pearsall | 1,660 | 1,893 | 2,059 | 2,087 | 2,119 | 2,155 |
| County-Other | 482 | 231 | 60 | 76 | 94 | 116 |
| Mining | 6,002 | 6,003 | 6,003 | 6,004 | 6,004 | 10 |
| Steam Electric Power | 54 | 54 | 54 | 54 | 54 | 54 |
| Livestock | 964 | 964 | 964 | 964 | 964 | 964 |
| Irrigation | 70,567 | 70,567 | 70,567 | 70,567 | 70,567 | 70,567 |
| | | | | | | |
| **Goliad County Total** | **9,836** | **9,814** | **9,803** | **9,791** | **9,777** | **9,761** |
| **Goliad County / Guadalupe Basin Total** | **6,062** | **6,052** | **6,046** | **6,041** | **6,033** | **6,026** |
| County-Other | 307 | 297 | 291 | 286 | 278 | 271 |
| Mining | 8 | 8 | 8 | 8 | 8 | 8 |
| Steam Electric Power | 4,994 | 4,994 | 4,994 | 4,994 | 4,994 | 4,994 |
| Livestock | 199 | 199 | 199 | 199 | 199 | 199 |
| Irrigation | 554 | 554 | 554 | 554 | 554 | 554 |
| | | | | | | |
| **Goliad County / San Antonio Basin Total** | **3,042** | **3,032** | **3,028** | **3,022** | **3,017** | **3,010** |
| Goliad | 293 | 292 | 292 | 292 | 292 | 292 |
| County-Other | 266 | 257 | 253 | 247 | 242 | 235 |
| Livestock | 311 | 311 | 311 | 311 | 311 | 311 |
| Irrigation | 2,172 | 2,172 | 2,172 | 2,172 | 2,172 | 2,172 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Goliad County / San Antonio-Nueces Basin Total** | **732** | **730** | **729** | **728** | **727** | **725** |
| County-Other | 53 | 51 | 50 | 49 | 48 | 46 |
| Livestock | 279 | 279 | 279 | 279 | 279 | 279 |
| Irrigation | 400 | 400 | 400 | 400 | 400 | 400 |
| | | | | | | |
| **Gonzales County Total** | **22,035** | **22,136** | **22,196** | **22,250** | **22,302** | **16,183** |
| **Gonzales County / Guadalupe Basin Total** | **21,531** | **21,630** | **21,687** | **21,739** | **21,788** | **16,097** |
| Fayette WSC* | 5 | 7 | 9 | 12 | 15 | 20 |
| Gonzales | 1,830 | 1,824 | 1,797 | 1,768 | 1,737 | 1,704 |
| Gonzales County WSC | 1,936 | 1,928 | 1,898 | 1,864 | 1,828 | 1,790 |
| Luling | 7 | 7 | 7 | 7 | 7 | 7 |
| Nixon | 342 | 340 | 335 | 329 | 322 | 315 |
| Smiley | 94 | 93 | 92 | 90 | 88 | 86 |
| Waelder | 170 | 169 | 167 | 163 | 160 | 157 |
| County-Other | 126 | 124 | 120 | 116 | 110 | 105 |
| Manufacturing | 2,311 | 2,397 | 2,486 | 2,578 | 2,673 | 2,772 |
| Mining | 6,133 | 6,164 | 6,199 | 6,235 | 6,271 | 564 |
| Livestock | 4,099 | 4,099 | 4,099 | 4,099 | 4,099 | 4,099 |
| Irrigation | 4,478 | 4,478 | 4,478 | 4,478 | 4,478 | 4,478 |
| | | | | | | |
| **Gonzales County / Lavaca Basin Total** | **504** | **506** | **509** | **511** | **514** | **86** |
| County-Other | 6 | 6 | 6 | 6 | 6 | 5 |
| Mining | 459 | 461 | 464 | 466 | 469 | 42 |
| Livestock | 39 | 39 | 39 | 39 | 39 | 39 |
| | | | | | | |
| **Guadalupe County Total** | **56,349** | **69,418** | **80,346** | **91,858** | **104,977** | **119,161** |
| **Guadalupe County / Guadalupe Basin Total** | **41,739** | **52,108** | **59,951** | **68,202** | **77,596** | **87,520** |
| Crystal Clear SUD | 4,956 | 9,068 | 10,693 | 12,700 | 15,011 | 17,668 |
| Gonzales County WSC | 34 | 43 | 53 | 64 | 77 | 92 |
| Green Valley SUD | 1,532 | 2,040 | 2,616 | 3,223 | 3,918 | 4,713 |
| Martindale WSC | 57 | 88 | 110 | 133 | 159 | 188 |
| New Braunfels | 7,314 | 10,502 | 14,093 | 17,877 | 22,204 | 27,157 |
| Schertz | 680 | 788 | 912 | 1,043 | 1,193 | 1,365 |
| Seguin | 7,605 | 8,929 | 9,580 | 9,963 | 10,357 | 10,761 |
| Springs Hill WSC | 4,983 | 5,876 | 6,894 | 7,966 | 9,182 | 10,564 |
| Tri Community WSC | 3 | 4 | 4 | 4 | 5 | 5 |
| Water Services | 31 | 28 | 25 | 22 | 20 | 18 |
| County-Other | 158 | 265 | 398 | 536 | 696 | 879 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Manufacturing | 2,475 | 2,566 | 2,662 | 2,760 | 2,863 | 2,969 |
| Mining | 770 | 770 | 770 | 770 | 770 | 0 |
| Steam Electric Power | 9,392 | 9,392 | 9,392 | 9,392 | 9,392 | 9,392 |
| Livestock | 985 | 985 | 985 | 985 | 985 | 985 |
| Irrigation | 764 | 764 | 764 | 764 | 764 | 764 |
| | | | | | | |
| **Guadalupe County / San Antonio Basin Total** | **14,610** | **17,310** | **20,395** | **23,656** | **27,381** | **31,641** |
| Cibolo | 2,572 | 3,101 | 3,711 | 4,356 | 5,094 | 5,939 |
| East Central SUD | 194 | 235 | 281 | 329 | 385 | 449 |
| Green Valley SUD | 3,277 | 4,362 | 5,594 | 6,893 | 8,379 | 10,080 |
| Marion | 179 | 187 | 197 | 208 | 221 | 235 |
| Schertz | 5,617 | 6,511 | 7,534 | 8,617 | 9,857 | 11,278 |
| Selma | 846 | 842 | 842 | 842 | 842 | 842 |
| Springs Hill WSC | 442 | 521 | 611 | 706 | 814 | 936 |
| Universal City | 29 | 37 | 45 | 55 | 65 | 77 |
| County-Other | 31 | 52 | 78 | 106 | 137 | 173 |
| Manufacturing | 1,051 | 1,090 | 1,130 | 1,172 | 1,215 | 1,260 |
| Livestock | 194 | 194 | 194 | 194 | 194 | 194 |
| Irrigation | 178 | 178 | 178 | 178 | 178 | 178 |
| | | | | | | |
| **Hays County Total** | **43,189** | **60,339** | **78,814** | **99,478** | **118,291** | **139,706** |
| **Hays County / Guadalupe Basin Total** | **43,189** | **60,339** | **78,814** | **99,478** | **118,291** | **139,706** |
| County Line SUD | 3,008 | 6,130 | 9,934 | 12,831 | 14,486 | 15,397 |
| Creedmoor-Maha WSC* | 6 | 6 | 6 | 6 | 6 | 6 |
| Crystal Clear SUD | 1,224 | 2,162 | 2,325 | 2,325 | 2,325 | 2,325 |
| Goforth SUD* | 4,505 | 7,147 | 10,649 | 15,393 | 20,823 | 27,038 |
| Kyle | 5,929 | 8,798 | 11,982 | 13,432 | 13,910 | 14,261 |
| Maxwell SUD | 1,072 | 1,621 | 2,395 | 3,483 | 4,923 | 5,631 |
| San Marcos | 17,284 | 23,836 | 28,707 | 32,303 | 34,447 | 36,069 |
| South Buda WCID 1 | 626 | 1,019 | 1,539 | 2,242 | 3,047 | 3,969 |
| Texas State University | 1,762 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 |
| Wimberley WSC | 585 | 845 | 1,189 | 1,657 | 2,193 | 2,806 |
| County-Other* | 2,310 | 2,132 | 3,437 | 9,145 | 15,458 | 25,519 |
| Manufacturing* | 57 | 59 | 61 | 63 | 65 | 67 |
| Mining* | 30 | 37 | 43 | 51 | 61 | 71 |
| Steam Electric Power | 1,949 | 1,949 | 1,949 | 1,949 | 1,949 | 1,949 |
| Livestock* | 2,712 | 2,712 | 2,712 | 2,712 | 2,712 | 2,712 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Irrigation* | 130 | 130 | 130 | 130 | 130 | 130 |
| | | | | | | |
| **Karnes County Total** | **7,417** | **7,574** | **7,742** | **7,932** | **8,153** | **6,485** |
| **Karnes County / Guadalupe Basin Total** | **222** | **222** | **223** | **223** | **223** | **101** |
| El Oso WSC* | 5 | 5 | 5 | 5 | 5 | 6 |
| County-Other | 6 | 6 | 7 | 7 | 7 | 8 |
| Mining | 124 | 124 | 124 | 124 | 124 | 0 |
| Livestock | 41 | 41 | 41 | 41 | 41 | 41 |
| Irrigation | 46 | 46 | 46 | 46 | 46 | 46 |
| | | | | | | |
| **Karnes County / Nueces Basin Total** | **340** | **342** | **344** | **345** | **347** | **207** |
| El Oso WSC* | 39 | 40 | 42 | 43 | 45 | 46 |
| Three Oaks WSC | 4 | 5 | 5 | 5 | 5 | 6 |
| County-Other | 1 | 1 | 1 | 1 | 1 | 1 |
| Mining | 142 | 142 | 142 | 142 | 142 | 0 |
| Livestock | 76 | 76 | 76 | 76 | 76 | 76 |
| Irrigation | 78 | 78 | 78 | 78 | 78 | 78 |
| | | | | | | |
| **Karnes County / San Antonio Basin Total** | **6,756** | **6,910** | **7,075** | **7,264** | **7,481** | **6,075** |
| El Oso WSC* | 1,128 | 1,158 | 1,192 | 1,233 | 1,279 | 1,332 |
| Falls City | 105 | 110 | 116 | 123 | 130 | 139 |
| Karnes City | 424 | 445 | 468 | 494 | 524 | 558 |
| Kenedy | 1,341 | 1,414 | 1,488 | 1,571 | 1,668 | 1,778 |
| Runge | 175 | 184 | 194 | 205 | 218 | 232 |
| Sunko WSC | 24 | 25 | 26 | 28 | 30 | 31 |
| Three Oaks WSC | 17 | 18 | 19 | 20 | 22 | 22 |
| County-Other | 274 | 285 | 298 | 313 | 330 | 350 |
| Manufacturing | 69 | 72 | 75 | 78 | 81 | 84 |
| Mining | 1,653 | 1,653 | 1,653 | 1,653 | 1,653 | 3 |
| Livestock | 787 | 787 | 787 | 787 | 787 | 787 |
| Irrigation | 759 | 759 | 759 | 759 | 759 | 759 |
| | | | | | | |
| **Karnes County / San Antonio-Nueces Basin Total** | **99** | **100** | **100** | **100** | **102** | **102** |
| El Oso WSC* | 11 | 11 | 11 | 11 | 12 | 12 |
| County-Other | 6 | 7 | 7 | 7 | 8 | 8 |
| Livestock | 50 | 50 | 50 | 50 | 50 | 50 |
| Irrigation | 32 | 32 | 32 | 32 | 32 | 32 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Kendall County Total** | **10,284** | **13,140** | **16,545** | **20,445** | **24,885** | **29,962** |
| **Kendall County / Colorado Basin Total** | **46** | **44** | **52** | **63** | **75** | **89** |
| County-Other | 42 | 40 | 48 | 59 | 71 | 85 |
| Livestock | 4 | 4 | 4 | 4 | 4 | 4 |
| | | | | | | |
| **Kendall County / Guadalupe Basin Total** | **2,783** | **3,337** | **3,716** | **4,178** | **4,718** | **5,341** |
| Guadalupe-Blanco River Authority | 268 | 856 | 856 | 856 | 856 | 856 |
| Kendall County WCID 1 | 261 | 280 | 355 | 441 | 539 | 652 |
| County-Other | 1,495 | 1,440 | 1,742 | 2,116 | 2,556 | 3,064 |
| Manufacturing | 46 | 48 | 50 | 52 | 54 | 56 |
| Livestock | 343 | 343 | 343 | 343 | 343 | 343 |
| Irrigation | 370 | 370 | 370 | 370 | 370 | 370 |
| | | | | | | |
| **Kendall County / San Antonio Basin Total** | **7,455** | **9,759** | **12,777** | **16,204** | **20,092** | **24,532** |
| Boerne | 5,384 | 7,392 | 9,997 | 13,020 | 16,482 | 20,444 |
| Fair Oaks Ranch | 656 | 895 | 1,015 | 1,063 | 1,075 | 1,075 |
| Guadalupe-Blanco River Authority | 5 | 14 | 14 | 14 | 14 | 14 |
| Kendall West Utility | 337 | 423 | 536 | 668 | 818 | 990 |
| Water Services | 34 | 30 | 27 | 24 | 21 | 19 |
| County-Other | 907 | 873 | 1,056 | 1,283 | 1,550 | 1,858 |
| Livestock | 41 | 41 | 41 | 41 | 41 | 41 |
| Irrigation | 91 | 91 | 91 | 91 | 91 | 91 |
| | | | | | | |
| **La Salle County Total** | **11,768** | **11,760** | **11,756** | **11,750** | **11,754** | **6,376** |
| **La Salle County / Nueces Basin Total** | **11,768** | **11,760** | **11,756** | **11,750** | **11,754** | **6,376** |
| Cotulla | 1,050 | 1,030 | 1,028 | 1,035 | 1,056 | 1,096 |
| Encinal WSC | 214 | 222 | 234 | 249 | 269 | 296 |
| County-Other | 253 | 257 | 243 | 215 | 178 | 129 |
| Mining | 5,396 | 5,396 | 5,396 | 5,396 | 5,396 | 0 |
| Livestock | 394 | 394 | 394 | 394 | 394 | 394 |
| Irrigation | 4,461 | 4,461 | 4,461 | 4,461 | 4,461 | 4,461 |
| | | | | | | |
| **Medina County Total** | **68,856** | **71,174** | **71,959** | **72,637** | **73,273** | **73,731** |
| **Medina County / Nueces Basin Total** | **57,251** | **57,695** | **58,073** | **58,387** | **58,692** | **58,994** |
| Benton City WSC | 614 | 649 | 677 | 695 | 715 | 739 |
| Devine | 616 | 621 | 629 | 640 | 653 | 666 |
| East Medina County SUD | 805 | 854 | 893 | 918 | 945 | 978 |
| Hondo | 2,111 | 2,020 | 1,972 | 1,983 | 1,995 | 2,006 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Lytle | 118 | 127 | 134 | 138 | 143 | 148 |
| Medina County WCID 2 | 86 | 83 | 81 | 82 | 82 | 83 |
| Medina River West WSC | 73 | 76 | 80 | 82 | 84 | 87 |
| Natalia | 190 | 184 | 193 | 198 | 199 | 194 |
| Ville Dalsace Water Supply | 57 | 62 | 66 | 68 | 70 | 73 |
| West Medina WSC | 202 | 217 | 220 | 225 | 233 | 220 |
| Yancey WSC | 51 | 54 | 56 | 58 | 60 | 62 |
| County-Other | 409 | 479 | 496 | 444 | 411 | 432 |
| Manufacturing | 15 | 16 | 17 | 18 | 19 | 20 |
| Mining | 3,825 | 4,174 | 4,480 | 4,759 | 5,004 | 5,207 |
| Livestock | 888 | 888 | 888 | 888 | 888 | 888 |
| Irrigation | 47,191 | 47,191 | 47,191 | 47,191 | 47,191 | 47,191 |
| | | | | | | |
| **Medina County / San Antonio Basin Total** | **11,605** | **13,479** | **13,886** | **14,250** | **14,581** | **14,737** |
| Canyon Lake Water Service* | 48 | 68 | 76 | 79 | 80 | 81 |
| Castroville | 1,165 | 1,266 | 1,418 | 1,631 | 1,826 | 1,954 |
| East Medina County SUD | 66 | 70 | 73 | 75 | 78 | 80 |
| La Coste | 131 | 128 | 127 | 129 | 131 | 132 |
| Medina River West WSC | 38 | 41 | 42 | 43 | 45 | 46 |
| San Antonio Water System | 889 | 2,503 | 2,663 | 2,787 | 2,885 | 2,839 |
| Ville Dalsace Water Supply | 54 | 59 | 62 | 64 | 66 | 69 |
| Yancey WSC | 632 | 666 | 695 | 712 | 733 | 757 |
| County-Other | 295 | 346 | 357 | 321 | 296 | 312 |
| Mining | 499 | 544 | 585 | 621 | 653 | 679 |
| Livestock | 170 | 170 | 170 | 170 | 170 | 170 |
| Irrigation | 7,618 | 7,618 | 7,618 | 7,618 | 7,618 | 7,618 |
| | | | | | | |
| **Refugio County Total** | **2,311** | **2,272** | **2,240** | **2,216** | **2,193** | **2,175** |
| **Refugio County / San Antonio Basin Total** | **48** | **47** | **47** | **47** | **46** | **46** |
| County-Other | 7 | 6 | 6 | 6 | 5 | 5 |
| Livestock | 41 | 41 | 41 | 41 | 41 | 41 |
| | | | | | | |
| **Refugio County / San Antonio-Nueces Basin Total** | **2,263** | **2,225** | **2,193** | **2,169** | **2,147** | **2,129** |
| Refugio | 474 | 467 | 465 | 468 | 481 | 510 |
| Woodsboro | 204 | 191 | 178 | 165 | 149 | 131 |
| County-Other | 298 | 280 | 263 | 249 | 230 | 201 |
| Livestock | 420 | 420 | 420 | 420 | 420 | 420 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Irrigation | 867 | 867 | 867 | 867 | 867 | 867 |
| | | | | | | |
| **Uvalde County Total** | **63,276** | **63,368** | **63,435** | **63,475** | **63,494** | **63,492** |
| **Uvalde County / Nueces Basin Total** | **63,276** | **63,368** | **63,435** | **63,475** | **63,494** | **63,492** |
| Concan WSC | 79 | 77 | 74 | 71 | 68 | 64 |
| Knippa WSC | 101 | 99 | 95 | 92 | 87 | 82 |
| Sabinal | 304 | 296 | 286 | 275 | 262 | 248 |
| Uvalde | 3,876 | 3,794 | 3,689 | 3,570 | 3,447 | 3,323 |
| Windmill WSC | 327 | 298 | 269 | 240 | 207 | 169 |
| County-Other | 633 | 629 | 620 | 609 | 597 | 583 |
| Mining | 3,204 | 3,423 | 3,650 | 3,866 | 4,074 | 4,271 |
| Livestock | 2,049 | 2,049 | 2,049 | 2,049 | 2,049 | 2,049 |
| Irrigation | 52,703 | 52,703 | 52,703 | 52,703 | 52,703 | 52,703 |
| | | | | | | |
| **Victoria County Total** | **74,612** | **76,401** | **78,019** | **79,511** | **81,048** | **82,624** |
| **Victoria County / Guadalupe Basin Total** | **57,737** | **59,417** | **61,005** | **62,527** | **64,098** | **65,714** |
| Quail Creek MUD | 148 | 152 | 153 | 153 | 152 | 151 |
| Victoria | 11,062 | 11,200 | 11,237 | 11,187 | 11,130 | 11,063 |
| County-Other | 1,721 | 1,781 | 1,801 | 1,791 | 1,781 | 1,769 |
| Manufacturing | 39,432 | 40,891 | 42,404 | 43,973 | 45,600 | 47,287 |
| Mining | 390 | 409 | 426 | 439 | 451 | 460 |
| Steam Electric Power | 3,198 | 3,198 | 3,198 | 3,198 | 3,198 | 3,198 |
| Livestock | 455 | 455 | 455 | 455 | 455 | 455 |
| Irrigation | 1,331 | 1,331 | 1,331 | 1,331 | 1,331 | 1,331 |
| | | | | | | |
| **Victoria County / Lavaca Basin Total** | **10** | **10** | **10** | **10** | **10** | **10** |
| County-Other | 7 | 7 | 7 | 7 | 7 | 7 |
| Livestock | 3 | 3 | 3 | 3 | 3 | 3 |
| | | | | | | |
| **Victoria County / Lavaca-Guadalupe Basin Total** | **16,821** | **16,929** | **16,959** | **16,929** | **16,895** | **16,855** |
| Victoria | 5,362 | 5,430 | 5,448 | 5,423 | 5,395 | 5,363 |
| Victoria County WCID 1 | 179 | 183 | 184 | 184 | 184 | 184 |
| County-Other | 1,035 | 1,071 | 1,082 | 1,077 | 1,071 | 1,063 |
| Livestock | 484 | 484 | 484 | 484 | 484 | 484 |
| Irrigation | 9,761 | 9,761 | 9,761 | 9,761 | 9,761 | 9,761 |
| | | | | | | |
| **Victoria County / San Antonio Basin Total** | **44** | **45** | **45** | **45** | **45** | **45** |
| County-Other | 7 | 8 | 8 | 8 | 8 | 8 |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | 37 | 37 | 37 | 37 | 37 | 37 |
| | | | | | | |
| **Wilson County Total** | **28,061** | **28,893** | **29,760** | **30,537** | **31,428** | **27,829** |
| **Wilson County / Guadalupe Basin Total** | **106** | **106** | **105** | **102** | **100** | **97** |
| Sunko WSC | 3 | 4 | 4 | 4 | 5 | 5 |
| County-Other | 32 | 31 | 30 | 27 | 24 | 21 |
| Livestock | 71 | 71 | 71 | 71 | 71 | 71 |
| | | | | | | |
| **Wilson County / Nueces Basin Total** | **7,499** | **7,517** | **7,536** | **7,551** | **7,569** | **6,252** |
| McCoy WSC* | 48 | 53 | 59 | 64 | 69 | 75 |
| Picosa WSC | 3 | 3 | 4 | 4 | 5 | 5 |
| Three Oaks WSC | 87 | 97 | 106 | 114 | 124 | 135 |
| County-Other | 2 | 2 | 2 | 2 | 2 | 1 |
| Mining | 1,353 | 1,356 | 1,359 | 1,361 | 1,363 | 30 |
| Livestock | 205 | 205 | 205 | 205 | 205 | 205 |
| Irrigation | 5,801 | 5,801 | 5,801 | 5,801 | 5,801 | 5,801 |
| | | | | | | |
| **Wilson County / San Antonio Basin Total** | **20,456** | **21,270** | **22,119** | **22,884** | **23,759** | **21,480** |
| C Willow Water | 119 | 132 | 145 | 156 | 169 | 184 |
| East Central SUD | 188 | 208 | 228 | 246 | 259 | 259 |
| El Oso WSC* | 34 | 41 | 49 | 55 | 63 | 71 |
| Floresville | 1,367 | 1,435 | 1,509 | 1,574 | 1,649 | 1,734 |
| La Vernia | 650 | 718 | 788 | 849 | 920 | 1,001 |
| Oak Hills WSC | 977 | 1,122 | 1,295 | 1,494 | 1,723 | 1,988 |
| Picosa WSC | 327 | 375 | 424 | 467 | 516 | 574 |
| Poth | 241 | 237 | 234 | 231 | 228 | 225 |
| S S WSC | 2,356 | 2,706 | 3,060 | 3,373 | 3,737 | 4,168 |
| Springs Hill WSC | 26 | 38 | 50 | 60 | 72 | 85 |
| Stockdale | 301 | 303 | 307 | 310 | 313 | 317 |
| Sunko WSC | 631 | 697 | 765 | 826 | 895 | 974 |
| Three Oaks WSC | 247 | 273 | 300 | 323 | 350 | 381 |
| County-Other | 653 | 637 | 610 | 556 | 493 | 420 |
| Manufacturing | 62 | 64 | 66 | 68 | 71 | 74 |
| Mining | 3,327 | 3,334 | 3,339 | 3,346 | 3,351 | 75 |
| Livestock | 1,433 | 1,433 | 1,433 | 1,433 | 1,433 | 1,433 |
| Irrigation | 7,517 | 7,517 | 7,517 | 7,517 | 7,517 | 7,517 |
| | | | | | | |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Water User Group (WUG) Demand

| | WUG Demand (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Zavala County Total** | **51,091** | **51,061** | **51,010** | **50,957** | **50,902** | **45,912** |
| **Zavala County / Nueces Basin Total** | **51,091** | **51,061** | **51,010** | **50,957** | **50,902** | **45,912** |
| Batesville WSC | 143 | 139 | 133 | 127 | 121 | 114 |
| Crystal City | 1,224 | 1,189 | 1,141 | 1,092 | 1,040 | 987 |
| Loma Alta Chula Vista Water System | 102 | 100 | 96 | 91 | 87 | 82 |
| Zavala County WCID 1 | 343 | 333 | 319 | 305 | 290 | 274 |
| County-Other | 186 | 180 | 173 | 165 | 157 | 148 |
| Manufacturing | 732 | 759 | 787 | 816 | 846 | 877 |
| Mining | 4,932 | 4,932 | 4,932 | 4,932 | 4,932 | 1 |
| Livestock | 855 | 855 | 855 | 855 | 855 | 855 |
| Irrigation | 42,574 | 42,574 | 42,574 | 42,574 | 42,574 | 42,574 |
| | | | | | | |
| **Region L Demand Total** | **1,134,971** | **1,228,646** | **1,312,186** | **1,401,489** | **1,493,287** | **1,557,437** |

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

# Region L Major Water Provider (MWP)
# Existing Sales and Transfers

Major Water Providers are entities of particular significance to a region's water supply as defined by the Regional Water Planning Group (RWPG), and may be a Water User Group (WUG) entity, Wholesale Water Provider (WWP) entity , or both (WUG/WWP). Retail denotes WUG projected demands and existing water supplies used by the WUG. Wholesale denotes a WWP or WUG/WWP selling water to another entity.

| **Canyon Lake Water Service - WUG/WWP** | **Water Volumes (acre-feet per year)** | | | | | |
|---|---|---|---|---|---|---|
| **Data Description** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Projected Retail WUG Demands | 11,947 | 16,145 | 18,839 | 20,588 | 27,112 | 34,309 |
| Projected Wholesale Contract Demands | 600 | 600 | 600 | 600 | 600 | 600 |
| **Total Projected Wholesale Contract and Retail Demands** | **12,547** | **16,745** | **19,439** | **21,188** | **27,712** | **34,909** |
| Groundwater Sales to Retail Customers | 7,946 | 7,946 | 7,946 | 7,946 | 7,946 | 7,946 |
| Reuse Sales to Retail Customers | 98 | 267 | 267 | 267 | 267 | 267 |
| Surface Water Sales to Retail Customers | 7,602 | 7,602 | 7,602 | 7,602 | 7,602 | 7,602 |
| Surface Water Sales to Wholesale Customers | 600 | 600 | 600 | 600 | 600 | 600 |
| **Total Wholesale and Retail Sales to Customers** | **16,246** | **16,415** | **16,415** | **16,415** | **16,415** | **16,415** |

| **Guadalupe-Blanco River Authority - WUG/WWP** | **Water Volumes (acre-feet per year)** | | | | | |
|---|---|---|---|---|---|---|
| **Data Description** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Projected Retail WUG Demands | 1,410 | 1,950 | 1,892 | 1,836 | 1,772 | 1,700 |
| Projected Wholesale Contract Demands | 139,593 | 135,593 | 135,593 | 135,593 | 135,593 | 135,593 |
| **Total Projected Wholesale Contract and Retail Demands** | **141,003** | **137,543** | **137,485** | **137,429** | **137,365** | **137,293** |
| Groundwater Sales to Retail Customers | 941 | 1,302 | 1,263 | 1,226 | 1,183 | 1,135 |
| Surface Water Sales to Retail Customers | 469 | 648 | 629 | 610 | 589 | 565 |
| Groundwater Sales to Wholesale Customers | 20,757 | 20,757 | 20,757 | 20,757 | 20,757 | 20,757 |
| Reuse Sales to Wholesale Customers | 445 | 445 | 445 | 445 | 445 | 445 |
| Surface Water Sales to Wholesale Customers | 110,611 | 104,371 | 104,371 | 104,371 | 104,371 | 104,371 |
| **Total Wholesale and Retail Sales to Customers** | **133,223** | **127,523** | **127,465** | **127,409** | **127,345** | **127,273** |

| **New Braunfels - WUG/WWP** | **Water Volumes (acre-feet per year)** | | | | | |
|---|---|---|---|---|---|---|
| **Data Description** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Projected Retail WUG Demands | 28,111 | 39,936 | 55,116 | 73,565 | 94,682 | 118,858 |
| Projected Wholesale Contract Demands | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| **Total Projected Wholesale Contract and Retail Demands** | **29,111** | **40,936** | **56,116** | **74,565** | **95,682** | **119,858** |
| Groundwater Sales to Retail Customers | 16,575 | 16,575 | 16,575 | 16,575 | 16,575 | 16,575 |
| Reuse Sales to Retail Customers | 65 | 65 | 65 | 65 | 65 | 65 |
| Surface Water Sales to Retail Customers | 13,856 | 13,856 | 13,856 | 13,856 | 13,856 | 13,856 |

# Region L Major Water Provider (MWP)
# Existing Sales and Transfers

| | | | | | | |
|---|---|---|---|---|---|---|
| Groundwater Sales to Wholesale Customers | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| **Total Wholesale and Retail Sales to Customers** | **31,496** | **31,496** | **31,496** | **31,496** | **31,496** | **31,496** |

| **San Antonio Water System - WUG/WWP** | **Water Volumes (acre-feet per year)** | | | | | |
|---|---|---|---|---|---|---|
| **Data Description** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Projected Retail WUG Demands | 268,649 | 298,339 | 316,699 | 330,991 | 342,110 | 358,791 |
| Projected Wholesale Contract Demands | 52,470 | 50,970 | 50,970 | 50,970 | 50,970 | 50,970 |
| **Total Projected Wholesale Contract and Retail Demands** | **321,119** | **349,309** | **367,669** | **381,961** | **393,080** | **409,761** |
| Groundwater Sales to Retail Customers | 283,201 | 281,201 | 281,201 | 278,401 | 278,401 | 278,401 |
| Reuse Sales to Retail Customers | 35,000 | 40,000 | 40,000 | 40,000 | 40,000 | 40,000 |
| Surface Water Sales to Retail Customers | 5,000 | 4,000 | 4,000 | 0 | 0 | 0 |
| Groundwater Sales to Wholesale Customers | 970 | 970 | 970 | 970 | 970 | 970 |
| Reuse Sales to Wholesale Customers | 45,000 | 45,000 | 45,000 | 45,000 | 45,000 | 45,000 |
| Surface Water Sales to Wholesale Customers | 1,500 | 0 | 0 | 0 | 0 | 0 |
| **Total Wholesale and Retail Sales to Customers** | **370,671** | **371,171** | **371,171** | **364,371** | **364,371** | **364,371** |

| **San Marcos - WUG/WWP** | **Water Volumes (acre-feet per year)** | | | | | |
|---|---|---|---|---|---|---|
| **Data Description** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Projected Retail WUG Demands | 17,396 | 23,946 | 28,814 | 32,409 | 34,552 | 36,174 |
| **Total Projected Wholesale Contract and Retail Demands** | **17,396** | **23,946** | **28,814** | **32,409** | **34,552** | **36,174** |
| Groundwater Sales to Retail Customers | 8,481 | 8,481 | 8,481 | 8,481 | 8,481 | 8,481 |
| Reuse Sales to Retail Customers | 1,905 | 1,905 | 1,905 | 1,905 | 1,905 | 1,905 |
| Surface Water Sales to Retail Customers | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| **Total Wholesale and Retail Sales to Customers** | **20,386** | **20,386** | **20,386** | **20,386** | **20,386** | **20,386** |

# Appendix 2B: Passive Conservation Water Savings by Decade

# Appendix 2B: Passive Conservation Water Savings by Decade

| | | Per Capita Water Use (GPCD) | | | | | | Plumbing Code Savings (GPCD) | | | | | | Plumbing Code Savings (acft/yr) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| 1 | 3009 Water | 248 | 248 | 248 | 248 | 248 | 248 | 4.33 | 4.91 | 4.91 | 4.91 | 4.91 | 4.91 | 7 | 10 | 13 | 18 | 22 | 27 |
| 2 | Air Force Village II Inc | 227 | 227 | 227 | 227 | 227 | 227 | 5.71 | 6.28 | 6.28 | 6.28 | 6.28 | 6.28 | 3 | 4 | 4 | 4 | 4 | 4 |
| 3 | Alamo Heights | 245 | 245 | 245 | 245 | 245 | 245 | 4.94 | 5.47 | 5.47 | 5.47 | 5.47 | 5.47 | 43 | 48 | 48 | 48 | 48 | 48 |
| 4 | Aqua WSC | 148 | 148 | 148 | 148 | 148 | 148 | 4.23 | 4.68 | 4.68 | 4.68 | 4.68 | 4.68 | 5 | 7 | 8 | 9 | 10 | 11 |
| 5 | Asherton | 182 | 182 | 182 | 182 | 182 | 182 | 4.79 | 5.34 | 5.34 | 5.34 | 5.34 | 5.34 | 4 | 4 | 4 | 3 | 3 | 3 |
| 6 | Atascosa Rural WSC | 114 | 114 | 114 | 114 | 114 | 114 | 4.12 | 4.59 | 4.59 | 4.59 | 4.59 | 4.59 | 62 | 80 | 91 | 99 | 109 | 121 |
| 7 | Batesville WSC | 153 | 153 | 153 | 153 | 153 | 153 | 4.06 | 4.65 | 4.65 | 4.65 | 4.65 | 4.65 | 4 | 4 | 4 | 4 | 4 | 4 |
| 8 | Benton City WSC | 97 | 97 | 97 | 97 | 97 | 97 | 4.09 | 4.57 | 4.57 | 4.57 | 4.57 | 4.57 | 99 | 123 | 133 | 140 | 148 | 157 |
| 9 | Bexar County WCID 10 | 193 | 193 | 193 | 193 | 193 | 193 | 5.13 | 5.70 | 5.70 | 5.70 | 5.70 | 5.70 | 36 | 45 | 49 | 53 | 58 | 63 |
| 10 | Big Wells | 143 | 143 | 143 | 143 | 143 | 143 | 4.55 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 2 | 2 | 2 | 2 | 2 | 2 |
| 11 | Boerne | 193 | 193 | 193 | 193 | 193 | 193 | 4.37 | 4.90 | 4.90 | 4.90 | 4.90 | 4.90 | 125 | 193 | 260 | 339 | 429 | 533 |
| 12 | C Willow Water | 165 | 165 | 165 | 165 | 165 | 165 | 4.89 | 5.41 | 5.41 | 5.41 | 5.41 | 5.41 | 4 | 4 | 5 | 5 | 6 | 6 |
| 13 | Canyon Lake Water Service (Texas Water Company) | 113 | 113 | 113 | 113 | 113 | 113 | 4.03 | 4.43 | 4.43 | 4.43 | 4.43 | 4.43 | 428 | 644 | 753 | 823 | 1,090 | 1,384 |
| 14 | Carrizo Hill WSC | 156 | 156 | 156 | 156 | 156 | 156 | 4.07 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 3 | 4 | 5 | 5 | 6 | 9 |
| 15 | Carrizo Springs | 243 | 243 | 243 | 243 | 243 | 243 | 4.69 | 5.30 | 5.30 | 5.30 | 5.30 | 5.30 | 24 | 26 | 24 | 23 | 21 | 20 |
| 16 | Castroville | 165 | 165 | 165 | 165 | 165 | 165 | 4.84 | 5.38 | 5.38 | 5.38 | 5.38 | 5.38 | 35 | 43 | 48 | 55 | 62 | 66 |
| 17 | Charlotte | 155 | 155 | 155 | 155 | 155 | 155 | 4.69 | 5.19 | 5.19 | 5.19 | 5.19 | 5.19 | 6 | 7 | 6 | 6 | 6 | 7 |
| 18 | Cibolo | 93 | 93 | 93 | 93 | 93 | 93 | 4.30 | 4.90 | 4.90 | 4.90 | 4.90 | 4.90 | 125 | 172 | 206 | 242 | 283 | 330 |
| 19 | Clear Water Estates Water System (Texas Water Company) | 1,083 | 1,083 | 1,083 | 1,083 | 1,083 | 1,083 | 5.04 | 5.57 | 5.57 | 5.57 | 5.57 | 5.57 | 5 | 8 | 11 | 15 | 19 | 24 |
| 20 | Concan WSC | 244 | 244 | 244 | 244 | 244 | 244 | 4.12 | 4.88 | 4.88 | 4.88 | 4.88 | 4.88 | 1 | 2 | 2 | 1 | 1 | 1 |
| 21 | Converse | 98 | 98 | 98 | 98 | 98 | 98 | 4.57 | 5.13 | 5.13 | 5.13 | 5.13 | 5.13 | 145 | 163 | 163 | 163 | 163 | 163 |
| 22 | Cotulla | 280 | 280 | 280 | 280 | 280 | 280 | 4.59 | 5.11 | 5.11 | 5.11 | 5.11 | 5.11 | 18 | 19 | 19 | 19 | 20 | 20 |
| 23 | County Line SUD | 80 | 80 | 80 | 80 | 80 | 80 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 126 | 252 | 403 | 521 | 588 | 625 |
| 24 | County-Other, Atascosa | 116 | 116 | 116 | 116 | 116 | 116 | 4.45 | 5.30 | 5.30 | 5.30 | 5.30 | 5.30 | 4 | 7 | 9 | 6 | 4 | 2 |
| 25 | County-Other, Bexar | 119 | 119 | 119 | 119 | 119 | 119 | 6.58 | 7.93 | 7.93 | 7.93 | 7.93 | 7.93 | 16 | 31 | 46 | 49 | 54 | 39 |
| 26 | County-Other, Caldwell | 107 | 107 | 107 | 107 | 107 | 107 | 3.72 | 4.09 | 4.09 | 4.09 | 4.09 | 4.09 | 3 | 4 | 8 | 6 | 8 | 14 |
| 27 | County-Other, Calhoun | 105 | 105 | 105 | 105 | 105 | 105 | 6.07 | 7.73 | 7.73 | 7.73 | 7.73 | 7.73 | 13 | 17 | 17 | 17 | 18 | 18 |
| 28 | County-Other, Comal | 152 | 152 | 152 | 152 | 152 | 152 | 4.91 | 5.47 | 5.47 | 5.47 | 5.47 | 5.47 | 113 | 147 | 207 | 454 | 606 | 794 |
| 29 | County-Other, DeWitt | 123 | 123 | 123 | 123 | 123 | 123 | 4.91 | 5.62 | 5.62 | 5.62 | 5.62 | 5.62 | 40 | 46 | 46 | 46 | 46 | 46 |
| 30 | County-Other, Dimmit | 124 | 124 | 124 | 124 | 124 | 124 | 4.77 | 6.04 | 6.04 | 6.04 | 6.04 | 6.04 | 10 | 11 | 10 | 8 | 6 | 2 |
| 31 | County-Other, Frio | 117 | 117 | 117 | 117 | 117 | 117 | 4.50 | 5.25 | 5.25 | 5.25 | 5.25 | 5.25 | 19 | 11 | 3 | 4 | 4 | 5 |
| 32 | County-Other, Goliad | 110 | 110 | 110 | 110 | 110 | 110 | 4.70 | 5.25 | 5.25 | 5.25 | 5.25 | 5.25 | 28 | 31 | 30 | 28 | 28 | 28 |
| 33 | County-Other, Gonzales | 108 | 108 | 108 | 108 | 108 | 108 | 5.43 | 6.26 | 6.26 | 6.26 | 6.26 | 6.26 | 7 | 8 | 7 | 7 | 7 | 6 |
| 34 | County-Other, Guadalupe | 105 | 105 | 105 | 105 | 105 | 105 | 6.61 | 7.22 | 7.22 | 7.22 | 7.22 | 7.22 | 13 | 24 | 35 | 48 | 61 | 78 |
| 35 | County-Other, Hays | 111 | 111 | 111 | 111 | 111 | 111 | 4.30 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 93 | 94 | 152 | 404 | 683 | 1,128 |

| | | Per Capita Water Use (GPCD) | | | | | | Plumbing Code Savings (GPCD) | | | | | | Plumbing Code Savings (acft/yr) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| 36 | County-Other, Karnes | 127 | 127 | 127 | 127 | 127 | 127 | 4.79 | 5.71 | 5.71 | 5.71 | 5.71 | 5.71 | 11 | 13 | 14 | 15 | 16 | 16 |
| 37 | County-Other, Kendall | 110 | 110 | 110 | 110 | 110 | 110 | 4.47 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 103 | 113 | 135 | 165 | 199 | 238 |
| 38 | County-Other, La Salle | 104 | 104 | 104 | 104 | 104 | 104 | 4.81 | 5.65 | 5.65 | 5.65 | 5.65 | 5.65 | 12 | 15 | 14 | 12 | 10 | 7 |
| 39 | County-Other, Medina | 116 | 116 | 116 | 116 | 116 | 116 | 4.27 | 4.73 | 4.73 | 4.73 | 4.73 | 4.73 | 27 | 35 | 36 | 33 | 30 | 31 |
| 40 | County-Other, Refugio | 107 | 107 | 107 | 107 | 107 | 107 | 4.81 | 5.47 | 5.47 | 5.47 | 5.47 | 5.47 | 14 | 15 | 14 | 13 | 12 | 11 |
| 41 | County-Other, Uvalde | 128 | 128 | 128 | 128 | 128 | 128 | 5.36 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 28 | 31 | 31 | 30 | 30 | 29 |
| 42 | County-Other, Victoria | 105 | 105 | 105 | 105 | 105 | 105 | 4.60 | 5.22 | 5.22 | 5.22 | 5.22 | 5.22 | 126 | 149 | 151 | 150 | 149 | 149 |
| 43 | County-Other, Wilson | 107 | 107 | 107 | 107 | 107 | 107 | 4.66 | 5.26 | 5.26 | 5.26 | 5.26 | 5.26 | 31 | 35 | 34 | 30 | 27 | 23 |
| 44 | County-Other, Zavala | 149 | 149 | 149 | 149 | 149 | 149 | 4.93 | 5.61 | 5.61 | 5.61 | 5.61 | 5.61 | 6 | 7 | 7 | 6 | 6 | 6 |
| 45 | Creedmoor-Maha WSC | 100 | 100 | 100 | 100 | 100 | 100 | 4.93 | 5.62 | 5.62 | 5.62 | 5.62 | 5.62 | 58 | 120 | 175 | 228 | 283 | 337 |
| 46 | Crystal City | 189 | 189 | 189 | 189 | 189 | 189 | 4.64 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 31 | 33 | 32 | 31 | 29 | 28 |
| 47 | Crystal Clear SUD | 129 | 129 | 129 | 129 | 129 | 129 | 4.51 | 5.04 | 5.04 | 5.04 | 5.04 | 5.04 | 301 | 565 | 638 | 719 | 813 | 921 |
| 48 | Cuero | 238 | 238 | 238 | 238 | 238 | 238 | 4.57 | 5.14 | 5.14 | 5.14 | 5.14 | 5.14 | 43 | 49 | 48 | 48 | 48 | 48 |
| 49 | Devine | 132 | 132 | 132 | 132 | 132 | 132 | 4.67 | 5.19 | 5.19 | 5.19 | 5.19 | 5.19 | 23 | 25 | 26 | 26 | 27 | 27 |
| 50 | Dilley | 212 | 212 | 212 | 212 | 212 | 212 | 4.34 | 4.81 | 4.81 | 4.81 | 4.81 | 4.81 | 26 | 35 | 40 | 40 | 41 | 41 |
| 51 | East Central SUD | 127 | 127 | 127 | 127 | 127 | 127 | 4.60 | 5.16 | 5.16 | 5.16 | 5.16 | 5.16 | 248 | 316 | 350 | 380 | 414 | 453 |
| 52 | East Medina County SUD | 81 | 81 | 81 | 81 | 81 | 81 | 4.28 | 4.77 | 4.77 | 4.77 | 4.77 | 4.77 | 49 | 57 | 61 | 62 | 64 | 66 |
| 53 | El Oso WSC | 183 | 183 | 183 | 183 | 183 | 183 | 4.40 | 5.13 | 5.13 | 5.13 | 5.13 | 5.13 | 31 | 36 | 37 | 40 | 41 | 42 |
| 54 | Elmendorf | 130 | 130 | 130 | 130 | 130 | 130 | 4.38 | 4.99 | 4.99 | 4.99 | 4.99 | 4.99 | 20 | 30 | 40 | 54 | 67 | 93 |
| 55 | Encinal WSC | 187 | 187 | 187 | 187 | 187 | 187 | 4.01 | 4.61 | 4.61 | 4.61 | 4.61 | 4.61 | 5 | 6 | 6 | 6 | 7 | 7 |
| 56 | Fair Oaks Ranch | 237 | 237 | 237 | 237 | 237 | 237 | 4.37 | 4.78 | 4.78 | 4.78 | 4.78 | 4.78 | 48 | 63 | 68 | 70 | 71 | 71 |
| 57 | Falls City | 201 | 201 | 201 | 201 | 201 | 201 | 4.94 | 5.41 | 5.41 | 5.41 | 5.41 | 5.41 | 3 | 3 | 3 | 3 | 4 | 4 |
| 58 | Fayette WSC | 126 | 126 | 126 | 126 | 126 | 126 | 3.94 | 4.52 | 4.52 | 4.52 | 4.52 | 4.52 | 0 | 0 | 0 | 0 | 1 | 1 |
| 59 | Floresville | 213 | 213 | 213 | 213 | 213 | 213 | 4.64 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 30 | 36 | 38 | 39 | 41 | 43 |
| 60 | Fort Sam Houston | 1,895 | 1,895 | 1,895 | 1,895 | 1,895 | 1,895 | 4.41 | 5.35 | 5.35 | 5.35 | 5.35 | 5.35 | 41 | 50 | 50 | 50 | 50 | 50 |
| 61 | Garden Ridge | 315 | 315 | 315 | 315 | 315 | 315 | 4.40 | 4.82 | 4.82 | 4.82 | 4.82 | 4.82 | 29 | 39 | 46 | 54 | 65 | 76 |
| 62 | Goforth SUD | 101 | 101 | 101 | 101 | 101 | 101 | 3.88 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 183 | 318 | 473 | 682 | 921 | 1,195 |
| 63 | Goliad | 180 | 180 | 180 | 180 | 180 | 180 | 4.98 | 5.51 | 5.51 | 5.51 | 5.51 | 5.51 | 8 | 9 | 9 | 9 | 9 | 9 |
| 64 | Gonzales | 222 | 222 | 222 | 222 | 222 | 222 | 4.57 | 5.14 | 5.14 | 5.14 | 5.14 | 5.14 | 38 | 43 | 43 | 42 | 41 | 40 |
| 65 | Gonzales County WSC | 244 | 244 | 244 | 244 | 244 | 244 | 4.58 | 5.23 | 5.23 | 5.23 | 5.23 | 5.23 | 40 | 45 | 45 | 44 | 44 | 43 |
| 66 | Green Valley SUD | 103 | 103 | 103 | 103 | 103 | 103 | 3.99 | 4.42 | 4.42 | 4.42 | 4.42 | 4.42 | 208 | 308 | 394 | 487 | 593 | 713 |
| 67 | Guadalupe-Blanco River Authority | 146 | 146 | 146 | 146 | 146 | 146 | 4.32 | 4.76 | 4.76 | 4.76 | 4.76 | 4.76 | 43 | 66 | 64 | 62 | 60 | 57 |
| 68 | Hondo | 243 | 243 | 243 | 243 | 243 | 243 | 4.69 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 42 | 45 | 44 | 44 | 44 | 45 |
| 69 | Jourdanton | 190 | 190 | 190 | 190 | 190 | 190 | 4.54 | 5.08 | 5.08 | 5.08 | 5.08 | 5.08 | 25 | 30 | 32 | 33 | 35 | 37 |
| 70 | Karnes City | 168 | 168 | 168 | 168 | 168 | 168 | 4.57 | 5.14 | 5.14 | 5.14 | 5.14 | 5.14 | 12 | 14 | 15 | 16 | 17 | 18 |
| 71 | Kendall County WCID 1 | 86 | 86 | 86 | 86 | 86 | 86 | 5.02 | 5.65 | 5.65 | 5.65 | 5.65 | 5.65 | 16 | 20 | 25 | 31 | 38 | 46 |
| 72 | Kendall West Utility | 111 | 111 | 111 | 111 | 111 | 111 | 4.42 | 5.01 | 5.01 | 5.01 | 5.01 | 5.01 | 14 | 20 | 25 | 32 | 39 | 47 |
| 73 | Kenedy | 352 | 352 | 352 | 352 | 352 | 352 | 4.80 | 5.27 | 5.27 | 5.27 | 5.27 | 5.27 | 19 | 21 | 23 | 24 | 25 | 27 |

| | | Per Capita Water Use (GPCD) | | | | | | Plumbing Code Savings (GPCD) | | | | | | Plumbing Code Savings (acft/yr) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| 74 | Kirby | 92 | 92 | 92 | 92 | 92 | 92 | 4.73 | 5.21 | 5.21 | 5.21 | 5.21 | 5.21 | 47 | 59 | 60 | 60 | 60 | 60 |
| 75 | Knippa WSC | 187 | 187 | 187 | 187 | 187 | 187 | 4.74 | 5.36 | 5.36 | 5.36 | 5.36 | 5.36 | 3 | 3 | 3 | 3 | 3 | 2 |
| 76 | KT Water Development | 304 | 304 | 304 | 304 | 304 | 304 | 3.78 | 4.15 | 4.15 | 4.15 | 4.15 | 4.15 | 11 | 19 | 28 | 40 | 53 | 68 |
| 77 | Kyle | 91 | 91 | 91 | 91 | 91 | 91 | 4.30 | 4.82 | 4.82 | 4.82 | 4.82 | 4.82 | 294 | 492 | 670 | 751 | 778 | 798 |
| 78 | La Coste | 94 | 94 | 94 | 94 | 94 | 94 | 4.61 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 7 | 7 | 7 | 8 | 8 | 8 |
| 79 | La Vernia | 190 | 190 | 190 | 190 | 190 | 190 | 4.89 | 5.69 | 5.69 | 5.69 | 5.69 | 5.69 | 17 | 22 | 24 | 26 | 28 | 31 |
| 80 | Lackland Air Force Base | 96 | 96 | 96 | 96 | 96 | 96 | 3.59 | 4.41 | 4.41 | 4.41 | 4.41 | 4.41 | 56 | 69 | 69 | 69 | 69 | 69 |
| 81 | Leon Valley | 110 | 110 | 110 | 110 | 110 | 110 | 4.69 | 5.30 | 5.30 | 5.30 | 5.30 | 5.30 | 79 | 109 | 109 | 109 | 109 | 109 |
| 82 | Live Oak | 159 | 159 | 159 | 159 | 159 | 159 | 4.63 | 5.42 | 5.42 | 5.42 | 5.42 | 5.42 | 51 | 60 | 60 | 60 | 60 | 60 |
| 83 | Lockhart | 129 | 129 | 129 | 129 | 129 | 129 | 4.49 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 107 | 130 | 141 | 152 | 163 | 173 |
| 84 | Loma Alta Chula Vista Water System | 287 | 287 | 287 | 287 | 287 | 287 | 4.10 | 4.69 | 4.69 | 4.69 | 4.69 | 4.69 | 1 | 2 | 2 | 2 | 1 | 1 |
| 85 | Luling | 128 | 128 | 128 | 128 | 128 | 128 | 4.65 | 5.21 | 5.21 | 5.21 | 5.21 | 5.21 | 29 | 34 | 34 | 36 | 37 | 38 |
| 86 | Lytle | 174 | 174 | 174 | 174 | 174 | 174 | 4.68 | 5.21 | 5.21 | 5.21 | 5.21 | 5.21 | 18 | 22 | 23 | 24 | 25 | 28 |
| 87 | Marion | 113 | 113 | 113 | 113 | 113 | 113 | 4.56 | 5.09 | 5.09 | 5.09 | 5.09 | 5.09 | 8 | 9 | 9 | 10 | 10 | 11 |
| 88 | Martindale WSC | 96 | 96 | 96 | 96 | 96 | 96 | 4.38 | 4.81 | 4.81 | 4.81 | 4.81 | 4.81 | 22 | 33 | 36 | 39 | 43 | 48 |
| 89 | Maxwell SUD | 92 | 92 | 92 | 92 | 92 | 92 | 4.29 | 4.64 | 4.64 | 4.64 | 4.64 | 4.64 | 98 | 143 | 193 | 259 | 348 | 385 |
| 90 | McCoy WSC | 111 | 111 | 111 | 111 | 111 | 111 | 4.61 | 5.26 | 5.26 | 5.26 | 5.26 | 5.26 | 42 | 51 | 53 | 56 | 58 | 63 |
| 91 | Medina County WCID 2 | 177 | 177 | 177 | 177 | 177 | 177 | 4.50 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 2 | 2 | 2 | 2 | 2 | 2 |
| 92 | Medina River West WSC | 91 | 91 | 91 | 91 | 91 | 91 | 3.66 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 5 | 6 | 6 | 6 | 6 | 6 |
| 93 | Moore WSC | 174 | 174 | 174 | 174 | 174 | 174 | 4.35 | 4.85 | 4.85 | 4.85 | 4.85 | 4.85 | 3 | 4 | 4 | 4 | 4 | 4 |
| 94 | Natalia | 154 | 154 | 154 | 154 | 154 | 154 | 4.50 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 6 | 6 | 6 | 7 | 7 | 7 |
| 95 | New Braunfels | 183 | 183 | 183 | 183 | 183 | 183 | 4.20 | 4.64 | 4.64 | 4.64 | 4.64 | 4.64 | 661 | 1,039 | 1,434 | 1,914 | 2,464 | 3,092 |
| 96 | Nixon | 140 | 140 | 140 | 140 | 140 | 140 | 4.38 | 4.91 | 4.91 | 4.91 | 4.91 | 4.91 | 11 | 12 | 12 | 12 | 12 | 11 |
| 97 | Oak Hills WSC | 150 | 150 | 150 | 150 | 150 | 150 | 4.38 | 4.92 | 4.92 | 4.92 | 4.92 | 4.92 | 29 | 38 | 44 | 52 | 59 | 68 |
| 98 | Pearsall | 178 | 178 | 178 | 178 | 178 | 178 | 4.70 | 5.26 | 5.26 | 5.26 | 5.26 | 5.26 | 45 | 58 | 63 | 64 | 65 | 66 |
| 99 | Picosa WSC | 86 | 86 | 86 | 86 | 86 | 86 | 4.05 | 4.48 | 4.48 | 4.48 | 4.48 | 4.48 | 16 | 21 | 23 | 26 | 28 | 32 |
| 100 | Pleasanton | 196 | 196 | 196 | 196 | 196 | 196 | 4.73 | 5.24 | 5.24 | 5.24 | 5.24 | 5.24 | 66 | 79 | 86 | 94 | 103 | 112 |
| 101 | Point Comfort | 94 | 94 | 94 | 94 | 94 | 94 | 5.07 | 5.87 | 5.87 | 5.87 | 5.87 | 5.87 | 3 | 3 | 3 | 3 | 3 | 3 |
| 102 | Polonia WSC | 112 | 112 | 112 | 112 | 112 | 112 | 3.85 | 4.35 | 4.35 | 4.35 | 4.35 | 4.35 | 37 | 49 | 59 | 69 | 82 | 97 |
| 103 | Port Lavaca | 126 | 126 | 126 | 126 | 126 | 126 | 4.65 | 5.23 | 5.23 | 5.23 | 5.23 | 5.23 | 60 | 65 | 62 | 58 | 55 | 51 |
| 104 | Port Oconnor Improvement District | 70 | 70 | 70 | 70 | 70 | 70 | 5.01 | 5.90 | 5.90 | 5.90 | 5.90 | 5.90 | 5 | 5 | 5 | 5 | 4 | 4 |
| 105 | Poteet | 111 | 111 | 111 | 111 | 111 | 111 | 4.49 | 5.01 | 5.01 | 5.01 | 5.01 | 5.01 | 14 | 14 | 13 | 13 | 13 | 13 |
| 106 | Poth | 144 | 144 | 144 | 144 | 144 | 144 | 4.94 | 5.51 | 5.51 | 5.51 | 5.51 | 5.51 | 9 | 9 | 9 | 9 | 9 | 9 |
| 107 | Quail Creek MUD | 105 | 105 | 105 | 105 | 105 | 105 | 4.82 | 5.56 | 5.56 | 5.56 | 5.56 | 5.56 | 7 | 9 | 9 | 9 | 8 | 8 |
| 108 | Randolph Air Force Base | 60 | 60 | 60 | 60 | 60 | 60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 |
| 109 | Refugio | 171 | 171 | 171 | 171 | 171 | 171 | 4.83 | 5.45 | 5.45 | 5.45 | 5.45 | 5.45 | 14 | 15 | 15 | 15 | 16 | 17 |
| 110 | Runge | 183 | 183 | 183 | 183 | 183 | 183 | 4.80 | 5.23 | 5.23 | 5.23 | 5.23 | 5.23 | 5 | 5 | 6 | 6 | 6 | 7 |

| | | Per Capita Water Use (GPCD) | | | | | | Plumbing Code Savings (GPCD) | | | | | | Plumbing Code Savings (acft/yr) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| 111 | S S WSC | 109 | 109 | 109 | 109 | 109 | 109 | 4.16 | 4.63 | 4.63 | 4.63 | 4.63 | 4.63 | 94 | 120 | 136 | 150 | 166 | 185 |
| 112 | Sabinal | 215 | 215 | 215 | 215 | 215 | 215 | 4.78 | 5.36 | 5.36 | 5.36 | 5.36 | 5.36 | 7 | 8 | 7 | 7 | 7 | 6 |
| 113 | San Antonio Water System | 106 | 106 | 106 | 106 | 106 | 106 | 4.00 | 8.70 | 11.50 | 14.40 | 17.20 | 18.60 | 10,534 | 26,676 | 38,539 | 52,034 | 66,266 | 76,356 |
| 114 | San Marcos | 119 | 119 | 119 | 119 | 119 | 119 | 9.50 | 12.00 | 14.50 | 15.80 | 17.00 | 17.00 | 1,510 | 2,685 | 3,998 | 4,962 | 5,758 | 6,029 |
| 115 | Schertz | 145 | 145 | 145 | 145 | 145 | 145 | 4.48 | 5.06 | 5.06 | 5.06 | 5.06 | 5.06 | 256 | 352 | 418 | 485 | 559 | 647 |
| 116 | Seadrift | 150 | 150 | 150 | 150 | 150 | 150 | 4.81 | 5.37 | 5.37 | 5.37 | 5.37 | 5.37 | 5 | 5 | 5 | 5 | 4 | 4 |
| 117 | Seguin | 139 | 139 | 139 | 139 | 139 | 139 | 4.60 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 260 | 346 | 371 | 386 | 401 | 417 |
| 118 | Selma | 148 | 148 | 148 | 148 | 148 | 148 | 4.22 | 4.83 | 4.83 | 4.83 | 4.83 | 4.83 | 78 | 107 | 125 | 143 | 161 | 184 |
| 119 | Shavano Park | 283 | 283 | 283 | 283 | 283 | 283 | 4.89 | 5.33 | 5.33 | 5.33 | 5.33 | 5.33 | 10 | 12 | 13 | 15 | 16 | 17 |
| 120 | Smiley | 181 | 181 | 181 | 181 | 181 | 181 | 4.75 | 5.32 | 5.32 | 5.32 | 5.32 | 5.32 | 3 | 3 | 3 | 3 | 3 | 3 |
| 121 | South Buda WCID 1 | 142 | 142 | 142 | 142 | 142 | 142 | 4.45 | 4.83 | 4.83 | 4.83 | 4.83 | 4.83 | 20 | 36 | 54 | 79 | 107 | 140 |
| 122 | Springs Hill WSC | 101 | 101 | 101 | 101 | 101 | 101 | 4.37 | 4.85 | 4.85 | 4.85 | 4.85 | 4.85 | 246 | 324 | 382 | 441 | 508 | 584 |
| 123 | Stockdale | 189 | 189 | 189 | 189 | 189 | 189 | 4.56 | 5.11 | 5.11 | 5.11 | 5.11 | 5.11 | 7 | 8 | 9 | 9 | 9 | 9 |
| 124 | Sunko WSC | 146 | 146 | 146 | 146 | 146 | 146 | 4.41 | 4.89 | 4.89 | 4.89 | 4.89 | 4.89 | 21 | 25 | 28 | 30 | 32 | 35 |
| 125 | Texas State University | 171 | 171 | 171 | 171 | 171 | 171 | 3.68 | 4.22 | 4.22 | 4.22 | 4.22 | 4.22 | 39 | 44 | 44 | 44 | 44 | 44 |
| 126 | The Oaks WSC | 157 | 157 | 157 | 157 | 157 | 157 | 5.23 | 5.81 | 5.81 | 5.81 | 5.81 | 5.81 | 7 | 9 | 10 | 11 | 12 | 13 |
| 127 | Three Oaks WSC | 223 | 223 | 223 | 223 | 223 | 223 | 4.73 | 5.41 | 5.41 | 5.41 | 5.41 | 5.41 | 7 | 9 | 10 | 11 | 13 | 13 |
| 128 | Tri Community WSC | 113 | 113 | 113 | 113 | 113 | 113 | 4.24 | 4.79 | 4.79 | 4.79 | 4.79 | 4.79 | 6 | 8 | 8 | 8 | 9 | 9 |
| 129 | Universal City | 135 | 135 | 135 | 135 | 135 | 135 | 4.86 | 5.52 | 5.52 | 5.52 | 5.52 | 5.52 | 112 | 134 | 136 | 136 | 137 | 137 |
| 130 | Uvalde | 211 | 211 | 211 | 211 | 211 | 211 | 4.58 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 86 | 95 | 93 | 90 | 87 | 83 |
| 131 | Victoria | 226 | 226 | 226 | 226 | 226 | 226 | 4.83 | 5.45 | 5.45 | 5.45 | 5.45 | 5.45 | 359 | 411 | 413 | 410 | 408 | 406 |
| 132 | Victoria County WCID 1 | 98 | 98 | 98 | 98 | 98 | 98 | 4.36 | 4.89 | 4.89 | 4.89 | 4.89 | 4.89 | 8 | 10 | 10 | 10 | 10 | 10 |
| 133 | Ville Dalsace Water Supply | 246 | 246 | 246 | 246 | 246 | 246 | 4.59 | 5.30 | 5.30 | 5.30 | 5.30 | 5.30 | 2 | 2 | 2 | 2 | 3 | 4 |
| 134 | Waelder | 154 | 154 | 154 | 154 | 154 | 154 | 4.62 | 5.20 | 5.20 | 5.20 | 5.20 | 5.20 | 5 | 6 | 6 | 6 | 6 | 5 |
| 135 | Water Services | 145 | 145 | 145 | 145 | 145 | 145 | 5.20 | 5.72 | 5.72 | 5.72 | 5.72 | 5.72 | 32 | 38 | 41 | 44 | 46 | 50 |
| 136 | West Medina WSC | 185 | 185 | 185 | 185 | 185 | 185 | 5.12 | 5.71 | 5.71 | 5.71 | 5.71 | 5.71 | 6 | 7 | 7 | 7 | 7 | 7 |
| 137 | Wimberley WSC | 104 | 104 | 104 | 104 | 104 | 104 | 4.90 | 5.30 | 5.30 | 5.30 | 5.30 | 5.30 | 29 | 45 | 64 | 89 | 118 | 151 |
| 138 | Windmill WSC | 197 | 197 | 197 | 197 | 197 | 197 | 4.17 | 4.71 | 4.71 | 4.71 | 4.71 | 4.71 | 7 | 7 | 7 | 6 | 5 | 4 |
| 139 | Wingert Water Systems | 180 | 180 | 180 | 180 | 180 | 180 | 4.67 | 5.20 | 5.20 | 5.20 | 5.20 | 5.20 | 9 | 11 | 12 | 13 | 13 | 13 |
| 140 | Woodsboro | 147 | 147 | 147 | 147 | 147 | 147 | 4.59 | 5.16 | 5.16 | 5.16 | 5.16 | 5.16 | 7 | 7 | 6 | 6 | 5 | 5 |
| 141 | Yancey WSC | 101 | 101 | 101 | 101 | 101 | 101 | 4.49 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 31 | 39 | 40 | 41 | 43 | 44 |
| 142 | Yoakum | 160 | 160 | 160 | 160 | 160 | 160 | 4.77 | 5.34 | 5.34 | 5.34 | 5.34 | 5.34 | 11 | 12 | 12 | 11 | 11 | 11 |
| 143 | Yorktown | 158 | 158 | 158 | 158 | 158 | 158 | 4.83 | 5.39 | 5.39 | 5.39 | 5.39 | 5.39 | 10 | 11 | 11 | 11 | 11 | 11 |
| 144 | Zavala County WCID 1 | 256 | 256 | 256 | 256 | 256 | 256 | 4.45 | 5.03 | 5.03 | 5.03 | 5.03 | 5.03 | 6 | 7 | 6 | 6 | 6 | 5 |
| **All** | **TOTAL** | | | | | | | | | | | | | **19,379** | **39,432** | **54,525** | **71,267** | **88,828** | **102,085** |

FINAL PLAN

# CHAPTER 3: WATER AVAILABILITY AND EXISTING WATER SUPPLIES

South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**3.0 Water Availability and Existing Water Supplies ..... 3-1**
3.1 Introduction ..... 3-1
3.2 Water Sources ..... 3-2
3.2.1 Surface Water ..... 3-2
3.2.2 Groundwater ..... 3-5
3.2.3 Reuse ..... 3-7
3.3 Hydrologic Assumptions ..... 3-8
3.3.1 Surface Water ..... 3-8
3.3.2 Groundwater ..... 3-11
3.3.3 Reuse ..... 3-15
3.4 Water Availability and Existing Water Supplies Identification ..... 3-15
3.4.1 Surface Water ..... 3-15
3.4.2 Groundwater ..... 3-20
3.4.3 Reuse ..... 3-26
3.5 Water User Groups ..... 3-27
3.6 Major Water Providers ..... 3-27

## APPENDICES

Appendix 3A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)
Appendix 3B: Hydrologic Assumptions Requests and Approvals
Appendix 3C: Technical Memorandum for the 2026 South Central Texas Regional Water Plan
Appendix 3D: Permitted Surface Water Rights and Reliability Assessment

## LIST OF TABLES

Table 3-1 Hydrologic Models Used for the Surface Water Availabilities and Existing Supplies Analysis ..... 3-9
Table 3-2 Run-of-River Availabilities by Source (acft/yr) ..... 3-15
Table 3-3 Reservoir Availabilities by Source (acft/yr) ..... 3-16
Table 3-4 Summary of Major Reservoirs in the South Central Texas Region ..... 3-17
Table 3-5 Local Surface Water Availabilities by County and Basin (acft/yr) ..... 3-19
Table 3-6 Groundwater Availabilities by County and Source (acft/yr) ..... 3-21
Table 3-7 Groundwater Availability by Source (acft/yr) ..... 3-24
Table 3-8 Reuse Availability by County and Type (acft/yr) ..... 3-26
Table 3-9 Existing Water Supplies for Major Water Providers (acft/yr) ..... 3-27
Table 3-10 Existing Water Supplies for Major Water Providers by Use Type (acft/yr) ..... 3-28

## LIST OF FIGURES

Figure 3-1 River Basins, Major Reservoirs, and Run-of-River Rights ..... 3-3
Figure 3-2 Major Aquifers ..... 3-6
Figure 3-3 Minor Aquifers ..... 3-7
Figure 3-4 Groundwater Conservation Districts ..... 3-12
Figure 3-5 Groundwater Management Areas ..... 3-13

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft/yr | Acre-Feet per Year |
| ASR | Aquifer Storage and Recovery |
| BFZ | Balcones Fault Zone |
| BMA WCID | Bexar-Medina-Atascosa Counties Water Control and Improvement District No. 1 |
| CA | Certificate of Adjudication |
| DB27 | 2027 Regional and State Water Planning Database |
| DFC | Desired Future Condition |
| EAA | Edwards Aquifer Authority |
| EARM | Empirical Area-Reduction Method |
| EAHCP | Edwards Aquifer Habitat Conservation Plan |
| GAM | Groundwater Availability Model |
| GBRA | Guadalupe-Blanco River Authority |
| GCD | Groundwater Conservation District |
| GMA | Groundwater Management Area |
| MAG | Modeled Available Groundwater |
| MWP | Major Water Provider |
| PGMA | Priority Groundwater Management Area |
| Region J | Plateau Region |
| Region L | South Central Texas Region |
| Region N | Coastal Bend Region |
| RIP | Recovery Implementation Program |
| SAWS | San Antonio Water System |
| SB | Senate Bill |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SV/SA | Storage Volume – Surface Area |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| TWC | Texas Water Code |
| TWDB | Texas Water Development Board |
| WAM | Water Availability Model |
| WMS | Water Management Strategy |

| | |
|---|---|
| WUG | Water User Group |
| WWP | Wholesale Water Provider |
| WWTP | Wastewater Treatment Plant |

# 3.0 Water Availability and Existing Water Supplies

## 3.1 Introduction

The South Central Texas Regional Water Planning Group (SCTRWPG) performed an evaluation to estimate the quantity of water that could meet water demands within the South Central Texas Region (Region L) Regional Water Planning Area (SCTRWPA). Available water quantities are estimated through a two-step process that examines both water availability and existing water supply. The evaluation estimated availabilities and supplies for water sources within the SCTRWPA, including groundwater, surface water, and reuse. This chapter reports results of the evaluation of the SCTRWPA's source water availability and existing supplies.

In regional water planning, there are two terms used that are similar but distinct: water availability and existing water supply. Water availability refers to the maximum amount of raw water that could be produced by or at a water source during a repeat of the drought of record. This estimate includes volumes of water that are not currently connected or being used, as they are potentially available for use currently or in the future. The determination of water availability is a source-based analysis, as described in the sections below. Generally, groundwater availability is derived from modeled available groundwater (MAG) estimates from the Texas Water Development Board (TWDB) Joint Groundwater Planning process, and surface water availability is derived from water availability modeling of water rights issued by the Texas Commission on Environmental Quality (TCEQ).

Existing water supply is the maximum amount of water that is physically and legally accessible from existing sources for immediate use by a water user group (WUG) or wholesale water provider (WWP) under drought of record conditions. This is a subset of the water availability volume that a WUG already has legal access to as well as the infrastructure in place to treat and deliver the water. Existing water supplies in the SCTRWPA were estimated by evaluating numerous sources of information, including but not limited to, the following:

- Responses from WUGs and WWPs to surveys or direct outreach from the SCTRWPG;
- Existing water rights from the TCEQ;
- Surface water availability modeling;
- Existing groundwater permits from groundwater conservation districts (GCDs);
- System and infrastructure capacities documented in the TCEQ Drinking Water Watch; and
- Supply estimates included in the 2021 Region L Regional Water Plan.

The following sections describe the water sources in the SCTRWPA, hydrologic assumptions used for the water availability and existing water supplies evaluation, and the evaluation results for WUGs, WWPs, and major water providers (MWPs). Water availabilities and water supplies within the SCTRWPA are also summarized in reports from the 2027 Regional and State Water Planning Database (DB27), which are available at https://www3.twdb.texas.gov/apps/SARA/reports/list. Relevant DB27 reports are included in Appendix 3A.

## 3.2 Water Sources

Water sources in the SCTRWPA include surface water within nine river and coastal basins and groundwater from 16 distinct groundwater sources with different geologic and management conditions. Treated effluent from wastewater treatment plants (WWTPs), called reclaimed water or reuse, is also considered as a water supply source. The following summarizes each of these sources within the SCTRWPA.

### 3.2.1 Surface Water

Surface water sources in the SCTRWPA include run-of-river, major reservoirs, and local surface water. The SCTRWPA includes parts of nine river and coastal basins, including the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins, and parts of the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins. The Nueces, San Antonio, and Guadalupe are the major river basins of interest in considering surface water availabilities and existing surface water supplies in the SCTRWPA. A map of the river basins, stream segments, and major reservoirs is provided on Figure 3-1.

#### 3.2.1.1 Run-of-River

The SCTRWPA includes the middle and lower portions of the San Antonio River Basin (Figure 3-1). The headwaters of the San Antonio River are located within the Plateau Regional Water Planning Area (Region J). Within the SCTRWPA, the San Antonio River Basin includes portions of 12 counties, including Atascosa, Bexar, Comal, DeWitt, Goliad, Guadalupe, Karnes, Kendall, Medina, Refugio, Victoria, and Wilson Counties.

Region L also includes the middle and lower portions of the Guadalupe River Basin (Figure 3-1); its headwaters are located in Region J. The Guadalupe Basin includes portions of 12 Region L counties, including Caldwell, Calhoun, Comal, DeWitt, Goliad, Gonzales, Guadalupe, Hays, Karnes, Kendall, Victoria, and Wilson Counties.

In the northern portions of the SCTRWPA, the Guadalupe and San Antonio River Basins are delineated as separate river basins. However, the San Antonio River confluences with the Guadalupe River in the lower basin at the corners of Victoria, Calhoun, and Refugio Counties before emptying into San Antonio Bay. In part because of the large concentration of senior water rights below the confluence of the two rivers, the two river basins are often referred to as the Guadalupe-San Antonio River Basin and are considered as one river basin when evaluating surface water supplies available under existing water rights.

The SCTRWPA includes the middle portions of the Nueces River Basin (Figure 3-1). The headwaters of the Nueces River are within Region J and the lower basin is within the Coastal Bend Regional Water Planning Area (Region N). Within the SCTRWPA, the Nueces River Basin includes portions of 10 counties, including Atascosa, Bexar, Dimmit, Frio, Karnes, La Salle, Medina, Uvalde, Wilson, and Zavala Counties.

#### 3.2.1.2 Reservoirs

Major reservoirs in the SCTRWPA include Canyon Lake, the Medina Lake System, and three cooling lakes for power generation facilities, including Calaveras Lake, Coleto Creek Reservoir, and Victor Braunig

Lake. All major reservoirs within Region L are located in the Guadalupe-San Antonio River Basin and are identified on Figure 3-1.

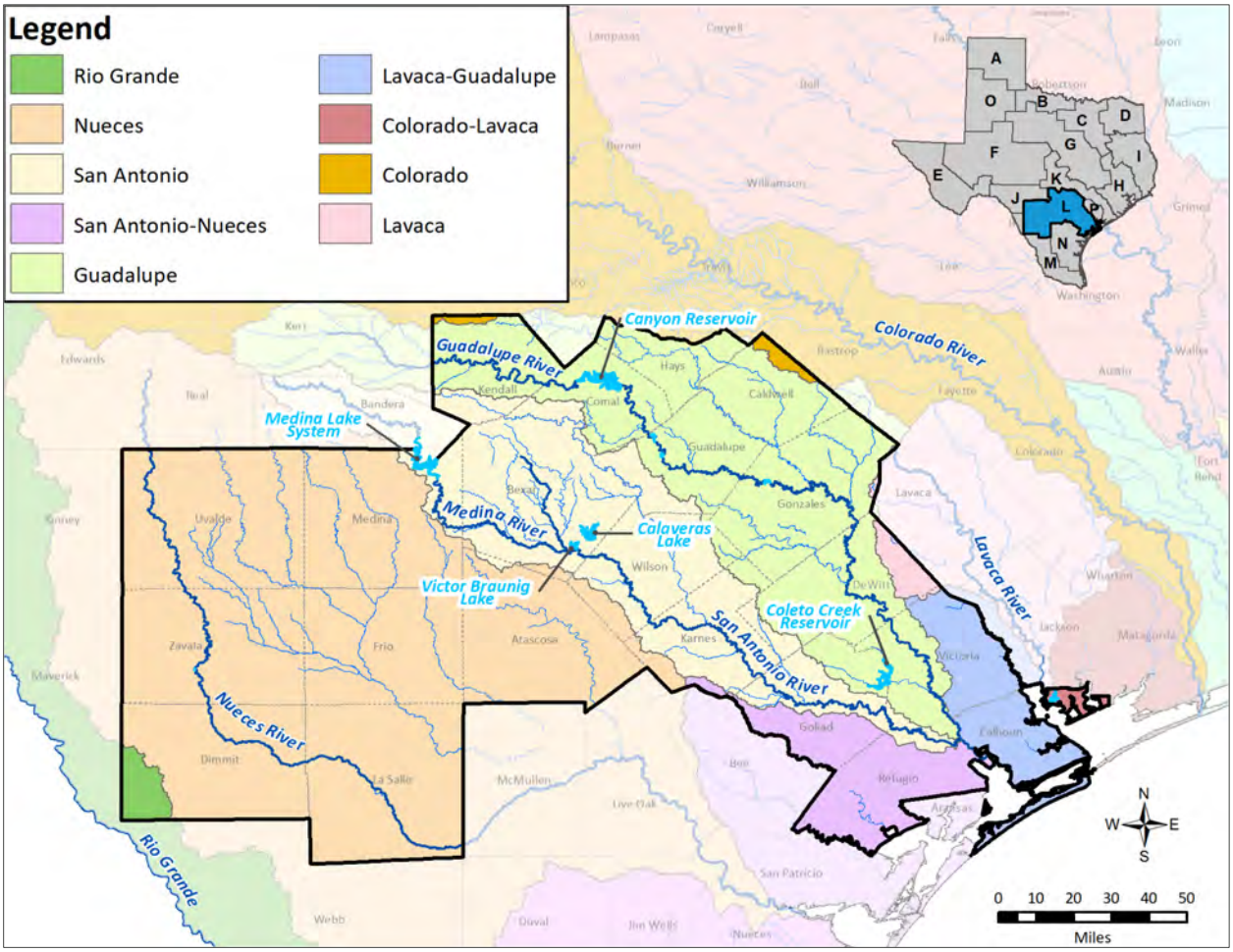



**Figure 3-1 River Basins, Major Reservoirs, and Run-of-River Rights**

#### 3.2.1.2.1 Calaveras Lake

CPS Energy owns Calaveras Lake, which is in the San Antonio River Basin in Bexar County to the southeast of San Antonio. The lake is used for steam-electric power plant cooling purposes. CPS Energy has water rights to divert up to 60,000 acre-feet per year (acft/yr) [1] of the unappropriated public waters of the San Antonio River including treated effluent to Calaveras Lake and to consume up to 36,900 acft/yr.

#### 3.2.1.2.2 Canyon Reservoir

Constructed by the US Army Corps of Engineers, Canyon Reservoir is in the Guadalupe River Basin in Comal County on the mainstem of the Guadalupe River. Uses of the reservoir include water supply for municipal, industrial, steam-electric power generation, irrigation, and hydroelectric power generation,

[1] One acft is approximately 325,851 gallons.

as well as flood protection and recreation. Diversions from Canyon Reservoir are currently authorized up to a maximum of 120,000 acft/yr and a 5-year rolling average of 90,000 acft/yr.

Water supplies from Canyon Reservoir are managed by the Guadalupe-Blanco River Authority (GBRA) and made available to customers both within their 10 county district and in adjacent counties and/or river basins. Because a portion of its watershed is in Region J, the TWDB has designated Canyon Reservoir as a special water resource.

#### 3.2.1.2.3 Coleto Creek Reservoir

Coleto Creek Reservoir is a cooling reservoir for steam-electric power generation and is located at the border of Victoria and Goliad Counties in the lower Guadalupe River Basin. Sources of water include runoff from the Coleto Creek watershed and diversions from the Guadalupe River, backed by stored water from Canyon Reservoir, when needed. The reservoir supplies water for steam-electric power generation at the Coleto Creek Power Station located in Goliad County. Existing water rights authorize Coleto Creek Power, LP (now owned by Vistra), to divert up to 24,160 acft/yr from the Guadalupe River to Coleto Creek Reservoir and to consume up to 24,160 acft/yr.

#### 3.2.1.2.4 Medina Lake System

The Medina Lake System is located on the Medina River, a tributary of the San Antonio River, in Medina and Bandera Counties. The Medina Lake System is owned by the Bexar-Medina-Atascosa Counties Water Control and Improvement District No. 1 (BMA WCID) and has traditionally been used to supply irrigation water to farms in Bexar, Medina, and Atascosa Counties via the Medina Canal System. San Antonio Water System (SAWS) has contracts with the BMA WCID to obtain municipal water supplies from the Medina Lake System; these supplies are capable of being delivered via the bed and banks of the Medina River to a point of diversion near Von Ormy in southwestern Bexar County. The Medina Lake System is unique among the major reservoirs in the SCTRWPA because waters impounded therein contribute recharge. Because of its location on the boundary of Regions L and J, the TWDB has designated the Medina Lake System as a special water resource.

#### 3.2.1.2.5 Victor Braunig Lake

CPS Energy owns Victor Braunig Lake or Braunig Lake, which is in Bexar County to the southeast of San Antonio, in the San Antonio River Basin. The lake is used for steam-electric power plant cooling purposes. CPS Energy has water rights to divert up to 12,000 acft/yr from the San Antonio River to Braunig Lake and to consume up to 12,000 acft/yr at Braunig Lake. Runoff from the watersheds above the reservoirs and diversions from the San Antonio River (including treated effluent discharged by SAWS) are used to maintain necessary lake levels to facilitate efficient power plant operations.

#### 3.2.1.2.6 Other Reservoirs

There are several reservoirs within the SCTRWPA that are not considered major reservoirs because their storage capacity is less than 5,000 acft/yr. These reservoirs include Boerne Lake, Cox Lake, Lake Dunlap, Gonzales Lake, Lake McQueeney, and Upper Nueces Lake. Several of these lakes are owned and operated by GBRA and have hydroelectric power generation authorizations and/or capabilities. In addition to those owned by GBRA, other small reservoirs and associated priority and non-priority water rights for hydroelectric power generation are located along the Guadalupe River at Seguin, Gonzales, and Cuero.

#### 3.2.1.3 Local Surface Water

Local surface water, also known as Livestock Local Supplies, are disbursed, limited, unnamed individual surface water supplies that, separately, are available only to particular WUGs, such as livestock and domestic users. These supplies are generally runoff collection, such as livestock and stock ponds, and are assumed to be fresh water. Local surface water supplies are considered withdrawals that do not require permits.

### 3.2.2 Groundwater

Groundwater sources within the SCTRWPA include 16 distinct groundwater sources with different geologic and management conditions. These groundwater sources include five major aquifers, five minor aquifers, and six other groundwater sources that the TWDB does not officially consider to be "aquifers."

The five major aquifers in the SCTRWPA are shown in Figure 3-2 and include the following:

- Edwards-Trinity (Plateau) Aquifer;
- Trinity Aquifer;
- Edwards-Balcones Fault Zone (BFZ) Aquifer;
- Carrizo-Wilcox Aquifer; and
- Gulf Coast Aquifer.

The five minor aquifers in the SCTRWPA are shown in Figure 3-3 and include the following:

- Ellenburger-San Saba Aquifer;
- Hickory Aquifer;
- Queen City Aquifer;
- Sparta Aquifer; and
- Yegua-Jackson Aquifer.

Other sources that supply groundwater to the SCTRWPA, include the Austin Chalk; Buda Limestone; Edwards-Trinity-Plateau, Pecos Valley, and Trinity; San Marcos River Alluvium; Leona Gravel; and the Carrizo Aquifer Storage and Recovery (ASR). Chapter 1 includes more detailed descriptions of the major aquifers, including water quality characteristics.

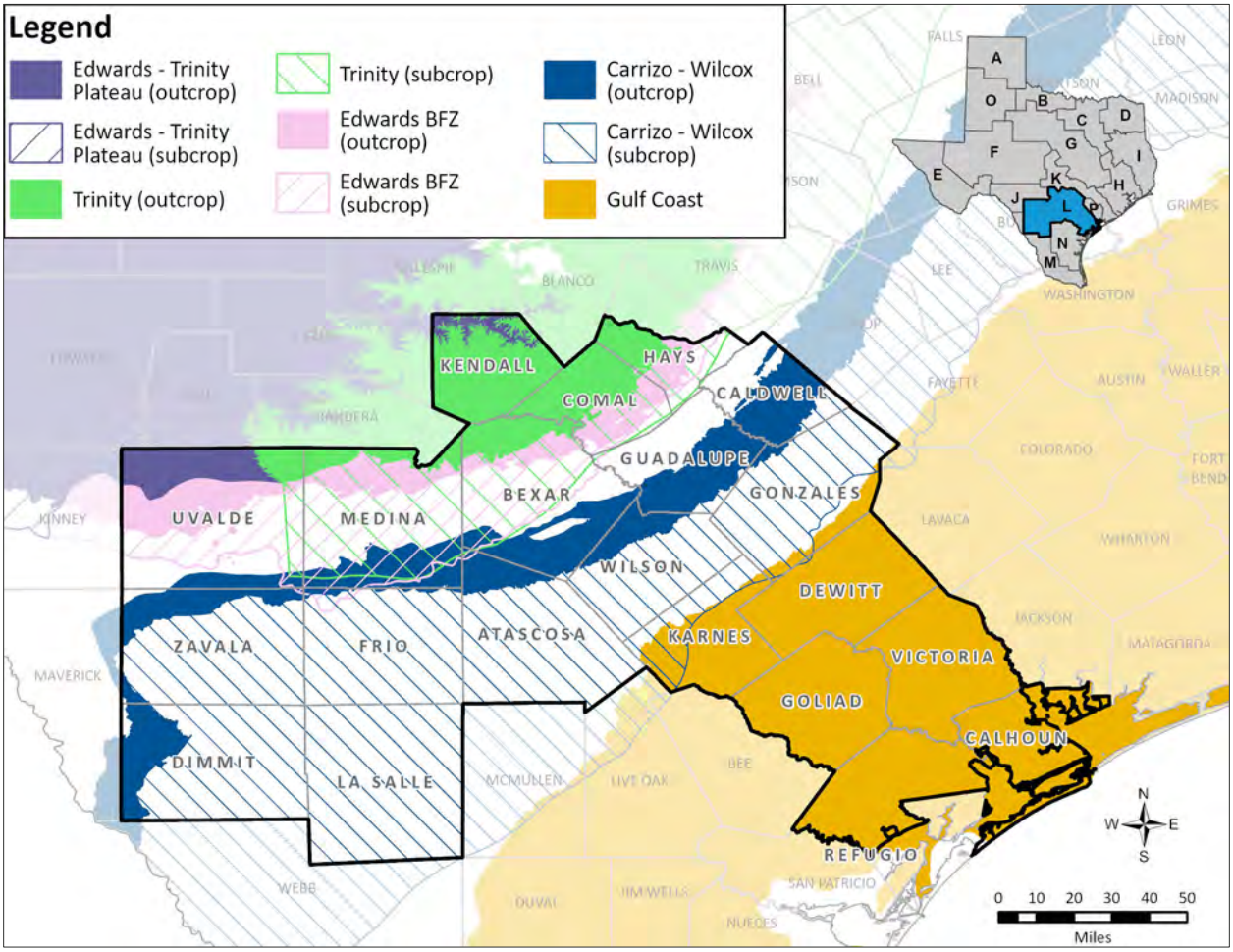



**Figure 3-2 Major Aquifers**

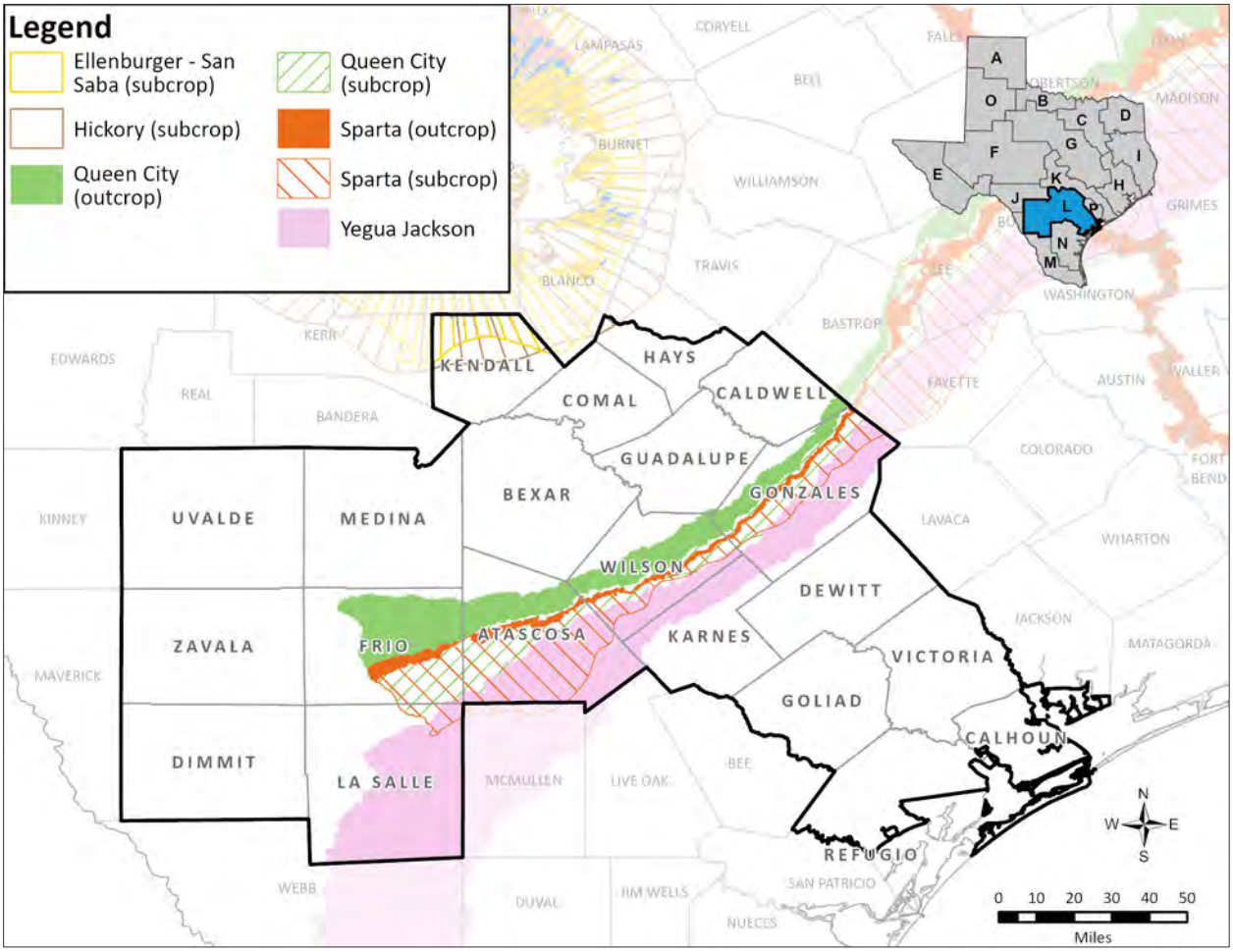



**Figure 3-3 Minor Aquifers**

### 3.2.3 Reuse

Reuse is the beneficial use of groundwater or surface water that has already been beneficially used. Reuse may be categorized as direct or indirect, and water can be used for potable and non-potable purposes. Reuse supplies that are most commonly used are reclaimed water sources, which is treated effluent from municipal or industrial WWTPs. Reclaimed water is treated to TCEQ-approved safe and suitable levels based on their purpose and location of use.

Water reuse is classified as direct or indirect and potable or non-potable. Direct reuse is defined as the use of reclaimed water that is piped directly from a WWTP to the place where it is utilized. Indirect reuse is defined as the use of reclaimed water by discharging to an intermediate water source, such as surface water or groundwater, where it blends with other water and may be further purified before being removed for non-potable or potable uses. Potable water is treated to drinking water standards and is suitable for direct consumption; whereas non-potable water is used to meet a range of other demands. For regional water planning purposes, this results in the following four classes of reuse:

1. Direct potable;
2. Direct non-potable;

3. Indirect potable; and

4. Indirect non-potable.

The most common class of reuse is direct non-potable for irrigation or industrial uses. Irrigation use may include turf irrigation, or in some cases, crop irrigation. Many forms of indirect reuse have been implemented through the years as discharges from one water user contribute to streamflow or groundwater recharge and are then diverted by a downstream water user. In unique cases involving groundwater-based return flows or interbasin transfers, a discharger may retain a right to its return flows. For planning purposes, indirect reuse is considered water that would require a permit to access it after discharged into surface waters in the state. This form of indirect reuse is limited by the legal complexity required to demonstrate that a discharge increases water availability.

The Title 30 of the Texas Administrative Code (TAC) Chapter 210 authorizes individual producers of reclaimed water to implement water reuse in Texas. Reclaimed water is partitioned into two types: Type I and Type II. Type I reclaimed water may be used where public contact is likely (e.g., irrigation for public facilities or fire protection). Type II reclaimed water may be used in remote, restricted, or controlled, or limited-access areas where human contact is unlikely (e.g., power plant cooling or supply to non-recreational water bodies).

## 3.3 Hydrologic Assumptions

The following describes the models and assumptions used to estimate the availability of water for surface water, groundwater, and reuse sources in the SCTRWPA. Hydrologic variance requests from the SCTRWPG and approvals by the TWDB are documented in Appendix 3B.

### 3.3.1 Surface Water

Surface water rights are issued by the TCEQ to permittees, such as individuals, cities, industries, water districts, and river authorities. Each water right includes a priority date, diversion location, maximum diversion rate, and annual quantity of diversion. Some rights may include off-channel storage authorization, ASR storage, instream flow restrictions, and various special conditions. The principle of prior appropriation or “first-in-time-first-in-right” is applied, which means that the most senior, or oldest, right has first call on flows, with the second, third, and more recent rights having second, third, and later priorities for diversions. This procedure gives senior right holders priority when streamflows are low, as in periods of drought, and renders junior rights less reliable during drought. The most junior water right holders may not be able to divert any water during severe drought, if directed by the TCEQ acting through the South Texas Watermaster.

It is important to note that many run-of-river rights are for irrigation purposes, where chances are taken at planting time upon whether water will be available for crop production during the growing season. In fact, when reviewing applications for irrigation rights, TCEQ staff have traditionally considered whether 75% of the proposed diversion would be available in 75% of the years. Municipal, industrial, and steam-electric power users, however, typically require more reliable supplies than are available from run-of-river flows. Hence, these types of users will often develop storage and/or alternative supplies to increase the reliability of their run-of-river rights.

Surface water availability was evaluated for the 2026 Regional Water Plan by applying models to estimate reservoir firm yields and run-of-river firm diversions. Firm yield, or reservoir availability, is the maximum water volume that a reservoir can provide each year under a repeat of the drought of record and includes anticipated sedimentation rates. Anticipated sedimentation is the projected decrease in a reservoir's area-capacity condition resulting in projected firm yield decreases each decade. Firm diversion, or run-of-river availability, is the minimum monthly diversion amount that is available 100% of the time during a repeat of the drought of record.

#### 3.3.1.1 Water Availability Models and Associated Hydrologic Variances

For regional water planning purposes, the default model used to assess surface water availability is the TCEQ Water Availability Model (WAM) Run 3, which assumes that all senior water rights will be utilized, and all applicable permit conditions will be met. The SCTRWPG reviewed, considered, and approved hydrologic assumptions and needed hydrologic variances for submittal to the TWDB at the November 2, 2023, SCTRWPG meeting. On November 15, 2023, the SCTRWPG submitted to the TWDB a Hydrologic Variance Request letter, which included hydrologic variance checklists for the Guadalupe-San Antonio River Basin and the Nueces River Basin. The TWDB subsequently approved the variance requests on January 8, 2024. Appendix 3B includes the TWDB's approval letter of hydrologic variances with attachments that include the initial variance request submitted by Region L and a memorandum regarding hydrologic variance request recommendations.

As described in the hydrologic variance checklists that were approved by TWDB, the SCTRWPG used the TCEQ WAM Run 3 and an alternative surface water model, the "Region L WAM" to assess surface water availabilities. The Region L WAM was used to estimate surface water availabilities for certain reservoirs, including Canyon Reservoir, Victor Braunig Lake, Calaveras Lake, and Coleto-Creek Reservoir. The unmodified WAM Run 3 was used to evaluate firm yields for all other reservoirs in the SCTRWPA. Table 3-1 summarizes the hydrologic models used for the surface water availabilities and existing supplies analysis, including the model name, version date, model input/output files used, date model used and any relevant comments.

**Table 3-1 Hydrologic Models Used for the Surface Water Availabilities and Existing Supplies Analysis**

| Model Name | Version Date | Input/Output Files Used | Date Model Used | Comments |
|---|---|---|---|---|
| TCEQ Full Authorization WAM for the Guadalupe-San Antonio River Basin | 10/1/2023 | WRAP SIM input file extensions: DAT, DIS, FLO, EVA, FAD, HIS<br>WRAP SIM output file extensions: OUT<br>WRAP TAB input file extensions: TIN<br>WRAP TAB output file extensions: TOU | December 2023 | N/A – None |
| Region L WAM | WRAP SIM: December 1999<br>DAT File: February 2004 | WRAP SIM input file extensions: DAT, DIS, INF, EVA, FAD, BSP, DAY, HUE, RCH<br>WRAP SIM output file extensions: OUT | December 2023 | N/A – None |

| Model Name | Version Date | Input/Output Files Used | Date Model Used | Comments |
|---|---|---|---|---|
| TCEQ Full Authorization WAM for the Nueces River Basin | 10/1/2023 | WRAP SIM input file extensions: DAT, DIS, FLO, EVA<br>WRAP SIM output file extensions: OUT<br>WRAP TAB input file extensions: TIN<br>WRAP TAB output file extensions: TOU | December 2023 | N/A – None |

### 3.3.1.2 Sedimentation Methodology

Sedimentation is the anticipated decreases in a reservoir's area-capacity condition, resulting in projected firm yield decreases in each decade. Anticipated sedimentation was incorporated into WAM Run 3 models and the Region L WAM. The storage volume - surface area (SV/SA) tables for Calaveras Lake, Canyon Reservoir, Coleto Creek Reservoir, and Victor Braunig Lake were adjusted to reflect sedimentation for the 2030 and 2080 planning decades. Sedimentation rates used for major reservoirs in the applicable WAMs included:

- Calaveras Lake: 29.05 acft/yr;
- Canyon Reservoir: 114.98 acft/yr;
- Coleto Creek Reservoir: 55.76 acft/yr; and
- Victor Braunig Lake: 4.23 acft/yr.

The program, SEDDIS2.exe, was used to execute the Empirical Area-Reduction Method (EARM). The EARM was developed by Borland and Miller (1960) [2] for the Bureau of Reclamation as a means to mathematically distribute a given sediment loading across the topology of a large reservoir. The EARM inputs include pre-sedimentation SV/SA tables and a projected sediment load. The modified SV/SA tables were computed for each reservoir for the 2030 and 2080 decades.

### 3.3.1.3 Local Surface Water

Local surface water availabilities, or livestock local supplies, were estimated for the 2026 Regional Water Plan using the most current accessible information. For all areas within the planning region, livestock water demand is generally assumed to be supplied 50 percent (%) from quantified groundwater sources and 50% from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. This assumption is based on data from the TWDB historic water use estimates, which indicate that the counties within the SCTRWPA average approximately 60% groundwater supply to meet livestock use over the past ten years (2011-2021).

Because the demands are based on a drought-year scenario, it was assumed that ranchers will manage their livestock in such a way that populations will be maintained at a level that can be supported by a combination of local surface water supplies and known water or groundwater supplies. Local surface water supplies used for livestock are considered firm, based on historical reliability and the assumption

[2] Borland, W.M., Miller, C.R., 1960. Distribution of Sediment in Large Reservoirs. Transactions of the American Society of Civil Engineers. Vol. 125. Iss. 1. DOI: 10.1061/TACEAT.0007776

that ranchers will manage livestock populations in accordance with the availability of these dependable sources.

Livestock water supply is set equal to projected livestock demands due to the nature of livestock water use. If the supply is not present, the livestock numbers are reduced until they match the available supply. Infrastructure is not a consideration for livestock supplies, and livestock pumpage is typically exempt from regulations; therefore, there are no regulatory considerations that might impact livestock groundwater supplies.

### 3.3.2 Groundwater

For the 2026 Regional Water Plan, groundwater availabilities generally fall into the following categories:

1. MAG Estimates Provided by the TWDB;
2. Desired Future Condition (DFC)-Compatible Estimates Provided by the TWDB; and
3. Regional Water Planning Group (RWPG) Estimates Developed by the SCTRWPG.

Groundwater availabilities were estimated using a combination of sources, including TWDB groundwater availabilities, published reports, and historical data and information. Groundwater availability estimates provided by TWDB were developed through a combination of aquifer characteristics and policy decisions, made primarily by GCDs and groundwater management areas (GMAs). GCDs and GMAs within the SCTRWPA are discussed in Chapter 1 of this plan and on the TWDB website at http://www.twdb.texas.gov/groundwater/index.asp.

Groundwater is regulated locally by GCDs except in locations that do not have a district. In areas that do not have a district, water availability may be set by a county commissioners' court pursuant to Texas Water Code (TWC) §35.019. There are 18 GCDs that serve all or a portion of a county within the SCTRWPA (Figure 3-4). The responsibilities and authorities of these GCDs vary depending on legislation and governing law, and some districts are not responsible for all aquifers within the geographic boundaries of the district. GCDs may issue permits that regulate management of groundwater in their jurisdiction, such as groundwater pumping and spacing of wells.

GMAs are a different concept in that every county in the State is in one or more of sixteen GMAs. For the most part, the major aquifers are not split across multiple GMAs, and the goal is to manage entire aquifer systems across political subdivisions in a consistent way. Multiple GCDs within a single GMA coordinate to adopt the DFCs of relevant aquifers within that area. DFCs are the desired, quantified conditions of groundwater resources, such as water levels, water quality, spring flows, or volumes at a specified time or times in the future or in perpetuity. The TWDB uses the DFCs established by GMAs to determine a MAG value for an aquifer or portion of an aquifer.

There are five GMAs located wholly or partially within the SCTRWPA, including GMAs 7, 9, 10, 13, and 15. Figure 3-5 provides a map of the GMAs within the SCTRWPA. The TWDB develops MAG reports for each GMA, which show groundwater availability for discrete geographic-aquifer units. The following provides a list of the most-recent MAG reports for each GMA within the SCTRWPA:

- GR21-012 MAG (GMA 7);
- GR21-014 MAG (GMA 9);

- GR21-015 MAG (GMA 10);
- GR21-018 MAG (GMA 13); and
- GR21-020 MAG (GMA 15).

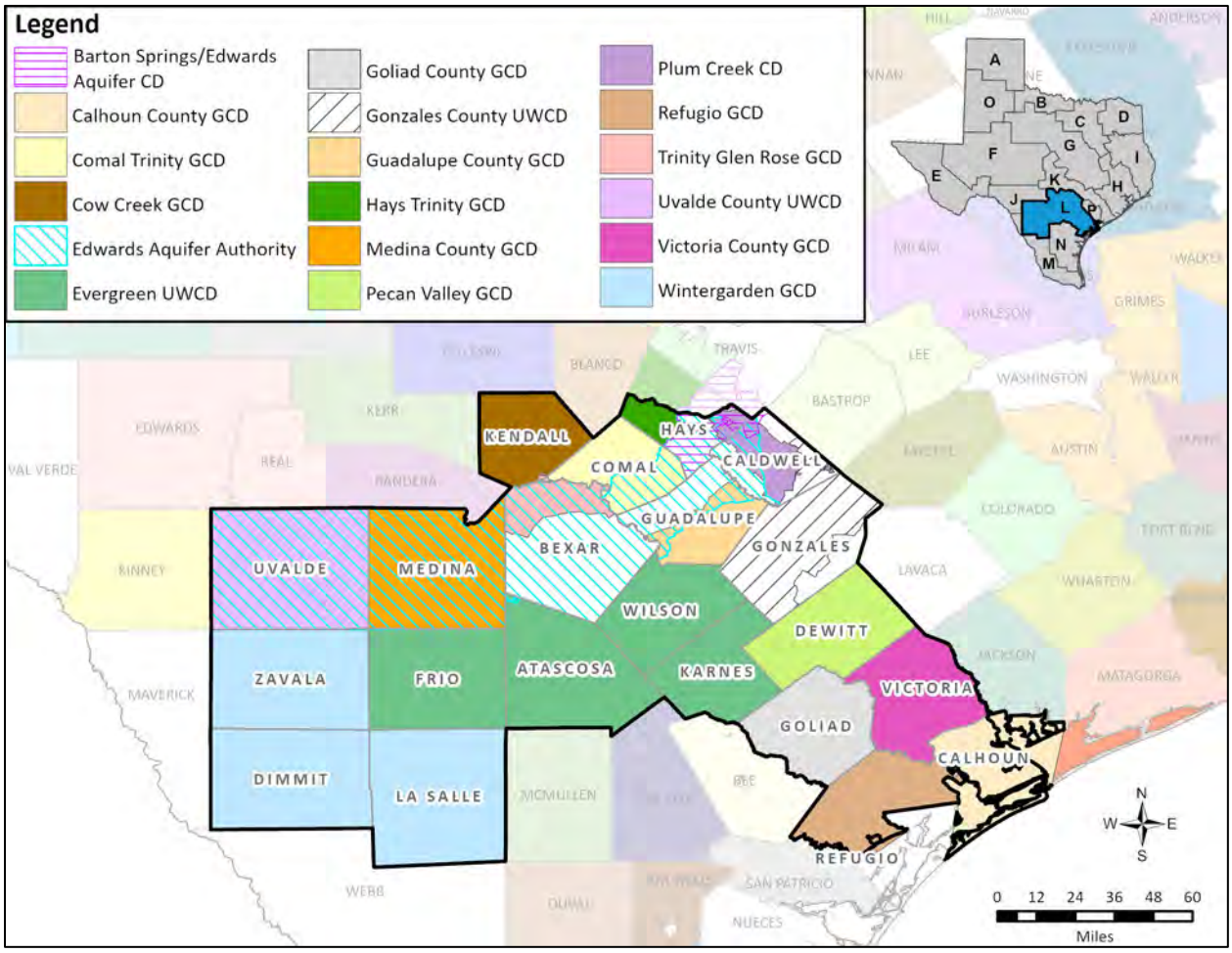



**Figure 3-4 Groundwater Conservation Districts**

There are several Priority Groundwater Management Areas (PGMAs) around the State, with portions of the Hill Country PGMA located within Region L. PGMAs are established to ensure management of groundwater in areas with critical groundwater problems and to consider the need for creating GCDs. PGMAs are designated or delineated by the TCEQ for areas that are experiencing or are expected to experience critical groundwater problems within 50 years, including shortages of surface water or groundwater, land subsidence resulting from groundwater withdrawal, or contamination of groundwater supplies. Each Region L county located within the Hill Country PGMA has a GCD: the Cow Creek GCD in Kendall County, the Comal Trinity GCD in Comal County, the Hays Trinity GCD in Hays County, and the Trinity Glen Rose GCD in Bexar County. These GCDs give notice to area residents that the declaration of the PGMA means that their water availability and quality will be at risk within the next 50 years. The Hays County Development Regulations have specific requirements listed for subdivisions

served by individual water wells producing local groundwater within the PGMA. These requirements can be found in Chapter 715, Sub-Chapter 3, Section 3.05 of the Hays County Development Regulations.

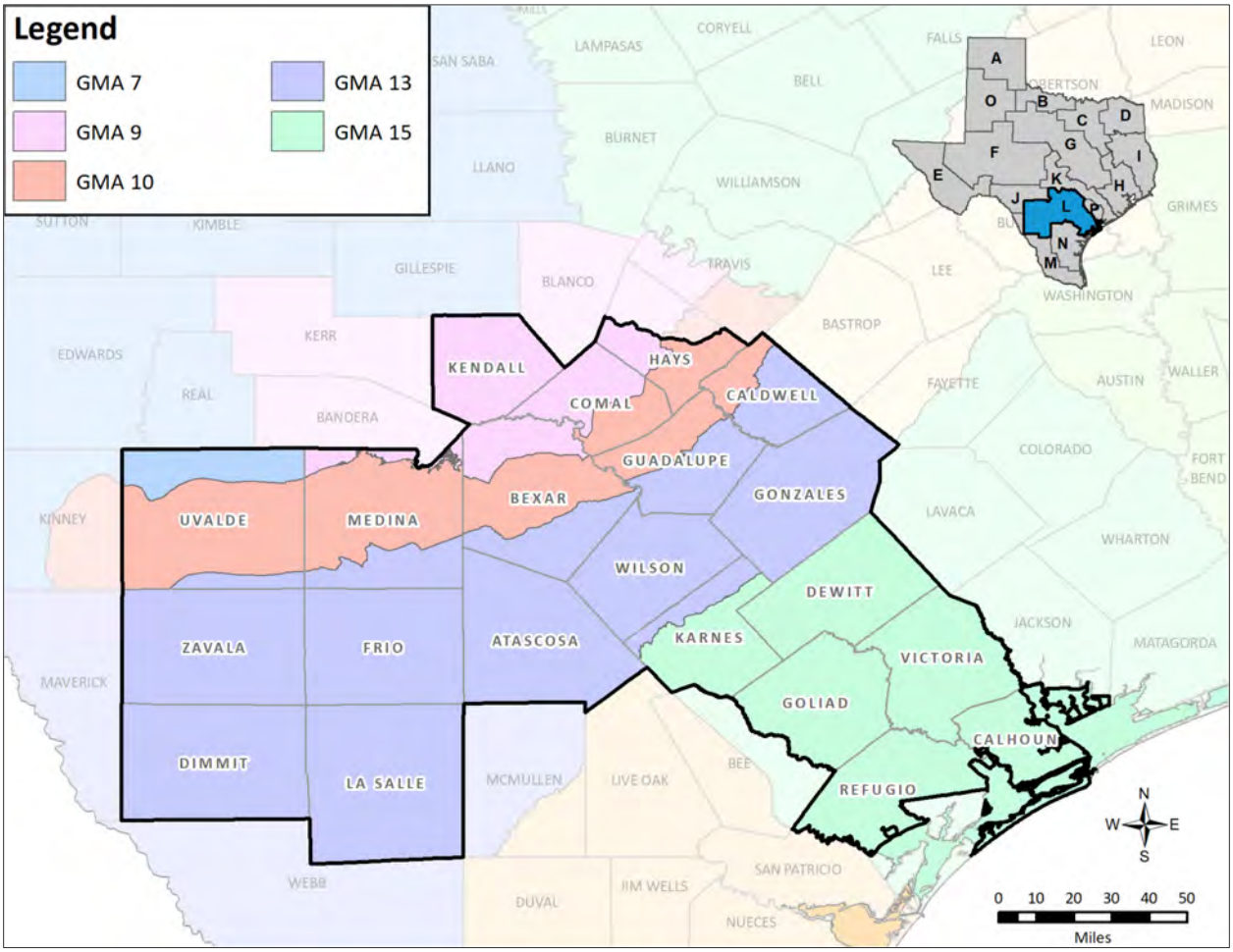



**Figure 3-5 Groundwater Management Areas**

### 3.3.2.1 Modeled Available Groundwater and DFC-Compatible Availability Estimates

TWDB staff translate DFCs from GMAs into MAG estimates using approved Groundwater Availability Models (GAMs) or other approaches if a GAM is not applicable. A MAG estimate is the amount of groundwater production, on an annual basis, which will achieve a DFC. The DFC in a specific location may not be achieved if groundwater production exceeds the MAG volume over the long term. Therefore, for regional water planning purposes, the total anticipated groundwater production in any planning decade may not exceed the MAG volume in any county-aquifer-basin location (total groundwater production includes quantities associated with both existing supplies and any recommended water management strategies [WMSs]). This prevents RWPGs from recommending WMSs with supply volumes that would result in exceeding (i.e., “overdrafting”) approved MAG volumes.

The SCTRWPG did not reallocate annual MAG volumes or use MAG Peak Factors in the 2026 Region L Regional Water Plan. In addition to the MAG estimates, the TWDB provided non-MAG availabilities that align with DFC pumping for non-relevant aquifers and local groundwater supply areas.

#### 3.3.2.2 RWPG-Estimated Groundwater Availabilities

In addition to the TWDB-provided MAG and non-MAG availabilities, RWPGs may estimate groundwater availabilities for certain non-MAG aquifers or portions thereof. The SCTRWPG developed RWPG-estimated groundwater availabilities for the following geographic locations and aquifers:

- Carrizo-Wilcox Aquifer in Karnes County;
- Edwards-BFZ Aquifer in Portions of Counties Regulated by the Edwards Aquifer Authority (EAA);
- Edwards-BFZ Aquifer in Frio County;
- Leona Gravel Aquifer in Medina County; and
- San Marcos River Alluvium in Caldwell County.

The SCTRWPG developed groundwater availabilities by referencing published groundwater reports, maximum historic annual production volumes, contracts, permit limitations, and other limitations. More information about how these RWPG-estimated groundwater availabilities were developed is included in the Region L Technical Memorandum in Appendix 3C [3].

In the case of the Edwards-BFZ Aquifer, Senate Bill (SB) 3 of the 80th Texas Legislature requires the EAA to cooperatively develop a Recovery Implementation Program (RIP) through a facilitated, consensus-based process that involves input from the United States Fish and Wildlife Service, other appropriate federal agencies, and all interested stakeholders, including those listed under Section 1.26A(e)(1) of the EAA Act. In 2013, the Edwards Aquifer Habitat Conservation Plan (EAHCP) was approved, which included four components that affect water supply from the portions of the Edwards-BFZ Aquifer regulated by EAA, as follows:

- Voluntary Irrigation Suspension Program Option;
- Additional municipal conservation measures;
- SAWS ASR tradeoff; and
- Emergency Stage V critical period reductions.

It should be noted that for long-term planning purposes, programs contained within the EAHCP and associated with its fifteen-year incidental take permit may be adjusted as the plan is resubmitted for approval upon expiration of the permit in 2028.

For portions of the Edwards-BFZ Aquifer that are regulated by EAA, the groundwater availabilities and existing supplies are based on the drought year reliable supply of EAA-issued permits. The EAA Act limits permitted withdrawals to 572,000 acft/yr; however, during a drought year, the reliable supply of

[3] For clarity and accuracy, appendices from the referenced 2024 Technical Memorandum in Appendix 3C are excluded from this Regional Water Plan. In some instances, the appendices of the Technical Memorandum are duplicates of those already contained here. In other instances, the data and information contained in the appendices have been updated and are superseded by those included with this plan, as they may conflict with data presented herein.

these permits is reduced by 41% to 73%, depending on the pool (county of permitted use) and permitted use type. Therefore, the total reliable supply or total groundwater availabilities for the EAA-regulated portions of the Edwards-BFZ Aquifer is 296,553 acft/yr, including estimated exempt federal and domestic and livestock production.

### 3.3.3 Reuse

The SCTRWPG determined reuse/recycled water supplies based on the estimated amount of water returned to a utility's WWTP for each decade, less the amount of reuse water already being utilized as existing supply. The upper limit of source water available for reuse WMSs will be determined based on the amount of water returned to a utility's WWTP, estimated at 50% of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site specific information is available.

## 3.4 Water Availability and Existing Water Supplies Identification

The following sections present results of the evaluation of water availabilities and existing water supplies for surface water, groundwater, and reuse water sources within the SCTRWPA.

### 3.4.1 Surface Water

Surface water plays a crucial role in the overall water supply within the SCTRWPA. Surface water resources include run-of-river supplies from rivers and stored water from reservoirs or other impoundments.

#### 3.4.1.1 Run-of-River

The firm run-of-river availability within the SCTRWPA is estimated to be 86,465 acft/yr, as summarized in Table 3-2. Run-of-river water availability was determined based upon the minimum monthly diversion amount, as calculated in the appropriate WAM. Firm diversion and firm yield amounts have been assigned to specific WUGs, county-aggregated WUGs, river basins, and sources, as appropriate. This assignment of firm diversion and yield amounts is representative of existing surface water supplies and is detailed by county, river basin, and WUG group in DB27 reports, included in Appendix 3A. Run-of-river reliability, including firm (or minimum monthly) diversions, for water rights in the Nueces, Guadalupe, and San Antonio River Basins is summarized in Appendix 3D.

**Table 3-2 Run-of-River Availabilities by Source (acft/yr)**

| Source | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Guadalupe Run-of-River | 83,862 | 83,862 | 83,862 | 83,862 | 83,862 | 83,862 |
| Nueces Run-of-River | 1,405 | 1,405 | 1,405 | 1,405 | 1,405 | 1,405 |
| San Antonio Run-of-River | 1,198 | 1,198 | 1,198 | 1,198 | 1,198 | 1,198 |
| **Total** | **86,465** | **86,465** | **86,465** | **86,465** | **86,465** | **86,465** |

#### 3.4.1.2 Reservoirs

The firm yield, or dependable supply of water available during a repeat of the drought of record, was estimated for each of the major reservoirs in the SCTRWPA. Firm yield takes into account potential supply reductions because of sedimentation.

The firm yield of reservoirs in the SCTRWPA is estimated to be 164,064 acft/yr in 2030, gradually decreasing to 162,846 acft/yr in 2080 because of sedimentation. A summary of the firm yields for major reservoirs and other reservoirs is included in Table 3-3. Information for major reservoirs, firm yields, and associated water rights within the SCTRWPA are summarized in Table 3-4.

**Table 3-3 Reservoir Availabilities by Source (acft/yr)**

| Source | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Boerne Lake/Reservoir | 648 | 648 | 648 | 648 | 648 | 648 |
| Calaveras Lake/Reservoir | 36,900 | 36,900 | 36,900 | 36,900 | 36,900 | 36,900 |
| Canyon Lake/Reservoir | 86,138 | 85,992 | 85,848 | 85,704 | 85,559 | 85,414 |
| Coleto Creek Lake/Reservoir | 24,160 | 24,160 | 24,160 | 24,160 | 23,926 | 23,666 |
| Cox Lake/Reservoir | 3,992 | 3,992 | 3,992 | 3,992 | 3,992 | 3,992 |
| Dunlap Lake/Reservoir | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales (H-4) Lake/Reservoir | 0 | 0 | 0 | 0 | 0 | 0 |
| McQueeney Lake/Reservoir | 0 | 0 | 0 | 0 | 0 | 0 |
| Upper Nueces Lake/Reservoir | 226 | 226 | 226 | 226 | 226 | 226 |
| Victor Braunig Lake/Reservoir | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| **Total** | **164,064** | **163,918** | **163,774** | **163,630** | **163,251** | **162,846** |

#### 3.4.1.2.1 Calaveras Lake

The existing water right held by CPS Energy authorizes diversion of up to 60,000 acft/yr of the unappropriated public waters of the San Antonio River including treated effluent to Calaveras Lake and to consume up to 36,900 acft/yr. Firm yield estimates for Calaveras Lake using the Region L WAM are greater than the authorized diversion amounts in the water right. Therefore, the 2030-2080 firm yields included in DB27 are the authorized diversion amounts in the water rights. For Calaveras Lake, the DB27 firm yield is 36,900 acft/yr for all decades within the planning horizon. Based on sedimentation analyses performed using the Region L WAM, sedimentation is not expected to have an impact on firm yield for Calaveras Lake.

#### 3.4.1.2.2 Canyon Reservoir

GBRA is authorized to divert a maximum of 120,000 acft/yr and a 5-year rolling average of 90,000 acft/yr. The firm yield of Canyon Reservoir is dependent upon a number of factors including points of diversion for contracted supplies, Edwards Aquifer springflow, term recreational flow agreements, and discharge of treated effluent throughout the Guadalupe - San Antonio River Basin. Subject to the hydrologic assumptions and operational procedures, firm yield estimates for Canyon Reservoir decrease over the planning horizon because of sedimentation impacts. For purposes of regional water planning (including DB27), the projected firm yield for Canyon Reservoir has been quantified as 86,138 acft/yr in 2030, decreasing to 85,414 acft/yr in 2080.

**Table 3-4 Summary of Major Reservoirs in the South Central Texas Region**

| Reservoir | River Basin | Water Right Owner | Certificate of Adjudication Number | Authorized Diversion (acft/yr) | Firm Yield in 2030 (acft/yr) | Purposes |
|---|---|---|---|---|---|---|
| Calaveras Reservoir | San Antonio | City Public Service Board of San Antonio (CPS Energy) | 19-2162 | 36,900 | 36,900 [1] | Steam-electric power generation |
| Canyon Reservoir | Guadalupe | GBRA | 18-2074 | 120,000 | 86,138 [2] | Municipal, industrial, steam-electric, hydropower, irrigation, flood protection |
| Coleto Creek Reservoir | Guadalupe | Coleto Creek Power, LP | 18-5486 | 24,160 | 24,160 [1] | Steam-electric power generation |
| Medina Lake System | San Antonio | Bexar-Medina-Atascosa Counties WCID 1 | 19-2130 | 70,750 | 0 | Irrigation, municipal, domestic, livestock |
| Victor Braunig Lake | San Antonio | City Public Service Board of San Antonio (CPS Energy) | 19-2161 | 12,000 | 12,000 [1] | Steam-electric power generation |

Notes

[1] Sedimentation is not expected to have an impact on firm yield for Victor Braunig Lake, Calaveras Lake, or Coleto Creek Reservoir.

[2] The estimated firm yield of Canyon Reservoir decreases due to sedimentation. For regional water planning purposes, the projected firm yield for Canyon Reservoir is 86,138 acft/yr in 2030, decreasing to 85,414 acft/yr in 2080.

#### 3.4.1.2.3 Coleto Creek Reservoir

Coleto Creek Power, LP, is authorized to divert up to 24,160 acft/yr from the Guadalupe River to Coleto Creek Reservoir and to consume up to 24,160 acft/yr. Firm yield estimates for Coleto Creek Reservoir using the Region L WAM are greater than the authorized diversion amount in the water right. Therefore, the 2030-2080 firm yields included in DB27 are the authorized diversion amounts in the water rights. For Coleto Creek Reservoir, the DB27 firm yield is 24,160 acft/yr for all decades within the planning horizon. Based on sedimentation analyses performed using the Region L WAM, sedimentation is not expected to have an impact on firm yield for Coleto Creek Reservoir.

#### 3.4.1.2.4 Medina Lake System

Because of the extensive recharge and special conditions within Certificate of Adjudication (CA) No. 19-2130, as amended, the firm yield of the Medina Lake System during a repeat of the drought of record is estimated to be essentially zero. Hence, the Medina Lake System cannot be included as an existing source of surface water supply in Region L because there is no firm yield. Sedimentation is not expected to have an impact on firm yield.

Region L does not identify the Medina Lake System as a firm source of supply during drought; therefore, it is assumed that there are no conflicts with any water supply contracts or option agreements held by entities in Region J. It is further assumed that interests upstream of Medina Lake will obtain the necessary water rights permit(s) for diversion from the Medina River and/or its tributaries and will mitigate any associated impacts upon recharge of the Edwards Aquifer within Region L.

#### 3.4.1.2.5 Victor Braunig Lake

CPS Energy is authorized under its existing water rights to divert and consume up to 12,000 acft/yr from the San Antonio River. The reservoir and supplemental authorized diversions from the adjacent river could support a firm yield greater than the authorized consumptive use; however, operations of steam-electric power generation facilities could be affected. Firm yield estimates for Braunig Lake using the Region L WAM are greater than the authorized diversion amount in the water right. Therefore, the 2030-2080 firm yields included in DB27 are the authorized diversion amounts in the water rights. For Braunig Lake, the DB27 firm yield is 12,000 acft/yr for all decades within the planning horizon. Based on sedimentation analyses performed using the Region L WAM, sedimentation is not expected to have an impact on firm yield for Braunig Lake.

#### 3.4.1.2.6 Other Reservoirs

The majority of the reservoirs within the SCTRWPA that are not considered major reservoirs are hydroelectric power generation lakes. Because hydroelectric power generation is typically a non-consumptive use of water, water available to these rights is not listed in Table 3-4. All water rights are, however, included on a priority basis in the assessment of surface water supply using the WAMs and are summarized in Appendix 3D.

### 3.4.1.3 Local Surface Water

Local surface water availabilities and supplies within the SCTRWPA is estimated to be 11,118 acft/yr, as summarized in Table 3-5. For the 2026 South Central Texas Regional Water Plan, local surface water availabilities and supplies were assumed for all counties with livestock demands. For all areas within the

SCTRWPA, livestock water demand is generally assumed to be supplied 50% from quantified groundwater sources and 50% from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills.

**Table 3-5 Local Surface Water Availabilities by County and Basin (acft/yr)**

| Source County | Source Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Atascosa | Nueces | 767 | 767 | 767 | 767 | 767 | 767 |
| Atascosa | San Antonio | 2 | 2 | 2 | 2 | 2 | 2 |
| Bexar | Nueces | 31 | 31 | 31 | 31 | 31 | 31 |
| Bexar | San Antonio | 463 | 463 | 463 | 463 | 463 | 463 |
| Caldwell | Colorado | 20 | 20 | 20 | 20 | 20 | 20 |
| Caldwell | Guadalupe | 396 | 396 | 396 | 396 | 396 | 396 |
| Calhoun | Colorado-Lavaca | 23 | 23 | 23 | 23 | 23 | 23 |
| Calhoun | Lavaca-Guadalupe | 119 | 119 | 119 | 119 | 119 | 119 |
| Calhoun | San Antonio-Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Comal | Guadalupe | 118 | 118 | 118 | 118 | 118 | 118 |
| Comal | San Antonio | 18 | 18 | 18 | 18 | 18 | 18 |
| DeWitt | Guadalupe | 660 | 660 | 660 | 660 | 660 | 660 |
| DeWitt | Lavaca | 133 | 133 | 133 | 133 | 133 | 133 |
| DeWitt | Lavaca-Guadalupe | 12 | 12 | 12 | 12 | 12 | 12 |
| DeWitt | San Antonio | 64 | 64 | 64 | 64 | 64 | 64 |
| Dimmit | Nueces | 172 | 172 | 172 | 172 | 172 | 172 |
| Dimmit | Rio Grande | 12 | 12 | 12 | 12 | 12 | 12 |
| Frio | Nueces | 482 | 482 | 482 | 482 | 482 | 482 |
| Goliad | Guadalupe | 100 | 100 | 100 | 100 | 100 | 100 |
| Goliad | San Antonio | 156 | 156 | 156 | 156 | 156 | 156 |
| Goliad | San Antonio-Nueces | 140 | 140 | 140 | 140 | 140 | 140 |
| Gonzales | Guadalupe | 2,050 | 2,050 | 2,050 | 2,050 | 2,050 | 2,050 |
| Gonzales | Lavaca | 20 | 20 | 20 | 20 | 20 | 20 |
| Guadalupe | Guadalupe | 493 | 493 | 493 | 493 | 493 | 493 |
| Guadalupe | San Antonio | 97 | 97 | 97 | 97 | 97 | 97 |
| Hays | Guadalupe | 140 | 140 | 140 | 140 | 140 | 140 |
| Karnes | Guadalupe | 21 | 21 | 21 | 21 | 21 | 21 |

| Source County | Source Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Karnes | Nueces | 38 | 38 | 38 | 38 | 38 | 38 |
| Karnes | San Antonio | 394 | 394 | 394 | 394 | 394 | 394 |
| Karnes | San Antonio-Nueces | 25 | 25 | 25 | 25 | 25 | 25 |
| Kendall | Colorado | 2 | 2 | 2 | 2 | 2 | 2 |
| Kendall | Guadalupe | 172 | 172 | 172 | 172 | 172 | 172 |
| Kendall | San Antonio | 21 | 21 | 21 | 21 | 21 | 21 |
| La Salle | Nueces | 197 | 197 | 197 | 197 | 197 | 197 |
| Medina | Nueces | 444 | 444 | 444 | 444 | 444 | 444 |
| Medina | San Antonio | 85 | 85 | 85 | 85 | 85 | 85 |
| Refugio | San Antonio | 21 | 21 | 21 | 21 | 21 | 21 |
| Refugio | San Antonio-Nueces | 210 | 210 | 210 | 210 | 210 | 210 |
| Uvalde | Nueces | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 |
| Victoria | Guadalupe | 228 | 228 | 228 | 228 | 228 | 228 |
| Victoria | Lavaca | 2 | 2 | 2 | 2 | 2 | 2 |
| Victoria | Lavaca-Guadalupe | 242 | 242 | 242 | 242 | 242 | 242 |
| Victoria | San Antonio | 19 | 19 | 19 | 19 | 19 | 19 |
| Wilson | Guadalupe | 36 | 36 | 36 | 36 | 36 | 36 |
| Wilson | Nueces | 103 | 103 | 103 | 103 | 103 | 103 |
| Wilson | San Antonio | 717 | 717 | 717 | 717 | 717 | 717 |
| Zavala | Nueces | 428 | 428 | 428 | 428 | 428 | 428 |
| **Total** | **All** | **11,118** | **11,118** | **11,118** | **11,118** | **11,118** | **11,118** |

### 3.4.2 Groundwater

As described in Section 3.3.2 above, groundwater availability estimates are subdivided into discrete geographic-aquifer units (i.e., aquifer/county/river basin), as supplied by the TWDB. Groundwater availabilities consist of MAG estimates, as calculated by TWDB on or before April 12, 2023, DFC-compatible availability estimates, as calculated by TWDB, and RWPG-estimated groundwater estimates. Table 3-6 provides a summary of groundwater availabilities by county and aquifer, along with the methodology or reference used to estimate the availabilities.

## Table 3-6 Groundwater Availabilities by County and Source (acft/yr)

| Source County | Groundwater Source | Availability Methodology | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| Atascosa | Carrizo-Wilcox | A | 54,397 | 55,329 | 56,828 | 58,406 | 59,982 | 59,982 |
| Atascosa | Edwards-BFZ | E | 667 | 667 | 667 | 667 | 667 | 667 |
| Atascosa | Queen City | A | 4,525 | 4,537 | 4,495 | 4,390 | 4,285 | 4,285 |
| Atascosa | Sparta | A | 1,187 | 1,043 | 998 | 961 | 932 | 932 |
| Atascosa | Trinity | C | 0 | 0 | 0 | 0 | 0 | 0 |
| Atascosa | Yegua-Jackson | C, D | 856 | 856 | 856 | 856 | 856 | 856 |
| Bexar | Carrizo-Aquifer ASR | J | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| Bexar | Carrizo-Wilcox | A | 68,451 | 68,928 | 68,739 | 67,653 | 67,849 | 67,849 |
| Bexar | Edwards-BFZ | E | 212,241 | 212,241 | 212,241 | 212,241 | 212,241 | 212,241 |
| Bexar | Trinity | A, B, C | 24,856 | 24,856 | 24,856 | 24,856 | 24,856 | 24,856 |
| Caldwell | Carrizo-Wilcox | A | 24,877 | 32,775 | 42,514 | 45,688 | 49,635 | 49,594 |
| Caldwell | Edwards-BFZ (Saline) | A, B | 1,410 | 1,410 | 1,410 | 1,410 | 1,410 | 1,410 |
| Caldwell | Queen City | A | 4,829 | 4,557 | 4,545 | 4,545 | 3,977 | 3,977 |
| Caldwell | San Marcos River Alluvium | I | 271 | 271 | 271 | 271 | 271 | 271 |
| Caldwell | Trinity | A, B | 10 | 10 | 10 | 10 | 10 | 10 |
| Calhoun | Gulf Coast | A | 7,611 | 7,611 | 7,611 | 7,611 | 7,611 | 7,611 |
| Comal | Edwards-BFZ | E | 13,728 | 13,728 | 13,728 | 13,728 | 13,728 | 13,728 |
| Comal | Trinity | A, B | 43,088 | 43,088 | 43,088 | 43,088 | 43,088 | 43,088 |
| DeWitt | Carrizo-Wilcox | C | 0 | 0 | 0 | 0 | 0 | 0 |
| DeWitt | Gulf Coast | A | 17,958 | 17,912 | 17,827 | 17,806 | 17,784 | 17,772 |
| Dimmit | Carrizo-Wilcox | A | 3,885 | 3,895 | 3,885 | 3,885 | 3,885 | 3,885 |
| Frio | Carrizo-Wilcox | A | 86,995 | 85,143 | 82,950 | 81,018 | 79,131 | 79,131 |
| Frio | Edwards-BFZ | G | 23,213 | 23,213 | 23,213 | 23,213 | 23,213 | 23,213 |
| Frio | Queen City | A | 4,533 | 4,380 | 4,231 | 4,066 | 3,927 | 3,927 |
| Frio | Sparta | A | 623 | 603 | 576 | 557 | 534 | 534 |
| Frio | Yegua-Jackson | C, D | 0 | 0 | 0 | 0 | 0 | 0 |
| Goliad | Gulf Coast | A | 6,254 | 6,436 | 6,615 | 6,791 | 6,972 | 6,972 |
| Gonzales | Carrizo-Wilcox | A | 76,265 | 90,788 | 102,373 | 102,747 | 103,707 | 96,161 |
| Gonzales | Gulf Coast | C | 0 | 0 | 0 | 0 | 0 | 0 |

| Source County | Groundwater Source | Availability Methodology | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| Gonzales | Queen City | A, C | 4,960 | 4,973 | 4,960 | 4,960 | 4,500 | 4,500 |
| Gonzales | Sparta | A, C | 2,451 | 2,457 | 2,451 | 2,451 | 2,451 | 2,451 |
| Gonzales | Yegua-Jackson | A | 4,728 | 4,728 | 4,728 | 4,728 | 4,728 | 4,728 |
| Guadalupe | Carrizo-Wilcox | A | 39,563 | 41,668 | 43,315 | 42,118 | 42,199 | 41,659 |
| Guadalupe | Edwards-BFZ | E | 293 | 293 | 293 | 293 | 293 | 293 |
| Guadalupe | Queen City | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | Trinity | A, B | 660 | 660 | 660 | 660 | 660 | 660 |
| Hays | Edwards-BFZ (Fresh and Saline) | A, B, C, E | 9,990 | 9,990 | 9,990 | 9,990 | 9,990 | 9,990 |
| Hays | Hickory | C, D | 0 | 0 | 0 | 0 | 0 | 0 |
| Hays | Trinity | A, B, C | 7,111 | 7,111 | 7,111 | 7,111 | 7,111 | 7,111 |
| Karnes | Carrizo-Wilcox | F | 1,212 | 1,212 | 1,212 | 1,212 | 1,212 | 1,212 |
| Karnes | Gulf Coast | A | 10,525 | 3,404 | 3,399 | 3,227 | 2,952 | 2,949 |
| Karnes | Yegua-Jackson | A, C | 2,013 | 2,013 | 2,013 | 2,013 | 2,013 | 2,013 |
| Kendall | Edwards-Trinity-Plateau | A | 199 | 199 | 199 | 199 | 199 | 199 |
| Kendall | Ellenburger-San Saba | A | 62 | 63 | 62 | 63 | 62 | 63 |
| Kendall | Hickory | A | 140 | 140 | 140 | 140 | 140 | 140 |
| Kendall | Trinity | A, B | 11,139 | 11,139 | 11,139 | 11,139 | 11,139 | 11,139 |
| La Salle | Carrizo-Wilcox | A | 6,536 | 6,554 | 6,536 | 6,536 | 6,536 | 6,536 |
| La Salle | Queen City | A | 1 | 1 | 1 | 1 | 1 | 1 |
| La Salle | Sparta | A | 0 | 0 | 0 | 0 | 0 | 0 |
| La Salle | Yegua-Jackson | C, D | 92 | 92 | 92 | 92 | 92 | 92 |
| Medina | Carrizo-Wilcox | A | 2,628 | 2,635 | 2,628 | 2,628 | 2,628 | 2,628 |
| Medina | Edwards-BFZ | E | 32,428 | 32,428 | 32,428 | 32,428 | 32,428 | 32,428 |
| Medina | Leona Gravel | H | 7,245 | 7,245 | 7,245 | 7,245 | 7,245 | 7,245 |
| Medina | Trinity | A, B, C | 9,002 | 9,002 | 9,002 | 9,002 | 9,002 | 9,002 |
| Refugio | Gulf Coast | A | 5,866 | 5,866 | 5,866 | 5,866 | 5,866 | 5,866 |
| Uvalde | Austin Chalk | A, B | 2,935 | 2,935 | 2,935 | 2,935 | 2,935 | 2,935 |
| Uvalde | Buda Limestone | A, B | 758 | 758 | 758 | 758 | 758 | 758 |

| Source County | Groundwater Source | Availability Methodology | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| Uvalde | Carrizo-Wilcox | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | Edwards-BFZ | E | 29,855 | 29,855 | 29,855 | 29,855 | 29,855 | 29,855 |
| Uvalde | Edwards-Trinity-Plateau, Pecos Valley, and Trinity | A, B | 1,993 | 1,993 | 1,993 | 1,993 | 1,993 | 1,993 |
| Uvalde | Leona Gravel | A, B | 9,385 | 9,385 | 9,385 | 9,385 | 9,385 | 9,385 |
| Uvalde | Trinity | A, B, C | 791 | 791 | 791 | 791 | 791 | 791 |
| Victoria | Gulf Coast | A | 59,948 | 59,948 | 59,948 | 59,948 | 59,948 | 59,948 |
| Wilson | Carrizo-Wilcox | A | 38,284 | 43,604 | 68,609 | 105,947 | 125,670 | 125,670 |
| Wilson | Queen City | A | 1,423 | 1,267 | 1,123 | 1,000 | 892 | 892 |
| Wilson | Sparta | A | 182 | 163 | 144 | 128 | 114 | 114 |
| Wilson | Yegua-Jackson | C, D | 859 | 859 | 859 | 859 | 859 | 859 |
| Zavala | Carrizo-Wilcox | A | 36,675 | 35,399 | 35,204 | 35,006 | 34,831 | 34,540 |
| Zavala | Edwards-BFZ | C | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **All** | **All** | **1,224,662** | **1,245,107** | **1,291,601** | **1,329,171** | **1,352,029** | **1,343,597** |

A = MAG

B = MAG values valid for portion of planning horizon; values from earlier decades are carried forward through 2080.

C = All or portions are considered non-relevant and not modeled.

D = TWDB-modeled, DFC-compatible availabilities.

E = Permitted Amount: Contracts, permits, and limitations consistent with EAHCP and EAA Act.

F = Published Reports/Data: Maximum Historic TWDB Water Use Survey Detailed Groundwater Pumpage by County (2019-2021).

G = Published Reports/Data: TWDB GTA Aquifer Assessment 10-40 MAG: Analytical Model Estimates of Modeled Available Groundwater for the Edwards Aquifer within Frio County in GMA 13 (2012).

H = Published Reports/Data: Average Historic Leona Gravel Aquifer Groundwater Pumpage (2010-2019) provided by Medina County GCD.

I = Published Reports/Data: Maximum Historic TWDB Water Use Survey, Detailed Groundwater Pumpage by County (1980-2021). The maximum historic annual production from "Other Aquifers" under the Entity "Non-Surveyed Estimate" in Caldwell County was 813 acft in 1990. Based on this historic data, and the assumption that one-third of this is from the San Marcos River Alluvium, the minimum supply from the San Marcos River Alluvium is 271 acft/yr.

J = SAWS ASR Availability

Projected groundwater supplies available in the SCTRWPA under drought of record conditions are 1,224,662 acft/yr in 2030 and 1,343,597 acft/yr in 2080 (Table 3-7). Supplies from most aquifers are projected to hold steady on an annual basis throughout the 2030 to 2080 projection period. The supply available from the Carrizo-Wilcox Aquifer is projected to increase from 439,768 acft/yr in 2030 to 568,847 acft/yr in 2080. The supplies available from the Gulf Coast Aquifer are projected to generally

decrease from 2030 to 2080, while the supplies available from the Sparta and Queen City Aquifers are projected to decline slightly over the same projection period.

**Table 3-7 Groundwater Availability by Source (acft/yr)**

| Groundwater Source | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Austin Chalk Aquifer | 2,935 | 2,935 | 2,935 | 2,935 | 2,935 | 2,935 |
| Buda Limestone Aquifer | 758 | 758 | 758 | 758 | 758 | 758 |
| Carrizo-Aquifer ASR | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| Carrizo-Wilcox Aquifer | 439,768 | 467,930 | 514,793 | 552,844 | 577,265 | 568,847 |
| Edwards-BFZ Aquifer | 323,825 | 323,825 | 323,825 | 323,825 | 323,825 | 323,825 |
| Edwards-Trinity-Plateau Aquifer | 199 | 199 | 199 | 199 | 199 | 199 |
| Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers | 1,993 | 1,993 | 1,993 | 1,993 | 1,993 | 1,993 |
| Ellenburger-San Saba Aquifer | 62 | 63 | 62 | 63 | 62 | 63 |
| Gulf Coast Aquifer System | 108,162 | 101,177 | 101,266 | 101,249 | 101,133 | 101,118 |
| Hickory Aquifer | 140 | 140 | 140 | 140 | 140 | 140 |
| Leona Gravel Aquifer | 16,630 | 16,630 | 16,630 | 16,630 | 16,630 | 16,630 |
| Queen City Aquifer | 20,271 | 19,715 | 19,355 | 18,962 | 17,582 | 17,582 |
| San Marcos River Alluvium Aquifer | 271 | 271 | 271 | 271 | 271 | 271 |
| Sparta Aquifer | 4,443 | 4,266 | 4,169 | 4,097 | 4,031 | 4,031 |
| Trinity Aquifer | 96,657 | 96,657 | 96,657 | 96,657 | 96,657 | 96,657 |
| Yegua-Jackson Aquifer | 8,548 | 8,548 | 8,548 | 8,548 | 8,548 | 8,548 |
| **Total** | **1,224,662** | **1,245,107** | **1,291,601** | **1,329,171** | **1,352,029** | **1,343,597** |

#### 3.4.2.1 Assumptions for Assessment of Existing Groundwater Supplies

Results of the evaluation of water supply results by WUG is included in Appendix 3A. Assumptions regarding allocation of groundwater supplies are detailed below:

1. Groundwater supplies are subdivided into geographic-aquifer units (Aquifer/County/Basin). Supplies within a geographic-aquifer unit cannot exceed groundwater availability.

2. Municipal supplies from all aquifers except the EAA portion of the Edwards Aquifer were estimated according to the following process:

    a. With respect to municipal utilities, it is important to note that the existing supplies, after generally accounting for the ratio of peak to average day water demands, are equal to the lesser of the tested well capacities as reported to the TCEQ or the MAG as calculated

by the TWDB. Existing supplies are not necessarily representative of current or projected groundwater use.

b. For entities using groundwater, supplies were estimated using a variety of sources of information, including responses from the WUG or WWP to the Region L Supplies & Strategies Survey, direct coordination with the WUG or WWP, well capacities as reported by the TCEQ Drinking Water Watch (DWW) with adjustments to account for a peak to average day water demand ratio of 2:1, Historic TWDB Groundwater Pumpage Data, TWDB water use surveys, permit information provided by GCDs, and data reported in the 2021 Region L Regional Water Plan. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular geographic-aquifer unit.

3. Industrial supply from groundwater (except for the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. Using best available data from the TWDB Water Use Survey or historical groundwater pumpage, the industrial supply is generally set equal to the maximum or average industrial groundwater pumpage within the 2000 to 2021 time period. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular geographic-aquifer unit.

4. Steam-electric supply from groundwater (except for the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. Using best available data from the TWDB Water Use Survey or historical groundwater pumpage, the steam-electric supply is generally set equal to the maximum steam-electric groundwater pumpage within the 2000 to 2021 time period. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular geographic-aquifer unit.

5. TWDB historic water use data indicate that the majority of irrigation demands in the SCTRWPA are supplied by groundwater. Irrigation supply from groundwater (except for the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. Using best available data from the TWDB Water Use Survey, historical groundwater pumpage, or permit information from GCDs, the irrigation supply is generally estimated to be the average irrigation groundwater pumpage within the 2000 to 2021 time period. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular geographic-aquifer unit.

6. TWDB historic water use data indicates that the majority of mining demands are supplied by groundwater. Mining supply from groundwater (except from the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. Using best available data from the TWDB Water Use Survey, historical groundwater pumpage, or permit data from GCDs, the mining supply is generally set equal to the average or maximum mining groundwater pumpage within the 2000 to 2021 time period. In cases in which the total demand

on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular geographic-aquifer unit.

7. Livestock water demands in the SCTRWPA are generally assumed to be supplied 50% from quantified groundwater sources and 50% from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. This assumption is based on data from the TWDB historic water use estimates, which indicate that the counties within the planning area average approximately 60% groundwater supply to meet livestock use over the past ten years (2011-2021). Because the demands are based on a drought year scenario, it was assumed that ranchers will manage their livestock in such a way that populations will be maintained at a level that can be supported by a combination of local surface water supplies and known water or groundwater supplies. Livestock water supply is set equal to projected livestock demands due to the nature of livestock water use. Livestock demand tends to match the available supply. If the supply is not present, the livestock numbers are reduced until they match the available supply. Infrastructure is not a consideration for livestock supplies, and livestock pumpage is typically exempt from regulations; therefore, there are no regulatory considerations that might impact livestock groundwater supplies.

8. The EAA manages withdrawals and points of withdrawal from the aquifer by granting permits. EAA has issued permits for municipal, industrial, and irrigation water use totaling 571,600 acft/yr. The reliable supply of the total permitted amounts and exempt use is estimated to be 296,553 acft/yr, which assumes full implementation of EAHCP during a repeat of the drought of record. Supplies for portions of the Edwards-BFZ Aquifer within the EAA were allocated to WUGs according to the reliable supply of permits issued by the EAA.

### 3.4.3 Reuse

Reuse availabilities within the SCTRWPA are estimated to be 142,359 acft/yr in 2030, increasing to 166,581 acft/yr in 2080. Reuse availabilities in the SCTRWPA are summarized by county and type of reuse in Table 3-8. Please note that these sources and availabilities are for existing water sources; they do not reflect availabilities for future sources of supply, such as availabilities that would enable a WUG to implement a reuse WMS. Currently, all availabilities in the SCTRWPA are for non-potable reuse, except for water recycling in Hays County. This availability reflects the Texas Parks and Wildlife Department A.E. Wood Fish Hatchery, which has on-site treatment facilities that enable water recycling.

**Table 3-8 Reuse Availability by County and Type (acft/yr)**

| Source County | Reuse Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Bexar | Direct, Non-Potable | 66,477 | 76,463 | 76,463 | 76,463 | 76,463 | 76,463 |
| Bexar | Indirect, Non-Potable | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| Comal | Direct, Non-Potable | 5,231 | 14,610 | 14,610 | 14,610 | 14,610 | 14,610 |
| Guadalupe | Direct, Non-Potable | 4,584 | 7,480 | 7,480 | 7,480 | 7,480 | 7,480 |
| Hays | Direct, Non-Potable | 10,082 | 11,763 | 11,763 | 11,763 | 11,763 | 11,763 |

| Source County | Reuse Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Hays | Water Recycling | 2,420 | 2,420 | 2,420 | 2,420 | 2,420 | 2,420 |
| Karnes | Direct, Non-Potable | 1,290 | 1,570 | 1,570 | 1,570 | 1,570 | 1,570 |
| Kendall | Direct, Non-Potable | 2,275 | 2,275 | 2,275 | 2,275 | 2,275 | 2,275 |
| **Total** | **All** | **142,359** | **166,581** | **166,581** | **166,581** | **166,581** | **166,581** |

## 3.5 Water User Groups

Existing water supplies for WUGs are provided in DB27 reports, which are available at https://www3.twdb.texas.gov/apps/SARA/reports/list. Relevant DB27 reports are also included in Appendix 3A.

## 3.6 Major Water Providers

A MWP is defined, as a WUG or WWP of particular significance to the region's water supply as determined by the RWPG. This may include public or private entities that provide water for any water use category. At the August 1, 2024, RWPG meeting, the SCTRWPG defined the following entities as MWPs for the sixth cycle of regional water planning:

- Canyon Lake Water Service (Texas Water Company);
- GBRA;
- New Braunfels;
- SAWS; and
- San Marcos.

A summary of existing supplies for MWPs by decade and category of use is included in Table 3-9. MWP supplies are based on what is available for use in terms of water availability and infrastructure capacity or treatment limitations.

Table 3-9 provides a summary of the existing water supplies for MWPs. Supplies include self-supplied sources and sources sold from other entities. MWP supplies are based on what is available for use in terms of water availability and infrastructure capacity or treatment limitations. Table 3-10 summarizes the existing water supplies for MWPs by use type. WUG volumes represent water supplies for portions of that entity within Region L. For Canyon Lake Water Service (Texas Water Company) and GBRA, contract supplies represent existing water supplies sold to entities in any region.

**Table 3-9 Existing Water Supplies for Major Water Providers (acft/yr)**

| Major Water Provider | Provider Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Canyon Lake Water Service (Texas Water Company) [1] | WUG/WWP | 15,493 | 15,664 | 15,665 | 15,666 | 15,668 | 15,673 |
| GBRA | WUG/WWP | 124,126 | 123,322 | 123,225 | 123,046 | 122,646 | 122,214 |

| Major Water Provider | Provider Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| New Braunfels | WUG/WWP | 31,496 | 31,496 | 31,496 | 31,496 | 31,496 | 31,496 |
| San Marcos | WUG/WWP | 20,386 | 20,386 | 20,386 | 20,386 | 20,386 | 20,386 |
| SAWS | WUG/WWP | 370,671 | 371,171 | 371,171 | 364,371 | 364,371 | 364,371 |
| [1] Canyon Lake Water Service (Texas Water Company) is split between Region K and Region L; existing water supplies shown above are for Region L only. | | | | | | | |

**Table 3-10 Existing Water Supplies for Major Water Providers by Use Type (acft/yr)**

| Major Water Provider | Need Type | Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| Canyon Lake Water Service (Texas Water Company) [1] | WUG | Municipal | 15,493 | 15,664 | 15,665 | 15,666 | 15,668 | 15,673 |
| Canyon Lake Water Service (Texas Water Company) [1] | Contract | Municipal | 545 | 545 | 545 | 545 | 545 | 545 |
| GBRA | WUG | Municipal | 9,879 | 13,733 | 13,589 | 13,445 | 13,300 | 13,155 |
| GBRA | Contract | Irrigation | 464 | 464 | 464 | 464 | 464 | 464 |
| GBRA | Contract | Manufacturing | 29,584 | 29,584 | 29,584 | 29,584 | 29,584 | 29,584 |
| GBRA | Contract | Municipal | 80,283 | 75,543 | 75,543 | 75,543 | 75,543 | 75,543 |
| GBRA | Contract | Steam-Electric | 6,429 | 6,429 | 6,429 | 6,429 | 6,429 | 6,429 |
| New Braunfels | WUG | Municipal | 30,496 | 30,496 | 30,496 | 30,496 | 30,496 | 30,496 |
| New Braunfels | Contract | Municipal | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| San Marcos | WUG | Municipal | 20,386 | 20,386 | 20,386 | 20,386 | 20,386 | 20,386 |
| San Marcos | Contract | -- | 0 | 0 | 0 | 0 | 0 | 0 |
| SAWS | WUG | Municipal | 323,201 | 325,201 | 325,201 | 318,401 | 318,401 | 318,401 |
| SAWS | Contract | Municipal | 2,470 | 970 | 970 | 970 | 970 | 970 |
| SAWS | Contract | Steam-Electric | 45,000 | 45,000 | 45,000 | 45,000 | 45,000 | 45,000 |
| [1] Canyon Lake Water Service (Texas Water Company) is split between Region K and Region L; existing water supplies shown above are for Region L only. Contract supplies are representative of contracts with entities in any region.<br>[2] GBRA WUG supplies are all located within Region L; however, contract supplies are representative of contracts with entities in any region. | | | | | | | | |

# Appendix 3A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| **Groundwater Source Availability Total** | | | | **1,224,662** | **1,245,107** | **1,291,601** | **1,329,171** | **1,352,029** | **1,343,597** |
| Austin Chalk Aquifer | Uvalde | Nueces | Fresh | 2,935 | 2,935 | 2,935 | 2,935 | 2,935 | 2,935 |
| Buda Limestone Aquifer | Uvalde | Nueces | Fresh | 758 | 758 | 758 | 758 | 758 | 758 |
| Carrizo-Aquifer ASR | Bexar | San Antonio | Fresh/ Brackish | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| Carrizo-Wilcox Aquifer | Atascosa | Nueces | Fresh | 54,310 | 55,241 | 56,739 | 58,316 | 59,890 | 59,890 |
| Carrizo-Wilcox Aquifer | Atascosa | San Antonio | Fresh | 87 | 88 | 89 | 90 | 92 | 92 |
| Carrizo-Wilcox Aquifer | Bexar | Nueces | Fresh/ Brackish | 38,762 | 38,993 | 39,134 | 39,134 | 39,287 | 39,287 |
| Carrizo-Wilcox Aquifer | Bexar | San Antonio | Fresh | 29,689 | 29,935 | 29,605 | 28,519 | 28,562 | 28,562 |
| Carrizo-Wilcox Aquifer | Caldwell | Colorado | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Carrizo-Wilcox Aquifer | Caldwell | Guadalupe | Fresh | 24,877 | 32,775 | 42,514 | 45,688 | 49,635 | 49,594 |
| Carrizo-Wilcox Aquifer | DeWitt | Guadalupe | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Carrizo-Wilcox Aquifer | Dimmit | Nueces | Fresh | 3,765 | 3,775 | 3,765 | 3,765 | 3,765 | 3,765 |
| Carrizo-Wilcox Aquifer | Dimmit | Rio Grande | Fresh | 120 | 120 | 120 | 120 | 120 | 120 |
| Carrizo-Wilcox Aquifer | Frio | Nueces | Fresh | 86,995 | 85,143 | 82,950 | 81,018 | 79,131 | 79,131 |
| Carrizo-Wilcox Aquifer | Gonzales | Guadalupe | Fresh/ Brackish | 76,265 | 90,788 | 102,373 | 102,747 | 103,707 | 96,161 |
| Carrizo-Wilcox Aquifer | Gonzales | Lavaca | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Carrizo-Wilcox Aquifer | Guadalupe | Guadalupe | Fresh | 32,400 | 34,200 | 35,631 | 34,655 | 34,736 | 34,345 |
| Carrizo-Wilcox Aquifer | Guadalupe | San Antonio | Fresh | 7,163 | 7,468 | 7,684 | 7,463 | 7,463 | 7,314 |
| Carrizo-Wilcox Aquifer | Karnes | Guadalupe | Fresh | 50 | 50 | 50 | 50 | 50 | 50 |
| Carrizo-Wilcox Aquifer | Karnes | Nueces | Fresh | 84 | 84 | 84 | 84 | 84 | 84 |
| Carrizo-Wilcox Aquifer | Karnes | San Antonio | Fresh | 1,078 | 1,078 | 1,078 | 1,078 | 1,078 | 1,078 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Carrizo-Wilcox Aquifer | La Salle | Nueces | Fresh | 6,536 | 6,554 | 6,536 | 6,536 | 6,536 | 6,536 |
| Carrizo-Wilcox Aquifer | Medina | Nueces | Fresh | 2,623 | 2,630 | 2,623 | 2,623 | 2,623 | 2,623 |
| Carrizo-Wilcox Aquifer | Medina | San Antonio | Fresh | 5 | 5 | 5 | 5 | 5 | 5 |
| Carrizo-Wilcox Aquifer | Uvalde | Nueces | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Carrizo-Wilcox Aquifer | Wilson | Guadalupe | Fresh | 443 | 653 | 762 | 3,870 | 3,982 | 3,982 |
| Carrizo-Wilcox Aquifer | Wilson | Nueces | Fresh | 10,774 | 11,171 | 11,578 | 12,027 | 12,546 | 12,546 |
| Carrizo-Wilcox Aquifer | Wilson | San Antonio | Fresh/ Brackish | 27,067 | 31,780 | 56,269 | 90,050 | 109,142 | 109,142 |
| Carrizo-Wilcox Aquifer | Zavala | Nueces | Fresh | 36,675 | 35,399 | 35,204 | 35,006 | 34,831 | 34,540 |
| Edwards-BFZ Aquifer | Atascosa | Nueces | Fresh | 522 | 522 | 522 | 522 | 522 | 522 |
| Edwards-BFZ Aquifer | Atascosa | San Antonio | Fresh | 145 | 145 | 145 | 145 | 145 | 145 |
| Edwards-BFZ Aquifer | Bexar | Nueces | Fresh | 446 | 446 | 446 | 446 | 446 | 446 |
| Edwards-BFZ Aquifer | Bexar | San Antonio | Fresh | 211,795 | 211,795 | 211,795 | 211,795 | 211,795 | 211,795 |
| Edwards-BFZ Aquifer | Caldwell | Colorado | Saline | 455 | 455 | 455 | 455 | 455 | 455 |
| Edwards-BFZ Aquifer | Caldwell | Guadalupe | Saline | 955 | 955 | 955 | 955 | 955 | 955 |
| Edwards-BFZ Aquifer | Comal | Guadalupe | Fresh | 13,179 | 13,179 | 13,179 | 13,179 | 13,179 | 13,179 |
| Edwards-BFZ Aquifer | Comal | San Antonio | Fresh | 549 | 549 | 549 | 549 | 549 | 549 |
| Edwards-BFZ Aquifer | Frio | Nueces | Fresh | 23,213 | 23,213 | 23,213 | 23,213 | 23,213 | 23,213 |
| Edwards-BFZ Aquifer | Guadalupe | Guadalupe | Fresh | 293 | 293 | 293 | 293 | 293 | 293 |
| Edwards-BFZ Aquifer | Hays | Guadalupe | Fresh | 8,283 | 8,283 | 8,283 | 8,283 | 8,283 | 8,283 |
| Edwards-BFZ Aquifer | Hays | Guadalupe | Saline | 1,707 | 1,707 | 1,707 | 1,707 | 1,707 | 1,707 |
| Edwards-BFZ Aquifer | Medina | Nueces | Fresh | 25,419 | 25,419 | 25,419 | 25,419 | 25,419 | 25,419 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Edwards-BFZ Aquifer | Medina | San Antonio | Fresh | 7,009 | 7,009 | 7,009 | 7,009 | 7,009 | 7,009 |
| Edwards-BFZ Aquifer | Uvalde | Nueces | Fresh | 29,855 | 29,855 | 29,855 | 29,855 | 29,855 | 29,855 |
| Edwards-BFZ Aquifer | Zavala | Nueces | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Edwards-Trinity-Plateau Aquifer | Kendall | Colorado | Fresh | 69 | 69 | 69 | 69 | 69 | 69 |
| Edwards-Trinity-Plateau Aquifer | Kendall | Guadalupe | Fresh | 130 | 130 | 130 | 130 | 130 | 130 |
| Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers | Uvalde | Nueces | Fresh | 1,993 | 1,993 | 1,993 | 1,993 | 1,993 | 1,993 |
| Ellenburger-San Saba Aquifer | Kendall | Colorado | Fresh | 9 | 9 | 9 | 9 | 9 | 9 |
| Ellenburger-San Saba Aquifer | Kendall | Guadalupe | Fresh | 53 | 54 | 53 | 54 | 53 | 54 |
| Gulf Coast Aquifer System | Calhoun | Colorado-Lavaca | Fresh | 5,221 | 5,221 | 5,221 | 5,221 | 5,221 | 5,221 |
| Gulf Coast Aquifer System | Calhoun | Guadalupe | Fresh | 18 | 18 | 18 | 18 | 18 | 18 |
| Gulf Coast Aquifer System | Calhoun | Lavaca-Guadalupe | Fresh | 2,365 | 2,365 | 2,365 | 2,365 | 2,365 | 2,365 |
| Gulf Coast Aquifer System | Calhoun | San Antonio-Nueces | Fresh | 7 | 7 | 7 | 7 | 7 | 7 |
| Gulf Coast Aquifer System | DeWitt | Guadalupe | Fresh | 14,055 | 14,042 | 13,966 | 13,946 | 13,927 | 13,917 |
| Gulf Coast Aquifer System | DeWitt | Lavaca | Fresh | 2,638 | 2,626 | 2,620 | 2,620 | 2,620 | 2,620 |
| Gulf Coast Aquifer System | DeWitt | Lavaca-Guadalupe | Fresh | 298 | 298 | 298 | 298 | 298 | 298 |
| Gulf Coast Aquifer System | DeWitt | San Antonio | Fresh | 967 | 946 | 943 | 942 | 939 | 937 |
| Gulf Coast Aquifer System | Goliad | Guadalupe | Fresh | 2,066 | 2,093 | 2,117 | 2,141 | 2,167 | 2,167 |
| Gulf Coast Aquifer System | Goliad | San Antonio | Fresh | 3,585 | 3,733 | 3,882 | 4,028 | 4,177 | 4,177 |
| Gulf Coast Aquifer System | Goliad | San Antonio-Nueces | Fresh | 603 | 610 | 616 | 622 | 628 | 628 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Gulf Coast Aquifer System | Gonzales | Guadalupe | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Gulf Coast Aquifer System | Gonzales | Lavaca | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Gulf Coast Aquifer System | Karnes | Guadalupe | Fresh | 18 | 18 | 18 | 18 | 18 | 18 |
| Gulf Coast Aquifer System | Karnes | Nueces | Fresh | 1,059 | 79 | 79 | 79 | 79 | 79 |
| Gulf Coast Aquifer System | Karnes | San Antonio | Fresh | 9,362 | 3,221 | 3,217 | 3,050 | 2,781 | 2,780 |
| Gulf Coast Aquifer System | Karnes | San Antonio-Nueces | Fresh | 86 | 86 | 85 | 80 | 74 | 72 |
| Gulf Coast Aquifer System | Refugio | San Antonio | Fresh | 329 | 329 | 329 | 329 | 329 | 329 |
| Gulf Coast Aquifer System | Refugio | San Antonio-Nueces | Fresh | 5,537 | 5,537 | 5,537 | 5,537 | 5,537 | 5,537 |
| Gulf Coast Aquifer System | Victoria | Guadalupe | Fresh | 27,611 | 27,611 | 27,611 | 27,611 | 27,611 | 27,611 |
| Gulf Coast Aquifer System | Victoria | Lavaca | Fresh | 234 | 234 | 234 | 234 | 234 | 234 |
| Gulf Coast Aquifer System | Victoria | Lavaca-Guadalupe | Fresh | 30,421 | 30,421 | 30,421 | 30,421 | 30,421 | 30,421 |
| Gulf Coast Aquifer System | Victoria | San Antonio | Fresh | 1,682 | 1,682 | 1,682 | 1,682 | 1,682 | 1,682 |
| Hickory Aquifer | Hays | Guadalupe | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory Aquifer | Kendall | Colorado | Fresh | 12 | 12 | 12 | 12 | 12 | 12 |
| Hickory Aquifer | Kendall | Guadalupe | Fresh | 128 | 128 | 128 | 128 | 128 | 128 |
| Leona Gravel Aquifer | Medina | Nueces | Fresh | 5,908 | 5,908 | 5,908 | 5,908 | 5,908 | 5,908 |
| Leona Gravel Aquifer | Medina | San Antonio | Fresh | 1,337 | 1,337 | 1,337 | 1,337 | 1,337 | 1,337 |
| Leona Gravel Aquifer | Uvalde | Nueces | Fresh | 9,385 | 9,385 | 9,385 | 9,385 | 9,385 | 9,385 |
| Queen City Aquifer | Atascosa | Nueces | Fresh | 4,525 | 4,537 | 4,495 | 4,390 | 4,285 | 4,285 |
| Queen City Aquifer | Caldwell | Guadalupe | Fresh | 4,829 | 4,557 | 4,545 | 4,545 | 3,977 | 3,977 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Queen City Aquifer | Frio | Nueces | Fresh | 4,533 | 4,380 | 4,231 | 4,066 | 3,927 | 3,927 |
| Queen City Aquifer | Gonzales | Guadalupe | Fresh | 4,960 | 4,973 | 4,960 | 4,960 | 4,500 | 4,500 |
| Queen City Aquifer | Gonzales | Lavaca | Brackish | 0 | 0 | 0 | 0 | 0 | 0 |
| Queen City Aquifer | Guadalupe | Guadalupe | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Queen City Aquifer | La Salle | Nueces | Fresh | 1 | 1 | 1 | 1 | 1 | 1 |
| Queen City Aquifer | Wilson | Guadalupe | Fresh | 106 | 95 | 84 | 75 | 67 | 67 |
| Queen City Aquifer | Wilson | Nueces | Fresh | 181 | 161 | 143 | 127 | 114 | 114 |
| Queen City Aquifer | Wilson | San Antonio | Fresh | 1,136 | 1,011 | 896 | 798 | 711 | 711 |
| San Marcos River Alluvium Aquifer | Caldwell | Guadalupe | Fresh | 271 | 271 | 271 | 271 | 271 | 271 |
| Sparta Aquifer | Atascosa | Nueces | Fresh | 1,187 | 1,043 | 998 | 961 | 932 | 932 |
| Sparta Aquifer | Frio | Nueces | Fresh | 623 | 603 | 576 | 557 | 534 | 534 |
| Sparta Aquifer | Gonzales | Guadalupe | Fresh | 2,451 | 2,457 | 2,451 | 2,451 | 2,451 | 2,451 |
| Sparta Aquifer | Gonzales | Lavaca | Brackish | 0 | 0 | 0 | 0 | 0 | 0 |
| Sparta Aquifer | La Salle | Nueces | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Sparta Aquifer | Wilson | Guadalupe | Fresh | 12 | 11 | 10 | 9 | 8 | 8 |
| Sparta Aquifer | Wilson | Nueces | Fresh | 19 | 17 | 15 | 13 | 12 | 12 |
| Sparta Aquifer | Wilson | San Antonio | Fresh | 151 | 135 | 119 | 106 | 94 | 94 |
| Trinity Aquifer | Atascosa | Nueces | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Trinity Aquifer | Bexar | Nueces | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Trinity Aquifer | Bexar | San Antonio | Fresh | 24,856 | 24,856 | 24,856 | 24,856 | 24,856 | 24,856 |
| Trinity Aquifer | Caldwell | Guadalupe | Fresh | 10 | 10 | 10 | 10 | 10 | 10 |
| Trinity Aquifer | Comal | Guadalupe | Fresh | 37,430 | 37,430 | 37,430 | 37,430 | 37,430 | 37,430 |

* Salinity field indicates whether the source availability is considered 'fresh' (less than 1,000 mg/L), 'brackish' (1,000 to 10,000 mg/L), 'saline' (10,001 mg/L to 34,999 mg/L), or 'seawater' (35,000 mg/L or greater). Sources can also be labeled as 'fresh/brackish' or 'brackish/saline', if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Trinity Aquifer | Comal | San Antonio | Fresh | 5,658 | 5,658 | 5,658 | 5,658 | 5,658 | 5,658 |
| Trinity Aquifer | Guadalupe | Guadalupe | Fresh | 75 | 75 | 75 | 75 | 75 | 75 |
| Trinity Aquifer | Guadalupe | San Antonio | Fresh | 585 | 585 | 585 | 585 | 585 | 585 |
| Trinity Aquifer | Hays | Guadalupe | Fresh | 7,111 | 7,111 | 7,111 | 7,111 | 7,111 | 7,111 |
| Trinity Aquifer | Kendall | Colorado | Fresh | 135 | 135 | 135 | 135 | 135 | 135 |
| Trinity Aquifer | Kendall | Guadalupe | Fresh | 6,028 | 6,028 | 6,028 | 6,028 | 6,028 | 6,028 |
| Trinity Aquifer | Kendall | San Antonio | Fresh | 4,976 | 4,976 | 4,976 | 4,976 | 4,976 | 4,976 |
| Trinity Aquifer | Medina | Nueces | Fresh | 7,008 | 7,008 | 7,008 | 7,008 | 7,008 | 7,008 |
| Trinity Aquifer | Medina | San Antonio | Fresh | 1,994 | 1,994 | 1,994 | 1,994 | 1,994 | 1,994 |
| Trinity Aquifer | Uvalde | Nueces | Fresh | 791 | 791 | 791 | 791 | 791 | 791 |
| Yegua-Jackson Aquifer | Atascosa | Nueces | Fresh | 856 | 856 | 856 | 856 | 856 | 856 |
| Yegua-Jackson Aquifer | Frio | Nueces | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Yegua-Jackson Aquifer | Gonzales | Guadalupe | Fresh | 4,709 | 4,709 | 4,709 | 4,709 | 4,709 | 4,709 |
| Yegua-Jackson Aquifer | Gonzales | Lavaca | Fresh | 19 | 19 | 19 | 19 | 19 | 19 |
| Yegua-Jackson Aquifer | Karnes | Guadalupe | Fresh | 292 | 292 | 292 | 292 | 292 | 292 |
| Yegua-Jackson Aquifer | Karnes | Nueces | Fresh | 91 | 91 | 91 | 91 | 91 | 91 |
| Yegua-Jackson Aquifer | Karnes | San Antonio | Fresh | 1,630 | 1,630 | 1,630 | 1,630 | 1,630 | 1,630 |
| Yegua-Jackson Aquifer | La Salle | Nueces | Fresh | 92 | 92 | 92 | 92 | 92 | 92 |
| Yegua-Jackson Aquifer | Wilson | Guadalupe | Fresh | 62 | 62 | 62 | 62 | 62 | 62 |
| Yegua-Jackson Aquifer | Wilson | Nueces | Fresh | 184 | 184 | 184 | 184 | 184 | 184 |
| Yegua-Jackson Aquifer | Wilson | San Antonio | Fresh | 613 | 613 | 613 | 613 | 613 | 613 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| **Reuse Source Availability Total** | | | | **142,359** | **166,581** | **166,581** | **166,581** | **166,581** | **166,581** |
| Direct Reuse | Bexar | San Antonio | Fresh | 66,477 | 76,463 | 76,463 | 76,463 | 76,463 | 76,463 |
| Direct Reuse | Comal | Guadalupe | Fresh | 5,231 | 14,610 | 14,610 | 14,610 | 14,610 | 14,610 |
| Direct Reuse | Guadalupe | Guadalupe | Fresh | 4,584 | 7,480 | 7,480 | 7,480 | 7,480 | 7,480 |
| Direct Reuse | Hays | Guadalupe | Fresh | 10,082 | 11,763 | 11,763 | 11,763 | 11,763 | 11,763 |
| Direct Reuse | Karnes | San Antonio | Fresh | 1,290 | 1,570 | 1,570 | 1,570 | 1,570 | 1,570 |
| Direct Reuse | Kendall | Guadalupe | Fresh | 1,752 | 1,752 | 1,752 | 1,752 | 1,752 | 1,752 |
| Direct Reuse | Kendall | San Antonio | Fresh | 523 | 523 | 523 | 523 | 523 | 523 |
| Indirect Reuse | Bexar | San Antonio | Fresh | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| Water Recycling | Hays | Guadalupe | Fresh | 2,420 | 2,420 | 2,420 | 2,420 | 2,420 | 2,420 |
| **Surface Water Source Availability Total** | | | | **261,647** | **261,501** | **261,357** | **261,213** | **260,834** | **260,429** |
| Boerne Lake/Reservoir | Reservoir** | San Antonio | Fresh | 648 | 648 | 648 | 648 | 648 | 648 |
| Calaveras Lake/Reservoir | Reservoir** | San Antonio | Fresh | 36,900 | 36,900 | 36,900 | 36,900 | 36,900 | 36,900 |
| Canyon Lake/Reservoir | Reservoir** | Guadalupe | Fresh | 86,138 | 85,992 | 85,848 | 85,704 | 85,559 | 85,414 |
| Coleto Creek Lake/Reservoir | Reservoir** | Guadalupe | Fresh | 24,160 | 24,160 | 24,160 | 24,160 | 23,926 | 23,666 |
| Colorado Livestock Local Supply | Caldwell | Colorado | Fresh | 20 | 20 | 20 | 20 | 20 | 20 |
| Colorado Livestock Local Supply | Kendall | Colorado | Fresh | 2 | 2 | 2 | 2 | 2 | 2 |
| Colorado-Lavaca Livestock Local Supply | Calhoun | Colorado-Lavaca | Fresh | 23 | 23 | 23 | 23 | 23 | 23 |
| Cox Lake/Reservoir | Reservoir** | Colorado-Lavaca | Fresh | 3,992 | 3,992 | 3,992 | 3,992 | 3,992 | 3,992 |
| Dunlap Lake/Reservoir | Reservoir** | Guadalupe | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales (H-4) Lake/Reservoir | Reservoir** | Guadalupe | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |

* Salinity field indicates whether the source availability is considered 'fresh' (less than 1,000 mg/L), 'brackish' (1,000 to 10,000 mg/L), 'saline' (10,001 mg/L to 34,999 mg/L), or 'seawater' (35,000 mg/L or greater). Sources can also be labeled as 'fresh/brackish' or 'brackish/saline', if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Guadalupe Livestock Local Supply | Caldwell | Guadalupe | Fresh | 396 | 396 | 396 | 396 | 396 | 396 |
| Guadalupe Livestock Local Supply | Comal | Guadalupe | Fresh | 118 | 118 | 118 | 118 | 118 | 118 |
| Guadalupe Livestock Local Supply | DeWitt | Guadalupe | Fresh | 660 | 660 | 660 | 660 | 660 | 660 |
| Guadalupe Livestock Local Supply | Goliad | Guadalupe | Fresh | 100 | 100 | 100 | 100 | 100 | 100 |
| Guadalupe Livestock Local Supply | Gonzales | Guadalupe | Fresh | 2,050 | 2,050 | 2,050 | 2,050 | 2,050 | 2,050 |
| Guadalupe Livestock Local Supply | Guadalupe | Guadalupe | Fresh | 493 | 493 | 493 | 493 | 493 | 493 |
| Guadalupe Livestock Local Supply | Hays | Guadalupe | Fresh | 140 | 140 | 140 | 140 | 140 | 140 |
| Guadalupe Livestock Local Supply | Karnes | Guadalupe | Fresh | 21 | 21 | 21 | 21 | 21 | 21 |
| Guadalupe Livestock Local Supply | Kendall | Guadalupe | Fresh | 172 | 172 | 172 | 172 | 172 | 172 |
| Guadalupe Livestock Local Supply | Victoria | Guadalupe | Fresh | 228 | 228 | 228 | 228 | 228 | 228 |
| Guadalupe Livestock Local Supply | Wilson | Guadalupe | Fresh | 36 | 36 | 36 | 36 | 36 | 36 |
| Guadalupe Run-of-River | Caldwell | Guadalupe | Fresh | 524 | 524 | 524 | 524 | 524 | 524 |
| Guadalupe Run-of-River | Calhoun | Guadalupe | Fresh | 33,557 | 33,557 | 33,557 | 33,557 | 33,557 | 33,557 |
| Guadalupe Run-of-River | Comal | Guadalupe | Fresh | 612 | 612 | 612 | 612 | 612 | 612 |
| Guadalupe Run-of-River | Gonzales | Guadalupe | Fresh | 2,240 | 2,240 | 2,240 | 2,240 | 2,240 | 2,240 |
| Guadalupe Run-of-River | Guadalupe | Guadalupe | Fresh | 8,089 | 8,089 | 8,089 | 8,089 | 8,089 | 8,089 |
| Guadalupe Run-of-River | Hays | Guadalupe | Fresh | 38,812 | 38,812 | 38,812 | 38,812 | 38,812 | 38,812 |
| Guadalupe Run-of-River | Kendall | Guadalupe | Fresh | 26 | 26 | 26 | 26 | 26 | 26 |
| Guadalupe Run-of-River | Victoria | Guadalupe | Fresh | 2 | 2 | 2 | 2 | 2 | 2 |
| Lavaca Livestock Local Supply | DeWitt | Lavaca | Fresh | 133 | 133 | 133 | 133 | 133 | 133 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Lavaca Livestock Local Supply | Gonzales | Lavaca | Fresh | 20 | 20 | 20 | 20 | 20 | 20 |
| Lavaca Livestock Local Supply | Victoria | Lavaca | Fresh | 2 | 2 | 2 | 2 | 2 | 2 |
| Lavaca-Guadalupe Livestock Local Supply | Calhoun | Lavaca-Guadalupe | Fresh | 119 | 119 | 119 | 119 | 119 | 119 |
| Lavaca-Guadalupe Livestock Local Supply | DeWitt | Lavaca-Guadalupe | Fresh | 12 | 12 | 12 | 12 | 12 | 12 |
| Lavaca-Guadalupe Livestock Local Supply | Victoria | Lavaca-Guadalupe | Fresh | 242 | 242 | 242 | 242 | 242 | 242 |
| McQueeney Lake/Reservoir | Reservoir** | Guadalupe | Fresh | 0 | 0 | 0 | 0 | 0 | 0 |
| Nueces Livestock Local Supply | Atascosa | Nueces | Fresh | 767 | 767 | 767 | 767 | 767 | 767 |
| Nueces Livestock Local Supply | Bexar | Nueces | Fresh | 31 | 31 | 31 | 31 | 31 | 31 |
| Nueces Livestock Local Supply | Dimmit | Nueces | Fresh | 172 | 172 | 172 | 172 | 172 | 172 |
| Nueces Livestock Local Supply | Frio | Nueces | Fresh | 482 | 482 | 482 | 482 | 482 | 482 |
| Nueces Livestock Local Supply | Karnes | Nueces | Fresh/ Brackish | 38 | 38 | 38 | 38 | 38 | 38 |
| Nueces Livestock Local Supply | La Salle | Nueces | Fresh | 197 | 197 | 197 | 197 | 197 | 197 |
| Nueces Livestock Local Supply | Medina | Nueces | Fresh | 444 | 444 | 444 | 444 | 444 | 444 |
| Nueces Livestock Local Supply | Uvalde | Nueces | Fresh | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 |
| Nueces Livestock Local Supply | Wilson | Nueces | Fresh | 103 | 103 | 103 | 103 | 103 | 103 |
| Nueces Livestock Local Supply | Zavala | Nueces | Fresh | 428 | 428 | 428 | 428 | 428 | 428 |
| Nueces Run-of-River | Dimmit | Nueces | Fresh | 211 | 211 | 211 | 211 | 211 | 211 |
| Nueces Run-of-River | La Salle | Nueces | Fresh | 474 | 474 | 474 | 474 | 474 | 474 |
| Nueces Run-of-River | Uvalde | Nueces | Fresh | 720 | 720 | 720 | 720 | 720 | 720 |
| Rio Grande Livestock Local Supply | Dimmit | Rio Grande | Fresh | 12 | 12 | 12 | 12 | 12 | 12 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| San Antonio Livestock Local Supply | Atascosa | San Antonio | Fresh | 2 | 2 | 2 | 2 | 2 | 2 |
| San Antonio Livestock Local Supply | Bexar | San Antonio | Fresh | 463 | 463 | 463 | 463 | 463 | 463 |
| San Antonio Livestock Local Supply | Comal | San Antonio | Fresh | 18 | 18 | 18 | 18 | 18 | 18 |
| San Antonio Livestock Local Supply | DeWitt | San Antonio | Fresh | 64 | 64 | 64 | 64 | 64 | 64 |
| San Antonio Livestock Local Supply | Goliad | San Antonio | Fresh | 156 | 156 | 156 | 156 | 156 | 156 |
| San Antonio Livestock Local Supply | Guadalupe | San Antonio | Fresh | 97 | 97 | 97 | 97 | 97 | 97 |
| San Antonio Livestock Local Supply | Karnes | San Antonio | Fresh | 394 | 394 | 394 | 394 | 394 | 394 |
| San Antonio Livestock Local Supply | Kendall | San Antonio | Fresh | 21 | 21 | 21 | 21 | 21 | 21 |
| San Antonio Livestock Local Supply | Medina | San Antonio | Fresh | 85 | 85 | 85 | 85 | 85 | 85 |
| San Antonio Livestock Local Supply | Refugio | San Antonio | Fresh | 21 | 21 | 21 | 21 | 21 | 21 |
| San Antonio Livestock Local Supply | Victoria | San Antonio | Fresh | 19 | 19 | 19 | 19 | 19 | 19 |
| San Antonio Livestock Local Supply | Wilson | San Antonio | Fresh | 717 | 717 | 717 | 717 | 717 | 717 |
| San Antonio Run-of-River | Bexar | San Antonio | Fresh | 4 | 4 | 4 | 4 | 4 | 4 |
| San Antonio Run-of-River | Karnes | San Antonio | Fresh | 100 | 100 | 100 | 100 | 100 | 100 |
| San Antonio Run-of-River | Wilson | San Antonio | Fresh | 1,094 | 1,094 | 1,094 | 1,094 | 1,094 | 1,094 |
| San Antonio-Nueces Livestock Local Supply | Goliad | San Antonio-Nueces | Fresh | 140 | 140 | 140 | 140 | 140 | 140 |
| San Antonio-Nueces Livestock Local Supply | Karnes | San Antonio-Nueces | Fresh | 25 | 25 | 25 | 25 | 25 | 25 |
| San Antonio-Nueces Livestock Local Supply | Refugio | San Antonio-Nueces | Fresh | 210 | 210 | 210 | 210 | 210 | 210 |

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

# Region L Source Total Availability

| | | | | Source Availability (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source Name** | **County** | **Basin** | **Salinity*** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Upper Nueces Lake/Reservoir | Reservoir** | Nueces | Fresh | 226 | 226 | 226 | 226 | 226 | 226 |
| Victor Braunig Lake/Reservoir | Reservoir** | San Antonio | Fresh | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| **Region L Source Availability Total** | | | | **1,628,668** | **1,673,189** | **1,719,539** | **1,756,965** | **1,779,444** | **1,770,607** |

* Salinity field indicates whether the source availability is considered 'fresh' (less than 1,000 mg/L), 'brackish' (1,000 to 10,000 mg/L), 'saline' (10,001 mg/L to 34,999 mg/L), or 'seawater' (35,000 mg/L or greater). Sources can also be labeled as 'fresh/brackish' or 'brackish/saline', if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Atascosa County WUG Total** | | | **53,821** | **53,775** | **53,769** | **53,788** | **53,811** | **53,837** |
| **Atascosa County / Nueces Basin WUG Total** | | | **53,153** | **53,099** | **53,085** | **53,095** | **53,108** | **53,238** |
| Benton City WSC | L | Carrizo-Wilcox Aquifer \| Atascosa County | 1,422 | 1,427 | 1,441 | 1,458 | 1,476 | 1,495 |
| Charlotte | L | Carrizo-Wilcox Aquifer \| Atascosa County | 1,098 | 1,098 | 1,098 | 1,098 | 1,098 | 1,098 |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Wilson County | 28 | 31 | 32 | 31 | 31 | 31 |
| Jourdanton | L | Carrizo-Wilcox Aquifer \| Atascosa County | 2,250 | 2,250 | 2,250 | 2,250 | 2,250 | 2,250 |
| Lytle | L | Edwards-BFZ Aquifer \| Medina County | 333 | 330 | 331 | 332 | 331 | 331 |
| McCoy WSC* | L | Carrizo-Wilcox Aquifer \| Atascosa County | 927 | 924 | 921 | 919 | 918 | 917 |
| McCoy WSC* | L | Queen City Aquifer \| Atascosa County | 89 | 90 | 90 | 91 | 92 | 92 |
| Pleasanton | L | Carrizo-Wilcox Aquifer \| Atascosa County | 5,028 | 5,028 | 5,028 | 5,028 | 5,028 | 5,028 |
| Poteet | L | Carrizo-Wilcox Aquifer \| Atascosa County | 806 | 806 | 806 | 806 | 806 | 806 |
| San Antonio Water System | L | Canyon Lake/Reservoir | 6 | 0 | 0 | 0 | 0 | 0 |
| San Antonio Water System | L | Carrizo-Aquifer ASR \| Bexar County | 131 | 122 | 119 | 119 | 119 | 119 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Bexar County | 55 | 51 | 50 | 50 | 50 | 50 |
| San Antonio Water System | G | Carrizo-Wilcox Aquifer \| Burleson County | 130 | 121 | 118 | 118 | 118 | 119 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Gonzales County | 30 | 28 | 27 | 28 | 28 | 28 |
| San Antonio Water System | L | Direct Reuse | 79 | 85 | 83 | 82 | 83 | 83 |
| San Antonio Water System | L | Edwards-BFZ Aquifer \| Bexar County | 374 | 348 | 338 | 338 | 339 | 342 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Atascosa County | 194 | 194 | 194 | 194 | 194 | 194 |
| County-Other | L | Edwards-BFZ Aquifer \| Atascosa County | 32 | 32 | 32 | 32 | 32 | 32 |
| County-Other | L | Queen City Aquifer \| Atascosa County | 173 | 173 | 173 | 173 | 173 | 173 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Atascosa County | 74 | 74 | 74 | 74 | 74 | 74 |
| Mining | L | Carrizo-Wilcox Aquifer \| Atascosa County | 4,563 | 4,556 | 4,549 | 4,543 | 4,537 | 4,645 |
| Steam Electric Power | L | Carrizo-Wilcox Aquifer \| Atascosa County | 8,427 | 8,427 | 8,427 | 8,427 | 8,427 | 8,427 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Atascosa County | 230 | 230 | 230 | 230 | 230 | 230 |
| Livestock | L | Local Surface Water Supply | 767 | 767 | 767 | 767 | 767 | 767 |
| Livestock | L | Queen City Aquifer \| Atascosa County | 403 | 403 | 403 | 403 | 403 | 403 |
| Livestock | L | Yegua-Jackson Aquifer \| Atascosa County | 134 | 134 | 134 | 134 | 134 | 134 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Atascosa County | 22,311 | 22,311 | 22,311 | 22,311 | 22,311 | 22,311 |
| Irrigation | L | Edwards-BFZ Aquifer \| Atascosa County | 496 | 496 | 496 | 496 | 496 | 496 |
| Irrigation | L | Queen City Aquifer \| Atascosa County | 1,638 | 1,638 | 1,638 | 1,638 | 1,638 | 1,638 |
| Irrigation | L | Sparta Aquifer \| Atascosa County | 395 | 395 | 395 | 395 | 395 | 395 |
| Irrigation | L | Yegua-Jackson Aquifer \| Atascosa County | 530 | 530 | 530 | 530 | 530 | 530 |
| | | | | | | | | |
| **Atascosa County / San Antonio Basin WUG Total** | | | **668** | **676** | **684** | **693** | **703** | **599** |
| Benton City WSC | L | Carrizo-Wilcox Aquifer \| Atascosa County | 224 | 225 | 227 | 230 | 233 | 236 |
| Lytle | L | Edwards-BFZ Aquifer \| Medina County | 9 | 9 | 8 | 8 | 9 | 9 |
| San Antonio Water System | L | Carrizo-Aquifer ASR \| Bexar County | 3 | 3 | 3 | 3 | 3 | 4 |
| Mining | L | Carrizo-Wilcox Aquifer \| Atascosa County | 176 | 183 | 190 | 196 | 202 | 94 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Atascosa County | 1 | 1 | 1 | 1 | 1 | 1 |
| Livestock | L | Local Surface Water Supply | 2 | 2 | 2 | 2 | 2 | 2 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Atascosa County | 114 | 114 | 114 | 114 | 114 | 114 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Irrigation | L | Edwards-BFZ Aquifer \| Atascosa County | 139 | 139 | 139 | 139 | 139 | 139 |
| | | | | | | | | |
| **Bexar County WUG Total** | | | **514,774** | **518,384** | **518,491** | **511,759** | **511,755** | **511,992** |
| **Bexar County / Nueces Basin WUG Total** | | | **12,633** | **12,629** | **12,633** | **12,631** | **12,634** | **12,630** |
| Atascosa Rural WSC | L | Edwards-BFZ Aquifer \| Bexar County | 28 | 28 | 28 | 28 | 28 | 28 |
| Lytle | L | Edwards-BFZ Aquifer \| Medina County | 31 | 33 | 33 | 34 | 36 | 37 |
| San Antonio Water System | L | Canyon Lake/Reservoir | 10 | 0 | 0 | 0 | 0 | 0 |
| San Antonio Water System | L | Carrizo-Aquifer ASR \| Bexar County | 200 | 199 | 199 | 199 | 199 | 199 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Bexar County | 84 | 84 | 84 | 84 | 84 | 84 |
| San Antonio Water System | G | Carrizo-Wilcox Aquifer \| Burleson County | 199 | 198 | 198 | 198 | 198 | 198 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Gonzales County | 46 | 46 | 46 | 46 | 46 | 46 |
| San Antonio Water System | L | Direct Reuse | 119 | 138 | 138 | 138 | 138 | 138 |
| San Antonio Water System | L | Edwards-BFZ Aquifer \| Bexar County | 570 | 568 | 568 | 568 | 568 | 568 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Bexar County | 103 | 103 | 103 | 103 | 103 | 103 |
| County-Other | L | Edwards-BFZ Aquifer \| Bexar County | 473 | 462 | 466 | 463 | 464 | 459 |
| Manufacturing | L | Direct Reuse | 4,076 | 4,076 | 4,076 | 4,076 | 4,076 | 4,076 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Bexar County | 31 | 31 | 31 | 31 | 31 | 31 |
| Livestock | L | Local Surface Water Supply | 31 | 31 | 31 | 31 | 31 | 31 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Bexar County | 4,293 | 4,293 | 4,293 | 4,293 | 4,293 | 4,293 |
| Irrigation | L | Edwards-BFZ Aquifer \| Bexar County | 2,339 | 2,339 | 2,339 | 2,339 | 2,339 | 2,339 |
| | | | | | | | | |
| **Bexar County / San Antonio Basin WUG Total** | | | **502,141** | **505,755** | **505,858** | **499,128** | **499,121** | **499,362** |
| Air Force Village II Inc | L | Edwards-BFZ Aquifer \| Bexar County | 263 | 263 | 263 | 263 | 263 | 263 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Alamo Heights | L | Edwards-BFZ Aquifer \| Bexar County | 1,611 | 1,611 | 1,611 | 1,611 | 1,611 | 1,611 |
| Atascosa Rural WSC | L | Edwards-BFZ Aquifer \| Bexar County | 418 | 418 | 418 | 418 | 418 | 418 |
| Bexar County WCID 10 | L | Edwards-BFZ Aquifer \| Bexar County | 928 | 928 | 928 | 928 | 928 | 928 |
| Converse | L | Carrizo-Wilcox Aquifer \| Gonzales County | 500 | 500 | 500 | 500 | 500 | 500 |
| Converse | L | Edwards-BFZ Aquifer \| Bexar County | 1,916 | 1,916 | 1,916 | 1,916 | 1,916 | 1,916 |
| East Central SUD | L | Canyon Lake/Reservoir | 1,319 | 1,317 | 1,314 | 1,310 | 1,308 | 1,307 |
| East Central SUD | L | Carrizo-Wilcox Aquifer \| Bexar County | 10 | 10 | 10 | 10 | 10 | 10 |
| East Central SUD | G | Carrizo-Wilcox Aquifer \| Burleson County | 10 | 10 | 10 | 10 | 10 | 10 |
| East Central SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 943 | 941 | 938 | 936 | 935 | 934 |
| East Central SUD | L | Direct Reuse | 226 | 226 | 226 | 226 | 226 | 226 |
| East Central SUD | L | Edwards-BFZ Aquifer \| Bexar County | 670 | 662 | 669 | 671 | 678 | 679 |
| East Central SUD | L | Trinity Aquifer \| Bexar County | 10 | 10 | 10 | 10 | 10 | 10 |
| Elmendorf | L | Carrizo-Wilcox Aquifer \| Bexar County | 1,211 | 1,211 | 1,211 | 1,211 | 1,211 | 1,211 |
| Elmendorf | G | Carrizo-Wilcox Aquifer \| Burleson County | 1 | 1 | 1 | 1 | 1 | 1 |
| Elmendorf | L | Edwards-BFZ Aquifer \| Bexar County | 100 | 100 | 100 | 100 | 100 | 100 |
| Elmendorf | L | Trinity Aquifer \| Bexar County | 4 | 4 | 4 | 4 | 4 | 4 |
| Fair Oaks Ranch | L | Canyon Lake/Reservoir | 1,027 | 957 | 930 | 921 | 919 | 919 |
| Fair Oaks Ranch | L | Direct Reuse | 155 | 145 | 141 | 139 | 139 | 139 |
| Fair Oaks Ranch | L | Trinity Aquifer \| Comal County | 347 | 323 | 314 | 311 | 310 | 310 |
| Fort Sam Houston | L | Edwards-BFZ Aquifer \| Bexar County | 3,363 | 3,363 | 3,363 | 3,363 | 3,363 | 3,363 |
| Green Valley SUD | L | Canyon Lake/Reservoir | 61 | 55 | 50 | 46 | 41 | 40 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 61 | 56 | 50 | 46 | 42 | 39 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 39 | 35 | 32 | 28 | 26 | 25 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 224 | 204 | 184 | 167 | 154 | 144 |
| Green Valley SUD | L | Edwards-BFZ Aquifer \| Comal County | 71 | 65 | 59 | 54 | 49 | 47 |
| Green Valley SUD | L | Trinity Aquifer \| Bexar County | 23 | 21 | 19 | 17 | 16 | 15 |
| Kirby | L | Edwards-BFZ Aquifer \| Bexar County | 738 | 738 | 738 | 738 | 738 | 738 |
| La Coste | L | Edwards-BFZ Aquifer \| Medina County | 2 | 2 | 2 | 2 | 2 | 3 |
| Lackland Air Force Base | L | Edwards-BFZ Aquifer \| Bexar County | 2,557 | 2,557 | 2,557 | 2,557 | 2,557 | 2,557 |
| Leon Valley | L | Edwards-BFZ Aquifer \| Bexar County | 1,016 | 1,016 | 1,016 | 1,016 | 1,016 | 1,016 |
| Live Oak | L | Direct Reuse | 238 | 238 | 238 | 238 | 212 | 238 |
| Live Oak | L | Edwards-BFZ Aquifer \| Bexar County | 1,251 | 1,251 | 1,251 | 1,251 | 1,251 | 1,251 |
| Lytle | L | Edwards-BFZ Aquifer \| Medina County | 2 | 2 | 2 | 2 | 2 | 2 |
| Oak Hills WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 7 | 9 | 12 | 17 | 24 | 33 |
| Randolph Air Force Base | L | Direct Reuse | 4,862 | 7,841 | 7,841 | 7,841 | 7,841 | 7,841 |
| Randolph Air Force Base | L | Edwards-BFZ Aquifer \| Bexar County | 807 | 807 | 807 | 807 | 807 | 807 |
| San Antonio Water System | L | Canyon Lake/Reservoir | 4,962 | 3,962 | 3,962 | 0 | 0 | 0 |
| San Antonio Water System | L | Carrizo-Aquifer ASR \| Bexar County | 49,848 | 49,605 | 49,606 | 49,607 | 49,606 | 49,633 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Bexar County | 20,906 | 20,805 | 20,805 | 20,805 | 20,805 | 20,815 |
| San Antonio Water System | G | Carrizo-Wilcox Aquifer \| Burleson County | 49,466 | 49,224 | 49,226 | 49,226 | 49,225 | 49,253 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Gonzales County | 14,847 | 14,772 | 14,773 | 11,999 | 11,998 | 12,007 |
| San Antonio Water System | L | Direct Reuse | 29,673 | 34,450 | 34,451 | 34,451 | 34,450 | 34,470 |
| San Antonio Water System | L | Edwards-BFZ Aquifer \| Bexar County | 142,062 | 141,367 | 141,374 | 141,372 | 141,370 | 141,451 |
| San Antonio Water System | L | San Antonio Indirect Reuse | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| San Antonio Water System | L | Trinity Aquifer \| Bexar County | 3,025 | 1,028 | 1,028 | 1,028 | 1,028 | 1,029 |
| Schertz | L | Carrizo-Wilcox Aquifer \| Gonzales County | 1,433 | 1,667 | 1,775 | 1,799 | 1,820 | 1,839 |
| Schertz | L | Direct Reuse | 18 | 18 | 18 | 18 | 18 | 18 |
| Schertz | L | Edwards-BFZ Aquifer \| Comal County | 115 | 134 | 142 | 144 | 146 | 148 |
| Selma | L | Carrizo-Wilcox Aquifer \| Gonzales County | 672 | 715 | 735 | 741 | 747 | 751 |
| Selma | L | Direct Reuse | 52 | 52 | 52 | 52 | 52 | 52 |
| Selma | L | Edwards-BFZ Aquifer \| Bexar County | 429 | 456 | 469 | 473 | 476 | 480 |
| Shavano Park | L | Edwards-BFZ Aquifer \| Bexar County | 514 | 514 | 514 | 514 | 514 | 514 |
| The Oaks WSC | L | Carrizo-Wilcox Aquifer \| Bexar County | 10 | 10 | 10 | 10 | 10 | 10 |
| The Oaks WSC | G | Carrizo-Wilcox Aquifer \| Burleson County | 10 | 10 | 10 | 10 | 10 | 10 |
| The Oaks WSC | L | Edwards-BFZ Aquifer \| Bexar County | 30 | 30 | 30 | 30 | 30 | 30 |
| The Oaks WSC | L | Trinity Aquifer \| Bexar County | 120 | 120 | 120 | 120 | 120 | 120 |
| Universal City | L | Carrizo-Wilcox Aquifer \| Gonzales County | 800 | 800 | 800 | 800 | 800 | 800 |
| Universal City | L | Direct Reuse | 750 | 742 | 734 | 724 | 714 | 702 |
| Universal City | L | Edwards-BFZ Aquifer \| Bexar County | 2,139 | 2,139 | 2,139 | 2,139 | 2,139 | 2,139 |
| Water Services | L | Trinity Aquifer \| Bexar County | 769 | 811 | 843 | 870 | 896 | 921 |
| County-Other | L | Edwards-BFZ Aquifer \| Bexar County | 9,849 | 9,860 | 9,856 | 9,859 | 9,858 | 9,863 |
| County-Other | L | Trinity Aquifer \| Bexar County | 426 | 426 | 426 | 426 | 426 | 426 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Bexar County | 17 | 17 | 17 | 17 | 17 | 17 |
| Manufacturing | L | Edwards-BFZ Aquifer \| Bexar County | 8,670 | 8,670 | 8,670 | 8,670 | 8,670 | 8,670 |
| Manufacturing | L | Trinity Aquifer \| Bexar County | 29 | 29 | 29 | 29 | 29 | 29 |
| Mining | L | Carrizo-Wilcox Aquifer \| Bexar County | 400 | 400 | 400 | 400 | 400 | 400 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Mining | L | Edwards-BFZ Aquifer \| Bexar County | 4,342 | 4,342 | 4,342 | 4,342 | 4,342 | 4,342 |
| Mining | L | Trinity Aquifer \| Bexar County | 6,535 | 6,535 | 6,535 | 6,535 | 6,535 | 6,535 |
| Steam Electric Power | L | Calaveras Lake/Reservoir | 36,900 | 36,900 | 36,900 | 36,900 | 36,900 | 36,900 |
| Steam Electric Power | L | Edwards-BFZ Aquifer \| Bexar County | 1,751 | 1,751 | 1,751 | 1,751 | 1,751 | 1,751 |
| Steam Electric Power | L | San Antonio Indirect Reuse | 45,000 | 45,000 | 45,000 | 45,000 | 45,000 | 45,000 |
| Steam Electric Power | L | Victor Braunig Lake/Reservoir | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Bexar County | 205 | 205 | 205 | 205 | 205 | 205 |
| Livestock | L | Edwards-BFZ Aquifer \| Bexar County | 52 | 52 | 52 | 52 | 52 | 52 |
| Livestock | L | Local Surface Water Supply | 463 | 463 | 463 | 463 | 463 | 463 |
| Livestock | L | Trinity Aquifer \| Bexar County | 206 | 206 | 206 | 206 | 206 | 207 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Bexar County | 560 | 560 | 560 | 560 | 560 | 560 |
| Irrigation | L | Edwards-BFZ Aquifer \| Bexar County | 18,943 | 18,943 | 18,943 | 18,943 | 18,943 | 18,943 |
| Irrigation | L | San Antonio Run-of-River | 4 | 4 | 4 | 4 | 4 | 4 |
| Irrigation | L | Trinity Aquifer \| Bexar County | 1,148 | 1,148 | 1,148 | 1,148 | 1,148 | 1,148 |
| | | | | | | | | |
| **Caldwell County WUG Total** | | | **14,379** | **16,801** | **16,432** | **16,119** | **15,856** | **15,623** |
| **Caldwell County / Colorado Basin WUG Total** | | | **4,314** | **4,454** | **4,241** | **4,029** | **3,793** | **3,541** |
| Creedmoor-Maha WSC* | K | Carrizo-Wilcox Aquifer \| Bastrop County | 1,688 | 1,688 | 1,688 | 1,688 | 1,688 | 1,688 |
| Creedmoor-Maha WSC* | L | Carrizo-Wilcox Aquifer \| Gonzales County | 2,216 | 1,809 | 1,594 | 1,376 | 1,141 | 888 |
| Polonia WSC* | L | Carrizo-Wilcox Aquifer \| Caldwell County | 333 | 804 | 806 | 810 | 811 | 812 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Caldwell County | 19 | 95 | 95 | 97 | 95 | 95 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Caldwell County | 19 | 19 | 19 | 19 | 19 | 19 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | L | Local Surface Water Supply | 20 | 20 | 20 | 20 | 20 | 20 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Caldwell County | 17 | 17 | 17 | 17 | 17 | 17 |
| Irrigation | L | Queen City Aquifer \| Caldwell County | 2 | 2 | 2 | 2 | 2 | 2 |
| | | | | | | | | |
| **Caldwell County / Guadalupe Basin WUG Total** | | | **10,065** | **12,347** | **12,191** | **12,090** | **12,063** | **12,082** |
| Aqua WSC* | L | Carrizo-Wilcox Aquifer \| Caldwell County | 166 | 186 | 205 | 221 | 239 | 259 |
| County Line SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 478 | 478 | 478 | 478 | 478 | 478 |
| County Line SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 160 | 119 | 92 | 91 | 91 | 91 |
| Creedmoor-Maha WSC* | L | Carrizo-Wilcox Aquifer \| Gonzales County | 122 | 220 | 318 | 417 | 515 | 615 |
| Goforth SUD* | L | Canyon Lake/Reservoir | 70 | 54 | 42 | 33 | 27 | 24 |
| Goforth SUD* | L | Carrizo-Wilcox Aquifer \| Gonzales County | 111 | 85 | 65 | 51 | 43 | 38 |
| Goforth SUD* | L | Edwards-BFZ Aquifer \| Hays County | 2 | 1 | 1 | 1 | 1 | 1 |
| Goforth SUD* | L | Trinity Aquifer \| Hays County | 38 | 28 | 22 | 17 | 15 | 13 |
| Gonzales County WSC | L | Carrizo-Wilcox Aquifer \| Gonzales County | 48 | 47 | 48 | 48 | 50 | 51 |
| Lockhart | L | Carrizo-Wilcox Aquifer \| Caldwell County | 2,967 | 3,395 | 3,395 | 3,395 | 3,395 | 3,395 |
| Luling | L | Carrizo-Wilcox Aquifer \| Caldwell County | 774 | 1,598 | 1,598 | 1,599 | 1,599 | 1,600 |
| Martindale WSC | L | Canyon Lake/Reservoir | 163 | 161 | 157 | 154 | 152 | 149 |
| Martindale WSC | L | Guadalupe Run-of-River | 226 | 221 | 216 | 212 | 208 | 205 |
| Martindale WSC | L | San Marcos River Alluvium Aquifer \| Caldwell County | 31 | 31 | 31 | 31 | 31 | 31 |
| Maxwell SUD | L | Canyon Lake/Reservoir | 416 | 355 | 302 | 254 | 221 | 198 |
| Maxwell SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 352 | 300 | 255 | 215 | 187 | 167 |
| Maxwell SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 352 | 300 | 255 | 215 | 187 | 167 |
| Maxwell SUD | L | Edwards-BFZ Aquifer \| Comal County | 110 | 94 | 80 | 67 | 59 | 52 |
| Maxwell SUD | L | Guadalupe Run-of-River | 371 | 319 | 273 | 231 | 203 | 182 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Polonia WSC* | L | Carrizo-Wilcox Aquifer \| Caldwell County | 704 | 1,705 | 1,710 | 1,714 | 1,716 | 1,720 |
| San Marcos | L | Canyon Lake/Reservoir | 2 | 2 | 2 | 3 | 3 | 3 |
| San Marcos | L | Edwards-BFZ Aquifer \| Hays County | 20 | 14 | 12 | 10 | 9 | 9 |
| Tri Community WSC | L | Guadalupe Run-of-River | 492 | 490 | 490 | 491 | 490 | 490 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Caldwell County | 62 | 316 | 316 | 314 | 316 | 316 |
| County-Other | L | Queen City Aquifer \| Caldwell County | 18 | 18 | 18 | 18 | 18 | 18 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Caldwell County | 5 | 5 | 5 | 5 | 5 | 5 |
| Mining | L | Carrizo-Wilcox Aquifer \| Caldwell County | 112 | 112 | 112 | 112 | 112 | 112 |
| Mining | L | Queen City Aquifer \| Caldwell County | 240 | 240 | 240 | 240 | 240 | 240 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Caldwell County | 96 | 96 | 96 | 96 | 96 | 96 |
| Livestock | L | Local Surface Water Supply | 396 | 396 | 396 | 396 | 396 | 396 |
| Livestock | L | Queen City Aquifer \| Caldwell County | 300 | 300 | 300 | 300 | 300 | 300 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Caldwell County | 585 | 585 | 585 | 585 | 585 | 585 |
| Irrigation | L | Queen City Aquifer \| Caldwell County | 76 | 76 | 76 | 76 | 76 | 76 |
| | | | | | | | | |
| **Calhoun County WUG Total** | | | **64,350** | **64,294** | **64,236** | **64,180** | **64,116** | **64,044** |
| **Calhoun County / Colorado-Lavaca Basin WUG Total** | | | **39,065** | **39,062** | **39,058** | **39,059** | **39,055** | **39,050** |
| Point Comfort | P | Texana Lake/Reservoir | 178 | 178 | 178 | 178 | 178 | 178 |
| County-Other | L | Gulf Coast Aquifer System \| Calhoun County | 110 | 107 | 103 | 103 | 99 | 93 |
| Manufacturing | L | Guadalupe Run-of-River | 17,199 | 17,199 | 17,199 | 17,199 | 17,199 | 17,200 |
| Manufacturing | L | Gulf Coast Aquifer System \| Calhoun County | 200 | 200 | 200 | 200 | 200 | 200 |
| Manufacturing | P | Texana Lake/Reservoir | 20,596 | 20,596 | 20,596 | 20,597 | 20,597 | 20,597 |
| Steam Electric Power | L | Gulf Coast Aquifer System \| Calhoun County | 37 | 37 | 37 | 37 | 37 | 37 |
| Livestock | L | Gulf Coast Aquifer System \| Calhoun County | 22 | 22 | 22 | 22 | 22 | 22 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | L | Local Surface Water Supply | 23 | 23 | 23 | 23 | 23 | 23 |
| Irrigation | L | Gulf Coast Aquifer System \| Calhoun County | 700 | 700 | 700 | 700 | 700 | 700 |
| | | | | | | | | |
| **Calhoun County / Lavaca-Guadalupe Basin WUG Total** | | | **24,429** | **24,375** | **24,321** | **24,265** | **24,205** | **24,138** |
| Guadalupe-Blanco River Authority | L | Canyon Lake/Reservoir | 194 | 175 | 156 | 137 | 116 | 92 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Caldwell County | 194 | 175 | 156 | 137 | 116 | 92 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Gonzales County | 194 | 176 | 156 | 138 | 116 | 92 |
| Port Lavaca | L | Guadalupe Run-of-River | 4,480 | 4,480 | 4,480 | 4,480 | 4,480 | 4,480 |
| Port Oconnor Improvement District | L | Gulf Coast Aquifer System \| Calhoun County | 102 | 102 | 102 | 102 | 102 | 102 |
| Seadrift | L | Gulf Coast Aquifer System \| Calhoun County | 245 | 245 | 245 | 245 | 245 | 245 |
| County-Other | L | Gulf Coast Aquifer System \| Calhoun County | 147 | 149 | 153 | 153 | 157 | 163 |
| Manufacturing | L | Guadalupe Run-of-River | 8,134 | 8,134 | 8,134 | 8,134 | 8,134 | 8,133 |
| Manufacturing | P | Texana Lake/Reservoir | 9,740 | 9,740 | 9,740 | 9,740 | 9,740 | 9,740 |
| Livestock | L | Gulf Coast Aquifer System \| Calhoun County | 118 | 118 | 118 | 118 | 118 | 118 |
| Livestock | L | Local Surface Water Supply | 119 | 119 | 119 | 119 | 119 | 119 |
| Irrigation | L | Gulf Coast Aquifer System \| Calhoun County | 762 | 762 | 762 | 762 | 762 | 762 |
| | | | | | | | | |
| **Calhoun County / San Antonio-Nueces Basin WUG Total** | | | **856** | **857** | **857** | **856** | **856** | **856** |
| County-Other | L | Gulf Coast Aquifer System \| Calhoun County | 5 | 6 | 6 | 6 | 6 | 6 |
| Manufacturing | L | Guadalupe Run-of-River | 387 | 387 | 387 | 387 | 387 | 387 |
| Manufacturing | P | Texana Lake/Reservoir | 464 | 464 | 464 | 463 | 463 | 463 |
| | | | | | | | | |
| **Comal County WUG Total** | | | **62,989** | **62,818** | **63,033** | **63,442** | **63,725** | **63,901** |
| **Comal County / Guadalupe Basin WUG Total** | | | **57,652** | **57,453** | **57,652** | **58,046** | **58,315** | **58,485** |
| 3009 Water | L | Trinity Aquifer \| Comal County | 1,622 | 1,621 | 1,621 | 1,622 | 1,622 | 1,622 |
| Canyon Lake Water Service* | L | Canyon Lake/Reservoir | 6,093 | 6,096 | 6,101 | 6,105 | 6,113 | 6,116 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Canyon Lake Water Service* | L | Direct Reuse | 78 | 215 | 215 | 215 | 215 | 217 |
| Canyon Lake Water Service* | L | Trinity Aquifer \| Comal County | 6,404 | 6,403 | 6,404 | 6,405 | 6,411 | 6,415 |
| Clear Water Estates Water System | L | Trinity Aquifer \| Comal County | 984 | 984 | 984 | 984 | 984 | 984 |
| Crystal Clear SUD | L | Canyon Lake/Reservoir | 59 | 57 | 55 | 53 | 52 | 51 |
| Crystal Clear SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 634 | 475 | 421 | 373 | 330 | 291 |
| Crystal Clear SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 202 | 152 | 134 | 119 | 105 | 93 |
| Crystal Clear SUD | L | Edwards-BFZ Aquifer \| Hays County | 299 | 225 | 198 | 176 | 156 | 138 |
| Crystal Clear SUD | L | Guadalupe Run-of-River | 128 | 96 | 85 | 75 | 67 | 59 |
| Garden Ridge | L | Edwards-BFZ Aquifer \| Comal County | 220 | 220 | 220 | 220 | 220 | 220 |
| Garden Ridge | L | Trinity Aquifer \| Comal County | 305 | 305 | 305 | 305 | 305 | 305 |
| Green Valley SUD | L | Canyon Lake/Reservoir | 46 | 51 | 57 | 64 | 69 | 72 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 45 | 50 | 56 | 63 | 68 | 72 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 28 | 32 | 35 | 40 | 43 | 45 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 166 | 185 | 207 | 232 | 251 | 266 |
| Green Valley SUD | L | Edwards-BFZ Aquifer \| Comal County | 53 | 60 | 66 | 75 | 81 | 85 |
| Green Valley SUD | L | Trinity Aquifer \| Bexar County | 17 | 19 | 21 | 24 | 25 | 27 |
| KT Water Development | L | Trinity Aquifer \| Comal County | 406 | 406 | 406 | 406 | 406 | 406 |
| New Braunfels | L | Canyon Lake/Reservoir | 6,214 | 6,191 | 6,252 | 6,359 | 6,430 | 6,481 |
| New Braunfels | L | Carrizo-Wilcox Aquifer \| Caldwell County | 846 | 842 | 851 | 865 | 875 | 882 |
| New Braunfels | L | Carrizo-Wilcox Aquifer \| Gonzales County | 5,073 | 5,054 | 5,104 | 5,191 | 5,249 | 5,290 |
| New Braunfels | L | Direct Reuse | 48 | 48 | 48 | 49 | 50 | 50 |
| New Braunfels | L | Edwards-BFZ Aquifer \| Comal County | 3,175 | 3,163 | 3,194 | 3,248 | 3,285 | 3,311 |
| New Braunfels | L | Guadalupe Run-of-River | 4,036 | 4,022 | 4,061 | 4,129 | 4,177 | 4,210 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| New Braunfels | L | Trinity Aquifer \| Comal County | 3,169 | 3,157 | 3,189 | 3,243 | 3,279 | 3,305 |
| San Antonio Water System | L | Canyon Lake/Reservoir | 4 | 2 | 2 | 0 | 0 | 0 |
| San Antonio Water System | L | Carrizo-Aquifer ASR \| Bexar County | 31 | 29 | 29 | 29 | 29 | 28 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Bexar County | 13 | 12 | 12 | 12 | 12 | 12 |
| San Antonio Water System | G | Carrizo-Wilcox Aquifer \| Burleson County | 31 | 29 | 29 | 29 | 29 | 27 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Gonzales County | 9 | 9 | 9 | 7 | 7 | 7 |
| San Antonio Water System | L | Direct Reuse | 18 | 20 | 20 | 20 | 20 | 19 |
| San Antonio Water System | L | Edwards-BFZ Aquifer \| Bexar County | 88 | 84 | 83 | 84 | 84 | 78 |
| San Antonio Water System | L | Trinity Aquifer \| Bexar County | 2 | 1 | 1 | 1 | 1 | 1 |
| Schertz | L | Carrizo-Wilcox Aquifer \| Gonzales County | 204 | 234 | 270 | 315 | 353 | 385 |
| Schertz | L | Edwards-BFZ Aquifer \| Comal County | 16 | 19 | 22 | 25 | 28 | 31 |
| Wingert Water Systems | L | Trinity Aquifer \| Hays County | 251 | 251 | 251 | 251 | 251 | 251 |
| County-Other | L | Canyon Lake/Reservoir | 464 | 464 | 464 | 464 | 464 | 464 |
| County-Other | L | Edwards-BFZ Aquifer \| Comal County | 595 | 595 | 595 | 595 | 595 | 595 |
| County-Other | L | Trinity Aquifer \| Comal County | 2,470 | 2,470 | 2,470 | 2,470 | 2,470 | 2,470 |
| Manufacturing | L | Canyon Lake/Reservoir | 4 | 4 | 4 | 4 | 4 | 4 |
| Manufacturing | L | Direct Reuse | 784 | 784 | 784 | 784 | 784 | 784 |
| Manufacturing | L | Edwards-BFZ Aquifer \| Comal County | 2,168 | 2,168 | 2,168 | 2,168 | 2,168 | 2,168 |
| Manufacturing | L | Guadalupe Run-of-River | 100 | 100 | 100 | 100 | 100 | 100 |
| Manufacturing | L | Trinity Aquifer \| Comal County | 63 | 63 | 63 | 63 | 63 | 63 |
| Mining | L | Edwards-BFZ Aquifer \| Comal County | 2,561 | 2,561 | 2,561 | 2,561 | 2,561 | 2,561 |
| Mining | L | Trinity Aquifer \| Comal County | 6,483 | 6,482 | 6,482 | 6,481 | 6,481 | 6,481 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | L | Local Surface Water Supply | 118 | 118 | 118 | 118 | 118 | 118 |
| Livestock | L | Trinity Aquifer \| Comal County | 118 | 118 | 118 | 118 | 118 | 118 |
| Irrigation | L | Canyon Lake/Reservoir | 129 | 129 | 129 | 129 | 129 | 129 |
| Irrigation | L | Edwards-BFZ Aquifer \| Comal County | 482 | 482 | 482 | 482 | 482 | 482 |
| Irrigation | L | Guadalupe Run-of-River | 6 | 6 | 6 | 6 | 6 | 6 |
| Irrigation | L | Trinity Aquifer \| Comal County | 90 | 90 | 90 | 90 | 90 | 90 |
| | | | | | | | | |
| **Comal County / San Antonio Basin WUG Total** | | | **5,337** | **5,365** | **5,381** | **5,396** | **5,410** | **5,416** |
| 3009 Water | L | Trinity Aquifer \| Comal County | 55 | 56 | 56 | 55 | 55 | 55 |
| Canyon Lake Water Service* | L | Canyon Lake/Reservoir | 1,331 | 1,331 | 1,332 | 1,332 | 1,333 | 1,334 |
| Canyon Lake Water Service* | L | Direct Reuse | 17 | 46 | 46 | 46 | 46 | 46 |
| Canyon Lake Water Service* | L | Trinity Aquifer \| Comal County | 1,367 | 1,367 | 1,367 | 1,367 | 1,368 | 1,369 |
| Fair Oaks Ranch | L | Canyon Lake/Reservoir | 353 | 354 | 354 | 354 | 354 | 354 |
| Fair Oaks Ranch | L | Direct Reuse | 53 | 54 | 54 | 54 | 54 | 54 |
| Fair Oaks Ranch | L | Trinity Aquifer \| Comal County | 119 | 120 | 120 | 120 | 120 | 120 |
| Garden Ridge | L | Edwards-BFZ Aquifer \| Comal County | 153 | 153 | 153 | 153 | 153 | 153 |
| Garden Ridge | L | Trinity Aquifer \| Comal County | 172 | 172 | 172 | 172 | 172 | 172 |
| Guadalupe-Blanco River Authority | L | Canyon Lake/Reservoir | 185 | 184 | 184 | 184 | 184 | 184 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Caldwell County | 185 | 184 | 184 | 184 | 184 | 184 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Gonzales County | 185 | 186 | 186 | 186 | 186 | 186 |
| San Antonio Water System | L | Canyon Lake/Reservoir | 2 | 2 | 2 | 0 | 0 | 0 |
| San Antonio Water System | L | Carrizo-Aquifer ASR \| Bexar County | 20 | 19 | 20 | 19 | 19 | 18 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Bexar County | 9 | 8 | 8 | 8 | 8 | 8 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| San Antonio Water System | G | Carrizo-Wilcox Aquifer \| Burleson County | 20 | 19 | 19 | 19 | 19 | 18 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Gonzales County | 6 | 6 | 6 | 5 | 5 | 4 |
| San Antonio Water System | L | Direct Reuse | 12 | 13 | 14 | 14 | 14 | 13 |
| San Antonio Water System | L | Edwards-BFZ Aquifer \| Bexar County | 58 | 55 | 56 | 56 | 55 | 52 |
| San Antonio Water System | L | Trinity Aquifer \| Bexar County | 1 | 0 | 0 | 0 | 0 | 0 |
| Selma | L | Carrizo-Wilcox Aquifer \| Gonzales County | 41 | 58 | 78 | 100 | 119 | 137 |
| Selma | L | Edwards-BFZ Aquifer \| Bexar County | 26 | 37 | 50 | 64 | 76 | 87 |
| Water Services | L | Trinity Aquifer \| Bexar County | 343 | 316 | 295 | 278 | 260 | 242 |
| County-Other | L | Edwards-BFZ Aquifer \| Comal County | 129 | 129 | 129 | 129 | 129 | 129 |
| County-Other | L | Trinity Aquifer \| Comal County | 400 | 400 | 400 | 400 | 400 | 400 |
| Mining | L | Trinity Aquifer \| Comal County | 2 | 3 | 3 | 4 | 4 | 4 |
| Livestock | L | Local Surface Water Supply | 18 | 18 | 18 | 18 | 18 | 18 |
| Livestock | L | Trinity Aquifer \| Comal County | 17 | 17 | 17 | 17 | 17 | 17 |
| Irrigation | L | Canyon Lake/Reservoir | 26 | 26 | 26 | 26 | 26 | 26 |
| Irrigation | L | Edwards-BFZ Aquifer \| Comal County | 10 | 10 | 10 | 10 | 10 | 10 |
| Irrigation | L | Trinity Aquifer \| Comal County | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | | | | | | |
| **DeWitt County WUG Total** | | | **9,972** | **9,971** | **9,969** | **9,969** | **9,967** | **9,966** |
| **DeWitt County / Guadalupe Basin WUG Total** | | | **7,538** | **7,536** | **7,535** | **7,536** | **7,533** | **7,532** |
| Cuero | L | Gulf Coast Aquifer System \| DeWitt County | 2,230 | 2,230 | 2,230 | 2,230 | 2,230 | 2,230 |
| Gonzales County WSC | L | Carrizo-Wilcox Aquifer \| Gonzales County | 67 | 66 | 65 | 65 | 63 | 61 |
| Yorktown | L | Gulf Coast Aquifer System \| DeWitt County | 368 | 368 | 368 | 368 | 368 | 368 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| County-Other | L | Gulf Coast Aquifer System \| DeWitt County | 1,007 | 1,007 | 1,007 | 1,007 | 1,007 | 1,007 |
| Manufacturing | L | Gulf Coast Aquifer System \| DeWitt County | 14 | 13 | 13 | 14 | 13 | 14 |
| Mining | L | Gulf Coast Aquifer System \| DeWitt County | 2,270 | 2,270 | 2,270 | 2,270 | 2,270 | 2,270 |
| Livestock | L | Gulf Coast Aquifer System \| DeWitt County | 659 | 659 | 659 | 659 | 659 | 659 |
| Livestock | L | Local Surface Water Supply | 660 | 660 | 660 | 660 | 660 | 660 |
| Irrigation | L | Gulf Coast Aquifer System \| DeWitt County | 263 | 263 | 263 | 263 | 263 | 263 |
| | | | | | | | | |
| **DeWitt County / Lavaca Basin WUG Total** | | | **1,774** | **1,775** | **1,774** | **1,773** | **1,774** | **1,774** |
| Yoakum* | L | Gulf Coast Aquifer System \| DeWitt County | 351 | 351 | 351 | 351 | 351 | 351 |
| County-Other | L | Gulf Coast Aquifer System \| DeWitt County | 212 | 212 | 211 | 211 | 211 | 212 |
| Manufacturing | L | Gulf Coast Aquifer System \| DeWitt County | 366 | 367 | 367 | 366 | 367 | 366 |
| Mining | L | Gulf Coast Aquifer System \| DeWitt County | 54 | 54 | 54 | 54 | 54 | 54 |
| Livestock | L | Gulf Coast Aquifer System \| DeWitt County | 132 | 132 | 132 | 132 | 132 | 132 |
| Livestock | L | Local Surface Water Supply | 133 | 133 | 133 | 133 | 133 | 133 |
| Irrigation | L | Gulf Coast Aquifer System \| DeWitt County | 526 | 526 | 526 | 526 | 526 | 526 |
| | | | | | | | | |
| **DeWitt County / Lavaca-Guadalupe Basin WUG Total** | | | **37** | **37** | **37** | **37** | **37** | **37** |
| County-Other | L | Gulf Coast Aquifer System \| DeWitt County | 3 | 3 | 3 | 3 | 3 | 3 |
| Livestock | L | Gulf Coast Aquifer System \| DeWitt County | 12 | 12 | 12 | 12 | 12 | 12 |
| Livestock | L | Local Surface Water Supply | 12 | 12 | 12 | 12 | 12 | 12 |
| Irrigation | L | Gulf Coast Aquifer System \| DeWitt County | 10 | 10 | 10 | 10 | 10 | 10 |
| | | | | | | | | |
| **DeWitt County / San Antonio Basin WUG Total** | | | **623** | **623** | **623** | **623** | **623** | **623** |
| County-Other | L | Gulf Coast Aquifer System \| DeWitt County | 84 | 84 | 84 | 84 | 84 | 84 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Mining | L | Gulf Coast Aquifer System \| DeWitt County | 347 | 347 | 347 | 347 | 347 | 347 |
| Livestock | L | Gulf Coast Aquifer System \| DeWitt County | 64 | 64 | 64 | 64 | 64 | 64 |
| Livestock | L | Local Surface Water Supply | 64 | 64 | 64 | 64 | 64 | 64 |
| Irrigation | L | Gulf Coast Aquifer System \| DeWitt County | 64 | 64 | 64 | 64 | 64 | 64 |
| | | | | | | | | |
| **Dimmit County WUG Total** | | | **4,026** | **4,026** | **4,026** | **4,026** | **4,032** | **4,089** |
| **Dimmit County / Nueces Basin WUG Total** | | | **3,921** | **3,921** | **3,921** | **3,921** | **3,927** | **3,984** |
| Asherton | L | Carrizo-Wilcox Aquifer \| Dimmit County | 193 | 193 | 193 | 193 | 193 | 193 |
| Big Wells | L | Carrizo-Wilcox Aquifer \| Dimmit County | 168 | 168 | 168 | 168 | 168 | 168 |
| Carrizo Hill WSC | L | Carrizo-Wilcox Aquifer \| Dimmit County | 154 | 154 | 154 | 154 | 160 | 217 |
| Carrizo Springs | L | Carrizo-Wilcox Aquifer \| Dimmit County | 1,789 | 1,789 | 1,789 | 1,789 | 1,789 | 1,789 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Dimmit County | 303 | 303 | 303 | 303 | 303 | 303 |
| Mining | L | Carrizo-Wilcox Aquifer \| Dimmit County | 695 | 695 | 695 | 695 | 695 | 695 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Dimmit County | 172 | 172 | 172 | 172 | 172 | 172 |
| Livestock | L | Local Surface Water Supply | 172 | 172 | 172 | 172 | 172 | 172 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Dimmit County | 64 | 64 | 64 | 64 | 64 | 64 |
| Irrigation | L | Nueces Run-of-River | 211 | 211 | 211 | 211 | 211 | 211 |
| | | | | | | | | |
| **Dimmit County / Rio Grande Basin WUG Total** | | | **105** | **105** | **105** | **105** | **105** | **105** |
| County-Other | L | Carrizo-Wilcox Aquifer \| Dimmit County | 4 | 4 | 4 | 4 | 4 | 4 |
| Mining | | No water supply associated with WUG | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Dimmit County | 11 | 11 | 11 | 11 | 11 | 11 |
| Livestock | L | Local Surface Water Supply | 12 | 12 | 12 | 12 | 12 | 12 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Dimmit County | 78 | 78 | 78 | 78 | 78 | 78 |
| | | | | | | | | |
| **Frio County WUG Total** | | | **82,268** | **82,294** | **82,282** | **82,256** | **82,226** | **82,218** |
| **Frio County / Nueces Basin WUG Total** | | | **82,268** | **82,294** | **82,282** | **82,256** | **82,226** | **82,218** |
| Benton City WSC | L | Carrizo-Wilcox Aquifer \| Atascosa County | 147 | 173 | 185 | 178 | 171 | 163 |
| Dilley | L | Carrizo-Wilcox Aquifer \| Frio County | 2,147 | 2,147 | 2,147 | 2,147 | 2,147 | 2,147 |
| Moore WSC | L | Carrizo-Wilcox Aquifer \| Frio County | 4,033 | 4,033 | 4,033 | 4,033 | 4,033 | 4,033 |
| Pearsall | L | Carrizo-Wilcox Aquifer \| Frio County | 1,410 | 1,410 | 1,410 | 1,410 | 1,410 | 1,410 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Frio County | 499 | 499 | 499 | 499 | 499 | 499 |
| Mining | L | Carrizo-Wilcox Aquifer \| Frio County | 984 | 984 | 984 | 984 | 984 | 984 |
| Mining | L | Queen City Aquifer \| Frio County | 984 | 984 | 984 | 984 | 984 | 984 |
| Steam Electric Power | L | Carrizo-Wilcox Aquifer \| Frio County | 124 | 124 | 124 | 124 | 124 | 124 |
| Livestock | L | Local Surface Water Supply | 482 | 482 | 482 | 482 | 482 | 482 |
| Livestock | L | Queen City Aquifer \| Frio County | 482 | 482 | 482 | 482 | 482 | 482 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Frio County | 69,351 | 69,351 | 69,351 | 69,351 | 69,351 | 69,351 |
| Irrigation | L | Queen City Aquifer \| Frio County | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 |
| Irrigation | L | Sparta Aquifer \| Frio County | 600 | 600 | 576 | 557 | 534 | 534 |
| | | | | | | | | |
| **Goliad County WUG Total** | | | **29,897** | **30,052** | **30,207** | **30,359** | **30,278** | **30,018** |
| **Goliad County / Guadalupe Basin WUG Total** | | | **25,600** | **25,600** | **25,600** | **25,600** | **25,366** | **25,106** |
| County-Other | L | Gulf Coast Aquifer System \| Goliad County | 307 | 307 | 307 | 307 | 307 | 307 |
| Mining | L | Gulf Coast Aquifer System \| Goliad County | 14 | 14 | 14 | 14 | 14 | 14 |
| Steam Electric Power | L | Coleto Creek Lake/Reservoir | 24,160 | 24,160 | 24,160 | 24,160 | 23,926 | 23,666 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Steam Electric Power | L | Gulf Coast Aquifer System \| Goliad County | 223 | 223 | 223 | 223 | 223 | 223 |
| Livestock | L | Gulf Coast Aquifer System \| Goliad County | 99 | 99 | 99 | 99 | 99 | 99 |
| Livestock | L | Local Surface Water Supply | 100 | 100 | 100 | 100 | 100 | 100 |
| Irrigation | L | Gulf Coast Aquifer System \| Goliad County | 697 | 697 | 697 | 697 | 697 | 697 |
| | | | | | | | | |
| **Goliad County / San Antonio Basin WUG Total** | | | **3,554** | **3,702** | **3,851** | **3,997** | **4,146** | **4,146** |
| Goliad | L | Gulf Coast Aquifer System \| Goliad County | 920 | 920 | 920 | 920 | 920 | 920 |
| County-Other | L | Gulf Coast Aquifer System \| Goliad County | 335 | 335 | 335 | 335 | 335 | 335 |
| Livestock | L | Gulf Coast Aquifer System \| Goliad County | 155 | 155 | 155 | 155 | 155 | 155 |
| Livestock | L | Local Surface Water Supply | 156 | 156 | 156 | 156 | 156 | 156 |
| Irrigation | L | Gulf Coast Aquifer System \| Goliad County | 1,988 | 2,136 | 2,285 | 2,431 | 2,580 | 2,580 |
| | | | | | | | | |
| **Goliad County / San Antonio-Nueces Basin WUG Total** | | | **743** | **750** | **756** | **762** | **766** | **766** |
| County-Other | L | Gulf Coast Aquifer System \| Goliad County | 53 | 53 | 53 | 53 | 53 | 53 |
| Livestock | L | Gulf Coast Aquifer System \| Goliad County | 139 | 139 | 139 | 139 | 139 | 139 |
| Livestock | L | Local Surface Water Supply | 140 | 140 | 140 | 140 | 140 | 140 |
| Irrigation | L | Gulf Coast Aquifer System \| Goliad County | 411 | 418 | 424 | 430 | 434 | 434 |
| | | | | | | | | |
| **Gonzales County WUG Total** | | | **24,145** | **24,145** | **24,134** | **24,121** | **24,106** | **24,091** |
| **Gonzales County / Guadalupe Basin WUG Total** | | | **24,018** | **24,019** | **24,007** | **23,994** | **23,979** | **23,965** |
| Fayette WSC* | K | Yegua-Jackson Aquifer \| Fayette County | 5 | 7 | 9 | 12 | 15 | 20 |
| Gonzales | L | Carrizo-Wilcox Aquifer \| Gonzales County | 2,920 | 2,920 | 2,920 | 2,920 | 2,920 | 2,920 |
| Gonzales | L | Guadalupe Run-of-River | 2,240 | 2,240 | 2,240 | 2,240 | 2,240 | 2,240 |
| Gonzales County WSC | L | Carrizo-Wilcox Aquifer \| Gonzales County | 2,396 | 2,387 | 2,374 | 2,359 | 2,341 | 2,322 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Luling | L | Carrizo-Wilcox Aquifer \| Caldwell County | 7 | 14 | 14 | 13 | 13 | 12 |
| Nixon | L | Carrizo-Wilcox Aquifer \| Gonzales County | 866 | 866 | 866 | 866 | 866 | 866 |
| Smiley | L | Carrizo-Wilcox Aquifer \| Gonzales County | 117 | 117 | 117 | 117 | 117 | 117 |
| Waelder | L | Queen City Aquifer \| Gonzales County | 630 | 630 | 630 | 630 | 630 | 630 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Gonzales County | 129 | 129 | 129 | 128 | 128 | 129 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Gonzales County | 451 | 451 | 451 | 451 | 451 | 451 |
| Manufacturing | L | Queen City Aquifer \| Gonzales County | 534 | 534 | 534 | 534 | 534 | 534 |
| Manufacturing | L | Sparta Aquifer \| Gonzales County | 1,140 | 1,140 | 1,140 | 1,140 | 1,140 | 1,140 |
| Manufacturing | L | Yegua-Jackson Aquifer \| Gonzales County | 687 | 687 | 687 | 687 | 687 | 687 |
| Mining | L | Carrizo-Wilcox Aquifer \| Gonzales County | 1,796 | 1,796 | 1,796 | 1,796 | 1,796 | 1,796 |
| Mining | L | Sparta Aquifer \| Gonzales County | 101 | 101 | 101 | 101 | 101 | 101 |
| Mining | L | Yegua-Jackson Aquifer \| Gonzales County | 982 | 983 | 982 | 983 | 983 | 983 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Gonzales County | 1,065 | 1,065 | 1,065 | 1,065 | 1,065 | 1,065 |
| Livestock | L | Local Surface Water Supply | 2,050 | 2,050 | 2,050 | 2,050 | 2,050 | 2,050 |
| Livestock | L | Queen City Aquifer \| Gonzales County | 315 | 315 | 315 | 315 | 315 | 315 |
| Livestock | L | Sparta Aquifer \| Gonzales County | 256 | 256 | 256 | 256 | 256 | 256 |
| Livestock | L | Yegua-Jackson Aquifer \| Gonzales County | 413 | 413 | 413 | 413 | 413 | 413 |
| Irrigation | L | Canyon Lake/Reservoir | 2 | 2 | 2 | 2 | 2 | 2 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Gonzales County | 3,788 | 3,788 | 3,788 | 3,788 | 3,788 | 3,788 |
| Irrigation | L | Queen City Aquifer \| Gonzales County | 867 | 867 | 867 | 867 | 867 | 867 |
| Irrigation | L | Yegua-Jackson Aquifer \| Gonzales County | 261 | 261 | 261 | 261 | 261 | 261 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Gonzales County / Lavaca Basin WUG Total** | | | **127** | **126** | **127** | **127** | **127** | **126** |
| County-Other | L | Carrizo-Wilcox Aquifer \| Gonzales County | 6 | 6 | 6 | 7 | 7 | 6 |
| Mining | L | Sparta Aquifer \| Gonzales County | 8 | 8 | 8 | 8 | 8 | 8 |
| Mining | L | Yegua-Jackson Aquifer \| Gonzales County | 74 | 73 | 74 | 73 | 73 | 73 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Gonzales County | 19 | 19 | 19 | 19 | 19 | 19 |
| Livestock | L | Local Surface Water Supply | 20 | 20 | 20 | 20 | 20 | 20 |
| | | | | | | | | |
| **Guadalupe County WUG Total** | | | **67,474** | **65,820** | **65,550** | **65,238** | **65,056** | **64,954** |
| **Guadalupe County / Guadalupe Basin WUG Total** | | | **46,801** | **45,648** | **45,572** | **45,346** | **45,211** | **45,134** |
| Crystal Clear SUD | L | Canyon Lake/Reservoir | 317 | 321 | 322 | 320 | 317 | 313 |
| Crystal Clear SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 1,480 | 1,619 | 1,691 | 1,781 | 1,862 | 1,934 |
| Crystal Clear SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 473 | 517 | 541 | 569 | 595 | 618 |
| Crystal Clear SUD | L | Edwards-BFZ Aquifer \| Hays County | 699 | 764 | 799 | 841 | 879 | 913 |
| Crystal Clear SUD | L | Guadalupe Run-of-River | 298 | 326 | 341 | 359 | 375 | 390 |
| Gonzales County WSC | L | Carrizo-Wilcox Aquifer \| Gonzales County | 42 | 53 | 66 | 81 | 99 | 119 |
| Green Valley SUD | L | Canyon Lake/Reservoir | 475 | 476 | 475 | 475 | 475 | 474 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 474 | 475 | 474 | 474 | 473 | 473 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 297 | 297 | 297 | 297 | 297 | 296 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 1,741 | 1,742 | 1,741 | 1,739 | 1,737 | 1,735 |
| Green Valley SUD | L | Edwards-BFZ Aquifer \| Comal County | 557 | 557 | 557 | 556 | 556 | 555 |
| Green Valley SUD | L | Trinity Aquifer \| Bexar County | 178 | 178 | 178 | 178 | 178 | 178 |
| Martindale WSC | L | Canyon Lake/Reservoir | 25 | 27 | 31 | 34 | 36 | 39 |
| Martindale WSC | L | Guadalupe Run-of-River | 32 | 37 | 42 | 46 | 50 | 53 |
| New Braunfels | L | Canyon Lake/Reservoir | 2,186 | 2,209 | 2,148 | 2,041 | 1,970 | 1,919 |
| New Braunfels | L | Carrizo-Wilcox Aquifer \| Caldwell County | 297 | 301 | 292 | 278 | 268 | 261 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| New Braunfels | L | Carrizo-Wilcox Aquifer \| Gonzales County | 1,784 | 1,803 | 1,753 | 1,666 | 1,608 | 1,567 |
| New Braunfels | L | Direct Reuse | 17 | 17 | 17 | 16 | 15 | 15 |
| New Braunfels | L | Edwards-BFZ Aquifer \| Comal County | 1,116 | 1,128 | 1,097 | 1,043 | 1,006 | 980 |
| New Braunfels | L | Guadalupe Run-of-River | 1,420 | 1,434 | 1,395 | 1,327 | 1,279 | 1,246 |
| New Braunfels | L | Trinity Aquifer \| Comal County | 1,115 | 1,127 | 1,095 | 1,041 | 1,005 | 979 |
| Schertz | L | Carrizo-Wilcox Aquifer \| Gonzales County | 642 | 613 | 598 | 590 | 584 | 579 |
| Schertz | L | Edwards-BFZ Aquifer \| Comal County | 52 | 49 | 48 | 48 | 47 | 46 |
| Schertz | L | Edwards-BFZ Aquifer \| Medina County | 1 | 1 | 1 | 1 | 1 | 1 |
| Seguin | L | Carrizo-Wilcox Aquifer \| Gonzales County | 1,468 | 1,468 | 1,468 | 1,468 | 1,468 | 1,468 |
| Seguin | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 3,515 | 3,515 | 3,515 | 3,515 | 3,515 | 3,515 |
| Seguin | L | Direct Reuse | 788 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 |
| Seguin | L | Guadalupe Run-of-River | 4,200 | 4,200 | 4,200 | 4,200 | 4,200 | 4,200 |
| Springs Hill WSC | L | Canyon Lake/Reservoir | 3,776 | 1,719 | 1,719 | 1,719 | 1,719 | 1,719 |
| Springs Hill WSC | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 2,283 | 2,283 | 2,283 | 2,283 | 2,283 | 2,283 |
| Tri Community WSC | L | Guadalupe Run-of-River | 8 | 10 | 10 | 9 | 10 | 10 |
| Water Services | L | Trinity Aquifer \| Bexar County | 42 | 35 | 30 | 25 | 21 | 18 |
| County-Other | L | Canyon Lake/Reservoir | 10 | 10 | 10 | 10 | 10 | 10 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 305 | 305 | 305 | 305 | 305 | 305 |
| County-Other | L | Edwards-BFZ Aquifer \| Guadalupe County | 12 | 12 | 12 | 12 | 12 | 12 |
| County-Other | L | Guadalupe Run-of-River | 61 | 61 | 61 | 61 | 61 | 61 |
| Manufacturing | L | Canyon Lake/Reservoir | 2,709 | 2,709 | 2,710 | 2,688 | 2,645 | 2,600 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 110 | 110 | 110 | 110 | 110 | 110 |
| Manufacturing | L | Edwards-BFZ Aquifer \| Guadalupe County | 201 | 201 | 201 | 201 | 201 | 201 |
| Manufacturing | L | Guadalupe Run-of-River | 59 | 59 | 59 | 59 | 59 | 59 |
| Mining | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 342 | 342 | 342 | 342 | 342 | 342 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Steam Electric Power | L | Canyon Lake/Reservoir | 4,520 | 4,520 | 4,520 | 4,520 | 4,520 | 4,520 |
| Steam Electric Power | L | Carrizo-Wilcox Aquifer \| Gonzales County | 2,600 | 2,600 | 2,600 | 2,600 | 2,600 | 2,600 |
| Steam Electric Power | L | Direct Reuse | 2,345 | 2,345 | 2,345 | 2,345 | 2,345 | 2,345 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 492 | 492 | 492 | 492 | 492 | 492 |
| Livestock | L | Local Surface Water Supply | 493 | 493 | 493 | 493 | 493 | 493 |
| Irrigation | L | Canyon Lake/Reservoir | 307 | 307 | 307 | 307 | 307 | 307 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 366 | 366 | 366 | 366 | 366 | 366 |
| Irrigation | L | Guadalupe Run-of-River | 71 | 71 | 71 | 71 | 71 | 71 |
| | | | | | | | | |
| **Guadalupe County / San Antonio Basin WUG Total** | | | **20,673** | **20,172** | **19,978** | **19,892** | **19,845** | **19,820** |
| Cibolo | L | Canyon Lake/Reservoir | 1,350 | 1,350 | 1,350 | 1,350 | 1,350 | 1,350 |
| Cibolo | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 | 1,861 |
| Cibolo | L | Direct Reuse | 7 | 7 | 7 | 7 | 7 | 7 |
| Cibolo | L | Edwards-BFZ Aquifer \| Comal County | 400 | 400 | 400 | 400 | 400 | 400 |
| East Central SUD | L | Canyon Lake/Reservoir | 41 | 44 | 48 | 51 | 55 | 59 |
| East Central SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 29 | 31 | 34 | 37 | 39 | 42 |
| East Central SUD | L | Edwards-BFZ Aquifer \| Bexar County | 25 | 26 | 23 | 28 | 25 | 30 |
| Green Valley SUD | L | Canyon Lake/Reservoir | 1,018 | 1,018 | 1,018 | 1,015 | 1,015 | 1,014 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 1,015 | 1,014 | 1,015 | 1,012 | 1,012 | 1,011 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 636 | 636 | 636 | 635 | 634 | 634 |
| Green Valley SUD | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 3,725 | 3,725 | 3,724 | 3,718 | 3,714 | 3,711 |
| Green Valley SUD | L | Edwards-BFZ Aquifer \| Comal County | 1,194 | 1,193 | 1,193 | 1,190 | 1,189 | 1,188 |
| Green Valley SUD | L | Trinity Aquifer \| Bexar County | 382 | 382 | 382 | 381 | 381 | 380 |
| Marion | L | Canyon Lake/Reservoir | 100 | 100 | 100 | 100 | 100 | 100 |
| Marion | L | Carrizo-Wilcox Aquifer \| Gonzales County | 200 | 200 | 200 | 200 | 200 | 200 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Marion | L | Direct Reuse | 23 | 45 | 45 | 45 | 45 | 45 |
| Marion | L | Edwards-BFZ Aquifer \| Guadalupe County | 78 | 78 | 78 | 78 | 78 | 78 |
| Schertz | L | Carrizo-Wilcox Aquifer \| Gonzales County | 5,304 | 5,069 | 4,940 | 4,879 | 4,826 | 4,780 |
| Schertz | L | Edwards-BFZ Aquifer \| Comal County | 426 | 407 | 397 | 392 | 388 | 384 |
| Schertz | L | Edwards-BFZ Aquifer \| Medina County | 4 | 4 | 4 | 4 | 4 | 4 |
| Selma | L | Carrizo-Wilcox Aquifer \| Gonzales County | 337 | 277 | 237 | 209 | 184 | 162 |
| Selma | L | Edwards-BFZ Aquifer \| Bexar County | 215 | 177 | 151 | 133 | 118 | 103 |
| Springs Hill WSC | L | Canyon Lake/Reservoir | 414 | 231 | 231 | 231 | 231 | 231 |
| Springs Hill WSC | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 237 | 237 | 237 | 237 | 237 | 237 |
| Universal City | L | Direct Reuse | 29 | 37 | 45 | 55 | 65 | 77 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 69 | 69 | 69 | 69 | 69 | 69 |
| County-Other | L | Edwards-BFZ Aquifer \| Guadalupe County | 2 | 2 | 2 | 2 | 2 | 2 |
| County-Other | L | Trinity Aquifer \| Guadalupe County | 9 | 9 | 9 | 9 | 9 | 9 |
| Manufacturing | L | Canyon Lake/Reservoir | 1,151 | 1,151 | 1,150 | 1,172 | 1,215 | 1,260 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 97 | 97 | 97 | 97 | 97 | 97 |
| Livestock | L | Local Surface Water Supply | 97 | 97 | 97 | 97 | 97 | 97 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Guadalupe County | 198 | 198 | 198 | 198 | 198 | 198 |
| | | | | | | | | |
| **Hays County WUG Total** | | | **61,790** | **62,246** | **62,533** | **62,637** | **62,451** | **62,204** |
| **Hays County / Guadalupe Basin WUG Total** | | | **61,790** | **62,246** | **62,533** | **62,637** | **62,451** | **62,204** |
| County Line SUD | L | Canyon Lake/Reservoir | 1,308 | 1,308 | 1,308 | 1,308 | 1,308 | 1,308 |
| County Line SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 2,119 | 2,160 | 2,187 | 2,188 | 2,188 | 2,188 |
| County Line SUD | L | Edwards-BFZ Aquifer \| Hays County | 166 | 166 | 166 | 166 | 166 | 166 |
| Creedmoor-Maha WSC* | L | Carrizo-Wilcox Aquifer \| Gonzales County | 6 | 6 | 6 | 6 | 6 | 6 |
| Crystal Clear SUD | L | Canyon Lake/Reservoir | 124 | 122 | 123 | 127 | 131 | 136 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Crystal Clear SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 366 | 386 | 368 | 326 | 288 | 255 |
| Crystal Clear SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 117 | 123 | 117 | 104 | 92 | 81 |
| Crystal Clear SUD | L | Edwards-BFZ Aquifer \| Hays County | 173 | 182 | 174 | 154 | 136 | 120 |
| Crystal Clear SUD | L | Guadalupe Run-of-River | 74 | 78 | 74 | 66 | 58 | 51 |
| Goforth SUD* | L | Canyon Lake/Reservoir | 3,804 | 3,848 | 3,877 | 3,898 | 3,911 | 3,920 |
| Goforth SUD* | L | Carrizo-Wilcox Aquifer \| Gonzales County | 5,959 | 6,029 | 6,075 | 6,039 | 5,780 | 5,489 |
| Goforth SUD* | L | Edwards-BFZ Aquifer \| Hays County | 105 | 107 | 107 | 108 | 108 | 109 |
| Goforth SUD* | K | Edwards-BFZ Aquifer \| Travis County | 7 | 7 | 7 | 7 | 7 | 7 |
| Goforth SUD* | L | Trinity Aquifer \| Hays County | 2,013 | 2,036 | 2,051 | 2,063 | 2,069 | 2,074 |
| Kyle | L | Canyon Lake/Reservoir | 5,443 | 5,443 | 5,443 | 5,443 | 5,443 | 5,443 |
| Kyle | L | Carrizo-Wilcox Aquifer \| Caldwell County | 4,225 | 4,225 | 4,225 | 4,225 | 4,225 | 4,225 |
| Kyle | L | Direct Reuse | 1,936 | 1,936 | 1,936 | 1,936 | 1,936 | 1,936 |
| Kyle | L | Edwards-BFZ Aquifer \| Hays County | 370 | 370 | 370 | 370 | 370 | 370 |
| Maxwell SUD | L | Canyon Lake/Reservoir | 472 | 533 | 586 | 634 | 667 | 690 |
| Maxwell SUD | L | Carrizo-Wilcox Aquifer \| Caldwell County | 398 | 450 | 495 | 535 | 563 | 583 |
| Maxwell SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 398 | 450 | 495 | 535 | 563 | 583 |
| Maxwell SUD | L | Edwards-BFZ Aquifer \| Comal County | 125 | 141 | 155 | 168 | 176 | 183 |
| Maxwell SUD | L | Guadalupe Run-of-River | 413 | 465 | 511 | 553 | 581 | 602 |
| San Marcos | L | Canyon Lake/Reservoir | 9,998 | 9,998 | 9,998 | 9,997 | 9,997 | 9,997 |
| San Marcos | L | Carrizo-Wilcox Aquifer \| Caldwell County | 5,380 | 5,380 | 5,380 | 5,380 | 5,380 | 5,380 |
| San Marcos | L | Direct Reuse | 1,905 | 1,905 | 1,905 | 1,905 | 1,905 | 1,905 |
| San Marcos | L | Edwards-BFZ Aquifer \| Hays County | 3,081 | 3,087 | 3,089 | 3,091 | 3,092 | 3,092 |
| South Buda WCID 1 | L | Trinity Aquifer \| Hays County | 850 | 850 | 850 | 850 | 850 | 850 |
| Texas State University | L | Edwards-BFZ Aquifer \| Hays County | 1,143 | 1,143 | 1,143 | 1,143 | 1,143 | 1,143 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Wimberley WSC | L | Trinity Aquifer \| Hays County | 750 | 750 | 750 | 750 | 750 | 750 |
| County-Other* | L | Canyon Lake/Reservoir | 560 | 560 | 560 | 560 | 560 | 560 |
| County-Other* | L | Edwards-BFZ Aquifer \| Hays County | 1,371 | 1,371 | 1,371 | 1,371 | 1,371 | 1,371 |
| County-Other* | L | Trinity Aquifer \| Hays County | 1,100 | 1,100 | 1,100 | 1,100 | 1,100 | 1,100 |
| Manufacturing* | L | Edwards-BFZ Aquifer \| Hays County | 70 | 70 | 70 | 70 | 70 | 70 |
| Mining* | L | Trinity Aquifer \| Hays County | 71 | 71 | 71 | 71 | 71 | 71 |
| Steam Electric Power | L | Canyon Lake/Reservoir | 2,464 | 2,464 | 2,464 | 2,464 | 2,464 | 2,464 |
| Livestock* | L | Guadalupe Run-of-River | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock* | L | Local Surface Water Supply | 140 | 140 | 140 | 140 | 140 | 140 |
| Livestock* | L | Trinity Aquifer \| Hays County | 140 | 140 | 140 | 140 | 140 | 140 |
| Livestock* | L | Water Recycling | 2,420 | 2,420 | 2,420 | 2,420 | 2,420 | 2,420 |
| Irrigation* | L | Direct Reuse | 37 | 37 | 37 | 37 | 37 | 37 |
| Irrigation* | L | Guadalupe Run-of-River | 130 | 130 | 130 | 130 | 130 | 130 |
| Irrigation* | L | Trinity Aquifer \| Hays County | 59 | 59 | 59 | 59 | 59 | 59 |
| | | | | | | | | |
| **Karnes County WUG Total** | | | **7,591** | **7,528** | **6,912** | **6,849** | **6,774** | **6,679** |
| **Karnes County / Guadalupe Basin WUG Total** | | | **340** | **340** | **339** | **339** | **338** | **338** |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Karnes County | 0 | 1 | 1 | 1 | 1 | 2 |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Wilson County | 7 | 6 | 5 | 5 | 4 | 5 |
| County-Other | L | Gulf Coast Aquifer System \| Karnes County | 7 | 7 | 7 | 7 | 7 | 7 |
| County-Other | L | Yegua-Jackson Aquifer \| Karnes County | 1 | 1 | 1 | 1 | 1 | 1 |
| Mining | L | Carrizo-Wilcox Aquifer \| Karnes County | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | L | Direct Reuse | 2 | 2 | 2 | 2 | 2 | 0 |
| Livestock | L | Gulf Coast Aquifer System \| Karnes County | 10 | 10 | 10 | 10 | 10 | 10 |
| Livestock | L | Local Surface Water Supply | 21 | 21 | 21 | 21 | 21 | 21 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | L | Yegua-Jackson Aquifer \| Karnes County | 10 | 10 | 10 | 10 | 10 | 10 |
| Irrigation | L | Yegua-Jackson Aquifer \| Karnes County | 282 | 282 | 282 | 282 | 282 | 282 |
| | | | | | | | | |
| **Karnes County / Nueces Basin WUG Total** | | | **188** | **189** | **189** | **186** | **183** | **181** |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Karnes County | 3 | 6 | 9 | 11 | 12 | 12 |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Wilson County | 52 | 48 | 46 | 42 | 40 | 38 |
| Three Oaks WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 16 | 18 | 17 | 16 | 14 | 16 |
| County-Other | L | Gulf Coast Aquifer System \| Karnes County | 1 | 1 | 1 | 1 | 1 | 1 |
| Mining | L | Direct Reuse | 2 | 2 | 2 | 2 | 2 | 0 |
| Mining | L | Gulf Coast Aquifer System \| Karnes County | 38 | 38 | 38 | 38 | 38 | 38 |
| Livestock | L | Gulf Coast Aquifer System \| Karnes County | 25 | 25 | 25 | 25 | 25 | 25 |
| Livestock | L | Local Surface Water Supply | 38 | 38 | 38 | 38 | 38 | 38 |
| Livestock | L | Yegua-Jackson Aquifer \| Karnes County | 13 | 13 | 13 | 13 | 13 | 13 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Karnes County | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | |
| **Karnes County / San Antonio Basin WUG Total** | | | **6,966** | **6,902** | **6,288** | **6,228** | **6,156** | **6,064** |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Karnes County | 84 | 161 | 242 | 305 | 343 | 341 |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Wilson County | 1,579 | 1,453 | 1,327 | 1,213 | 1,106 | 1,020 |
| Falls City | L | Carrizo-Wilcox Aquifer \| Karnes County | 142 | 142 | 142 | 142 | 142 | 142 |
| Karnes City | L | Carrizo-Wilcox Aquifer \| Karnes County | 525 | 525 | 525 | 525 | 525 | 525 |
| Karnes City | L | Direct Reuse | 90 | 90 | 90 | 90 | 90 | 90 |
| Kenedy | L | Direct Reuse | 30 | 30 | 30 | 30 | 30 | 30 |
| Kenedy | L | Gulf Coast Aquifer System \| Karnes County | 1,838 | 1,838 | 1,838 | 1,838 | 1,838 | 1,838 |
| Runge | L | Gulf Coast Aquifer System \| Karnes County | 225 | 225 | 225 | 225 | 225 | 225 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Sunko WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 64 | 53 | 46 | 39 | 35 | 33 |
| Three Oaks WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 70 | 67 | 64 | 62 | 64 | 58 |
| County-Other | L | Gulf Coast Aquifer System \| Karnes County | 302 | 301 | 301 | 301 | 300 | 300 |
| County-Other | L | Yegua-Jackson Aquifer \| Karnes County | 50 | 50 | 50 | 50 | 50 | 50 |
| Manufacturing | L | Gulf Coast Aquifer System \| Karnes County | 84 | 84 | 84 | 84 | 84 | 84 |
| Mining | L | Direct Reuse | 26 | 26 | 26 | 26 | 26 | 30 |
| Mining | L | Yegua-Jackson Aquifer \| Karnes County | 411 | 411 | 411 | 411 | 411 | 411 |
| Livestock | L | Gulf Coast Aquifer System \| Karnes County | 197 | 197 | 197 | 197 | 197 | 197 |
| Livestock | L | Local Surface Water Supply | 394 | 394 | 394 | 394 | 394 | 394 |
| Livestock | L | Yegua-Jackson Aquifer \| Karnes County | 196 | 196 | 196 | 196 | 196 | 196 |
| Irrigation | L | Gulf Coast Aquifer System \| Karnes County | 559 | 559 | 0 | 0 | 0 | 0 |
| Irrigation | L | San Antonio Run-of-River | 100 | 100 | 100 | 100 | 100 | 100 |
| | | | | | | | | |
| **Karnes County / San Antonio-Nueces Basin WUG Total** | | | **97** | **97** | **96** | **96** | **97** | **96** |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Karnes County | 1 | 2 | 2 | 3 | 3 | 3 |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Wilson County | 15 | 13 | 12 | 11 | 11 | 10 |
| County-Other | L | Gulf Coast Aquifer System \| Karnes County | 6 | 7 | 7 | 7 | 8 | 8 |
| Livestock | L | Gulf Coast Aquifer System \| Karnes County | 25 | 25 | 25 | 25 | 25 | 25 |
| Livestock | L | Local Surface Water Supply | 25 | 25 | 25 | 25 | 25 | 25 |
| Irrigation | L | Gulf Coast Aquifer System \| Karnes County | 25 | 25 | 25 | 25 | 25 | 25 |
| | | | | | | | | |
| **Kendall County WUG Total** | | | **15,597** | **14,787** | **14,821** | **14,830** | **14,829** | **14,825** |
| **Kendall County / Colorado Basin WUG Total** | | | **127** | **102** | **102** | **102** | **102** | **102** |
| County-Other | L | Canyon Lake/Reservoir | 25 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| County-Other | L | Edwards-Trinity-Plateau Aquifer \| Kendall County | 2 | 2 | 2 | 2 | 2 | 2 |
| County-Other | L | Trinity Aquifer \| Kendall County | 96 | 96 | 96 | 96 | 96 | 96 |
| Livestock | L | Edwards-Trinity-Plateau Aquifer \| Kendall County | 1 | 1 | 1 | 1 | 1 | 1 |
| Livestock | L | Local Surface Water Supply | 2 | 2 | 2 | 2 | 2 | 2 |
| Livestock | L | Trinity Aquifer \| Kendall County | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | | | | |
| **Kendall County / Guadalupe Basin WUG Total** | | | **5,867** | **5,537** | **5,537** | **5,537** | **5,537** | **5,537** |
| Guadalupe-Blanco River Authority | L | Canyon Lake/Reservoir | 89 | 285 | 285 | 285 | 285 | 285 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Caldwell County | 89 | 285 | 285 | 285 | 285 | 285 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Gonzales County | 90 | 286 | 286 | 286 | 286 | 286 |
| Kendall County WCID 1 | L | Direct Reuse | 227 | 227 | 227 | 227 | 227 | 227 |
| Kendall County WCID 1 | L | Trinity Aquifer \| Kendall County | 500 | 500 | 500 | 500 | 500 | 500 |
| County-Other | L | Canyon Lake/Reservoir | 1,668 | 750 | 750 | 750 | 750 | 750 |
| County-Other | L | Edwards-Trinity-Plateau Aquifer \| Kendall County | 53 | 53 | 53 | 53 | 53 | 53 |
| County-Other | L | Trinity Aquifer \| Kendall County | 2,167 | 2,167 | 2,167 | 2,167 | 2,167 | 2,167 |
| Manufacturing | L | Trinity Aquifer \| Kendall County | 3 | 3 | 3 | 3 | 3 | 3 |
| Livestock | L | Edwards-Trinity-Plateau Aquifer \| Kendall County | 9 | 9 | 9 | 9 | 9 | 9 |
| Livestock | L | Local Surface Water Supply | 172 | 172 | 172 | 172 | 172 | 172 |
| Livestock | L | Trinity Aquifer \| Kendall County | 162 | 162 | 162 | 162 | 162 | 162 |
| Irrigation | L | Direct Reuse | 230 | 230 | 230 | 230 | 230 | 230 |
| Irrigation | L | Guadalupe Run-of-River | 26 | 26 | 26 | 26 | 26 | 26 |
| Irrigation | L | Trinity Aquifer \| Kendall County | 382 | 382 | 382 | 382 | 382 | 382 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Kendall County / San Antonio Basin WUG Total** | | | **9,603** | **9,148** | **9,182** | **9,191** | **9,190** | **9,186** |
| Boerne | L | Boerne Lake/Reservoir | 648 | 648 | 648 | 648 | 648 | 648 |
| Boerne | L | Canyon Lake/Reservoir | 3,611 | 3,611 | 3,611 | 3,611 | 3,611 | 3,611 |
| Boerne | L | Direct Reuse | 523 | 523 | 523 | 523 | 523 | 523 |
| Boerne | L | Trinity Aquifer \| Kendall County | 1,850 | 1,850 | 1,850 | 1,850 | 1,850 | 1,850 |
| Fair Oaks Ranch | L | Canyon Lake/Reservoir | 470 | 539 | 566 | 575 | 577 | 577 |
| Fair Oaks Ranch | L | Direct Reuse | 72 | 81 | 85 | 87 | 87 | 87 |
| Fair Oaks Ranch | L | Trinity Aquifer \| Comal County | 159 | 182 | 191 | 194 | 195 | 195 |
| Guadalupe-Blanco River Authority | L | Canyon Lake/Reservoir | 1 | 4 | 4 | 4 | 4 | 4 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Caldwell County | 1 | 4 | 4 | 4 | 4 | 4 |
| Guadalupe-Blanco River Authority | L | Carrizo-Wilcox Aquifer \| Gonzales County | 3 | 6 | 6 | 6 | 6 | 6 |
| Kendall West Utility | L | Trinity Aquifer \| Kendall County | 500 | 500 | 500 | 500 | 500 | 500 |
| Water Services | L | Trinity Aquifer \| Bexar County | 46 | 38 | 32 | 27 | 23 | 19 |
| County-Other | L | Canyon Lake/Reservoir | 557 | 0 | 0 | 0 | 0 | 0 |
| County-Other | L | Trinity Aquifer \| Kendall County | 1,026 | 1,026 | 1,026 | 1,026 | 1,026 | 1,026 |
| Livestock | L | Local Surface Water Supply | 21 | 21 | 21 | 21 | 21 | 21 |
| Livestock | L | Trinity Aquifer \| Kendall County | 20 | 20 | 20 | 20 | 20 | 20 |
| Irrigation | L | Trinity Aquifer \| Kendall County | 95 | 95 | 95 | 95 | 95 | 95 |
| | | | | | | | | |
| **La Salle County WUG Total** | | | **6,627** | **6,627** | **6,627** | **6,627** | **6,627** | **6,627** |
| **La Salle County / Nueces Basin WUG Total** | | | **6,627** | **6,627** | **6,627** | **6,627** | **6,627** | **6,627** |
| Cotulla | L | Carrizo-Wilcox Aquifer \| La Salle County | 1,100 | 1,100 | 1,100 | 1,100 | 1,100 | 1,100 |
| Encinal WSC | L | Carrizo-Wilcox Aquifer \| La Salle County | 296 | 296 | 296 | 296 | 296 | 296 |
| County-Other | L | Carrizo-Wilcox Aquifer \| La Salle County | 260 | 260 | 260 | 260 | 260 | 260 |
| Mining | L | Carrizo-Wilcox Aquifer \| La Salle County | 529 | 529 | 529 | 529 | 529 | 529 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | L | Carrizo-Wilcox Aquifer \| La Salle County | 105 | 105 | 105 | 105 | 105 | 105 |
| Livestock | L | Local Surface Water Supply | 197 | 197 | 197 | 197 | 197 | 197 |
| Livestock | L | Queen City Aquifer \| La Salle County | 1 | 1 | 1 | 1 | 1 | 1 |
| Livestock | L | Yegua-Jackson Aquifer \| La Salle County | 91 | 91 | 91 | 91 | 91 | 91 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| La Salle County | 3,574 | 3,574 | 3,574 | 3,574 | 3,574 | 3,574 |
| Irrigation | L | Nueces Run-of-River | 474 | 474 | 474 | 474 | 474 | 474 |
| Irrigation | L | Sparta Aquifer \| La Salle County | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | |
| **Medina County WUG Total** | | | **46,525** | **48,057** | **47,949** | **47,807** | **47,717** | **47,475** |
| **Medina County / Nueces Basin WUG Total** | | | **35,260** | **35,151** | **35,042** | **34,957** | **34,877** | **34,810** |
| Benton City WSC | L | Carrizo-Wilcox Aquifer \| Atascosa County | 674 | 642 | 614 | 601 | 587 | 573 |
| Devine | L | Carrizo-Wilcox Aquifer \| Medina County | 280 | 280 | 280 | 280 | 280 | 280 |
| Devine | L | Edwards-BFZ Aquifer \| Medina County | 471 | 471 | 471 | 471 | 471 | 471 |
| East Medina County SUD | L | Edwards-BFZ Aquifer \| Medina County | 924 | 924 | 924 | 924 | 924 | 924 |
| Hondo | L | Edwards-BFZ Aquifer \| Medina County | 1,823 | 1,823 | 1,823 | 1,823 | 1,823 | 1,823 |
| Lytle | L | Edwards-BFZ Aquifer \| Medina County | 79 | 80 | 80 | 78 | 76 | 75 |
| Medina County WCID 2 | L | Edwards-BFZ Aquifer \| Medina County | 102 | 102 | 102 | 102 | 102 | 102 |
| Medina County WCID 2 | L | Trinity Aquifer \| Medina County | 468 | 468 | 468 | 468 | 468 | 468 |
| Medina River West WSC | L | Edwards-BFZ Aquifer \| Medina County | 67 | 67 | 67 | 67 | 67 | 67 |
| Medina River West WSC | L | Trinity Aquifer \| Medina County | 215 | 214 | 214 | 214 | 214 | 215 |
| Natalia | L | Edwards-BFZ Aquifer \| Medina County | 186 | 186 | 186 | 186 | 186 | 186 |
| Ville Dalsace Water Supply | L | Edwards-BFZ Aquifer \| Medina County | 15 | 15 | 15 | 15 | 15 | 15 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| West Medina WSC | L | Edwards-BFZ Aquifer \| Medina County | 246 | 246 | 246 | 246 | 246 | 246 |
| Yancey WSC | L | Edwards-BFZ Aquifer \| Medina County | 97 | 97 | 97 | 98 | 98 | 98 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Medina County | 315 | 315 | 315 | 315 | 315 | 315 |
| County-Other | L | Edwards-BFZ Aquifer \| Medina County | 968 | 968 | 970 | 968 | 969 | 968 |
| County-Other | L | Leona Gravel Aquifer \| Medina County | 32 | 32 | 32 | 32 | 32 | 32 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Medina County | 2 | 2 | 2 | 2 | 2 | 2 |
| Manufacturing | L | Edwards-BFZ Aquifer \| Medina County | 1,567 | 1,567 | 1,567 | 1,567 | 1,567 | 1,567 |
| Manufacturing | L | Leona Gravel Aquifer \| Medina County | 15 | 15 | 15 | 15 | 15 | 15 |
| Mining | L | Edwards-BFZ Aquifer \| Medina County | 101 | 101 | 101 | 101 | 101 | 101 |
| Mining | L | Leona Gravel Aquifer \| Medina County | 551 | 551 | 551 | 551 | 551 | 551 |
| Mining | L | Trinity Aquifer \| Medina County | 369 | 369 | 369 | 369 | 369 | 369 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Medina County | 20 | 20 | 20 | 20 | 20 | 20 |
| Livestock | L | Edwards-BFZ Aquifer \| Medina County | 314 | 314 | 314 | 314 | 314 | 314 |
| Livestock | L | Leona Gravel Aquifer \| Medina County | 55 | 55 | 55 | 55 | 55 | 55 |
| Livestock | L | Local Surface Water Supply | 444 | 444 | 444 | 444 | 444 | 444 |
| Livestock | L | Trinity Aquifer \| Medina County | 55 | 55 | 55 | 55 | 55 | 55 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Medina County | 1,602 | 1,525 | 1,442 | 1,373 | 1,308 | 1,256 |
| Irrigation | L | Edwards-BFZ Aquifer \| Medina County | 17,419 | 17,419 | 17,419 | 17,419 | 17,419 | 17,419 |
| Irrigation | L | Trinity Aquifer \| Medina County | 5,784 | 5,784 | 5,784 | 5,784 | 5,784 | 5,784 |
| | | | | | | | | |
| **Medina County / San Antonio Basin WUG Total** | | | **11,265** | **12,906** | **12,907** | **12,850** | **12,840** | **12,665** |
| Canyon Lake Water Service* | L | Canyon Lake/Reservoir | 32 | 33 | 31 | 30 | 23 | 18 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Canyon Lake Water Service* | L | Direct Reuse | 0 | 1 | 1 | 1 | 1 | 1 |
| Canyon Lake Water Service* | L | Trinity Aquifer \| Comal County | 32 | 33 | 32 | 31 | 24 | 19 |
| Castroville | L | Edwards-BFZ Aquifer \| Medina County | 632 | 632 | 632 | 632 | 632 | 632 |
| East Medina County SUD | L | Edwards-BFZ Aquifer \| Medina County | 76 | 76 | 76 | 76 | 76 | 76 |
| La Coste | L | Edwards-BFZ Aquifer \| Medina County | 128 | 128 | 128 | 128 | 128 | 127 |
| Medina River West WSC | L | Edwards-BFZ Aquifer \| Medina County | 35 | 35 | 35 | 35 | 35 | 35 |
| Medina River West WSC | L | Trinity Aquifer \| Medina County | 109 | 110 | 110 | 110 | 110 | 109 |
| San Antonio Water System | L | Canyon Lake/Reservoir | 16 | 34 | 34 | 0 | 0 | 0 |
| San Antonio Water System | L | Carrizo-Aquifer ASR \| Bexar County | 167 | 423 | 424 | 424 | 425 | 399 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Bexar County | 70 | 177 | 178 | 178 | 178 | 168 |
| San Antonio Water System | G | Carrizo-Wilcox Aquifer \| Burleson County | 165 | 420 | 421 | 421 | 422 | 396 |
| San Antonio Water System | L | Carrizo-Wilcox Aquifer \| Gonzales County | 50 | 127 | 127 | 103 | 104 | 96 |
| San Antonio Water System | L | Direct Reuse | 99 | 294 | 294 | 295 | 295 | 277 |
| San Antonio Water System | L | Edwards-BFZ Aquifer \| Bexar County | 475 | 1,205 | 1,208 | 1,209 | 1,211 | 1,136 |
| San Antonio Water System | L | Trinity Aquifer \| Bexar County | 10 | 9 | 9 | 9 | 9 | 8 |
| Ville Dalsace Water Supply | L | Edwards-BFZ Aquifer \| Medina County | 14 | 14 | 14 | 14 | 14 | 14 |
| Yancey WSC | L | Edwards-BFZ Aquifer \| Medina County | 1,203 | 1,203 | 1,203 | 1,202 | 1,202 | 1,202 |
| County-Other | L | Edwards-BFZ Aquifer \| Medina County | 699 | 699 | 697 | 699 | 698 | 699 |
| County-Other | L | Leona Gravel Aquifer \| Medina County | 218 | 218 | 218 | 218 | 218 | 218 |
| County-Other | L | Trinity Aquifer \| Medina County | 202 | 202 | 202 | 202 | 202 | 202 |
| Mining | L | Edwards-BFZ Aquifer \| Medina County | 77 | 77 | 77 | 77 | 77 | 77 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Mining | L | Leona Gravel Aquifer \| Medina County | 184 | 184 | 184 | 184 | 184 | 184 |
| Livestock | L | Leona Gravel Aquifer \| Medina County | 43 | 43 | 43 | 43 | 43 | 43 |
| Livestock | L | Local Surface Water Supply | 85 | 85 | 85 | 85 | 85 | 85 |
| Livestock | L | Trinity Aquifer \| Medina County | 42 | 42 | 42 | 42 | 42 | 42 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Medina County | 5 | 5 | 5 | 5 | 5 | 5 |
| Irrigation | L | Edwards-BFZ Aquifer \| Medina County | 4,803 | 4,803 | 4,803 | 4,803 | 4,803 | 4,803 |
| Irrigation | L | Trinity Aquifer \| Medina County | 1,594 | 1,594 | 1,594 | 1,594 | 1,594 | 1,594 |
| **Refugio County WUG Total** | | | **2,513** | **2,513** | **2,513** | **2,513** | **2,513** | **2,513** |
| **Refugio County / San Antonio Basin WUG Total** | | | **58** | **58** | **58** | **58** | **58** | **58** |
| County-Other | L | Gulf Coast Aquifer System \| Refugio County | 17 | 17 | 17 | 17 | 17 | 17 |
| Livestock | L | Gulf Coast Aquifer System \| Refugio County | 20 | 20 | 20 | 20 | 20 | 20 |
| Livestock | L | Local Surface Water Supply | 21 | 21 | 21 | 21 | 21 | 21 |
| **Refugio County / San Antonio-Nueces Basin WUG Total** | | | **2,455** | **2,455** | **2,455** | **2,455** | **2,455** | **2,455** |
| Refugio | L | Gulf Coast Aquifer System \| Refugio County | 645 | 645 | 645 | 645 | 645 | 645 |
| Woodsboro | L | Gulf Coast Aquifer System \| Refugio County | 210 | 210 | 210 | 210 | 210 | 210 |
| County-Other | L | Gulf Coast Aquifer System \| Refugio County | 312 | 312 | 312 | 312 | 312 | 312 |
| Livestock | L | Gulf Coast Aquifer System \| Refugio County | 210 | 210 | 210 | 210 | 210 | 210 |
| Livestock | L | Local Surface Water Supply | 210 | 210 | 210 | 210 | 210 | 210 |
| Irrigation | L | Gulf Coast Aquifer System \| Refugio County | 868 | 868 | 868 | 868 | 868 | 868 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Uvalde County WUG Total** | | | **44,463** | **44,463** | **44,463** | **44,463** | **44,463** | **44,463** |
| **Uvalde County / Nueces Basin WUG Total** | | | **44,463** | **44,463** | **44,463** | **44,463** | **44,463** | **44,463** |
| Concan WSC | L | Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers \| Uvalde County | 75 | 75 | 75 | 75 | 75 | 75 |
| Concan WSC | L | Trinity Aquifer \| Uvalde County | 6 | 6 | 6 | 6 | 6 | 6 |
| Knippa WSC | L | Austin Chalk Aquifer \| Uvalde County | 100 | 100 | 100 | 100 | 100 | 100 |
| Knippa WSC | L | Edwards-BFZ Aquifer \| Uvalde County | 127 | 127 | 127 | 127 | 127 | 127 |
| Sabinal | L | Edwards-BFZ Aquifer \| Uvalde County | 307 | 307 | 307 | 307 | 307 | 307 |
| Uvalde | L | Edwards-BFZ Aquifer \| Uvalde County | 3,159 | 3,159 | 3,159 | 3,159 | 3,159 | 3,159 |
| Windmill WSC | L | Austin Chalk Aquifer \| Uvalde County | 480 | 480 | 480 | 480 | 480 | 480 |
| County-Other | L | Buda Limestone Aquifer \| Uvalde County | 525 | 525 | 525 | 525 | 525 | 525 |
| County-Other | L | Edwards-BFZ Aquifer \| Uvalde County | 1,672 | 1,672 | 1,672 | 1,672 | 1,672 | 1,672 |
| County-Other | L | Leona Gravel Aquifer \| Uvalde County | 150 | 150 | 150 | 150 | 150 | 150 |
| County-Other | L | Trinity Aquifer \| Uvalde County | 140 | 140 | 140 | 140 | 140 | 140 |
| Mining | L | Edwards-BFZ Aquifer \| Uvalde County | 30 | 30 | 30 | 30 | 30 | 30 |
| Mining | L | Leona Gravel Aquifer \| Uvalde County | 1,565 | 1,565 | 1,565 | 1,565 | 1,565 | 1,565 |
| Livestock | L | Edwards-BFZ Aquifer \| Uvalde County | 989 | 989 | 989 | 989 | 989 | 989 |
| Livestock | L | Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers \| Uvalde County | 9 | 9 | 9 | 9 | 9 | 9 |
| Livestock | L | Leona Gravel Aquifer \| Uvalde County | 17 | 17 | 17 | 17 | 17 | 17 |
| Livestock | L | Local Surface Water Supply | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 | 1,025 |
| Livestock | L | Trinity Aquifer \| Uvalde County | 9 | 9 | 9 | 9 | 9 | 9 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Irrigation | L | Austin Chalk Aquifer \| Uvalde County | 1,780 | 1,780 | 1,780 | 1,780 | 1,780 | 1,780 |
| Irrigation | L | Edwards-BFZ Aquifer \| Uvalde County | 23,404 | 23,404 | 23,404 | 23,404 | 23,404 | 23,404 |
| Irrigation | L | Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers \| Uvalde County | 1,374 | 1,374 | 1,374 | 1,374 | 1,374 | 1,374 |
| Irrigation | L | Leona Gravel Aquifer \| Uvalde County | 6,200 | 6,200 | 6,200 | 6,200 | 6,200 | 6,200 |
| Irrigation | L | Nueces Run-of-River | 720 | 720 | 720 | 720 | 720 | 720 |
| Irrigation | L | Trinity Aquifer \| Uvalde County | 600 | 600 | 600 | 600 | 600 | 600 |
| | | | | | | | | |
| **Victoria County WUG Total** | | | **27,724** | **27,724** | **27,724** | **27,724** | **27,724** | **27,724** |
| **Victoria County / Guadalupe Basin WUG Total** | | | **12,891** | **12,890** | **12,890** | **12,890** | **12,891** | **12,890** |
| Quail Creek MUD | L | Gulf Coast Aquifer System \| Victoria County | 1,235 | 1,235 | 1,235 | 1,235 | 1,235 | 1,235 |
| Victoria | L | Canyon Lake/Reservoir | 836 | 836 | 836 | 836 | 836 | 836 |
| Victoria | L | Guadalupe Run-of-River | 410 | 409 | 409 | 409 | 410 | 409 |
| Victoria | L | Gulf Coast Aquifer System \| Victoria County | 4,264 | 4,264 | 4,264 | 4,264 | 4,264 | 4,264 |
| County-Other | L | Gulf Coast Aquifer System \| Victoria County | 1,504 | 1,504 | 1,504 | 1,504 | 1,504 | 1,504 |
| Manufacturing | L | Guadalupe Run-of-River | 2 | 2 | 2 | 2 | 2 | 2 |
| Manufacturing | L | Gulf Coast Aquifer System \| Victoria County | 470 | 470 | 470 | 470 | 470 | 470 |
| Mining | L | Gulf Coast Aquifer System \| Victoria County | 52 | 52 | 52 | 52 | 52 | 52 |
| Steam Electric Power | L | Gulf Coast Aquifer System \| Victoria County | 2,532 | 2,532 | 2,532 | 2,532 | 2,532 | 2,532 |
| Livestock | L | Gulf Coast Aquifer System \| Victoria County | 227 | 227 | 227 | 227 | 227 | 227 |
| Livestock | L | Local Surface Water Supply | 228 | 228 | 228 | 228 | 228 | 228 |
| Irrigation | L | Gulf Coast Aquifer System \| Victoria County | 1,131 | 1,131 | 1,131 | 1,131 | 1,131 | 1,131 |
| | | | | | | | | |
| **Victoria County / Lavaca Basin WUG Total** | | | **23** | **23** | **23** | **23** | **23** | **23** |
| County-Other | L | Gulf Coast Aquifer System \| Victoria County | 20 | 20 | 20 | 20 | 20 | 20 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Livestock | L | Gulf Coast Aquifer System \| Victoria County | 1 | 1 | 1 | 1 | 1 | 1 |
| Livestock | L | Local Surface Water Supply | 2 | 2 | 2 | 2 | 2 | 2 |
| | | | | | | | | |
| **Victoria County / Lavaca-Guadalupe Basin WUG Total** | | | **14,566** | **14,567** | **14,567** | **14,567** | **14,566** | **14,567** |
| Victoria | L | Canyon Lake/Reservoir | 404 | 404 | 404 | 404 | 404 | 404 |
| Victoria | L | Guadalupe Run-of-River | 198 | 199 | 199 | 199 | 198 | 199 |
| Victoria | L | Gulf Coast Aquifer System \| Victoria County | 2,063 | 2,063 | 2,063 | 2,063 | 2,063 | 2,063 |
| Victoria County WCID 1 | L | Gulf Coast Aquifer System \| Victoria County | 370 | 370 | 370 | 370 | 370 | 370 |
| County-Other | L | Gulf Coast Aquifer System \| Victoria County | 1,086 | 1,086 | 1,086 | 1,086 | 1,086 | 1,086 |
| Livestock | L | Gulf Coast Aquifer System \| Victoria County | 242 | 242 | 242 | 242 | 242 | 242 |
| Livestock | L | Local Surface Water Supply | 242 | 242 | 242 | 242 | 242 | 242 |
| Irrigation | L | Gulf Coast Aquifer System \| Victoria County | 9,961 | 9,961 | 9,961 | 9,961 | 9,961 | 9,961 |
| | | | | | | | | |
| **Victoria County / San Antonio Basin WUG Total** | | | **244** | **244** | **244** | **244** | **244** | **244** |
| County-Other | L | Gulf Coast Aquifer System \| Victoria County | 207 | 207 | 207 | 207 | 207 | 207 |
| Livestock | L | Gulf Coast Aquifer System \| Victoria County | 18 | 18 | 18 | 18 | 18 | 18 |
| Livestock | L | Local Surface Water Supply | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | | | | | | |
| **Wilson County WUG Total** | | | **37,307** | **37,333** | **37,348** | **37,353** | **37,350** | **37,340** |
| **Wilson County / Guadalupe Basin WUG Total** | | | **204** | **205** | **205** | **206** | **205** | **205** |
| Sunko WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 8 | 9 | 9 | 10 | 9 | 9 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Wilson County | 125 | 125 | 125 | 125 | 125 | 125 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Wilson County | 35 | 35 | 35 | 35 | 35 | 35 |
| Livestock | L | Local Surface Water Supply | 36 | 36 | 36 | 36 | 36 | 36 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Wilson County / Nueces Basin WUG Total** | | | **8,560** | **8,566** | **8,570** | **8,573** | **8,576** | **8,578** |
| McCoy WSC* | L | Carrizo-Wilcox Aquifer \| Atascosa County | 48 | 51 | 54 | 56 | 57 | 58 |
| McCoy WSC* | L | Queen City Aquifer \| Atascosa County | 5 | 5 | 6 | 6 | 6 | 6 |
| Picosa WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 3 | 3 | 4 | 4 | 5 | 5 |
| Three Oaks WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 355 | 358 | 357 | 358 | 359 | 360 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Wilson County | 95 | 95 | 95 | 95 | 95 | 95 |
| Mining | L | Carrizo-Wilcox Aquifer \| Wilson County | 1,631 | 1,631 | 1,631 | 1,631 | 1,631 | 1,631 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Wilson County | 102 | 102 | 102 | 102 | 102 | 102 |
| Livestock | L | Local Surface Water Supply | 103 | 103 | 103 | 103 | 103 | 103 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Wilson County | 6,138 | 6,138 | 6,138 | 6,138 | 6,138 | 6,138 |
| Irrigation | L | Queen City Aquifer \| Wilson County | 80 | 80 | 80 | 80 | 80 | 80 |
| | | | | | | | | |
| **Wilson County / San Antonio Basin WUG Total** | | | **28,543** | **28,562** | **28,573** | **28,574** | **28,569** | **28,557** |
| C Willow Water | L | Carrizo-Wilcox Aquifer \| Wilson County | 123 | 123 | 123 | 123 | 123 | 123 |
| East Central SUD | L | Canyon Lake/Reservoir | 40 | 39 | 38 | 39 | 37 | 34 |
| East Central SUD | L | Carrizo-Wilcox Aquifer \| Gonzales County | 28 | 28 | 28 | 27 | 26 | 24 |
| East Central SUD | L | Edwards-BFZ Aquifer \| Bexar County | 75 | 82 | 78 | 71 | 67 | 61 |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Karnes County | 3 | 6 | 10 | 14 | 17 | 18 |
| El Oso WSC* | L | Carrizo-Wilcox Aquifer \| Wilson County | 45 | 49 | 53 | 54 | 57 | 59 |
| Floresville | L | Carrizo-Wilcox Aquifer \| Wilson County | 2,486 | 2,486 | 2,486 | 2,486 | 2,486 | 2,486 |
| La Vernia | L | Canyon Lake/Reservoir | 270 | 270 | 270 | 270 | 270 | 270 |
| La Vernia | L | Carrizo-Wilcox Aquifer \| Wilson County | 1,935 | 1,935 | 1,935 | 1,935 | 1,935 | 1,935 |
| La Vernia | L | Guadalupe Run-of-River | 130 | 130 | 130 | 130 | 130 | 130 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Oak Hills WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 446 | 444 | 441 | 436 | 429 | 420 |
| Picosa WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 303 | 303 | 302 | 302 | 301 | 301 |
| Poth | L | Carrizo-Wilcox Aquifer \| Wilson County | 630 | 630 | 630 | 630 | 630 | 630 |
| S S WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 4,705 | 4,705 | 4,705 | 4,705 | 4,705 | 4,705 |
| Springs Hill WSC | | No water supply associated with WUG | 0 | 0 | 0 | 0 | 0 | 0 |
| Stockdale | L | Carrizo-Wilcox Aquifer \| Wilson County | 920 | 920 | 920 | 920 | 920 | 920 |
| Sunko WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 1,453 | 1,463 | 1,470 | 1,476 | 1,481 | 1,483 |
| Three Oaks WSC | L | Carrizo-Wilcox Aquifer \| Wilson County | 1,009 | 1,007 | 1,012 | 1,014 | 1,013 | 1,016 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Wilson County | 1,256 | 1,256 | 1,256 | 1,256 | 1,256 | 1,256 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Wilson County | 57 | 57 | 57 | 57 | 57 | 57 |
| Mining | L | Carrizo-Wilcox Aquifer \| Wilson County | 4,010 | 4,010 | 4,010 | 4,010 | 4,010 | 4,010 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Wilson County | 321 | 321 | 321 | 321 | 321 | 321 |
| Livestock | L | Local Surface Water Supply | 717 | 717 | 717 | 717 | 717 | 717 |
| Livestock | L | Queen City Aquifer \| Wilson County | 168 | 168 | 168 | 168 | 168 | 168 |
| Livestock | L | Sparta Aquifer \| Wilson County | 94 | 94 | 94 | 94 | 94 | 94 |
| Livestock | L | Yegua-Jackson Aquifer \| Wilson County | 133 | 133 | 133 | 133 | 133 | 133 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Wilson County | 5,989 | 5,989 | 5,989 | 5,989 | 5,989 | 5,989 |
| Irrigation | L | San Antonio Run-of-River | 1,093 | 1,093 | 1,093 | 1,093 | 1,093 | 1,093 |
| Irrigation | L | Yegua-Jackson Aquifer \| Wilson County | 104 | 104 | 104 | 104 | 104 | 104 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Existing Water Supply

| WUG Name | Source Region | Source Description | Existing Supply (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Zavala County WUG Total** | | | **34,968** | **34,968** | **34,968** | **34,968** | **34,968** | **34,968** |
| **Zavala County / Nueces Basin WUG Total** | | | **34,968** | **34,968** | **34,968** | **34,968** | **34,968** | **34,968** |
| Batesville WSC | L | Carrizo-Wilcox Aquifer \| Zavala County | 215 | 215 | 215 | 215 | 215 | 215 |
| Crystal City | L | Carrizo-Wilcox Aquifer \| Zavala County | 2,455 | 2,455 | 2,455 | 2,455 | 2,455 | 2,455 |
| Loma Alta Chula Vista Water System | L | Carrizo-Wilcox Aquifer \| Zavala County | 205 | 205 | 205 | 205 | 205 | 205 |
| Zavala County WCID 1 | L | Carrizo-Wilcox Aquifer \| Zavala County | 1,340 | 1,340 | 1,340 | 1,340 | 1,340 | 1,340 |
| County-Other | L | Carrizo-Wilcox Aquifer \| Zavala County | 245 | 245 | 245 | 245 | 245 | 245 |
| Manufacturing | L | Carrizo-Wilcox Aquifer \| Zavala County | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | L | Carrizo-Wilcox Aquifer \| Zavala County | 1,268 | 1,268 | 1,268 | 1,268 | 1,268 | 1,268 |
| Livestock | L | Carrizo-Wilcox Aquifer \| Zavala County | 427 | 427 | 427 | 427 | 427 | 427 |
| Livestock | L | Local Surface Water Supply | 428 | 428 | 428 | 428 | 428 | 428 |
| Irrigation | L | Carrizo-Wilcox Aquifer \| Zavala County | 28,385 | 28,385 | 28,385 | 28,385 | 28,385 | 28,385 |
| | | | | | | | | |
| **Region L WUG Existing Water Supply Total** | | | **1,213,200** | **1,218,626** | **1,217,987** | **1,211,028** | **1,210,344** | **1,209,551** |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Atascosa County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 14,475 | 13,421 | -7.3% | 15,049 | 13,411 | -10.9% |
| Projected demand total | 9,223 | 7,991 | -13.4% | 13,077 | 10,234 | -21.7% |
| Water supply needs total** | 878 | 169 | -80.8% | 1,517 | 849 | -44.0% |
| **Atascosa County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 97 | 74 | -23.7% | 97 | 74 | -23.7% |
| Projected demand total | 97 | 56 | -42.3% | 97 | 64 | -34.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Atascosa County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 4,043 | 4,739 | 17.2% | 2,043 | 4,739 | 132.0% |
| Projected demand total | 4,043 | 8,039 | 98.8% | 2,043 | 9,217 | 351.2% |
| Water supply needs total** | 0 | 3,300 | 100.0% | 0 | 4,478 | 100.0% |
| **Atascosa County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 8,427 | 8,427 | 0.0% | 8,427 | 8,427 | 0.0% |
| Projected demand total | 8,427 | 7,962 | -5.5% | 8,427 | 7,962 | -5.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Atascosa County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,673 | 1,537 | -8.1% | 1,673 | 1,537 | -8.1% |
| Projected demand total | 1,673 | 1,537 | -8.1% | 1,673 | 1,537 | -8.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Atascosa County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 33,516 | 25,623 | -23.5% | 33,428 | 25,623 | -23.3% |
| Projected demand total | 29,946 | 25,441 | -15.0% | 29,946 | 25,441 | -15.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Bexar County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 274,487 | 366,779 | 33.6% | 284,477 | 363,760 | 27.9% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 289,932 | 314,613 | 8.5% | 386,599 | 397,644 | 2.9% |
| Water supply needs total** | 20,916 | 21,570 | 3.1% | 106,399 | 54,350 | -48.9% |
| **Bexar County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 6,861 | 12,792 | 86.4% | 6,861 | 12,792 | 86.4% |
| Projected demand total | 6,776 | 8,873 | 30.9% | 6,776 | 10,260 | 51.4% |
| Water supply needs total** | 0 | 16 | 100.0% | 0 | 1,381 | 100.0% |
| **Bexar County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 8,740 | 11,277 | 29.0% | 12,502 | 11,277 | -9.8% |
| Projected demand total | 8,740 | 7,634 | -12.7% | 12,502 | 10,322 | -17.4% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Bexar County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 49,511 | 95,651 | 93.2% | 49,511 | 95,651 | 93.2% |
| Projected demand total | 52,293 | 52,293 | 0.0% | 52,293 | 52,293 | 0.0% |
| Water supply needs total** | 2,782 | 0 | -100.0% | 2,782 | 0 | -100.0% |
| **Bexar County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,201 | 988 | -17.7% | 1,201 | 988 | -17.7% |
| Projected demand total | 1,201 | 988 | -17.7% | 1,201 | 988 | -17.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Bexar County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 11,926 | 27,287 | 128.8% | 11,926 | 27,287 | 128.8% |
| Projected demand total | 11,926 | 11,751 | -1.5% | 11,926 | 11,751 | -1.5% |
| Water supply needs total** | 3,318 | 0 | -100.0% | 3,318 | 0 | -100.0% |
| **Caldwell County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,105 | 12,511 | 12.7% | 11,051 | 13,988 | 26.6% |
| Projected demand total | 7,072 | 8,142 | 15.1% | 11,811 | 15,558 | 31.7% |
| Water supply needs total** | 290 | 108 | -62.8% | 3,060 | 3,330 | 8.8% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Caldwell County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 5 | 5 | 0.0% | 5 | 5 | 0.0% |
| Projected demand total | 5 | 14 | 180.0% | 5 | 18 | 260.0% |
| Water supply needs total** | 0 | 9 | 100.0% | 0 | 13 | 100.0% |
| **Caldwell County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 100 | 352 | 252.0% | 9 | 352 | 3811.1% |
| Projected demand total | 98 | 352 | 259.2% | 9 | 352 | 3811.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Caldwell County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 788 | 831 | 5.5% | 788 | 831 | 5.5% |
| Projected demand total | 788 | 831 | 5.5% | 788 | 831 | 5.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Caldwell County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 802 | 680 | -15.2% | 802 | 680 | -15.2% |
| Projected demand total | 802 | 680 | -15.2% | 802 | 680 | -15.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 6,923 | 5,849 | -15.5% | 7,131 | 5,615 | -21.3% |
| Projected demand total | 3,271 | 2,628 | -19.7% | 4,384 | 2,050 | -53.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 119 | 0 | -100.0% |
| **Calhoun County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 60,351 | 56,720 | -6.0% | 60,275 | 56,720 | -5.9% |
| Projected demand total | 52,479 | 54,587 | 4.0% | 52,479 | 63,125 | 20.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 6,405 | 100.0% |
| **Calhoun County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 55 | 0 | -100.0% | 12 | 0 | -100.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 55 | 0 | -100.0% | 12 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 0 | 37 | 100.0% | 0 | 37 | 100.0% |
| Projected demand total | 0 | 37 | 100.0% | 0 | 37 | 100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 400 | 282 | -29.5% | 400 | 282 | -29.5% |
| Projected demand total | 290 | 282 | -2.8% | 290 | 282 | -2.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,751 | 1,462 | -16.5% | 1,751 | 1,462 | -16.5% |
| Projected demand total | 15,839 | 10,460 | -34.0% | 15,839 | 10,460 | -34.0% |
| Water supply needs total** | 14,088 | 9,173 | -34.9% | 14,088 | 9,173 | -34.9% |
| **Comal County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 36,662 | 49,788 | 35.8% | 36,928 | 50,524 | 36.8% |
| Projected demand total | 34,742 | 44,596 | 28.4% | 62,682 | 134,706 | 114.9% |
| Water supply needs total** | 6,419 | 2,734 | -57.4% | 27,302 | 84,810 | 210.6% |
| **Comal County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 2,020 | 3,119 | 54.4% | 2,020 | 3,119 | 54.4% |
| Projected demand total | 5,788 | 901 | -84.4% | 5,788 | 1,042 | -82.0% |
| Water supply needs total** | 3,768 | 0 | -100.0% | 3,768 | 0 | -100.0% |
| **Comal County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 4,795 | 9,046 | 88.7% | 6,779 | 9,046 | 33.4% |
| Projected demand total | 9,996 | 12,013 | 20.2% | 15,628 | 20,432 | 30.7% |
| Water supply needs total** | 5,201 | 2,967 | -43.0% | 8,849 | 11,386 | 28.7% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Comal County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 237 | 271 | 14.3% | 237 | 271 | 14.3% |
| Projected demand total | 237 | 271 | 14.3% | 237 | 271 | 14.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Comal County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 639 | 765 | 19.7% | 639 | 765 | 19.7% |
| Projected demand total | 428 | 591 | 38.1% | 428 | 591 | 38.1% |
| Water supply needs total** | 33 | 0 | -100.0% | 33 | 0 | -100.0% |
| **DeWitt County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 4,112 | 4,322 | 5.1% | 4,122 | 4,317 | 4.7% |
| Projected demand total | 3,995 | 3,882 | -2.8% | 4,052 | 3,800 | -6.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 322 | 380 | 18.0% | 350 | 380 | 8.6% |
| Projected demand total | 344 | 248 | -27.9% | 344 | 287 | -16.6% |
| Water supply needs total** | 22 | 0 | -100.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,378 | 2,671 | 93.8% | 301 | 2,671 | 787.4% |
| Projected demand total | 2,973 | 1,695 | -43.0% | 301 | 1,695 | 463.1% |
| Water supply needs total** | 1,595 | 0 | -100.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,904 | 1,736 | -8.8% | 1,904 | 1,736 | -8.8% |
| Projected demand total | 1,904 | 1,736 | -8.8% | 1,904 | 1,736 | -8.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 510 | 863 | 69.2% | 1,479 | 863 | -41.6% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 757 | 590 | -22.1% | 757 | 590 | -22.1% |
| Water supply needs total** | 318 | 0 | -100.0% | 0 | 0 | 0.0% |
| **Dimmit County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 2,579 | 2,611 | 1.2% | 2,883 | 2,617 | -9.2% |
| Projected demand total | 2,542 | 1,771 | -30.3% | 2,883 | 1,435 | -50.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 44 | 100.0% |
| **Dimmit County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 689 | 695 | 0.9% | 673 | 695 | 3.3% |
| Projected demand total | 5,001 | 6,146 | 22.9% | 612 | 6,146 | 904.2% |
| Water supply needs total** | 4,312 | 5,451 | 26.4% | 81 | 5,451 | 6629.6% |
| **Dimmit County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 388 | 367 | -5.4% | 388 | 367 | -5.4% |
| Projected demand total | 388 | 367 | -5.4% | 388 | 367 | -5.4% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Dimmit County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 352 | 353 | 0.3% | 352 | 353 | 0.3% |
| Projected demand total | 5,601 | 4,689 | -16.3% | 5,601 | 4,689 | -16.3% |
| Water supply needs total** | 5,249 | 4,336 | -17.4% | 5,249 | 4,336 | -17.4% |
| **Frio County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 8,240 | 8,236 | 0.0% | 8,229 | 8,260 | 0.4% |
| Projected demand total | 3,991 | 3,612 | -9.5% | 5,047 | 4,328 | -14.2% |
| Water supply needs total** | 771 | 250 | -67.6% | 1,351 | 746 | -44.8% |
| **Frio County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,250 | 1,968 | 57.4% | 390 | 1,968 | 404.6% |
| Projected demand total | 1,250 | 6,002 | 380.2% | 390 | 6,004 | 1439.5% |
| Water supply needs total** | 0 | 4,034 | 100.0% | 0 | 4,036 | 100.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Frio County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 124 | 124 | 0.0% | 124 | 124 | 0.0% |
| Projected demand total | 124 | 54 | -56.5% | 124 | 54 | -56.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Frio County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 882 | 964 | 9.3% | 882 | 964 | 9.3% |
| Projected demand total | 882 | 964 | 9.3% | 882 | 964 | 9.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Frio County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 78,183 | 70,976 | -9.2% | 71,037 | 70,910 | -0.2% |
| Projected demand total | 78,183 | 70,567 | -9.7% | 78,183 | 70,567 | -9.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 7,146 | 0 | -100.0% |
| **Goliad County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 2,060 | 1,615 | -21.6% | 2,101 | 1,615 | -23.1% |
| Projected demand total | 1,324 | 919 | -30.6% | 1,466 | 860 | -41.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 4 | 0 | -100.0% | 4 | 0 | -100.0% |
| Projected demand total | 1 | 0 | -100.0% | 1 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 450 | 14 | -96.9% | 450 | 14 | -96.9% |
| Projected demand total | 450 | 8 | -98.2% | 450 | 8 | -98.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 26,023 | 24,383 | -6.3% | 26,023 | 24,149 | -7.2% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 1,863 | 4,994 | 168.1% | 1,863 | 4,994 | 168.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 841 | 789 | -6.2% | 841 | 789 | -6.2% |
| Projected demand total | 841 | 789 | -6.2% | 841 | 789 | -6.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 2,839 | 3,096 | 9.1% | 2,839 | 3,711 | 30.7% |
| Projected demand total | 2,839 | 3,126 | 10.1% | 2,839 | 3,126 | 10.1% |
| Water supply needs total** | 388 | 184 | -52.6% | 388 | 0 | -100.0% |
| **Gonzales County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 13,633 | 9,316 | -31.7% | 13,641 | 9,277 | -32.0% |
| Projected demand total | 5,292 | 4,516 | -14.7% | 7,209 | 4,273 | -40.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Gonzales County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 2,427 | 2,812 | 15.9% | 2,427 | 2,812 | 15.9% |
| Projected demand total | 2,427 | 2,311 | -4.8% | 2,427 | 2,673 | 10.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Gonzales County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,207 | 2,961 | 145.3% | 1 | 2,961 | 296000.0% |
| Projected demand total | 1,207 | 6,592 | 446.1% | 1 | 6,740 | 673900.0% |
| Water supply needs total** | 0 | 3,631 | 100.0% | 0 | 3,779 | 100.0% |
| **Gonzales County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 9,572 | 4,138 | -56.8% | 9,572 | 4,138 | -56.8% |
| Projected demand total | 9,572 | 4,138 | -56.8% | 9,572 | 4,138 | -56.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Gonzales County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 5,609 | 4,918 | -12.3% | 5,609 | 4,918 | -12.3% |
| Projected demand total | 5,127 | 4,478 | -12.7% | 5,127 | 4,478 | -12.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Guadalupe County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 37,416 | 51,316 | 37.1% | 38,504 | 48,898 | 27.0% |
| Projected demand total | 30,784 | 40,540 | 31.7% | 50,420 | 88,616 | 75.8% |
| Water supply needs total** | 92 | 2,082 | 2163.0% | 14,377 | 40,118 | 179.0% |
| **Guadalupe County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 4,136 | 4,230 | 2.3% | 4,136 | 4,230 | 2.3% |
| Projected demand total | 4,523 | 3,526 | -22.0% | 4,523 | 4,078 | -9.8% |
| Water supply needs total** | 388 | 0 | -100.0% | 388 | 0 | -100.0% |
| **Guadalupe County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 550 | 342 | -37.8% | 1,043 | 342 | -67.2% |
| Projected demand total | 550 | 770 | 40.0% | 1,043 | 770 | -26.2% |
| Water supply needs total** | 0 | 428 | 100.0% | 0 | 428 | 100.0% |
| **Guadalupe County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 13,320 | 9,465 | -28.9% | 13,320 | 9,465 | -28.9% |
| Projected demand total | 9,405 | 9,392 | -0.1% | 9,405 | 9,392 | -0.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Guadalupe County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,300 | 1,179 | -9.3% | 1,300 | 1,179 | -9.3% |
| Projected demand total | 1,300 | 1,179 | -9.3% | 1,300 | 1,179 | -9.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Guadalupe County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,179 | 942 | -20.1% | 1,179 | 942 | -20.1% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 1,136 | 942 | -17.1% | 1,136 | 942 | -17.1% |
| Water supply needs total** | 0 | 20 | 100.0% | 0 | 20 | 100.0% |
| **Hays County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 31,099 | 56,259 | 80.9% | 35,922 | 56,920 | 58.5% |
| Projected demand total | 29,294 | 38,311 | 30.8% | 65,003 | 113,374 | 74.4% |
| Water supply needs total** | 1,654 | 989 | -40.2% | 29,359 | 56,454 | 92.3% |
| **Hays County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 550 | 70 | -87.3% | 550 | 70 | -87.3% |
| Projected demand total | 56 | 57 | 1.8% | 56 | 65 | 16.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Hays County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 0 | 71 | 100.0% | 0 | 71 | 100.0% |
| Projected demand total | 0 | 30 | 100.0% | 0 | 61 | 100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Hays County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 0 | 2,464 | 100.0% | 0 | 2,464 | 100.0% |
| Projected demand total | 0 | 1,949 | 100.0% | 0 | 1,949 | 100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Hays County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 2,792 | 2,700 | -3.3% | 2,792 | 2,700 | -3.3% |
| Projected demand total | 2,792 | 2,712 | -2.9% | 2,792 | 2,712 | -2.9% |
| Water supply needs total** | 0 | 12 | 100.0% | 0 | 12 | 100.0% |
| **Hays County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 506 | 226 | -55.3% | 506 | 226 | -55.3% |
| Projected demand total | 157 | 130 | -17.2% | 157 | 130 | -17.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Karnes County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 3,861 | 5,108 | 32.3% | 3,768 | 4,850 | 28.7% |
| Projected demand total | 3,636 | 3,560 | -2.1% | 3,563 | 4,284 | 20.2% |
| Water supply needs total** | 352 | 0 | -100.0% | 395 | 0 | -100.0% |
| **Karnes County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 155 | 84 | -45.8% | 0 | 84 | 100.0% |
| Projected demand total | 155 | 69 | -55.5% | 155 | 81 | -47.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 155 | 0 | -100.0% |
| **Karnes County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 563 | 479 | -14.9% | 28 | 479 | 1610.7% |
| Projected demand total | 1,919 | 1,919 | 0.0% | 2 | 1,919 | 95850.0% |
| Water supply needs total** | 1,356 | 1,440 | 6.2% | 1 | 1,440 | 143900.0% |
| **Karnes County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,908 | 954 | -50.0% | 1,644 | 954 | -42.0% |
| Projected demand total | 1,086 | 954 | -12.2% | 1,086 | 954 | -12.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Karnes County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,023 | 966 | -5.6% | 464 | 407 | -12.3% |
| Projected demand total | 1,023 | 915 | -10.6% | 1,023 | 915 | -10.6% |
| Water supply needs total** | 268 | 185 | -31.0% | 827 | 744 | -10.0% |
| **Kendall County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,689 | 14,473 | 23.8% | 12,550 | 13,705 | 9.2% |
| Projected demand total | 8,369 | 9,389 | 12.2% | 15,308 | 23,982 | 56.7% |
| Water supply needs total** | 282 | 0 | -100.0% | 4,389 | 10,908 | 148.5% |
| **Kendall County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 1 | 3 | 200.0% | 1 | 3 | 200.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 1 | 46 | 4500.0% | 1 | 54 | 5300.0% |
| Water supply needs total** | 0 | 43 | 100.0% | 0 | 51 | 100.0% |
| **Kendall County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 395 | 388 | -1.8% | 395 | 388 | -1.8% |
| Projected demand total | 395 | 388 | -1.8% | 395 | 388 | -1.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Kendall County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 622 | 733 | 17.8% | 622 | 733 | 17.8% |
| Projected demand total | 606 | 461 | -23.9% | 606 | 461 | -23.9% |
| Water supply needs total** | 1 | 0 | -100.0% | 1 | 0 | -100.0% |
| **La Salle County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 2,997 | 1,656 | -44.7% | 3,088 | 1,656 | -46.4% |
| Projected demand total | 1,942 | 1,517 | -21.9% | 2,518 | 1,503 | -40.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **La Salle County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 529 | 529 | 0.0% | 529 | 529 | 0.0% |
| Projected demand total | 4,772 | 5,396 | 13.1% | 676 | 5,396 | 698.2% |
| Water supply needs total** | 4,243 | 4,867 | 14.7% | 147 | 4,867 | 3210.9% |
| **La Salle County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 491 | 394 | -19.8% | 491 | 394 | -19.8% |
| Projected demand total | 491 | 394 | -19.8% | 491 | 394 | -19.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **La Salle County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 4,581 | 4,048 | -11.6% | 4,490 | 4,048 | -9.8% |
| Projected demand total | 5,784 | 4,461 | -22.9% | 5,784 | 4,461 | -22.9% |
| Water supply needs total** | 1,203 | 413 | -65.7% | 1,294 | 413 | -68.1% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Medina County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 8,681 | 11,394 | 31.3% | 9,164 | 12,880 | 40.5% |
| Projected demand total | 8,508 | 8,650 | 1.7% | 10,770 | 11,730 | 8.9% |
| Water supply needs total** | 1,787 | 949 | -46.9% | 3,255 | 1,980 | -39.2% |
| **Medina County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 1,543 | 1,584 | 2.7% | 1,543 | 1,584 | 2.7% |
| Projected demand total | 67 | 15 | -77.6% | 67 | 19 | -71.6% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Medina County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 2,214 | 1,282 | -42.1% | 3,029 | 1,282 | -57.7% |
| Projected demand total | 2,057 | 4,324 | 110.2% | 2,872 | 5,657 | 97.0% |
| Water supply needs total** | 0 | 3,042 | 100.0% | 0 | 4,375 | 100.0% |
| **Medina County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,165 | 1,058 | -9.2% | 1,165 | 1,058 | -9.2% |
| Projected demand total | 1,145 | 1,058 | -7.6% | 1,145 | 1,058 | -7.6% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Medina County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 24,211 | 31,207 | 28.9% | 22,742 | 30,913 | 35.9% |
| Projected demand total | 59,968 | 54,809 | -8.6% | 59,968 | 54,809 | -8.6% |
| Water supply needs total** | 35,757 | 23,602 | -34.0% | 37,226 | 23,896 | -35.8% |
| **Refugio County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 1,200 | 1,184 | -1.3% | 1,200 | 1,184 | -1.3% |
| Projected demand total | 1,200 | 983 | -18.1% | 1,200 | 865 | -27.9% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Refugio County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 69 | 0 | -100.0% | 15 | 0 | -100.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 69 | 0 | -100.0% | 15 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Refugio County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 475 | 461 | -2.9% | 475 | 461 | -2.9% |
| Projected demand total | 475 | 461 | -2.9% | 475 | 461 | -2.9% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Refugio County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,034 | 868 | -16.1% | 1,034 | 868 | -16.1% |
| Projected demand total | 1,034 | 867 | -16.2% | 1,034 | 867 | -16.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Uvalde County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 3,963 | 6,741 | 70.1% | 4,202 | 6,741 | 60.4% |
| Projected demand total | 6,626 | 5,320 | -19.7% | 8,334 | 4,668 | -44.0% |
| Water supply needs total** | 2,925 | 717 | -75.5% | 4,273 | 288 | -93.3% |
| **Uvalde County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 111 | 0 | -100.0% | 111 | 0 | -100.0% |
| Projected demand total | 3 | 0 | -100.0% | 3 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Uvalde County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 2,814 | 1,595 | -43.3% | 3,772 | 1,595 | -57.7% |
| Projected demand total | 2,916 | 3,204 | 9.9% | 3,874 | 4,074 | 5.2% |
| Water supply needs total** | 102 | 1,609 | 1477.5% | 102 | 2,479 | 2330.4% |
| **Uvalde County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 2,198 | 2,049 | -6.8% | 2,198 | 2,049 | -6.8% |
| Projected demand total | 2,198 | 2,049 | -6.8% | 2,198 | 2,049 | -6.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Uvalde County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 21,663 | 34,078 | 57.3% | 20,705 | 34,078 | 64.6% |
| Projected demand total | 62,409 | 52,703 | -15.6% | 62,409 | 52,703 | -15.6% |
| Water supply needs total** | 40,746 | 18,625 | -54.3% | 41,704 | 18,625 | -55.3% |
| **Victoria County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,533 | 12,597 | 9.2% | 11,533 | 12,597 | 9.2% |
| Projected demand total | 21,065 | 19,521 | -7.3% | 23,877 | 19,728 | -17.4% |
| Water supply needs total** | 10,681 | 8,466 | -20.7% | 13,446 | 8,627 | -35.8% |
| **Victoria County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 472 | 472 | 0.0% | 472 | 472 | 0.0% |
| Projected demand total | 9,234 | 39,432 | 327.0% | 9,234 | 45,600 | 393.8% |
| Water supply needs total** | 8,762 | 38,960 | 344.6% | 8,762 | 45,128 | 415.0% |
| **Victoria County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 75 | 52 | -30.7% | 18 | 52 | 188.9% |
| Projected demand total | 75 | 390 | 420.0% | 18 | 451 | 2405.6% |
| Water supply needs total** | 0 | 338 | 100.0% | 0 | 399 | 100.0% |
| **Victoria County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 12,550 | 2,532 | -79.8% | 12,550 | 2,532 | -79.8% |
| Projected demand total | 31,475 | 3,198 | -89.8% | 31,475 | 3,198 | -89.8% |
| Water supply needs total** | 18,925 | 666 | -96.5% | 18,925 | 666 | -96.5% |
| **Victoria County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,064 | 979 | -8.0% | 1,064 | 979 | -8.0% |
| Projected demand total | 1,064 | 979 | -8.0% | 1,064 | 979 | -8.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Victoria County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 13,398 | 11,092 | -17.2% | 13,398 | 11,092 | -17.2% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 13,398 | 11,092 | -17.2% | 13,398 | 11,092 | -17.2% |
| Water supply needs total** | 5,791 | 200 | -96.5% | 5,791 | 200 | -96.5% |
| **Wilson County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,141 | 16,496 | 48.1% | 11,099 | 16,539 | 49.0% |
| Projected demand total | 10,037 | 8,292 | -17.4% | 16,123 | 11,616 | -28.0% |
| Water supply needs total** | 1,770 | 626 | -64.6% | 7,013 | 1,762 | -74.9% |
| **Wilson County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 43 | 57 | 32.6% | 43 | 57 | 32.6% |
| Projected demand total | 43 | 62 | 44.2% | 43 | 71 | 65.1% |
| Water supply needs total** | 0 | 5 | 100.0% | 0 | 14 | 100.0% |
| **Wilson County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,548 | 5,641 | 264.4% | 204 | 5,641 | 2665.2% |
| Projected demand total | 1,548 | 4,680 | 202.3% | 204 | 4,714 | 2210.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Wilson County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 2,439 | 0 | -100.0% | 2,439 | 0 | -100.0% |
| Projected demand total | 2,439 | 0 | -100.0% | 2,439 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Wilson County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,889 | 1,709 | -9.5% | 1,889 | 1,709 | -9.5% |
| Projected demand total | 1,889 | 1,709 | -9.5% | 1,889 | 1,709 | -9.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Wilson County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 15,442 | 13,404 | -13.2% | 14,965 | 13,404 | -10.4% |
| Projected demand total | 15,418 | 13,318 | -13.6% | 15,418 | 13,318 | -13.6% |
| Water supply needs total** | 3,405 | 331 | -90.3% | 3,882 | 331 | -91.5% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Zavala County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 4,642 | 4,460 | -3.9% | 4,799 | 4,460 | -7.1% |
| Projected demand total | 3,133 | 1,998 | -36.2% | 4,151 | 1,695 | -59.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Zavala County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 766 | 0 | -100.0% | 766 | 0 | -100.0% |
| Projected demand total | 766 | 732 | -4.4% | 766 | 846 | 10.4% |
| Water supply needs total** | 0 | 732 | 100.0% | 0 | 846 | 100.0% |
| **Zavala County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 2,257 | 1,268 | -43.8% | 557 | 1,268 | 127.6% |
| Projected demand total | 2,257 | 4,932 | 118.5% | 557 | 4,932 | 785.5% |
| Water supply needs total** | 0 | 3,664 | 100.0% | 0 | 3,664 | 100.0% |
| **Zavala County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 893 | 855 | -4.3% | 893 | 855 | -4.3% |
| Projected demand total | 893 | 855 | -4.3% | 893 | 855 | -4.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Zavala County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 24,968 | 28,385 | 13.7% | 25,901 | 28,385 | 9.6% |
| Projected demand total | 46,318 | 42,574 | -8.1% | 45,766 | 42,574 | -7.0% |
| Water supply needs total** | 21,350 | 14,189 | -33.5% | 19,865 | 14,189 | -28.6% |
| **Region L Total** | | | | | | |
| Existing WUG supply total | 1,005,292 | 1,213,200 | 20.7% | 1,013,911 | 1,210,344 | 19.4% |
| Projected demand total | 1,114,948 | 1,134,971 | 1.8% | 1,320,128 | 1,493,287 | 13.1% |
| Water supply needs total** | 232,188 | 185,132 | -20.3% | 401,027 | 437,491 | 9.1% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Source Availability Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Atascosa County** | | | | | | |
| Groundwater availability total | 77,333 | 61,632 | -20.3% | 82,505 | 66,722 | -19.1% |
| Surface Water availability total | 754 | 769 | 2.0% | 754 | 769 | 2.0% |
| **Bexar County** | | | | | | |
| Groundwater availability total | 308,252 | 505,548 | 64.0% | 306,242 | 504,946 | 64.9% |
| Reuse availability total | 34,735 | 116,477 | 235.3% | 39,735 | 126,463 | 218.3% |
| Surface Water availability total | 693 | 498 | -28.1% | 693 | 498 | -28.1% |
| **Caldwell County** | | | | | | |
| Groundwater availability total | 63,270 | 31,397 | -50.4% | 56,214 | 55,303 | -1.6% |
| Surface Water availability total | 1,025 | 940 | -8.3% | 1,025 | 940 | -8.3% |
| **Calhoun County** | | | | | | |
| Groundwater availability total | 7,565 | 7,611 | 0.6% | 7,565 | 7,611 | 0.6% |
| Surface Water availability total | 33,841 | 33,699 | -0.4% | 33,841 | 33,699 | -0.4% |
| **Comal County** | | | | | | |
| Groundwater availability total | 56,130 | 56,816 | 1.2% | 56,130 | 56,816 | 1.2% |
| Reuse availability total | 107 | 5,231 | 4788.8% | 107 | 14,610 | 13554.2% |
| Surface Water availability total | 741 | 748 | 0.9% | 741 | 748 | 0.9% |
| **DeWitt County** | | | | | | |
| Groundwater availability total | 15,476 | 17,958 | 16.0% | 14,485 | 17,784 | 22.8% |
| Surface Water availability total | 997 | 869 | -12.8% | 997 | 869 | -12.8% |
| **Dimmit County** | | | | | | |
| Groundwater availability total | 4,129 | 3,885 | -5.9% | 4,129 | 3,885 | -5.9% |
| Surface Water availability total | 454 | 395 | -13.0% | 454 | 395 | -13.0% |
| **Frio County** | | | | | | |
| Groundwater availability total | 113,722 | 115,364 | 1.4% | 105,303 | 106,805 | 1.4% |
| Surface Water availability total | 497 | 482 | -3.0% | 497 | 482 | -3.0% |
| **Goliad County** | | | | | | |
| Groundwater availability total | 11,539 | 6,254 | -45.8% | 11,539 | 6,972 | -39.6% |
| Surface Water availability total | 564 | 396 | -29.8% | 564 | 396 | -29.8% |
| **Gonzales County** | | | | | | |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs.

**Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

# Region L 2026 Regional Water Plan (RWP)
# Source Availability Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Groundwater availability total | 94,989 | 88,404 | -6.9% | 99,391 | 115,386 | 16.1% |
| Surface Water availability total | 7,079 | 4,310 | -39.1% | 7,079 | 4,310 | -39.1% |
| **Guadalupe County** | | | | | | |
| Groundwater availability total | 48,724 | 40,516 | -16.8% | 48,714 | 43,152 | -11.4% |
| Reuse availability total | 1,325 | 4,584 | 246.0% | 1,325 | 7,480 | 464.5% |
| Surface Water availability total | 8,739 | 8,679 | -0.7% | 8,739 | 8,679 | -0.7% |
| **Hays County** | | | | | | |
| Groundwater availability total | 16,376 | 17,101 | 4.4% | 16,376 | 17,101 | 4.4% |
| Reuse availability total | 8,448 | 12,502 | 48.0% | 8,848 | 14,183 | 60.3% |
| Surface Water availability total | 1,546 | 38,952 | 2419.5% | 1,546 | 38,952 | 2419.5% |
| **Karnes County** | | | | | | |
| Groundwater availability total | 13,340 | 13,750 | 3.1% | 6,105 | 6,177 | 1.2% |
| Surface Water availability total | 688 | 578 | -16.0% | 688 | 578 | -16.0% |
| **Kendall County** | | | | | | |
| Groundwater availability total | 11,552 | 11,540 | -0.1% | 11,552 | 11,540 | -0.1% |
| Reuse availability total | 334 | 2,275 | 581.1% | 334 | 2,275 | 581.1% |
| Surface Water availability total | 224 | 221 | -1.3% | 224 | 221 | -1.3% |
| **La Salle County** | | | | | | |
| Groundwater availability total | 7,940 | 6,629 | -16.5% | 7,940 | 6,629 | -16.5% |
| Surface Water availability total | 719 | 671 | -6.7% | 719 | 671 | -6.7% |
| **Medina County** | | | | | | |
| Groundwater availability total | 59,504 | 51,303 | -13.8% | 59,502 | 51,303 | -13.8% |
| Surface Water availability total | 582 | 529 | -9.1% | 582 | 529 | -9.1% |
| **Refugio County** | | | | | | |
| Groundwater availability total | 5,847 | 5,866 | 0.3% | 5,847 | 5,866 | 0.3% |
| Surface Water availability total | 237 | 231 | -2.5% | 237 | 231 | -2.5% |
| **Reservoir** County** | | | | | | |
| Surface Water availability total | 159,843 | 164,064 | 2.6% | 159,266 | 163,251 | 2.5% |
| **Uvalde County** | | | | | | |
| Groundwater availability total | 32,464 | 45,717 | 40.8% | 32,061 | 45,717 | 42.6% |
| Surface Water availability total | 1,236 | 1,745 | 41.2% | 1,236 | 1,745 | 41.2% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs.

**Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

# Region L 2026 Regional Water Plan (RWP)
# Source Availability Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Victoria County** | | | | | | |
| Groundwater availability total | 49,970 | 59,948 | 20.0% | 59,963 | 59,948 | 0.0% |
| Surface Water availability total | 13,642 | 493 | -96.4% | 13,642 | 493 | -96.4% |
| **Wilson County** | | | | | | |
| Groundwater availability total | 107,503 | 40,748 | -62.1% | 113,021 | 127,535 | 12.8% |
| Surface Water availability total | 2,018 | 1,950 | -3.4% | 2,018 | 1,950 | -3.4% |
| **Zavala County** | | | | | | |
| Groundwater availability total | 35,305 | 36,675 | 3.9% | 34,695 | 34,831 | 0.4% |
| Surface Water availability total | 594 | 428 | -27.9% | 594 | 428 | -27.9% |
| **Region L Total** | | | | | | |
| Groundwater availability total | 1,140,930 | 1,224,662 | 7.3% | 1,139,279 | 1,352,029 | 18.7% |
| Reuse availability total | 44,949 | 141,069 | 213.8% | 50,349 | 165,011 | 227.7% |
| Surface Water availability total | 236,713 | 261,647 | 10.5% | 236,136 | 260,834 | 10.5% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs.

**Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

# Appendix 3B: Hydrologic Assumptions Requests and Approvals

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

January 8, 2024

Mr. Tim Andruss
Chair
South Central Texas (Region L) Regional Water Planning Group
c/o San Antonio River Authority
100 East Guenther Street
San Antonio, TX 78204

Dear Mr. Andruss:

I have reviewed your request dated November 15, 2023, for approval of alternative water supply assumptions to be used in determining existing and future surface water availability. This letter confirms that the TWDB approves the following assumptions that require a variance:

1. Use of the Region L Guadalupe-San Antonio Water Availability Model (i.e., "Region L WAM") to evaluate existing supply for Canyon Reservoir, and for the power plant reservoirs Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir. The Region L WAM includes the following:
    a. Simulates Federal Energy Regulatory Commission (FERC) requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe Trout Unlimited, and various water rights, including special conditions, and daily operations dependent on Canyon Reservoir.
    b. Uses of a daily timestep simulation with no use of effluent or other changes to water rights.
    c. Reflects the operation of the power plant reservoirs as being subject to authorized consumptive uses, with makeup diversions as needed to maintain full conservation storage to the extent possible, subject to senior water rights, instream flow considerations, and/or applicable contractual provisions. Add return flows to the Region L WAM and the TCEQ Guadalupe/San Antonio WAM Run 3 in the evaluation of existing supply when specifically required by a surface water right.
2. Add return flows to the TCEQ Guadalupe/San Antonio WAM Run 3 in the evaluation of water management strategies if an entity requests inclusion of a project that includes an indirect reuse permit. The source water available for reuse will be:

Our Mission
Leading the state's efforts in ensuring a secure water future for Texas

Board Members
Brooke T. Paup, Chairwoman | George B. Peyton V, Board Member | L'Oreal Stepney, P.E., Board Member
Jeff Walker, Executive Administrator

   a. Estimated as the amount of water returned to a utility's wastewater treatment plant for each decade, less the amount of reuse water already utilized as existing supply.
   b. Where the upper limit of source water available for reuse water management strategies will be based on the amount of water returned to a utility's wastewater treatment plants, estimated at 50% of the utility's projected water demands and adjusted for water conservation and drought management strategies, unless site specific information is available.
3. Add return flows to the TCEQ Nueces WAM for the evaluation of strategy supplies if an entity requests inclusion of a project that includes an indirect reuse permit. The source water available for reuse will be:
   a. Estimated as the amount of water returned to a utility's wastewater treatment plant for each decade, less the amount of reuse water already utilized as existing supply.
   b. Where the upper limit of source water available for reuse water management strategies will be based on the amount of water returned to a utility's wastewater treatment plants, estimated at 50% of the utility's projected water demands and adjusted for water conservation and drought management strategies, unless site specific information is available.
4. Use of the Flow Regime Application Tool (FRAT), with the relevant TCEQ WAM Run 3, to evaluate environmental flows for new surface water management strategies.

For the purpose of evaluating potentially feasible water management strategies not included in the above list, the TCEQ WAM Run 3 is to be used.

While the TWDB authorizes these modifications to evaluate existing and future water supplies for development of the 2026 Region L South Central Texas RWP, it is the responsibility of the RWPG to ensure that the resulting estimates of water availability are reasonable for drought planning purposes and will reflect conditions expected in the event of actual drought conditions; and in all other regards will be evaluated in accordance with the most recent version of regional water planning contract Exhibit C, *General Guidelines for Development of the 2026 Regional Water Plans.*

Please do not hesitate to contact Michele Foss of our Regional Water Planning staff at 512-463-9225 or mfoss@twdb.texas.gov if you have any questions.

Sincerely,

Temple McKinnon Digitally signed by Temple McKinnon
Date: 2024.01.08 08:59:10 -06'00'

Matt Nelson
Deputy Executive Administrator

c: Cayethania Castillo, San Antonio River Authority
Lauren Gonzalez, Black & Veatch
Jaime Burke, Black & Veatch
Michele Foss, Water Supply Planning
Sarah Lee, Water Supply Planning
Nelun Fernando, Ph.D., Surface Water

## ATTACHMENT A

## REGION L HYDROLOGIC VARIANCE REQUEST SUBMITTAL

**Black & Veatch**
4009 Banister Lane, Suite 412; Austin, Texas 78704
**P** +1 512-782-4914 **E** GonzalezL@bv.com

November 15, 2023

B&V Project 411170

Mr. Jeff Walker
Executive Administrator
Texas Water Development Board
P.O. Box 13231
1700 North Congress Avenue
Austin, Texas 78711-3231

Transmitted Via Email

RE: Submittal of Hydrologic Variance Request Checklists on behalf of the South Central Texas (Region L) Regional Water Planning Group 2026 Regional Water Planning Cycle

Dear Mr. Walker,

The South Central Texas (Region L) Regional Water Planning Group (SCTRWPG) approved hydrologic assumptions and needed hydrologic variances for submittal to the Texas Water Development Board (TWDB) at the November 2, 2023, SCTRWPG meeting. On behalf of the SCTRWPG, Black & Veatch submits this transmittal letter and enclosed hydrologic variance checklists for the Guadalupe-San Antonio River Basin and Nueces River Basin for your consideration for the 2026 Region L Regional Water Planning Cycle.

We appreciate your consideration of this request. Please let me know if you need any additional information or if you have any questions. Thank you.

Sincerely,

Lauren E. Gonzalez
Planning and Regulatory Permitting Lead
BLACK & VEATCH

Enclosures (2)

cc: Michele Foss, Texas Water Development Board
Tim Andruss, Victoria County Groundwater Conservation District
Vanessa Puig-Williams, Environmental Defense Fund
Steve Graham, San Antonio River Authority
Cayethania Castillo, San Antonio River Authority
Jaime Burke, Black & Veatch

**Black & Veatch**
4009 Banister Lane, Suite 412; Austin, Texas 78704
**P** +1 512-782-4914 **E** GonzalezL@bv.com

# ENCLOSURE 1
# Hydrologic Variance Checklist for the Guadalupe-San Antonio River Basin

# Surface Water Hydrologic Variance Request Checklist

Texas Water Development Board (TWDB) rules[1] require that regional water planning groups (RWPG) use most current Water Availability Models (WAM) from the Texas Commission on Environmental Quality (TCEQ) and assume full utilization of existing water rights and no return flows for surface water supply analysis. Additionally, evaluation of existing stored surface water available during Drought of Record conditions must be based on Firm Yield using anticipated sedimentation rates. However, the TWDB rules also allow, and **we encourage**, RWPGs to use more representative, water availability modeling assumptions; better site-specific information; or justified operational procedures other than Firm Yield with written approval (via a Hydrologic Variance) from the Executive Administrator in order to better represent and therefore prepare for expected drought conditions.

RWPGs must use this checklist, which is intended to save time and reduce effort, to request a Hydrologic Variance for estimating the availability of surface water sources. For Questions 4 – 10, please indicate whether the requested variance is for determining Existing Supply, Strategy Supply, or both. Please complete a separate checklist for each river basin in which variances are being requested.

**Water Planning Region: L**

1. Which major river basin does the request apply to? Please specify if the request only applies part of the basin or only to certain reservoirs.

   **Guadalupe-San Antonio Basin**

2. Please give a brief, bulleted, description of the requested hydrologic variances including how the alternative availability assumptions vary from rule requirements, how the modifications will affect the associated annual availability volume(s) in the regional water plan, and why the variance is necessary or provides a better basis for planning. You must provide more-detailed descriptions in the subsequent checklist questions. Attach any available documentation supporting the request.

   **A. The unmodified (other than reservoir sedimentation) Guadalupe-San Antonio Water Availability Model (WAM) from Texas Commission on Environmental Quality (TCEQ) will be used for surface water supply evaluations, except as described below.**
   **B. The Region L WAM will be used to establish existing supply for Canyon Reservoir and power plant reservoirs of Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir. This is the same model approved by the Texas Water Development Board (TWDB) and used in the currently approved 2021 Region L Regional Water Plan. The model uses a daily time step simulation with no use of effluent or other changes to water rights. The Region L WAM more accurately considers reservoir operations in its analysis, including operation of the power plant reservoirs subject to authorized consumptive uses, with makeup diversions as needed to maintain full conservation storage to the extent possible, subject to senior water rights, instream flow**

[1] 31 Texas Administrative Code (TAC) §§ 357.10(14) and 357.32(c)

**considerations, and/or applicable contractual provisions. The associated annual availability of the reservoirs is expected to increase with use of the Region L WAM.**

**C. The Flow Regime Application Tool (FRAT) will be used, in conjunction with the TCEQ WAM Run 3, to evaluate environmental flows for new surface water management strategies (WMSs). FRAT converts between monthly time step simulations and daily time step simulations.**

3. Was this request submitted in a previous planning cycle? If yes, please indicate which cycle and note how it is different, if at all, from the previous request?

   **Yes**

   **The same hydrologic assumptions and variances were used in the 2016 and 2021 Regional Water Plan.**

4. Are you requesting to extend the period of record beyond the current applicable WAM hydrologic period? If yes, please describe the proposed methodology. Indicate whether you believe there is a new drought of record in the basin.

   **No**

   Choose an item.

   **No, Region L does not request to extend the period of record beyond the current applicable WAM hydrologic period.**

   **No, Region L does not believe there is a new drought of record in the basin.**

5. Are you requesting to use a reservoir safe yield? If yes, please describe in detail how the safe yield would be calculated and defined, which reservoir(s) it would apply to, and why the modification is needed or preferrable for drought planning purposes.

   **No**

   Choose an item.

   **No, Region L does not request to use a reservoir safe yield.**

6. Are you requesting to use a reservoir yield other than firm yield or safe yield? If yes, please describe, in a bulleted list, each modification requested including how the alternative yield was calculated, which reservoir(s) it applies to, and why the modification is needed or preferrable for drought planning purposes. Examples of alternative reservoir yield analyses may include using an alternative reservoir level, conditional reliability, or other special reservoir operations.

   **No**

Choose an item.

**No, Region L will use firm yield to determine reservoir yield.**

7. Are you requesting to use a different model (such as a RiverWare or Excel-based models) than RUN 3 of the applicable TCEQ WAM? If yes, please describe the model being considered including how it incorporates water rights and prior appropriation and how it is more conservative than RUN 3 of the applicable TCEQ WAM.

   **Yes**

   **Existing Supply**

   **The Region L Water Availability Model (WAM) will be used to establish existing supply for Canyon Reservoir and power plant reservoirs of Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir. This model simulates Federal Energy Regulatory Commission (FERC) requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe River Trout Unlimited, and various water rights and daily operations dependent on Canyon Reservoir. The model uses a daily time step simulation with no use of effluent or other changes to water rights. The Region L WAM more accurately considers reservoir operations in its analysis, including operation of the power plant reservoirs subject to authorized consumptive uses, with makeup diversions as needed to maintain full conservation storage to the extent possible, subject to senior water rights, instream flow considerations, and/or applicable contractual provisions.**

8. Are you requesting to use a modified TCEQ WAM? If yes, please describe in a bulleted list all modifications in detail including all specific changes to the WAM and whether the modified WAM is more conservative than the TCEQ WAM RUN 3. Examples of WAM modifications may include adding subordination agreements, contracts, updated water rights, modified spring flows, updated lake evaporation, updated sedimentation[2], system or reservoir operations, or special operational procedures into the WAM.

   **Yes**

   Existing Supply

   **The Region L WAM more accurately considers reservoir operations in its analysis. The Region L WAM includes the following considerations:**

   - **Simulates Federal Energy Regulatory Commission (FERC) requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe**

[2] Updating anticipated sedimentation rates does not require a hydrologic variance under 31 TAC § 357.10(14). The Technical Memorandum will require providing details regarding the sedimentation methodology utilized. Please consider providing that information with this request.

**River Trout Unlimited, and various water rights, including special conditions, and daily operations dependent on Canyon Reservoir.**

- **The model uses a daily time step simulation with no use of effluent or other changes to water rights.**
- **Operation of the power plant reservoirs subject to authorized consumptive uses, with makeup diversions as needed to maintain full conservation storage to the extent possible, subject to senior water rights, instream flow considerations, and/or applicable contractual provisions.**

9. Are you requesting to include return flows in the modeling? If yes, are you doing so to model an indirect reuse water management strategy (WMS)? Please provide complete details regarding the proposed methodology for determining reuse WMS availability.

   **Yes**

   **Existing and Strategy Supply**

   **For Existing Supply, return flows will be included in the WAM when specifically required by a surface water right. For example, the Region L WAM includes a detailed simulation of Calaveras Reservoir, which incorporates effluent from the San Antonio Water System (SAWS), subject to downstream senior water rights and CPS Energy's diversion operations.**

   **Additionally, return flows will be included for Water Management Strategies (WMSs) if an entity requests inclusion of a project that includes a bed and banks permit. For example, the 2021 Regional Water Plan included the Canyon Regional Water Authority (CRWA) Siesta Project, which modeled firm yield based on return flows from a wastewater treatment facility.**

   **Source water available for reuse WMSs will be determined based on the estimated amount of water returned to a utility's WWTPs for each decade, less the amount of reuse water already being utilized as existing supply. The upper limit of source water available for reuse WMSs will be determined based on the amount of water returned to a utility's wastewater treatment plants, estimated at 50% of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site specific information is available. Indirect reuse WMSs are evaluated using TCEQ WAM Run 3. Direct reuse WMSs do not require WAM modeling.**

10. Are any of the requested Hydrologic Variances also planned to be used by another region for the same basin? If yes, please indicate the other Region. Please indicate if unknown.

    **No**

    **Click or tap here to enter text.**

11. Please describe any other variance requests not captured on this checklist or add any other information regarding the variance requests on this checklist.

    **Not Applicable – No additional variances are requested.**

**Black & Veatch**
4009 Banister Lane, Suite 412; Austin, Texas 78704
**P** +1 512-782-4914 **E** GonzalezL@bv.com

# ENCLOSURE 2
# Hydrologic Variance Checklist for the Nueces River Basin

# Surface Water Hydrologic Variance Request Checklist

Texas Water Development Board (TWDB) rules[1] require that regional water planning groups (RWPG) use most current Water Availability Models (WAM) from the Texas Commission on Environmental Quality (TCEQ) and assume full utilization of existing water rights and no return flows for surface water supply analysis. Additionally, evaluation of existing stored surface water available during Drought of Record conditions must be based on Firm Yield using anticipated sedimentation rates. However, the TWDB rules also allow, and **we encourage**, RWPGs to use more representative, water availability modeling assumptions; better site-specific information; or justified operational procedures other than Firm Yield with written approval (via a Hydrologic Variance) from the Executive Administrator in order to better represent and therefore prepare for expected drought conditions.

RWPGs must use this checklist, which is intended to save time and reduce effort, to request a Hydrologic Variance for estimating the availability of surface water sources. For Questions 4 – 10, please indicate whether the requested variance is for determining Existing Supply, Strategy Supply, or both. Please complete a separate checklist for each river basin in which variances are being requested.

**Water Planning Region: L**

1. Which major river basin does the request apply to? Please specify if the request only applies part of the basin or only to certain reservoirs.

   **Nueces Basin**

2. Please give a brief, bulleted, description of the requested hydrologic variances including how the alternative availability assumptions vary from rule requirements, how the modifications will affect the associated annual availability volume(s) in the regional water plan, and why the variance is necessary or provides a better basis for planning. You must provide more-detailed descriptions in the subsequent checklist questions. Attach any available documentation supporting the request.

   **Return flows will be included for Water Management Strategies (WMSs) if an entity requests inclusion of a project that includes a bed and banks permit.**

3. Was this request submitted in a previous planning cycle? If yes, please indicate which cycle and note how it is different, if at all, from the previous request?

   **Yes**

[1] 31 Texas Administrative Code (TAC) §§ 357.10(14) and 357.32(c)

**The same hydrologic assumptions and variances were used in the 2016 and 2021 Regional Water Plan.**

4. Are you requesting to extend the period of record beyond the current applicable WAM hydrologic period? If yes, please describe the proposed methodology. Indicate whether you believe there is a new drought of record in the basin.

   **No**

   Choose an item.

   **No, Region L does not request to extend the period of record beyond the current applicable WAM hydrologic period.**

   **No, Region L does not believe there is a new drought of record in the basin.**

5. Are you requesting to use a reservoir safe yield? If yes, please describe in detail how the safe yield would be calculated and defined, which reservoir(s) it would apply to, and why the modification is needed or preferrable for drought planning purposes.

   **No**

   Choose an item.

   **No, Region L does not request to use a reservoir safe yield for existing supplies or for WMSs.**

6. Are you requesting to use a reservoir yield other than firm yield or safe yield? If yes, please describe, in a bulleted list, each modification requested including how the alternative yield was calculated, which reservoir(s) it applies to, and why the modification is needed or preferrable for drought planning purposes. Examples of alternative reservoir yield analyses may include using an alternative reservoir level, conditional reliability, or other special reservoir operations.

   **No**

   Choose an item.

   **No, Region L will use firm yield to determine reservoir yield.**

7. Are you requesting to use a different model (such as a RiverWare or Excel-based models) than RUN 3 of the applicable TCEQ WAM? If yes, please describe the model being considered including how it incorporates water rights and prior appropriation and how it is more conservative than RUN 3 of the applicable TCEQ WAM.

**No**

Choose an item.

**No, Region L does not request to use a different model than RUN 3 of the applicable TCEQ WAM.**

8. Are you requesting to use a modified TCEQ WAM? If yes, please describe in a bulleted list all modifications in detail including all specific changes to the WAM and whether the modified WAM is more conservative than the TCEQ WAM RUN 3. Examples of WAM modifications may include adding subordination agreements, contracts, updated water rights, modified spring flows, updated lake evaporation, updated sedimentation[2], system or reservoir operations, or special operational procedures into the WAM.

   **No**

   Choose an item.

   **No, Region L does not request to use a modified TCEQ WAM for the Nueces Basin.**

9. Are you requesting to include return flows in the modeling? If yes, are you doing so to model an indirect reuse water management strategy (WMS)? Please provide complete details regarding the proposed methodology for determining reuse WMS availability.

   **Yes**

   **Strategy Supply**

   **Return flows will not be included in the modeling for the Nueces Basin for existing supply.**

   **Return flows will be included for Water Management Strategies (WMSs) if an entity requests inclusion of a project that includes a bed and banks permit.**

   **Source water available for reuse WMSs will be determined based on the estimated amount of water returned to a utility's WWTPs for each decade, less the amount of reuse water already being utilized as existing supply. The upper limit of source water available for reuse WMSs will be determined based on the amount of water returned to a utility's wastewater treatment plants, estimated at 50% of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site specific information is available. Indirect reuse WMSs are evaluated using TCEQ WAM Run 3. Direct reuse WMSs do not require WAM modeling.**

[2] Updating anticipated sedimentation rates does not require a hydrologic variance under 31 TAC § 357.10(14). The Technical Memorandum will require providing details regarding the sedimentation methodology utilized. Please consider providing that information with this request.

10. Are any of the requested Hydrologic Variances also planned to be used by another region for the same basin? If yes, please indicate the other Region. Please indicate if unknown.

    **Unknown**

    Click or tap here to enter text.

11. Please describe any other variance requests not captured on this checklist or add any other information regarding the variance requests on this checklist.

    **N/A – None.**

## ATTACHMENT B

## MEMORANDUM: RECOMMENDATIONS ON REGION L'S HYDROLOGIC VARIANCE REQUEST FOR THE 2026 REGIONAL WATER PLAN

**TO:** Michele Foss, Regional Water Planner, Regional Water Planning

**FROM:** Nelun Fernando, Ph.D., Manager, Water Availability

**DATE**: January 2, 2024

**SUBJECT**: Recommendations on Region L's hydrologic variance request for the 2026 Regional Water Plan

---

This memorandum summarizes my review recommendations on the hydrologic variance request submitted for assessing current surface water availability in Region L's 2026 regional water plan.

1. Use the Region L Guadalupe-San Antonio Water Availability Model (i.e., "Region L WAM") to evaluate existing supply for Canyon Reservoir, and for the power plant reservoirs Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir. The Region L WAM includes the following:
    a. Simulates Federal Energy Regulatory Commission (FERC) requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe Trout Unlimited, and various water rights, including special conditions, and daily operations dependent on Canyon Reservoir.
    b. Uses of a daily timestep simulation with no use of effluent or other changes to water rights.
    c. Reflects the operation of the power plant reservoirs as being subject to authorized consumptive uses, with makeup diversions as needed to maintain full conservation storage to the extent possible, subject to senior water rights, instream flow considerations, and/or applicable contractual provisions.

    ***Recommendation:*** Approve request.

    ***Justification:*** The Region L WAM more accurately considers reservoir operations in its analysis. Furthermore, this variance request was implemented in the 2016 and 2021 regional water plans.

2. Add return flows to the Region L WAM and to the Texas Commission on Environmental Quality (TCEQ) Guadalupe/San Antonio WAM Run 3 in the evaluation of existing supply when specifically required by a surface water right. Also add return flows in the evaluation of water management strategies if an entity requests inclusion of a project that includes a bed and banks permit. The TCEQ Guadalupe/San Antonio WAM Run 3 will be used for the evaluation of indirect reuse water management strategies. The source water available for reuse will be:
    - Estimated as the amount of water returned to a utility's wastewater treatment plant for each decade, less the amount of reuse water already utilized as existing supply.
    - Where the upper limit of source water available for reuse water management strategies will be based on the amount of water returned to a utility's wastewater treatment plants, estimated at 50% of the utility's projected water demands and adjusted for water conservation and drought management strategies, unless site specific information is available.

    ***Recommendation:*** Approve request.

    ***Justification:*** Adding return flows in the evaluation of existing supply reflects current operations within the Guadalupe-San Antonio River Basin. The methodology for including return flows in the evaluation of strategy supply is similar to the method implemented in the 2021 regional water plan (e.g., Canyon Regional Water Authority Siesta Project).

3. Add return flows to the TCEQ Nueces WAM for the evaluation of strategy supplies if an entity requests inclusion of a project that includes a bed and banks permit. The source water available for reuse will be:
   - Estimated as the amount of water returned to a utility's wastewater treatment plant for each decade, less the amount of reuse water already utilized as existing supply.
   - Where the upper limit of source water available for reuse water management strategies will be based on the amount of water returned to a utility's wastewater treatment plants, estimated at 50% of the utility's projected water demands and adjusted for water conservation and drought management strategies, unless site specific information is available.

   ***Recommendation:*** Approve request.

   ***Justification:*** The request was implemented in the 2016 and 2021 regional water plans.

4. Use the Flow Regime Application Tool (FRAT), with the relevant TCEQ WAM Run 3, to evaluate environmental flows for new surface water management strategies.

   ***Recommendation:*** Approve request.

   ***Justification:*** FRAT was used to evaluate environmental flows for new surface water management strategies in the 2016 and 2021 regional water plans.

# Appendix 3C: Technical Memorandum for the 2026 South Central Texas Regional Water Plan

**FINAL**

# TECHNICAL MEMORANDUM

## 2026 South Central Texas Regional Water Plan

**B&V PROJECT NO. 411170**

©Black & Veatch Holding Company 2020. All rights reserved.

**PREPARED FOR**

South Central Texas Regional Water Planning Group & Texas Water Development Board

4 MARCH 2024




Lauren E. Gonzalez
Project Manager, Black & Veatch

Jaime Burke, P.E.
Technical Lead, Black & Veatch

BLACK & VEATCH

**TBPELS Reg. No F-258**

# Table of Contents

1.0 Introduction ..... 1
2.0 Summary of Public Comments ..... 1
3.0 TWDB DB27 Reports ..... 1
4.0 Source Water Availability Assumptions ..... 2
4.1. Surface Water ..... 2
4.1.1. Water Availability Models and Associated Hydrologic Variances ..... 2
4.1.2. Sedimentation Methodology ..... 3
4.2. Groundwater ..... 4
4.2.1. TWDB Unmodified, Original Groundwater Availabilities ..... 4
4.2.2. RWPG-Estimated Groundwater Availabilities ..... 5
4.3. Reuse/Recycle Water Supplies ..... 7
4.4. Livestock Local Supplies ..... 8
5.0 Infeasible Water Management Strategies From the 2021 RWP ..... 8
6.0 Documented Process to Identify Potentially Feasible Water Management Strategies for the 2026 Planning Cycle ..... 8
7.0 Potentially Feasible Water Management Strategies Identified by the RWPG ..... 9
8.0 Interregional Coordination Efforts to Date ..... 9

## LIST OF TABLES

Table 1 Major Reservoir Firm Yields Using WAM Run 3 and the Region L WAM ..... 2
Table 2 Details for Hydrologic Models Used ..... 3
Table 3 MAG and Non-MAG Groundwater Availabilities Provided by TWDB ..... 5
Table 4 Summary of Leona Gravel Aquifer Groundwater Availabilities in Medina County Based on TWDB Published Reports for GMAs 10 and 13 ..... 7
Table 5 Summary of Potentially Feasible WMSs Identified to Date ..... 9

## APPENDICES

Appendix A DB27 Reports
Appendix B Correspondence with TWDB Regarding Hydrologic Variance Requests
Appendix C Electronic Model Input/Output Data
Appendix D RWPG-Estimated Groundwater Availabilities and Source Methodology
Appendix E Process to Identify Potentially Feasible Water Management Strategies
Appendix F Potentially Feasible Water Management Strategies Identified to Meet Needs

# List of Abbreviations

| | |
|---|---|
| acft/yr | Acre-Feet per Year |
| BFZ | Balcones Fault Zone |
| DB27 | 2027 State Water Planning Database |
| DFC | Desired Future Condition |
| EAA | Edwards Aquifer Authority |
| EAHCP | Edwards Aquifer Habitat Conservation Plan |
| EARM | Empirical Area-Reduction Method |
| GAM | Groundwater Availability Model |
| GCD | Groundwater Conservation District |
| GMA | Groundwater Management Area |
| GSA WAM | Guadalupe-San Antonio River Basin Water Availability Model |
| HCP | Habitat Conservation Plan |
| MAG | Modeled Available Groundwater |
| PGMA | Priority Groundwater Management Area |
| Region J | Plateau Region |
| Region K | Lower Colorado Region |
| Region L | South Central Texas Region |
| Region M | Rio Grande Region |
| Region N | Coastal Bend Region |
| Region P | Lavaca Region |
| RWPG | Regional Water Planning Group |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SV/SA | Storage Volume-Surface Area |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| TWDB | Texas Water Development Board |
| WAM | Water Availability Model |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |
| WWTP | Wastewater Treatment Plant |

# 1.0 INTRODUCTION

At its meeting on February 14, 2024, the South Central Texas (Region L) Regional Water Planning Group (SCTRWPG) reviewed the information pertinent to this Technical Memorandum, allotted additional time to its technical consultant, Black & Veatch, to continue updating the 2027 State Water Planning Database (DB27), and approved the submittal of the Technical Memorandum to the Texas Water Development Board (TWDB).

This Technical Memorandum is intended to be a snapshot of the planning process at approximately the halfway point of the planning cycle to document the progress of plan development. Information contained in this Technical Memorandum is preliminary, as the SCTRWPG and Black & Veatch will continue to refine the data through the remainder of the planning process. Specifically, it should be noted that estimates of Existing Supplies and calculation of Identified Needs may change between the submittal of this Technical Memorandum and the adoption of the 2026 Region L Regional Water Plan.

# 2.0 SUMMARY OF PUBLIC COMMENTS

Rules in Title 31 of the Texas Administrative Code (TAC) Chapter 357.21(g)(2) describe notice requirements when a Regional Water Planning Group (RWPG) approves submittal of the Technical Memorandum. Specifically, notice must be provided at least 14 days prior to the meeting, written comment must be accepted for 14 days prior to the meeting and considered by the RWPG members prior to taking the associated action, and meeting materials must be made available on the RWPG website for a minimum of seven days prior to and 14 days following the meeting.

There was one comment received from the public during the requisite public comment period. At the February 14th Regional Water Planning Group meeting, David Caldwell, General Manager for the Medina County Groundwater Conservation District, indicated that the availability volumes estimated for the Leona Gravel Aquifer are higher than currently available. To address this comment, the SCTRWPG established a new subcommittee entitled the Groundwater Availabilities Workgroup to review and determine RWPG-estimated groundwater availabilities for inclusion in the 2026 Region L Regional Water Plan. Meetings will be held in Spring 2024, after submittal of this Technical Memorandum. Therefore, groundwater availability estimates may change between submittal of this Technical Memorandum and the adoption of the 2026 Region L Regional Water Plan.

# 3.0 TWDB DB27 REPORTS

The following reports have been generated from DB27 and are included in Appendix A.

1. Population Projections
2. Water Demand Projections
3. Source Water Availability
4. Existing Water Supplies
5. Identified Water Needs/Surpluses
6. Comparison of Supply, Demand, and Needs to 2021 RWP
7. Comparison of Source Availability to 2021 RWP

# 4.0 SOURCE WATER AVAILABILITY ASSUMPTIONS

The following describes the models and assumptions used to estimate the availability of water for surface water, groundwater, and other sources.

## 4.1. SURFACE WATER

### 4.1.1. Water Availability Models and Associated Hydrologic Variances

The SCTRWPG reviewed, considered, and approved hydrologic assumptions and needed hydrologic variances for submittal to the TWDB at the November 2, 2023, SCTRWPG meeting. Region L submitted a Hydrologic Variance Request letter to TWDB on November 15, 2023. The request letter included hydrologic variance checklists for the Guadalupe-San Antonio River Basin and the Nueces River Basin. The TWDB subsequently approved the variance requests on January 8, 2024. Appendix B includes the TWDB's approval letter of hydrologic variances with attachments that include the initial variance request submitted by Region L and a memorandum regarding hydrologic variance request recommendations.

As described in the hydrologic variance checklists, the SCTRWPG used the Texas Commission on Environmental Quality (TCEQ) Water Availability Model (WAM) Run 3, which assumes all water rights use their full authorized amount, all applicable permit conditions, such as flow requirements, are met, and no return flows. The hydrologic variance checklists also requested use of an alternative surface water model, the "Region L WAM", to assess surface water availabilities for certain reservoirs, including Canyon Reservoir, Victor Braunig Lake, Calaveras Lake, and Coleto-Creek Reservoir. The TWDB subsequently approved use of the Region L WAM in their correspondence dated January 8, 2024. Firm yields for all other reservoirs in Region L were determined using the TCEQ's unmodified WAM Run 3. Table 1 provides the original, unmodified firm yields from WAM Run 3, along with the alternative surface water model (Region L WAM) availabilities, measured in acre-feet per year (acft/yr), utilized as the basis for planning.

**Table 1 Major Reservoir Firm Yields Using WAM Run 3 and the Region L WAM**

| SOURCE [A] | FIRM YIELD FROM UNMODIFIED WAM RUN 3 [B] (ACFT/YR) | | FIRM YIELD FROM REGION L WAM [B] (ACFT/YR) | |
|---|---|---|---|---|
| | 2030 | 2080 | 2030 | 2080 |
| Canyon Reservoir | 63,182 | 62,591 | 86,138 | 85,414 |
| Victor Braunig Lake | 7,802 | 7,775 | 12,916 [C] | 12,901 [C] |
| Calaveras Lake | 11,290 | 11,008 | 39,975 [C] | 39,285 [C] |
| Coleto-Creek Reservoir | 11,934 | 11,257 | 24,965 [C] | 23,666 [C] |

Notes:
[A] For all other reservoirs in Region L, firm yields were determined using the unmodified WAM Run 3. Firm yields are provided in the DB27 report (Appendix A)
[B] Firm yields incorporate sedimentation
[C] For certain reservoirs, firm yield estimates using the Region L WAM are greater than the authorized diversion amounts in their respective water rights permits. Therefore, the 2030-2080 firm yields included in DB27 are the authorized diversion amounts in the water right permits. For Victor Braunig Lake, Calaveras Lake, and Coleto-Creek Reservoir, DB27 firm yields are 12,000 acft/yr, 36,900 acft/yr, and 24,160 acft/yr, respectively.

Table 2 includes details for hydrologic models used, including the model name, version date, model input/output files used, date model used and any relevant comments. Appendix C is an electronic appendix that includes model input/output or other model files used to date in determining water availability.

**Table 2 Details for Hydrologic Models Used**

| MODEL NAME | VERSION DATE | INPUT/OUTPUT FILES USED | DATE MODEL USED | COMMENTS |
|---|---|---|---|---|
| TCEQ Full Authorization WAM for the Guadalupe-San Antonio River Basin | 10/1/2023 | WRAP SIM input file extensions: DAT, DIS, FLO, EVA, FAD, HIS<br><br>WRAP SIM output file extensions: OUT<br><br>WRAP TAB input file extensions: TIN<br><br>WRAP TAB output file extensions: TOU | December 2023 | N/A – None |
| Region L WAM | WRAP SIM: December 1999<br><br>DAT File: February 2004 | WRAP SIM input file extensions: DAT, DIS, INF, EVA, FAD, BSP, DAY, HUE, RCH<br><br>WRAP SIM output file extensions: OUT | December 2023 | N/A – None |
| TCEQ Full Authorization WAM for the Nueces River Basin | 10/1/2023 | WRAP SIM input file extensions: DAT, DIS, FLO, EVA<br><br>WRAP SIM output file extensions: OUT<br><br>WRAP TAB input file extensions: TIN<br><br>WRAP TAB output file extensions: TOU | December 2023 | N/A – None |

### 4.1.2. Sedimentation Methodology

Sedimentation is the anticipated decreases in a reservoir's area-capacity condition, resulting in projected firm yield decreases in each decade. Sedimentation must be performed by RWPGs and incorporating into the WAM Run 3 models and the alternative model, the "Region L WAM". The following summarizes the methodology used for estimating and incorporating sedimentation into the WAMs.

The storage volume - surface area (SV/SA) tables for Canyon Reservoir, Victor Braunig Lake, Calaveras Lake, and Coleto-Creek Reservoir are adjusted to reflect sedimentation for the 2030 and 2080 planning horizons. The program, SEDDIS2.exe, was used to execute the Empirical Area-Reduction Method (EARM). The EARM was developed by Borland and Miller (1960)[1] for the Bureau of Reclamation as a means to mathematically distribute a given sediment loading across the topology of a large reservoir. The EARM inputs include pre-sedimentation SV/SA tables and a projected sediment load. The modified SV/SA tables were computed for each reservoir for the 2030 and 2080 decades.

## 4.2. GROUNDWATER

The most-recent work from Groundwater Management Areas (GMAs) are detailed in Modeled Available Groundwater (MAG) reports, prepared by the TWDB. There are five GMAs located wholly or partially within the Region L planning area, including GMA 7, GMA 9, GMA 10, GMA 13, and GMA 15. The MAG reports, which show availability for each decade of the planning horizon for most of the aquifers in Region L, include the following:

- GR21-012 MAG (GMA 7);
- GR21-014 MAG (GMA 9);
- GR21-015 MAG (GMA 10);
- GR21-018 MAG (GMA 13); and
- GR21-020 MAG (GMA 15).

At present, the SCTRWPG has not reallocated annual MAG volumes, nor identified the need to use MAG Peak Factors.

### 4.2.1. TWDB Unmodified, Original Groundwater Availabilities

For each GMA, the TWDB develops MAG reports with MAG values for each major or minor (i.e., relevant) aquifer. MAG values represent the average annual volume of groundwater production that would achieve the DFCs established by GMAs. The TWDB provided RWPGs with MAG volumes through the DB27 interface, organized by aquifer, county, and basin. In addition, the TWDB provided non-MAG availabilities that align with DFC pumping for non-relevant aquifers and local groundwater supply areas. Table 3 provides a list of aquifers in Region L for which the TWDB provided MAG and non-MAG groundwater availability estimates.

[1] Borland, W.M., Miller, C.R., 1960. Distribution of Sediment in Large Reservoirs. Transactions of the American Society of Civil Engineers. Vol. 125. Iss. 1. DOI: 10.1061/TACEAT.0007776

**Table 3 MAG and Non-MAG Groundwater Availabilities Provided by TWDB**

| AQUIFER | GROUNDWATER MODELING TYPE | |
|---|---|---|
| | TWDB MAG AVAILABILITY ESTIMATES | TWDB NON-MAG AVAILABILITY ESTIMATES |
| Austin Chalk | ● | |
| Buda Limestone | ● | |
| Carrizo-Wilcox | ● | ● |
| Edwards-Balcones Fault Zone (BFZ) (not regulated by the Edwards Authority [EAA]) | ● | ● |
| Edwards-Trinity-Plateau | ● | |
| Edwards-Trinity-Plateau, Pecos Valley, and Trinity | ● | |
| Ellenburger-San Saba | ● | |
| Gulf Coast System | ● | ● |
| Hickory | ● | ● |
| Leona Gravel | ● | ● |
| Queen City | ● | ● |
| Sparta | ● | ● |
| Trinity | ● | ● |
| Yegua-Jackson | ● | ● |

### 4.2.2. RWPG-Estimated Groundwater Availabilities

The SCTRWPG estimated groundwater availabilities for non-MAG aquifers or portions thereof. The sources used to estimate groundwater availabilities include published groundwater reports, maximum historic annual production volumes, contracts, permit limitations, and other limitations. The table provided in Appendix D summarizes RWPG-estimated groundwater availabilities to date by county, aquifer, and basin, and identifies the source methodology used for the estimates.

#### 4.2.2.1. Carrizo-Wilcox Aquifer in Karnes County

Historic annual production values indicate that groundwater availabilities in the Carrizo-Wilcox Aquifer in Karnes County are likely higher than MAG values. Data published in the TWDB Water Use Survey Detailed Groundwater Pumpage by County were analyzed to determine the maximum annual groundwater production values from 2019 to 2021. Groundwater pumpage volumes for the Carrizo-Wilcox Aquifer in Karnes County in the Guadalupe, Nueces, and San Antonio Basins were 50 acft/yr, 84 acft/yr, and 1,078 acft/yr, respectively. Appendix D provides a summary of RWPG-estimated groundwater availabilities to date for the Carrizo-Wilcox Aquifer in Karnes County.

#### 4.2.2.2. Portions of the Edwards-BFZ Aquifer Regulated by Edwards Aquifer Authority

The SCTRWPG estimated groundwater availabilities for the portion of the Edwards-BFZ Aquifer regulated by EAA. The EAA-Regulated Edwards-BFZ Aquifer availability was determined using the current Edwards Aquifer Authority permitted volumes, while being consistent with the full implementation of the Edwards Aquifer Habitat Conservation Plan and any forbearance programs. Appendix D provides a summary of RWPG-estimated groundwater availabilities to date for the portions of the Edwards-BFZ Aquifer regulated by EAA.

Hays County is partially regulated by EAA, GMA 9, and GMA 10. GMA 9 declared the entire Edwards-BFZ aquifer to be non-relevant within Hays County. For GMA 10, the MAG value for the Edwards BFZ Aquifer, freshwater, in Hays County is 942 acft/yr. The EAA permitted amount is 7,116 acft/yr. The RWPG estimated the Hays County freshwater groundwater availability by summing the MAG values and EAA-permitted amounts, which results in 8,058 acft/yr.

#### 4.2.2.3. Edwards-BFZ Aquifer in Frio County

Frio County is located within Groundwater Management Area 13 and is not regulated by the EAA. The TWDB's 2022 published report, entitled *GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers In Groundwater Management Area 13* indicates that the Edwards-BFZ Aquifer was declared not relevant for purposes of joint planning. However, a TWDB published report in 2012, entitled *GTA Aquifer Assessment 10-40 MAG: Analytical Model Estimates of Modeled Available Groundwater for the Edwards Aquifer within Frio County in GMA 13,* estimated the MAG for the Edwards-BFZ Aquifer within Frio County to be approximately 23,213 acft/yr. Therefore, the RWPG has estimated groundwater availabilities for the Edwards-BFZ Aquifer within Frio County to be 23,213 acft/yr for all decades within the planning horizon (Appendix D). This non-MAG value is consistent with the values included in the 2021 Region L Regional Water Plan.

#### 4.2.2.4. Leona Gravel Aquifer in Medina County

Medina County is located within GMAs 9, 10, and 13. Additionally, the county is partially within the Nueces River Basin and the San Antonio River Basin. MAG values for the Leona Gravel Aquifer in Medina County are provided in the Medina County Groundwater Conservation District Groundwater Management Plan[2], which includes and references the following two TWDB-published reports to estimate groundwater availabilities for the Leona Gravel Aquifer in Medina County (Appendix D), as follows:

- GMA 10, Medina County, Leona Gravel Aquifer: Bradley, Robert. GTA Aquifer Assessment 10-07 MAG: Modeled Available Groundwater Estimates for Leona Gravel Aquifer in Medina County. Texas Water Development Board. 20 August 2012, 8 p
- GMA 13, Medina County, Leona Gravel Aquifer: Bradley, Robert. *Aquifer Assessment 10-41: Aquifer Assessment for the Leona Gravel Aquifer in Groundwater Management Area 13*. Texas Water Development Board. 20 August 2012, 8 p.

[2] Medina County Groundwater Conservation District Groundwater Management Plan. Medina County Groundwater Conservation District. 30 March 2022, 112 p.

These reports each estimate MAG values for the Leona Gravel Aquifer within its respective GMAs. Table 4 summarizes the basin-specific MAG values identified in these two reports. To determine RWPG-estimated groundwater availabilities for the Leona Gravel in Medina County, each GMA's MAG values were summed to determine RWPG-estimated values by basin. The RWPG-estimated groundwater availabilities for the Leona Gravel Aquifer in Medina County are shown in Appendix D. These non-MAG values are consistent with the values included in the 2021 Region L Regional Water Plan.

**Table 4 Summary of Leona Gravel Aquifer Groundwater Availabilities in Medina County Based on TWDB Published Reports for GMAs 10 and 13**

| COUNTY | GROUNDWATER MANAGEMENT AREA | LEONA GRAVEL AQUIFER AVAILABILITIES (ACFT/YR) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | BASIN | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| Medina | GMA 10 [A] | Nueces | 12,369 | 12,369 | 12,369 | 12,369 | N/A | N/A |
| | | San Antonio | 4,013 | 4,013 | 4,013 | 4,013 | N/A | N/A |
| | GMA 13 [B] | Nueces | 5,586 | 5,586 | 5,586 | 5,586 | N/A | N/A |
| | | San Antonio | 49 | 49 | 49 | 49 | N/A | N/A |

**Notes:**

[A] **MAG v**alues from ***GTA Aquifer Assessment 10-07 MAG (2012)***

[B] **MAG values from** ***Aquifer Assessment 10-41: Aquifer Assessment for the Leona Gravel Aquifer in Groundwater Management Area 13 (2012)***

#### 4.2.2.5. San Marcos River Alluvium in Caldwell County

For the San Marcos River Alluvium Aquifer, groundwater availability estimates are based on a TWDB-published groundwater report[3] and the maximum historic annual production volume from 1980 to 2021. Appendix D provides a summary of the RWPG-estimated groundwater availabilities for the planning horizon. These non-MAG values are consistent with the values included in the 2021 South Central Texas (Region L) Regional Water Plan.

## 4.3. REUSE/RECYCLE WATER SUPPLIES

As described in the TWDB-approved hydrologic variances, the SCTRWPG will determine reuse/recycle water supplies based on the estimated amount of water returned to a utility's wastewater treatment plant (WWTP) for each decade, less the amount of reuse water already being utilized as existing supply. The upper limit of source water available for reuse water management strategies (WMSs) will be determined based on the amount of water returned to a utility's WWTP, estimated at 50 percent (%) of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site specific information is available.

[3] Follett, C.R. Ground-Water Resources of Caldwell County, Texas; Texas Water Development Board Report 12. Texas Water Development Board. January 1966; 88 p.

## 4.4. LIVESTOCK LOCAL SUPPLIES

For all areas within the planning region, livestock water demand is generally assumed to be supplied 50% from quantified groundwater sources and 50 percent from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. This assumption is based on data from the TWDB historic water use estimates, which indicate that the counties within the planning area average approximately 60% groundwater supply to meet livestock use over the past ten years (2011-2021). Because the demands are based on a drought year scenario, it was assumed that ranchers will manage their livestock in such a way that populations will be maintained at a level that can be supported by a combination of local surface water supplies and known water or groundwater supplies. Livestock water supply is set equal to projected livestock demands due to the nature of livestock water use. Livestock demand tends to match the available supply. If the supply is not present, the livestock numbers are reduced until they match the available supply. Infrastructure is not a consideration for livestock supplies, and livestock pumpage is typically exempt from regulations; therefore, there are no regulatory considerations that might impact livestock groundwater supplies.

# 5.0 INFEASIBLE WATER MANAGEMENT STRATEGIES FROM THE 2021 RWP

The SCTRWPG conducted a one-time, mid-cycle analysis of the 2021 Region L Regional Water Plan (RWP) to identify any newly infeasible WMSs and water management strategy projects (WMSPs). The SCTRWPG reviewed a list of WMSs and WMSPs from TWDB that were feasible and recommended at the time of adoption of the 2021 Region L Regional Water Plan but which have since become infeasible. Information from WMS and WMSP sponsors was gathered to determine whether they have taken affirmative steps to implement projects with a near-term online decade (2020, 2030, and 2040). In addition, the list of TWDB-provided strategies was presented to the SCTRWPG for discussion related to implementation status.

On November 2, 2023, the SCTRWPG held a public meeting to receive results of the potentially infeasible WMS analysis. These results were presented at the same public meeting in which the methodology for identifying potentially feasible WMSs for the current plan were presented and approved.

The analysis identified no infeasible WMSs or WMSPs; therefore, an amendment of the 2021 Region L Regional Water Plan is not necessary.

# 6.0 DOCUMENTED PROCESS TO IDENTIFY POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES FOR THE 2026 PLANNING CYCLE

On November 2, 2023, the SCTRWPG considered and approved a documented process to identify potentially feasible WMSs for the 2026 Regional Water Planning Cycle. The process is documented in Appendix E of this Technical Memorandum.

# 7.0 POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES IDENTIFIED BY THE RWPG

The SCTRWPG identified potentially feasible WMSs for meeting Needs in the region. In future meetings, the SCTRWPG may consider additional WMSs, review scope and fee of each, and submit a request to TWDB for notice to proceed. Appendix F provides the potentially feasible WMSs identified to date for WUGs with identified Needs. A summary of the potentially feasible WMSs is provided in Table 5.

**Table 5 Summary of Potentially Feasible WMSs Identified to Date**

| NO. | POTENTIALLY FEASIBLE WMS | NO. | POTENTIALLY FEASIBLE WMS |
|---|---|---|---|
| 1 | Advanced Water Conservation | 16 | SAWS Regional Wilcox Project |
| 2 | Non-municipal Water Conservation | 17 | ARWA Project (Phase 2) |
| 3 | Drought Management | 18 | ARWA Project (Phase 3) |
| 4 | Edwards Transfers | 19 | GBRA WaterSECURE |
| 5 | Fresh Groundwater Development | 20 | GBRA Lower Basin New Appropriation |
| 6 | Brackish Groundwater Development | 21 | CRWA Wells Ranch (Phase 3) |
| 7 | Groundwater Conversions | 22 | CRWA Siesta Project |
| 8 | Brush Management | 23 | CRWA Expanded Brackish Carrizo-Wilcox Project |
| 9 | Rainwater Harvesting | 24 | CVLGC Carrizo Project |
| 10 | Surface Water Rights | 25 | SSLGC Expanded Carrizo Project |
| 11 | Balancing Storage | 26 | SSLGC Expanded Brackish Wilcox Project |
| 12 | Facilities Expansion | 27 | NBU ASR |
| 13 | Recycled Water Strategies | 28 | NBU Trinity Well Field Expansion |
| 14 | SAWS Expanded Local Carrizo Project | 29 | City of Victoria ASR |
| 15 | SAWS Expanded Brackish Groundwater Project | 30 | City of Victoria Groundwater-Surface Water Exchange |

# 8.0 INTERREGIONAL COORDINATION EFFORTS TO DATE

Region L is bordered by five regional water planning areas, including the Plateau (Region J), Lower Colorado (Region K), Rio Grande (Region M), Coastal Bend (Region N), and Lavaca (Region P). The following summarizes interregional coordination efforts to date.

- Regular meetings or conversations with consultants in Regions G, K, M, and P
- Regular reports from interregional liaisons
- Engagement and membership in the Interregional Planning Council
- Engagement in Regional Water Planning Chairs' Meetings

***Note on Technical Memorandum Appendices:***

*For clarity and accuracy, appendices from the 2024 Technical Memorandum are excluded from the 2026 South Central Texas (Region L) Regional Water Plan.*

*In some instances, the appendices of the 2024 Technical Memorandum are duplicates of those already contained in the 2026 Region L Regional Water Plan. In other instances, the data and information contained in the appendices have been superseded and may conflict with current data presented in the 2026 Region L Regional Water Plan.*

# Appendix 3D: Permitted Surface Water Rights and Reliability Assessment

# Appendix 3D: Permitted Surface Water Rights and Reliability Assessment

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Guadalupe | Caldwell | HYD | P4492_1 | 15,000 | 61.55 | 0 | 61.55 | 0 | HYDRACO POWER INC |
| 2 | Guadalupe | Caldwell | IRR | P4080_1 | 425 | 71.94 | 0 | 71.94 | 0 | BENO CORPORATION |
| 3 | Guadalupe | Caldwell | IRR | C3898_1 | 20 | 88.83 | 0 | 88.83 | 0 | CITY OF LULING |
| 4 | Guadalupe | Caldwell | IRR | P4373_1 | 300 | 66.50 | 0 | 66.50 | 0 | CONTINENTAL WHOLESALE FLORISTS |
| 5 | Guadalupe | Caldwell | IRR | P4373_2 | 300 | 65.59 | 0 | 65.59 | 0 | CONTINENTAL WHOLESALE FLORISTS |
| 6 | Guadalupe | Caldwell | IRR | P4033_1 | 300 | 74.01 | 0 | 74.01 | 0 | DICK BROWN |
| 7 | Guadalupe | Caldwell | IRR | P5857_1 | 1 | 84.43 | 0 | 84.43 | 0 | GENE MILLIGAN |
| 8 | Guadalupe | Caldwell | IRR | C3890_1 | 50 | 88.83 | 0 | 88.83 | 0 | GEORGE PARTNERSHIP LTD |
| 9 | Guadalupe | Caldwell | IRR | C3900_2 | 500 | 86.37 | 0 | 86.37 | 0 | JAMES D JAMISON |
| 10 | Guadalupe | Caldwell | IRR | P4518_1 | 120 | 80.57 | 0 | 80.57 | 0 | JOHN H COX |
| 11 | Guadalupe | Caldwell | IRR | P4597_1 | 320 | 65.85 | 0 | 65.85 | 0 | JOHN TO'BANION JR ET AL |
| 12 | Guadalupe | Caldwell | IRR | P4110_1 | 240 | 73.01 | 0 | 73.01 | 0 | LYNN STORM |
| 13 | Guadalupe | Caldwell | IRR | P4022_1 | 450 | 79.33 | 0 | 79.33 | 0 | MARY ANN LANGFORD ET AL |
| 14 | Guadalupe | Caldwell | IRR | C3899_1 | 1,180 | 88.80 | 0 | 88.80 | 0 | MIGUEL CALZADA URQUIZA ET UX |
| 15 | Guadalupe | Caldwell | IRR | P4569_2 | 240 | 66.34 | 0 | 66.34 | 0 | ROBERT L BOOTHE |
| 16 | Guadalupe | Caldwell | IRR | P3857_1 | 144 | 84.25 | 0 | 84.25 | 0 | ROBERT M KIEHN |
| 17 | Guadalupe | Caldwell | IRR | C3904_1 | 28 | 79.75 | 0 | 79.75 | 0 | SHERRY CHAPPELL |
| 18 | Guadalupe | Caldwell | IRR | C3906_1 | 63 | 90.45 | 0 | 90.45 | 0 | TEXAS PARKS & WILDLIFE DEPT |
| 19 | Guadalupe | Caldwell | IRR | C3906_2 | 12 | 93.17 | 0 | 93.17 | 0 | TEXAS PARKS & WILDLIFE DEPT |
| 20 | Guadalupe | Caldwell | MUN | C3889_1 | 24 | 100.00 | 24 | 100.00 | 24 | CANYON REGIONAL |
| 21 | Guadalupe | Caldwell | MUN | C3896_1 | 1,500 | 87.35 | 0 | 87.35 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 22 | Guadalupe | Caldwell | MUN | C3896_2 | 1,300 | 73.31 | 0 | 73.31 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 23 | Guadalupe | Caldwell | MUN | P5234_2 | 1,022 | 63.68 | 0 | 63.68 | 0 | GUADALUPE - BLANCO RIVER AUTHORITY |
| 24 | Guadalupe | Caldwell | MUN | C3895_2 | 580 | 90.26 | 0 | 90.26 | 0 | STATE BANK & TRUST COMPANY |
| 25 | Guadalupe | Caldwell | MUN | C3891_3 | 500 | 100.00 | 500 | 100.00 | 500 | TRI - COMMUNITY WSC |
| 26 | Guadalupe | Caldwell | MUN | P5092_2 | 150 | 63.63 | 0 | 63.63 | 0 | WILLIAM JAMES WOOTEN ET AL |
| 27 | Guadalupe | Calhoun | IND | P4586_1 | 272 | 82.09 | 0 | 82.09 | 0 | DEL & GLORIA WILLIAMS , Crawfish Isle P |
| 28 | Guadalupe | Calhoun | IND | C5173_2 | 1,250 | 100.00 | 1,250 | 100.00 | 1,250 | GUADALUPE - BLANCO RIVER AUTH |
| 29 | Guadalupe | Calhoun | IND | C5174_3 | 935 | 99.48 | 0 | 99.48 | 0 | GUADALUPE - BLANCO RIVER AUTH |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | Guadalupe | Calhoun | IND | C5176_3 | 3,315 | 99.09 | 0 | 99.09 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 31 | Guadalupe | Calhoun | IND | C5177_1 | 10,763 | 100.00 | 10,763 | 100.00 | 10,763 | GUADALUPE - BLANCO RIVER AUTH |
| 32 | Guadalupe | Calhoun | IND | C5177_4 | 10,000 | 99.69 | 0 | 99.69 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 33 | Guadalupe | Calhoun | IND | C5178_2 | 30,525 | 97.71 | 0 | 97.71 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 34 | Guadalupe | Calhoun | IND | C5175_2 | 470 | 99.30 | 0 | 99.30 | 0 | UNION CARBIDE |
| 35 | Guadalupe | Calhoun | IRR | P5381_1 | 150 | 82.57 | 0 | 82.57 | 0 | BRETT BRATCHER |
| 36 | Guadalupe | Calhoun | IRR | C5173_1 | 1,250 | 100.00 | 1,250 | 100.00 | 1,250 | GUADALUPE - BLANCO RIVER AUTH |
| 37 | Guadalupe | Calhoun | IRR | C5174_2 | 935 | 99.25 | 0 | 99.25 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 38 | Guadalupe | Calhoun | IRR | C5175_1 | 470 | 99.04 | 0 | 99.04 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 39 | Guadalupe | Calhoun | IRR | C5176_1 | 3,315 | 99.04 | 0 | 99.04 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 40 | Guadalupe | Calhoun | IRR | C5177_2 | 10,763 | 100.00 | 10,763 | 100.00 | 10,763 | GUADALUPE - BLANCO RIVER AUTH |
| 41 | Guadalupe | Calhoun | IRR | C5177_6 | 4,316 | 99.17 | 0 | 99.17 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 42 | Guadalupe | Calhoun | IRR | C5178_3 | 44,950 | 95.40 | 0 | 95.40 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 43 | Guadalupe | Calhoun | MUN | C5176_2 | 3,314 | 99.09 | 0 | 99.09 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 44 | Guadalupe | Calhoun | MUN | C5177_3 | 11,089 | 99.97 | 9,531 | 99.97 | 9,531 | GUADALUPE - BLANCO RIVER AUTH |
| 45 | Guadalupe | Calhoun | MUN | C5177_5 | 4,316 | 99.37 | 0 | 99.37 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 46 | Guadalupe | Calhoun | MUN | C5178_1 | 30,525 | 98.43 | 0 | 98.43 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 47 | Guadalupe | Comal | EVN | C2074_1 | 10,000 | 98.14 | 0 | 97.97 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 48 | Guadalupe | Comal | EVN | C2074_2 | 40,000 | 97.93 | 0 | 97.88 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 49 | Guadalupe | Comal | HYD | C3824_1 | 124,870 | 5.34 | 0 | 5.34 | 0 | NEW BRAUNFELS UTILITIES |
| 50 | Guadalupe | Comal | IND | C3829_1 | 100 | 100.00 | 100 | 100.00 | 100 | MISSION VALLEY MILL HOLDINGS , LLC |
| 51 | Guadalupe | Comal | IRR | C3828_1 | 1 | 100.00 | 0.86 | 100.00 | 0.86 | CAMP WARNECKE INC |
| 52 | Guadalupe | Comal | IRR | C1955_1 | 10 | 47.84 | 0 | 47.84 | 0 | CHESTER & RICKIE KRAUSE |
| 53 | Guadalupe | Comal | IRR | C3826_2 | 100 | 24.36 | 0 | 24.36 | 0 | CITY OF NEW BRAUNFELS |
| 54 | Guadalupe | Comal | IRR | C3817_1 | 79 | 88.94 | 0 | 88.94 | 0 | CLARENCE B ANDERSON ET AL |
| 55 | Guadalupe | Comal | IRR | C2060_2 | 80 | 68.28 | 0 | 68.28 | 0 | DAVID MICHAEL HIXON 2011 TRUST ET AL |
| 56 | Guadalupe | Comal | IRR | C2072_1 | 35 | 98.45 | 0 | 98.45 | 0 | ELOY GARCIA JR ET UX |
| 57 | Guadalupe | Comal | IRR | C2070_1 | 98 | 19.98 | 0 | 19.98 | 0 | FRANK A STANUSH |
| 58 | Guadalupe | Comal | IRR | C2070_2 | 22 | 19.98 | 0 | 19.98 | 0 | FRANK A STANUSH |
| 59 | Guadalupe | Comal | IRR | C2071_1 | 1 | 99.05 | 0 | 99.05 | 0 | GUADALUPE RIVER RANCH & CATTLE |
| 60 | Guadalupe | Comal | IRR | C1954_1 | 15 | 49.09 | 0 | 49.09 | 0 | LAWRENCE D KRAUSE |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 61 | Guadalupe | Comal | IRR | C1954_2 | 5 | 67.06 | 0 | 67.06 | 0 | LAWRENCE D KRAUSE |
| 62 | Guadalupe | Comal | IRR | C3828_2 | 2 | 100.00 | 2.14 | 100.00 | 2.14 | LIBERTY PARTNERSHIP LTD |
| 63 | Guadalupe | Comal | IRR | C3824_4 | 200 | 94.36 | 38 | 94.36 | 38 | NEW BRAUNFELS UTILITIES |
| 64 | Guadalupe | Comal | IRR | C3819_1 | 14 | 98.96 | 0 | 98.96 | 0 | PATRICK S MOLAK |
| 65 | Guadalupe | Comal | IRR | P4607_1 | 50 | 88.20 | 0 | 88.20 | 0 | PURALLOY INC |
| 66 | Guadalupe | Comal | IRR | A5647_1 | 350 | 65.63 | 0 | 65.63 | 0 | RIVER CROSSING HOLDINGS LLC |
| 67 | Guadalupe | Comal | IRR | C3821_1 | 4 | 99.02 | 0 | 99.02 | 0 | ROBERT & MARY RAE PRESTON |
| 68 | Guadalupe | Comal | IRR | C3821_2 | 1 | 100.00 | 1 | 100.00 | 1 | ROBERT & MARY RAE PRESTON |
| 69 | Guadalupe | Comal | IRR | C3822_1 | 3 | 99.91 | 3 | 99.91 | 3 | ROBERT KRUEGER ET AL |
| 70 | Guadalupe | Comal | MUN | C3829_3 | 400 | 100.00 | 400 | 100.00 | 400 | CANYON REGIONAL WATER AUTHORITY |
| 71 | Guadalupe | Comal | MUN | P4491_1 | 120 | 86.19 | 0 | 86.19 | 0 | COMAL CO FRESH WSD # 1 |
| 72 | Guadalupe | Comal | MUN | C2074_7 | 40,000 | 98.09 | 0 | 97.99 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 73 | Guadalupe | Comal | MUN | C3815_1 | 3 | 28.98 | 0 | 28.98 | 0 | J D MURRELL |
| 74 | Guadalupe | Comal | MUN | C3823_2 | 1,289 | 72.28 | 0 | 72.28 | 0 | NEW BRAUNFELS UTILITIES |
| 75 | Guadalupe | Comal | MUN | C3824_5 | 2,240 | 99.65 | 68 | 99.65 | 68 | NEW BRAUNFELS UTILITIES |
| 76 | Guadalupe | Comal | MUN | C3824_6 | 3,418 | 73.06 | 0 | 73.06 | 0 | NEW BRAUNFELS UTILITIES |
| 77 | Guadalupe | Comal | MUN | C3830_2 | 5 | 72.20 | 0 | 72.20 | 0 | NEW BRAUNFELS UTILITIES |
| 78 | Guadalupe | Comal | MUN | C3819_2 | 9 | 99.26 | 0 | 99.26 | 0 | PATRICK S MOLAK |
| 79 | Guadalupe | Comal | REC | P4114_1 | 3,711 | 4.30 | 0 | 4.30 | 0 | BAD SCHOLOESS INC |
| 80 | Guadalupe | Comal | REC | P4114_2 | 1,289 | 7.88 | 0 | 7.88 | 0 | BAD SCHOLOESS INC |
| 81 | Guadalupe | Comal | REC | C3816_1 | 1,460 | 27.63 | 0 | 27.63 | 0 | WHITEWATER SPORTS INC |
| 82 | Guadalupe | DeWitt | IRR | P4318_1 | 80 | 82.45 | 0 | 82.45 | 0 | F T BUCHEL |
| 83 | Guadalupe | DeWitt | IRR | C3854_1 | 32 | 95.83 | 0 | 95.83 | 0 | J D BRAMLETTE JR |
| 84 | Guadalupe | DeWitt | IRR | C3851_1 | 182 | 97.82 | 0 | 97.82 | 0 | JACK H BOOTHE |
| 85 | Guadalupe | DeWitt | IRR | C3852_1 | 35 | 98.61 | 0 | 98.61 | 0 | JOHN BRADEN JR ET AL |
| 86 | Guadalupe | DeWitt | IRR | C3850_1 | 80 | 98.75 | 0 | 98.75 | 0 | JOSEPHINE B MUSSELMAN ET AL |
| 87 | Guadalupe | DeWitt | IRR | P5006_2 | 299 | 85.35 | 0 | 85.35 | 0 | LORITA MAE FITZGERALD |
| 88 | Guadalupe | DeWitt | IRR | C3855_1 | 26 | 98.75 | 0 | 98.75 | 0 | MRS JOHN C LEY |
| 89 | Guadalupe | DeWitt | IRR | C3856_1 | 50 | 84.25 | 0 | 84.25 | 0 | PATRICK B & MARY KARYN ELDER |
| 90 | Guadalupe | DeWitt | REC | P5294_1 | 15 | 94.15 | 0 | 94.15 | 0 | CITY OF YORKTOWN |
| 91 | Guadalupe | Goliad | IRR | C3820_1 | 4 | 99.15 | 0 | 99.15 | 0 | VETERANS OF FOREIGN WARS |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 92 | Guadalupe | Gonzales | HYD | C3846_1 | 796,363 | 56.80 | 0 | 56.81 | 0 | CITY OF GONZALES |
| 93 | Guadalupe | Gonzales | HYD | C5172_1 | 585,599 | 56.31 | 0 | 56.31 | 0 | GUADALUPE - BLANCO R A H - 4 |
| 94 | Guadalupe | Gonzales | HYD | C5172_2 | 574,832 | 56.88 | 0 | 56.89 | 0 | GUADALUPE - BLANCO R A H - 5 |
| 95 | Guadalupe | Gonzales | IRR | P5038_1 | 66 | 75.95 | 0 | 75.95 | 0 | ARTHUR DENNIS HUEBNER ET AL |
| 96 | Guadalupe | Gonzales | IRR | P4075_1 | 225 | 70.00 | 0 | 70.00 | 0 | DAVID S SHELTON |
| 97 | Guadalupe | Gonzales | IRR | P3916_1 | 50 | 84.25 | 0 | 84.25 | 0 | DON A LIGHTSEY ET UX |
| 98 | Guadalupe | Gonzales | IRR | P4089_1 | 830 | 76.80 | 0 | 76.80 | 0 | DR IV EPSTEIN |
| 99 | Guadalupe | Gonzales | IRR | C3847_1 | 250 | 98.75 | 0 | 98.75 | 0 | DR JAMES W NIXON JR |
| 100 | Guadalupe | Gonzales | IRR | C3848_1 | 1,800 | 99.18 | 0 | 99.18 | 0 | KING RANCH INC |
| 101 | Guadalupe | Gonzales | IRR | C3908_1 | 670 | 88.52 | 0 | 88.52 | 0 | LARRY E & PHYLIS A BROWNE |
| 102 | Guadalupe | Gonzales | IRR | P5037_1 | 230 | 76.00 | 0 | 76.00 | 0 | RICHARD D BRAMLET |
| 103 | Guadalupe | Gonzales | IRR | P4539_1 | 8 | 86.48 | 0 | 86.48 | 0 | T PAUL SIDES |
| 104 | Guadalupe | Gonzales | MUN | C3846_2 | 2,240 | 100.00 | 2,240 | 100.00 | 2,240 | CITY OF GONZALES |
| 105 | Guadalupe | Gonzales | MUN | P12378 | 75,000 | 85.76 | 0 | 85.76 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 106 | Guadalupe | Guadalupe | HYD | C5488_1 | 663,892 | 50.65 | 0 | 50.65 | 0 | GUADALUPE - BLANCO R A TP - 1 |
| 107 | Guadalupe | Guadalupe | HYD | C5488_2 | 659,995 | 50.77 | 0 | 50.77 | 0 | GUADALUPE - BLANCO R A TP - 3 |
| 108 | Guadalupe | Guadalupe | HYD | C5488_3 | 655,323 | 50.89 | 0 | 50.90 | 0 | GUADALUPE - BLANCO R A TP - 4 |
| 109 | Guadalupe | Guadalupe | HYD | C5488_4 | 624,781 | 52.64 | 0 | 52.64 | 0 | GUADALUPE - BLANCO R A TP - 5 |
| 110 | Guadalupe | Guadalupe | HYD | CANSUBBU | 25,144 | 0.00 | 0 | 0.00 | 0 | GUADALUPE - BLANCO R A TP-1 |
| 111 | Guadalupe | Guadalupe | IND | C3836_1 | 25 | 100.00 | 25 | 100.00 | 25 | ACME BRICK COMPANY |
| 112 | Guadalupe | Guadalupe | IND | P5240_1 | 31 | 71.34 | 0 | 71.34 | 0 | B SHANKLIN |
| 113 | Guadalupe | Guadalupe | IND | C3837_1 | 34 | 100.00 | 34 | 100.00 | 34 | STRUCTURAL METALS INC |
| 114 | Guadalupe | Guadalupe | IRR | P5604_1 | 8 | 62.01 | 0 | 62.01 | 0 | ALBERT GREEN , ET UX SAN MA |
| 115 | Guadalupe | Guadalupe | IRR | C3840_1 | 34 | 87.32 | 0 | 87.32 | 0 | ARNO NEUMANN |
| 116 | Guadalupe | Guadalupe | IRR | C3834_1 | 71 | 100.00 | 71.48 | 100.00 | 71.48 | CANYON REGIONAL WATER AUTH |
| 117 | Guadalupe | Guadalupe | IRR | C3844_1 | 608 | 100.00 | 608 | 100.00 | 608 | CITY OF VICTORIA |
| 118 | Guadalupe | Guadalupe | IRR | C3838_1 | 37 | 47.18 | 0 | 47.18 | 0 | DONALD E NORED |
| 119 | Guadalupe | Guadalupe | IRR | P3973_1 | 73 | 34.50 | 0 | 34.50 | 0 | DONALD J JOHNSON ET UX |
| 120 | Guadalupe | Guadalupe | IRR | P4502_1 | 600 | 68.40 | 0 | 68.40 | 0 | JOHN SCOTT GREENE ET AL |
| 121 | Guadalupe | Guadalupe | IRR | C3841_1 | 5 | 64.37 | 0 | 64.37 | 0 | LEO P CLOUD JR ET AL |
| 122 | Guadalupe | Guadalupe | IRR | C3843_1 | 27 | 100.00 | 27 | 100.00 | 27 | LEONARD FLEMING |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 123 | Guadalupe | Guadalupe | IRR | C3835_1 | 19 | 80.76 | 0 | 80.76 | 0 | OTTO VOIGT |
| 124 | Guadalupe | Guadalupe | IRR | C3832_1 | 44 | 100.00 | 44 | 100.00 | 44 | RAY E DITTMAR |
| 125 | Guadalupe | Guadalupe | IRR | C3842_1 | 158 | 87.26 | 0 | 87.26 | 0 | SARA DARILEK RAINWATER |
| 126 | Guadalupe | Guadalupe | IRR | C3839_3 | 200 | 100.00 | 200 | 100.00 | 200 | SEGUIN MUNICIPAL UTILITIES |
| 127 | Guadalupe | Guadalupe | IRR | P4043_1 | 150 | 74.03 | 0 | 74.03 | 0 | TERRAND LTD ET AL |
| 128 | Guadalupe | Guadalupe | IRR | P3600_3 | 750 | 73.07 | 0 | 73.07 | 0 | THE LULING FOUNDATION |
| 129 | Guadalupe | Guadalupe | MUN | C3834_2 | 19 | 100.00 | 18.52 | 100.00 | 18.52 | CANYON REGIONAL WATER AUTH |
| 130 | Guadalupe | Guadalupe | MUN | C3833_1 | 56 | 100.00 | 56 | 100.00 | 56 | GARY A DITTMAR |
| 131 | Guadalupe | Guadalupe | MUN | C3833_2 | 5 | 100.00 | 5 | 100.00 | 5 | GARY A DITTMAR |
| 132 | Guadalupe | Guadalupe | MUN | C3839_1 | 7,000 | 100.00 | 7,000 | 100.00 | 7,000 | SEGUIN MUNICIPAL UTILITIES |
| 133 | Guadalupe | Guadalupe | REC | P5121_1 | 83 | 64.99 | 0 | 64.99 | 0 | GUADALUPE SKI - PLEX HOME ASSOC |
| 134 | Guadalupe | Hays | HYD | C3865_1 | 64,370 | 98.16 | 37,910 | 98.16 | 37,910 | TEXAS STATE UNIVERSITY |
| 135 | Guadalupe | Hays | IND | C3869_1 | 10,000 | 99.48 | 0 | 99.48 | 0 | TEXAS PARKS & WILDLIFE DEPT |
| 136 | Guadalupe | Hays | IND | C3865_3 | 534 | 89.77 | 0 | 89.77 | 0 | TEXAS STATE UNIVERSITY |
| 137 | Guadalupe | Hays | IND | C3866_1 | 60 | 80.18 | 0 | 80.18 | 0 | TEXAS STATE UNIVERSITY |
| 138 | Guadalupe | Hays | IRR | C3884_1 | 20 | 78.97 | 0 | 78.97 | 0 | BRUCE COLLIE ET AL |
| 139 | Guadalupe | Hays | IRR | C3884_2 | 90 | 81.31 | 0 | 81.31 | 0 | BRUCE COLLIE ET AL |
| 140 | Guadalupe | Hays | IRR | P5545_1 | 7 | 67.56 | 0 | 67.56 | 0 | FRANK T & PAMELA H ARNOSKY |
| 141 | Guadalupe | Hays | IRR | C3902_1 | 30 | 85.04 | 0 | 85.04 | 0 | FRITZ OTTO ANTON |
| 142 | Guadalupe | Hays | IRR | C3887_1 | 15 | 100.00 | 15 | 100.00 | 15 | GREEN VALLEY FARMS INC |
| 143 | Guadalupe | Hays | IRR | C3886_1 | 150 | 79.82 | 0 | 79.82 | 0 | HAYS COUNTY REC ASSOC INC |
| 144 | Guadalupe | Hays | IRR | C3868_2 | 70 | 100.00 | 70 | 100.00 | 70 | J R THORNTON , ET AL |
| 145 | Guadalupe | Hays | IRR | P4027_1 | 9 | 59.31 | 0 | 59.31 | 0 | JESS WEBB ET UX |
| 146 | Guadalupe | Hays | IRR | P5426_1 | 165 | 67.97 | 0 | 67.97 | 0 | JOHN G CURRIE |
| 147 | Guadalupe | Hays | IRR | C3881_1 | 40 | 100.00 | 40 | 100.00 | 40 | LYON L BRINSMADE |
| 148 | Guadalupe | Hays | IRR | C3901_1 | 100 | 32.65 | 0 | 32.65 | 0 | M D HEATLY SR |
| 149 | Guadalupe | Hays | IRR | C3882_1 | 100 | 94.39 | 0 | 94.39 | 0 | NEWTON B THOMPSON |
| 150 | Guadalupe | Hays | IRR | P5371_1 | 5 | 60.92 | 0 | 60.92 | 0 | ROBERT BOURKE SIMPSON |
| 151 | Guadalupe | Hays | IRR | C3887_3 | 5 | 100.00 | 5 | 100.00 | 5 | SAN MARCOS RIVER FOUNDATION |
| 152 | Guadalupe | Hays | IRR | C3865_5 | 100 | 89.01 | 0 | 89.01 | 0 | TEXAS STATE UNIVERSITY |
| 153 | Guadalupe | Hays | IRR | C3866_2 | 20 | 89.10 | 0 | 89.10 | 0 | TEXAS STATE UNIVERSITY |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 154 | Guadalupe | Hays | IRR | C3866_3 | 20 | 57.04 | 0 | 57.04 | 0 | TEXAS STATE UNIVERSITY |
| 155 | Guadalupe | Hays | IRR | P4027_2 | 82 | 59.31 | 0 | 59.31 | 0 | THOMAS L HUSBANDS ET UX |
| 156 | Guadalupe | Hays | IRR | P4170_1 | 15 | 38.60 | 0 | 38.60 | 0 | TWAIN J JAGGE ET UX |
| 157 | Guadalupe | Hays | MUN | C3888_1 | 320 | 91.26 | 0 | 91.26 | 0 | JOHN F BAUGH |
| 158 | Guadalupe | Hays | MUN | C3887_2 | 772 | 100.00 | 772 | 100.00 | 772 | MAXWELL |
| 159 | Guadalupe | Hays | MUN | C3865_4 | 513 | 89.40 | 0 | 89.40 | 0 | TEXAS STATE UNIVERSITY |
| 160 | Guadalupe | Hays | REC | C3865_2 | 700 | 90.36 | 0 | 90.36 | 0 | TEXAS STATE UNIVERSITY |
| 161 | Guadalupe | Kendall | IRR | P5501_1 | 5 | 18.21 | 0 | 18.21 | 0 | BARRY T & KATHRYN B NALL |
| 162 | Guadalupe | Kendall | IRR | P5490_1 | 10 | 71.58 | 0 | 71.58 | 0 | BILLY J. & KARAN R. BOLES |
| 163 | Guadalupe | Kendall | IRR | C2047_1 | 20 | 88.84 | 0 | 88.84 | 0 | C SEIDENSTICKER |
| 164 | Guadalupe | Kendall | IRR | C2069_1 | 30 | 95.72 | 0 | 95.72 | 0 | DOUBLE U - SPRING BRANCH |
| 165 | Guadalupe | Kendall | IRR | C2064_1 | 4 | 97.68 | 0 | 97.68 | 0 | EARL S DODERER ET UX |
| 166 | Guadalupe | Kendall | IRR | C2054_1 | 80 | 19.48 | 0 | 19.48 | 0 | EDMUND BEHR ESTATE |
| 167 | Guadalupe | Kendall | IRR | P5474_1 | 10 | 71.58 | 0 | 71.58 | 0 | ELTON RUST |
| 168 | Guadalupe | Kendall | IRR | C2053_1 | 32 | 19.92 | 0 | 19.92 | 0 | ERNO SPENRATH |
| 169 | Guadalupe | Kendall | IRR | C2050_2 | 136 | 72.71 | 0 | 72.71 | 0 | ERWIN KLEMSTEIN ET AL |
| 170 | Guadalupe | Kendall | IRR | C2063_1 | 44 | 88.84 | 0 | 88.84 | 0 | FROST - LANCASTER PROPERTIES |
| 171 | Guadalupe | Kendall | IRR | C2065_1 | 10 | 19.89 | 0 | 19.89 | 0 | G PHIL BERRYMAN ET UX |
| 172 | Guadalupe | Kendall | IRR | P5528_1 | 49 | 71.58 | 0 | 71.58 | 0 | GEORGE A SCHMIDT ET UX |
| 173 | Guadalupe | Kendall | IRR | P5528_2 | 49 | 71.58 | 0 | 71.58 | 0 | GEORGE A SCHMIDT ET UX |
| 174 | Guadalupe | Kendall | IRR | P4590_1 | 50 | 18.34 | 0 | 18.34 | 0 | GEORGE M WILLIAMS SR ET AL |
| 175 | Guadalupe | Kendall | IRR | C2065_2 | 10 | 19.89 | 0 | 19.89 | 0 | GUY BODINE III ET UX |
| 176 | Guadalupe | Kendall | IRR | C2051_1 | 2 | 86.15 | 0 | 86.15 | 0 | JOE B. KERCHEVILLE |
| 177 | Guadalupe | Kendall | IRR | C2051_2 | 260 | 83.49 | 0 | 83.49 | 0 | JOE B. KERCHEVILLE |
| 178 | Guadalupe | Kendall | IRR | C2049_1 | 5 | 19.55 | 0 | 19.55 | 0 | KENNETH M & CYNTHIA RUSCH |
| 179 | Guadalupe | Kendall | IRR | C2068_1 | 72 | 84.97 | 0 | 84.97 | 0 | KWW Ranches LTD |
| 180 | Guadalupe | Kendall | IRR | P5321_1 | 150 | 78.42 | 0 | 78.42 | 0 | LARRY J LANGBEIN |
| 181 | Guadalupe | Kendall | IRR | C2044_1 | 16 | 100.00 | 16.38 | 100.00 | 16.38 | LION'S LAIR LLC |
| 182 | Guadalupe | Kendall | IRR | C2061_1 | 16 | 19.46 | 0 | 19.46 | 0 | LOUIS SCOTT FELDER ET UX |
| 183 | Guadalupe | Kendall | IRR | P5534_1 | 20 | 71.58 | 0 | 71.58 | 0 | MARGOT O BURRELL |
| 184 | Guadalupe | Kendall | IRR | C2061_2 | 18 | 19.46 | 0 | 19.46 | 0 | MARJORIE RANZAU INGENHUETT |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 185 | Guadalupe | Kendall | IRR | C2056_1 | 20 | 56.20 | 0 | 56.20 | 0 | MARK E. WATSON , JR . , ET UX |
| 186 | Guadalupe | Kendall | IRR | C2057_1 | 25 | 56.63 | 0 | 56.63 | 0 | MARK E. WATSON , JR . , ET UX |
| 187 | Guadalupe | Kendall | IRR | C2045_1 | 8 | 100.00 | 8 | 100.00 | 8 | MARSHALL STEVES |
| 188 | Guadalupe | Kendall | IRR | C2061_3 | 37 | 19.46 | 0 | 19.46 | 0 | MURRAY A WINN JR |
| 189 | Guadalupe | Kendall | IRR | C2035_1 | 2 | 19.54 | 0 | 19.54 | 0 | OHARRY C MECKEL |
| 190 | Guadalupe | Kendall | IRR | C2058_1 | 40 | 19.98 | 0 | 19.98 | 0 | OTTO KASTEN |
| 191 | Guadalupe | Kendall | IRR | C2044_2 | 2 | 100.00 | 1.62 | 100.00 | 1.62 | PATRICIA GALT STEVES |
| 192 | Guadalupe | Kendall | IRR | C2048_1 | 100 | 22.23 | 0 | 22.23 | 0 | RAYMOND JAMES ROSE |
| 193 | Guadalupe | Kendall | IRR | C2059_1 | 39 | 19.98 | 0 | 19.98 | 0 | ROBERT C REINARZ ET AL |
| 194 | Guadalupe | Kendall | IRR | C2450_1 | 158 | 93.32 | 0 | 93.32 | 0 | ROBERT L MOSTY ET AL |
| 195 | Guadalupe | Kendall | IRR | C2063_2 | 15 | 88.84 | 0 | 88.84 | 0 | RONALD L BAETZ ET AL |
| 196 | Guadalupe | Kendall | IRR | C2066_1 | 5 | 20.01 | 0 | 20.01 | 0 | ROY C SMITH ESTATE |
| 197 | Guadalupe | Kendall | IRR | C2064_2 | 8 | 96.20 | 0 | 96.20 | 0 | SYBIL R JONES CO - TRUSTEE ET AL |
| 198 | Guadalupe | Kendall | IRR | C3870_1 | 3 | 99.78 | 0 | 99.78 | 0 | T R and PRISCILLA H IMMEL |
| 199 | Guadalupe | Kendall | IRR | C3870_2 | 22 | 99.50 | 0 | 99.50 | 0 | T R and PRISCILLA H IMMEL |
| 200 | Guadalupe | Kendall | IRR | C2060_1 | 10 | 19.98 | 0 | 19.98 | 0 | TEXAS BEVERAGE PACKERS INC |
| 201 | Guadalupe | Kendall | IRR | C2067_1 | 20 | 20.16 | 0 | 20.16 | 0 | TY RAMPY ET AL |
| 202 | Guadalupe | Kendall | IRR | C2067_2 | 20 | 48.02 | 0 | 48.02 | 0 | TY RAMPY ET AL |
| 203 | Guadalupe | Kendall | IRR | C2046_1 | 28 | 20.16 | 0 | 20.16 | 0 | WILLIAM G & MILDRED D SPROWLS |
| 204 | Guadalupe | Kendall | IRR | C2036_1 | 125 | 46.40 | 0 | 46.40 | 0 | WILLIAM K ANDERSON ET UX |
| 205 | Guadalupe | Kendall | IRR | P5107_1 | 518 | 83.17 | 0 | 83.17 | 0 | WILLIAM K ANDERSON ET UX |
| 206 | Guadalupe | Kendall | IRR | C2062_1 | 60 | 44.95 | 0 | 44.95 | 0 | WILLIAM L PULS |
| 207 | Guadalupe | Kendall | IRR | C2052_1 | 232 | 88.84 | 0 | 88.84 | 0 | ZARCO FOWARDING , INC |
| 208 | Guadalupe | Kendall | MUN | P4106_1 | 25 | 90.93 | 0 | 90.93 | 0 | TEXAS PARKS & WILDLIFE DEPT |
| 209 | Guadalupe | Kerr | IRR | C2034_1 | 2 | 96.90 | 0 | 96.90 | 0 | CHESTER P HEINEN ET AL |
| 210 | Guadalupe | Kerr | IRR | C2043_1 | 17 | 18.65 | 0 | 18.65 | 0 | EDGAR SEIDENSTICKER ET UX |
| 211 | Guadalupe | Kerr | IRR | C2043_2 | 4 | 18.65 | 0 | 18.65 | 0 | L J MANNERING ET UX |
| 212 | Guadalupe | Kerr | IRR | C2043_3 | 20 | 18.65 | 0 | 18.65 | 0 | MARY LEE EDWARDS |
| 213 | Guadalupe | Kerr | IRR | C2041_1 | 25 | 86.13 | 0 | 86.13 | 0 | THOMAS L BRUNDAGE ET AL |
| 214 | Guadalupe | Kerr | IRR | C2041_2 | 109 | 85.28 | 0 | 85.28 | 0 | THOMAS L BRUNDAGE ET AL |
| 215 | Guadalupe | Victoria | HYD | C3853_1 | 538,560 | 63.01 | 0 | 63.01 | 0 | CUERO HYDROELECTRIC , INC . |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 216 | Guadalupe | Victoria | IND | C5485_1 | 209,189 | 93.86 | 0 | 93.86 | 0 | CENTRAL POWER & LIGHT CO |
| 217 | Guadalupe | Victoria | IND | C5486_1 | 20,000 | 94.39 | 0 | 94.39 | 0 | COLETO CREEK POWER LP |
| 218 | Guadalupe | Victoria | IND | C3861_1 | 60,000 | 98.90 | 0 | 98.90 | 0 | E I DU PONT DE NEMOURS |
| 219 | Guadalupe | Victoria | IND | P5376_1 | 2 | 100.00 | 2 | 100.00 | 2 | HELDENFELS BROTHERS INC |
| 220 | Guadalupe | Victoria | IND | C3859_1 | 110,000 | 85.16 | 0 | 85.16 | 0 | SOUTH TEXAS ELECTRIC COOP INC |
| 221 | Guadalupe | Victoria | IRR | C3862_1 | 263 | 93.76 | 0 | 93.76 | 0 | CITY OF VICTORIA |
| 222 | Guadalupe | Victoria | IRR | P4441_1 | 200 | 85.26 | 0 | 85.26 | 0 | CITY OF VICTORIA |
| 223 | Guadalupe | Victoria | IRR | C3862_2 | 137 | 98.65 | 0 | 98.65 | 0 | E I DUPONT DE NEMOURS & CO |
| 224 | Guadalupe | Victoria | IRR | C3863_2 | 3,000 | 97.42 | 0 | 97.42 | 0 | GUADALUPE - BLANCO RIVER AUTH |
| 225 | Guadalupe | Victoria | IRR | C3863_1 | 200 | 99.04 | 0 | 99.04 | 0 | JESS YELL WOMACK II ET AL |
| 226 | Guadalupe | Victoria | IRR | P5012_1 | 140 | 72.96 | 0 | 72.96 | 0 | JOE D. HAWES |
| 227 | Guadalupe | Victoria | IRR | P4182_1 | 200 | 85.58 | 0 | 85.58 | 0 | MAXINE ROBSON KYLE ET AL |
| 228 | Guadalupe | Victoria | IRR | P4020_1 | 100 | 85.86 | 0 | 85.86 | 0 | NELSON PANTEL |
| 229 | Guadalupe | Victoria | IRR | P4062_1 | 90 | 86.14 | 0 | 86.14 | 0 | RONALD A KURTZ ET UX |
| 230 | Guadalupe | Victoria | LIV | P5489_1 | 750 | 88.36 | 0 | 88.36 | 0 | JESSY WOMACK II |
| 231 | Guadalupe | Victoria | MUN | C3858_1 | 1,000 | 98.61 | 0 | 98.61 | 0 | CITY OF VICTORIA |
| 232 | Guadalupe | Victoria | MUN | P5466_1 | 20,000 | 86.26 | 0 | 86.26 | 0 | VICTORIA , CITY OF |
| 233 | Guadalupe | Victoria | MUN | C3860_2 | 260 | 78.58 | 0 | 78.58 | 0 | W L LIPSCOMB ET AL |
| 234 | Guadalupe | Wilson | IRR | STORY_1 | 400 | 91.04 | 0 | 91.04 | 0 | JAMES D STORY |
| 235 | Nueces | Atascosa | IRR | C3216_1 | 20 | 15.58 | 0 | 15.58 | 0 | ATASCOSA COWBOY RECREATION |
| 236 | Nueces | Atascosa | IRR | C3219_1 | 30 | 15.86 | 0 | 15.86 | 0 | ERNKORUS LP |
| 237 | Nueces | Atascosa | IRR | C3217_1 | 27 | 15.96 | 0 | 15.96 | 0 | FRANCES S MARSH |
| 238 | Nueces | Atascosa | IRR | C3218_1 | 7 | 15.68 | 0 | 15.68 | 0 | JEROME W. SCHUCHART |
| 239 | Nueces | Atascosa | IRR | C3218_2 | 11 | 15.67 | 0 | 15.67 | 0 | JEROME W. SCHUCHART |
| 240 | Nueces | Atascosa | IRR | C4772_1 | 2 | 98.41 | 0 | 98.41 | 0 | MAGSONS NV |
| 241 | Nueces | Atascosa | IRR | C3213_1 | 13 | 0.98 | 0 | 0.98 | 0 | SAM COUNTISS |
| 242 | Nueces | Atascosa | Other | P5511_1 | 120 | 2.4 | 0 | 2.4 | 0 | SAN MIGUEL ELECTRIC COOP INC |
| 243 | Nueces | Bexar | IRR | C3196_1 | 40 | 9.73 | 0 | 9.73 | 0 | SAN ANTONIO RANCH LTD |
| 244 | Nueces | Dimmit | IRR | C3093_1 | 102 | 99.64 | 0 | 99.64 | 0 | CHARLES LYDELL THALMANN |
| 245 | Nueces | Dimmit | IRR | C3093_2 | 1 | 99.6 | 0 | 99.6 | 0 | CHARLES LYDELL THALMANN |
| 246 | Nueces | Dimmit | IRR | C3099_1 | 34 | 37.35 | 0 | 37.35 | 0 | CHARLES W WILSON ET UX |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 247 | Nueces | Dimmit | IRR | C3086_1 | 554 | 38.23 | 0 | 38.23 | 0 | CHARLES W WILSON SR ET AL |
| 248 | Nueces | Dimmit | IRR | C3097_1 | 231 | 99.64 | 0 | 99.64 | 0 | DONALD E JACKSON , ET UX |
| 249 | Nueces | Dimmit | IRR | C3098_1 | 60 | 68.19 | 0 | 68.19 | 0 | FREDERICK JAY WHITECOTTON |
| 250 | Nueces | Dimmit | IRR | C3096_1 | 337 | 99.64 | 0 | 99.64 | 0 | JAMES A WILSON JR |
| 251 | Nueces | Dimmit | IRR | C3102_1 | 15 | 30.9 | 0 | 30.9 | 0 | NEEDMORE RANCH INC |
| 252 | Nueces | Dimmit | IRR | C3103_1 | 400 | 89.12 | 0 | 89.12 | 0 | R W BRIGGS JR |
| 253 | Nueces | Dimmit | IRR | C3094_1 | 300 | 99.93 | 210.61 | 99.93 | 210.61 | RESIDUAL TRUST OF ALBERT IVY SR |
| 254 | Nueces | Dimmit | IRR | C3095_1 | 1,090 | 99.71 | 0 | 99.71 | 0 | RUTH BOWMAN RUSSELL |
| 255 | Nueces | Dimmit | IRR | C3095_2 | 201 | 99.64 | 0 | 99.64 | 0 | RUTH BOWMAN RUSSELL |
| 256 | Nueces | Frio | IRR | P3914_1 | 19 | 6.75 | 0 | 6.75 | 0 | A R GALLOWAY ET UX |
| 257 | Nueces | Frio | IRR | P3914_2 | 7 | 6.59 | 0 | 6.59 | 0 | A R GALLOWAY ET UX |
| 258 | Nueces | Frio | IRR | C3212_1 | 25 | 2.48 | 0 | 2.48 | 0 | CHARLES CURTIS RAMSEY ET UX |
| 259 | Nueces | Frio | IRR | P3884_1 | 80 | 0.02 | 0 | 0.02 | 0 | Claude DJ Smith |
| 260 | Nueces | Frio | IRR | C3208_1 | 230 | 1.3 | 0 | 1.3 | 0 | COX FEEDLOTS INC |
| 261 | Nueces | Frio | IRR | P4113_1 | 15 | 1.13 | 0 | 1.13 | 0 | DR LESLIE R FRICKE |
| 262 | Nueces | Frio | IRR | P4041_1 | 25 | 0 | 0 | 0 | 0 | FLOYD B NEUMAN |
| 263 | Nueces | Frio | IRR | P4041_2 | 20 | 0.17 | 0 | 0.17 | 0 | FLOYD B NEUMAN |
| 264 | Nueces | Frio | IRR | C3210_1 | 20 | 1.96 | 0 | 1.96 | 0 | FRANCIS MALDONADO |
| 265 | Nueces | Frio | IRR | C3193_1 | 8 | 31.63 | 0 | 31.63 | 0 | GEOFFREY A STONE |
| 266 | Nueces | Frio | IRR | P4014_1 | 124 | 1.37 | 0 | 1.37 | 0 | JOE H BERRY |
| 267 | Nueces | Frio | IRR | C3199_1 | 50 | 20.08 | 0 | 20.08 | 0 | JOHN COALTER BAKER , ET AL |
| 268 | Nueces | Frio | IRR | C3209_1 | 118 | 24.91 | 0 | 24.91 | 0 | MIKE MORRIS |
| 269 | Nueces | Frio | IRR | C3211_1 | 40 | 48.09 | 0 | 48.09 | 0 | ROBERT ARTHUR BAKER ET AL |
| 270 | Nueces | Frio | IRR | C3211_2 | 60 | 17.78 | 0 | 17.78 | 0 | ROBERT ARTHUR BAKER ET AL |
| 271 | Nueces | La Salle | IRR | C3115_1 | 55 | 96.58 | 0 | 96.58 | 0 | ANDREW DE LA GARZA ET AL |
| 272 | Nueces | La Salle | IRR | C3107_1 | 210 | 43.32 | 0 | 43.32 | 0 | BC GETAWAY LLC |
| 273 | Nueces | La Salle | IRR | C3108_1 | 298 | 31.54 | 0 | 31.54 | 0 | C L PROPERTIES LLC |
| 274 | Nueces | La Salle | IRR | C3138_1 | 55 | 88.63 | 0 | 88.63 | 0 | CHARLES D JOHNSON |
| 275 | Nueces | La Salle | IRR | C3136_1 | 200 | 99.16 | 0.04 | 99.16 | 0.04 | DOROTHY M KINSEL |
| 276 | Nueces | La Salle | IRR | C3203_1 | 106 | 35.54 | 0 | 35.54 | 0 | DOUGLAS A MILLER ET AL |
| 277 | Nueces | La Salle | IRR | C3201_1 | 649 | 35.61 | 0 | 35.61 | 0 | EL JARDIN LP |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 278 | Nueces | La Salle | IRR | C3111_1 | 30 | 92.49 | 0 | 92.49 | 0 | EUGENE WHITE |
| 279 | Nueces | La Salle | IRR | C3116_1 | 33 | 96.5 | 0 | 96.5 | 0 | FRANK S MORELLO JR |
| 280 | Nueces | La Salle | IRR | C3116_2 | 145 | 96.31 | 0 | 96.31 | 0 | FRANK S MORELLO JR |
| 281 | Nueces | La Salle | IRR | C3105_1 | 150 | 99.79 | 0.51 | 99.79 | 0.51 | FRANKLIN JERRY MEEKS |
| 282 | Nueces | La Salle | IRR | C3140_1 | 76 | 60.53 | 0 | 60.53 | 0 | FRED HILLJE ESTATE |
| 283 | Nueces | La Salle | IRR | C3112_1 | 47 | 97.64 | 0 | 97.64 | 0 | FREDNA K DOBIE |
| 284 | Nueces | La Salle | IRR | C3125_1 | 20 | 81.2 | 0 | 81.2 | 0 | GEORGE & SHARON TRIGO |
| 285 | Nueces | La Salle | IRR | C3118_1 | 50 | 100 | 50 | 100 | 50 | GLENNT ROBERTS ET UX |
| 286 | Nueces | La Salle | IRR | C3133_1 | 54 | 90.61 | 0 | 90.61 | 0 | H B RAMSEY |
| 287 | Nueces | La Salle | IRR | C3133_2 | 296 | 89.75 | 0 | 89.75 | 0 | H B RAMSEY |
| 288 | Nueces | La Salle | IRR | C3135_1 | 42 | 99.89 | 11.26 | 99.89 | 11.26 | H B RAMSEY |
| 289 | Nueces | La Salle | IRR | C3135_2 | 38 | 88.54 | 0 | 88.54 | 0 | H B RAMSEY |
| 290 | Nueces | La Salle | IRR | C3139_1 | 2,023 | 97.78 | 0.02 | 97.78 | 0.02 | HOLLAND TEXAS DAM & IRR CO |
| 291 | Nueces | La Salle | IRR | C3131_1 | 50 | 88.3 | 0 | 88.3 | 0 | IPO RANCH LP |
| 292 | Nueces | La Salle | IRR | C3132_1 | 195 | 88.3 | 0 | 88.3 | 0 | IPO RANCH LP |
| 293 | Nueces | La Salle | IRR | C3120_1 | 200 | 100 | 200 | 100 | 200 | JOEL GILBERT |
| 294 | Nueces | La Salle | IRR | C3130_1 | 92 | 88.39 | 0 | 88.39 | 0 | JOSE R GARZA and GARZA BLUEBIRD MANAGEMENT LLC |
| 295 | Nueces | La Salle | IRR | C3127_1 | 180 | 89.48 | 0 | 89.48 | 0 | LEE M GATES ET UX |
| 296 | Nueces | La Salle | IRR | C3129_1 | 180 | 91.42 | 0 | 91.42 | 0 | LOUISE G DAVIS |
| 297 | Nueces | La Salle | IRR | C3123_1 | 70 | 100 | 70 | 100 | 70 | LUIS ALLALA JR |
| 298 | Nueces | La Salle | IRR | C3123_2 | 130 | 99.95 | 67.08 | 99.95 | 67.08 | LUIS ALLALA JR |
| 299 | Nueces | La Salle | IRR | C3106_1 | 20 | 94.89 | 0 | 94.89 | 0 | M C WHITWELL ET UX |
| 300 | Nueces | La Salle | IRR | C3106_2 | 20 | 93.78 | 0 | 93.78 | 0 | M C WHITWELL ET UX |
| 301 | Nueces | La Salle | IRR | C3109_1 | 10 | 47.33 | 0 | 47.33 | 0 | M C WHITWELL ET UX |
| 302 | Nueces | La Salle | IRR | C3110_1 | 22 | 47.08 | 0 | 47.08 | 0 | MKM BUSINESS HOLDINGS LLC |
| 303 | Nueces | La Salle | IRR | C3119_1 | 40 | 100 | 40 | 100 | 40 | NORMA D GARCIA ET VIR |
| 304 | Nueces | La Salle | IRR | C3117_1 | 270 | 95.44 | 0 | 95.44 | 0 | PRESIDIO RANCH , LP |
| 305 | Nueces | La Salle | IRR | C3114_1 | 199 | 97.19 | 0 | 97.19 | 0 | RALPH P GUTTMAN |
| 306 | Nueces | La Salle | IRR | C3124_1 | 5 | 99.9 | 0 | 99.9 | 0 | RAUL DEL TORO ET UX |
| 307 | Nueces | La Salle | IRR | C3134_1 | 398 | 88.86 | 0 | 88.86 | 0 | ROCKY COMFORT PARTNERSHIP LTD |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 308 | Nueces | La Salle | IRR | C3121_1 | 5 | 100 | 5 | 100 | 5 | RUDY & TERESA RODRIGUEZ SR |
| 309 | Nueces | La Salle | IRR | C3122_1 | 30 | 100 | 30 | 100 | 30 | SANTANA A MORIN ET AL |
| 310 | Nueces | La Salle | IRR | C3126_1 | 100 | 84.66 | 0 | 84.66 | 0 | SILLER BROTHERS |
| 311 | Nueces | La Salle | IRR | C3126_2 | 260 | 63.63 | 0 | 63.63 | 0 | SILLER BROTHERS |
| 312 | Nueces | La Salle | IRR | C3137_1 | 84 | 88.48 | 0 | 88.48 | 0 | T G RANKIN |
| 313 | Nueces | La Salle | IRR | C3128_1 | 39 | 90.45 | 0 | 90.45 | 0 | VALDA M GATES |
| 314 | Nueces | La Salle | IRR | C3104_1 | 250 | 97.84 | 0.04 | 97.84 | 0.04 | WAITZ SUPER MARKET INC |
| 315 | Nueces | Medina | IRR | C3207_1 | 2,000 | 2.22 | 0 | 2.22 | 0 | BEXAR - MEDINA - ATASCOSA WCID 1 |
| 316 | Nueces | Medina | IRR | P4286_1 | 4 | 0.96 | 0 | 0.96 | 0 | C H PIFER |
| 317 | Nueces | Medina | IRR | P4506_1 | 40 | 1.92 | 0 | 1.92 | 0 | JAMES THOMAS BAGBY JR |
| 318 | Nueces | Medina | IRR | C3191_1 | 20 | 16.39 | 0 | 16.39 | 0 | L S MOLLERE TRUSTEE |
| 319 | Nueces | Medina | IRR | C3189_1 | 40 | 8.65 | 0 | 8.65 | 0 | RICHARD W SCHWEERS |
| 320 | Nueces | Medina | IRR | C3190_1 | 80 | 30.88 | 0 | 30.88 | 0 | TJ HONDO RANCH LTD |
| 321 | Nueces | Medina | RCH | C3192_1 | 5,998 | 6.84 | 0 | 6.84 | 0 | EDWARDS AQUIFER AUTHORITY |
| 322 | Nueces | Medina | RCH | P3745_1 | 4,141 | 21.04 | 0 | 21.04 | 0 | EDWARDS AQUIFER AUTHORITY |
| 323 | Nueces | Medina | RCH | P3806_1 | 12,000 | 10.06 | 0 | 10.06 | 0 | EDWARDS AQUIFER AUTHORITY |
| 324 | Nueces | Uvalde | IND | C3087_1 | 10 | 85.94 | 0 | 85.94 | 0 | R L WHITE COMPANY |
| 325 | Nueces | Uvalde | IRR | C3073_1 | 22 | 26.99 | 0 | 26.99 | 0 | 5653.041 ACRE RANCH LP |
| 326 | Nueces | Uvalde | IRR | C3073_2 | 122 | 26.85 | 0 | 26.85 | 0 | 5653.041 ACRE RANCH LP |
| 327 | Nueces | Uvalde | IRR | C3064_1 | 150 | 31.81 | 0 | 31.81 | 0 | ADANA TEAGUE |
| 328 | Nueces | Uvalde | IRR | C3173_1 | 1,000 | 3.87 | 0 | 3.87 | 0 | ALVIN M RIMKUS |
| 329 | Nueces | Uvalde | IRR | P3989_1 | 56 | 5.67 | 0 | 5.67 | 0 | ANTHONY C LEHOSKI ET UX |
| 330 | Nueces | Uvalde | IRR | P5241_1 | 108 | 3.3 | 0 | 3.3 | 0 | BARKAT LAND & CATTLE CO |
| 331 | Nueces | Uvalde | IRR | P4238_1 | 140 | 3.76 | 0 | 3.76 | 0 | CON CAN ENTERPRISES INC |
| 332 | Nueces | Uvalde | IRR | P5497_2 | 15 | 3.3 | 0 | 3.3 | 0 | CONCAN WATER SUPPLY CORPORATION |
| 333 | Nueces | Uvalde | IRR | P3990_1 | 30 | 1.7 | 0 | 1.7 | 0 | DON INMAN |
| 334 | Nueces | Uvalde | IRR | C3175_1 | 9 | 10.1 | 0 | 10.1 | 0 | EL CAMINO GIRL SCOUT COUNCIL |
| 335 | Nueces | Uvalde | IRR | C3065_1 | 720 | 100 | 720 | 100 | 720 | F KENNETH BAILEY JR |
| 336 | Nueces | Uvalde | IRR | P5063_1 | 94 | 3.52 | 0 | 3.52 | 0 | GAFFORD FAMILY PARTNERSHIP |
| 337 | Nueces | Uvalde | IRR | P5063_2 | 6 | 3.8 | 0 | 3.8 | 0 | GAFFORD FAMILY PARTNERSHIP |
| 338 | Nueces | Uvalde | IRR | C3194_1 | 50 | 3.62 | 0 | 3.62 | 0 | GEORGE E LIGOCKY |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 339 | Nueces | Uvalde | IRR | C3194_2 | 49 | 3.14 | 0 | 3.14 | 0 | GEORGE E LIGOCKY |
| 340 | Nueces | Uvalde | IRR | C3066_1 | 10 | 30.91 | 0 | 30.91 | 0 | GEORGE H MOFF |
| 341 | Nueces | Uvalde | IRR | P3988_1 | 28 | 3.73 | 0 | 3.73 | 0 | GEORGE LIGOCKY |
| 342 | Nueces | Uvalde | IRR | C3166_1 | 35 | 36.08 | 0 | 36.08 | 0 | JOE C KRANZ ET UX |
| 343 | Nueces | Uvalde | IRR | C3163_1 | 113 | 35.9 | 0 | 35.9 | 0 | JOHN HAMMAN JR ESTATE |
| 344 | Nueces | Uvalde | IRR | C3163_2 | 133 | 3.3 | 0 | 3.3 | 0 | JOHN HAMMAN JR ESTATE |
| 345 | Nueces | Uvalde | IRR | C3170_1 | 19 | 10.58 | 0 | 10.58 | 0 | JOHN M & MARY ANN BARKLEY |
| 346 | Nueces | Uvalde | IRR | C3169_1 | 40 | 35.51 | 0 | 35.51 | 0 | JOHN S GRAVES JR ET AL |
| 347 | Nueces | Uvalde | IRR | C3168_1 | 4 | 36.01 | 0 | 36.01 | 0 | JOHN THOMAS BUCHANAN |
| 348 | Nueces | Uvalde | IRR | C3168_2 | 37 | 35.54 | 0 | 35.54 | 0 | JOHN THOMAS BUCHANAN |
| 349 | Nueces | Uvalde | IRR | C3069_1 | 134 | 44.54 | 0 | 44.54 | 0 | JONATHAN H. WATFORD |
| 350 | Nueces | Uvalde | IRR | C3067_1 | 1,461 | 88.08 | 0 | 88.08 | 0 | JOSEPH M MASSEY ET UX |
| 351 | Nueces | Uvalde | IRR | P4352_1 | 110 | 14.57 | 0 | 14.57 | 0 | LOUIS A WATERS |
| 352 | Nueces | Uvalde | IRR | C3167_1 | 11 | 36.01 | 0 | 36.01 | 0 | MACONDA BROWN O'CONNOR |
| 353 | Nueces | Uvalde | IRR | P4177_1 | 200 | 3.65 | 0 | 3.65 | 0 | MARVIN G VERSTUYFT ET AL |
| 354 | Nueces | Uvalde | IRR | P4177_2 | 795 | 3.37 | 0 | 3.37 | 0 | MARVIN G VERSTUYFT ET AL |
| 355 | Nueces | Uvalde | IRR | C3171_1 | 75 | 26.55 | 0 | 26.55 | 0 | MICHAEL L STONER MARITAL DEDUCTION TRUST |
| 356 | Nueces | Uvalde | IRR | C3072_1 | 200 | 82.41 | 0 | 82.41 | 0 | MIRASOL RANCH FAMILY LTD PARTNERSHIP |
| 357 | Nueces | Uvalde | IRR | C3197_1 | 523 | 83.66 | 0 | 83.66 | 0 | NAJAC PROPERTIES LTD |
| 358 | Nueces | Uvalde | IRR | C3197_2 | 305 | 81.7 | 0 | 81.7 | 0 | NAJAC PROPERTIES LTD |
| 359 | Nueces | Uvalde | IRR | C3182_1 | 40 | 19.98 | 0 | 19.98 | 0 | PAUL G SILBER JR |
| 360 | Nueces | Uvalde | IRR | C3174_1 | 31 | 12.94 | 0 | 12.94 | 0 | RIO GRANDE CHILDRENS HOME INC |
| 361 | Nueces | Uvalde | IRR | P5372_1 | 320 | 1.6 | 0 | 1.6 | 0 | ROBERT LK LYNCH ET AL |
| 362 | Nueces | Uvalde | IRR | P5325_1 | 255 | 5.71 | 0 | 5.71 | 0 | RONALD E LEE JR |
| 363 | Nueces | Uvalde | IRR | C3068_1 | 310 | 86.38 | 0 | 86.38 | 0 | RREP LTD |
| 364 | Nueces | Uvalde | IRR | P4305_1 | 1,140 | 3.76 | 0 | 3.76 | 0 | TED ALLEN SANDERLIN ET AL |
| 365 | Nueces | Uvalde | IRR | C3172_1 | 1,000 | 3.87 | 0 | 3.87 | 0 | THOMAS & GRETEL EKBAUM |
| 366 | Nueces | Uvalde | IRR | P3991_1 | 250 | 82.27 | 0 | 82.27 | 0 | TURNER - PASCHE RANCH LLC |
| 367 | Nueces | Uvalde | IRR | C3165_1 | 86 | 35.89 | 0 | 35.89 | 0 | WALLACE S & ISABEL B WILSON |
| 368 | Nueces | Uvalde | MUN | P5497_1 | 35 | 1.91 | 0 | 1.91 | 0 | CONCAN WATER SUPPLY CORPORATION |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 369 | Nueces | Uvalde | MUN | P4505_1 | 200 | 13.71 | 0 | 13.71 | 0 | UTOPIA WATER SUPPLY CORP |
| 370 | Nueces | Zavala | IRR | C3076_1 | 200 | 16.92 | 0 | 16.92 | 0 | BAKER CATTLE CO |
| 371 | Nueces | Zavala | IRR | C3092_1 | 684 | 44.02 | 0 | 44.02 | 0 | BAYOU ROUGE LAND & CATTLE |
| 372 | Nueces | Zavala | IRR | C3088_1 | 150 | 78.92 | 0 | 78.92 | 0 | CHAPARROSA RANCHES LTD |
| 373 | Nueces | Zavala | IRR | C3198_1 | 150 | 7.16 | 0 | 7.16 | 0 | DENVER C CARNES |
| 374 | Nueces | Zavala | IRR | C3074_1 | 200 | 16.92 | 0 | 16.92 | 0 | DONALD R LINDENBORN JR TRUSTEE |
| 375 | Nueces | Zavala | IRR | C3080_1 | 75 | 9.09 | 0 | 9.09 | 0 | F F BONNETT ET UX |
| 376 | Nueces | Zavala | IRR | C3091_3 | 400 | 62.96 | 0 | 62.96 | 0 | FRANK W HARBORTH |
| 377 | Nueces | Zavala | IRR | C3078_1 | 200 | 16.77 | 0 | 16.77 | 0 | JACK E RUTLEDGE ET UX |
| 378 | Nueces | Zavala | IRR | C3079_1 | 313 | 16.77 | 0 | 16.77 | 0 | JACK RUTLEDGE |
| 379 | Nueces | Zavala | IRR | C3089_1 | 206 | 77.14 | 0 | 77.14 | 0 | JAMES R PERLITZ ET AL |
| 380 | Nueces | Zavala | IRR | C3090_1 | 45 | 43.5 | 0 | 43.5 | 0 | JIM G FERGUSON JR |
| 381 | Nueces | Zavala | IRR | C3090_2 | 65 | 28.77 | 0 | 28.77 | 0 | JIM G FERGUSON JR |
| 382 | Nueces | Zavala | IRR | C3077_1 | 200 | 16.82 | 0 | 16.82 | 0 | K & M FARMS |
| 383 | Nueces | Zavala | IRR | C3091_1 | 800 | 64.93 | 0 | 64.93 | 0 | L C ROBBINS, JR |
| 384 | Nueces | Zavala | IRR | C3083_1 | 230 | 39.12 | 0 | 39.12 | 0 | MARIO A ESCOBAR ET UX |
| 385 | Nueces | Zavala | IRR | C3091_2 | 400 | 63.83 | 0 | 63.83 | 0 | NORMAN SCHUETZ |
| 386 | Nueces | Zavala | IRR | C3084_1 | 80 | 38.86 | 0 | 38.86 | 0 | OPAL E C MARBURGER |
| 387 | Nueces | Zavala | IRR | C3085_1 | 320 | 27.03 | 0 | 27.03 | 0 | OWARD L BOX |
| 388 | Nueces | Zavala | IRR | C3091_4 | 498 | 62.17 | 0 | 62.17 | 0 | RICHARD DALE & SHARON HORNSBY LeDOUX |
| 389 | Nueces | Zavala | IRR | C3081_1 | 390 | 38.36 | 0 | 38.36 | 0 | THOREEN LIMITED PARTNERSHIP |
| 390 | Nueces | Zavala | IRR | C3075_1 | 124 | 16.92 | 0 | 16.92 | 0 | WALTER D MOORE |
| 391 | Nueces | Zavala | IRR | C3082_1 | 8,000 | 61.61 | 0 | 61.61 | 0 | ZAVALA - DIMMIT CO WID 1 |
| 392 | Nueces | Zavala | IRR | C3082_8 | 19,996 | 77.28 | 0 | 77.28 | 0 | ZAVALA - DIMMIT CO WID 1 |
| 393 | Nueces | Zavala | IRR | C3082_9 | 4 | 60.61 | 0 | 60.61 | 0 | ZAVALA - DIMMIT CO WID 1 |
| 394 | San Antonio | Bandera | IRR | C2135_1 | 5 | 96.84 | 0 | 96.84 | 0 | KITTIE NELSON FERGUSON |
| 395 | San Antonio | Bexar | IND | C2161_1 | 12,000 | 95.40 | 0 | 95.39 | 0 | CITY OF SAN ANTONIO |
| 396 | San Antonio | Bexar | IND | C2162_2 | 60,000 | 73.76 | 0 | 73.76 | 0 | CITY OF SAN ANTONIO |
| 397 | San Antonio | Bexar | IND | C2162_3 | 36,900 | 93.59 | 0 | 93.49 | 0 | CITY OF SAN ANTONIO |
| 398 | San Antonio | Bexar | IND | C2162_5 | 11 | 92.46 | 0 | 92.34 | 0 | CITY OF SAN ANTONIO |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 399 | San Antonio | Bexar | IND | P5337_1 | 25 | 22.02 | 0 | 22.02 | 0 | H B ZACHRY CO |
| 400 | San Antonio | Bexar | IND | P5469_2 | 1,500 | 52.46 | 0 | 52.46 | 0 | HAUSMAN ROAD W SC |
| 401 | San Antonio | Bexar | IRR | C2150_1 | 62 | 97.55 | 0 | 97.55 | 0 | ANGELINA BORDANO |
| 402 | San Antonio | Bexar | IRR | P4134_1 | 200 | 39.96 | 0 | 39.96 | 0 | ANITA T WALSH ESTATE |
| 403 | San Antonio | Bexar | IRR | P5262_1 | 250 | 30.85 | 0 | 30.85 | 0 | ANTHONY J GRANIERI |
| 404 | San Antonio | Bexar | IRR | C2142_1 | 197 | 89.94 | 0 | 89.94 | 0 | ANTONIO MARIO FERNANDEZ |
| 405 | San Antonio | Bexar | IRR | C2154_2 | 200 | 50.01 | 0 | 50.01 | 0 | ARNOLD ALBERT |
| 406 | San Antonio | Bexar | IRR | C2160_1 | 116 | 92.98 | 0 | 92.98 | 0 | BEN B MORRIS ESTATE |
| 407 | San Antonio | Bexar | IRR | P4135_1 | 200 | 40.17 | 0 | 40.17 | 0 | BESSIE WALSH |
| 408 | San Antonio | Bexar | IRR | P4139_1 | 200 | 40.14 | 0 | 40.14 | 0 | BESSIE WALSH |
| 409 | San Antonio | Bexar | IRR | C2142_2 | 3 | 87.84 | 0 | 87.84 | 0 | BEXAR , COUNTY OF |
| 410 | San Antonio | Bexar | IRR | P5596_1 | 770 | 25.28 | 0 | 25.28 | 0 | BILLY T MITCHELL |
| 411 | San Antonio | Bexar | IRR | C2141_1 | 75 | 82.17 | 0 | 82.17 | 0 | BIPPERT FARMS |
| 412 | San Antonio | Bexar | IRR | C2146_1 | 215 | 92.87 | 0 | 92.87 | 0 | BURRELL DAY |
| 413 | San Antonio | Bexar | IRR | P4497_1 | 20 | 65.69 | 0 | 65.69 | 0 | CARL RAY DRZYMALLA ET AL |
| 414 | San Antonio | Bexar | IRR | C2152_1 | 409 | 81.17 | 0 | 81.17 | 0 | CAROLYN VANCE COOK |
| 415 | San Antonio | Bexar | IRR | C1146_1 | 26 | 98.75 | 0 | 98.75 | 0 | CIBOLO CREEK MUNICIPAL AUTH |
| 416 | San Antonio | Bexar | IRR | P4105_1 | 150 | 88.43 | 0 | 88.43 | 0 | CITY OF LIVE OAK |
| 417 | San Antonio | Bexar | IRR | C2156_1 | 294 | 99.04 | 0 | 99.04 | 0 | CITY OF SAN ANTONIO |
| 418 | San Antonio | Bexar | IRR | C2159_1 | 60 | 97.44 | 0 | 97.44 | 0 | CITY OF SAN ANTONIO |
| 419 | San Antonio | Bexar | IRR | P4187_3 | 179 | 5.15 | 0 | 5.15 | 0 | CURTIS HARRY MAHLA REVOCABLE TRUST |
| 420 | San Antonio | Bexar | IRR | C2148_1 | 8 | 92.27 | 0 | 92.27 | 0 | DONALD G RAMBIE |
| 421 | San Antonio | Bexar | IRR | C1146_2 | 62 | 98.22 | 0 | 98.22 | 0 | DOUG WISE |
| 422 | San Antonio | Bexar | IRR | C1942_1 | 886 | 90.85 | 0 | 90.85 | 0 | ESPADA DITCH COMPANY |
| 423 | San Antonio | Bexar | IRR | P4141_1 | 20 | 39.89 | 0 | 39.89 | 0 | GULF LAND & INVESTMENT CO INC |
| 424 | San Antonio | Bexar | IRR | P4141_2 | 23 | 39.89 | 0 | 39.89 | 0 | H H GIRDLEY TRUSTEE |
| 425 | San Antonio | Bexar | IRR | C1170_1 | 17 | 99.82 | 4 | 99.82 | 4 | JAMES N EVANS SR ET AL |
| 426 | San Antonio | Bexar | IRR | C2145_1 | 32 | 89.90 | 0 | 89.90 | 0 | JERRY & MARIAM SPEARS |
| 427 | San Antonio | Bexar | IRR | C2158_1 | 24 | 97.75 | 0 | 97.75 | 0 | JOE S GARCIA JR ET UX |
| 428 | San Antonio | Bexar | IRR | C1146_3 | 5 | 96.40 | 0 | 96.40 | 0 | JOHN E NEWTON ET AL |
| 429 | San Antonio | Bexar | IRR | P4138_1 | 126 | 40.17 | 0 | 40.17 | 0 | JOHN H SMALL |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 430 | San Antonio | Bexar | IRR | C1146_4 | 8 | 95.45 | 0 | 95.45 | 0 | JOHN K KOHLHAAS |
| 431 | San Antonio | Bexar | IRR | C1960_1 | 20 | 39.24 | 0 | 39.24 | 0 | JOHN O SPICE |
| 432 | San Antonio | Bexar | IRR | P4141_3 | 179 | 39.89 | 0 | 39.89 | 0 | JOHN POWELL WALKER TRUSTEE |
| 433 | San Antonio | Bexar | IRR | C2147_1 | 28 | 94.12 | 0 | 94.12 | 0 | JOSE LUIS AMADOR |
| 434 | San Antonio | Bexar | IRR | P4499_1 | 54 | 45.10 | 0 | 45.10 | 0 | JOSEPH M STANUSH ET AL |
| 435 | San Antonio | Bexar | IRR | C1962_1 | 10 | 45.00 | 0 | 45.00 | 0 | JULIA H. KUSENER JACQUET ET AL |
| 436 | San Antonio | Bexar | IRR | C2155_1 | 240 | 99.75 | 0 | 99.75 | 0 | LES MENDELSOHN |
| 437 | San Antonio | Bexar | IRR | C1965_1 | 300 | 44.54 | 0 | 44.54 | 0 | LOMAS SANTA FE LTD |
| 438 | San Antonio | Bexar | IRR | P4187_1 | 333 | 40.14 | 0 | 40.14 | 0 | LOTTIE WALSH MAHLA ESTATE |
| 439 | San Antonio | Bexar | IRR | P4187_2 | 333 | 46.31 | 0 | 46.31 | 0 | LOTTIE WALSH MAHLA ESTATE |
| 440 | San Antonio | Bexar | IRR | C2157_1 | 50 | 97.75 | 0 | 97.75 | 0 | LOUIS PAWELEK |
| 441 | San Antonio | Bexar | IRR | P4294_1 | 40 | 91.36 | 0 | 91.36 | 0 | MARY HARPER TUDHOPE |
| 442 | San Antonio | Bexar | IRR | P5265_1 | 35 | 42.19 | 0 | 42.19 | 0 | MARY JAKSIK ZIGMOND |
| 443 | San Antonio | Bexar | IRR | C1933_1 | 480 | 75.79 | 0 | 75.79 | 0 | MISSION CEMETERY CO |
| 444 | San Antonio | Bexar | IRR | P5503_1 | 220 | 50.27 | 0 | 50.27 | 0 | O-SPORTS GOLF DEVELOPMENT II |
| 445 | San Antonio | Bexar | IRR | P4141_4 | 77 | 39.89 | 0 | 39.89 | 0 | PEOPLES SAVINGS & LOAN ASSN |
| 446 | San Antonio | Bexar | IRR | P5266_1 | 45 | 29.72 | 0 | 29.72 | 0 | RANDALL K HOOVER ET UX |
| 447 | San Antonio | Bexar | IRR | C2149_1 | 32 | 98.57 | 0 | 98.57 | 0 | RANDALL S PREISSIG TRUSTEE |
| 448 | San Antonio | Bexar | IRR | P5577_1 | 420 | 53.12 | 0 | 53.12 | 0 | ROBERT LG WATSON |
| 449 | San Antonio | Bexar | IRR | C1944_1 | 16 | 35.92 | 0 | 35.92 | 0 | SAN ANTONIO MISSIONS NATL PARK |
| 450 | San Antonio | Bexar | IRR | P3476_1 | 100 | 74.99 | 0 | 74.99 | 0 | SAN ANTONIO RANCH LTD |
| 451 | San Antonio | Bexar | IRR | C1931_4 | 450 | 79.40 | 0 | 79.40 | 0 | SAN ANTONIO RIVER AUTHORITY |
| 452 | San Antonio | Bexar | IRR | P4497_2 | 186 | 72.50 | 0 | 72.50 | 0 | SAN ANTONIO RIVER AUTHORITY |
| 453 | San Antonio | Bexar | IRR | P4138_2 | 23 | 40.17 | 0 | 40.17 | 0 | SAN ANTONIO WATER SYSTEM |
| 454 | San Antonio | Bexar | IRR | C1931_1 | 990 | 88.24 | 0 | 88.24 | 0 | SAN JUAN DITCH WSC |
| 455 | San Antonio | Bexar | IRR | P4136_1 | 124 | 40.17 | 0 | 40.17 | 0 | SAWS |
| 456 | San Antonio | Bexar | IRR | P4137_1 | 34 | 41.24 | 0 | 41.24 | 0 | SAWS |
| 457 | San Antonio | Bexar | IRR | C2151_1 | 1,500 | 53.58 | 0 | 53.58 | 0 | SOUTH LOOP LAND & CATTLE LC |
| 458 | San Antonio | Bexar | IRR | P5289_1 | 300 | 21.44 | 0 | 21.44 | 0 | SOUTHEAST INVESTMENTS INC |
| 459 | San Antonio | Bexar | IRR | P3852_1 | 50 | 93.55 | 0 | 93.55 | 0 | THOMAS A KORZEKWA |
| 460 | San Antonio | Bexar | IRR | P3852_2 | 25 | 55.59 | 0 | 55.59 | 0 | THOMAS A KORZEKWA |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 461 | San Antonio | Bexar | IRR | P4498_1 | 83 | 48.95 | 0 | 48.95 | 0 | VIRGINIA JAKSIK |
| 462 | San Antonio | Bexar | IRR | P4496_1 | 30 | 62.30 | 0 | 62.30 | 0 | WILLIAM WALLS JR |
| 463 | San Antonio | Bexar | MIN | P4025_1 | 431 | 46.07 | 0 | 46.07 | 0 | CAPITOL AGGREGATES INC |
| 464 | San Antonio | Bexar | MIN | P4025_2 | 769 | 45.20 | 0 | 45.20 | 0 | CAPITOL AGGREGATES INC |
| 465 | San Antonio | Bexar | MIN | P4025_3 | 3,304 | 27.22 | 0 | 27.22 | 0 | CAPITOL AGGREGATES INC |
| 466 | San Antonio | Bexar | MUN | C1959_1 | 150 | 90.46 | 0 | 90.46 | 0 | BEXAR METROPOLITAN WATER DIST |
| 467 | San Antonio | Bexar | MUN | C1966_1 | 481 | 94.11 | 0 | 94.11 | 0 | BEXAR METROPOLITAN WATER DIST |
| 468 | San Antonio | Bexar | MUN | C2144_1 | 215 | 94.38 | 0 | 94.38 | 0 | BEXAR METROPOLITAN WATER DIST |
| 469 | San Antonio | Bexar | MUN | C2144_2 | 93 | 93.80 | 0 | 93.80 | 0 | BEXAR METROPOLITAN WATER DIST |
| 470 | San Antonio | Bexar | MUN | C2144_3 | 308 | 28.19 | 0 | 28.19 | 0 | BEXAR METROPOLITAN WATER DIST |
| 471 | San Antonio | Bexar | MUN | C4768_1 | 89 | 99.06 | 0 | 99.06 | 0 | BEXAR METROPOLITAN WATER DIST |
| 472 | San Antonio | Bexar | MUN | C4768_2 | 417 | 98.59 | 0 | 98.59 | 0 | BEXAR METROPOLITAN WATER DIST |
| 473 | San Antonio | Bexar | MUN | C4768_3 | 4,494 | 27.14 | 0 | 27.14 | 0 | BEXAR METROPOLITAN WATER DIST |
| 474 | San Antonio | Bexar | MUN | P5549_1 | 2,250 | 26.29 | 0 | 26.29 | 0 | BEXAR METROPOLITAN WATER DIST |
| 475 | San Antonio | Bexar | MUN | P4136_2 | 276 | 39.48 | 0 | 39.48 | 0 | BMWD |
| 476 | San Antonio | Bexar | MUN | P4137_2 | 566 | 39.17 | 0 | 39.17 | 0 | BMWD |
| 477 | San Antonio | Bexar | MUN | P4138_3 | 152 | 39.24 | 0 | 39.24 | 0 | BMWD |
| 478 | San Antonio | Bexar | MUN | C2162_4 | 100 | 92.37 | 0 | 92.17 | 0 | CITY OF SAN ANTONIO |
| 479 | San Antonio | Bexar | MUN | P5517_1 | 7,500 | 39.18 | 0 | 39.18 | 0 | LEON CREEK WSC |
| 480 | San Antonio | Bexar | MUN | P5211_1 | 100 | 38.10 | 0 | 38.10 | 0 | LONE STAR GROWERS CO |
| 481 | San Antonio | Bexar | MUN | P5211_2 | 2,900 | 25.67 | 0 | 25.67 | 0 | LONE STAR GROWERS CO |
| 482 | San Antonio | Bexar | MUN | C2140_1 | 963 | 78.52 | 0 | 78.52 | 0 | METROPOLITAN RESOURCES INC |
| 483 | San Antonio | Bexar | REC | C2019_1 | 241 | 96.82 | 0 | 96.82 | 0 | THE BLUE WING CLUB |
| 484 | San Antonio | Bexar | REC | C2019_2 | 509 | 96.56 | 0 | 96.56 | 0 | THE BLUE WING CLUB |
| 485 | San Antonio | Bexar | REC | C2019_3 | 250 | 96.43 | 0 | 96.43 | 0 | THE BLUE WING CLUB |
| 486 | San Antonio | Caldwell | IRR | P3897_1 | 716 | 35.12 | 0 | 35.12 | 0 | ALFRED J NEWMAN , ET UX |
| 487 | San Antonio | DeWitt | IRR | P3851_1 | 50 | 93.77 | 0 | 93.77 | 0 | SAM M. KORZEKWA |
| 488 | San Antonio | Goliad | IRR | P5220_1 | 90 | 92.25 | 0 | 92.25 | 0 | CLARENCE F SCHENDEL ET UX |
| 489 | San Antonio | Goliad | IRR | C2196_1 | 336 | 99.04 | 0 | 99.04 | 0 | COLETO CATTLE COMPANY |
| 490 | San Antonio | Goliad | IRR | P5313_1 | 100 | 97.09 | 0 | 97.09 | 0 | EDWIN JACOBSON ET AL |
| 491 | San Antonio | Goliad | IRR | C2193_1 | 284 | 90.66 | 0 | 90.66 | 0 | JAMES M PETTUS ET AL |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 492 | San Antonio | Goliad | IRR | C2197_1 | 86 | 92.80 | 0 | 92.80 | 0 | JAMES M PETTUS II |
| 493 | San Antonio | Goliad | IRR | C2195_1 | 410 | 97.42 | 0 | 97.42 | 0 | JOE F FRENCH |
| 494 | San Antonio | Goliad | IRR | P5079_1 | 114 | 92.25 | 0 | 92.25 | 0 | JOHN C & SHERRY BROOKE |
| 495 | San Antonio | Goliad | IRR | C2194_1 | 1,020 | 99.25 | 0 | 99.25 | 0 | JULIA GANTT NEWTON ET AL |
| 496 | San Antonio | Goliad | IRR | P5478_1 | 300 | 60.02 | 0 | 60.02 | 0 | PATRICIA PITTMAN LIGHT |
| 497 | San Antonio | Goliad | IRR | C2199_1 | 325 | 99.04 | 0 | 99.04 | 0 | SAM HOUSTON CLINTON ET AL |
| 498 | San Antonio | Goliad | IRR | C2198_2 | 333 | 99.04 | 0 | 99.04 | 0 | SAN ANTONIO RIVER AUTHORITY |
| 499 | San Antonio | Guadalupe | IRR | P3837_1 | 21 | 46.64 | 0 | 46.64 | 0 | LAWRENCE R HALLIBURTON ET UX |
| 500 | San Antonio | Guadalupe | IRR | P3837_2 | 29 | 46.64 | 0 | 46.64 | 0 | WH HALLIBURTON , ESTATE OF |
| 501 | San Antonio | Hays | IRR | P3888_1 | 290 | 47.13 | 0 | 47.13 | 0 | ALAN D BARIBEAU ET UX |
| 502 | San Antonio | Hays | IRR | P3887_1 | 50 | 46.64 | 0 | 46.64 | 0 | PATTILLO FAMILY FARMS INC |
| 503 | San Antonio | Karnes | IRR | P5062_1 | 100 | 92.87 | 0 | 92.87 | 0 | ALFRED J RAHE |
| 504 | San Antonio | Karnes | IRR | C2188_1 | 40 | 93.59 | 0 | 93.59 | 0 | ALFRED MOCZYGEMBA |
| 505 | San Antonio | Karnes | IRR | P4538_1 | 150 | 92.87 | 0 | 92.87 | 0 | ALICE P JENDRUSCH ET AL |
| 506 | San Antonio | Karnes | IRR | C1168_1 | 30 | 98.90 | 0 | 98.90 | 0 | ALOYS PAWELEK |
| 507 | San Antonio | Karnes | IRR | P3431_1 | 60 | 93.05 | 0 | 93.05 | 0 | ANDREW RIVES ET UX |
| 508 | San Antonio | Karnes | IRR | P5368_1 | 300 | 59.40 | 0 | 59.36 | 0 | ARTHUR RAY YANTA ET UX |
| 509 | San Antonio | Karnes | IRR | C2184_1 | 120 | 52.80 | 0 | 52.80 | 0 | BONNIE SKLOSS |
| 510 | San Antonio | Karnes | IRR | C2184_2 | 80 | 46.64 | 0 | 46.64 | 0 | BONNIE SKLOSS |
| 511 | San Antonio | Karnes | IRR | P4002_1 | 80 | 73.67 | 0 | 73.67 | 0 | CASPER F MOCZYGEMBA JR ET AL |
| 512 | San Antonio | Karnes | IRR | P5044_1 | 150 | 92.92 | 0 | 92.92 | 0 | CHARLES WAYNE HUBBARD ET AL |
| 513 | San Antonio | Karnes | IRR | C2189_1 | 350 | 97.82 | 0 | 97.82 | 0 | CLEM R CANNON ET AL |
| 514 | San Antonio | Karnes | IRR | P4490_1 | 90 | 46.64 | 0 | 46.64 | 0 | DANIEL RANDERSON ET AL |
| 515 | San Antonio | Karnes | IRR | P5455_1 | 3 | 59.49 | 0 | 59.49 | 0 | DAVID C. " CHARLIE " ZUNKER |
| 516 | San Antonio | Karnes | IRR | P5296_1 | 74 | 93.56 | 0 | 93.56 | 0 | DENNIS J MOY |
| 517 | San Antonio | Karnes | IRR | P5532_1 | 2 | 55.67 | 0 | 55.67 | 0 | FELIX BRONDER |
| 518 | San Antonio | Karnes | IRR | P3767_1 | 20 | 93.55 | 0 | 93.55 | 0 | FELIX MOCZYGEMBA |
| 519 | San Antonio | Karnes | IRR | P3808_1 | 232 | 46.64 | 0 | 46.64 | 0 | FLAVIAN B MOCZYGEMBA |
| 520 | San Antonio | Karnes | IRR | C2190_1 | 100 | 100.00 | 100 | 100.00 | 100 | FLORENCE S BAUMANN ET AL |
| 521 | San Antonio | Karnes | IRR | C2185_1 | 90 | 93.43 | 0 | 93.43 | 0 | FRANCIS MOY & MARY MOY KOWALIK |
| 522 | San Antonio | Karnes | IRR | C1167_1 | 5 | 99.26 | 0 | 99.26 | 0 | FRANK B KRAWIETZ |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 523 | San Antonio | Karnes | IRR | C2192_1 | 140 | 99.04 | 0 | 99.04 | 0 | HALLIS DAVENPORT REVC MAN TR |
| 524 | San Antonio | Karnes | IRR | P5333_1 | 90 | 59.28 | 0 | 59.28 | 0 | HECTOR O HERRERA , ET UX |
| 525 | San Antonio | Karnes | IRR | P5333_2 | 300 | 59.40 | 0 | 59.37 | 0 | HECTOR O HERRERA , ET UX |
| 526 | San Antonio | Karnes | IRR | P4503_1 | 55 | 46.64 | 0 | 46.64 | 0 | HENRY D STRINGER JR |
| 527 | San Antonio | Karnes | IRR | P5306_1 | 200 | 92.51 | 0 | 92.51 | 0 | HERBERT JOHN EWALD JR ET AL |
| 528 | San Antonio | Karnes | IRR | P5239_1 | 4 | 92.66 | 0 | 92.66 | 0 | HOLY TRINITY CATHOLIC CHURCH |
| 529 | San Antonio | Karnes | IRR | P4536_1 | 100 | 92.90 | 0 | 92.90 | 0 | JAMES M & NANCY W BAILEY |
| 530 | San Antonio | Karnes | IRR | P4536_2 | 200 | 92.66 | 0 | 92.66 | 0 | JAMES M & NANCY W BAILEY |
| 531 | San Antonio | Karnes | IRR | P5622_1 | 240 | 53.36 | 0 | 53.36 | 0 | JAY E. BAKER ET AL SAN ANT |
| 532 | San Antonio | Karnes | IRR | P5043_1 | 150 | 92.84 | 0 | 92.84 | 0 | MELANIE A JACOBS ET AL |
| 533 | San Antonio | Karnes | IRR | P5635_1 | 55 | 65.24 | 0 | 65.24 | 0 | MICHAEL PAWELEK |
| 534 | San Antonio | Karnes | IRR | P4512_1 | 160 | 93.59 | 0 | 93.59 | 0 | OLIVE L RIDLEY ET AL |
| 535 | San Antonio | Karnes | IRR | P3517_2 | 80 | 78.74 | 0 | 78.74 | 0 | RIDLEY FAMILY RANCHES |
| 536 | San Antonio | Karnes | IRR | P4175_1 | 160 | 78.81 | 0 | 78.81 | 0 | RIDLEY FAMILY RANCHES |
| 537 | San Antonio | Karnes | IRR | P4561_1 | 525 | 92.64 | 0 | 92.64 | 0 | RIO GRANDE RESOURCES CORP |
| 538 | San Antonio | Karnes | IRR | P5367_1 | 300 | 59.40 | 0 | 59.37 | 0 | SUSIE LEE YANTA |
| 539 | San Antonio | Karnes | IRR | P4407_1 | 50 | 92.87 | 0 | 92.87 | 0 | TOMMY NAJVAR ET UX |
| 540 | San Antonio | Karnes | IRR | C2186_1 | 70 | 93.71 | 0 | 93.71 | 0 | VINCENT LABUS JR |
| 541 | San Antonio | Karnes | IRR | P5323_1 | 100 | 59.28 | 0 | 59.28 | 0 | WILLIAM I DUBEL |
| 542 | San Antonio | Karnes | IRR | P5002_1 | 150 | 92.87 | 0 | 92.87 | 0 | WM A JEFFERS JR & ANN JACKSON |
| 543 | San Antonio | Kendall | IRR | C1142_1 | 4 | 94.23 | 0 | 94.23 | 0 | JEB B MAEBIUS JR ET UX |
| 544 | San Antonio | Kendall | IRR | C1144_1 | 48 | 97.17 | 0 | 97.17 | 0 | WILLIS JAY HARPOLE |
| 545 | San Antonio | Kendall | IRR | C1144_2 | 7 | 97.02 | 0 | 97.02 | 0 | WILLIS JAY HARPOLE |
| 546 | San Antonio | Kendall | MUN | C1143_1 | 523 | 99.14 | 0 | 99.14 | 0 | CITY OF BOERNE |
| 547 | San Antonio | Kendall | MUN | C1143_2 | 310 | 99.03 | 0 | 99.03 | 0 | CITY OF BOERNE |
| 548 | San Antonio | Kerr | IRR | P4181_1 | 86 | 46.64 | 0 | 46.64 | 0 | BERTRAND O BAETZ ESTATE ET AL |
| 549 | San Antonio | Kerr | IRR | P4181_2 | 120 | 46.43 | 0 | 46.43 | 0 | BERTRAND O BAETZ ESTATE ET AL |
| 550 | San Antonio | Medina | IRR | C2139_1 | 112 | 90.16 | 0 | 90.16 | 0 | AL GILLIAM |
| 551 | San Antonio | Medina | IRR | SANTE_2 | 156 | 38.60 | 0 | 38.60 | 0 | ALVIN C SANTLEBEN |
| 552 | San Antonio | Medina | IRR | C2130_4 | 45,856 | 89.44 | 0 | 89.44 | 0 | BEXAR - MEDINA - ATASCOSA COS WCID |
| 553 | San Antonio | Medina | IRR | C2134_1 | 17 | 92.93 | 0 | 92.93 | 0 | GLENNIS W STEIN |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 554 | San Antonio | Medina | IRR | P4149_1 | 20 | 38.60 | 0 | 38.60 | 0 | GLENNIS W STEIN |
| 555 | San Antonio | Medina | IRR | C2133_1 | 18 | 89.07 | 0 | 89.07 | 0 | HARLEY & DOROTHY TSCHIRHART |
| 556 | San Antonio | Medina | IRR | P4159_1 | 50 | 38.60 | 0 | 38.60 | 0 | J C GRIFFITH |
| 557 | San Antonio | Medina | IRR | P4151_1 | 170 | 38.60 | 0 | 38.60 | 0 | JAMES A OPPELT ET UX |
| 558 | San Antonio | Medina | IRR | P4140_1 | 185 | 38.60 | 0 | 38.60 | 0 | KATHLEEN DAVENPORT CARSKADDEN |
| 559 | San Antonio | Medina | IRR | C2136_1 | 6 | 90.07 | 0 | 90.07 | 0 | KITTIE NELSON FERGUSON |
| 560 | San Antonio | Medina | MUN | C2130_1 | 750 | 98.38 | 0 | 98.38 | 0 | BEXAR - MEDINA - ATASCOSA COS WCID |
| 561 | San Antonio | Medina | MUN | C2130_2 | 170 | 97.96 | 0 | 97.96 | 0 | BEXAR - MEDINA - ATASCOSA COS WCID |
| 562 | San Antonio | Medina | MUN | C2130_6 | 19,974 | 92.36 | 0 | 92.36 | 0 | BEXAR - MEDINA - ATASCOSA COS WCID |
| 563 | San Antonio | Medina | RCG | P3220_1 | 29,652 | 7.29 | 0 | 7.29 | 0 | EDWARDS UNDERGROUND WD |
| 564 | San Antonio | Victoria | IRR | P3861_1 | 200 | 46.64 | 0 | 46.64 | 0 | GEO D POOL & RONALD R STINSON |
| 565 | San Antonio | Victoria | IRR | P4117_1 | 950 | 92.54 | 0 | 92.54 | 0 | JUNE PETTUS |
| 566 | San Antonio | Wilson | IRR | C2179_1 | 47 | 100.00 | 47 | 100.00 | 47 | A D D CORPORATION |
| 567 | San Antonio | Wilson | IRR | C2179_2 | 72 | 100.00 | 72 | 100.00 | 72 | A D D CORPORATION |
| 568 | San Antonio | Wilson | IRR | C2179_3 | 39 | 100.00 | 39 | 100.00 | 39 | A D D CORPORATION |
| 569 | San Antonio | Wilson | IRR | C2179_4 | 467 | 46.49 | 0 | 46.49 | 0 | A D D CORPORATION |
| 570 | San Antonio | Wilson | IRR | C1148_1 | 11 | 98.75 | 0 | 98.75 | 0 | ALLAN G LYNHAM ET UX |
| 571 | San Antonio | Wilson | IRR | P5587_1 | 300 | 28.99 | 0 | 28.99 | 0 | ALOIS D KOLLODZIEJ ET UX |
| 572 | San Antonio | Wilson | IRR | C1162_1 | 2 | 93.05 | 0 | 93.05 | 0 | ALVIN PRUSKI |
| 573 | San Antonio | Wilson | IRR | C1162_2 | 78 | 73.17 | 0 | 73.17 | 0 | ALVIN PRUSKI |
| 574 | San Antonio | Wilson | IRR | P4121_1 | 38 | 46.64 | 0 | 46.64 | 0 | BENITO D. CABRIALES ET UX |
| 575 | San Antonio | Wilson | IRR | C2183_2 | 100 | 100.00 | 100 | 100.00 | 100 | BENJAMIN C PAWELEK |
| 576 | San Antonio | Wilson | IRR | C1152_1 | 35 | 93.85 | 0 | 93.85 | 0 | BILL & MELVIN DEAGEN ET AL |
| 577 | San Antonio | Wilson | IRR | P3994_1 | 1,056 | 46.22 | 0 | 46.22 | 0 | BOENING ENTERPRISES |
| 578 | San Antonio | Wilson | IRR | C1151_1 | 86 | 99.11 | 0 | 99.11 | 0 | CANYON REGIONAL WATER AUTHORITY |
| 579 | San Antonio | Wilson | IRR | C2173_1 | 78 | 97.82 | 0 | 97.82 | 0 | CECIL MARK RICHARDSON ET AL |
| 580 | San Antonio | Wilson | IRR | C2163_1 | 44 | 99.94 | 33 | 99.94 | 33 | CHARLES HONEYCUTT , ET AL |
| 581 | San Antonio | Wilson | IRR | C2163_2 | 256 | 46.43 | 0 | 46.43 | 0 | CHARLES HONEYCUTT , ET AL |
| 582 | San Antonio | Wilson | IRR | C2172_1 | 18 | 99.49 | 0 | 99.49 | 0 | CLYDE R MAHA ET AL |
| 583 | San Antonio | Wilson | IRR | C1163_1 | 80 | 100.00 | 80 | 100.00 | 80 | CYNTHIA A TITZMAN ET VIR |
| 584 | San Antonio | Wilson | IRR | C1160_1 | 140 | 77.11 | 0 | 77.11 | 0 | DDR ROCK RANCH PARTNERS |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 585 | San Antonio | Wilson | IRR | C1159_1 | 0 | 93.4 | 0 | 93.4 | 0 | DEBORAH M IRWIN ET VIR |
| 586 | San Antonio | Wilson | IRR | P4484_1 | 5 | 46.64 | 0 | 46.64 | 0 | DELBERT J KELLER |
| 587 | San Antonio | Wilson | IRR | P4484_2 | 200 | 92.95 | 0 | 92.95 | 0 | DELBERT J KELLER |
| 588 | San Antonio | Wilson | IRR | P4484_3 | 100 | 92.84 | 0 | 92.84 | 0 | DELBERT J KELLER |
| 589 | San Antonio | Wilson | IRR | C2180_1 | 18 | 100.00 | 18 | 100.00 | 18 | DONALD A OCKER ET AL |
| 590 | San Antonio | Wilson | IRR | C2180_2 | 110 | 100.00 | 110 | 100.00 | 110 | DONALD A OCKER ET AL |
| 591 | San Antonio | Wilson | IRR | C2180_3 | 497 | 46.46 | 0 | 46.46 | 0 | DONALD A OCKER ET AL |
| 592 | San Antonio | Wilson | IRR | C2165_1 | 50 | 93.45 | 0 | 93.45 | 0 | ED WISEMAN MARITAL TRUST |
| 593 | San Antonio | Wilson | IRR | C2165_2 | 70 | 38.51 | 0 | 38.51 | 0 | ED WISEMAN MARITAL TRUST |
| 594 | San Antonio | Wilson | IRR | P5611_1 | 175 | 48.18 | 0 | 48.18 | 0 | ELIAS DUGI , ET UX CIBO |
| 595 | San Antonio | Wilson | IRR | C1165_1 | 4 | 99.26 | 0 | 99.26 | 0 | EMERYK KELLER |
| 596 | San Antonio | Wilson | IRR | C2178_1 | 63 | 100.00 | 63 | 100.00 | 63 | FELIX J JANEK JR ET UX |
| 597 | San Antonio | Wilson | IRR | C2178_2 | 180 | 100.00 | 180 | 100.00 | 180 | FELIX J JANEK JR ET UX |
| 598 | San Antonio | Wilson | IRR | C2178_3 | 500 | 92.25 | 0 | 92.25 | 0 | FELIX J JANEK JR ET UX |
| 599 | San Antonio | Wilson | IRR | C2177_1 | 81 | 100.00 | 81 | 100.00 | 81 | FRANK & JA LABUS |
| 600 | San Antonio | Wilson | IRR | P5243_1 | 54 | 46.43 | 0 | 46.43 | 0 | FRANK R BOLF |
| 601 | San Antonio | Wilson | IRR | C2181_1 | 64 | 100.00 | 64 | 100.00 | 64 | FRED J LYSSY ET AL |
| 602 | San Antonio | Wilson | IRR | C2181_2 | 157 | 46.64 | 0 | 46.64 | 0 | FRED J LYSSY ET AL |
| 603 | San Antonio | Wilson | IRR | C2181_3 | 159 | 46.64 | 0 | 46.64 | 0 | FRED J LYSSY ET AL |
| 604 | San Antonio | Wilson | IRR | P5499_1 | 50 | 37.51 | 0 | 37.51 | 0 | GARY ZOOK , ET UX |
| 605 | San Antonio | Wilson | IRR | C1159_2 | 13 | 93.40 | 0 | 93.40 | 0 | GAYLON T CLICK ET UX |
| 606 | San Antonio | Wilson | IRR | C1159_3 | 16 | 93.40 | 0 | 93.40 | 0 | GAYLONT CLICK ET UX |
| 607 | San Antonio | Wilson | IRR | P5202_1 | 75 | 46.64 | 0 | 46.64 | 0 | GEORGE R GAWLIK ET UX |
| 608 | San Antonio | Wilson | IRR | C1166_1 | 25 | 93.40 | 0 | 93.40 | 0 | GERVAS JASKINIA ESTATE |
| 609 | San Antonio | Wilson | IRR | C2168_1 | 16 | 95.45 | 0 | 95.45 | 0 | H W FINCK |
| 610 | San Antonio | Wilson | IRR | P5307_1 | 300 | 39.12 | 0 | 39.12 | 0 | JAMES R LEININGER |
| 611 | San Antonio | Wilson | IRR | P5182_1 | 100 | 69.90 | 0 | 69.90 | 0 | JAMES T WATSON |
| 612 | San Antonio | Wilson | IRR | C1164_1 | 6 | 93.40 | 0 | 93.40 | 0 | JANE LYSSY OPIELA ET AL |
| 613 | San Antonio | Wilson | IRR | C2169_1 | 29 | 100.00 | 29 | 100.00 | 29 | JIMMY E HOLT ET UX |
| 614 | San Antonio | Wilson | IRR | P5194_1 | 210 | 46.64 | 0 | 46.64 | 0 | JOE R HOLLAWAY JR ET AL |
| 615 | San Antonio | Wilson | IRR | C1161_1 | 15 | 93.40 | 0 | 93.40 | 0 | JOHN DRZYMALA |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 616 | San Antonio | Wilson | IRR | C2164_1 | 23 | 100.00 | 23 | 100.00 | 23 | JOHN WILLIAM HELTON JR ET UX |
| 617 | San Antonio | Wilson | IRR | C2164_2 | 59 | 39.22 | 0 | 39.22 | 0 | JOHN WILLIAM HELTON JR ET UX |
| 618 | San Antonio | Wilson | IRR | P5224_1 | 60 | 67.40 | 0 | 67.40 | 0 | JOHNNY KOSUB & BETTY KOSUB |
| 619 | San Antonio | Wilson | IRR | C1154_1 | 69 | 98.75 | 0 | 98.75 | 0 | JONAH H WILSON |
| 620 | San Antonio | Wilson | IRR | C2182_3 | 700 | 93.26 | 0 | 93.26 | 0 | LEO V LYSSY ET AL |
| 621 | San Antonio | Wilson | IRR | C2182_4 | 166 | 39.21 | 0 | 39.21 | 0 | LEO V LYSSY ET AL |
| 622 | San Antonio | Wilson | IRR | P5264_1 | 130 | 39.21 | 0 | 39.21 | 0 | LILLIANS WISEMAN TRUST ET AL |
| 623 | San Antonio | Wilson | IRR | P5633_1 | 130 | 84.71 | 0 | 84.71 | 0 | LOUIS T. AND SONIA ROSENBERG |
| 624 | San Antonio | Wilson | IRR | P5171_1 | 200 | 46.64 | 0 | 46.64 | 0 | MESCALERO PROPERTIES |
| 625 | San Antonio | Wilson | IRR | C2166_1 | 105 | 94.45 | 0 | 94.45 | 0 | NICK KOLENDA |
| 626 | San Antonio | Wilson | IRR | C2166_2 | 95 | 39.21 | 0 | 39.21 | 0 | NICK KOLENDA |
| 627 | San Antonio | Wilson | IRR | C1150_1 | 200 | 98.75 | 0 | 98.75 | 0 | PAT HIGGINS ESTATE |
| 628 | San Antonio | Wilson | IRR | C1159_4 | 7 | 93.40 | 0 | 93.40 | 0 | PATRICK NEIDORF |
| 629 | San Antonio | Wilson | IRR | C2176_1 | 105 | 100.00 | 105 | 100.00 | 105 | POTH LAND & CATTLE CO |
| 630 | San Antonio | Wilson | IRR | C2176_2 | 145 | 39.21 | 0 | 39.21 | 0 | POTH LAND & CATTLE CO |
| 631 | San Antonio | Wilson | IRR | C2171_1 | 63 | 99.11 | 0.0 | 99.11 | 0.00 | R C CARROLL |
| 632 | San Antonio | Wilson | IRR | P5559_1 | 99 | 50.26 | 0 | 50.26 | 0 | RALPH MCGREW ET UX |
| 633 | San Antonio | Wilson | IRR | C1149_1 | 62 | 98.75 | 0 | 98.75 | 0 | RAY SMITH ET UX |
| 634 | San Antonio | Wilson | IRR | P5395_1 | 254 | 38.46 | 0 | 38.46 | 0 | RENATO MARTINEZ ET UX |
| 635 | San Antonio | Wilson | IRR | P5395_2 | 450 | 37.42 | 0 | 37.42 | 0 | RENATO MARTINEZ ET UX |
| 636 | San Antonio | Wilson | IRR | C2169_2 | 18 | 100.00 | 17.7 | 100.00 | 17.66 | RICHARD E ULLMANN ET UX |
| 637 | San Antonio | Wilson | IRR | C1171_1 | 80 | 98.36 | 0 | 98.36 | 0 | ROSS OWEN SCULL |
| 638 | San Antonio | Wilson | IRR | C1171_2 | 250 | 73.90 | 0 | 73.90 | 0 | ROSS OWEN SCULL |
| 639 | San Antonio | Wilson | IRR | C1171_3 | 330 | 68.46 | 0 | 68.46 | 0 | ROSS OWEN SCULL |
| 640 | San Antonio | Wilson | IRR | P5308_1 | 100 | 57.71 | 0 | 57.71 | 0 | SAM JARZOMBEK |
| 641 | San Antonio | Wilson | IRR | P5320_1 | 200 | 38.50 | 0 | 38.50 | 0 | SHELBY KOEHLER ET UX |
| 642 | San Antonio | Wilson | IRR | C2167_1 | 17 | 100.00 | 17 | 100.00 | 17 | TOMAS CAVAZOS |
| 643 | San Antonio | Wilson | IRR | C1158_1 | 30 | 93.40 | 0 | 93.40 | 0 | VIVA LEA MILLS |
| 644 | San Antonio | Wilson | IRR | C1153_1 | 100 | 93.05 | 0 | 93.05 | 0 | WAYNE H STROUD ET AL |
| 645 | San Antonio | Wilson | IRR | C1156_1 | 35 | 98.75 | 0 | 98.75 | 0 | WAYNE H STROUD ET AL |
| 646 | San Antonio | Wilson | IRR | C2175_2 | 60 | 37.50 | 0 | 37.50 | 0 | WELMA L R KIRCHOFF ET AL |

| No. | Basin | County | Use | Water Right ID No. | Authorized Diversion (acft /yr) | 2030 Volume Reliability (%) | 2030 Minimum Annual Supply (acft) | 2080 Volume Reliability (%) | 2080 Minimum Annual Supply (acft) | Owner |
|---|---|---|---|---|---|---|---|---|---|---|
| 647 | San Antonio | Wilson | IRR | C2175_1 | 38 | 99.49 | 0 | 99.49 | 0 | WELMA LR KIRCHOFF ET AL |
| 648 | San Antonio | Wilson | IRR | P4495_1 | 50 | 46.64 | 0 | 46.64 | 0 | WILLIAM & IRENE C WALLS JR |
| 649 | San Antonio | Wilson | IRR | P5126_1 | 150 | 46.64 | 0 | 46.64 | 0 | WILLIAM M PAVLISKA |
| 650 | San Antonio | Wilson | IRR | P5218_1 | 360 | 73.18 | 0 | 73.18 | 0 | WILLIAM P REDDICK ET UX |
| 651 | San Antonio | Wilson | IRR | C2174_1 | 14 | 100.00 | 14 | 100.00 | 14 | WILLIE HOSEK ESTATE |
| 652 | San Antonio | Wilson | MUN | C1157_2 | 117 | 93.35 | 0 | 93.35 | 0 | OSCAR SANDERS |
| 653 | San Antonio | Wilson | MUN | C1155_1 | 42 | 98.86 | 0 | 98.86 | 0 | SIESTA CATTLE COMPANY |
| **All** | **Total** | **All** | **All** | **All** | **6,500,997** | | **86,465.04** | | **86,465.04** | |

FINAL PLAN

# CHAPTER 4: IDENTIFICATION OF WATER NEEDS

## South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**4.0 Identification of Water Needs ..... 4-1**

4.1 Introduction ..... 4-1

4.2 Identified Needs ..... 4-1

4.2.1 Water User Groups ..... 4-2

4.2.2 Counties ..... 4-9

4.2.3 Use Types ..... 4-11

4.2.4 Major Water Providers ..... 4-25

## APPENDICES

Appendix 4A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)

## LIST OF TABLES

Table 4-1 Total Identified Water Needs and Second-Tier Water Needs for the South Central Texas Region (acft/yr) ..... 4-1

Table 4-2 Identified Water Needs for Individual Water User Groups (acft/yr) ..... 4-3

Table 4-3 Identified Water Needs for Individual Counties (acft/yr) ..... 4-10

Table 4-4 Identified Water Needs for Individual Use Types (acft/yr) ..... 4-12

Table 4-5 Second-Tier Water Needs for Individual Use Types (acft/yr) ..... 4-12

Table 4-6 Irrigation Needs for Individual Counties (acft/yr) ..... 4-14

Table 4-7 Irrigation Needs for Individual Basins (acft/yr) ..... 4-16

Table 4-8 Livestock Needs for Individual Counties (acft/yr) ..... 4-17

Table 4-9 Manufacturing Needs for Individual Counties (acft/yr) ..... 4-19

Table 4-10 Mining Needs for Individual Counties (acft/yr)) ..... 4-20

Table 4-11 Municipal Needs for Individual Counties (acft/yr) ..... 4-22

Table 4-12 Steam-Electric Power Needs Projections for Individual Counties (acft/yr) ..... 4-24

Table 4-13 Identified Needs for Major Water Providers (acft/yr) ..... 4-25

Table 4-14 Needs for Major Water Providers by Use Type (acft/yr) ..... 4-26

## LIST OF FIGURES

Figure 4-1 Total Identified Water Needs, Shown as a Portion of Total Demands ..... 4-2

Figure 4-2 Identified Water Needs by County ..... 4-10

Figure 4-3 Identified Water Needs by Use Type ..... 4-12

Figure 4-4 Proportion of Total Needs by Use Type ..... 4-13

Figure 4-5 Irrigation Needs, Shown as a Portion of Irrigation Demands ..... 4-14

Figure 4-6 Irrigation Needs in 2080 by River and Coastal Basin ..... 4-15

Figure 4-7 Livestock Needs, Shown as a Portion of Livestock Demands ..... 4-16

Figure 4-8 Manufacturing Needs, Shown as a Portion of Manufacturing Demands ..... 4-18

Figure 4-9 Mining Needs, Shown as a Portion of Mining Demands ..... 4-20
Figure 4-10 Municipal Needs, Shown as a Portion of Municipal Demands ..... 4-22
Figure 4-11 Steam-Electric Power Needs, Shown as a Portion of Steam-Electric Power Demands ..... 4-24

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft/yr | Acre-Foot per Year |
| DB27 | 2027 Regional and State Water Planning Database |
| GBRA | Guadalupe-Blanco River Authority |
| IH-35 | Interstate Highway 35 |
| MUD | Municipal Utility District |
| MWP | Major Water Provider |
| Region L | South Central Texas Region |
| SAWS | San Antonio Water System |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SUD | Special Utility District |
| TPWD | Texas Parks and Wildlife Department |
| TWDB | Texas Water Development Board |
| WCID | Water Control and Improvement District |
| WMS | Water Management Strategy |
| WSC | Water Supply Corporation |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |

# 4.0 Identification of Water Needs

## 4.1 Introduction

This chapter describes the evaluation and results of the water needs (shortages) analysis and secondary needs analysis for water user groups (WUGs) and major water providers (MWPs). In Chapter 5, water management strategies (WMSs) are identified for identified needs within the South Central Texas (Region L) Regional Water Planning Area (SCTRWPA) for decades 2030 to 2080, as required by the regional water planning process.

In Chapter 2, drought-year water demands were identified for all WUGs. In Chapter 3, available drought-year existing water supplies were identified and allocated to WUGs, wholesale water providers (WWPs), and MWPs based on current usage, permits, and contracts. The water needs analysis includes comparison of existing supplies and demands to identify projected surpluses and shortages. Additionally, a secondary or second-tier needs analysis was performed to identify remaining needs after assuming all recommended conservation and direct reuse WMSs are fully implemented.

## 4.2 Identified Needs

The SCTRWPA consists of 20 full counties and part of Hays County. Table 4-1 summarizes identified water needs and second-tier water needs for the SCTRWPA. Needs are presented in acre-feet per year (acft/yr) [1]. Figure 4-1 provides the identified water needs for the SCTRWPA, shown as a portion of the total regional water demands.

**Table 4-1 Total Identified Water Needs and Second-Tier Water Needs for the South Central Texas Region (acft/yr)**

| Need Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Identified Needs Total, Region L | 185,132 | 220,771 | 269,912 | 350,184 | 437,491 | 513,712 |
| Second-Tier Needs Total, Region L | 175,863 | 190,610 | 206,563 | 242,055 | 291,449 | 318,286 |

The SCTRWPA has a projected annual water need of 185,132 acft/yr in 2030, increasing to 513,712 acft/yr in 2080. After applying all recommended conservation and direct reuse WMSs, the secondary water needs are 175,863 acft/yr in 2030 and 318,286 acft/yr in 2080. All counties within the SCTRWPA, except DeWitt and Refugio Counties, have identified needs in at least one decade during the 50-year planning horizon.

Projections of identified needs in the SCTRWPA follow similar trends to the water demand projections identified in Chapter 2. In general, identified water needs increase over the planning horizon, with most of the increases attributed to municipal uses and, to a lesser extent, manufacturing uses. Needs for irrigation, livestock, and steam-electric are expected to remain relatively constant over the planning horizon. Mining needs are expected to gradually increase through 2070 because of population increases

[1] One acft is approximately 325,851 gallons.

before decreasing sharply due to expected declines in hydraulic fracturing. Between 2030 and 2080, areas along the Interstate Highway 35 (IH-35) corridor will experience the greatest growth in municipal needs, including Kendall, Hays, Caldwell, Comal, and Guadalupe Counties.

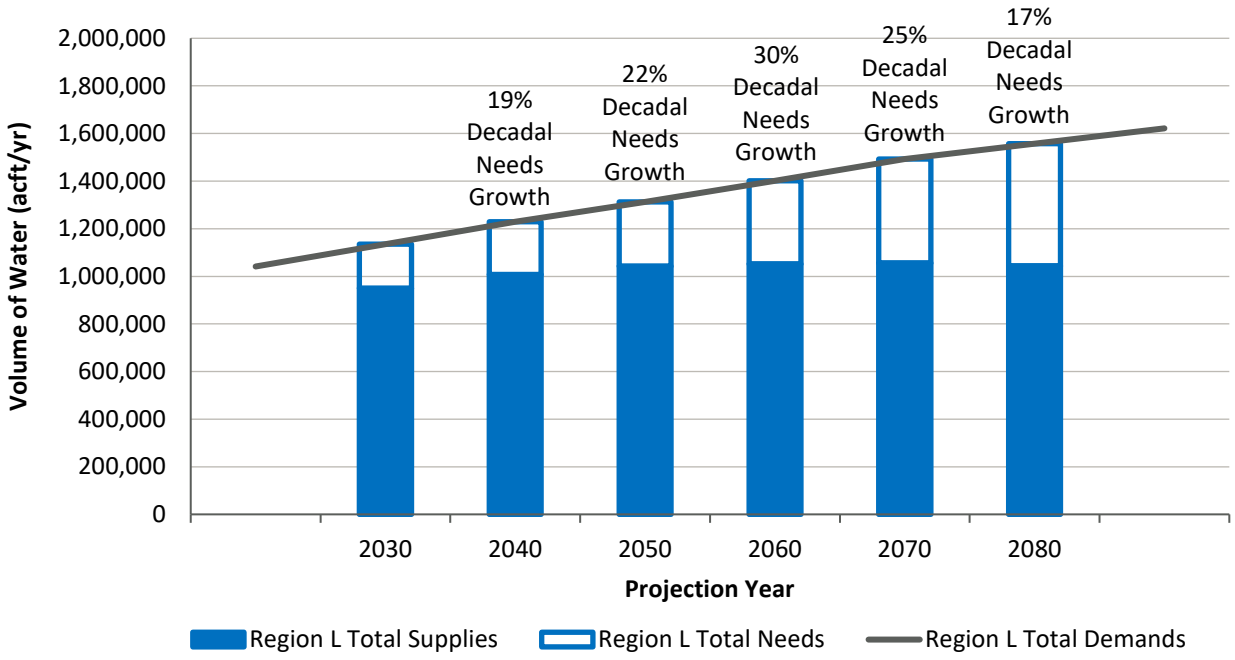



**Figure 4-1 Total Identified Water Needs, Shown as a Portion of Total Demands**

The Texas Water Development Board (TWDB) distinguishes a WUG's or WWP's supplies, demands, and needs by region, county, and basin. For the purposes of this chapter and needs analysis, any WUG's surplus on the basis of county or basin split was considered as a zero-value. This means that a split-WUG may have a need shown in this chapter but in practice, the WUG may have a surplus in another basin or county that offsets those needs. In other cases, needs may be better supplied near the location of the demand, requiring separate strategies in each basin or county unit. If supply and demand centers are not fully connected across a WUG's or WWP's service area, new interconnections may allow these entities to meet future needs as one system.

The following sections present identified water needs for each planning decade by WUGs, counties, use types, and MWPs.

### 4.2.1 Water User Groups

Identified needs for each WUG within the SCTRWPA are summarized in Table 4-2. They are also provided in reports from the 2027 Regional and State Water Planning Database (DB27), which are available at https://www3.twdb.texas.gov/apps/SARA/reports/list. Relevant DB27 reports are included in Appendix 4A:.

Of the 227 WUGs evaluated in the needs analysis, 96 WUGs have needs in at least one decade during the planning horizon. Of those WUGs with needs, the average need increases from 2,848 acft/yr in 2030

to 5,905 acft/yr in 2080. In 2030, the top five WUGs with the greatest needs include four non-municipal WUGs (Victoria County Manufacturing, Medina County Irrigation, Uvalde County Irrigation, and Zavala County Irrigation) and one municipal WUG (Fort Sam Houston). By 2080, however, the top five WUGs with the greatest needs include three municipal WUGs (New Braunfels, San Antonio Water System [SAWS], and Hays County-Other) and two non-municipal WUGs (Victoria County Manufacturing and Medina County Irrigation).

For WWPs that are also WUGs, needs are shown according to the supplies or portions of supplies that are identified to meet their WUG needs. WWP supplies to other WUGs are included as a supply for that WUG. WWPs without WUG demands do not have identified needs and are not shown in the needs analysis. Several WUGs are split between Region L and other regional water planning areas; needs estimates in this chapter and in DB27 reports are representative of only the portions of WUGs that are located within the SCTRWPA.

**Table 4-2 Identified Water Needs for Individual Water User Groups (acft/yr)**

| No. | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| 1 | 3009 Water | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Air Force Village II Inc | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | Alamo Heights | 488 | 483 | 483 | 483 | 483 | 483 |
| 4 | Aqua WSC [1] | 18 | 26 | 33 | 43 | 54 | 67 |
| 5 | Asherton | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Atascosa Rural WSC | 1,201 | 1,464 | 1,706 | 1,917 | 2,159 | 2,436 |
| 7 | Batesville WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | Benton City WSC | 0 | 27 | 252 | 386 | 539 | 716 |
| 9 | Bexar County WCID 10 | 377 | 541 | 691 | 825 | 978 | 1,154 |
| 10 | Big Wells | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | Boerne | 0 | 760 | 3,365 | 6,388 | 9,850 | 13,812 |
| 12 | C Willow Water | 0 | 9 | 22 | 33 | 46 | 61 |
| 13 | Canyon Lake Water Service (Texas Water Company) [1] | 0 | 239 | 2,923 | 4,663 | 11,183 | 18,379 |
| 14 | Carrizo Hill WSC | 0 | 0 | 0 | 12 | 44 | 67 |
| 15 | Carrizo Springs | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | Castroville | 533 | 634 | 786 | 999 | 1,194 | 1,322 |
| 17 | Charlotte | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | Cibolo | 0 | 0 | 93 | 738 | 1,476 | 2,321 |
| 19 | Clear Water Estates Water System (Texas Water Company) | 100 | 528 | 1,098 | 1,822 | 2,649 | 3,596 |
| 20 | Concan WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | Converse | 552 | 538 | 538 | 538 | 538 | 538 |
| 22 | Cotulla | 0 | 0 | 0 | 0 | 0 | 0 |

| No. | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| 23 | County Line SUD | 0 | 2,496 | 6,273 | 9,169 | 10,859 | 11,808 |
| 24 | County-Other, Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | County-Other, Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | County-Other, Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | County-Other, Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | County-Other, Comal | 79 | 175 | 1,492 | 8,120 | 12,171 | 17,204 |
| 29 | County-Other, DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | County-Other, Dimmit | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | County-Other, Frio | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | County-Other, Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | County-Other, Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| 34 | County-Other, Guadalupe | 0 | 0 | 10 | 174 | 365 | 584 |
| 35 | County-Other, Hays [1] | 0 | 0 | 406 | 6,114 | 12,427 | 22,488 |
| 36 | County-Other, Karnes | 0 | 0 | 0 | 0 | 0 | 0 |
| 37 | County-Other, Kendall | 0 | 0 | 30 | 257 | 524 | 926 |
| 38 | County-Other, La Salle | 0 | 0 | 0 | 0 | 0 | 0 |
| 39 | County-Other, Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | County-Other, Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| 41 | County-Other, Uvalde | 0 | 0 | 0 | 0 | 0 | 0 |
| 42 | County-Other, Victoria | 217 | 277 | 297 | 287 | 277 | 265 |
| 43 | County-Other, Wilson | 0 | 0 | 0 | 0 | 0 | 0 |
| 44 | County-Other, Zavala | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | Creedmoor-Maha WSC [1] | 0 | 0 | 0 | 351 | 1,396 | 2,466 |
| 46 | Crystal City | 0 | 0 | 0 | 0 | 0 | 0 |
| 47 | Crystal Clear SUD | 2,859 | 8,448 | 10,236 | 12,243 | 14,554 | 17,211 |
| 48 | Cuero | 0 | 0 | 0 | 0 | 0 | 0 |
| 49 | Devine | 0 | 0 | 0 | 0 | 0 | 0 |
| 50 | Dilley | 0 | 0 | 0 | 0 | 0 | 0 |
| 51 | East Central SUD | 3,189 | 4,035 | 4,830 | 5,544 | 6,355 | 7,269 |
| 52 | East Medina County SUD | 0 | 0 | 0 | 0 | 23 | 58 |
| 53 | El Oso WSC [1] | 0 | 0 | 0 | 0 | 3 | 6 |
| 54 | Elmendorf | 0 | 0 | 0 | 40 | 373 | 1,016 |
| 55 | Encinal WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 56 | Fair Oaks Ranch | 0 | 319 | 565 | 664 | 689 | 689 |
| 57 | Falls City | 0 | 0 | 0 | 0 | 0 | 0 |
| 58 | Fayette WSC [1] | 0 | 0 | 0 | 0 | 0 | 0 |
| 59 | Floresville | 0 | 0 | 0 | 0 | 0 | 0 |

| No. | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| 60 | Fort Sam Houston | 14,151 | 14,142 | 14,142 | 14,142 | 14,142 | 14,142 |
| 61 | Garden Ridge | 1,163 | 1,635 | 2,111 | 2,659 | 3,310 | 4,081 |
| 62 | Goforth SUD [1] | 0 | 0 | 0 | 3,305 | 9,008 | 15,528 |
| 63 | Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| 64 | Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| 65 | Gonzales County WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 66 | Green Valley SUD | 0 | 0 | 0 | 0 | 686 | 3,381 |
| 67 | Guadalupe-Blanco River Authority | 0 | 0 | 0 | 0 | 0 | 0 |
| 68 | Hondo | 288 | 197 | 149 | 160 | 172 | 183 |
| 69 | Irrigation, Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| 70 | Irrigation, Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| 71 | Irrigation, Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| 72 | Irrigation, Calhoun | 9,173 | 9,173 | 9,173 | 9,173 | 9,173 | 9,173 |
| 73 | Irrigation, Comal | 0 | 0 | 0 | 0 | 0 | 0 |
| 74 | Irrigation, DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| 75 | Irrigation, Dimmit | 4,336 | 4,336 | 4,336 | 4,336 | 4,336 | 4,336 |
| 76 | Irrigation, Frio | 0 | 0 | 0 | 0 | 0 | 0 |
| 77 | Irrigation, Goliad | 184 | 36 | 0 | 0 | 0 | 0 |
| 78 | Irrigation, Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| 79 | Irrigation, Guadalupe | 20 | 20 | 20 | 20 | 20 | 20 |
| 80 | Irrigation, Hays [1] | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 | Irrigation, Karnes | 185 | 185 | 744 | 744 | 744 | 744 |
| 82 | Irrigation, Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| 83 | Irrigation, La Salle | 413 | 413 | 413 | 413 | 413 | 413 |
| 84 | Irrigation, Medina | 23,602 | 23,679 | 23,762 | 23,831 | 23,896 | 23,948 |
| 85 | Irrigation, Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| 86 | Irrigation, Uvalde | 18,625 | 18,625 | 18,625 | 18,625 | 18,625 | 18,625 |
| 87 | Irrigation, Victoria | 200 | 200 | 200 | 200 | 200 | 200 |
| 88 | Irrigation, Wilson | 331 | 331 | 331 | 331 | 331 | 331 |
| 89 | Irrigation, Zavala | 14,189 | 14,189 | 14,189 | 14,189 | 14,189 | 14,189 |
| 90 | Jourdanton | 0 | 0 | 0 | 0 | 0 | 0 |
| 91 | Karnes City | 0 | 0 | 0 | 0 | 0 | 0 |
| 92 | Kendall County WCID 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 93 | Kendall West Utility | 0 | 0 | 36 | 168 | 318 | 490 |
| 94 | Kenedy | 0 | 0 | 0 | 0 | 0 | 0 |
| 95 | Kirby | 138 | 248 | 270 | 270 | 270 | 270 |
| 96 | Knippa WSC | 0 | 0 | 0 | 0 | 0 | 0 |

| No. | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| 97 | KT Water Development | 486 | 973 | 1,624 | 2,448 | 3,391 | 4,471 |
| 98 | Kyle | 0 | 0 | 8 | 1,458 | 1,936 | 2,287 |
| 99 | La Coste | 3 | 0 | 0 | 1 | 3 | 5 |
| 100 | La Vernia | 0 | 0 | 0 | 0 | 0 | 0 |
| 101 | Lackland Air Force Base | 0 | 0 | 0 | 0 | 0 | 0 |
| 102 | Leon Valley | 763 | 1,129 | 1,129 | 1,129 | 1,129 | 1,129 |
| 103 | Live Oak | 211 | 202 | 202 | 202 | 228 | 202 |
| 104 | Livestock, Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| 105 | Livestock, Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| 106 | Livestock, Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| 107 | Livestock, Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | Livestock, Comal | 0 | 0 | 0 | 0 | 0 | 0 |
| 109 | Livestock, DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | Livestock, Dimmit | 0 | 0 | 0 | 0 | 0 | 0 |
| 111 | Livestock, Frio | 0 | 0 | 0 | 0 | 0 | 0 |
| 112 | Livestock, Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| 113 | Livestock, Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| 114 | Livestock, Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| 115 | Livestock, Hays [1] | 12 | 12 | 12 | 12 | 12 | 12 |
| 116 | Livestock, Karnes | 0 | 0 | 0 | 0 | 0 | 0 |
| 117 | Livestock, Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| 118 | Livestock, La Salle | 0 | 0 | 0 | 0 | 0 | 0 |
| 119 | Livestock, Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| 120 | Livestock, Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| 121 | Livestock, Uvalde | 0 | 0 | 0 | 0 | 0 | 0 |
| 122 | Livestock, Victoria | 0 | 0 | 0 | 0 | 0 | 0 |
| 123 | Livestock, Wilson | 0 | 0 | 0 | 0 | 0 | 0 |
| 124 | Livestock, Zavala | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | Lockhart | 0 | 0 | 99 | 369 | 639 | 908 |
| 126 | Loma Alta Chula Vista Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| 127 | Luling | 0 | 0 | 0 | 0 | 0 | 0 |
| 128 | Lytle | 223 | 266 | 309 | 349 | 395 | 447 |
| 129 | Manufacturing, Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| 130 | Manufacturing, Bexar | 16 | 338 | 673 | 1,020 | 1,381 | 1,755 |
| 131 | Manufacturing, Caldwell | 9 | 10 | 11 | 12 | 13 | 14 |
| 132 | Manufacturing, Calhoun | 0 | 28 | 1,981 | 4,153 | 6,405 | 8,741 |
| 133 | Manufacturing, Comal | 0 | 0 | 0 | 0 | 0 | 0 |

| No. | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| 134 | Manufacturing, DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| 135 | Manufacturing, Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| 136 | Manufacturing, Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| 137 | Manufacturing, Hays [1] | 0 | 0 | 0 | 0 | 0 | 0 |
| 138 | Manufacturing, Karnes | 0 | 0 | 0 | 0 | 0 | 0 |
| 139 | Manufacturing, Kendall | 43 | 45 | 47 | 49 | 51 | 53 |
| 140 | Manufacturing, Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| 141 | Manufacturing, Victoria | 38,960 | 40,419 | 41,932 | 43,501 | 45,128 | 46,815 |
| 142 | Manufacturing, Wilson | 5 | 7 | 9 | 11 | 14 | 17 |
| 143 | Manufacturing, Zavala | 732 | 759 | 787 | 816 | 846 | 877 |
| 144 | Marion | 0 | 0 | 0 | 0 | 0 | 0 |
| 145 | Martindale WSC | 0 | 134 | 199 | 269 | 347 | 434 |
| 146 | Maxwell SUD | 0 | 0 | 224 | 1,473 | 3,152 | 3,838 |
| 147 | McCoy WSC [1] | 0 | 0 | 0 | 48 | 111 | 185 |
| 148 | Medina County WCID 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 149 | Medina River West WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 150 | Mining, Atascosa | 3,300 | 3,613 | 3,919 | 4,208 | 4,478 | 0 |
| 151 | Mining, Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| 152 | Mining, Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| 153 | Mining, Comal | 2,967 | 5,084 | 7,218 | 9,340 | 11,386 | 13,268 |
| 154 | Mining, DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| 155 | Mining, Dimmit | 5,451 | 5,451 | 5,451 | 5,451 | 5,451 | 0 |
| 156 | Mining, Frio | 4,034 | 4,035 | 4,035 | 4,036 | 4,036 | 0 |
| 157 | Mining, Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| 158 | Mining, Gonzales | 3,631 | 3,664 | 3,702 | 3,740 | 3,779 | 0 |
| 159 | Mining, Guadalupe | 428 | 428 | 428 | 428 | 428 | 0 |
| 160 | Mining, Hays [1] | 0 | 0 | 0 | 0 | 0 | 0 |
| 161 | Mining, Karnes | 1,440 | 1,440 | 1,440 | 1,440 | 1,440 | 0 |
| 162 | Mining, La Salle | 4,867 | 4,867 | 4,867 | 4,867 | 4,867 | 0 |
| 163 | Mining, Medina | 3,042 | 3,436 | 3,783 | 4,098 | 4,375 | 4,604 |
| 164 | Mining, Uvalde | 1,609 | 1,828 | 2,055 | 2,271 | 2,479 | 2,676 |
| 165 | Mining, Victoria | 338 | 357 | 374 | 387 | 399 | 408 |
| 166 | Mining, Wilson | 0 | 0 | 0 | 0 | 0 | 0 |
| 167 | Mining, Zavala | 3,664 | 3,664 | 3,664 | 3,664 | 3,664 | 0 |
| 168 | Moore WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 169 | Natalia | 4 | 0 | 7 | 12 | 13 | 8 |

| No. | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| 170 | New Braunfels | 0 | 9,440 | 24,620 | 43,069 | 64,186 | 88,362 |
| 171 | Nixon | 0 | 0 | 0 | 0 | 0 | 0 |
| 172 | Oak Hills WSC | 531 | 678 | 854 | 1,058 | 1,294 | 1,568 |
| 173 | Pearsall | 250 | 483 | 649 | 677 | 709 | 745 |
| 174 | Picosa WSC | 24 | 72 | 122 | 165 | 215 | 273 |
| 175 | Pleasanton | 0 | 0 | 0 | 0 | 0 | 0 |
| 176 | Point Comfort | 0 | 0 | 0 | 0 | 0 | 0 |
| 177 | Polonia WSC [1] | 0 | 0 | 0 | 0 | 0 | 0 |
| 178 | Port Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| 179 | Port Oconnor Improvement District | 0 | 0 | 0 | 0 | 0 | 0 |
| 180 | Poteet | 0 | 0 | 0 | 0 | 0 | 0 |
| 181 | Poth | 0 | 0 | 0 | 0 | 0 | 0 |
| 182 | Quail Creek MUD | 0 | 0 | 0 | 0 | 0 | 0 |
| 183 | Randolph Air Force Base | 0 | 0 | 0 | 0 | 0 | 0 |
| 184 | Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| 185 | Runge | 0 | 0 | 0 | 0 | 0 | 7 |
| 186 | S S WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 187 | Sabinal | 0 | 0 | 0 | 0 | 0 | 0 |
| 188 | San Antonio Water System | 0 | 0 | 29 | 12,590 | 23,709 | 40,390 |
| 189 | San Marcos | 90 | 3,560 | 8,428 | 12,023 | 14,166 | 15,788 |
| 190 | Schertz | 0 | 1,526 | 3,351 | 5,178 | 7,272 | 9,676 |
| 191 | Seadrift | 0 | 0 | 0 | 0 | 0 | 0 |
| 192 | Seguin | 0 | 0 | 0 | 0 | 0 | 234 |
| 193 | Selma | 863 | 1,418 | 1,958 | 2,454 | 3,024 | 3,680 |
| 194 | Shavano Park | 48 | 121 | 186 | 245 | 312 | 389 |
| 195 | Smiley | 0 | 0 | 0 | 0 | 0 | 0 |
| 196 | South Buda WCID 1 | 0 | 169 | 689 | 1,392 | 2,197 | 3,119 |
| 197 | Springs Hill WSC | 26 | 1,965 | 3,085 | 4,262 | 5,598 | 7,115 |
| 198 | Steam-Electric Power, Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| 199 | Steam-Electric Power, Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | Steam-Electric Power, Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| 201 | Steam-Electric Power, Frio | 0 | 0 | 0 | 0 | 0 | 0 |

| No. | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| 202 | Steam-Electric Power, Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| 203 | Steam-Electric Power, Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| 204 | Steam-Electric Power, Hays | 0 | 0 | 0 | 0 | 0 | 0 |
| 205 | Steam-Electric Power, Victoria | 666 | 666 | 666 | 666 | 666 | 666 |
| 206 | Stockdale | 0 | 0 | 0 | 0 | 0 | 0 |
| 207 | Sunko WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 208 | Texas State University | 619 | 613 | 613 | 613 | 613 | 613 |
| 209 | The Oaks WSC | 47 | 75 | 100 | 123 | 149 | 178 |
| 210 | Three Oaks WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 211 | Tri Community WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 212 | Universal City | 0 | 0 | 0 | 0 | 0 | 0 |
| 213 | Uvalde | 717 | 635 | 530 | 411 | 288 | 164 |
| 214 | Victoria | 8,249 | 8,455 | 8,510 | 8,435 | 8,350 | 8,251 |
| 215 | Victoria County WCID 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 216 | Ville Dalsace Water Supply | 82 | 92 | 99 | 103 | 107 | 113 |
| 217 | Waelder | 0 | 0 | 0 | 0 | 0 | 0 |
| 218 | Water Services | 0 | 0 | 0 | 0 | 0 | 0 |
| 219 | West Medina WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 220 | Wimberley WSC | 0 | 95 | 439 | 907 | 1,443 | 2,056 |
| 221 | Windmill WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 222 | Wingert Water Systems | 71 | 111 | 165 | 175 | 175 | 175 |
| 223 | Woodsboro | 0 | 0 | 0 | 0 | 0 | 0 |
| 224 | Yancey WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| 225 | Yoakum [1] | 0 | 0 | 0 | 0 | 0 | 0 |
| 226 | Yorktown | 0 | 0 | 0 | 0 | 0 | 0 |
| 227 | Zavala County WCID 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **All** | **Total** | **185,132** | **220,771** | **269,912** | **350,184** | **437,491** | **513,712** |

[1] WUG is split between Region L and one or more regions. Values shown in table represent only the Region L portion.

### 4.2.2 Counties

Identified water needs for the SCTRWPA are summarized by county on Figure 4-2 and in Table 4-3.

The municipal needs distribution is heavily concentrated in Comal, Bexar, Hays, and Guadalupe Counties. As discussed in Chapter 2, these four counties are high population growth areas along the IH-35 corridor. The existing supplies that utilities currently have access to are not sufficient to keep up with the projected growth, hence the large, anticipated future needs. Victoria County also exhibits significant needs; however, most of the needs are for the manufacturing sector, and they do not increase as significantly from 2030-2080 as the municipal needs.

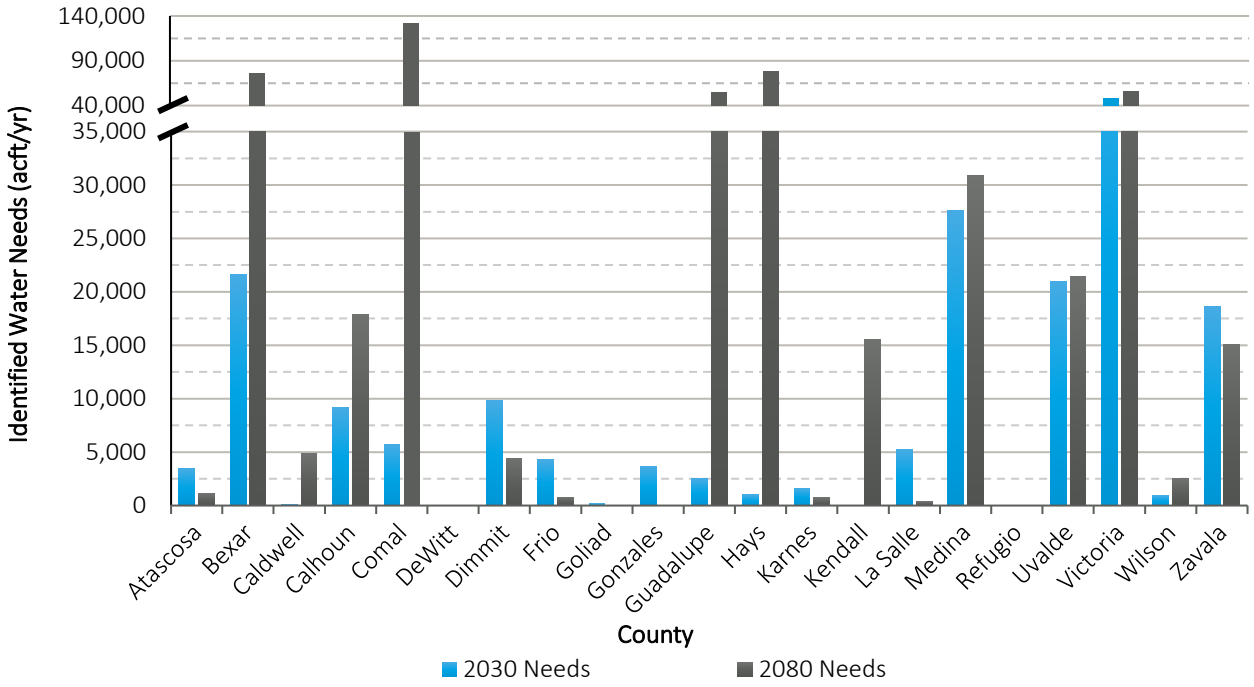



**Figure 4-2 Identified Water Needs by County**

**Table 4-3 Identified Water Needs for Individual Counties (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 3,469 | 3,831 | 4,330 | 4,824 | 5,327 | 1,130 |
| Bexar | 21,586 | 24,580 | 27,146 | 41,827 | 55,731 | 75,795 |
| Caldwell | 117 | 240 | 469 | 1,526 | 3,343 | 4,896 |
| Calhoun | 9,173 | 9,201 | 11,154 | 13,326 | 15,578 | 17,914 |
| Comal | 5,701 | 17,545 | 37,087 | 64,276 | 96,196 | 132,638 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 9,787 | 9,787 | 9,787 | 9,799 | 9,831 | 4,403 |
| Frio | 4,284 | 4,520 | 4,703 | 4,741 | 4,782 | 792 |
| Goliad | 184 | 36 | 0 | 0 | 0 | 0 |
| Gonzales | 3,631 | 3,664 | 3,702 | 3,740 | 3,779 | 0 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Guadalupe | 2,530 | 12,081 | 20,006 | 29,369 | 40,566 | 54,863 |
| Hays (part)* | 1,001 | 8,122 | 18,397 | 37,479 | 56,466 | 78,116 |
| Karnes | 1,625 | 1,625 | 2,184 | 2,184 | 2,184 | 751 |
| Kendall | 43 | 898 | 3,651 | 7,069 | 10,959 | 15,497 |
| La Salle | 5,280 | 5,280 | 5,280 | 5,280 | 5,280 | 413 |
| Medina | 27,593 | 28,093 | 28,715 | 29,523 | 30,251 | 30,882 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 20,951 | 21,088 | 21,210 | 21,307 | 21,392 | 21,465 |
| Victoria | 48,630 | 50,374 | 51,979 | 53,476 | 55,020 | 56,605 |
| Wilson | 962 | 1,194 | 1,472 | 1,769 | 2,107 | 2,486 |
| Zavala | 18,585 | 18,612 | 18,640 | 18,669 | 18,699 | 15,066 |
| **Total** | **185,132** | **220,771** | **269,912** | **350,184** | **437,491** | **513,712** |
| * Hays County is split between Region K and Region L; needs shown above are for Region L. | | | | | | |

### 4.2.3 Use Types

Water needs are identified and categorized by use type, which includes irrigation, livestock, manufacturing, mining, municipal, and steam-electric power generation. Identified water needs for the SCTRWPA are summarized by use type on Figure 4-3 and in Table 4-4. Table 4-5 summarizes the secondary water needs for individual use types.

In all decades, municipal and irrigation needs make up the majority of identified water needs in the SCTRWPA. In 2030 and 2040, irrigation has the highest needs of the use types; however, by 2050, municipal needs are expected to overtake irrigation and increase through the end of the planning horizon. Like water demand projections in Chapter 2, the municipal and manufacturing needs are expected to increase over the planning horizon; whereas needs for the irrigation, livestock, and steam-electric power sectors are expected to remain steady from 2030 to 2080. The livestock sector is anticipated to have minimal needs of 12 acft/yr, localized to Hays County. The mining sector is expected to experience a gradual increase in needs between 2030 and 2070 before declining sharply in 2080.

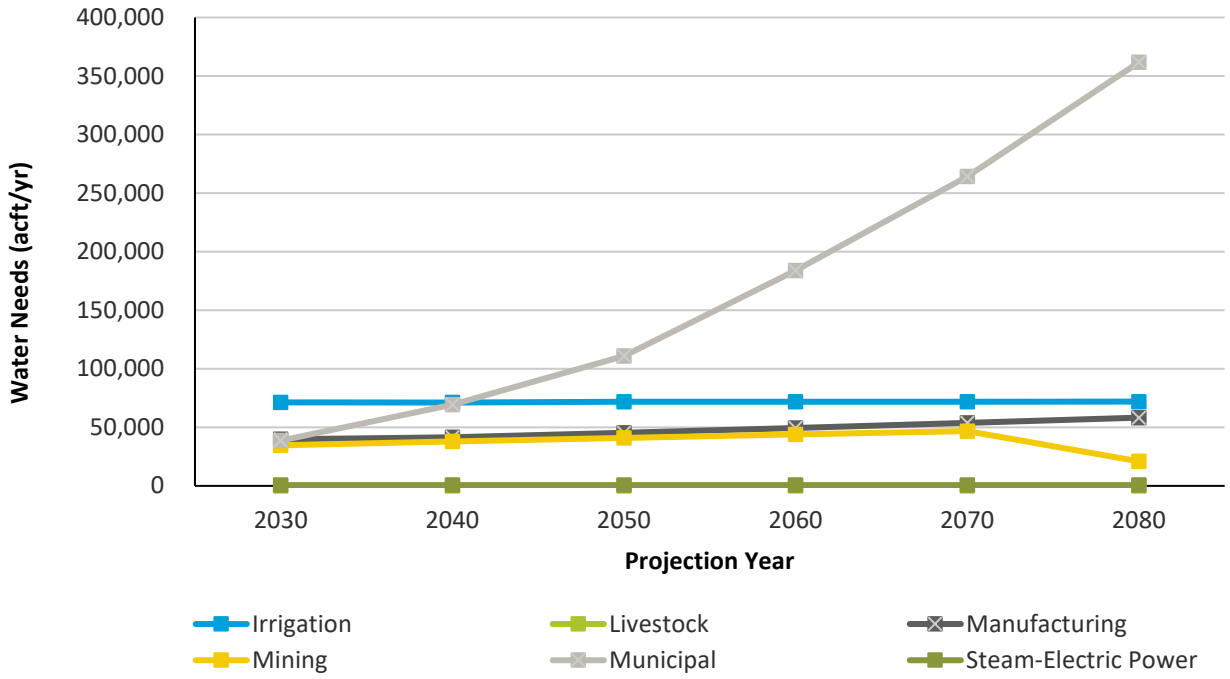



**Figure 4-3 Identified Water Needs by Use Type**

**Table 4-4 Identified Water Needs for Individual Use Types (acft/yr)**

| Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation | 71,258 | 71,187 | 71,793 | 71,862 | 71,927 | 71,979 |
| Livestock | 12 | 12 | 12 | 12 | 12 | 12 |
| Manufacturing | 39,765 | 41,606 | 45,440 | 49,562 | 53,838 | 58,272 |
| Mining | 34,771 | 37,867 | 40,936 | 43,930 | 46,782 | 20,956 |
| Municipal | 38,660 | 69,433 | 111,065 | 184,152 | 264,266 | 361,827 |
| Steam-Electric Power | 666 | 666 | 666 | 666 | 666 | 666 |
| **Total** | **185,132** | **220,771** | **269,912** | **350,184** | **437,491** | **513,712** |

**Table 4-5 Second-Tier Water Needs for Individual Use Types (acft/yr)**

| Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation | 71,258 | 71,187 | 71,793 | 71,862 | 71,927 | 71,979 |
| Livestock | 12 | 12 | 12 | 12 | 12 | 12 |
| Manufacturing | 39,765 | 41,606 | 45,440 | 49,562 | 53,838 | 58,272 |
| Mining | 34,771 | 37,867 | 40,936 | 43,930 | 46,782 | 20,956 |
| Municipal | 29,391 | 39,272 | 47,716 | 76,023 | 118,224 | 166,401 |

| Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Steam-Electric Power | 666 | 666 | 666 | 666 | 666 | 666 |
| **Total** | **175,863** | **190,610** | **206,563** | **242,055** | **291,449** | **318,286** |

Figure 4-4 demonstrates the proportion of sector-specific water needs to the total water needs in the SCTRWPA. In 2030, the municipal sector will constitute 21 percent (%) of the total region's needs but by 2080, it will rise to 70% of the total needs in the SCTRWPA. Needs for industrial uses in the manufacturing, mining, and steam-electric power sectors represent a combined 40% of the total needs in 2030. Despite increased needs for manufacturing and unchanged needs for mining and steam-electric power uses, the proportion of industrial needs to total water needs in the SCTRWPA declines to 15% by 2080 because of the significant increases in municipal needs.

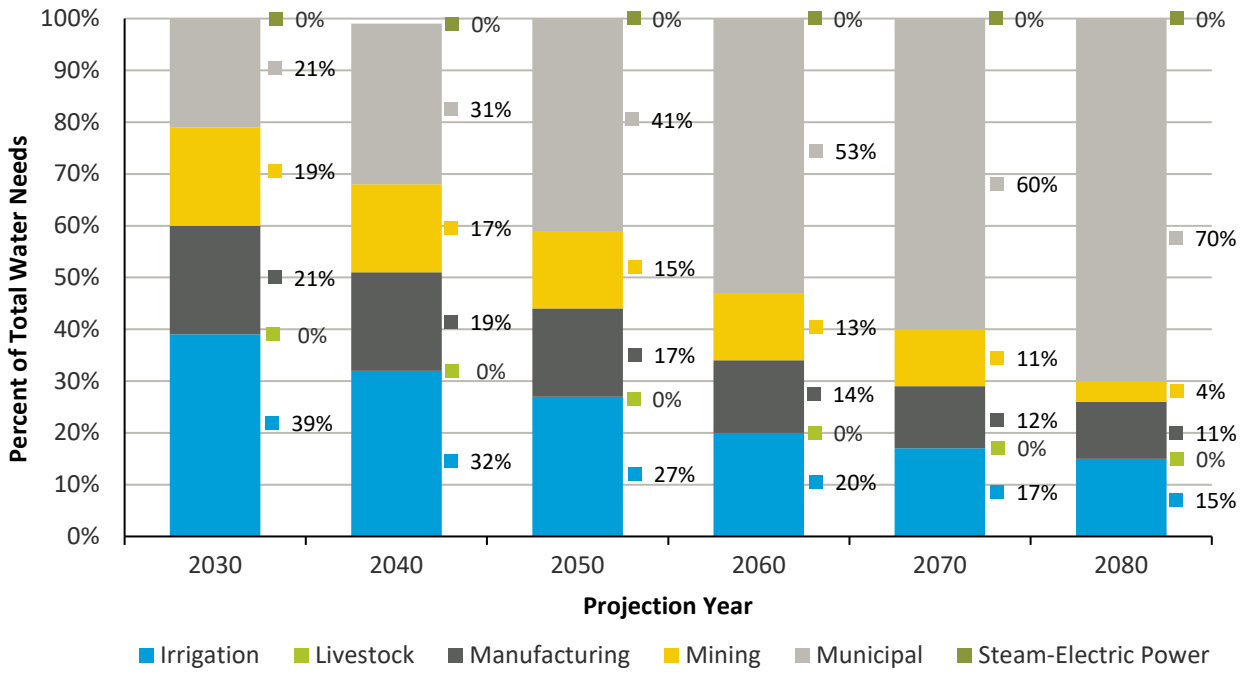



**Figure 4-4 Proportion of Total Needs by Use Type**

The following sections provide additional information regarding the needs by use type.

### 4.2.3.1 Irrigation

Irrigation is the second largest water use type in Region L, behind municipal, and has the largest need in 2030. The volume of irrigation needs remains relatively unchanged over the planning horizon, ranging between 71,258 acft/yr in 2040 and 71,979 acft/yr in 2080. These needs represent the extent of water shortages anticipated by farmers in years of limited supply. The portion of irrigation demands that is met and the resulting needs are shown on Figure 4-5. Water conservation and drought management WMSs may alleviate some of the impacts of drought on productivity for farmers. Recommended WMSs are discussed in detail in Chapter 5.

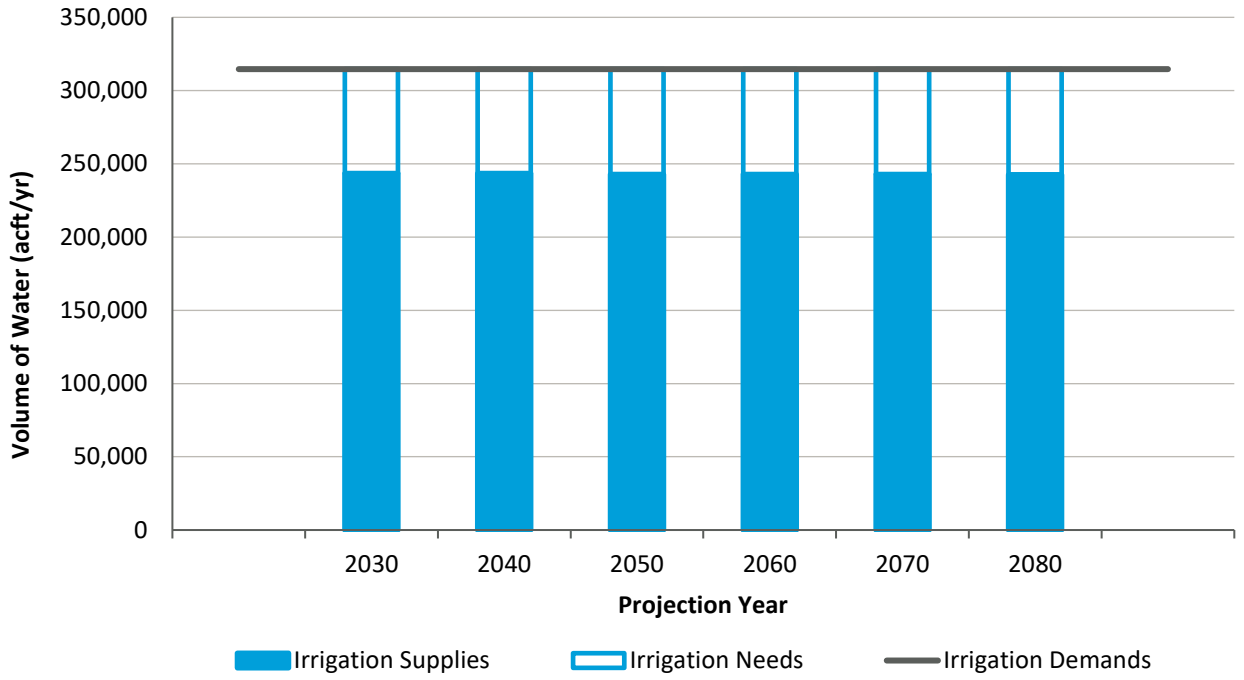



**Figure 4-5 Irrigation Needs, Shown as a Portion of Irrigation Demands**

Table 4-6 provides the irrigation needs for individual counties in the SCTRWPA. Of the 21 counties in Region L, there are 11 counties with identified needs between 2030 and 2040, and 10 counties with needs between 2050 and 2080. Counties with the greatest irrigation needs are Medina, Uvalde, Zavala, Calhoun, and Dimmit Counties. Although Chapter 2 showed Frio County having the greatest irrigation demands, there are no needs for Frio County because all the demands are met by supplies.

Irrigation needs are summarized by river and coastal basin in Table 4-7. Figure 4-6 demonstrates the proportion of irrigation needs in 2080 by river and coastal basin. In 2080, most of the irrigation needs are in the Nueces River Basin (83%) and in the Lavaca-Guadalupe Coastal Basin (13%).

**Table 4-6 Irrigation Needs for Individual Counties (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| Calhoun | 9,173 | 9,173 | 9,173 | 9,173 | 9,173 | 9,173 |
| Comal | 0 | 0 | 0 | 0 | 0 | 0 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 4,336 | 4,336 | 4,336 | 4,336 | 4,336 | 4,336 |
| Frio | 0 | 0 | 0 | 0 | 0 | 0 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Goliad | 184 | 36 | 0 | 0 | 0 | 0 |
| Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 20 | 20 | 20 | 20 | 20 | 20 |
| Hays (part)* | 0 | 0 | 0 | 0 | 0 | 0 |
| Karnes | 185 | 185 | 744 | 744 | 744 | 744 |
| Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| La Salle | 413 | 413 | 413 | 413 | 413 | 413 |
| Medina | 23,602 | 23,679 | 23,762 | 23,831 | 23,896 | 23,948 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 18,625 | 18,625 | 18,625 | 18,625 | 18,625 | 18,625 |
| Victoria | 200 | 200 | 200 | 200 | 200 | 200 |
| Wilson | 331 | 331 | 331 | 331 | 331 | 331 |
| Zavala | 14,189 | 14,189 | 14,189 | 14,189 | 14,189 | 14,189 |
| **Total** | **71,258** | **71,187** | **71,793** | **71,862** | **71,927** | **71,979** |
| * Hays County is split between Region K and Region L; needs shown above are for Region L. | | | | | | |

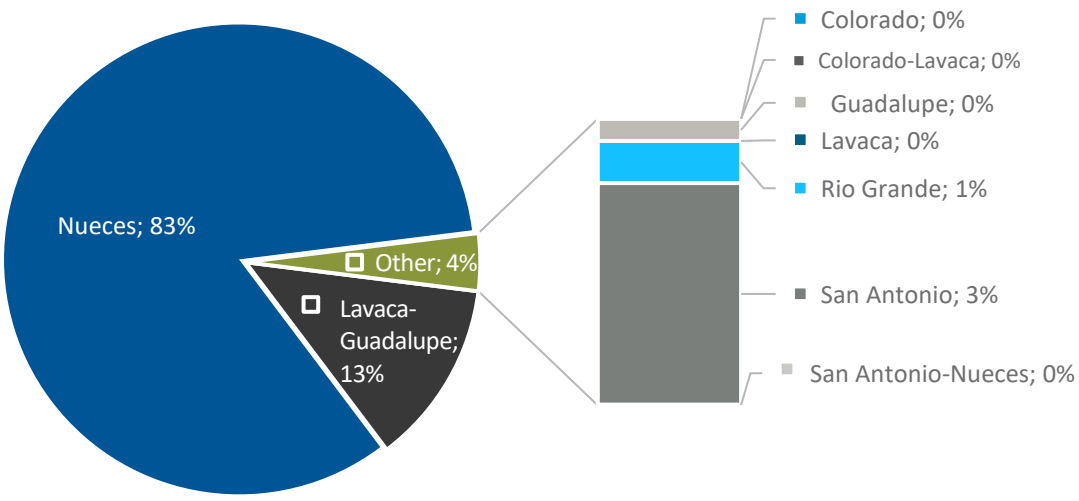



**Figure 4-6 Irrigation Needs in 2080 by River and Coastal Basin**

**Table 4-7 Irrigation Needs for Individual Basins (acft/yr)**

| Basin | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Colorado | 0 | 0 | 0 | 0 | 0 | 0 |
| Colorado-Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 220 | 220 | 220 | 220 | 220 | 220 |
| Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Lavaca-Guadalupe | 9,173 | 9,173 | 9,173 | 9,173 | 9,173 | 9,173 |
| Nueces | 59,608 | 59,685 | 59,768 | 59,837 | 59,902 | 59,954 |
| Rio Grande | 419 | 419 | 419 | 419 | 419 | 419 |
| San Antonio | 1,831 | 1,683 | 2,206 | 2,206 | 2,206 | 2,206 |
| San Antonio-Nueces | 7 | 7 | 7 | 7 | 7 | 7 |
| **Total** | **71,258** | **71,187** | **71,793** | **71,862** | **71,927** | **71,979** |

### 4.2.3.2 Livestock

Livestock demands are met by numerous groundwater wells, ephemeral streams, and ponds, as well as surface water diversions, often classified together with lawn watering contracts or referred to here as Livestock Local Supplies. In particular areas, there may be some difficulty providing sufficient water in a drought year, but overall ranchers are expected to manage their livestock within the available supplies.

The livestock sector is anticipated to have minimal needs of 12 acft/yr between 2030 and 2080. The portion of livestock demands that is met and the resulting needs are shown on Figure 4-7.

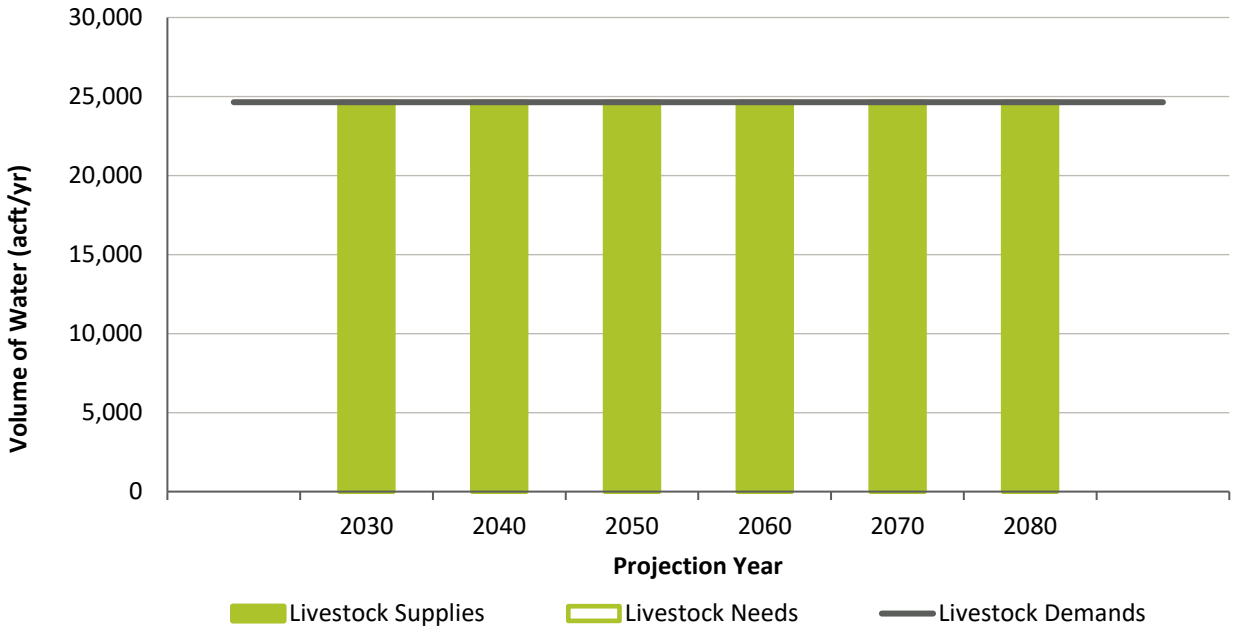



**Figure 4-7 Livestock Needs, Shown as a Portion of Livestock Demands**

Table 4-8 provides the livestock needs for individual counties in the SCTRWPA. Of the 21 counties in Region L, only Hays County has identified water needs over the planning horizon.

The Texas Parks and Wildlife Department (TPWD) owns and operates the A.E. Wood State Fish Hatchery, which accounts for the majority of livestock demands in Hays County, estimated at 2,432 acft/yr. During typical years, the hatchery relies on surface water from the Guadalupe River and recycled water from their facility. However, water availability modeling for the 2026 Plan indicates that the hatchery's Guadalupe Run-of-River water rights do not have a firm yield during a repeat of the drought of record. During periods of drought, the TPWD would rely on their recycled water or reuse supplies, which would provide 2,420 acft/yr, resulting in a need of 12 acft/yr. This recycled water supply would allow the hatchery to maintain broodstock that are critical to production; however, it will not enable the hatchery to sustain full operating capacity during severe drought. To address the 12 acft/yr of needs for Hays County Livestock, a drought management WMS is included in Chapter 5.

**Table 4-8 Livestock Needs for Individual Counties (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| Comal | 0 | 0 | 0 | 0 | 0 | 0 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 0 | 0 | 0 | 0 | 0 | 0 |
| Frio | 0 | 0 | 0 | 0 | 0 | 0 |
| Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Hays (part)* | 12 | 12 | 12 | 12 | 12 | 12 |
| Karnes | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| La Salle | 0 | 0 | 0 | 0 | 0 | 0 |
| Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 0 | 0 | 0 | 0 | 0 | 0 |
| Victoria | 0 | 0 | 0 | 0 | 0 | 0 |
| Wilson | 0 | 0 | 0 | 0 | 0 | 0 |
| Zavala | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **12** | **12** | **12** | **12** | **12** | **12** |

* Hays County is split between Region K and Region L; needs shown above are for Region L.

#### 4.2.3.3 Manufacturing

Water demand associated with manufacturing is met by both groundwater and surface water and comprises a relatively small portion of the regional demand and need. Current supplies meet about 64% of 2030 projected manufacturing demands. The need likely results in part due to the fact that manufacturing demands are projected out to 2030 from their baseline date of 2019, assuming that growth in the various manufacturing sectors is similar to historical rates. In addition, Victoria County Manufacturing has a large need of almost 40,000 acft/yr due to the fact that during a drought of record, their run-of-river water right is not firm.

The manufacturing sector is anticipated to have needs of 39,765 acft/yr in 2030, increasing gradually to 58,272 acft/yr in 2080. The portion of manufacturing demands that is met and the resulting needs are shown on Figure 4-8.

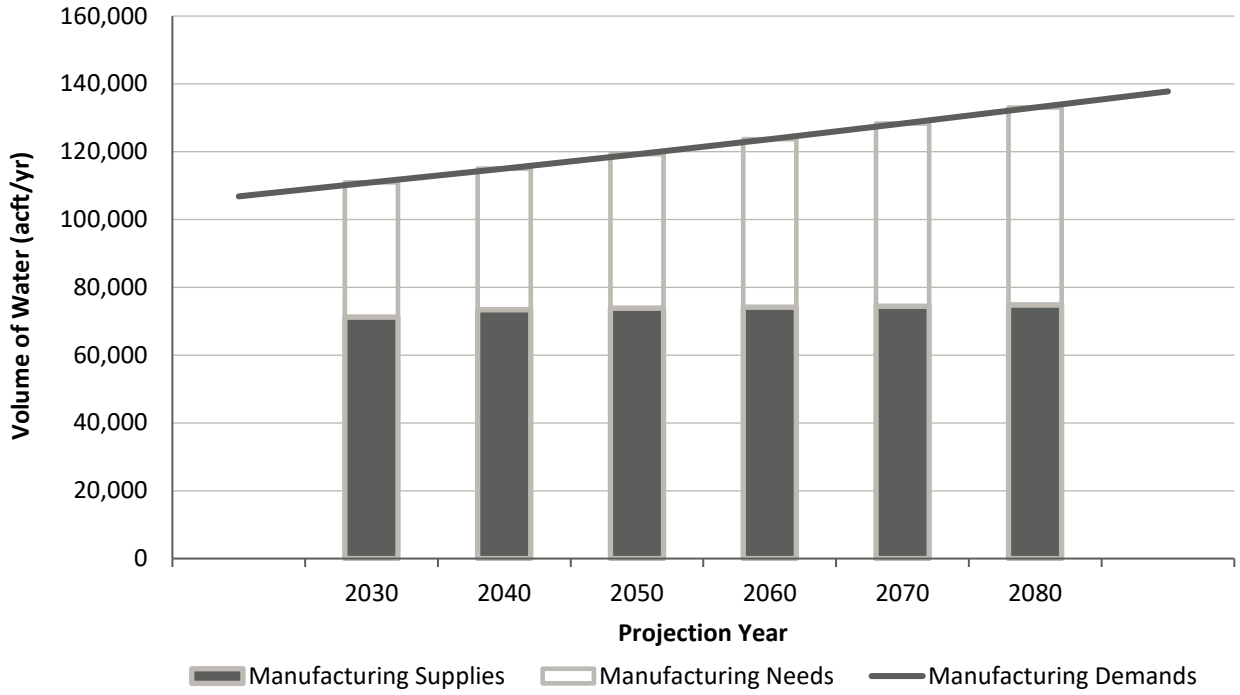



**Figure 4-8 Manufacturing Needs, Shown as a Portion of Manufacturing Demands**

Table 4-9 provides the manufacturing needs for individual counties in the SCTRWPA. Of the 21 counties in Region L, seven counties have manufacturing water needs over the planning horizon. Needs in the manufacturing water use category will likely require implementation of WMSs, such as increased conservation and water efficiency strategies, new or expanded use of reclaimed water, new or expanded use of groundwater, or a combination of strategies. Because most of the reuse availability is derived from domestic wastewater treatment facilities, increased cooperation with wastewater permittees, such as municipalities and utilities, will likely be necessary. Recommended WMSs are discussed in detail in Chapter 5.

**Table 4-9 Manufacturing Needs for Individual Counties (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| Bexar | 16 | 338 | 673 | 1,020 | 1,381 | 1,755 |
| Caldwell | 9 | 10 | 11 | 12 | 13 | 14 |
| Calhoun | 0 | 28 | 1,981 | 4,153 | 6,405 | 8,741 |
| Comal | 0 | 0 | 0 | 0 | 0 | 0 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 0 | 0 | 0 | 0 | 0 | 0 |
| Frio | 0 | 0 | 0 | 0 | 0 | 0 |
| Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Hays (part)* | 0 | 0 | 0 | 0 | 0 | 0 |
| Karnes | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall | 43 | 45 | 47 | 49 | 51 | 53 |
| La Salle | 0 | 0 | 0 | 0 | 0 | 0 |
| Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 0 | 0 | 0 | 0 | 0 | 0 |
| Victoria | 38,960 | 40,419 | 41,932 | 43,501 | 45,128 | 46,815 |
| Wilson | 5 | 7 | 9 | 11 | 14 | 17 |
| Zavala | 732 | 759 | 787 | 816 | 846 | 877 |
| **Total** | **39,765** | **41,606** | **45,440** | **49,562** | **53,838** | **58,272** |

* Hays County is split between Region K and Region L; needs shown above are for Region L.

### 4.2.3.4 Mining

Current mining supplies appear to meet about 52% of the 2030 mining demands. Because of reporting limitations, there may be additional mining supplies from groundwater that would exceed the MAG values for some aquifer/county/river basin areas. The mining sector is anticipated to have demands and needs that increase through the 2070 decade, and then decrease sharply in 2080 due to reductions in hydraulic fracturing uses. The remaining needs in 2080 are from aggregate mining. Aggregate mining tends to occur near the higher population growth areas to bring materials for home building and manufacturing. The portion of mining demands that is met and the resulting needs are shown on Figure 4-9.

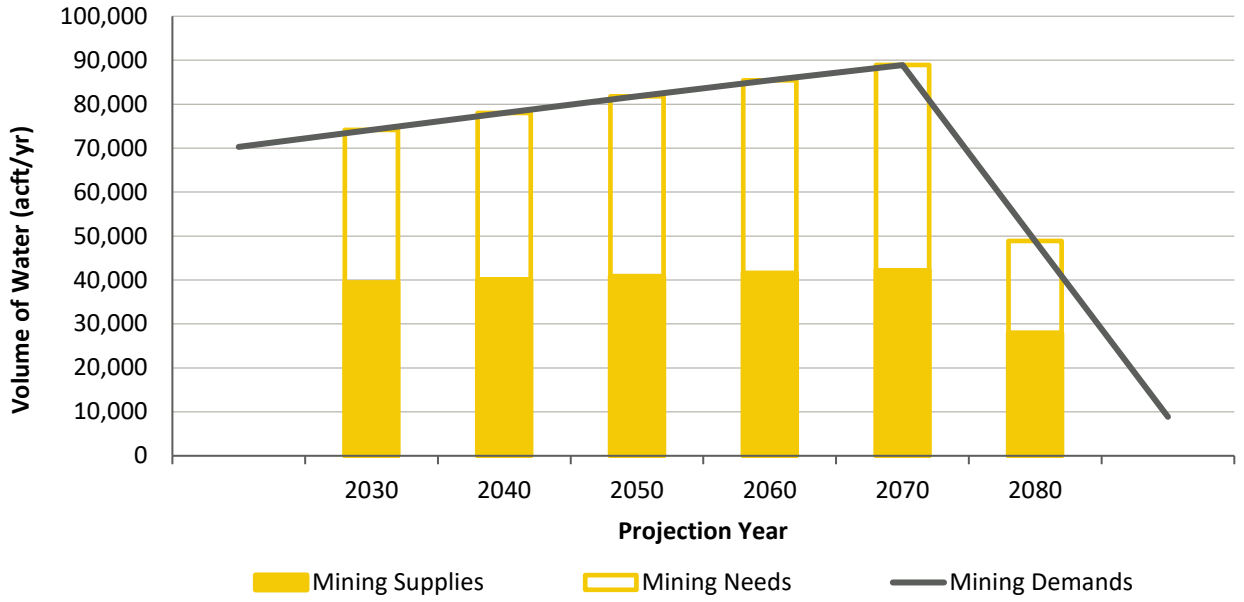



**Figure 4-9 Mining Needs, Shown as a Portion of Mining Demands**

Table 4-10 provides the mining needs for individual counties in the SCTRWPA. Of the 21 counties in Region L, 12 have mining needs between 2030 and 2070. The largest 2030 need is 5,451 acft/yr in Dimmit County. In 2080, there are only four counties with mining needs, including Comal, Medina, Uvalde, and Victoria Counties. The largest 2080 need is 13,268 acft/yr in Comal County.

Needs in the mining sector will likely require implementation of WMSs, such as increased conservation and water efficiency strategies, new or expanded use of reclaimed water, new or expanded use of groundwater, or a combination of strategies. Because most of the reuse availability is derived from domestic wastewater treatment facilities, increased cooperation with wastewater permittees, such as municipalities and utilities, will likely be necessary. Recommended WMSs are discussed in detail in Chapter 5.

**Table 4-10 Mining Needs for Individual Counties (acft/yr))**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 3,300 | 3,613 | 3,919 | 4,208 | 4,478 | 0 |
| Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| Comal | 2,967 | 5,084 | 7,218 | 9,340 | 11,386 | 13,268 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 5,451 | 5,451 | 5,451 | 5,451 | 5,451 | 0 |
| Frio | 4,034 | 4,035 | 4,035 | 4,036 | 4,036 | 0 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales | 3,631 | 3,664 | 3,702 | 3,740 | 3,779 | 0 |
| Guadalupe | 428 | 428 | 428 | 428 | 428 | 0 |
| Hays (part)* | 0 | 0 | 0 | 0 | 0 | 0 |
| Karnes | 1,440 | 1,440 | 1,440 | 1,440 | 1,440 | 0 |
| Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| La Salle | 4,867 | 4,867 | 4,867 | 4,867 | 4,867 | 0 |
| Medina | 3,042 | 3,436 | 3,783 | 4,098 | 4,375 | 4,604 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 1,609 | 1,828 | 2,055 | 2,271 | 2,479 | 2,676 |
| Victoria | 338 | 357 | 374 | 387 | 399 | 408 |
| Wilson | 0 | 0 | 0 | 0 | 0 | 0 |
| Zavala | 3,664 | 3,664 | 3,664 | 3,664 | 3,664 | 0 |
| **Total** | **34,771** | **37,867** | **40,936** | **43,930** | **46,782** | **20,956** |
| * Hays County is split between Region K and Region L; needs shown above are for Region L. | | | | | | |

#### 4.2.3.5 Municipal

As discussed in Chapter 2, the municipal water demands in the SCTRWPA are expected to increase by 80% over the planning horizon from 530,751 acft/yr in 2030 to 956,362 acft/yr in 2080. Similarly, municipal needs are also projected to rise considerably from 38,660 acft/yr in 2030 to 361,827 acft/yr in 2080, representing an 836% increase over the planning horizon. The portion of municipal demands that is met and the resulting needs are shown on Figure 4-10.

Municipal supplies are estimated to meet approximately 93% of the demands in 2030; however, by 2080, supplies will only meet 62% of the demands. In some cases, drought-year demands exceed normal supplies, and that need can be met by short-term contracts for water. Other municipalities may experience persistent shortage. While one-time purchases of water, are often used as a stopgap measure, this is not a reliable drought year supply strategy for a long-term, sustainable water supply. Chapter 5 recommends WMSs for demand management, expansion of reuse, and development of new sources of supply to address current and future needs of municipal WUGs and WWPs.

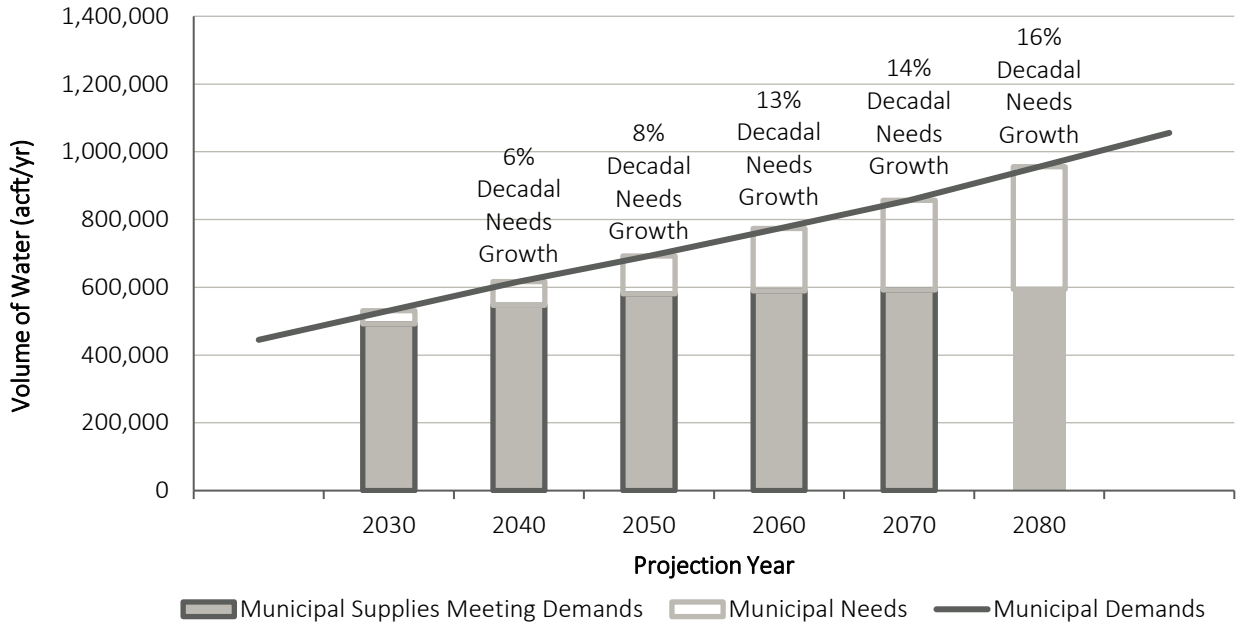



**Figure 4-10 Municipal Needs, Shown as a Portion of Municipal Demands**

Table 4-11 provides the municipal needs for individual counties in the SCTRWPA. Of the 21 counties in Region L, 14 counties are projected to have at least one WUG with a municipal need during the planning period. The need distribution is heavily concentrated along the IH-35 corridor, including Comal, Bexar, Hays, and Guadalupe Counties, although Victoria County has the second largest need in 2030.

**Table 4-11 Municipal Needs for Individual Counties (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 169 | 218 | 411 | 616 | 849 | 1,130 |
| Bexar | 21,570 | 24,242 | 26,473 | 40,807 | 54,350 | 74,040 |
| Caldwell | 108 | 230 | 458 | 1,514 | 3,330 | 4,882 |
| Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| Comal | 2,734 | 12,461 | 29,869 | 54,936 | 84,810 | 119,370 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 0 | 0 | 0 | 12 | 44 | 67 |
| Frio | 250 | 485 | 668 | 705 | 746 | 792 |
| Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 2,082 | 11,633 | 19,558 | 28,921 | 40,118 | 54,843 |
| Hays (part)* | 989 | 8,110 | 18,385 | 37,467 | 56,454 | 78,104 |

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Karnes | 0 | 0 | 0 | 0 | 0 | 7 |
| Kendall | 0 | 853 | 3,604 | 7,020 | 10,908 | 15,444 |
| La Salle | 0 | 0 | 0 | 0 | 0 | 0 |
| Medina | 949 | 978 | 1,170 | 1,594 | 1,980 | 2,330 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 717 | 635 | 530 | 411 | 288 | 164 |
| Victoria | 8,466 | 8,732 | 8,807 | 8,722 | 8,627 | 8,516 |
| Wilson | 626 | 856 | 1,132 | 1,427 | 1,762 | 2,138 |
| Zavala | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **38,660** | **69,433** | **111,065** | **184,152** | **264,266** | **361,827** |
| * Hays County is split between Region K and Region L; needs shown above are for Region L. | | | | | | |

### 4.2.3.6 Steam-Electric Power

Current supplies meet about 99% of the 2030 through 2080 steam-electric power demands. This stems, in part, from the anticipated limited near-term growth of power generation demands in the region and in part from increasingly efficient power generation in terms of consumptive water use. Steam-electric demands occur only in Atascosa, Bexar, Calhoun, Frio, Goliad, Guadalupe, Hays, and Victoria Counties. The portion of steam-electric power demands that is met and the resulting needs are shown on Figure 4-11.

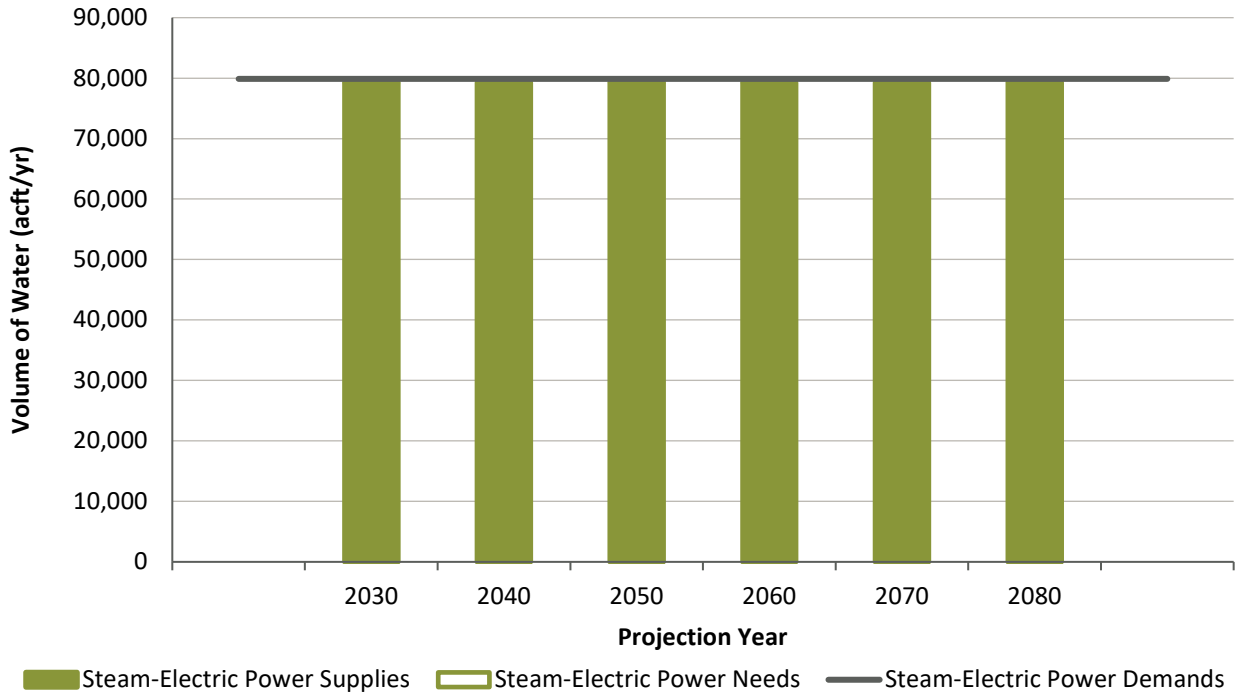


**Figure 4-11 Steam-Electric Power Needs, Shown as a Portion of Steam-Electric Power Demands**

Table 4-12 provides the steam-electric power needs for individual counties in the SCTRWPA. Of the 21 counties in Region L, only Victoria County has identified water needs over the planning horizon with 666 acft/yr of needs in each decade.

**Table 4-12 Steam-Electric Power Needs Projections for Individual Counties (acft/yr)**

| County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Atascosa | 0 | 0 | 0 | 0 | 0 | 0 |
| Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| Caldwell | 0 | 0 | 0 | 0 | 0 | 0 |
| Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| Comal | 0 | 0 | 0 | 0 | 0 | 0 |
| DeWitt | 0 | 0 | 0 | 0 | 0 | 0 |
| Dimmit | 0 | 0 | 0 | 0 | 0 | 0 |
| Frio | 0 | 0 | 0 | 0 | 0 | 0 |
| Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Hays (part)* | 0 | 0 | 0 | 0 | 0 | 0 |
| Karnes | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall | 0 | 0 | 0 | 0 | 0 | 0 |
| La Salle | 0 | 0 | 0 | 0 | 0 | 0 |
| Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 0 | 0 | 0 | 0 | 0 | 0 |
| Victoria | 666 | 666 | 666 | 666 | 666 | 666 |
| Wilson | 0 | 0 | 0 | 0 | 0 | 0 |
| Zavala | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **666** | **666** | **666** | **666** | **666** | **666** |

* Hays County is split between Region K and Region L; needs shown above are for Region L.

### 4.2.4 Major Water Providers

A MWP is defined as a WUG or WWP of particular significance to the region's water supply as determined by the RWPG. This may include public or private entities that provide water for any water use category. At the August 1, 2024, RWPG meeting, the South Central Texas Regional Water Planning Group (SCTRWPG) defined the following entities as MWPs for the sixth cycle of regional water planning:

- Canyon Lake Water Service (Texas Water Company);
- Guadalupe-Blanco River Authority (GBRA);
- New Braunfels;
- SAWS; and
- San Marcos.

Table 4-13 provides the identified water needs for MWPs. Needs are based on the MWP's supplies and WUG demands, if applicable, and the contract demands of customers. MWP supplies are based on what is available for use in terms of water availability and infrastructure capacity or treatment limitations. Water needs for MWPs are summarized by use type in Table 4-14. Second-tier major water provider needs are included in Appendix 4A.

**Table 4-13 Identified Needs for Major Water Providers (acft/yr)**

| Major Water Provider | Provider Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Canyon Lake Water Service (Texas Water Company) | WUG/WWP* | 0 | 239 | 2,923 | 4,663 | 11,183 | 18,379 |
| GBRA | WUG/WWP | 0 | 0 | 0 | 0 | 0 | 0 |
| New Braunfels | WUG/WWP | 0 | 9,440 | 24,620 | 43,069 | 64,186 | 88,362 |
| San Marcos | WUG/WWP | 90 | 3,560 | 8,428 | 12,023 | 14,166 | 15,788 |
| SAWS | WUG/WWP | 0 | 0 | 29 | 12,590 | 23,709 | 40,390 |
| *Canyon Lake Water Service (Texas Water Company) is split between Region K and Region L; needs shown above are for Region L only. | | | | | | | |

**Table 4-14 Needs for Major Water Providers by Use Type (acft/yr)**

| Major Water Provider | Need Type | Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| Canyon Lake Water Service (Texas Water Company) | WUG | Municipal | 0 | 239 | 2,923 | 4,663 | 11,183 | 18,379 |
| Canyon Lake Water Service (Texas Water Company) | Contract | Municipal | 0 | 0 | 0 | 0 | 0 | 0 |
| GBRA | WUG | Municipal | 0 | 0 | 0 | 0 | 0 | 0 |
| GBRA | Contract | Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| GBRA | Contract | Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| GBRA | Contract | Municipal | 0 | 0 | 0 | 0 | 0 | 0 |
| GBRA | Contract | Steam-Electric | 0 | 0 | 0 | 0 | 0 | 0 |
| GBRA | Contract | WWP | 0 | 0 | 0 | 0 | 0 | 0 |
| New Braunfels | WUG | Municipal | 0 | 9,440 | 24,620 | 43,069 | 64,186 | 88,362 |
| New Braunfels | Contract | Municipal | 0 | 0 | 0 | 0 | 0 | 0 |
| San Marcos | WUG | Municipal | 90 | 3,560 | 8,428 | 12,023 | 14,166 | 15,788 |
| San Marcos | Contract | -- | 0 | 0 | 0 | 0 | 0 | 0 |
| SAWS | WUG | Municipal | 0 | 0 | 29 | 12,590 | 23,709 | 40,390 |
| SAWS | Contract | Municipal | 0 | 0 | 0 | 0 | 0 | 0 |
| SAWS | Contract | Steam-Electric | 0 | 0 | 0 | 0 | 0 | 0 |

1. Canyon Lake Water Service (Texas Water Company) is split between Region K and Region L; water needs shown above are for Region L only. Contract demands are representative of contracts with entities in any region.
2. GBRA WUG demands and needs are all located within Region L; however, contract demands are representative of contracts with entities in any region.

# Appendix 4A: Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)

# Region L Water User Group (WUG) Needs or Surplus

WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Needs/Surplus report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Surplus volumes are shown as positive values, and needs are shown as negative values in parentheses.

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Benton City WSC | Atascosa | Nueces | 125 | (16) | (147) | (228) | (323) | (435) |
| Charlotte | Atascosa | Nueces | 890 | 909 | 921 | 916 | 911 | 906 |
| El Oso WSC* | Atascosa | Nueces | 7 | 5 | 3 | 0 | (3) | (6) |
| Jourdanton | Atascosa | Nueces | 1,220 | 1,165 | 1,102 | 1,040 | 969 | 889 |
| Lytle | Atascosa | Nueces | (165) | (195) | (225) | (254) | (289) | (329) |
| McCoy WSC* | Atascosa | Nueces | 93 | 57 | 8 | (46) | (105) | (174) |
| Pleasanton | Atascosa | Nueces | 2,368 | 2,139 | 1,881 | 1,601 | 1,296 | 963 |
| Poteet | Atascosa | Nueces | 480 | 515 | 540 | 533 | 527 | 521 |
| San Antonio Water System | Atascosa | Nueces | 108 | 32 | (10) | (45) | (71) | (110) |
| County-Other | Atascosa | Nueces | 288 | 252 | 219 | 279 | 323 | 360 |
| Manufacturing | Atascosa | Nueces | 18 | 16 | 14 | 12 | 10 | 8 |
| Mining | Atascosa | Nueces | (3,300) | (3,613) | (3,919) | (4,208) | (4,478) | 458 |
| Steam Electric Power | Atascosa | Nueces | 465 | 465 | 465 | 465 | 465 | 465 |
| Livestock | Atascosa | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Atascosa | Nueces | 182 | 182 | 182 | 182 | 182 | 182 |
| Benton City WSC | Atascosa | San Antonio | 20 | (2) | (23) | (36) | (51) | (68) |
| Lytle | Atascosa | San Antonio | (4) | (5) | (6) | (7) | (7) | (8) |
| San Antonio Water System | Atascosa | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | Atascosa | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | Atascosa | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Atascosa | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Atascosa Rural WSC | Bexar | Nueces | (75) | (92) | (107) | (120) | (135) | (153) |
| Lytle | Bexar | Nueces | (15) | (19) | (23) | (27) | (31) | (36) |
| San Antonio Water System | Bexar | Nueces | 161 | 54 | (19) | (75) | (119) | (186) |
| County-Other | Bexar | Nueces | 564 | 545 | 540 | 535 | 533 | 538 |
| Manufacturing | Bexar | Nueces | 3,935 | 3,929 | 3,924 | 3,918 | 3,913 | 3,907 |
| Livestock | Bexar | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Bexar | Nueces | 5,341 | 5,341 | 5,341 | 5,341 | 5,341 | 5,341 |
| Air Force Village II Inc | Bexar | San Antonio | 130 | 130 | 130 | 130 | 130 | 130 |
| Alamo Heights | Bexar | San Antonio | (488) | (483) | (483) | (483) | (483) | (483) |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Atascosa Rural WSC | Bexar | San Antonio | (1,126) | (1,372) | (1,599) | (1,797) | (2,024) | (2,283) |
| Bexar County WCID 10 | Bexar | San Antonio | (377) | (541) | (691) | (825) | (978) | (1,154) |
| Converse | Bexar | San Antonio | (552) | (538) | (538) | (538) | (538) | (538) |
| East Central SUD | Bexar | San Antonio | (3,045) | (3,842) | (4,570) | (5,222) | (5,960) | (6,811) |
| Elmendorf | Bexar | San Antonio | 751 | 562 | 306 | (40) | (373) | (1,016) |
| Fair Oaks Ranch | Bexar | San Antonio | 94 | (166) | (285) | (331) | (342) | (342) |
| Fort Sam Houston | Bexar | San Antonio | (14,151) | (14,142) | (14,142) | (14,142) | (14,142) | (14,142) |
| Green Valley SUD | Bexar | San Antonio | 282 | 197 | 117 | 48 | (20) | (81) |
| Kirby | Bexar | San Antonio | (138) | (248) | (270) | (270) | (270) | (270) |
| La Coste | Bexar | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Lackland Air Force Base | Bexar | San Antonio | 1,103 | 1,116 | 1,116 | 1,116 | 1,116 | 1,116 |
| Leon Valley | Bexar | San Antonio | (763) | (1,129) | (1,129) | (1,129) | (1,129) | (1,129) |
| Live Oak | Bexar | San Antonio | (211) | (202) | (202) | (202) | (228) | (202) |
| Lytle | Bexar | San Antonio | 0 | 0 | (1) | (1) | (1) | (1) |
| Oak Hills WSC | Bexar | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Randolph Air Force Base | Bexar | San Antonio | 5,583 | 8,562 | 8,562 | 8,562 | 8,562 | 8,562 |
| San Antonio Water System | Bexar | San Antonio | 54,070 | 26,571 | 8,496 | (12,304) | (23,249) | (39,694) |
| Schertz | Bexar | San Antonio | 48 | (323) | (772) | (1,216) | (1,733) | (2,335) |
| Selma | Bexar | San Antonio | (534) | (949) | (1,356) | (1,717) | (2,134) | (2,617) |
| Shavano Park | Bexar | San Antonio | (48) | (121) | (186) | (245) | (312) | (389) |
| The Oaks WSC | Bexar | San Antonio | (47) | (75) | (100) | (123) | (149) | (178) |
| Universal City | Bexar | San Antonio | 726 | 583 | 525 | 515 | 505 | 493 |
| Water Services | Bexar | San Antonio | 199 | 168 | 134 | 101 | 59 | 6 |
| County-Other | Bexar | San Antonio | 10,025 | 9,859 | 9,668 | 9,625 | 9,561 | 9,773 |
| Manufacturing | Bexar | San Antonio | (16) | (338) | (673) | (1,020) | (1,381) | (1,755) |
| Mining | Bexar | San Antonio | 3,643 | 2,911 | 2,205 | 1,553 | 955 | 426 |
| Steam Electric Power | Bexar | San Antonio | 43,358 | 43,358 | 43,358 | 43,358 | 43,358 | 43,358 |
| Livestock | Bexar | San Antonio | 0 | 0 | 0 | 0 | 0 | 1 |
| Irrigation | Bexar | San Antonio | 10,195 | 10,195 | 10,195 | 10,195 | 10,195 | 10,195 |
| Creedmoor-Maha WSC* | Caldwell | Colorado | 2,900 | 1,692 | 670 | (351) | (1,396) | (2,466) |
| Polonia WSC* | Caldwell | Colorado | 1 | 413 | 343 | 261 | 161 | 43 |
| County-Other | Caldwell | Colorado | 0 | 70 | 50 | 62 | 46 | 11 |
| Livestock | Caldwell | Colorado | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Irrigation | Caldwell | Colorado | 0 | 0 | 0 | 0 | 0 | 0 |
| Aqua WSC* | Caldwell | Guadalupe | (18) | (26) | (33) | (43) | (54) | (67) |
| County Line SUD | Caldwell | Guadalupe | 411 | 259 | 153 | 34 | (35) | (73) |
| Creedmoor-Maha WSC* | Caldwell | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Goforth SUD* | Caldwell | Guadalupe | 137 | 68 | 15 | (27) | (60) | (89) |
| Gonzales County WSC | Caldwell | Guadalupe | 9 | 9 | 10 | 10 | 11 | 12 |
| Lockhart | Caldwell | Guadalupe | 0 | 170 | (99) | (369) | (639) | (908) |
| Luling | Caldwell | Guadalupe | 0 | 808 | 788 | 762 | 733 | 703 |
| Martindale WSC | Caldwell | Guadalupe | 20 | (110) | (162) | (216) | (274) | (338) |
| Maxwell SUD | Caldwell | Guadalupe | 655 | 287 | (71) | (415) | (779) | (848) |
| Polonia WSC* | Caldwell | Guadalupe | 1 | 876 | 728 | 552 | 340 | 90 |
| San Marcos | Caldwell | Guadalupe | (90) | (94) | (93) | (93) | (93) | (93) |
| Tri Community WSC | Caldwell | Guadalupe | 325 | 318 | 313 | 307 | 298 | 289 |
| County-Other | Caldwell | Guadalupe | 18 | 251 | 185 | 218 | 171 | 54 |
| Manufacturing | Caldwell | Guadalupe | (9) | (10) | (11) | (12) | (13) | (14) |
| Mining | Caldwell | Guadalupe | 0 | 0 | 0 | 0 | 0 | 350 |
| Livestock | Caldwell | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Caldwell | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Point Comfort | Calhoun | Colorado-Lavaca | 123 | 126 | 129 | 131 | 135 | 138 |
| County-Other | Calhoun | Colorado-Lavaca | 48 | 44 | 39 | 38 | 33 | 24 |
| Manufacturing | Calhoun | Colorado-Lavaca | 1,492 | 141 | (1,259) | (2,711) | (4,217) | (5,779) |
| Steam Electric Power | Calhoun | Colorado-Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | Calhoun | Colorado-Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Calhoun | Colorado-Lavaca | 175 | 175 | 175 | 175 | 175 | 175 |
| Guadalupe-Blanco River Authority | Calhoun | Lavaca-Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Port Lavaca | Calhoun | Lavaca-Guadalupe | 2,911 | 2,980 | 3,056 | 3,133 | 3,214 | 3,300 |
| Port Oconnor Improvement District | Calhoun | Lavaca-Guadalupe | 41 | 44 | 48 | 51 | 54 | 58 |
| Seadrift | Calhoun | Lavaca-Guadalupe | 98 | 105 | 113 | 121 | 129 | 138 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| County-Other | Calhoun | Lavaca-Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | Calhoun | Lavaca-Guadalupe | 612 | (27) | (689) | (1,376) | (2,088) | (2,827) |
| Livestock | Calhoun | Lavaca-Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Calhoun | Lavaca-Guadalupe | (9,173) | (9,173) | (9,173) | (9,173) | (9,173) | (9,173) |
| County-Other | Calhoun | San Antonio-Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | Calhoun | San Antonio-Nueces | 29 | (1) | (33) | (66) | (100) | (135) |
| 3009 Water | Comal | Guadalupe | 1,235 | 1,127 | 983 | 801 | 591 | 351 |
| Canyon Lake Water Service* | Comal | Guadalupe | 3,078 | (221) | (2,424) | (3,853) | (9,213) | (15,134) |
| Clear Water Estates Water System | Comal | Guadalupe | (100) | (528) | (1,098) | (1,822) | (2,649) | (3,596) |
| Crystal Clear SUD | Comal | Guadalupe | (800) | (1,656) | (1,768) | (1,865) | (1,951) | (2,029) |
| Garden Ridge | Comal | Guadalupe | (661) | (939) | (1,220) | (1,543) | (1,926) | (2,381) |
| Green Valley SUD | Comal | Guadalupe | 209 | 181 | 132 | 68 | (30) | (156) |
| KT Water Development | Comal | Guadalupe | (486) | (973) | (1,624) | (2,448) | (3,391) | (4,471) |
| New Braunfels | Comal | Guadalupe | 1,764 | (6,957) | (18,324) | (32,604) | (49,133) | (68,172) |
| San Antonio Water System | Comal | Guadalupe | 31 | 12 | 1 | (11) | (17) | (24) |
| Schertz | Comal | Guadalupe | 4 | (47) | (121) | (216) | (339) | (492) |
| Wingert Water Systems | Comal | Guadalupe | (71) | (111) | (165) | (175) | (175) | (175) |
| County-Other | Comal | Guadalupe | 735 | 293 | (1,029) | (6,472) | (9,798) | (13,931) |
| Manufacturing | Comal | Guadalupe | 2,218 | 2,185 | 2,150 | 2,114 | 2,077 | 2,039 |
| Mining | Comal | Guadalupe | (2,967) | (5,084) | (7,218) | (9,340) | (11,386) | (13,268) |
| Livestock | Comal | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Comal | Guadalupe | 174 | 174 | 174 | 174 | 174 | 174 |
| 3009 Water | Comal | San Antonio | 42 | 39 | 34 | 27 | 20 | 12 |
| Canyon Lake Water Service* | Comal | San Antonio | 688 | (17) | (487) | (793) | (1,938) | (3,202) |
| Fair Oaks Ranch | Comal | San Antonio | 32 | (60) | (107) | (126) | (131) | (131) |
| Garden Ridge | Comal | San Antonio | (502) | (696) | (891) | (1,116) | (1,384) | (1,700) |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Guadalupe-Blanco River Authority | Comal | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| San Antonio Water System | Comal | San Antonio | 19 | 7 | 2 | (7) | (12) | (17) |
| Selma | Comal | San Antonio | (35) | (81) | (148) | (237) | (350) | (486) |
| Water Services | Comal | San Antonio | 89 | 65 | 47 | 32 | 17 | 2 |
| County-Other | Comal | San Antonio | (79) | (175) | (463) | (1,648) | (2,373) | (3,273) |
| Mining | Comal | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | Comal | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Comal | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Cuero | DeWitt | Guadalupe | 22 | 30 | 43 | 50 | 59 | 67 |
| Gonzales County WSC | DeWitt | Guadalupe | 13 | 13 | 13 | 14 | 14 | 14 |
| Yorktown | DeWitt | Guadalupe | 55 | 56 | 58 | 60 | 61 | 63 |
| County-Other | DeWitt | Guadalupe | 319 | 323 | 326 | 325 | 323 | 321 |
| Manufacturing | DeWitt | Guadalupe | 5 | 4 | 4 | 4 | 3 | 3 |
| Mining | DeWitt | Guadalupe | 812 | 812 | 812 | 812 | 812 | 2,263 |
| Livestock | DeWitt | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | DeWitt | Guadalupe | 57 | 57 | 57 | 57 | 57 | 57 |
| Yoakum* | DeWitt | Lavaca | 0 | 4 | 10 | 18 | 28 | 39 |
| County-Other | DeWitt | Lavaca | 31 | 32 | 31 | 31 | 31 | 31 |
| Manufacturing | DeWitt | Lavaca | 127 | 119 | 109 | 99 | 90 | 79 |
| Mining | DeWitt | Lavaca | 31 | 31 | 31 | 31 | 31 | 54 |
| Livestock | DeWitt | Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | DeWitt | Lavaca | 189 | 189 | 189 | 189 | 189 | 189 |
| County-Other | DeWitt | Lavaca-Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | DeWitt | Lavaca-Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | DeWitt | Lavaca-Guadalupe | 4 | 4 | 4 | 4 | 4 | 4 |
| County-Other | DeWitt | San Antonio | 0 | 1 | 1 | 1 | 1 | 1 |
| Mining | DeWitt | San Antonio | 133 | 133 | 133 | 133 | 133 | 346 |
| Livestock | DeWitt | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | DeWitt | San Antonio | 23 | 23 | 23 | 23 | 23 | 23 |
| Asherton | Dimmit | Nueces | 57 | 64 | 71 | 78 | 86 | 94 |
| Big Wells | Dimmit | Nueces | 103 | 107 | 110 | 114 | 117 | 122 |
| Carrizo Hill WSC | Dimmit | Nueces | 41 | 27 | 9 | (12) | (44) | (67) |
| Carrizo Springs | Dimmit | Nueces | 586 | 644 | 709 | 771 | 836 | 908 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| County-Other | Dimmit | Nueces | 53 | 81 | 110 | 141 | 185 | 261 |
| Mining | Dimmit | Nueces | (4,798) | (4,798) | (4,798) | (4,798) | (4,798) | 692 |
| Livestock | Dimmit | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Dimmit | Nueces | (3,917) | (3,917) | (3,917) | (3,917) | (3,917) | (3,917) |
| County-Other | Dimmit | Rio Grande | 0 | 0 | 1 | 1 | 2 | 3 |
| Mining | Dimmit | Rio Grande | (653) | (653) | (653) | (653) | (653) | 0 |
| Livestock | Dimmit | Rio Grande | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Dimmit | Rio Grande | (419) | (419) | (419) | (419) | (419) | (419) |
| Benton City WSC | Frio | Nueces | 13 | (2) | (19) | (28) | (37) | (47) |
| Dilley | Frio | Nueces | 923 | 630 | 425 | 407 | 387 | 365 |
| Moore WSC | Frio | Nueces | 3,921 | 3,903 | 3,890 | 3,888 | 3,886 | 3,884 |
| Pearsall | Frio | Nueces | (250) | (483) | (649) | (677) | (709) | (745) |
| County-Other | Frio | Nueces | 17 | 268 | 439 | 423 | 405 | 383 |
| Mining | Frio | Nueces | (4,034) | (4,035) | (4,035) | (4,036) | (4,036) | 1,958 |
| Steam Electric Power | Frio | Nueces | 70 | 70 | 70 | 70 | 70 | 70 |
| Livestock | Frio | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Frio | Nueces | 409 | 409 | 385 | 366 | 343 | 343 |
| County-Other | Goliad | Guadalupe | 0 | 10 | 16 | 21 | 29 | 36 |
| Mining | Goliad | Guadalupe | 6 | 6 | 6 | 6 | 6 | 6 |
| Steam Electric Power | Goliad | Guadalupe | 19,389 | 19,389 | 19,389 | 19,389 | 19,155 | 18,895 |
| Livestock | Goliad | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Goliad | Guadalupe | 143 | 143 | 143 | 143 | 143 | 143 |
| Goliad | Goliad | San Antonio | 627 | 628 | 628 | 628 | 628 | 628 |
| County-Other | Goliad | San Antonio | 69 | 78 | 82 | 88 | 93 | 100 |
| Livestock | Goliad | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Goliad | San Antonio | (184) | (36) | 113 | 259 | 408 | 408 |
| County-Other | Goliad | San Antonio-Nueces | 0 | 2 | 3 | 4 | 5 | 7 |
| Livestock | Goliad | San Antonio-Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Goliad | San Antonio-Nueces | 11 | 18 | 24 | 30 | 34 | 34 |
| Fayette WSC* | Gonzales | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales | Gonzales | Guadalupe | 3,330 | 3,336 | 3,363 | 3,392 | 3,423 | 3,456 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Gonzales County WSC | Gonzales | Guadalupe | 460 | 459 | 476 | 495 | 513 | 532 |
| Luling | Gonzales | Guadalupe | 0 | 7 | 7 | 6 | 6 | 5 |
| Nixon | Gonzales | Guadalupe | 524 | 526 | 531 | 537 | 544 | 551 |
| Smiley | Gonzales | Guadalupe | 23 | 24 | 25 | 27 | 29 | 31 |
| Waelder | Gonzales | Guadalupe | 460 | 461 | 463 | 467 | 470 | 473 |
| County-Other | Gonzales | Guadalupe | 3 | 5 | 9 | 12 | 18 | 24 |
| Manufacturing | Gonzales | Guadalupe | 501 | 415 | 326 | 234 | 139 | 40 |
| Mining | Gonzales | Guadalupe | (3,254) | (3,284) | (3,320) | (3,355) | (3,391) | 2,316 |
| Livestock | Gonzales | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Gonzales | Guadalupe | 440 | 440 | 440 | 440 | 440 | 440 |
| County-Other | Gonzales | Lavaca | 0 | 0 | 0 | 1 | 1 | 1 |
| Mining | Gonzales | Lavaca | (377) | (380) | (382) | (385) | (388) | 39 |
| Livestock | Gonzales | Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Crystal Clear SUD | Guadalupe | Guadalupe | (1,689) | (5,521) | (6,999) | (8,830) | (10,983) | (13,500) |
| Gonzales County WSC | Guadalupe | Guadalupe | 8 | 10 | 13 | 17 | 22 | 27 |
| Green Valley SUD | Guadalupe | Guadalupe | 2,190 | 1,685 | 1,106 | 496 | (202) | (1,002) |
| Martindale WSC | Guadalupe | Guadalupe | 0 | (24) | (37) | (53) | (73) | (96) |
| New Braunfels | Guadalupe | Guadalupe | 621 | (2,483) | (6,296) | (10,465) | (15,053) | (20,190) |
| Schertz | Guadalupe | Guadalupe | 15 | (125) | (265) | (404) | (561) | (739) |
| Seguin | Guadalupe | Guadalupe | 2,366 | 1,598 | 947 | 564 | 170 | (234) |
| Springs Hill WSC | Guadalupe | Guadalupe | 1,076 | (1,874) | (2,892) | (3,964) | (5,180) | (6,562) |
| Tri Community WSC | Guadalupe | Guadalupe | 5 | 6 | 6 | 5 | 5 | 5 |
| Water Services | Guadalupe | Guadalupe | 11 | 7 | 5 | 3 | 1 | 0 |
| County-Other | Guadalupe | Guadalupe | 230 | 123 | (10) | (148) | (308) | (491) |
| Manufacturing | Guadalupe | Guadalupe | 604 | 513 | 418 | 298 | 152 | 1 |
| Mining | Guadalupe | Guadalupe | (428) | (428) | (428) | (428) | (428) | 342 |
| Steam Electric Power | Guadalupe | Guadalupe | 73 | 73 | 73 | 73 | 73 | 73 |
| Livestock | Guadalupe | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Guadalupe | Guadalupe | (20) | (20) | (20) | (20) | (20) | (20) |
| Cibolo | Guadalupe | San Antonio | 1,046 | 517 | (93) | (738) | (1,476) | (2,321) |
| East Central SUD | Guadalupe | San Antonio | (99) | (134) | (176) | (213) | (266) | (318) |
| Green Valley SUD | Guadalupe | San Antonio | 4,693 | 3,606 | 2,374 | 1,058 | (434) | (2,142) |
| Marion | Guadalupe | San Antonio | 222 | 236 | 226 | 215 | 202 | 188 |
| Schertz | Guadalupe | San Antonio | 117 | (1,031) | (2,193) | (3,342) | (4,639) | (6,110) |
| Selma | Guadalupe | San Antonio | (294) | (388) | (454) | (500) | (540) | (577) |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Springs Hill WSC | Guadalupe | San Antonio | 209 | (53) | (143) | (238) | (346) | (468) |
| Universal City | Guadalupe | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | Guadalupe | San Antonio | 49 | 28 | 2 | (26) | (57) | (93) |
| Manufacturing | Guadalupe | San Antonio | 100 | 61 | 20 | 0 | 0 | 0 |
| Livestock | Guadalupe | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Guadalupe | San Antonio | 20 | 20 | 20 | 20 | 20 | 20 |
| County Line SUD | Hays | Guadalupe | 585 | (2,496) | (6,273) | (9,169) | (10,824) | (11,735) |
| Creedmoor-Maha WSC* | Hays | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Crystal Clear SUD | Hays | Guadalupe | (370) | (1,271) | (1,469) | (1,548) | (1,620) | (1,682) |
| Goforth SUD* | Hays | Guadalupe | 7,383 | 4,880 | 1,468 | (3,278) | (8,948) | (15,439) |
| Kyle | Hays | Guadalupe | 6,045 | 3,176 | (8) | (1,458) | (1,936) | (2,287) |
| Maxwell SUD | Hays | Guadalupe | 734 | 418 | (153) | (1,058) | (2,373) | (2,990) |
| San Marcos | Hays | Guadalupe | 3,080 | (3,466) | (8,335) | (11,930) | (14,073) | (15,695) |
| South Buda WCID 1 | Hays | Guadalupe | 224 | (169) | (689) | (1,392) | (2,197) | (3,119) |
| Texas State University | Hays | Guadalupe | (619) | (613) | (613) | (613) | (613) | (613) |
| Wimberley WSC | Hays | Guadalupe | 165 | (95) | (439) | (907) | (1,443) | (2,056) |
| County-Other* | Hays | Guadalupe | 721 | 899 | (406) | (6,114) | (12,427) | (22,488) |
| Manufacturing* | Hays | Guadalupe | 13 | 11 | 9 | 7 | 5 | 3 |
| Mining* | Hays | Guadalupe | 41 | 34 | 28 | 20 | 10 | 0 |
| Steam Electric Power | Hays | Guadalupe | 515 | 515 | 515 | 515 | 515 | 515 |
| Livestock* | Hays | Guadalupe | (12) | (12) | (12) | (12) | (12) | (12) |
| Irrigation* | Hays | Guadalupe | 96 | 96 | 96 | 96 | 96 | 96 |
| El Oso WSC* | Karnes | Guadalupe | 2 | 2 | 1 | 1 | 0 | 1 |
| County-Other | Karnes | Guadalupe | 2 | 2 | 1 | 1 | 1 | 0 |
| Mining | Karnes | Guadalupe | (122) | (122) | (122) | (122) | (122) | 0 |
| Livestock | Karnes | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Karnes | Guadalupe | 236 | 236 | 236 | 236 | 236 | 236 |
| El Oso WSC* | Karnes | Nueces | 16 | 14 | 13 | 10 | 7 | 4 |
| Three Oaks WSC | Karnes | Nueces | 12 | 13 | 12 | 11 | 9 | 10 |
| County-Other | Karnes | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | Karnes | Nueces | (102) | (102) | (102) | (102) | (102) | 38 |
| Livestock | Karnes | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Karnes | Nueces | (78) | (78) | (78) | (78) | (78) | (78) |
| El Oso WSC* | Karnes | San Antonio | 535 | 456 | 377 | 285 | 170 | 29 |
| Falls City | Karnes | San Antonio | 37 | 32 | 26 | 19 | 12 | 3 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Karnes City | Karnes | San Antonio | 191 | 170 | 147 | 121 | 91 | 57 |
| Kenedy | Karnes | San Antonio | 527 | 454 | 380 | 297 | 200 | 90 |
| Runge | Karnes | San Antonio | 50 | 41 | 31 | 20 | 7 | (7) |
| Sunko WSC | Karnes | San Antonio | 40 | 28 | 20 | 11 | 5 | 2 |
| Three Oaks WSC | Karnes | San Antonio | 53 | 49 | 45 | 42 | 42 | 36 |
| County-Other | Karnes | San Antonio | 78 | 66 | 53 | 38 | 20 | 0 |
| Manufacturing | Karnes | San Antonio | 15 | 12 | 9 | 6 | 3 | 0 |
| Mining | Karnes | San Antonio | (1,216) | (1,216) | (1,216) | (1,216) | (1,216) | 438 |
| Livestock | Karnes | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Karnes | San Antonio | (100) | (100) | (659) | (659) | (659) | (659) |
| El Oso WSC* | Karnes | San Antonio-Nueces | 5 | 4 | 3 | 3 | 2 | 1 |
| County-Other | Karnes | San Antonio-Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | Karnes | San Antonio-Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Karnes | San Antonio-Nueces | (7) | (7) | (7) | (7) | (7) | (7) |
| County-Other | Kendall | Colorado | 81 | 58 | 50 | 39 | 27 | 13 |
| Livestock | Kendall | Colorado | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe-Blanco River Authority | Kendall | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall County WCID 1 | Kendall | Guadalupe | 466 | 447 | 372 | 286 | 188 | 75 |
| County-Other | Kendall | Guadalupe | 2,393 | 1,530 | 1,228 | 854 | 414 | (94) |
| Manufacturing | Kendall | Guadalupe | (43) | (45) | (47) | (49) | (51) | (53) |
| Livestock | Kendall | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Kendall | Guadalupe | 268 | 268 | 268 | 268 | 268 | 268 |
| Boerne | Kendall | San Antonio | 1,248 | (760) | (3,365) | (6,388) | (9,850) | (13,812) |
| Fair Oaks Ranch | Kendall | San Antonio | 45 | (93) | (173) | (207) | (216) | (216) |
| Guadalupe-Blanco River Authority | Kendall | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall West Utility | Kendall | San Antonio | 163 | 77 | (36) | (168) | (318) | (490) |
| Water Services | Kendall | San Antonio | 12 | 8 | 5 | 3 | 2 | 0 |
| County-Other | Kendall | San Antonio | 676 | 153 | (30) | (257) | (524) | (832) |
| Livestock | Kendall | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Irrigation | Kendall | San Antonio | 4 | 4 | 4 | 4 | 4 | 4 |
| Cotulla | La Salle | Nueces | 50 | 70 | 72 | 65 | 44 | 4 |
| Encinal WSC | La Salle | Nueces | 82 | 74 | 62 | 47 | 27 | 0 |
| County-Other | La Salle | Nueces | 7 | 3 | 17 | 45 | 82 | 131 |
| Mining | La Salle | Nueces | (4,867) | (4,867) | (4,867) | (4,867) | (4,867) | 529 |
| Livestock | La Salle | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | La Salle | Nueces | (413) | (413) | (413) | (413) | (413) | (413) |
| Benton City WSC | Medina | Nueces | 60 | (7) | (63) | (94) | (128) | (166) |
| Devine | Medina | Nueces | 135 | 130 | 122 | 111 | 98 | 85 |
| East Medina County SUD | Medina | Nueces | 119 | 70 | 31 | 6 | (21) | (54) |
| Hondo | Medina | Nueces | (288) | (197) | (149) | (160) | (172) | (183) |
| Lytle | Medina | Nueces | (39) | (47) | (54) | (60) | (67) | (73) |
| Medina County WCID 2 | Medina | Nueces | 484 | 487 | 489 | 488 | 488 | 487 |
| Medina River West WSC | Medina | Nueces | 209 | 205 | 201 | 199 | 197 | 195 |
| Natalia | Medina | Nueces | (4) | 2 | (7) | (12) | (13) | (8) |
| Ville Dalsace Water Supply | Medina | Nueces | (42) | (47) | (51) | (53) | (55) | (58) |
| West Medina WSC | Medina | Nueces | 44 | 29 | 26 | 21 | 13 | 26 |
| Yancey WSC | Medina | Nueces | 46 | 43 | 41 | 40 | 38 | 36 |
| County-Other | Medina | Nueces | 906 | 836 | 821 | 871 | 905 | 883 |
| Manufacturing | Medina | Nueces | 1,569 | 1,568 | 1,567 | 1,566 | 1,565 | 1,564 |
| Mining | Medina | Nueces | (2,804) | (3,153) | (3,459) | (3,738) | (3,983) | (4,186) |
| Livestock | Medina | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Medina | Nueces | (22,386) | (22,463) | (22,546) | (22,615) | (22,680) | (22,732) |
| Canyon Lake Water Service* | Medina | San Antonio | 16 | (1) | (12) | (17) | (32) | (43) |
| Castroville | Medina | San Antonio | (533) | (634) | (786) | (999) | (1,194) | (1,322) |
| East Medina County SUD | Medina | San Antonio | 10 | 6 | 3 | 1 | (2) | (4) |
| La Coste | Medina | San Antonio | (3) | 0 | 1 | (1) | (3) | (5) |
| Medina River West WSC | Medina | San Antonio | 106 | 104 | 103 | 102 | 100 | 98 |
| San Antonio Water System | Medina | San Antonio | 163 | 186 | 32 | (148) | (241) | (359) |
| Ville Dalsace Water Supply | Medina | San Antonio | (40) | (45) | (48) | (50) | (52) | (55) |
| Yancey WSC | Medina | San Antonio | 571 | 537 | 508 | 490 | 469 | 445 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| County-Other | Medina | San Antonio | 824 | 773 | 760 | 798 | 822 | 807 |
| Mining | Medina | San Antonio | (238) | (283) | (324) | (360) | (392) | (418) |
| Livestock | Medina | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Medina | San Antonio | (1,216) | (1,216) | (1,216) | (1,216) | (1,216) | (1,216) |
| County-Other | Refugio | San Antonio | 10 | 11 | 11 | 11 | 12 | 12 |
| Livestock | Refugio | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Refugio | Refugio | San Antonio-Nueces | 171 | 178 | 180 | 177 | 164 | 135 |
| Woodsboro | Refugio | San Antonio-Nueces | 6 | 19 | 32 | 45 | 61 | 79 |
| County-Other | Refugio | San Antonio-Nueces | 14 | 32 | 49 | 63 | 82 | 111 |
| Livestock | Refugio | San Antonio-Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Refugio | San Antonio-Nueces | 1 | 1 | 1 | 1 | 1 | 1 |
| Concan WSC | Uvalde | Nueces | 2 | 4 | 7 | 10 | 13 | 17 |
| Knippa WSC | Uvalde | Nueces | 126 | 128 | 132 | 135 | 140 | 145 |
| Sabinal | Uvalde | Nueces | 3 | 11 | 21 | 32 | 45 | 59 |
| Uvalde | Uvalde | Nueces | (717) | (635) | (530) | (411) | (288) | (164) |
| Windmill WSC | Uvalde | Nueces | 153 | 182 | 211 | 240 | 273 | 311 |
| County-Other | Uvalde | Nueces | 1,854 | 1,858 | 1,867 | 1,878 | 1,890 | 1,904 |
| Mining | Uvalde | Nueces | (1,609) | (1,828) | (2,055) | (2,271) | (2,479) | (2,676) |
| Livestock | Uvalde | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Uvalde | Nueces | (18,625) | (18,625) | (18,625) | (18,625) | (18,625) | (18,625) |
| Quail Creek MUD | Victoria | Guadalupe | 1,087 | 1,083 | 1,082 | 1,082 | 1,083 | 1,084 |
| Victoria | Victoria | Guadalupe | (5,552) | (5,691) | (5,728) | (5,678) | (5,620) | (5,554) |
| County-Other | Victoria | Guadalupe | (217) | (277) | (297) | (287) | (277) | (265) |
| Manufacturing | Victoria | Guadalupe | (38,960) | (40,419) | (41,932) | (43,501) | (45,128) | (46,815) |
| Mining | Victoria | Guadalupe | (338) | (357) | (374) | (387) | (399) | (408) |
| Steam Electric Power | Victoria | Guadalupe | (666) | (666) | (666) | (666) | (666) | (666) |
| Livestock | Victoria | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Victoria | Guadalupe | (200) | (200) | (200) | (200) | (200) | (200) |
| County-Other | Victoria | Lavaca | 13 | 13 | 13 | 13 | 13 | 13 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Livestock | Victoria | Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Victoria | Victoria | Lavaca-Guadalupe | (2,697) | (2,764) | (2,782) | (2,757) | (2,730) | (2,697) |
| Victoria County WCID 1 | Victoria | Lavaca-Guadalupe | 191 | 187 | 186 | 186 | 186 | 186 |
| County-Other | Victoria | Lavaca-Guadalupe | 51 | 15 | 4 | 9 | 15 | 23 |
| Livestock | Victoria | Lavaca-Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Victoria | Lavaca-Guadalupe | 200 | 200 | 200 | 200 | 200 | 200 |
| County-Other | Victoria | San Antonio | 200 | 199 | 199 | 199 | 199 | 199 |
| Livestock | Victoria | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Sunko WSC | Wilson | Guadalupe | 5 | 5 | 5 | 6 | 4 | 4 |
| County-Other | Wilson | Guadalupe | 93 | 94 | 95 | 98 | 101 | 104 |
| Livestock | Wilson | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 |
| McCoy WSC* | Wilson | Nueces | 5 | 3 | 1 | (2) | (6) | (11) |
| Picosa WSC | Wilson | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Three Oaks WSC | Wilson | Nueces | 268 | 261 | 251 | 244 | 235 | 225 |
| County-Other | Wilson | Nueces | 93 | 93 | 93 | 93 | 93 | 94 |
| Mining | Wilson | Nueces | 278 | 275 | 272 | 270 | 268 | 1,601 |
| Livestock | Wilson | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Wilson | Nueces | 417 | 417 | 417 | 417 | 417 | 417 |
| C Willow Water | Wilson | San Antonio | 4 | (9) | (22) | (33) | (46) | (61) |
| East Central SUD | Wilson | San Antonio | (45) | (59) | (84) | (109) | (129) | (140) |
| El Oso WSC* | Wilson | San Antonio | 14 | 14 | 14 | 13 | 11 | 6 |
| Floresville | Wilson | San Antonio | 1,119 | 1,051 | 977 | 912 | 837 | 752 |
| La Vernia | Wilson | San Antonio | 1,685 | 1,617 | 1,547 | 1,486 | 1,415 | 1,334 |
| Oak Hills WSC | Wilson | San Antonio | (531) | (678) | (854) | (1,058) | (1,294) | (1,568) |
| Picosa WSC | Wilson | San Antonio | (24) | (72) | (122) | (165) | (215) | (273) |
| Poth | Wilson | San Antonio | 389 | 393 | 396 | 399 | 402 | 405 |
| S S WSC | Wilson | San Antonio | 2,349 | 1,999 | 1,645 | 1,332 | 968 | 537 |
| Springs Hill WSC | Wilson | San Antonio | (26) | (38) | (50) | (60) | (72) | (85) |
| Stockdale | Wilson | San Antonio | 619 | 617 | 613 | 610 | 607 | 603 |
| Sunko WSC | Wilson | San Antonio | 822 | 766 | 705 | 650 | 586 | 509 |
| Three Oaks WSC | Wilson | San Antonio | 762 | 734 | 712 | 691 | 663 | 635 |
| County-Other | Wilson | San Antonio | 603 | 619 | 646 | 700 | 763 | 836 |
| Manufacturing | Wilson | San Antonio | (5) | (7) | (9) | (11) | (14) | (17) |
| Mining | Wilson | San Antonio | 683 | 676 | 671 | 664 | 659 | 3,935 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG) Needs or Surplus

| | | | Water Supply Needs or Surplus (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WUG Name** | **County** | **Basin** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Livestock | Wilson | San Antonio | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Wilson | San Antonio | (331) | (331) | (331) | (331) | (331) | (331) |
| Batesville WSC | Zavala | Nueces | 72 | 76 | 82 | 88 | 94 | 101 |
| Crystal City | Zavala | Nueces | 1,231 | 1,266 | 1,314 | 1,363 | 1,415 | 1,468 |
| Loma Alta Chula Vista Water System | Zavala | Nueces | 103 | 105 | 109 | 114 | 118 | 123 |
| Zavala County WCID 1 | Zavala | Nueces | 997 | 1,007 | 1,021 | 1,035 | 1,050 | 1,066 |
| County-Other | Zavala | Nueces | 59 | 65 | 72 | 80 | 88 | 97 |
| Manufacturing | Zavala | Nueces | (732) | (759) | (787) | (816) | (846) | (877) |
| Mining | Zavala | Nueces | (3,664) | (3,664) | (3,664) | (3,664) | (3,664) | 1,267 |
| Livestock | Zavala | Nueces | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | Zavala | Nueces | (14,189) | (14,189) | (14,189) | (14,189) | (14,189) | (14,189) |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

Second-tier needs are WUG split needs adjusted to include the implementation of recommended conservation and direct reuse water management strategies.

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Atascosa County WUG Total** | **3,418** | **3,713** | **4,078** | **4,420** | **4,761** | **388** |
| **Atascosa County / Nueces Basin WUG** | **3,415** | **3,710** | **4,069** | **4,404** | **4,738** | **355** |
| Benton City WSC | 0 | 0 | 40 | 75 | 124 | 188 |
| Charlotte | 0 | 0 | 0 | 0 | 0 | 0 |
| El Oso WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| Jourdanton | 0 | 0 | 0 | 0 | 0 | 0 |
| Lytle | 115 | 97 | 110 | 121 | 136 | 153 |
| McCoy WSC* | 0 | 0 | 0 | 0 | 0 | 14 |
| Pleasanton | 0 | 0 | 0 | 0 | 0 | 0 |
| Poteet | 0 | 0 | 0 | 0 | 0 | 0 |
| San Antonio Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 3,300 | 3,613 | 3,919 | 4,208 | 4,478 | 0 |
| Steam Electric Power | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Atascosa County / San Antonio Basin WUG** | **3** | **3** | **9** | **16** | **23** | **33** |
| Benton City WSC | 0 | 0 | 6 | 12 | 20 | 29 |
| Lytle | 3 | 3 | 3 | 4 | 3 | 4 |
| San Antonio Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Bexar County WUG Total** | **16,545** | **15,351** | **14,862** | **14,581** | **14,739** | **15,502** |
| **Bexar County / Nueces Basin WUG** | **82** | **96** | **108** | **120** | **131** | **145** |
| Atascosa Rural WSC | 72 | 87 | 97 | 106 | 116 | 128 |
| Lytle | 10 | 9 | 11 | 14 | 15 | 17 |
| San Antonio Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Bexar County / San Antonio Basin WUG** | **16,463** | **15,255** | **14,754** | **14,461** | **14,608** | **15,357** |
| Air Force Village II Inc | 0 | 0 | 0 | 0 | 0 | 0 |
| Alamo Heights | 279 | 90 | 0 | 0 | 0 | 0 |
| Atascosa Rural WSC | 1,087 | 1,289 | 1,459 | 1,592 | 1,742 | 1,913 |
| Bexar County WCID 10 | 247 | 266 | 256 | 322 | 398 | 483 |
| Converse | 478 | 409 | 339 | 269 | 202 | 135 |
| East Central SUD | 736 | 0 | 0 | 0 | 0 | 0 |
| Elmendorf | 0 | 0 | 0 | 0 | 179 | 697 |
| Fair Oaks Ranch | 0 | 0 | 0 | 0 | 0 | 0 |
| Fort Sam Houston | 12,399 | 10,823 | 9,405 | 8,128 | 6,980 | 5,946 |
| Green Valley SUD | 0 | 0 | 0 | 0 | 0 | 12 |
| Kirby | 116 | 205 | 201 | 191 | 191 | 191 |
| La Coste | 0 | 0 | 0 | 0 | 0 | 0 |
| Lackland Air Force Base | 0 | 0 | 0 | 0 | 0 | 0 |
| Leon Valley | 719 | 1,035 | 984 | 935 | 885 | 838 |
| Live Oak | 0 | 0 | 0 | 0 | 0 | 0 |
| Lytle | 0 | 0 | 1 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Bexar County / San Antonio Basin WUG** | **16,463** | **15,255** | **14,754** | **14,461** | **14,608** | **15,357** |
| Oak Hills WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Randolph Air Force Base | 0 | 0 | 0 | 0 | 0 | 0 |
| San Antonio Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| Schertz | 0 | 64 | 388 | 698 | 1,052 | 1,458 |
| Selma | 361 | 689 | 986 | 1,231 | 1,508 | 1,822 |
| Shavano Park | 0 | 1 | 0 | 0 | 0 | 0 |
| The Oaks WSC | 25 | 46 | 62 | 75 | 90 | 107 |
| Universal City | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Services | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 16 | 338 | 673 | 1,020 | 1,381 | 1,755 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Steam Electric Power | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Caldwell County WUG Total** | **84** | **181** | **217** | **639** | **2,067** | **3,209** |
| **Caldwell County / Colorado Basin WUG** | **0** | **0** | **0** | **44** | **922** | **1,791** |
| Creedmoor-Maha WSC* | 0 | 0 | 0 | 44 | 922 | 1,791 |
| Polonia WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Caldwell County / Guadalupe Basin WUG** | **84** | **181** | **217** | **595** | **1,145** | **1,418** |
| Aqua WSC* | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Caldwell County / Guadalupe Basin WUG** | **84** | **181** | **217** | **595** | **1,145** | **1,418** |
| County Line SUD | 0 | 0 | 0 | 0 | 0 | 0 |
| Creedmoor-Maha WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| Goforth SUD* | 0 | 0 | 0 | 18 | 44 | 66 |
| Gonzales County WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Lockhart | 0 | 0 | 0 | 20 | 173 | 318 |
| Luling | 0 | 0 | 0 | 0 | 0 | 0 |
| Martindale WSC | 0 | 88 | 125 | 161 | 198 | 249 |
| Maxwell SUD | 0 | 0 | 15 | 323 | 656 | 712 |
| Polonia WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| San Marcos | 75 | 83 | 66 | 61 | 61 | 59 |
| Tri Community WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 9 | 10 | 11 | 12 | 13 | 14 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Calhoun County WUG Total** | **9,025** | **8,974** | **10,848** | **12,940** | **15,121** | **17,384** |
| **Calhoun County / Colorado-Lavaca Basin WUG** | **0** | **0** | **1,259** | **2,711** | **4,217** | **5,779** |
| Point Comfort | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 0 | 1,259 | 2,711 | 4,217 | 5,779 |
| Steam Electric Power | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Calhoun County / Lavaca-Guadalupe Basin WUG** | **9,025** | **8,973** | **9,556** | **10,163** | **10,804** | **11,470** |
| Guadalupe-Blanco River Authority | 0 | 0 | 0 | 0 | 0 | 0 |
| Port Lavaca | 0 | 0 | 0 | 0 | 0 | 0 |
| Port Oconnor Improvement District | 0 | 0 | 0 | 0 | 0 | 0 |
| Seadrift | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 27 | 689 | 1,376 | 2,088 | 2,827 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 9,025 | 8,946 | 8,867 | 8,787 | 8,716 | 8,643 |
| **Calhoun County / San Antonio-Nueces Basin WUG** | **0** | **1** | **33** | **66** | **100** | **135** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 1 | 33 | 66 | 100 | 135 |
| **Comal County WUG Total** | **5,178** | **10,126** | **15,327** | **29,945** | **48,372** | **68,248** |
| **Comal County / Guadalupe Basin WUG** | **4,721** | **9,476** | **14,088** | **27,411** | **44,224** | **62,307** |
| 3009 Water | 0 | 0 | 0 | 0 | 0 | 0 |
| Canyon Lake Water Service* | 0 | 0 | 1,333 | 2,271 | 6,618 | 11,234 |
| Clear Water Estates Water System | 0 | 242 | 535 | 858 | 1,162 | 1,451 |
| Crystal Clear SUD | 776 | 1,565 | 1,618 | 1,525 | 1,555 | 1,553 |
| Garden Ridge | 542 | 663 | 749 | 834 | 923 | 1,022 |
| Green Valley SUD | 0 | 0 | 0 | 0 | 0 | 30 |
| KT Water Development | 397 | 712 | 1,076 | 1,469 | 1,839 | 2,190 |
| New Braunfels | 0 | 1,160 | 1,060 | 6,085 | 13,133 | 20,835 |
| San Antonio Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| Schertz | 0 | 7 | 59 | 123 | 205 | 309 |
| Wingert Water Systems | 39 | 43 | 53 | 53 | 45 | 38 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Comal County / Guadalupe Basin WUG** | **4,721** | **9,476** | **14,088** | **27,411** | **44,224** | **62,307** |
| County-Other | 0 | 0 | 387 | 4,853 | 7,358 | 10,377 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 2,967 | 5,084 | 7,218 | 9,340 | 11,386 | 13,268 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Comal County / San Antonio Basin WUG** | **457** | **650** | **1,239** | **2,534** | **4,148** | **5,941** |
| 3009 Water | 0 | 0 | 0 | 0 | 0 | 0 |
| Canyon Lake Water Service* | 0 | 0 | 249 | 448 | 1,371 | 2,348 |
| Fair Oaks Ranch | 0 | 0 | 0 | 0 | 0 | 0 |
| Garden Ridge | 419 | 503 | 562 | 622 | 686 | 752 |
| Guadalupe-Blanco River Authority | 0 | 0 | 0 | 0 | 0 | 0 |
| San Antonio Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| Selma | 20 | 56 | 105 | 169 | 249 | 342 |
| Water Services | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 18 | 91 | 323 | 1,295 | 1,842 | 2,499 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **DeWitt County WUG Total** | **0** | **0** | **0** | **0** | **0** | **0** |
| **DeWitt County / Guadalupe Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| Cuero | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales County WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Yorktown | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **DeWitt County / Guadalupe Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **DeWitt County / Lavaca Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| Yoakum* | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **DeWitt County / Lavaca-Guadalupe Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **DeWitt County / San Antonio Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Dimmit County WUG Total** | **9,702** | **9,651** | **9,599** | **9,547** | **9,509** | **4,018** |
| **Dimmit County / Nueces Basin WUG** | **8,639** | **8,593** | **8,547** | **8,500** | **8,467** | **3,634** |
| Asherton | 0 | 0 | 0 | 0 | 0 | 0 |
| Big Wells | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Dimmit County / Nueces Basin WUG** | **8,639** | **8,593** | **8,547** | **8,500** | **8,467** | **3,634** |
| Carrizo Hill WSC | 0 | 0 | 0 | 0 | 6 | 9 |
| Carrizo Springs | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 4,798 | 4,798 | 4,798 | 4,798 | 4,798 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 3,841 | 3,795 | 3,749 | 3,702 | 3,663 | 3,625 |
| **Dimmit County / Rio Grande Basin WUG** | **1,063** | **1,058** | **1,052** | **1,047** | **1,042** | **384** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 653 | 653 | 653 | 653 | 653 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 410 | 405 | 399 | 394 | 389 | 384 |
| **Frio County WUG Total** | **4,118** | **4,163** | **4,139** | **4,128** | **4,115** | **72** |
| **Frio County / Nueces Basin WUG** | **4,118** | **4,163** | **4,139** | **4,128** | **4,115** | **72** |
| Benton City WSC | 0 | 0 | 8 | 13 | 16 | 21 |
| Dilley | 0 | 0 | 0 | 0 | 0 | 0 |
| Moore WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Pearsall | 84 | 128 | 96 | 79 | 63 | 51 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 4,034 | 4,035 | 4,035 | 4,036 | 4,036 | 0 |
| Steam Electric Power | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Goliad County WUG Total** | **136** | **0** | **0** | **0** | **0** | **0** |
| **Goliad County / Guadalupe Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Goliad County / Guadalupe Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Steam Electric Power | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Goliad County / San Antonio Basin WUG** | **136** | **0** | **0** | **0** | **0** | **0** |
| Goliad | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 136 | 0 | 0 | 0 | 0 | 0 |
| **Goliad County / San Antonio-Nueces Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gonzales County WUG Total** | **3,631** | **3,664** | **3,702** | **3,740** | **3,779** | **0** |
| **Gonzales County / Guadalupe Basin WUG** | **3,254** | **3,284** | **3,320** | **3,355** | **3,391** | **0** |
| Fayette WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| Gonzales County WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Luling | 0 | 0 | 0 | 0 | 0 | 0 |
| Nixon | 0 | 0 | 0 | 0 | 0 | 0 |
| Smiley | 0 | 0 | 0 | 0 | 0 | 0 |
| Waelder | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Gonzales County / Guadalupe Basin WUG** | **3,254** | **3,284** | **3,320** | **3,355** | **3,391** | **0** |
| Mining | 3,254 | 3,284 | 3,320 | 3,355 | 3,391 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gonzales County / Lavaca Basin WUG** | **377** | **380** | **382** | **385** | **388** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 377 | 380 | 382 | 385 | 388 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| **Guadalupe County WUG Total** | **2,201** | **8,513** | **11,696** | **16,130** | **22,453** | **29,477** |
| **Guadalupe County / Guadalupe Basin WUG** | **1,961** | **7,924** | **10,118** | **13,287** | **17,928** | **22,700** |
| Crystal Clear SUD | 1,527 | 5,071 | 6,201 | 6,880 | 8,473 | 10,340 |
| Gonzales County WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Valley SUD | 0 | 0 | 0 | 0 | 0 | 177 |
| Martindale WSC | 0 | 19 | 27 | 39 | 54 | 73 |
| New Braunfels | 0 | 766 | 909 | 2,375 | 4,280 | 6,172 |
| Schertz | 0 | 32 | 137 | 235 | 342 | 449 |
| Seguin | 0 | 0 | 0 | 0 | 0 | 0 |
| Springs Hill WSC | 0 | 1,608 | 2,416 | 3,230 | 4,122 | 5,117 |
| Tri Community WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Services | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 100 | 229 | 372 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 428 | 428 | 428 | 428 | 428 | 0 |
| Steam Electric Power | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Guadalupe County / Guadalupe Basin WUG** | **1,961** | **7,924** | **10,118** | **13,287** | **17,928** | **22,700** |
| Irrigation | 6 | 0 | 0 | 0 | 0 | 0 |
| **Guadalupe County / San Antonio Basin WUG** | **240** | **589** | **1,578** | **2,843** | **4,525** | **6,777** |
| Cibolo | 0 | 0 | 0 | 342 | 1,007 | 1,775 |
| East Central SUD | 22 | 0 | 0 | 0 | 0 | 0 |
| Green Valley SUD | 0 | 0 | 0 | 0 | 0 | 377 |
| Marion | 0 | 0 | 0 | 0 | 0 | 0 |
| Schertz | 0 | 264 | 1,136 | 1,945 | 2,836 | 3,811 |
| Selma | 218 | 295 | 341 | 367 | 387 | 405 |
| Springs Hill WSC | 0 | 30 | 101 | 173 | 253 | 340 |
| Universal City | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 16 | 42 | 69 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Hays County WUG Total** | **403** | **4,070** | **8,203** | **18,989** | **32,969** | **47,783** |
| **Hays County / Guadalupe Basin WUG** | **403** | **4,070** | **8,203** | **18,989** | **32,969** | **47,783** |
| County Line SUD | 0 | 1,435 | 4,661 | 6,848 | 7,965 | 8,338 |
| Creedmoor-Maha WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| Crystal Clear SUD | 349 | 1,189 | 1,335 | 1,250 | 1,272 | 1,266 |
| Goforth SUD* | 0 | 0 | 0 | 1,758 | 6,395 | 11,508 |
| Kyle | 0 | 0 | 0 | 0 | 0 | 0 |
| Maxwell SUD | 0 | 0 | 0 | 739 | 1,943 | 2,516 |
| San Marcos | 0 | 1,257 | 1,260 | 2,366 | 3,964 | 4,650 |
| South Buda WCID 1 | 0 | 121 | 579 | 1,180 | 1,840 | 2,567 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Hays County / Guadalupe Basin WUG** | **403** | **4,070** | **8,203** | **18,989** | **32,969** | **47,783** |
| Texas State University | 42 | 0 | 0 | 0 | 0 | 0 |
| Wimberley WSC | 0 | 56 | 356 | 753 | 1,190 | 1,669 |
| County-Other* | 0 | 0 | 0 | 4,083 | 8,388 | 15,257 |
| Manufacturing* | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining* | 0 | 0 | 0 | 0 | 0 | 0 |
| Steam Electric Power | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock* | 12 | 12 | 12 | 12 | 12 | 12 |
| Irrigation* | 0 | 0 | 0 | 0 | 0 | 0 |
| **Karnes County WUG Total** | **1,607** | **1,596** | **2,143** | **2,132** | **2,121** | **673** |
| **Karnes County / Guadalupe Basin WUG** | **122** | **122** | **122** | **122** | **122** | **0** |
| El Oso WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 122 | 122 | 122 | 122 | 122 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Karnes County / Nueces Basin WUG** | **178** | **177** | **176** | **175** | **174** | **72** |
| El Oso WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| Three Oaks WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 102 | 102 | 102 | 102 | 102 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 76 | 75 | 74 | 73 | 72 | 72 |
| **Karnes County / San Antonio Basin WUG** | **1,301** | **1,291** | **1,840** | **1,830** | **1,820** | **597** |
| El Oso WSC* | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Karnes County / San Antonio Basin WUG** | **1,301** | **1,291** | **1,840** | **1,830** | **1,820** | **597** |
| Falls City | 0 | 0 | 0 | 0 | 0 | 0 |
| Karnes City | 0 | 0 | 0 | 0 | 0 | 0 |
| Kenedy | 0 | 0 | 0 | 0 | 0 | 0 |
| Runge | 0 | 0 | 0 | 0 | 0 | 0 |
| Sunko WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Three Oaks WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 1,216 | 1,216 | 1,216 | 1,216 | 1,216 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 85 | 75 | 624 | 614 | 604 | 597 |
| **Karnes County / San Antonio-Nueces Basin WUG** | **6** | **6** | **5** | **5** | **5** | **4** |
| El Oso WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 6 | 6 | 5 | 5 | 5 | 4 |
| **Kendall County WUG Total** | **43** | **45** | **47** | **946** | **3,193** | **5,804** |
| **Kendall County / Colorado Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| **Kendall County / Guadalupe Basin WUG** | **43** | **45** | **47** | **49** | **51** | **53** |
| Guadalupe-Blanco River Authority | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall County WCID 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Kendall County / Guadalupe Basin WUG** | **43** | **45** | **47** | **49** | **51** | **53** |
| Manufacturing | 43 | 45 | 47 | 49 | 51 | 53 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Kendall County / San Antonio Basin WUG** | **0** | **0** | **0** | **897** | **3,142** | **5,751** |
| Boerne | 0 | 0 | 0 | 650 | 2,570 | 4,965 |
| Fair Oaks Ranch | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadalupe-Blanco River Authority | 0 | 0 | 0 | 0 | 0 | 0 |
| Kendall West Utility | 0 | 0 | 0 | 107 | 225 | 356 |
| Water Services | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 140 | 347 | 430 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **La Salle County WUG Total** | **5,198** | **5,146** | **5,096** | **5,043** | **5,001** | **91** |
| **La Salle County / Nueces Basin WUG** | **5,198** | **5,146** | **5,096** | **5,043** | **5,001** | **91** |
| Cotulla | 0 | 0 | 0 | 0 | 0 | 0 |
| Encinal WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 4,867 | 4,867 | 4,867 | 4,867 | 4,867 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 331 | 279 | 229 | 176 | 134 | 91 |
| **Medina County WUG Total** | **26,195** | **25,902** | **25,790** | **25,663** | **25,619** | **25,464** |
| **Medina County / Nueces Basin WUG** | **24,434** | **24,208** | **24,045** | **23,834** | **23,706** | **23,537** |
| Benton City WSC | 0 | 0 | 12 | 22 | 34 | 50 |
| Devine | 0 | 0 | 0 | 0 | 0 | 0 |
| East Medina County SUD | 0 | 0 | 0 | 0 | 21 | 54 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Medina County / Nueces Basin WUG** | **24,434** | **24,208** | **24,045** | **23,834** | **23,706** | **23,537** |
| Hondo | 77 | 0 | 0 | 0 | 0 | 0 |
| Lytle | 28 | 22 | 26 | 28 | 32 | 34 |
| Medina County WCID 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Medina River West WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Natalia | 0 | 0 | 0 | 0 | 0 | 0 |
| Ville Dalsace Water Supply | 36 | 35 | 33 | 29 | 26 | 24 |
| West Medina WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Yancey WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 2,804 | 3,153 | 3,459 | 3,738 | 3,983 | 4,186 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 21,489 | 20,998 | 20,515 | 20,017 | 19,610 | 19,189 |
| **Medina County / San Antonio Basin WUG** | **1,761** | **1,694** | **1,745** | **1,829** | **1,913** | **1,927** |
| Canyon Lake Water Service* | 0 | 0 | 10 | 15 | 30 | 35 |
| Castroville | 417 | 397 | 492 | 628 | 743 | 803 |
| East Medina County SUD | 0 | 0 | 0 | 0 | 2 | 4 |
| La Coste | 0 | 0 | 0 | 0 | 0 | 0 |
| Medina River West WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| San Antonio Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| Ville Dalsace Water Supply | 35 | 34 | 31 | 29 | 26 | 23 |
| Yancey WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 238 | 283 | 324 | 360 | 392 | 418 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Medina County / San Antonio Basin WUG** | **1,761** | **1,694** | **1,745** | **1,829** | **1,913** | **1,927** |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 1,071 | 980 | 888 | 797 | 720 | 644 |
| **Refugio County WUG Total** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Refugio County / San Antonio Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| **Refugio County / San Antonio-Nueces Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| Refugio | 0 | 0 | 0 | 0 | 0 | 0 |
| Woodsboro | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Uvalde County WUG Total** | **19,514** | **18,722** | **18,267** | **17,802** | **17,450** | **17,086** |
| **Uvalde County / Nueces Basin WUG** | **19,514** | **18,722** | **18,267** | **17,802** | **17,450** | **17,086** |
| Concan WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Knippa WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Sabinal | 0 | 0 | 0 | 0 | 0 | 0 |
| Uvalde | 330 | 0 | 0 | 0 | 0 | 0 |
| Windmill WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 1,609 | 1,828 | 2,055 | 2,271 | 2,479 | 2,676 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 17,575 | 16,894 | 16,212 | 15,531 | 14,971 | 14,410 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Victoria County WUG Total** | **46,928** | **47,147** | **47,331** | **47,583** | **48,019** | **49,352** |
| **Victoria County / Guadalupe Basin WUG** | **44,766** | **45,401** | **46,012** | **46,679** | **47,487** | **48,920** |
| Quail Creek MUD | 0 | 0 | 0 | 0 | 0 | 0 |
| Victoria | 4,448 | 3,591 | 2,709 | 1,856 | 1,086 | 882 |
| County-Other | 175 | 201 | 176 | 126 | 75 | 27 |
| Manufacturing | 38,960 | 40,419 | 41,932 | 43,501 | 45,128 | 46,815 |
| Mining | 338 | 357 | 374 | 387 | 399 | 408 |
| Steam Electric Power | 666 | 666 | 666 | 666 | 666 | 666 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 179 | 167 | 155 | 143 | 133 | 122 |
| **Victoria County / Lavaca Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| **Victoria County / Lavaca-Guadalupe Basin WUG** | **2,162** | **1,746** | **1,319** | **904** | **532** | **432** |
| Victoria | 2,162 | 1,746 | 1,319 | 904 | 532 | 432 |
| Victoria County WCID 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Victoria County / San Antonio Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| **Wilson County WUG Total** | **683** | **758** | **858** | **1,034** | **1,264** | **1,519** |
| **Wilson County / Guadalupe Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| Sunko WSC | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Wilson County / Guadalupe Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| **Wilson County / Nueces Basin WUG** | **0** | **0** | **0** | **0** | **0** | **0** |
| McCoy WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| Picosa WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Three Oaks WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 0 | 0 | 0 | 0 | 0 | 0 |
| **Wilson County / San Antonio Basin WUG** | **683** | **758** | **858** | **1,034** | **1,264** | **1,519** |
| C Willow Water | 0 | 0 | 0 | 0 | 5 | 11 |
| East Central SUD | 13 | 0 | 0 | 0 | 0 | 0 |
| El Oso WSC* | 0 | 0 | 0 | 0 | 0 | 0 |
| Floresville | 0 | 0 | 0 | 0 | 0 | 0 |
| La Vernia | 0 | 0 | 0 | 0 | 0 | 0 |
| Oak Hills WSC | 432 | 544 | 670 | 812 | 974 | 1,156 |
| Picosa WSC | 16 | 65 | 114 | 156 | 206 | 262 |
| Poth | 0 | 0 | 0 | 0 | 0 | 0 |
| S S WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Springs Hill WSC | 25 | 36 | 46 | 55 | 65 | 73 |
| Stockdale | 0 | 0 | 0 | 0 | 0 | 0 |
| Sunko WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Three Oaks WSC | 0 | 0 | 0 | 0 | 0 | 0 |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L Water User Group (WUG)
# Second-Tier Identified Water Needs

| | WUG Second-Tier Needs (acre-feet per year) | | | | | |
|---|---|---|---|---|---|---|
| | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
| **Wilson County / San Antonio Basin WUG** | **683** | **758** | **858** | **1,034** | **1,264** | **1,519** |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 5 | 7 | 9 | 11 | 14 | 17 |
| Mining | 0 | 0 | 0 | 0 | 0 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 192 | 106 | 19 | 0 | 0 | 0 |
| **Zavala County WUG Total** | **17,818** | **17,377** | **16,936** | **16,496** | **16,128** | **12,099** |
| **Zavala County / Nueces Basin WUG** | **17,818** | **17,377** | **16,936** | **16,496** | **16,128** | **12,099** |
| Batesville WSC | 0 | 0 | 0 | 0 | 0 | 0 |
| Crystal City | 0 | 0 | 0 | 0 | 0 | 0 |
| Loma Alta Chula Vista Water System | 0 | 0 | 0 | 0 | 0 | 0 |
| Zavala County WCID 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| County-Other | 0 | 0 | 0 | 0 | 0 | 0 |
| Manufacturing | 732 | 759 | 787 | 816 | 846 | 877 |
| Mining | 3,664 | 3,664 | 3,664 | 3,664 | 3,664 | 0 |
| Livestock | 0 | 0 | 0 | 0 | 0 | 0 |
| Irrigation | 13,422 | 12,954 | 12,485 | 12,016 | 11,618 | 11,222 |
| **Region L Second-Tier Needs Total** | **172,427** | **185,099** | **199,139** | **231,758** | **276,680** | **298,169** |

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Atascosa County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 14,475 | 13,421 | -7.3% | 15,049 | 13,411 | -10.9% |
| Projected demand total | 9,223 | 7,991 | -13.4% | 13,077 | 10,234 | -21.7% |
| Water supply needs total** | 878 | 169 | -80.8% | 1,517 | 849 | -44.0% |
| **Atascosa County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 97 | 74 | -23.7% | 97 | 74 | -23.7% |
| Projected demand total | 97 | 56 | -42.3% | 97 | 64 | -34.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Atascosa County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 4,043 | 4,739 | 17.2% | 2,043 | 4,739 | 132.0% |
| Projected demand total | 4,043 | 8,039 | 98.8% | 2,043 | 9,217 | 351.2% |
| Water supply needs total** | 0 | 3,300 | 100.0% | 0 | 4,478 | 100.0% |
| **Atascosa County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 8,427 | 8,427 | 0.0% | 8,427 | 8,427 | 0.0% |
| Projected demand total | 8,427 | 7,962 | -5.5% | 8,427 | 7,962 | -5.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Atascosa County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,673 | 1,537 | -8.1% | 1,673 | 1,537 | -8.1% |
| Projected demand total | 1,673 | 1,537 | -8.1% | 1,673 | 1,537 | -8.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Atascosa County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 33,516 | 25,623 | -23.5% | 33,428 | 25,623 | -23.3% |
| Projected demand total | 29,946 | 25,441 | -15.0% | 29,946 | 25,441 | -15.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Bexar County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 274,487 | 366,779 | 33.6% | 284,477 | 363,760 | 27.9% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 289,932 | 314,613 | 8.5% | 386,599 | 397,644 | 2.9% |
| Water supply needs total** | 20,916 | 21,570 | 3.1% | 106,399 | 54,350 | -48.9% |
| **Bexar County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 6,861 | 12,792 | 86.4% | 6,861 | 12,792 | 86.4% |
| Projected demand total | 6,776 | 8,873 | 30.9% | 6,776 | 10,260 | 51.4% |
| Water supply needs total** | 0 | 16 | 100.0% | 0 | 1,381 | 100.0% |
| **Bexar County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 8,740 | 11,277 | 29.0% | 12,502 | 11,277 | -9.8% |
| Projected demand total | 8,740 | 7,634 | -12.7% | 12,502 | 10,322 | -17.4% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Bexar County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 49,511 | 95,651 | 93.2% | 49,511 | 95,651 | 93.2% |
| Projected demand total | 52,293 | 52,293 | 0.0% | 52,293 | 52,293 | 0.0% |
| Water supply needs total** | 2,782 | 0 | -100.0% | 2,782 | 0 | -100.0% |
| **Bexar County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,201 | 988 | -17.7% | 1,201 | 988 | -17.7% |
| Projected demand total | 1,201 | 988 | -17.7% | 1,201 | 988 | -17.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Bexar County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 11,926 | 27,287 | 128.8% | 11,926 | 27,287 | 128.8% |
| Projected demand total | 11,926 | 11,751 | -1.5% | 11,926 | 11,751 | -1.5% |
| Water supply needs total** | 3,318 | 0 | -100.0% | 3,318 | 0 | -100.0% |
| **Caldwell County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,105 | 12,511 | 12.7% | 11,051 | 13,988 | 26.6% |
| Projected demand total | 7,072 | 8,142 | 15.1% | 11,811 | 15,558 | 31.7% |
| Water supply needs total** | 290 | 108 | -62.8% | 3,060 | 3,330 | 8.8% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Caldwell County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 5 | 5 | 0.0% | 5 | 5 | 0.0% |
| Projected demand total | 5 | 14 | 180.0% | 5 | 18 | 260.0% |
| Water supply needs total** | 0 | 9 | 100.0% | 0 | 13 | 100.0% |
| **Caldwell County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 100 | 352 | 252.0% | 9 | 352 | 3811.1% |
| Projected demand total | 98 | 352 | 259.2% | 9 | 352 | 3811.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Caldwell County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 788 | 831 | 5.5% | 788 | 831 | 5.5% |
| Projected demand total | 788 | 831 | 5.5% | 788 | 831 | 5.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Caldwell County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 802 | 680 | -15.2% | 802 | 680 | -15.2% |
| Projected demand total | 802 | 680 | -15.2% | 802 | 680 | -15.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 6,923 | 5,849 | -15.5% | 7,131 | 5,615 | -21.3% |
| Projected demand total | 3,271 | 2,628 | -19.7% | 4,384 | 2,050 | -53.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 119 | 0 | -100.0% |
| **Calhoun County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 60,351 | 56,720 | -6.0% | 60,275 | 56,720 | -5.9% |
| Projected demand total | 52,479 | 54,587 | 4.0% | 52,479 | 63,125 | 20.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 6,405 | 100.0% |
| **Calhoun County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 55 | 0 | -100.0% | 12 | 0 | -100.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 55 | 0 | -100.0% | 12 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 0 | 37 | 100.0% | 0 | 37 | 100.0% |
| Projected demand total | 0 | 37 | 100.0% | 0 | 37 | 100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 400 | 282 | -29.5% | 400 | 282 | -29.5% |
| Projected demand total | 290 | 282 | -2.8% | 290 | 282 | -2.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Calhoun County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,751 | 1,462 | -16.5% | 1,751 | 1,462 | -16.5% |
| Projected demand total | 15,839 | 10,460 | -34.0% | 15,839 | 10,460 | -34.0% |
| Water supply needs total** | 14,088 | 9,173 | -34.9% | 14,088 | 9,173 | -34.9% |
| **Comal County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 36,662 | 49,788 | 35.8% | 36,928 | 50,524 | 36.8% |
| Projected demand total | 34,742 | 44,596 | 28.4% | 62,682 | 134,706 | 114.9% |
| Water supply needs total** | 6,419 | 2,734 | -57.4% | 27,302 | 84,810 | 210.6% |
| **Comal County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 2,020 | 3,119 | 54.4% | 2,020 | 3,119 | 54.4% |
| Projected demand total | 5,788 | 901 | -84.4% | 5,788 | 1,042 | -82.0% |
| Water supply needs total** | 3,768 | 0 | -100.0% | 3,768 | 0 | -100.0% |
| **Comal County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 4,795 | 9,046 | 88.7% | 6,779 | 9,046 | 33.4% |
| Projected demand total | 9,996 | 12,013 | 20.2% | 15,628 | 20,432 | 30.7% |
| Water supply needs total** | 5,201 | 2,967 | -43.0% | 8,849 | 11,386 | 28.7% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Comal County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 237 | 271 | 14.3% | 237 | 271 | 14.3% |
| Projected demand total | 237 | 271 | 14.3% | 237 | 271 | 14.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Comal County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 639 | 765 | 19.7% | 639 | 765 | 19.7% |
| Projected demand total | 428 | 591 | 38.1% | 428 | 591 | 38.1% |
| Water supply needs total** | 33 | 0 | -100.0% | 33 | 0 | -100.0% |
| **DeWitt County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 4,112 | 4,322 | 5.1% | 4,122 | 4,317 | 4.7% |
| Projected demand total | 3,995 | 3,882 | -2.8% | 4,052 | 3,800 | -6.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 322 | 380 | 18.0% | 350 | 380 | 8.6% |
| Projected demand total | 344 | 248 | -27.9% | 344 | 287 | -16.6% |
| Water supply needs total** | 22 | 0 | -100.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,378 | 2,671 | 93.8% | 301 | 2,671 | 787.4% |
| Projected demand total | 2,973 | 1,695 | -43.0% | 301 | 1,695 | 463.1% |
| Water supply needs total** | 1,595 | 0 | -100.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,904 | 1,736 | -8.8% | 1,904 | 1,736 | -8.8% |
| Projected demand total | 1,904 | 1,736 | -8.8% | 1,904 | 1,736 | -8.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **DeWitt County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 510 | 863 | 69.2% | 1,479 | 863 | -41.6% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 757 | 590 | -22.1% | 757 | 590 | -22.1% |
| Water supply needs total** | 318 | 0 | -100.0% | 0 | 0 | 0.0% |
| **Dimmit County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 2,579 | 2,611 | 1.2% | 2,883 | 2,617 | -9.2% |
| Projected demand total | 2,542 | 1,771 | -30.3% | 2,883 | 1,435 | -50.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 44 | 100.0% |
| **Dimmit County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 689 | 695 | 0.9% | 673 | 695 | 3.3% |
| Projected demand total | 5,001 | 6,146 | 22.9% | 612 | 6,146 | 904.2% |
| Water supply needs total** | 4,312 | 5,451 | 26.4% | 81 | 5,451 | 6629.6% |
| **Dimmit County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 388 | 367 | -5.4% | 388 | 367 | -5.4% |
| Projected demand total | 388 | 367 | -5.4% | 388 | 367 | -5.4% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Dimmit County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 352 | 353 | 0.3% | 352 | 353 | 0.3% |
| Projected demand total | 5,601 | 4,689 | -16.3% | 5,601 | 4,689 | -16.3% |
| Water supply needs total** | 5,249 | 4,336 | -17.4% | 5,249 | 4,336 | -17.4% |
| **Frio County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 8,240 | 8,236 | 0.0% | 8,229 | 8,260 | 0.4% |
| Projected demand total | 3,991 | 3,612 | -9.5% | 5,047 | 4,328 | -14.2% |
| Water supply needs total** | 771 | 250 | -67.6% | 1,351 | 746 | -44.8% |
| **Frio County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,250 | 1,968 | 57.4% | 390 | 1,968 | 404.6% |
| Projected demand total | 1,250 | 6,002 | 380.2% | 390 | 6,004 | 1439.5% |
| Water supply needs total** | 0 | 4,034 | 100.0% | 0 | 4,036 | 100.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Frio County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 124 | 124 | 0.0% | 124 | 124 | 0.0% |
| Projected demand total | 124 | 54 | -56.5% | 124 | 54 | -56.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Frio County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 882 | 964 | 9.3% | 882 | 964 | 9.3% |
| Projected demand total | 882 | 964 | 9.3% | 882 | 964 | 9.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Frio County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 78,183 | 70,976 | -9.2% | 71,037 | 70,910 | -0.2% |
| Projected demand total | 78,183 | 70,567 | -9.7% | 78,183 | 70,567 | -9.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 7,146 | 0 | -100.0% |
| **Goliad County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 2,060 | 1,615 | -21.6% | 2,101 | 1,615 | -23.1% |
| Projected demand total | 1,324 | 919 | -30.6% | 1,466 | 860 | -41.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 4 | 0 | -100.0% | 4 | 0 | -100.0% |
| Projected demand total | 1 | 0 | -100.0% | 1 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 450 | 14 | -96.9% | 450 | 14 | -96.9% |
| Projected demand total | 450 | 8 | -98.2% | 450 | 8 | -98.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 26,023 | 24,383 | -6.3% | 26,023 | 24,149 | -7.2% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 1,863 | 4,994 | 168.1% | 1,863 | 4,994 | 168.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 841 | 789 | -6.2% | 841 | 789 | -6.2% |
| Projected demand total | 841 | 789 | -6.2% | 841 | 789 | -6.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Goliad County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 2,839 | 3,096 | 9.1% | 2,839 | 3,711 | 30.7% |
| Projected demand total | 2,839 | 3,126 | 10.1% | 2,839 | 3,126 | 10.1% |
| Water supply needs total** | 388 | 184 | -52.6% | 388 | 0 | -100.0% |
| **Gonzales County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 13,633 | 9,316 | -31.7% | 13,641 | 9,277 | -32.0% |
| Projected demand total | 5,292 | 4,516 | -14.7% | 7,209 | 4,273 | -40.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Gonzales County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 2,427 | 2,812 | 15.9% | 2,427 | 2,812 | 15.9% |
| Projected demand total | 2,427 | 2,311 | -4.8% | 2,427 | 2,673 | 10.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Gonzales County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,207 | 2,961 | 145.3% | 1 | 2,961 | 296000.0% |
| Projected demand total | 1,207 | 6,592 | 446.1% | 1 | 6,740 | 673900.0% |
| Water supply needs total** | 0 | 3,631 | 100.0% | 0 | 3,779 | 100.0% |
| **Gonzales County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 9,572 | 4,138 | -56.8% | 9,572 | 4,138 | -56.8% |
| Projected demand total | 9,572 | 4,138 | -56.8% | 9,572 | 4,138 | -56.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Gonzales County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 5,609 | 4,918 | -12.3% | 5,609 | 4,918 | -12.3% |
| Projected demand total | 5,127 | 4,478 | -12.7% | 5,127 | 4,478 | -12.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Guadalupe County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 37,416 | 51,316 | 37.1% | 38,504 | 48,898 | 27.0% |
| Projected demand total | 30,784 | 40,540 | 31.7% | 50,420 | 88,616 | 75.8% |
| Water supply needs total** | 92 | 2,082 | 2163.0% | 14,377 | 40,118 | 179.0% |
| **Guadalupe County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 4,136 | 4,230 | 2.3% | 4,136 | 4,230 | 2.3% |
| Projected demand total | 4,523 | 3,526 | -22.0% | 4,523 | 4,078 | -9.8% |
| Water supply needs total** | 388 | 0 | -100.0% | 388 | 0 | -100.0% |
| **Guadalupe County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 550 | 342 | -37.8% | 1,043 | 342 | -67.2% |
| Projected demand total | 550 | 770 | 40.0% | 1,043 | 770 | -26.2% |
| Water supply needs total** | 0 | 428 | 100.0% | 0 | 428 | 100.0% |
| **Guadalupe County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 13,320 | 9,465 | -28.9% | 13,320 | 9,465 | -28.9% |
| Projected demand total | 9,405 | 9,392 | -0.1% | 9,405 | 9,392 | -0.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Guadalupe County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,300 | 1,179 | -9.3% | 1,300 | 1,179 | -9.3% |
| Projected demand total | 1,300 | 1,179 | -9.3% | 1,300 | 1,179 | -9.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Guadalupe County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,179 | 942 | -20.1% | 1,179 | 942 | -20.1% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 1,136 | 942 | -17.1% | 1,136 | 942 | -17.1% |
| Water supply needs total** | 0 | 20 | 100.0% | 0 | 20 | 100.0% |
| **Hays County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 31,099 | 56,259 | 80.9% | 35,922 | 56,920 | 58.5% |
| Projected demand total | 29,294 | 38,311 | 30.8% | 65,003 | 113,374 | 74.4% |
| Water supply needs total** | 1,654 | 989 | -40.2% | 29,359 | 56,454 | 92.3% |
| **Hays County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 550 | 70 | -87.3% | 550 | 70 | -87.3% |
| Projected demand total | 56 | 57 | 1.8% | 56 | 65 | 16.1% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Hays County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 0 | 71 | 100.0% | 0 | 71 | 100.0% |
| Projected demand total | 0 | 30 | 100.0% | 0 | 61 | 100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Hays County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 0 | 2,464 | 100.0% | 0 | 2,464 | 100.0% |
| Projected demand total | 0 | 1,949 | 100.0% | 0 | 1,949 | 100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Hays County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 2,792 | 2,700 | -3.3% | 2,792 | 2,700 | -3.3% |
| Projected demand total | 2,792 | 2,712 | -2.9% | 2,792 | 2,712 | -2.9% |
| Water supply needs total** | 0 | 12 | 100.0% | 0 | 12 | 100.0% |
| **Hays County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 506 | 226 | -55.3% | 506 | 226 | -55.3% |
| Projected demand total | 157 | 130 | -17.2% | 157 | 130 | -17.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Karnes County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 3,861 | 5,108 | 32.3% | 3,768 | 4,850 | 28.7% |
| Projected demand total | 3,636 | 3,560 | -2.1% | 3,563 | 4,284 | 20.2% |
| Water supply needs total** | 352 | 0 | -100.0% | 395 | 0 | -100.0% |
| **Karnes County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 155 | 84 | -45.8% | 0 | 84 | 100.0% |
| Projected demand total | 155 | 69 | -55.5% | 155 | 81 | -47.7% |
| Water supply needs total** | 0 | 0 | 0.0% | 155 | 0 | -100.0% |
| **Karnes County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 563 | 479 | -14.9% | 28 | 479 | 1610.7% |
| Projected demand total | 1,919 | 1,919 | 0.0% | 2 | 1,919 | 95850.0% |
| Water supply needs total** | 1,356 | 1,440 | 6.2% | 1 | 1,440 | 143900.0% |
| **Karnes County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,908 | 954 | -50.0% | 1,644 | 954 | -42.0% |
| Projected demand total | 1,086 | 954 | -12.2% | 1,086 | 954 | -12.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Karnes County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,023 | 966 | -5.6% | 464 | 407 | -12.3% |
| Projected demand total | 1,023 | 915 | -10.6% | 1,023 | 915 | -10.6% |
| Water supply needs total** | 268 | 185 | -31.0% | 827 | 744 | -10.0% |
| **Kendall County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,689 | 14,473 | 23.8% | 12,550 | 13,705 | 9.2% |
| Projected demand total | 8,369 | 9,389 | 12.2% | 15,308 | 23,982 | 56.7% |
| Water supply needs total** | 282 | 0 | -100.0% | 4,389 | 10,908 | 148.5% |
| **Kendall County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 1 | 3 | 200.0% | 1 | 3 | 200.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 1 | 46 | 4500.0% | 1 | 54 | 5300.0% |
| Water supply needs total** | 0 | 43 | 100.0% | 0 | 51 | 100.0% |
| **Kendall County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 395 | 388 | -1.8% | 395 | 388 | -1.8% |
| Projected demand total | 395 | 388 | -1.8% | 395 | 388 | -1.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Kendall County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 622 | 733 | 17.8% | 622 | 733 | 17.8% |
| Projected demand total | 606 | 461 | -23.9% | 606 | 461 | -23.9% |
| Water supply needs total** | 1 | 0 | -100.0% | 1 | 0 | -100.0% |
| **La Salle County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 2,997 | 1,656 | -44.7% | 3,088 | 1,656 | -46.4% |
| Projected demand total | 1,942 | 1,517 | -21.9% | 2,518 | 1,503 | -40.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **La Salle County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 529 | 529 | 0.0% | 529 | 529 | 0.0% |
| Projected demand total | 4,772 | 5,396 | 13.1% | 676 | 5,396 | 698.2% |
| Water supply needs total** | 4,243 | 4,867 | 14.7% | 147 | 4,867 | 3210.9% |
| **La Salle County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 491 | 394 | -19.8% | 491 | 394 | -19.8% |
| Projected demand total | 491 | 394 | -19.8% | 491 | 394 | -19.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **La Salle County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 4,581 | 4,048 | -11.6% | 4,490 | 4,048 | -9.8% |
| Projected demand total | 5,784 | 4,461 | -22.9% | 5,784 | 4,461 | -22.9% |
| Water supply needs total** | 1,203 | 413 | -65.7% | 1,294 | 413 | -68.1% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Medina County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 8,681 | 11,394 | 31.3% | 9,164 | 12,880 | 40.5% |
| Projected demand total | 8,508 | 8,650 | 1.7% | 10,770 | 11,730 | 8.9% |
| Water supply needs total** | 1,787 | 949 | -46.9% | 3,255 | 1,980 | -39.2% |
| **Medina County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 1,543 | 1,584 | 2.7% | 1,543 | 1,584 | 2.7% |
| Projected demand total | 67 | 15 | -77.6% | 67 | 19 | -71.6% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Medina County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 2,214 | 1,282 | -42.1% | 3,029 | 1,282 | -57.7% |
| Projected demand total | 2,057 | 4,324 | 110.2% | 2,872 | 5,657 | 97.0% |
| Water supply needs total** | 0 | 3,042 | 100.0% | 0 | 4,375 | 100.0% |
| **Medina County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,165 | 1,058 | -9.2% | 1,165 | 1,058 | -9.2% |
| Projected demand total | 1,145 | 1,058 | -7.6% | 1,145 | 1,058 | -7.6% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Medina County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 24,211 | 31,207 | 28.9% | 22,742 | 30,913 | 35.9% |
| Projected demand total | 59,968 | 54,809 | -8.6% | 59,968 | 54,809 | -8.6% |
| Water supply needs total** | 35,757 | 23,602 | -34.0% | 37,226 | 23,896 | -35.8% |
| **Refugio County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 1,200 | 1,184 | -1.3% | 1,200 | 1,184 | -1.3% |
| Projected demand total | 1,200 | 983 | -18.1% | 1,200 | 865 | -27.9% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Refugio County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 69 | 0 | -100.0% | 15 | 0 | -100.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 69 | 0 | -100.0% | 15 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Refugio County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 475 | 461 | -2.9% | 475 | 461 | -2.9% |
| Projected demand total | 475 | 461 | -2.9% | 475 | 461 | -2.9% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Refugio County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 1,034 | 868 | -16.1% | 1,034 | 868 | -16.1% |
| Projected demand total | 1,034 | 867 | -16.2% | 1,034 | 867 | -16.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Uvalde County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 3,963 | 6,741 | 70.1% | 4,202 | 6,741 | 60.4% |
| Projected demand total | 6,626 | 5,320 | -19.7% | 8,334 | 4,668 | -44.0% |
| Water supply needs total** | 2,925 | 717 | -75.5% | 4,273 | 288 | -93.3% |
| **Uvalde County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 111 | 0 | -100.0% | 111 | 0 | -100.0% |
| Projected demand total | 3 | 0 | -100.0% | 3 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Uvalde County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 2,814 | 1,595 | -43.3% | 3,772 | 1,595 | -57.7% |
| Projected demand total | 2,916 | 3,204 | 9.9% | 3,874 | 4,074 | 5.2% |
| Water supply needs total** | 102 | 1,609 | 1477.5% | 102 | 2,479 | 2330.4% |
| **Uvalde County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 2,198 | 2,049 | -6.8% | 2,198 | 2,049 | -6.8% |
| Projected demand total | 2,198 | 2,049 | -6.8% | 2,198 | 2,049 | -6.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Uvalde County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 21,663 | 34,078 | 57.3% | 20,705 | 34,078 | 64.6% |
| Projected demand total | 62,409 | 52,703 | -15.6% | 62,409 | 52,703 | -15.6% |
| Water supply needs total** | 40,746 | 18,625 | -54.3% | 41,704 | 18,625 | -55.3% |
| **Victoria County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,533 | 12,597 | 9.2% | 11,533 | 12,597 | 9.2% |
| Projected demand total | 21,065 | 19,521 | -7.3% | 23,877 | 19,728 | -17.4% |
| Water supply needs total** | 10,681 | 8,466 | -20.7% | 13,446 | 8,627 | -35.8% |
| **Victoria County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 472 | 472 | 0.0% | 472 | 472 | 0.0% |
| Projected demand total | 9,234 | 39,432 | 327.0% | 9,234 | 45,600 | 393.8% |
| Water supply needs total** | 8,762 | 38,960 | 344.6% | 8,762 | 45,128 | 415.0% |
| **Victoria County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 75 | 52 | -30.7% | 18 | 52 | 188.9% |
| Projected demand total | 75 | 390 | 420.0% | 18 | 451 | 2405.6% |
| Water supply needs total** | 0 | 338 | 100.0% | 0 | 399 | 100.0% |
| **Victoria County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 12,550 | 2,532 | -79.8% | 12,550 | 2,532 | -79.8% |
| Projected demand total | 31,475 | 3,198 | -89.8% | 31,475 | 3,198 | -89.8% |
| Water supply needs total** | 18,925 | 666 | -96.5% | 18,925 | 666 | -96.5% |
| **Victoria County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,064 | 979 | -8.0% | 1,064 | 979 | -8.0% |
| Projected demand total | 1,064 | 979 | -8.0% | 1,064 | 979 | -8.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Victoria County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 13,398 | 11,092 | -17.2% | 13,398 | 11,092 | -17.2% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| Projected demand total | 13,398 | 11,092 | -17.2% | 13,398 | 11,092 | -17.2% |
| Water supply needs total** | 5,791 | 200 | -96.5% | 5,791 | 200 | -96.5% |
| **Wilson County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 11,141 | 16,496 | 48.1% | 11,099 | 16,539 | 49.0% |
| Projected demand total | 10,037 | 8,292 | -17.4% | 16,123 | 11,616 | -28.0% |
| Water supply needs total** | 1,770 | 626 | -64.6% | 7,013 | 1,762 | -74.9% |
| **Wilson County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 43 | 57 | 32.6% | 43 | 57 | 32.6% |
| Projected demand total | 43 | 62 | 44.2% | 43 | 71 | 65.1% |
| Water supply needs total** | 0 | 5 | 100.0% | 0 | 14 | 100.0% |
| **Wilson County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 1,548 | 5,641 | 264.4% | 204 | 5,641 | 2665.2% |
| Projected demand total | 1,548 | 4,680 | 202.3% | 204 | 4,714 | 2210.8% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Wilson County\| Steam Electric Power WUG Type** | | | | | | |
| Existing WUG supply total | 2,439 | 0 | -100.0% | 2,439 | 0 | -100.0% |
| Projected demand total | 2,439 | 0 | -100.0% | 2,439 | 0 | -100.0% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Wilson County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 1,889 | 1,709 | -9.5% | 1,889 | 1,709 | -9.5% |
| Projected demand total | 1,889 | 1,709 | -9.5% | 1,889 | 1,709 | -9.5% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Wilson County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 15,442 | 13,404 | -13.2% | 14,965 | 13,404 | -10.4% |
| Projected demand total | 15,418 | 13,318 | -13.6% | 15,418 | 13,318 | -13.6% |
| Water supply needs total** | 3,405 | 331 | -90.3% | 3,882 | 331 | -91.5% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

# Region L 2026 Regional Water Plan (RWP)
# Water User Group (WUG) Data Comparison to 2021 RWP

**Water Volumes Shown in Acre-Feet per year**

| | 2030 Planning Decade* | | | 2070 Planning Decade* | | |
|---|---|---|---|---|---|---|
| | 2021 RWP | 2026 RWP | Difference (%) | 2021 RWP | 2026 RWP | Difference (%) |
| **Zavala County\| Municipal WUG Type** | | | | | | |
| Existing WUG supply total | 4,642 | 4,460 | -3.9% | 4,799 | 4,460 | -7.1% |
| Projected demand total | 3,133 | 1,998 | -36.2% | 4,151 | 1,695 | -59.2% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Zavala County\| Manufacturing WUG Type** | | | | | | |
| Existing WUG supply total | 766 | 0 | -100.0% | 766 | 0 | -100.0% |
| Projected demand total | 766 | 732 | -4.4% | 766 | 846 | 10.4% |
| Water supply needs total** | 0 | 732 | 100.0% | 0 | 846 | 100.0% |
| **Zavala County\| Mining WUG Type** | | | | | | |
| Existing WUG supply total | 2,257 | 1,268 | -43.8% | 557 | 1,268 | 127.6% |
| Projected demand total | 2,257 | 4,932 | 118.5% | 557 | 4,932 | 785.5% |
| Water supply needs total** | 0 | 3,664 | 100.0% | 0 | 3,664 | 100.0% |
| **Zavala County\| Livestock WUG Type** | | | | | | |
| Existing WUG supply total | 893 | 855 | -4.3% | 893 | 855 | -4.3% |
| Projected demand total | 893 | 855 | -4.3% | 893 | 855 | -4.3% |
| Water supply needs total** | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Zavala County\| Irrigation WUG Type** | | | | | | |
| Existing WUG supply total | 24,968 | 28,385 | 13.7% | 25,901 | 28,385 | 9.6% |
| Projected demand total | 46,318 | 42,574 | -8.1% | 45,766 | 42,574 | -7.0% |
| Water supply needs total** | 21,350 | 14,189 | -33.5% | 19,865 | 14,189 | -28.6% |
| **Region L Total** | | | | | | |
| Existing WUG supply total | 1,005,292 | 1,213,200 | 20.7% | 1,013,911 | 1,210,344 | 19.4% |
| Projected demand total | 1,114,948 | 1,134,971 | 1.8% | 1,320,128 | 1,493,287 | 13.1% |
| Water supply needs total** | 232,188 | 185,132 | -20.3% | 401,027 | 437,491 | 9.1% |

*The 2030 and 2070 planning decades are used in this comparison because they represent the earliest and latest planning decades in both the 2021 and 2026 RWPs

**WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Data Comparison to 2021 RWP report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG county and category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the water supply needs totals.

FINAL PLAN

# CHAPTER 5: EVALUATION AND RECOMMENDATION OF WATER MANAGEMENT STRATEGIES

South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**Chapter 5: Evaluation and Recommendation of Water Management Strategies**

**Subchapter 5.1 Potentially Feasible Water Management Strategies ..... 5.1-1**

**Subchapter 5.2 Water Management Strategy Evaluations ..... 5.2-1**

5.2.1 Municipal Water Conservation ..... 5.2.1 – 1
5.2.2 Non-Municipal Water Conservation ..... 5.2.2 – 1
5.2.3 Drought Management ..... 5.2.3 – 1
5.2.4 Edwards Transfers ..... 5.2.4 – 1
5.2.5 Fresh Groundwater Development ..... 5.2.5 – 1
5.2.6 Brackish Groundwater Development ..... 5.2.6 – 1
5.2.7 Groundwater Conversions ..... 5.2.7 – 1
5.2.8 Facilities Expansion ..... 5.2.8 – 1
5.2.9 Reuse Water ..... 5.2.9 – 1
5.2.10 Brush Management ..... 5.2.10 – 1
5.2.11 Rainwater Harvesting ..... 5.2.11 – 1
5.2.12 Surface Water Rights ..... 5.2.12 – 1
5.2.13 Balancing Storage ..... 5.2.13 – 1
5.2.14 ARWA Carrizo-Wilcox Project (Phase 2) ..... 5.2.14 – 1
5.2.15 ARWA DPR Project (Phase 3) ..... 5.2.15 – 1
5.2.16 CRWA Expanded Brackish Carrizo-Wilcox Project ..... 5.2.16 – 1
5.2.17 CRWA Siesta Project ..... 5.2.17 – 1
5.2.18 CRWA Wells Ranch (Phase 3) Project ..... 5.2.18 – 1
5.2.19 CVLGC Carrizo Project ..... 5.2.19 – 1
5.2.20 GBRA Lower Basin New Appropriation ..... 5.2.20 – 1
5.2.21 GBRA WaterSECURE ..... 5.2.21 – 1
5.2.22 Medina County Regional ASR Project ..... 5.2.22 – 1
5.2.23 NBU ASR Project ..... 5.2.23 – 1
5.2.24 NBU Trinity Well Field Expansion ..... 5.2.24 – 1
5.2.25 SAWS Expanded Local Carrizo Project ..... 5.2.25 – 1
5.2.26 SAWS Expanded Brackish Groundwater Project ..... 5.2.26 – 1
5.2.27 SAWS Regional Wilcox Project ..... 5.2.27 – 1
5.2.28 SSLGC Expanded Brackish Wilcox Project ..... 5.2.28 – 1

5.2.29 SSLGC Expanded Carrizo Project ..... 5.2.29 – 1
5.2.30 Victoria ASR Project ..... 5.2.30 – 1
5.2.31 Victoria Groundwater-Surface Water Exchange ..... 5.2.31 – 1
5.2.32 Weather Modification ..... 5.2.32 – 1
**Subchapter 5.3 Water Conservation Information and Recommendations ..... 5.3-1**

## APPENDICES

Appendix 5A: Guiding Principles of the South Central Texas Regional Water Planning Group

Appendix 5B: Water Management Strategies Considered and Evaluated to Meet Identified Needs

Appendix 5C: Implementation Status of Certain Water Management Strategies

Appendix 5D: Threatened and Endangered Species and Species of Greatest Conservation Need by County

Appendix 5E: Miscellaneous Water Management Strategy Cost Estimate Summaries

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft | Acre-Feet |
| acft/yr | Acre-Feet per Year |
| ACT | Antiquities Code of Texas |
| AMI | Advanced Metering Infrastructure |
| ANSI | American National Standards Institute |
| ANWR | Aransas National Wildlife Refuge |
| ASME | American Society of Mechanical Engineers |
| ARWA | Alliance Regional Water Authority |
| ASR | Aquifer Storage and Recovery |
| BFZ | Balcones Fault Zone |
| BMP | Best Management Practice |
| $BOD_5$ | Five-Day Biochemical Oxygen Demand |
| BSEACD | Barton Springs Edwards Aquifer Conservation District |
| BVRT | BVRT Utility Holding Company |
| CA | Certificate of Adjudication |
| $CBOD_5$ | Five-Day Carbonaceous Biochemical Oxygen Demand |
| CCMA | Cibolo Creek Municipal Authority |
| CD | Conservation District |
| cfs | Cubic Feet per Second |
| CFU | Colony Forming Units |
| CLSUD | County Line SUD |
| CPM | Critical Period Management |
| CPS | City Public Services |
| CRWA | Canyon Regional Water Authority |
| CVLGC | Cibolo Valley Local Government Corporation |
| DB27 | 2027 Regional and State Water Planning Database |
| DCP | Drought Contingency Plan |
| DFC | Desired Future Condition |
| DPR | Direct Potable Reuse |
| EAA | Edwards Aquifer Authority |
| EAHCP | Edwards Aquifer Habitat Conservation Plan |
| EDYS | Ecological Dynamics Simulation |
| EMST | Ecological Mapping System of Texas |

| | |
|---|---|
| EQIP | Environmental Quality Incentive Program |
| EST | Elevated Storage Tank |
| ET | Evapotranspiration |
| FAA | Federal Aviation Administration |
| FARM | Financial and Risk Management |
| FEMA | Federal Emergency Management Agency |
| FIRM | Flood Insurance Rate Map |
| FM | Farm-to-Market |
| FRAT | Flow Regime Application Tool |
| GAM | Groundwater Availability Model |
| GBRA | Guadalupe-Blanco River Authority |
| GCD | Groundwater Conservation District |
| GIS | Geographic Information System |
| GLO | General Land Office |
| GMA | Groundwater Management Area |
| GPCD | Gallons per Capita per Day |
| gpd | Gallons per Day |
| gpm | Gallons per Minute |
| GSA WAM | Guadalupe-San Antonio River Basin Water Availability Model |
| GST | Ground Storage Tank |
| HB | House Bill |
| HCP | Habitat Conservation Plan |
| HSPS | High Service Pump Station |
| Hwy | Highway |
| IH | Interstate Highway |
| IPaC | Information for Planning and Consultation |
| IRP | Initial Regular Permit |
| MAG | Modeled Available Groundwater |
| MBTA | Migratory Bird Treaty Act |
| MCL | Maximum Contaminant Level |
| MG | Million Gallon |
| mg/L | Milligrams per Liter |
| MGD | Million Gallons per Day |
| mL | Milliliter |
| MUD | Municipal Utility District |
| NHD | National Hydrography Dataset |

| | |
|---|---|
| NBU | New Braunfels Utilities |
| NETR | Nationwide Environmental Title Research |
| NHPA | National Historic Preservation Act |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NTU | Nephelometric Turbidity Unit |
| NWI | National Wetlands Inventory |
| O&M | Operation and Maintenance |
| OCR | Off-Channel Reservoir |
| OTHM | Official Texas Historical Marker |
| PDSI | Palmer Drought Severity Index |
| psi | Pounds per Square Inch |
| PHS | Potential Historical Structures |
| Region L | South Central Texas Region |
| RO | Reverse Osmosis |
| RTHL | Recorded Texas Historical Landmark |
| RWP | Regional Water Plan |
| RWPA | Regional Water Planning Area |
| RWPG | Regional Water Planning Group |
| SAL | State Antiquities Landmark |
| SAWS | San Antonio Water System |
| SB | Senate Bill |
| SCTRWP | South Central Texas Regional Water Plan |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SGCN | Species of Greatest Conservation Need |
| SH | State Highway |
| SHPO | State Historic Preservation Office |
| SJR | Senate Joint Resolution |
| SSLGC | Schertz-Seguin Local Government Corporation |
| STWMA | South Texas Weather Modification Association |
| SUD | Special Utility District |
| SWCD | Soil and Water Conservation District |
| SWIFT | State Water Implementation Fund for Texas |
| SWP | State Water Plan |
| SWTP | Surface Water Treatment Plant |

| | |
|---|---|
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| TDA | Texas Department of Agriculture |
| TDS | Total Dissolved Solids |
| TxDOT | Texas Department of Transportation |
| THC | Texas Historical Commission |
| TML | Texas Municipal League |
| TPWD | Texas Parks and Wildlife Department |
| TSSWCB | Texas State Soil and Water Conservation Board |
| TWC | Texas Water Code |
| TWDB | Texas Water Development Board |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| U.S. EPA | United States Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| UWCD | Underground Water Conservation District |
| VISPO | Voluntary Irrigation Suspension Program Option |
| WAM | Water Availability Model |
| WCAC | Water Conservation Advisory Council |
| WCID | Water Control and Improvement District |
| WMS | Water Management Strategy |
| WMSP | Water Management Strategy Project |
| WRC | Water Recycling Center |
| WSC | Water Supply Corporation |
| WSEP | Water Supply Enhancement Program |
| WQMP | Water Quality Management Plan |
| WTP | Water Treatment Plant |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |
| WWTP | Wastewater Treatment Plant |

# 5.0 Evaluation and Recommendation of Water Management Strategies

The purpose of this chapter is to provide information on the identification and evaluation of water management strategies (WMSs) for the 2026 South Central Texas (Region L) Regional Water Plan (SCTRWP). A WMS is a plan to meet an identified need for additional water by an entity, which can mean increasing the total water supply or maximizing an existing supply, including through reducing demands. A water management strategy project (WMSP) is a water project that has a non-zero capital cost and is developed to implement one or more WMSs. When a WMSP is implemented, it is intended to develop, deliver, and/or treat additional water supply volumes, or conserve water for one or more entities. A WMS may or may not require the development of an associated WMSP for strategy implementation and one WMSP may be associated with multiple WMSs.

Chapter 5 is organized into three subchapters, summarized as follows:

- **Subchapter 5.1: Potentially Feasible Water Management Strategies.** Describes the process to identify potentially feasible WMSs, which strategies were identified as potentially feasible, which strategies were Recommended, and the implementation status of certain Recommended WMSs.
- **Subchapter 5.2: Water Management Strategy Evaluations.** Summarizes methodology and results of WMS evaluations for the 2026 SCTRWP, including a quantitative reporting for each WMS of the net quantity of water, reliability, financial costs, effects on environmental factors and agricultural resources
- **Subchapter 5.3: Water Conservation Information and Recommendations.** Consolidates and presents conservation-related recommendations.

# 5.1 Potentially Feasible Water Management Strategies

This subchapter includes descriptions of the process to identify WMSs, the WMSs designated by the SCTRWPG as Recommended or Alternative, and the implementation status of certain Recommended WMSs.

## 5.1.1 Process to Identify Potentially Feasible WMSs

The process for identification of potentially feasible WMSs was approved at a regular meeting of the SCTRWPG on November 2, 2023. The approved, documented process is as follows:

1. WMSs from the 2021 SCTRWP will be considered to determine if they are appropriate for inclusion in the 2026 SCTRWP.
2. Current water planning information, including specific WMSs of interest, will be solicited from water user groups (WUGs) and wholesale water providers (WWPs) within the South Central Texas (Region L) Regional Water Planning Area (SCTRWPA), including rural entities.
    a. Solicitation of planning information (to be initiated in 4th quarter 2023) will include a list of WMSs from the 2021 SCTRWP to determine whether the project sponsor wishes to include the WMSs in the 2026 SCTRWP.
    b. The solicitation will also request whether there are additional WMSs desired for inclusion in the 2026 SCTRWP.
3. In accordance with Statute (Texas Water Code [TWC] §16.053[e][5]) and rules (Title 31 of the Texas Administrative Code [TAC] §357.34, the SCTRWPG must consider certain types of WMSs for all identified water needs.
4. Information gathered from the solicitation and input from WUGs will be considered during development of a list of Potentially Feasible WMSs. The Potentially Feasible WMSs will be prepared and presented to the SCTRWPG at a regularly scheduled meeting (1st quarter 2024). Additional information may follow in subsequent SCTRWPG meetings.
5. Additional WMSs may be brought forth to the SCTRWPG for consideration and inclusion. The deadline for providing an additional WMS for inclusion in the 2026 SCTRWP is the 2nd quarter 2024 meeting, usually held in May.
6. The list of Potentially Feasible WMSs will be further considered to identify “potentially feasible” or “not potentially feasible” WMSs for WUGs and WWPs with identified water needs.
7. The SCTRWPG will reference and follow the SCTRWPG Bylaws and Guiding Principles, specifically Guiding Principle VII regarding “Minimum Standards for Water Management Strategies,” Guiding Principle VIII regarding “Designation of Recommended and Alternative Strategies,” and Guiding Principle IX regarding “Establishment of Management Supply.”

Item No. 7 of the above process identifies three SCTRWPG Guiding Principles for use in the development of the 2026 SCTRWP. The Guiding Principles are provided in Appendix 5A.

### 5.1.2 Potentially Feasible Strategies for the 2026 South Central Texas Regional Water Plan

Using the documented process identified above, the SCTRWPG identified potentially feasible WMSs for the 2026 SCTRWP. This list of potentially feasible strategies includes the following:

- Municipal Water Conservation
- Non-Municipal Water Conservation
- Drought Management
- Edwards Transfers
- Fresh Groundwater Development
- Brackish Groundwater Development
- Groundwater Conversions
- Facilities Expansion
- Reuse Water
- Brush Management
- Rainwater Harvesting
- Surface Water Rights
- Balancing Storage
- Alliance Regional Water Authority (ARWA) Carrizo-Wilcox Project (Phase 2)
- ARWA Direct Potable Reuse (DPR) Project (Phase 3)
- Canyon Regional Water Authority (CRWA) Expanded Brackish Carrizo-Wilcox Project
- CRWA Siesta Project
- CRWA Wells Ranch (Phase 3) Project
- Cibolo Valley Local Government Corporation (CVLGC) Carrizo Project
- Guadalupe Blanco River Authority (GBRA) Lower Basin New Appropriation
- GBRA WaterSECURE
- Medina County Regional Aquifer Storage and Recovery (ASR)
- New Braunfels Utilities (NBU) ASR
- NBU Trinity Well Field Expansion
- San Antonio Water System (SAWS) Expanded Local Carrizo Project
- SAWS Expanded Brackish Groundwater Project
- SAWS Regional Wilcox Project
- Schertz-Seguin Local Government Corporation (SSLGC) Expanded Brackish Wilcox Project
- SSLGC Expanded Carrizo Project
- Victoria ASR
- Victoria Groundwater-Surface Water Exchange
- Weather Modification

Evaluations for each of these potentially feasible WMSs can be found in Subchapter 5.2.

Appendix 5B provides a list of potentially feasible WMSs for WUGs with identified water needs (refer to Chapter 4: Identification of Water Needs). Several WUGs with identified needs do not have a potentially feasible WMS identified. Sufficient data are not currently available for manufacturing, steam-electric power, and mining use categories for the South Central Texas Region to enable accurate demand reduction volumes and costs. However, the SCTRWPG strongly supports and recommends implementation of water conservation efforts for all WUGs. The following WUGs have identified needs but do not have a potentially feasible WMS identified in the 2026 SCTRWP:

- Manufacturing, Bexar
- Manufacturing, Caldwell
- Manufacturing, Calhoun
- Manufacturing, Kendall
- Manufacturing, Victoria
- Manufacturing, Wilson

- Manufacturing, Zavala
- Mining, Atascosa
- Mining, Comal
- Mining, Dimmit
- Mining, Frio
- Mining, Gonzales
- Mining, Guadalupe
- Mining, Karnes
- Mining, La Salle
- Mining, Medina
- Mining, Victoria
- Mining, Zavala
- Steam-Electric Power, Victoria

#### 5.1.2.1 Recommended Strategies

On November 7, 2024, the SCTRWPG convened at a regularly-scheduled meeting to review evaluations of the potentially feasible WMSs. At this meeting, the SCTRWPG considered the potentially feasible WMSs and took action to identify certain strategies as Recommended or Alternative. Table 5.1-1 includes a summary of the Recommended WMSs, along with a cross reference to the section that describes each WMS evaluation.

**Table 5.1-1 Recommended Water Management Strategies**

| Recommended Water Management Strategies | Strategy Evaluation Section Reference |
|---|---|
| Municipal Water Conservation | 5.2.1 |
| Non-Municipal Water Conservation | 5.2.2 |
| Drought Management | 5.2.3 |
| Edwards Transfers | 5.2.4 |
| Fresh Groundwater Development | 5.2.5 |
| Brackish Groundwater Development | 5.2.6 |
| Facilities Expansion | 5.2.8 |
| Reuse Water | 5.2.9 |
| Rainwater Harvesting | 5.2.11 |
| ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| ARWA DPR Project (Phase 3) | 5.2.15 |
| CRWA Expanded Brackish Carrizo-Wilcox Project | 5.2.16 |
| CRWA Siesta Project | 5.2.17 |
| CRWA Wells Ranch (Phase 3) Project | 5.2.18 |
| CVLGC Carrizo Project | 5.2.19 |
| GBRA Lower Basin New Appropriation | 5.2.20 |
| GBRA WaterSECURE | 5.2.21 |
| Medina County Regional ASR Project | 5.2.22 |
| NBU ASR Project | 5.2.23 |
| NBU Trinity Well Field Expansion | 5.2.24 |

| Recommended Water Management Strategies | Strategy Evaluation Section Reference |
|---|---|
| SAWS Expanded Local Carrizo Project | 5.2.25 |
| SAWS Expanded Brackish Groundwater Project | 5.2.26 |
| SAWS Regional Wilcox Project | 5.2.27 |
| SSLGC Expanded Brackish Wilcox Project | 5.2.28 |
| SSLGC Expanded Carrizo Project | 5.2.29 |
| Victoria ASR Project | 5.2.30 |
| Victoria Groundwater-Surface Water Exchange | 5.2.31 |
| Weather Modification | 5.2.32 |

Table 5.1-2 provides water supply plans for each WUG and WWP relying on the Recommended WMSs and WMSPs.

**Table 5.1-2 Water Supply Plans for WUGs and WWPs Considering Recommended Water Management Strategies and Water Management Strategy Projects**

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 1 | 3009 Water | Municipal Water Conservation | 5.2.1 |
| 2 | Air Force Village II Inc | Municipal Water Conservation | 5.2.1 |
| | Air Force Village II Inc | Drought Management | 5.2.3 |
| 3 | Alamo Heights | Municipal Water Conservation | 5.2.1 |
| | Alamo Heights | Drought Management | 5.2.3 |
| | Alamo Heights | Edwards Transfers | 5.2.4 |
| 4 | Alliance Regional Water Authority (ARWA) | ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| | ARWA | ARWA DPR Project (Phase 3) | 5.2.15 |
| 5 | Aqua Water Supply Corporation (WSC) | Municipal Water Conservation | 5.2.1 |
| | Aqua WSC [1] | Drought Management | 5.2.3 |
| 6 | Asherton | Municipal Water Conservation | 5.2.1 |
| 7 | Atascosa Rural WSC | Municipal Water Conservation | 5.2.1 |
| | Atascosa Rural WSC | Drought Management | 5.2.3 |
| | Atascosa Rural WSC | Fresh Groundwater Development | 5.2.5 |
| 8 | Batesville WSC | Municipal Water Conservation | 5.2.1 |
| 9 | Benton City WSC | Municipal Water Conservation | 5.2.1 |
| | Benton City WSC | Drought Management | 5.2.3 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| | Benton City WSC | Fresh Groundwater Development | 5.2.5 |
| | Benton City WSC | Medina County Regional ASR Project | 5.2.22 |
| 10 | Bexar County Water Control and Improvement District (WCID) 10 | Municipal Water Conservation | 5.2.1 |
| | Bexar County WCID 10 | Drought Management | 5.2.3 |
| | Bexar County WCID 10 | Edwards Transfers | 5.2.4 |
| 11 | Big Wells | Municipal Water Conservation | 5.2.1 |
| 12 | Boerne | Municipal Water Conservation | 5.2.1 |
| | Boerne | Drought Management | 5.2.3 |
| | Boerne | Reuse Water | 5.2.9 |
| | Boerne | Rainwater Harvesting | 5.2.11 |
| | Boerne | GBRA WaterSECURE | 5.2.21 |
| 13 | Buda [2] | ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| | Buda [2] | ARWA DPR Project (Phase 3) | 5.2.15 |
| | Buda [2] | GBRA WaterSECURE | 5.2.21 |
| 14 | C Willow Water | Municipal Water Conservation | 5.2.1 |
| | C Willow Water | Drought Management | 5.2.3 |
| 15 | Canyon Lake Water Service (Texas Water Company) [1] | Municipal Water Conservation | 5.2.1 |
| | Canyon Lake Water Service (Texas Water Company) [1] | Drought Management | 5.2.3 |
| | Canyon Lake Water Service (Texas Water Company) [1] | GBRA WaterSECURE | 5.2.21 |
| 16 | Canyon Regional Water Authority | Facilities Expansion | 5.2.8 |
| | Canyon Regional Water Authority | CRWA Expanded Brackish Carrizo-Wilcox Project | 5.2.16 |
| | Canyon Regional Water Authority | CRWA Siesta Project | 5.2.17 |
| | Canyon Regional Water Authority | CRWA Wells Ranch (Phase 3) Project | 5.2.18 |
| | Canyon Regional Water Authority | GBRA WaterSECURE | 5.2.21 |
| 17 | Carrizo Hill WSC | Municipal Water Conservation | 5.2.1 |
| | Carrizo Hill WSC | Drought Management | 5.2.3 |
| 18 | Carrizo Springs | Municipal Water Conservation | 5.2.1 |
| 19 | Castroville | Municipal Water Conservation | 5.2.1 |
| | Castroville | Drought Management | 5.2.3 |
| | Castroville | Edwards Transfers | 5.2.4 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| | Castroville | Medina County Regional ASR Project | 5.2.22 |
| 20 | Charlotte | Municipal Water Conservation | 5.2.1 |
| 21 | Cibolo | Municipal Water Conservation | 5.2.1 |
| | Cibolo | Drought Management | 5.2.3 |
| | Cibolo | CVLGC Carrizo Project | 5.2.19 |
| 22 | Cibolo Valley Local Government Corporation (CVLGC) | CVLGC Carrizo Project | 5.2.19 |
| 23 | Clear Water Estates Water System (Texas Water Company) | Municipal Water Conservation | 5.2.1 |
| | Clear Water Estates Water System (Texas Water Company) | Drought Management | 5.2.3 |
| | Clear Water Estates Water System (Texas Water Company) | Fresh Groundwater Development | 5.2.5 |
| 24 | Concan WSC | Municipal Water Conservation | 5.2.1 |
| 25 | Converse | Municipal Water Conservation | 5.2.1 |
| | Converse | Drought Management | 5.2.3 |
| | Converse | Edwards Transfers | 5.2.4 |
| | Converse | CRWA Wells Ranch (Phase 3) Project | 5.2.18 |
| 26 | Cotulla | Municipal Water Conservation | 5.2.1 |
| 27 | County Line SUD | Municipal Water Conservation | 5.2.1 |
| | County Line SUD | Drought Management | 5.2.3 |
| | County Line SUD | Brackish Groundwater Development: County Line SUD Trinity Project | 5.2.6 |
| | County Line SUD | Brackish Groundwater Development: County Line SUD - Brackish Edwards Project | 5.2.6 |
| | County Line SUD | Brackish Groundwater Development: Caldwell Brackish Partnership Project | 5.2.6 |
| | County Line SUD | Brackish Groundwater Development: Gonzales & Guadalupe Brackish Partnership Project | 5.2.6 |
| | County Line SUD | Reuse Water | 5.2.9 |
| | County Line SUD | ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| | County Line SUD | ARWA DPR Project (Phase 3) | 5.2.15 |
| | County Line SUD | GBRA WaterSECURE | 5.2.21 |
| 28 | County-Other, Atascosa | Municipal Water Conservation | 5.2.1 |
| | County-Other, Atascosa | Rainwater Harvesting | 5.2.11 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 29 | County-Other, Bexar | Municipal Water Conservation | 5.2.1 |
| | County-Other, Bexar | Rainwater Harvesting | 5.2.11 |
| 30 | County-Other, Caldwell | Municipal Water Conservation | 5.2.1 |
| | County-Other, Caldwell | Brackish Groundwater Development: Caldwell Brackish Partnership Project | 5.2.6 |
| | County-Other, Caldwell | Brackish Groundwater Development: Gonzales & Guadalupe Brackish Partnership Project | 5.2.6 |
| | County-Other, Caldwell | Rainwater Harvesting | 5.2.11 |
| | County-Other, Caldwell | GBRA WaterSECURE | 5.2.21 |
| 31 | County-Other, Calhoun | Municipal Water Conservation | 5.2.1 |
| | County-Other, Calhoun | Rainwater Harvesting | 5.2.11 |
| 32 | County-Other, Comal | Municipal Water Conservation | 5.2.1 |
| | County-Other, Comal | Fresh Groundwater Development | 5.2.5 |
| | County-Other, Comal | Rainwater Harvesting | 5.2.11 |
| 33 | County-Other, DeWitt | Municipal Water Conservation | 5.2.1 |
| | County-Other, DeWitt | Rainwater Harvesting | 5.2.11 |
| 34 | County-Other, Dimmit | Municipal Water Conservation | 5.2.1 |
| | County-Other, Dimmit | Rainwater Harvesting | 5.2.11 |
| 35 | County-Other, Frio | Municipal Water Conservation | 5.2.1 |
| | County-Other, Frio | Rainwater Harvesting | 5.2.11 |
| 36 | County-Other, Goliad | Municipal Water Conservation | 5.2.1 |
| | County-Other, Goliad | Rainwater Harvesting | 5.2.11 |
| 37 | County-Other, Gonzales | Municipal Water Conservation | 5.2.1 |
| | County-Other, Gonzales | Rainwater Harvesting | 5.2.11 |
| 38 | County-Other, Guadalupe | Municipal Water Conservation | 5.2.1 |
| | County-Other, Guadalupe | Rainwater Harvesting | 5.2.11 |
| 39 | County-Other, Hays [1] | Municipal Water Conservation | 5.2.1 |
| | County-Other, Hays [1] | Rainwater Harvesting | 5.2.11 |
| | County-Other, Hays [1] | GBRA WaterSECURE | 5.2.21 |
| 40 | County-Other, Karnes | Municipal Water Conservation | 5.2.1 |
| | County-Other, Karnes | Rainwater Harvesting | 5.2.11 |
| 41 | County-Other, Kendall | Municipal Water Conservation | 5.2.1 |
| | County-Other, Kendall | Rainwater Harvesting | 5.2.11 |
| | County-Other, Kendall | GBRA WaterSECURE | 5.2.21 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 42 | County-Other, La Salle | Municipal Water Conservation | 5.2.1 |
| | County-Other, La Salle | Rainwater Harvesting | 5.2.11 |
| 43 | County-Other, Medina | Municipal Water Conservation | 5.2.1 |
| | County-Other, Medina | Rainwater Harvesting | 5.2.11 |
| 44 | County-Other, Refugio | Municipal Water Conservation | 5.2.1 |
| | County-Other, Refugio | Rainwater Harvesting | 5.2.11 |
| 45 | County-Other, Uvalde | Municipal Water Conservation | 5.2.1 |
| | County-Other, Uvalde | Rainwater Harvesting | 5.2.11 |
| 46 | County-Other, Victoria | Municipal Water Conservation | 5.2.1 |
| | County-Other, Victoria | Fresh Groundwater Development | 5.2.5 |
| | County-Other, Victoria | Rainwater Harvesting | 5.2.11 |
| 47 | County-Other, Wilson | Municipal Water Conservation | 5.2.1 |
| | County-Other, Wilson | Rainwater Harvesting | 5.2.11 |
| 48 | County-Other, Zavala | Municipal Water Conservation | 5.2.1 |
| | County-Other, Zavala | Rainwater Harvesting | 5.2.11 |
| 49 | Creedmoor-Maha WSC [1] | Municipal Water Conservation | 5.2.1 |
| | Creedmoor-Maha WSC [1] | Drought Management | 5.2.3 |
| | Creedmoor-Maha WSC [1] | GBRA WaterSECURE | 5.2.21 |
| 50 | Crystal City | Municipal Water Conservation | 5.2.1 |
| 51 | Crystal Clear SUD | Municipal Water Conservation | 5.2.1 |
| | Crystal Clear SUD | Drought Management | 5.2.3 |
| | Crystal Clear SUD | Fresh Groundwater Development | 5.2.5 |
| | Crystal Clear SUD | Facilities Expansion | 5.2.8 |
| | Crystal Clear SUD | ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| | Crystal Clear SUD | ARWA DPR Project (Phase 3) | 5.2.15 |
| | Crystal Clear SUD | CRWA Wells Ranch (Phase 3) Project | 5.2.18 |
| | Crystal Clear SUD | Entity Purchase to Meet Shortages (GBRA) [3] | N/A |
| 52 | Cuero | Municipal Water Conservation | 5.2.1 |
| | Cuero | Drought Management | 5.2.3 |
| 53 | Devine | Municipal Water Conservation | 5.2.1 |
| | Devine | Medina County Regional ASR Project | 5.2.22 |
| 54 | Dilley | Municipal Water Conservation | 5.2.1 |
| 55 | East Central SUD | Municipal Water Conservation | 5.2.1 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| | East Central SUD | Drought Management | 5.2.3 |
| | East Central SUD | Reuse Water | 5.2.9 |
| | East Central SUD | Entity Purchase to Meet Shortages (CRWA) | N/A |
| 56 | East Medina County SUD | Municipal Water Conservation | 5.2.1 |
| | East Medina County SUD | Drought Management | 5.2.3 |
| | East Medina County SUD | Medina County Regional ASR Project | 5.2.22 |
| 57 | El Oso WSC [1] | Municipal Water Conservation | 5.2.1 |
| | El Oso WSC [1] | Drought Management | 5.2.3 |
| 58 | Elmendorf | Municipal Water Conservation | 5.2.1 |
| | Elmendorf | Drought Management | 5.2.3 |
| | Elmendorf | Fresh Groundwater Development | 5.2.5 |
| | Elmendorf | Entity Purchase to Meet Shortages (SAWS) | N/A |
| 59 | Encinal WSC | Municipal Water Conservation | 5.2.1 |
| 60 | Fair Oaks Ranch | Municipal Water Conservation | 5.2.1 |
| | Fair Oaks Ranch | Drought Management | 5.2.3 |
| | Fair Oaks Ranch | Reuse Water | 5.2.9 |
| | Fair Oaks Ranch | GBRA WaterSECURE | 5.2.21 |
| 61 | Falls City | Municipal Water Conservation | 5.2.1 |
| 62 | Fayette WSC [1] | Municipal Water Conservation | 5.2.1 |
| | Fayette WSC [1] | Drought Management | 5.2.3 |
| 63 | Floresville | Municipal Water Conservation | 5.2.1 |
| 64 | Fort Sam Houston | Municipal Water Conservation | 5.2.1 |
| | Fort Sam Houston | Drought Management | 5.2.3 |
| | Fort Sam Houston | Edwards Transfers | 5.2.4 |
| 65 | Garden Ridge | Municipal Water Conservation | 5.2.1 |
| | Garden Ridge | Drought Management | 5.2.3 |
| | Garden Ridge | Fresh Groundwater Development | 5.2.5 |
| 66 | Goforth SUD [1] | Municipal Water Conservation | 5.2.1 |
| | Goforth SUD [1] | Drought Management | 5.2.3 |
| | Goforth SUD [1] | Entity Purchase to Meet Shortages (GBRA) [3] | N/A |
| 67 | Goliad | Municipal Water Conservation | 5.2.1 |
| 68 | Gonzales | Municipal Water Conservation | 5.2.1 |
| | Gonzales | Drought Management | 5.2.3 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 69 | Gonzales County WSC | Municipal Water Conservation | 5.2.1 |
| 70 | Green Valley SUD | Municipal Water Conservation | 5.2.1 |
| | Green Valley SUD | Drought Management | 5.2.3 |
| | Green Valley SUD | ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| | Green Valley SUD | ARWA DPR Project (Phase 3) | 5.2.15 |
| | Green Valley SUD | GBRA WaterSECURE | 5.2.21 |
| 71 | Guadalupe-Blanco River Authority (GBRA) | Municipal Water Conservation | 5.2.1 |
| | GBRA | Drought Management | 5.2.3 |
| | GBRA | Facilities Expansion | 5.2.8 |
| | GBRA | Reuse Water | 5.2.9 |
| | GBRA | GBRA Lower Basin New Appropriation | 5.2.20 |
| | GBRA | GBRA WaterSECURE | 5.2.21 |
| 72 | Hondo | Municipal Water Conservation | 5.2.1 |
| | Hondo | Drought Management | 5.2.3 |
| | Hondo | Edwards Transfers | 5.2.4 |
| | Hondo | Medina County Regional ASR Project | 5.2.22 |
| 73 | Irrigation, Atascosa | Non-Municipal Water Conservation | 5.2.2 |
| | Irrigation, Atascosa | Weather Modification | 5.2.32 |
| 74 | Irrigation, Bexar | Non-Municipal Water Conservation | 5.2.2 |
| | Irrigation, Bexar | Weather Modification | 5.2.32 |
| 75 | Irrigation, Caldwell | Non-Municipal Water Conservation | 5.2.2 |
| 76 | Irrigation, Calhoun | Non-Municipal Water Conservation | 5.2.2 |
| 77 | Irrigation, Comal | Non-Municipal Water Conservation | 5.2.2 |
| 78 | Irrigation, Dimmit | Non-Municipal Water Conservation | 5.2.2 |
| 79 | Irrigation, Frio | Weather Modification | 5.2.32 |
| 80 | Irrigation, Goliad | Non-Municipal Water Conservation | 5.2.2 |
| 81 | Irrigation, Guadalupe | Non-Municipal Water Conservation | 5.2.2 |
| 82 | Irrigation, Karnes | Non-Municipal Water Conservation | 5.2.2 |
| | Irrigation, Karnes | Weather Modification | 5.2.32 |
| 83 | Irrigation, La Salle | Non-Municipal Water Conservation | 5.2.2 |
| 84 | Irrigation, Medina | Non-Municipal Water Conservation | 5.2.2 |
| | Irrigation, Medina | Weather Modification | 5.2.32 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 85 | Irrigation, Uvalde | Non-Municipal Water Conservation | 5.2.2 |
| | Irrigation, Uvalde | Weather Modification | 5.2.32 |
| 86 | Irrigation, Victoria | Non-Municipal Water Conservation | 5.2.2 |
| 87 | Irrigation, Wilson | Non-Municipal Water Conservation | 5.2.2 |
| | Irrigation, Wilson | Weather Modification | 5.2.32 |
| 88 | Irrigation, Zavala | Non-Municipal Water Conservation | 5.2.2 |
| 89 | Jourdanton | Municipal Water Conservation | 5.2.1 |
| 90 | Karnes City | Municipal Water Conservation | 5.2.1 |
| | Karnes City | Drought Management | 5.2.3 |
| 91 | Kendall County WCID 1 | Municipal Water Conservation | 5.2.1 |
| 92 | Kendall West Utility | Municipal Water Conservation | 5.2.1 |
| | Kendall West Utility | Drought Management | 5.2.3 |
| | Kendall West Utility | Fresh Groundwater Development | 5.2.5 |
| 93 | Kenedy | Municipal Water Conservation | 5.2.1 |
| 94 | Kirby | Municipal Water Conservation | 5.2.1 |
| | Kirby | Drought Management | 5.2.3 |
| | Kirby | Edwards Transfers | 5.2.4 |
| | Kirby | Rainwater Harvesting | 5.2.11 |
| 95 | Knippa WSC | Municipal Water Conservation | 5.2.1 |
| 96 | KT Water Development | Municipal Water Conservation | 5.2.1 |
| | KT Water Development | Drought Management | 5.2.3 |
| | KT Water Development | Fresh Groundwater Development | 5.2.5 |
| 97 | Kyle | Municipal Water Conservation | 5.2.1 |
| | Kyle | Drought Management | 5.2.3 |
| | Kyle | Reuse Water | 5.2.9 |
| | Kyle | Rainwater Harvesting | 5.2.11 |
| | Kyle | ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| | Kyle | ARWA DPR Project (Phase 3) | 5.2.15 |
| | Kyle | GBRA WaterSECURE | 5.2.21 |
| 98 | La Coste | Municipal Water Conservation | 5.2.1 |
| | La Coste | Drought Management | 5.2.3 |
| | La Coste | Medina County Regional ASR Project | 5.2.22 |
| 99 | La Vernia | Municipal Water Conservation | 5.2.1 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 100 | Lackland Air Force Base | Municipal Water Conservation | 5.2.1 |
| 101 | Leon Valley | Municipal Water Conservation | 5.2.1 |
| | Leon Valley | Drought Management | 5.2.3 |
| | Leon Valley | Edwards Transfers | 5.2.4 |
| | Leon Valley | Rainwater Harvesting | 5.2.11 |
| 102 | Live Oak | Municipal Water Conservation | 5.2.1 |
| | Live Oak | Drought Management | 5.2.3 |
| | Live Oak | Reuse Water | 5.2.9 |
| 103 | Livestock, Hays [1] | Drought Management | 5.2.3 |
| 104 | Lockhart | Municipal Water Conservation | 5.2.1 |
| | Lockhart | Drought Management | 5.2.3 |
| | Lockhart | GBRA WaterSECURE | 5.2.21 |
| 105 | Loma Alta Chula Vista Water System | Municipal Water Conservation | 5.2.1 |
| 106 | Luling | Municipal Water Conservation | 5.2.1 |
| | Luling | Drought Management | 5.2.3 |
| | Luling | GBRA WaterSECURE | 5.2.21 |
| 107 | Lytle | Municipal Water Conservation | 5.2.1 |
| | Lytle | Drought Management | 5.2.3 |
| | Lytle | Edwards Transfers | 5.2.4 |
| | Lytle | Medina County Regional ASR Project | 5.2.22 |
| 108 | Manufacturing, Caldwell | GBRA WaterSECURE | 5.2.21 |
| 109 | Marion | Municipal Water Conservation | 5.2.1 |
| | Marion | CRWA Wells Ranch (Phase 3) Project | 5.2.18 |
| 110 | Martindale WSC | Municipal Water Conservation | 5.2.1 |
| | Martindale WSC | Drought Management | 5.2.3 |
| | Martindale WSC | Fresh Groundwater Development | 5.2.5 |
| | Martindale WSC | CRWA Wells Ranch (Phase 3) Project | 5.2.18 |
| | Martindale WSC | GBRA WaterSECURE | 5.2.21 |
| 111 | Maxwell SUD | Municipal Water Conservation | 5.2.1 |
| | Maxwell SUD | Drought Management | 5.2.3 |
| | Maxwell SUD | Brackish Groundwater Development: Maxwell SUD - Trinity Project | 5.2.6 |
| | Maxwell SUD | Brackish Groundwater Development: Caldwell Brackish Partnership Project | 5.2.6 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| | Maxwell SUD | Brackish Groundwater Development: Gonzales & Guadalupe Brackish Partnership Project | 5.2.6 |
| | Maxwell SUD | GBRA WaterSECURE | 5.2.21 |
| 112 | McCoy WSC [1] | Municipal Water Conservation | 5.2.1 |
| | McCoy WSC [1] | Drought Management | 5.2.3 |
| 113 | Medina County WCID 2 | Municipal Water Conservation | 5.2.1 |
| 114 | Medina River West WSC | Municipal Water Conservation | 5.2.1 |
| 115 | Mining, Uvalde | Fresh Groundwater Development | 5.2.5 |
| 116 | Moore WSC | Municipal Water Conservation | 5.2.1 |
| 117 | Natalia | Municipal Water Conservation | 5.2.1 |
| | Natalia | Drought Management | 5.2.3 |
| | Natalia | Medina County Regional ASR Project | 5.2.22 |
| 118 | New Braunfels | Municipal Water Conservation | 5.2.1 |
| | New Braunfels | Drought Management | 5.2.3 |
| | New Braunfels | Facilities Expansion | 5.2.8 |
| | New Braunfels | Reuse Water | 5.2.9 |
| | New Braunfels | NBU ASR Project | 5.2.23 |
| | New Braunfels | NBU Trinity Well Field Expansion | 5.2.24 |
| 119 | Nixon | Municipal Water Conservation | 5.2.1 |
| 120 | Oak Hills WSC | Municipal Water Conservation | 5.2.1 |
| | Oak Hills WSC | Drought Management | 5.2.3 |
| | Oak Hills WSC | Fresh Groundwater Development | 5.2.5 |
| 121 | Pearsall | Municipal Water Conservation | 5.2.1 |
| | Pearsall | Drought Management | 5.2.3 |
| | Pearsall | Fresh Groundwater Development | 5.2.5 |
| 122 | Picosa WSC | Municipal Water Conservation | 5.2.1 |
| | Picosa WSC | Drought Management | 5.2.3 |
| | Picosa WSC | Fresh Groundwater Development | 5.2.5 |
| 123 | Pleasanton | Municipal Water Conservation | 5.2.1 |
| | Pleasanton | Drought Management | 5.2.3 |
| 124 | Point Comfort | Municipal Water Conservation | 5.2.1 |
| 125 | Polonia WSC [1] | Municipal Water Conservation | 5.2.1 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 126 | Port Lavaca | Municipal Water Conservation | 5.2.1 |
| | Port Lavaca | Drought Management | 5.2.3 |
| | Port Lavaca | Rainwater Harvesting | 5.2.11 |
| 127 | Poteet | Municipal Water Conservation | 5.2.1 |
| | Poteet | Rainwater Harvesting | 5.2.11 |
| 128 | Poth | Municipal Water Conservation | 5.2.1 |
| 129 | Quail Creek Municipal Utility District (MUD) | Municipal Water Conservation | 5.2.1 |
| 130 | Refugio | Municipal Water Conservation | 5.2.1 |
| 131 | Runge | Municipal Water Conservation | 5.2.1 |
| | Runge | Drought Management | 5.2.3 |
| 132 | S S WSC | Municipal Water Conservation | 5.2.1 |
| | S S WSC | Drought Management | 5.2.3 |
| | S S WSC | Brackish Groundwater Development: S S WSC - Brackish Carrizo-Wilcox Project | 5.2.6 |
| 133 | Sabinal | Municipal Water Conservation | 5.2.1 |
| 134 | San Antonio Water System (SAWS) | Municipal Water Conservation | 5.2.1 |
| | SAWS | Drought Management | 5.2.3 |
| | SAWS | Facilities Expansion | 5.2.8 |
| | SAWS | Reuse Water | 5.2.9 |
| | SAWS | SAWS Expanded Local Carrizo Project | 5.2.25 |
| | SAWS | SAWS Expanded Brackish Groundwater Project | 5.2.26 |
| | SAWS | SAWS Regional Wilcox Project | 5.2.27 |
| 135 | San Marcos | Municipal Water Conservation | 5.2.1 |
| | San Marcos | Drought Management | 5.2.3 |
| | San Marcos | Reuse Water | 5.2.9 |
| | San Marcos | ARWA Carrizo-Wilcox Project (Phase 2) | 5.2.14 |
| | San Marcos | ARWA DPR Project (Phase 3) | 5.2.15 |
| 136 | Schertz | Municipal Water Conservation | 5.2.1 |
| | Schertz | Drought Management | 5.2.3 |
| | Schertz | CVLGC Carrizo Project | 5.2.19 |
| | Schertz | SSLGC Expanded Brackish Wilcox Project | 5.2.28 |
| | Schertz | SSLGC Expanded Carrizo Project | 5.2.29 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 137 | Schertz-Seguin Local Government Corporation (SSLGC) | SSLGC Expanded Brackish Wilcox Project | 5.2.28 |
| | SSLGC | SSLGC Expanded Carrizo Project | 5.2.29 |
| 138 | Seadrift | Municipal Water Conservation | 5.2.1 |
| 139 | Seguin | Municipal Water Conservation | 5.2.1 |
| | Seguin | Drought Management | 5.2.3 |
| | Seguin | SSLGC Expanded Brackish Wilcox Project | 5.2.28 |
| | Seguin | SSLGC Expanded Carrizo Project | 5.2.29 |
| 140 | Selma | Municipal Water Conservation | 5.2.1 |
| | Selma | Drought Management | 5.2.3 |
| | Selma | Edwards Transfers | 5.2.4 |
| 141 | Shavano Park | Municipal Water Conservation | 5.2.1 |
| | Shavano Park | Drought Management | 5.2.3 |
| 142 | Smiley | Municipal Water Conservation | 5.2.1 |
| 143 | South Buda WCID 1 | Municipal Water Conservation | 5.2.1 |
| | South Buda WCID 1 | Drought Management | 5.2.3 |
| | South Buda WCID 1 | Entity Purchase to Meet Shortages (GBRA) [3] | N/A |
| 144 | Springs Hill WSC | Municipal Water Conservation | 5.2.1 |
| | Springs Hill WSC | Drought Management | 5.2.3 |
| | Springs Hill WSC | Fresh Groundwater Development | 5.2.5 |
| | Springs Hill WSC | Facilities Expansion | 5.2.8 |
| 145 | Steam-Electric Power, Bexar | Facilities Expansion | 5.2.8 |
| 146 | Stockdale | Municipal Water Conservation | 5.2.1 |
| 147 | Sunko WSC | Municipal Water Conservation | 5.2.1 |
| 148 | Texas State University | Municipal Water Conservation | 5.2.1 |
| | Texas State University | Drought Management | 5.2.3 |
| | Texas State University | Entity Purchase to Meet Shortages (San Marcos) | N/A |
| 149 | The Oaks WSC | Municipal Water Conservation | 5.2.1 |
| | The Oaks WSC | Drought Management | 5.2.3 |
| | The Oaks WSC | Entity Purchase to Meet Shortages (SAWS) | N/A |
| 150 | Three Oaks WSC | Municipal Water Conservation | 5.2.1 |
| 151 | Tri Community WSC | Municipal Water Conservation | 5.2.1 |
| 152 | Universal City | Municipal Water Conservation | 5.2.1 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| | Universal City | Drought Management | 5.2.3 |
| | Universal City | Reuse Water | 5.2.9 |
| 153 | Uvalde | Municipal Water Conservation | 5.2.1 |
| | Uvalde | Drought Management | 5.2.3 |
| | Uvalde | Edwards Transfers | 5.2.4 |
| 154 | Victoria | Municipal Water Conservation | 5.2.1 |
| | Victoria | Drought Management | 5.2.3 |
| | Victoria | GBRA WaterSECURE | 5.2.21 |
| | Victoria | Victoria ASR Project | 5.2.30 |
| | Victoria | Victoria Groundwater-Surface Water Exchange | 5.2.31 |
| 155 | Victoria County WCID 1 | Municipal Water Conservation | 5.2.1 |
| | Victoria County WCID 1 | Drought Management | 5.2.3 |
| 156 | Ville Dalsace Water Supply | Municipal Water Conservation | 5.2.1 |
| | Ville Dalsace Water Supply | Drought Management | 5.2.3 |
| | Ville Dalsace Water Supply | Edwards Transfers | 5.2.4 |
| 157 | Waelder | Municipal Water Conservation | 5.2.1 |
| 158 | Water Services | Municipal Water Conservation | 5.2.1 |
| | Water Services | Drought Management | 5.2.3 |
| 159 | West Medina WSC | Municipal Water Conservation | 5.2.1 |
| | West Medina WSC | Medina County Regional ASR Project | 5.2.22 |
| 160 | Wimberley WSC | Municipal Water Conservation | 5.2.1 |
| | Wimberley WSC | Drought Management | 5.2.3 |
| | Wimberley WSC | Entity Purchase to Meet Shortages (GBRA) [3] | N/A |
| 161 | Windmill WSC | Municipal Water Conservation | 5.2.1 |
| 162 | Wingert Water Systems | Municipal Water Conservation | 5.2.1 |
| | Wingert Water Systems | Drought Management | 5.2.3 |
| | Wingert Water Systems | Fresh Groundwater Development | 5.2.5 |
| 163 | Woodsboro | Municipal Water Conservation | 5.2.1 |
| 164 | Yancey WSC | Municipal Water Conservation | 5.2.1 |
| | Yancey WSC | Drought Management | 5.2.3 |
| | Yancey WSC | Medina County Regional ASR Project | 5.2.22 |
| 165 | Yoakum [1] | Municipal Water Conservation | 5.2.1 |
| 166 | Yorktown | Municipal Water Conservation | 5.2.1 |

| No. | Water User Group or Wholesale Water Provider | Water Management Strategy or Water Management Strategy Project | Strategy Evaluation Section Reference |
|---|---|---|---|
| 167 | Zavala County WCID 1 | Municipal Water Conservation | 5.2.1 |

[1] WUG is split between Region L and other regions (Regions K, P, and/or N).
[2] Buda is located in Region K and is a recipient of WMS supplies from projects located in Region L.
[3] To meet shortages, WUG is purchasing water from GBRA's general surplus supply; however, for purposes of the 2026 SCTRWP, these WUGs are shown in the 2027 Regional and State Water Planning Database (DB27) as customers of the GBRA WaterSECURE WMS.

### 5.1.2.2 Alternative Strategies

On November 7, 2024, the SCTRWPG reviewed and considered potentially feasible WMS evaluations and designated strategies as Recommended, Alternative, or neither. For the 2026 SCTRWP, the SCTRWPG identified one WMS as Alternative, as shown in Table 5.1-3. At the request of SAWS, the SCTRWPG designated the Reuse Water – SAWS DPR Project as Alternative.

**Table 5.1-3 Alternative Water Management Strategies**

| Alternative Water Management Strategy | Strategy Evaluation Section Reference |
|---|---|
| Reuse Water – SAWS DPR Project | 5.2.9 |

### 5.1.2.3 Strategies Considered but Not Recommended or Alternative

The following sections summarize the strategies that were considered but not identified by the SCTRWPG as Recommended or Alternative strategies.

#### 5.1.2.3.1 Groundwater Conversions

The SCTRWPG identified the Groundwater Conversions WMS as a potentially feasible strategy. However, for the 2026 SCTRWP, the SCTRWPG evaluated and considered the WMS but did not identify it as a Recommended strategy. For more information, refer to Section 5.2.7.

The SCTRWPG includes WMSs in the SCTRWP at the request of a WUG or WWP sponsors. For the 2026 SCTRWP, the Groundwater Conversions WMS was not included as a Recommended WMS because it was not requested for inclusion by any sponsoring entity.

#### 5.1.2.3.2 Brush Management

The SCTRWPG identified the Brush Management WMS as a potentially feasible strategy. However, for the 2026 SCTRWP, the SCTRWPG evaluated and considered the WMS but did not identify it as a Recommended strategy. For more information, refer to Section 5.2.10.

The evaluation of brush management as a WMS included review of existing brush control studies localized within the SCTRWPA. The evaluation also included coordination with the Texas State Soil and Water Conservation Board (TSSWCB), Edwards Aquifer Authority (EAA), Evergreen Underground Water Conservation District (UWCD), and Nueces River Authority. While the SCTRWPG supports the practice of brush management, it was not designated as a Recommended strategy in the 2026 SCTRWP because available studies within the SCTRWPA demonstrate zero firm yield during drought of record (DOR) conditions. Specifically, the Nueces River Authority, EAA and Poteet expressed interest in inclusion of

brush management as a WMS. Support for the practice is expressed in Chapter 8 under Assistance for Alternative Rangeland Management.

#### 5.1.2.3.3 Surface Water Rights

The SCTRWPG identified the Surface Water Rights WMS as a potentially feasible strategy. However, for the 2026 SCTRWP, the SCTRWPG evaluated and considered the WMS but did not identify it as a Recommended strategy. For more information, refer to Section 5.2.12.

The SCTRWPG includes WMSs in the SCTRWP at the request of a WUG or WWP sponsor. For the 2026 SCTRWP, the Surface Water Rights WMS was not included as a Recommended WMS because it was not requested for inclusion by any sponsoring entity.

#### 5.1.2.3.4 Balancing Storage

The SCTRWPG identified the Balancing Storage WMS as a potentially feasible strategy. However, for the 2026 SCTRWP, the SCTRWPG evaluated and considered the WMS but did not identify it as a Recommended strategy. For more information, refer to Section 5.2.13.

The SCTRWPG includes WMSs in the SCTRWP at the request of a WUG or WWP sponsor. For the 2026 SCTRWP, the Balancing Storage WMS was not included as a Recommended WMS because it was not requested for inclusion by any sponsoring entity.

#### 5.1.2.3.5 Seawater Desalination

Seawater Desalination was considered but not identified as a potentially feasible WMS. As discussed previously, the SCTRWPG includes WMSs in the SCTRWP at the request of a WUG or WWP sponsor. For the 2026 SCTRWP, seawater desalination was not included as a potentially feasible WMS because it was not requested for inclusion by any WUGs or WWPs. Furthermore, the majority of needs in the SCTRWPA can be met by fresh groundwater development, brackish groundwater development, reuse, and conservation WMSs.

There are several seawater desalination facilities currently being planned within Texas; seawater desalination may become a feasible and cost-effective strategy for entities within the SCTRWPA in the future.

### 5.1.3 Potential for Aquifer Storage and Recovery Projects to Meet Significant Identified Needs

In accordance with 31 TAC §357.34(h), if a Regional Water Planning Area (RWPA) has significant identified water needs, the Regional Water Planning Group (RWPG) shall provide a specific assessment of the potential for ASR projects to meet those needs. At the August 1, 2024, SCTRWPG meeting, the SCTRWPG defined the threshold of significant identified water needs to be a WUG, not including County-Other, with an identified municipal need of 10,000 acre-feet per year (acft/yr) [1] or greater during any decade of the planning horizon (2030 to 2080). WUGs meeting this definition in the 2026 SCTRWP include Boerne, Canyon Lake Water Service (Texas Water Company), County Line SUD, Crystal Clear SUD, Fort Sam Houston, Goforth SUD, New Braunfels, SAWS, and San Marcos. The following provides a summary of the potential for ASR projects to meet significant identified water needs in the SCTRWPA:

[1] One acft is approximately 325,851 gallons.

- Boerne: The 2026 SCTRWP includes the GBRA WaterSECURE Project, which includes an ASR component. Boerne will purchase water from GBRA's WaterSECURE Project. An evaluation of the GBRA WaterSECURE Project can be found in Section 5.2.21.
- Canyon Lake Water Service (Texas Water Company): The 2026 SCTRWP includes the GBRA WaterSECURE Project, which includes an ASR component. Canyon Lake Water Service (Texas Water Company) will purchase water from GBRA's WaterSECURE Project. An evaluation of the GBRA WaterSECURE Project can be found in Section 5.2.21.
- County Line SUD: The 2026 SCTRWP includes the GBRA WaterSECURE Project, which includes an ASR component. County Line SUD will purchase water from GBRA's WaterSECURE Project. An evaluation of the GBRA WaterSECURE Project can be found in Section 5.2.21.
- Crystal Clear SUD: A full strategy evaluation of the potential for ASR projects to meet Crystal Clear SUD's significant identified water needs was not conducted because implementation of ASR may be considered cost-prohibitive compared to the cost of surface water and/or groundwater projects. Their needs have been met through a variety of cost-effective WMSs, which are listed in Table 5.1-2.
- Fort Sam Houston: A full strategy evaluation of the potential for ASR projects to meet Fort Sam Houston's significant identified water needs was not conducted because their needs have been met through a variety of cost-effective WMSs, which are listed in Table 5.1-2.
- Goforth SUD: The 2026 SCTRWP includes the GBRA WaterSECURE Project, which includes an ASR component. Goforth SUD will purchase water from GBRA's WaterSECURE Project. An evaluation of the GBRA WaterSECURE Project can be found in Section 5.2.21.
- New Braunfels: To meet New Braunfels' significant identified needs, the 2026 SCTRWP includes the NBU ASR Project as a Recommended strategy. An evaluation of the NBU ASR Project can be found in Section 5.2.23.
- San Antonio Water System: SAWS already has an ASR system in operation, including a water treatment plant (WTP) called the H2Oaks Center. The 2026 SCTRWP includes an expansion of the H2Oaks Center as a Recommended WMS under Facilities Expansion. The WMS evaluation for the Facilities Expansion – SAWS Expanded ASR Treatment Plant can be found in Section 5.2.8.
- San Marcos: A full strategy evaluation of the potential for ASR projects to meet San Marcos' significant identified water needs was not conducted because their needs have been met through a variety of cost-effective WMSs, including Municipal Water Conservation, Drought Management, ARWA Carrizo-Wilcox Project (Phase 2), ARWA DPR Project (Phase 3), and Reuse Water. Given the location and aquifer characteristics in the area, an ASR project could potentially be developed to meet additional needs for San Marcos in the future.

### 5.1.4 Strategies with Flood Mitigation Benefits

This section is a new requirement for inclusion in the 2026 Regional Water Plans (RWPs). The purpose of this new section is to consider whether any of the identified potentially feasible WMSs could, in addition to providing water supply, potentially provide non-trivial flood mitigation benefits or be potential candidates for exploring ways that WMSs might be combined with flood mitigation features to leverage planning efforts to achieve potential cost savings or other combined water supply and flood mitigation benefits. Infrastructure that may provide additional water supply and mitigates non-trivial flooding may include projects or strategies that contribute to aquifer recharge and additional surface water inflows directed to reservoirs.

The identification of these WMSs was based on a high-level, qualitative assessment that did not require modeling or other additional technical analyses. In 2024, the Texas Water Development Board (TWDB) adopted the state's first 2024 State Flood Plan. Similar to the regional water planning process, the State Flood Plan is compiled from multiple Regional Flood Plans that were developed by the state's 15 Regional Flood Planning Groups. The 2024 State Flood Plan includes numerous flood mitigation projects, of which some may also provide water supply benefits. The SCTRWPG reviewed the 2024 State Flood Plan and did not identify any Flood Management Strategies or Flood Management Projects that were identified as potentially feasible WMSs in the 2026 SCTRWP. Furthermore, the SCTRWPG did not receive any requests from WUGs or WWPs to sponsor a WMS in the 2026 SCTRWPG that has potential for non-trivial flood mitigation.

### 5.1.5 Implementation Status of Certain Recommended Water Management Strategies

This section is a new requirement for inclusion in the 2026 RWPs. The purpose of this new section is to document the implementation status of certain Recommended WMSs to demonstrate the feasibility of each Recommended strategy to be fully implemented by the online decade in the RWP.

The implementation status must be documented for the following types of Recommended WMSs with any online planning decade:

- All reservoir strategies (including major and minor reservoirs);
- All seawater desalination strategies;
- Direct potable reuse strategies that provide greater than 5,000 acre-feet per year (acft/yr) of supply;
- Brackish groundwater strategies that provide greater than 10,000 acft/yr of supply;
- Aquifer storage and recovery strategies that provide greater than 10,000 acft/yr;
- All water transfers from out of state; and
- Any other innovative technology projects the RWPG considers appropriate.

The implementation status includes key milestones achieved, such as when a WMS sponsor took an affirmative vote or other action to make expenditures necessary to apply for permits and/or perform planning, design, or construction. Appendix 5C includes a table that documents these key milestones. The appendix also includes graphical timelines of the full planning horizon for each of the relevant WMSs and their major anticipated, future implementation milestones. The strategies that meet the above requirements include the following:

- ARWA DPR Project (Phase 3);
- Brackish Groundwater Development: Caldwell Brackish Partnership Project; [2]
- Brackish Groundwater Development: Gonzales & Guadalupe Brackish Partnership Project;
- CRWA Expanded Brackish Carrizo-Wilcox Project;
- GBRA Lower Basin New Appropriation;

[2] This brackish groundwater strategy is subject to Modeled Available Groundwater (MAG) limitations and does not meet the 10,000 acft/yr threshold; however, it has been included in the implementation status assessment due to the strategy's envisioned yield being greater than 10,000 acft/yr.

- GBRA WaterSECURE;
- Medina County Regional ASR Project;
- Reuse Water: NBU Potable Reuse Project;
- SAWS Expanded Brackish Groundwater Project; and
- SAWS Regional Wilcox Project.

# 5.2 Water Management Strategy Evaluations

The purpose of Subchapter 5.2 is to provide the methodology and results of the evaluations of potentially feasible WMSs for the 2026 SCTRWP. Each potentially feasible WMS was evaluated in accordance with TWDB rules in 31 TAC §357.34, which requires analysis of a WMS' net quantity of water, reliability, financial costs, and effects on environmental factors and agricultural resources.

The following provides information and methodologies used in this plan to evaluate the WMSs. The WMS evaluation summaries are included in subsequent sections.

## Resources and Methodology

Evaluations of potentially feasible WMSs and associated WMSPs were performed uniformly and consistently to enable an equitable comparison among the WMSs and WMSPs within this plan and with other RWPs.

## Net Quantity of Water

Analyses of each WMS' net quantity of water were performed under drought of record conditions, taking into account and reporting anticipated strategy water losses. Available yields for WMSs considered water availability volumes and other Recommended WMSs to ensure that no WMSs relied on the same water availability volume or rendered multiple WMSs mutually exclusive.

The TWDB prohibits exceedances and overallocations of water availability. In instances where the sum of supplies (existing and future from WMSs) exceeds a source's availability, available yields for WMSs were reduced in an equitable and proportional way to prevent an overallocation of the water source. Strategies with yield reductions are described within each WMS evaluation, as applicable.

### Surface Water

Each WMS' available yield considered Senate Bill (SB) 3 environmental flow standards adopted in 30 TAC §298. Future supplies associated with surface water WMSs were estimated using water availability models (WAMs) from the Texas Commission on Environmental Quality (TCEQ). For applicable river basins, SCTRWPG used the TCEQ-approved WAM Run 3, which assumes full exercise of existing surface water rights and zero effluent discharges, unless specifically required by a surface water right. This method reflects conditions under which an associated permit application would be evaluated. The TWDB granted a hydrologic variance to Region L to use the Flow Regime Application Tool (FRAT) in conjunction with the TCEQ-approved WAMs to evaluate environmental flows for new surface water WMSs (refer to Appendix 3B for more information regarding hydrologic assumptions and variances). Table 5.2-1 summarizes the hydrologic models used for the surface water availabilities and existing supplies analysis, including the model name, version date, model input/output files used, date model used and any relevant comments.

**Table 5.2-1 Hydrologic Models Used for Water Management Strategy Analyses**

| Model Name | Version Date | Input/Output Files Used | Date Model Used | Comments |
|---|---|---|---|---|
| TCEQ Full Authorization WAM for the Guadalupe-San Antonio River Basin | 10/1/2023 | WRAP SIM input file extensions: DAT, DIS, FLO, EVA, FAD, HIS<br><br>WRAP SIM output file extensions: OUT<br><br>WRAP TAB input file extensions: TIN<br><br>WRAP TAB output file extensions: TOU | October, 2024 | N/A – None |
| Flow Regime Application Tool (FRAT) v4.0.xlsb | 1/13/2012 | Inputs:<br>WAM generated regulated and available flows<br>qnday daily disaggregation of monthly flows<br>Pulse Translation<br><br>Output:<br>Project Depletions<br>Monthly e-flow pass-through requirements | October, 2024 | N/A – None |

### Groundwater

Available yields associated with new groundwater WMSs in the Carrizo-Wilcox, Trinity, Gulf Coast, and other minor aquifers were determined in accordance with groundwater availability estimates. As discussed in Chapter 3, the majority of the groundwater availabilities in Region L are derived from Modeled Available Groundwater (MAG) estimates calculated by the TWDB on or before April 12, 2023.

For most aquifers in the region, Groundwater Conservation Districts (GCDs) have adopted desired future conditions (DFCs). In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments, or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits

that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s). Supplemental groundwater may be obtained under existing permits through the Groundwater Conversions WMS.

## Water Management Strategy Water Loss

Each WMS evaluation considered potential strategy water loss, which can affect the net quantity of water or available yield. Unless otherwise specified in a particular WMS evaluation, WMSs evaluated in the 2026 Region L Regional Water Plan used the following water loss assumptions:

- Municipal Water Conservation: Water conservation strategies are assumed to have no associated water losses. In some instances, projects are intended to decrease the water loss for existing infrastructure.
- Non-Municipal Water Conservation: Water conservation strategies are assumed to have no associated water losses. In some instances, projects are intended to decrease the water loss for existing infrastructure.
- Drought Management: Drought management strategies are assumed to have no associated water losses.
- Edwards Transfers: Strategies involving transfers of water rights are assumed to have no additional water losses associated with the use of existing infrastructure.
- Fresh Groundwater Development: Groundwater expansion strategies that assume additional yield from existing infrastructure have no additional water losses associated with them. Groundwater expansion, development, and importation strategies that require new infrastructure are assumed to have no water losses.
- Brackish Groundwater Development: Brackish groundwater desalination strategies include 20% water loss associated with desalination treatment technologies and disposal of brine concentrate, unless otherwise stated in the WMS.
- Fresh Groundwater Conversions: Strategies involving conversions of a groundwater permit type (i.e., irrigation, public water supply, etc.) are assumed to have no additional water losses associated with the use of existing infrastructure.
- Facilities Expansion: Facilities expansion or new infrastructure such as pump stations and transmission pipelines are assumed to have no water losses.
- Reuse Water:
  - Direct, Non-Potable Reuse: Direct reuse water strategies are assumed to have no water losses.
  - Direct, Potable Reuse: DPR strategies typically use reverse osmosis (RO) technologies that generate a brine concentrate stream that requires disposal. DPR strategies are assumed to have a calculated water loss of 80%, which is attributed to the nature of RO treatment processes and disposal of brine concentrate.
  - Indirect, Potable and Non-Potable Reuse: Indirect reuse requiring a bed and banks permit is assumed to have water losses associated with transportation, evaporation, seepage, and channel or other associated carriage losses. For strategies with existing

bed and banks permits, the WMS evaluation was assumed to have no water losses since the yield already incorporates associated water losses. For strategies without an existing bed and banks permit, the water losses are accounted for by the WAM's channel loss factors which represent estimates of all carriage losses along the stream segments within the basin.

- Brush Management: Brush Management strategies are assumed to have no associated water losses.
- Rainwater Harvesting: Rainwater Harvesting strategies are assumed to have no associated water losses.
- Surface Water Rights: Strategies involving transfers of water rights are assumed to have no additional water losses associated with the use of existing infrastructure.
- Balancing Storage: Recommended and alternative surface water strategies such as new reservoirs have water losses associated with evaporation. ASR reduces the water losses associated with evaporation from a reservoir, but there can be water losses due to recovery efficiency from the aquifer. Migration rates vary depending on the aquifer used for storage, and impacts will depend on how long the stored water remains in the aquifer. Recovery efficiency will have some impacts on water volume but are assumed to have no impacts on the firm yield volumes.
- Aquifer Storage and Recovery: ASR strategies have losses due to recovery efficiency from the aquifer. Nationwide, recovery rates for ASR typically range from 70-90 percent (%), allowing for 10-30% water loss. Each WMS evaluation uses its own project-specific estimated percent water loss.
- Off-Channel Reservoirs: Surface water strategies that include new off-channel reservoirs (OCRs) have water losses associated with evaporation. If water is transmitted via open channel canals, there are also water losses associated with evaporation.

## Reliability

Reliability is an assessment of the availability of the specified water quantity to the user over time. Quantifiably, the water volumes presented in this plan for Recommended strategies are firm supplies that are 100% reliable during Drought of Record conditions, per TWDB planning guidelines.

Considering other factors that can affect long-term availability, such as potential future modeling or rule changes that are beyond the scope of this planning effort, the SCTRWPG developed additional qualified reliability reporting in the form of a reliability evaluation matrix (Table 5.2-2) that was used in conjunction with other implementation considerations to also qualify the reliability of WMSs shown in Table 5.2-3.

Each WMS evaluation includes a qualified assessment of reliability.

**Table 5.2-2 Qualified Reliability Evaluation Matrix [1]**

| Reliability Score | Reliability |
|---|---|
| 1 | Low |
| 2 | Low to Medium |

| Reliability Score | Reliability |
|---|---|
| 3 | Medium |
| 4 | Medium to High |
| 5 | High |

[1] Quantification of reliability is reported in the paragraph above this table and all water volumes presented in this plan are 100% reliable during Drought of Record conditions.

### Table 5.2-3 Qualitative Reliability Assessment for Potentially Feasible Strategies

| WMS No. | WMS Name | Reliability Score | Reliability Considerations |
|---|---|---|---|
| 1 | Municipal Water Conservation | 5 | Since this strategy is a demand reduction, the reliability is high. |
| 2 | Non-Municipal Water Conservation | 5 | Since this strategy is a demand reduction, the reliability is high. |
| 3 | Drought Management | 5 | Since this strategy is a demand reduction, the reliability is high. |
| 4 | Edwards Transfers | 4 | The reliability is considered to be medium to high, as the yields were developed in accordance with full implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP). Reliability may be impacted by changes to rules and/or requirements of the EAHCP when it is renewed periodically. |
| 5 | Fresh Groundwater Development | 4 | Reliability is considered to be medium to high, as the yields were developed within the MAG. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 6 | Brackish Groundwater Development | 4 | Reliability is considered to be medium to high, as the yields were developed within the MAG. Reliability may be impacted because of differing well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 7 | Groundwater Conversions | 4 | The reliability is considered to be medium to high, as the yields were developed within the MAG. Reliability may be impacted by well production volumes, produced water quality, impacts to |

| WMS No. | WMS Name | Reliability Score | Reliability Considerations |
|---|---|---|---|
| | | | natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 8 | Facilities Expansion | 5 | Reliability is considered high, as the expanded infrastructure will help to improve efficiency and/or treat or distribute additional supplies. |
| 9 | Reuse Water | 5 | Reliability is considered to be high, as the supplies for this strategy are based on estimates of water use and related return flows to specific wastewater treatment plants (WWTPs). |
| 10 | Brush Management | 1 | This strategy is considered low reliability because there is no demonstrated firm yield during a repeat of the drought of record. |
| 11 | Rainwater Harvesting | 2 | This strategy is considered to have low to medium reliability because of uncertainties of precipitation frequency and intensity. |
| 12 | Surface Water Rights | 3 | This supply is considered medium reliability because of uncertainty involved in negotiations between willing buyers and sellers of existing water rights. |
| 13 | Balancing Storage | 5 | Storage options, such as ASR or OCRs are considered to have a reliability rating of high. |
| 14 | ARWA Carrizo-Wilcox Project (Phase 2) | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated through implementation of Phase 1. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 15 | ARWA DPR Project (Phase 3) | 5 | Reliability is considered to be high, as the supplies for this strategy are based on estimates of water use and related return flows to specific WWTPs. |
| 16 | CRWA Expanded Brackish Carrizo-Wilcox Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated through implementation of initial project phases. Blending of Carrizo-Wilcox Aquifer water is considered to be as reliable as the fresh water source. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can |

| WMS No. | WMS Name | Reliability Score | Reliability Considerations |
|---|---|---|---|
| | | | also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 17 | CRWA Siesta Project | 4 | Reliability is considered medium to high, as the hydrology has already been validated using the WAM. |
| 18 | CRWA Wells Ranch (Phase 3) Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated from existing, nearby wells. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 19 | CVLGC Carrizo Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated from existing, nearby wells. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can be impacted by ability to secure necessary permits because of competition for limited groundwater supplies within Wilson County. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 20 | GBRA Lower Basin New Appropriation | 5 | Reliability is considered high, as the hydrology has already been validated using the WAM and the strategy includes a storage reservoir to firm up supplies. |
| 21 | GBRA WaterSECURE | 5 | The reliability of the water supplies is considered high, as the surface water rights have already been secured and successful ASR development is highly reliable. While a small portion of the overall yield, the reliability of the brackish groundwater component could be considered medium to high because of the potential for differing well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can be impacted by the ability to secure necessary permits because of competition for limited groundwater supplies within Gonzales County. Reliability can also be impacted by rules and management policies of the |

| WMS No. | WMS Name | Reliability Score | Reliability Considerations |
|---|---|---|---|
| | | | respective GCD, which regulates production, well spacing, and other activities. |
| 22 | Medina County Regional ASR Project | 5 | Reliability is considered high. Successful ASR projects typically require extensive site-specific analyses, feasibility studies, and cycle testing prior to full implementation. |
| 23 | NBU ASR Project | 5 | Reliability is considered high. Successful ASR projects typically require extensive site-specific analyses, feasibility studies, and cycle testing prior to full implementation. |
| 24 | NBU Trinity Well Field Expansion | 4 | Reliability is considered medium to high. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 25 | SAWS Expanded Local Carrizo Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated through implementation of initial project phases. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 26 | SAWS Expanded Brackish Groundwater Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated from existing, nearby wells. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can be impacted by ability to secure necessary permits because of competition for limited groundwater supplies within Wilson County. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 27 | SAWS Regional Wilcox Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated from existing, nearby wells. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can be impacted by ability to secure necessary permits because of competition for limited groundwater supplies |

| WMS No. | WMS Name | Reliability Score | Reliability Considerations |
|---|---|---|---|
| | | | within Wilson County. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 28 | SSLGC Expanded Brackish Wilcox Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated through implementation of initial project phases. Blending of Carrizo-Wilcox Aquifer water is considered to be as reliable as the fresh water source. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 29 | SSLGC Expanded Carrizo Project | 4 | Reliability is considered medium to high, as the hydrogeology has already been validated through implementation of initial project phases. Reliability may be impacted by well production volumes, produced water quality, impacts to natural resources, and user competition. Reliability can also be impacted by rules and management policies of the respective GCD, which regulates production, well spacing, and other activities. |
| 30 | Victoria ASR Project | 5 | Reliability is considered high. Successful ASR projects typically require extensive site-specific analyses, feasibility studies, and cycle testing prior to full implementation. |
| 31 | Victoria Groundwater-Surface Water Exchange | 4 | Reliability is considered medium to high, as the hydrology has already been validated using the WAM. |
| 32 | Weather Modification | 2 | Reliability is considered low to medium, as the strategy is dependent on the presence of clouds capable of producing precipitation. |

## Financial Costs

Financial costs were evaluated using the TWDB Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. All costs included in the 2026 SCTRWP are shown in September 2023 dollars.

Costs do not include costs of infrastructure associated with distribution of water within a WUG after treatment, except for specific, limited allowances for direct reuse and conservation WMSs. Infrastructure was sized to deliver the sponsor's requested or envisioned yield; however, WMSs that are MAG-constrained include annual unit costs that were calculated using the MAG-constrained yield in the first decade of implementation.

The Uniform Costing Model generates cost estimate summaries that include costs associated with capital expenditures, operation and maintenance (O&M), contingency, debt service, and unit costs. Certain WMSs were evaluated using alternative financial cost methodologies, as follows:

- Drought Management (Refer to Section 5.2.3): Costs were evaluated using the TWDB Drought Management Costing Tool, which estimates the economic costs of foregone water use.
- Brush Management (Refer to Section 5.2.10): Texas A&M University provided a cost estimate for brush control as well as a cost for the associated monitoring program. The costs, updated to September 2023 dollars, assume initial clearing costs to be $304/acre and maintenance clearing costs to be $7.61/acre/year.

## Environmental Factors

This subchapter includes a quantitative reporting of the effects of potentially feasible WMSs on environmental factors, which includes environmental water needs (including effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico), agricultural resources, wildlife habitats, and cultural resources. WMS evaluations in Subchapter 5.2 include an Environmental Factors section, which is further organized into sections for Environmental Considerations and Cultural Considerations.

### Environmental Considerations

Environmental considerations were evaluated for each potentially feasible WMS based on information provided by sponsors, available published information, maps, and recent aerial photography, including available geographic information system (GIS) shapefiles. The project locations shown on maps in this chapter are conceptual in nature and are not meant to represent actual locations of facilities. Siting of facilities are subject to studies, designs, engineering, and/or contract negotiations to be determined by the project's sponsor later. Therefore, as projects enter the detailed design phases, it should be noted that potential environmental impacts identified in this analysis could be avoided or reduced through such approaches as facility layout or alignment adjustments, changes in construction methods, and construction timing.

Data were obtained from various reference sources and compiled into GIS using ArcGIS software. Environmental datasets were overlaid on defined conceptual project boundaries or alignments for each WMS to determine potential project effects on (1) vegetation, land use, and agricultural resources; (2) aquatic resources; and (3) threatened, endangered, and species of concern. Data were obtained from the following sources:

- Aerial Photography: ESRI ArcGIS Online Basemap Map Services and Google Earth;
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM);
- TCEQ 2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d);
- Texas Parks and Wildlife Department (TPWD) Ecological Mapping Systems of Texas (EMST) of Vegetation Maps;
- TPWD Wildlife Division, Diversity and Habitat Assessment Programs. TPWD County Lists of Protected Species and Species of Greatest Conservation Need (SGCN) (2024 August 22).

- TPWD Wildlife Diversity Program of Texas Parks & Wildlife Department. Texas Natural Diversity Database (2019);
- TPWD Coastal Fisheries Division: Water Resources Branch. Ecologically Significant River and Stream Segments of Region L (South Central) Regional Water Planning Area (2005);
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS): Soil Data Mart, Web Soil Survey and PLANTS Database;
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Resource List of Critical Habitat Maps and County Threatened and Endangered Species Lists;
- USFWS Karst Invertebrate Zone Maps;
- USFWS National Wetland Inventory (NWI) Maps;
- U.S. Geological Survey (USGS) 7.5-Minute Topographic Quadrangle Maps; and
- USGS National Hydrography Dataset (NHD) Maps.

Evaluations of WMS impacts to threatened and endangered species and SGCN included in this regional water plan used information and data sources that were current as of the time of writing. The TPWD county species lists used for the evaluation of environmental factors were published on August 22, 2024. The TPWD's county species lists were subsequently updated on January 15, 2025, which was after the SCTRWPG performed the WMS evaluations. Most of the updates included in the January 15, 2025, version of the TPWD county species lists reflect additions, deletions, or revisions of SGCN, and the monarch butterfly (migratory) was added as a federal candidate species for each project county evaluated in this plan. Project implementation would require independent review of impacts to threatened and endangered species and SGCN as part of the regulatory permitting for the project.

### Cultural Resources Considerations

Cultural resources were evaluated for each potentially feasible WMS using a cultural resources background literature review and probability modeling analysis to estimate the potential of a WMS project for containing cultural resources.

A background literature review was conducted by examining records from the Texas Historical Commission's (THC) Texas Historic and Archeology Sites Atlas (Atlas) online-restricted cultural resources database and the Texas Department of Transportation (TxDOT) Historic Resources Aggregator. Cemetery locations were identified using historically relevant locations listed on the Texas Freedom Colonies Project database and using the online database from Find a Grave. These sources provide information on the nature and location of previously conducted cultural resources surveys, previously recorded archaeological sites, National Historic Landmarks, National Registered Historic Places (NRHP)-listed or -eligible districts and properties, State Antiquities Landmarks (SALs), Recorded Texas Historic Landmarks, historical markers, cemeteries, Texas Freedom Colonies, and local neighborhood surveys.

For regional analysis, each WMS project area (e.g., polygon or large area) was examined for the presence of previously recorded cultural resources, and each WMS project alignment (e.g., line or pipeline) was examined for the presence of previously recorded cultural resources in additional to a 300-foot radius from the project alignment.

An analysis of historical maps was also performed as part of the background literature review to determine whether any historic-age (built in 1980 [45 years] or earlier) resources or potential historical structures (PHSs) were located within the WMS project. The review included historical topographic maps available on the USGS TopoView website, and historical aerial photography contained on the Nationwide Environmental Title Research (NETR) Historic Aerials website.

To conduct the probability modeling analysis, the SCTRWPG used TxDOT's Potential Archaeological Liability Maps and Hybrid Potential Archaeological Liability Maps systems, which use a geoarchaeological approach to determine where deeply buried archaeological sites may be preserved with sufficient integrity to warrant further study. The model also assigns higher scores to locales that possess or have a statistically greater likelihood of containing intact archaeological deposits in accordance with certain attributes. These attributes include proximity to natural water sources, soils and stratigraphic integrity, and areas with buildings, roads, or trails that have the potential to be historical in age. The overall potential integrity of deeply buried archaeological resources was assessed for each WMS on a scale of low, medium, and high potential. According to the scale, each WMS project received a mean score.

Results of the cultural resources background literature review and probability modeling analyses were collated to generate a baseline cultural resource assessment score. These scores were determined by the number and types of known cultural resources identified, and the mean score of the probability model. The previously recorded cultural resources within WMS projects were evaluated according to their NRHP eligibility and SAL designation, allowing for a tabular evaluation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries, which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 points. In addition, Recorded Texas Historical Landmarks, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The frequency of cultural resource sites combined with the project's mean archaeological probability generated the final cultural resource assessment scores presented for each WMS. When viewed as a series, a higher cultural resource assessment score indicates greater archaeological probability for known and unknown cultural resources sites to be within a WMS project's footprint. As the WMS boundaries remain in the conceptual stage, a more precise evaluation of cultural resources impacts would require the project footprint to be fully defined.

## 5.2.1 Municipal Water Conservation

The SCTRWPG identified the Municipal Water Conservation WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.1.1 Description of Water Management Strategy

Water conservation measures are defined as practices, techniques, programs, and technologies that will protect water resources, reduce consumption of water, reduce the loss or waste of water, or improve the efficiency in the use of water so that a water supply is made available for future or alternative uses. The goal of this WMS is to increase water conservation and thereby reduce freshwater use within the South Central Texas Region. The general methods to accomplish this objective are to (1) reduce per capita water use in the municipal water use category; (2) recycle and reuse water and substitute reclaimed water (treated municipal and industrial wastewater) for use in some industries, steam-electric power generation, and mining; and (3) improve irrigation efficiencies to reduce the quantity of water use in agriculture per acre irrigated.

Best Management Practices (BMPs) for water conservation are also included in this WMS evaluation [1]. In addition, the WMS includes estimates of potential water conservation demand reductions and associated costs of water conservation for municipal WUGs. This WMS is considered for implementation beginning in the 2030 decade.

#### 5.2.1.1.1 Municipal Water Conservation

For regional water planning purposes, municipal water use is defined as residential and commercial water use. Municipal water supply is used primarily for drinking, sanitation, cleaning, cooling, fire protection, and landscape watering for residential, commercial, and institutional establishments. Such water is supplied by both public and private utilities and, in areas not served by water utilities, is supplied by individual households. A key parameter of municipal water use within a typical city or water service area is the number of gallons used per person per day (per capita water use), measured as gallons per capita per day (GPCD). The objective of municipal water conservation programs is to reduce the per capita water use parameter without adversely affecting the quality of life of the people involved. This can be achieved through the following:

- Use of low flow plumbing fixtures (e.g., toilets, shower heads, and faucets that are designed for low quantities of flow per unit of use);
- Selection and use of more efficient water-using appliances (e.g., clothes washers and dishwashers);
- Modification and/or installation of lawn and landscaping systems to use grass and plants that require less water;
- Repair of plumbing and water-using appliances to reduce leaks; and
- Modification of personal behavior that controls the use of plumbing fixtures, appliances, and lawn watering methods.

Expected water-efficiency savings, or passive water savings, are incorporated into the current TWDB municipal water demand projections (refer to Chapter 2) and include estimated or anticipated savings due to state and federal specifications for fixture and appliance design. The savings projected by the

[1] Water Conservation Implementation Task Force. Report to the 79th Legislature, Texas Water Development Board, Special Report. Austin, Texas. November 2004.

TWDB includes complete replacement of existing plumbing fixtures to water-efficient fixtures by the year 2045. The projections also assume that all new construction includes water-efficient plumbing fixtures.

The 1991 State Water Efficient Plumbing Act established minimum standards for plumbing fixtures sold in Texas. The standards for new plumbing fixtures, as specified by the State Water Efficient Plumbing Act and updated by the TCEQ, are shown in Table 5.2.1-1. The TCEQ has established rules requiring the labeling of both plumbing fixtures and water-using appliances sold in Texas. The labels must specify the rates of flow for plumbing fixtures and lawn sprinklers, and the amounts of water used per cycle for clothes washers and dishwashers.

In 2009, the Texas Legislature enacted House Bill (HB) 2667, establishing new minimum standards for plumbing fixtures sold in Texas beginning in 2014. HB 2667 clarifies and sets out the national standards of the American Society of Mechanical Engineers (ASME) and American National Standards Institute (ANSI) by which plumbing fixtures will be produced and tested. This bill establishes a phase-in of high efficiency plumbing fixtures brought into Texas, which allowed manufacturers the time to change their production and retailers the opportunity to turn over their inventory. HB 2667 creates an exemption for those manufacturers that volunteer to register their products with the United States Environmental Protection Agency's (U.S. EPA's) WaterSense Program, which should result in additional water savings. This bill also repeals the TCEQ certification process for plumbing fixtures since the plumbing fixtures must meet national certification and testing procedures.

The TCEQ has established rules [2] to reflect this change in statute. The 2009 law required that by January 2014, all toilets use no more than 1.28 gallons per flush (20% savings from the 1991 standard of 1.6 gallons per flush). Assuming an average frequency of per-person toilet use in households of 5.1 and a per-use savings of 0.32 gallons per use, the supplementary savings of adopting high-efficiency toilets is 1.63 GPCD. This change is also reflected in Table 5.2.1-1.

**Table 5.2.1-1 Standards for Plumbing Fixtures**

| Fixture | Standard |
|---|---|
| Toilets | 1.28 gallons per flush |
| Shower Heads | 2.50 gallons per minute (gpm) at 80 pounds per square inch (psi) |
| Urinals | 0.50 gallons per flush |
| Faucet Aerators | 2.20 gpm at 60 psi |
| Drinking Water Fountains | Self-closing valve |

The TWDB estimates that new plumbing fixtures in dwellings, offices, and public places will be a reduction in per capita water use, in comparison to what would have occurred with previous generations of plumbing fixtures found in Table 5.2.1-2.

[2] Title 30 of the Texas Administrative Code (TAC) §290.252; 30 TAC §290, Subchapter G; and Texas Health and Safety Code 372.

**Table 5.2.1-2 Water Conservation Potentials of Low Flow Plumbing Fixtures (GPCD)**

| Plumbing Fixture | Pre-1995 Average Use to 1995 Standard | Pre-1995 Average Use to 2014 Standard | 1995 Average Use to 2014 Standard |
|---|---|---|---|
| Showerheads [1] | 13.0 | NA | 1.86 |
| Toilets - Residential | 10.5 | 12.1 | 1.6 |
| Toilets and Urinals – Commercial [2] | 7.06 | 8.41 | 1.35 |
| Showerheads [1] | 13.0 | NA | 1.86 |

[1] Savings values shown assume 8 minutes per shower and 6.5 showers per person per week

[2] Savings values shown assume state-level gender employee proportions and 6 days per week use for commercial toilet and urinal use

In 2001, the Texas Legislature amended the TWC to require RWPGs to consider water conservation and drought management measures for each WUG with an identified need (projected water shortage). Beginning in 2004, the Water Conservation Implementation Task Force initially provided a BMP guide for use by RWPGs [3]. In 2007, the Task Force was succeeded by the Water Conservation Advisory Council (WCAC), enacted by the 80th Texas Legislature with the passage of SB 3 and HB 4. The council's primary roles include monitoring trends in water conservation implementation and technologies for potential inclusion as BMPs. Since its inception, WCAC has continually worked with TWDB and TCEQ to update the *Best Management Practices Guide*.

A variety of conservation measures are recommended as described in the WCAC BMP Guide [4], any combination of which can be used to meet the specific goals for a municipality or utility. Conservation can be achieved using a variety of strategies, including the following:

- **Conservation Analysis and Planning**
  - Conservation Coordinator
  - Cost-Effectiveness Analysis
  - Water Survey for Single-Family and Multi-Family Customers
  - Customer Characterization
- **Financial**
  - Water Conservation Pricing
  - Wholesale Agency Assistance Programs
- **System Operations**
  - Metering of all New Connections and Retrofitting of Existing Connections
  - System Water Audit and Water Loss

[3] Water Conservation Implementation Task Force. Report to the 79th Legislature, Texas Water Development Board, Special Report. Austin, Texas. November 2004.

[4] *Best Management Practices for Municipal Water Users*. Texas Water Development Board. Austin, Texas. May 2019.

- **Landscaping**
  - Athletic Field Conservation
  - Golf Course Conservation
  - Landscape Irrigation Conservation and Incentives
  - Park Conservation
  - Residential Landscape Irrigation Evaluations
  - Outdoor Watering Schedule
- **Education and Public Awareness**
  - Public Information
  - School Education
  - Public Outreach and Education
  - Partnerships with Nonprofit Organizations
- **Rebate, Retrofit, and Incentive Programs**
  - Conservation Programs for Industrial, Commercial, and Institutional Accounts
  - Residential Clothes Washer Incentive Program
  - Residential Toilet Replacement Programs
  - Showerhead, Aerator, and Toilet Flapper Retrofit Program
  - Water-Wise Landscape Design and Conversion Programs
  - Customer Conservation Rebates
  - Plumbing Assistance Programs for Economically Disadvantaged Customers
- **Conservation Technology**
  - New Construction Graywater
  - Rainwater Harvesting and Condensate Reuse [5]
  - Reuse of Reclaimed Water [6]
- **Regulatory Enforcement**
  - Prohibition of Wasting Water
  - Conservation Ordinance Planning and Development

[5] While Rainwater Harvesting, Condensate Reuse, and Reuse of Reclaimed Water are included in the WCAC Municipal BMP Guide as water conservation measures, they are not classified as water conservation measures by the TWDB for regional water planning purposes or in the 2027 Regional and State Water Planning Database (DB27).

Entities must submit a water conservation plan if they meet one or more of the following conditions [6]:

- The entity is a retail public water supplier with 3,300 or more connections;
- The entity is applying to the TWDB for financial assistance of more than $500,000; or
- The entity has certain surface water rights through the TCEQ.

Submitted water conservation plans must meet certain minimum requirements and be updated every five years. The water conservation plans should include a utility profile, an evaluation of the applicant's water and wastewater system and customer use characteristics, to identify water conservation opportunities. The plans should also set specific and quantifiable five-year and ten-year conservation goals for water loss programs and municipal and residential uses in GPCD with a schedule. More information and resources to develop water conservation plans can be found on the TWDB website [7].

In addition to the BMP Guide and required water conservation plans, the WCAC recommends use of a standardized methodology to determine per capita municipal water use. A standardized methodology would allow consistent evaluations and comparisons of water conservation measures' effectiveness among cities located in different climates and parts of Texas. The WCAC further recommends GPCD targets and goals that should be considered by retail public water suppliers, as follows:

- "All public water suppliers that are required to prepare and submit water conservation plans should establish targets for water conservation, including specific goals for per capita water use and for water loss programs using appropriate water conservation BMPs;" and
- "Municipal Water Conservation Plans required by the state shall include per capita water-use goals, with targets and goals established by an entity giving consideration to a minimum annual reduction of 1% in total GPCD, based upon a five-year moving average, until such time as the entity achieves a total GPCD of 140 GPCD or less."

The Texas WCAC provides information on best management practices and continuing development of water conservation resources, expertise, and progress evaluation. More information is available on the WCAC website at www.savetexaswater.org. The SCTRWPG considered these recommendations and incorporated them into the Region L Municipal Water Conservation Goals.

Anticipated per capita water use for Region L WUGs as a result of passive water conservation is shown in Table 5.2.1-3, which represents the effects of low flow plumbing fixtures. These per capita water use estimates were used to project water demands for each municipal WUG (See Chapter 2). The table includes a list of 144 municipal WUGs in the SCTRWPA, arranged in order of lowest to highest per capita water use in year 2011 (baseline). Projected per capita water use represents the anticipated impacts of low flow plumbing fixtures for each decade from 2030 through 2080. **For most WUGs, additional GPCD savings are expected when the Municipal Water Conservation strategy goals are applied** (refer to Section 5.2.1.2: Available Yield for a description of Municipal Water Conservation GPCD goals and accompanying yield or savings).

[6] *Evaluation of Best Management Practices in Certain Water Conservation Plans*. Biennial Report to the Texas Legislature, 85th Legislative Session. Texas Water Development Board, 2017.
[7] Texas Water Development Board (TWDB), Water Conservation Plans website: http://www.twdb.texas.gov/conservation/municipal/plans/index.asp

## Table 5.2.1-3 Projected Per-Capita Water Use with Passive Conservation (GPCD) [1]

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Randolph Air Force Base | Bexar | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 2 | Port Oconnor Improvement District | Calhoun | 70 | 65 | 64 | 64 | 64 | 64 | 64 |
| 3 | County Line SUD | Hays | 80 | 77 | 77 | 77 | 77 | 77 | 77 |
| 4 | East Medina County SUD | Medina | 81 | 77 | 76 | 76 | 76 | 76 | 76 |
| 5 | Kendall County WCID 1 | Kendall | 86 | 81 | 80 | 80 | 80 | 80 | 80 |
| 6 | Picosa WSC | Wilson | 86 | 82 | 82 | 82 | 82 | 82 | 82 |
| 7 | Medina River West WSC | Medina | 91 | 87 | 87 | 87 | 87 | 87 | 87 |
| 8 | Kyle | Hays | 91 | 87 | 86 | 86 | 86 | 86 | 86 |
| 9 | Kirby | Bexar | 92 | 87 | 87 | 87 | 87 | 87 | 87 |
| 10 | Maxwell SUD | Hays | 92 | 88 | 87 | 87 | 87 | 87 | 87 |
| 11 | Cibolo | Guadalupe | 93 | 89 | 88 | 88 | 88 | 88 | 88 |
| 12 | Point Comfort | Calhoun | 94 | 89 | 88 | 88 | 88 | 88 | 88 |
| 13 | La Coste | Medina | 94 | 89 | 89 | 89 | 89 | 89 | 89 |
| 14 | Martindale WSC | Caldwell | 96 | 92 | 91 | 91 | 91 | 91 | 91 |
| 15 | Lackland Air Force Base | Bexar | 96 | 92 | 92 | 92 | 92 | 92 | 92 |
| 16 | Benton City WSC | Medina | 97 | 93 | 92 | 92 | 92 | 92 | 92 |
| 17 | Converse | Bexar | 98 | 93 | 93 | 93 | 93 | 93 | 93 |
| 18 | Victoria County WCID 1 | Victoria | 98 | 94 | 93 | 93 | 93 | 93 | 93 |
| 19 | Creedmoor-Maha WSC [2] | Caldwell | 100 | 95 | 94 | 94 | 94 | 94 | 94 |
| 20 | Yancey WSC | Medina | 101 | 97 | 96 | 96 | 96 | 96 | 96 |
| 21 | Springs Hill WSC | Guadalupe | 101 | 97 | 96 | 96 | 96 | 96 | 96 |
| 22 | Goforth SUD [2] | Hays | 101 | 97 | 97 | 97 | 97 | 97 | 97 |
| 23 | Green Valley SUD | Guadalupe | 103 | 99 | 99 | 99 | 99 | 99 | 99 |
| 24 | Wimberley WSC | Hays | 104 | 99 | 99 | 99 | 99 | 99 | 99 |
| 25 | County-Other, La Salle | La Salle | 104 | 99 | 98 | 98 | 98 | 98 | 98 |
| 26 | County-Other, Guadalupe | Guadalupe | 105 | 98 | 98 | 98 | 98 | 98 | 98 |
| 27 | County-Other, Calhoun | Calhoun | 105 | 99 | 97 | 97 | 97 | 97 | 97 |
| 28 | County-Other, Victoria | Victoria | 105 | 100 | 100 | 100 | 100 | 100 | 100 |
| 29 | Quail Creek MUD | Victoria | 105 | 100 | 99 | 99 | 99 | 99 | 99 |
| 30 | San Antonio Water System [3] | Bexar | 106 | 102 | 97 | 95 | 92 | 89 | 87 |
| 31 | County-Other, Wilson | Wilson | 107 | 102 | 102 | 102 | 102 | 102 | 102 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 32 | County-Other, Refugio | Refugio | 107 | 102 | 102 | 102 | 102 | 102 | 102 |
| 33 | County-Other, Caldwell | Caldwell | 107 | 103 | 103 | 103 | 103 | 103 | 103 |
| 34 | County-Other, Gonzales | Gonzales | 108 | 103 | 102 | 102 | 102 | 102 | 102 |
| 35 | S S WSC | Wilson | 109 | 105 | 104 | 104 | 104 | 104 | 104 |
| 36 | County-Other, Goliad | Goliad | 110 | 105 | 105 | 105 | 105 | 105 | 105 |
| 37 | Leon Valley | Bexar | 110 | 105 | 105 | 105 | 105 | 105 | 105 |
| 38 | County-Other, Kendall | Kendall | 110 | 106 | 105 | 105 | 105 | 105 | 105 |
| 39 | McCoy WSC [2] | Atascosa | 111 | 106 | 106 | 106 | 106 | 106 | 106 |
| 40 | Poteet | Atascosa | 111 | 107 | 106 | 106 | 106 | 106 | 106 |
| 41 | County-Other, Hays [2] | Hays | 111 | 107 | 106 | 106 | 106 | 106 | 106 |
| 42 | Kendall West Utility | Kendall | 111 | 107 | 106 | 106 | 106 | 106 | 106 |
| 43 | Polonia WSC [2] | Caldwell | 112 | 108 | 108 | 108 | 108 | 108 | 108 |
| 44 | Marion | Guadalupe | 113 | 108 | 108 | 108 | 108 | 108 | 108 |
| 45 | Canyon Lake Water Service (Texas Water Company) [2] | Comal | 113 | 109 | 109 | 109 | 109 | 109 | 109 |
| 46 | Tri Community WSC | Caldwell | 113 | 109 | 108 | 108 | 108 | 108 | 108 |
| 47 | Atascosa Rural WSC | Bexar | 114 | 110 | 109 | 109 | 109 | 109 | 109 |
| 48 | County-Other, Medina | Medina | 116 | 112 | 111 | 111 | 111 | 111 | 111 |
| 49 | County-Other, Atascosa | Atascosa | 116 | 112 | 111 | 111 | 111 | 111 | 111 |
| 50 | County-Other, Frio | Frio | 117 | 113 | 112 | 112 | 112 | 112 | 112 |
| 51 | San Marcos | Hays | 119 | 110 | 107 | 105 | 103 | 102 | 102 |
| 52 | County-Other, Bexar | Bexar | 119 | 112 | 111 | 111 | 111 | 111 | 111 |
| 53 | County-Other, DeWitt | DeWitt | 123 | 118 | 117 | 117 | 117 | 117 | 117 |
| 54 | County-Other, Dimmit | Dimmit | 124 | 119 | 118 | 118 | 118 | 118 | 118 |
| 55 | Port Lavaca | Calhoun | 126 | 121 | 121 | 121 | 121 | 121 | 121 |
| 56 | Fayette WSC [2] | Gonzales | 126 | 122 | 121 | 121 | 121 | 121 | 121 |
| 57 | County-Other, Karnes | Karnes | 127 | 122 | 121 | 121 | 121 | 121 | 121 |
| 58 | East Central SUD | Bexar | 127 | 122 | 122 | 122 | 122 | 122 | 122 |
| 59 | County-Other, Uvalde | Uvalde | 128 | 123 | 122 | 122 | 122 | 122 | 122 |
| 60 | Luling | Caldwell | 128 | 123 | 123 | 123 | 123 | 123 | 123 |
| 61 | Crystal Clear SUD | Guadalupe | 129 | 124 | 124 | 124 | 124 | 124 | 124 |
| 62 | Lockhart | Caldwell | 129 | 125 | 124 | 124 | 124 | 124 | 124 |
| 63 | Elmendorf | Bexar | 130 | 126 | 125 | 125 | 125 | 125 | 125 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 64 | Devine | Medina | 132 | 127 | 127 | 127 | 127 | 127 | 127 |
| 65 | Universal City | Bexar | 135 | 130 | 129 | 129 | 129 | 129 | 129 |
| 66 | Seguin | Guadalupe | 139 | 134 | 134 | 134 | 134 | 134 | 134 |
| 67 | Nixon | Gonzales | 140 | 136 | 135 | 135 | 135 | 135 | 135 |
| 68 | South Buda WCID 1 | Hays | 142 | 138 | 137 | 137 | 137 | 137 | 137 |
| 69 | Big Wells | Dimmit | 143 | 138 | 138 | 138 | 138 | 138 | 138 |
| 70 | Poth | Wilson | 144 | 139 | 138 | 138 | 138 | 138 | 138 |
| 71 | Water Services | Bexar | 145 | 140 | 139 | 139 | 139 | 139 | 139 |
| 72 | Schertz | Bexar | 145 | 141 | 140 | 140 | 140 | 140 | 140 |
| 73 | Guadalupe-Blanco River Authority | Comal | 146 | 142 | 141 | 141 | 141 | 141 | 141 |
| 74 | Sunko WSC | Karnes | 146 | 142 | 141 | 141 | 141 | 141 | 141 |
| 75 | Woodsboro | Refugio | 147 | 142 | 142 | 142 | 142 | 142 | 142 |
| 76 | Aqua WSC [2] | Caldwell | 148 | 144 | 143 | 143 | 143 | 143 | 143 |
| 77 | Selma | Bexar | 148 | 144 | 143 | 143 | 143 | 143 | 143 |
| 78 | County-Other, Zavala | Zavala | 149 | 144 | 143 | 143 | 143 | 143 | 143 |
| 79 | Seadrift | Calhoun | 150 | 145 | 145 | 145 | 145 | 145 | 145 |
| 80 | Oak Hills WSC | Wilson | 150 | 146 | 145 | 145 | 145 | 145 | 145 |
| 81 | County-Other, Comal | Comal | 152 | 147 | 147 | 147 | 147 | 147 | 147 |
| 82 | Batesville WSC | Zavala | 153 | 149 | 148 | 148 | 148 | 148 | 148 |
| 83 | Waelder | Gonzales | 154 | 149 | 149 | 149 | 149 | 149 | 149 |
| 84 | Natalia | Medina | 154 | 150 | 149 | 149 | 149 | 149 | 149 |
| 85 | Charlotte | Atascosa | 155 | 150 | 150 | 150 | 150 | 150 | 150 |
| 86 | Carrizo Hill WSC | Dimmit | 156 | 152 | 151 | 151 | 151 | 151 | 151 |
| 87 | The Oaks WSC | Bexar | 157 | 152 | 151 | 151 | 151 | 151 | 151 |
| 88 | Yorktown | DeWitt | 158 | 153 | 153 | 153 | 153 | 153 | 153 |
| 89 | Live Oak | Bexar | 159 | 154 | 154 | 154 | 154 | 154 | 154 |
| 90 | Yoakum [2] | DeWitt | 160 | 155 | 155 | 155 | 155 | 155 | 155 |
| 91 | C Willow Water | Wilson | 165 | 160 | 160 | 160 | 160 | 160 | 160 |
| 92 | Castroville | Medina | 165 | 160 | 160 | 160 | 160 | 160 | 160 |
| 93 | Karnes City | Karnes | 168 | 163 | 163 | 163 | 163 | 163 | 163 |
| 94 | Refugio | Refugio | 171 | 166 | 166 | 166 | 166 | 166 | 166 |
| 95 | Texas State University | Hays | 171 | 167 | 167 | 167 | 167 | 167 | 167 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 96 | Lytle | Atascosa | 174 | 169 | 169 | 169 | 169 | 169 | 169 |
| 97 | Moore WSC | Frio | 174 | 170 | 169 | 169 | 169 | 169 | 169 |
| 98 | Medina County WCID 2 | Medina | 177 | 173 | 172 | 172 | 172 | 172 | 172 |
| 99 | Pearsall | Frio | 178 | 173 | 173 | 173 | 173 | 173 | 173 |
| 100 | Goliad | Goliad | 180 | 175 | 174 | 174 | 174 | 174 | 174 |
| 101 | Wingert Water Systems | Comal | 180 | 175 | 175 | 175 | 175 | 175 | 175 |
| 102 | Smiley | Gonzales | 181 | 176 | 176 | 176 | 176 | 176 | 176 |
| 103 | Asherton | Dimmit | 182 | 177 | 177 | 177 | 177 | 177 | 177 |
| 104 | Runge | Karnes | 183 | 178 | 178 | 178 | 178 | 178 | 178 |
| 105 | El Oso WSC [2] | Karnes | 183 | 179 | 178 | 178 | 178 | 178 | 178 |
| 106 | New Braunfels | Comal | 183 | 179 | 178 | 178 | 178 | 178 | 178 |
| 107 | West Medina WSC | Medina | 185 | 180 | 179 | 179 | 179 | 179 | 179 |
| 108 | Knippa WSC | Uvalde | 187 | 182 | 182 | 182 | 182 | 182 | 182 |
| 109 | Encinal WSC | La Salle | 187 | 183 | 182 | 182 | 182 | 182 | 182 |
| 110 | Stockdale | Wilson | 189 | 184 | 184 | 184 | 184 | 184 | 184 |
| 111 | Crystal City | Zavala | 189 | 184 | 184 | 184 | 184 | 184 | 184 |
| 112 | La Vernia | Wilson | 190 | 185 | 184 | 184 | 184 | 184 | 184 |
| 113 | Jourdanton | Atascosa | 190 | 185 | 185 | 185 | 185 | 185 | 185 |
| 114 | Bexar County WCID 10 | Bexar | 193 | 188 | 187 | 187 | 187 | 187 | 187 |
| 115 | Boerne | Kendall | 193 | 189 | 188 | 188 | 188 | 188 | 188 |
| 116 | Pleasanton | Atascosa | 196 | 191 | 191 | 191 | 191 | 191 | 191 |
| 117 | Windmill WSC | Uvalde | 197 | 193 | 192 | 192 | 192 | 192 | 192 |
| 118 | Falls City | Karnes | 201 | 196 | 196 | 196 | 196 | 196 | 196 |
| 119 | Uvalde | Uvalde | 211 | 206 | 206 | 206 | 206 | 206 | 206 |
| 120 | Dilley | Frio | 212 | 208 | 207 | 207 | 207 | 207 | 207 |
| 121 | Floresville | Wilson | 213 | 208 | 208 | 208 | 208 | 208 | 208 |
| 122 | Sabinal | Uvalde | 215 | 210 | 210 | 210 | 210 | 210 | 210 |
| 123 | Gonzales | Gonzales | 222 | 217 | 217 | 217 | 217 | 217 | 217 |
| 124 | Three Oaks WSC | Wilson | 223 | 218 | 218 | 218 | 218 | 218 | 218 |
| 125 | Victoria | Victoria | 226 | 221 | 221 | 221 | 221 | 221 | 221 |
| 126 | Air Force Village II Inc | Bexar | 227 | 221 | 221 | 221 | 221 | 221 | 221 |
| 127 | Fair Oaks Ranch | Bexar | 237 | 233 | 232 | 232 | 232 | 232 | 232 |
| 128 | Cuero | DeWitt | 238 | 233 | 233 | 233 | 233 | 233 | 233 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 129 | Carrizo Springs | Dimmit | 243 | 238 | 238 | 238 | 238 | 238 | 238 |
| 130 | Hondo | Medina | 243 | 238 | 238 | 238 | 238 | 238 | 238 |
| 131 | Gonzales County WSC | Gonzales | 244 | 239 | 239 | 239 | 239 | 239 | 239 |
| 132 | Concan WSC | Uvalde | 244 | 240 | 239 | 239 | 239 | 239 | 239 |
| 133 | Alamo Heights | Bexar | 245 | 240 | 240 | 240 | 240 | 240 | 240 |
| 134 | Ville Dalsace Water Supply | Medina | 246 | 241 | 241 | 241 | 241 | 241 | 241 |
| 135 | 3009 Water | Comal | 248 | 244 | 243 | 243 | 243 | 243 | 243 |
| 136 | Zavala County WCID 1 | Zavala | 256 | 252 | 251 | 251 | 251 | 251 | 251 |
| 137 | Cotulla | La Salle | 280 | 275 | 275 | 275 | 275 | 275 | 275 |
| 138 | Shavano Park | Bexar | 283 | 278 | 278 | 278 | 278 | 278 | 278 |
| 139 | Loma Alta Chula Vista Water System | Zavala | 287 | 283 | 282 | 282 | 282 | 282 | 282 |
| 140 | KT Water Development | Comal | 304 | 300 | 300 | 300 | 300 | 300 | 300 |
| 141 | Garden Ridge | Comal | 315 | 311 | 310 | 310 | 310 | 310 | 310 |
| 142 | Kenedy | Karnes | 352 | 347 | 347 | 347 | 347 | 347 | 347 |
| 143 | Clear Water Estates Water System (Texas Water Company) | Comal | 1,083 | 1,078 | 1,077 | 1,077 | 1,077 | 1,077 | 1,077 |
| 144 | Fort Sam Houston | Bexar | 1,895 | 1,891 | 1,890 | 1,890 | 1,890 | 1,890 | 1,890 |

[1] Passive water conservation effects are a result of low flow plumbing fixtures. Projected per capita water uses are estimated by the TWDB and used in calculating municipal water demands for WUGs in Chapter 2.

[2] WUGs are split between Region L and other regions (Regions K, P, and/or N).

[3] SAWS has identified utility-specific water conservation goals that are described and quantified in Section 5.2.1.2.3.

#### 5.2.1.1.2 Outdoor Water Conservation

In 2018, Texas Living Waters published the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential*, which detailed regional and statewide projected conservation savings using effective outdoor watering education, technology, and restrictions. According to Texas Living Waters, effectively implementing outdoor watering restrictions can achieve much of the projected conservation savings identified in the 2017 State Water Plan (SWP) efficiently utilizing the following limits:

- Number of days per week residents can water;
- Hours during which residents can irrigate; and
- Specific water delivering technologies.

The Texas Living Waters Project reported an estimated savings potential of twice per week outdoor watering restrictions ranges from 3.5 (low effort) to 8.5 (high effort) percent of total municipal demand. The Texas Living Waters Project research indicates that education and enforcement have a direct impact on the effectiveness of outdoor watering restrictions.

#### 5.2.1.2 Available Yield

The purpose of the Municipal Water Conservation WMS is to evaluate the potential of additional municipal water conservation for inclusion in the RWP, which could meet part of the projected water needs (shortages) of each WUG for which a need (shortage) is projected. The Municipal Water Conservation WMS for municipal WUGs of Region L is based on the above-listed BMPs, WCAC guidelines for water-use targets and goals, as well as the quantities and costs of water conservation measures, as reported in TWDB's publication entitled, *Quantifying the Effectiveness of Various Water Conservation Techniques in Texas* (TWDB Water Conservation Publication) [8].

For the 2026 RWPs, water conservation strategies are separated into two distinct types:

- Water Loss Mitigation: examples include leak detection and water loss programs, advanced metering infrastructure (AMI), utility water loss audits, and transmission system water loss mitigation.
- Water Use Reduction: examples include conservation analysis and planning, education and outreach, water conservation pricing, landscape irrigation conservation and incentives, outdoor watering schedules, and prohibitions on wasting water.

Yields and cost estimates for these two types of conservation are included in subsequent sections.

##### 5.2.1.2.1 Municipal Water Conservation Goals

The SCTRWPG established the following Municipal Water Conservation goals for the 2026 RWP:

- For municipal WUGs having year 2030 water use of 140 GPCD and greater, the goal is to reduce per capita water use by 10% per decade until 140 GPCD is reached; after which, the goal is to reduce per capita water use by 2.5% per decade for the remainder of the planning period;
- For municipal WUGs having year 2030 water use between 80 GPCD and 139 GPCD, the goal is to reduce per capita water use by 2.5% per decade for the remainder of the planning period or until 80 GPCD is reached; and
- For municipal WUGs having year 2030 water use less than 80 GPCD, the goal is to maintain per capita water use at or below 80 GPCD throughout the planning horizon.

A summary of municipal WUGs' water use and population is provided in Table 5.2.1-4. In year 2030, 71 municipal WUGs have a projected per capita water use less than 140 GPCD. These WUGs represent approximately 86% of the South Central Texas Region's population in 2030 and are projected to use approximately 75% of the Region's municipal water. In contrast, 73 WUGs in the SCTRWPA have a projected municipal per capita water use of 140 GPCD or more, representing 14% of the region's population and 25% of the region's municipal water demands.

The above Municipal Water Conservation Goals for the SCTRWPA were applied to WUGs and the resulting per capita water use goals are summarized in Table 5.2.1-5.

[8] Texas Water Development Board (TWDB). 2003. *Quantifying the Effectiveness of Various Water Conservation Techniques in Texas*. Appendix VI, Region L. Prepared by GDS Associates.

SAWS has chosen to develop utility-specific conservation goals, beyond those included in the Region L Municipal Water Conservation goals described above. A description of the Municipal Water Conservation WMS for SAWS and accompanying tables are included in Section 5.2.1.2.3.

**Table 5.2.1-4 Population and Municipal Per Capita Water Use**

| 2030 per Capita Water Use (GPCD) | Number of Municipal WUGs | Percent of Municipal WUGs | 2030 Population (No.) | Percent of Total Population | 2030 Water Demands (acft/yr) | Percent of Total Water Demands |
|---|---|---|---|---|---|---|
| Less than 140 | 71 | 49.3% | 3,452,367 | 86.0% | 399,216 | 74.7% |
| 140 and Greater | 73 | 50.7% | 564,269 | 14.0% | 135,115 | 25.3% |
| **Totals** | **144** | **100%** | **4,016,636** | **100%** | **534,331** | **100%** |

**Table 5.2.1-5 Per Capita Water Use Goals for Region L Municipal WUGs (GPCD) [1]**

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Randolph Air Force Base | Bexar | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 2 | Port Oconnor Improvement District | Calhoun | 70 | 65 | 64 | 64 | 64 | 64 | 64 |
| 3 | County Line SUD | Hays | 80 | 77 | 77 | 77 | 77 | 77 | 77 |
| 4 | East Medina County SUD | Medina | 81 | 77 | 76 | 76 | 76 | 76 | 76 |
| 5 | Kendall County WCID 1 | Kendall | 86 | 80 | 80 | 80 | 80 | 80 | 80 |
| 6 | Picosa WSC | Wilson | 86 | 80 | 80 | 80 | 80 | 80 | 80 |
| 7 | Medina River West WSC | Medina | 91 | 85 | 83 | 81 | 80 | 80 | 80 |
| 8 | Kyle | Hays | 91 | 85 | 82 | 80 | 80 | 80 | 80 |
| 9 | Kirby | Bexar | 92 | 85 | 83 | 81 | 80 | 80 | 80 |
| 10 | Maxwell SUD | Hays | 92 | 86 | 83 | 81 | 80 | 80 | 80 |
| 11 | Cibolo | Guadalupe | 93 | 87 | 84 | 82 | 80 | 80 | 80 |
| 12 | Point Comfort | Calhoun | 94 | 87 | 85 | 82 | 80 | 80 | 80 |
| 13 | La Coste | Medina | 94 | 87 | 85 | 83 | 81 | 80 | 80 |
| 14 | Martindale WSC | Caldwell | 96 | 89 | 87 | 85 | 83 | 81 | 80 |
| 15 | Lackland Air Force Base | Bexar | 96 | 90 | 88 | 86 | 84 | 81 | 80 |
| 16 | Benton City WSC | Medina | 97 | 91 | 88 | 86 | 84 | 82 | 80 |
| 17 | Converse | Bexar | 98 | 91 | 89 | 87 | 84 | 82 | 80 |
| 18 | Victoria County WCID 1 | Victoria | 98 | 91 | 89 | 87 | 85 | 83 | 80 |
| 19 | Creedmoor-Maha WSC [2] | Caldwell | 100 | 93 | 90 | 88 | 86 | 84 | 82 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 20 | Yancey WSC | Medina | 101 | 94 | 92 | 89 | 87 | 85 | 83 |
| 21 | Springs Hill WSC | Guadalupe | 101 | 94 | 92 | 90 | 87 | 85 | 83 |
| 22 | Goforth SUD [2] | Hays | 101 | 95 | 92 | 90 | 88 | 86 | 84 |
| 23 | Green Valley SUD | Guadalupe | 103 | 97 | 94 | 92 | 89 | 87 | 85 |
| 24 | Wimberley WSC | Hays | 104 | 97 | 94 | 92 | 90 | 87 | 85 |
| 25 | County-Other, La Salle | La Salle | 104 | 97 | 94 | 92 | 90 | 87 | 85 |
| 26 | County-Other, Guadalupe | Guadalupe | 105 | 96 | 94 | 91 | 89 | 87 | 85 |
| 27 | County-Other, Calhoun | Calhoun | 105 | 97 | 94 | 92 | 89 | 87 | 85 |
| 28 | County-Other, Victoria | Victoria | 105 | 98 | 96 | 93 | 91 | 89 | 86 |
| 29 | Quail Creek MUD | Victoria | 105 | 98 | 95 | 93 | 91 | 88 | 86 |
| 30 | San Antonio Water System [3] | Bexar | 106 | 94 | 89 | 86 | 84 | 81 | 79 |
| 31 | County-Other, Wilson | Wilson | 107 | 100 | 97 | 95 | 93 | 90 | 88 |
| 32 | County-Other, Refugio | Refugio | 107 | 100 | 97 | 95 | 92 | 90 | 88 |
| 33 | County-Other, Caldwell | Caldwell | 107 | 101 | 98 | 96 | 93 | 91 | 89 |
| 34 | County-Other, Gonzales | Gonzales | 108 | 100 | 98 | 95 | 93 | 90 | 88 |
| 35 | S S WSC | Wilson | 109 | 102 | 100 | 97 | 95 | 92 | 90 |
| 36 | County-Other, Goliad | Goliad | 110 | 103 | 100 | 98 | 95 | 93 | 91 |
| 37 | Leon Valley | Bexar | 110 | 103 | 100 | 98 | 95 | 93 | 91 |
| 38 | County-Other, Kendall | Kendall | 110 | 103 | 100 | 98 | 95 | 93 | 91 |
| 39 | McCoy WSC [2] | Atascosa | 111 | 104 | 101 | 99 | 96 | 94 | 91 |
| 40 | Poteet | Atascosa | 111 | 104 | 101 | 99 | 96 | 94 | 92 |
| 41 | County-Other, Hays [2] | Hays | 111 | 104 | 101 | 99 | 96 | 94 | 92 |
| 42 | Kendall West Utility | Kendall | 111 | 104 | 101 | 99 | 96 | 94 | 92 |
| 43 | Polonia WSC [2] | Caldwell | 112 | 105 | 103 | 100 | 98 | 95 | 93 |
| 44 | Marion | Guadalupe | 113 | 106 | 103 | 101 | 98 | 96 | 93 |
| 45 | Canyon Lake Water Service (Texas Water Company) [2] | Comal | 113 | 106 | 104 | 101 | 98 | 96 | 94 |
| 46 | Tri Community WSC | Caldwell | 113 | 106 | 103 | 101 | 98 | 96 | 93 |
| 47 | Atascosa Rural WSC | Bexar | 114 | 107 | 104 | 102 | 99 | 97 | 94 |
| 48 | County-Other, Medina | Medina | 116 | 109 | 106 | 104 | 101 | 98 | 96 |
| 49 | County-Other, Atascosa | Atascosa | 116 | 109 | 106 | 103 | 101 | 98 | 96 |
| 50 | County-Other, Frio | Frio | 117 | 110 | 107 | 104 | 102 | 99 | 97 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 51 | San Marcos | Hays | 119 | 107 | 104 | 102 | 99 | 97 | 94 |
| 52 | County-Other, Bexar | Bexar | 119 | 110 | 107 | 104 | 102 | 99 | 97 |
| 53 | County-Other, DeWitt | DeWitt | 123 | 115 | 112 | 109 | 107 | 104 | 101 |
| 54 | County-Other, Dimmit | Dimmit | 124 | 116 | 113 | 111 | 108 | 105 | 102 |
| 55 | Port Lavaca | Calhoun | 126 | 118 | 115 | 112 | 110 | 107 | 104 |
| 56 | Fayette WSC [2] | Gonzales | 126 | 119 | 116 | 113 | 110 | 108 | 105 |
| 57 | County-Other, Karnes | Karnes | 127 | 119 | 116 | 113 | 111 | 108 | 105 |
| 58 | East Central SUD | Bexar | 127 | 119 | 116 | 113 | 111 | 108 | 105 |
| 59 | County-Other, Uvalde | Uvalde | 128 | 120 | 117 | 114 | 111 | 108 | 105 |
| 60 | Luling | Caldwell | 128 | 120 | 117 | 114 | 112 | 109 | 106 |
| 61 | Crystal Clear SUD | Guadalupe | 129 | 121 | 118 | 115 | 113 | 110 | 107 |
| 62 | Lockhart | Caldwell | 129 | 121 | 118 | 115 | 113 | 110 | 107 |
| 63 | Elmendorf | Bexar | 130 | 123 | 119 | 116 | 114 | 111 | 108 |
| 64 | Devine | Medina | 132 | 124 | 121 | 118 | 115 | 112 | 109 |
| 65 | Universal City | Bexar | 135 | 127 | 124 | 121 | 118 | 115 | 112 |
| 66 | Seguin | Guadalupe | 139 | 131 | 128 | 125 | 121 | 118 | 115 |
| 67 | Nixon | Gonzales | 140 | 132 | 129 | 126 | 123 | 120 | 117 |
| 68 | South Buda WCID 1 | Hays | 142 | 134 | 131 | 127 | 124 | 121 | 118 |
| 69 | Big Wells | Dimmit | 143 | 135 | 132 | 128 | 125 | 122 | 119 |
| 70 | Poth | Wilson | 144 | 136 | 132 | 129 | 126 | 123 | 120 |
| 71 | Water Services | Bexar | 145 | 136 | 133 | 130 | 126 | 123 | 120 |
| 72 | Schertz | Bexar | 145 | 127 | 123 | 120 | 117 | 114 | 111 |
| 73 | Guadalupe-Blanco River Authority | Comal | 146 | 128 | 124 | 121 | 118 | 115 | 112 |
| 74 | Sunko WSC | Karnes | 146 | 127 | 124 | 121 | 118 | 115 | 112 |
| 75 | Woodsboro | Refugio | 147 | 128 | 125 | 122 | 119 | 116 | 113 |
| 76 | Aqua WSC [2] | Caldwell | 148 | 129 | 126 | 123 | 120 | 117 | 114 |
| 77 | Selma | Bexar | 148 | 129 | 126 | 123 | 120 | 117 | 114 |
| 78 | County-Other, Zavala | Zavala | 149 | 130 | 127 | 123 | 120 | 117 | 114 |
| 79 | Seadrift | Calhoun | 150 | 131 | 127 | 124 | 121 | 118 | 115 |
| 80 | Oak Hills WSC | Wilson | 150 | 131 | 128 | 125 | 122 | 119 | 116 |
| 81 | County-Other, Comal | Comal | 152 | 132 | 129 | 126 | 123 | 120 | 117 |
| 82 | Batesville WSC | Zavala | 153 | 134 | 131 | 127 | 124 | 121 | 118 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 83 | Waelder | Gonzales | 154 | 134 | 131 | 128 | 125 | 121 | 118 |
| 84 | Natalia | Medina | 154 | 135 | 131 | 128 | 125 | 122 | 119 |
| 85 | Charlotte | Atascosa | 155 | 135 | 132 | 129 | 125 | 122 | 119 |
| 86 | Carrizo Hill WSC | Dimmit | 156 | 137 | 133 | 130 | 127 | 124 | 121 |
| 87 | The Oaks WSC | Bexar | 157 | 137 | 133 | 130 | 127 | 124 | 120 |
| 88 | Yorktown | DeWitt | 158 | 138 | 135 | 131 | 128 | 125 | 122 |
| 89 | Live Oak | Bexar | 159 | 139 | 135 | 132 | 129 | 126 | 122 |
| 90 | Yoakum [2] | DeWitt | 160 | 140 | 136 | 133 | 130 | 126 | 123 |
| 91 | C Willow Water | Wilson | 165 | 144 | 130 | 127 | 123 | 120 | 117 |
| 92 | Castroville | Medina | 165 | 144 | 130 | 127 | 123 | 120 | 117 |
| 93 | Karnes City | Karnes | 168 | 147 | 132 | 129 | 126 | 123 | 120 |
| 94 | Refugio | Refugio | 171 | 150 | 135 | 131 | 128 | 125 | 122 |
| 95 | Texas State University | Hays | 171 | 151 | 136 | 132 | 129 | 126 | 123 |
| 96 | Lytle | Atascosa | 174 | 152 | 137 | 134 | 131 | 127 | 124 |
| 97 | Moore WSC | Frio | 174 | 153 | 137 | 134 | 131 | 127 | 124 |
| 98 | Medina County WCID 2 | Medina | 177 | 155 | 140 | 136 | 133 | 130 | 126 |
| 99 | Pearsall | Frio | 178 | 156 | 140 | 126 | 123 | 120 | 117 |
| 100 | Goliad | Goliad | 180 | 158 | 142 | 128 | 124 | 121 | 118 |
| 101 | Wingert Water Systems | Comal | 180 | 158 | 142 | 128 | 125 | 122 | 119 |
| 102 | Smiley | Gonzales | 181 | 159 | 143 | 128 | 125 | 122 | 119 |
| 103 | Asherton | Dimmit | 182 | 160 | 144 | 129 | 126 | 123 | 120 |
| 104 | Runge | Karnes | 183 | 160 | 144 | 130 | 127 | 124 | 121 |
| 105 | El Oso WSC [2] | Karnes | 183 | 161 | 145 | 130 | 127 | 124 | 121 |
| 106 | New Braunfels | Comal | 183 | 161 | 145 | 130 | 125 | 117 | 110 |
| 107 | West Medina WSC | Medina | 185 | 162 | 146 | 131 | 128 | 125 | 122 |
| 108 | Knippa WSC | Uvalde | 187 | 164 | 148 | 133 | 130 | 126 | 123 |
| 109 | Encinal WSC | La Salle | 187 | 165 | 148 | 133 | 130 | 127 | 124 |
| 110 | Stockdale | Wilson | 189 | 166 | 149 | 135 | 131 | 128 | 125 |
| 111 | Crystal City | Zavala | 189 | 166 | 149 | 134 | 131 | 128 | 125 |
| 112 | La Vernia | Wilson | 190 | 167 | 150 | 135 | 132 | 128 | 125 |
| 113 | Jourdanton | Atascosa | 190 | 167 | 150 | 135 | 132 | 129 | 125 |
| 114 | Bexar County WCID 10 | Bexar | 193 | 169 | 152 | 137 | 134 | 130 | 127 |

| No. | Water User Group | Primary County | Base-line (GPCD) | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 115 | Boerne | Kendall | 193 | 170 | 153 | 138 | 134 | 131 | 127 |
| 116 | Pleasanton | Atascosa | 196 | 172 | 155 | 139 | 136 | 133 | 129 |
| 117 | Windmill WSC | Uvalde | 197 | 174 | 156 | 141 | 127 | 123 | 120 |
| 118 | Falls City | Karnes | 201 | 177 | 159 | 143 | 129 | 126 | 122 |
| 119 | Uvalde | Uvalde | 211 | 186 | 167 | 151 | 136 | 132 | 129 |
| 120 | Dilley | Frio | 212 | 187 | 168 | 151 | 136 | 133 | 130 |
| 121 | Floresville | Wilson | 213 | 188 | 169 | 152 | 137 | 133 | 130 |
| 122 | Sabinal | Uvalde | 215 | 189 | 170 | 153 | 138 | 135 | 131 |
| 123 | Gonzales | Gonzales | 222 | 196 | 176 | 159 | 143 | 128 | 125 |
| 124 | Three Oaks WSC | Wilson | 223 | 196 | 177 | 159 | 143 | 129 | 126 |
| 125 | Victoria | Victoria | 226 | 199 | 179 | 161 | 145 | 131 | 127 |
| 126 | Air Force Village II Inc | Bexar | 227 | 199 | 179 | 161 | 145 | 131 | 128 |
| 127 | Fair Oaks Ranch | Bexar | 237 | 209 | 189 | 170 | 153 | 137 | 134 |
| 128 | Cuero | DeWitt | 238 | 210 | 189 | 170 | 153 | 138 | 135 |
| 129 | Carrizo Springs | Dimmit | 243 | 215 | 193 | 174 | 156 | 141 | 127 |
| 130 | Hondo | Medina | 243 | 215 | 193 | 174 | 156 | 141 | 127 |
| 131 | Gonzales County WSC | Gonzales | 244 | 216 | 194 | 175 | 157 | 141 | 127 |
| 132 | Concan WSC | Uvalde | 244 | 216 | 194 | 175 | 157 | 142 | 128 |
| 133 | Alamo Heights | Bexar | 245 | 216 | 195 | 175 | 158 | 142 | 128 |
| 134 | Ville Dalsace Water Supply | Medina | 246 | 217 | 196 | 176 | 158 | 143 | 128 |
| 135 | 3009 Water | Comal | 248 | 219 | 197 | 178 | 160 | 144 | 130 |
| 136 | Zavala County WCID 1 | Zavala | 256 | 226 | 204 | 183 | 165 | 149 | 134 |
| 137 | Cotulla | La Salle | 280 | 248 | 223 | 201 | 181 | 163 | 146 |
| 138 | Shavano Park | Bexar | 283 | 250 | 225 | 203 | 183 | 164 | 148 |
| 139 | Loma Alta Chula Vista Water System | Zavala | 287 | 255 | 229 | 206 | 186 | 167 | 150 |
| 140 | KT Water Development | Comal | 304 | 270 | 243 | 219 | 197 | 177 | 160 |
| 141 | Garden Ridge | Comal | 315 | 280 | 252 | 226 | 204 | 183 | 165 |
| 142 | Kenedy | Karnes | 352 | 313 | 281 | 253 | 228 | 205 | 185 |
| 143 | Clear Water Estates Water System (Texas Water Company) | Comal | 1,083 | 970 | 873 | 786 | 707 | 637 | 573 |
| 144 | Fort Sam Houston | Bexar | 1,895 | 1,702 | 1,531 | 1,378 | 1,241 | 1,117 | 1,005 |

#### 5.2.1.2.2 Region L Municipal Water Conservation Demand Reduction (Yield)

To quantify the volumetric yield of the Municipal Water Conservation WMS, the WUG-specific GPCD goals for each decade were multiplied by the WUG's population projection for that decade, converted to acft/yr, then subtracted from the original water demands (with passive water savings included). For the 2026 SCTRWP, two Municipal Water Conservation strategies were developed and recommended to reach the GPCD goals:

- Municipal Water Conservation – Water Loss Mitigation; and
- Municipal Water Conservation Water Use Reduction.

The volumes of water that could be conserved (demand reduction) due to Water Loss Mitigation and Water Use Reduction are shown in Table 5.2.1-6 and Table 5.2.1-7, respectively.

**Table 5.2.1-6 Demand Reduction (Yield) from Water Loss Mitigation (acft/yr) [1]**

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Randolph Air Force Base [2] | Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Port Oconnor Improvement District [2] | Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | County Line SUD [2] | Hays | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | East Medina County SUD [2] | Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | Kendall County WCID 1 | Kendall | 1 | 1 | 1 | 1 | 1 | 2 |
| 6 | Picosa WSC | Wilson | 5 | 6 | 6 | 7 | 8 | 9 |
| 7 | Medina River West WSC | Medina | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | Kyle | Hays | 118 | 176 | 240 | 268 | 278 | 286 |
| 9 | Kirby | Bexar | 18 | 20 | 20 | 20 | 20 | 20 |
| 10 | Maxwell SUD | Hays | 40 | 54 | 72 | 98 | 132 | 144 |
| 11 | Cibolo | Guadalupe | 52 | 62 | 74 | 88 | 102 | 118 |
| 12 | Point Comfort | Calhoun | 1 | 1 | 0 | 0 | 0 | 0 |
| 13 | La Coste | Medina | 2 | 2 | 2 | 2 | 2 | 2 |
| 14 | Martindale WSC | Caldwell | 10 | 12 | 14 | 14 | 16 | 18 |
| 15 | Lackland Air Force Base | Bexar | 30 | 28 | 28 | 28 | 28 | 28 |
| 16 | Benton City WSC | Medina | 44 | 50 | 54 | 58 | 60 | 64 |
| 17 | Converse | Bexar | 60 | 60 | 60 | 60 | 60 | 60 |
| 18 | Victoria County WCID 1 | Victoria | 4 | 4 | 4 | 4 | 4 | 4 |
| 19 | Creedmoor-Maha WSC [3] | Caldwell | 22 | 40 | 58 | 76 | 94 | 114 |
| 20 | Yancey WSC | Medina | 14 | 14 | 16 | 16 | 16 | 16 |
| 21 | Springs Hill WSC | Guadalupe | 110 | 128 | 152 | 174 | 202 | 232 |
| 22 | Goforth SUD [3] | Hays | 100 | 156 | 230 | 330 | 446 | 578 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 23 | Green Valley SUD | Guadalupe | 104 | 138 | 176 | 218 | 264 | 318 |
| 24 | Wimberley WSC | Hays | 12 | 16 | 24 | 34 | 44 | 56 |
| 25 | County-Other, La Salle | La Salle | 3 | 3 | 2 | 2 | 2 | 1 |
| 26 | County-Other, Guadalupe | Guadalupe | 2 | 3 | 5 | 6 | 8 | 11 |
| 27 | County-Other, Calhoun | Calhoun | 2 | 2 | 2 | 2 | 2 | 2 |
| 28 | County-Other, Victoria | Victoria | 28 | 29 | 29 | 29 | 29 | 28 |
| 29 | Quail Creek MUD | Victoria | 2 | 4 | 4 | 4 | 4 | 4 |
| 30 | San Antonio Water System [4] | Bexar | 2,686 | 2,983 | 3,167 | 3,310 | 3,421 | 3,588 |
| 31 | County-Other, Wilson | Wilson | 7 | 7 | 6 | 6 | 5 | 4 |
| 32 | County-Other, Refugio | Refugio | 3 | 3 | 3 | 3 | 2 | 2 |
| 33 | County-Other, Caldwell | Caldwell | 1 | 1 | 2 | 1 | 2 | 4 |
| 34 | County-Other, Gonzales | Gonzales | 1 | 1 | 1 | 1 | 1 | 1 |
| 35 | S S WSC | Wilson | 48 | 54 | 62 | 68 | 74 | 84 |
| 36 | County-Other, Goliad | Goliad | 6 | 6 | 6 | 6 | 6 | 6 |
| 37 | Leon Valley | Bexar | 36 | 42 | 42 | 42 | 42 | 42 |
| 38 | County-Other, Kendall | Kendall | 24 | 24 | 28 | 35 | 42 | 50 |
| 39 | McCoy WSC [3] | Atascosa | 20 | 20 | 22 | 22 | 24 | 26 |
| 40 | Poteet | Atascosa | 6 | 6 | 6 | 6 | 6 | 6 |
| 41 | County-Other, Hays [3] | Hays | 49 | 66 | 108 | 218 | 349 | 526 |
| 42 | Kendall West Utility | Kendall | 6 | 8 | 10 | 14 | 16 | 20 |
| 43 | Polonia WSC [3] | Caldwell | 22 | 24 | 30 | 34 | 40 | 48 |
| 44 | Marion | Guadalupe | 4 | 4 | 4 | 4 | 4 | 4 |
| 45 | Canyon Lake Water Service (Texas Water Company) [3] | Comal | 238 | 322 | 376 | 412 | 542 | 686 |
| 46 | Tri Community WSC | Caldwell | 4 | 4 | 4 | 4 | 4 | 4 |
| 47 | Atascosa Rural WSC | Bexar | 32 | 38 | 44 | 48 | 52 | 58 |
| 48 | County-Other, Medina | Medina | 7 | 8 | 9 | 8 | 7 | 7 |
| 49 | County-Other, Atascosa | Atascosa | 1 | 1 | 2 | 1 | 1 | 0 |
| 50 | County-Other, Frio | Frio | 5 | 2 | 1 | 1 | 1 | 1 |
| 51 | San Marcos | Hays | 348 | 478 | 576 | 648 | 692 | 724 |
| 52 | County-Other, Bexar | Bexar | 3 | 4 | 6 | 7 | 8 | 5 |
| 53 | County-Other, DeWitt | DeWitt | 10 | 10 | 9 | 9 | 10 | 10 |
| 54 | County-Other, Dimmit | Dimmit | 3 | 2 | 2 | 2 | 1 | 0 |
| 55 | Port Lavaca | Calhoun | 32 | 30 | 28 | 26 | 26 | 24 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 56 | Fayette WSC [3] | Gonzales | 0 | 0 | 0 | 0 | 0 | 0 |
| 57 | County-Other, Karnes | Karnes | 3 | 3 | 3 | 3 | 3 | 4 |
| 58 | East Central SUD | Bexar | 132 | 150 | 166 | 180 | 196 | 214 |
| 59 | County-Other, Uvalde | Uvalde | 6 | 6 | 6 | 6 | 6 | 6 |
| 60 | Luling | Caldwell | 16 | 16 | 16 | 16 | 18 | 18 |
| 61 | Crystal Clear SUD | Guadalupe | 166 | 278 | 314 | 354 | 400 | 454 |
| 62 | Lockhart | Caldwell | 60 | 64 | 70 | 76 | 80 | 86 |
| 63 | Elmendorf | Bexar | 12 | 16 | 20 | 28 | 34 | 46 |
| 64 | Devine | Medina | 12 | 12 | 12 | 12 | 14 | 14 |
| 65 | Universal City | Bexar | 60 | 62 | 64 | 64 | 64 | 64 |
| 66 | Seguin | Guadalupe | 152 | 178 | 192 | 200 | 208 | 216 |
| 67 | Nixon | Gonzales | 6 | 6 | 6 | 6 | 6 | 6 |
| 68 | South Buda WCID 1 | Hays | 12 | 20 | 30 | 44 | 60 | 80 |
| 69 | Big Wells | Dimmit | 2 | 2 | 2 | 2 | 2 | 0 |
| 70 | Poth | Wilson | 4 | 4 | 4 | 4 | 4 | 4 |
| 71 | Water Services | Bexar | 18 | 20 | 20 | 22 | 22 | 24 |
| 72 | Schertz | Bexar | 160 | 194 | 232 | 268 | 310 | 358 |
| 73 | Guadalupe-Blanco River Authority | Comal | 28 | 40 | 38 | 36 | 36 | 34 |
| 74 | Sunko WSC | Karnes | 14 | 14 | 16 | 18 | 18 | 20 |
| 75 | Woodsboro | Refugio | 4 | 4 | 4 | 4 | 2 | 2 |
| 76 | Aqua WSC [3] | Caldwell | 4 | 4 | 4 | 6 | 6 | 6 |
| 77 | Selma | Bexar | 52 | 64 | 74 | 84 | 96 | 110 |
| 78 | County-Other, Zavala | Zavala | 2 | 2 | 2 | 2 | 2 | 1 |
| 79 | Seadrift | Calhoun | 2 | 2 | 2 | 2 | 2 | 2 |
| 80 | Oak Hills WSC | Wilson | 20 | 22 | 26 | 30 | 34 | 40 |
| 81 | County-Other, Comal | Comal | 34 | 39 | 55 | 122 | 162 | 213 |
| 82 | Batesville WSC | Zavala | 2 | 2 | 2 | 2 | 2 | 2 |
| 83 | Waelder | Gonzales | 4 | 4 | 4 | 4 | 4 | 4 |
| 84 | Natalia | Medina | 4 | 4 | 4 | 4 | 4 | 4 |
| 85 | Charlotte | Atascosa | 4 | 4 | 4 | 4 | 4 | 4 |
| 86 | Carrizo Hill WSC | Dimmit | 2 | 2 | 2 | 4 | 4 | 6 |
| 87 | The Oaks WSC | Bexar | 4 | 4 | 6 | 6 | 6 | 6 |
| 88 | Yorktown | DeWitt | 6 | 6 | 6 | 6 | 6 | 6 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 89 | Live Oak | Bexar | 34 | 34 | 34 | 34 | 34 | 34 |
| 90 | Yoakum [3] | DeWitt | 8 | 6 | 6 | 6 | 6 | 6 |
| 91 | C Willow Water | Wilson | 10 | 2 | 2 | 4 | 4 | 4 |
| 92 | Castroville | Medina | 93 | 26 | 28 | 32 | 36 | 40 |
| 93 | Karnes City | Karnes | 34 | 8 | 10 | 10 | 10 | 12 |
| 94 | Refugio | Refugio | 38 | 10 | 10 | 10 | 10 | 10 |
| 95 | Texas State University | Hays | 141 | 36 | 36 | 36 | 36 | 36 |
| 96 | Lytle | Atascosa | 54 | 14 | 16 | 16 | 16 | 18 |
| 97 | Moore WSC | Frio | 9 | 2 | 2 | 2 | 2 | 2 |
| 98 | Medina County WCID 2 | Medina | 7 | 2 | 2 | 2 | 2 | 2 |
| 99 | Pearsall | Frio | 133 | 152 | 42 | 42 | 42 | 44 |
| 100 | Goliad | Goliad | 24 | 24 | 6 | 6 | 6 | 6 |
| 101 | Wingert Water Systems | Comal | 26 | 29 | 8 | 8 | 8 | 8 |
| 102 | Smiley | Gonzales | 8 | 8 | 2 | 2 | 2 | 2 |
| 103 | Asherton | Dimmit | 11 | 10 | 2 | 2 | 2 | 2 |
| 104 | Runge | Karnes | 14 | 15 | 4 | 4 | 4 | 4 |
| 105 | El Oso WSC [3] | Karnes | 119 | 125 | 34 | 36 | 38 | 40 |
| 106 | New Braunfels | Comal | 2,249 | 3,195 | 1,102 | 1,472 | 1,894 | 2,378 |
| 107 | West Medina WSC | Medina | 16 | 18 | 4 | 4 | 4 | 4 |
| 108 | Knippa WSC | Uvalde | 8 | 8 | 2 | 2 | 2 | 2 |
| 109 | Encinal WSC | La Salle | 17 | 18 | 4 | 4 | 6 | 6 |
| 110 | Stockdale | Wilson | 24 | 24 | 6 | 6 | 6 | 6 |
| 111 | Crystal City | Zavala | 98 | 95 | 22 | 22 | 20 | 20 |
| 112 | La Vernia | Wilson | 53 | 58 | 16 | 16 | 18 | 20 |
| 113 | Jourdanton | Atascosa | 82 | 87 | 22 | 24 | 26 | 28 |
| 114 | Bexar County WCID 10 | Bexar | 104 | 117 | 32 | 36 | 38 | 42 |
| 115 | Boerne | Kendall | 431 | 592 | 200 | 260 | 330 | 408 |
| 116 | Pleasanton | Atascosa | 213 | 231 | 62 | 68 | 74 | 82 |
| 117 | Windmill WSC | Uvalde | 26 | 24 | 21 | 4 | 4 | 4 |
| 118 | Falls City | Karnes | 8 | 9 | 9 | 2 | 2 | 2 |
| 119 | Uvalde | Uvalde | 310 | 304 | 295 | 72 | 68 | 66 |
| 120 | Dilley | Frio | 98 | 121 | 138 | 34 | 36 | 36 |
| 121 | Floresville | Wilson | 109 | 115 | 120 | 32 | 32 | 34 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 122 | Sabinal | Uvalde | 24 | 24 | 23 | 6 | 6 | 4 |
| 123 | Gonzales | Gonzales | 146 | 146 | 144 | 141 | 34 | 34 |
| 124 | Three Oaks WSC | Wilson | 29 | 32 | 34 | 37 | 10 | 10 |
| 125 | Victoria | Victoria | 1,314 | 1,330 | 1,335 | 1,329 | 330 | 328 |
| 126 | Air Force Village II Inc | Bexar | 11 | 11 | 11 | 11 | 2 | 2 |
| 127 | Fair Oaks Ranch | Bexar | 207 | 246 | 266 | 274 | 68 | 68 |
| 128 | Cuero | DeWitt | 176 | 176 | 175 | 174 | 44 | 44 |
| 129 | Carrizo Springs | Dimmit | 96 | 91 | 86 | 82 | 77 | 18 |
| 130 | Hondo | Medina | 169 | 162 | 158 | 158 | 160 | 40 |
| 131 | Gonzales County WSC | Gonzales | 165 | 165 | 163 | 162 | 160 | 40 |
| 132 | Concan WSC | Uvalde | 6 | 6 | 6 | 6 | 5 | 2 |
| 133 | Alamo Heights | Bexar | 168 | 168 | 168 | 168 | 168 | 42 |
| 134 | Ville Dalsace Water Supply | Medina | 9 | 10 | 10 | 11 | 11 | 2 |
| 135 | 3009 Water | Comal | 32 | 41 | 53 | 67 | 85 | 26 |
| 136 | Zavala County WCID 1 | Zavala | 27 | 27 | 26 | 24 | 24 | 6 |
| 137 | Cotulla | La Salle | 85 | 83 | 82 | 83 | 85 | 88 |
| 138 | Shavano Park | Bexar | 45 | 51 | 56 | 61 | 66 | 72 |
| 139 | Loma Alta Chula Vista Water System | Zavala | 8 | 8 | 8 | 8 | 7 | 6 |
| 140 | KT Water Development | Comal | 72 | 110 | 163 | 229 | 304 | 390 |
| 141 | Garden Ridge | Comal | 161 | 199 | 237 | 280 | 333 | 395 |
| 142 | Kenedy | Karnes | 107 | 113 | 119 | 126 | 133 | 142 |
| 143 | Clear Water Estates Water System (Texas Water Company) | Comal | 87 | 121 | 166 | 224 | 291 | 366 |
| 144 | Fort Sam Houston | Bexar | 1,401 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| **All** | **Total** | **All** | **14,549** | **16,646** | **14,423** | **15,467** | **15,638** | **17,034** |

[1] Projected savings is the volume of water (acft/yr) conserved from replacement of leaking pipes and installation of AMI.

[2] WUGs with zero yields in every decade are shown in this table for consistency with other tables in this section; however, if a WMS does not demonstrate a firm yield under drought of record conditions, it is not considered a Recommended strategy.

[3] WUGs are split between Region L and other regions (Regions K, P, and/or N). Values in the table represent Region L portion of projected demand reduction to meet Municipal Water Conservation Goals.

[4] SAWS has identified utility-specific water conservation goals that are described and quantified in Section 5.2.1.2.3.

## Table 5.2.1-7 Demand Reduction (Yield) from Water Use Reduction (acft/yr) [1]

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Randolph Air Force Base [2] | Bexar | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Port Oconnor Improvement District [2] | Calhoun | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | County Line SUD [2] | Hays | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | East Medina County SUD [2] | Medina | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | Kendall County WCID 1 | Kendall | 3 | 0 | 1 | 1 | 1 | 1 |
| 6 | Picosa WSC | Wilson | 3 | 1 | 2 | 2 | 1 | 2 |
| 7 | Medina River West WSC | Medina | 1 | 3 | 6 | 7 | 8 | 8 |
| 8 | Kyle | Hays | 32 | 210 | 578 | 695 | 720 | 736 |
| 9 | Kirby | Bexar | 4 | 23 | 49 | 59 | 59 | 59 |
| 10 | Maxwell SUD | Hays | 10 | 68 | 179 | 313 | 421 | 466 |
| 11 | Cibolo | Guadalupe | 11 | 72 | 174 | 308 | 367 | 428 |
| 12 | Point Comfort | Calhoun | 0 | 1 | 3 | 5 | 4 | 4 |
| 13 | La Coste | Medina | 1 | 3 | 6 | 10 | 11 | 11 |
| 14 | Martindale WSC | Caldwell | 1 | 15 | 33 | 55 | 79 | 94 |
| 15 | Lackland Air Force Base | Bexar | 6 | 31 | 66 | 99 | 132 | 154 |
| 16 | Benton City WSC | Medina | 12 | 61 | 132 | 206 | 285 | 364 |
| 17 | Converse | Bexar | 14 | 69 | 139 | 209 | 276 | 343 |
| 18 | Victoria County WCID 1 | Victoria | 0 | 4 | 8 | 13 | 17 | 21 |
| 19 | Creedmoor-Maha WSC [3] | Caldwell | 7 | 46 | 138 | 269 | 438 | 647 |
| 20 | Yancey WSC | Medina | 3 | 17 | 35 | 53 | 73 | 94 |
| 21 | Springs Hill WSC | Guadalupe | 27 | 163 | 370 | 630 | 956 | 1,353 |
| 22 | Goforth SUD [3] | Hays | 23 | 201 | 573 | 1,199 | 2,123 | 3,376 |
| 23 | Green Valley SUD | Guadalupe | 27 | 173 | 437 | 793 | 1,261 | 1,873 |
| 24 | Wimberley WSC | Hays | 3 | 23 | 59 | 120 | 209 | 331 |
| 25 | County-Other, La Salle | La Salle | 3 | 7 | 14 | 17 | 18 | 16 |
| 26 | County-Other, Guadalupe | Guadalupe | 3 | 10 | 27 | 52 | 86 | 132 |
| 27 | County-Other, Calhoun | Calhoun | 3 | 5 | 11 | 16 | 21 | 28 |
| 28 | County-Other, Victoria | Victoria | 41 | 94 | 165 | 230 | 296 | 356 |
| 29 | Quail Creek MUD | Victoria | 2 | 2 | 6 | 10 | 13 | 16 |
| 30 | San Antonio Water System [4] | Bexar | 18,385 | 22,467 | 25,319 | 24,152 | 26,629 | 30,895 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 31 | County-Other, Wilson | Wilson | 10 | 22 | 37 | 47 | 53 | 56 |
| 32 | County-Other, Refugio | Refugio | 5 | 9 | 15 | 21 | 25 | 26 |
| 33 | County-Other, Caldwell | Caldwell | 1 | 4 | 11 | 13 | 22 | 46 |
| 34 | County-Other, Gonzales | Gonzales | 2 | 5 | 7 | 10 | 12 | 14 |
| 35 | S S WSC | Wilson | 11 | 69 | 151 | 245 | 358 | 490 |
| 36 | County-Other, Goliad | Goliad | 9 | 21 | 34 | 47 | 59 | 69 |
| 37 | Leon Valley | Bexar | 8 | 52 | 103 | 152 | 202 | 249 |
| 38 | County-Other, Kendall | Kendall | 36 | 81 | 167 | 282 | 435 | 632 |
| 39 | McCoy WSC [3] | Atascosa | 4 | 24 | 50 | 81 | 110 | 145 |
| 40 | Poteet | Atascosa | 2 | 8 | 12 | 19 | 26 | 33 |
| 41 | County-Other, Hays [3] | Hays | 74 | 236 | 647 | 1,813 | 3,690 | 6,705 |
| 42 | Kendall West Utility | Kendall | 3 | 11 | 26 | 47 | 77 | 114 |
| 43 | Polonia WSC [3] | Caldwell | 5 | 32 | 72 | 126 | 196 | 284 |
| 44 | Marion | Guadalupe | 1 | 4 | 9 | 15 | 22 | 28 |
| 45 | Canyon Lake Water Service (Texas Water Company) [3] | Comal | 66 | 430 | 955 | 1,517 | 2,622 | 4,076 |
| 46 | Tri Community WSC | Caldwell | 0 | 4 | 8 | 12 | 19 | 24 |
| 47 | Atascosa Rural WSC | Bexar | 10 | 50 | 106 | 171 | 249 | 337 |
| 48 | County-Other, Medina | Medina | 10 | 29 | 50 | 63 | 75 | 96 |
| 49 | County-Other, Atascosa | Atascosa | 2 | 5 | 9 | 10 | 8 | 6 |
| 50 | County-Other, Frio | Frio | 7 | 8 | 3 | 6 | 9 | 15 |
| 51 | San Marcos | Hays | 255 | 411 | 539 | 995 | 1,518 | 2,440 |
| 52 | County-Other, Bexar | Bexar | 4 | 13 | 33 | 51 | 74 | 65 |
| 53 | County-Other, DeWitt | DeWitt | 14 | 32 | 55 | 77 | 98 | 120 |
| 54 | County-Other, Dimmit | Dimmit | 3 | 6 | 10 | 13 | 12 | 5 |
| 55 | Port Lavaca | Calhoun | 7 | 38 | 71 | 99 | 119 | 138 |
| 56 | Fayette WSC [3] | Gonzales | 0 | 0 | 1 | 1 | 1 | 2 |
| 57 | County-Other, Karnes | Karnes | 4 | 10 | 18 | 26 | 35 | 45 |
| 58 | East Central SUD | Bexar | 36 | 190 | 406 | 647 | 930 | 1,255 |
| 59 | County-Other, Uvalde | Uvalde | 10 | 22 | 35 | 49 | 62 | 73 |
| 60 | Luling | Caldwell | 3 | 19 | 40 | 61 | 82 | 105 |
| 61 | Crystal Clear SUD | Guadalupe | 41 | 345 | 768 | 1,281 | 1,901 | 2,645 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 62 | Lockhart | Caldwell | 14 | 82 | 172 | 273 | 386 | 504 |
| 63 | Elmendorf | Bexar | 2 | 18 | 50 | 97 | 160 | 273 |
| 64 | Devine | Medina | 4 | 16 | 31 | 47 | 62 | 77 |
| 65 | Universal City | Bexar | 14 | 79 | 155 | 231 | 303 | 377 |
| 66 | Seguin | Guadalupe | 40 | 230 | 475 | 725 | 986 | 1,265 |
| 67 | Nixon | Gonzales | 3 | 10 | 18 | 25 | 31 | 37 |
| 68 | South Buda WCID 1 | Hays | 3 | 28 | 80 | 168 | 297 | 472 |
| 69 | Big Wells | Dimmit | 0 | 0 | 2 | 3 | 4 | 6 |
| 70 | Poth | Wilson | 2 | 7 | 13 | 17 | 22 | 27 |
| 71 | Water Services | Bexar | 4 | 24 | 50 | 76 | 107 | 141 |
| 72 | Schertz | Bexar | 642 | 965 | 1,399 | 1,909 | 2,527 | 3,291 |
| 73 | Guadalupe-Blanco River Authority | Comal | 113 | 194 | 231 | 263 | 290 | 315 |
| 74 | Sunko WSC | Karnes | 52 | 73 | 96 | 122 | 154 | 186 |
| 75 | Woodsboro | Refugio | 16 | 18 | 21 | 23 | 25 | 25 |
| 76 | Aqua WSC [3] | Caldwell | 14 | 22 | 29 | 37 | 48 | 61 |
| 77 | Selma | Bexar | 212 | 314 | 452 | 603 | 784 | 1,001 |
| 78 | County-Other, Zavala | Zavala | 16 | 19 | 22 | 24 | 26 | 29 |
| 79 | Seadrift | Calhoun | 13 | 15 | 16 | 18 | 20 | 20 |
| 80 | Oak Hills WSC | Wilson | 79 | 112 | 158 | 216 | 286 | 372 |
| 81 | County-Other, Comal | Comal | 306 | 430 | 727 | 1,850 | 2,809 | 4,115 |
| 82 | Batesville WSC | Zavala | 12 | 14 | 17 | 18 | 20 | 21 |
| 83 | Waelder | Gonzales | 13 | 16 | 20 | 22 | 25 | 28 |
| 84 | Natalia | Medina | 15 | 18 | 24 | 28 | 33 | 36 |
| 85 | Charlotte | Atascosa | 17 | 18 | 21 | 26 | 30 | 35 |
| 86 | Carrizo Hill WSC | Dimmit | 9 | 13 | 19 | 23 | 34 | 52 |
| 87 | The Oaks WSC | Bexar | 18 | 25 | 32 | 42 | 53 | 65 |
| 88 | Yorktown | DeWitt | 25 | 31 | 38 | 44 | 51 | 56 |
| 89 | Live Oak | Bexar | 137 | 166 | 204 | 240 | 275 | 309 |
| 90 | Yoakum [3] | DeWitt | 27 | 36 | 42 | 48 | 53 | 58 |
| 91 | C Willow Water | Wilson | 2 | 23 | 28 | 31 | 37 | 46 |
| 92 | Castroville | Medina | 23 | 211 | 266 | 339 | 415 | 479 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 93 | Karnes City | Karnes | 9 | 75 | 87 | 102 | 119 | 136 |
| 94 | Refugio | Refugio | 9 | 77 | 87 | 96 | 109 | 126 |
| 95 | Texas State University | Hays | 35 | 293 | 329 | 364 | 398 | 430 |
| 96 | Lytle | Atascosa | 13 | 121 | 142 | 166 | 193 | 221 |
| 97 | Moore WSC | Frio | 2 | 22 | 28 | 31 | 35 | 38 |
| 98 | Medina County WCID 2 | Medina | 1 | 14 | 15 | 17 | 18 | 20 |
| 99 | Pearsall | Frio | 33 | 203 | 511 | 556 | 604 | 650 |
| 100 | Goliad | Goliad | 5 | 31 | 72 | 78 | 83 | 88 |
| 101 | Wingert Water Systems | Comal | 6 | 39 | 104 | 114 | 122 | 129 |
| 102 | Smiley | Gonzales | 2 | 9 | 23 | 24 | 25 | 25 |
| 103 | Asherton | Dimmit | 3 | 14 | 31 | 31 | 31 | 30 |
| 104 | Runge | Karnes | 4 | 19 | 48 | 55 | 63 | 70 |
| 105 | El Oso WSC [3] | Karnes | 30 | 169 | 410 | 466 | 535 | 614 |
| 106 | New Braunfels | Comal | 565 | 4,319 | 13,749 | 20,537 | 30,679 | 43,177 |
| 107 | West Medina WSC | Medina | 4 | 23 | 55 | 60 | 67 | 67 |
| 108 | Knippa WSC | Uvalde | 2 | 11 | 23 | 25 | 24 | 24 |
| 109 | Encinal WSC | La Salle | 5 | 24 | 59 | 67 | 76 | 89 |
| 110 | Stockdale | Wilson | 6 | 33 | 77 | 83 | 89 | 96 |
| 111 | Crystal City | Zavala | 25 | 129 | 285 | 292 | 298 | 299 |
| 112 | La Vernia | Wilson | 12 | 76 | 196 | 227 | 262 | 302 |
| 113 | Jourdanton | Atascosa | 21 | 117 | 287 | 324 | 365 | 411 |
| 114 | Bexar County WCID 10 | Bexar | 26 | 158 | 403 | 467 | 542 | 629 |
| 115 | Boerne | Kendall | 106 | 795 | 2,490 | 3,478 | 4,700 | 6,189 |
| 116 | Pleasanton | Atascosa | 54 | 312 | 786 | 918 | 1,066 | 1,230 |
| 117 | Windmill WSC | Uvalde | 6 | 32 | 51 | 78 | 70 | 59 |
| 118 | Falls City | Karnes | 3 | 11 | 22 | 40 | 44 | 50 |
| 119 | Uvalde | Uvalde | 77 | 408 | 697 | 1,148 | 1,167 | 1,178 |
| 120 | Dilley | Frio | 25 | 165 | 326 | 561 | 595 | 631 |
| 121 | Floresville | Wilson | 27 | 154 | 286 | 507 | 560 | 615 |
| 122 | Sabinal | Uvalde | 6 | 31 | 54 | 88 | 88 | 89 |
| 123 | Gonzales | Gonzales | 37 | 197 | 339 | 463 | 674 | 686 |

| No. | Water User Group | Primary County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 124 | Three Oaks WSC | Wilson | 6 | 42 | 82 | 121 | 194 | 220 |
| 125 | Victoria | Victoria | 325 | 1,788 | 3,147 | 4,346 | 6,402 | 6,609 |
| 126 | Air Force Village II Inc | Bexar | 2 | 14 | 25 | 35 | 52 | 54 |
| 127 | Fair Oaks Ranch | Bexar | 51 | 333 | 628 | 897 | 1,338 | 1,389 |
| 128 | Cuero | DeWitt | 44 | 237 | 413 | 572 | 841 | 870 |
| 129 | Carrizo Springs | Dimmit | 24 | 123 | 205 | 266 | 311 | 394 |
| 130 | Hondo | Medina | 42 | 217 | 372 | 520 | 654 | 897 |
| 131 | Gonzales County WSC | Gonzales | 42 | 222 | 385 | 528 | 652 | 879 |
| 132 | Concan WSC | Uvalde | 2 | 9 | 14 | 18 | 23 | 28 |
| 133 | Alamo Heights | Bexar | 41 | 225 | 395 | 548 | 686 | 936 |
| 134 | Ville Dalsace Water Supply | Medina | 2 | 13 | 25 | 34 | 44 | 64 |
| 135 | 3009 Water | Comal | 8 | 55 | 124 | 223 | 350 | 588 |
| 136 | Zavala County WCID 1 | Zavala | 7 | 35 | 60 | 80 | 94 | 122 |
| 137 | Cotulla | La Salle | 20 | 111 | 195 | 272 | 347 | 425 |
| 138 | Shavano Park | Bexar | 11 | 69 | 132 | 199 | 271 | 350 |
| 139 | Loma Alta Chula Vista Water System | Zavala | 2 | 11 | 18 | 23 | 29 | 32 |
| 140 | KT Water Development | Comal | 17 | 151 | 385 | 750 | 1,248 | 1,891 |
| 141 | Garden Ridge | Comal | 41 | 270 | 563 | 923 | 1,368 | 1,912 |
| 142 | Kenedy | Karnes | 27 | 154 | 282 | 412 | 548 | 690 |
| 143 | Clear Water Estates Water System (Texas Water Company) | Comal | 21 | 165 | 397 | 740 | 1,196 | 1,779 |
| 144 | Fort Sam Houston | Bexar | 351 | 1,919 | 3,337 | 4,614 | 5,762 | 6,796 |
| **All** | **Total** | **All** | **23,186** | **43,191** | **70,854** | **92,368** | **123,723** | **160,886** |

[1] Projected demand reduction is the volume of water (acft/yr) conserved by means of non-capital efforts.

[2] WUGs with zero yields in every decade are shown in this table for consistency with other tables in this section; however, if a WMS does not demonstrate a firm yield under drought of record conditions, it is not considered a Recommended strategy.

[3] WUGs are split between Region L and other regions (Regions K, P, and/or N). Values in the table represent Region L portion of projected demand reduction to meet Municipal Water Conservation Goals.

[4] SAWS has identified utility-specific water conservation goals that are described and quantified in Section 5.2.1.2.3.

Many WUGs have high baseline GPCDs (220+). Because the municipal conservation strategy applies a higher reduction for WUGs with GPCD above 140, and because these entities remain above that threshold throughout most of or all of the planning horizon, the cumulative savings are proportionally higher. Furthermore, a separate Drought Management WMS (Refer to Section 5.2.3) applies additional demand reduction volumes associated with temporary demand reductions during drought conditions.

While these demand reductions represent a significant decrease from current usage levels, they are considered achievable and are aligned with state water planning goals.

#### 5.2.1.2.3 San Antonio Water System Municipal Water Conservation

SAWS has chosen to develop utility-specific conservation goals beyond the methodology described in Section 5.2.1.2.3. The decadal savings for SAWS Municipal Water Conservation are presented in Table 5.2.1-8.

As of June 2024, SAWS replaced 200,000 meters with AMI, which represents approximately 30% of customer meters. SAWS anticipates replacement of all customer meters by late 2025. Therefore, the water conservation goal GPCD estimates reflect full implementation of AMI by 2030.

As demonstrated in the table below, the projected per capita water use for SAWS with only passive conservation is 102 GPCD in 2030, decreasing to 87 GPCD by 2080. However, these values represent only the effects of passive conservation water savings, which is the implementation of low flow plumbing fixtures. SAWS implements and plans to continue implementing advanced water conservation measures, which would effectively reduce SAWS' per capita water use to 94 GPCD in 2030, decreasing to 79 GPCD by 2080.

**Table 5.2.1-8 SAWS Municipal Water Conservation Goals (GPCD)**

| Description | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| GPCD with Passive Conservation (From Table 5.2.1-3) | 102 | 97 | 95 | 92 | 89 | 87 |
| GPCD Reduction due to SAWS Conservation Strategies | 8 | 8 | 9 | 8 | 8 | 8 |
| Per Capita Water Use Goals [1] | 94 | 89 | 86 | 84 | 81 | 79 |

[1] The GPCD goals identified in this table are consistent with the GPCD goals recommended by the SCTRWPG and those included in the *SAWS 2025 Water Management Plan*.

### 5.2.1.3 Environmental Factors

For the most part, the Municipal Water Conservation WMS is not expected to have negative impacts on natural, cultural, or agricultural resources. While increased conservation may increase concentrations of influent to wastewater treatment facilities, the wastewater treatment facilities would be expected to improve treatment technologies to meet discharge permit requirements necessary to maintain receiving water quality standards. Strategies to encourage reduced lawn watering and/or replacement of lawns with water-conserving landscaping could result in environmentally beneficial increases in landscape species diversity and drought tolerance.

For water loss mitigation projects that involve water pipeline replacement, project owners need to be aware of potential for projects in karst invertebrate zones to encounter karst features during construction. Impacts to karst features with suitable habitat may adversely affect federally endangered karst invertebrate species. USFWS-designated karst invertebrate zones occur in Bexar, Medina, Hays, Comal, and Guadalupe Counties. Appendix 5D provides a summary of threatened, endangered, and

candidate species and species of concern that may occur in Bexar, Comal, Guadalupe, Hays, and Medina Counties [9, 10, 11, 12, 13, 14, 15, 16, 17, 18].

#### 5.2.1.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model methodology, which includes standard costing procedures and methods for calculating project costs, annual costs, and unit costs.

As deteriorating infrastructure can have high rates of water loss, water loss mitigation is recommended through leak detection and repair, installation of AMI, and utility water audits. Costs for leak detection and repair were estimated by assuming that 2.5% of a WUG's pipelines are replaced each decade over the planning horizon. It is assumed that none of the distribution line replacements for this water conservation strategy are subject to adopted utility standard minimum size requirements that exceed two standard pipe diameters. Implementing leak detection and repair and utility water audits would reduce a WUG's demand by approximately 1 to 3%.

An AMI fixed network system automates the meter reading process with two way communications from utility to meter. The network collects, delivers, and analyzes data regarding how and when usage takes place. This strategy is designed to provide the utility with more information to proactively manage customers and resources. In addition, more information will be available to customers, encouraging participation in conservation efforts. AMI can promote conservation through improved reporting, thereby reducing demand and increasing the available supply. Smart meters were assumed a cost of $330 per home, with the assumption that 100% of homes would implement this strategy over the planning horizon. Implementing AMI would reduce a WUG's demand by approximately 1 to 5%. Water loss is discussed further in Chapter 1, including summaries of water loss audits for WUGs in the SCTRWPA.

[9] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Bexar County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[10] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Comal County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[11] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Guadalupe County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[12] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Hays County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[13] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Medina County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[14] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Bexar County. https://ipac.ecosphere.fws.gov/location/index
[15] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Comal County. https://ipac.ecosphere.fws.gov/location/index
[16] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Guadalupe County. https://ipac.ecosphere.fws.gov/location/index
[17] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Hays County. https://ipac.ecosphere.fws.gov/location/index
[18] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Medina County. https://ipac.ecosphere.fws.gov/location/index

Table 5.2.1-9 provides the estimated costs for municipal conservation (water loss mitigation). The facility and project costs reflect the cost of water main replacement and installation of AMI throughout the entire planning horizon.

Water use reduction includes non-capital efforts to reduce the consumption of water, which could include both labor and materials associated with implementing standards, incentives, and outreach. Many of the non-capital cost measures include, but are not limited to, drought tolerant landscape, public education and outreach – including school programs, rebate and incentive programs – local ordinances that increase water efficiency by customers, support of legislation that increases water efficiency in plumbing products and appliances at both the State and Federal level, increased water efficiency in utility operations, and conservation-oriented rate structures. Conservation measures for non-capital approaches were included in the annual costs at an average of $305/acft of water savings.

**Table 5.2.1-9 Estimated Costs of Water Loss Mitigation [1]**

| No. | Water User Group | Primary County | Facility Cost ($) | Project Cost ($) | Annual Cost ($) | Unit Cost ($/YR) |
|---|---|---|---|---|---|---|
| 1 | Randolph Air Force Base | Bexar | $0 | $0 | $0 | $0 |
| 2 | Port Oconnor Improvement District | Calhoun | $0 | $0 | $0 | $0 |
| 3 | County Line SUD | Hays | $0 | $0 | $0 | $0 |
| 4 | East Medina County SUD | Medina | $0 | $0 | $0 | $0 |
| 5 | Kendall County WCID 1 | Kendall | $797,000 | $1,036,000 | $129,000 | $43,000 |
| 6 | Picosa WSC | Wilson | $10,680,000 | $14,522,000 | $380,500 | $42,278 |
| 7 | Medina River West WSC | Medina | $3,105,000 | $4,269,000 | $103,500 | $51,750 |
| 8 | Kyle | Hays | $56,183,000 | $75,589,000 | $3,697,167 | $12,927 |
| 9 | Kirby | Bexar | $18,610,000 | $25,309,000 | $654,000 | $32,700 |
| 10 | Maxwell SUD | Hays | $38,093,000 | $51,434,000 | $2,119,667 | $14,720 |
| 11 | Cibolo | Guadalupe | $25,754,000 | $34,702,000 | $1,582,667 | $13,412 |
| 12 | Point Comfort | Calhoun | $45,000 | $58,000 | $7,000 | $7,000 |
| 13 | La Coste | Medina | $3,103,000 | $4,267,000 | $103,500 | $51,750 |
| 14 | Martindale WSC | Caldwell | $9,299,000 | $12,620,000 | $381,833 | $21,213 |
| 15 | Lackland Air Force Base | Bexar | $24,839,000 | $33,779,000 | $875,500 | $31,268 |
| 16 | Benton City WSC | Medina | $110,699,000 | $150,765,000 | $3,432,667 | $53,635 |
| 17 | Converse | Bexar | $22,258,000 | $30,157,000 | $1,018,667 | $16,978 |
| 18 | Victoria County WCID 1 | Victoria | $2,163,000 | $2,967,000 | $84,000 | $21,000 |
| 19 | Creedmoor-Maha WSC [2] | Caldwell | $25,858,000 | $34,892,000 | $1,488,000 | $13,053 |
| 20 | Yancey WSC | Medina | $162,232,000 | $221,213,000 | $4,476,333 | $279,771 |
| 21 | Springs Hill WSC | Guadalupe | $105,839,000 | $143,597,000 | $4,438,667 | $19,132 |
| 22 | Goforth SUD [2] | Hays | $73,402,000 | $98,239,000 | $5,916,000 | $10,235 |
| 23 | Green Valley SUD | Guadalupe | $115,676,000 | $156,757,000 | $5,243,333 | $16,488 |

| No. | Water User Group | Primary County | Facility Cost ($) | Project Cost ($) | Annual Cost ($) | Unit Cost ($/YR) |
|---|---|---|---|---|---|---|
| 24 | Wimberley WSC | Hays | $17,767,000 | $24,054,000 | $853,833 | $15,247 |
| 25 | County-Other, La Salle | La Salle | $129,000 | $168,000 | $21,000 | $7,000 |
| 26 | County-Other, Guadalupe | Guadalupe | $1,057,000 | $1,374,000 | $171,000 | $15,545 |
| 27 | County-Other, Calhoun | Calhoun | $241,000 | $313,000 | $39,000 | $13,000 |
| 28 | County-Other, Victoria | Victoria | $2,802,000 | $3,643,000 | $452,000 | $11,024 |
| 29 | Quail Creek MUD | Victoria | $3,103,000 | $4,267,000 | $103,500 | $25,875 |
| 30 | San Antonio Water System [3] | Bexar | $1,591,457,000 | $2,170,567,000 | $42,808,667 | $2,328 |
| 31 | County-Other, Wilson | Wilson | $426,000 | $554,000 | $69,000 | $6,900 |
| 32 | County-Other, Refugio | Refugio | $199,000 | $259,000 | $32,000 | $6,400 |
| 33 | County-Other, Caldwell | Caldwell | $347,000 | $451,000 | $56,000 | $14,000 |
| 34 | County-Other, Gonzales | Gonzales | $106,000 | $138,000 | $17,000 | $8,500 |
| 35 | S S WSC | Wilson | $33,870,000 | $45,944,000 | $1,438,667 | $17,127 |
| 36 | County-Other, Goliad | Goliad | $517,000 | $672,000 | $83,000 | $9,222 |
| 37 | Leon Valley | Bexar | $26,970,000 | $36,655,000 | $996,333 | $23,722 |
| 38 | County-Other, Kendall | Kendall | $4,683,000 | $6,088,000 | $756,000 | $15,120 |
| 39 | McCoy WSC [2] | Atascosa | $101,000,000 | $137,678,000 | $2,874,333 | $110,551 |
| 40 | Poteet | Atascosa | $5,256,000 | $7,151,000 | $177,333 | $29,556 |
| 41 | County-Other, Hays [2] | Hays | $48,638,000 | $63,229,000 | $7,850,000 | $14,924 |
| 42 | Kendall West Utility | Kendall | $8,405,000 | $11,404,000 | $349,333 | $17,467 |
| 43 | Polonia WSC [2] | Caldwell | $4,706,000 | $6,277,000 | $424,167 | $8,837 |
| 44 | Marion | Guadalupe | $3,660,000 | $5,030,000 | $127,667 | $31,917 |
| 45 | Canyon Lake Water Service (Texas Water Company) [2] | Comal | $104,241,000 | $140,191,000 | $6,977,167 | $10,171 |
| 46 | Tri Community WSC | Caldwell | $3,633,000 | $4,995,000 | $122,667 | $30,667 |
| 47 | Atascosa Rural WSC | Bexar | $32,536,000 | $44,210,000 | $1,222,667 | $21,080 |
| 48 | County-Other, Medina | Medina | $657,000 | $854,000 | $106,000 | $10,600 |
| 49 | County-Other, Atascosa | Atascosa | $34,000 | $44,000 | $5,000 | $2,500 |
| 50 | County-Other, Frio | Frio | $102,000 | $133,000 | $16,000 | $2,286 |
| 51 | San Marcos | Hays | $104,708,000 | $140,584,000 | $7,500,667 | $10,360 |
| 52 | County-Other, Bexar | Bexar | $478,000 | $621,000 | $77,000 | $9,625 |
| 53 | County-Other, DeWitt | DeWitt | $797,000 | $1,036,000 | $129,000 | $9,214 |
| 54 | County-Other, Dimmit | Dimmit | $36,000 | $47,000 | $6,000 | $2,000 |

| No. | Water User Group | Primary County | Facility Cost ($) | Project Cost ($) | Annual Cost ($) | Unit Cost ($/YR) |
|---|---|---|---|---|---|---|
| 55 | Port Lavaca | Calhoun | $20,094,000 | $27,344,000 | $669,667 | $22,322 |
| 56 | Fayette WSC [2] | Gonzales | $17,000 | $22,000 | $3,000 | $0 |
| 57 | County-Other, Karnes | Karnes | $297,000 | $386,000 | $48,000 | $12,000 |
| 58 | East Central SUD | Bexar | $61,863,000 | $83,824,000 | $2,823,167 | $13,192 |
| 59 | County-Other, Uvalde | Uvalde | $470,000 | $611,000 | $76,000 | $7,600 |
| 60 | Luling | Caldwell | $53,134,000 | $72,422,000 | $1,526,833 | $84,824 |
| 61 | Crystal Clear SUD | Guadalupe | $89,492,000 | $120,910,000 | $4,820,500 | $10,618 |
| 62 | Lockhart | Caldwell | $24,205,000 | $32,795,000 | $1,109,500 | $12,901 |
| 63 | Elmendorf | Bexar | $3,496,000 | $4,651,000 | $340,667 | $7,406 |
| 64 | Devine | Medina | $8,003,000 | $10,882,000 | $284,333 | $20,310 |
| 65 | Universal City | Bexar | $19,084,000 | $25,873,000 | $842,500 | $13,164 |
| 66 | Seguin | Guadalupe | $56,980,000 | $77,210,000 | $2,595,333 | $12,015 |
| 67 | Nixon | Gonzales | $4,389,000 | $5,972,000 | $148,833 | $24,806 |
| 68 | South Buda WCID 1 | Hays | $7,001,000 | $9,367,000 | $570,833 | $7,135 |
| 69 | Big Wells | Dimmit | $1,510,000 | $2,079,000 | $44,667 | $22,333 |
| 70 | Poth | Wilson | $3,606,000 | $4,960,000 | $118,667 | $29,667 |
| 71 | Water Services | Bexar | $14,151,000 | $19,246,000 | $494,000 | $20,583 |
| 72 | Schertz | Bexar | $61,638,000 | $83,265,000 | $3,346,333 | $5,212 |
| 73 | Guadalupe-Blanco River Authority | Comal | $18,652,000 | $25,364,000 | $661,000 | $5,850 |
| 74 | Sunko WSC | Karnes | $54,778,000 | $74,666,000 | $1,568,500 | $30,163 |
| 75 | Woodsboro | Refugio | $2,553,000 | $3,512,000 | $81,167 | $5,073 |
| 76 | Aqua WSC [2] | Caldwell | $3,178,000 | $4,364,000 | $115,500 | $8,250 |
| 77 | Selma | Bexar | $16,218,000 | $21,881,000 | $939,667 | $4,432 |
| 78 | County-Other, Zavala | Zavala | $101,000 | $131,000 | $16,000 | $1,000 |
| 79 | Seadrift | Calhoun | $2,534,000 | $3,488,000 | $78,167 | $6,013 |
| 80 | Oak Hills WSC | Wilson | $22,166,000 | $30,144,000 | $780,500 | $9,880 |
| 81 | County-Other, Comal | Comal | $14,250,000 | $18,525,000 | $2,300,000 | $7,516 |
| 82 | Batesville WSC | Zavala | $2,538,000 | $3,493,000 | $78,167 | $6,514 |
| 83 | Waelder | Gonzales | $2,566,000 | $3,529,000 | $83,167 | $6,397 |
| 84 | Natalia | Medina | $3,082,000 | $4,239,000 | $100,500 | $6,700 |
| 85 | Charlotte | Atascosa | $3,080,000 | $4,237,000 | $99,500 | $5,853 |
| 86 | Carrizo Hill WSC | Dimmit | $2,154,000 | $2,955,000 | $83,000 | $9,222 |
| 87 | The Oaks WSC | Bexar | $1,211,000 | $1,652,000 | $63,500 | $3,528 |

| No. | Water User Group | Primary County | Facility Cost ($) | Project Cost ($) | Annual Cost ($) | Unit Cost ($/YR) |
|---|---|---|---|---|---|---|
| 88 | Yorktown | DeWitt | $4,627,000 | $6,364,000 | $151,167 | $6,047 |
| 89 | Live Oak | Bexar | $20,215,000 | $27,501,000 | $689,667 | $5,034 |
| 90 | Yoakum [2] | DeWitt | $14,341,000 | $19,547,000 | $412,500 | $15,278 |
| 91 | C Willow Water | Wilson | $1,098,000 | $1,505,000 | $44,500 | $11,125 |
| 92 | Castroville | Medina | $8,689,000 | $11,774,000 | $395,333 | $9,883 |
| 93 | Karnes City | Karnes | $7,823,000 | $10,648,000 | $255,333 | $21,278 |
| 94 | Refugio | Refugio | $6,125,000 | $8,335,000 | $205,667 | $20,567 |
| 95 | Texas State University | Hays | $19,336,000 | $26,306,000 | $659,333 | $18,315 |
| 96 | Lytle | Atascosa | $10,507,000 | $14,297,000 | $353,500 | $19,639 |
| 97 | Moore WSC | Frio | $2,056,000 | $2,828,000 | $67,000 | $33,500 |
| 98 | Medina County WCID 2 | Medina | $1,524,000 | $2,097,000 | $47,667 | $23,833 |
| 99 | Pearsall | Frio | $18,695,000 | $25,420,000 | $668,000 | $4,395 |
| 100 | Goliad | Goliad | $3,610,000 | $4,965,000 | $119,667 | $4,986 |
| 101 | Wingert Water Systems | Comal | $3,686,000 | $5,064,000 | $131,667 | $4,540 |
| 102 | Smiley | Gonzales | $1,525,000 | $2,098,000 | $47,667 | $5,958 |
| 103 | Asherton | Dimmit | $2,024,000 | $2,786,000 | $62,000 | $6,200 |
| 104 | Runge | Karnes | $2,590,000 | $3,561,000 | $87,167 | $5,811 |
| 105 | El Oso WSC [2] | Karnes | $125,908,000 | $171,652,000 | $3,537,667 | $28,301 |
| 106 | New Braunfels | Comal | $199,380,000 | $267,751,000 | $14,164,833 | $4,433 |
| 107 | West Medina WSC | Medina | $11,935,000 | $16,447,000 | $336,833 | $18,713 |
| 108 | Knippa WSC | Uvalde | $1,522,000 | $2,094,000 | $46,667 | $5,833 |
| 109 | Encinal WSC | La Salle | $2,621,000 | $3,601,000 | $92,167 | $5,120 |
| 110 | Stockdale | Wilson | $2,631,000 | $3,614,000 | $93,167 | $3,882 |
| 111 | Crystal City | Zavala | $13,838,000 | $18,839,000 | $443,000 | $4,663 |
| 112 | La Vernia | Wilson | $7,189,000 | $9,771,000 | $265,000 | $4,569 |
| 113 | Jourdanton | Atascosa | $9,042,000 | $12,286,000 | $340,833 | $3,918 |
| 114 | Bexar County WCID 10 | Bexar | $15,234,000 | $20,708,000 | $556,500 | $4,756 |
| 115 | Boerne | Kendall | $38,126,000 | $51,318,000 | $2,461,500 | $4,158 |
| 116 | Pleasanton | Atascosa | $22,059,000 | $29,953,000 | $875,000 | $3,788 |
| 117 | Windmill WSC | Uvalde | $1,071,000 | $1,470,000 | $40,500 | $1,688 |
| 118 | Falls City | Karnes | $1,547,000 | $2,127,000 | $50,667 | $5,630 |
| 119 | Uvalde | Uvalde | $28,206,000 | $38,369,000 | $972,167 | $3,198 |
| 120 | Dilley | Frio | $9,996,000 | $13,579,000 | $382,167 | $2,769 |

| No. | Water User Group | Primary County | Facility Cost ($) | Project Cost ($) | Annual Cost ($) | Unit Cost ($/YR) |
|---|---|---|---|---|---|---|
| 121 | Floresville | Wilson | $14,130,000 | $19,219,000 | $490,000 | $4,083 |
| 122 | Sabinal | Uvalde | $608,000 | $830,000 | $32,167 | $1,340 |
| 123 | Gonzales | Gonzales | $19,074,000 | $25,965,000 | $617,333 | $4,228 |
| 124 | Three Oaks WSC | Wilson | $18,954,000 | $26,114,000 | $543,167 | $14,680 |
| 125 | Victoria | Victoria | $91,338,000 | $124,107,000 | $3,440,167 | $2,577 |
| 126 | Air Force Village II Inc | Bexar | $1,536,000 | $2,113,000 | $48,667 | $4,424 |
| 127 | Fair Oaks Ranch | Bexar | $18,094,000 | $24,586,000 | $682,500 | $2,491 |
| 128 | Cuero | DeWitt | $17,550,000 | $23,879,000 | $594,500 | $3,378 |
| 129 | Carrizo Springs | Dimmit | $12,011,000 | $16,358,000 | $372,333 | $4,092 |
| 130 | Hondo | Medina | $16,635,000 | $22,636,000 | $559,167 | $3,452 |
| 131 | Gonzales County WSC | Gonzales | $146,394,000 | $199,614,000 | $4,047,167 | $24,528 |
| 132 | Concan WSC | Uvalde | $1,503,000 | $2,070,000 | $43,667 | $7,278 |
| 133 | Alamo Heights | Bexar | $16,665,000 | $22,675,000 | $564,167 | $3,358 |
| 134 | Ville Dalsace Water Supply | Medina | $1,535,000 | $2,111,000 | $48,667 | $4,424 |
| 135 | 3009 Water | Comal | $3,977,000 | $5,442,000 | $178,667 | $2,102 |
| 136 | Zavala County WCID 1 | Zavala | $4,045,000 | $5,569,000 | $123,000 | $4,556 |
| 137 | Cotulla | La Salle | $6,214,000 | $8,450,000 | $219,667 | $2,496 |
| 138 | Shavano Park | Bexar | $4,257,000 | $5,845,000 | $157,000 | $2,181 |
| 139 | Loma Alta Chula Vista Water System | Zavala | $1,505,000 | $2,073,000 | $44,667 | $5,583 |
| 140 | KT Water Development | Comal | $9,916,000 | $13,422,000 | $481,833 | $1,235 |
| 141 | Garden Ridge | Comal | $10,712,000 | $14,510,000 | $498,167 | $1,261 |
| 142 | Kenedy | Karnes | $11,318,000 | $15,404,000 | $371,833 | $2,619 |
| 143 | Clear Water Estates Water System (Texas Water Company) | Comal | $2,879,000 | $3,936,000 | $133,167 | $364 |
| 144 | Fort Sam Houston | Bexar | $17,548,000 | $23,876,000 | $594,500 | $425 |

[1] Costs are associated with conservation measures associated with replacement of leaking pipes and installation of AMI.

[2] WUGs are split between Region L and other regions (Regions K, P, and/or N). Values in the table represent the Region L portion of the municipal water conservation strategy.

[3] SAWS has identified utility-specific water conservation goals that are described and quantified in Section 5.2.1.2.3.

## 5.2.2 Non-Municipal Water Conservation

The SCTRWPG identified the Non-Municipal Water Conservation WMS as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.2.1 Description of Water Management Strategy

Non-Municipal Water Conservation is included as a Recommended strategy for all Irrigation WUGs with an identified water need. Water conservation measures are defined as practices, techniques, programs, and technologies that will protect water resources, reduce consumption of water, reduce the loss or waste of water, or improve the efficiency in the use of water so that a water supply is made available for future or alternative uses. The goal of this WMS is to increase water conservation and thereby reduce freshwater use within the SCTRWPA. The SCTRWPG recommends non-municipal water conservation to improve irrigation efficiencies to reduce the quantity of water used for agricultural activities per acre irrigated.

Several methods of conservation for agriculture were considered for inclusion in the 2026 SCTRWP to help meet irrigation needs. The recommended conservation measures for irrigation include soil moisture monitoring, irrigation scheduling, real-time use metering and monitoring, and soil conservation tillage. Irrigation water conservation is Recommended as a WMS in counties where irrigation needs are identified or created through groundwater conversions and transfers. However, the SCTRWPG supports conservation for irrigation and any other use types for all entities in the SCTRWPA. The full range of BMPs described in TWDB literature is recommended, where appropriate [1].

The Non-Municipal Water Conservation WMS includes estimates of potential water conservation demand reductions and associated costs of water conservation for irrigation WUGs. The following conservation measures are included in the Non-Municipal Water Conservation WMS:

- A tandem strategy of soil moisture monitoring and irrigation scheduling can ensure adequate soil moisture conditions while limiting excess watering. Soil moisture monitoring manages soil moisture levels by use of soil matric potential sensors to measure water suction in soil. Generally, planting in wet soil and adequate water before critical growth periods indicates the success of a crop. Irrigation scheduling is the process of allocating irrigation water according to crop requirements based on meteorological demands and field conditions. According to the Water Advisory Council's Report and Recommendations to the 88th Texas Legislature, it is estimated that fewer than 10% of producers in Texas were using soil water sensors for irrigation scheduling as of 2018. This measure assumes sensors and scheduling will be applied to 10% of cropland by 2030 and will incrementally increase by 3% each decade throughout the planning horizon.
- Real-time monitoring involves the installation of meters that assess water use by automatically recording and transferring flow data at 15-minute intervals. Water providers and users are able to accurately quantify the usage, generating awareness of consumption and cost, thereby improving irrigation efficiency and providing a water savings. This measure assumes metering will be added to 3% of cropland each decade throughout the planning horizon.
- Conservation tillage is defined as tillage practices that minimize soil and water loss by maintaining a surface residue cover of more than 30% on the soil surface. Conservation tillage can reduce evaporation, increase rainfall infiltration, enhance soil profile water storage, soil

[1] Texas Water Development Board (TWDB). BMPs for Agricultural Water users. http://www.twdb.texas.gov/conservation/BMPs/Ag/index.asp.

moisture conservation, and water use efficiency. A December 2015 USDA report [2] on Conservation-Practice Adoption Rates show that conservation tillage in some form (minimum till, strip till, or no-till) is practiced on 63% of cropland in the region. This strategy assumes a decadal increase of 6% slowing in later years of the planning horizon until 95% of all irrigated acreage practices some sort of conservation tillage.

### 5.2.2.2 Available Yield

This Non-Municipal Water Conservation WMS is considered for implementation beginning in the 2030 decade. Total yield from all measures is 17,720 acft/yr in the SCTRWPA by 2080. Table 5.2.2-1 summarizes the water demand savings (yield) for each decade and WUG for this Non-Municipal Water Conservation WMS.

The water savings from adopting irrigation scheduling is assumed to be 10% and effective soil conservation tillage is assumed to be 1.75 acre-inches per acre [3]. Adoption of real-time monitoring is assumed to reduced water use by 10% [4].

**Table 5.2.2-1 Water Demand Savings (Yield) from Non-Municipal (Irrigation) Water Conservation (acft/yr)**

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Irrigation | Atascosa | 538 | 900 | 1,261 | 1,621 | 1,914 | 2,205 |
| 2 | Irrigation | Bexar | 222 | 362 | 501 | 640 | 757 | 874 |
| 3 | Irrigation | Caldwell | 13 | 21 | 29 | 37 | 44 | 51 |
| 4 | Irrigation | Calhoun | 156 | 239 | 322 | 406 | 481 | 558 |
| 5 | Irrigation | Comal | 11 | 19 | 24 | 31 | 38 | 44 |
| 6 | Irrigation | Dimmit | 85 | 136 | 188 | 240 | 284 | 327 |
| 7 | Irrigation | Goliad | 69 | 117 | 164 | 212 | 250 | 287 |
| 8 | Irrigation | Guadalupe | 17 | 28 | 37 | 48 | 57 | 67 |
| 9 | Irrigation | Karnes | 19 | 31 | 43 | 55 | 66 | 75 |
| 10 | Irrigation | La Salle | 82 | 134 | 184 | 237 | 279 | 322 |
| 11 | Irrigation | Medina | 1,042 | 1,701 | 2,359 | 3,017 | 3,566 | 4,115 |
| 12 | Irrigation | Uvalde | 1,050 | 1,731 | 2,413 | 3,094 | 3,654 | 4,215 |
| 13 | Irrigation | Victoria | 177 | 276 | 375 | 474 | 562 | 651 |
| 14 | Irrigation | Wilson | 246 | 399 | 552 | 704 | 833 | 962 |

[2] Wade, Tara; Claassen, Roger; Wallander, Steven. 2015. *Conservation-Practice Adoption Rates Vary Widely by Crop and Region*. United States Department of Agriculture (USDA) Economic Information Bulletin, Number 147.
[3] Crouch, MariKate; Guerrero, Bridget; Amosson, Steve; Marek, Thomas; Almas, Lal. 2020. *Analyzing Potential Water Conservation Strategies in the Texas Panhandle.* Irrigation Science, Volume 38 (5-6): 9.
[4] Fipps, Guy. 2001. *Potential Water Savings in Irrigated Agriculture in the Lower Rio Grande Basin of Texas*. Texas A&M University.

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 15 | Irrigation | Zavala | 767 | 1,235 | 1,704 | 2,173 | 2,571 | 2,967 |
| **All** | **Total** | **All** | **4,494** | **7,329** | **10,156** | **12,989** | **15,356** | **17,720** |

The possibility exists that implementation of these irrigation conservation measures in a drought year increases the potential yield of a crop per acre-foot (acft) of water but may not reduce the irrigator's overall demand for water. When water is available in a drought year, farmers are likely to use it. Making better use of the water that is available is critical to helping farmers through drought, and the SCTRWPG recommends continued research, education, demonstration, and large-scale implementation of these and any other irrigation conservation measures that farmers find to be appropriate.

### 5.2.2.3 Environmental Factors

Increased conservation in agricultural irrigation would have a potentially negative impact on streamflows in the area. During dry months, return flows from agricultural operations represent a considerable portion of the streamflow seen in the region. Therefore, additional conservation during these times could have adverse effects on aquatic wildlife habitat and water quality parameters such as dissolved oxygen concentrations. This could also negatively affect protected aquatic species, such as freshwater mussels. The more efficient usage of available supply may reduce habitat if canals with current plant growth and wildlife harborage are converted to pipelines or are lined to reduce seepage and plant growth. Increased conservation would have positive impacts on agricultural resources by enabling more efficient use of the irrigation water supply. This strategy would have no impacts to cultural resources. Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in the counties listed for this WMS.

### 5.2.2.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs.

Table 5.2.2-2 and Table 5.2.2-3 provide the estimated costs for the Non-Municipal Water Conservation WMS. It is assumed that sensors associated with soil moisture monitoring cost about $1,000 each, requiring approximately one node per 10 acres, and have a life of about 10 years. It is assumed that meters associated with real-time metering cost about $6,000 each and have a lifespan of about 20 years. According to the EAA, where wells can be on voluntary automated metering, there are approximately 1.5 meters per farm.

**Table 5.2.2-2 Non-Municipal Water Conservation WMS Costs for Project Sponsors**

| No. | Water User Group | Total Cost of Facilities | Total Cost of Project | Annual Cost | Annual Cost of Water ($ per acft) |
|---|---|---|---|---|---|
| 1 | Irrigation, Atascosa | $4,309,000 | $6,007,000 | $765,000 | $347 |
| 2 | Irrigation, Bexar | $1,708,000 | $2,381,000 | $303,000 | $347 |
| 3 | Irrigation, Caldwell | $100,000 | $139,000 | $17,000 | $333 |

| No. | Water User Group | Total Cost of Facilities | Total Cost of Project | Annual Cost | Annual Cost of Water ($ per acft) |
|---|---|---|---|---|---|
| 4 | Irrigation, Calhoun | $1,091,000 | $1,520,000 | $194,000 | $348 |
| 5 | Irrigation, Comal | $86,000 | $120,000 | $15,000 | $341 |
| 6 | Irrigation, Dimmit | $639,000 | $890,000 | $113,000 | $346 |
| 7 | Irrigation, Goliad | $561,000 | $782,000 | $100,000 | $348 |
| 8 | Irrigation, Guadalupe | $131,000 | $182,000 | $24,000 | $358 |
| 9 | Irrigation, Karnes | $147,000 | $204,000 | $26,000 | $347 |
| 10 | Irrigation, La Salle | $629,000 | $877,000 | $112,000 | $348 |
| 11 | Irrigation, Medina | $8,042,000 | $11,211,000 | $1,429,000 | $347 |
| 12 | Irrigation, Uvalde | $8,237,000 | $11,483,000 | $1,463,000 | $347 |
| 13 | Irrigation, Victoria | $1,272,000 | $1,773,000 | $226,000 | $347 |
| 14 | Irrigation, Wilson | $1,880,000 | $2,620,000 | $333,000 | $346 |
| 15 | Irrigation, Zavala | $5,798,000 | $8,082,000 | $1,030,000 | $347 |
| **All** | **Total** | **$34,630,000** | **$48,271,000** | **$6,150,000** | **$347** |

The capital costs of $34,630,000 are associated with the full demand reduction volume listed in 2080.

### Table 5.2.2-3 Cost Estimate Summary for the Non-Municipal Water Conservation WMS

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator, and Other | $34,630,000 |
| **TOTAL COST OF FACILITIES** | **$34,630,000** |
| | |
| Planning (3%) | $1,039,000 |
| Design (7%) | $2,424,000 |
| Construction Engineering (1%) | $346,000 |
| Legal Assistance (2%) | $693,000 |
| Fiscal Services (2%) | $693,000 |
| All Other Facilities Contingency (20%) | $6,926,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,520,000 |
| **TOTAL COST OF PROJECT** | **$48,271,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 10 years) | $5,804,000 |
| Reservoir Debt Service (3.5 percent, 40 years) | $0 |

| Item | Estimated Costs |
|---|---|
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $346,000 |
| **TOTAL ANNUAL COST** | **$6,150,000** |
| | |
| **Available Project Yield (acft/yr)** | 17,720 |
| **Annual Cost of Water ($ per acft)*** | $347 |
| **Annual Cost of Water After Debt Service*** | $20 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.06 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.06 |
| *Based on a peaking factor of 0 | |
| Note: One or more cost element has been calculated externally. | |

### 5.2.2.5 Implementation Considerations

On the agricultural side, conservation savings would not result in a reduction of capital expenditures but a forced expenditure of funding to garner any savings. A finite upper limit to the amount of money that can be spent to conserve agricultural water and still be supported by agricultural income, as individual producers are responsible for implementation. The high cost of conservation and the lack of funds to pay for it make large-scale conservation projects challenging.

In many cases, State Water Implementation Fund for Texas (SWIFT) funding is not eligible for individual agricultural users; therefore, implementation of this strategy depends on large-scale implementation by an organization, such as a river authority, or individual funding to agricultural users from grant and loan programs. The following summarizes resources that may support implementation of the Non-Municipal Water Conservation WMS:

- TWDB's Agricultural Water Conservation Grants Program offers grants for projects that support agricultural irrigation conservation strategies in alignment with the SWP and demonstrate agricultural water conservation best management practices, such as irrigation systems improvements, demonstrations and technology transfer, and equipment cost share grant programs. Applications must be submitted by a political subdivision such as GCDs or River Authorities. These entities can serve as sponsors or facilitators to pass funding through to local producers. More information can be found at https://www.twdb.texas.gov/financial/programs/awcg/index.asp.
- The Texas Department of Agriculture (TDA) hosts a series of grant, loan, and cost share assistance programs for agricultural producers which can be found at https://texasagriculture.gov/Grants-Services/Grants-and-Services.
- Through the USDA NRCS, the Environmental Quality Incentive Program (EQIP) provides incentives to farmers toward the costs of improvements. More information can be found at https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives.
- Through partnerships for Climate-Smart Commodities, the USDA provides technical and financial assistance to producers to implement climate-smart production practices on a voluntary basis

on working lands. More information can be found at https://www.usda.gov/climate-solutions/climate-smart-commodities.

- The Water Quality Management Plan (WQMP) program, administered by the TSSWCB, develops site-specific, voluntary plans specially crafted for agricultural or silvicultural lands approved by local Soil and Water Conservation Districts (SWCDs). TSSWCB offers financial assistance for implementation in the form of cost-share funding. To identify the appropriate TSSWCB Regional Office administering the WQMPs, visit www.tsswcb.texas.gov/contact-us/regional-office-service-areas.
- Through the EAA Groundwater Conservation Plan Program, EAA promotes implementation of individual groundwater conservation plans through its water conservation grant and cost-share programs. Documentation can be found at https://www.edwardsaquifer.org/business-center/bc-files/#cost-share-grant-programs.

Other programs, such as the Texas A&M AgriLife Extension Service's Financial and Risk Management (FARM) Assistance Program, offer additional, non-financial support for farmers. FARM Assistance provides individual producers with a statistically-based strategic financial analysis that is unique to the participant's operation. The data garnered from these analyses provide Texas A&M AgriLife Extension Service with insight on the agricultural industry and enable research to help industry groups, policymakers, and individuals identify trends and gauge impacts at the industry level.

## 5.2.3 Drought Management

The SCTRWPG identified the Drought Management WMS as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.3.1 Description of Water Management Strategy

For the 2026 SCTRWP, the Drought Management WMS was developed for Municipal, Irrigation, and Livestock uses. The following sections provide descriptions of the WMS for each use type.

#### Municipal

Drought management is the periodic activation of approved drought contingency plans (DCPs) resulting in short-term demand reduction and/or restriction. This reduction in demand is then considered a "supply" source. Using this approach, an entity may make the conscious decision not to develop firm water supplies greater than or equal to projected water demands with the understanding that demands will have to be reduced or go unmet during times of drought. Using this rationale, an economic impact of not meeting projected water demands can be estimated and compared with the costs of other potentially feasible WMSs in terms of annual unit costs.

Figure 5.2.3-1 is a water supply planning example of the visual methodology. For each WUG with an identified shortage or need during the planning period, a future water supply plan was developed consisting of one or more WMSs. In each case, the planned future water supply was greater than the projected dry weather demand to allow for droughts more severe than the drought of record, uncertainty in water demand projections, and/or available supply from Recommended WMSs. This difference between planned water supply and projected dry weather demand is called management supply in Region L.

Figure 5.2.3-2 illustrates how a drought management WMS could alter the planning paradigm for WUGs with projected needs. Instead of identifying WMSs to meet the projected need, planned water supply remains below the projected dry weather water demand. The difference between these two lines represents the drought management WMS. Under this concept, water demand of a WUG would be reduced by activating a drought contingency plan to reduce demands, resulting in unmet needs. This strategy of demand reduction or water restriction could negate the need for WMSs to meet the full projected need of the WUG. Basically, using this approach, the WUG is planning to manage water shortages through DCP activation or water restriction, if needed. This concept is more fully illustrated on Figure 5.2.3-3, which shows that, in any given year, the actual demand may be above or below the planned supply. During times in which the demand exceeds supply, the WUG would experience shortages and incur associated economic impacts.

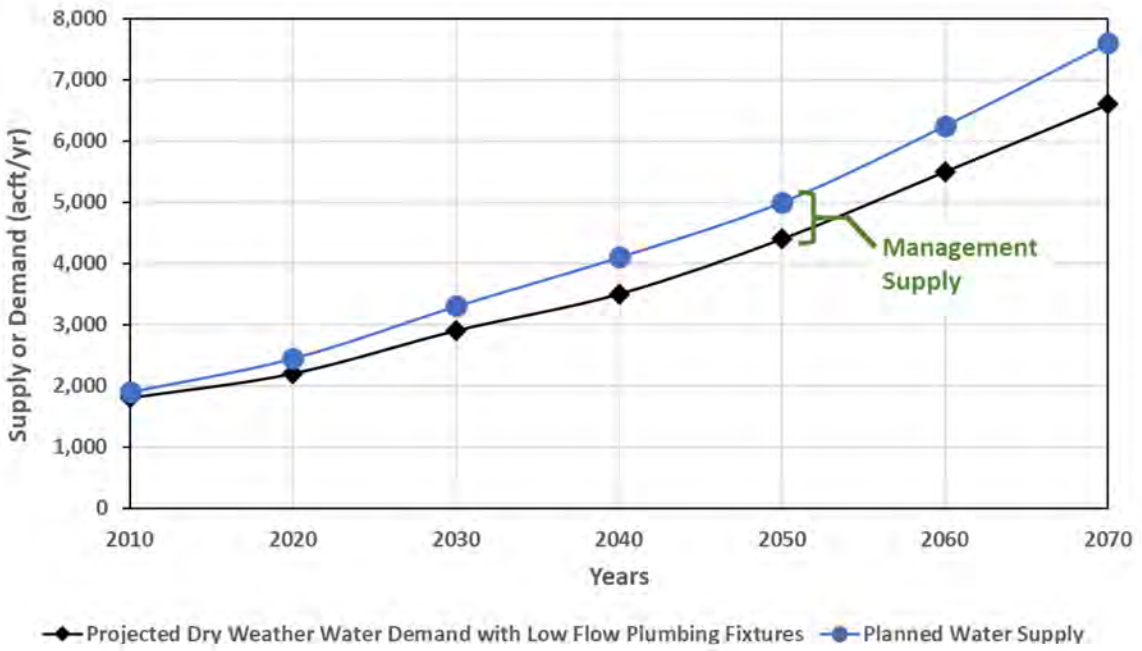



**Figure 5.2.3-1 Example - Typical Water Supply Planning**

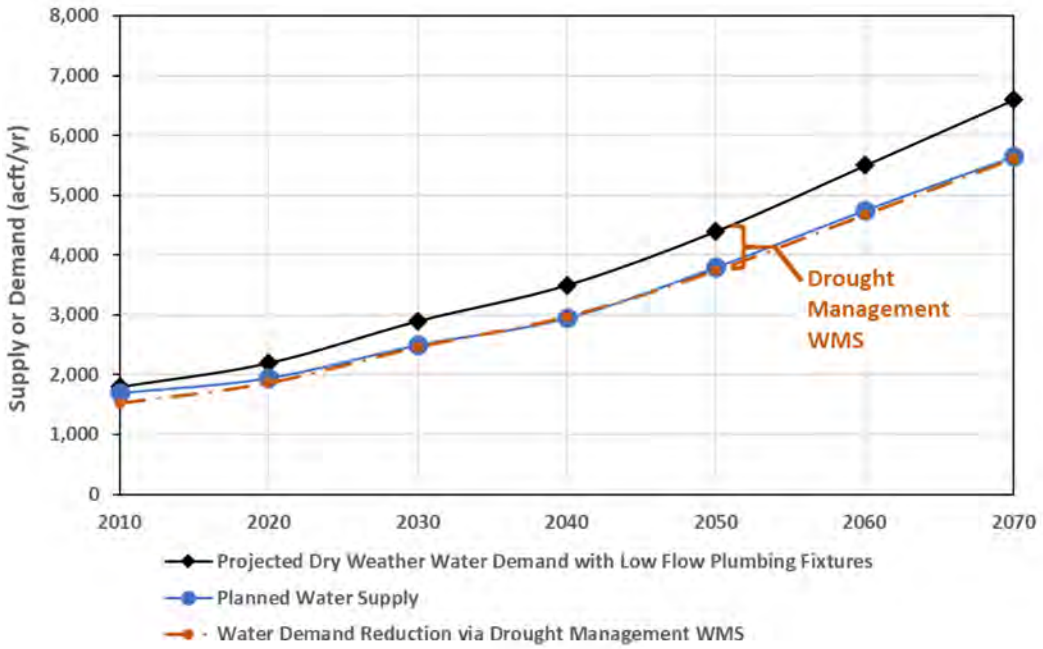



**Figure 5.2.3-2 Example - Drought Management WMS Planning Application**

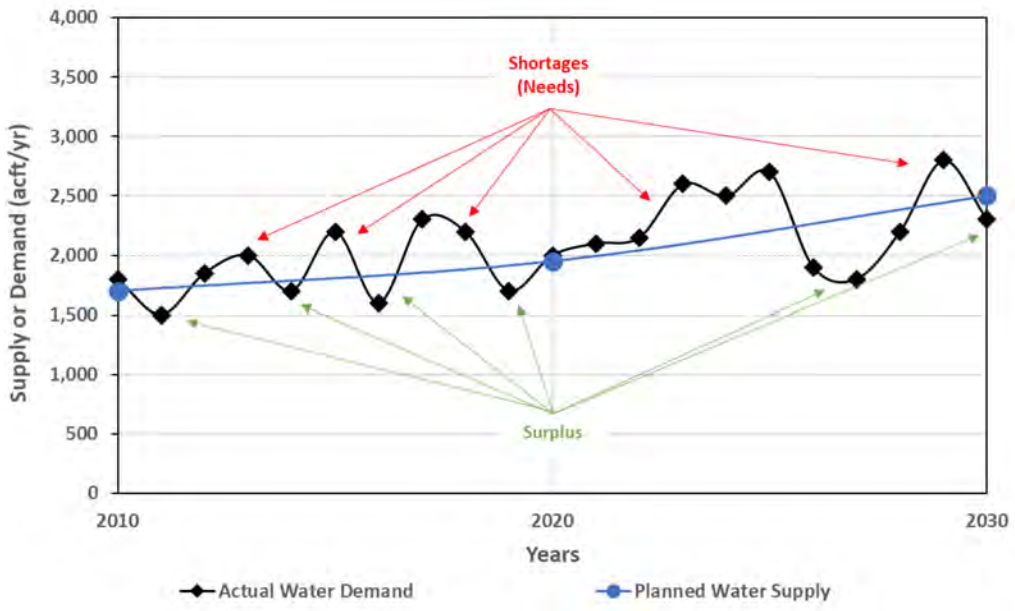



**Figure 5.2.3-3 Example - Annual Water Demand and Planned Water Supply**

## Drought Management Strategy Methodology

On October 3, 2019, the TWDB released the Drought Management Costing Tool to estimate socioeconomic impacts and evaluate economic impact of the water volumes reduced by implementation of drought management strategies. The tool was subsequently updated in March 2024 for use in 2026 SCTRWPs. As described in the TWDB-provided Drought Management Costing Tool User Manual, "the primary purpose of the tool is to provide WUG level costs and the expected household level residential water savings associated with policy-imposed restrictions or reduction on residential water use." The tool utilizes various inputs – user supplied percent use reductions; Census household size; population projections; and Texas Municipal League (TML) price and quantity data to estimate reductions in water use and consumer costs (Figure 5.2.3-4). The following subsections summarize the components and features that comprise the Drought Management Costing Tool. More details can be found in the TWDB Drought Management Costing Tool User Manual.

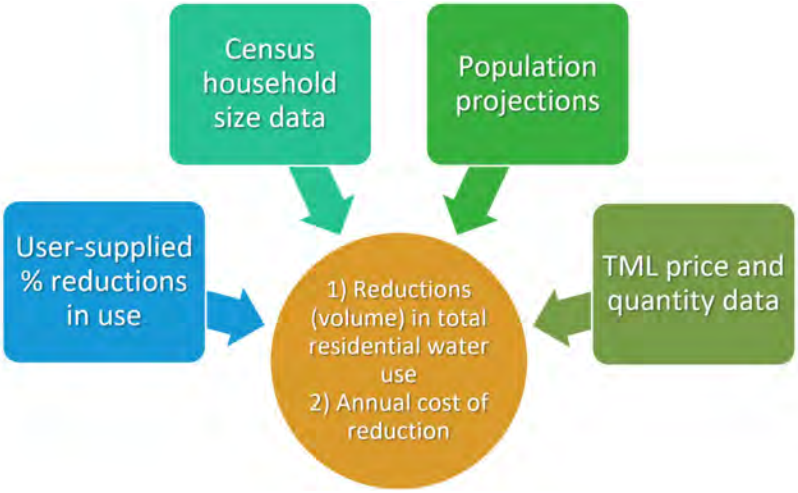



**Figure 5.2.3-4 Costing Data and Output (TWDB, 2024)**

### Texas Municipal League Data

The TML generated water demand curves for WUGs from the 2023 annual cost and usage surveys. Parameters that were used included population, fees for 5,000 and 10,000 gallons of use, and average monthly use for each household in the associated WUG. These data were compiled to estimate the expected price for the average monthly water use for WUGs.

### Analysis Assumptions

The following are the key assumptions in the development of the Drought Management Costing Tool (TWDB, 2024):

1. The relevant demand functions are only for residential outdoor water use. Historical studies have revealed that approximately 30% of residential use within the state is for outdoor water use. Therefore, this tool only allows potential reductions less than or equal to 30% of normal water use due to drought management strategies.
2. A representative value of -0.5 was assumed for outdoor water demand.
3. Only residential water use reductions are examined. Available data did not support similar estimates for commercial water use.
4. County-other WUGs are not included in this costing tool.
5. Year 2020 household size data (WUG-specific where possible) are employed to determine the number of households in each decade, using the TWDB adopted projected populations. These baseline household sizes are not assumed to adjust over time.
6. Baseline data from TML for average monthly prices and quantities (per household) from the most recent years 2020-2023 were used in developing the demand functions for the various WUGs. Where possible, WUG-specific data was used. Proxy values that were based on planning region and three city size classifications were assigned to WUGs with no TML survey results.
7. Final cost estimates are expressed in Year 2023 dollars to be consistent with the WMS costing requirements in the 2027 SWP.

### Use of the Costing Tool

The Microsoft Excel-based tool is composed of three major components (tabs within the workbook; TWDB, 2024):

1. **Data Entry:** User data entry form for decade-specific desired reductions in water use by region and WUG;
2. **Final Summary:** A summary of the key parameters and final cost (economic impact) and water savings estimates; and
3. **Population and Households:** Reference tab with background information on the number of households according to the 2020 census data and the Board-adopted 2030 through 2080 WUG and region level population projections.

For the purposes of the SCTRWPG and the Drought Management WMS, only total annual water reduction (in acft; described as yield) and total annual cost (in 2023 dollars) data for the Region L WUGs were obtained from the Drought Management Costing Tool. Total annual water reduction or yield by WUG is described in Section 5.2.3.2 and detailed in Table 5.2.3-1. Total annual costs are described in Section 5.2.3.4 and detailed in Table 5.2.3-5. Due to the decentralized nature of County-Other WUGs

and the reduced ability to create and enforce restrictions, drought management was considered as a WMS but not recommended for meeting needs.

### Irrigation

Irrigation Drought Management is the demand reduction associated with irrigation-related, voluntary reductions of groundwater during severe drought conditions.

This strategy is recommended for irrigation WUGs demonstrating needs that do not fall under the EAA's jurisdiction, as the EAA implements water restrictions by curtailment of water; the EAA Critical Period Management (CPM) Plan helps sustain aquifer and springflow levels during times of drought by temporarily reducing the authorized withdrawal amounts of Edwards groundwater permit holders.

### Livestock

The Drought Management WMS is recommended for only one Livestock WUG in Region L, which is Livestock, Hays County. The TPWD owns and operates the A.E. Wood State Fish Hatchery, which accounts for the majority of Livestock demands in Hays County, estimated at 2,432 acft/yr. During typical years, the hatchery relies on surface water from the Guadalupe River and recycled water from their facility. However, water availability modeling for the 2026 SCTRWP indicates that the hatchery's Guadalupe Run-of-River water rights do not have a firm yield during a repeat of the drought of record. During periods of drought, the TPWD would rely on their recycled water or reuse supplies, which would provide 2,420 acft/yr, resulting in a Need of 12 acft/yr. This reuse supply would allow the hatchery to maintain broodstock that are critical to production; however, it will not enable the hatchery to sustain full operating capacity during severe drought.

## 5.2.3.2 Available Yield

For the 2026 SCTRWP, the Drought Management WMS was developed for Municipal, Irrigation, and Livestock uses. The following sections provide yields for each water use type.

### Municipal

The TWDB defines "total annual water reduction" in the Drought Management Costing Tool User Manual as "… all household water use due to drought management plan implementation based on percentage of reduction," which is estimated via the equation represented on Figure 5.2.3-5.

$$\frac{\left[\left(\frac{population}{household\ size}\right) * 12 * (monthly\ reduction\ in\ gallons)\right]}{325{,}851\,\frac{gal}{acft}}\ [\textbf{in acft}].$$

**Figure 5.2.3-5 Formula Used to Calculate Total Annual Water Reduction for the Municipal Drought Management WMS**

As described above, the TWDB defines "total annual water reduction" as yield that is based on the SCTRWPG's set percent reduction in demand. The yield is considered a "supply" for participating WUGs because the reduction in demand "reduces" the associated needs. For the Drought Management WMS, the SCTWPG considered four demand reduction scenarios of 5%, 10%, 15%, and 20%. At an RWPG meeting on August 1, 2024, the SCTRWPG selected the 10% demand reduction scenario for all applicable

WUGs, unless another demand reduction scenario was appropriate or a WUG requested a utility-specific reduction scenario.

To determine the yield of the Drought Management WMS for municipal users, the 10% reduction scenario was applied to whole municipal WUGs in all decades, regardless of split region, for those that exhibited identified needs in any decade of the planning horizon. The yields for the Municipal Drought Management WMS are summarized for each applicable WUG in Table 5.2.3-1. SAWS requested a utility-specific reduction savings for Drought Management, which is discussed in subsequent paragraphs. In addition, there were utility-specific drought management reductions for New Braunfels (15% demand reduction for 2030 to 2070; and a 30% demand reduction for 2080), Oak Hills WSC (15% demand reduction for all decades), and Springs Hill WSC (10% demand reduction for 2030 to 2070; and a 15% demand reduction for 2080).

**Table 5.2.3-1 Yield for the Municipal Drought Management WMS (acft/yr) [1]**

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Air Force Village II Inc | Bexar | 8 | 8 | 8 | 8 | 8 | 8 |
| 2 | Alamo Heights | Bexar | 88 | 88 | 88 | 88 | 88 | 88 |
| 3 | Aqua WSC [2] | Bexar | 10 | 11 | 13 | 14 | 16 | 18 |
| 4 | Atascosa Rural WSC | Bexar | 100 | 117 | 132 | 145 | 159 | 176 |
| 5 | Benton City WSC | Atascosa | 158 | 176 | 192 | 202 | 213 | 225 |
| 6 | Bexar County WCID 10 | Bexar | 71 | 80 | 88 | 95 | 103 | 113 |
| 7 | Boerne | Kendall | 213 | 293 | 396 | 516 | 653 | 810 |
| 8 | C Willow Water | Wilson | 7 | 8 | 8 | 9 | 10 | 11 |
| 9 | Canyon Lake Water Service (Texas Water Company) [2] | Comal | 827 | 1,131 | 1,323 | 1,448 | 1,916 | 2,432 |
| 10 | Carrizo Hill WSC | Dimmit | 3 | 4 | 4 | 5 | 6 | 9 |
| 11 | Castroville | Medina | 59 | 64 | 71 | 82 | 92 | 99 |
| 12 | Cibolo | Guadalupe | 207 | 252 | 301 | 353 | 413 | 482 |
| 13 | Clear Water Estates Water System (Texas Water Company) | Comal | 8 | 11 | 15 | 21 | 27 | 34 |
| 14 | Converse | Bexar | 284 | 285 | 285 | 285 | 285 | 285 |
| 15 | County Line SUD | Hays | 314 | 628 | 1,004 | 1,297 | 1,464 | 1,556 |
| 16 | Creedmoor-Maha WSC [2] | Hays | 112 | 202 | 292 | 381 | 472 | 563 |
| 17 | Crystal Clear SUD | Hays | 531 | 893 | 1,008 | 1,136 | 1,285 | 1,456 |
| 18 | Cuero | DeWitt | 76 | 76 | 76 | 75 | 75 | 75 |
| 19 | East Central SUD | Guadalupe | 472 | 535 | 592 | 644 | 702 | 767 |
| 20 | East Medina County SUD | Medina | 84 | 90 | 94 | 97 | 100 | 103 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 21 | El Oso WSC [2] | Karnes | 61 | 64 | 66 | 68 | 71 | 75 |
| 22 | Elmendorf | Bexar | 28 | 38 | 51 | 68 | 85 | 117 |
| 23 | Fair Oaks Ranch | Bexar | 74 | 88 | 95 | 98 | 99 | 99 |
| 24 | Fayette WSC [2] | Bexar | 0 | 0 | 1 | 1 | 1 | 1 |
| 25 | Fort Sam Houston | Comal | 47 | 47 | 47 | 47 | 47 | 47 |
| 26 | Garden Ridge | Caldwell | 211 | 261 | 311 | 368 | 436 | 517 |
| 27 | Goforth SUD [2] | Gonzales | 359 | 569 | 845 | 1,218 | 1,646 | 2,135 |
| 28 | Gonzales | Comal | 48 | 48 | 47 | 47 | 46 | 46 |
| 29 | Green Valley SUD | Calhoun | 380 | 508 | 652 | 805 | 980 | 1,179 |
| 30 | Guadalupe-Blanco River Authority | Medina | 91 | 127 | 123 | 119 | 115 | 110 |
| 31 | Hondo | Karnes | 59 | 57 | 55 | 56 | 56 | 56 |
| 32 | Karnes City | Kendall | 17 | 18 | 19 | 20 | 21 | 22 |
| 33 | Kendall West Utility | Bexar | 18 | 23 | 29 | 36 | 45 | 54 |
| 34 | Kirby | Comal | 63 | 71 | 72 | 72 | 72 | 72 |
| 35 | KT Water Development | Hays | 19 | 29 | 43 | 60 | 80 | 102 |
| 36 | Kyle | Medina | 542 | 809 | 1,102 | 1,235 | 1,279 | 1,312 |
| 37 | La Coste | Bexar | 11 | 11 | 11 | 11 | 11 | 12 |
| 38 | Leon Valley | Bexar | 142 | 172 | 172 | 172 | 172 | 172 |
| 39 | Live Oak | Caldwell | 85 | 85 | 85 | 85 | 85 | 85 |
| 40 | Lockhart | Caldwell | 141 | 153 | 166 | 179 | 192 | 205 |
| 41 | Luling | Caldwell | 38 | 38 | 39 | 41 | 42 | 44 |
| 42 | Lytle | Atascosa | 25 | 26 | 28 | 29 | 31 | 33 |
| 43 | Martindale WSC | Caldwell | 33 | 44 | 49 | 54 | 60 | 66 |
| 44 | Maxwell SUD | Caldwell | 197 | 265 | 356 | 479 | 644 | 711 |
| 45 | McCoy WSC [2] | Atascosa | 73 | 77 | 81 | 85 | 90 | 96 |
| 46 | Natalia | Medina | 11 | 11 | 11 | 12 | 12 | 11 |
| 47 | New Braunfels | Comal | 1,529 | 2,177 | 3,004 | 4,010 | 5,161 | 12,958 |
| 48 | Oak Hills WSC | Wilson | 78 | 91 | 105 | 121 | 140 | 162 |
| 49 | Pearsall | Frio | 74 | 85 | 92 | 93 | 95 | 96 |
| 50 | Picosa WSC | Wilson | 23 | 27 | 30 | 34 | 37 | 41 |
| 51 | Pleasanton | Atascosa | 111 | 121 | 132 | 144 | 157 | 171 |
| 52 | Port Lavaca | Calhoun | 79 | 76 | 72 | 68 | 64 | 60 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 53 | Runge | Karnes | 11 | 11 | 12 | 13 | 14 | 14 |
| 54 | S S WSC | Wilson | 165 | 191 | 216 | 238 | 264 | 294 |
| 55 | San Antonio Water System [3] | Bexar | 26,865 | 29,834 | 31,670 | 33,099 | 34,211 | 35,879 |
| 56 | San Marcos | Hays | 1,168 | 1,646 | 2,028 | 2,309 | 2,491 | 2,608 |
| 57 | Schertz | Guadalupe | 574 | 699 | 830 | 960 | 1,111 | 1,283 |
| 58 | Seguin | Guadalupe | 537 | 633 | 679 | 706 | 734 | 763 |
| 59 | Selma | Bexar | 108 | 131 | 153 | 173 | 197 | 224 |
| 60 | Shavano Park | Bexar | 73 | 83 | 91 | 99 | 108 | 118 |
| 61 | South Buda WCID 1 | Hays | 47 | 77 | 116 | 168 | 229 | 298 |
| 62 | Springs Hill WSC | Guadalupe | 443 | 525 | 617 | 713 | 822 | 1,418 |
| 63 | Texas State University | Hays | 42 | 42 | 42 | 42 | 42 | 42 |
| 64 | The Oaks WSC | Bexar | 15 | 17 | 19 | 20 | 22 | 24 |
| 65 | Universal City | Bexar | 184 | 194 | 197 | 198 | 199 | 199 |
| 66 | Uvalde | Uvalde | 135 | 133 | 129 | 125 | 121 | 116 |
| 67 | Victoria | Victoria | 670 | 680 | 683 | 680 | 676 | 672 |
| 68 | Victoria County WCID 1 | Victoria | 11 | 11 | 12 | 12 | 12 | 12 |
| 69 | Ville Dalsace Water Supply | Medina | 3 | 4 | 4 | 4 | 4 | 4 |
| 70 | Water Services | Bexar | 80 | 86 | 91 | 96 | 101 | 108 |
| 71 | Wimberley WSC | Hays | 44 | 64 | 91 | 126 | 167 | 214 |
| 72 | Wingert Water Systems | Comal | 14 | 16 | 18 | 19 | 19 | 19 |
| 73 | Yancey WSC | Medina | 54 | 57 | 59 | 61 | 63 | 65 |
| **All** | **Total** | **All** | **39,542** | **46,302** | **51,738** | **56,697** | **61,766** | **74,551** |

[1] Based on 10% demand reduction, unless otherwise stated.

[2] WUGs are split between Region L and other regions (Regions K, P, and/or N). Values in the table represent Region L's portion of the WUG's yield.

[3] SAWS has identified utility-specific drought management reductions that are described and quantified in subsequent paragraphs.

SAWS has chosen to develop utility-specific drought management reduction savings, which are summarized in Table 5.2.3-2.

**Table 5.2.3-2 SAWS Drought Management Reduction**

| Description | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| % Reduction (Drought Management) | 10% | 10% | 10% | 10% | 10% | 10% |

| Description | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Drought Management Savings or Yield (acft/yr) | 26,865 | 29,834 | 31,670 | 33,099 | 34,211 | 35,879 |
| Total Annual Cost (2023 $) | $6,515,377 | $7,235,427 | $7,680,699 | $8,027,264 | $8,296,950 | $8,701,478 |

## Irrigation

It is assumed that the growth of agriculture would be reduced based on water available, and during severe drought conditions, farmers that use groundwater would restrict their usage by 10%. The Palmer Drought Severity Index (PDSI) is a resource that could be used for determining triggers for drought management strategies. The volumes of water saved (yield) for the Irrigation Drought Management WMS are shown in Table 5.2.2-3.

**Table 5.2.2-3 Yield for the Irrigation Drought Management WMS (acft/yr)**

| No. | Water User Group | WMS Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Irrigation, Caldwell | Drought Management Reduction: Irrigation | 34 | 34 | 34 | 34 | 34 | 34 |
| 2 | Irrigation, Calhoun | Drought Management Reduction: Irrigation | 1,046 | 1,046 | 1,046 | 1,046 | 1,046 | 1,046 |
| 3 | Irrigation, Dimmit | Drought Management Reduction: Irrigation | 189 | 189 | 189 | 189 | 189 | 189 |
| 4 | Irrigation, Goliad | Drought Management Reduction: Irrigation | 313 | 313 | 313 | 313 | 313 | 313 |
| 5 | Irrigation, Guadalupe | Drought Management Reduction: Irrigation | 28 | 28 | 28 | 28 | 28 | 28 |
| 6 | Irrigation, Karnes | Drought Management Reduction: Irrigation | 82 | 82 | 82 | 82 | 82 | 82 |
| 7 | Irrigation, La Salle | Drought Management Reduction: Irrigation | 394 | 394 | 394 | 394 | 394 | 394 |
| 8 | Irrigation, Victoria | Drought Management Reduction: Irrigation | 1,109 | 1,109 | 1,109 | 1,109 | 1,109 | 1,109 |
| 9 | Irrigation, Wilson | Drought Management Reduction: Irrigation | 1,223 | 1,223 | 1,223 | 1,223 | 1,223 | 1,223 |
| 10 | Irrigation, Zavala | Drought Management Reduction: Irrigation | 4,257 | 4,257 | 4,257 | 4,257 | 4,257 | 4,257 |
| **All** | **Total** | **All** | **8,675** | **8,675** | **8,675** | **8,675** | **8,675** | **8,675** |

### Livestock

Based on conversations with TPWD A.E. Wood State Fish Hatchery staff, the facility would implement a drought management strategy, thereby temporarily suspending operations until conditions improve. Table 5.2.3-4 provides a summary of the yield associated with Demand Management for Livestock.

**Table 5.2.3-4 Yield for the Livestock Drought Management WMS (acft/yr)**

| No. | Water User Group | WMS Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Livestock, Hays | Drought Management Reduction: Livestock | 12 | 12 | 12 | 12 | 12 | 12 |

## 5.2.3.3 Environmental Considerations

Drought Management is not expected to have significant negative impacts on natural resources. Successful drought management could reduce flows to streams and other surface water sources. However, this WMS would be implemented during severe drought, and it is unlikely that its implementation would reduce flows to surface water further than flow reductions that would already occur during severe drought. If flow contributions to streams are reduced from this strategy, implementation may negatively impact stream water quality, which can negatively affect aquatic resources and protected aquatic wildlife species.

Strategies to encourage reduced lawn watering and/or replacement of lawns with water-conserving landscaping could result in environmentally beneficial increases in landscape species diversity and general drought tolerance of landscapes. Increased use of drought-tolerant native plant species would also benefit native pollinator species, including the protected monarch butterfly. No adverse impacts on cultural or agricultural resources are expected.

## 5.2.3.4 Engineering and Costing

For the 2026 SCTRWP, the Drought Management WMS was developed for Municipal, Irrigation, and Livestock uses. The following sections provide engineering and costing information for each water use type.

### Municipal

Preliminary engineering and costing analyses were performed using TWDB Drought Management Costing Tool. Black & Veatch utilized the Drought Management Costing Tool to estimate costs in 2023 dollars. The TWDB defines "total annual cost" in the Drought Management Costing Tool User Manual as "[…] adverse monetary impacts of possible restrictions on water use for the residential water user," which is estimated using the formula shown on Figure 5.2.3-6.

$$(average\ unit\ cost\ per\ acft) * (yield)\ [\mathbf{in\ 2023}\ \$].$$

**Figure 5.2.3-6 Formula Used to Calculate Total Annual Costs for the Municipal Drought Management WMS**

Using this approach, an entity may make the conscious decision not to develop firm water supplies greater than or equal to projected water demands with the understanding that demands will have to be reduced or go unmet during times of drought. Using this rationale, an economic impact of not meeting

projected water demands can be estimated and compared with the costs of other potentially feasible WMSs in terms of annual unit costs.

Based on the municipal yields data presented in Table 5.2.3-1, annual cost data were estimated for WUGs that exhibited municipal water needs in any decade. These values were determined to compare with other potentially feasible WMSs and are summarized in Table 5.2.3-5. The decadal percent reductions, yields, and costs for SAWS are presented in Table 5.2.3-2. For the 2026 planning cycle, the SCTRWP selected a 10% demand reduction for all applicable WUGs.

**Table 5.2.3-5 Total Annual Cost for Municipal Drought Management WMS [1]**

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Air Force Village II Inc | Bexar | $2,493 | $2,493 | $2,493 | $2,493 | $2,493 | $2,493 |
| 2 | Alamo Heights | Bexar | $22,858 | $22,858 | $22,858 | $22,858 | $22,858 | $22,858 |
| 3 | Aqua WSC [2] | Bexar | $2,575 | $2,971 | $3,345 | $3,701 | $4,111 | $4,578 |
| 4 | Atascosa Rural WSC | Bexar | $26,147 | $30,455 | $34,317 | $37,678 | $41,536 | $45,963 |
| 5 | Benton City WSC | Atascosa | $41,240 | $45,976 | $50,118 | $52,577 | $55,415 | $58,677 |
| 6 | Bexar County WCID 10 | Bexar | $18,396 | $20,770 | $22,894 | $24,786 | $26,955 | $29,435 |
| 7 | Boerne | Kendall | $59,450 | $81,852 | $110,691 | $144,172 | $182,502 | $226,377 |
| 8 | C Willow Water | Wilson | $2,243 | $2,489 | $2,732 | $2,949 | $3,199 | $3,479 |
| 9 | Canyon Lake Water Service (Texas Water Company) [2] | Comal | $215,574 | $294,766 | $344,999 | $377,593 | $499,539 | $634,096 |
| 10 | Carrizo Hill WSC | Dimmit | $1,141 | $1,294 | $1,470 | $1,688 | $2,069 | $2,888 |
| 11 | Castroville | Medina | $19,388 | $21,134 | $23,668 | $27,220 | $30,485 | $32,619 |
| 12 | Cibolo | Guadalupe | $71,714 | $87,037 | $104,166 | $122,257 | $142,971 | $166,692 |
| 13 | Clear Water Estates Water System (Texas Water Company) | Comal | $2,641 | $3,685 | $5,073 | $6,838 | $8,852 | $11,161 |
| 14 | Converse | Bexar | $74,168 | $74,262 | $74,262 | $74,262 | $74,262 | $74,262 |
| 15 | County Line SUD | Hays | $81,808 | $163,615 | $261,785 | $338,053 | $381,673 | $405,664 |
| 16 | Creedmoor-Maha WSC [2] | Hays | $29,092 | $52,613 | $76,049 | $99,409 | $122,944 | $146,682 |
| 17 | Crystal Clear SUD | Hays | $138,493 | $232,736 | $262,694 | $296,310 | $335,028 | $379,552 |
| 18 | Cuero | DeWitt | $19,881 | $19,858 | $19,740 | $19,669 | $19,594 | $19,519 |
| 19 | East Central SUD | Guadalupe | $123,160 | $139,553 | $154,436 | $167,803 | $182,973 | $200,057 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 20 | East Medina County SUD | Medina | $21,970 | $23,448 | $24,521 | $25,193 | $25,966 | $26,855 |
| 21 | El Oso WSC [2] | Karnes | $15,950 | $16,569 | $17,185 | $17,843 | $18,598 | $19,469 |
| 22 | Elmendorf | Bexar | $16,847 | $22,594 | $30,269 | $40,651 | $50,625 | $69,928 |
| 23 | Fair Oaks Ranch | Bexar | $33,691 | $40,139 | $43,362 | $44,650 | $44,973 | $44,973 |
| 24 | Fayette WSC [2] | Bexar | $97 | $126 | $159 | $208 | $273 | $362 |
| 25 | Fort Sam Houston | Comal | $12,362 | $12,362 | $12,362 | $12,362 | $12,362 | $12,362 |
| 26 | Garden Ridge | Caldwell | $33,779 | $41,754 | $49,753 | $58,965 | $69,894 | $82,849 |
| 27 | Goforth SUD [2] | Gonzales | $93,552 | $148,301 | $220,265 | $317,639 | $429,088 | $556,673 |
| 28 | Gonzales | Comal | $10,451 | $10,447 | $10,294 | $10,127 | $9,950 | $9,950 |
| 29 | Green Valley SUD | Calhoun | $99,150 | $132,563 | $170,077 | $209,869 | $255,399 | $307,514 |
| 30 | Guadalupe-Blanco River Authority | Medina | $23,793 | $32,997 | $32,006 | $31,067 | $29,988 | $28,759 |
| 31 | Hondo | Karnes | $17,114 | $16,419 | $16,032 | $16,121 | $16,214 | $16,307 |
| 32 | Karnes City | Kendall | $5,634 | $5,943 | $6,247 | $6,595 | $6,990 | $7,443 |
| 33 | Kendall West Utility | Bexar | $6,048 | $7,640 | $9,687 | $12,064 | $14,783 | $17,898 |
| 34 | Kirby | Comal | $8,744 | $9,893 | $10,112 | $10,112 | $10,112 | $10,112 |
| 35 | KT Water Development | Hays | $6,193 | $9,586 | $14,116 | $19,844 | $26,401 | $33,909 |
| 36 | Kyle | Medina | $141,322 | $210,971 | $287,312 | $322,100 | $333,551 | $341,984 |
| 37 | La Coste | Bexar | $2,127 | $2,098 | $2,086 | $2,112 | $2,143 | $2,175 |
| 38 | Leon Valley | Bexar | $37,039 | $44,911 | $44,911 | $44,911 | $44,911 | $44,911 |
| 39 | Live Oak | Caldwell | $14,029 | $14,029 | $14,029 | $14,029 | $14,029 | $14,029 |
| 40 | Lockhart | Caldwell | $45,288 | $49,419 | $53,551 | $57,682 | $61,814 | $65,937 |
| 41 | Luling | Caldwell | $9,058 | $9,291 | $9,515 | $9,830 | $10,165 | $10,530 |
| 42 | Lytle | Atascosa | $4,755 | $5,070 | $5,378 | $5,657 | $5,975 | $6,341 |
| 43 | Martindale WSC | Caldwell | $10,897 | $14,645 | $16,176 | $17,869 | $19,738 | $21,803 |
| 44 | Maxwell SUD | Caldwell | $51,450 | $69,144 | $92,929 | $124,887 | $167,843 | $185,399 |
| 45 | McCoy WSC [2] | Atascosa | $19,109 | $20,014 | $21,030 | $22,165 | $23,455 | $24,919 |
| 46 | Natalia | Medina | $2,935 | $2,850 | $2,989 | $3,072 | $3,085 | $3,008 |
| 47 | New Braunfels | Comal | $510,737 | $727,367 | $1,003,841 | $1,339,860 | $1,724,479 | $10,514,664 |
| 48 | Oak Hills WSC | Wilson | $32,492 | $37,532 | $43,365 | $50,120 | $57,948 | $67,026 |
| 49 | Pearsall | Frio | $19,308 | $22,088 | $24,027 | $24,359 | $24,732 | $25,154 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 50 | Picosa WSC | Wilson | $7,719 | $8,903 | $10,066 | $11,093 | $12,274 | $13,623 |
| 51 | Pleasanton | Atascosa | $62,989 | $68,606 | $74,720 | $81,377 | $88,628 | $96,533 |
| 52 | Port Lavaca | Calhoun | $25,117 | $24,121 | $22,894 | $21,654 | $20,357 | $18,980 |
| 53 | Runge | Karnes | $1,986 | $2,097 | $2,208 | $2,335 | $2,480 | $2,645 |
| 54 | San Antonio Water System [3] | Bexar | $6,515,377 | $7,235,427 | $7,680,699 | $8,027,264 | $8,296,950 | $8,701,478 |
| 55 | S SSC | Wilson | $43,143 | $49,769 | $56,277 | $62,029 | $68,722 | $76,647 |
| 56 | San Marcos | Hays | $418,654 | $589,729 | $726,609 | $827,570 | $8 | $934,561 |
| 57 | Schertz | Guadalupe | $185,356 | $225,755 | $268,076 | $310,393 | $358,952 | $414,653 |
| 58 | Seguin | Guadalupe | $161,403 | $190,327 | $204,190 | $212,360 | $220,747 | $229,370 |
| 59 | Selma | Bexar | $16,456 | $20,005 | $23,392 | $26,505 | $30,081 | $34,192 |
| 60 | Shavano Park | Bexar | $14,990 | $16,960 | $18,713 | $20,283 | $22,070 | $24,122 |
| 61 | South Buda WCID 1 | Hays | $15,541 | $25,352 | $38,274 | $55,772 | $75,800 | $98,721 |
| 62 | Springs Hill WSC | Guadalupe | $115,434 | $136,962 | $160,792 | $185,829 | $214,261 | $587,378 |
| 63 | Texas State University | Hays | $10,901 | $10,901 | $10,901 | $10,901 | $10,901 | $10,901 |
| 64 | The Oaks WSC | Bexar | $4,932 | $5,581 | $6,160 | $6,677 | $7,264 | $7,944 |
| 65 | Universal City | Bexar | $52,253 | $55,013 | $56,044 | $56,207 | $56,392 | $56,604 |
| 66 | Uvalde | Uvalde | $17,854 | $17,530 | $17,042 | $16,491 | $15,923 | $15,350 |
| 67 | Victoria | Victoria | $114,691 | $116,454 | $116,840 | $116,316 | $115,717 | $115,030 |
| 68 | Victoria County WCID 1 | Victoria | $3,709 | $3,804 | $3,834 | $3,834 | $3,832 | $3,832 |
| 69 | Ville Dalsace Water Supply | Medina | $1,150 | $1,253 | $1,329 | $1,371 | $1,419 | $1,475 |
| 70 | Water Services | Bexar | $20,904 | $22,454 | $23,817 | $25,028 | $26,456 | $28,113 |
| 71 | Wimberley WSC | Hays | $14,699 | $21,301 | $29,994 | $41,791 | $55,299 | $70,759 |
| 72 | Wingert Water Systems | Comal | $4,665 | $5,260 | $6,055 | $6,203 | $6,203 | $6,203 |
| 73 | Yancey WSC | Medina | $13,993 | $14,857 | $15,491 | $15,900 | $16,370 | $16,911 |
| **All** | **Total ($)** | **All** | **$10,102,299** | **$11,929,048** | **$13,439,793** | **$14,839,462** | **$15,382,049** | **$26,606,302** |

[1] Based on 10% demand reduction, unless otherwise stated.

[2] WUGs are split between Region L and other regions (Regions K, P, and/or N). Values in the table represent Region L's portion of the WUG's yield.

[3] SAWS has identified utility-specific drought management reductions that are described and quantified in subsequent paragraphs.

## Irrigation

No capital costs are associated with this strategy; however, costs are determined using the TWDB Socioeconomic Impact Analysis of Unmet Needs for the 2026 SCTRWP, which was published by the TWDB in June 2025. The report shows an impact cost to the local economy based on the missed opportunity to grow agriculture. This cost is an opportunity cost, rather than an implementation cost, due to the fact that farming plays an important role in the local economy, and the high cost of agriculture requires farmers to maximize their yield to generate a profit. Unit costs vary by county. The unit costs, shown in 2023 dollars, for irrigation drought management WUGs are shown in Table 5.2.3-6.

**Table 5.2.3-6 Unit Costs for Irrigation Drought Management WMS (in millions of dollars) [1]**

| County | Use Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Calhoun | Irrigation | $ 5.83 | $ 5.83 | $ 5.83 | $ 5.83 | $ 5.83 | $ 5.83 |
| Dimmit | Irrigation | $ 3.18 | $ 3.18 | $ 3.18 | $ 3.18 | $ 3.18 | $ 3.18 |
| Goliad | Irrigation | $ 0.00 | $ - | $ - | $ - | $ - | $ - |
| Karnes | Irrigation | $ 0.08 | $ 0.08 | $ 0.70 | $ 0.70 | $ 0.70 | $ 0.70 |
| La Salle | Irrigation | $ 0.03 | $ 0.03 | $ 0.03 | $ 0.03 | $ 0.03 | $ 0.03 |
| Medina | Irrigation | $ 9.87 | $ 9.91 | $ 9.94 | $ 9.97 | $ 10.00 | $ 10.02 |
| Uvalde | Irrigation | $ 9.73 | $ 9.73 | $ 9.73 | $ 9.73 | $ 9.73 | $ 9.73 |
| Zavala | Irrigation | $ 6.74 | $ 6.74 | $ 6.74 | $ 6.74 | $ 6.74 | $ 6.74 |
| **Total** | **All** | **$ 35.46** | **$ 35.50** | **$ 36.15** | **$ 36.18** | **$ 36.21** | **$ 36.23** |

[1] Entries denoted by a dash (-) indicate there are no estimated economic impacts. Entries denoted by a zero (0) indicate that the estimated income losses are less than $500,000.

## Livestock

Based on conversations with staff from the TPWD A.E. Wood State Fish Hatchery staff, the facility would implement a drought management strategy, thereby temporarily suspending operations until conditions improve. Costs are not associated with this strategy, as the facility will continue operations and no capital investment is required.

## 5.2.4 Edwards Transfers

The SCTRWPG identified the Edwards Transfers WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.4.1 Description of Water Management Strategy

The EAA was created in 1993 by SB 1477 of the 73rd Texas Legislature. This bill, which is typically called "The Act" has been amended in subsequent legislative sessions. Requirements of the EAA pursuant to The Act include the following:

- Issuing permits for all non-exempt wells;
- Limiting permitted withdrawals to 572,000 acft/yr; and
- Enforcing water management practices, procedures, and methods to ensure that the continuous minimum springflows of the Comal Springs and the San Marcos Springs are maintained to protect endangered and threatened species to the extent required by federal law (e.g., the EAHCP, EAA critical period rules, etc.).

Since the EAA began to issue Initial Regular Permits (IRPs) for wells, numerous transfers of the water rights have been associated with these permits among interested parties. Subject to requirements in The Act and EAA rules related to the base and unrestricted portions of water rights associated with irrigated agriculture, many historical transfers have been from irrigation to municipal use. This Edwards Transfers WMS is an estimate of such irrigation to municipal transfers for entities in Atascosa, Bexar, Comal, Guadalupe, Hays, Medina, and Uvalde Counties.

### 5.2.4.2 Available Yield

The Edwards Transfers WMS is planned for implementation in the 2030 decade and has an available yield that varies by decade. Table 5.2.4-1 provides a summary of the available yield for the Edwards Transfers WMS.

**Table 5.2.4-1 Available Yield for the Edwards Transfers WMS (acft/yr)**

| Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Alamo Heights | 200 | 200 | 200 | 200 | 200 | 200 |
| Bexar County WCID 10 | 400 | 400 | 400 | 400 | 400 | 400 |
| Castroville | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Converse | 200 | 200 | 200 | 200 | 200 | 200 |
| Fort Sam Houston | 12,550 | 12,550 | 9,450 | 8,250 | 7,250 | 6,250 |
| Hondo | 350 | 350 | 350 | 350 | 350 | 350 |
| Kirby | 150 | 150 | 150 | 150 | 150 | 150 |
| Leon Valley | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Lytle | 200 | 200 | 200 | 200 | 200 | 200 |
| Selma | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 |

| Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Uvalde | 350 | 350 | 350 | 350 | 350 | 350 |
| Ville Dalsace Water Supply | 100 | 100 | 100 | 100 | 100 | 100 |
| **Total** | **19,000** | **19,000** | **15,900** | **14,700** | **13,700** | **12,700** |

Section 1.15 of The Act provides that the EAA shall manage withdrawals and points of withdrawal from the aquifer by granting permits, and Section 1.34 of The Act specifies the manner in which water rights may be transferred, as follows:

- Water withdrawn from the aquifer must be used within the boundaries of the authority.
- The authority by rule may establish a procedure by which a person who installs water conservation equipment may sell the water conserved.
- A permit holder may lease permitted water rights, but a holder of a permit for irrigation use may not lease more than 50 percent of the irrigation water rights initially permitted. The user's remaining irrigation water rights must be used in accordance with the original permit and must pass with transfer of the irrigated land.
- Subject to approval by the authority, the owner of historically irrigated land may sever all or a portion of the remaining water rights for the historically irrigated land which has become developed land in the same proportion as the proportion of developed land and undeveloped land or for which the owner of the historically irrigated land has demonstrated that all or a portion of the land is land no longer practicable to farm. Water rights used for irrigation tied to a portion of land that cannot be developed because of its topography or its location in a floodplain may be included in the proportion of land considered developed land. Water rights for use in irrigation severed under this subsection may change in purpose or place of use. Rules adopted to implement this subsection may not expand the type of land considered developed land or land considered land no longer practicable to farm. The approval of a severance under this section is subject to a contested case hearing in accordance with authority rules.

In accordance with these and many other provisions of The Act, the EAA has issued IRPs for municipal, industrial, and irrigation water use totaling 571,600 acft/yr. During a drought scenario and full implementation of the EAHCP, the reliable supply of the total permitted amounts is approximately 296,553 acft/yr [1] in all decades. However, the Edwards Aquifer transferability is most constrained by the amount of enrollment in the EAA's Voluntary Irrigation Suspension Program Option (VISPO) and ASR programs. As of January 8, 2024, the EAA reported total enrolled program balances for VISPO of 41,795 acft/yr and for ASR of 50,000 acft/yr, totaling approximately 91,795 acft/yr. While legally transferrable, due to the nature of the EAHCP's VISPO and ASR programs, the VISPO and ASR enrolled volumes cannot be relied upon to be available for withdrawal during a repeat of the drought of record.

Table 5.2.4-2 summarizes the volumes of EAA permits and estimated unrestricted transfer potential by use type. The transfer potential takes into consideration drought-stage implementation of the EAHCP

[1] Availability is derived from limitations imposed by the EAA Act and from contractual obligations associated with the Edwards Aquifer Habitat Conservation Plan (EAHCP). It should be noted, for long-term planning purposes, programs contained within the EAHCP and associated with its 15-year incidental take permit may be adjusted as the plan is resubmitted for approval upon the expiration of the permit.

based on the EAA's CPM Plan [2]. Therefore, it is anticipated that all recommended Edwards Aquifer transfers shown as part of this WMS will involve leasing or purchasing Edwards Aquifer rights from irrigation permit holders. As shown in Table 5.2.4-3, the unrestricted transfer potential for irrigation permits is 26,907 acft/yr, which represents the maximum available yield that this WMS could attain. As described above, however, the actual yield for the WMS varies between 12,700 acft/yr and 19,000 acft/yr.

**Table 5.2.4-2 EAA Permits and Remaining Unrestricted Transfer Potential by Use Type (acft/yr)**

| Use Type | EAA Estimated Permits [1] | EAA Enrolled ASR and VISPO Permits [2] | Estimated Unrestricted Transfer Potential [3] |
|---|---|---|---|
| Municipal | 333,301 | 2,110 | 195,418 |
| Industrial [4] | 40,930 | 11,972 | 22,487 |
| Irrigation | 197,270 | 77,713 | 26,907 |
| Exempt | 99 | 0 | 0 |
| **EAA Total** | **571,600** | **91,795** | **244,812** |

Notes:

[1] EAA estimated permit values before any transfers, as of January 8, 2024.

[2] EAA enrolled ASR and VISPO permits as of October 18, 2024.

[3] Unrestricted transfer potential represents the sum of the reliable supply (volume available during a repeat of the drought of record) of permits that are administratively available for transfer to other entities.

[4] EAA's Industrial Use designation includes permits associated with manufacturing, steam-electric power, mining, and livestock uses, as defined by Regional Water Planning rules.

**Table 5.2.4-3 Transfer Potential of Irrigation Permits by County**

| Source County | Estimated Unrestricted Transfer Potential of Irrigation Permits (acft/yr) |
|---|---|
| Atascosa | 335 |
| Bexar | 4,702 |
| Comal | 398 |
| Guadalupe | 0 |
| Hays | 0 |
| Medina | 10,716 |
| Uvalde | 10,756 |
| **Total** | **26,907** |

[2] Edwards Aquifer Authority (EAA). "Critical Period/Drought Management." April 2019. https://www.edwardsaquifer.org/business-center/groundwater-permit-holder/critical-period-drought-management/

In the 2026 SCTRWP, the Edwards Transfers WMS is recommended for WUGs that are already using Edwards Aquifer supplies, as permitted by the EAA. Volumes of the Edwards Transfers are summarized by the county in which the transfer would originate (transfer source county) in Table 5.2.4-4.

**Table 5.2.4-4 Edwards Transfers WMS Volumes by Transfer Source County (acft/yr)**

| Transfer Source County | Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Atascosa | Lytle | 200 | 200 | 200 | 200 | 200 | 200 |
| Bexar | Alamo Heights | 200 | 200 | 200 | 200 | 200 | 200 |
| Bexar | Bexar County WCID 10 | 400 | 400 | 400 | 400 | 400 | 400 |
| Bexar | Converse | 200 | 200 | 200 | 200 | 200 | 200 |
| Bexar | Fort Sam Houston | 250 | 250 | 250 | 250 | 250 | 250 |
| Bexar | Kirby | 150 | 150 | 150 | 150 | 150 | 150 |
| Bexar | Leon Valley | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Bexar | Selma | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 |
| Medina | Castroville | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Medina | Fort Sam Houston | 9,200 | 9,200 | 9,200 | 8,000 | 7,000 | 6,000 |
| Medina | Hondo | 350 | 350 | 350 | 350 | 350 | 350 |
| Medina | Ville Dalsace Water Supply | 100 | 100 | 100 | 100 | 100 | 100 |
| Uvalde | Fort Sam Houston | 3,100 | 3,100 | 0 | 0 | 0 | 0 |
| Uvalde | Uvalde | 350 | 350 | 350 | 350 | 350 | 350 |
| **Total** | **All** | **19,000** | **19,000** | **15,900** | **14,700** | **13,700** | **12,700** |

### 5.2.4.3 Environmental Factors

#### Environmental Considerations

No major environmental impacts are associated with the Edwards Transfers WMS. The transferred water that will be withdrawn from the aquifer is already permitted; only the locations of withdrawals will be changed. As the recommended transfers will generally be from central or eastern urban areas to central or western rural (or suburban) areas (i.e., transfer from east to west due to hydrologic constraints), withdrawal centers will be somewhat farther from Comal and San Marcos Springs, which could result in incremental springflow enhancement.

Implementation of this Edwards Transfers WMS may have a positive impact on habitats of threatened and endangered species and SGCN. If irrigators transfer their irrigation permits and convert their land to dryland crops and/or grassland, native grasses could speed the process of reaching a mature plant community, which reduces the opportunity for soil erosion through water and winds. Such a decision could provide habitat for native Texas wildlife, including the Texas horned lizard, tortoises, deer, raptors,

and other desert grassland species. Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Atascosa, Bexar, Comal, Guadalupe, Hays, Medina, and Uvalde Counties [3, 4, 5, 6, 7, 8, 9, 10].

### Cultural Considerations

Projects in Texas can come under the purview of the National Historic Preservation Act (NHPA) and the Antiquities Code of Texas (ACT). Both are administered by lead federal agencies and the State Historic Preservation Officer of Texas at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as a SAL. Because this WMS involves the transfer of water rights from irrigation to municipal and other uses, the project is not expected to have adverse impacts on cultural resources. Should construction become necessary, a cultural resources assessment should be performed to determine whether additional cultural resources investigations are required.

## 5.2.4.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include costs associated with integration and facility upgrades ($309 per acft) and purchase of water ($1,928 per acft). The purchase of water was estimated using the average unit cost of non-Edwards WMSs recommended for SAWS, NBU, and GBRA strategies. A cost estimate summary for the Edwards Transfers WMS is provided in Table 5.2.4-5. TWDB Costing Tool Cost Estimate Summaries for the Edwards Transfers WMS are provided in Appendix 5E.

[3] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Atascosa County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[4] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Bexar County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[5] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Medina County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[6] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Uvalde County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[7] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Atascosa County. https://ipac.ecosphere.fws.gov/location/index

[8] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Bexar County. https://ipac.ecosphere.fws.gov/location/index

[9] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Medina County. https://ipac.ecosphere.fws.gov/location/index

[10] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Uvalde County. https://ipac.ecosphere.fws.gov/location/index

**Table 5.2.4-5 Cost Estimate Summary for the Edwards Transfers WMS**

| Water User Group | Available Project Yield in 2030 (acft/yr) | Total Cost of Facilities ($) | Total Cost of Project ($) | Annual Unit Cost ($/acft) |
|---|---|---|---|---|
| Alamo Heights | 200 | $62,000 | $86,000 | $1,961 |
| Bexar County WCID 10 | 400 | $124,000 | $171,000 | $1,961 |
| Castroville | 1,000 | $309,000 | $428,000 | $1,961 |
| Converse | 200 | $62,000 | $86,000 | $1,961 |
| Fort Sam Houston | 12,550 | $3,878,000 | $5,371,000 | $1,961 |
| Hondo | 350 | $108,000 | $150,000 | $1,961 |
| Kirby | 150 | $46,000 | $64,000 | $1,961 |
| Leon Valley | 1,000 | $309,000 | $428,000 | $1,961 |
| Lytle | 200 | $62,000 | $86,000 | $1,961 |
| Selma | 2,500 | $773,000 | $1,070,000 | $1,961 |
| Uvalde | 350 | $108,000 | $150,000 | $1,961 |
| Ville Dalsace Water Supply | 100 | $31,000 | $43,000 | $1,961 |
| **Total** | **19,000** | **$5,872,000** | **$8,133,000** | **$23,532** |

### 5.2.4.5 Implementation Considerations

Lease and purchase of Edwards Aquifer irrigation permits for transfer to municipal and industrial uses are active at the present time. As the existing Edwards Aquifer supply used to quantify needs reported in the 2026 SCTRWP assumes full EAHCP implementation, the key implementation considerations for the Edwards Transfers WMS is the ability to locate and negotiate with willing lessors or sellers of permits in sufficient quantities. Additionally, as costs associated with buying or leasing EAA permits continues to increase, implementation is also impacted by the willingness of rural or suburban communities to buy or lease EAA permits at costs substantially greater than previously experienced.

## 5.2.5 Fresh Groundwater Development

The SCTRWPG identified the Fresh Groundwater Development WMS as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.5.2 Description of Water Management Strategy

Fresh Groundwater Development is a Recommended WMS for 18 municipal WUGs and one non-municipal WUG. Many WUGs in the SCTRWPA commonly use local aquifers as a water supply source. Where local groundwater supplies are available, there is generally a preference for groundwater as a source because it is 1) readily available at different locations within a distribution system; 2) relatively inexpensive; and 3) often requires minimal treatment compared to surface water. The implementation decade for this WMS varies depending on the sponsor.

For the 2026 SCTRWP, two Fresh Groundwater Development strategies were developed and recommended:

- Fresh Groundwater Development – New Wells to Increase Production Capacity; and
- Fresh Groundwater Development – New Permits or Increased Permit Production Limits.

Inclusion and evaluation of this WMS was performed at the request of individual WUGs, regardless of needs or alternative sources. Inclusion and evaluation of this WMS was also provided for WUGs with water needs that rely on groundwater but do not already have WMSs to meet needs. For these WUGs, selection and evaluation of the appropriate strategy was accomplished using the following approach:

- Evaluate applicability of this WMS for WUGs by considering existing sources of water for WUGs with identified needs. Applicable WUGs 1) rely solely on groundwater from a single aquifer or have limited options for future supplies; and 2) have projected needs during the planning horizon that are likely not to be met by other WMSs.
- Determine whether the MAG or groundwater availability for each WUG's existing groundwater supply source is sufficient to meet projected water needs. If there is sufficient water available within the constraints of the MAG or groundwater availability, then determine if the WUG's existing infrastructure capacities are sufficient to meet identified needs.
- Evaluate the production capacity from the selected WUGs' existing wells and their permitted water rights. Determine which entities are limited by the capacity of their existing wells and which are limited by their permitted water rights. If existing capacity does not meet projected water needs, then develop a strategy for Fresh Groundwater Development – New Wells to Increase Production Capacity. Estimate the number of new wells required to meet water needs, plus the capacities and depths of existing wells in the area and costs for new wells using the Uniform Costing Model.
- If existing infrastructure capacity is sufficient, then develop a strategy for Fresh Groundwater Development – New Permits or Increased Permit Production Limits. Estimate costs for system expansion using the Uniform Costing Model.

The evaluation of the Fresh Groundwater Development WMS is at a planning level and was based on data from the following sources:

- Information prepared for the SCTRWPG on projected water demands for each of the WUGs;

- Estimated system capacity for each WUG through 2080, based on TCEQ reported system information; and
- Compilation of publicly available information for each WUG from TCEQ and TWDB.

Figure 5.2.5-1 shows the general locations of municipal WUGs that would need new wells to expand production capacity under this WMS. Figure 5.2.5-2 illustrates the general location of the non-municipal WUG requiring one or more new wells as part of this WMS.

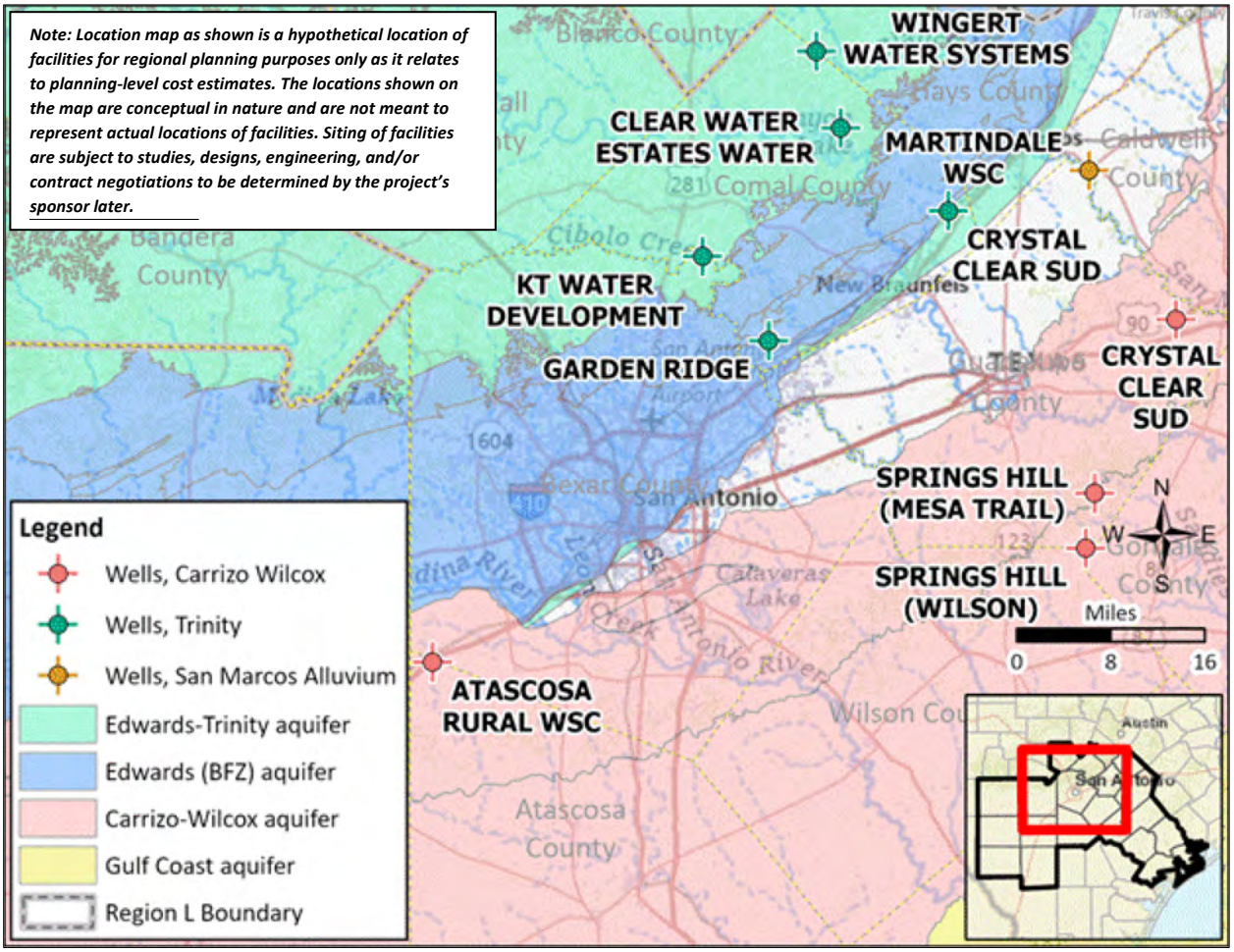



**Figure 5.2.5-1 General Location of Municipal WUGs with the Fresh Groundwater Development – New Wells to Increase Production Capacity WMS**

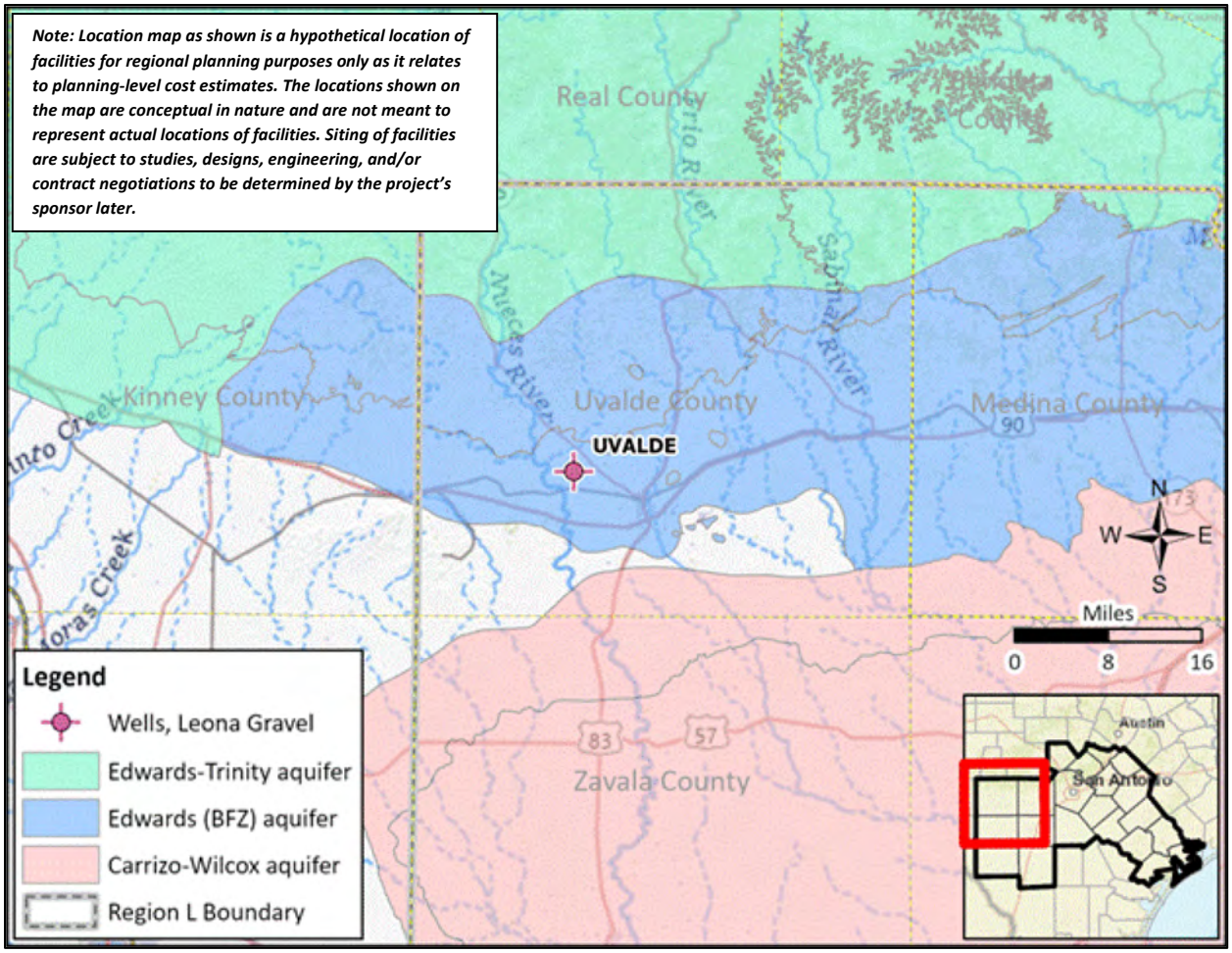



**Figure 5.2.5-2 General Location of Non-Municipal WUGs Requiring New Wells**

### 5.2.5.3 Available Yield

The following sections provide summaries of the available yields for the two Fresh Groundwater Development strategies: New Wells to Increase Production Capacity; and New Permits or Increased Permit Production Limits.

#### 5.2.5.3.1 New Wells to Increase Production Capacity

Fresh Groundwater Development – New Wells to Increase Production Capacity is the Recommended WMS for 13 municipal WUGs and one non-municipal WUG (Mining, Uvalde County) that do not have sufficient production capacities to meet identified water needs. Many of these strategies are limited by MAG estimates, which become groundwater availabilities. Therefore, the available yield for each WUG varies depending on MAG availability. Table 5.2.5-1 provides a summary of the yields as envisioned by the sponsor (Envisioned Yield). Table 5.2.5-2 provides a summary of the yields available considering MAG constraints (MAG-Constrained Yield) for the Fresh Groundwater Development WMS. The MAG-Constrained Yield is the available yield included in the 2027 Regional and State Water Planning Database (DB27).

### Table 5.2.5-1 Envisioned Yields for the Fresh Groundwater Development WMS – New Wells to Increase Production Capacity (acft/yr)

| No. | Water User Group | County | Aquifer | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Atascosa Rural WSC | Atascosa | Carrizo-Wilcox | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 | 2,200 |
| 2 | Clear Water Estates Water System (Texas Water Company) | Comal | Trinity | 0 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| 3 | County-Other, Comal | Comal | Trinity | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 4 | County-Other, Victoria | Victoria | Gulf Coast | 300 | 300 | 300 | 300 | 300 | 300 |
| 5 | Crystal Clear SUD | Comal | Trinity | 1,988 | 1,988 | 1,988 | 1,988 | 1,988 | 1,988 |
| 6 | Crystal Clear SUD [1] | Guadalupe | Carrizo-Wilcox | 766 | 766 | 766 | 766 | 766 | 766 |
| 7 | Elmendorf | Bexar | Carrizo-Wilcox | 0 | 0 | 847 | 847 | 847 | 847 |
| 8 | Garden Ridge | Comal | Trinity | 750 | 905 | 1,000 | 1,088 | 1,173 | 1,257 |
| 9 | KT Water Development | Comal | Trinity | 486 | 973 | 1,624 | 2,448 | 3,391 | 4,471 |
| 10 | Martindale WSC | Caldwell | San Marcos River Alluvium | 0 | 240 | 240 | 240 | 240 | 240 |
| 11 | Mining, Uvalde | Uvalde | Leona Gravel | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 12 | Springs Hill WSC (Mesa Trail) | Guadalupe | Carrizo-Wilcox | 560 | 560 | 560 | 560 | 560 | 560 |
| 13 | Springs Hill WSC (Wilson) | Wilson | Carrizo-Wilcox | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 14 | Wingert Water Systems | Hays | Trinity | 35 | 35 | 35 | 35 | 35 | 35 |
| **All** | **Total Envisioned Yield** | **All** | **All** | **9,416** | **11,062** | **13,525** | **15,414** | **17,506** | **19,839** |

[1] Indicates this project has yields that are MAG-Constrained in one or more decades.

### Table 5.2.5-2 MAG-Constrained Yields for the Fresh Groundwater Development WMS – New Wells to Increase Production Capacity (acft/yr)

| No. | Water User Group | County | Aquifer | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Atascosa Rural WSC | Atascosa | Carrizo-Wilcox | 1,200 | 1,400 | 1,600 | 1,800 | 2,000 | 2,200 |
| 2 | Clear Water Estates Water System (Texas Water Company) | Comal | Trinity | 0 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| 3 | County-Other, Comal | Comal | Trinity | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 4 | County-Other, Victoria | Victoria | Gulf Coast | 300 | 300 | 300 | 300 | 300 | 300 |
| 5 | Crystal Clear SUD | Comal | Trinity | 1,988 | 1,988 | 1,988 | 1,988 | 1,988 | 1,988 |
| 6 | Crystal Clear SUD [1] | Guadalupe | Carrizo-Wilcox | 280 | 248 | 284 | 260 | 262 | 252 |
| 7 | Elmendorf | Bexar | Carrizo-Wilcox | 0 | 0 | 847 | 847 | 847 | 847 |
| 8 | Garden Ridge | Comal | Trinity | 750 | 905 | 1,000 | 1,088 | 1,173 | 1,257 |
| 9 | KT Water Development | Comal | Trinity | 486 | 973 | 1,624 | 2,448 | 3,391 | 4,471 |
| 10 | Martindale WSC | Caldwell | San Marcos River Alluvium | 0 | 240 | 240 | 240 | 240 | 240 |
| 11 | Mining, Uvalde | Uvalde | Leona Gravel | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 12 | Springs Hill WSC (Mesa Trail) [1] | Guadalupe | Carrizo-Wilcox | 205 | 180 | 207 | 191 | 191 | 184 |
| 13 | Springs Hill WSC (Wilson) [1] | Wilson | Carrizo-Wilcox | 95 | 165 | 200 | 1,000 | 1,000 | 1,000 |
| 14 | Wingert Water Systems | Hays | Trinity | 35 | 35 | 35 | 35 | 35 | 35 |
| **All** | **Total MAG-Constrained Yield** | **All** | **All** | **7,739** | **10,334** | **12,225** | **14,097** | **15,327** | **16,674** |

[1] Indicates this project has yields that are MAG-Constrained in one or more decades.

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the

DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

The following assumptions were used to develop the Fresh Groundwater Development WMS – New Wells to Increase Production Capacity for non-municipal WUGs:

- Well capacity is 150 gallons per minute (gpm);
- Well construction standards are consistent with non-potable wells;
- Water treatment costs were not included;
- Facilities will be constructed on land owned or leased by the WUG; and
- Power costs are calculated by estimating a typical water lift for medium sized wells in the county.

#### 5.2.5.3.2 New Permits or Increased Permit Production Limits

Fresh Groundwater Development – New Permits or Increased Permit Production Limits is the Recommended WMS for five municipal WUGs that rely on groundwater as a sole source and are expected to have a water shortage by 2080. These five WUGs have sufficient infrastructure capacity to develop additional supply from existing well(s) to meet their projected needs; however, they are limited by their permitted capacities. This strategy includes acquisition of new or amended permits to increase the authorized production limits of existing permits. The Fresh Groundwater Development – New Permits or Increased Permit Production Limits is a Recommended strategy for the following five WUGs:

- Benton City WSC;
- Kendall West Utility;
- Oak Hills WSC;
- Pearsall; and
- Picosa WSC.

The recommended strategy for the above entities is to apply for new permits or permit modifications to increase their permitted capacities. Because no new or expanded infrastructure is associated with new

permits or expanded production permit limits, no costs are associated for these WUGs. Estimated permit capacity increases are summarized in Table 5.2.5-3.

**Table 5.2.5-3 Yields for the Fresh Groundwater Development WMS – New Permits or Increased Permit Production Limits (acft/yr)**

| No. | Water User Group | County | Aquifer | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Benton City WSC | Atascosa | Carrizo-Wilcox | 0 | 0 | 0 | 0 | 0 | 63 |
| 2 | Kendall West Utility | Kendall | Trinity | 0 | 0 | 400 | 400 | 400 | 400 |
| 3 | Oak Hills WSC | Wilson | Carrizo-Wilcox | 373 | 475 | 588 | 714 | 857 | 1,015 |
| 4 | Pearsall | Frio | Carrizo-Wilcox | 100 | 100 | 100 | 100 | 100 | 100 |
| 5 | Picosa WSC | Wilson | Carrizo-Wilcox | 0 | 38 | 84 | 122 | 169 | 221 |
| **All** | **Total** | **All** | **All** | **473** | **613** | **1,172** | **1,336** | **1,526** | **1,799** |

### 5.2.5.4 Environmental Factors

Individual projects associated with the Fresh Groundwater Development WMS may include well field development, well field expansions, pipeline construction, access road construction, and associated facility construction and upgrades. These projects would likely require site-specific reviews to determine applicable requirements for environmental permitting and field data collection.

## Environmental Considerations

#### Vegetation, Land Use, and Agricultural Resources

Detailed field surveys would typically be required for projects involving new pipeline construction and/or projects requiring extensive vegetation clearing, soil disturbance, or stream/wetland impacts. If a significant negative impact appears likely, it may be possible to adjust well pad, pipeline, and/or access road locations to reduce or avoid impacts. Mitigation may include compensation for net losses of wetlands where impacts are unavoidable. Well pad and/or road construction in agricultural areas would result in loss of agricultural land uses.

Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing and woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes.

#### Aquatic Resources

Projects may require an on-site delineation of streams, ponds, and wetlands to comply with U.S. Army Corps of Engineers (USACE) Section 404 regulations. Stream crossings for pipeline construction would result in temporary stream impacts that may require USACE permitting or coordination, depending on

the level of project impacts. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities. A preconstruction notification to the USACE is required under certain conditions, including cases where there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under streams/rivers (e.g., through horizontal directional drilling) would not require a USACE permit.

#### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in the project areas for this WMS [1, 2]. Site-specific field surveys would likely be required to determine the quality of habitat for federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be necessary to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur or nest in project areas. The federal Migratory Bird Treaty Act (MBTA) protects birds, nests, and eggs from impacts unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Preconstruction surveys for active bird nests are recommended.

### Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by the THC and the SHPO in Austin, Texas. If an undertaking is federally permitted, licensed, or partially funded, the Project must comply with Section 106 of the NHPA. The ACT requires projects on land owned or operated by a political subdivision of the State of Texas [3] to assess whether the project will impact cultural resources that meet the requirements for listing as a SAL.

Projects under control of political subdivisions of the State of Texas, such as water agencies, counties, and city-owned entities, must comply with the ACT. A structured cultural resources survey of the final design plan may be performed to accurately assess the presence and significance of identified and unrecorded cultural resources within its boundaries.

## 5.2.5.5 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include the cost of

[1] Texas Parks and Wildlife Department. 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[2] U.S. Fish and Wildlife Service. 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index

[3] Political subdivision entities include any county, municipality, special district, river authority, or compact, Title 4 Water Code District, soil and water conservation district, county or municipal improvement district, regional planning commission, council of government, or utility that is public-owned. Refer to Texas Water Code (TWC) §2254.021.

disinfection treatment and do not include 1) expenses attributed to regional water level declines that may necessitate the lowering of pumps or replacement of older wells; 2) expenses for removing high concentrations of metals such as iron and manganese; or 3) expenses for cooling water from deep well extraction.

A summary of the projected cost estimates associated with the Fresh Groundwater Development WMS is provided in Table 5.2.5-4. Infrastructure was sized to deliver the sponsor's Envisioned Yield, but because the project is MAG-limited, the annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the lack of groundwater availability. TWDB Costing Tool Cost Estimate Summaries for the Fresh Groundwater Development WMS are provided in Appendix 5E.

**Table 5.2.5-4 Cost Estimate Summary for the Fresh Groundwater Development WMS – New Wells to Increase Production Capacity**

| No. | Water User Group | County | Aquifer | Total Cost of Facilities | Total Cost of Project | Annual Cost [1] | Annual Cost of Water ($ per acft) |
|---|---|---|---|---|---|---|---|
| 1 | Atascosa Rural WSC | Atascosa | Carrizo-Wilcox | $6,694,000 | $9,484,000 | $1,315,000 | $1,096 |
| 2 | Clear Water Estates Water System (Texas Water Company) | Comal | Trinity | $4,369,000 | $6,305,000 | $1,015,000 | $677 |
| 3 | County-Other, Comal | Comal | Trinity | $4,687,000 | $6,764,000 | $1,236,000 | $1,236 |
| 4 | County-Other, Victoria | Victoria | Gulf Coast | $703,000 | $1,079,000 | $84,000 | $279 |
| 5 | Crystal Clear SUD | Comal | Trinity | $12,586,000 | $18,231,000 | $1,441,000 | $725 |
| 6 | Crystal Clear SUD | Guadalupe | Carrizo-Wilcox | $18,596,000 | $27,384,000 | $2,482,000 | $8,864 |
| 7 | Elmendorf | Bexar | Carrizo-Wilcox | $3,383,000 | $4,861,000 | $828,000 | $978 |
| 8 | Garden Ridge | Comal | Trinity | $4,861,000 | $6,991,000 | $1,068,000 | $1,424 |
| 9 | KT Water Development | Comal | Trinity | $7,884,000 | $11,362,000 | $1,720,000 | $3,539 |
| 10 | Martindale WSC | Caldwell | San Marcos River Alluvium | $932,000 | $1,514,000 | $128,000 | $533 |
| 11 | Mining, Uvalde | Uvalde | Leona Gravel | $1,147,000 | $1,731,000 | $137,000 | $98 |

| No. | Water User Group | County | Aquifer | Total Cost of Facilities | Total Cost of Project | Annual Cost [1] | Annual Cost of Water ($ per acft) |
|---|---|---|---|---|---|---|---|
| 12 | Springs Hill (Mesa Trail) | Guadalupe | Carrizo-Wilcox | $930,000 | $1,364,000 | $105,000 | $512 |
| 13 | Springs Hill (Wilson) | Wilson | Carrizo-Wilcox | $4,705,000 | $6,870,000 | $1,116,000 | $11,747 |
| 14 | Wingert Water Systems | Hays | Trinity | $836,000 | $1,252,000 | $208,000 | $5,939 |

[1] Includes amortization at 3.5% for 20 years, O&M, and power costs.

### 5.2.5.6 Implementation Considerations

Implementation of the Fresh Groundwater Development WMS includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of constituents, such as total dissolved solids (TDS), chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Verification of impacts to the aquifer source;
- Verification that groundwater is compatible with other water sources being used by the sponsor and/or its customers and that it will meet all water quality requirements in the end user's distribution system;
- Potential for differing water qualities/chemical constituents in the water;
- Regulations by TCEQ;
- Regulations by and obtaining permits from local GCDs, including potential permit renewals;
- Depending on the level and types of project impacts, the following natural and cultural resources studies and agency coordination may be required:
  - Stream/wetland delineations to support USACE Section 404 permitting;
  - Site-specific evaluations for threatened/endangered species habitat;
  - Presence/absence surveys for threatened/endangered species if suitable habitat occurs;
  - USFWS and TPWD coordination if protected species may be affected; and
  - Structured cultural resources surveys of project impact areas, and THC coordination in compliance with the Antiquities Code of Texas and NHPA, if applicable.
- Because of the generalized nature and planning-level detail of this evaluation, each sponsor or WUG should conduct more thorough and site-specific evaluations for any new well. It is recommended that the owner or WUG evaluate infrastructure capabilities specific to their existing system and their local hydrogeologic conditions to determine feasibility and to refine cost estimates accordingly; and
- During times of drought, WUGs should be aware that the saturated thickness and, therefore, the associated well capacity, may be impacted by drawdown from nearby operating wells.

## 5.2.6 Brackish Groundwater Development

The SCTRWPG identified the Brackish Groundwater Development WMS as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.6.1 Description of Water Management Strategy

There are six projects included in the Brackish Groundwater Development WMS. These six projects would provide water to four distinct municipal WUGs in the SCTRWPA, including Caldwell County-Other, County Line SUD, Maxwell SUD, and S S WSC. Inclusion and evaluation of these projects were performed at the request of individual WUGs.

Projects included in this WMS generally include new brackish groundwater well fields and associated infrastructure to withdraw brackish groundwater, treat raw water using desalination treatment technologies, and convey treated water to distribution systems or customers, and dispose of brine concentrate. The implementation decade for this Brackish Groundwater Development WMS varies depending on the project. More information on the yields and implementation decades can be found in the subsequent section .

### 5.2.6.2 Available Yield

Six new Brackish Groundwater Development projects are included in the 2026 SCTRWP. Many of these strategies are limited by MAG estimates, which become groundwater availabilities. Therefore, the available yield for each WUG varies depending on MAG availability. Table 5.2.6-1 provides a summary of the yields as envisioned by the sponsor (Envisioned Yield).

Table 5.2.6-2 provides a summary of the yields available considering MAG constraints (MAG-Constrained Yield) for the Brackish Groundwater Development WMS. For each project, the MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.6-1 Envisioned Yields for the Brackish Groundwater Development WMS (acft/yr)**

| Project | County | Aquifer | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| Caldwell Brackish Partnership Project [1] | Caldwell | Carrizo-Wilcox | 0 | 10,305 | 10,305 | 10,305 | 10,305 | 10,305 |
| Gonzales & Guadalupe Brackish Partnership Project [1] | Gonzales and Guadalupe | Carrizo-Wilcox | 0 | 13,332 | 13,332 | 13,332 | 13,332 | 13,332 |
| County Line SUD - Trinity Project | Hays | Trinity | 0 | 0 | 500 | 1,000 | 1,000 | 1,000 |
| County Line SUD - Brackish Edwards Project [1] | Hays | Edwards-Balcones Fault Zone (BFZ) (Saline) | 0 | 0 | 500 | 1,000 | 1,500 | 1,500 |
| Maxwell SUD - Trinity Project | Hays | Trinity | 0 | 230 | 230 | 230 | 230 | 230 |

| Project | County | Aquifer | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| S S WSC - Brackish Carrizo-Wilcox Project [1] | Wilson | Carrizo-Wilcox | 0 | 0 | 0 | 1,120 | 1,120 | 1,120 |
| **Total Envisioned Yield** | **All** | **All** | **0** | **23,864** | **24,864** | **26,724** | **27,224** | **27,224** |

[1] Indicates this project has yields that are MAG-Constrained in one or more decades.

**Table 5.2.6-2 MAG-Constrained Yields for the Brackish Groundwater Development WMS (acft/yr)**

| Project | County | Aquifer | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| Caldwell Brackish Partnership Project [1] | Caldwell | Carrizo-Wilcox | 0 | 1,176 | 4,137 | 5,103 | 6,303 | 6,291 |
| Gonzales & Guadalupe Brackish Partnership Project [1] | Gonzales and Guadalupe | Carrizo-Wilcox | 0 | 8,558 | 10,763 | 10,211 | 10,376 | 9,266 |
| County Line SUD - Trinity Project | Hays | Trinity | 0 | 0 | 500 | 1,000 | 1,000 | 1,000 |
| County Line SUD - Brackish Edwards Project [1] | Hays | Edwards-BFZ (Saline) | 0 | 0 | 500 | 1,000 | 1,366 | 1,366 |
| Maxwell SUD - Trinity Project | Hays | Trinity | 0 | 230 | 230 | 230 | 230 | 230 |
| S S WSC - Brackish Carrizo-Wilcox Project [1] | Wilson | Carrizo-Wilcox | 0 | 0 | 0 | 705 | 914 | 913 |
| **Total MAG-Constrained Yield** | **All** | **All** | **0** | **9,964** | **16,130** | **18,249** | **20,189** | **19,066** |

[1] Indicates this project has yields that are MAG-Constrained in one or more decades.

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made

by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued, or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s). Supplemental groundwater may be obtained under existing permits through the Groundwater Conversions WMS.

Brackish groundwater desalination projects are described in detail in the following sections. All strategies include water loss associated with desalination treatment technologies and disposal of brine concentrate. Each brackish groundwater desalination WMS has a calculated water loss of 20%.

#### 5.2.6.2.1 Caldwell Brackish Partnership Project

The partnership of BVRT Utility Holding Company (BVRT), County Line SUD, and Maxwell SUD signed a Memorandum of Understanding to explore the development of groundwater in Caldwell County to address rapid population growth within their services areas which straddle the Interstate Highway-35 (IH-35) and State Highway-130 (SH-130) corridors; the sponsors for this WMS are Caldwell County-Other, County Line SUD, and Maxwell SUD. The Envisioned Yield for this WMS is 10,305 acft/yr, projected for the mid-2030s. Because of MAG limitations, the project has a reduced project firm yield (MAG-constrained yield), as shown in Table 5.2.6-2. Strategy yields are allocated evenly amongst Caldwell County-Other, County Line SUD, and Maxwell SUD, as shown in Table 5.2.6-3.

**Table 5.2.6-3 WUG Allocations for the Caldwell Brackish Partnership Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| County-Other, Caldwell | 0 | 392 | 1,379 | 1,701 | 2,101 | 2,097 |
| County Line SUD | 0 | 392 | 1,379 | 1,701 | 2,101 | 2,097 |
| Maxwell SUD | 0 | 392 | 1,379 | 1,701 | 2,101 | 2,097 |
| **Total** | **0** | **1,176** | **4,137** | **5,103** | **6,303** | **6,291** |

This project includes an 11 million gallons per day (MGD) RO WTP assuming 1.1 peaking factor, well field, two injection wells, and a 30-inch diameter 18-mile transmission pipeline. Wells would be completed in the Carrizo-Wilcox Aquifer, and their approximate locations were determined based on aquifer thickness, well depth, estimated water quality, and consideration of available property. This project is located in Caldwell County (Figure 5.2.6-1).

While the WTP is sized at 11 MGD, with a peaking factor of 1.1 the annual average demand is roughly 10 MGD. As part of the RO treatment process, an assumed 10% water loss between the point where the influent enters the WTP and the finished water leaves the WTP. However, this percentage is only applied to 8 MGD, as 2 MGD would bypass the WTP and be blended with the finished water, resulting in a total finished water volume of 9.2 MGD, or 10,305 acft/year.

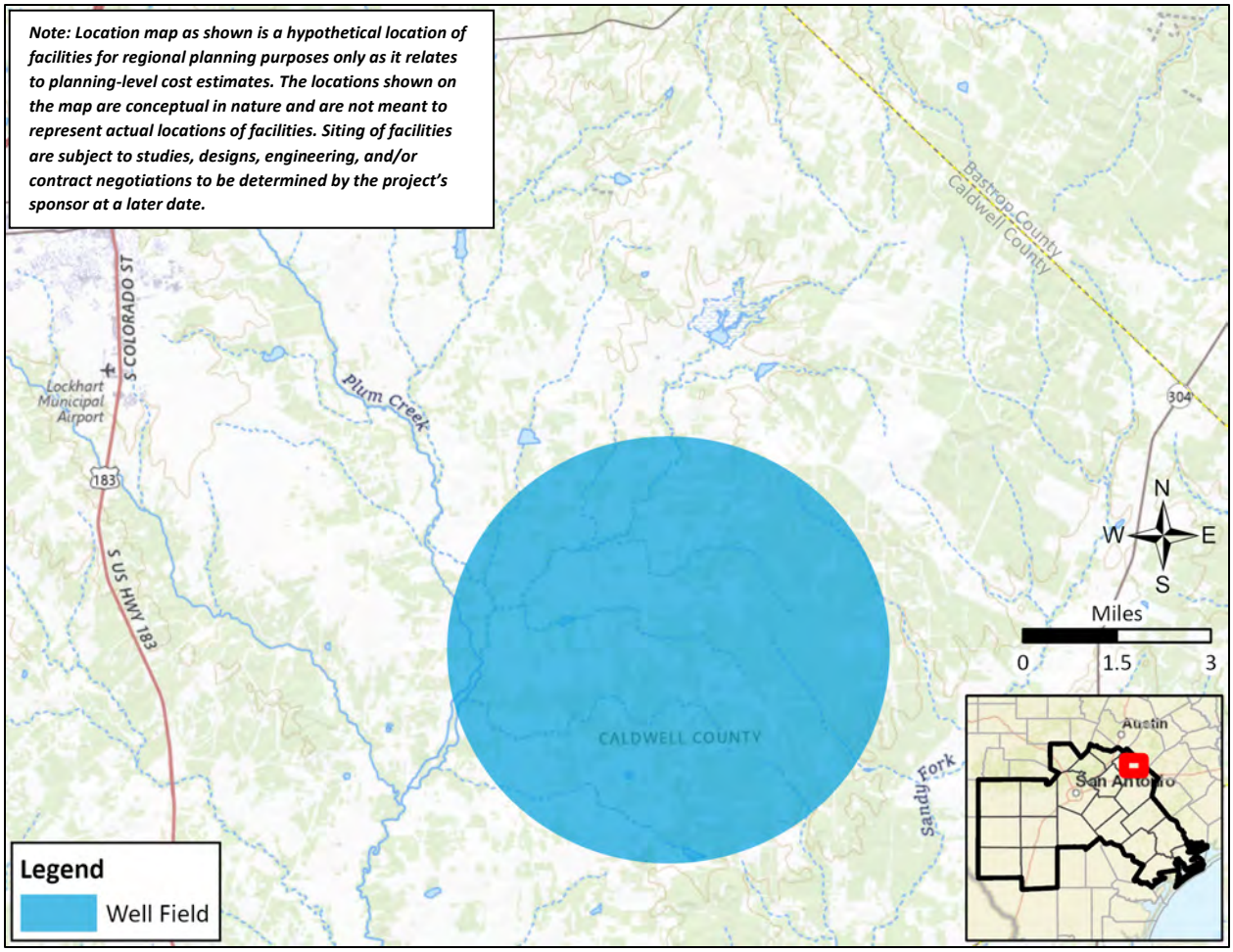



**Figure 5.2.6-1 Approximate Location of Caldwell Brackish Partnership Project**

The proposed well field would be located within both the Plum Creek Conservation District (CD) and the Gonzales County UWCD, both of which regulate groundwater production and well spacing in the Carrizo-Wilcox Aquifer within their districts. Well field configuration assumes a total of 10 wells producing 800 gpm each, at approximately 1,400 feet deep. Water from the Carrizo-Wilcox Aquifer at this location is estimated to have a TDS concentration of approximately 1,500 milligrams per liter (mg/L). This strategy is designed to produce water at a uniform (baseload) rate.

#### 5.2.6.2.2 Gonzales & Guadalupe Brackish Partnership Project

The partnership of BVRT, County Line SUD, and Maxwell SUD signed a Memorandum of Understanding to explore the development of groundwater in Guadalupe County to address rapid population growth within their services areas which straddle the IH-35 and SH-130 corridors; the sponsors for this WMS are Caldwell County-Other, County Line SUD, and Maxwell SUD. The Envisioned Yield for this WMS is 13,329 acft/yr, projected for the mid-2030s. Because of MAG limitations, the project has a reduced project firm yield (MAG-constrained yield), as shown in Table 5.2.6-2. Strategy yields are allocated evenly amongst Caldwell County-Other, County Line SUD, and Maxwell SUD in Gonzales and Guadalupe Counties, as shown in Table 5.2.6-4 and Table 5.2.6-5.

**Table 5.2.6-4 WUG Allocations for Gonzales County for the Gonzales & Guadalupe Brackish Partnership Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| County-Other, Caldwell | 0 | 880 | 1,326 | 1,340 | 1,378 | 1,087 |
| County Line SUD | 0 | 880 | 1,326 | 1,340 | 1,378 | 1,087 |
| Maxwell SUD | 0 | 880 | 1,326 | 1,340 | 1,378 | 1,087 |
| **Total** | **0** | **2,640** | **3,978** | **4,020** | **4,134** | **3,261** |

**Table 5.2.6-5 WUG Allocations for Guadalupe County for the Gonzales & Guadalupe Brackish Partnership Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| County-Other, Caldwell | 0 | 1,972 | 2,261 | 2,063 | 2,080 | 2,001 |
| County Line SUD | 0 | 1,973 | 2,262 | 2,064 | 2,081 | 2,002 |
| Maxwell SUD | 0 | 1,973 | 2,262 | 2,064 | 2,081 | 2,002 |
| **Total** | **0** | **5,918** | **6,785** | **6,191** | **6,242** | **6,005** |

The project includes a 14.3 MGD RO WTP assuming a 1.1 peaking factor, well field, two injection wells, and a 30-inch diameter 32-mile transmission pipeline with a booster pump station. Wells would be completed in the Carrizo-Wilcox Aquifer, and their approximate locations were determined based on aquifer thickness, well depth, estimated water quality, and consideration of available property. The project is located in Guadalupe County and a portion of western Gonzales County (Figure 5.2.6-2).

While the WTP is sized at 14.3 MGD, with a peaking factor of 1.1, the annual average demand is roughly 13 MGD. As part of the RO treatment process, an assumed 10% water loss between the point where the influent enters the WTP and the finished water leaves the WTP. However, this percentage is only applied to 10.4 MGD, as 2.6 MGD would bypass the WTP and be blended with the finished water, resulting in a total finished water volume of 11.9 MGD, or 13,329 acft/year.

The proposed well field would be located within both the Guadalupe County GCD and the Gonzales County UWCD, both of which regulate groundwater production and well spacing in the Carrizo-Wilcox Aquifer within their Districts. Well field configuration assumes a total of 12 wells producing 1,000 gpm each, at approximately 1,600 feet deep. Water from the Carrizo-Wilcox Aquifer at this location is estimated to have a TDS concentration of approximately 1,500 mg/L. This strategy is designed to produce water at a uniform (baseload) rate.

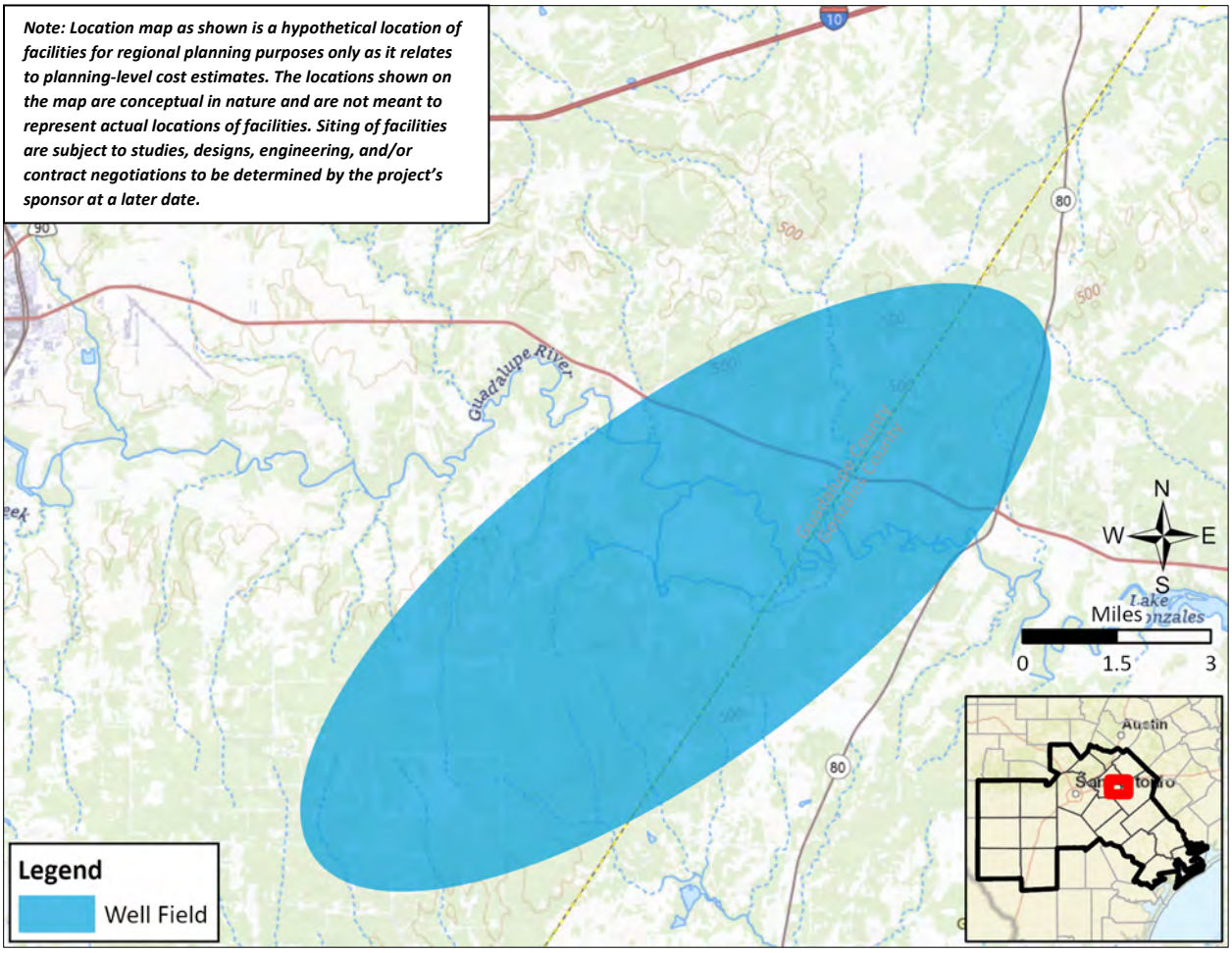



**Figure 5.2.6-2 Approximate Location of Gonzales & Guadalupe Brackish Partnership Project**

### 5.2.6.2.3 County Line SUD – Trinity Project

County Line SUD plans to add a well field in the Trinity Aquifer as a new source of water. The project will be delivered to their system in a phased approach (Table 5.2.6-6). Phase 1 is projected for the 2050 decade and will have a yield of 500 acft/yr. Phase 2 is projected for the 2060 decade and will expand upon Phase 1 with an additional yield of 500 acft/yr. The total project is envisioned to result in a yield of 1,000 acft/yr after Phase 2. Both phases are included and evaluated as part of this WMS.

Water is to be pumped from the downdip portion of the Trinity Aquifer and will be treated. The project's general location is anticipated to be near the northwest boundary of County Line SUD and the City of Kyle in Hays County (Figure 5.2.6-3). This WMS utilizes the same facilities and is within the same area as the County Line SUD – Brackish Edwards Project. Locations will be defined when the project is executed.

The project will consist of three wells: two wells in Phase 1 and one well in Phase 2, each with an estimated pumping capacity of 350 gpm. In this downdip region of the Trinity Aquifer, the well depth is expected to be approximately 1,200 feet, and have a TDS concentration of 1,000 mg/L. This area is near the edge of the Trinity Aquifer system, and wells are limited in the area. The lack of available data and the fractured and heterogenous nature of the aquifer system in this area are such that it is difficult to

predict well characteristics. Test hole drilling and evaluation is recommended prior to well installation to determine site-specific aquifer properties and water quality.

**Table 5.2.6-6 County Line SUD – Trinity Project Decadal Water Management Strategy Yields by Phase (acft/yr)**

| County Line SUD – Trinity Project | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Phase 1 | 0 | 0 | 500 | 500 | 500 | 500 |
| Phase 2 | 0 | 0 | 0 | 500 | 500 | 500 |
| **Total** | **0** | **0** | **500** | **1,000** | **1,000** | **1,000** |

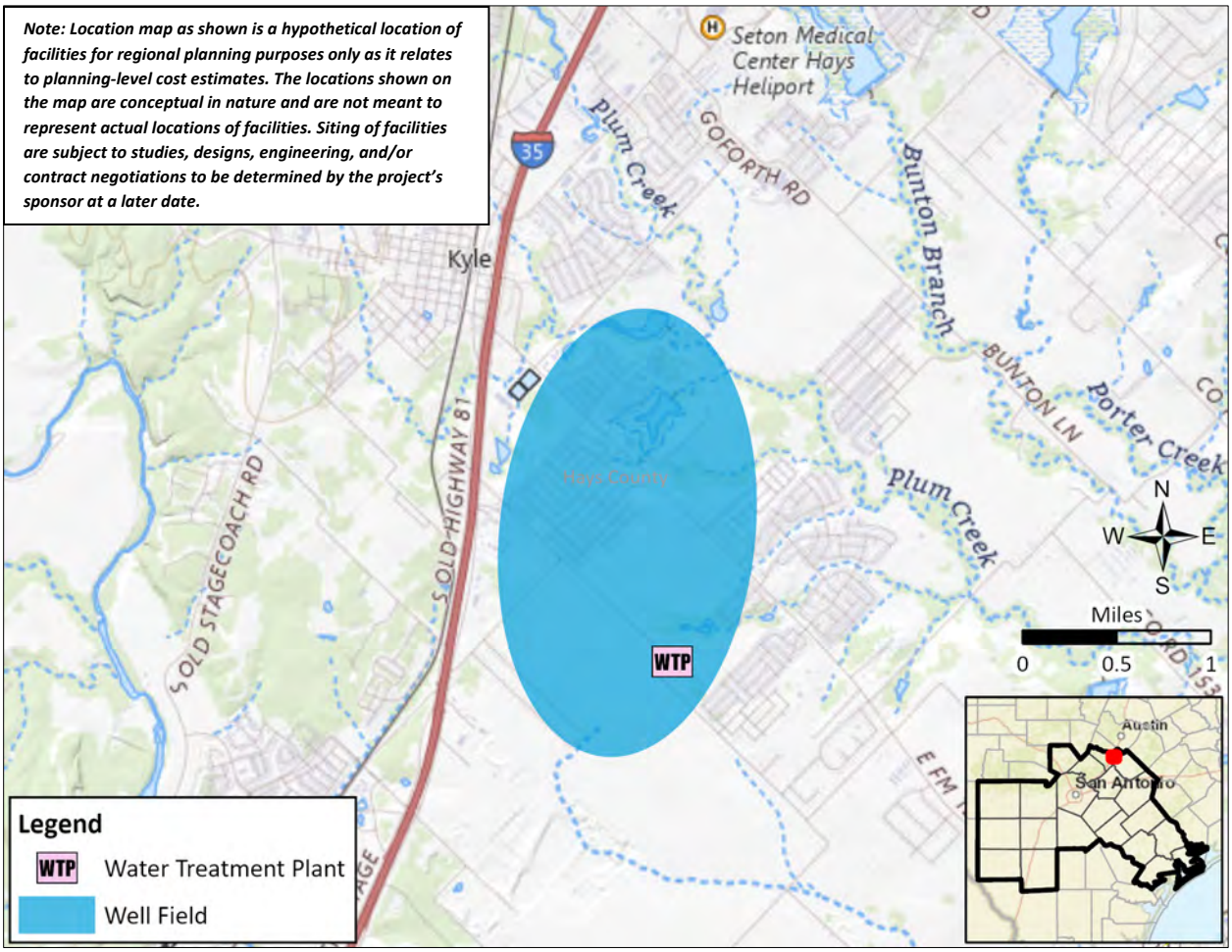



**Figure 5.2.6-3 Approximate Location of County Line SUD – Trinity Project**

### 5.2.6.2.4 County Line SUD – Brackish Edwards Project

County Line SUD plans to add wells in the brackish portion of the Edwards Aquifer. The new source of water for County Line SUD will be delivered to their system in a three-phased approach (Table 5.2.6-7). Phase 1 is projected for the 2050 decade and will have a firm yield of 500 acft/yr. Phase 2 is projected for the 2060 decade and will expand upon Phase 1, resulting in a combined firm yield of 1,000 acft/yr.

Finally, Phase 3 is projected for the 2070 decade and will result in a total project firm yield of 1,500 acft/yr. All three phases are included and evaluated as part of this WMS. Because of MAG limitations, the project has a reduced project firm yield (MAG-constrained yield), as shown in Table 5.2.6-2.

A new desalination WTP will be included to treat the brackish Edwards Aquifer water. The project's general location is anticipated to be near the northwest boundary of County Line SUD and the City of Kyle in Hays County (Figure 5.2.6-4). This WMS utilizes the same facilities and is within the same area as the County Line SUD – Trinity Project. Locations will be defined when the project is executed.

The project will consist of four wells: two wells in Phase 1, one well in Phase 2, and one well in Phase 3, each with an estimated pumping capacity of 350 gpm. In this downdip region of the Brackish Edwards Aquifer, the exact well depth is unknown because of limited information available for this area. It is recommended that a test well be drilled, and additional studies performed in the area to determine more accurate well field information. For planning purposes, the well depth is assumed to be approximately 1,200 feet, and has a TDS concentration of 1,500 mg/L. This area is close to the transition zone of the Edwards Aquifer where water quality changes from fresh to brackish, and wells in the area are limited. The lack of available data and the fractured and heterogenous nature of the aquifer system in this area are such that it is difficult to predict the well characteristics. Test hole drilling and evaluation is recommended prior to well installation to determine site-specific aquifer properties and water quality.

**Table 5.2.6-7 County Line SUD – Brackish Edwards Project Decadal Water Management Strategy Yields by Phase (acft/yr)**

| County Line SUD – Brackish Edwards Project | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Phase 1 | 0 | 0 | 500 | 500 | 500 | 500 |
| Phase 2 | 0 | 0 | 0 | 500 | 500 | 500 |
| Phase 3 | 0 | 0 | 0 | 0 | 500 | 500 |
| **Total** | **0** | **0** | **500** | **1,000** | **1,500** | **1,500** |

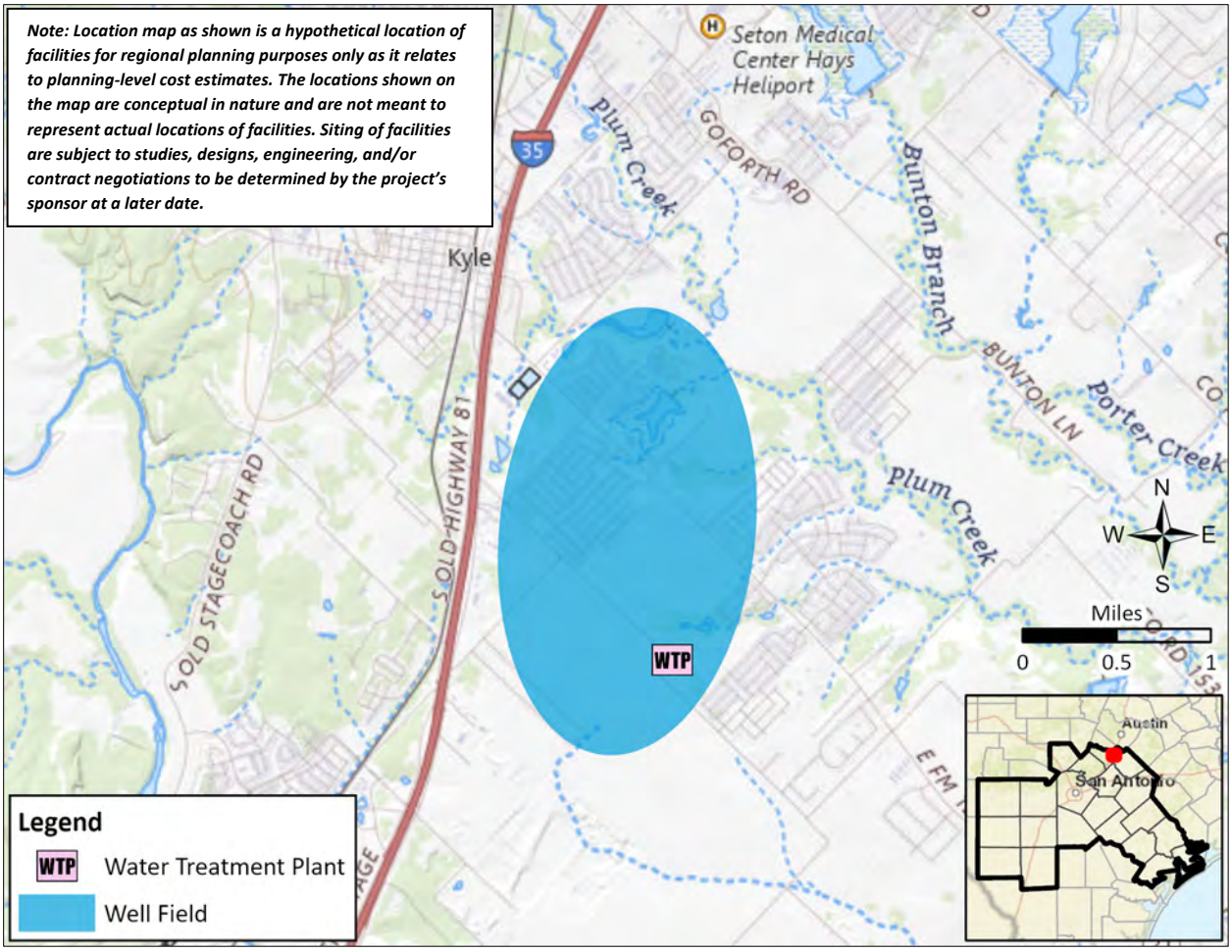



**Figure 5.2.6-4 Approximate Location of County Line SUD – Brackish Edwards Project**

### 5.2.6.2.5 Maxwell SUD – Trinity Project

Maxwell SUD plans to add a well in the Trinity Aquifer in the 2040 decade that will develop a supply of 230 acft/yr. The new source of water for Maxwell SUD will be treated via brackish water treatment at the well field and delivered to the existing distribution system via a new 16-inch pipeline that will replace the existing infrastructure. The projected general location is anticipated to be at the existing Maxwell SUD Edwards well field site in Hays County (Figure 5.2.6-5). The total project is envisioned to result in a yield of 230 acft/yr.

The project is anticipated to consist of one new well in the Trinity Aquifer with a pumping capacity of approximately 250 gpm. In this region of the Trinity Aquifer, the depth of the well is expected to be approximately 1,200 feet, and the water is anticipated to have a TDS concentration of approximately 2,000 mg/L. Most of the wells in the proposed well field area are completed in the overlying Edwards Aquifer, and therefore, little data exist on the deeper Trinity Aquifer. Any potential project in the area should include test well drilling and evaluation to determine aquifer characteristics and water quality in the vicinity of the planned Trinity Aquifer wells. The project lies within the purview of the Barton Springs Edwards Aquifer Conservation District (BSEACD).

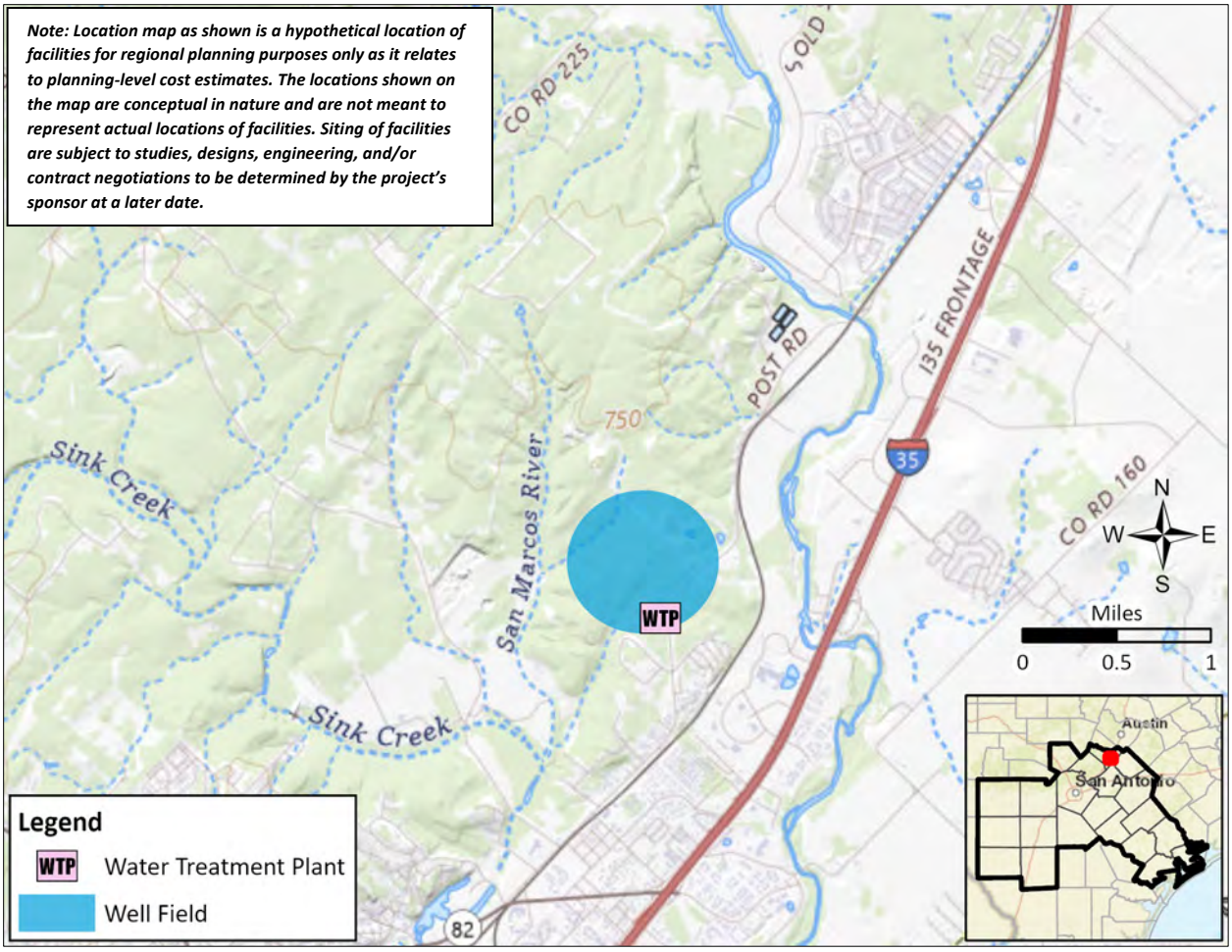



**Figure 5.2.6-5 Approximate Location of Maxwell SUD – Trinity Project**

### 5.2.6.2.6 S S WSC – Brackish Carrizo-Wilcox Project

S S WSC – Brackish Carrizo-Wilcox Project was originally a recommended WMS in the 2016 SCTRWP. It includes development of a 1,120 acft/yr brackish groundwater supply from the Carrizo-Wilcox Aquifer in Wilson County. It is designed to produce an average annual water supply of 1.0 MGD and a peak demand of 2.0 mgd. Because of MAG limitations, the project has a reduced project firm yield (MAG-constrained yield), as shown in Table 5.2.6-2.

The facilities of the project are planned to be located in the vicinity of S S WSC's Sutherland Springs Road Plant, which is located approximately 3 miles west-northwest of the town of Sutherland Springs (Figure 5.2.6-6). This strategy builds on a preliminary assessment of potential brackish groundwater supplies from the Carrizo-Wilcox Aquifer in a target area that is generally a 10 to 20 mile wide band that is south of Interstate 10 and between Loop 410 and Seguin [1].

The project includes a brackish well field consisting of three wells located along CR 319, spaced approximately 1 mile apart. The desalination WTP will be co-located at S S WSC's existing water plant.

[1] HDR Engineering, Inc. February 2008. *Preliminary assessment of potential water supplies from the Wilcox Aquifer in parts of Bexar, Guadalupe, and Wilson Counties.* Prepared for San Antonio River Authority.

The disposal well for the brine concentrate is planned to be in the general area of the desalination plant. A raw water collector pipeline will deliver brackish Carrizo-Wilcox Aquifer water from the wells to the WTP. Water treatment will consist of pretreatment and desalination. A treated water pipeline and booster pump station would deliver water to the Sutherland Springs Road Plant. A concentrate water pipeline would deliver reject water to a ground storage tank (GST). A small pump and a pipeline will transport the concentrate to a new, deep injection well.

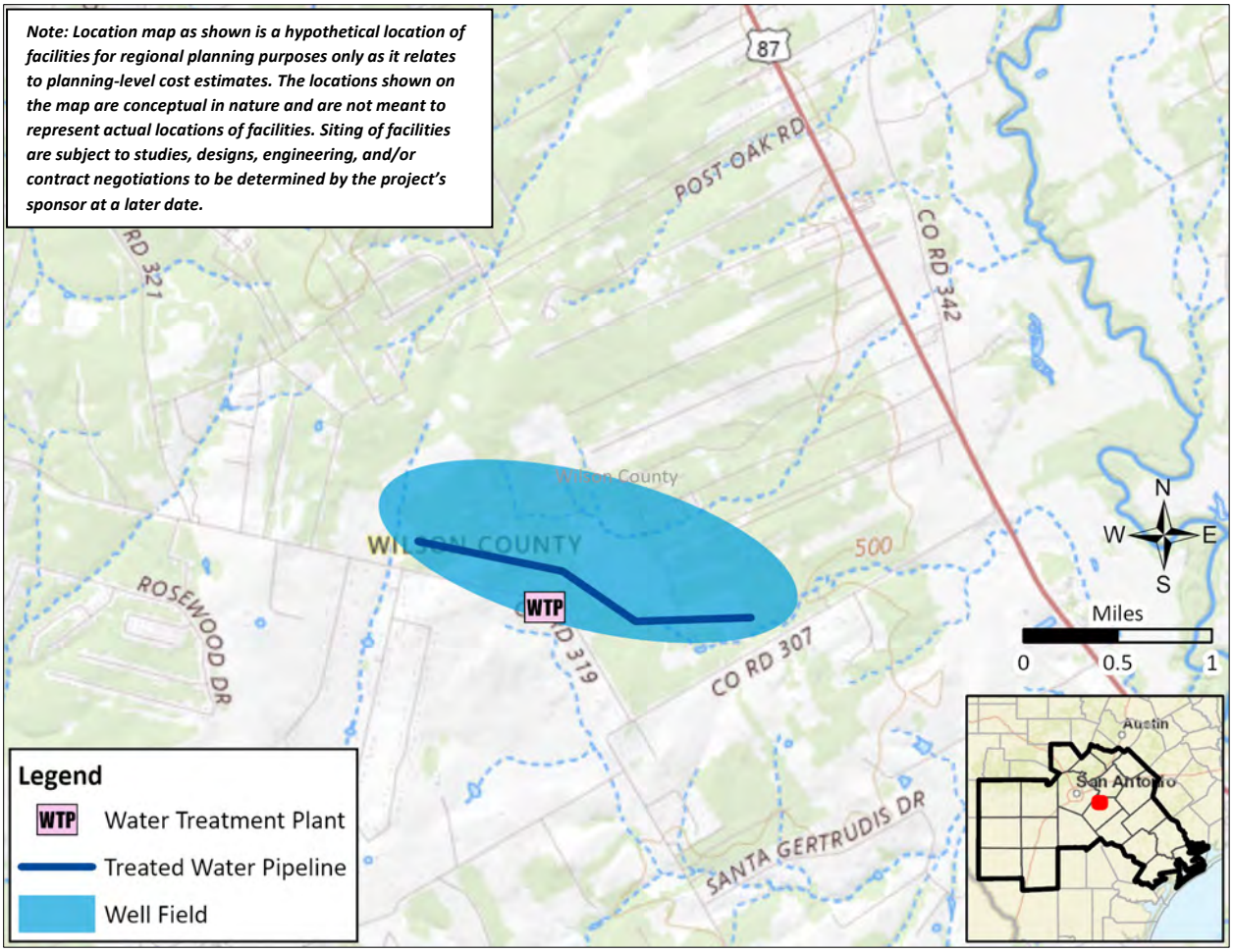



**Figure 5.2.6-6 Approximate Location of S S WSC – Brackish Carrizo-Wilcox Groundwater Project**

Groundwater production and well spacing in the Carrizo-Wilcox Aquifer are regulated by the Evergreen UWCD. Based on the results from the earlier study and for planning purposes, a typical Carrizo-Wilcox Aquifer well in this location is expected to be about 1,100 feet deep, yield about 750 gpm, and produce water with a TDS concentration of about 1,200 mg/L.

### 5.2.6.3 Environmental Factors

Individual projects associated with the Brackish Groundwater Development WMS may include well field development, desalination treatment, pipeline construction, and associated facility construction and upgrades. These projects would require site-specific reviews to determine requirements for environmental permitting and field data collection, if needed.

#### 5.2.6.3.1 Caldwell Brackish Partnership Project

### Environmental Considerations

#### Vegetation, Land Use, and Agricultural Resources

The project area occurs mostly in the East Central Texas Plains ecoregion, with a small portion on the west edge mapped as Texas Blackland Prairie. The majority of the project area is mapped as post oak motte/woodlands, post oak savanna grassland, and mesquite shrubland by TPWD [2]; the project area is mostly open fields and woodlands with one industrial cattle facility. Based on the TPWD mapping, the project area contains 11 acres mapped as row crops, and 661 acres mapped as disturbance or tame grassland which may be used for grazing or hay fields.

Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing and woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes.

#### Aquatic Resources

The project area contains one underground water pipeline, one unnamed artificial path, and four artificial paths in streams/rivers, seven intermittent segments of streams/rivers (Big Sandy Creek, Copperas Creek, Daniels Creek, Hines Branch, McNeil Creek, Tenney Creek, and Plum Creek), and one perennial segment of Plum Creek. The project area contains 360 acres of freshwater emergent wetlands, 140.6 acres of which are freshwater pond, and 219.4 acres of which are riverine mapped wetlands. The project area includes impaired stream segment 1810 Plum Creek, as defined by TCEQ [3]. The project area does not contain ecologically significant stream segments, as designated by the TPWD.

Projects may require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including cases where there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of

[2] Elliott, L.F., A. Treuer-Kuehn, C.F. Blodgett, C.D. True, D. German, and D.D. Diamond. 2009-2014. Ecological Systems of Texas: 391 Mapped Types. Phase 1 – 6, 10-meter resolution Geodatabase, Interpretive Guides, and Technical Type Descriptions. Texas Parks & Wildlife Department and Texas Water Development Board, Austin, Texas. Documents and Data Available at: https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

[3] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Draft Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d)*. https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

waters of the United States. Utility crossings under streams/rivers (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Caldwell County [4, 5]. Suitable habitat may occur the federally listed endangered whooping crane (*Grus americana*); federal proposed endangered tricolored bat (*Perimyotis subflavus*); and federal candidate monarch butterfly (*Danaus plexippus*) in the project region. Suitable habitat may occur for the state threatened species interior least tern (*Sternula antillarum anthalassos*), swallow-tailed kite (*Elanoides forficatus*), white-faced ibis (*Plegadis ibis*), wood stork (*Mycteria americana*), Guadalupe darter (*Percina apristis*), headwater catfish (*Ictalurus lupus*), Cagle's map turtle (*Graptemys caglei*), and Texas horned lizard (*Phrynosoma cornutum*). Potentially suitable habitat may occur for numerous state wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD.

Migratory birds may occur in and nest in the project areas. The federal MBTA protects birds, nests, and eggs from impacts unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Preconstruction surveys for active bird nests are recommended.

## Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by lead federal agencies and the State Historic Preservation Officer (SHPO) at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas [6] is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as an SAL.

In the State of Texas, all human burials are protected by law [7], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and the remains are determined to be Native American, they will be handled in accordance with procedures established

[4] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[5] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.
[6] Political subdivision entities include any county, municipality, special district, river authority or compact, Title 4 Water Code District, soil and water conservation district, county or municipal improvement district, regional planning commission, council of government, or utility that is public-owned. Refer to Texas Water Code (TWC) Code §2254.021.
[7] As per the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

through coordination with the THC, and work in the affected area could only resume in accordance with THC authorization.

A background literature review was performed for the proposed project's footprint. The background literature review identified four cultural resources within the approximate 24,149-acre project area (Table 5.2.6-8) [8]. These cultural resources are one archaeological site (41CW40) undetermined for NRHP-listing, two cemeteries (CW-C014, and CW-C015), and one Official Texas Historical Marker (OTHM) (Marker No. 16585). Additionally, the historical map review identified 205 potential historic-age buildings/structures that are within the project area [9].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area, which included low, moderate, and high potential zones. The model indicated that 3.3% of the project area had a high likelihood of containing significant unidentified archaeological resources, 51.5% had a moderate likelihood, and 45.2% had a low likelihood. Areas with higher archaeological probability were considered to be located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score for the project area was developed, which considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, RTHLs, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, Freedom Colonies, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score.

According to the background review results, one archaeological site, two cemeteries, one OTHM, and 205 potential historic-age structures are located within the project area; the probability model indicates a moderate likelihood of buried deposits; and the project assessment score is 248.8. Based on these results, a cultural resources assessment for the final design plan will likely be necessary, as well as a buffer zone of at least 100 feet between the cemeteries and the proposed development.

**Table 5.2.6-8 Cultural Resources Results for the Caldwell Brackish Partnership Project**

| Resource Name | Resource Type | Prehistoric/ Historic | NRHP Eligibility |
|---|---|---|---|
| 41CW40 | Archaeological site | Historic | Undetermined |

[8] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed December 2024.

[9] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed December 2024.

| Resource Name | Resource Type | Prehistoric/ Historic | NRHP Eligibility |
|---|---|---|---|
| Hard Shell Cemetery 1 (CW-C034) | Cemetery | Historic | Undetermined |
| Hall Cemetery (CW-C014) | Cemetery | Historic | Undetermined |
| Wattsville Gin (16585) | OTHM | Historic | Undetermined |
| None (N=205) | Buildings/Structures | Historic | – |
| **Assessment Score Total** | **All** | **All** | **248.8** |

#### 5.2.6.3.2 Gonzales & Guadalupe Brackish Partnership Project

##### Environmental Considerations

###### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the East Central Texas Plains ecoregion, with the majority of the project area mapped as post oak motte/woodlands, savannah grassland, and mesquite shrubland by TPWD [10]; the project area is mostly open fields and woodlands with some residential development. Based on the TWPD mapping, the project area includes 81 acres mapped as row crops, 676 acres mapped as disturbance or tame grassland, and 77 acres mapped as sandyland grassland which may be used for livestock grazing or hay fields.

Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing and woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes.

###### Aquatic Resources

The project area contains one pipeline, one canal/ditch, one unnamed artificial path, and 10 artificial paths/streams/rivers (Darst Creek, East Fork O'Neal Creek, Guadalupe River, Nash Creek, O'Neal Creek, Polecat Creek, Rocky Creek, Salt Creek, Sawlog Creek, and Tidwell Creek). The project area contains 5.7 acres of freshwater emergent wetlands, 181.9 acres of freshwater pond, and 513.3 acres of riverine mapped wetlands. The project has the potential to affect impaired stream segment 1804 of the

[10] Elliott, L.F., A. Treuer-Kuehn, C.F. Blodgett, C.D. True, D. German, and D.D. Diamond. 2009-2014. Ecological Systems of Texas: 391 Mapped Types. Phase 1 – 6, 10-meter resolution Geodatabase, Interpretive Guides, and Technical Type Descriptions. Texas Parks & Wildlife Department and Texas Water Development Board, Austin, Texas. Documents and Data Available at: https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

Guadalupe River Below Comal River, as defined by TCEQ [11]. The project area does not contain ecologically significant stream segments, as designated by the TPWD.

Projects may require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including cases where there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under streams/rivers (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in the project areas for this WMS [12, 13]. Suitable habitat may occur for the federally listed endangered whooping crane (*Grus americana*), false spike (*Fusconaia mitchelli*), federal proposed endangered tricolored bat (*Perimyotis subflavus*), and federal candidate monarch butterfly (*Danaus plexippus*) in the project region.

Suitable habitat may occur for the state threatened species interior least tern (*Sternula antillarum anthalassos*), swallow-tailed kite (*Elanoides forficatus*), white-faced ibis (*Plegadis ibis*), wood stork (*Mycteria americana*), Guadalupe darter (*Percina apristis*), plateau shiner (*Cyprinella lepida*), Cagle's map turtle (*Graptemys caglei*), Texas horned lizard (*Phrynosoma cornutum*), Texas tortoise (*Gopherus berlandieri*), and white-nosed coati (*Nasua narica*). Potentially suitable habitat may occur for numerous state wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD.

Migratory birds may occur in and nest in the project areas. The federal MBTA protects birds, nests, and eggs from impacts unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Preconstruction surveys for active bird nests are recommended.

## Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by lead federal agencies and the SHPO at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or

[11] Texas Commission on Environmental Quality. 2024. *2024 Draft Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

[12] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[13] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.

eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas [14] is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as an SAL.

In the State of Texas, all human burials are protected by law [15], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume in accordance with THC authorization.

A background literature review was performed for the proposed project's footprint. The background literature review identified 25 cultural resources within the approximate 39,851-acre project area (Table 5.2.6-9) [16, 17]. These cultural resources include 10 archaeological sites; one NRHP-listed district; ten cemeteries, of which two are Texas Freedom Colonies; and three OTHMs. All 10 archaeological sites are currently undetermined for listing on the NRHP. One of the cemeteries (Capote Cemetery) is a designated Historic Texas Cemetery. Additionally, the historical map review identified 316 potential historic-age buildings/structures that are within the project area [18].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area, which included low, moderate, and high potential zones. The model indicated that 3.8% of the project area had a high likelihood of containing significant unidentified archaeological resources, 18.1% had a moderate likelihood, and 78.1% had a low likelihood. Areas with higher archaeological probability were considered to be located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score for the project area was developed, which considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, RTHLs, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts,

[14] Political subdivision entities include any county, municipality, special district, river authority or compact, Title 4 Water Code District, soil and water conservation district, county or municipal improvement district, regional planning commission, council of government, or utility that is public-owned. Refer to Texas Water Code (TWC) §2254.021.

[15] As per the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

[16] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed December 2024.

[17] Texas Freedom Colonies Project. 2024. Texas Freedom Colonies Atlas 2.1. Available at: https://www.thetexasfreedomcoloniesproject.com/atlas. Accessed December 2024.

[18] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed December 2024.

Freedom Colonies, and historical markers each received 1 point. For cultural resources with multiple resource types, the values of each resource type were calculated and used to determine the overall assessment score. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score.

According to the background review results, 10 archaeological sites, one NRHP-listed district, 10 cemeteries, two Texas Freedom Colonies, three OTHMs, and 316 potential historic-age structures are located within the project area; the probability model indicates a low likelihood of buried deposits; and the project assessment score is 424.2. Based on these results, a cultural resources assessment for the final design plan will likely be necessary, as well as a buffer zone of at least 100 feet between the cemeteries and the proposed development.

**Table 5.2.6-9 Cultural Resources Results for the Gonzalez & Guadalupe Brackish Partnership Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| 41GU5 | Archaeological site | Historic | Undetermined |
| 41GU6 | Archaeological site | Historic | Undetermined |
| 41GU170 | Archaeological site | Prehistoric | Undetermined |
| 41GU171 | Archaeological site | Prehistoric | Undetermined |
| 41GU172 | Archaeological site | Prehistoric | Undetermined |
| 41GZ3 | Archaeological site | Prehistoric | Undetermined |
| 41GZ180 | Archaeological site | Multicomponent | Undetermined |
| 41GZ181 | Archaeological site | Prehistoric | Undetermined |
| 41GZ188 | Archaeological site | Historic | Undetermined |
| 41GZ189 | Archaeological site / Cemetery | Historic | Undetermined |
| Wilson Utility Pottery Kilns | Archaeological District | Historic | Listed |
| Belmont (GZ-C089) | Cemetery | Historic | Undetermined |
| Belmont No. 2 (GZ-C105) | Cemetery | Historic | Undetermined |
| Capote Cemetery (GU-C152) | Cemetery / Freedom Colony | Historic | Undetermined |
| Erskine (GU-C194) | Cemetery | Historic | Undetermined |
| Matthies Cemetery (GU-C011) | Cemetery | Historic | Undetermined |
| Meyer (GZ-C118) | Cemetery | Historic | Undetermined |
| Nash Creek Cemetery (GU-C140) | Cemetery / Freedom Colony | Historic | Undetermined |
| New Birth (GU-C146) | Cemetery | Historic | Undetermined |
| St. James (GZ-C096) | Cemetery | Historic | Undetermined |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| El Capote Ranch (Marker No. 1412) | OTHM | Historic | Undetermined |
| Wilson Potteries (Marker No. 5858) | OTHM | Historic | Undetermined |
| William B. Fleming (Marker No. 17932) | OTHM | Historic | Undetermined |
| None (N=316) | Buildings / Structures | Historic | – |
| **Assessment Score Total** | **All** | **All** | **424.2** |

#### 5.2.6.3.3 County Line SUD – Trinity Project

##### Environmental Considerations

###### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Blackland Prairie ecoregion, and the project vicinity contains high-density residential development, agricultural fields, and a small amount of uncleared woodland. As mapped by TPWD [19], the dominant vegetation types in the project area are disturbance or tame grassland, row crops, urban low intensity, deciduous woodland, and mesquite shrubland. Based on the TPWD mapping, the project area contains 439 acres mapped as row crops and 772 acres mapped as disturbance or tame grassland which could be used for grazing or hay production.

Construction of the WTP would result in conversion of native herbaceous and woody vegetation into industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species which are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

###### Aquatic Resources

One artificial path, three intermittent streams including Plum Creek and Clear Fork Plum Creek, their associated floodplains, and one pipeline are mapped in the project area. The NWI mapping shows 36.4 acres of ponds and riverine wetlands in the project area.

[19] Elliott, L.F., A. Treuer-Kuehn, C.F. Blodgett, C.D. True, D. German, and D.D. Diamond. 2009-2014. Ecological Systems of Texas: 391 Mapped Types. Phase 1 – 6, 10-meter resolution Geodatabase, Interpretive Guides, and Technical Type Descriptions. Texas Parks & Wildlife Department and Texas Water Development Board, Austin, Texas. Documents and Data Available at: https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

The Texas Integrated Report of 303(d) listed water bodies identifies the water bodies or segments in Texas that do not meet assigned water quality standards. Segment 1810 of Plum Creek, a tributary of the San Marcos River, is listed as impaired. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction, if applicable, would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58 – Utility Line Activities for Water and other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under stream (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Hays County [20, 21]. Suitable habitat for the federally endangered whooping crane (*Grus americana*) and the federal candidate monarch butterfly may occur in the project area. The whooping crane would be expected to occur only during migration. The project will likely require an on-site habitat assessment to determine if suitable habitat for federally listed species is present within this area.

Suitable habitat may occur for the state threatened species interior least tern (*Sternula antillarum anthalassos*), white-faced ibis (*Plegadis ibis*), wood stork (*Mycteria americana*), Texas troglobitic water slater (*Lirceolus smithii*), Guadalupe darter (*Percina apristis*), headwater catfish (*Isctalurus lupus*), Cagle's map turtle (*Graptemys caglei*), and Texas horned lizard (*Phrynosoma cornutum*). Potentially suitable habitat may occur for numerous state wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat and potential for impacts to federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD would likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur or nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Preconstruction surveys for active bird nests are recommended.

[20] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[21] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.

## Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by lead federal agencies and the SHPO at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas [22] is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as an SAL.

A background literature review was performed for the proposed project's footprint. The background literature review identified two cultural resources within the approximately 1,629-acre project area (Table 5.2.6-10) [23]. These cultural resources are two archaeological sites (41HY543 and 41HY572). Site 41HY572 is ineligible for NRHP-listing, while 41HY543 remains undetermined for listing on the NRHP. Additionally, the historical map review identified 25 potential historic-age buildings/structures that are within the project area [24].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area, which included low, moderate, and high potential zones. The model indicated that 92% of the project area had a high likelihood of containing significant unidentified archaeological resources, and 8% had a low likelihood. Areas with high archaeological probability were considered to be located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score for the project area was developed, which considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, RTHLs, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, Freedom Colonies, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score.

[22] Political subdivision entities include any county, municipality, special district, river authority or compact, Title 4 Water Code District, soil and water conservation district, county or municipal improvement district, regional planning commission, council of government, or utility that is public-owned. Refer to Texas Water Code (TWC) §2254.021.

[23] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed December 2024.

[24] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed December 2024.

According to the background review results, two archaeological sites and 25 potential historic-age structures are located within the project area; the probability model indicates a high likelihood of buried deposits; and the project assessment score is 90.8. Based on these results, a cultural resources assessment for the final design plan will likely be necessary.

**Table 5.2.6-10 Cultural Resources Results for the County Line SUD – Trinity Project**

| Resource Name | Resource Type | Prehistoric/Historic | NRHP Eligibility |
|---|---|---|---|
| 41HY543 | Archaeological site | Multicomponent | Ineligible |
| 41HY572 | Archaeological site | Multicomponent | Undetermined |
| None (N=25) | Buildings / Structures | Historic | – |
| **Assessment Score Total** | **All** | **All** | **90.8** |

### 5.2.6.3.4 County Line SUD – Brackish Edwards Project

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Blackland Prairie ecoregion, and the project vicinity contains high-density residential development, agricultural fields, and a small amount of uncleared woodland. As mapped by TPWD,[25] the dominant vegetation types in the project area are disturbance or tame grassland, row crops, urban low intensity, deciduous woodland, and mesquite shrubland. Based on the TPWD mapping, the project area contains 439 acres mapped as row crops and 772 acres mapped as disturbance or tame grassland which could be used for grazing or hay production.

Construction of the WTP would result in conversion of native herbaceous and woody vegetation into industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species which are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

##### Aquatic Resources

One artificial path, three intermittent streams including Plum Creek and Clear Fork Plum Creek, their associated floodplains, and one pipeline are mapped in the project area. The NWI mapping shows 36.4 acres of ponds and riverine wetlands in the project area.

[25] Elliott, L.F., A. Treuer-Kuehn, C.F. Blodgett, C.D. True, D. German, and D.D. Diamond. 2009-2014. Ecological Systems of Texas: 391 Mapped Types. Phase 1 – 6, 10-meter resolution Geodatabase, Interpretive Guides, and Technical Type Descriptions. Texas Parks & Wildlife Department and Texas Water Development Board, Austin, Texas. Documents and Data Available at: https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

The Texas Integrated Report of 303(d) listed water bodies identifies the water bodies or segments in Texas that do not meet assigned water quality standards. Segment 1810 of Plum Creek, a tributary of the San Marcos River, is listed as impaired. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction, if applicable, would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58 – Utility Line Activities for Water and other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under stream (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Hays County [26, 27]. Suitable habitat for the federally endangered whooping crane (*Grus americana*) and the federal candidate monarch butterfly may occur in the project area. The whooping crane would be expected to occur only during migration. The project will require an on-site habitat assessment to determine if suitable habitat for federally listed species is present within this area.

Suitable habitat may occur for the state threatened species interior least tern (*Sternula antillarum anthalassos*), white-faced ibis (*Plegadis ibis*), wood stork (*Mycteria americana*), Texas troglobitic water slater (*Lirceolus smithii*), Guadalupe darter (*Percina apristis*), headwater catfish (*Isctalurus lupus*), Cagle's map turtle (*Graptemys caglei*), and Texas horned lizard (*Phrynosoma cornutum*). Potentially suitable habitat may occur for numerous state wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat and potential for impacts to federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD would likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur or nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct pre-construction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Pre-construction surveys for active bird nests are recommended.

[26] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[27] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.

## Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by lead federal agencies and the SHPO at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas[28] is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as an SAL.

A background literature review was performed for the proposed project's footprint. . The background literature review identified two cultural resources within the approximately 1,629-acre project area (Table 5.2.6-11) [29]. These cultural resources are two archaeological sites (41HY543 and 41HY572). Site 41HY572 is ineligible for NRHP-listing, while 41HY543 remains undetermined for listing on the NRHP. Additionally, the historical map review identified 25 potential historic-age buildings/structures that are within the project area [30].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area, which included low, moderate, and high potential zones. The model indicated that 92% of the project area had a high likelihood of containing significant unidentified archaeological resources, and 8% had a low likelihood. Areas with high archaeological probability were considered to be located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score for the project area was developed, which considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, RTHLs, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, Freedom Colonies, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score.

[28] Political subdivision entities include any county, municipality, special district, river authority or compact, Title 4 Water Code District, soil and water conservation district, county or municipal improvement district, regional planning commission, council of government, or utility that is public-owned. Refer to Texas Water Code (TWC) §2254.021.

[29] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed December 2024.

[30] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed December 2024.

According to the background review results, two archaeological sites and 25 potential historic-age structures are located within the project area; the probability model indicates a high likelihood of buried deposits; and the project assessment score is 90.8. Based on these results, a cultural resources assessment for the final design plan will likely be necessary.

**Table 5.2.6-11 Cultural Resources Results for the County Line SUD – Brackish Edwards Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| 41HY543 | Archaeological site | Multicomponent | Ineligible |
| 41HY572 | Archaeological site | Multicomponent | Undetermined |
| None (N=25) | Buildings / Structures | Historic | – |
| **Assessment Score Total** | **All** | **All** | **90.8** |

### 5.2.6.3.5 Maxwell SUD – Trinity Project

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area occurs mostly in the Edwards Plateau ecoregion with a small area on the eastern edge within the Texas Blackland Prairies ecoregion. The project vicinity contains low-density residential development. As mapped by TPWD [31], the dominant vegetation types in the project area are deciduous oak/evergreen motte and woodland, oak/hardwood motte and woodland, savanna grassland, and Ashe juniper motte and woodland. Based on TPWD vegetation mapping, the project would not affect area mapped as row crops but has the potential to impact 2 acres of agricultural resources mapped as tame/disturbance grassland that may include pasture areas used for grazing or hay production. Construction of the WTP would result in conversion of native herbaceous and woody vegetation areas to industrial use.

Construction of project facilities would result in conversion of native herbaceous and woody vegetation to industrial use. Pipeline construction would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species which are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

[31] Elliott, L.F., A. Treuer-Kuehn, C.F. Blodgett, C.D. True, D. German, and D.D. Diamond. 2009-2014. Ecological Systems of Texas: 391 Mapped Types. Phase 1 – 6, 10-meter resolution Geodatabase, Interpretive Guides, and Technical Type Descriptions. Texas Parks & Wildlife Department and Texas Water Development Board, Austin, Texas. Documents and Data Available at: https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

### Aquatic Resources

One intermittent stream and one lake/pond are mapped in the project area. The NWI mapping shows small areas in the project vicinity, approximately 2.0 acres, mapped as wetlands or ponds. The Texas Integrated Report of 303(d) listed water bodies[32] identifies the water bodies or segments in Texas that do not meet assigned water quality standards. There are no streams within one mile of the project area listed as impaired. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project has a low likelihood of affecting wetlands. Well facilities and small WTPs can typically be sited to avoid impacts to waters of the United States. including wetlands. The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58 – Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in pre-construction contours of waters of the United States. Utility crossings under stream (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Hays County [33, 34]. Suitable habitat for the federally endangered golden-cheeked warbler (*Setophaga chrysoparia*), whooping crane (*Grus americana*) (during migration), Austin blind salamander (*Eurycea waterlooensis*), Texas blind salamander (*Eurycea rathbuni*), and the federal candidate monarch butterfly may occur in the project area. The project will require an on-site habitat assessment to determine if suitable habitat for federally listed species is present within this area.

Suitable habitat may occur for the state threatened species interior least tern (*Sternula antillarum anthalassos*), white-faced ibis (*Plegadis ibis*), wood stork (*Mycteria americana*), Texas troglobitic water slater (*Lirceolus smithii*), Guadalupe darter (*Percina apristis*), headwater catfish (*Isctalurus lupus*), Cagle's map turtle (*Graptemys caglei*), and Texas horned lizard (*Phrynosoma cornutum*). Potentially suitable habitat may occur for numerous state wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat and potential for impacts to federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD would likely be required to obtain their recommendations on minimizing impacts to

[32] Texas Commission on Environmental Quality. 2024. *2024 Draft Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.
[33] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[34] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.

protected species and sensitive habitats. If suitable habitat occurs, TPWD may request pre-construction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur or nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct pre-construction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Pre-construction surveys for active bird nests are recommended.

### Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by lead federal agencies and the SHPO at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas [35] is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as an SAL.

In the State of Texas, all human burials are protected by law [36], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume in accordance with THC authorization.

A background literature review was performed for the proposed project's footprint. The background literature review identified two cultural resources within the approximate 308-acre project area (Table 5.2.6-12) [37]. These cultural resources are one cemetery (HY-C011), with an associated OTHM (Marker No. 10318). Additionally, the historical map review identified seven potential historic-age buildings/structures that are within the project area [38].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area, which included low, moderate, and high potential zones. The model indicated that 99% of the project area had a high likelihood of containing significant unidentified archaeological resources, and 1% had a moderate likelihood. Areas with high archaeological probability

[35] Political subdivision entities include any county, municipality, special district, river authority or compact, Title 4 Water Code District, soil and water conservation district, county or municipal improvement district, regional planning commission, council of government, or utility that is public-owned. Refer to Texas Water Code (TWC) §2254.021.
[36] As per the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.
[37] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed December 2024.
[38] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed December 2024.

were considered to be located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score for the project area was developed, which considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, Recorded Texas Historical Landmarks, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, Freedom Colonies, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score.

According to the background review results, one cemetery with an associated historical marker, and seven potential historic-age structures are located within the project area; the probability model indicates a high likelihood of buried deposits; and the project assessment score is 79.5. Based on these results, a cultural resources assessment for the final design plan will likely be necessary, as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

**Table 5.2.6-12 Cultural Resources Results for the Maxwell SUD – Trinity Project**

| Resource Name | Resource Type | Prehistoric/Historic | NRHP Eligibility |
|---|---|---|---|
| San Marcos – Blanco | Cemetery / OTHM | Historic | Undetermined |
| None (N=7) | Buildings / Structures | Historic | – |
| **Assessment Score Total** | **All** | **All** | **79.5** |

### 5.2.6.3.6 S S WSC – Brackish Carrizo-Wilcox Project

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the East Central Texas Plains ecoregion, with the majority of the project area mapped as post oak motte/woodlands and savanna grassland by TPWD [39]; the project area is mostly open fields and woodlands with some residential development. Based on the TPWD mapping, the project area does not contain row crops or tame/disturbance grassland; there are 5 acres mapped as sandyland grassland that may be used for grazing or hay production.

[39] Elliott, L.F., A. Treuer-Kuehn, C.F. Blodgett, C.D. True, D. German, and D.D. Diamond. 2009-2014. Ecological Systems of Texas: 391 Mapped Types. Phase 1 – 6, 10-meter resolution Geodatabase, Interpretive Guides, and Technical Type Descriptions. Texas Parks & Wildlife Department and Texas Water Development Board, Austin, Texas. Documents and Data Available at: https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

The proposed well pads and treatment facility would result in conversion of land use from undeveloped fields to small areas of industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed.

### Aquatic Resources

The project area contains one artificial path, one mapped intermittent stream, one intermittent lake/pond, and one perennial lake/pond. The project area does not contain any mapped wetlands. The project would not affect impaired stream segments as defined by TCEQ [40] or ecologically significant stream segments as designated by TPWD.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in the project areas for this WMS [41, 42]. Suitable habitat for the federal candidate monarch butterfly (*Danaus plexippus*) may occur within the project area. Suitable habitat may occur for the state listed endangered species interior least tern (*Sternula antillarum athalassos*), and state threatened species swallow-tailed kite (*Elanoides forficatus*), white-faced ibis (*Plegadis chihi*), wood stork (*Mycteria americana*), white-nosed coati (*Nasua narica*), Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise (*Gopherus berlandieri*). There is potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN including SGCN bat species which may utilize structures and could therefore occur in developed areas. The SGCN list also includes numerous plant species, including many for which detailed habitat requirements have not been developed by TPWD. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat for federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request pre-construction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur or nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct pre-construction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

---

[40] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Draft Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d)*. https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

[41] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[42] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.

## Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by lead federal agencies and the SHPO at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas [43] is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as an SAL.

A background literature review was performed for the proposed project's footprint, which includes a 1.9-mile-long project alignment within the project area boundary. The background literature review determined that no previously recorded cultural resources intersect the approximate 943-acre project area [44]. The historical map review did not identify any potential historic-age buildings/structures within the project area [45].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area, which included low, moderate, and high potential zones. The model indicated that the entirety of the project area had a low likelihood of containing significant, unidentified archaeological resources. Areas with higher archaeological probability would have been considered to be located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score for the project area was developed, which considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, Recorded Texas Historical Landmarks, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, Freedom Colonies, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score.

According to the background review results, no cultural resources or potential historic-age structures are located within the project area; the probability model indicates a low likelihood of buried deposits;

[43] Political subdivision entities include any county, municipality, special district, river authority or compact, Title 4 Water Code District, soil and water conservation district, county or municipal improvement district, regional planning commission, council of government, or utility that is public-owned. Refer to Texas Water Code (TWC) §2254.021.

[44] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas*. Available at: https://atlas.thc.texas.gov/. Accessed December 2024.

[45] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed December 2024.

and the project assessment score is 11.5. Based on these results, a cultural resource assessment is not likely to be necessary for the final design plan; however, cultural resource investigations may be required depending on whether regulatory triggers are present.

### 5.2.6.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using the 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Tool, which includes standard costing procedures and method for calculating unit costs. The estimated costs include all facilities required for water production, collection, transmission, and treatment. Given the anticipated TDS concentration of the water, treatment for desalination and disinfection is assumed to be necessary to meet drinking water standards for all projects. In addition, it is assumed that brine concentrate will be disposed via deep well injection well(s).

A summary of the projected cost estimates for development of brackish groundwater projects is provided in Table 5.2.6-13. Infrastructure was sized to deliver the sponsor's Envisioned Yield, but because the project is MAG-limited, the annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the lack of groundwater availability. TWDB Costing Tool Cost Estimate Summaries for the Fresh Groundwater Development WMS are provided in Appendix 5E.

**Table 5.2.6-13 Cost Estimate Summary for the Brackish Groundwater Development WMS**

| WMS | Total Cost of Facilities | Total Cost of Project | Annual Cost | Annual Cost of Water ($ per acft) |
|---|---|---|---|---|
| Caldwell Brackish Partnership Project | $ 208,281,000 | $ 292,793,000 | $ 40,904,000 | $ 6,490 |
| Gonzales & Guadalupe Brackish Partnership Project | $ 300,344,000 | $ 421,443,000 | $ 56,005,000 | $ 6,544 |
| County Line SUD - Trinity Project | $ 38,990,000 | $ 54,991,000 | $ 9,026,000 | $ 18,052 |
| County Line SUD - Brackish Edwards Project | $ 42,112,000 | $ 59,431,000 | $ 10,541,000 | $ 21,082 |
| Maxwell SUD - Trinity Project | $ 12,782,000 | $ 18,050,000 | $ 2,674,000 | $ 11,626 |
| S S WSC - Brackish Carrizo-Wilcox Project | $ 37,734,000 | $ 52,902,000 | $ 8,815,000 | $ 12,504 |

#### 5.2.6.4.1 Caldwell Brackish Partnership Project

Facilities in the Caldwell Brackish Partnership Project will consist of an 11 MGD RO WTP, well field, two injection wells, and a 30-inch diameter, 18-mile transmission pipeline.

#### 5.2.6.4.2 Gonzales & Guadalupe Brackish Partnership Project

Facilities in the Gonzales & Guadalupe Brackish Partnership Project will consist of a 14.3 MGD RO WTP, well field, two injection wells, and a 30-inch diameter, 32-mile transmission pipeline with a booster pump station.

#### 5.2.6.4.3 County Line SUD – Trinity Project

Facilities in Phase 1 of the County Line SUD – Trinity Project will consist of two wells, infrastructure for brackish groundwater treatment, one injection well, and a 1 million gallon (MG) GST. Phase 2 will consist of one additional well. Well pumps will be sized to deliver raw water to the water treatment infrastructure. The cost estimate does not include delivery of treated water to the County Line SUD distribution system. Costs associated with land acquisition, WTP, injection well, and pump station are shared with the County Line SUD – Brackish Edwards Project, which is co-located with this WMS.

#### 5.2.6.4.4 County Line SUD – Brackish Edwards Project

Facilities in Phase 1 of the County Line SUD – Brackish Edwards Project will consist of two production wells, one injection well, and infrastructure for desalination and disinfection. Phases 2 and 3 will each consist of one additional production well for each phase in the existing well field. Well pumps will be sized to deliver raw water to the water treatment infrastructure. The cost estimate does not include delivery of treated water to the County Line SUD distribution system. Costs associated with land acquisition, WTP, injection well, and pump station are shared with the County Line SUD – Trinity Project, which is co-located with this WMS.

#### 5.2.6.4.5 Maxwell SUD – Trinity Project

Facilities in the Maxwell SUD – Trinity Project will include a new production well, an injection well, collector pipelines, GST, and a WTP. Well pumps will be sized to deliver the raw water to the water treatment infrastructure and storage tank. Treated water will be delivered to Maxwell SUD's distribution system via a new 16-inch pipeline that will replace the existing 6- and 8-inch pipelines.

#### 5.2.6.4.6 S S WSC – Brackish Carrizo-Wilcox Project

The engineering and costing analysis for S S WSC Brackish Carrizo-Wilcox Project includes all facilities required for water production from the Carrizo-Wilcox Aquifer, including wells, collector pipeline, water treatment utilizing RO technology, treated water pipeline and pump stations, and disposal of concentrate to deep injection wells. The well field consists of three brackish water supply wells, two miles of collector pipelines with a diameter of 12 inches. The treated water facilities consist of a short 12 inch diameter transmission pipeline, a pump station, and integration into the existing distribution system. A concentrate disposal well, GST, pipelines, and facilities are planned near the Sutherland Springs Road Plant. The target disposal of the concentration will be deep well injection into depleted or partially depleted oil and gas producing reservoirs (Austin Chalk or Edwards Limestone).

The required secondary Maximum Contaminant Level (MCL) for TDS is 1,000 mg/L. The design of the water treatment facilities is to produce potable water with a TDS concentration of about 400 to 500 mg/L. The preliminary water treatment design includes: 1) pretreatment of all raw water; 2) about 60% of this water will be sent to the desalination WTP; and 3) the remaining 40% will be blended with the desalinated water. The desalination plant recovery rate using conventional RO with raw water having a TDS of about 1,200 mg/L is estimated to be 85%, meaning that 85% of the water entering the

desalination plant becomes purified water and 15% of the water remains as concentrated brine. The desalinated water and the treated brackish water are blended to produce treated water with a TDS of about 480 mg/L. This process converts about 90% of the quantity of raw water produced from the well field into potable water. The remaining 10% is a concentrate and is discharged to a deep injection well.

### 5.2.6.5 Implementation Considerations

Implementation of the Brackish Groundwater Development WMS includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Verification of the potential for deep well injection of concentrate, as applicable;
- Verification that desalinated water is compatible with other water sources being used by customers and will meet all water quality requirements in the end user's distribution system;
- Verification of impacts to the aquifer source;
- Verification that groundwater is compatible with other water sources being used by the sponsor and/or its customers and that it will meet all water quality requirements in the end user's distribution system;
- Potential for differing water qualities/chemical constituents in the water;
- Regulations by and obtaining deep well injection permits from the TCEQ;
- Regulations by and obtaining permits from local GCDs, including potential permit renewals;
- Experience in operating and maintaining a desalination WTP;
- Depending on the level and types of project impacts, the following natural and cultural resources studies and agency coordination may be required:
    - Stream/wetland delineations to support USACE Section 404 permitting;
    - Site-specific evaluations for threatened/endangered species habitat;
    - Presence/absence surveys for threatened/endangered species if suitable habitat occurs;
    - USFWS and TPWD coordination if protected species may be affected; and
    - Structured cultural resources surveys of project impact areas, and THC coordination in compliance with the ACT and NHPA, if applicable.
- Because of the generalized nature and planning-level detail of this evaluation, each individual entity or WUG should conduct more thorough and site-specific evaluations for any new well. It is recommended that the owner or WUG evaluate infrastructure capabilities specific to their existing system and their local hydrogeologic conditions to determine feasibility and to refine cost estimates accordingly;
- During times of drought, WUGs should be aware that the saturated thickness and, therefore, the associated well capacity, may be impacted by drawdown from nearby operating wells; and
- Competition with others in the area for groundwater in the Carrizo-Wilcox Aquifer may include the following:

- Private water purveyors;
- Public water purveyors in the area; and/or
- Future oil and gas drilling operations.

#### 5.2.6.5.1 Caldwell Brackish Partnership Project

Implementation of the Caldwell Brackish Partnership Project will likely require permits and approvals from TCEQ, the Plum Creek CD, and the Gonzales County UWCD.

#### 5.2.6.5.2 Gonzales & Guadalupe Brackish Partnership Project

Implementation of the Gonzales & Guadalupe Brackish Partnership Project will likely require permits and approvals from TCEQ, the Guadalupe County GCD, and the Gonzales County UWCD.

#### 5.2.6.5.3 County Line SUD – Trinity Project

Implementation of the County Line SUD – Trinity Project will likely require permits and approvals from TCEQ and the EAA. Given the approximate location of the well field, the proposed wells could be regulated by Plum Creek CD, BSEACD, and/or EAA.

#### 5.2.6.5.4 County Line SUD – Brackish Edwards Project

Implementation of the County Line SUD – Brackish Edwards Project will likely require permits and approvals from TCEQ and the EAA. Given the approximate location of the well field, the proposed wells could be regulated by Plum Creek CD, BSEACD, and/or EAA.

#### 5.2.6.5.5 Maxwell SUD – Trinity Project

Implementation of the Maxwell SUD – Trinity Project will likely require permits and approvals from TCEQ, the EAA, and the BSEACD.

#### 5.2.6.5.6 S S WSC – Brackish Carrizo-Wilcox Project

Implementation of the S S WSC – Brackish Carrizo-Wilcox Project will likely require permits and approvals from the TCEQ and the Evergreen UWCD.

## 5.2.7 Groundwater Conversions

The SCTRWPG identified the Groundwater Conversions WMS as a potentially feasible strategy. However, for the 2026 RWP, the SCTRWPG designated the Groundwater Conversions WMS as considered and evaluated but not Recommended because there are no sponsoring entities under this strategy.

### 5.2.7.1 Description of Water Management Strategy

The Groundwater Conversions WMS is intended to be used by WUGs where the Fresh Groundwater Development WMS (Section 5.2.5) would be the primary recommended strategy to meet their needs, but no groundwater is available because of existing permits and/or MAG constraints. This strategy includes purchasing and/or leasing existing irrigation or mining groundwater permits and changing the type of use to municipal use. The Groundwater Conversions WMS is intended to be used within the same county between willing sellers and willing buyers.

For the 2026 SCTRWP, no strategies were identified that would be appropriate for utilizing Groundwater Conversions as a WMS.

### 5.2.7.2 Available Yield

This WMS has zero firm yield as there are no sponsoring entities. Table 5.2.7-1 provides a summary of the available yield for the Groundwater Conversions WMS.

**Table 5.2.7-1 Available Yield for the Groundwater Conversions WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Groundwater Conversions | 0 | 0 | 0 | 0 | 0 | 0 |

The available supply from the Groundwater Conversions WMS would be limited to the firm supply under existing irrigation or mining groundwater permits and surplus availabilities within the same county as the municipal WUG seeking to acquire additional supply via use type conversion.

### 5.2.7.3 Environmental Factors

Environmental and cultural considerations associated with the Groundwater Conversions WMS are anticipated to be limited. The projects may result in agricultural impacts in the form of reductions in irrigated acreage.

### 5.2.7.4 Engineering and Costing

The cost associated with the Groundwater Conversions WMS is limited to the negotiations between willing sellers and willing buyers. Details associated with the costs necessary to develop groundwater infrastructure, if able to complete a successful transaction, can be found in the Fresh Groundwater Development WMS (Section 5.2.5).

### 5.2.7.5 Implementation Considerations

Implementation would require the ability to execute contractual agreements between the municipal WUG and the irrigators or mining entities and the ability to amend existing groundwater permits at the groundwater conservation district to add municipal use as a type. If the rules of the local GCD do not explicitly allow for the conversion of groundwater permits between use types, then such rules would require amendment to enable this strategy to be implemented.

## 5.2.8 Facilities Expansion

The SCTRWPG identified the Facilities Expansion as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.8.1 Description of Water Management Strategies

Several WUGs are interested in projects to expand major components of their existing infrastructure (facilities) so they can continue to provide a safe and reliable water supply to their customers during the planning period. These facilities expansions are considered to be independent of any potential WMSs to acquire a new water supply and instead, are intended to address expected future improvements to the water system, such as the installation of new water transmission facilities or additional water treatment. Only the portion of WTP facilities and associated costs that are directly required to increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this RWP. Additionally, these facilities expansions could include new transmission facilities designated to move waters from multiple WMSs throughout an area.

Facilities expansions projects are included in the 2026 SCTRWP at the request of project sponsors (i.e., WUGs and WWPs). Given the localized impacts of these projects, there are no significant impacts to environmental factors or cultural resources. However, This WMS does not include an environmental assessment, as any environmental issues would likely be localized. Furthermore, cost estimates for each of these facilities expansions are limited and compiled herein using information from the sponsoring entity. Cost estimate summaries for each of these projects are included in Appendix 5E.

#### CRWA Lake Dunlap WTP Expansion

CRWA is seeking an expansion of its Lake Dunlap WTP and transmission facilities to meet future needs. The facility currently has a capacity of 14.4 MGD or 16,100 acft/yr and the expansion is expected to provide an additional 2 MGD (2,300 acft/yr) of capacity in the 2030 decade. Current WMS supplies may be limited by availability and are only made consistent with TWDB data. Available yield volumes are not representative of the physical project.

#### CRWA Hays Caldwell WTP Expansion

CRWA is planning to expand its Hays Caldwell WTP to treat an additional 2 MGD (2,300 acft/yr). This expansion is currently planned for the 2030 decade. Current WMS supplies may be limited by availability and are only made consistent with TWDB data. Available yield volumes are not representative of the physical project.

#### County Line SUD SH-21 Booster Site Project

County Line SUD (CLSUD) plans to expand the SH-21 Booster Site, which receives 1,308 acft/yr of surface water from the CRWA Hays-Caldwell WTP up to a peak amount of approximately 1.5 MGD. Additional water supplies from CRWA, such as the CRWA Wells Ranch (Phase 3) WMS (Refer to Section 5.2.18), would be delivered to this booster site. To accommodate these additional water supplies, the SH-21 Booster Site will require expansion, including additional ground storage, pumps, piping, and electrical upgrades. It is estimated that such expansions would occur by 2040 .

### County Line SUD High Road Booster Site Project

CLSUD is seeking an expansion of their High Road Booster Site to enable delivery of future water sources to CLSUD's distribution system. The High Road Booster Site will receive approximately 0.25 MGD (290 acft/yr) of water from future ARWA groundwater projects (Refer to Section 5.2.14). The initial phase is anticipated for implementation by 2030. Additionally, ARWA plans to develop future phases to deliver increased water volumes to customers. With the additional ARWA supplies, CLSUD will expand the facility in the future, which would likely include a second GST, pumps, piping, electrical upgrades, and a generator. It is estimated that additional, future expansions would be implemented by 2040.

### County Line SUD Bobwhite Booster Site Project

CLSUD plans to develop a new 2.8 MGD WTP at an existing booster site location to allow delivery of future water sources and pumping to CLSUD's distribution system. The project is anticipated to be implemented by 2030. The Bobwhite Booster Site will be designed to treat, store, and pump 2,419 acft/yr of groundwater from GBRA (Refer to Section 5.2.21), with the flexibility for expansion to accommodate potential future sources of supply. Future expansions will likely include expanded ground storage, pumps, piping, and electrical and would likely occur in the mid-2030s.

### GBRA Western Canyon WTP Expansion

GBRA is seeking an expansion of its Western Canyon WTP and transmission facilities to meet future needs in western Comal County. The WTP expansion is expected to increase the treatment capacity and transmission pump stations of the plant from 11 MGD to 16 MGD – an increase of 5 MGD (5,600 acft/yr). GBRA expects these expansions to be online in the 2030 decade. Current WMS supplies may be limited by availability and are only made consistent with TWDB data. Available yield volumes are not representative of the physical project.

### NBU South WTP Expansion

NBU is seeking an expansion of its South WTP and transmission facilities to meet future needs of the service area. The WTP expansion is expected to increase the treatment capacity of the plant from 8 MGD to 16 MGD (8,960 acft/yr increase). Improvements to transmission pump stations will increase capacity to 16 MGD. NBU expects these facilities to be developed by 2030. Current WMS supplies are limited by availability and are only made consistent with TWDB data. Available yield volumes are not representative of the physical project.

The design and bidding of the Surface Water Treatment Plant (SWTP) is expected to be complete by the end of 2025 and construction is expected to be complete by the end of 2028. The SWTP is anticipated to be online by early 2029 producing additional 8 MGD of potable water. The water is meant to meet NBU's demand.

To produce this 8 MGD of potable water, an additional treatment train is being added consisting of rapid mix chamber, flocculation chamber, clarification basin with inclined plate settlers, filters, junction chamber, storage tank, decantation basin, and sludge drying beds. A new chemical building will be added, and the high service pump station will see additional pumps installed to support both existing and proposed treatment trains.

Part of the SWTP site is located in the FEMA designated 100-year flood zone. Therefore, the design has incorporated improvements to make the new treatment train a hardened facility, with the entire train raised above the 100-year flood elevation. The only existing grade level access into the filter gallery will have a flood-proof door. The new chlorine, liquid ammonia sulfate, fluoride building, electrical building and raw water pump station electrical equipment are also raised above the 100-year flood elevation.

### NBU South WTP 2 and Two Expansions

NBU is looking to construct the South WTP and expansion over the next several years. The project is tentatively sited north of the existing WTP on a plot of land that NBU has already purchased. A Preliminary Feasibility Study evaluated the most appropriate water treatment capacity and construction year for the South WTP. Initial completion of the South WTP construction is anticipated in the late 2030 decade, resulting in an initial capacity of 8,400 acft/yr. The first expansion of the plant will be implemented by 2050, adding another 4,200 acft/yr. The final expansion will occur in 2060 and will add the remaining 4,200 ac-ft/yr with an ultimate plant capacity of 16,800 acft/yr. Current WMS supplies may be limited by availability and are only made consistent with TWDB data. Available yield volumes are not representative of the physical project.

### NBU-Seguin Interconnect

NBU is looking to construct an interconnect with the City of Seguin to receive an additional 2.2 MGD (2,500 acft/yr). This strategy includes a 26,300 foot long 14-inch pipeline and a new pumping station. These facility expansions would provide an increased capacity of 2.2 MGD (2,500 acft/yr). NBU expects these facilities to be developed in the 2030 decade. This project aims to maximize the production capacity with the capability to fully utilize NBU's existing water rights and recharge NBU's planned ASR well field as quickly as excess water supply is available.

### SAWS Southeast Integration Pipeline (Phase 2) Project

SAWS plans to develop a new, 36-inch Southeast Integration Pipeline, which will be designed to increase the operational flexibility to integrate water as a segment off the Eastern Integration Pipeline (also known as the ASR transmission line) in the high growth area of southeast Bexar County. The Southeast Integration Pipeline will convey treated water from either Artesia, Mission, or SAWS $H_2$Oaks Center to a newly constructed production facility in this southeast region (Refer to Section 5.2.25 regarding the associated SAWS Expanded Local Carrizo WMS). The rated capacity of the pipeline will be at least 20 MGD to accommodate full buildout of the new production facility. Construction is scheduled for 2035 and the pipeline is expected to be in service by 2040.

### SAWS Expanded ASR Treatment Plant

SAWS plans to expand its existing ASR Treatment Plant, known as the SAWS $H_2$Oaks Center. The expansion is planned to be implemented by 2030, and is necessary to accommodate additional water from the Expanded Local Carrizo Project and to allow larger volumes of stored ASR water to be recovered during severe, multi-year droughts. This will decrease demand on the Edwards Aquifer, which benefits the region by staving off deeper critical period reductions. The Expanded ASR Treatment Plant will increase the plant's capacity by 30 MGD (33,600 acft/year), resulting in a future total capacity of 60 MGD. Costs and discussion here are only related to the expansion of the ASR WTP. Infrastructure and costs associated with the SAWS Expanded Local Carrizo Project are discussed in detail in Section 5.2.25.

### Springs Hill WSC Zone 2 Transmission Main Project

Springs Hill WSC is seeking implementation of a new Zone 2 Transmission Pipeline. The project includes 11,800 linear feet of 16-inch pipe, a new pump station, and a new 16-inch pipeline bored under the Guadalupe River along SH-46, which would increase capacity by 2030. The bored pipeline would be approximately 1,000 linear feet. This WMSP is associated with two WMSs. For more information regarding the two associated WMSs, refer to the Springs Hill WSC Gamecock WTP description in the subsequent paragraph and the Fresh Groundwater Development WMS in Section 5.2.5.

### Springs Hill WSC Gamecock WTP

Springs Hill WSC is interested in constructing the new Gamecock WTP at the intersection of Gamecock Road and Farm-to-Market Road (FM) 725. The WTP is expected to have a treatment capacity of 4 MGD (4,480 act/yr) and be implemented by 2040. Other infrastructure will include a 1 MG GST, new intake, and pump station from Lake Placid, and conveyance pipelines from the intake to the WTP. Sources of supply to be treated at the Gamecock WTP include surface water from Lake Placid (Guadalupe Run-of-River) and water purchased from the SSLGC interconnect. Current WMS supplies may be limited by availability and are only made consistent with TWDB data. Available yield volumes are not representative of the physical project.

### CPS Energy Direct Recycle Pipeline (Bexar Co. Steam-Electric)

City Public Services (CPS) Energy is considering a direct reuse pipeline from SAWS' Steven M. Clouse Water Recycling Center (WRC) to its CPS Energy power plant lakes (Calaveras Lake and Lake Braunig). For purposes of the 2026 SCTRWP, Bexar County Steam-Electric Power is identified as the sponsor of this project. The capacity of the pipeline 44.6 MGD (50,000 acft/yr) and the available yield of reuse water from SAWS to CPS Energy is 4.46 MGD (5,000 acft/yr) in the 2030 decade.

## 5.2.8.2 Available Yield

Table 5.2.8-1 provides a summary of the WMSs included in the Facilities Expansion section, including the decade of implementation, capacity of expansion, and supply to be developed from this WMS. WMS supplies may differ from the capacities of infrastructure because facilities are frequently designed to meet peak demand, whereas the WMS supply is based on water availability and average flows. In some cases, water availability is limited by the MAG or water rights. Additionally, facilities are frequently designed for capacities larger than current supplies in order to meet future demands as a result of growth. Engineering and costing information associated with these Facilities Expansion projects is summarized in Section 5.2.8.4.

**Table 5.2.8-1 Capacities and Available Yields for the Facilities Expansion WMSs (acft/yr)**

| WMS Name | Implementation Decade | Capacity of Expansion | 2030 Yield | 2040 Yield | 2050 Yield | 2060 Yield | 2070 Yield | 2080 Yield |
|---|---|---|---|---|---|---|---|---|
| CRWA Lake Dunlap WTP Expansion (2 MGD) | 2030 | 2,300 | 59 | 59 | 59 | 2,300 | 2,300 | 2,300 |
| CRWA Hays Caldwell WTP Expansion (2 MGD) [A] | 2030 | 2,300 | 406 | 406 | 406 | 2,165 | 2,165 | 2,165 |
| GBRA Western Canyon WTP Expansion (5 MGD) | 2030 | 5,600 | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 | 1,245 |
| NBU South WTP Expansion (8 MGD) | 2030 | 8,400 | [B] | [B] | [B] | [B] | [B] | [B] |
| NBU South WTP 2 (8 MGD) | 2040 | 8,400 | 0 | [B] | [B] | [B] | [B] | [B] |
| NBU South WTP 2 Expansion 1 (4 MGD) | 2050 | 4,200 | 0 | 0 | [B] | [B] | [B] | [B] |
| NBU South WTP 2 Expansion 2 (4 MGD) | 2060 | 4,200 | 0 | 0 | 0 | [B] | [B] | [B] |
| NBU-Seguin Interconnect | 2030 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 |
| SAWS Expanded ASR Treatment Plant (30 MGD) | 2040 | 33,600 | 0 | 33,600 | 33,600 | 33,600 | 33,600 | 33,600 |
| Springs Hill WSC Gamecock WTP (4 MGD) | 2040 | 4,480 | 0 | 3,200 | 3,200 | 3,200 | 3,200 | 3,200 |
| CPS Energy Direct Recycle Pipeline from the Steven M. Clouse WRC to Calaveras Lake (Bexar Co. Steam-Electric) | 2030 | 50,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |

[A] All or a portion of yield from this WMS remains unallocated to a specific WUG because the project sponsor is a WWP and has chosen to instead have a surplus management supply. Surplus management supply is when the cumulative supply of the recommended WMSs is in excess of the amount needed to meet regional needs to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability. Rather than assigning volumes from a specific project to individual WUGs in the plan, the WWP contracts with customers from their general water supply portfolio or surplus. This approach allows for flexibility in meeting future demands and accommodating evolving customer needs. As such, the strategy volumes are included in the plan to reflect the WWP's capacity to meet regional needs, even though specific allocations to WUGs are not identified at this time.

[B] The four NBU WTP projects are for infrastructure only. These infrastructure projects are all associated with the same 6,800 acft/yr of remaining contract supply volume. The total yield available for all four projects is 6,800 acft/yr.

Facilities Expansion projects included in Table 5.2.8-2 include conveyance infrastructure only. These infrastructure projects do not include available yields as the supply source is associated with the WMSs detailed outside of the Facilities Expansion section. Table 5.2.8-2 provides a summary of Facilities Expansion projects that are associated with WMSs included outside of the Facilities Expansion section, including decade of implementation, associated WMS, and a section reference for additional details regarding the associated WMS. Engineering and costing information associated with these Facilities Expansion projects is summarized in Section 5.2.8.4 and detailed in Appendix 5E.

**Table 5.2.8-2 Facilities Expansion WMSPs and Associated WMSs**

| WMSP Name | Implementation Decade | Associated WMS | Section Reference |
|---|---|---|---|
| County Line SUD SH-21 Booster Site | 2040 | CRWA Wells Ranch (Phase 3) | 5.2.18 |
| County Line SUD High Road Booster Site | 2030 | ARWA Expanded Carrizo Wilcox (Phase 2) | 5.2.14 |
| County Line SUD Bobwhite Booster Site | 2040 | GBRA WaterSECURE | 5.2.21 |
| SAWS Southeast Integration Pipeline (Phase 2) | 2040 | SAWS Expanded Local Carrizo | 5.2.25 |
| Springs Hill WSC Zone 2 Transmission Main | 2030 | Springs Hill WSC Gamecock WTP and Fresh Groundwater Development | 5.2.8 and 5.2.5 |

### 5.2.8.3 Environmental Factors

Facilities Expansion projects typically include addition of or expansion to existing infrastructure, such as WTPs, pipelines, pump stations, GSTs, or ESTs. Many of these projects are located on land and easements that have already been disturbed and/or are already secured by the WUG or WWP. These projects are not expected to have significant impacts on agricultural resources, wildlife habitats, cultural resources, or effects on bays, estuaries, and arms of the Gulf of Mexico due to upstream development. During the permitting process for these Facilities Expansion projects, some facilities may require habitat studies and surveys for protected species and a cultural review. Detailed field surveys would typically be required for expansion projects involving new pipeline construction and/or expansion of facilities requiring extensive vegetation clearing, soil disturbance, or stream and wetland impacts. If a significant negative impact appears likely, some modifications to the project may be required be regulatory agencies. Mitigation may include compensation for net losses of wetlands where impacts are unavoidable. Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in the project area [1, 2].

[1] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[2] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.

The Facilities Expansion WMS was evaluated to determine its potential impacts on environmental factors. A summary of the evaluation is presented in Table 5.2.8-3.

**Table 5.2.8-3 Potential Project Effects on Environmental Factors for the Facilities Expansion WMS**

| Environmental Factor | Potential Impacts |
|---|---|
| Vegetation, Land Use, and Agricultural Resources | • Possible impacts on native vegetation, depending on project location and whether it is temporary or permanent. Temporary construction impacts provide an opportunity to plant native herbaceous species which are beneficial to native wildlife.<br>• Permanent impacts may include conversion of vegetation to pipeline easements and other industrial uses.<br>• Possible impacts to land use and agricultural resources if they are permanently converted for use by the project, depending on project location.<br>• No apparent negative impacts on state water resources; benefit accrues to demand centers by more efficient use of available water supplies; no effect on navigation. |
| Aquatic Resources | • No anticipated impacts to water quality, environmental water needs, instream flows, or effects on bays, estuaries, and arms of the Gulf of Mexico.<br>• Possible impacts on wetlands and waters of the United States, depending on project location. Site-specific stream and wetland delineations would be required to determine the extent of impacts, and to see if project adjustments can be made to reduce or avoid impacts to sensitive aquatic features. |
| Threatened and Endangered Species and SGCN | • Appendix 5D provides a summary of threatened and endangered species, and SGCN that may occur in the counties where the projects are located.<br>• Possible impacts for listed species, depending on project location and habitat requirements. |
| Cultural Resources | • Possible impacts, depending on project location. Cultural resources survey of the final design plan may need to be performed to accurately assess the presence and significance of identified and unrecorded cultural resources within the footprint of the project. |

### 5.2.8.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs.

Infrastructure was sized to deliver the sponsor's Envisioned Yield or Infrastructure Capacity, but because the available yield is limited for some projects, the annual unit costs were calculated using the available yield in the first decade of implementation. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield or Infrastructure Capacity, regardless of water supply availability.

A summary of the projected cost estimates associated with the Facilities Expansion WMS is provided in Table 5.2.8-4.Cost Estimate Summaries for the Facilities Expansion WMS are provided in Appendix 5E.

**Table 5.2.8-4 Cost Estimate Summary for the Facilities Expansion WMS and WMSPs**

| Project | Total Project Cost | Total Annual Cost |
|---|---|---|
| CRWA Lake Dunlap WTP Expansion (2 MGD) | $13.78M | $1.86M |
| CRWA Hays Caldwell WTP Expansion (2 MGD) | $13.78M | $1.86M |
| County Line SUD SH 21 Booster Site | $2.1M | $0.22M |
| County Line SUD High Road Booster Site | $1.4M | $0.14M |
| County Line SUD Bobwhite Booster Site | $2.8M | $0.31M |
| GBRA Western Canyon WTP Expansion (5 MGD) | $23.73M | $2.98M |
| NBU South WTP Expansion (8 MGD) | $33.65M | $4.1M |
| NBU South WTP 2 (8 MGD) | $84.58M | $10.33M |
| NBU South WTP 2 (Expansion 1) (4 MGD) | $20.42M | $2.61M |
| NBU South WTP 2 (Expansion 2) (4 MGD) | $20.42M | $2.61M |
| NBU-Seguin Interconnect | $16.02M | $1.61M |
| SAWS Southeast Integration Pipeline (Phase 2) | $76.99M | $6.58M |
| SAWS Expanded ASR Treatment Plant (30 MGD) | $92.59M | $11.16M |
| Springs Hill WSC Zone 2 Transmission Main | $58.54M | $4.61M |
| Springs Hill WSC Gamecock WTP (4 MGD) | $64.33M | $7.89M |
| CPS Energy Direct Recycle Pipeline (Bexar Co. Steam-Electric) | $85.2M | $7.49M |

### 5.2.8.5 Implementation Considerations

Implementation of the Facilities Expansion WMS includes the following considerations:

- Impacts and considerations are dependent on the type of project, location, source of supply, interested parties, and other factors;
- Project sponsors will need to secure and/or verify availability of water supply source(s);
- Securing permits, authorizations, or applicability of regulations by agencies and entities, such as TCEQ, TxDOT, GLO, USACE, GCDs, EAA, and other local entities; and
- Additional implementation considerations may include impacts on the following:

- Endangered and threatened species and SGCN;
- Cultural resources;
- Baseflow in streams; and
- Wetlands.

### 5.2.9 Reuse Water

The SCTRWPG identified the Reuse Water WMS as a potentially-feasible strategy. The SCTRWPG designated all Reuse Water strategies and projects as Recommended strategies in the 2026 RWP with the exception of the SAWS Direct Potable Reuse project. At the request of SAWS, the SAWS Direct Potable Reuse Project was designated as an Alternative strategy in the 2026 RWP.

#### 5.2.9.1 Description of Water Management Strategy

This strategy consists of projects that utilize treated effluent from domestic WWTPs as a water supply, reducing the overall demand for potable water supply. Reuse water typically involves a capital project connecting the WWTP discharge facilities to an individual area that has a relatively high, localized use. Examples most frequently include the irrigation of golf courses and other public lands and specific industries or industrial use areas. Currently, a few entities use all of their effluent for reclaimed water purposes; however, it is likely that increased pressure on water supplies will result in increased emphasis on reuse water in the future.

The Reuse Water WMS assumes that downstream needs, both water rights and environmental instream uses, would be met before any remaining flows could be utilized for reclaimed water purposes. Virtually any water supply entity with a WWTP could pursue a reuse water alternative, provided that downstream water rights do not have a claim for the entire return flow.

Reuse water quality and system design requirements are regulated by the TCEQ under 30 TAC §210. TCEQ allows two types of reuse water as defined by the use of the water and the required water quality:

- Type 1 – Public or food crops generally can come in contact with reuse water.
- Type 2 – Public or food crops cannot come in contact with reuse water.

Current TCEQ criteria for reuse water are shown in Table 5.2.9-1. Trends across the country indicate that criteria for unrestricted reuse water will likely tend to become more stringent over time. The water quality required for Type 1 reuse water is more stringent with lower requirements for oxygen demand (five-day biochemical oxygen demand [$BOD_5$] or five-day carbonaceous biochemical oxygen demand [$CBOD_5$]), turbidity, and fecal coliform levels.

A general evaluation of reuse water for multiple WUGs with needs and potential wastewater sources were utilized to evaluate a broad range of potential reuse water supplies.

**Table 5.2.9-1 TCEQ Criteria for Reuse Water (Allowable Levels)**

| Parameter | Type 1 | Type 2 For a System Other Than a Pond | Type 2 For a Pond System |
|---|---|---|---|
| $BOD_5$ or $CBOD_5$ | 5 mg/L | 20 mg/L | 30 mg/L |
| Turbidity | 3 NTU | 3 NTU | 3 NTU |
| Fecal Coliform [1] | 20 CFU/100 mL [1] | 200 CFU/100 mL [1] | 200 CFU/100 mL [1] |
| Fecal Coliform (not to exceed) [2] | 75 CFU/100 mL [2] | 800 CFU/100 mL [2] | 800 CFU/100 mL [2] |

| Parameter | Type 1 | Type 2 For a System Other Than a Pond | Type 2 For a Pond System |
|---|---|---|---|
| Enterococci [1] | 4 CFU/100 mL [1] | 35 CFU/100 mL [1] | 35 CFU/100 mL [1] |
| Enterococci (not to exceed) [2] | 9 CFU/100 mL [2] | 89 FU/100 mL [2] | 89 FU/100 mL [2] |

[1] Geometric mean
[2] Single grab sample
NTU - nephelometric turbidity unit; CFU - colony forming units; mL - milliliter.

### 5.2.9.2 Evaluation of Submitted Reuse Water Management Strategies

This WMS has 11 projects with varying firm yields and implementation decades. Table 5.2.9-2 provides a summary of the available yields for the Reuse Water WMS. Population and demand projections show an increase over time for all WUGs requesting reuse strategies, so this amount of water should continue to be available.

**Table 5.2.9-2 Available Yield for Reuse Water WMS (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Boerne, Direct Non-Potable Reuse | 1,500 | 1,500 | 1,785 | 2,000 | 2,250 | 2,250 |
| County Line SUD, Direct Non-Potable Reuse | 560 | 1,120 | 1,680 | 2,240 | 2,800 | 3,360 |
| Fair Oaks Ranch, Direct Non-Potable Reuse | 425 | 500 | 525 | 525 | 525 | 525 |
| GBRA, Direct Non-Potable Reuse | 1,064 | 6,778 | 10,587 | 10,587 | 10,587 | 10,587 |
| Kyle, Direct Non-Potable Reuse | 3,105 | 4,786 | 4,786 | 4,786 | 4,786 | 4,786 |
| New Braunfels, Direct Potable Reuse | 0 | 0 | 7,800 | 12,600 | 14,200 | 15,800 |
| San Antonio River Authority, Direct Non-Potable Reuse | 6,750 | 12,500 | 18,200 | 21,100 | 24,000 | 24,000 |
| SAWS, Direct Non-Potable Reuse | 5,000 | 5,000 | 15,000 | 25,000 | 40,000 | 40,000 |
| SAWS, Direct Potable Reuse (Alternative) | 0 | 0 | 0 | 25,000 | 25,000 | 25,000 |
| San Marcos, Direct Non-Potable Reuse | 1,971 | 1,971 | 1,971 | 1,971 | 1,971 | 1,971 |
| San Marcos, Direct Potable Reuse | 0 | 0 | 4,705 | 4,705 | 4,705 | 4,705 |

#### 5.2.9.2.1 Boerne (Direct Non-Potable)

Boerne, located in Kendall County, currently supplies direct reclaimed water for municipal irrigation uses and is considering expansion of their WWTP, enabling them to increase reclaimed water supplies. Boerne is currently completing a study to assess an expansion of their WWTP, which would include infrastructure upgrades and expanded capacity that would yield increased effluent. It is anticipated that the additional return flows would be treated the reclaimed water quality standards and provided to reuse customers.

Boerne currently has infrastructure in place for distributing reclaimed water; as such, it is assumed that most costs associated with this strategy will be related to additional storage and pumping capacity due to increased WWTP return flows. For purposes of this WMS, new infrastructure includes a storage tank and high service pump station (HSPS). Table 5.2.9-3 provides a summary of the available yield for the project.

**Table 5.2.9-3 Boerne Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Boerne, Direct Non-Potable Reuse | 1,500 | 1,500 | 1,785 | 2,000 | 2,250 | 2,250 |

#### 5.2.9.2.2 County Line SUD (Direct Non-Potable)

County Line SUD, located in Caldwell and Hays Counties, is planning a phased project to develop a new direct reclaimed water distribution system for the future. In the first phase, County Line SUD will provide reclaimed water to a nearby concrete plant (approximately 60,000 gallons per day [gpd]) and several residential subdivisions to irrigate their parks and green spaces. Potential residential end users include existing and new subdivisions. The concrete plant should have consistent demands and use of reclaimed water; however, residential users' demands will fluctuate seasonally due to rainfall, weather, and growing seasons for turfgrass and plants.

County Line SUD has constructed a purple pipe that will link the reuse pump station to landscape/park irrigation meters within a subdivision that is being built and another that is expected to start construction in the near future. Current proposed projects include a non-potable reuse pump station and waterline improvements to deliver non-potable water to one of the water system's highest volume users. The construction of a new 12-inch potable waterline will allow County Line SUD to convert an existing 4-inch potable water pipe along that same route alignment to reclaimed water, which will deliver the reuse water to the concrete plant. Other future improvements will be determined as potential non-potable water users are targeted. Table 5.2.9-4 provides a summary of the available yield for the project.

**Table 5.2.9-4 County Line SUD Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| County Line SUD, Direct Non-Potable Reuse | 560 | 1,120 | 1,680 | 2,240 | 2,800 | 3,360 |

#### 5.2.9.2.3 Fair Oaks Ranch (Direct Non-Potable)

Fair Oaks Ranch, located in Kendall, Comal, and Bexar Counties, currently has a successful water reuse program that provides direct non-potable reuse water from its WWTP to a golf course for irrigation. The city is contractually obligated to provide all effluent from the WWTP to the golf course. The existing reuse system consists of a network of lines ranging from 6 to 8 inches, two chlorine stations, and three effluent storage ponds.

The City is planning to upgrade the WWTP effluent pump station and conveyance lines to 12 inches to increase throughput. The golf course is also planning to construct an additional effluent storage pond.

As the reuse program expands, irrigation with potable water will be reduced on a gallon-for-gallon basis. Table 5.2.9-5 provides a summary of the available yield for the project.

**Table 5.2.9-5 Fair Oaks Ranch Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Fair Oaks Ranch, Direct Non-Potable Reuse | 425 | 500 | 525 | 525 | 525 | 525 |

#### 5.2.9.2.4 GBRA (Direct Non-Potable)

GBRA currently provides reclaimed water from the Stein Falls WWTP located in Comal County to the Calpine Guadalupe Energy Center, which is a natural gas fired combined cycle power plant located in Guadalupe County. Stein Falls WWTP currently sends all of their wastewater effluent to the power plant, resulting in zero discharge for many years. GBRA plans to expand the Stein Falls WWTP, which would increase the amount of direct non-potable reclaimed water available for existing and potential new customers. The reuse water is anticipated to meet Type I reclaimed water standards, requiring additional treatment at the WWTP. The project costs include additional treatment, conveyance, and storage facilities. Table 5.2.9-6 provides a summary of the available yield for the project.

**Table 5.2.9-6 GBRA Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| GBRA, Direct Non-Potable Reuse | 1,064 | 6,778 | 10,587 | 10,587 | 10,587 | 10,587 |

#### 5.2.9.2.5 Kyle (Direct Non-Potable)

Reuse water has been in use in Kyle for well over two decades, providing reclaimed water to the Plum Creek Golf Course for irrigation since 1998. The city is currently expanding their WWTF from 3.0 to 4.5 MGD and expects to expand shortly thereafter to 9 MGD. Additionally, the city recently expanded their reuse pump station, enabling them to provide up to 1,936 acft/yr of reclaimed water to existing customers. Kyle, located in Hays County, plans to expand upon their existing reclaimed water system to provide reclaimed water to new customers, including parks, athletic fields, residential developments, and commercial developments. Table 5.2.9-7 provides a summary of the available yield for the project.

**Table 5.2.9-7 Kyle Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Kyle, Direct Non-Potable Reuse | 3,105 | 4,786 | 4,786 | 4,786 | 4,786 | 4,786 |

#### 5.2.9.2.6 New Braunfels (Direct Potable)

NBU, located in Comal and Guadalupe Counties, currently owns and operates several WWTPs that provide direct non-potable reclaimed water to customers, including the Gruene Road WWTP, McKenzie WWTP, and North and South Kuehler WWTPs. NBU plans to develop and implement direct potable reuse beginning in the 2050 decade at the North and South Kuehler WWTPs, and expand it to include the McKenzie WWTP beginning in the 2060 decade. In 2023, NBU, the City of New Braunfels, and GBRA

launched One Water New Braunfels, which is an interagency collaboration to develop a comprehensive approach to water planning. One Water is a planning and implementation approach that considers all water flows, including reclaimed water, stormwater, and rainwater as viable water resources. As such, expansion of reclaimed water resources will continue to be an area of focus in New Braunfels for the anticipated future.

The current NBU reuse water system provides direct non-potable reuse water to a 29-acre mixed use development called Sundance Park. Delivery of the reuse water is through approximately 0.75 mile of 10-inch pipeline from the Gruene Road WWTP. Three ponds at Sundance Park store effluent. The Gruene Road WWTP is located in the northeastern quadrant of the city on the Guadalupe River, upstream of the confluence with the Comal River.

The North and South Kuehler WWTPs are located south of IH-35 on the Guadalupe River, below the confluence with the Comal River. NBU plans to retrofit and expand the existing wastewater treatment trains at the North and South Kuehler WWTPs to provide direct potable reclaimed water to users. Completion of the treatment systems will occur by the 2050 decade with an initial combined reuse yield of 7,800 acft/yr from both WWTPs. The city plans to expand the treatment system to provide an additional combined reuse yield of 800 acft/yr each decade through 2080.

The McKenzie WWTP is located southeast of New Braunfels off SH-46 on Elley Lane. NBU plans to retrofit and expand the existing treatment trains to provide direct potable reclaimed water to users. The initial direct potable reuse system will be constructed to provide 4,000 acft/yr of reclaimed water by the 2060 decade. The city plans to expand the treatment system to provide an additional combined reuse yield of 800 acft/yr each decade through 2080.

NBU will ensure that any direct potable reuse project complies with all applicable federal and state laws, regulations, rules, guidelines, and design criteria to produce safe drinking water. Table 5.2.9-8 provides a summary of the available yield for the project.

**Table 5.2.9-8 New Braunfels Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| New Braunfels, Direct Potable Reuse | 0 | 0 | 7,800 | 12,600 | 14,200 | 15,800 |

#### 5.2.9.2.7 San Antonio River Authority (Direct Non-Potable)

The San Antonio River Authority owns and operates three WWTPs, including Martinez II, Martinez IV, and Salitrillo Creek WWTPs in Bexar County. Although the San Antonio River Authority is not considered a WUG for regional water planning purposes, they provide reclaimed water to several customers, including the City of Universal City (WUG recipient is Universal City), Alamo Community College (WUG recipient is Live Oak), and Texas Landfill Management, LLC (WUG recipient is East Central SUD). The total combined contracted flow commitments for the aforementioned entities currently totals approximately 677 acft/yr.

Developing a reuse water program may provide a cost-effective regional strategy for meeting current and future water needs. In the future, the San Antonio River Authority aims to discharge the base flow required by SB-3 and utilize the rest of the WWTP effluent for direct or indirect reuse. According to a

previous San Antonio River Authority study, the base flow requirements for Martinez and Salitrillo Creeks will total 4,344 acft/yr in 2080, which leaves approximately 24,000 acft/yr for the reuse water program in 2080. Direct or indirect potable reuse water from the Salitrillo or Martinez WWTPs for a WMS is considered available for implementation beginning in the 2030 decade. Table 5.2.9-9 provides a summary of the available yield for the project.

**Table 5.2.9-9 San Antonio River Authority Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| San Antonio River Authority, Direct Non-Potable Reuse | 6,750 | 12,500 | 18,200 | 21,100 | 24,000 | 24,000 |

### 5.2.9.2.8 SAWS (Direct Non-Potable and Potable)

SAWS currently supplies direct and indirect non-potable reclaimed water to retail customers and electrical generation end users. Reclaimed water is produced by SAWS' Leon Creek Water Recycling Center Wastewater Treatment Facility and the Steven M. Clouse Water Recycling Center, both in Bexar County.

SAWS plans to increase its direct non-potable reuse program incrementally beginning in 2030 and expanding it to 40,000 acft/yr by 2080. In addition, SAWS requested inclusion of a direct potable reuse strategy that would be considered as an Alternative strategy. The project would develop 25,000 acft/yr of direct potable reclaimed water beginning in the 2060 decade. The strategy would include advanced treatment technologies to treat wastewater effluent to drinking water standards. The treatment facilities would be located at the Steven M. Clouse Water Recycling Center site, then route the potable reclaimed water to the SAWS H2Oaks Center for direct blending and integration into SAWS' existing potable water distribution system. Table 5.2.9-10 provides a summary of the available yield for the potable and non-potable reuse projects.

**Table 5.2.9-10 SAWS Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| SAWS, Direct Non-Potable Reuse | 5,000 | 5,000 | 15,000 | 25,000 | 40,000 | 40,000 |
| SAWS, Direct Potable Reuse (Alternative) | 0 | 0 | 0 | 25,000 | 25,000 | 25,000 |

### 5.2.9.2.9 San Marcos (Direct Non-Potable and Potable)

San Marcos is planning to expand and enhance its existing direct non-potable reuse system in the near future and initiate direct potable reuse as soon as the 2050 decade to provide potable water to customers. The existing San Marcos WWTP, located in Hays County, is expected to undergo a 5 MGD expansion prior to 2030, bringing the total capacity to 14 MGD. Only the portion of WTP facilities and associated costs that are directly required to increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this regional water plan. San Marcos is also planning to construct a new 2 MGD WWTP near FM 1978, which would come online prior to 2030. San Marcos aims to reuse 100 percent of its WWTP effluent by 2080.

The existing reuse water conveyance system consists of an 18-inch diameter main from the San Marcos WWTP to a power plant. There is a 12-inch diameter extension to a cement plant and a planned extension to the proposed Paso Robles Golf Course. Current contracts for reuse water provide a commitment to the power plant but supply other users only on the basis of available supply. Although much of the city's parklands are maintained without supplemental irrigation, the parks along the San Marcos River are the centerpiece of the city's recreational tourist economy. The city's parks department has suggested that irrigating these parklands with reuse water could provide environmental and social benefits by reducing erosion potential along the river and improving the level of service of the local parks.

A previous study identified potential new customers along the existing reuse water pipeline and along the route of a proposed pipeline to serve the Kissing Tree Development and Texas State University's thermal plants. Making reuse water available to the university would reduce demand for San Marcos River water and provide a benefit by allowing increased river flows through the areas of critical habitat. Additional extensions to serve the city's soccer complex and Gary ball fields would reduce potable water demands. Potential industrial users identified by the study include a concrete products manufacturer and a concrete batch plant.

The effluent produced by the existing San Marcos WWTP is already treated to Type 1 reclaimed water standards. Expansion of the direct non-potable system should not require significant additional costs for treatment to non-potable standards. For the direct potable reuse project, advanced treatment technologies would be necessary to meet drinking water standards. Therefore, costs include advanced water treatment, conveyance, and concentrate disposal. Table 5.2.9-11 provides a summary of the available yield for the project.

**Table 5.2.9-11 San Marcos Reuse Available Yield (acft/yr)**

| WUG, Project Name | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| San Marcos, Direct Non-Potable Reuse | 1,971 | 1,971 | 1,971 | 1,971 | 1,971 | 1,971 |
| San Marcos, Direct Potable Reuse | 0 | 0 | 4,705 | 4,705 | 4,705 | 4,705 |

### 5.2.9.3 Environmental Factors

The Reuse Water was evaluated to determine its potential impacts on environmental factors. A summary of the evaluation is presented in Table 5.2.9-12.

A potential positive effect of the Reuse Water Strategies WMS is the potential reduced need for additional groundwater and/or surface water projects that may have greater negative environmental effects through aquifer or stream withdrawals and additional transmission pipelines.

### Table 5.2.9-12 Potential Project Effects on Environmental Factors for the Reuse Water WMS

| Environmental Factor | Potential Impacts |
|---|---|
| Vegetation, Land Use, and Agricultural Resources | • Possible impacts on native vegetation, depending on project location and whether it is temporary or permanent. Temporary construction impacts provide an opportunity to plant native herbaceous species which are beneficial to native wildlife.<br>• Permanent impacts may include conversion of vegetation to pipeline easements and other industrial uses.<br>• Irrigation of natural areas could be beneficial to native vegetation and wildlife.<br>• Reuse water development could provide additional sources of water for agriculture. Irrigation of agricultural lands could be beneficial to the local and state agricultural economy.<br>• Reuse water could provide additional sources of non-potable water for landscape irrigation. Use of drought- tolerant native species in landscapes would help conserve water and support native pollinator species, including the protected monarch butterfly.<br>• Possible impacts to land use and agricultural resources if they are permanently converted for use by the project, depending on project location.<br>• No apparent negative impacts on state water resources; benefit accrues to demand centers by more efficient use of available water supplies; no effect on navigation. |
| Aquatic Resources | • Possible negative water quality impacts if concentrate is discharged into surface water, depending on location and pollutant concentrations.<br>• Possible low impact on environmental water needs, instream flows, and bays and estuaries because of decreased effluent being discharged into water bodies, depending on location.<br>• Possible impacts on wetlands and waters of the United States, depending on project location. Site-specific stream and wetland delineations would be required to determine the extent of impacts, and to see if project adjustments can be made to reduce or avoid impacts to sensitive aquatic features. |

| Environmental Factor | Potential Impacts |
|---|---|
| Threatened, Endangered, and Species of Concern | • Appendix 5D provides a summary of threatened and endangered species, and SGCN that may occur in the counties where the projects are located, including Bexar, Caldwell, Comal, Guadalupe, Hays, and Kendall Counties.<br>• Possible impacts, depending on project location and habitat requirements for listed species.<br>• Native freshwater mussel species are particularly sensitive to reduced stream flow and negative water quality impacts.<br>• Possible impacts, depending on changes in volume of effluent and locations of reuse water projects. |
| Cultural Resources | Possible impacts, depending on project location. Cultural resources survey of the final design plan may be performed to accurately assess the presence and significance of identified and unrecorded cultural resources within the footprint of project impacts. |

### 5.2.9.4 Engineering and Costing

The required improvements to implement a reuse water program would be expected to vary considerably between entities according to the upgrades required both in treatment and distribution. Therefore, cost estimates received from participating entities were used when available. Recent reuse reports and costs were obtained for future development from County Line SUD [1], Fair Oaks Ranch [2], and San Marcos [3]. Other strategy information was obtained via direct communication with the WUG or WWP. The information provided was used to develop costs using the Texas Water Development Board Cost Estimating Tool reported in September 2023 dollars. A unit cost per acft of reuse supply was then applied to the first decade of implementation, and an interest rate of 3.5 percent was assumed for a debt service of 20 years.

The projected project, annual, and unit costs for each of the reuse strategies is presented in Table 5.2.9-13. TWDB Costing Tool Cost Estimate Summaries for Reuse Water strategies are provided in Appendix 5E.

[1] *County Line Reuse Plant Preliminary Cost Estimate*. Southwest Engineers. Prepared for County Line SUD. May 9, 2019.
[2] *Final Draft Water, Wastewater, & Reuse Master Report*. Freese and Nichols, Inc. Prepared for City of Fair Oaks Ranch. 2019.
[3] *Direct Water Reuse Expansion Feasibility Study*. RPS. Prepared for The City of San Marcos and Texas State University. September 2013.

**Table 5.2.9-13 Cost Estimate Summary for the Reuse Water WMS**

| Entity | Initial Capacity (acft/yr) | Project Costs | Annual Costs | Unit Costs ($/acft) |
|---|---|---|---|---|
| Boerne | 1,500 | $9,991,000 | $813,000 | $542 |
| County Line SUD | 560 | $52,441,000 | $6,562,000 | $2,929 |
| Fair Oaks Ranch | 425 | $3,746,000 | $308,000 | $725 |
| GBRA | 1,064 | $41,535,000 | $3,968,000 | $3,729 |
| Kyle | 3,105 | $14,780,000 | $1,319,000 | $425 |
| New Braunfels Utilities | 7,800 | $118,459,000 | $15,213,000 | $1,950 |
| San Antonio River Authority | 6,750 | $142,108,000 | $11,019,000 | $1,632 |
| SAWS (Non-Potable) | 5,000 | $396,046,000 | $55,437,000 | $11,087 |
| SAWS (Potable) | 25,000 | $348,862,000 | $46,321,000 | $1,853 |
| San Marcos (Non-Potable) | 1,971 | $9,933,000 | $972,000 | $493 |
| San Marcos (Potable) | 4,705 | $122,317,000 | $8,671,000 | $1,536 |

### 5.2.9.5 Implementation Considerations

Implementation of the Reuse Water WMS includes the following considerations:

- Each community that pursues reuse water will need to investigate concerns that would include, at a minimum, the following:
  - Amount of treated effluent available, taking into consideration downstream water commitments and discharge permit restrictions;
  - Potential users, primarily individual large-scale users that could utilize non-potable water (e.g., certain industries) and irrigated lands (e.g., golf courses and park areas); and
  - Capital costs of constructing needed distribution systems connecting the treatment facilities to the areas of reuse water.
- Additional implementation considerations include the following:
  - During project development and implementation, it is recommended to avoid and minimize impacts in or near the Edwards Aquifer recharge and contributing zones
  - Use of reclaimed water requires a 210 authorization from the TCEQ.
  - It may be necessary to obtain the following permits or authorizations for project infrastructure:

  - USACE Sections 10 and 404 dredge and fill permits;
  - General Land Office (GLO) sand and gravel removal permits;
  - GLO easement for use of state-owned land; and
  - TPWD sand, gravel, and marl permit.
- Acquisition of private land for construction of new facilities through either negotiations or condemnation;
- Infrastructure design; and
- Depending on the level and types of project impacts, the following natural and cultural resources studies and agency coordination may be required:
  - Stream/wetland delineations to support USACE Section 404 permitting;
  - Site-specific evaluations for threatened/endangered species habitat;
  - Presence/absence surveys for threatened/endangered species if suitable habitat occurs;
  - USFWS and TPWD coordination if protected species may be affected; and
  - Structured cultural resources surveys of project impact areas, and THC coordination in compliance with the ACT and NHPA, if applicable.

## 5.2.10 Brush Management

The SCTRWPG identified the Brush Management WMS as a potentially feasible strategy. However, for the 2026 RWP, the SCTRWPG evaluated and considered the Brush Management WMS but did not identify it as a Recommended strategy because it does not demonstrate a firm yield under drought of record conditions. However, the SCTRWPG supports brush control practices and includes a legislative recommendation in Chapter 8 under the section entitled "Assistance for Alternative Rangeland Management".

### 5.2.10.1 Description of Water Management Strategy

Brush management is the targeted control of brush species that are detrimental to water conservation (e.g., juniper, mesquite, saltcedar) to increase available surface and ground water supplies. The interest in brush management to increase water supply has its roots in 1) the observation that Texas rangelands changed after settlement and use by Europeans from predominantly open grasslands to domination of brush; and 2) the significantly greater interception of water by brush than grasses. The former suggests that the "natural" character of Texas rangelands would be grasslands. The latter suggests the possibility of increasing aquifer recharge and streamflow by controlling and limiting growth of brush and trees in areas where grasslands would have naturally dominated.

The Texas Brush Control Program, created in 1985 and operated by the TSSWCB, served to study and implement brush control programs until September 2011. HB 1808 established the Water Supply Enhancement Program (WSEP) in 2012, with the purpose and intent of increasing available surface and ground water supplies through the selective control of brush species detrimental to water conservation. Beginning in 2019, the legislature has not appropriated funding to the Texas Brush Control Program; any further program activities would require action by the legislature to appropriate funding.

Under the Texas Brush Control Program, the TSSWCB collaborated with soil and water conservation districts and other local, regional, state, and federal agencies to identify watersheds across the state where it is feasible to implement brush control that enhances water supplies. Table 5.2.10-1 summarizes studies performed or sponsored by the TSSWCB within the SCTRWPA since 2000.

**Table 5.2.10-1 TSSWCB Brush Control Planning, Assessment, and Feasibility Studies in Region L**

| TSSWCB Brush Control Planning, Assessment, and Feasibility Studies in Region L | Publication Date | Region L Counties included in Study |
|---|---|---|
| Brush Control Planning, Assessment, And Feasibility Study - Frio River Watershed | 2000 | Uvalde, Medina, Zavala, Frio, Dimmit, La Salle |
| Brush Control Planning, Assessment, and Feasibility Study - Nueces River Watershed | 2000 | Uvalde, Zavala, Dimmit, La Salle |
| Application of the EDYS Decision Tool for Modeling of Target Sites in Gonzales County for Water Yield Enhancement Through Brush Control | 2012 | Gonzales |
| Simulation of Streamflow and the Effects of Brush Management on Water Yields in the Upper Guadalupe River Watershed, South-Central Texas, 1995–2010 | 2012 | Kendall, Comal |

| TSSWCB Brush Control Planning, Assessment, and Feasibility Studies in Region L | Publication Date | Region L Counties included in Study |
|---|---|---|
| Brush Management in Gonzales County as a Water Management Strategy | 2015 | Guadalupe, Caldwell, Gonzales |
| Effects of Huisache Removal on Rangeland Evapotranspiration in Victoria County, South-Central Texas, 2015–18 | 2020 | Victoria |

The evaluation of brush management as a WMS included an evaluation of existing brush control studies and coordination with TSSWCB, EAA, Evergreen UWCD, and Nueces River Authority. While the SCTRWPG supports the practice of brush management, it was not designated as a Recommended strategy in the 2026 RWP because it shows zero firm yield during drought of record conditions. Specifically, Nueces River Authority, EAA and Poteet expressed interest in inclusion of brush management as a WMS. Support for the practice is expressed in Chapter 8 under Assistance for Alternative Rangeland Management.

A statewide TSSWCB initiative for brush control or brush management implementation currently does not exist. TSSWCB funding is available via the WQMP program for conservation practices. To qualify for potential funding, brush management for water supply enhancement must be viewed favorably by the RWPG where the proposed project is located. “Viewed favorably” is distinguished as a recommended or alternative WMS or as a Policy Recommendation. Otherwise, the application is considered not to qualify for funding (State Water Supply Enhancement Plan, TSSWCB, July 2014).

### 5.2.10.2 Available Yield

This WMS has zero firm yield, as described in subsequent paragraphs. Table 5.2.10-2 provides a summary of the available yield for the Brush Management WMS.

**Table 5.2.10-2 Available Yield for the Brush Management WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Brush Management | 0 | 0 | 0 | 0 | 0 | 0 |

Feasibility studies utilize water modeling to calculate project yields. For example, the Ecological Dynamics Simulation (EDYS) model incorporates precipitation, depth of groundwater, topography, soils, and vegetation in order to complete a water balance tracking rainfall, soil moisture, evapotranspiration, runoff of surface water, and recharge of groundwater. Information from these models can be used to approximate recharge to the aquifer in the areas that could potentially increase pumping in fully allocated aquifers, which could lead to a larger MAG, while still adhering to the DFCs adopted by local GMAs. However, models such as EDYS utilize average precipitation data over a period of time. The modeled benefit for the project, while realized long-term, has not been quantified for drought conditions.

In watersheds where WSEP funds were allocated, the TSSWCB worked through districts to deliver technical assistance to landowners to implement brush control activities for water supply enhancement. The 2017 State Water Supply Enhancement Plan incentivized 30,202 acres across the State in 19 project areas through cost share assistance. Projects implemented wholly or partially within the SCTRWPA

improved 2,449 acres of land for a yield of 382 acft/yr. Table 5.2.10-3 provides a summary of the WSEP projects implemented in the SCTRWPA.

**Table 5.2.10-3 Water Supply Enhancement Program 2017 Projects**

| Project | Population Served | No. of Acres Improved | Enhanced Water Yield (acft/yr) |
|---|---|---|---|
| Upper Guadalupe River Project | New Braunfels, San Marcos, Kyle, Buda, Boerne, Kerrville, and surrounding areas | 1,483 | 107 |
| Edwards Aquifer – Frio River Project | Concan, Knippa, and Leakey | 67 | 57 |
| Edwards Aquifer – Medina River Project | Castroville, Bandera, and Medina | 105 | 59 |
| Edwards Aquifer – Nueces River Project | Uvalde, Barksdale, and Camp Wood | 685 | 132 |
| Carrizo/Wilcox Aquifer Project | Guadalupe-Blanco River Authority, San Antonio Water System, Schertz-Seguin Local Government Corporation, Texas Water Alliance, and Gonzales County Water Supply Cooperation | 109 | 27 |
| **Total** | | **2,449** | **382** |

However, TSSWCB confirmed that projects required 18 inches of rain to realize reported yields; as such, these projects could not show a dependable, continuously available water supply in a repeat of the drought of record.

### 5.2.10.3 Environmental Factors

The Brush Management WMS was evaluated to determine its potential impacts on environmental factors. A summary of the evaluation is presented in Table 5.2.10-4.

**Table 5.2.10-4 Potential Project Effects on Environmental Factors for the Brush Management WMS**

| Consideration | Potential Impacts |
|---|---|
| Vegetation, Land Use, and Agricultural Resources | • Possible positive impacts on native vegetation, depending on project location.<br>• No apparent negative impacts on state water resources; benefit accrues to demand centers by more efficient use of available water supplies; no effect on navigation.<br>• Potential to create grassland habitats suitable for livestock grazing. |
| Aquatic Resources | • May have positive impact on environmental water needs, instream flows, and bays and estuaries, depending on location. |

| Consideration | Potential Impacts |
|---|---|
| | • Possible impacts on wetlands and waters of the U.S., depending on project location. |
| Threatened, Endangered, and Species of Concern | • Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that may occur in the counties where the projects are located.<br>• Possible impacts, depending on project location and habitat requirements for listed species.<br>• Best management practices should be implemented to minimize erosion/stream sedimentation during brush removal and until herbaceous vegetation has established.<br>• Migratory birds may occur or nest in project areas. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Preconstruction surveys for active bird nests are recommended.<br>• May remove suitable habitat for woodland species, including golden-cheeked warbler, bats, and migratory birds, while creating habitat for grassland species. |
| Cultural Resources | Soil disturbance due to brush management may affect surficial or shallowly buried archaeological and historic artifacts. |

### 5.2.10.4 Engineering and Costing

Texas A&M University provided a cost estimate for brush control as well as a cost for the associated monitoring program that was considered in the 2016 SCTRWP. The costs, updated for September 2023 dollars, assume initial clearing costs to be $304/acre and maintenance clearing costs to be $7.61/acre/year.

### 5.2.10.5 Implementation Considerations

To make a significant impact upon increasing the recharge of an aquifer, brush control would need to be practiced over a significant land area. Large-scale brush control would require support and cooperative agreements with numerous landowners with various land uses. To incentivize collaboration with landowners, additional subsidies or other considerations may be necessary, which could increase the cost for brush control implementation.

Most of the assumptions and results of brush management are based on computer modeling rather than in situ examples that have the benefit of several years of performance to demonstrate results. One critical implementation issue is how the increase in recharge resulting from brush control would be

related to water supply yield in a permit application with the TCEQ. Key considerations include the following:

- Quantification of increased recharge rates attributable to brush control;
- Differences in recharge rates in various aquifers; and
- Impacts of recharge rate variations to MAG estimates.

Additional environmental considerations may include, but not be limited to, the following:

- Best management practices should be implemented to minimize erosion/stream sedimentation during brush removal and until herbaceous vegetation has established;
- Migratory birds may occur or nest in project areas. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Preconstruction surveys for active bird nests are recommended; and
- Ashe juniper woodlands may contain habitat for the federally endangered golden-cheeked warbler. Habitat and, if appropriate, presence/absence surveys may need to be conducted to determine if brush management activities affect the golden-cheeked warbler.

### 5.2.11 Rainwater Harvesting

The SCTRWPG identified the Rainwater Harvesting WMS as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

#### 5.2.11.1 Description of Water Management Strategy

The Rainwater Harvesting WMS is a new strategy included in the 2026 SCTRWP and is recommended for WUGs considering strategy implementation and County-Other WUGs. Rainwater harvesting is the collection, treatment, and use of stormwater runoff, typically from impermeable surfaces, such as roofs or paved surfaces. Rainwater may be stored and used later for potable and non-potable applications. For purposes of the 2026 RWP, the strategy assumes that potable rainwater harvesting would be implemented by individual homeowners that are considered County-Other; non-potable rainwater harvesting would be implemented individual homeowners within WUGs who request inclusion of the strategy as a supplemental supply that reduces demands for potable water. Figure 5.2.11-1 provides the approximate location of WUGs with the Rainwater Harvesting WMS.

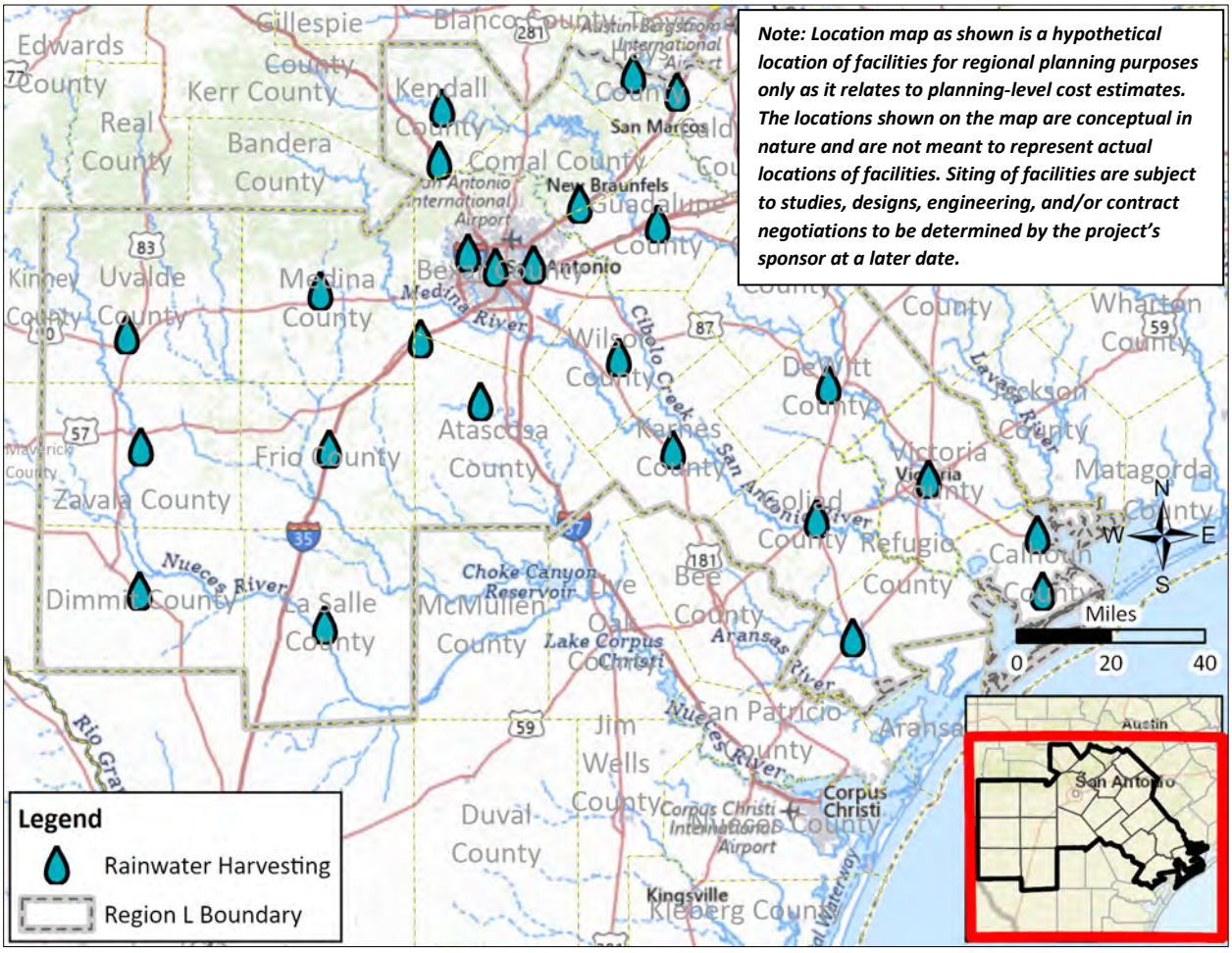



**Figure 5.2.11-1 Approximate Locations of WUGs with the Rainwater Harvesting WMS**

Implementation of rainwater harvesting as a WMS is dependent upon the catchment area, storage capacity, rainfall frequency, and water demand of the end user. Typically, rooftops serve as the catchment area for rainwater harvesting systems, either from a single residence or a group of buildings. A catchment area of 2,000 square feet yields about 1,000 gallons for 1 inch of rainfall. The required

storage capacity is a function of the rainfall frequency and water demand. The variability of rainfall requires consideration of the size, design, and storage over a multi-month period in order to balance rainfall with water demand.

If rainwater harvesting is considered for secondary non-potable uses, as opposed to being a primary water supply, the significance of storage is lessened, and the only remaining concern is the distribution system to deliver the water. This distribution system typically consists of a pump and pressure tank. However, some rainwater catchment systems are gravity driven, where pressurized systems may not be required. If rainwater harvesting is considered as the primary potable water supply, additional considerations concerning filtration and disinfection must be considered. The filtration is available with cloth and carbon filtration units. Disinfection is available with either chemical or ultraviolet systems. Like the non-potable use, a distribution system is required and includes a pump and pressure tank.

### 5.2.11.2 Available Yield

This WMS firm yield is dependent on drought-year rainfall and will be implemented in the 2040 decade. Table 5.2.11-1 provides a summary of the available yield for the Rainwater Harvesting WMS.

**Table 5.2.11-1 Available Yield for the Rainwater Harvesting WMS**

| Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Boerne | 0 | 51 | 69 | 90 | 114 | 141 |
| County-Other, Atascosa | 0 | 2 | 2 | 2 | 2 | 2 |
| County-Other, Bexar | 0 | 6 | 8 | 9 | 9 | 7 |
| County-Other, Caldwell | 0 | 1 | 3 | 2 | 3 | 5 |
| County-Other, Calhoun | 0 | 3 | 3 | 3 | 3 | 3 |
| County-Other, Comal | 0 | 37 | 52 | 114 | 152 | 199 |
| County-Other, DeWitt | 0 | 11 | 11 | 11 | 11 | 11 |
| County-Other, Dimmit | 0 | 2 | 2 | 2 | 2 | 2 |
| County-Other, Frio | 0 | 2 | 2 | 2 | 2 | 2 |
| County-Other, Goliad | 0 | 8 | 8 | 8 | 8 | 8 |
| County-Other, Gonzales | 0 | 2 | 2 | 2 | 2 | 2 |
| County-Other, Guadalupe | 0 | 4 | 7 | 9 | 12 | 15 |
| County-Other, Hays | 0 | 27 | 44 | 118 | 199 | 329 |
| County-Other, Karnes | 0 | 3 | 4 | 4 | 4 | 4 |
| County-Other, Kendall | 0 | 31 | 37 | 45 | 55 | 65 |
| County-Other, La Salle | 0 | 2 | 2 | 2 | 2 | 2 |
| County-Other, Medina | 0 | 10 | 10 | 9 | 9 | 9 |
| County-Other, Refugio | 0 | 4 | 4 | 4 | 4 | 4 |
| County-Other, Uvalde | 0 | 6 | 6 | 6 | 6 | 6 |

| Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| County-Other, Victoria | 0 | 39 | 40 | 40 | 39 | 39 |
| County-Other, Wilson | 0 | 9 | 9 | 9 | 9 | 9 |
| County-Other, Zavala | 0 | 1 | 1 | 1 | 1 | 1 |
| Kirby | 0 | 16 | 16 | 16 | 16 | 16 |
| Kyle | 0 | 132 | 180 | 201 | 208 | 214 |
| Leon Valley | 0 | 28 | 28 | 28 | 28 | 28 |
| Port Lavaca | 0 | 17 | 17 | 17 | 17 | 17 |
| Poteet | 0 | 3 | 3 | 3 | 3 | 3 |
| **Total** | **0** | **457** | **570** | **757** | **920** | **1,143** |

Rainfall throughout the area is not distributed uniformly during the year and, as a result, implementation of rainwater harvesting as a WMS should consider water demands and supplies over a multi-month period. Yields reflect rainfall data from 2011, the peak of the drought of record, when counties across the SCTRWPG received approximately 13 to 18 inches of rain.

For the purposes of planning, it was assumed that 10% of households (one catchment area of about 2,000 square feet per household) will implement rainwater harvesting starting in 2040. Table 5.2.11-2 provides a summary of household implementation, including yield by household limited by either drought of record rainfall or storage capacity.

**Table 5.2.11-2 Rainwater Harvesting WMS Household Implementation**

| WUG | Type of Rainwater Harvesting | Number of Households Implementing WMS by 2080 | Drought-Year Capture per Household (gallons/yr) | Drought-Year Capture per Household (acft/yr) |
|---|---|---|---|---|
| Boerne | Non-Potable | 3,732 | 12,340 | 0.038 |
| County-Other, Atascosa | Potable | 312 | 13,270 | 0.041 |
| County-Other, Bexar | Potable | 4,343 | 15,000 | 0.046 |
| County-Other, Caldwell | Potable | 3,159 | 15,000 | 0.046 |
| County-Other, Calhoun | Potable | 2,187 | 15,000 | 0.046 |
| County-Other, Comal | Potable | 129,543 | 15,000 | 0.046 |
| County-Other, DeWitt | Potable | 7,246 | 15,000 | 0.046 |
| County-Other, Dimmit | Potable | 329 | 12,910 | 0.040 |
| County-Other, Frio | Potable | 927 | 10,380 | 0.032 |
| County-Other, Goliad | Potable | 4,702 | 15,000 | 0.046 |
| County-Other, Gonzales | Potable | 962 | 15,000 | 0.046 |

| WUG | Type of Rainwater Harvesting | Number of Households Implementing WMS by 2080 | Drought-Year Capture per Household (gallons/yr) | Drought-Year Capture per Household (acft/yr) |
|---|---|---|---|---|
| County-Other, Guadalupe | Potable | 9,608 | 15,000 | 0.046 |
| County-Other, Hays | Potable | 214,315 | 15,000 | 0.046 |
| County-Other, Karnes | Potable | 2,703 | 15,000 | 0.046 |
| County-Other, Kendall | Potable | 42,569 | 15,000 | 0.046 |
| County-Other, La Salle | Potable | 1,172 | 9,980 | 0.031 |
| County-Other, Medina | Potable | 5,970 | 14,860 | 0.046 |
| County-Other, Refugio | Potable | 1,807 | 14,050 | 0.043 |
| County-Other, Uvalde | Potable | 4,271 | 13,150 | 0.040 |
| County-Other, Victoria | Potable | 25,476 | 15,000 | 0.046 |
| County-Other, Wilson | Potable | 3,875 | 15,000 | 0.046 |
| County-Other, Zavala | Potable | 919 | 12,470 | 0.038 |
| Kirby | Non-Potable | 393 | 13,370 | 0.041 |
| Kyle | Non-Potable | 5,220 | 13,340 | 0.041 |
| Leon Valley | Non-Potable | 685 | 13,370 | 0.041 |
| Port Lavaca | Non-Potable | 412 | 13,770 | 0.042 |
| Poteet | Non-Potable | 79 | 11,250 | 0.035 |

### 5.2.11.3 Environmental Factors

#### Environmental Considerations

Rainwater harvesting would not adversely affect land use, agricultural resources, aquatic resources, or threatened and endangered species. Harvested rainwater may be used to replace potable water use for landscape watering. Combined with the use of native landscaping plants, rainwater harvesting could result in benefits to native pollinator species.

#### Cultural Considerations

Construction of rainwater harvesting facilities for a historic building or in a designated historic district may require Texas Historical Commission review/approval to ensure that significant historic resources are not negatively impacted. Some cities or counties also have local ordinances or regulations governing protection of historic structures and historic districts.

### 5.2.11.4 Engineering and Costing

The project costs of rainwater harvesting systems are borne by individual system owners, although some WUGs may provide incentives to these individuals such as rebates and tax credits. The actual cost of a rainwater harvesting system is proportional to the water demand to be served by the system.

It is assumed that a single-family household potable rainwater harvesting system consists of 15,000 gallons of storage, a pump and pressure tank, an ultraviolet disinfection system, filtration and miscellaneous piping. All equipment is assumed to be located on the footprint of the homeowner's property. The capital cost for this system is about $21,000 for a system with a 30-year life and 30-year debt service, as is possible that these costs will be passed to developers for new-build homes and paid over the life of the mortgage.

It is assumed that a single-family household non-potable rainwater harvesting system consists of 2,000 gallons of storage, a pump and pressure tank, filtration and miscellaneous piping. All equipment is assumed to be located on the footprint of the homeowner's property. The capital cost for this system is about $8,000 for a system with a 30-year life and 10-year debt service.

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model methodology, which includes standard costing procedures and methods for calculating facility costs, project costs, annual costs, and unit costs. O&M costs were estimated to be 1% of the annual costs. Table 5.2.11-3 provides a cost estimate summary for the Rainwater Harvesting WMS. The unit cost during wet years may be lower, as the yield is based on drought-year rainfall and storage.

**Table 5.2.11-3 Cost Estimate Summary for the Rainwater Harvesting WMS**

| Water User Group | Total Cost of Facilities | Total Cost of Project | Annual Cost | Annual Cost of Water ($ per 1,000 gal) |
|---|---|---|---|---|
| Boerne | $29,856,000 | $29,856,000 | $3,888,560 | $84.64 |
| County-Other, Atascosa | $819,000 | $819,000 | $53,190 | $81.62 |
| County-Other, Bexar | $3,045,000 | $3,045,000 | $196,450 | $86.13 |
| County-Other, Caldwell | $2,205,000 | $2,205,000 | $142,050 | $87.19 |
| County-Other, Calhoun | $1,533,000 | $1,533,000 | $98,330 | $100.59 |
| County-Other, Comal | $90,678,000 | $90,678,000 | $5,836,780 | $90.01 |
| County-Other, DeWitt | $5,082,000 | $5,082,000 | $326,820 | $91.18 |
| County-Other, Dimmit | $1,197,000 | $1,197,000 | $76,970 | $118.11 |
| County-Other, Frio | $1,302,000 | $1,302,000 | $84,020 | $128.92 |
| County-Other, Goliad | $3,612,000 | $3,612,000 | $232,120 | $89.04 |
| County-Other, Gonzales | $798,000 | $798,000 | $50,980 | $78.23 |
| County-Other, Guadalupe | $6,720,000 | $6,720,000 | $432,200 | $88.42 |
| County-Other, Hays | $150,024,000 | $150,024,000 | $9,657,240 | $90.08 |

| Water User Group | Total Cost of Facilities | Total Cost of Project | Annual Cost | Annual Cost of Water ($ per 1,000 gal) |
|---|---|---|---|---|
| County-Other, Karnes | $1,890,000 | $1,890,000 | $121,900 | $93.52 |
| County-Other, Kendall | $29,799,000 | $29,799,000 | $1,917,990 | $90.56 |
| County-Other, La Salle | $1,638,000 | $1,638,000 | $105,380 | $161.70 |
| County-Other, Medina | $4,179,000 | $4,179,000 | $268,790 | $91.65 |
| County-Other, Refugio | $1,764,000 | $1,764,000 | $113,640 | $87.19 |
| County-Other, Uvalde | $3,213,000 | $3,213,000 | $207,130 | $105.94 |
| County-Other, Victoria | $17,829,000 | $17,829,000 | $1,147,290 | $90.28 |
| County-Other, Wilson | $4,116,000 | $4,116,000 | $265,160 | $90.42 |
| County-Other, Zavala | $777,000 | $777,000 | $49,770 | $152.74 |
| Kirby | $3,144,000 | $3,144,000 | $409,440 | $78.53 |
| Kyle | $41,760,000 | $41,760,000 | $5,438,600 | $77.99 |
| Leon Valley | $5,480,000 | $5,480,000 | $713,800 | $78.23 |
| Port Lavaca | $3,296,000 | $3,296,000 | $428,960 | $77.44 |
| Poteet | $632,000 | $632,000 | $82,320 | $84.21 |

### 5.2.11.5 Implementation Considerations

The Rainwater Harvesting WMS includes the following implementation considerations:

- There may be additional THC and local regulatory requirements if adding a rainwater harvesting system to certain existing historic structures.

## 5.2.12 Surface Water Rights

The SCTRWPG identified the Surface Water Rights WMS as a potentially feasible strategy. However, for the 2026 RWP, the SCTRWPG evaluated and considered the Surface Water Rights WMS but did not identify it as a Recommended strategy because there are no sponsoring entities.

### 5.2.12.1 Description of Water Management Strategy

The Surface Water Rights WMS is included in the 2026 SCTRWP to explicitly recognize that use of water supplies made available under existing water rights by lease or purchase agreements between willing buyers and willing sellers is an activity consistent with the 2026 SCTRWP. The additions of diversion points or types and places of use for existing surface water rights are also activities consistent with the 2026 SCTRWP; if necessary, authorizations would be obtained pursuant to TCEQ rules and applicable law. Essentially, this strategy is to develop or enhance water supplies through lease or purchase of existing right(s) having consumptive use and/or impoundment authorizations. Diversion point(s), use type(s), and/or place(s) of use may be amended as long as no associated adverse impact on other water rights or the environment are greater than that with full use prior to amendment (the "No Injury" rule).

It is important to note that this WMS is intended to address existing water rights (within currently authorized annual and instantaneous maximum diversion rates) and not applications for new surface water appropriations. Furthermore, this strategy focuses on maximizing beneficial use of existing run-of-river water rights as opposed to the development of new major reservoirs. As described in Chapter 3, existing firm supplies from major reservoirs are either committed to current steam-electric power generation uses (Coleto Creek Reservoir, Victor Braunig Lake, and Calaveras Lake) or contracted for multiple uses (Canyon Reservoir).

Key applicable water law regarding amendment of existing water rights to facilitate lease/purchase agreements is found in TWC §11.122. which requires water rights holders to obtain authorization from TCEQ to "change the place of use, purpose of use, point of diversion, rate of diversion, acreage to be irrigated, or otherwise alter a water right." §11.122 further provides that "an amendment, except an amendment to a water right that increases the amount of water authorized to be diverted or the authorized rate of diversion, shall be authorized if the requested change will not cause adverse impact on other water right holders or the environment on the stream of greater magnitude than under circumstances in which the permit, certified filing, or certificate of adjudication that is sought to be amended was fully exercised according to its terms and conditions as they existed before the requested amendment." This section is identified in the TCEQ rules as the "No Injury" rule. Pursuant to the "No Injury" rule, restrictions may be placed upon a right for which amendment is being sought in order to protect senior water rights. An example of such restrictions is subordination of an amended right to water rights situated between the existing and amended diversion locations.

### 5.2.12.2 Available Yield

This WMS has zero firm yield as there are no sponsoring entities. Table 5.2.12-1 provides a summary of the available yield for the Surface Water Rights WMS.

**Table 5.2.12-1 Available Yield for the Surface Water Rights WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Surface Water Rights | 0 | 0 | 0 | 0 | 0 | 0 |

Available yield of run-of-river surface water rights, whether before or after lease/purchase under the Surface Water Rights WMS, is typically determined using the applicable WAM. The Guadalupe-San Antonio River Basin (GSA) WAM and the Nueces River basin WAM are the primary tools applicable for consideration of water rights in the SCTRWPA. These WAMs perform the complex calculations accounting for relative seniority, authorized annual diversion, type(s) of use, maximum diversion rate, instream flow requirements, physical location, and authorized storage associated with a particular water right. These calculations are completed in the context of historical hydrology, as necessary to quantify firm diversion or available yield subject to DOR conditions. Information regarding current surface water rights in Region L is summarized in Chapter 3.

### 5.2.12.3 Environmental Factors

Impacts of the Surface Water Rights WMS on environmental factors are location-dependent and project-specific. Because the WMS does not have sponsoring entities in the 2026 RWP, impacts on environmental factors are general in nature.

Potential environmental issues associated with implementation of the Surface Water Rights WMS are limited compared to other strategies because the source of water is existing water rights having prior authorizations for consumptive use. If an amendment to an existing water right is necessary to implement the strategy, §11.122 of the TWC indicates that only adverse impacts on the environment on the stream of greater magnitude than under circumstances in which the right sought to be amended was fully exercised prior to the amendment need be addressed. Construction of a new diversion intake structure, storage, transmission, treatment, and/or integration facilities necessary to use water available under existing rights must be addressed in accordance with applicable state and federal requirements, as they may result in minor to moderate impacts to vegetation, land use, agricultural resources, aquatic resources, cultural resources, and threatened, endangered, and species of concern. Individual projects would require site-specific reviews to determine requirements for environmental permitting and field data collection, if needed.

### 5.2.12.4 Engineering and Costing

This WMS has zero costs, as there are no sponsoring entities. Estimated costs for purchase or lease of existing surface water rights are highly variable depending on location, reliability, and negotiations between willing buyers and sellers. Future acquisitions of specific water rights are not addressed herein.

### 5.2.12.5 Implementation Considerations

The Surface Water Rights WMS includes the following implementation considerations:

- Any potential effects on other water rights, streamflows, and freshwater inflows to bays and estuaries must be considered and quantified to the extent required by TCEQ rules and applicable state and federal law;
- Changes in the point of diversion may necessitate subordination of an amended right to water rights situated between the existing and amended diversion locations;
- Interbasin transfer of water made available under existing surface water rights may involve additional regulatory requirements to amend place of use and may introduce changes in relative priority and inflow passage for environmental flow needs; and
- Run-of-river water rights often require storage and/or groundwater to firm up supply for municipal water use; feasibility studies may be necessary to determine which alternatives are the most economically and operationally feasible.

## 5.2.13 Balancing Storage

The SCTRWPG identified the Balancing Storage WMS as a potentially feasible strategy. However, for the 2026 RWP, the SCTRWPG evaluated and considered the Balancing Storage WMS but did not identify it as a Recommended strategy because there are no sponsoring entities.

### 5.2.13.1 Description of Water Management Strategy

The Balancing Storage WMS is included in the 2026 SCTRWP to explicitly recognize that storage is needed to 1) firm up supplies from run-of-river diversions or interruptible groundwater sources; and 2) ensure that supplies delivered through long distance conveyance facilities are available to meet daily and seasonal demands.

In general, strategies and projects are sized and scheduled to meet seasonal and daily variations of demand, but without storage, some current and proposed supplies may not be fully reliable during extended droughts. Several recommended strategies involve long distance pipelines of more than 40 miles in length that will be supplied from a combination of run-of-river diversions and groundwater. Thus, surface reservoirs, large scale ASR systems, or multipurpose reservoirs that are adequate in size to store surplus flows of surface water during periods of high streamflows, including flood flows, need to be available during extended periods of drought. The Balancing Storage WMS involves implementing such ASR and/or surface storage facilities to assist in satisfying applicable needs.

### 5.2.13.2 Available Yield

This WMS has zero firm yield, as there are no sponsoring entities. Table 5.2.13-1 provides a summary of the available yield for the Balancing Storage WMS.

**Table 5.2.13-1 Available Yield for the Balancing Storage WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|---|
| Balancing Storage | 0 | 0 | 0 | 0 | 0 | 0 |

Available yield associated with the Balancing Storage WMS is typically determined using the applicable surface WAM to simulate operations of the respective WMSs. The GSA WAM, Nueces River Basin WAM, FRAT, Groundwater Availability Models (GAMs), and spreadsheet models are the primary tools applicable for consideration of surface and groundwater flows in Region L.

### 5.2.13.3 Environmental Factors

Impacts of the Balancing Storage WMS on environmental factors are location-dependent and project-specific. Because the WMS does not have sponsoring entities in the 2026 SCTRWP, impacts on environmental factors are general in nature.

Impacts would primarily be associated with terrestrial habitats, as the strategy would use existing surface water or groundwater rights and authorizations and the storage would be either off-channel or underground. Construction or upgrades of storage facilities could result in minor to moderate impacts to vegetation, land use, agricultural resources, aquatic resources, cultural resources, and threatened, endangered, and species of concern. Individual projects would require site-specific reviews to determine requirements for environmental permitting and field data collection, if needed.

### 5.2.13.4 Engineering and Costing

This WMS has zero costs, as there are no sponsoring entities. Estimated costs for development of balancing storage are highly variable depending on location, source water reliability, availability of embankment construction materials, and/or aquifer characteristics.

### 5.2.13.5 Implementation Considerations

The Balancing Storage WMS includes the following implementation considerations:

- Quantification and consideration of any potential effects on water rights, streamflows, and freshwater inflows to bays and estuaries to the extent required by TCEQ rules and applicable state and federal law;
- Run-of-river water rights often require surface storage and/or groundwater to firm up supply for municipal water use; feasibility studies may be necessary to determine which alternatives are the most economically and operationally feasible;
- Acquisition of state, federal, and local permits;
- Environmental studies; and
- Relocations of affected roads, railroads, utilities, and cultural resources.

## 5.2.14 ARWA Carrizo-Wilcox Project (Phase 2)

The SCTRWPG identified the ARWA Carrizo-Wilcox Project (Phase 2) WMS as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.14.1 Description of Water Management Strategy

ARWA Carrizo-Wilcox Project (Phase 2) includes development of raw groundwater supply from the Carrizo-Wilcox Aquifer in Caldwell County.

The project is designed to supply 21,000 acft/yr of treated water by the 2040 decade; however, the available yield varies because of MAG limitations. Planned facilities for Phase 2 include a new well field in Caldwell County for ARWA from the Carrizo-Wilcox Aquifer to increase groundwater supply, a new 28 MGD WTP, an expansion to increase the capacity of the booster pump station that was implemented in Phase 1, two 10 MG GSTs at the expanded booster pump station, and supplementary delivery volumes to the ARWA delivery points. An additional 48-inch diameter pipeline parallel to the Phase 1 pipeline to the booster station is also planned for Phase 2. The approximate location of the project is shown on Figure 5.2.14-1. Phase 2 implementation is planned for the 2040 decade.

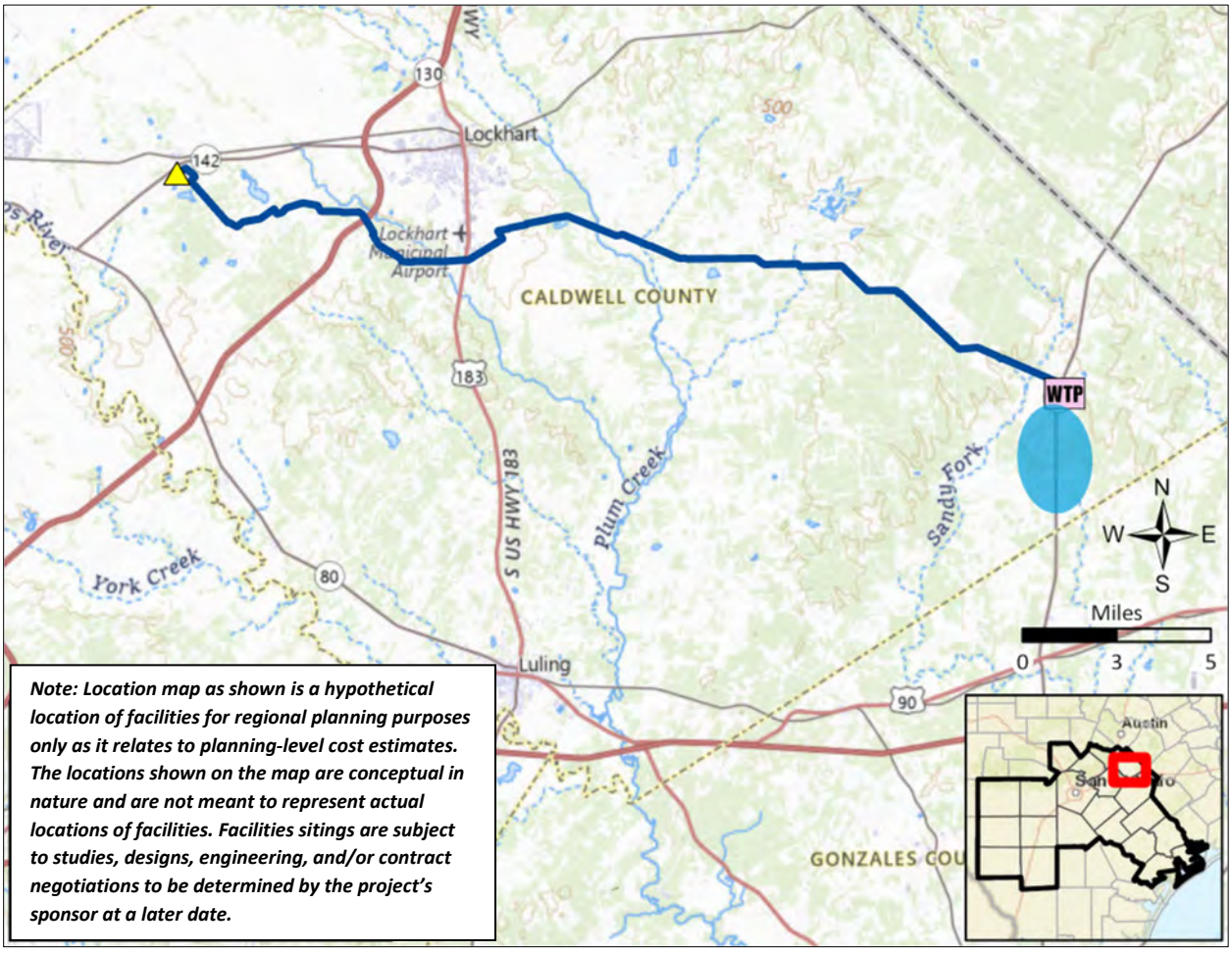



**Figure 5.2.14-1 Approximate Location of the ARWA Carrizo-Wilcox Project (Phase 2)**

### 5.2.14.2 Available Yield

This WMS is planned for full completion by 2040 and has an available yield that varies by decade because of MAG limitations. Table 5.2.14-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the ARWA Carrizo-Wilcox Project (Phase 2) WMS. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.14-1 Envisioned and MAG-Constrained Yields for the ARWA Carrizo-Wilcox Project (Phase 2) (acft/yr)**

| Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Envisioned Yield | 0 | 21,000 | 21,000 | 21,000 | 21,000 | 21,000 |
| MAG-Constrained Yield | 0 | 2,392 | 8,429 | 10,397 | 12,844 | 12,818 |

The Gonzales County UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Gonzales County. In 2021, Groundwater Management Area (GMA)-13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer is 30,087 acft/yr for Gonzales County in 2080 [2].

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[2] Wade, S.C. 2022. Groundwater Availability Model (GAM) Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

The ARWA Carrizo-Wilcox Project (Phase 2) will provide treated water volumes to customers, as shown in Table 5.2.14-2. Because this WMS is MAG-constrained, customer allocations are detailed for both the Envisioned Yield and the MAG-Constrained Yield.

**Table 5.2.14-2 Delivery Points and Annual Volumes for ARWA Carrizo-Wilcox Project (Phase 2) (acft/yr)**

| Delivery Point | Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| Crystal Clear SUD (Delivery Point 1) | Envisioned Yield | 0 | 3,297 | 3,297 | 3,297 | 3,297 | 3,297 |
| | MAG-Constrained Yield | 0 | 376 | 1,323 | 1,632 | 2,017 | 2,012 |
| Crystal Clear SUD (Delivery Point 2) | Envisioned Yield | 0 | 288 | 288 | 288 | 288 | 288 |
| | MAG-Constrained Yield | 0 | 33 | 116 | 143 | 176 | 176 |
| Green Valley SUD | Envisioned Yield | 0 | 2,232 | 2,232 | 2,232 | 2,232 | 2,232 |
| | MAG-Constrained Yield | 0 | 254 | 896 | 1,105 | 1,365 | 1,362 |
| San Marcos (Delivery Point 1) | Envisioned Yield | 0 | 3,523 | 3,523 | 3,523 | 3,523 | 3,523 |
| | MAG-Constrained Yield | 0 | 401 | 1,414 | 1,744 | 2,155 | 2,151 |
| San Marcos (Delivery Point 2) | Envisioned Yield | 0 | 4,007 | 4,007 | 4,007 | 4,007 | 4,007 |
| | MAG-Constrained Yield | 0 | 456 | 1,608 | 1,984 | 2,450 | 2,446 |
| County Line SUD | Envisioned Yield | 0 | 670 | 670 | 670 | 670 | 670 |
| | MAG-Constrained Yield | 0 | 76 | 269 | 332 | 410 | 409 |
| Kyle Delivery Point | Envisioned Yield | 0 | 5,916 | 5,916 | 5,916 | 5,916 | 5,916 |
| | MAG-Constrained Yield | 0 | 674 | 2,375 | 2,929 | 3,618 | 3,611 |
| Buda Delivery Point [1] | Envisioned Yield | 0 | 1,067 | 1,067 | 1,067 | 1,067 | 1,067 |
| | MAG-Constrained Yield | 0 | 122 | 428 | 528 | 653 | 651 |

[1] Buda is a WUG in Region K.

For the ARWA Carrizo-Wilcox Project (Phase 2), ARWA plans to develop a well field that would supply a total of 21,000 acft/yr from the Carrizo-Wilcox Aquifer. A total of 15 wells are proposed, with two of the 15 wells recommended as contingency for operational flexibility or backup raw water supply. These 15 wells are in addition to the 11 existing wells in Phase 1 of the ARWA project. Well field details and project yield for the ARWA Carrizo-Wilcox Project (Phase 2) are provided in Table 5.2.14-3.

**Table 5.2.14-3 Well Field Details and Envisioned Project Yield for the ARWA Carrizo-Wilcox Project (Phase 2)**

| Description | Phase 2 |
|---|---|
| Envisioned Project Yield (acft/yr) | 21,000 |
| Number of Wells | 15 |
| Average Well Production Capacity (gpm) | 1,012 |
| Well Depth (ft) | ~700 |
| TDS Concentration (mg/L) | 200 |

### 5.2.14.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.14-4 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.14-4 Summary of Potential Project Effects on Environmental Factors for the ARWA Carrizo-Wilcox Project (Phase 2)**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 89 |
| Potential Species Impact Score | 8 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 4 |
| Potential Stream Flow / Water Quality Impact Score | 2 |
| Potential Cultural Resources Impact Score | 71.7 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area is located in the Post Oak Savannah and Blackland Prairie ecoregions and crosses a variety of vegetation types, mostly open fields, pastures, and riparian zones along streams. As mapped by TPWD [3], dominant vegetation types in the project area are savanna grassland, yaupon motte and woodland, post oak motte and woodland, mesquite shrubland, and disturbance/tame grassland. The linear components of the project cross riparian vegetation zones along streams, mapped by TPWD as floodplain and riparian herbaceous vegetation, floodplain and riparian hardwood forest, floodplain and riparian deciduous shrubland, and riparian hardwood/evergreen forest. Riparian vegetation zones within the Phase 2 well field site are mapped by TPWD as floodplain and riparian herbaceous vegetation, hardwood/evergreen forest, deciduous and evergreen shrublands, and live oak and hardwood forests.

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

Based on TPWD vegetation mapping, the project may have the potential to impact 89 acres of agricultural resources, including 4 acres mapped as row crops, and 85 acres of disturbance or tame grassland which may include pasture areas used for grazing.

Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing and woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may also continue to be used for agricultural purposes.

### Aquatic Resources

The project pipeline alignment does not cross any major rivers but crosses several mapped streams and their floodplains, including Clear Fork Plum Creek, Plum Creek, Big West Fork Plum Creek, and Buck Branch within the Guadalupe River basin. The NWI mapping shows 3.3 acres of ponds and riverine wetlands in the project area. The well field site contains approximately 52.1 acres of mapped ponds and riverine wetlands.

The pipeline alignment crosses Segment 1810 of Plum Creek, which is designated as an impaired water body in the Texas Integrated Report of 303(d) listed water bodies [4]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The project pipeline does not cross any ecologically significant stream segments designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including cases where there would be permanent impacts to more than 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that may occur in Caldwell County [5, 6]. Streams in the project area may contain suitable habitat for the federally endangered false spike (*Fusconaia mitchelli*) and Guadalupe orb (*Cyclonaias necki*)

---

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir .

[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Caldwell County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[6] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Caldwell County. https://ipac.ecosphere.fws.gov/location/index.

freshwater mussels. The federally endangered whooping crane (*Grus americana*) and black rail (*Laterallus jamaicensis*) may occur in or fly over the project area during migration. Suitable habitat is also likely to occur for the monarch butterfly (*Daneus plexippus*), which is a candidate species for federal listing as a threatened or endangered species.

Suitable habitat may occur for several state-listed threatened species, including the swallow-tailed kite (*Elanoides forficatus*), white-faced ibis (*Plegadis chihi*), wood stork (*Mycteria americana*), false spike, Guadalupe orb, and Texas horned lizard. Potentially suitable habitat may occur for numerous wildlife, plant, and insect species designated by TPWD as SGCN, particularly species associated with sandy soil habitats. These species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones and wetland areas.

Suitable freshwater mussel habitat may occur in perennial streams and perennial pools of intermittent streams. If any such habitat would be affected by construction, presence/absence surveys and relocation of native mussel species would be required. Handling and relocation of mussels and other aquatic species must be conducted by USFWS- and TPWD-permitted personnel and in accordance with an approved Aquatic Resources Relocation Plan.

Site-specific field surveys would be required to determine the quality of habitat for state-listed species. Coordination with TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat is present, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs from impacts unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15.

### Cultural Considerations

For linear portions of the project (i.e., project alignment), a background literature review was performed for the alignment a 300-foot radius around the project alignment. For the area portion of the project (i.e., project area), A background literature review of just the area portion. The background literature review identified 16 cultural resources that intersect with the approximate 3,245-acre project area and alignment (Table 5.2.14-5). The project area contains one cemetery (i.e., Smith Cemetery), and the project alignment contains 15 archaeological sites (i.e., 41CW117, 41CW118, 41CW119, 41CW186, 41CW187, 41CW188, 41CW191, 41CW192, 41CW194, 41CW195, 41CW196, 41CW197, 41CW198, 41CW202, and 41CW203) [7]. Out of the archaeological sites, only one is ineligible for listing on the NRHP (i.e., 41CW117), while the rest remain undetermined for listing on the NRHP. Additionally, the historical

[7] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed September 2024.

map review identified 16 potential historic-age structures that intersect with the project area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment [8].

**Table 5.2.14-5 Cultural Resources Results for the ARWA Carrizo-Wilcox Project (Phase 2)**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41CW117) | Lithic scatter | Prehistoric | Ineligible (THC 8/28/2009; 5/4/2022) | Intersect |
| Archaeological Site (41CW118) | Open camp | Prehistoric | Undetermined (THC 8/28/2009; 5/4/2022) | Intersect |
| Archaeological Site (41CW119) | Open camp | Prehistoric | Undetermined (THC 8/28/2009; 5/4/2022) | Intersect |
| Archaeological Site (41CW186) | Farmstead | Historic | Undetermined | Intersect |
| Archaeological Site (41CW187) | Lithic scatter / Farmstead | Multicomponent | Undetermined | Intersect |
| Archaeological Site (41CW188) | Residence | Historic | Undetermined | Intersect |
| Archaeological Site (41CW191) | Residence | Historic | Undetermined | Intersect |
| Archaeological Site (41CW192) | Lithic scatter / historic artifact scatter | Multicomponent | Undetermined | Intersect |
| Archaeological Site (41CW194) | Camp site | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41CW195) | Quarry / Procurement site | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41CW196) | Lithic procurement site | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41CW197) | Lithic procurement site | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41CW198) | Farmstead | Historic | Undetermined | Intersect |
| Archaeological Site (41CW202) | Farmstead | Historic | Undetermined | Intersect |
| Archaeological Site (41CW203) | Farmstead | Historic | Undetermined | Intersect |
| Smith Cemetery | Cemetery | Historic | Undetermined | Intersect |

[8] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| None (N=16) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **71.7** |

In the State of Texas, all human burials are protected by law[9], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and alignment and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume per THC authorization.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for this project equaled 71.7.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, 15 archaeological sites, one cemetery, and 16 potential historic-age structures are located within the project area and alignment; the probability model indicates a low likelihood of buried deposits; and the project assessment score is 71.7. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

### 5.2.14.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required

[9] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

for a new groundwater well field, a new WTP, and conveyance of potable water to existing integration pipelines that currently deliver water recovered from the existing local projects.

A cost estimate summary for ARWA Carrizo-Wilcox Project (Phase 2) is provided in Table 5.2.14-6. Infrastructure was sized to deliver the sponsor's Envisioned Yield, but because the project is MAG-limited, the annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the lack of groundwater availability.

**Table 5.2.14-6 Cost Estimate Summary for the ARWA Carrizo-Wilcox Project (Phase 2)**

| Item | Estimated Costs |
|---|---|
| Transmission Pipeline (48 in. dia., 27.7 miles) | $150,352,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $3,569,000 |
| Well Fields (Wells, Pumps, and Piping) | $28,086,000 |
| Water Treatment Plant (28 MGD) | $10,808,000 |
| Integration, Relocations, Backup Generator & Other | $493,000 |
| **TOTAL COST OF FACILITIES** | **$193,308,000** |
| | |
| Planning (3%) | $5,799,000 |
| Design (7%) | $13,532,000 |
| Construction Engineering (1%) | $1,933,000 |
| Legal Assistance (2%) | $3,866,000 |
| Fiscal Services (2%) | $3,866,000 |
| Pipeline Contingency (15%) | $22,553,000 |
| All Other Facilities Contingency (20%) | $8,591,000 |
| Environmental & Archaeology Studies and Mitigation | $1,492,000 |
| Land Acquisition and Surveying (421 acres) | $566,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $8,288,000 |
| **TOTAL COST OF PROJECT** | **$263,794,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $18,526,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $1,825,000 |
| Water Treatment Plant | $3,567,000 |
| Pumping Energy Costs (26,633,630 kW-hr @ 0.09 $/kW-hr) | $2,397,000 |

| Item | Estimated Costs |
|---|---|
| **TOTAL ANNUAL COST** | **$26,315,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,392 |
| **Annual Cost of Water ($ per acft)*** | $11,001 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $3,256 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $33.76 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $9.99 |
| *Based on a peaking factor of 1.5. | |

### 5.2.14.5 Implementation Considerations

Information presented in this WMS was provided by ARWA and represents the current plan, which is based on the sponsor's current understanding of the system. The actual well capacities and water quality may vary, depending on site-specific conditions. Implementation of the ARWA Carrizo-Wilcox Project (Phase 2) WMS includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Regulations by TCEQ; and
- Regulations by the Gonzales County UWCD and/or the Plum Creek CD.

Additional considerations may include the following:

- Impacts on the following:
  - Endangered and threatened species;
  - Baseflow in streams; and
  - Wetlands.
- Competition with others in the area for groundwater in the Carrizo Aquifer, including the following:
  - Private water purveyors;
  - Public water purveyors in the area; and/or
  - Future oil and gas drilling operations.

## 5.2.15 ARWA DPR Project (Phase 3)

The SCTRWPG identified the ARWA DPR Project (Phase 3) WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.15.1 Description of Water Management Strategy

For the ARWA DPR Phase 3 Project, ARWA plans to develop a DPR WTP that would provide approximately 5,494 acft/yr of water supply for ARWA's customers. Phase 3 expands upon two prior projects: an existing, joint project with GBRA called the ARWA/GBRA Project (Phase 1); and the ARWA Carrizo-Wilcox Project (Phase 2) (refer to Section 5.2.14). Water developed in Phase 3 would be commingled with water from Phase 1 and Phase 2, then be delivered via existing delivery points to customers. Phase 3 is planned for full completion by the 2060 decade.

Phase 3 includes advanced treatment of wastewater effluent from the San Marcos WWTP for direct potable reuse and construction of new pipelines for delivery of treated water and disposal of blended effluent concentrate. Planned facilities will be located within Caldwell and Hays Counties. The planned facilities and features for the ARWA Project (Phase 3) include the following:

- Construction of a 5.0 MGD DPR WTP near the San Marcos WWTP that would provide advanced treatment of the San Marcos WWTP effluent to DPR standards;
- A 5.0 MGD pump station at the DPR WTP;
- A 5.0 MGD expansion to an existing booster station;
- An 18-inch diameter pipeline to deliver the DPR treated drinking water to the existing booster station;
- A 16-inch pipeline for the blended effluent concentrate;
- A 1 MG ground storage tank; and
- Supplementary delivery volumes to the ARWA delivery points.

The approximate location of the project is shown on Figure 5.2.15-1.

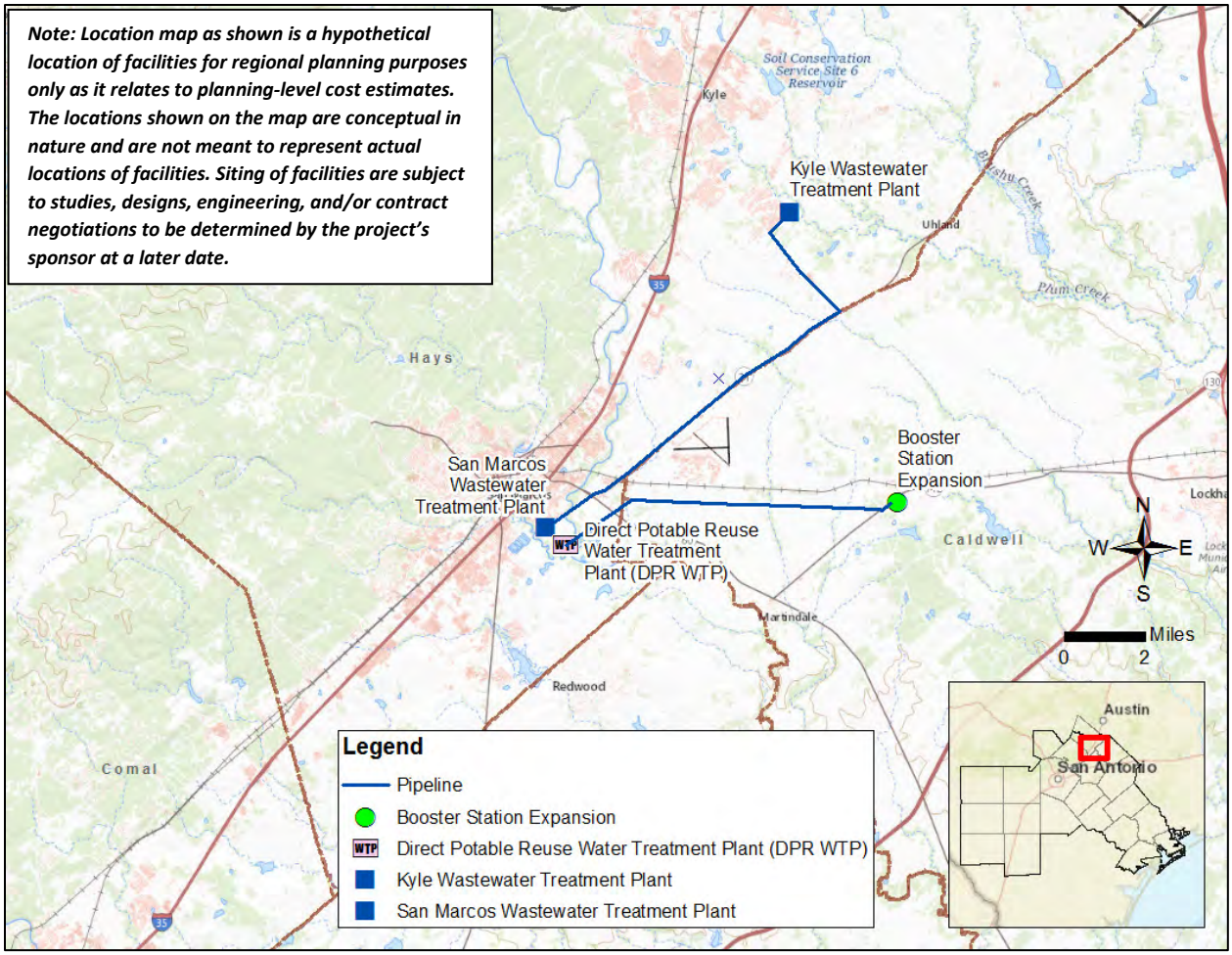



**Figure 5.2.15-1 Approximate Location for the ARWA DPR Project (Phase 3)**

### 5.2.15.2 Available Yield

This WMS has a firm yield of 5,494 acft/yr and is planned for completion by 2060. Table 5.2.15-1 provides a summary of the available yield for the ARWA DPR Project (Phase 3) WMS.

**Table 5.2.15-1 Available Yield for the ARWA DPR Project (Phase 3) WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| ARWA DPR Project (Phase 3) | 0 | 0 | 0 | 5,494 | 5,494 | 5,494 |

Phase 3 will provide an additional 5,494 acft/yr of water by treating effluent from the San Marcos WWTP and Kyle WWTP via RO at a planned 5.0 MGD DPR WTP. Population and demand projections show increase over time for ARWA customers, so this amount of water should continue to be available. Treated water will be conveyed through an 18-inch diameter pipeline to the booster station for blending with other ARWA water sources and then distributed to customers. All eight of the ARWA delivery locations are expected to receive additional treated water as detailed in Table 5.2.15-2. The concentrate waste stream from the DPR WTP will be blended with effluent from the San Marcos WWTP, pumped to

the Kyle WWTP via a 16-inch diameter pipeline, and then blended with the Kyle WWTP effluent prior to discharge.

**Table 5.2.15-2 Delivery Points and Annual Volumes for the ARWA Phase 2 and ARWA Phase 3 Projects (acft/yr)**

| Delivery Point | Phase 2 [1] | Phase 3 | Total |
|---|---|---|---|
| Crystal Clear SUD (Delivery Point 1) | 3,297 | 953 | 4,250 |
| Crystal Clear SUD (Delivery Point 2) | 288 | 0 | 288 |
| Green Valley SUD | 2,232 | 594 | 2,826 |
| San Marcos (Delivery Point 1) | 3,523 | 937 | 4,460 |
| San Marcos (Delivery Point 2) | 4,007 | 1,065 | 5,072 |
| County Line SUD | 669 | 178 | 847 |
| Kyle Delivery Point | 5,916 | 1,573 | 7,489 |
| Buda Delivery Point [2] | 1,067 | 178 | 1,245 |
| **Total** | **20,999** | **5,494** [3] | **26,493** |

[1] Refer to Section 5.2.14 for more details on the ARWA Expanded Carrizo-Wilcox Project (Phase 2).
[2] Buda is a WUG in Region K.
[3] Phase 3 also includes 16 acft/yr of unassigned volumes to ARWA, for a total of 5,494 acft/yr.

### 5.2.15.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.15-3 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.15-3 Summary of Potential Project Effects on Environmental Factors for the ARWA DPR Project (Phase 3) WMS**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 139 |
| Potential Species Impact Score | 8 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 2 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 103 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area is located in the Blackland Prairie ecoregion and crosses a variety of vegetation types, mostly open fields, pastures, and riparian zones along streams. As mapped by TPWD [1], dominant vegetation types in the project area are disturbance/tame grassland, row crops, savanna grassland, and low-density residential. The project crosses riparian vegetation zones along streams, mapped by TPWD as floodplain and riparian herbaceous vegetation, floodplain and riparian hardwood forest, and floodplain and riparian deciduous shrubland.

Based on TPWD vegetation mapping, the project may have the potential to impact 139 acres of agricultural resources, including 67 acres mapped as row crops, and 72 acres of disturbance or tame grassland which may include pasture areas used for grazing.

Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes.

### Aquatic Resources

The project pipeline alignment crosses the Blanco River, Clear Fork Plum Creek, Hemphill Creek, and Morrison Creek and their floodplains associated with the San Marcos River within the Guadalupe River basin. The NWI mapping shows 3.2 acres of ponds and riverine wetlands in the project area.

The project pipeline does not cross any streams designated as impaired stream segments in the Texas Integrated Report of 303(d)-listed water bodies [2]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The project pipeline does not cross any ecologically significant stream segments designated by TPWD. Plum Creek would receive discharge from the Kyle Wastewater Treatment Plant. The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

---

[1] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

[2] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Caldwell and Hays counties [3, 4, 5, 6]. The project area may contain suitable habitat for the federally endangered Guadalupe orb (*Cyclonaias necki*), proposed endangered tricolored bat (*Perimyotis subflavus*), and the monarch butterfly (*Danaus plexippus*), which is a candidate for listing as a federally threatened or endangered species.

Suitable habitat may occur for several state-listed threatened species including Texas horned lizard (*Phrynosoma cornutum*), white-faced ibis (*Plegadis chihi*), and Guadalupe darter (*Percina apristis*). Potentially suitable habitat may occur for numerous wildlife, plant, and insect species designated by TPWD as SGCN, particularly species associated with sandy soil habitats. These species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones and wetland areas.

Suitable habitat for federally endangered freshwater mussels and the state-threatened Guadalupe darter may occur in perennial streams and perennial pools of intermittent streams. If any such habitat would be affected by construction, presence/absence surveys, and relocation of native mussel species would be required. Handling and relocation of mussels and other aquatic species must be conducted by TPWD-permitted personnel and in accordance with an approved Aquatic Resources Relocation Plan. Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs from impacts unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

## Cultural Considerations

For linear portions of the project, a background literature review was performed for the alignment a 300-foot radius around the project alignment. The background literature review identified 22 cultural resources that intersect with or are immediately adjacent (i.e., within 300 feet) to the approximate 220-acre project alignment (Table 5.2.15-4). Seventeen of these cultural resources intersect the project alignment and include eight archaeological sites (i.e., 41CW53, 41CW96, 41CW206, 41CW208, 41HY324,

[3] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Caldwell County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[4] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Caldwell County. https://ipac.ecosphere.fws.gov/location/index.
[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Hays County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[6] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Hays County. https://ipac.ecosphere.fws.gov/location/index.

41HY383, 41HY402, and 41HY466), one historic trail (i.e., El Camino Real de Los Tejas), and one NRHP-eligible historic district containing seven NRHP-eligible properties (i.e., Hohenberg-Mittendorf Farm) [7, 8]. Five cultural resources are adjacent to the project alignment and include four archaeological sites (i.e., 41CW223, 41CW228, 41HY292, and 41HY611) and one cemetery (i.e., Santa Maria Aida Cemetery). Among the total 12 archaeological sites located within or adjacent to the project alignment, six are ineligible for listing on the NRHP (i.e., 41CW53, 41CW96, 41HY324, 41HY402, 41HY466, and 41HY611), and other six remain undetermined (i.e., 41CW206, 41CW208, 41CW223, 41CW228, 41HY292, and 41HY383) for listing on the NRHP. Additionally, the historical map review identified three potential historic-age structures that intersect with the project alignment [9].

In the State of Texas, all human burials are protected by law [10], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project alignment and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume in accordance with THC authorization.

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 88% of the project alignment had a high likelihood of containing significant unidentified archaeological resources and 12% had a moderate likelihood. No areas were identified by the model as having a low probability. Areas with high archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project alignment. Next, the cultural resources within the project alignment were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 103.

[7] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed July 2024.
[8] Texas Department of Transportation (TxDOT). 2024. TxDOT Historic Resources Aggregator, TxDOT Environmental Affairs Division. Austin, Texas Available at: https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=e13ba0aa78bf4548a8e98758177a8dd5. Accessed July 2024.
[9] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.
[10] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

### Table 5.2.15-4 Cultural Resources Results for the ARWA DPR Project (Phase 3) WMS

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41CW53) | Camp Site | Prehistoric | Ineligible (THC 12/9/2022) | Intersect |
| Archaeological Site (41CW96) | Lithic Scatter, and Artifact Scatter | Prehistoric, and Historic | Ineligible (THC 3/8/2007) | Intersect |
| Archaeological Site (41CW206) | Historic Dump | Historic | Undetermined | Intersect |
| Archaeological Site (41CW208) | Lithic Scatter, and Farmstead | Prehistoric, and Historic | Undetermined | Intersect |
| Archaeological Site (41CW223) | Camp Site | Historic | Undetermined (THC 6/24/1998) | Adjacent |
| Archaeological Site (41CW228) | Quarry, and Farmstead | Prehistoric, and Historic | Undetermined | Adjacent |
| Archaeological Site (41HY292) | Lithic Scatter | Prehistoric | Undetermined | Adjacent |
| Archaeological Site (41HY324) | Farmstead | Historic | Ineligible (THC 12/10/2019) | Intersect |
| Archaeological Site (41HY383) | Lithic Scatter, and Artifact Scatter | Prehistoric, and Historic | Undetermined | Intersect |
| Archaeological Site (41HY402) | Household | Historic | Ineligible (THC 3/8/2007) | Intersect |
| Archaeological Site (41HY466) | Lithic Scatter | Prehistoric | Ineligible (THC 5/27/2010) | Intersect |
| Archaeological Site (41HY611) | Household | Historic | Ineligible (THC 11/27/2023) | Adjacent |
| Santa Maria Aida Cemetery (CW-C071) | Cemetery | Historic | Undetermined | Adjacent |
| El Camino Real De Los Tejas | Historic Trail | Historic | Listed (segments) | Intersect |
| Hohenberg-Mittendorf Farm | Historic District | Historic | Eligible (since 2021) | Intersect |
| Farm Building (1) | Historic Property (Contributing Resource) | Historic | Eligible | Intersect |
| Farm Building (2) | Historic Property (Contributing Resource) | Historic | Eligible | Adjacent |
| Farm Building (3) | Historic Property (Contributing Resource) | Historic | Eligible | Adjacent |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Leser House | Historic Property (Contributing Resource) | Historic | Eligible | Adjacent |
| Mayfield-Gutsch Estate | Historic Property (Contributing Resource) | Historic | Eligible | Adjacent |
| Mount Bonell | Historic Property (Contributing Resource) | Historic | Eligible | Adjacent |
| Radkey` House | Historic Property (Contributing Resource) | Historic | Eligible | Adjacent |
| None (N=3) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **103** |

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, the project alignment contains eight archaeological sites, one NRHP district with seven contributing resources, one historic trail, and three potential historic-age structures; in addition, four archaeological sites and one cemetery are located immediately adjacent to the project's pipeline alignment. The probability model for the project indicates a high likelihood of buried deposits; and the project assessment score is 103. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

### 5.2.15.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for advanced water treatment, transmission, and integration. A cost estimate summary for the ARWA DPR Project (Phase 3) WMS is provided in Table 5.2.15-5.

### Table 5.2.15-5 Cost Estimate Summary for the ARWA DPR Project (Phase 3) WMS

| Item | Estimated Costs |
|---|---|
| Intake Pump Stations (5.2 MGD) | $10,689,000 |
| Transmission Pipeline (16-18 in. dia., 14.3 miles) | $23,156,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $1,784,000 |
| Advanced Water Treatment Facility (5 MGD) | $42,724,000 |
| Integration, Relocations, Backup Generator & Other | $7,039,000 |
| **TOTAL COST OF FACILITIES** | **$85,392,000** |
| | |
| Planning (3%) | $2,562,000 |
| Design (7%) | $5,977,000 |
| Construction Engineering (1%) | $854,000 |
| Legal Assistance (2%) | $1,708,000 |
| Fiscal Services (2%) | $1,708,000 |
| Pipeline Contingency (15%) | $3,473,000 |
| All Other Facilities Contingency (20%) | $12,447,000 |
| Environmental & Archaeology Studies and Mitigation | $517,000 |
| Land Acquisition and Surveying (188 acres) | $1,479,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $3,762,000 |
| **TOTAL COST OF PROJECT** | **$119,879,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $8,408,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $320,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $267,000 |
| Advanced Water Treatment Facility | $5,568,000 |
| Pumping Energy Costs (6,266,181 kW-hr @ 0.09 $/kW-hr) | $564,000 |
| **TOTAL ANNUAL COST** | **$15,127,000** |
| | |
| **Available Project Yield (acft/yr)** | 5,494 |
| **Annual Cost of Water ($ per acft)*** | $2,753 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,223 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $8.45 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.75 |
| *Based on Peaking Factor of 1.0 | |

### 5.2.15.5 Implementation Considerations

Information presented in this WMS was provided by ARWA and represents the current approach, which is based on the sponsor's current understanding of the system. Implementation of the ARWA DPR Project (Phase 3) WMS will require permits and approvals from the TCEQ. Additional implementation considerations include the following:

- Adequate treatment of WWTP effluent to drinking water quality standards;
- Verification of water quality for concentrations of constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- The TCEQ has not previously approved potable reuse projects that combine effluent from multiple WWTPs; additional effluent source water characterization studies may be required; and
- Uncertain TCEQ regulatory requirements for DPR WTPs and for blending DPR treated water with other water sources.

## 5.2.16 CRWA Expanded Brackish Carrizo-Wilcox Project

The SCTRWPG identified the CRWA Expanded Brackish Carrizo-Wilcox Project as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.16.1 Description of Water Management Strategy

The CRWA Expanded Brackish Carrizo-Wilcox Project includes developing a brackish groundwater supply from the Carrizo-Wilcox Aquifer in Guadalupe and Wilson Counties for members of CRWA with service areas in Bexar, Guadalupe, and Wilson Counties. The project is designed to supply 14,700 acft/yr of treated water (13.1 MGD) with a peak demand of 17.1 MGD by the 2040 decade; however, the available yield varies because of MAG limitations. Planned facilities for the CRWA Brackish Carrizo-Wilcox Project include two new well fields to produce brackish groundwater from the Carrizo-Wilcox Aquifer in Wilson and Guadalupe Counties; wells, pumps, and collector pipelines; a new 17.1 MGD WTP with desalination; a 12-mile treated water transmission pipeline; pump stations; one GST; and five deep-well injection wells for disposal of desalination concentrate. The well fields are planned for northern Wilson County and southern Guadalupe County, along Hwy 123. The desalination WTP and site of concentrate disposal will be in the vicinity of the well fields. The target disposal of the concentrate will be deep well injection into depleted or partially depleted oil and gas producing reservoirs (Austin Chalk or Edwards Limestone). Treated water will be transferred to the existing Liessner Booster Station for distribution to CRWA's customers. The approximate location of the CRWA Expanded Brackish Carrizo-Wilcox Project is shown on Figure 5.2.16-1.

Water treatment will consist of pretreatment and desalination. Pretreatment will include filtration and possibly other processes to remove particulates such as iron or manganese and to condition the water for optimal desalination. Desalination treatment is expected to be completed by RO. The required secondary MCL for TDS is 1,000 mg/L. The design of the water treatment facilities is to produce potable water with a TDS concentration between 400 and 450 mg/L. Preliminary water treatment design includes (1) pretreatment of all raw water, (2) approximately 70% of the water will be sent to the desalination WTP, and (3) the remaining 30% of the water will be blended with the desalinated water. A desalination plant recovery rate of 80% is obtained by treating raw water with a TDS concentration of approximately 1,200 mg/L with conventional RO. Thus, 80% of the water entering the desalination plant becomes potable water and 20% of the water remains as concentrated brine. The desalinated water and the pretreated brackish water are blended to produce a treated water with a TDS concentration of approximately 420 mg/L, which is reasonably consistent with water currently being used by customers in the area. This process converts nearly 86% of the quantity of raw water produced from the well fields into potable water. The remaining 14% concentrate is discharged into the deep injection wells.

A concentrate disposal well, GST, pipelines, and facilities are planned at or near the WTP. A concentrate water pipeline will deliver reject water to a GST. A small pump and a pipeline are planned to transport the concentrate to a new deep injection well field near the plant. The project will likely require five injection wells.

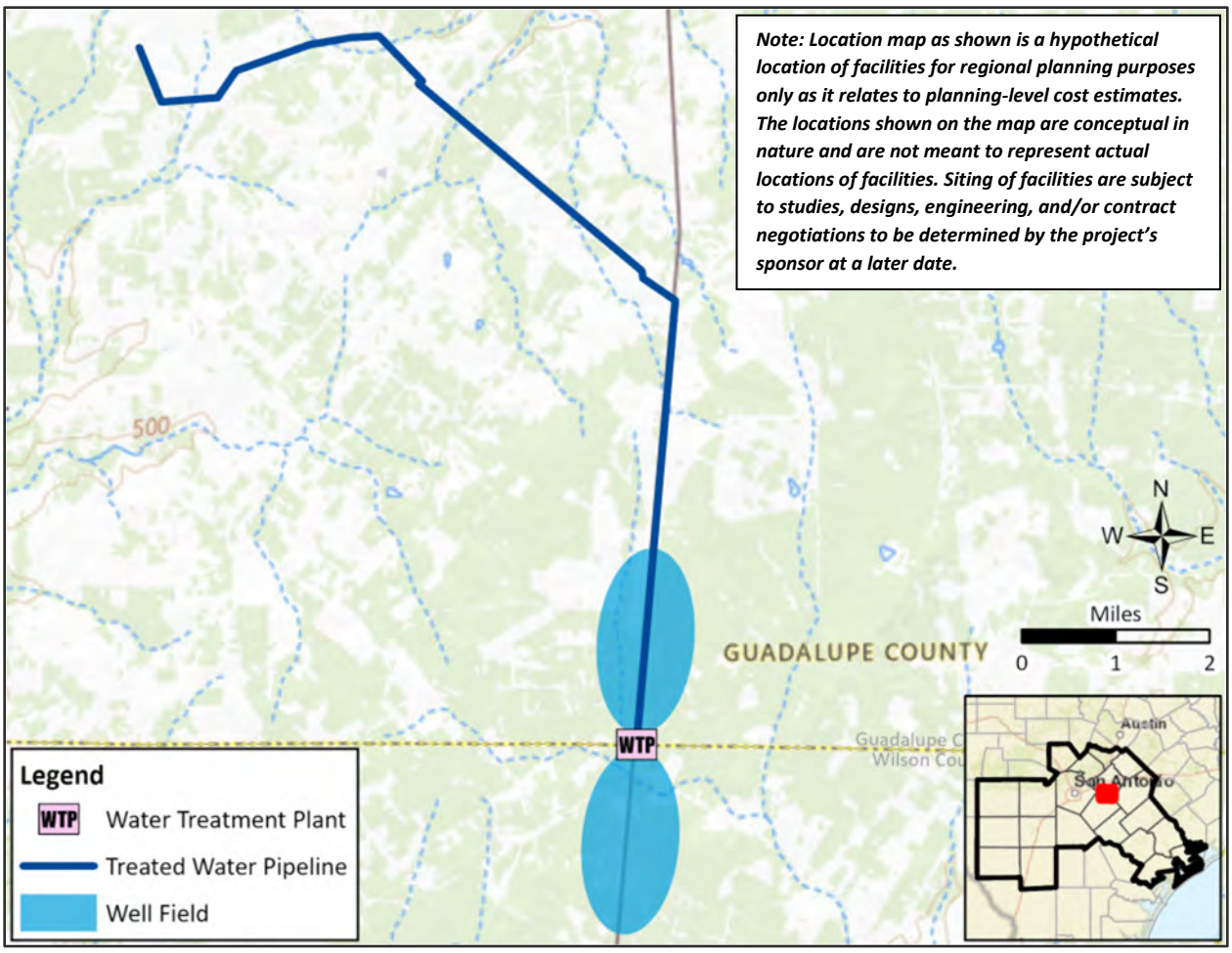



**Figure 5.2.16-1 Approximate Location of the CRWA Expanded Brackish Carrizo-Wilcox Project**

### 5.2.16.2 Available Yield

This WMS is planned for full completion by 2040 and has an available yield that varies by decade because of MAG limitations. Table 5.2.16-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the CRWA Expanded Brackish Carrizo-Wilcox Project WMS. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.16-1 Envisioned and MAG-Constrained Yields for the CRWA Expanded Brackish Carrizo-Wilcox Project (acft/yr)**

| Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Envisioned Yield | 0 | 14,700 | 14,700 | 14,700 | 14,700 | 14,700 |
| MAG-Constrained Yield | 0 | 6,568 | 7,991 | 10,097 | 11,396 | 11,265 |

The Evergreen Underground WCD and the Guadalupe County GCD regulate groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Wilson County and Guadalupe County, respectively. In 2021, GMA-13 established DFCs for the Carrizo-Wilcox Aquifer [2]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer is 125,670 acft/yr in Wilson County in 2080, and is 41,659 acft/yr in Guadalupe County in 2080 [3].

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

According to the previous study performed for the San Antonio River Authority, "favorable" and "most favorable" areas for brackish water wells in the Carrizo-Wilcox Aquifer were identified (Figure 5.2.16-2). The study identified trends and patterns of well depths, well yields, and concentrations of TDS, chlorides, and sulfates in the target area. The study relied on well data from the TWDB and oil and gas well logs from the TCEQ. Using information from the previous study, the CRWA Brackish Carrizo-Wilcox Project was sited to provide a reliable, safe yield for CRWA.

Wells for this project will be located in the vicinity of the Guadalupe-Wilson County line and Hwy 123, which was identified as the "most favorable" area in a previous study (Figure 5.2.16-2). According to TWDB well data and sand thicknesses included in the previous study, potential well yields in the "favorable" and "most favorable" areas are expected to be 500 to 800 gpm and 700 to 1,000 gpm, respectively. Concentrations of TDS are expected to range between 1,000 and 1,500 mg/L in the

[2] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[3] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

"favorable" area and 800 and 1,200 mg/L for the "most favorable" area. The Carrizo-Wilcox wells are expected to be between 1,200 and 1,700 feet deep. Well field details for the CRWA Brackish Carrizo-Wilcox Project are provided in Table 5.2.16-2.

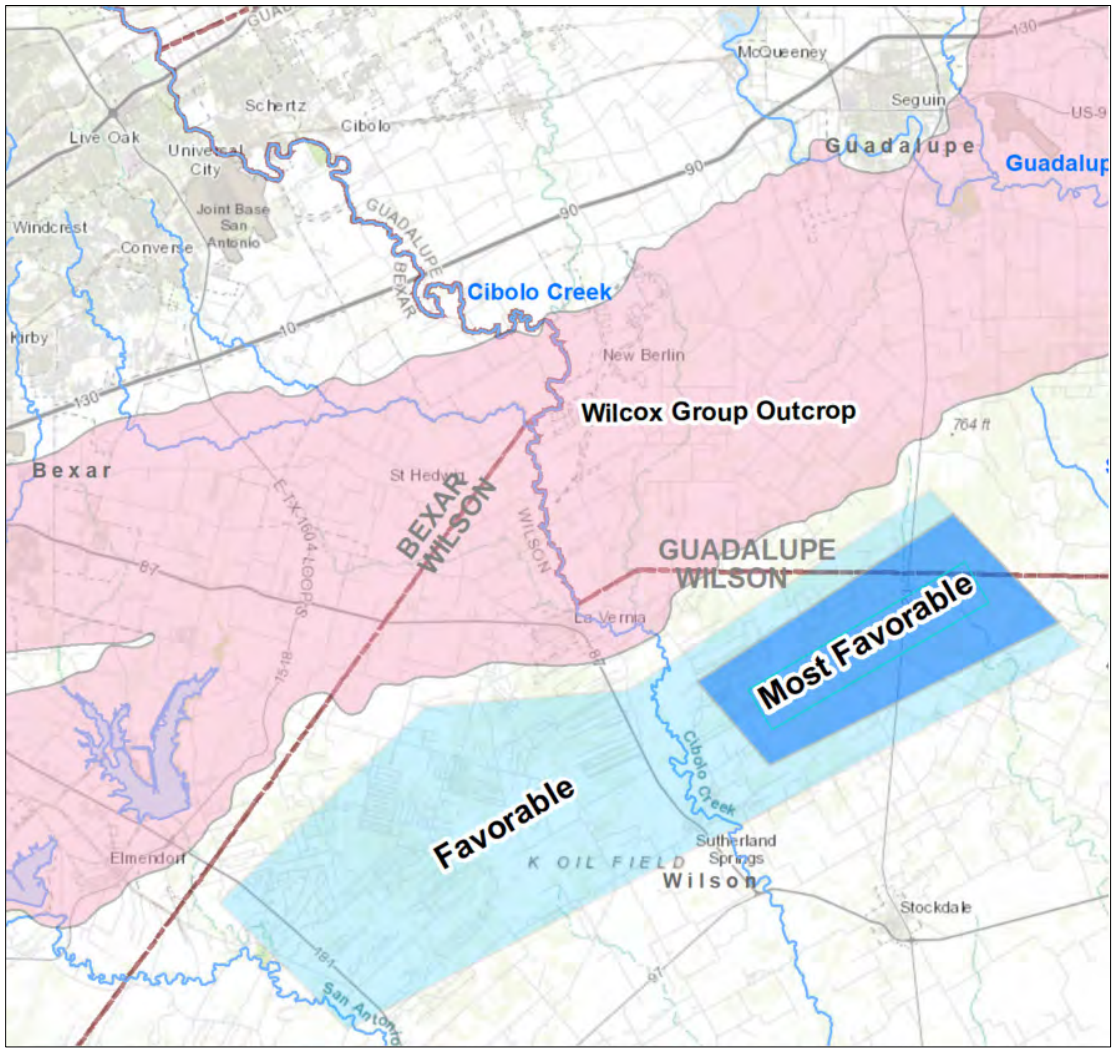



**Figure 5.2.16-2 Location of Favorable and Most Favorable Areas for Groundwater Development in Carrizo-Wilcox Aquifer, as identified by HDR Engineering, Inc. (2008)**

**Table 5.2.16-2 Well Field Summary for the CRWA Expanded Brackish Carrizo-Wilcox Project**

| Description | Southern Guadalupe County Well Field | Northern Wilson County Well Field |
|---|---|---|
| Number of Wells | 9 | 8 |
| Average Well Production Capacity (gpm) | 800 | 800 |
| Well Depth (ft) | 1,200 – 1,700 | 1,200 – 1,700 |
| TDS Concentration (mg/L) | 1,000 – 1,500 | 1,000 – 1,500 |

All or a portion of yield from this WMS remains unallocated to a specific WUG because the project sponsor is a WWP and has chosen to instead have a surplus management supply. Surplus management supply is when the cumulative supply of the recommended WMSs is in excess of the amount needed to meet regional needs to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability. Rather than assigning volumes from a specific project to individual WUGs in the plan, the WWP contracts with customers from their general water supply portfolio or surplus. This approach allows for flexibility in meeting future demands and accommodating evolving customer needs. As such, the strategy volumes are included in the plan to reflect the WWP's capacity to meet regional needs, even though specific allocations to WUGs are not identified at this time.

### 5.2.16.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.16-3 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.16-3 Summary of Potential Project Effects on Environmental Factors for the CRWA Expanded Brackish Carrizo-Wilcox Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 5 |
| Potential Species Impact Score | 4 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 2 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 31 |

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area is located in the Post Oak Savanna ecoregion and crosses mostly pastures and post oak woodlands. As mapped by TPWD [4], the project pipeline crosses primarily savannah grassland and post oak motte and woodland. Vegetation within the well field sites consists mostly of post oak motte and woodland and grassland.

Based on TPWD vegetation mapping, the project may affect less than 1 acre of agricultural resources mapped as row crops. The project impact area also contains 2 acres mapped as tame/disturbance grassland and 2 acres mapped as sandyland grassland which may include pasture areas used for grazing or hay production.

[4] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

Construction of well fields would result in conversion of woody and herbaceous vegetation and agricultural areas to industrial land use for facilities. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes.

### Aquatic Resources

The project area includes several intermittent streams, and the NWI shows approximately 20.7 acres of freshwater and riverine wetlands in the project area. Project well field locations are traversed by TCEQ Segment No. 1901F of Ecleto Creek, a tributary of the San Marcos River. This creek is listed as impaired for depressed dissolved oxygen in the Texas Integrated Report of 303(d) listed water bodies [5]. The 303(d) list identifies the water bodies or segments in Texas that do not meet designated water quality standards. The project pipeline does not cross any streams identified as impaired stream segments. The project area does not include any ecologically significant stream segments designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under stream (e.g., through HDD) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that have the potential to occur in Guadalupe and Wilson counties [6,7,8,9]. Suitable habitat may occur for the proposed federally endangered tricolored bat (*Perimyotis subflavus*) and the monarch butterfly (*Danaus plexippus*), which is a candidate for federal listing as a threatened or endangered

[5] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

[6] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Guadalupe County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[7] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Guadalupe County. https://ipac.ecosphere.fws.gov/location/index.

[8] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Wilson County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[9] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Wilson County. https://ipac.ecosphere.fws.gov/location/index.

species. The federally endangered whooping crane (*Grus americana*) has low potential to occur during migration.

Suitable habitat may occur for the state listed threatened white-faced ibis (*Plegadis chihi*), Texas horned lizard (*Phrynosoma cornutum*) and Texas tortoise (*Gopherus berlandieri*). Potentially suitable habitat may occur for numerous wildlife, plant and insect species designated by TPWD as SGCN, particularly species associated with sandy soil habitats. These species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones and wetland areas.

Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area. Migratory birds may occur in the project area during spring or fall migration. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

### Cultural Considerations

In the State of Texas, all human burials are protected by law [10], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and alignment and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume in accordance with THC authorization.

For linear portions of the project (i.e., project alignment), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. For the area portion of the project (i.e., project area), a background literature review was conducted of the area portion only. The background literature review determined that cultural resources do not intersect with the approximate 2,187-acre project area and alignment, but identified one cultural resource immediately adjacent (i.e., within 300 feet) of the project alignment (Table 5.2.16-4) [11]. Elm Creek Community Cemetery (also known as Elm Creek Methodist Cemetery) (GU-C044) is found immediately adjacent to the project alignment in its northern portion. The cemetery is a designated Historic Texas Cemetery. Additionally, the historical map review identified nine potential historic-age structures that intersect with the project

[10] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.
[11] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed October 2024.

area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment [12].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area and alignment, which included low, medium, and high potential zones. The model indicated that 0.1% of the project area and alignment had a high likelihood of containing significant unidentified archaeological resources, 4.3% had a moderate likelihood, and 95.4% had a low likelihood. Areas with higher archaeological probability were considered to have been located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, RTHLs, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for this project equaled 31.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, one cemetery and nine potential historic-age structures are located within the project area and alignment; the probability model indicates a low likelihood of buried deposits; and the project assessment score is 31. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

**Table 5.2.16-4 Cultural Resources Results for the CRWA Expanded Brackish Carrizo-Wilcox Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Elm Creek Community Cemetery | Cemetery | Historic | Undetermined | Adjacent |
| None (N=9) | Buildings / Structures | Historic | – | Intersect |

[12] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed October 2024.

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| **Assessment Score Total** | **All** | **All** | **All** | **31.0** |

### 5.2.16.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using the 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures for the CRWA Expanded Brackish Carrizo-Wilcox Project include all facilities required for a new brackish groundwater well field, a new desalination WTP, disposal of brine concentrate via deep well injection, and conveyance of potable water to existing integration pipelines that currently deliver water to customers.

Because this WMS is MAG-constrained, cost estimate summaries for the CRWA Expanded Brackish Carrizo-Wilcox Project are included for the Envisioned Yield and for the MAG-Constrained Yield. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the limited groundwater availability. Therefore, project costs are the same for the Envisioned and MAG-Constrained summaries but unit costs vary, as they are dependent on the yield. For the MAG-Constrained cost estimate summary, annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. The following cost estimate summary tables are included:

- Envisioned Yield Cost Estimate Summary: Table 5.2.16-5; and
- MAG-Constrained Yield Cost Estimate Summary: Table 5.2.16-6.

## Table 5.2.16-5 Cost Estimate Summary for the CRWA Expanded Brackish Carrizo-Wilcox Project (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (17.1 MGD) | $11,103,000 |
| Transmission Pipeline (30 in. dia., 12 miles) | $29,416,000 |
| Well Fields (wells, pumps, and piping) | $74,370,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $10,915,000 |
| Water Treatment Plant (17.1 MGD) | $110,155,000 |
| Integration, Relocations, Backup Generator & Other | $251,000 |
| **TOTAL COST OF FACILITIES** | **$236,210,000** |
| | |
| Planning (3%) | $7,086,000 |
| Design (7%) | $16,535,000 |
| Construction Engineering (1%) | $2,362,000 |
| Legal Assistance (2%) | $4,724,000 |
| Fiscal Services (2%) | $4,724,000 |
| Pipeline Contingency (15%) | $4,412,000 |
| All Other Facilities Contingency (20%) | $41,359,000 |
| Environmental & Archaeology Studies and Mitigation | $2,185,000 |
| Land Acquisition and Surveying (368 acres) | $2,460,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $10,459,000 |
| **TOTAL COST OF PROJECT** | **$332,516,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $23,379,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $1,150,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $278,000 |
| Water Treatment Plant | $20,531,000 |
| Pumping Energy Costs (5,684,528 kWh @ 0.09 $/kWh) | $512,000 |
| Purchase of Water (7,280 acft/yr @ 83.15 $/acft) | $605,000 |
| **TOTAL ANNUAL COST** | **$46,455,000** |
| | |
| **Available Project Yield (acft/yr)** | 14,700 |
| **Annual Cost of Water ($ per acft)*** | $3,160 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,570 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $9.70 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $4.82 |
| *Based on a peaking factor of 1.3. | |

## Table 5.2.16-6 Cost Estimate Summary for the CRWA Expanded Brackish Carrizo-Wilcox Project (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (17.1 MGD) | $11,103,000 |
| Transmission Pipeline (30 in. dia., 12 miles) | $29,416,000 |
| Well Fields (wells, pumps, and piping) | $74,370,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $10,915,000 |
| Water Treatment Plant (17.1 MGD) | $110,155,000 |
| Integration, Relocations, Backup Generator & Other | $251,000 |
| **TOTAL COST OF FACILITIES** | **$236,210,000** |
| | |
| Planning (3%) | $7,086,000 |
| Design (7%) | $16,535,000 |
| Construction Engineering (1%) | $2,362,000 |
| Legal Assistance (2%) | $4,724,000 |
| Fiscal Services (2%) | $4,724,000 |
| Pipeline Contingency (15%) | $4,412,000 |
| All Other Facilities Contingency (20%) | $41,359,000 |
| Environmental & Archaeology Studies and Mitigation | $2,185,000 |
| Land Acquisition and Surveying (368 acres) | $2,460,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $10,459,000 |
| **TOTAL COST OF PROJECT** | **$332,516,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $23,379,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $1,150,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $278,000 |
| Water Treatment Plant | $20,531,000 |
| Pumping Energy Costs (5,684,528 kWh @ 0.09 $/kWh) | $512,000 |
| Purchase of Water (7,280 acft/yr @ 83.15 $/acft) | $605,000 |
| **TOTAL ANNUAL COST** | **$46,455,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,568 |
| **Annual Cost of Water ($ per acft)*** | $7,073 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $3,513 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $21.70 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $10.78 |
| *Based on a peaking factor of 1.3. | |

### 5.2.16.5 Implementation Considerations

Information presented in this WMS was provided by CRWA and previous reports and represents the current plan, which is based on the sponsor's current understanding of the system. Implementation of the CRWA Expanded Brackish Carrizo-Wilcox Project includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of dissolved constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Verification of the potential for deep well injection of concentrate;
- Class I disposal well permit through the TCEQ for deep well injection of desalination concentrate;
- Regulations by TCEQ;
- Regulations by the Evergreen UWCD and Guadalupe County GCD;
- Verification that desalinated Carrizo-Wilcox Aquifer water is compatible with other water sources being used by customers and will meet all water quality requirements in the end user's distribution system;
- Experience in operating and maintaining a desalination WTP; and
- Competition with others in the area for groundwater in the Carrizo-Wilcox Aquifer, including the following:
  - Private water purveyors;
  - Public water purveyors in the area; and/or
  - Future oil and gas drilling operations.
- Additional considerations may include potential impacts on the following:
  - Endangered and threatened species;
  - Water levels in the aquifer; and
  - Wetlands.

## 5.2.17 CRWA Siesta Project

The SCTRWPG identified the CRWA Siesta Project as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.17.1 Description of Water Management Strategy

The CRWA Siesta Project includes diversions from Cibolo Creek in Wilson County under existing and amended water rights along with treated effluent from treatment facilities operated by the San Antonio River Authority, Cibolo Creek Municipal Authority (CCMA), the City of Marion, and/or Green Valley SUD. Should treated effluent from wastewater treatment facilities not be available, the project could include brackish groundwater as an alternate backup source. The CRWA Siesta Project involves the acquisition/lease of additional water rights and the amendment of surface water right CA #19-1155 presently held by CRWA to increase authorized diversions from Cibolo Creek by CRWA from 42 acft/yr to 5,042 acft/yr. The firm yield of the CRWA Siesta Project at the Siesta Cattle Company site is to be available to the CRWA members via the existing CRWA Mid-Cities Pipeline (Figure 5.2.17-1).

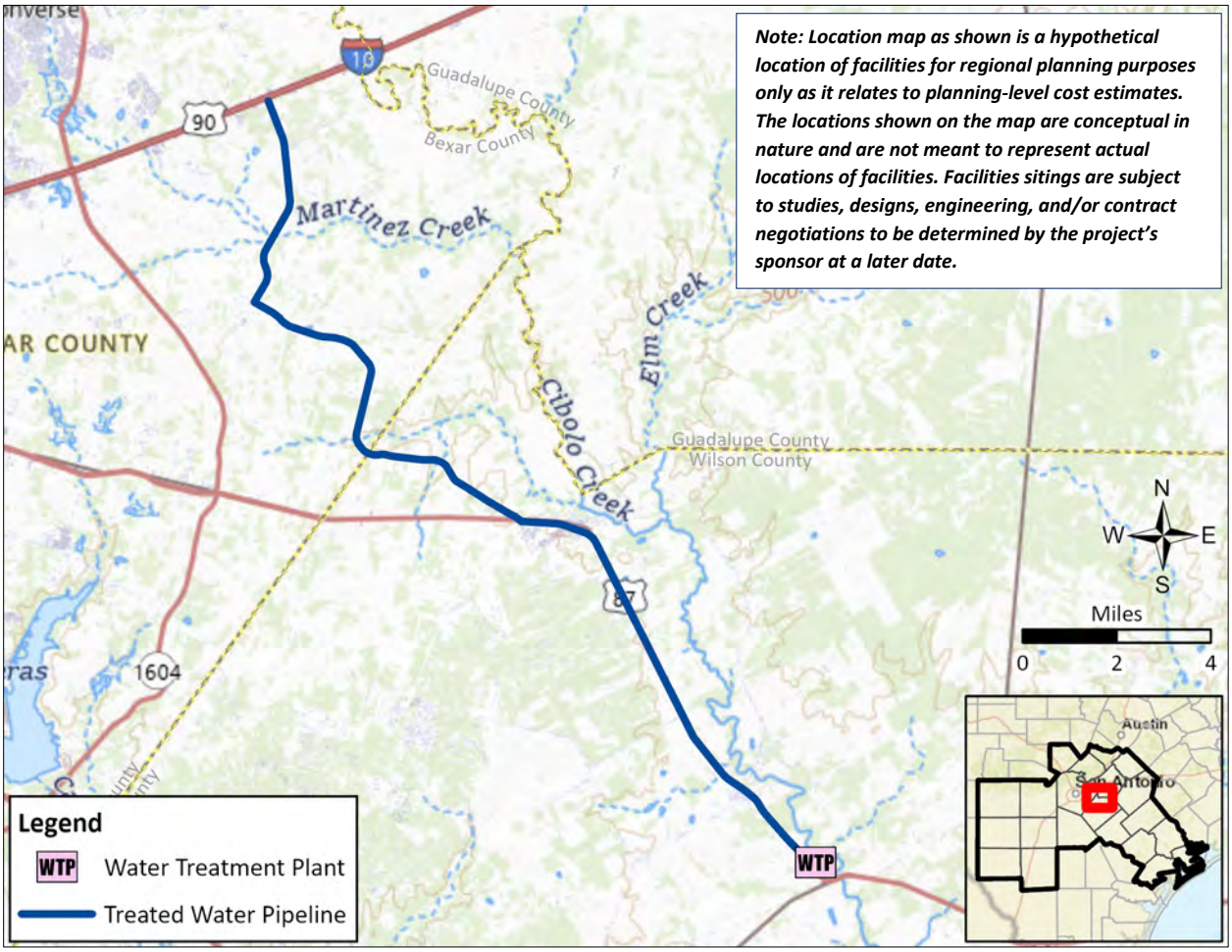



**Figure 5.2.17-1 Approximate Location for the CRWA Siesta Project**

### 5.2.17.2 Available Yield

This WMS has a firm yield of 5,042 acft/yr and is planned for full completion by 2060. Table 5.2.17-1 provides a summary of the available yield for the CRWA Siesta Project.

**Table 5.2.17-1 Available Yield for the CRWA Siesta Project (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| CRWA Siesta Project | 0 | 0 | 0 | 5,042 | 5,042 | 5,042 |

CRWA has acquired two water rights on Cibolo Creek – Certificate of Adjudication (CA) #19-1155 for 42 acft/yr (formerly held by the Siesta Cattle Company) and CA #19-1151 for 86 acft/yr (formerly held by Raymond D. Hegwer et ux). CRWA has entered into agreements to lease water from two water rights holders on Cibolo Creek – CA #19-1152 for 35 acft/yr and CA #19-1157 for 117 acft/yr (for a total of 152 acft/yr). CRWA will be seeking to amend these water rights so that a common diversion point can be utilized at the Siesta Cattle Company site and to increase total authorized diversions at that point to 5,042 acft/yr, which is the firm yield for this WMS.

The GSA WAM was used to quantify water available for diversion under the existing water rights CRWA has either already acquired/leased or is seeking to acquire/lease. Hydrologic simulations and calculations were performed subject to the Hydrologic Assumptions for approval by TWDB for regional planning.

The GSA WAM was also used to quantify the water available under a proposed amendment to the Siesta water right (CA #19-1155), thereby increasing authorized diversion by 4,762 acft/yr. The proposed amendment to CA #19-1155 was modeled as a new appropriation subject to TCEQ Environmental Flow Standards.

The volumetric and monthly reliability of the water diverted for the CRWA Siesta Project under the various water rights acquisitions, leases, and amendments is shown in Table 5.2.17-2. In addition, Figure 5.2.17-2 shows the makeup water necessary from the San Antonio River Authority and/or CCMA WWTPs on Martinez Creek to obtain a firm yield of 5,042 acft/yr. The long-term average (1934 to 1989) diversion from Cibolo Creek under the various water rights is 1,564 acft/yr. The corresponding long-term average makeup water requirement is 3,478 acft/yr. This WMS project is planned for implementation in the 2060 decade.

**Table 5.2.17-2 Volumetric and Monthly Reliability for the CRWA Siesta Project**

| Water Right | Maximum Authorized Diversion (acft/yr) | Average Annual Diversion (acft/yr) | Volumetric Reliability | Monthly Reliability |
|---|---|---|---|---|
| CA #19-1155_1 | 42 | 41.5 | 98.86% | 99.11% |
| CA #19-1151_1 | 86 | 85 | 98.86% | 99.11% |
| CA #19-1152_1 | 35 | 32.9 | 94.16% | 95.24% |
| CA #19-1157_2 | 117 | 109.2 | 93.35% | 94.49% |
| CA #19-1155_2 [1] | 4,762 | 1,295.8 | 27.21% | 16.37% |
| [1] New surface water amendment/permit to be obtained by CRWA. | | | | |

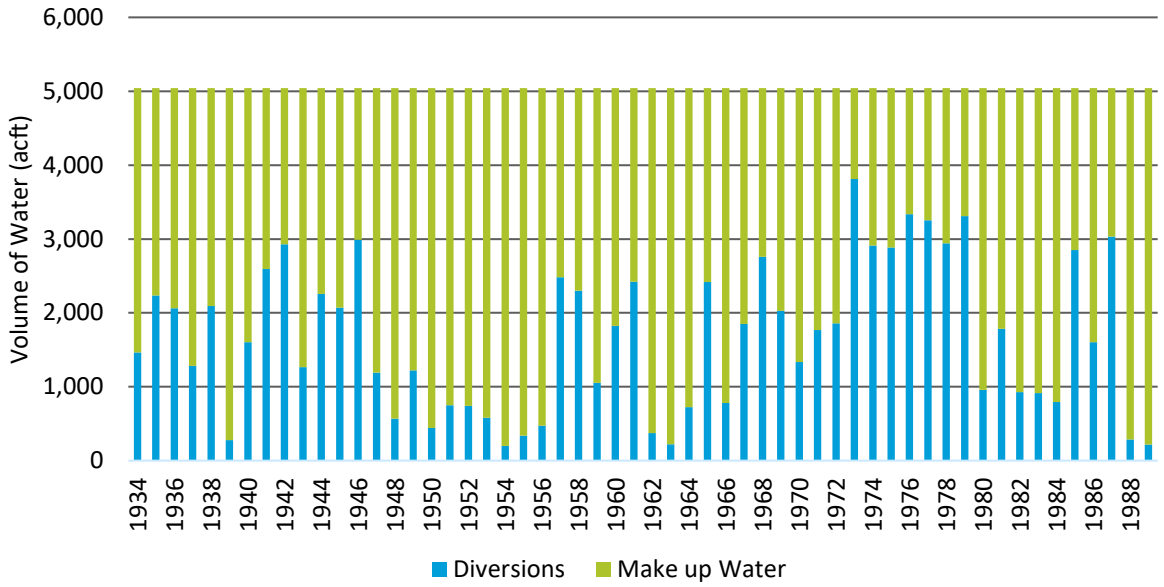



**Figure 5.2.17-2 Annual Surface Water Diversion and Makeup Water for the CRWA Siesta Project**

All or a portion of yield from this WMS remains unallocated to a specific WUG because the project sponsor is a WWP and has chosen to instead have a surplus management supply. Surplus management supply is when the cumulative supply of the recommended WMSs is in excess of the amount needed to meet regional needs to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability. Rather than assigning volumes from a specific project to individual WUGs in the plan, the WWP contracts with customers from their general water supply portfolio or surplus. This approach allows for flexibility in meeting future demands and accommodating evolving customer needs. As such, the strategy volumes are included in the plan to reflect the WWP's capacity to meet regional needs, even though specific allocations to WUGs are not identified at this time.

### 5.2.17.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.17-3 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.17-3 Summary of Potential Project Effects on Environmental Factors for the CRWA Siesta Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 35 |
| Potential Species Impact Score | 5 |
| Potential Habitat Impact Score | 1 |
| Potential Stream Construction Impact Score | 3 |

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Stream Flow / Water Quality Impact Score | 3 |
| Potential Cultural Resources Impact Score | 95 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Post Oak Savanna and Blackland Prairie ecoregions, and crosses a variety of vegetation types, mostly open fields, pastures, and riparian zones along streams. As mapped by TPWD [1], dominant vegetation types in the project area are post oak savanna grassland, disturbance/tame grassland, floodplain herbaceous vegetation, mesquite shrubland, and urban. The linear components of the project cross riparian vegetation zones along streams, mapped by TPWD as floodplain and riparian herbaceous vegetation, floodplain and riparian hardwood forest, and floodplain live oak forest.

Based on TPWD vegetation mapping, the project may have the potential to impact 35 acres of agricultural resources, including 2 acres mapped as row crops, and 33 acres of disturbance or tame grassland which may include pasture areas used for grazing or hay production.

The water treatment plant, storage tank, and pump station would result in conversion of land use from riparian woodland along Cibolo Creek to small areas of industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Pipeline easements may continue to be used for agricultural purposes.

### Aquatic Resources

The project pipeline alignment crosses several mapped streams and their associated floodplains, including the Martinez Creek, Dry Hollow Creek, and several unnamed tributaries of Cibolo Creek. The NWI mapping displays 2.1 acres of freshwater pond/riverine wetlands in the project area.

The project alignment crosses Segment 1902A of Martinez Creek twice. This segment has been designated as an impaired stream segment in the Texas Integrated Report of 303(d) listed water bodies [2] This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The southern half of the project pipeline alignment generally follows, but does not cross, Cibolo Creek. However, TCEQ Segment 1902, Lower Cibolo Creek, is the water source for this project. This stream segment has also been designated as an impaired stream segment in the Texas

[1] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

[2] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

Integrated Report of 303(d) listed water bodies. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58 – Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if permanent impacts would be to over 0.1 acre of waters of the United States. The USACE permit requires that no change in preconstruction contours of waters of the United States would occur. Utility crossings under stream (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that may occur in Bexar and Wilson Counties [3, 4, 5]. The federally endangered whooping crane (*Grus americana*) has low potential to occur during migration. Suitable habitat may occur for the monarch butterfly, which is a candidate for federal listing as a threatened or endangered species.

Suitable habitat may occur for several state-listed threatened species, including white-faced ibis (*Plegadis chihi*), wood stork (*Mycteria americana*), Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise (*Gopherus berlandieri*). Potentially suitable habitat may occur for numerous state wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones and wetland areas.

Site-specific field surveys would be required to determine the quality of habitat for federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur in the project area during spring or fall migration. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Preconstruction surveys for active bird nests are recommended.

[3] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Bexar County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[4] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Wilson County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[5] U.S. Fish and Wildlife Service. 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index

## Cultural Considerations

Vicinity cemeteries are very general areas where a cemetery location was reported at one time, but the exact location is unknown or could not be confirmed. If project impacts are to occur near the vicinity cemetery location, further work (e.g., pedestrian survey and/or metal detecting) or construction monitoring might be needed to ensure human burials are not present in the project alignment. In the State of Texas, all human burials are protected by law [6], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project alignment and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume according to THC authorization.

For linear portions of the project (i.e., project alignments), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. The background literature review determined that 10 cultural resources are located within or immediately adjacent (i.e., within 300 feet) to the approximate 282-acre project alignment (Table 5.2.17-4) [7]. These cultural resources include one archaeological site (41WN58), two NRHP-eligible properties (i.e., Annunciation of the Blessed Virgin Mary Roman Catholic Church, and Saint Hedwig Commercial Building), two cemeteries (i.e., Annunciation of the Blessed Virgin Mary Roman Catholic Cemetery [BX-C037], and Immanuel Lutheran Cemetery [WN-C002]), one vicinity cemetery (Carpenter Family [BX-C192]), and four OTHMs (i.e., Applewhite Homestead [Marker No. 13773], Immanuel Lutheran Cemetery [Marker No. 13555], Saint Hedwig [Marker No. 18445], and Suttles Pottery [Marker No. 13047]). Note that there are cultural resources with multiple resource types. Archaeological site 41WN58 remains undetermined for listing on the NRHP. Both cemeteries are designated as a Historic Texas Cemetery. Additionally, the historical map review identified 23 potential historic-age structures that intersect with or are immediately adjacent (i.e., within 300 feet) to the project alignment[8].

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project alignment, which included low, medium, and high potential zones. The model indicated that 26.4% of the project alignment had a high likelihood of containing significant unidentified archaeological resources, 50.3% had a moderate likelihood, and 23.3% had a low likelihood. Areas with higher archaeological probability were considered to have been located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project alignment. Next, the cultural resources within the project alignment were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each

[6] As per the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.
[7] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed October 2024.
[8] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed October 2024.

resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, Recorded Texas Historical Landmarks, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. For cultural resources with multiple resource types, the values of each resource type were calculated and used to determine the overall assessment score. The points for all cultural resources within the project alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for this project equaled 95.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, one archaeological site, two NRHP-eligible historic properties, two cemeteries, one vicinity cemetery, four historical markers, and 23 potential historic-age structures are located within the project alignment; the probability model indicates a moderate to high likelihood of buried deposits; and the project assessment score is 95. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemeteries and the proposed development.

**Table 5.2.17-4 Cultural Resources Results for the CRWA Siesta Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| 41WN58 | Archaeological site | Prehistoric | Undetermined | Adjacent |
| Saint Hedwig Commercial Building | Historic property / OTHM | Historic | Eligible | Intersect |
| Annunciation of the Blessed Virgin Mary Roman Catholic Church | Historic property / Cemetery | Historic | Eligible | Adjacent |
| Immanuel Lutheran Cemetery | Cemetery / OTHM | Historic | Undetermined | Intersect |
| Carpenter Family | Vicinity Cemetery | Historic | Undetermined | Intersect |
| Applewhite Homestead | Historical Marker | Historic | Undetermined | Intersect |
| Suttles Pottery | Historical Marker | Historic | Undetermined | Adjacent |
| None (N=23) | Buildings / Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **95** |

### 5.2.17.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing

procedures and methods for calculating unit costs. These costs include all facilities required for water diversion, conveyance, and treatment.

Cost estimates were calculated for capital costs, annual debt service, O&M, power, land acquisition, and environmental mitigation for season and peak day demands. These costs are summarized in Table 5.2.17-5 for the CRWA Siesta Project. Facilities for the CRWA Siesta Project include a raw water intake and pump station and a water treatment plant at the Siesta Cattle Company site as well as a 23-mile, 20-inch treated water transmission pipeline to the existing FM 1518 elevated tank, part of the existing CRWA Mid-Cities Pipeline. The new water treatment plant would include conventional treatment.

Facilities have been sized with a 1.5 peaking factor to meet peak month demands. For costing purposes, it is assumed that the entire project yield would be delivered to the FM 1518 elevated storage tank (EST).

**Table 5.2.17-5 Cost Estimate Summary for the CRWA Siesta Project**

| Item | Estimated Costs |
|---|---|
| **CAPITAL COST** | |
| Intake Pump Stations (6.8 MGD) | $28,764,000 |
| Transmission Pipeline (20 in. dia., 23.3 miles) | $53,020,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $9,537,000 |
| Water Treatment Plant (6.8 MGD) | $53,885,000 |
| Integration, Relocations, Backup Generator & Other | $354,000 |
| **TOTAL COST OF FACILITIES** | **$145,560,000** |
| | |
| Planning (3%) | $4,367,000 |
| Design (7%) | $10,189,000 |
| Construction Engineering (1%) | $1,456,000 |
| Legal Assistance (2%) | $2,911,000 |
| Fiscal Services (2%) | $2,911,000 |
| Pipeline Contingency (15%) | $7,953,000 |
| All Other Facilities Contingency (20%) | $18,508,000 |
| Environmental & Archaeology Studies and Mitigation | $781,000 |
| Land Acquisition and Surveying (296 acres) | $1,980,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $6,379,000 |
| **TOTAL COST OF PROJECT** | **$202,995,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $14,258,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $4549,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $919,000 |

| | |
|---|---|
| Water Treatment Plant | $3,999,000 |
| Pumping Energy Costs (5,813,397 kW-hr @ 0.09 $/kW-hr) | $523,000 |
| Purchase of Water (152 acft/yr @ 75 $/acft) | $11,000 |
| **TOTAL ANNUAL COST** | **$20,259,000** |
| | |
| **Available Project Yield (acft/yr)** | 5,042 |
| **Annual Cost of Water ($ per acft)*** | $4,018 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,190 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $12.33 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.65 |
| *Based on a peaking factor of 1.5. | |

### 5.2.17.5 Implementation Considerations

Implementation of the CRWA Siesta Project WMS includes the following considerations:

- Purchase or lease agreements with water rights holders on Cibolo Creek;
- Permit amendments for each of the water rights to be purchased or leased to allow diversion from a common point at the Siesta Cattle Company site;
- Permit amendment for the Siesta water right (CA #19-1155) to authorize increased diversions;
- Agreement between CRWA and the San Antonio River Authority, the City of Marion, Green Valley SUD, and/or CCMA for the purchase and use of treated effluent from the San Antonio River Authority WWTPs on Martinez Creek; and
- Application to the TCEQ to obtain an authorization for the bed and banks transfer of treated effluent from the discharge points along Martinez Creek to the Siesta Cattle Company site.

## 5.2.18 CRWA Wells Ranch (Phase 3) Project

The SCTRWPG identified the CRWA Wells Ranch (Phase 3) Project as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.18.1 Description of Water Management Strategy

CRWA is planning to expand their existing Wells Ranch Project to develop a new well field in Gonzales County. The project is designed to supply 14,500 acft/yr of treated water by the 2030 decade; however, the available yield varies because of MAG limitations. The project includes six new wells in the Carrizo-Wilcox Aquifer. Raw water from the wells would be delivered to the CRWA Wells Ranch WTP in Guadalupe County, which would require a 12.9 MGD WTP expansion for treatment before the water is delivered to CRWA's customers. The proposed wells are to be constructed in a new well field northeast of the intersection of Hwy 80 and Hwy 97 in Gonzales County, southeast of the existing Wells Ranch WTP (Figure 5.2.18-1). The project is expected to be implemented in the 2030 decade.

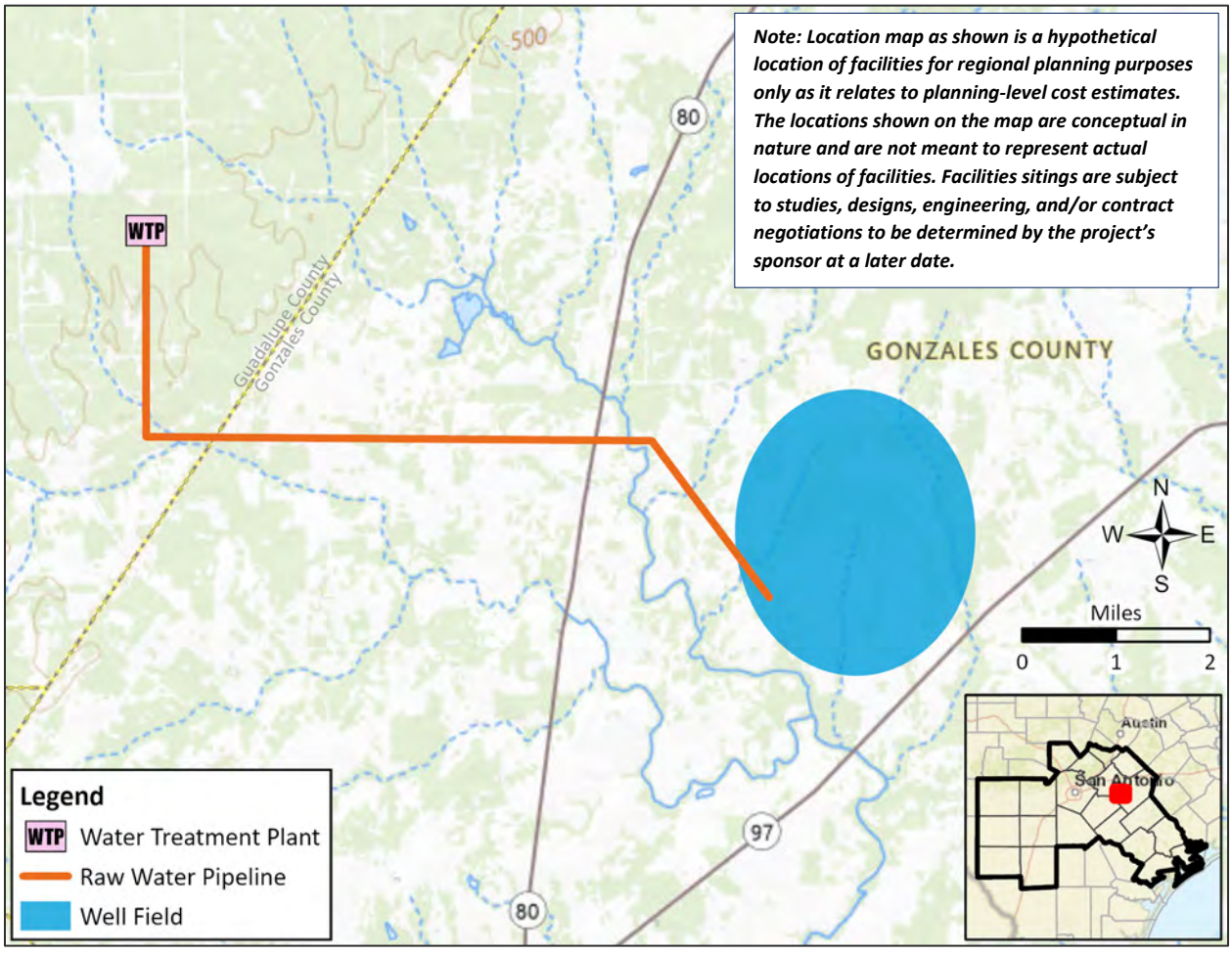



**Figure 5.2.18-1 Approximate Location of the CRWA Wells Ranch (Phase 3) Project**

### 5.2.18.2 Available Yield

This WMS is planned for full completion by 2030 and has an available yield that varies by decade because of MAG limitations. Table 5.2.18-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the CRWA Wells Ranch (Phase 3) Project WMS. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.18-1 Envisioned and MAG-Constrained Yields for the CRWA Wells Ranch (Phase 3) Project (acft/yr)**

| Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Envisioned Yield | 14,500 | 14,500 | 14,500 | 14,500 | 14,500 | 14,500 |
| MAG-Constrained Yield | 8,341 | 7,182 | 10,820 | 10,938 | 11,239 | 8,869 |

The CRWA Wells Ranch (Phase 3) Project will provide treated water volumes to CRWA customers, as shown in Table 5.2.18-2. A portion of yield from this WMS remains unallocated to a specific WUG and will be considered surplus management supply.

**Table 5.2.18-2 WUG Allocations for the CRWA Wells Ranch (Phase 3) Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Converse | 500 | 500 | 500 | 500 | 500 | 500 |
| Crystal Clear SUD | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| Marion | 300 | 300 | 300 | 300 | 300 | 300 |
| Martindale WSC | 446 | 446 | 446 | 446 | 446 | 446 |
| Unallocated | 5,595 | 4,436 | 8,074 | 8,192 | 8,493 | 6,123 |
| **Total** | **8,341** | **7,182** | **10,820** | **10,938** | **11,239** | **8,869** |

The Gonzales County UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Gonzales County. In 2021, GMA-13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer is 96,161 acft/yr for Gonzales County in 2080 [2].

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[2] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

The CRWA Wells Ranch (Phase 3) Project wells are to be designed to each produce approximately 1,700 gpm. Wells in the Carrizo Aquifer are expected to have a depth ranging from 400 to 600 feet. The well field is anticipated to include six new wells. Overall, the water quality of the Carrizo-Wilcox Aquifer is suitable for use as a water supply, as this area is low in TDS concentrations, but often is high concentrations of iron and manganese.

### 5.2.18.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.18-3 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.18-3 Summary of Potential Project Effects on Environmental Factors for the CRWA Wells Ranch (Phase 3) Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 28 |
| Potential Species Impact Score | 5 |
| Potential Habitat Impact Score | 1 |
| Potential Stream Construction Impact Score | 2 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 57 |

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Post Oak Savannah ecoregion. As mapped by TPWD [3], the project area crosses a mix of grassland, shrubland, and wooded areas. The predominant vegetation communities are

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

post oak motte and woodland, and savannah grassland. The project area also includes some mesquite shrubland, and the proposed pipelines cross several riparian vegetation zones mapped by TPWD as riparian deciduous hardwood forest, riparian deciduous shrubland, and riparian herbaceous vegetation.

Based on TPWD vegetation mapping, the project does not affect agricultural resources mapped as row crops or tame grassland that may be used for pasture. The project impact area does contain 28 acres mapped as sandyland grassland that may include pasture areas used for grazing or hay production

The proposed well pads would result in conversion of land use from undeveloped vegetation or pasture (mostly open fields) to small areas of industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

### Aquatic Resources

The project area contains several mapped intermittent streams and their associated floodplains, including Tidwell Creek, East Fork Ecleto Creek, Ecleto Creek, multiple crossings of Sandies Creek, and several unnamed tributaries. The NWI mapping shows 63 acres of freshwater ponds and riverine wetlands in the project area.

Segment 1803B of Sandies Creek and Segment 1901F of Ecleto Creek in the project area has been designated as an impaired stream segment in the Texas Integrated Report of 303(d) listed water bodies [4]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well field facilities can typically be sited to avoid impacts to waters of the United States, including wetlands. Stream crossing for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to more than 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that have potential to occur in Gonzales and Guadalupe Counties [5, 6, 7, 8]. Suitable habitat may occur for the proposed federally endangered tricolored bat (*Perimyotis subflavus*) and the monarch butterfly, which is a candidate for federal listing as a threatened or endangered species. The federally endangered whooping crane *(Grus americana)* has low potential to occur during migration.

Suitable habitat may occur for the state-listed threatened species: white-faced ibis (*Plegadis chihi*), Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise (*Gopherus berlandieri*).

There is potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN, including American bumblebee (*Bombus pensylvanicus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), western burrowing owl (*Athene cunicularia hypugaea*), eastern spotted skunk (*Spilogale putorius*), and plains spotted skunk (*Spilogale putorius interrupta*). In addition, SGCN bat species may utilize structures and could therefore occur in developed areas. The SGCN list also includes numerous plant species. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

## Cultural Considerations

For linear portions of the project (i.e., project alignment), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. For the area portion of the project (i.e., project area), a background literature review was performed of the area portion only. The background literature review determined that no previously recorded cultural resources intersect the approximate 4,027-acre project area and alignment or are immediately adjacent (i.e., within 300 feet) to

[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Guadalupe County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[6] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Guadalupe County. https://ipac.ecosphere.fws.gov/.
[7] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Gonzales County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[8] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Gonzales County. https://ipac.ecosphere.fws.gov/.

the project's pipeline alignment [9, 10]. The historical map review identified 46 potential historic-age structures that intersect with the project area and alignment (Table 5.2.18-4) [11].

**Table 5.2.18-4 Cultural Resources Results for the CRWA Wells Ranch (Phase 3) Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| None (N=46) | Buildings / Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **57.0** |

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area and alignment, which included low, medium, and high potential zones. The model indicated that the entirety of the project area and alignment had a low likelihood of containing significant unidentified archaeological resources. No areas were identified by the model as having a high or moderate probability. Areas with higher archaeological probability would have been located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, Recorded Texas Historical Landmarks, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for this project equaled 57.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, 46 potential historic-age structures are located within the project area and alignment; the probability model indicates a low likelihood of buried deposits; and the project assessment score is 57. Based on these results, a cultural resource assessment for the final design plan is likely necessary;

[9] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed July 2024.

[10] Texas Department of Transportation (TxDOT). 2024. Aggregator. Available at: https://atlas.thc.texas.gov/Map. Accessed July 2024.

[11] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.

however, cultural resource investigations may be required depending on whether regulatory triggers are present.

### 5.2.18.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures for the CRWA Wells Ranch (Phase 3) Project include all facilities required for a new groundwater well field, expansion of the existing WTP, and conveyance of potable water to existing integration pipelines that deliver water to customers.

Because this WMS is MAG-constrained, cost estimate summaries for the CRWA Wells Ranch (Phase 3) Project are included for the Envisioned Yield and for the MAG-Constrained Yield. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the limited groundwater availability. Therefore, project costs are the same for the Envisioned and MAG-Constrained summaries but unit costs vary, as they are dependent on the yield. For the MAG-Constrained cost estimate summary, annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. The following cost estimate summary tables are included:

- Envisioned Yield Cost Estimate Summary: Table 5.2.18-5; and
- MAG-Constrained Yield Cost Estimate Summary: Table 5.2.18-6.

## Table 5.2.18-5 Cost Estimate Summary for the CRWA Wells Ranch (Phase 3) Project (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Pump Stations (13.6 MGD) | $10,697,000 |
| Transmission Pipeline (30 in. dia., 9.7 miles) | $32,965,000 |
| Well Fields (Wells, Pumps, and Piping) | $19,858,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $1,784,000 |
| Water Treatment Plant (12.9 MGD) | $34,355,000 |
| Integration, Relocations, Backup Generator & Other | $417,000 |
| **TOTAL COST OF FACILITIES** | **$100,076,000** |
| | |
| Planning (3%) | $3,002,000 |
| Design (7%) | $7,005,000 |
| Construction Engineering (1%) | $1,001,000 |
| Legal Assistance (2%) | $2,002,000 |
| Fiscal Services (2%) | $2,002,000 |
| Pipeline Contingency (15%) | $4,945,000 |
| All Other Facilities Contingency (20%) | $13,422,000 |
| Environmental & Archaeology Studies and Mitigation | $486,000 |
| Land Acquisition and Surveying (196 acres) | $829,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $4,367,000 |
| **TOTAL COST OF PROJECT** | **$139,137,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $9,760,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $550,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $267,000 |
| Water Treatment Plant | $2,405,000 |
| Pumping Energy Costs (7,378,758 kW-hr @ 0.09 $/kW-hr) | $664,000 |
| **TOTAL ANNUAL COST** | **$13,646,000** |
| | |
| **Available Project Yield (acft/yr)** | 14,500 |
| **Annual Cost of Water ($ per acft)*** | $941 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $268 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $2.89 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.82 |
| * Based on a peaking factor of 1.0. | |

## Table 5.2.18-6 Cost Estimate Summary for the CRWA Wells Ranch (Phase 3) Project (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Pump Stations (13.6 MGD) | $10,697,000 |
| Transmission Pipeline (30 in. dia., 9.7 miles) | $32,965,000 |
| Well Fields (Wells, Pumps, and Piping) | $19,858,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $1,784,000 |
| Water Treatment Plant (12.9 MGD) | $34,355,000 |
| Integration, Relocations, Backup Generator & Other | $417,000 |
| **TOTAL COST OF FACILITIES** | **$100,076,000** |
| | |
| Planning (3%) | $3,002,000 |
| Design (7%) | $7,005,000 |
| Construction Engineering (1%) | $1,001,000 |
| Legal Assistance (2%) | $2,002,000 |
| Fiscal Services (2%) | $2,002,000 |
| Pipeline Contingency (15%) | $4,945,000 |
| All Other Facilities Contingency (20%) | $13,422,000 |
| Environmental & Archaeology Studies and Mitigation | $486,000 |
| Land Acquisition and Surveying (196 acres) | $829,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $4,367,000 |
| **TOTAL COST OF PROJECT** | **$139,137,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $9,760,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $550,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $267,000 |
| Water Treatment Plant | $2,405,000 |
| Pumping Energy Costs (7,378,758 kW-hr @ 0.09 $/kW-hr) | $664,000 |
| **TOTAL ANNUAL COST** | **$13,646,000** |
| | |
| **Available Project Yield (acft/yr)** | 8,341 |
| **Annual Cost of Water ($ per acft)*** | $1,636 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $466 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.43 |
| * Based on a peaking factor of 1.0. | |

### 5.2.18.5 Implementation Considerations

Information presented in this WMS was provided by CRWA and previous reports and represents the current plan, which is based on the sponsor's current understanding of the system. Implementation of the CRWA Wells Ranch (Phase 3) Project includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of dissolved constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Potential for differing water qualities/chemical constituents in the water;
- Iron and manganese content in the water;
- Regulations by TCEQ;
- Regulations by and securing permits from the Gonzales County UWCD; and
- Competition with others in the area for groundwater in the Carrizo-Wilcox Aquifer, including the following:
  - Private water purveyors;
  - Public water purveyors in the area; and/or
  - Future oil and gas drilling operations.
- Additional considerations may include potential impacts on the following:
  - Endangered and threatened species;
  - Water levels in the aquifer; and
  - Wetlands.

## 5.2.19 CVLGC Carrizo Project

The SCTRWPG identified the CVLGC Carrizo Project WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.19.1 Description of Water Management Strategy

The CVLGC comprises the cities of Schertz and Cibolo. CVLGC is considering a new groundwater well field project in the Carrizo-Wilcox Aquifer in Wilson County. The general location of the planned well field is north of US Hwy 87 and east of Stockdale in Wilson County with infrastructure extending into Guadalupe and Gonzales Counties (Figure 5.2.19.1). Land use and groundwater availability were considered when determining the approximate well field location.

The project is designed to supply 11,802 acft/yr of treated water by the 2030 decade; however, the available yield varies because of MAG limitations. The project includes seven new wells, pipelines and pump stations, and a 12 MGD expansion of the existing WTP. Only the portion of WTP facilities and associated costs that are directly required to increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this WMS evaluation and RWP. Treatment would include iron and manganese removal.

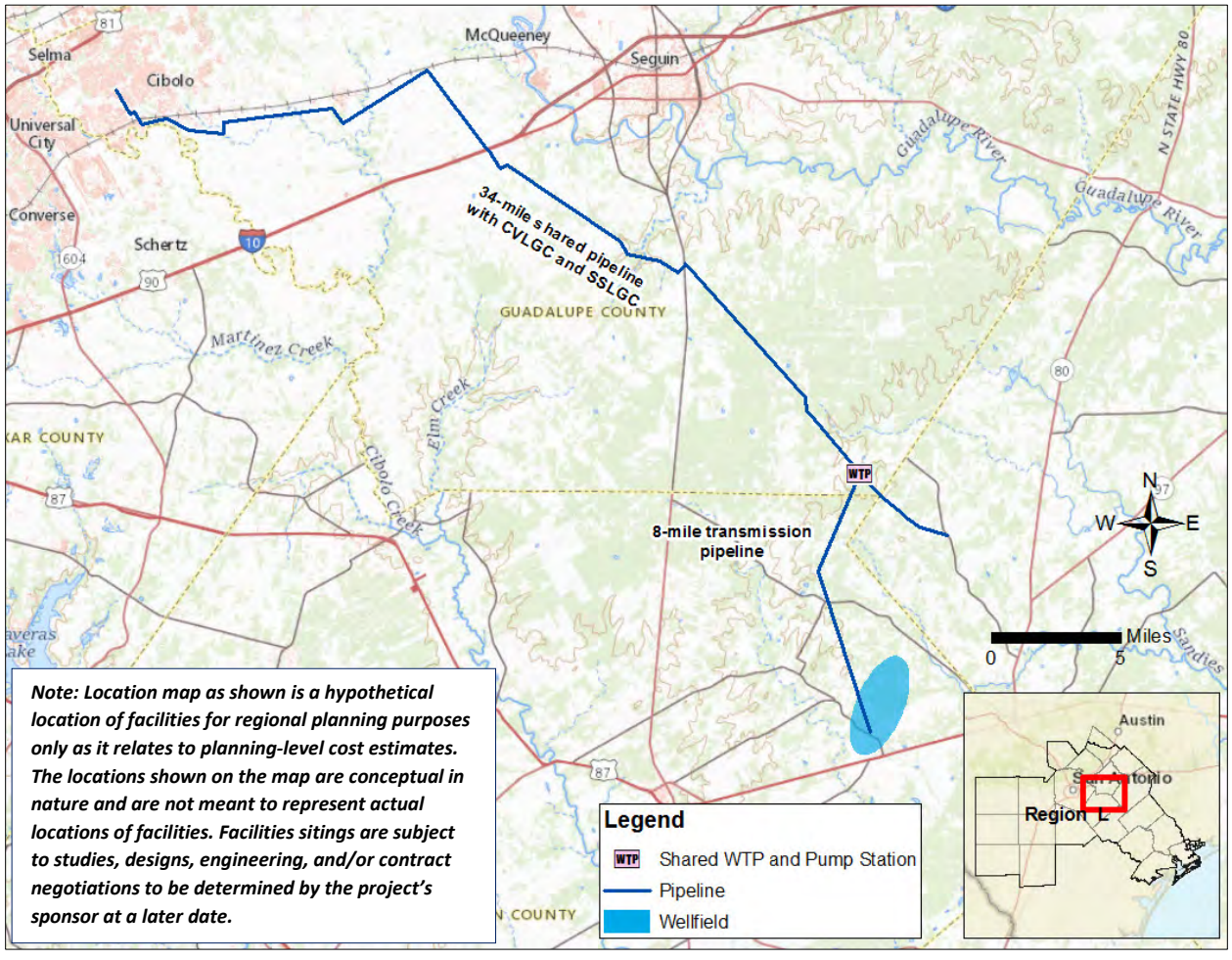



**Figure 5.2.19.1 Approximate Location for the CVLGC Carrizo Project**

### 5.2.19.2 Available Yield

This WMS is planned for implementation by 2030 and has an available yield that varies by decade because of MAG limitations. Table 5.2.19-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the CVLGC Carrizo Project. The MAG-Constrained Yield is the available yield included in DB27. The CVLGC Carrizo Project will provide treated water volumes to partnering entities or customers, as shown in Table 5.2.19-2.

**Table 5.2.19-1 Envisioned and MAG-Constrained Yields for the CVLGC Carrizo Project (acft/yr)**

| Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Envisioned Yield | 11,802 | 11,802 | 11,802 | 11,802 | 11,802 | 11,802 |
| MAG-Constrained Yield | 194 | 1,032 | 2,860 | 7,854 | 9,816 | 9,760 |

**Table 5.2.19-2 Customers and Annual Volumes for the CVLGC Carrizo Project (acft/yr)**

| Customers | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Cibolo | 97 | 516 | 1,430 | 3,927 | 4,908 | 4,880 |
| Schertz | 97 | 516 | 1,430 | 3,927 | 4,908 | 4,880 |
| **Total** | **194** | **1,032** | **2,860** | **7,854** | **9,816** | **9,760** |

The Evergreen UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Wilson County. In 2021, GMA 13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer in Wilson County is 125,670 acft/yr in 2080 [2].

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[2] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

The planned well field is in the confined part of the Carrizo-Wilcox Aquifer and is located approximately 7 miles downdip of the outcrop. Based on available hydrogeologic information, wells in this area would be capable of producing more than 2,000 gpm and would range in depth from 1,000 to 1,500 feet deep. CVLGC has also increased the area by acquiring one 2.5-acre well site. The well field is anticipated to include seven new wells. The target aquifer is the Carrizo Sand instead of the Wilcox Group for water quality and depth considerations. Groundwater quality in the area generally has a TDS concentration of less than 300 mg/L. However, the water typically has elevated concentrations of iron and manganese that requires treatment prior to public consumption.

### 5.2.19.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.19-3 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.19-3 Summary of Potential Project Effects on Environmental Factors for the CVLGC Carrizo Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 976 |
| Potential Species Impact Score | 10 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 5 |
| Potential Stream Flow / Water Quality Impact Score | 2 |
| Potential Cultural Resources Impact Score | 104.5 |

#### Environmental Considerations

##### Vegetation, Land Use, Agricultural Resources

The project area is located in the Blackland Prairie and Post Oak Savannah ecoregions, and crosses a variety of vegetation types, primarily open fields and pastures. As mapped by TPWD [3], dominant vegetation communities in the area are savanna grassland, disturbance, or tame grassland, post oak motte and woodland, and mesquite shrubland. The linear components of the project cross riparian

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

vegetation zones along streams, mapped by TPWD as floodplain hardwood forest, floodplain live oak forest, floodplain herbaceous vegetation, and floodplain deciduous shrubland.

Based on TPWD vegetation mapping, the project may have the potential to impact 976 acres of agricultural resources, including 65 acres mapped as row crops and 911 acres mapped as tame/disturbance grassland which may include pasture areas used for grazing or hay production.

Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing and woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes. The proposed well field site would result in conversion of land use from undeveloped vegetation and agricultural areas (mostly open fields and shrubland) to small areas of industrial use.

### Aquatic Resources

The proposed pipeline would cross Campbell Branch, Clear Fork Creek, Cottonwood Creek, Elm Creek, Konde Branch, Krams Creek, Sandies Creek, Tally Branch, Deadman Creek, and Santa Clara Creek. The NWI mapping identifies 29.9 acres of freshwater wetlands in the overall project area.

The project pipeline crosses Segment 1803B of Sandies Creek, which is listed as impaired in the Texas Integrated Report of 303(d) listed water bodies [4]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The well field project area does not contain listed impaired water bodies. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well field facilities can typically be sited to avoid impacts to waters of the United States, including wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including cases where there would be permanent impacts to more than 0.1 acre of Waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that have potential to occur in Gonzales, Guadalupe, and Wilson Counties [5, 6, 7, 8, 9, 10]. Suitable habitat may occur for the federally endangered whooping crane (*Grus americana*), false spike (*Fusconaia mitchelli*), Guadalupe fatmucket (*Lampsilis bracteata*), Guadalupe orb (*Cyclonaias necki*), candidate monarch butterfly (*Danaus plexippus*), and proposed endangered tricolored bat (*Perimyotis subflavus*). However, the whooping crane only has a low likelihood to occur during migration and the streams crossed by the pipelines have a low potential to provide suitable habitat for endangered freshwater mussels.

Suitable habitat may occur for state-listed threatened species, including the white-faced ibis (*Plegadis chihi*), woodstork (*Mycteria americana*), swallow-tailed kite (*Elanoides forficatus*), Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise (*Gopherus berlandieri*).

There is potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN, including American bumblebee (*Bombus pensylvanicus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), eastern spotted skunk (*Spilogale putorius*), plains spotted skunk (*Spilogale interrupta*), and Elmendorf's onion (*Allium elmendorfii*). In addition, SGCN bat species may utilize structures and could, therefore, occur in developed areas. The SGCN list also includes numerous other plant species, including many for which detailed habitat requirements have not been developed by TPWD. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Although it is no longer on the federal endangered species list, the bald eagle is protected by the federal Bald and Golden Eagle Protection Act,

[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Gonzales County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[6] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Guadalupe County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[7] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Wilson County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/
[8] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Gonzales County. https://ipac.ecosphere.fws.gov/location/index
[9] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Guadalupe County. https://ipac.ecosphere.fws.gov/location/index
[10] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Wilson County. https://ipac.ecosphere.fws.gov/location/index

which prohibits impacts to the eagles unless permitted by USFWS. Preconstruction surveys for active bird nests and presence of eagles are recommended.

## Cultural Considerations

For linear portions of the project (i.e., project alignment), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. For the area portion of the project (i.e., project area), a background literature review was conducted of the area portion only. The background literature review identified nine cultural resources that intersect with the approximate 3,412-acre project area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment (Table 5.2.19-4) [11, 12]. The project area and alignment contain three archaeological sites (i.e., 41GU131, 41GU169, and 41WN63), and one vicinity cemetery (i.e., Barnett Family Cemetery). Cultural resources located immediately adjacent to the project's pipeline alignment include four archaeological sites (i.e., 41GU19, 41GU192, 41GU194, and 41GU195), and one historical marker (i.e., Cibolo). Out of the total seven archaeological sites within the project area and alignment as well as immediately adjacent to the project's pipeline alignment, two are ineligible for listing on the NRHP (i.e., 41GU19, and 41GU131), and five remain undetermined (i.e., 41GU169, 41GU192, 41GU194, 41GU195, and 41WN63) for listing on the NRHP. Additionally, the historical map review identified 65 potential historic-age structures that intersect with the project area and alignment [13].

Vicinity cemeteries are very general areas where a cemetery location was reported at one time, but the exact location is unknown or could not be confirmed. If project impacts are to occur near the vicinity cemetery location, further work (e.g., pedestrian survey and/or metal detecting) or construction monitoring might be needed to ensure human burials are not present in the project area and alignment. In the State of Texas, all human burials are protected by law [14], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and alignment and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume according to THC authorization.

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 11% of the project area and alignment had a high likelihood of containing significant unidentified archaeological resources, 21% had a moderate likelihood, and 68% had a low likelihood. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

---

[11] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed July 2024.

[12] Texas Department of Transportation (TxDOT). 2024. TxDOT Historic Resources Aggregator, TxDOT Environmental Affairs Division. Austin, Texas Available at: https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=e13ba0aa78bf4548a8e98758177a8dd5. Accessed July 2024.

[13] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.

[14] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 104.5.

**Table 5.2.19-4 Cultural Resources Results for the CVLGC Carrizo Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41GU19) | Lithic scatter | Prehistoric | Ineligible (THC 5/10/2007) | Adjacent |
| Archaeological Site (41GU131) | Lithic Scatter | Prehistoric | Ineligible within ROW (THC 7/5/2011) | Intersect |
| Archaeological Site (41GU169) | Farmstead | Historic | Undetermined | Intersect |
| Archaeological Site (41GU192) | Lithic Scatter/Open Camp | Prehistoric | Undetermined | Adjacent |
| Archaeological Site (41GU194) | Lithic Scatter/Open Camp | Prehistoric | Undetermined | Adjacent |
| Archaeological Site (41GU195) | Lithic Scatter/Open Camp | Prehistoric | Undetermined | Adjacent |
| Archaeological Site (41WN63) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Barnett Family Cemetery (WN-C149) | Vicinity Cemetery | Historic | Undetermined | Intersect |
| Cibolo | Historical Marker | Historic | Undetermined | Adjacent |
| None (N=65) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **104.5** |

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, the project area and alignment contain three archaeological sites, one cemetery, and

65 potential historic-age structures; in addition, four archaeological sites and one historical marker are located immediately adjacent to the project's pipeline alignment. The probability model for the project indicates a low to moderate likelihood of buried deposits; and the project assessment score is 104.5. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

### 5.2.19.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures for the CVLGC Carrizo Project include all facilities required for a new groundwater well field, expanded WTP, and conveyance of potable water to customers via shared pipelines and pump stations.

A final delivery point has not been selected at this time. For cost estimating purposes, the delivery point is assumed to be near the City of Cibolo. As shown on Figure 5.2.19.1, this project will share a planned SSLGC pipeline and pump station to deliver the water from the current SSLGC water treatment.

Because this WMS is MAG-constrained, cost estimate summaries for the CVLGC Carrizo Project are included for the Envisioned Yield and for the MAG-Constrained Yield. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the limited groundwater availability. Therefore, project costs are the same for the Envisioned and MAG-Constrained summaries but unit costs vary, as they are dependent on the yield. For the MAG-Constrained cost estimate summary, annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. The following cost estimate summary tables are included:

- Envisioned Yield Cost Estimate Summary: Table 5.2.19-5; and
- MAG-Constrained Yield Cost Estimate Summary: Table 5.2.19-6.

**Table 5.2.19-5 Cost Estimate Summary for the CVLGC Carrizo Project (Envisioned Yield)**

| Item | Estimated Costs |
|---|---|
| Pump Stations (13.2 MGD) | $21,394,000 |
| Transmission Pipelines (30-36 in. dia., 41.9 miles) | $105,268,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $5,407,000 |
| Well Fields (Wells, Pumps, and Piping) | $22,292,000 |
| Water Treatment Plant Expansion (12 MGD) | $32,575,000 |
| Integration, Relocations, Backup Generator & Other | $1,096,000 |
| **TOTAL COST OF FACILITIES** | **$188,032,000** |
| | |
| Planning (3%) | $5,499,000 |
| Design (7%) | $12,830,000 |
| Construction Engineering (1%) | $1,833,000 |
| Legal Assistance (2%) | $3,666,000 |
| Fiscal Services (2%) | $3,666,000 |
| Pipeline Contingency (15%) | $15,078,000 |
| All Other Facilities Contingency (20%) | $16,553,000 |
| Environmental & Archaeology Studies and Mitigation | $1,924,000 |
| Land Acquisition and Surveying (611 acres) | $5,183,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $8,228,000 |
| **TOTAL COST OF PROJECT** | **$262,492,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $18,392,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,239,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $670,000 |
| Water Treatment Plant | $2,280,000 |
| Pumping Energy Costs (18,462,048 kW-hr @ 0.09 $/kW-hr) | $1,662,000 |
| Purchase of Water (11,802 acft/yr @ 8.15 $/acft) | $96,000 |
| **TOTAL ANNUAL COST** | **$24,339,000** |
| | |
| **Available Project Yield (acft/yr)** | 11,802 |
| **Annual Cost of Water ($ per acft)*** | $2,062 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $504 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.33 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.55 |
| *Based on a peaking factor of 1.25. | |

**Table 5.2.19-6 Cost Estimate Summary for the CVLGC Carrizo Project (MAG-Constrained Yield)**

| Item | Estimated Costs |
|---|---|
| Pump Stations (13.2 MGD) | $21,394,000 |
| Transmission Pipelines (30-36 in. dia., 41.9 miles) | $105,268,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $5,407,000 |
| Well Fields (Wells, Pumps, and Piping) | $22,292,000 |
| Water Treatment Plant Expansion (12 MGD) | $32,575,000 |
| Integration, Relocations, Backup Generator & Other | $1,096,000 |
| **TOTAL COST OF FACILITIES** | **$188,032,000** |
| | |
| Planning (3%) | $5,499,000 |
| Design (7%) | $12,830,000 |
| Construction Engineering (1%) | $1,833,000 |
| Legal Assistance (2%) | $3,666,000 |
| Fiscal Services (2%) | $3,666,000 |
| Pipeline Contingency (15%) | $15,078,000 |
| All Other Facilities Contingency (20%) | $16,553,000 |
| Environmental & Archaeology Studies and Mitigation | $1,924,000 |
| Land Acquisition and Surveying (611 acres) | $5,183,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $8,228,000 |
| **TOTAL COST OF PROJECT** | **$262,492,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $18,392,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,239,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $670,000 |
| Water Treatment Plant | $2,280,000 |
| Pumping Energy Costs (18,462,048 kW-hr @ 0.09 $/kW-hr) | $1,662,000 |
| Purchase of Water (11,802 acft/yr @ 8.15 $/acft) | $96,000 |
| **TOTAL ANNUAL COST** | **$24,339,000** |
| | |
| **Available Project Yield (acft/yr)** | 194 |
| **Annual Cost of Water ($ per acft)*** | $125,459 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $30,655 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $384.96 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $94.06 |
| *Based on a peaking factor of 1.25. | |

### 5.2.19.5 Implementation Considerations

Implementation of the CVLGC Carrizo Project could create conflicts with other water supply plans as they will be competing for limited groundwater supplies within Wilson County and the Evergreen Underground WCD. Because the district's permitting process is independent of the regional planning process, potentially competing groundwater management strategies are not prioritized.

The development of groundwater in the Carrizo-Wilcox Aquifer in the SCTRWPA must address several issues, which may include the following:

- Evergreen UWCD permits:
  - Analyses of pumping impacts on groundwater levels;
  - Mitigation of impacts on existing well owners;
  - Drought and Water Conservation Plans; and
  - Needs assessment of the receiving water utilities.
- Impacts on:
  - Endangered and threatened species;
  - Baseflow in streams; and
  - Wetlands.
- Competition with others in the area for groundwater.

## 5.2.20 GBRA Lower Basin New Appropriation

The SCTRWPG identified the GBRA Lower Basin New Appropriation as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.20.1 Description of Water Management Strategy

The GBRA Lower Basin New Appropriation WMS includes a diversion of up to 189,484 acft/yr from the Guadalupe River in Calhoun County. The project would use either the existing gravity-flow diversion facilities located immediately upstream of GBRA's Saltwater Barrier and Diversion Dam or new diversion facilities in order to divert water at a rate not to exceed 500 cubic feet per second (cfs) (within the existing 622 cfs maximum authorized diversion rate) and authorization to impound up to 200,000 acft in Calhoun County (Figure 5.2.20-1). The diversion and storage will serve municipal and industrial water users in GBRA's 10-county statutory district.

Implementation of this WMS will help to meet projected demands for current and future GBRA customers over the next 50 years and beyond. As discussed in the Available Yield section below, water availability modeling indicates a proposed 50,000 acft OCR would have an estimated firm yield of 26,500 acft/yr. This WMS is planned for implementation in the 2040 decade.

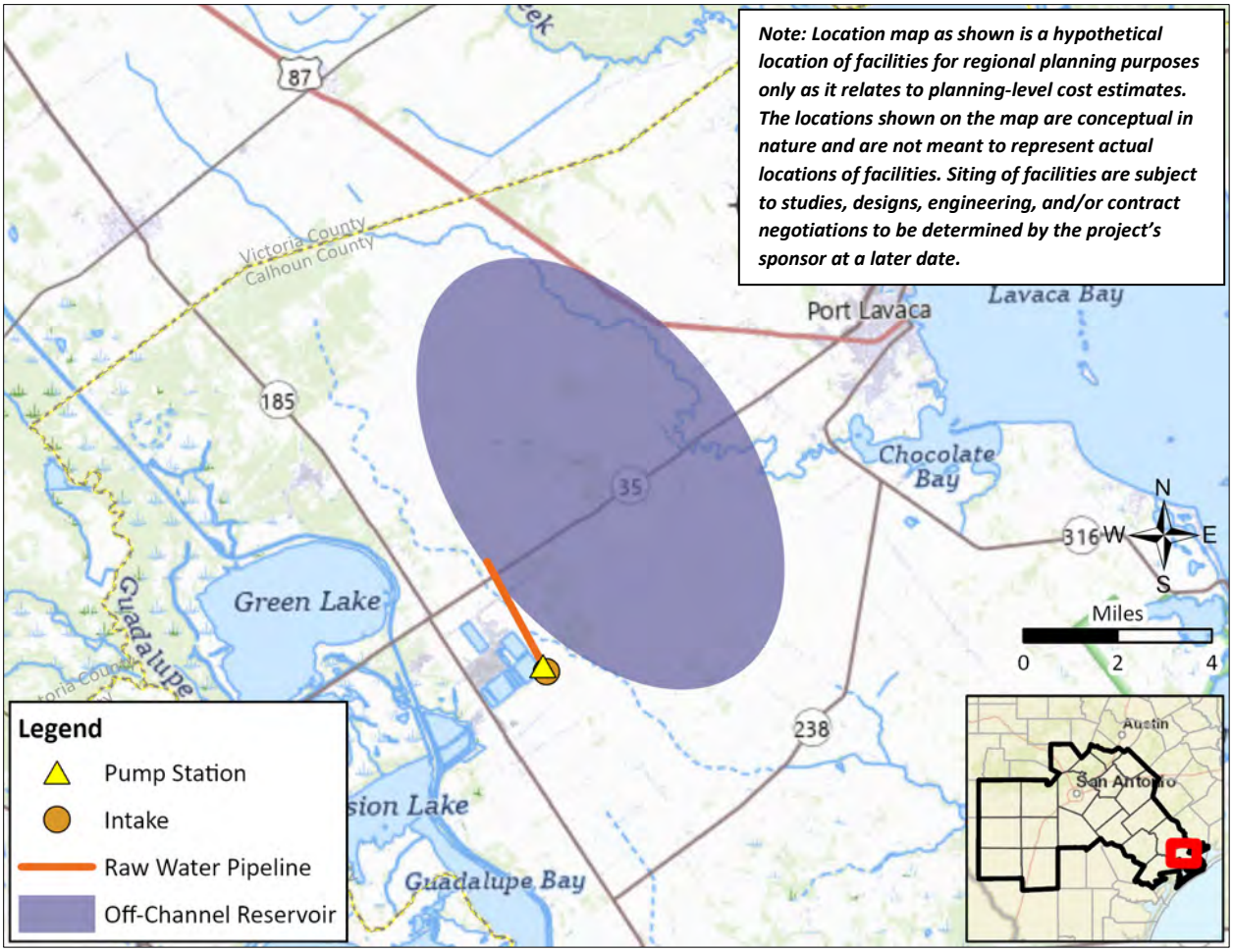



**Figure 5.2.20-1 Approximate Location for the GBRA Lower Basin New Appropriation WMS**

### 5.2.20.2 Available Yield

This WMS has a firm yield of 26,500 acft/yr and is planned for completion by 2040. Table 5.2.20-1 provides a summary of the available yield for the GBRA Lower Basin New Appropriation WMS. The following sections provide additional information regarding estimation of available yield for this WMS.

**Table 5.2.20-1 Available Yield for the GBRA Lower Basin New Appropriation WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| GBRA Lower Basin New Appropriation | 0 | 26,500 | 26,500 | 26,500 | 26,500 | 26,500 |

The GBRA Lower Basin New Appropriation WMS was evaluated using the TCEQ GSA WAM Run 3, which does not include effluent return flows. This WMS is subject to full application of environmental flow standards adopted pursuant to TWC §11.1471. The GSA WAM is a monthly time-step model; however, a series of spreadsheet models, including the FRAT, were used to quantify water availability for a new water right subject to daily flow variations, senior water rights, instantaneous instream flow restrictions, and an instantaneous maximum diversion rate. General technical assumptions used for the applications of the GSA WAM include the following:

- Surface water rights were modeled at full consumptive amounts per certificates of adjudication and permits with no treated effluent discharges (TCEQ WAM Run 3).
- Edwards Aquifer withdrawals, critical period management, and resulting springflows consistent with the approved Habitat Conservation Plan (Phase I) were developed through the Edwards Aquifer Recovery Implementation Program.
- All senior Guadalupe River hydropower water rights were subordinated to Canyon Reservoir.
- For firm water supply modeling purposes, the total run-of-river supply of water available under the GBRA/Dow Water Rights at any time is assumed to be allocated first to satisfy projected demands for firm water at that time among all present and future GBRA customers and then, to the extent additional run-of-river water is available, to storage in the proposed OCR.
- For firm water supply modeling purposes, projected demands for firm water by all present and future GBRA customers are assumed to be in accordance with current GBRA planning.

Specifically, the GSA WAM was used to determine the regulated flow and unappropriated flow for the San Antonio and Guadalupe Rivers, separately, just upstream of the confluence of the two rivers. For each river, the regulated and unappropriated flows were disaggregated to daily values, and the daily senior water rights passage volume was determined. Results were imported into separate FRAT models, and the appropriate instream flow standard was incorporated. For the Guadalupe River, the environmental flow standard associated with the Guadalupe River at Victoria was used, adjusted for the additional incremental drainage area to the confluence. For the San Antonio River, the environmental flow standard associated with the San Antonio River at Goliad was used, adjusted for the additional incremental drainage area to the confluence. The FRAT models were then used to determine the amounts of water available to the GBRA Lower Basin New Appropriation WMS from each river. Finally, a daily spreadsheet model was used to estimate the amount of water used from each river in conjunction with daily reservoir operations and to calculate firm yield.

Firm yield calculations were performed for an off-channel reservoir of 50,000 acft, assuming 2,000 acre surface area and 25-foot depth, which would enable a firm yield of 26,500 acft/yr.

With any new project in the Guadalupe-San Antonio River Basin, the project's impacts on freshwater inflows to the Guadalupe Estuary is a concern. Figure 5.2.20-2 and Figure 5.2.20-3 illustrate simulated freshwater inflows to the Guadalupe Estuary with and without implementation of this WMS. The data labeled as "With GBRA Lower Basin New Appropriation WMS" on the figures are from simulations including a 50,000 acft OCR and annual diversion of the firm yield as reported in Table 5.2.20-1.

All or a portion of yield from this WMS remains unallocated to a specific WUG because the project sponsor is a WWP and has chosen to instead have a surplus management supply. Surplus management supply is when the cumulative supply of the recommended WMSs is in excess of the amount needed to meet regional needs to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability. Rather than assigning volumes from a specific project to individual WUGs in the plan, the WWP contracts with customers from their general water supply portfolio or surplus. This approach allows for flexibility in meeting future demands and accommodating evolving customer needs. As such, the strategy volumes are included in the plan to reflect the WWP's capacity to meet regional needs, even though specific allocations to WUGs are not identified at this time.

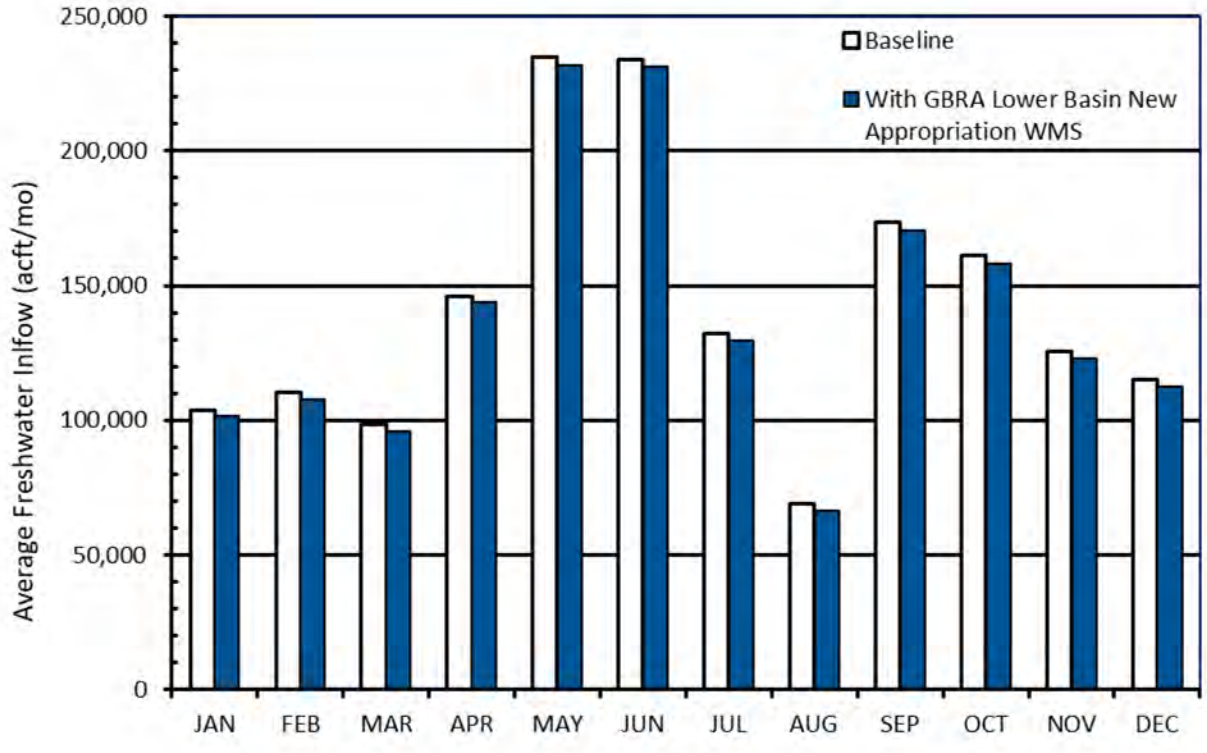



**Figure 5.2.20-2 Monthly Average Freshwater Inflows to the Guadalupe Estuary**

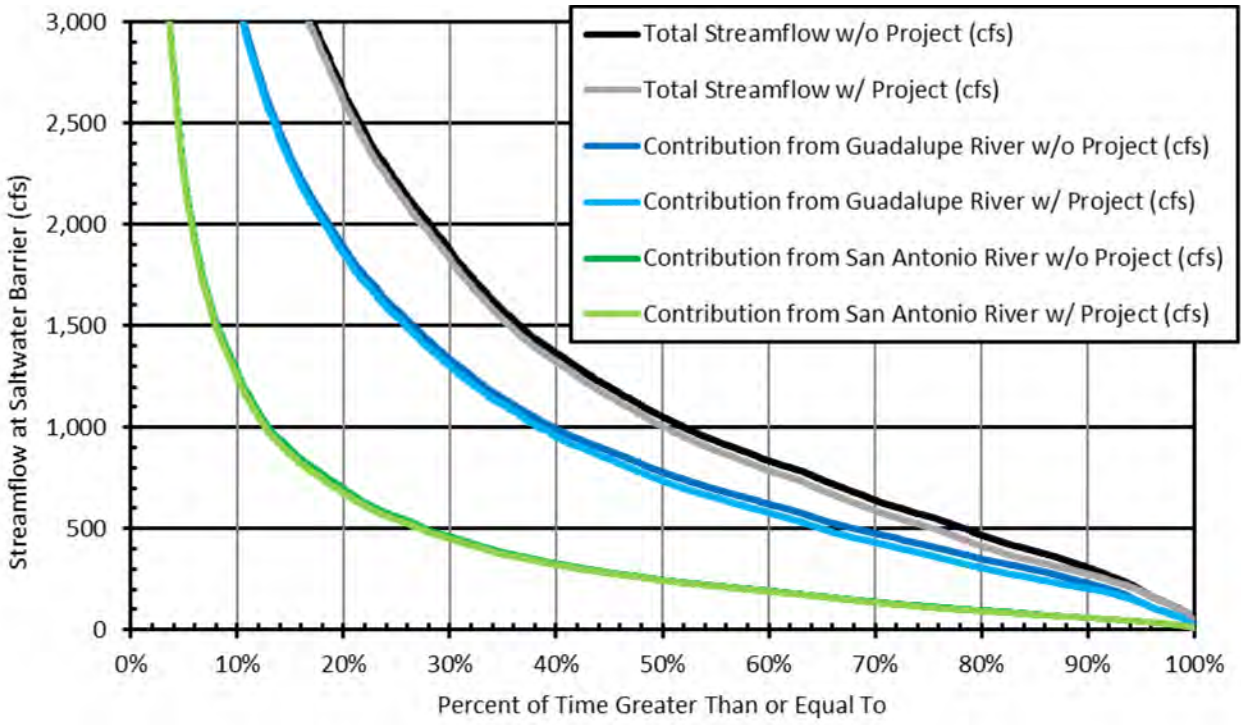



**Figure 5.2.20-3 Freshwater Inflow Frequency to the Guadalupe Estuary**

### 5.2.20.3 Environmental Factors

The GBRA Lower Basin New Appropriation WMS was evaluated to determine its potential impacts on environmental factors. Table 5.2.20-2 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.20-2 Summary of Potential Project Effects on Environmental Factors for the GBRA Lower Basin New Appropriation WMS**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 29,748 |
| Potential Species Impact Score | 13 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 3 |
| Potential Stream Flow / Water Quality Impact Score | 5 |
| Potential Cultural Resources Impact Score | 242 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area is located in the Western Gulf Coastal Plain ecoregion, and occurs within a variety of vegetation types, mostly croplands, pastures, shrublands, and wetlands. A railway associated with a

large chemical facility occurs within the project area. As mapped by TPWD [1], dominant vegetation types in the project area are row crops and coastal prairie, with small amounts of wooded area such as evergreen shrubland, live oak motte and woodland, and mesquite shrubland. The project also contains riparian vegetation zones, mapped by TPWD as riparian grassland, riparian evergreen and deciduous shrublands, riparian live oak/hardwood forest, riparian hardwood forest, and riparian herbaceous wetland.

Based on TPWD vegetation mapping, the project may have the potential to impact up to 29,748 acres of agricultural resources, including 19,635 acres mapped as row crops and 10,113 acres mapped as coastal prairie which may include pasture areas used for grazing or hay production.

Construction of project storage and mechanical facilities would result in conversion of native vegetation and/or croplands to industrial and reservoir use. Project pipeline easements would require the removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

### Aquatic Resources

The project occurs between San Antonio Bay and Lavaca Bay/Matagorda Bay. As mapped by NHD, a network of irrigation ditches and East and West Coloma Creeks traverse the project area. These two creeks appear to be channelized and eventually flow into Matagorda Bay. NWI mapping shows 808 acres of emergent and forested/shrub wetlands and ponds, and riverine wetlands in the project area.

No water bodies are in the project area that are designated as impaired in the Texas Integrated Report of 303(d) listed water bodies [2]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. No ecologically significant stream segments designated by TPWD occur in the project area.

The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that no change in preconstruction contours of waters of the United States occur. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

[1] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

[2] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d)*. https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that may occur in Calhoun County [3, 4]. Suitable foraging habitat for the federally endangered whooping crane (*Grus americana*) may occur in the project area. The only natural flock of whooping cranes winter mainly in and adjacent to ANWR along the central Texas coast in Aransas, Calhoun, and Refugio Counties [5] (Canadian Wildlife Service and USFWS 2007). The project area occurs approximately 13 miles north-northwest of the ANWR. Furthermore, the project area occurs approximately 14 miles north of federally designated critical habitat for the whooping crane. Habitat for the federally threatened black rail (*Laterallus jamaicensis*) may occur within wetlands in the project area. The area may also contain suitable habitat for the proposed federally endangered tricolored bat (*Perimyotis subflavus*) and the monarch butterfly (*Danaus plexippus*), which is a candidate for federal listing as threatened or endangered.

Suitable habitat may occur for state listed threatened species including the black-spotted newt (*Notophthalmus meridionalis*), reddish egret (*Egretta rufescens*), swallow-tailed kite (*Elanoides forficatus*), white-faced ibis (*Plegadis chihi*), white-tailed hawk (*Buteo albicaudatus*), wood stork (*Mycteria americana*), bald eagle (*Haliaeetus leucocephalus*), and Texas horned lizard (*Phrynosoma cornutum*). The wood stork and bald eagle would only be expected to forage within the project area. Potentially suitable habitat may occur for numerous wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones and wetland areas.

A site-specific assessment for the potential for whooping cranes to utilize the project area would be required. Additionally, site-specific field surveys would be required to determine the quality of habitat for other federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest within the project area. The federal MBTA protects birds, nests, and eggs from impacts unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Preconstruction surveys for bald eagle nests are recommended.

## Cultural Considerations

For linear portions of the project (i.e., project alignment), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. For the well field portion of the project (i.e., project area), a background literature review was conducted of the area portion only. The background literature review identified 10 cultural resources that intersect with the approximate

[3] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Calhoun County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[4] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Calhoun County. https://ipac.ecosphere.fws.gov/location/index

[5] Canadian Wildlife Service and USFWS 2007. *International Recovery Plan for the Whooping Crane*. Ottawa: Recovery of Nationally Endangered Wildlife, and USFWS, Albuquerque, New Mexico.

32,258-acre project area (Table 5.2.20-3); the project alignment contained no previously recorded cultural resources. The cultural resources contained within the project area include four cemeteries (i.e., Branch-Clark Cemetery, Hatch Bend Cemetery, Colonial Gardens Cemetery, and Dr. Moses Johnson Cemetery), five OTHMSs, and one 1936 Texas Centennial Marker [6,7]. The 1936 Centennial Marker is eligible for the NRHP, and three OTHMs exist within the cemeteries. Additionally, the historical map review identified 196 potential historic-age structures that intersect with the project area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment [8].

**Table 5.2.20-3 Cultural Resources Results for the GBRA Lower Basin New Appropriation WMS**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Branch-Clark Cemetery (CL-C005) | Cemetery / OTHM | Historic | Undetermined | Intersect |
| Colonial Gardens Cemetery (CL-C021) | Cemetery | Historic | Undetermined | Intersect |
| Dr. Moses Johnson Grave (CL-C025) | Cemetery / OTHM | Historic | Undetermined | Intersect |
| Hatch Bend Cemetery (CL-C022) | Cemetery / OTHM | Historic | Undetermined | Intersect |
| Cotton Gins of Calhoun County | OTHM | Historic | Undetermined | Intersect |
| Moses Johnson, M.D. | OTHM | Historic | Undetermined | Intersect |
| Hatch Sylvanus | 1936 Texas Centennial Marker | Historic | Eligible | Intersect |
| None (N=196) | Buildings/ Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **241.8** |

[6] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed September 2024.

[7] Texas Department of Transportation (TxDOT). 2024. TxDOT Historic Resources Aggregator, TxDOT Environmental Affairs Division. Austin, Texas Available at: https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=e13ba0aa78bf4548a8e98758177a8dd5. Accessed September 2024.

[8] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.

In the State of Texas, all human remains and human burials are protected by law[9], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and alignment and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume in accordance with THC authorization.

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area, which included low, medium, and high potential zones. The model indicated that 1.5% of the project are and alignment had a high likelihood of containing significant unidentified archaeological resources, 26.2% had a moderate likelihood, and 72.3% had a low likelihood. Areas with higher archaeological probability were considered to have been located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for this project equaled 241.8.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, four cemetery, six historical markers, and 196 potential historic-age structures are located within the project area and alignment; the probability model indicates a low to moderate likelihood of buried deposits; and the project assessment score is 241.8. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemeteries and the proposed development.

### 5.2.20.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for the surface water diversion, storage in an OCR, transmission, and integration. Land acquisition includes 2,000 acres for the reservoir footprint at an assumed cost of $11 million and a mitigation cost for the same acreage of $11 million. Pipeline and pump station land acquisition assumes 37.2 acres will

[9] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

be needed at a cost of $204,000 and a mitigation cost for the same acreage of $107,000. A cost estimate summary for the GBRA Lower Basin New Appropriation WMS is provided in Table 5.2.20-4.

**Table 5.2.20-4 Cost Estimate Summary for the GBRA Lower Basin New Appropriation WMS**

| Item | Estimated Costs |
|---|---|
| **CAPITAL COST** | |
| Dam and Reservoir (Conservation Pool 50,000 acft, 2,000 acres) | $38,149,000 |
| Intake Pump Stations (99.6 MGD) | $55,652,000 |
| Transmission Pipeline (78 in. dia., 2.7 miles) | $21,447,000 |
| Integration, Relocations, Backup Generator & Other | $48,164,000 |
| **TOTAL COST OF FACILITIES** | **$163,412,000** |
| | |
| | |
| - Planning (7%) | $4,902,000 |
| - Design (7%) | $11,439,000 |
| - Construction Engineering (7%) | $1,634,000 |
| Legal Assistance (2%) | $3,268,000 |
| Fiscal Services (2%) | $3,268,000 |
| Pipeline Contingency (20%) | $3,217,000 |
| All Other Facilities Contingency (30%) | $28,393,000 |
| Environmental & Archaeology Studies and Mitigation | $11,105,000 |
| Land Acquisition and Surveying (8,217 acres) | $11,343,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $7,842,000 |
| **TOTAL COST OF PROJECT** | **$249,823,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $12,179,000 |
| Reservoir Debt Service (3.5 percent, 40 years) | $3,559,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $696,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $1,391,000 |
| Dam and Reservoir (1.5% of Cost of Facilities) | $572,000 |
| Pumping Energy Costs (11,822,567 kW-hr @ 0.09 $/kW-hr) | $1,064,000 |
| **TOTAL ANNUAL COST** | **$19,461,000** |
| | |
| **Available Project Yield (acft/yr)** | 26,500 |
| **Annual Cost of Water ($ per acft)*** | $734 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $140 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $2.25 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.43 |
| * Based on a peaking factor of 1. | |

### 5.2.20.5 Implementation Considerations

Implementation of the GBRA Lower Basin New Appropriation WMS includes the following considerations:

- It may be necessary to obtain the following:
  - TCEQ Diversion and Storage Permits (Application No. 12482, pending);
  - USACE Sections 10 and 404 Dredge and Fill Permits;
  - TCEQ stormwater permit for construction activities;
  - GLO sand and gravel removal permits;
  - GLO easement for use of state-owned land; and
  - TPWD sand, gravel, and marl permit.
- Acquisition of private land for construction of facilities through either negotiations or condemnation.
- Additional studies, investigations, and/or agency coordination will be necessary prior to full implementation, including but not limited to the following:
  - Design of infrastructure;
  - Local coordination with municipalities, county, or railroads for roadway, railroad, and utility crossings;
  - Environmental studies;
  - Potential stream/wetland mitigation plans;
  - Site-specific protected species habitat evaluations and presence/absence surveys; and
  - Cultural resources surveys.

In addition, GBRA is currently developing a regional Habitat Conservation Plan (HCP) to cover implementation of projects in the entirety of the Guadalupe River Basin. Once approved, the HCP will provide incidental take coverage for federally listed threatened and endangered species that are covered under the HCP, which are anticipated to include eastern black rail, whooping crane, Guadalupe darter, false spike, Guadalupe orb, and Guadalupe fatmucket. Protected species not covered by the HCP would require individual consultation with the USFWS if they may be adversely affected by proposed project activities.

## 5.2.21 GBRA WaterSECURE

The SCTRWPG identified the GBRA WaterSECURE WMS as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.21.1 Description of Water Management Strategy

The GBRA WaterSECURE is a WMS that combines the following two WMSs that were included in the 2021 Regional Water Plan, with modifications to infrastructure and customers: GBRA Mid-Basin Project (Phase 2) and GBRA Lower Basin Storage Project. The WMS is designed to supply 125,000 acft/yr; however, the available yield varies because of MAG limitations.

Given the geographic extent of this WMS, the approximate project location is shown in two maps; one for the lower basin (Figure 5.2.21-1) and one for the mid-basin (Figure 5.2.21-2). The maps are conceptual, as the exact locations and configuration of infrastructure have not yet been finalized. The WMS would include the following:

- Diversion of surface water from the lower Guadalupe-San Antonio River Basin in Refugio County;
- Storage of raw water in a new lower basin OCR in Calhoun County;
- Conveyance of raw water northward from Calhoun County to Gonzales County, traversing through Victoria and DeWitt Counties, where the Yoakum Raw Water Booster Station is located;
- Diversion of surface water from the mid-Guadalupe River Basin in Gonzales County;
- Treatment at a new conventional WTP in Gonzales County of raw surface water from the lower and mid-basin diversions;
- Injection and storage of treated water in an ASR well field in the Carrizo-Wilcox Aquifer in Gonzales County;
- Withdrawal of brackish groundwater from a new well field in the Carrizo-Wilcox Aquifer in Gonzales County, which is co-located on the same footprint as the ASR well field;
- Treatment of brackish groundwater at a new brackish desalination WTP in Gonzales County; and
- Conveyance of treated water to the north and northwest for delivery to GBRA customers, with pipelines located in Caldwell, Hays, Guadalupe, Comal, and Kendall Counties.

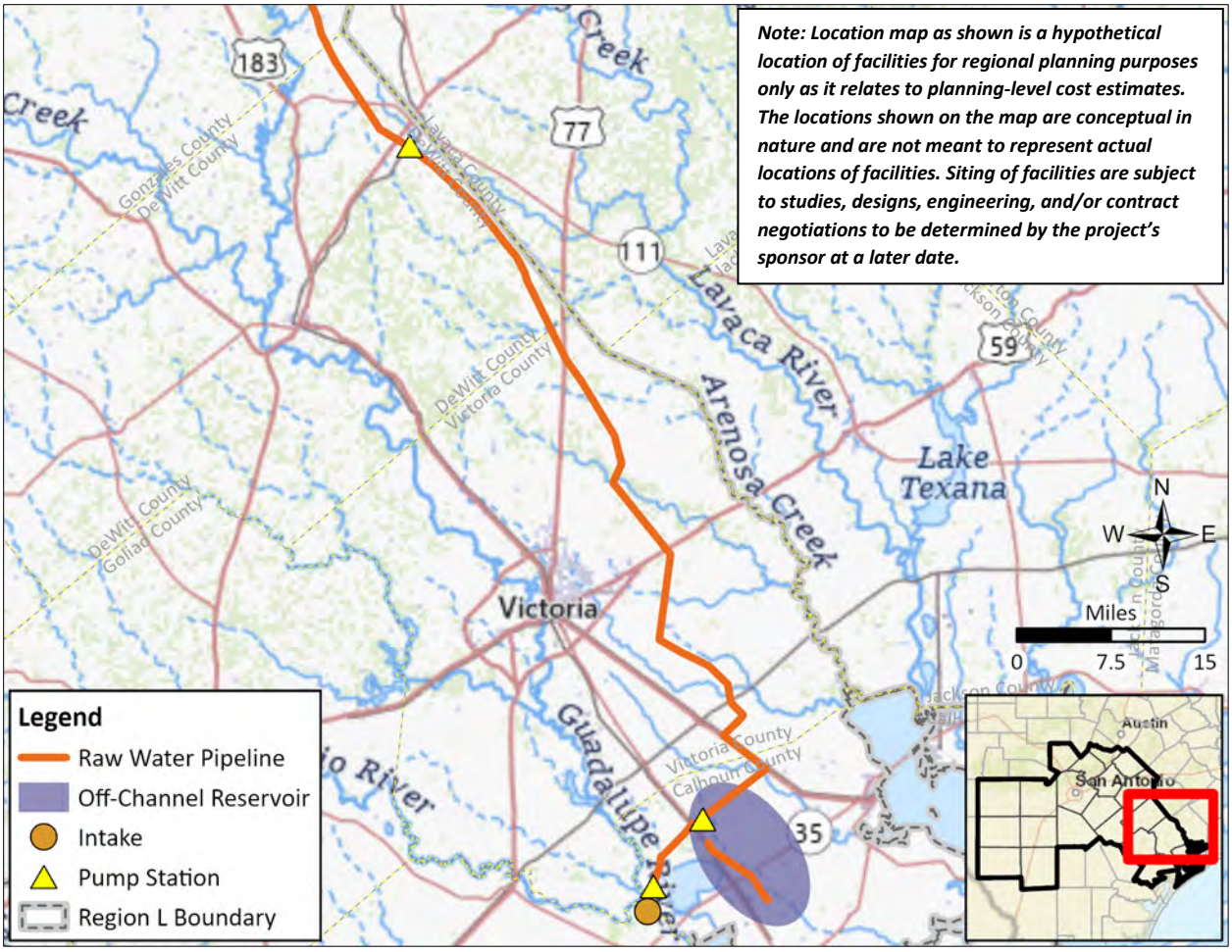



**Figure 5.2.21-1 Approximate Location in the Lower Basin for the GBRA WaterSECURE WMS**

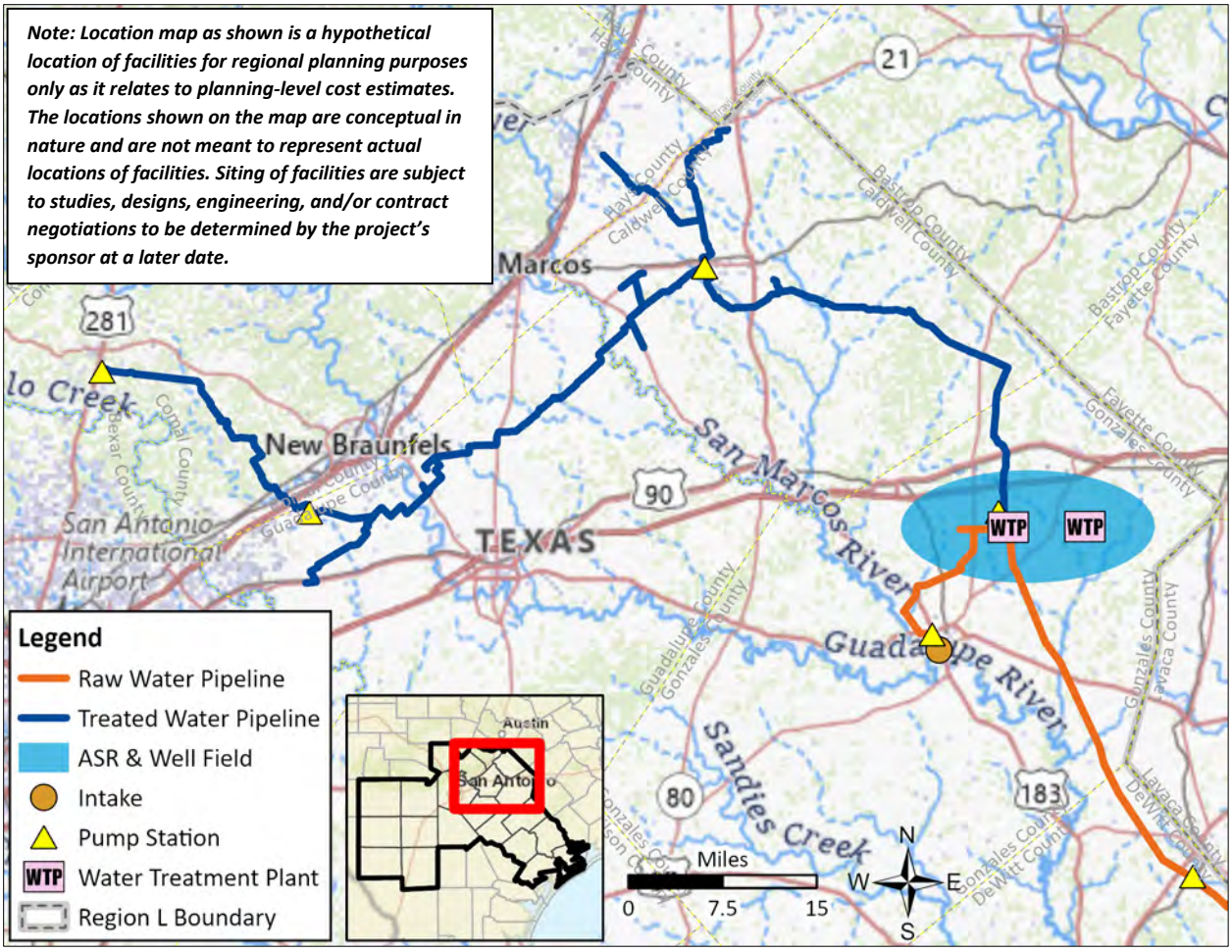



**Figure 5.2.21-2 Approximate Location in the Mid-basin for the GBRA WaterSECURE WMS**

A new conventional WTP (IH-10 South WTP) will be located northwest of Gonzales and will receive raw surface water from the Lower Basin OCR (approximately 95 miles away) and from the river diversion/intake point near Gonzales (5.3 miles). Additionally, a new desalination WTP will be located in Gonzales County, which will treat brackish groundwater from a new well field in the Carrizo-Wilcox Aquifer in Gonzales County, which is co-located on the same footprint as the ASR well field.

Treated water will generally be delivered to meet daily needs; however, when WTP capacity exceeds daily needs, additional raw water supplies will be treated and injected into the Carrizo-Wilcox Aquifer using new ASR wells. Potable water supplies will be conveyed to various delivery points throughout the proposed central, eastern, and western treated water systems. Customers will be responsible for construction of any facilities required to connect to the delivery locations. Additionally, some treated supply could be made available to customers along the transmission line.

The finished water pipeline throughout the proposed central, eastern, and western treated water systems will total approximately 150 miles in length. The transmission line is sized to deliver baseline supply with a 1.3 peaking factor. Two pump stations will be required to deliver supplies along the central treated water system transmission main before branching into the proposed eastern and western

treated water systems. A HSPS will pump treated water from the clear well located at the new I-10 South WTP and will provide sufficient head to deliver supplies to the first booster pump station, the SH-142 Booster Station. The SH-142 Booster Station will boost pressures to convey supplies to the delivery points within the proposed eastern and western treated water systems. Two additional booster pump stations in the western treated water system are included in the WMS: the New Braunfels Booster Station and the Western Canyon Booster Station.

### 5.2.21.2 Available Yield

The GBRA WaterSECURE WMS is planned for implementation by 2040 and has an available yield that varies by decade because of MAG limitations. Table 5.2.21-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the GBRA WaterSECURE WMS. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.21-1 Envisioned and MAG-Constrained Yields for the GBRA WaterSECURE WMS (acft/yr)**

| Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Envisioned Yield | 0 | 125,000 | 125,000 | 125,000 | 125,000 | 125,000 |
| MAG-Constrained Yield | 0 | 117,429 | 121,194 | 121,315 | 121,627 | 119,175 |

The GBRA WaterSECURE WMS will provide treated water to GBRA customers, as shown in Table 5.2.21-2. Although this WMS has a MAG-constrained yield, customer allocations shown in the table represent the available, firm yield. A portion of yield from this WMS remains unallocated to a specific WUG and will be considered surplus management supply.

**Table 5.2.21-2 WUG and WWP Allocations for the GBRA WaterSECURE WMS (acft/yr)**

| WUG/WWP | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Buda [1] | 0 | 1,680 | 1,680 | 1,680 | 1,680 | 1,680 |
| Canyon Lake Water Service (Texas Water Company) [2] | 0 | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| Canyon Regional Water Authority | 0 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| County Line SUD | 0 | 4,144 | 4,144 | 4,144 | 4,144 | 4,144 |
| County-Other, Caldwell | 0 | 4,570 | 4,570 | 4,570 | 4,570 | 4,570 |
| County-Other, Hays [2] | 0 | 3,180 | 3,180 | 3,180 | 3,180 | 3,180 |
| County-Other, Kendall | 0 | 553 | 553 | 553 | 553 | 553 |
| Creedmoor-Maha WSC [2] | 0 | 9,304 | 9,304 | 9,304 | 9,304 | 9,304 |
| Crystal Clear SUD [3] | 0 | 3,000 | 3,000 | 3,000 | 4,000 | 6,000 |
| Fair Oaks Ranch | 0 | 300 | 300 | 300 | 300 | 300 |
| Goforth SUD [2] | 0 | 8,682 | 8,682 | 8,682 | 8,682 | 8,682 |
| Goforth SUD [3] | 0 | 0 | 0 | 0 | 0 | 800 |
| Green Valley SUD | 0 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 |
| Kyle | 0 | 4,592 | 4,592 | 4,592 | 4,592 | 4,592 |

| WUG/WWP | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Lockhart | 0 | 7,880 | 7,880 | 7,880 | 7,880 | 7,880 |
| Luling | 0 | 2,066 | 2,066 | 2,066 | 2,066 | 2,066 |
| Manufacturing, Caldwell | 0 | 4,132 | 4,132 | 4,132 | 4,132 | 4,132 |
| Martindale WSC | 0 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Maxwell SUD | 0 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| South Buda WCID 1 [3] | 0 | 100 | 500 | 1,100 | 1,700 | 2,300 |
| Victoria | 0 | 5,601 | 5,601 | 5,601 | 5,601 | 5,601 |
| Wimberley WSC [3] | 0 | 0 | 300 | 700 | 1,100 | 1,500 |
| Guadalupe-Blanco River Authority | 0 | 12,580 | 14,810 | 13,900 | 12,133 | 6,462 |
| Unallocated | 0 | 1,065 | 1,900 | 1,931 | 2,010 | 1,429 |
| **Total** | **0** | **117,429** | **121,194** | **121,315** | **121,627** | **119,175** |

[1] Buda is a WUG in Region K.
[2] WUG is split between Region K and Region L. Yields shown represent allocations to the WUG/WWP in both regions.
[3] For purposes of the 2026 Regional Water Plan, WUGs that purchase water from GBRA's general supply are shown as customers of the GBRA WaterSECURE WMS in the 2027 Regional and State Water Planning Database (DB27).

The yield as envisioned by the sponsor (Envisioned Yield) is 125,000 acft/yr, consisting of 110,000 acft/yr for the surface water and ASR components and 15,000 acft/yr for the brackish groundwater component. However, the firm yield of brackish groundwater component varies by decade due to MAG limitations of the Carrizo-Wilcox Aquifer in Gonzales County and the Guadalupe Basin.

Subsequent sections provide additional information regarding the evaluation of the available yield for the GBRA WaterSECURE WMS.

### Surface Water Modeling of the Lower Basin Diversion and OCR

For the surface water and ASR components, the firm yield is based on detailed WAM modeling provided by the project sponsor, which estimated a firm yield of 110,000 acft/yr. Additional WAM evaluations were performed for Regional Water Planning purposes, which estimated a higher annual yield than 110,000 acft/yr. However, the more conservative, lower estimate provided by the project sponsor was used as the firm yield for this WMS.

All surface water rights for the GBRA WaterSECURE WMS have been granted. In the lower basin, GBRA and Dow, individually and collectively, own surface water rights in the lower Guadalupe-San Antonio River Basin (the GBRA/Dow Water Rights) authorizing diversions from the run-of-river flow of the Guadalupe River totaling 172,501 acft/yr. Table 5.2.21-3 summarizes the GBRA/Dow Water Rights, including the certificate of adjudication number, priority date, annual diversion amount, authorized uses, and ownership.

**Table 5.2.21-3 GBRA/Dow Water Rights in the Lower Guadalupe River Basin**

| Certificate of Adjudication | Priority Date | Authorized Uses | Ownership | Annual Diversion (acft/yr) |
|---|---|---|---|---|
| 18-5173 | 2/3/1941 | Irrigation/Industrial | GBRA/Dow | 2,500 |
| 18-5174 | 6/15/1944 | Irrigation/Industrial | GBRA/Dow | 1,870 |
| 18-5175 | 2/13/1951 | Irrigation/ Industrial/ Mining/ Livestock | GBRA/Dow | 940 |
| 18-5176 | 6/21/1951 | Irrigation/ Industrial/ Municipal | GBRA/Dow | 9,944 |
| 18-5177 | 1/3/1944 | Irrigation/ Industrial/ Municipal | Dow | 10,000 |
| 18-5177 | 1/3/1944 | Irrigation/ Industrial/ Municipal | GBRA/Dow | 32,615 |
| 18-5177 | 1/26/1948 | Irrigation/ Industrial | GBRA/Dow | 8,632 |
| 18-5178 | 1/7/1952 | Irrigation/ Industrial/ Municipal | GBRA/Dow | 106,000 |
| **Total Annual Diversion** | **All** | **All** | **All** | **172,501** |

Water available for diversion under these rights for use by GBRA and Dow is governed by the complex interactions of natural, anthropogenic, and legal factors including rainfall, runoff, springflow, evaporation, aquifer recharge, diversions by other water right owners, reservoir operations, off-channel storage, terms and conditions of contracts between GBRA and Dow, terms and conditions of water rights, and the prior appropriation doctrine as enforced by the South Texas Watermaster of the TCEQ. Because the point of diversion for the GBRA/Dow Water Rights near Tivoli is below the confluence of the San Antonio and Guadalupe Rivers, and the water rights have senior priority dates to most upstream water rights in both the Guadalupe and San Antonio River Basins, the water rights are considered quite reliable but not firm.

To firm up the run-of-river supplies of water available under the GBRA/Dow Water Rights, an OCR near the GBRA Main Canal and Dow Seadrift Operations facilities is planned for implementation by 2040 decade. Although a final site has yet to be selected, the general location of the OCR is shown on Figure 5.2.21-1, just east of Green Lake. The OCR is assumed to be a traditional dam with a surface area of 2,462 acres and a maximum water depth of 25 feet, capable of impounding approximately 60,000 acft of water. A raw water pipeline would transport water diverted from the raw water intake in Refugio County and pump it to the OCR site. GBRA has obtained water rights permits for this project.

Initial water availability calculations were performed using TCEQ's GSA WAM Run 3. The GSA WAM is a monthly time-step computer model used to estimate regulated streamflow and water available for diversion under existing water rights on a priority basis subject to technical assumptions regarding natural, anthropogenic, and legal factors. General technical assumptions used for the applications of the GSA WAM include the following:

- Surface water rights were modeled at full consumptive amounts per certificates of adjudication and permits with no treated effluent discharges (TCEQ WAM Run 3).
- Edwards Aquifer withdrawals, critical period management, and resulting springflows consistent with the approved Habitat Conservation Plan (Phase I) were developed through the Edwards Aquifer Recovery Implementation Program.

- All senior Guadalupe River hydropower water rights were subordinated to Canyon Reservoir.
- For firm water supply modeling purposes, the total run-of-river supply of water available under the GBRA/Dow Water Rights at any time is assumed to be allocated first to satisfy projected demands for firm water at that time among all present and future GBRA customers and then, to the extent additional run-of-river water is available, to storage in the proposed OCR.
- For firm water supply modeling purposes, projected demands for firm water by all present and future GBRA customers are assumed to be in accordance with current GBRA planning.

Monthly regulated streamflow values from the GSA WAM were disaggregated to daily values using historical daily streamflow patterns to obtain estimates of firm water supply available under the GBRA/Dow Water Rights on a daily basis. The daily firm supply available from the GBRA/Dow Water Rights without the proposed OCR is approximately 8,870 acft/yr. This analysis is limited to a shorter historical period of record because of data availability and does not include on-site storage capacity that Dow or other end users may have, which could impact firm yield.

Firm water supplies available on a daily basis under the GBRA/Dow Water Rights can be enhanced with development and integration of off-channel storage. Analyses of the proposed OCR are based on the following:

- Assumed an OCR capacity of approximately 60,000 acft;
- Assumed an OCR surface area of 2,426 acres;
- Simplified OCR operations simulations assuming maximum and minimum water depths of approximately 25 feet and 3 feet, respectively;
- Assumed a maximum instantaneous diversion rate to the OCR of 250 cfs; and
- Applied historical net evaporation from the GSA WAM.

Under the above assumptions, firm surface water supply from the lower basin could be increased from 8,870 acft/yr to 117,800 acft/yr with the addition of the 60,000 acft OCR. Note that 50,000 acft/yr of the increased firm surface water supply of the lower basin component will remain in the lower basin. When the remaining lower basin supply is combined with the firm surface water supply of the mid-basin component of this project, the total firm surface water supply of the GBRA WaterSECURE WMS is approximately 110,000 acft/yr. Additionally, the firm supply would also be increased by increasing the rate of delivery of water into the OCR above the assumed maximum rate of 250 cfs.

### Surface Water Modeling of the Mid-Basin Diversion and ASR Well Field

As described previously, all surface water rights for the GBRA WaterSECURE WMS have been granted. Estimates of surface water available for diversion under GBRA's Permit No. 12378 from the Guadalupe River at Gonzales were computed using the TCEQ WAM Run 3, which considers senior water rights and environmental flow requirements included in the Special Conditions of the permit. Surface water availability was estimated in accordance with GBRA's permit.

Models used to determine availability and yield include the GSA WAM and the FRAT. Major modeling assumptions in applications of the GSA WAM and FRAT include the following:

- Estimated water availability subject to full use of senior water rights for consumptive uses and environmental flow standards in 30 TAC §298, as adopted by TCEQ on August 30, 2012.

- Excluded treated effluent discharges throughout the river basin (similar to TCEQ Run 3), except when specifically addressed in a water right (e.g., INVISTA, Kate O'Connor Trust, etc.).
- Based the springflows from the Edwards Aquifer on aquifer management in accordance with full implementation of the EAHCP, as approved by the USFWS.
- Assumed maximum instantaneous Mid-Basin diversion rate of 135 cfs.
- Assumed maximum annual Mid-Basin diversion amount of 75,000 acft, in accordance with GBRA's permit No. 12378.
- Assumed maximum ASR storage of 193,800 acft.
- Assumed maximum ASR recharge rate of 35 MGD.
- Assumed maximum ASR recovery rate of 58 MGD.
- Assumed annual ASR storage loss rate of 10%.

Monthly regulated flows were then disaggregated to daily values using gaged or estimated daily streamflows for the Guadalupe River at Gonzales. Monthly amounts allocated to downstream senior water rights were then taken uniformly out of the base of the daily hydrograph so that the sum of daily pass-through amounts in each month equaled the total monthly amount allocated to downstream senior water rights.

Daily senior water right pass-throughs and daily regulated flows are incorporated into the FRAT model, along with environmental flow requirements included in the permit's Special Conditions. These environmental flow requirements for the mid-basin diversion on the Guadalupe River under Permit No. 12378 are based on the Environmental Flow Standards for the Guadalupe River at Gonzales in 30 TAC §298.380(c)(6). The standards consist of subsistence, base, and pulse flow requirements. Although the requirements in Permit No. 12378 contain subsistence and base flow requirements, the pulse flow requirements do not include the standards' small seasonal pulse for the spring season or the large seasonal pulses for winter, spring, and fall. Because the authorized diversion rate of Permit No. 12378 is less than 20% of the pulse trigger level requirement, it is exempt from the specific small and large seasonal pulses mentioned above according to 30 TAC §298.385(b).

The proposed ASR well field will be located approximately 20 miles northeast of the City of Gonzales and include approximately 24 wells for injection and recovery. It was assumed to include a design recharge rate of 35 MGD, which is incorporated into the respective conventional WTP capacity.

Challenges to reliability include natural groundwater flow away from the ASR site and the associated drift of the storage bubble, thus reducing available supplies. For the purposes of this WMS, the anticipated water loss associated with ASR recovery rates is assumed to be 10% of the storage volume each year. This water loss is associated with drift within the aquifer. To compensate for the anticipated water loss, GBRA plans to inject additional water into the stored volume within the aquifer.

### Brackish Groundwater Well Field

The proposed brackish groundwater well field will be co-located on the same footprint as the new ASR well field, which is approximately 20 miles northeast of the City of Gonzales. The wells would withdraw brackish groundwater from the Carrizo-Wilcox Aquifer in Gonzales County.

The Gonzales County UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Gonzales County. In 2021, GMA 13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer in Gonzales County is 96,161 acft/yr in 2080 [2].

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

For planning purposes, infrastructure for the brackish groundwater component of the GBRA WaterSECURE WMS is sized to deliver the Envisioned Yield, which is 15,000 acft/yr. The lack of available data and the fractured and heterogenous nature of the aquifer system in this area are such that it is difficult to accurately predict well characteristics. Additional studies, test hole drilling, and characterization studies are recommended prior to well design to determine site-specific aquifer properties, well water quality. Based on available data, the project is anticipated to include 12 wells, each with an estimated pumping capacity of 1,000 gpm. For planning purposes, the brackish groundwater wells are assumed to have a depth of approximately 1,600 feet.

The anticipated TDS concentration is 1,500 mg/L, which would require a brackish desalination WTP. For planning purposes, the estimated RO efficiency is assumed to be 80%. Brackish concentrate will be disposed via deep well injection. It is anticipated that there would be five concentrate injection wells, which includes one contingency well.

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[2] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

### 5.2.21.3 Environmental Factors

The GBRA WaterSECURE WMS was evaluated to determine its potential impacts on environmental factors. Table 5.2.21-4 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.21-4 Summary of Potential Project Effects on Environmental Factors for the GBRA WaterSECURE WMS**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 36,551 |
| Potential Species Impact Score | 21 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 6 |
| Potential Stream Flow / Water Quality Impact Score | 5 |
| Potential Cultural Resources Impact Score | 1,233 |

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area is located in the Balcones Canyonlands, Blackland Prairie, Southern Post Oak Savanna, Southern Blackland/Fayette Prairie, Northern Humid Gulf Coastal Prairie, and Mid-Coast Barrier Islands and Coastal Marshes ecoregions, and crosses a variety of vegetation types, mostly open fields, pastures, and riparian zones along streams. A large chemical plant and associated water basins and railway lie within the project area. As mapped by TPWD [3], dominant vegetation types in the project area include savanna grassland, mesquite shrubland, floodplain herbaceous vegetation, post oak motte and woodland, croplands, pastures, shrublands, wetlands, coastal prairie, row crops, open water, and invasive evergreen shrubland. The linear components of the project cross riparian vegetation zones along streams, mapped by TPWD as floodplain and riparian herbaceous vegetation, floodplain and riparian hardwood forest, floodplain and riparian deciduous shrubland, floodplain live oak forest, riparian grassland, riparian evergreen and deciduous shrublands, riparian live oak forest, and hardwood forest; with the transmission pipeline alignment also crossing significant areas of central Texas floodplain hardwood forest and floodplain herbaceous vegetation communities.

Based on TPWD vegetation mapping, the project may have the potential to impact up to 36,551 acres of agricultural resources, including 19,508 acres mapped as row crops, 5,519 acres mapped as tame/disturbance grassland, and 11,524 acres mapped as coastal prairie which may include pasture areas used for grazing or hay production.

Construction of well fields would result in conversion of woody and herbaceous vegetation and agricultural uses to industrial land use for facilities. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing and woody vegetation clearing) to maintain

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes.

### Aquatic Resources

The mid-basin linear components from Comal/Hays to Gonzales Counties cross several NHD mapped streams and their associated floodplains, including the San Marcos River, Plum Creek, and Sandy Fork, and includes a raw water intake in the Guadalupe River. The project pipeline crosses Segment 1804A of Geronimo Creek, a tributary of the Guadalupe River. This stream segment has been designated as impaired in the Texas Integrated Report of 303(d) listed water bodies [4]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The project pipeline crosses the headwaters of Geronimo Creek, an ecologically significant stream segment designated by TPWD.

The transmission pipeline from the lower basin to the mid-basin areas extends from DeWitt to Refugio Counties located between San Antonio Bay and Matagorda Bay, with the transmission pipeline extending generally to the northwest to Gonzales. A network of irrigation ditches and East and West Coloma creeks traverse the approximate OCR area. These two creeks appear to be channelized and eventually flow into Matagorda Bay. The lower basin pipeline alignment crosses numerous mapped streams and their associated floodplains, including the Guadalupe River. Operational water basins associated with a chemical plant occur on the western side of the project region.

Linear components of the project cross several stream segments that have been designated as impaired in the Texas Integrated Report of 303(d) listed water bodies. The impaired water bodies in the pipeline alignments include the Lower San Marcos River (Segment 1808), Guadalupe River below San Antonio River (Segment 1802), Arenosa Creek (Segment 2453C), Peach Creek (Segment 1803C), Sandy Fork (Segment 1803G), Denton Creek (Segment 1803F), Dry Comal Creek (Segment 1811A), Plum Creek (Segment 1810), Garcitas Creek above tidal (Segment 2453E), Guadalupe River below Comal River (Segment 1804), Victoria Barge Canal (Segment 1701), and Alligator Creek (Segment 1804C). NWI mapping shows 617 acres of freshwater emergent wetlands, 36 acres of freshwater forested/shrub wetlands, 657 acres of freshwater ponds, 1,818 acres of lakes, and 1,118 acres of riverine wetlands in the project area. During planning and design of the project, GBRA intends to seek alternatives to avoid impacts to aquatic resources wherever possible.

The project pipeline crosses three water bodies that have been designated as ecologically significant stream segments by TPWD. Garcitas Creek, from its confluence with Lavaca Bay in Victoria/Jackson/ Calhoun County upstream to FM 1315 in Victoria County, was designated because of the presence of estuarine wetlands, high water quality/high aesthetic value, and occurrence of rare Texas palmetto palm (*Sabal mexicana*) and diamondback terrapin (*Malaclemys terrapin*). The Guadalupe River, from US 183

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

in Gonzales County upstream to Lake Gonzales Dam in Gonzales County (Segments 1803 and 1804), was designated due to known populations of the Guadalupe orb freshwater mussel (*Cyclonaias necki*). Another segment of the Guadalupe River, from its confluence with Guadalupe Bay in Calhoun/Refugio County upstream to FM 447 in northwest Victoria County (Segment 1801 and part of Segment 1803), was designated due to the presence of extensive freshwater and estuarine wetland habitat, including the 7,410-acre Guadalupe Delta Wildlife Management Area. This river segment also contains extensive marshland that provides habitat for the federally endangered whooping crane (*Grus americana*).

The project will require an on-site delineation of streams, ponds, and wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that may require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of waters of the U.S. The USACE permit requires that there will be no change in pre-construction contours of waters of the U.S. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit. Although the proposed project includes an OCR, streams or wetlands impacted by reservoir development would require appropriate USACE permitting depending on impacts. During planning and design of the project, GBRA intends to seek alternatives to avoid impacts to aquatic resources wherever possible.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Caldwell, Calhoun, Comal, DeWitt, Gonzales, Guadalupe, Hays, and Victoria Counties [5, 6, 7, 8, 9, 10, 11, 12]. Suitable habitat for the federally listed endangered golden-cheeked warbler (*Setophaga chrysoparia*), whooping crane (*Grus americana*), northern aplomado falcon (*Falco femoralis septentrionalis*), Attwater's greater prairie-chicken (*Tympanuchus cupido attwateri*), Houston toad (*Bufo houstonensis*), false spike (*Fusconaia mitchelli*), Guadalupe fatmucket (*Lampsilis bergmanni*), Guadalupe orb (*Cyclonaias necki*), and bracted twistflower (*Streptanthus bracteatus*), federally listed threatened eastern black rail (*Laterallus jamaicensis* ssp. *jamaicensis*), rufa red knot (*Calidris canutus rufa*), and

[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Caldwell County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[6] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Calhoun County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[7] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Comal County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[8] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – DeWitt County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[9] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Gonzales County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[10] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Guadalupe County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[11] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Hays County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[12] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Victoria County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

piping plover (*Charadrius melodus*), the federally proposed tricolored bat (*Perimyotis subflavus*), and the candidate monarch butterfly (*Danaus plexippus*) may occur within the project area.

Habitat for the federally listed endangered golden-cheeked warbler, northern aplomado falcon, the federally proposed listed tricolored bat, and monarch butterfly may occur in the open grasslands and woodlands of the project area. The only natural flock of whooping cranes winters mainly in and adjacent to Aransas National Wildlife Refuge (ANWR) along the central Texas coast in Aransas, Calhoun, and Refugio Counties[13]. The project area occurs approximately 12 miles north of the ANWR. Furthermore, the project area occurs approximately 8.5 miles north of federally designated critical habitat for the whooping crane. Therefore, the federally endangered whooping crane may occur in or fly over the project area. Habitat for the federally threatened eastern black rail, rufa red knot, and piping plover may occur within wetlands in the project area. Suitable habitat for the federally listed endangered Attwater's greater prairie-chicken may occur in the open coastal grasslands of the project area. Suitable habitat for the federally endangered false spike, Guadalupe fatmucket, and Guadalupe orb may occur in the project streams and canal crossings where they contain suitable flow conditions. Proposed critical habitat for the Guadalupe fatmucket and Guadalupe orb occurs within the Guadalupe River at the pipeline alignment. Suitable habitat for the bracted twistflower may occur within the project footprint in Comal County. Based on updated karst invertebrate zones issued by the USFWS in August 2024[14], habitat for federally endangered karst invertebrates may occur along the westernmost end of the transmission pipeline in the mid-basin area. The project will require on-site habitat assessments to determine if suitable habitat is present within the project impact areas.

Suitable habitat may occur for several state-listed threatened species, including the wood stork (*Mycteria americana*), Texas horned lizard (*Phrynosoma cornutum*), Texas tortoise (*Gopherus berlandieri*), and Cagle's map turtle (*Graptemys caglei*). The wood stork would only be expected to forage within the project area. Potentially suitable habitat may occur for numerous state wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones and wetland areas.

Streams in the project area may contain suitable habitat for federal endangered/state threatened freshwater mussel species. Suitable habitat may occur in perennial rivers/streams and perennial pools of intermittent streams. If any such habitat would be affected by construction, presence/absence surveys and relocation of native mussel species would be required. Handling and relocation of mussels and other aquatic species must be conducted by TPWD-permitted personnel and in accordance with an approved Aquatic Resources Relocation Plan. Furthermore, any species impacts would require USFWS consultation.

Site-specific field surveys would be required to determine the quality of habitat for state-listed species. Coordination with TPWD may be required to mitigate species impacts. If TWDB funding/financing will be

[13] Canadian Wildlife Service and U.S. Fish and Wildlife Service (USFWS). 2007. International Recovery Plan for the Whooping Crane. Ottawa: Recovery of Nationally Endangered Wildlife, and USFWS, Albuquerque, New Mexico.
[14] United States Fish and Wildlife Service (USFWS). Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys and Habitat Assessments for Listed Karst Invertebrates in Central Texas. U.S. Fish and Wildlife Service, Austin Ecological Services Field Office, 1505 Ferguson Lane, Austin, Texas. August 12, 2024.

used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur and nest in the project area. The federal MBTA protects birds, nests, and eggs from impacts unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Preconstruction surveys for active bird nests are recommended.

### Cultural Considerations

For the linear portions of the project (i.e., project alignment), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. For the well fields and OCR portions of the project (i.e., project area), a background literature review of the portion identified 82 cultural resources within the approximate 15,952-acre project area and alignment or immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment (Table 5.2.21-5) [15, 16]. These cultural resources include 52 archaeological sites, two NRHP-listed historic districts, one NRHP-eligible historic property, 13 cemeteries, five vicinity cemeteries, seven OTHMs, and two historic trails. Note that there are cultural resources with multiple resource types. Out of the archaeological sites, three are NRHP-eligible, six are ineligible for NRHP-listing, and 43 remain undetermined for listing on the NRHP. Two of the cemeteries, Jewish Cemetery and Saturn, are designated as Historic Texas Cemeteries. Additionally, the historical map review identified 975 potential historic-age structures that intersect with the project area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment [17].

Vicinity cemeteries are general areas where a cemetery location was reported at one time, but the exact location is unknown or could not be confirmed. If project impacts are to occur near the vicinity cemetery location, further work (e.g., pedestrian survey and/or metal detecting) or construction monitoring might be needed to ensure human burials are not present in the project area and alignment. In the State of Texas, all human burials are protected by law [18], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and alignment and the remains are determined to be Native American, they will be managed in accordance with procedures established through coordination with the THC, and work in the affected area can only resume per THC authorization.

---

[15] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed October 2024.

[16] Texas Department of Transportation (TxDOT). 2024. TxDOT Historic Resources Aggregator, TxDOT Environmental Affairs Division. Austin, Texas Available at: https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=e13ba0aa78bf4548a8e98758177a8dd5. Accessed October 2024.

[17] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed October 2024.

[18] As per the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area and alignment, which included low, medium, and high potential zones. The model indicated that 14.2% of the project area and alignment had a high likelihood of containing significant unidentified archaeological resources, 22.6% had a moderate likelihood, and 63.2% had a low likelihood. Areas with higher archaeological probability were considered to have been located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 points. In addition, Recorded Texas Historical Landmarks, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. For cultural resources with multiple resource types, the values of each resource type were calculated and used to determine the overall assessment score. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for this project equaled 1,233.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, 52 archaeological sites, two NRHP-listed historic districts, one NRHP-eligible historic property, 13 cemeteries, five vicinity cemeteries, seven OTHMs, two historic trails, and 975 potential historic-age structures are located within the project area and alignment; the probability model indicates that one-third of the project area has a moderate to high likelihood of buried deposits; and the project assessment score is 1,233. Based on these results, a cultural resources assessment for the final design plan is recommended, as well as a buffer zone of at least 100 feet between the cemeteries and the proposed project infrastructure.

**Table 5.2.21-5 Cultural Resources Results for the GBRA WaterSECURE WMS**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| 41CL1 | Archaeological site | Multicomponent | Ineligible | Intersect |
| 41CL10 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CL59 | Archaeological site | Prehistoric | Eligible | Intersect |
| 41CL70 | Archaeological site | Multicomponent | Undetermined | Intersect |
| 41CL77 | Archaeological site | Multicomponent | Eligible | Intersect |
| 41CL78 | Archaeological site | Multicomponent | Eligible | Intersect |
| 41CL79 | Archaeological site | Multicomponent | Undetermined | Intersect |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| 41CL89 | Archaeological site | No data | Undetermined | Intersect |
| 41CL96 | Archaeological site | Historic | Undetermined | Intersect |
| 41CM140 | Archaeological site | Prehistoric | Ineligible | Intersect |
| 41CM141 | Archaeological site | Prehistoric | Ineligible | Intersect |
| 41CM399 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW35 | Archaeological site | Historic | Undetermined | Adjacent |
| 41CW117 | Archaeological site | Prehistoric | Ineligible | Intersect |
| 41CW118 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW119 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW185 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW186 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW187 | Archaeological site | Multicomponent | Undetermined | Intersect |
| 41CW188 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW189 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW190 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW194 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW195 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW196 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW197 | Archaeological site | Prehistoric | Undetermined | Adjacent |
| 41CW198 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW199 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW200 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41CW201 | Archaeological site | Multicomponent | Undetermined | Intersect |
| 41CW202 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW203 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW204 | Archaeological site | Historic | Undetermined | Intersect |
| 41CW239 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41GU45 | Archaeological site | Historic | Undetermined | Adjacent |
| 41GU190 | Archaeological site | Historic | Undetermined | Adjacent |
| 41GU212 | Archaeological site | Historic | Undetermined | Intersect |
| 41GU214 | Archaeological site | Historic | Undetermined | Intersect |
| 41GU215 | Archaeological site | Historic | Undetermined | Intersect |
| 41GU216 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41GU217 | Archaeological site | Historic | Undetermined | Intersect |
| 41GU218 | Archaeological site | Multicomponent | Undetermined | Intersect |
| 41GU220 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41GZ106 | Archaeological site | Prehistoric | Undetermined | Intersect |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| 41GZ120 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41GZ191 | Archaeological site | Historic | Undetermined | Adjacent |
| 41GZ210 | Archaeological site | Prehistoric | Ineligible | Intersect |
| 41GZ229 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41GZ259 | Archaeological site | Prehistoric | Undetermined | Intersect |
| 41GZ230 | Archaeological site | Historic | Undetermined | Intersect |
| 41HY535 | Archaeological site | Historic | Ineligible | Intersect |
| 41HY593 | Archaeological site | Prehistoric | Undetermined | Intersect |
| Cuero I | Archaeological District | Multicomponent | Listed | Intersect |
| Gonzalez Commercial | Historic District | Historic | Listed | Adjacent |
| Altwein Farm | Historic Property / OTHM | Historic | Eligible | Adjacent |
| Baldridge | Cemetery | Historic | Undetermined | Intersect |
| Bodemann | Cemetery | Historic | Undetermined | Intersect |
| Center Union | Cemetery | Historic | Undetermined | Intersect |
| Haschke | Cemetery | Historic | Undetermined | Intersect |
| Hebron | Cemetery | Historic | Undetermined | Intersect |
| Helmke | Cemetery | Historic | Undetermined | Adjacent |
| Hillert CM-C040 | Cemetery | Historic | Undetermined | Adjacent |
| Jewish Cemetery | Cemetery / OTHM | Historic | Undetermined | Intersect |
| Long Mott | Cemetery | Historic | Undetermined | Intersect |
| McKinney #2 | Cemetery | Historic | Undetermined | Adjacent |
| Mt. Eden-Hickston | Cemetery | Historic | Undetermined | Intersect |
| Saturn | Cemetery / OTHM | Historic | Undetermined | Intersect |
| Unknown (West of Ohiendorf) | Cemetery | Historic | Undetermined | Adjacent |
| Bohr | Vicinity Cemetery | Historic | Undetermined | Intersect |
| DeCloudt Graves | Vicinity Cemetery | Historic | Undetermined | Intersect |
| Matthias Haug (Hagg) | Vicinity Cemetery | Historic | Undetermined | Intersect |
| Parr | Vicinity Cemetery | Historic | Undetermined | Intersect |
| Weston Family | Vicinity Cemetery | Historic | Undetermined | Adjacent |
| Cotton Gins of Calhoun County | OTHM | Historic | Undetermined | Intersect |
| Green Lake | OTHM | Historic | Undetermined | Intersect |
| Sam Houston Oak | OTHM | Historic | Undetermined | Intersect |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Site of Dietz Community | OTHM | Historic | Undetermined | Adjacent |
| El Camino Real de Los Tejas | Historic trail | Historic | Listed (segments) | Intersect |
| Chisholm Trail | Historic trail | Historic | Listed (segments) | Intersect |
| None (N=975) | Buildings / Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **1,233** |

### 5.2.21.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for surface water diversions, storage in an OCR, raw water conveyance, conventional water treatment, ASR system for recharge and recovery, brackish groundwater, brackish desalination water treatment, and potable water delivery to customers via pipelines and pump stations. The costs developed for GBRA WaterSECURE are based on external costs provided by GBRA. Land acquisition includes 2,562 acres for the reservoir footprint at an assumed cost of $13.0 million, and an additional 438 acres of mitigation area surrounding the reservoir at an assumed cost of $2.2 million. Pipeline and other facilities land acquisition assumes 5,217 acres will be needed at a cost of $186.7 million.

An overview of the cost estimate for the GBRA WaterSECURE Program components is summarized in Table 5.2.21-6. A cost estimate summary for the GBRA WaterSECURE Program is provided in Table 5.2.21-7. Infrastructure was sized to deliver the sponsor's Envisioned Yield, but because the project is MAG-limited, the annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the lack of groundwater availability.

**Table 5.2.21-6 Cost Estimate Summary for the GBRA WaterSECURE Program Components**

| GBRA WaterSECURE Program Components | Capital Cost | Total Project Cost | Total Annual Cost |
|---|---|---|---|
| ASR | $113.74M | $191.79M | $14.69M |
| OCR | $1,570.67M | $2,462.74M | $190.18M |
| Brackish Groundwater | $164.65M | $263.50M | $37.00M |
| Shared Facilities | $1,929.16M | $3,267.84M | $359.82M |
| **Total Program** | **$3,778.22M** | **$6,185.87M** | **$601.69M** |

### Table 5.2.21-7 Cost Estimate Summary for the GBRA WaterSECURE Total Program

| Item | Estimated Costs |
|---|---|
| Lower Basin Off-Channel Reservoir (Conservation Pool 60,000 acft, 2,562 acres) | $155,000,000 |
| Intake Pump Stations (210 MGD) | $499,487,000 |
| Transmission Pipelines (14-96 in. dia., 258.2 miles) | $1,859,840,000 |
| Transmission Pump Stations & Storage Tank | $382,500,000 |
| Well Fields (Wells, Pumps, and Piping) – ASR and Brackish GW | $183,677,000 |
| Two Water Treatment Plants (140 MGD and 13.5 MGD) | $697,714,000 |
| **TOTAL COST OF FACILITIES** | **$3,778,218,000** |
| | |
| - Planning (7%) | $264,475,000 |
| - Design (7%) | $264,475,000 |
| - Construction Engineering (7%) | $264,475,000 |
| Legal Assistance (2%) | $75,564,000 |
| Fiscal Services (2%) | $75,564,000 |
| Pipeline Contingency (20%) | $371,968,000 |
| All Other Facilities Contingency (30%) | $575,513,000 |
| Environmental & Archaeology Studies and Mitigation | $98,621,000 |
| Land Acquisition and Surveying (8,217 acres) | $222,282,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $194,714,000 |
| **TOTAL COST OF PROJECT** | **$6,185,869,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $277,309,000 |
| Reservoir Debt Service (3.5%, 40 years) | $12,359,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $20,435,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $22,050,000 |
| Dam and Reservoir (1.5% of Cost of Facilities) | $2,325,000 |
| Water Treatment Plants | $58,388,000 |
| Pumping Energy Costs (771,781,284 kW-hr @ 0.09 $/kW-hr) | $69,460,000 |
| **TOTAL ANNUAL COST** | **$462,326,000** |
| | |
| **Available Project Yield (acft/yr)** | 117,429 |
| **Annual Cost of Water ($ per acft)*** | $3,937 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,470 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $12.08 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $4.51 |
| * Based on a Peaking Factor of 1.3. | |
| One or more cost elements have been calculated externally | |

### 5.2.21.5 Implementation Considerations

Implementation of the GBRA WaterSECURE WMS includes the following considerations:

- It may be necessary to obtain the following permits or authorizations:
  - USACE Sections 10 and 404 dredge and fill permits;
  - TCEQ Underground Injection Control Permit for deep well disposal of desalination concentrate;
  - TCEQ Class V injection well permit for ASR wells. Key requirements for permits to construct and operate a Class V injection well are mechanical integrity of the well, pollution control, demonstration of recoverability in the permitting process, and periodic reports.
  - TCEQ stormwater permit for construction activities;
  - GLO sand and gravel removal permits;
  - GLO easement for use of state-owned land; and
  - TPWD sand, gravel, and marl permits.
- Acquisition of private land for construction of facilities through either negotiations or condemnation.
- Additional studies, investigations, and/or agency coordination will be necessary prior to full project implementation, including but not limited to the following:
  - ASR well testing and monitoring;
  - ASR cycle testing;
  - Design of infrastructure;
  - Local coordination with municipalities, county, or railroads for roadway, railroad, and utility crossings;
  - Environmental studies;
  - Potential stream/wetland mitigation plans;
  - Site-specific protected species habitat evaluations and presence/absence surveys; and
  - Cultural resources surveys.

In addition, GBRA is currently developing a regional Habitat Conservation Plan (HCP) to cover implementation of projects in the entirety of the Guadalupe River Basin. Once approved, the HCP will provide incidental take coverage for federally listed threatened and endangered species that are covered under the HCP, which are anticipated to include eastern black rail, whooping crane, Guadalupe darter, false spike, Guadalupe orb, and Guadalupe fatmucket. Protected species not covered by the HCP would require individual consultation with the USFWS if they may be adversely affected by proposed project activities.

## 5.2.22 Medina County Regional ASR Project

The SCTRWPG identified the Medina County Regional ASR Project as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.22.1 Description of Water Management Strategy

Medina County is experiencing rapid population growth, like other counties located along the IH-35 corridor. Located west of San Antonio, Medina County grew by nearly 30% between the 2000 and 2020 Census to a population of 50,748. Population projections (see Chapter 2) show continued rapid growth with an expected population of 79,204 in 2040 and 92,564 in 2080.

Historically, WUGs in Medina County have relied primarily on groundwater from the Trinity Aquifer and Edwards Aquifer, and to a lesser extent on surface water from Medina Lake. These supplies are limited, however. The Edwards Aquifer is subject to EAA critical period management plan that requires reductions of permitted production by 44% during Stage 5, and Medina Lake has zero firm yield during a repeat of the drought of record.

To accommodate this growth and to increase drought resilience, several WUGs within Medina County are considering implementation of a regional ASR project. For purposes of this WMS evaluation, the project sponsors are Yancey WSC and East Medina County SUD, which will sell water to various customers within Medina County. For purposes of this section 5.2.22, the term "project participants" will refer to the project sponsors and customers listed in Section 5.2.22.2 Available Yield.

The ASR project will be implemented to accomplish the following:

- Provide a long-term supply during a repeat of the drought of record;
- Develop a shared resource that leverages economies of scale;
- Provide an opportunity to increase utilization of existing Edwards Aquifer permits, postponing or reducing acquisition of new water supplies;
- Meet seasonal demands when restrictions are imposed;
- Meet demands at the ends of the distribution system;
- Provide an emergency supply;
- Minimize construction of new facilities;
- Provide for efficient use of existing distribution systems; and
- Minimize environmental impacts.

Like any ASR project, the purpose is to store water during times of plenty and to recover the water during times of shortage. Excess treated Edwards Aquifer water or treated Medina Lake surface water from project participants will be injected into the ASR system. The Medina County Regional ASR Project was designed to consider both the short-term and long-term timeframes. For the short-term or annual cycle, water is stored during winter and spring and recovered during the summer. For the long-term or multi-year cycle, water is stored over several years or even decades to provide emergency supply during a major drought.

The project will be implemented in two phases, with Phase 1 in 2040 and Phase 2 in 2080. The source of water for recharge will be Edwards Aquifer water or Medina Lake surface water, treated to meet drinking water standards at existing production wells operated by project participants and conveyed to the ASR well field via existing pipelines, supplemented as necessary with new pipelines. The project will utilize new and existing infrastructure. New infrastructure includes a new conventional WTP, transmission pipelines, pump stations, and ASR wells, well pumps, and well piping. The proposed ASR well field will be located in northeast Medina County, near Medina Lake's Diversion Lake. The ASR wells will inject water that will be stored within the saline portion of the Trinity Aquifer (Figure 5.2.22-1).

Many of the project participants already have interconnections with each other. However, with the additional water from the ASR system, new or additional pipeline capacities will be necessary for the interconnections. Therefore, booster pump stations and approximately 21 miles of additional pipelines are included in this WMS. Although Phase 1 is expected to be online and providing water by the 2040 decade, interconnection infrastructure may be needed prior to 2040.

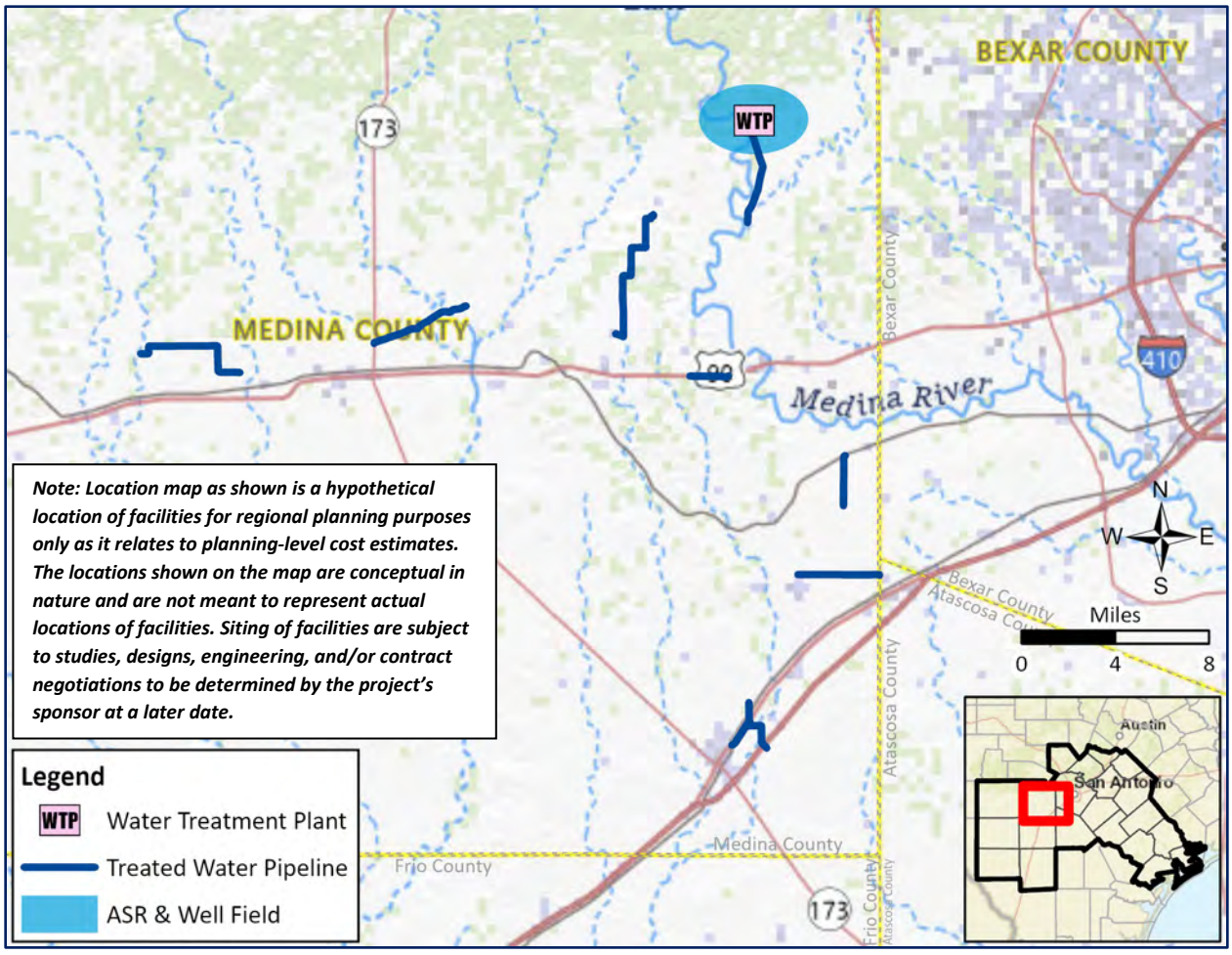



**Figure 5.2.22-1 Approximate Location of the Medina County Regional ASR Project**

### 5.2.22.2 Available Yield

This WMS has multiple phases, with Phase 1 having a firm yield of 6,250 acft/yr with implementation by 2030, and Phase 2 having a firm yield of 6,250 acft/yr with implementation by 2080, for a total firm yield of 12,500 acft/yr . Table 5.2.22-1 provides a summary of the available yield for the Medina County Regional ASR Project WMS. Delivery volumes for project participants are summarized in Table 5.2.22-2.

**Table 5.2.22-1 Available Yield for the Medina County Regional ASR Project (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Medina County Regional ASR Project | 0 | 6,250 | 6,250 | 6,250 | 6,250 | 12,500 |

**Table 5.2.22-2 Delivery Points and Annual Volumes for the Medina County Regional ASR Project (acft/yr)**

| Delivery Point | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Benton City WSC | 0 | 1,767 | 1,767 | 1,767 | 1,767 | 3,534 |
| Castroville | 0 | 268 | 268 | 268 | 268 | 536 |
| Devine | 0 | 439 | 439 | 439 | 439 | 878 |
| East Medina County SUD [1] | 0 | 870 | 870 | 870 | 870 | 1,740 |
| Hondo | 0 | 915 | 915 | 915 | 915 | 1,830 |
| La Coste | 0 | 123 | 123 | 123 | 123 | 246 |
| Lytle | 0 | 403 | 403 | 403 | 403 | 806 |
| Natalia | 0 | 151 | 151 | 151 | 151 | 302 |
| West Medina WSC | 0 | 121 | 121 | 121 | 121 | 242 |
| Yancey WSC [1] | 0 | 1,193 | 1,193 | 1,193 | 1,193 | 2,386 |
| **Total** | **0** | **6,250** | **6,250** | **6,250** | **6,250** | **12,500** |

[1] For Regional Water Planning purposes, East Medina County SUD and Yancey WSC are the WMS sponsors and the other WUGs are considered customers.

The majority of project participants currently obtain Edwards Aquifer water, permitted through EAA. For Phase 1, the source water will include solely Edwards Aquifer water; Phase 2 may include a combination of Edwards Aquifer and other sources, such as surface water from Medina Lake. When project participants have excess treated water, it will be conveyed to the ASR well field for injection via the proposed ASR wells. Injected water will be stored in the saline portion of the Trinity Aquifer. When demands exceed supplies, water will be recovered from the ASR wells for treatment on-site and distribution into project participants' distribution systems. A new 18 MGD conventional WTP is proposed for Phase 1 and will be sited at the ASR well field. Phase 2 will include an 18 MGD WTP expansion, yielding a total WTP capacity of 36 MGD.

Each of the wells is anticipated to have a depth of 3,100 feet with a peak recovery capacity of approximately 1,350 gpm and a recharge capacity of about 1,000 gpm. Phase 1 of the project is

expected to consist of 10 wells, with nine ASR wells for recharge and recovery and one monitoring well. Phase 2 will include an additional nine ASR wells, bringing the total project's ASR well field to 19 wells. The number of wells may change in the future, depending on site-specific recharge and recovery rates or other factors. The target storage volume is 63,700 acft, which includes approximately 60,000 acft of stored water and 3,700 acft of buffer zone volume for a 700-ft thick aquifer and an estimated porosity of 15%. Per the Preliminary Feasibility Report for this project, prepared by RESPEC Company, LLC, "The radius of the stored water "bubble" surrounding an ASR wellfield in the Trinity Aquifer will depend upon the target storage volume (TSV), storage aquifer thickness, and bulk porosity of the aquifer. A preliminary estimate of the TSV is 36 months at the wellfield recovery capacity, currently estimated at an average day demand of 16 MGD. This volume is approximately 60,000 acft of stored drinking water, available for recovery, plus the buffer zone volume, which is never recovered", equating to a water loss of 5.8%.

### 5.2.22.3 Environmental Factors

The Medina County Regional ASR Project was evaluated to determine its potential impacts on environmental factors. Table 5.2.22-3 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.22-3 Summary of Potential Project Effects on Environmental Factors for the Medina County Regional ASR Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 3,284 |
| Potential Species Impact Score | 5 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 2 |
| Potential Stream Flow / Water Quality Impact Score | 2 |
| Potential Cultural Resources Impact Score | 144 |

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Southern Plains and Texas Blackland Prairie ecoregions and is comprised of eight project sites in Medina County. The area contains a mixture of herbaceous and woody vegetation, mostly paralleling existing roads. As mapped by TPWD [1], dominant vegetation types in the project vicinity are row crops, barren, disturbance/tame grassland, urban, riparian forest/herbaceous, and various types of Edwards Plateau, Native Invasive, Post Oak Savanna, and South Texas shrublands and woodlands. Areas mapped as urban, barren, and row crops are not likely to contain significant amounts of native vegetation.

Based on TPWD vegetation mapping in the general project area, the project may have the potential to impact 3,284 acres of agricultural resources, including 1,078 acres mapped as row crops and 2,206 acres

[1] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

mapped as tame, disturbance, and savanna grasslands which may include pasture areas used for grazing or hay production.

### Aquatic Resources

According to the NHD, the project area crosses segments of 22 streams or rivers. These include the Medina River, Chacon Creek, Deep Creek, East Prong Fort Ewell Creek, Hondo Creek, Mesquite Creek, San Francisco Perez Creek, Second Creek, Verde Creek, West Branch Live Oak Creek, West Prong Atascosa River, and West Prong Fort Ewell Creek. NWI mapping shows small areas (62.3 acres) mapped as wetlands or ponds. The Texas Integrated Report of 303(d) listed water bodies [2] identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The Medina River below Medina Diversion Lake, Chacon Creek, and Hondo Creek are classified as an impaired stream segment. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well facilities can typically be sited to avoid impacts to waters of the United States, including wetlands. Stream crossings for pipeline construction will result in temporary stream impacts that may require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there will be permanent impacts to over 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in pre-construction contours of waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) will not require a USACE permit. Although the proposed project is an off-channel reservoir, streams/wetlands affected by reservoir development, if applicable, will require appropriate USACE permitting depending on impacts.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Medina County [3, 4]. Suitable habitat may occur for the federally listed endangered golden-cheeked Warbler (*Setophaga chrysoparia*) in the Edwards Plateau Woodlands of the project area. Suitable subterranean habitat within the Edwards Aquifer may occur for the Peck's cave amphipod (*Stygobromus pecki*) throughout the project area. Suitable habitat may occur for the federally endangered black lace cactus (*Echinocereus reichenbachii var albertii*) in the open grasslands and savannas of central and southeast Medina County. Suitable habitat may occur for the federal candidate for listing monarch butterfly (*Danaus plexippus*) in the grasslands, savannas, woodlands, forests, and riparian areas of the project area.

Because of the existing agricultural development in the project area, suitable habitat is not expected to occur for most state-listed species; however, there is potential suitable habitat for species that utilize

[2] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

[3] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Medina County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[4] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List. https://ipac.ecosphere.fws.gov/location/index.

open, sparsely vegetated areas, and wooded areas such as the state-threatened Texas horned lizard (*Phrynosoma cornutum*) and Texas tortoise (*Gopherus berlandieri*). There is low to moderate potential for suitable habitat for numerous wildlife and plant species designated by TPWD as SGCN. In addition, several bat SGCN species may utilize structures and could, therefore, occur in developed areas. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys will be required to determine the quality of habitat and potential for impacts to federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat is present, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur and nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Although it is no longer on the federal endangered species list, the bald eagle is protected by the federal Bald and Golden Eagle Protection Act, which prohibits impacts to the eagles unless permitted by USFWS. Preconstruction surveys for active bird nests and presence of eagles are recommended.

### Cultural Considerations

For the linear portion of the project (i.e., project alignment), a background literature review was performed for the alignment in addition to a 300-foot radius around the project alignment. A background literature review was also performed for the well field area (i.e., project area). The background literature review identified two cultural resources within the approximate 5,611-acre project area and alignment, as shown in Table 5.2.22-4 [5]. These cultural resources include one vicinity cemetery (Seekatz Family [ME-C056]) and one historic trail (El Camino Real de Los Tejas). Additionally, the historical map review identified 94 potential historic-age structures that intersect with the project area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment [6].

Vicinity cemeteries are very general areas where a cemetery location was reported at one time, but the exact location is unknown or could not be confirmed. If project impacts are to occur near the vicinity cemetery location, further work (e.g., pedestrian survey and/or metal detecting) or construction monitoring might be needed to ensure human burials are not present in the project area and alignment. In the State of Texas, all human burials are protected by law [7], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and alignment and the remains are determined to be Native American, they will be handled in accordance with procedures

[5] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed October 2024.
[6] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed October 2024.
[7] As per the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

established through coordination with the THC, and work in the affected area could only resume per THC authorization.

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area and alignment, which included low, medium, and high potential zones. The model indicated that 22.4% of the project area and alignment had a high likelihood of containing significant unidentified archaeological resources, 61.7% had a moderate likelihood, and 15.9% had a low likelihood. Areas with higher archaeological probability were considered to have been located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 points. In addition, Recorded Texas Historical Landmarks, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. For cultural resources with multiple resource types, the values of each resource type were calculated and used to determine the overall assessment score. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score (See Table 5.2.22-4). Based on this methodology, the overall calculated cultural resources assessment score for this project equaled 144.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, one vicinity cemetery, one historic trail, and 94 potential historic-age structures are located within the project area and alignment; the probability model indicates a moderate to high likelihood of buried deposits; and the project assessment score is 144. Based on these results, cultural resources assessment for the final design plan is likely necessary.

**Table 5.2.22-4 Cultural Resources Results Factors for the Medina County Regional ASR Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Seekatz Family | Vicinity Cemetery | Historic | Undetermined | Intersect |
| El Camino Real de Los Tejas | Historic trail | Historic | Listed (segments) | Intersect |
| None (N=94) | Buildings / Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **144** |

### 5.2.22.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for water recharge, recovery, collection, treatment, and conveyance. Water treatment will require a conventional WTP to treat recovered water from the ASR system. Costs for interconnection booster pump stations were provided by project sponsors. The following cost estimate summary tables are included:

- Medina County Regional ASR Project – Phase 1: Table 5.2.22-5;
- Medina County Regional ASR Project – Phase 2: Table 5.2.22-6; and
- Total Project Medina County Regional ASR Project – Phases 1 and 2: Table 5.2.22-7;

**Table 5.2.22-5 Cost Estimate Summary for the Medina County Regional ASR Project – Phase 1**

| Item | Estimated Costs |
|---|---|
| Pump Stations (20.1 MGD) | $6,219,000 |
| Transmission Pipeline (42 in. dia., 25.2 miles) | $53,217,000 |
| Well Fields (Wells, Pumps, and Piping) | $57,954,000 |
| New Water Treatment Plant (18 MGD) | $103,721,000 |
| **TOTAL COST OF FACILITIES** | **$221,111,000** |
| | |
| - Planning (3%) | $6,382,000 |
| - Design (7%) | $14,892,000 |
| - Construction Engineering (1%) | $2,127,000 |
| Legal Assistance (2%) | $4,255,000 |
| Fiscal Services (2%) | $4,255,000 |
| Pipeline Contingency (15%) | $6,726,000 |
| All Other Facilities Contingency (20%) | $33,579,000 |
| Environmental & Archaeology Studies and Mitigation | $1,092,000 |
| Land Acquisition and Surveying (62 acres) | $454,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $9,584,000 |
| **TOTAL COST OF PROJECT** | **$304,457,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $21,422,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,028,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $155,000 |
| Water Treatment Plant | $7,261,000 |
| Pumping Energy Costs (7,550,757 kW-hr @ 0.09 $/kW-hr) | $680,000 |
| **TOTAL ANNUAL COST** | **$30,546,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,250 |
| **Annual Cost of Water ($ per acft)*** | $4,887 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,460 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $15.00 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $4.48 |
| *Based on a Peaking Factor of 1.0 | |
| One or more cost elements have been calculated externally | |

**Table 5.2.22-6 Cost Estimate Summary for the Medina County Regional ASR Project – Phase 2**

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $54,475,000 |
| Water Treatment Plant Expansion (18 MGD) | $43,858,000 |
| **TOTAL COST OF FACILITIES** | **$98,333,000** |
| | |
| - Planning (3%) | $2,950,000 |
| - Design (7%) | $6,883,000 |
| - Construction Engineering (1%) | $983,000 |
| Legal Assistance (2%) | $1,967,000 |
| Fiscal Services (2%) | $1,967,000 |
| All Other Facilities Contingency (20%) | $19,667,000 |
| Environmental & Archaeology Studies and Mitigation | $311,000 |
| Land Acquisition and Surveying (33 acres) | $238,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $4,333,000 |
| **TOTAL COST OF PROJECT** | **$137,632,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $9,684,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $545,000 |
| Water Treatment Plant | $3,070,000 |
| Pumping Energy Costs (85,605 kW-hr @ 0.09 $/kW-hr) | $8,000 |
| **TOTAL ANNUAL COST** | **$13,307,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,250 |
| **Annual Cost of Water ($ per acft)*** | $2,129 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $580 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.53 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.78 |
| *Based on a Peaking Factor of 1.0 | |
| One or more cost elements have been calculated externally | |

**Table 5.2.22-7 Total Project Cost Estimate Summary for the Medina County Regional ASR Project – Phases 1 and 2**

| Item | Estimated Costs |
|---|---|
| Pump Stations (20.1 MGD) | $6,219,000 |
| Transmission Pipeline (42 in. dia., 25.2 miles) | $53,217,000 |
| Well Fields (Wells, Pumps, and Piping) | $112,429,000 |
| Water Treatment Plants (New 18 MGD and Expansion 18 MGD) | $147,580,000 |
| **TOTAL COST OF FACILITIES** | **$319,445,000** |
| | |
| - Planning (3%) | $9,332,000 |
| - Design (7%) | $21,775,000 |
| - Construction Engineering (1%) | $3,111,000 |
| Legal Assistance (2%) | $6,221,000 |
| Fiscal Services (2%) | $6,221,000 |
| Pipeline Contingency (15%) | $6,726,000 |
| All Other Facilities Contingency (20%) | $53,246,000 |
| Environmental & Archaeology Studies and Mitigation | $1,402,000 |
| Land Acquisition and Surveying (95 acres) | $692,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $13,916,000 |
| **TOTAL COST OF PROJECT** | **$442,087,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $31,106,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,573,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $155,000 |
| Water Treatment Plant | $10,331,000 |
| Pumping Energy Costs (15,255,604 kW-hr @ 0.09 $/kW-hr) | $1,373,000 |
| **TOTAL ANNUAL COST** | **$44,538,000** |
| | |
| **Available Project Yield (acft/yr)** | 12,500 |
| **Annual Cost of Water ($ per acft)*** | $3,563 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,074 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $10.93 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.30 |
| *Based on a Peaking Factor of 1.0 | |
| One or more cost elements have been calculated externally | |

### 5.2.22.5 Implementation Considerations

Implementation of the Medina County Regional ASR Project includes the following considerations:

- TCEQ:
  - USACE Sections 10 and 404 dredge and fill permits; and
  - TCEQ Class V injection well permit for ASR wells. Key requirements for permits to construct and operate a Class V injection well are mechanical integrity of the well, pollution control, demonstration of recoverability in the permitting process, and periodic reports.
- EAA:
  - An authorization from or interlocal agreement with EAA may be necessary; and
  - EAA construction permits for each individual ASR well must comply with EAA specifications. Coordination with EAA is recommended, as additional requirements may be required.
- It may be necessary to obtain the following permits or authorizations for the project:
  - USACE Sections 10 and 404 dredge and fill permits;
  - TCEQ stormwater permit for construction activities;
  - GLO sand and gravel removal permits;
  - GLO easement for use of state-owned land; and
  - TPWD sand, gravel, and marl permits.
- Acquisition of private land for construction of new facilities through either negotiations or condemnation.
- Additional studies, investigations, and/or agency coordination will be necessary prior to full implementation, including but not limited to the following:
  - Feasibility studies;
  - ASR well testing and monitoring;
  - ASR cycle testing;
  - Design of infrastructure;
  - Local coordination with municipalities, county, or railroads for roadway, railroad, and utility crossings;
  - Environmental studies;
  - Potential stream/wetland mitigation plans;
  - Site-specific protected species habitat evaluations and presence/absence surveys; and
  - Cultural resources surveys.

## 5.2.23 NBU ASR Project

The SCTRWPG identified the NBU ASR Project WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.23.1 Description of Water Management Strategy

To firm up its existing water supply, NBU plans to develop an ASR project (utilizing dual-purpose wells) to its water system [1]. The NBU ASR Project WMS is designed to accomplish the following:

- Provide a long-term supply during the drought of record;
- Provide an opportunity to increase utilization of existing permits, which postpones acquisition of new water supplies;
- Defer construction of a second WTP;
- Meet seasonal demands when restrictions are imposed;
- Meet demands at the ends of the distribution system;
- Provide an emergency supply;
- Minimize construction of new facilities;
- Provide for efficient use of existing distribution system; and
- Minimize environmental impacts.

Like any ASR project, the purpose is to store water during times of plenty and to recover the water during times of shortage. The NBU ASR Project was designed to consider both the short-term and long-term timeframes. For the short-term or annual cycle, water is stored during winter and spring and recovered during the summer. For the long-term or multi-year cycle, water is stored over several years or even decades to provide emergency supply during a major drought.

The proposed ASR wells are located on property owned by NBU and the City of New Braunfels (City), near the New Braunfels Regional Airport in Guadalupe County. The ASR wells are located in the saline portion of the Edwards Aquifer (Figure 5.2.23-1). The ASR project is currently in the demonstration phase. One ASR well has been completed to the upper saline zone of the Edwards Aquifer. This first well is planned to be drilled to the lower saline zone in the near future. Findings from the first two rounds of cycle testing suggest that injecting water into both the upper and lower saline zones will ensure the delivery of a higher quantity of fresh water. This project additionally includes the construction of a new WTP for standard disinfection, prior to delivering to the distribution system.

[1] New Braunfels Utilities, June 2018, 2018 Water Resources Plan, Executive Summary.

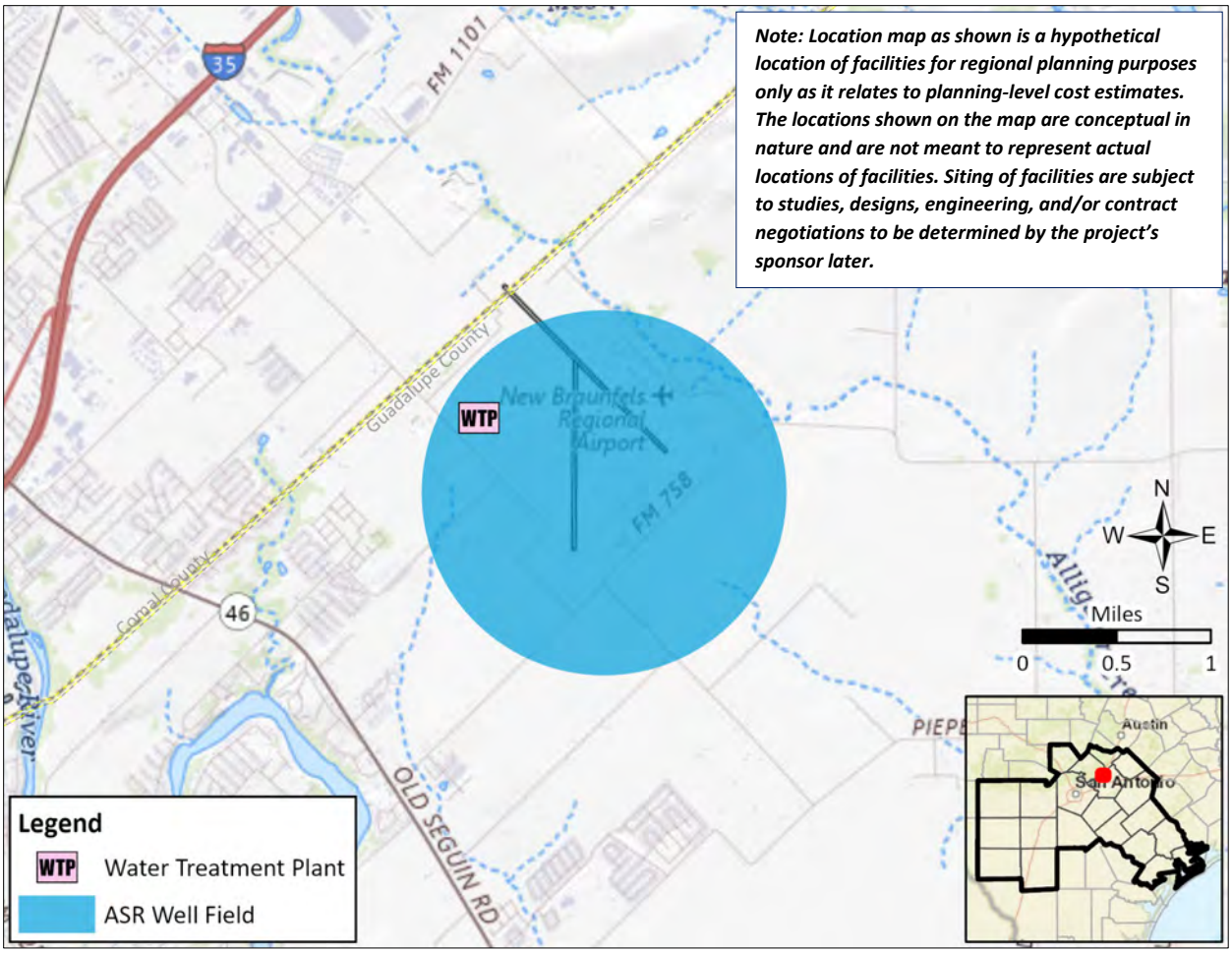



**Figure 5.2.23-1 Approximate Location of the NBU ASR Project**

### 5.2.23.2 Available Yield

This WMS has a firm yield of 7,000 acft/yr and is planned for full completion by 2030. Table 5.2.23-1 provides a summary of the available yield for the NBU ASR Project WMS.

**Table 5.2.23-1 Available Yield for the NBU ASR Project (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| NBU ASR Project | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 |

NBU obtains water from multiple sources, including surface water from the Guadalupe River, stored water contracts from Canyon Reservoir, and groundwater from the Edwards Aquifer. When NBU has excess treated water in its distribution system, that water will be injected via the proposed ASR wells for storage in the saline portion of the Edwards Aquifer. NBU will be able to recover the stored water for on-site disinfection treatment and distribution into its system.

The project will consist of up to nine ASR wells for recharge and recovery. Each of the wells is anticipated to have a recovery capacity of about 694 gpm and a recharge capacity of about 347 gpm.

The project will increase NBU's firm supply incrementally by 7,000 acft/yr. The stored water volume of water within the aquifer will be 7,000 acft with an additional 7,000 acft buffer zone volume that would remain in the aquifer, resulting in a target storage volume of 14,000 acft. Nationwide, recovery rates for ASR typically range from 70-90%, allowing for 10-30% water loss. In the case of the NBU ASR project, the buffer zone storage allows for up to 50% water loss, or water that is not recovered and remains in the aquifer.

The NBU ASR Project is designed to work in conjunction with the NBU SWTP expansion, included in the Facilities Expansion WMS (refer to Section 5.2.8), which is designed to provide increased capacity to treat water for storage in the ASR project.

### 5.2.23.3 Environmental Factors

The NBU ASR Project was evaluated to determine its potential impacts on environmental factors. Table 5.2.23-2 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.23-2 Summary of Potential Project Effects on Environmental Factors for the NBU ASR Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 1,714 |
| Potential Species Impact Score | 2 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 0 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 132 |

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Blackland Prairie ecoregion and is generally situated in and near the New Braunfels Regional Airport. The area appears to contain little woody vegetation. As mapped by TPWD [2], dominant vegetation types in the project vicinity are row crops, disturbance/tame grassland, and urban, with small areas mapped as floodplain herbaceous vegetation and mesquite shrubland. Areas mapped as industrial (airport) and row crops are not likely to contain significant amounts of native vegetation.

Based on TPWD vegetation mapping in the general project area, the project may have the potential to impact 1,714 acres of agricultural resources, including 1,045 acres mapped as row crops and 669 acres mapped as tame/disturbance grassland which may include pasture areas used for grazing or hay production.

[2] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

### Aquatic Resources

According to the NHD, Alligator Creek, an intermittent stream with associated floodplain, runs along the northeastern edge of the project area. The NWI mapping shows small areas (less than 10 acres) mapped as wetlands or ponds. The Texas Integrated Report of 303(d) listed water bodies [3] identifies the water bodies or segments in Texas that do not meet assigned water quality standards. Alligator Creek is not classified as an impaired stream segment. Geronimo Creek, which occurs just downgradient to the southwest of the project area, is listed as impaired. The project area does not contain ecologically significant stream segments as designated by TPWD; however, Geronimo Creek just downgradient is designated as an ecologically significant stream.

The project will require an on-site delineation of streams, ponds, and wetlands. Well facilities can typically be sited to avoid impacts to waters of the United States, including wetlands.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that may occur in Guadalupe County [4, 5]. Suitable habitat does not occur for any of the federally listed threatened or endangered species. However, the habitat for the monarch butterfly (*Danaus plexippus*), which is a candidate species for listing as federally threatened or endangered, is suitable.

Because of the existing agricultural and industrial development in the project area, suitable habitat is not expected to occur for most state-listed species; however, habitat for species that utilize open, sparsely vegetated areas, such as the state-threatened Texas horned lizard (*Phrynosoma cornutum*) is potentially suitable.

The potential for suitable habitat for several wildlife species designated by TPWD as SGCN is low to moderate: Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), eastern spotted skunk (*Spilogale putorius*), plains spotted skunk (*Spilogale interrupta*), western spotted skunk (*Spilogale gracilis*), and eastern box turtle (*Terrepene carolina*). In addition, several bat SGCN species may utilize structures and could, therefore, occur in developed areas. The likelihood of occurrence of the SGCN plant species low spurge (*Euphobia peplidion*) and parks jointweed (*Polygonella parksii*) is low. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat and potential for impacts to state-listed species and confirm lack of suitable habitat for federally threatened and endangered species. Coordination with TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD would likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If

[3] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d)*. https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

[4] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Guadalupe County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[5] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Guadalupe County. https://ipac.ecosphere.fws.gov/location/index .

suitable habitat is present, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15.

### Cultural Considerations

The background literature review identified two cultural resources that intersect with the approximate 1,882-acre project area, as shown in Table 5.2.23-3. The cultural resources consist of two historic-age archaeological sites (i.e., 41GU45 and 41GU236) that are located in the northwestern and southeastern portions of the project area [6]. One of these sites is ineligible (i.e., 41GU236) for listing on the NRHP, and the other remains undetermined (i.e., 41GU45) for listing on the NRHP. Additionally, the historical map review identified 85 potential historic-age structures that intersect with the project area [7].

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 14% of the project area had a high likelihood of containing significant unidentified archaeological resources and 86% had a moderate likelihood. No areas were identified by the model as having a low probability. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 132.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, two archaeological sites and 85 potential historic-age structures are located within the project

[6] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed July 2024.
[7] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.

area; the probability model indicates a moderate to high likelihood of buried deposits; and the project assessment score is 132. Based on these results, a cultural resources assessment for the final design plan is likely necessary.

**Table 5.2.23-3 Cultural Resources Results for the NBU ASR Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41GU45) | Trash Scatter | Historic | Undetermined (THC 6/24/1998) | Intersect |
| Archaeological Site (41GU236) | Farmstead | Historic | Ineligible (THC 5/26/2023) | Intersect |
| None (N=85) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **132** |

### 5.2.23.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for water recharge, recovery, collection, and treatment. Water treatment will require standard disinfection to treat recovered water from the ASR system. A cost estimate summary for the NBU ASR Project is provided in Table 5.2.23-4.

### Table 5.2.23-4 Cost Estimate Summary for the NBU ASR Project

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $22,416,000 |
| Water Treatment Plant (6.3 MGD) | $446,000 |
| Integration, Relocations, Backup Generator & Other | $3,042,000 |
| **TOTAL COST OF FACILITIES** | **$25,904,000** |
| | |
| Planning (3%) | $777,000 |
| Design (7%) | $1,813,000 |
| Construction Engineering (1%) | $259,000 |
| Legal Assistance (2%) | $518,000 |
| Fiscal Services (2%) | $518,000 |
| All Other Facilities Contingency (20%) | $5,181,000 |
| Environmental & Archaeology Studies and Mitigation | $463,000 |
| Land Acquisition and Surveying (63 acres) | $36,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,153,000 |
| **TOTAL COST OF PROJECT** | **$36,622,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $2,577,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $255,000 |
| Water Treatment Plant | $268,000 |
| Pumping Energy Costs (13,524,835 kW-hr @ 0.09 $/kW-hr) | $1,217,000 |
| **TOTAL ANNUAL COST** | **$4,317,000** |
| | |
| **Available Project Yield (acft/yr)** | 7,000 |
| **Annual Cost of Water ($ per acft)*** | $617 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $249 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.89 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.76 |
| *Based on a Peaking Factor of 1.0 | |

### 5.2.23.6 Implementation Considerations

Implementation of the NBU ASR Project includes the following considerations:

- TCEQ:
  - An ASR well is authorized as a Class V injection well. Key requirements for permits to construct and operate a Class V injection well are mechanical integrity of the well, pollution control, demonstration of recoverability in the permitting process, and periodic reports;
  - Under recent legislation related to the Edwards Aquifer (Balcones Fault Zone), the source water for injection into an ASR well in NBU's proposed project area can be blended water directly from NBU's distribution system; and
  - The run-of-the-river permits will not need to be amended for injection and recovery operations.
- EAA:
  - NBU has an interlocal contract with EAA that provides the authorizations needed to implement the ASR project in measured phases; and
  - NBU's contractor(s) will obtain construction permits for each individual ASR well based on the final design of the well, which must meet EAA's standard requirements.
- It may be necessary to obtain the following permits or authorizations for the project:
  - USACE Sections 10 and 404 dredge and fill permits;
  - TCEQ stormwater permit for construction activities;
  - GLO sand and gravel removal permits;
  - GLO easement for use of state-owned land; and
  - TPWD sand, gravel, and marl permit.
- Additional studies, investigations, and/or agency coordination will be necessary prior to full implementation, including but not limited to the following:
  - Feasibility studies;
  - ASR well testing and monitoring;
  - ASR cycle testing;
  - Design of infrastructure;
  - Local coordination with municipalities, county, or railroads for roadway, railroad, and utility crossings;
  - Environmental studies;
  - Potential stream/wetland mitigation plans;
  - Site-specific protected species habitat evaluations and presence/absence surveys; and
  - Cultural resources surveys.

## 5.2.24 NBU Trinity Well Field Expansion

The SCTRWPG identified the NBU Trinity Well Field Expansion WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.24.1 Description of Water Management Strategy

In 2023, NBU began construction to expand the existing Trinity well field. The proposed site of the Trinity well field is on the northwest side of the City of New Braunfels (City). More specifically, it is in the vicinity of Loop 377 and Oak Run Parkway and on property owned by NBU. A well field consisting of four wells is already on this site and is set to be expanded upon. The project includes drilling three additional groundwater wells, installing conveyance piping to the WTP, expanding the existing treatment facility (membranes), store additional capacity in an additional GST, and distribute additional flows with an expanded pump station (Figure 5.2.24-1). Only the portion of WTP facilities and associated costs that are directly required to increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this RWP.

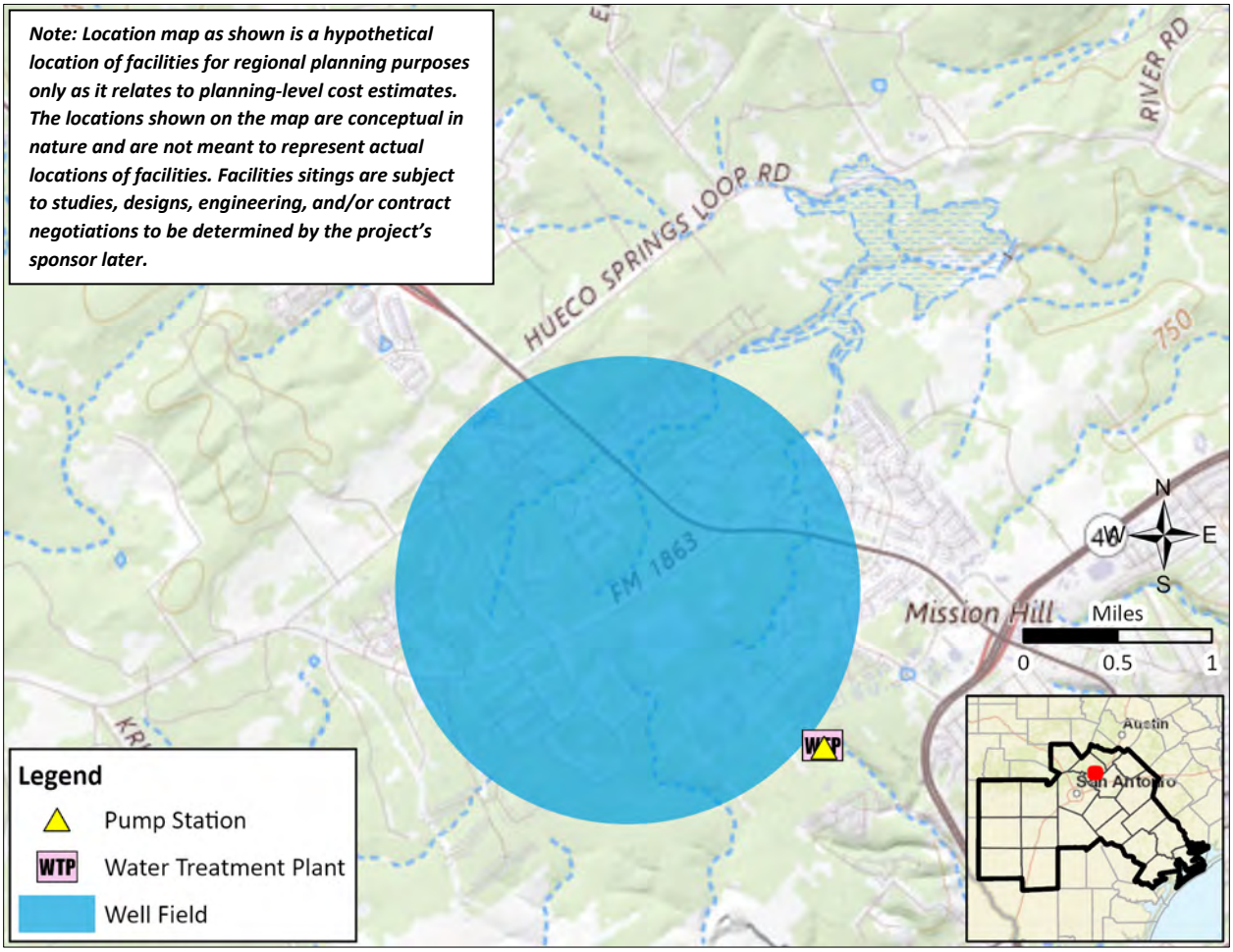



**Figure 5.2.24-1 Approximate Location for the NBU Trinity Well Field Expansion WMS**

As of the time of writing, four wells have been drilled. Wells 20, 21, and 22 are anticipated to produce 1.2 MGD, 1.2 MGD, and 1.4 MGD, respectively. Well 23 was found to be a low producing well and is

anticipated to be plugged in 2024. Final production rates will be confirmed once the wells are commissioned, permitted, and placed into service in late 2025.

The adjacent WTP expansion includes expanded treatment equipment, additional GST, and expanded pump station. Facility construction is anticipated to be completed and permitted by Summer 2025. Flows from the facility storage will add resilience and provide potable water to additional customers.

### 5.2.24.2 Available Yield

This WMS is planned for implementation in the 2030 decade and has a yield of 3,900 acft/yr. Table 5.2.24-1 provides a summary of the yield requested by the WMS sponsor and the available yield for the NBU Trinity Well Field Expansion WMS.

**Table 5.2.24-1 Available Yield for the NBU Trinity Well Field Expansion WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| NBU Trinity Well Field Expansion WMS | 3,900 | 3,900 | 3,900 | 3,900 | 3,900 | 3,900 |

The project will expand the well field from four wells to seven wells, and increase the supply of the Trinity well field from 3,900 acft/yr to 7,800 acft/yr. For purposes of this WMS, it is assumed that three wells are feasible and that each well has a peak capacity of 1.2 MGD, a depth of 620 feet.

An assessment of groundwater availability consists of calculating a water balance of the Trinity Aquifer in Comal County between the supply, as determined from the MAG, and the estimated demands from current users. The MAG for the Trinity Aquifer in Comal County is 43,088 acft/yr for 2030 [1, 2]. This strategy is located within the boundaries of the Comal Trinity GCD; but because this is a new GCD, they have not implemented any type of permitting system at this time. This strategy is planned for implementation beginning in the 2030 decade (Table 5.2.24-1).

### 5.2.24.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.24-2 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent sections.

[1] 2021. Modeled Available Groundwater for Relevant Aquifers by County in Groundwater Management Area 10: Texas Water Development Board. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA10_MAGsbyCounty_2021.pdf?d=14134.199999988079.

[2] 2021. Modeled Available Groundwater for Relevant Aquifers by County in Groundwater Management Area 9: Texas Water Development Board. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA9_MAGsbyCounty_2021.pdf.

**Table 5.2.24-2 Summary of Potential Project Effects on Environmental Factors for the NBU Trinity Well Field Expansion WMS**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 0 |
| Potential Species Impact Score | 7 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 0 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 218.5 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Balcones Canyonlands Level IV ecoregion and most of the project vicinity contains residential and commercial development. As mapped by TPWD [3], the dominant vegetation types in the project vicinity are Ashe juniper motte and woodland, urban, deciduous oak/evergreen motte and woodland, savanna grassland, deciduous woodland, and Ashe juniper/live oak shrubland. Since the existing project land use is a well field, the project area likely does not contain significant amounts of native vegetation, although fields and woody vegetation occur nearby.

Based on TPWD vegetation mapping, the project is unlikely to affect agricultural resources as the project area does not contain mapped row crops or tame/disturbance grassland that may include pasture areas used for grazing or hay production.

### Aquatic Resources

According to NHD, no streams are mapped in the project area. The NWI mapping shows areas in the project vicinity, approximately 16 acres, mapped as ponds/potential wetlands. The Texas Integrated Report of 303(d)-listed water bodies [4] identifies the water bodies or segments in Texas that do not meet assigned water quality standards. Streams within the project area are not listed as impaired. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project has a low likelihood of affecting ponds or wetlands. Well facilities can typically be sited to avoid impacts to waters of the United States, including wetlands.

The project area occurs in the Edwards Aquifer Recharge Zone. Project activities will need to comply with TCEQ Edwards Aquifer Protection Program regulations, and the project area may require a geologic assessment.

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Comal County. Suitable habitat may occur for the federally endangered golden-cheeked warbler (*Setophaga chrysoparia*), federally proposed endangered tricolored bat (*Perimyotis subflavus*), and candidate monarch butterfly (*Danaus plexippus*)[5]. Federally endangered karst invertebrates are not known to occur in Comal County; however, a portion of the project area occurs in karst Zone 3a. Zone 3a is defined as areas suitable for troglobitic species but which have a low probability of containing listed karst species because the habitat is occupied by other troglobitic species. Thus, the likelihood of occurrence of endangered karst invertebrates in the project area is low.

Because of the existing development in and around the project area, suitable habitat is not expected to occur for most state-listed species; however, the habitat in the project vicinity for species that utilize open fields and shrublands such as the state-threatened Texas horned lizard (*Phrynosoma cornutum*) and Texas tortoise (*Gopherus berlandieri*) is potentially suitable [6].

The potential for suitable habitat in the project vicinity for several wildlife species designated by TPWD as SGCN, including American bumblebee (*Bombus pensylvanicus*), plains spotted skunk (*Spilogale interrupta*), western spotted skunk (*Spilogale gracilis*), plateau spot-tailed earless lizard (*Holbrookia lacerata*), and western box turtle (*Terrapene ornata*) is low to moderate. In addition, SGCN bat species may utilize structures and could therefore occur in developed areas. The potential of occurrence of the SGCN plant species tree dodder (*Cuscuta exaltata*) is low. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific and species-specific field surveys would be required to determine the quality of habitat and potential for impacts to federally and state-listed species. Coordination with UWFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD would likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

## Cultural Considerations

The background literature review identified 33 cultural resources that intersect with the approximate 2,320-acre project area (Table 5.2.24-3). The cultural resources include six archaeological sites (i.e., 41CM298, 41CM303, 41CM358, 41CM359, 41CM360, and 41CM443), one cemetery (i.e., Brehmer Cemetery), three NRHP-listed districts (i.e., Mission Valley School and Teacherage, Pape-Brocher

[5] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Comal County. https://ipac.ecosphere.fws.gov/.
[6] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Comal County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

Homestead, and Walzem Homestead), and 10 NRHP-eligible properties [7,8]. As part of the NRHP-listed districts, Mission Valley School and Teacherage is also a Recorded Texas Historic Landmark (RTHL) and includes one historical marker and nine contributing resources within the limits of the project area; the Pape-Borchers Homestead is also an archaeological site (i.e., 41CM303) and includes four contributing resources within the limits of the project area; and the Walzem Homestead includes one contributing resource within the limits of the project area. Out of the total six archaeological sites within the project area, one is listed on the NRHP as part of a historic district (i.e., 41CM303), three are ineligible for listing on the NRHP (i.e., 41CM298, 41CM360, and 41CM443), and two remain undetermined (i.e., 41CM358, and 41CM359). Additionally, the historical map review identified 62 potential historic-age structures that intersect with the project area [9].

In the State of Texas, all human burials are protected by law [10], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume according to THC authorization.

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 93% of the project area had a high likelihood of containing significant unidentified archaeological resources and 7% had a moderate likelihood. No areas were identified by the model as having a low probability. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 points. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score

[7] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed July 2024.
[8] Texas Department of Transportation (TxDOT). 2024. TxDOT Historic Resources Aggregator, TxDOT Environmental Affairs Division. Austin, Texas Available at: https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=e13ba0aa78bf4548a8e98758177a8dd5. Accessed July 2024.
[9] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.
[10] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 218.5.

**Table 5.2.24-3 Cultural Resources Results for the NBU Trinity Well Field Expansion WMS**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41CM298) | Lithic Scatter/Quarry | Prehistoric | Ineligible (THC 11/3/2006) | Intersect |
| Archaeological Site (41CM358) | Lithic Scatter/Workshop Site | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41CM359) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41CM360) | Lithic Scatter | Prehistoric | Ineligible within ROW (THC 9/6/2022) | Intersect |
| Archaeological Site (41CM443) | Lithic Scatter/Quarry/ Historical Graffiti | Prehistoric and Historic | Ineligible within ROW (THC 12/17/2022) | Intersect |
| Brehmer Cemetery (CM-C194) | Cemetery | Historic | Undetermined | Adjacent |
| Mission Valley School and Teacherage | Historic District/Recorded Texas Historic Landmark/OTHM | Historic | Listed | Intersect |
| Cistern (1) | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Cistern (2) | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Garage | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Outhouse (1) | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Outhouse (2) | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Playground | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Shed | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Teacherage | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Woodshed | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Pape-Borchers Homestead (41CM303) | Historic District/ Archaeological Site | Historic | Listed | Intersect |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Garage | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Trough | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Tractor Shed | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Well House | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Walzem Homestead | Historic District | Historic | Listed | Intersect |
| Stock Tank | Historic Property (Contributing Resource) | Historic | Listed | Intersect |
| Barn (1) | Historic Property | Historic | Eligible | Intersect |
| Barn (2) | Historic Property | Historic | Eligible | Intersect |
| Farmstead Bungalow | Historic Property | Historic | Eligible | Intersect |
| Garage | Historic Property | Historic | Eligible | Intersect |
| Molasses Shed | Historic Property | Historic | Eligible | Intersect |
| Open Air Tractor Shed | Historic Property | Historic | Eligible | Intersect |
| Original Farmstead Home | Historic Property | Historic | Eligible | Intersect |
| Rocky Pylons | Historic Property | Historic | Eligible | Intersect |
| Schuetzen Verein | Historic Property | Historic | Eligible | Intersect |
| Water Tank | Historic Property | Historic | Eligible | Intersect |
| None (N=62) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **218.5** |

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, five archaeological sites, three NRHP districts and 14 contributing resources, 10 NRHP-eligible properties, one cemetery, one historical marker, and 62 potential historic-age structures are located within the project area; the probability model indicates a high likelihood of buried deposits; and the project assessment score is 218.5. Based on these results, a cultural resources assessment for the final design plan is likely necessary as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

### 5.2.24.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required to deliver treated water to the existing water distribution system. The estimated costs for Environmental and Archaeology Studies and Mitigation were provided by NBU. A cost estimate summary for the NBU Trinity Well Field Expansion WMS is provided in Table 5.2.24-4.

**Table 5.2.24-4 Cost Estimate Summary for the NBU Trinity Well Field Expansion WMS**

| Item | Estimated Costs |
|---|---|
| Pump Stations | $2,540,000 |
| Well Fields (wells, pumps, and piping) | $3,762,000 |
| Storage Tanks (other than at booster pump stations) | $3,763,000 |
| Advanced Water Treatment Facility Expansion (3.6 MGD) | $24,629,000 |
| Integration, Relocations, Backup Generator, and Other | $83,000 |
| **TOTAL COST OF FACILITIES** | **$34,777,000** |
| | |
| Planning (3%) | $1,043,000 |
| Design (7%) | $2,434,000 |
| Construction Engineering (1%) | $348,000 |
| Legal Assistance (2%) | $696,000 |
| Fiscal Services (2%) | $696,000 |
| All Other Facilities Contingency (20%) | $6,955,000 |
| Environmental and Archaeology Studies and Mitigation | $150,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $1,528,000 |
| **TOTAL COST OF PROJECT** | **$48,627,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $3,416,000 |
| O&M | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $76,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $63,000 |
| Advanced Water Treatment Facility | $4,121,000 |
| Pumping Energy Costs (3,121,775 kWh at 0.09 $/kWh) | $281,000 |
| **TOTAL ANNUAL COST** | **$7,957,000** |
| | |

| Item | Estimated Costs |
|---|---|
| **Available Project Yield (acft/yr)** | 3,900 |
| **Annual Cost of Water ($ per acft)*** | $2,040 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,164 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.26 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.57 |
| *Based on a Peaking Factor of 1.04. | |

### 5.2.24.5 Implementation Considerations

Implementation of the NBU Trinity Well Field Expansion WMS includes the following considerations:

- TCEQ:
  - Review and approval of technical specifications for all new or rehabilitated components of the public water system;
  - Review and approval of facilities and water quality to begin operations; and
  - Review and approval of injection well permit.
- EAA:
  - Obtain a “Drilling Through the Edwards Aquifer” Well Construction Permit from the EAA for the construction of wells passing through the Edwards Aquifer;
  - Verify available groundwater quantity and well productivity;
  - Verify water quality; and
  - Verify minimal impacts to the aquifers, particularly as it relates to applicable DFCs.
- The Comal Trinity GCD regulates the Trinity Aquifer in Comal County. Thus, any local permits and approvals from the GCD may be required.

## 5.2.25 SAWS Expanded Local Carrizo Project

The SCTRWPG identified the SAWS Expanded Local Carrizo Project as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.25.1 Description of Water Management Strategy

SAWS currently produces approximately 9,900 acft/yr of groundwater from the Carrizo Aquifer from wells located at the SAWS $H_2$Oaks Center in southern Bexar County [1]. This WMS includes expansion of the current well field to produce an additional 21,000 acft/yr of water from 12 new wells in the Carrizo-Wilcox Aquifer in Bexar County (Figure 5.2.25-1). The wells would be located northeast of the $H_2$Oaks Center, where the groundwater will be treated for delivery through SAWS' distribution system. The project will be constructed in three phases, all of which are anticipated to be implemented by 2030. The wells will primarily be used for production of native groundwater from the Carrizo-Wilcox Aquifer. Given the proximity of the well field to the existing SAWS ASR system, SAWS is exploring the feasibility of having the wells serve a secondary function to perform recharge and recovery of ASR water.

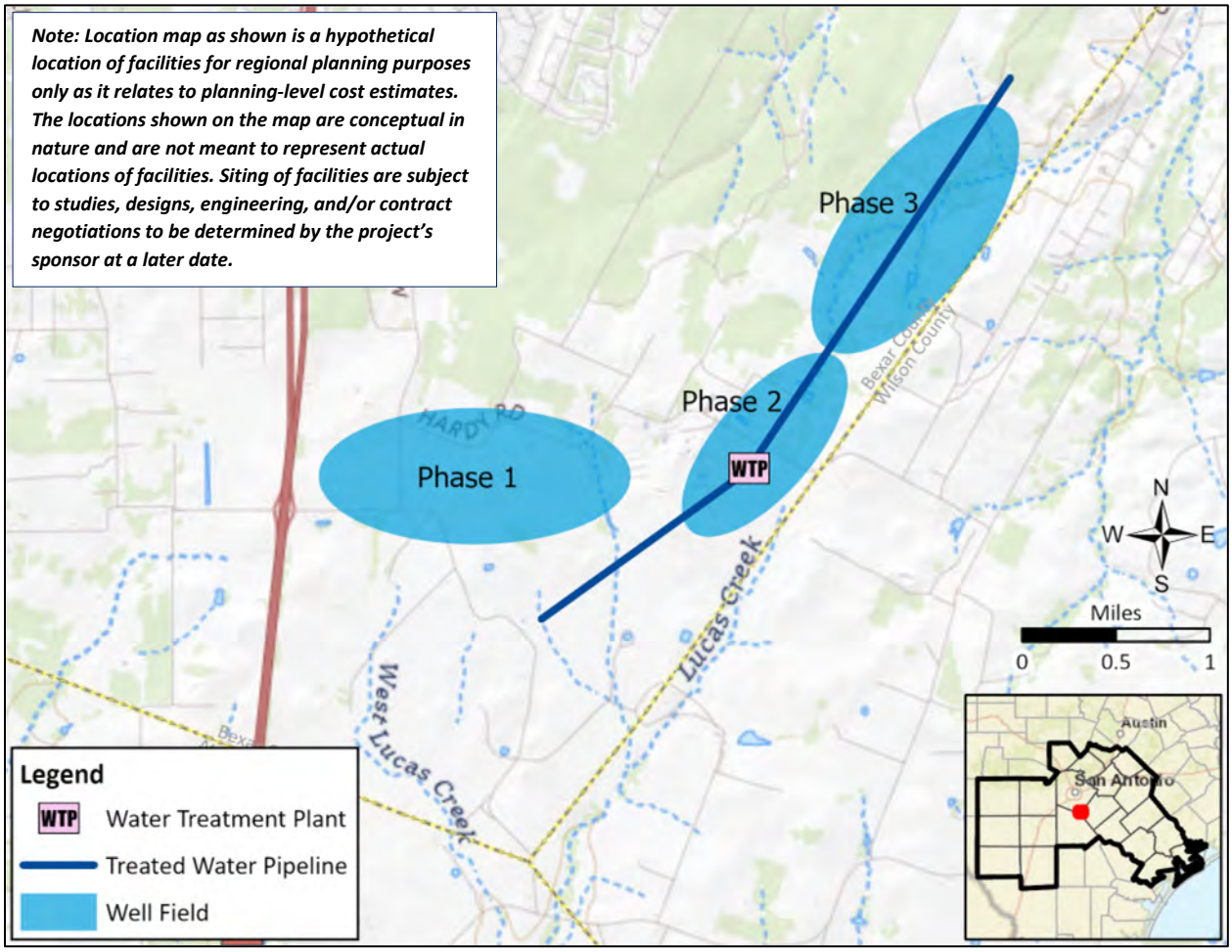



**Figure 5.2.25-1 Approximate Location for the SAWS Expanded Local Carrizo Project**

[1] SAWS *2025 Water Management Plan*. https://www.saws.org

### 5.2.25.2 Available Yield

This WMS includes development of additional fresh groundwater from the Carrizo Sands of the Carrizo-Wilcox Aquifer. Based on available hydrogeologic information [2], the SAWS Expanded Local Carrizo Project will consist of 12 wells constructed in three phases (Table 5.2.25-1). The expected depth for each new Carrizo Aquifer well will range from 550 to 850 feet below ground surface (average depth of 575 feet) and will produce approximately 1,400 gpm per well. The wells will be screened in the Carrizo Sand formation, just down-dip of the Carrizo Aquifer outcrop. Water in the Carrizo formation has a TDS concentration of less than 300 mg/L and relatively high concentrations of iron and manganese. Treatment will require iron and manganese removal at the $H_2$Oaks Center before being sent to the distribution system.

**Table 5.2.25-1 SAWS Expanded Local Carrizo Project Phases**

| Phase | Number of Wells | Available Yield (acft/yr) | Implementation Decade |
|---|---|---|---|
| 1 | 4* | 7,000 | 2030 |
| 2 | 4* | 7,000 | 2030 |
| 3 | 4 | 7,000 | 2030 |
| **Total** | **12** | **21,000** | **2030** |
| * Includes one contingency well in this phase. | | | |

Several SAWS projects are located in the vicinity of the SAWS Expanded Local Carrizo Project, including the following:

- The existing SAWS Local Carrizo Project;
- The existing SAWS Brackish Groundwater Project;
- The SAWS ASR Project that stores Edwards Aquifer water in the Carrizo Aquifer;
- The planned SAWS Expanded Brackish Groundwater Project (refer to Section 5.2.26); and
- The planned SAWS Regional Wilcox Project (refer to Section 5.2.27).
- As part of future planning for this SAWS Expanded Local Carrizo Project, the cumulative effects of recharge operations and pumping will be thoroughly evaluated for SAWS operations and impacts to neighboring groundwater users. There is no local groundwater conservation district that regulates groundwater production or well spacing in the Carrizo Aquifer in Bexar County.

The Evergreen UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Bexar County. In 2021, GMA-13 established DFCs for the Carrizo-Wilcox

[2] Schorr et al. 2023, Conceptual Model Report: Update to the Groundwater Availability Model for Southern Portion of the Carrizo-Wilcox, Queen City, and Sparta Aquifers. TWDB. https://www.twdb.texas.gov/groundwater/models/gam/czwx_s/South%20QCSCW%20ConceptualModelRpt_Final.pdf?d=53611.5

Aquifer [3]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer in Bexar County is 67,849 acft/yr in 2080 [4]. The TWDB's historic groundwater pumping data for the entire Carrizo-Wilcox Aquifer in Bexar County indicate that production has been highly variable since 2008, ranging from less than 1,000 acft/yr to more than 10,000 acft/yr with no discernable trend. Even if the largest estimated historic production of 10,436 acft/yr is assumed, approximately 57,000 acft/yr is remaining of available MAG for additional projects.

### 5.2.25.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.25-2 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.25-2 Summary of Potential Project Effects on Environmental Factors for the SAWS Expanded Local Carrizo Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 1,270 |
| Potential Species Impact Score | 6 |
| Potential Habitat Impact Score | 1 |
| Potential Stream Construction Impact Score | 2 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 60.5 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project is located in the Post Oak Savanna ecoregion. As mapped by the Texas Parks and Wildlife Department (TPWD) [5], the project area is primarily situated within savannah grassland vegetation communities. Small areas of woody vegetation are mapped, including live oak motte and woodland, post oak motte and woodland, and mesquite shrubland. The proposed pipeline crosses riparian vegetation zones identified and mapped by TPWD as riparian live oak forest, riparian deciduous shrubland, and riparian herbaceous vegetation.

[3] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[4] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

[5] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

Based on TPWD vegetation mapping, the project may have the potential to impact 27 acres of agricultural resources, including 13 acres of row crops and 14 acres mapped as Sandyland Grassland which may include pasture areas used for grazing or hay production.

The proposed well pads would result in conversion of land use from undeveloped vegetation or agricultural use (mostly open fields) to small areas of industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

### Aquatic Resources

The project area contains several unnamed intermittent streams and their associated floodplains. The project does not cross any water bodies designated as impaired in the Texas Integrated Report of 303(d) listed water bodies[6]. The NWI mapping shows two freshwater ponds in the project area. The project area does not contain impaired stream segments as defined by TCEQ or ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well field facilities can typically be sited to avoid impacts to Waters of the United States, including wetlands. Stream crossing for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58 – Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if permanent impacts would occur to over 0.1 acre of Waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of Waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that have potential to occur in Bexar County[7,8]. Suitable habitat may occur for the federally endangered black lace cactus (*Echinocereus reichenbachii var. albertii*), proposed endangered tricolored bat (*Perimyotis subflavus*), and the monarch butterfly *(Danaus plexippus),* which is a candidate for federal listing as a threatened or endangered species. Suitable habitat may occur for state-listed

[6] Texas Commission on Environmental Quality (TCEQ). 2024. 2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d). https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

[7] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Bexar County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[8] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Bexar County. https://ipac.ecosphere.fws.gov/location/index.

threatened species, including white-faced ibis (*Plegadis chihi*), Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise (*Gopherus berlandieri*).

There is potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN including American bumblebee (*Bombus pensylvanicus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), eastern spotted skunk (*Spilogale putorius*), and plains spotted skunk (*Spilogale interrupta*). In addition, SGCN bat species may utilize structures and could therefore occur in developed areas. The SGCN list also includes numerous plant species. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

## Cultural Considerations

For linear portions of the project (i.e., project alignment), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. For the area portion of the project (i.e., project area), a background literature review was conducted of the area portion only. The background literature review identified four cultural resources that intersect with the approximate 1,490-acre project area and alignment, as shown in Table 5.2.25-3.

The identified cultural resources include two prehistoric archaeological sites (i.e., 41BX1461 and 41BX1963), and two cemeteries (i.e., Jhon Schock Shely Cemetery and site 41BX1463) [9]. Of the identified sites, two are ineligible for listing on the NRHP (i.e., 41BX1461 and 41BX1963), and two remain undetermined (i.e., Jhon Schock Shely Cemetery and site 41BX1463) [10] for listing on the NRHP. Additionally, the historical map review identified 26 potential historic-age structures that intersect with the project area and alignment [11].

In the State of Texas, all human burials are protected by law [12], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area or alignment and the

[9] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed July 2024.
[10] THC (2024).
[11] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.
[12] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

remains are determined to be Native American, they will be managed in accordance with procedures established through coordination with the THC, and work in the affected area could only resume according to THC authorization.

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 34% of the project area and alignment had a moderate likelihood of containing significant unidentified archaeological resources and 66% had a low likelihood. No areas were identified by the model as having a high probability. Areas with moderate archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 60.5.

**Table 5.2.25-3 Cultural Resources Results for the SAWS Expanded Local Carrizo Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41BX1461) | Lithic Scatter | Prehistoric | Ineligible (THC 6/28/2002) | Intersect |
| Archaeological Site (41BX1463) | Cemetery | Historic | Undetermined (THC 4/8/2002) | Intersect |
| Archaeological Site (41BX1963) | Lithic Scatter | Prehistoric | Ineligible (THC 4/12/2013) | Intersect |
| Jhon Shock Shely (BC-189) | Cemetery | Historic | Undetermined | Intersect |
| None (N=26) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **60.5** |

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review

results, three archaeological sites, two cemeteries (cemetery site 41BX1463 is also considered an archaeological site), and 26 potential historic-age structures are located within the project area and alignment; the probability model indicates a low to moderate likelihood of buried deposits; and the project assessment score is 60.5. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as buffer zones of at least 100 feet between the cemeteries and the proposed development.

#### 5.2.25.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. Costing procedures for the SAWS Expanded Local Carrizo Project include all facilities required for water production, collection, and transmission but do not include costs of the $H_2$Oaks Center WTP expansion or expanding transmission facilities to deliver the treated water to portions of SAWS' distribution system. The $H_2$Oaks WTP expansion and the SAWS Southeast Integration Pipeline are included in the 2026 SCTRWP as part of the Facilities Expansion WMS. As such, information and costs associated with these treatment and transmission facilities expansions are discussed in Section 5.2.8, Facilities Expansion WMS. The following cost estimate summary tables are included:

- Cost Estimate Summary – Phase 1: Table 5.2.25-4
- Cost Estimate Summary – Phase 2: Table 5.2.25-5
- Cost Estimate Summary – Phase 3: Table 5.2.25-6
- Total Project Cost Estimate Summary – Phases 1, 2, and 3: Table 5.2.25-7

**Table 5.2.25-4 Cost Estimate Summary for the SAWS Expanded Local Carrizo Project – Phase 1**

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $12,234,000 |
| **TOTAL COST OF FACILITIES** | **$12,234,000** |
| | |
| Planning (3%) | $367,000 |
| Design (7%) | $856,000 |
| Construction Engineering (1%) | $122,000 |
| Legal Assistance (2%) | $245,000 |
| Fiscal Services (2%) | $245,000 |
| All Other Facilities Contingency (20%) | $2,447,000 |
| Environmental & Archaeology Studies and Mitigation | $105,000 |
| Land Acquisition and Surveying (45 acres) | $42,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $542,000 |
| **TOTAL COST OF PROJECT** | **$17,205,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $1,211,000 |
| O&M | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $122,000 |
| Pumping Energy Costs (2,950,610 kW-hr @ 0.09 $/kW-hr) | $266,000 |
| **TOTAL ANNUAL COST** | **$1,599,000** |
| | |
| **Available Project Yield (acft/yr)** | 7,000 |
| **Annual Cost of Water ($ per acft)*** | $228 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $55 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.70 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.17 |
| * Based on a peaking factor of 1.0. | |

**Table 5.2.25-5 Cost Estimate Summary for the SAWS Expanded Local Carrizo Project – Phase 2**

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $6,096,000 |
| **TOTAL COST OF FACILITIES** | **$6,096,000** |
| | |
| - Planning (3%) | $183,000 |
| - Design (7%) | $427,000 |
| - Construction Engineering (1%) | $61,000 |
| Legal Assistance (2%) | $122,000 |
| Fiscal Services (2%) | $122,000 |
| All Other Facilities Contingency (20%) | $1,219,000 |
| Environmental & Archaeology Studies and Mitigation | $23,000 |
| Land Acquisition and Surveying (11 acres) | $9,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $269,000 |
| **TOTAL COST OF PROJECT** | **$8,531,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $600,000 |
| O&M | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $61,000 |
| Pumping Energy Costs (2,619,050 kW-hr @ 0.09 $/kW-hr) | $236,000 |
| **TOTAL ANNUAL COST** | **$897,000** |
| | |
| **Available Project Yield (acft/yr)** | 7,000 |
| **Annual Cost of Water ($ per acft)*** | $128 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $42 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.39 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.13 |
| * Based on a peaking factor of 1.0. | |

**Table 5.2.25-6 Cost Estimate Summary for the SAWS Expanded Local Carrizo Project – Phase 3**

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $7,996,000 |
| **TOTAL COST OF FACILITIES** | **$7,996,000** |
| | |
| Planning (3%) | $240,000 |
| Design (7%) | $560,000 |
| Construction Engineering (1%) | $80,000 |
| Legal Assistance (2%) | $160,000 |
| Fiscal Services (2%) | $160,000 |
| All Other Facilities Contingency (20%) | $1,599,000 |
| Environmental & Archaeology Studies and Mitigation | $64,000 |
| Land Acquisition and Surveying (28 acres) | $26,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $354,000 |
| **TOTAL COST OF PROJECT** | **$11,239,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $791,000 |
| O&M | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $80,000 |
| Pumping Energy Costs (5,575,739 kW-hr @ 0.09 $/kW-hr) | $502,000 |
| **TOTAL ANNUAL COST** | **$1,373,000** |
| | |
| **Available Project Yield (acft/yr)** | 7,000 |
| **Annual Cost of Water ($ per acft)*** | $196 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $83 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.60 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.26 |
| * Based on a peaking factor of 1.0. | |

### Table 5.2.25-7 Total Project Cost Estimate Summary for the SAWS Expanded Local Carrizo Project – Phases 1, 2, and 3

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $26,326,000 |
| **TOTAL COST OF FACILITIES** | **$26,326,000** |
| | |
| - Planning (3%) | $790,000 |
| - Design (7%) | $1,843,000 |
| - Construction Engineering (1%) | $263,000 |
| Legal Assistance (2%) | $527,000 |
| Fiscal Services (2%) | $527,000 |
| All Other Facilities Contingency (20%) | $5,265,000 |
| Environmental & Archaeology Studies and Mitigation | $192,000 |
| Land Acquisition and Surveying (84 acres) | $77,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,164,000 |
| **TOTAL COST OF PROJECT** | **$36,974,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $2,601,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $263,000 |
| Pumping Energy Costs (10,113,860 kW-hr @ 0.09 $/kW-hr) | $910,000 |
| **TOTAL ANNUAL COST** | **$3,774,000** |
| | |
| **Available Project Yield (acft/yr)** | 21,000 |
| **Annual Cost of Water ($ per acft)*** | $180 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $56 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.55 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.17 |
| * Based on a peaking factor of 1.0. | |

### 5.2.25.5 Implementation Considerations

The SAWS Expanded Local Carrizo Project is planned to be located north/northeast of the existing SAWS ASR well field (Figure 5.2.25-1), which currently stores Edwards Aquifer water in the Carrizo Aquifer. Groundwater withdrawals from the new SAWS Expanded Local Carrizo Project wells could affect groundwater gradients, flow rates, and mixing rates of SAWS' water stored in the nearby ASR well field. Increased extraction from the Carrizo Aquifer could increase movement of water from the ASR well field toward the Carrizo Aquifer wells and cause more rapid mixing of stored Edwards Aquifer groundwater with native Carrizo Aquifer groundwater. Implications of increased groundwater withdrawals will need to be fully evaluated during the planning and design phases and prior to implementation of the SAWS Expanded Local Carrizo Project.

Implementation of the SAWS Expanded Local Carrizo Project includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Potential for differing water qualities/chemical constituents in the water;
- Regulations by TCEQ; and
- Potential impacts on the following natural resources:
    - Endangered and threatened species;
    - Water levels in the aquifer, including potential dewatering of the current artesian part of the aquifer;
    - Baseflow in streams; and
    - Wetlands.
- Competition with others in the area for groundwater in the Carrizo Aquifer, including the following:
    - Private water purveyors;
    - Public water purveyors in the area; and/or
    - Future oil and gas drilling operations.

## 5.2.26 SAWS Expanded Brackish Groundwater Project

The SCTRWPG identified the SAWS Expanded Brackish Groundwater Project as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.26.1 Description of Water Management Strategy

As part of a multi-stage water supply plan, SAWS identified the Carrizo-Wilcox Aquifer in Wilson County as a potential source of groundwater for its customers. SAWS currently owns and operates a brackish groundwater desalination project in Bexar County, known as Phase 1. This WMS includes an expansion of SAWS' existing Carrizo-Wilcox Aquifer brackish groundwater project into Wilson County through two additional phases (Phases 2 and 3). An approximate project location is shown on Figure 5.2.26-1.

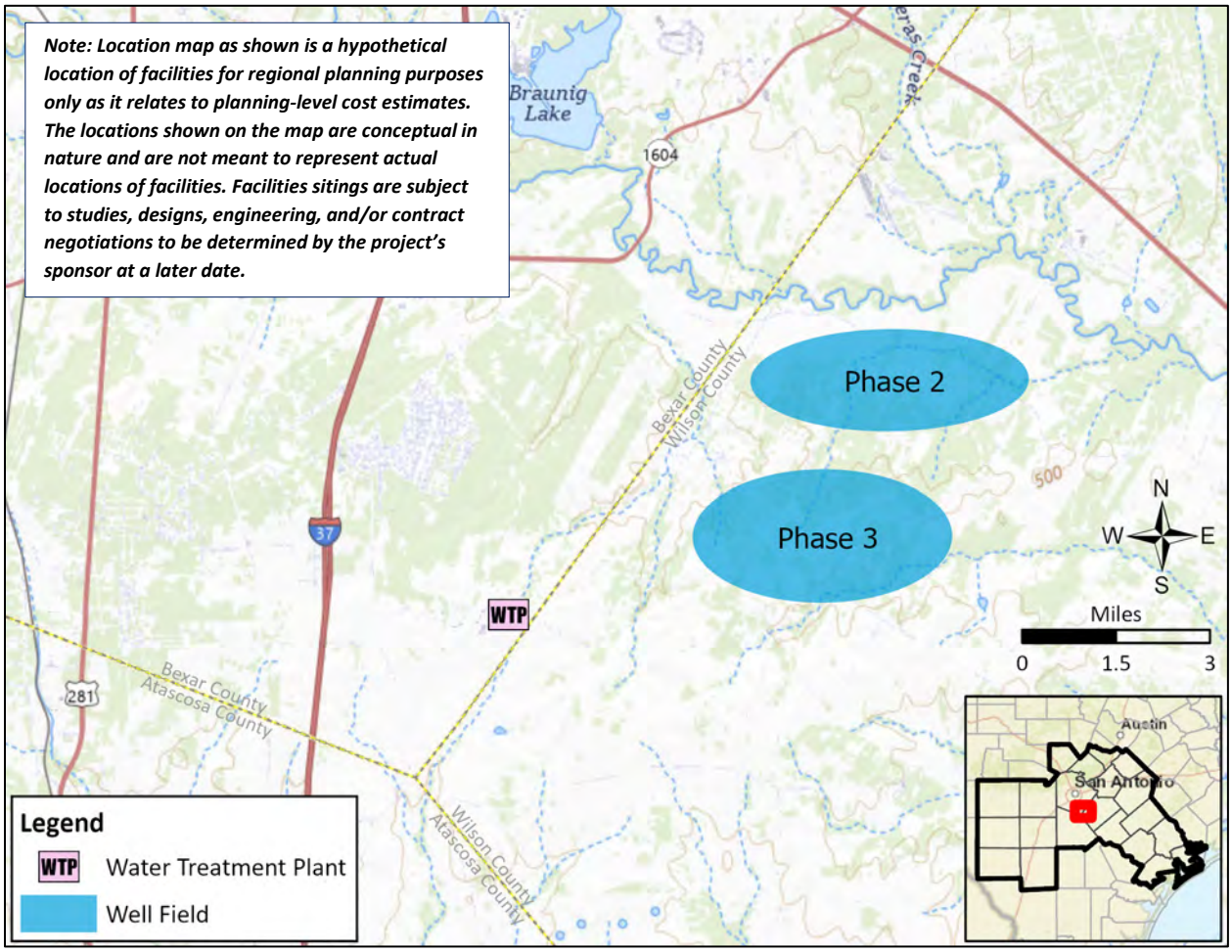



**Figure 5.2.26-1 Approximate Location for the SAWS Expanded Brackish Groundwater Project**

The project is designed to supply 22,400 acft/yr of treated water by the 2040 decade; however, the available yield varies because of MAG limitations. The project includes expansions of the existing SAWS brackish groundwater desalination WTP, which would include iron and manganese removal and reverse osmosis treatment. Only the portion of WTP facilities and associated costs that are directly required to increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this RWP. Phase 2 would include a 12 MGD expansion of the existing

brackish desalination plant, located near the $H_2$Oaks Center. Phase 3 would include an 8 MGD expansion of the existing brackish desalination plant. Once treated, potable water will be delivered through SAWS' distribution system. Brine concentrate will be disposed of via deep well injections in Wilson County near the existing SAWS brackish concentrate injection wells. Phase 2 would include two new injection wells and Phase 3 would include one new injection well.

### 5.2.26.2 Available Yield

This WMS is planned for full completion by 2040 and has an available yield that varies by decade because of MAG limitations. Table 5.2.26-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the SAWS Expanded Brackish Groundwater Project. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.26-1 Envisioned and MAG-Constrained Yields for the SAWS Expanded Brackish Groundwater Project (acft/yr)**

| Phase and Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Phase 2 – Envisioned Yield | 0 | 13,440 | 13,440 | 13,440 | 13,440 | 13,440 |
| Phase 2 – MAG-Constrained Yield | 0 | 1,587 | 4,016 | 8,453 | 10,976 | 10,952 |
| Phase 3 – Envisioned Yield | 0 | 8,960 | 8,960 | 8,960 | 8,960 | 8,960 |
| Phase 3 – MAG-Constrained Yield | 0 | 1,058 | 2,677 | 5,636 | 7,317 | 7,302 |
| **Total Envisioned Yield** | **0** | **22,400** | **22,400** | **22,400** | **22,400** | **22,400** |
| **Total MAG-Constrained Yield** | **0** | **2,645** | **6,693** | **14,089** | **18,293** | **18,254** |

The Evergreen UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Wilson County. In 2021, GMA-13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer in Wilson County is 125,670 acft/yr in 2080 [2].

For most aquifers in the region, GCDs have adopted desired future conditions (DFCs). In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). This has resulted, for planning purposes only, in adjustments to permit amounts, and a lack of firm water available for future permits in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments, or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. SCTRWPG recognizes and supports the ability of permit

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[2] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

Phases 2 and 3 of the project will be located in Wilson County, northeast of the existing ASR wells. Wells in this area are expected to produce approximately 800 gpm each and have a completion depth of approximately 2,300 feet below surface. Phase 2 is designed to produce 12 MGD (13,440 acft/yr) of potable water and is expected to be online by the 2040 decade. The new brackish groundwater well field in Phase 2 would include 14 wells. Phase 3 is designed to produce 8 MGD (8,960 acft/yr) of potable water and is expected to be online by the 2040 decade. The new brackish groundwater well field in Phase 3 would include seven wells.

Water from the Carrizo-Wilcox Aquifer in this area is expected to have a TDS concentration of about 1,500 mg/L. Therefore, reverse osmosis technology is planned for the desalination treatment plant expansions. Groundwater in this aquifer area and depth typically has elevated concentrations of iron and manganese, requiring treatment and removal prior to public consumption. Disposal of the brine concentrate is planned by deep well injection into the Edwards Limestone near the existing SAWS concentrate injection wells. The injection wells are anticipated to have a depth of approximately 5,000 feet. Phase 2 would include two new concentrate injection wells and Phase 3 would include one new concentrate injection well.

### 5.2.26.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.26-2 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.26-2 Summary of Potential Project Effects on Environmental Factors for the SAWS Expanded Brackish Groundwater Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 184 |
| Potential Species Impact Score | 6 |
| Potential Habitat Impact Score | 1 |
| Potential Stream Construction Impact Score | 2 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 173.5 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Post Oak Savannah ecoregion and crosses a variety of vegetation types, mostly open fields and pastures. As mapped by TPWD [3], dominant vegetation types in the project area are savannah grassland, post oak motte and woodland, and live oak motte and woodland. Riparian communities in the project area include floodplain hardwood forest, floodplain herbaceous vegetation, and riparian hardwood forest.

Based on TPWD vegetation mapping, the project may potentially impact 184 acres of agricultural resources, including 162 acres mapped as row crops, and 22 acres of Sandyland Grassland which may include pasture areas used for grazing.

The proposed well pads and any new storage facilities would result in conversion of land use from undeveloped fields or agricultural use to small areas of industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

### Aquatic Resources

The project area contains numerous unnamed intermittent streams. The NWI mapping shows 77 acres of mapped freshwater ponds and wetlands within the project area.

The project area does not include stream segments have been designated as impaired stream segments in the Texas Integrated Report of 303(d) listed water bodies [4]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The project area does not contain ecologically significant stream segments, as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well field facilities can typically be sited to avoid impacts to Waters of the United States including wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of Waters of the United States. The USACE permit requires that no change will occur in pre-construction contours of Waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

---

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that may occur in Wilson County [5, 6]. The project area may contain suitable habitat for the federally endangered black lace cactus (*Echinocereus reichenbacchii* var. *albertii*), the proposed federally endangered tricolored bat (*Perimyotis subflavus*), and the monarch butterfly (*Danaus plexippus*), which is a candidate for federal listing as a threatened or endangered species.

Suitable habitat may occur for the state-listed threatened species white-faced ibis (*Plegadis ibis*), wood stork (*Mycteria americana*), Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise (*Gopherus berlandieri*). The project area may contain a potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN including American bumblebee (*Bombus pensylvanicus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), western burrowing owl (*Athene cunicularia hypugaea*), eastern spotted skunk (*Spilogale putorius*), and plains spotted skunk (*Spilogale interrupta*). In addition, SGCN bat species may utilize structures and could therefore occur in developed areas. The SGCN list also includes numerous plant species, including many for which detailed habitat requirements have not been developed by TPWD. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Although it is no longer on the federal endangered species list, the bald eagle is protected by the federal Bald and Golden Eagle Protection Act, which prohibits impacts to the eagles unless permitted by USFWS. Preconstruction surveys for active bird nests and presence of eagles are recommended.

## Cultural Considerations

The background literature review identified two cultural resources within the project area (Table 5.2.26-3) [7]. The identified cultural resources are Canada Verde Cemetery (WN-C021), in the eastern end of the northern segment of the project area, and the Chisholm Trail that crosses the southern segment

[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Wilson County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[6] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Wilson County. https://ipac.ecosphere.fws.gov/location/index.
[7] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed September 2024.

of the project area. Additionally, the historical map review identified 142 potential historic-age buildings/structures that are within the project area [8].

In the State of Texas, all human burials are protected by law [9], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume in accordance with THC authorization.

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 1% of the project alignment had a high likelihood of containing significant unidentified archaeological resources, 63% had a moderate likelihood, and 36% had a low likelihood. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 173.5.

**Table 5.2.26-3 Cultural Resources Results for the SAWS Expanded Brackish Groundwater Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Canada Verde Cemetery | Cemetery | Historic | Undetermined | Intersect |
| Chisholm Trail | Historic Trail | Historic | Undetermined | Intersect |
| None (N=142) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **173.5** |

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal

[8] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.
[9] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

government must also comply with Section 106 of the NHPA. According to the background review results, one cemetery and 142 potential historic-age structures are located within the project area. The probability model for the project indicates a low to moderate likelihood of buried deposits; the project assessment score is 173.5. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

#### 5.2.26.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for a new brackish groundwater well field, expansion of the brackish desalination WTP, brine concentrate disposal via deep well injection, and conveyance of potable water to existing integration pipelines that currently deliver water recovered from the existing local projects.

Because this WMS is MAG-constrained, cost estimate summaries for the SAWS Expanded Brackish Groundwater Project are included for the Envisioned Yield and for the MAG-Constrained Yield. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the limited groundwater availability. Therefore, project costs are the same for the Envisioned and MAG-Constrained summaries but unit costs vary, as they are dependent on the yield. For the MAG-Constrained cost estimate summaries, annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. The following cost estimate summary tables are included:

- Envisioned Yield Cost Estimate Summary – Phase 2: Table 5.2.26-4
- Envisioned Yield Cost Estimate Summary – Phase 3: Table 5.2.26-5
- Total Project Envisioned Yield Cost Estimate Summary – Phases 2 and 3: Table 5.2.26-6
- MAG-Constrained Yield Cost Estimate Summary – Phase 2: Table 5.2.26-7
- MAG-Constrained Yield Cost Estimate Summary – Phase 3: Table 5.2.26-8
- Total Project MAG-Constrained Yield Cost Estimate Summary – Phases 2 and 3: Table 5.2.26-9

### Table 5.2.26-4 Cost Estimate Summary for the SAWS Expanded Brackish Groundwater Project – Phase 2 (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (12.6 MGD) | $1,666,000 |
| Transmission Pipeline (42 in. dia., 5.9 miles) | $11,776,000 |
| Well Fields (wells, pumps, and piping) | $68,225,000 |
| Water Treatment Plant Expansion (12 MGD) | $52,785,000 |
| Integration, Relocations, Backup Generator & Other | $29,000 |
| **TOTAL COST OF FACILITIES** | **$134,481,000** |
| | |
| Planning (3%) | $4,034,000 |
| Design (7%) | $9,414,000 |
| Construction Engineering (1%) | $1,345,000 |
| Legal Assistance (2%) | $2,690,000 |
| Fiscal Services (2%) | $2,690,000 |
| Pipeline Contingency (15%) | $1,766,000 |
| All Other Facilities Contingency (20%) | $24,541,000 |
| Environmental and Archaeology Studies and Mitigation | $1,708,000 |
| Land Acquisition and Surveying (293 acres) | $1,703,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% return on investment) | $5,992,000 |
| **TOTAL COST OF PROJECT** | **$190,364,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $13,392,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $800,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $42,000 |
| Water Treatment Plant | $9,897,000 |
| Pumping Energy Costs (3,468,502 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $312,000 |
| **TOTAL ANNUAL COST** | **$24,443,000** |
| | |
| **Available Project Yield (acft/yr)** | 13,440 |
| **Annual Cost of Water ($ per acft)*** | $1,819 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $822 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.58 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.52 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.26-5 Cost Estimate Summary for the SAWS Expanded Brackish Groundwater Project – Phase 3 (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (8.4 MGD) | $1,205,000 |
| Transmission Pipeline (42 in. dia., 5.9 miles ) | $11,776,000 |
| Well Fields (wells, pumps, and piping) | $44,753,000 |
| Water Treatment Plant Expansion (8 MGD) | $35,133,000 |
| Integration, Relocations, Backup Generator & Other | $15,000 |
| **TOTAL COST OF FACILITIES** | **$92,882,000** |
| | |
| Planning (3%) | $2,786,000 |
| Design (7%) | $6,502,000 |
| Construction Engineering (1%) | $929,000 |
| Legal Assistance (2%) | $1,858,000 |
| Fiscal Services (2%) | $1,858,000 |
| Pipeline Contingency (15%) | $1,766,000 |
| All Other Facilities Contingency (20%) | $16,221,000 |
| Environmental and Archaeology Studies and Mitigation | $1,106,000 |
| Land Acquisition and Surveying (231 acres) | $1,224,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% return on investment) | $4,132,000 |
| **TOTAL COST OF PROJECT** | **$131,264,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $9,235,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $565,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $30,000 |
| Water Treatment Plant | $6,588,000 |
| Pumping Energy Costs (6,608,157 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $595,000 |
| **TOTAL ANNUAL COST** | **$17,013,000** |
| | |
| **Available Project Yield (acft/yr)** | 8,960 |
| **Annual Cost of Water ($ per acft)*** | $1,899 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $868 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.83 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.66 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.26-6 Total Project Cost Estimate Summary for the SAWS Expanded Brackish Groundwater Project – Phases 2 and 3 (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (12.6 MGD) | $1,666,000 |
| Transmission Pipeline (42 in. dia., 5.9 miles) | $23,553,000 |
| Well Fields (wells, pumps, and piping) | $112,978,000 |
| Water Treatment Plant Expansion (20 MGD) | $87,919,000 |
| Integration, Relocations, Backup Generator & Other | $29,000 |
| **TOTAL COST OF FACILITIES** | **$226,145,000** |
| | |
| Planning (3%) | $6,784,000 |
| Design (7%) | $15,830,000 |
| Construction Engineering (1%) | $2,261,000 |
| Legal Assistance (2%) | $4,523,000 |
| Fiscal Services (2%) | $4,523,000 |
| Pipeline Contingency (15%) | $3,533,000 |
| All Other Facilities Contingency (20%) | $40,518,000 |
| Environmental and Archaeology Studies and Mitigation | $2,606,000 |
| Land Acquisition and Surveying (403 acres) | $2,412,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% return on investment) | $10,046,000 |
| **TOTAL COST OF PROJECT** | **$319,181,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $22,456,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $1,366,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $42,000 |
| Water Treatment Plant | $16,485,000 |
| Pumping Energy Costs (468,100 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $42,000 |
| **TOTAL ANNUAL COST** | **$40,391,000** |
| | |
| **Available Project Yield (acft/yr)** | 22,400 |
| **Annual Cost of Water ($ per acft)*** | $1,803 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $801 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.53 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.46 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.26-7 Cost Estimate Summary for the SAWS Expanded Brackish Groundwater Project – Phase 2 (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (12.6 MGD) | $1,666,000 |
| Transmission Pipeline (42 in. dia., 5.9 miles) | $11,776,000 |
| Well Fields (wells, pumps, and piping) | $68,225,000 |
| Water Treatment Plant Expansion (12 MGD) | $52,785,000 |
| Integration, Relocations, Backup Generator & Other | $29,000 |
| **TOTAL COST OF FACILITIES** | **$134,481,000** |
| | |
| Planning (3%) | $4,034,000 |
| Design (7%) | $9,414,000 |
| Construction Engineering (1%) | $1,345,000 |
| Legal Assistance (2%) | $2,690,000 |
| Fiscal Services (2%) | $2,690,000 |
| Pipeline Contingency (15%) | $1,766,000 |
| All Other Facilities Contingency (20%) | $24,541,000 |
| Environmental and Archaeology Studies and Mitigation | $1,708,000 |
| Land Acquisition and Surveying (293 acres) | $1,703,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% return on investment) | $5,992,000 |
| **TOTAL COST OF PROJECT** | **$190,364,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $13,392,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $800,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $42,000 |
| Water Treatment Plant | $9,897,000 |
| Pumping Energy Costs (3,468,502 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $312,000 |
| **TOTAL ANNUAL COST** | **$24,443,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,587 |
| **Annual Cost of Water ($ per acft)*** | $15,402 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $6,963 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $47.26 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $21.37 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.26-8 Cost Estimate Summary for the SAWS Expanded Brackish Groundwater Project – Phase 3 (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (8.4 MGD) | $1,205,000 |
| Transmission Pipeline (42 in. dia., 5.9 miles ) | $11,776,000 |
| Well Fields (wells, pumps, and piping) | $44,753,000 |
| Water Treatment Plant Expansion (8 MGD) | $35,133,000 |
| Integration, Relocations, Backup Generator & Other | $15,000 |
| **TOTAL COST OF FACILITIES** | **$92,882,000** |
| | |
| Planning (3%) | $2,786,000 |
| Design (7%) | $6,502,000 |
| Construction Engineering (1%) | $929,000 |
| Legal Assistance (2%) | $1,858,000 |
| Fiscal Services (2%) | $1,858,000 |
| Pipeline Contingency (15%) | $1,766,000 |
| All Other Facilities Contingency (20%) | $16,221,000 |
| Environmental and Archaeology Studies and Mitigation | $1,106,000 |
| Land Acquisition and Surveying (231 acres) | $1,224,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% return on investment) | $4,132,000 |
| **TOTAL COST OF PROJECT** | **$131,264,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $9,235,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $565,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $30,000 |
| Water Treatment Plant | $6,588,000 |
| Pumping Energy Costs (6,608,157 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $595,000 |
| **TOTAL ANNUAL COST** | **$17,013,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,058 |
| **Annual Cost of Water ($ per acft)*** | $16,080 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $7,352 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $49.34 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $22.56 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.26-9 Total Project Cost Estimate Summary for the SAWS Expanded Brackish Groundwater Project – Phases 2 and 3 (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (12.6 MGD) | $1,666,000 |
| Transmission Pipeline (42 in. dia., 5.9 miles) | $23,553,000 |
| Well Fields (wells, pumps, and piping) | $112,978,000 |
| Water Treatment Plant Expansion (20 MGD) | $87,919,000 |
| Integration, Relocations, Backup Generator & Other | $29,000 |
| **TOTAL COST OF FACILITIES** | **$226,145,000** |
| | |
| Planning (3%) | $6,784,000 |
| Design (7%) | $15,830,000 |
| Construction Engineering (1%) | $2,261,000 |
| Legal Assistance (2%) | $4,523,000 |
| Fiscal Services (2%) | $4,523,000 |
| Pipeline Contingency (15%) | $3,533,000 |
| All Other Facilities Contingency (20%) | $40,518,000 |
| Environmental and Archaeology Studies and Mitigation | $2,606,000 |
| Land Acquisition and Surveying (403 acres) | $2,412,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% return on investment) | $10,046,000 |
| **TOTAL COST OF PROJECT** | **$319,181,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $22,456,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $1,366,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $42,000 |
| Water Treatment Plant | $16,485,000 |
| Pumping Energy Costs (468,100 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $42,000 |
| **TOTAL ANNUAL COST** | **$40,391,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,645 |
| **Annual Cost of Water ($ per acft)*** | $15,271 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $6,781 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $46.86 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $20.81 |
| *Based on a peaking factor of 1.0. | |

### 5.2.26.5 Implementation Considerations

Implementation of the SAWS Expanded Brackish Groundwater Project includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of dissolved constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Verification of the potential for deep well injection of concentrate;
- Verification that desalinated Carrizo-Wilcox Aquifer water is compatible with other water sources being used by customers and will meet all water quality requirements in the end user's distribution system;
- Potential for differing water qualities/chemical constituents in the water;
- Regulations by TCEQ;
- Regulations by and securing permits from the Evergreen UWCD;
- Experience in operating and maintaining a desalination WTP; and
- Competition with others in the area for groundwater in the Carrizo-Wilcox Aquifer, including the following:
  - Private water purveyors;
  - Public water purveyors in the area; and/or
  - Future oil and gas drilling operations.
- Additional implementation considerations may include impacts on the following:
  - Endangered and threatened species;
  - Water levels in the aquifer, including potential dewatering of the current artesian part of the aquifer;
  - Baseflow in streams; and
  - Wetlands.

## 5.2.27 SAWS Regional Wilcox Project

The SCTRWPG identified the SAWS Regional Wilcox Project as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.27.1 Description of Water Management Strategy

As part of a multi-stage water supply plan, SAWS identified the SAWS Regional Wilcox Project in the Carrizo-Wilcox Aquifer in Wilson County as a potential source for its customers. SAWS currently owns and operates a brackish groundwater desalination project in Bexar County, which is presently online. This WMS evaluation includes expansion of SAWS' existing Carrizo-Wilcox Aquifer brackish groundwater project into Wilson County in two phases (Phases 1 and 2). Figure 5.2.27-1 provides the approximate project location of the two phases for the SAWS Regional Wilcox Project.

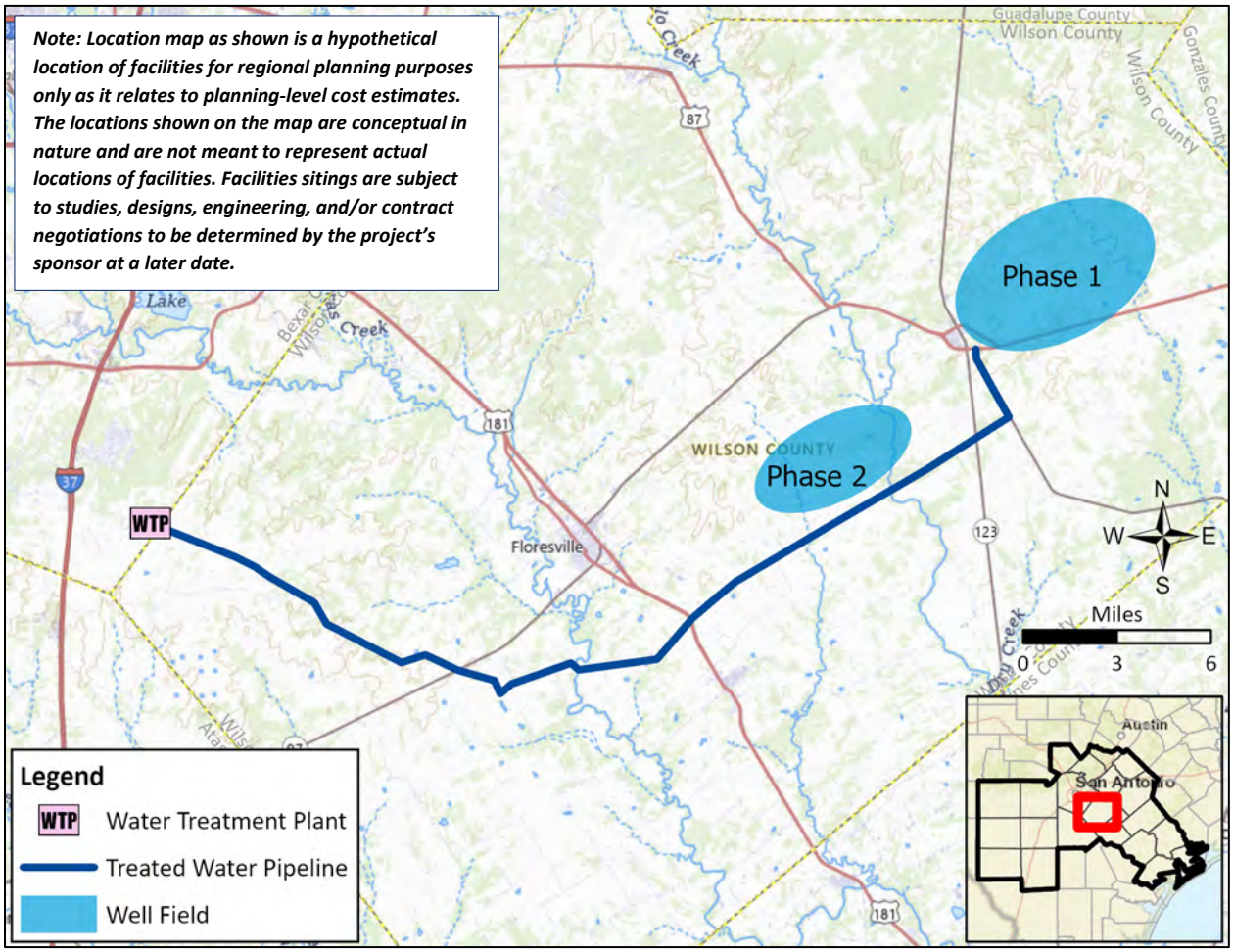



**Figure 5.2.27-1 Approximate Location for the SAWS Regional Wilcox Project**

The project is designed to supply 50,000 acft/yr of treated water by the 2050 decade; however, the available yield varies because of MAG limitations. The project includes expansions of the existing SAWS brackish groundwater desalination WTP, which would include iron and manganese removal and reverse osmosis treatment. Only the portion of WTP facilities and associated costs that are directly required to

increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this RWP. Phase 1 would include a 28.6 MGD expansion of the existing brackish desalination plant, located near the H2Oaks Center. Phase 2 would include a 16.1 MGD expansion of the existing brackish desalination plant. Once treated, potable water will be delivered through SAWS' distribution system. Brine concentrate will be disposed of via deep well injections in Wilson County near the existing SAWS brackish concentrate injection wells. Phase 1 would include four new injection wells and Phase 2 would include two new injection wells.

### 5.2.27.2 Available Yield

This WMS is planned for full completion by 2050 and has an available yield that varies by decade because of MAG limitations. Table 5.2.27-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the SAWS Regional Wilcox Project. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.27-1 Envisioned and MAG-Constrained Yields for the SAWS Regional Wilcox Project (acft/yr)**

| Phase and Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Phase 1 – Envisioned Yield | 0 | 0 | 32,000 | 32,000 | 32,000 | 32,000 |
| Phase 1 – MAG-Constrained Yield | 0 | 0 | 9,564 | 20,127 | 26,132 | 26,078 |
| Phase 2 – Envisioned Yield | 0 | 0 | 18,000 | 18,000 | 18,000 | 18,000 |
| Phase 2 – MAG-Constrained Yield | 0 | 0 | 5,379 | 11,321 | 14,699 | 14,669 |
| **Total Envisioned Yield** | **0** | **0** | **50,000** | **50,000** | **50,000** | **50,000** |
| **Total MAG-Constrained Yield** | **0** | **0** | **14,943** | **31,448** | **40,831** | **40,747** |

The Evergreen UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Wilson County. In 2021, GMA-13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimate for the Carrizo-Wilcox Aquifer in Wilson County is 125,670 acft/yr in 2080 [2].

For most aquifers in the region, GCDs have adopted desired future conditions (DFCs). In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). This has resulted, for planning purposes only, in adjustments to permit amounts, and a lack of firm water available for future permits in this plan for

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf.

[2] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf.

some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments, or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

Phase 1 is located northeast of Stockdale in eastern Wilson County, and Phase 2 is located northeast of Floresville in central Wilson County. Wells in this area are expected to produce approximately 800 gpm each and have a completion depth of approximately 2,300 feet below surface. Phase 1 is designed to produce 28.5 MGD (32,000 acft/yr) of potable water and is expected to be online by the 2050 decade. The new well field in Phase 1 would include 33 wells, including six contingency wells. Phase 2 is designed to produce 16 MGD (18,000 acft/yr) of potable water and is expected to be online by the 2050 decade. The new well field in Phase 2 would include 19 production wells, including three contingency wells.

Water from the Carrizo-Wilcox Aquifer in this area is expected to have a TDS concentration of about 1,500 mg/L. Therefore, reverse osmosis technology is planned for the desalination treatment plant expansions. Groundwater in this aquifer area and depth typically has elevated concentrations of iron and manganese, requiring treatment and removal prior to public consumption. Disposal of the brine concentrate is planned by deep well injection into the Edwards Limestone near the existing SAWS concentrate injection wells. The injection wells are anticipated to have a depth of approximately 5,000 feet. Phase 1 would include four new concentrate injection wells and Phase 2 would include two new concentrate injection wells.

### 5.2.27.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.27-2 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.27-2 Summary of Potential Project Effects on Environmental Factors for the SAWS Regional Wilcox Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 2,973 |
| Potential Species Impact Score | 7 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 4 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 291.6 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Post Oak Savannah ecoregion and crosses a variety of vegetation types, mostly open fields and pastures. As mapped by TPWD [3], dominant vegetation types in the project area are savannah grassland and disturbance/tame grassland. Small areas of mapped woody vegetation communities include post oak motte and woodland and mesquite shrubland. The linear components of the project cross riparian vegetation zones along streams, mapped by TPWD as floodplain and riparian herbaceous vegetation, floodplain and riparian hardwood forest, and floodplain live oak and deciduous shrubland.

Based on TPWD vegetation mapping, the project may potentially impact 2,973 acres of agricultural resources, including 355 acres mapped as row crops, and 2,618 acres of disturbance or tame grassland which may include pasture areas used for grazing.

The proposed well pads facilities would result in conversion of land use from undeveloped fields or agricultural use to small areas of industrial use. Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

### Aquatic Resources

The project area contains several mapped streams and their associated floodplains including the San Antonio River, Wallace Branch, Mariana Branch, Marcelinas Creek, Cibolo Creek, and numerous unnamed tributaries. The NWI mapping shows one freshwater forested/shrub wetlands and several ponds in the project area.

The project crosses Segment 1911 of the San Antonio River and Segment 1902 of Lower Cibolo Creek; these stream segments have been designated as impaired stream segments in the Texas Integrated Report of 303(d) listed water bodies [4]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well field facilities can typically be sited to avoid impacts to Waters of the United States including wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.

Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to over 0.1 acre of Waters of the United States. The USACE permit requires that no change will be present in preconstruction contours of Waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Bexar and Wilson Counties [5, 6, 7, 8]. The project area may contain suitable habitat for the federally endangered black lace cactus (*Echinocereus reichenbacchii* var. *albertii*), the proposed federally endangered tricolored bat (*Perimyotis subflavus*), and the monarch butterfly (*Danaus plexippus*), which is a candidate for federal listing as a threatened or endangered species. The black rail (*Laterallus jamaicensis*), also under federal review as a threatened species, has low potential to occur in wetland areas in the project region.

Suitable habitat may occur for the state listed threatened species white-faced ibis (*Plegadis ibis*), Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise (*Gopherus berlandieri*). The state-threatened bald eagle (*Haliaeetus leucocephalus*) has been observed in areas of the lower San Antonio River. There is potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN including American bumblebee (*Bombus pensylvanicus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), western burrowing owl (*Athene cunicularia hypugaea*), eastern spotted skunk (*Spilogale putorius*), and plains spotted skunk (*Spilogale interrupta*). In addition, SGCN bat species may utilize structures and could therefore occur in developed areas. The SGCN list also includes numerous plant species, including many for which detailed habitat requirements have not been developed by TPWD. SGCN species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones.

The project area is likely to contain suitable habitat for federally endangered freshwater mussel species. Suitable habitat may occur in perennial rivers/streams and perennial pools of intermittent streams. If any such habitat would be affected by construction, presence/absence surveys and relocation of native mussel species would be required. Handling and relocation of aquatic species must be conducted by TPWD-permitted personnel and in accordance with an approved Aquatic Resources Relocation Plan. Furthermore, these candidate species may be listed as threatened or endangered during the project timeline; in which case, any species impacts would require USFWS consultation.

---

[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Bexar County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[6] Texas Parks and Wildlife Department (TPWD). 2019. Annotated County Lists of Rare Species – Wilson County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.

[7] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Bexar County. https://ipac.ecosphere.fws.gov/location/index.

[8] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Wilson County. https://ipac.ecosphere.fws.gov/location/index.

Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain its recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request pre-construction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct pre-construction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15. Although it is no longer on the federal endangered species list, the bald eagle is protected by the federal Bald and Golden Eagle Protection Act, which prohibits impacts to the eagles unless permitted by USFWS. Preconstruction surveys for active bird nests and presence of eagles are recommended.

## Cultural Considerations

For linear portions of the project (i.e., pipeline alignments), a background literature review was performed for the alignment and a 300-foot radius around the project alignment. For the area portion of the project (i.e., well fields), a background literature review was conducted of just the area portion. The background literature review identified 18 cultural resources that intersect with the approximate 22,346-acre project area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment (Table 5.2.27-3) [9]. The project area and alignment contain eight archaeological sites (i.e., 41WN6, 41WN12, 41WN21, 41WN22, 41WN23, 41WN25, 41WN111, and 41WN113), four cemeteries (i.e., Bird Cemetery, Old Wheeler Cemetery, Pleasant Valley Cemetery, and Steele Branch Cemetery), two vicinity cemeteries (i.e., Gouger Cemetery and Svoboda Family Cemetery), and two historic trails (i.e., Chisholm Trail, and El Camino Real de Los Tejas). One of the cemeteries contains a historical marker (i.e., Old Wheeler Cemetery). Cultural resources located immediately adjacent to the project's pipeline alignment include a single archaeological site (i.e., 41WN115). Out of the nine archaeological sites within the project area, alignment, and immediately adjacent to the pipeline alignment, all are undetermined for listing on the NRHP. Additionally, the historical map review identified 221 potential historic-age structures that intersect with the project area and alignment [10].

Vicinity cemeteries are very general areas where a cemetery location was reported at one time, but the exact location is unknown or could not be confirmed. If project impacts are to occur near the vicinity cemetery location, further work (e.g., pedestrian survey and/or metal detecting) or construction monitoring might be needed to ensure human burials are not present in the project area and alignment. In the State of Texas, all human burials are protected by law [11], and warrant avoidance with a minimum

[9] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed September 2024.

[10] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the USGS Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.

[11] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

100-foot avoidance buffer. If human burials are encountered in the project area or alignment and the remains are determined to be Native American, they will be handled in accordance with procedures established through coordination with the THC, and work in the affected area could only resume per THC authorization.

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 2% of the project area and alignment had a high likelihood of containing significant unidentified archaeological resources, 5% had a moderate likelihood, and 93% had a low likelihood. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 291.6.

**Table 5.2.27-3 Cultural Resources Results for the SAWS Regional Wilcox Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41WN6) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41WN12) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41WN21) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41WN22) | Unknown | Unknown | Undetermined | Intersect |
| Archaeological Site (41WN23) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41WN25) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41WN111) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41WN113) | Lithic Scatter | Prehistoric | Undetermined | Intersect |
| Archaeological Site (41WN115) | Lithic Scatter | Prehistoric | Undetermined | Adjacent |
| Bird Cemetery (WN-C109) | Cemetery | Historic | Undetermined | Intersect |
| Old Wheeler Cemetery (WN-C017) | Cemetery/OTHM | Historic | Undetermined | Intersect |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Pleasant Valley Cemetery (WN-C005) | Cemetery | Historic | Undetermined | Intersect |
| Steele Branch Cemetery (WN-C006) | Cemetery | Historic | Undetermined | Intersect |
| Gouger Cemetery (WN-C058) | Vicinity Cemetery | Historic | Undetermined | Intersect |
| Svoboda Family Cemetery (WN-C131) | Vicinity Cemetery | Historic | Undetermined | Intersect |
| Chisholm Trail | Historic Trail | Historic | Listed (segments) | Intersect |
| El Camino Real De Los Tejas | Historic Trail | Historic | Listed (segments) | Intersect |
| None (N=221) | Buildings/ Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **291.6** |

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, the project area and alignment contain eight archaeological sites, four cemeteries, two vicinity cemeteries, two historic trails, one historical marker, and 221 potential historic-age structures; in addition, one archaeological site is located immediately adjacent to the project's pipeline alignment. The probability model for the project indicates a low to moderate likelihood of buried deposits, resulting in a project assessment score is 291.6. Based on these results, a cultural resources assessment for the final design plan is likely necessary, as well as a buffer zone of at least 100 feet between the cemetery and the proposed development.

### 5.2.27.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for a new brackish groundwater well field, expansion of the brackish desalination WTP, brine concentrate storage, concentrate disposal via deep well injection, and conveyance of potable water to existing integration pipelines that currently deliver water recovered from the existing local projects.

Because this WMS is MAG-constrained, cost estimate summaries for the SAWS Regional Wilcox Project are included for the Envisioned Yield and for the MAG-Constrained Yield. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the limited groundwater availability. Therefore, project costs are the same for the Envisioned and MAG-Constrained summaries but unit costs vary, as they are dependent on the yield. For the MAG-Constrained cost estimate summaries, annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. The following cost estimate summary tables are included:

- Envisioned Yield Cost Estimate Summary – Phase 1: Table 5.2.27-4;

- Envisioned Yield Cost Estimate Summary – Phase 2: Table 5.2.27-5;
- Total Project Envisioned Yield Cost Estimate Summary – Phases 1 and 2: Table 5.2.27-6;
- MAG-Constrained Yield Cost Estimate Summary – Phase 1: Table 5.2.27-7;
- MAG-Constrained Yield Cost Estimate Summary – Phase 2: Table 5.2.27-8; and
- Total Project MAG-Constrained Yield Cost Estimate Summary – Phases 1 and 2: Table 5.2.27-9.

### Table 5.2.27-4 Cost Estimate Summary for the SAWS Regional Wilcox Project – Phase 1 (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (30.1 MGD) | $62,136,000 |
| Transmission Pipeline (42 in. dia.) | $215,050,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $4,600,000 |
| Well Fields (wells, pumps, and piping) | $340,383,000 |
| Water Treatment Plant Expansion (28.6 MGD) | $124,725,000 |
| Integration, Relocations, Backup Generator & Other | $3,419,000 |
| **TOTAL COST OF FACILITIES** | **$750,313,000** |
| | |
| Planning (3%) | $22,509,000 |
| Design (7%) | $52,522,000 |
| Construction Engineering (1%) | $7,503,000 |
| Legal Assistance (2%) | $15,006,000 |
| Fiscal Services (2%) | $15,006,000 |
| Pipeline Contingency (15%) | $32,257,000 |
| All Other Facilities Contingency (20%) | $107,053,000 |
| All Other Facilities Contingency (20%) | $107,053,000 |
| Environmental and Archaeology Studies and Mitigation | $8,474,000 |
| Land Acquisition and Surveying (1,373 acres) | $8,746,000 |
| Interest During Construction (3% for 2 years with a 0.5% return on investment) | $33,020,000 |
| **TOTAL COST OF PROJECT** | **$1,052,409,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $73,808,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $5,635,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $1,553,000 |
| Water Treatment Plant | $23,386,000 |
| Pumping Energy Costs (111,570,693 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $10,041,000 |
| **TOTAL ANNUAL COST** | **$114,423,000** |
| | |
| **Available Project Yield (acft/yr)** | 32,000 |
| **Annual Cost of Water ($ per acft)** | $3,576 |
| **Annual Cost of Water After Debt Service ($ per acft)** | $1,269 |
| **Annual Cost of Water ($ per 1,000 gallons)** | $10.97 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)** | $3.89 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.27-5 Cost Estimate Summary for the SAWS Regional Wilcox Project – Phase 2 (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Transmission Pump Station(s) & Storage Tank(s) | $1,024,000 |
| Well Fields (wells, pumps, and piping) | $87,479,000 |
| Water Treatment Plant Expansion (16.1 MGD) | $69,167,000 |
| **TOTAL COST OF FACILITIES** | **$157,670,000** |
| | |
| Planning (3%) | $4,730,000 |
| Design (7%) | $11,037,000 |
| Construction Engineering (1%) | $1,577,000 |
| Legal Assistance (2%) | $3,153,000 |
| Fiscal Services (2%) | $3,153,000 |
| All Other Facilities Contingency (20%) | $31,534,000 |
| Environmental and Archaeology Studies and Mitigation | $1,826,000 |
| Land Acquisition and Surveying (303 acres) | $1,447,000 |
| Interest During Construction (3% for 2 years with a 0.5% return on investment) | $7,025,000 |
| **TOTAL COST OF PROJECT** | **$223,152,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $15,701,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $885,000 |
| Water Treatment Plant | $12,969,000 |
| Pumping Energy Costs (913,225 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $82,000 |
| **TOTAL ANNUAL COST** | **$29,637,000** |
| | |
| **Available Project Yield (acft/yr)** | 18,000 |
| **Annual Cost of Water ($ per acft)*** | $1,647 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $774 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.05 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.38 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.27-6 Total Project Cost Estimate Summary for the SAWS Regional Wilcox Project – Phases 1 and 2 (Envisioned Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (30.1 MGD) | $62,136,000 |
| Transmission Pipeline (42 in. dia.) | $215,050,000 |
| Well Fields (wells, pumps, and piping) | $427,862,000 |
| Water Treatment Plant Expansion (44.7 MGD) | $193,892,000 |
| Integration, Relocations, Backup Generator & Other | $3,419,000 |
| **TOTAL COST OF FACILITIES** | **$902,359,000** |
| | |
| Planning (3%) | $27,071,000 |
| Design (7%) | $63,165,000 |
| Construction Engineering (1%) | $9,024,000 |
| Legal Assistance (2%) | $18,047,000 |
| Fiscal Services (2%) | $18,047,000 |
| Pipeline Contingency (15%) | $32,257,000 |
| All Other Facilities Contingency (20%) | $137,462,000 |
| Planning (3%) | $27,071,000 |
| Environmental and Archaeology Studies and Mitigation | $10,300,000 |
| Land Acquisition and Surveying (1,597 acres) | $10,193,000 |
| Interest During Construction (3% for 2 years with a 0.5% return on investment) | $39,797,000 |
| **TOTAL COST OF PROJECT** | **$1,267,722,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $88,958,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $6,463,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $1,553,000 |
| Water Treatment Plant | $36,355,000 |
| Pumping Energy Costs (128,011,441 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $11,521,000 |
| **TOTAL ANNUAL COST** | **$144,850,000** |
| | |
| **Available Project Yield (acft/yr)** | 50,000 |
| **Annual Cost of Water ($ per acft)*** | $2,897 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,118 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $8.89 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.43 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.27-7 Cost Estimate Summary for the SAWS Regional Wilcox Project – Phase 1 (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (30.1 MGD) | $62,136,000 |
| Transmission Pipeline (42 in. dia.) | $215,050,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $4,600,000 |
| Well Fields (wells, pumps, and piping) | $340,383,000 |
| Water Treatment Plant Expansion (28.6 MGD) | $124,725,000 |
| Integration, Relocations, Backup Generator & Other | $3,419,000 |
| **TOTAL COST OF FACILITIES** | **$750,313,000** |
| | |
| Planning (3%) | $22,509,000 |
| Design (7%) | $52,522,000 |
| Construction Engineering (1%) | $7,503,000 |
| Legal Assistance (2%) | $15,006,000 |
| Fiscal Services (2%) | $15,006,000 |
| Pipeline Contingency (15%) | $32,257,000 |
| All Other Facilities Contingency (20%) | $107,053,000 |
| All Other Facilities Contingency (20%) | $107,053,000 |
| Environmental and Archaeology Studies and Mitigation | $8,474,000 |
| Land Acquisition and Surveying (1,373 acres) | $8,746,000 |
| Interest During Construction (3% for 2 years with a 0.5% return on investment) | $33,020,000 |
| **TOTAL COST OF PROJECT** | **$1,052,409,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $73,808,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $5,635,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $1,553,000 |
| Water Treatment Plant | $23,386,000 |
| Pumping Energy Costs (111,570,693 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $10,041,000 |
| **TOTAL ANNUAL COST** | **$114,423,000** |
| | |
| **Available Project Yield (acft/yr)** | 9,564 |
| **Annual Cost of Water ($ per acft)** | $11,964 |
| **Annual Cost of Water After Debt Service ($ per acft)** | $4,247 |
| **Annual Cost of Water ($ per 1,000 gallons)** | $36.71 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)** | $13.03 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.27-8 Cost Estimate Summary for the SAWS Regional Wilcox Project – Phase 2 (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Transmission Pump Station(s) & Storage Tank(s) | $1,024,000 |
| Well Fields (wells, pumps, and piping) | $87,479,000 |
| Water Treatment Plant Expansion (16.1 MGD) | $69,167,000 |
| **TOTAL COST OF FACILITIES** | **$157,670,000** |
| | |
| Planning (3%) | $4,730,000 |
| Design (7%) | $11,037,000 |
| Construction Engineering (1%) | $1,577,000 |
| Legal Assistance (2%) | $3,153,000 |
| Fiscal Services (2%) | $3,153,000 |
| All Other Facilities Contingency (20%) | $31,534,000 |
| Environmental and Archaeology Studies and Mitigation | $1,826,000 |
| Land Acquisition and Surveying (303 acres) | $1,447,000 |
| Interest During Construction (3% for 2 years with a 0.5% return on investment) | $7,025,000 |
| **TOTAL COST OF PROJECT** | **$223,152,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $15,701,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $885,000 |
| Water Treatment Plant | $12,969,000 |
| Pumping Energy Costs (913,225 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $82,000 |
| **TOTAL ANNUAL COST** | **$29,637,000** |
| | |
| **Available Project Yield (acft/yr)** | 5,379 |
| **Annual Cost of Water ($ per acft)*** | $5,510 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $2,591 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $16.91 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $7.95 |
| *Based on a peaking factor of 1.0. | |

### Table 5.2.27-9 Total Project Cost Estimate Summary for the SAWS Regional Wilcox Project - Phases 1 and 2 (MAG-Constrained Yield)

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (30.1 MGD) | $62,136,000 |
| Transmission Pipeline (42 in. dia.) | $215,050,000 |
| Well Fields (wells, pumps, and piping) | $427,862,000 |
| Water Treatment Plant Expansion (44.7 MGD) | $193,892,000 |
| Integration, Relocations, Backup Generator & Other | $3,419,000 |
| **TOTAL COST OF FACILITIES** | **$902,359,000** |
| | |
| Planning (3%) | $27,071,000 |
| Design (7%) | $63,165,000 |
| Construction Engineering (1%) | $9,024,000 |
| Legal Assistance (2%) | $18,047,000 |
| Fiscal Services (2%) | $18,047,000 |
| Pipeline Contingency (15%) | $32,257,000 |
| All Other Facilities Contingency (20%) | $137,462,000 |
| Planning (3%) | $27,071,000 |
| Environmental and Archaeology Studies and Mitigation | $10,300,000 |
| Land Acquisition and Surveying (1,597 acres) | $10,193,000 |
| Interest During Construction (3% for 2 years with a 0.5% return on investment) | $39,797,000 |
| **TOTAL COST OF PROJECT** | **$1,267,722,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5%, 20 years) | $88,958,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of cost of facilities) | $6,463,000 |
| Intakes and Pump Stations (2.5% of cost of facilities) | $1,553,000 |
| Water Treatment Plant | $36,355,000 |
| Pumping Energy Costs (128,011,441 kilowatt-hour [kW-h] at 0.09 $/kW-h) | $11,521,000 |
| **TOTAL ANNUAL COST** | **$144,850,000** |
| | |
| **Available Project Yield (acft/yr)** | 14,943 |
| **Annual Cost of Water ($ per acft)*** | $9,694 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $3,740 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $29.74 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $11.48 |
| *Based on a peaking factor of 1.0. | |

### 5.2.27.5 Implementation Considerations

Implementation of the SAWS Regional Wilcox Project includes the following considerations:

- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of dissolved constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Verification that desalinated Carrizo-Wilcox Aquifer water is compatible with other water sources being used by customers and will meet all water quality requirements in the end user's distribution system;
- Verification of the potential for deep well injection of concentrate;
- Potential for differing water qualities/chemical constituents in the water;
- Regulations by TCEQ;
- Regulations by and securing permits from the Evergreen UWCD; and
- Experience in operating and maintaining a desalination WTP; and
- Competition with others in the area for groundwater in the Carrizo-Wilcox Aquifer, including the following:
    - Private water purveyors;
    - Public water purveyors in the area; and/or
    - Future oil and gas drilling operations.
- Additional considerations may include potential impacts on the following:
    - Endangered and threatened species;
    - Water levels in the aquifer, including potential dewatering of the current artesian part of the aquifer;
    - Baseflow in streams; and
    - Wetlands.

## 5.2.28 SSLGC Expanded Brackish Wilcox Project

The SCTRWPG identified the SSLGC Expanded Brackish Wilcox Project as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.28.1 Description of Water Management Strategy

This WMS is an expansion of an existing SSLGC well field in the Brackish Wilcox Aquifer in Gonzales County. The SSLGC Expanded Brackish Wilcox Project is designed to supply 5,000 acft/yr of treated water by the 2040 decade; however, the available yield varies because of MAG limitations. The project includes seven new brackish groundwater wells and a 5 MGD expansion of the existing WTP from 35 MGD to 40 MGD. Only the portion of WTP facilities and associated costs that are directly required to increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this RWP. Brackish groundwater from this WMS would be blended with raw groundwater from the Carrizo Aquifer, which has a lower TDS concentration. The blended water is estimated to have a TDS concentration of 450 mg/L before entering the WTP. The primary recipients of the water are the cities of Schertz and Seguin. Figure 5.2.28-1 illustrates the approximate project location.

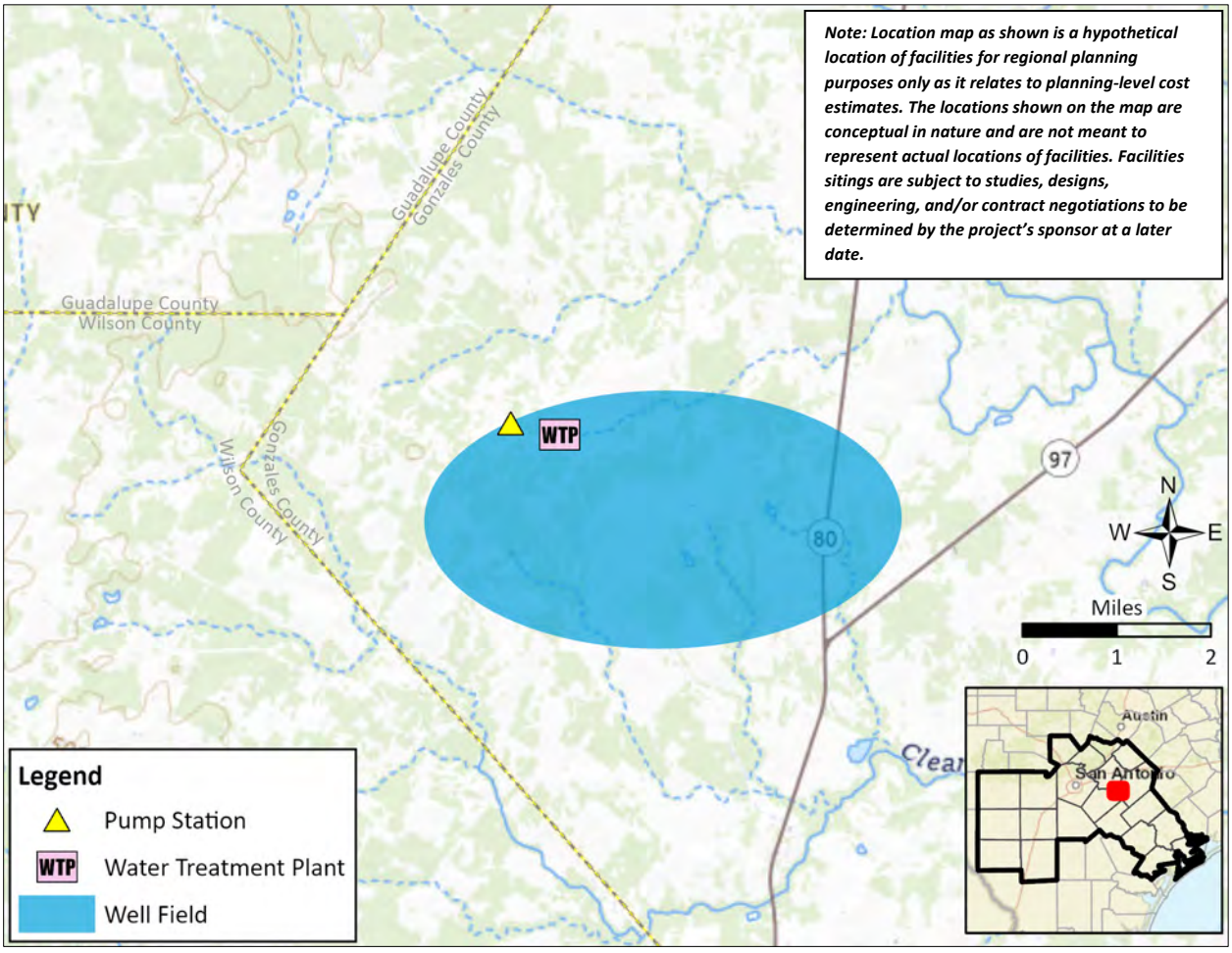



**Figure 5.2.28-1 Approximate Location for the SSLGC Expanded Brackish Wilcox Project**

### 5.2.28.2 Available Yield

This WMS is planned for full completion by 2040 and has an available yield that varies by decade because of MAG limitations. Table 5.2.28-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the SSLGC Expanded Brackish Wilcox Project. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.28-1 Envisioned and MAG-Constrained Yields for the SSLGC Expanded Brackish Wilcox Project (acft/yr)**

| Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Envisioned Yield | 0 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| MAG-Constrained Yield | 0 | 2,476 | 3,732 | 3,772 | 3,876 | 3,058 |

The SSLGC Expanded Brackish Wilcox Project is envisioned to provide treated water volumes to customers, as shown in Table 5.2.28-2. Because this WMS is MAG-constrained, customer allocations are detailed for the MAG-Constrained Yield in Table 5.2.28-3.

**Table 5.2.28-2 Envisioned WUG Allocations for the SSLGC Expanded Brackish Wilcox Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Schertz | 0 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 |
| Seguin | 0 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 |
| **Total** | **0** | **5,000** | **5,000** | **5,000** | **5,000** | **5,000** |

**Table 5.2.28-3 MAG-Constrained WUG Allocations for the SSLGC Expanded Brackish Wilcox Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Schertz | 0 | 1,238 | 1,866 | 1,886 | 1,938 | 1,529 |
| Seguin | 0 | 1,238 | 1,866 | 1,886 | 1,938 | 1,529 |
| **Total** | **0** | **2,476** | **3,732** | **3,772** | **3,876** | **3,058** |

The Gonzales County UWCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Gonzales County. In 2021, GMA-13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimates for the Carrizo-Wilcox Aquifer in Gonzales County ranges between 60,431 acft/yr and 103,707 acft/yr [2].

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[2] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

The proposed wells are in the confined part of the Wilcox Aquifer and are approximately 12 miles downdip of the outcrop. Wells in this area are expected to produce approximately 800 gpm each and have a completion depth of approximately 1,800 feet to 2,400 feet below surface. The new brackish groundwater well field would include seven wells. The majority of the wells are planned to be screened in the Carrizo Sand instead of the Wilcox Group for water quality and depth considerations. Water quality of groundwater from the Carrizo Sand often has elevated concentrations of iron and manganese, which require removal before public use.

Water from the Carrizo-Wilcox Aquifer in this area is expected to have a TDS concentration of about 1,500 mg/L. Typically, RO technology would be used to treat the brackish groundwater; however, SSLGC will blend the raw brackish groundwater from this WMS with Carrizo groundwater, which has TDS concentrations of about 300 mg/L. The resulting blended water is estimated to have a TDS concentration of 450 mg/L before entering the WTP for treatment. SSLGC plans to expand their existing conventional WTP from 35 MGD to 40 MGD to handle the new capacity from this well field. It is anticipated that the conventional WTP will include iron and manganese removal. The treated water will be transported to customers via future pipelines shared between SSLGC and CVLGC. These pipelines are included in a separate WMS entitled, "SSLGC Expanded Carrizo Project" (refer to Section 5.2.29).

### 5.2.28.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.28-4 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.28-4 Summary of Potential Project Effects on Environmental Factors for the SSLGC Expanded Brackish Wilcox Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 21 |
| Potential Species Impact Score | 9 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 4 |
| Potential Stream Flow / Water Quality Impact Score | 2 |
| Potential Cultural Resources Impact Score | 59.47 |

## Environmental Considerations

### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Blackland Prairie and Post Oak Savannah ecoregions. As mapped by TPWD [3]; the project area is primarily grassland and savanna with some wooded areas along streams. The predominant vegetation communities are savanna grassland, mesquite shrubland, disturbance/tame grassland, and live oak motte and woodland.

Based on TPWD vegetation mapping, the project may have the potential to impact 490 acres of agricultural resources, including 1 acre mapped as row crops and 489 acres mapped as tame/disturbance grassland which may include pasture areas used for grazing or hay production. The proposed well field expansion would result in conversion of land use from undeveloped vegetation or agricultural lands (mostly open fields) to small areas of industrial use.

### Aquatic Resources

The project area contains mapped intermittent streams and several unnamed tributaries, including Murray Branch, Nose Creek, Red Branch, and Salt Branch. The Texas Integrated Report of 303(d)-listed water bodies [4] identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The well field project area does not contain listed water bodies. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well field facilities can typically be sited to avoid impacts to waters of the United States, including wetlands. Since the project would rely on existing pipeline, environmental impacts from the pipeline component should be limited to ongoing maintenance activities.

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that have potential to occur in Gonzales County [5, 6]. Suitable habitat may occur for the monarch butterfly (*Danaus plexippus*), which is a candidate for federal listing as a threatened or endangered species.

Suitable habitat may occur for the state-listed threatened species such as white-faced ibis (*Plegadis chihi*), white-tailed hawk (*Buteo albicaudatus*), and Texas horned lizard (*Phrynosoma cornutum*).

There is potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN, including American bumblebee (*Bombus pensylvanicus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), western burrowing owl (*Athene cunicularia hypugaea*), eastern spotted skunk (*Spilogale putorius*), and plains spotted skunk (*Spilogale interrupta*). In addition, SGCN bat species may utilize structures and could therefore occur in developed areas. The SGCN list also includes numerous plant species, including many for which detailed habitat requirements have not been developed by TPWD. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat for federally and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

## Cultural Considerations

The background literature review identified one cultural resource that intersects with the approximate 6,974-acre project area (Table 5.2-28-5) [7]. This is archaeological site 41GZ208, located within the northern portion of the project area. A recommendation for NRHP-listing for the site has not been made by the THC, which indicates that the site should be regarded as undetermined and avoided or further investigated. Additionally, the historical map review identified 46 potential historic-age structures that intersect with the project area [8].

---

[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Gonzales County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[6] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Gonzales County. https://ipac.ecosphere.fws.gov/location/index

[7] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed October 2024.

[8] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed October 2024.

**Table 5.2-28-5 Cultural Resources Results for the SSLGC Expanded Brackish Wilcox Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41GZ208) | Farmstead | Historic | Undetermined | Intersect |
| None (N=46) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **59.47** |

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 0.1% of the project area had a moderate likelihood of containing significant unidentified archaeological resources and 99.9% had a low likelihood. No areas were identified by the model as having a high probability. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 59.47.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, one archaeological site and 46 potential historic-age structures are located within the project area; the probability model indicates a general low likelihood of buried deposits; and the project assessment score is 59.47. Based on these results, a cultural resources assessment for the final design plan is likely necessary.

### 5.2.28.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for a new brackish groundwater well field and expansion of the existing conventional WTP with iron and manganese removal.

A cost estimate summary for the SSLGC Expanded Brackish Wilcox Project is provided in Table 5.2.28-6. Infrastructure was sized to deliver the sponsor's Envisioned Yield, but because the project is MAG-limited, the annual unit costs were calculated using the MAG-Constrained Yield in the first decade of implementation. All cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the lack of groundwater availability.

**Table 5.2.28-6 Cost Estimate Summary for the SSLGC Expanded Brackish Wilcox Project**

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $22,784,000 |
| Water Treatment Plant Expansion (5 MGD) | $16,986,000 |
| **TOTAL COST OF FACILITIES** | **$39,770,000** |
| | |
| - Planning (3%) | $1,193,000 |
| - Design (7%) | $2,784,000 |
| - Construction Engineering (1%) | $398,000 |
| Legal Assistance (2%) | $795,000 |
| Fiscal Services (2%) | $795,000 |
| All Other Facilities Contingency (20%) | $7,954,000 |
| Environmental & Archaeology Studies and Mitigation | $754,000 |
| Land Acquisition and Surveying (56 acres) | $63,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,772,000 |
| **TOTAL COST OF PROJECT** | **$56,278,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $3,960,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $228,000 |
| Water Treatment Plant | $1,314,000 |
| Pumping Energy Costs (24,531,791 kW-hr @ 0.09 $/kW-hr) | $2,208,000 |
| Purchase of Water (5,000 acft/yr @ 8.15 $/acft) | $41,000 |
| **TOTAL ANNUAL COST** | **$7,751,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,476 |
| **Annual Cost of Water ($ per acft)*** | $3,130 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,531 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $9.61 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $4.70 |
| * Based on a peaking factor of 1.25 | |

### 5.2.28.5 Implementation Considerations

Implementation of the SSLGC Expanded Brackish Wilcox Project includes the following considerations:

- Detailed feasibility evaluation, including test drilling and aquifer and water quality testing, followed by more detailed groundwater modeling to confirm results of this preliminary evaluation. This has been largely accomplished through the operation of the SSLGC well field since startup in October 2002;
- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of dissolved constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Verification that blended Carrizo Aquifer and Wilcox Aquifer water is compatible with other water sources being used by customers and will meet all water quality requirements in the end user's distribution system;
- Potential for differing water qualities/chemical constituents in the water;
- Regulations by and obtaining permits from the Gonzales County GCD, including the renewal of pumping permits; and
- Competition with others in the area for groundwater in the Carrizo-Wilcox Aquifer, including the following:
    - Private water purveyors;
    - Public water purveyors in the area; and/or
    - Future oil and gas drilling operations.
- Additional implementation considerations may include impacts on the following:
    - Endangered and threatened species;
    - Water levels in the aquifer;
    - Baseflow in streams; and
    - Wetlands.

## 5.2.29 SSLGC Expanded Carrizo Project

The SCTRWPG identified the SSLGC Expanded Carrizo Project as a potentially feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.29.1 Description of Water Management Strategy

This WMS is an expansion of the existing Schertz-Seguin Water Supply Project, owned and operated by SSLGC. The SSLGC Expanded Carrizo Project is designed to supply 6,000 acft/yr of treated water by the 2030 decade; however, the available yield varies because of MAG limitations. SSLGC has obtained a permit for 4,035 acft/yr from the Carrizo Aquifer in southeastern Guadalupe County, and a permit for 1,290 acft/yr from the Wilcox Aquifer in southeastern Guadalupe County. SSLGC plans to obtain additional permits for 675 acft/yr.

The SSLGC Expanded Carrizo Project will include 10 production wells in a new well field located in southeastern Guadalupe County on lands owned or leased by SSLGC. After treatment at a new 6 MGD WTP, water will be transported to customers via a shared pipeline between SSLGC and CVLGC, which will run parallel to SSLGC's existing transmission pipeline. The primary recipients of the water are the cities of Schertz and Seguin. Figure 5.2.29-1 illustrates the approximate project location.

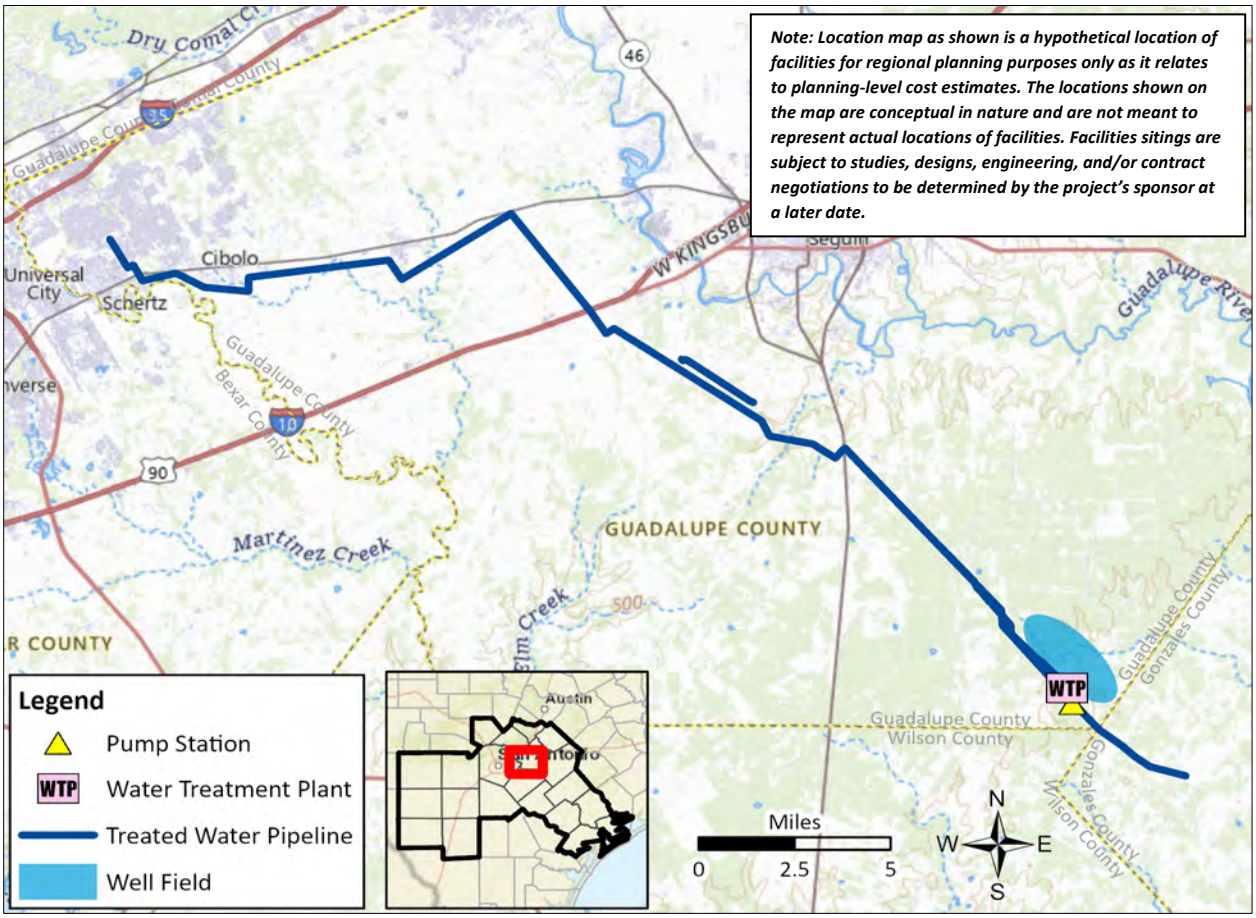



**Figure 5.2.29-1 Approximate Location for the SSLGC Expanded Carrizo Project**

### 5.2.29.2 Available Yield

This WMS is planned for full completion by 2030 and has an available yield that varies by decade because of MAG limitations. Table 5.2.29-1 provides a summary of the yield as envisioned by the sponsor (Envisioned Yield) and the yield available considering MAG constraints (MAG-Constrained Yield) for the SSLGC Expanded Carrizo Project. The MAG-Constrained Yield is the available yield included in DB27.

**Table 5.2.29-1 Envisioned and MAG-Constrained Yields for the SSLGC Expanded Carrizo Project (acft/yr)**

| Phase and Yield Type | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Envisioned Yield | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| MAG-Constrained Yield | 2,190 | 1,944 | 2,228 | 2,034 | 2,050 | 1,972 |

The SSLGC Expanded Carrizo Project is envisioned to provide treated water volumes to customers, as shown in Table 5.2.29-2. Because this WMS is MAG-constrained, customer allocations are detailed for the MAG-Constrained Yield in Table 5.2.29-3.

**Table 5.2.29-2 Envisioned WUG Allocations for the SSLGC Expanded Carrizo Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Schertz | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Seguin | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| **Total** | **6,000** | **6,000** | **6,000** | **6,000** | **6,000** | **6,000** |

**Table 5.2.29-3 MAG-Constrained WUG Allocations for the SSLGC Expanded Carrizo Project (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Schertz | 1,095 | 972 | 1,114 | 1,017 | 1,025 | 986 |
| Seguin | 1,095 | 972 | 1,114 | 1,017 | 1,025 | 986 |
| **Total** | **2,190** | **1,944** | **2,228** | **2,034** | **2,050** | **1,972** |

The Guadalupe County GCD regulates groundwater production, well spacing, and other requirements in the Carrizo-Wilcox Aquifer in Guadalupe County. In 2021, GMA-13 established DFCs for the Carrizo-Wilcox Aquifer [1]. On the basis of the approved DFCs, the TWDB determined that the MAG estimates for the Carrizo-Wilcox Aquifer in Guadalupe County ranges between 39,563 acft/yr and 55,637 acft/yr [2].

Production and/or drilling permits for these wells may be required in accordance with specific GCD rules. For most aquifers in the region, GCDs have adopted DFCs. In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB requires that groundwater availability

[1] Texas Water Development Board, Groundwater Management Area 13 – Desired Future Conditions. https://www.twdb.texas.gov/groundwater/dfc/docs/summary/GMA13_DFC_2021.pdf

[2] Wade, S.C. 2022. GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA-13: TWDB. https://www.twdb.texas.gov/groundwater/docs/GAMruns/GR21-018_MAG.pdf

for each aquifer be limited for planning purposes to the MAG for the discrete geographic-aquifer unit (i.e., aquifer/county/basin unit). In some instances, the sum of existing supplies and future supplies (as groundwater-based WMSs) are greater than the MAG or groundwater availability for a discrete geographic-aquifer unit. This has resulted, for regional water planning purposes only, in adjustments to available yields shown in this plan, and a lack of firm water available for future projects in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. As described in Guiding Principle V (refer to Appendix 5A), this is not intended to influence or interfere with the regulatory decisions made by the governing boards of permitting entities. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports a GCD's discretion to issue permits and grandfather historical users for amounts in excess of the MAG. The SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If MAG estimates are modified during or after this planning cycle, the SCTRWPG may amend this plan to adjust WMS supply volumes that are affected by the modified MAG estimate(s).

SSLGC currently holds permits to pump 19,362 acft/yr of groundwater from the Carrizo Aquifer in western Gonzales County at its existing Carrizo Well Field. For this WMS, SSLGC plans to expand into a new well field in Guadalupe County which will provide a supply of 6,000 acft/yr. SSLGC has obtained a permit for 4,035 acft/yr from the Carrizo Aquifer in southeastern Guadalupe County, and a permit for 1,290 acft/yr from the Wilcox Aquifer in southeastern Guadalupe County. SSLGC would need to obtain additional permits for 675 acft/yr.

The project will consist of 10 new production wells: eight wells in the Carrizo Aquifer and two wells in the Wilcox Aquifer. The Carrizo Aquifer, near the planned well field, is in the confined part of the aquifer, and approximately 2 miles downdip of the outcrop. Hydrogeologic maps of the aquifer in this area suggest that wells would be capable of producing more than 500 gpm and have a completion depth of approximately 800 feet deep. The Wilcox Aquifer wells will be capable of producing approximately 400 gpm and be between 1,000 and 1,600 below surface. The majority of the wells are planned to be screened in the Carrizo Sand instead of the Wilcox Group for water quality and depth considerations.

Water from the Carrizo-Wilcox Aquifer in this area is expected to have a TDS concentration of less than 300 mg/L. However, the water quality of groundwater from the Carrizo Sand often has elevated concentrations of iron and manganese, which require removal to meet drinking water quality standards. This WMS includes a new 6 MGD WTP at the new well field for chlorine disinfection and iron and manganese removal. The treated water will be conveyed to customers via future pipelines shared between SSLGC and CVLGC. The shared treated water pipeline is sized to convey yields from this SSLGC Expanded Carrizo Project WMS, the SSLGC Expanded Brackish Wilcox Project WMS (refer to Section 5.2.28), and the CVLGC Carrizo Project WMS (Refer to Section 5.2.19). Pipeline costs are only shared between the CVLGC Carrizo Project WMS and this SSLGC Expanded Carrizo Project WMS.

### 5.2.29.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.29-4 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.29-4 Summary of Potential Project Effects on Environmental Factors for the SSLGC Expanded Carrizo Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 155 |
| Potential Species Impact Score | 9 |
| Potential Habitat Impact Score | 2 |
| Potential Stream Construction Impact Score | 31 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 109 |

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

The project area occurs in the Blackland Prairies and East Central Texas Plains ecoregions. As mapped by Texas Parks and Wildlife Department (TPWD) [3]; the project area includes a variety of vegetation types -- primarily grassland and savanna with more wooded areas towards the southeastern part of the project area and wooded riparian areas along streams. The predominant vegetation communities are savanna grassland, mesquite shrubland, post oak motte/woodland, and disturbance/tame grassland. The project vicinity is rural, dominated by agricultural uses and undeveloped grassland and wooded areas.

Based on TPWD vegetation mapping, the project may have the potential to impact 155 acres of agricultural resources, including 43 acres mapped as row crops and 112 acres mapped as tame/disturbance grassland which may include pasture areas used for grazing or hay production.

Project pipeline easements would require removal of woody vegetation and long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Herbaceous vegetation would be expected to quickly re-establish within pipeline easements once construction has been completed. Revegetation of easements and other disturbed areas provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation. Pipeline easements may continue to be used for agricultural purposes.

The proposed well field expansion would result in conversion of land use from undeveloped vegetation and agricultural areas (mostly open fields and shrubland) to small areas of industrial use.

[3] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/.

### Aquatic Resources

The NHD indicates that the proposed pipeline would cross Santa Clara Creek, Deadman Creek, Sandies Creek, Krams Creek, Konde Branch, Elm Creek, Cottonwood Creek, Campbell Branch, and several unnamed tributaries. The NWI mapping identifies 42 acres of ponds/potential wetlands in the overall project area. The Texas Integrated Report of 303(d)-listed water bodies[4] identifies the water bodies or segments in Texas that do not meet assigned water quality standards. Segment 1803B of Sandies Creek, within the project alignment, and Segment 1913 of Cibolo Creek, south of the pipeline alignment, are listed as impaired. The well field project area does not contain listed impaired water bodies. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well field facilities can typically be sited to avoid impacts to waters of the United States including wetlands. Stream crossings for pipeline construction would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to more than 0.1 acre of waters of the United States. The USACE permit requires that there will be no change in preconstruction contours of waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that have potential to occur in Guadalupe and Gonzales Counties [5],[6],[7],[8]. Suitable habitat may occur for the federally endangered whooping crane (*Grus americana*), false spike (*Fusconaia mitchelli*), Guadalupe orb (*Cyclonaias necki*), candidate monarch butterfly (*Danaus plexippus*), and the proposed endangered tricolored bat (*Perimyotis subflavus*). The whooping crane has a low likelihood to occur during migration, and the project pipeline crosses streams that have a low potential to provide suitable habitat for endangered freshwater mussels.

Suitable habitat may occur for the state-listed threatened species white-faced ibis (*Plegadis chihi*), white-tailed hawk (*Buteo albicaudatus*), Texas horned lizard (*Phrynosoma cornutum*), Texas tortoise (*Gopherus berlandieri*), and timber rattlesnake (*Croatalus horridus*). There is potential for suitable habitat for numerous wildlife species designated by TPWD as SGCN, including American bumblebee (*Bombus pensylvanicus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus*

[4] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d)*. https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir.
[5] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Guadalupe County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[6] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Guadalupe County. https://ipac.ecosphere.fws.gov/location/index.
[7] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Gonzales County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/.
[8] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation (IPaC) Resource List – Gonzales County. https://ipac.ecosphere.fws.gov/location/index.

*woodhousii*), western burrowing owl (*Athene cunicularia hypugaea*), American badger (*Taxidea taxus*), eastern spotted skunk (*Spilogale putorius*), and plains spotted skunk (*Spilogale interrupta*). In addition, SGCN bat species may utilize structures and could therefore occur in developed areas. The SGCN list also includes numerous plant species, including many for which detailed habitat requirements have not been developed by TPWD. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat for freshwater mussels if streams would be impacted. Consultation with the USFWS would be required if mussel suitable habitat may be affected by pipeline construction activities. The regulatory status of the tricolored bat and monarch butterfly may change during the duration of the project; if these species are listed as threatened or endangered, additional field studies and USFWS consultation may be required. Site-specific field surveys would also be required to determine the quality of habitat for state-listed species. Coordination with TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD will likely be required to obtain their recommendations on minimizing impacts to protected species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or avoid vegetation clearing during the general bird nesting season of March 15 to September 15.

### Cultural Considerations

The background literature review identified 11 cultural resources that intersect with the approximate 9,583-acre project area and alignment or are immediately adjacent (i.e., within 300 feet) to the project's pipeline alignment (Table 5.2.29-5) [9]. The project area and alignment contain six archaeological sites (i.e., 41GU131, 41GU169, 41GU196, 41GU238, 41GU239, and 41GZ208). Cultural resources located immediately adjacent to the project's pipeline alignment include four archaeological sites (i.e., 41GU19, 41GU192, 41GU194, and 41GU195) and one historical marker (i.e., Cibolo). Out of the 10 archaeological sites within the project area and alignment and immediately adjacent to the pipeline alignment, two are ineligible for listing on the NRHP (i.e., 41GU19 and 41GU131), and eight remain undetermined (i.e., 41GU169, 41GU192, 41GU194, 41GU195, 41GU196, 41GU238, 41GU239, and 41GZ208) [10] for listing on the NRHP. Additionally, the historical map review identified 72 potential historic-age structures that intersect with the project area and alignment or are immediately adjacent to the project's pipeline alignment [11].

[9] Texas Historical Commission (THC). 2024. *Texas Archeological and Historical Sites Atlas.* Available at: https://atlas.thc.texas.gov/. Accessed July 2024.
[10] THC (2024).
[11] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.

A probability model was used to assess the overall archaeological site potential, which included low, medium, and high potential zones. The model indicated that 6% of the project area and alignment had a high likelihood of containing significant unidentified archaeological resources, 10% had a moderate likelihood, and 84% had a low likelihood. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area and alignment that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area and alignment. Next, the cultural resources within the project area and alignment were evaluated according to its NRHP eligibility. The values attributed to each resource type include: NRHP-listed or NRHP-eligible districts, properties or archaeological sites, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. The points for all cultural resources within the project area and alignment were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 109.

**Table 5.2.29-5 Cultural Resources Results for the SSLGC Expanded Carrizo Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41GU19) | Open Campsite | Prehistoric | Ineligible within ROW (THC 5/10/2007) | Adjacent |
| Archaeological Site (41GU131) | Lithic Scatter / Artifact Scatter | Prehistoric and Historic | Ineligible within ROW (THC 7/5/2011) | Intersect |
| Archaeological Site (41GU169) | Farmstead | Historic | Undetermined | Intersect |
| Archaeological Site (41GU192) | Unknown | Unknown | Undetermined | Adjacent |
| Archaeological Site (41GU194) | Lithic Scatter | Prehistoric | Undetermined | Adjacent |
| Archaeological Site (41GU195) | Lithic Scatter | Prehistoric | Undetermined | Adjacent |
| Archaeological Site (41GU196) | Oil tank | Historic | Undetermined | Intersect |
| Archaeological Site (41GU238) | Unknown | Unknown | Undetermined | Intersect |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility | Location |
|---|---|---|---|---|
| Archaeological Site (41GU239) | Unknown | Unknown | Undetermined | Intersect |
| Archaeological Site (41GZ208) | Farmstead | Historic | Undetermined | Intersect |
| Cibolo | Historical Marker | Historic | Undetermined | Adjacent |
| None (N=72) | Buildings/Structures | Historic | – | Intersect |
| **Assessment Score Total** | **All** | **All** | **All** | **109** |

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, the project area and alignment contain six archaeological sites, and 72 potential historic-age structures; in addition, four archaeological sites and one historical marker are located immediately adjacent to the project's pipeline alignment. The probability model for the project indicates a low to moderate likelihood of buried deposits; and the project assessment score is 109. Based on these results, a cultural resources assessment is likely necessary for the final design plan.

### 5.2.29.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for a new groundwater well field, new WTP with iron and manganese removal, and conveyance of potable water to the delivery point via shared treated water pipelines with CVLGC.

Although the project is MAG-constrained, cost estimates consider infrastructure and capacities necessary to deliver the sponsor's Envisioned Yield, despite the limited groundwater availability. The annual unit costs were calculated using the available/MAG-constrained yields in the first decade of implementation. The shared pipelines and pump stations are sized to convey the Envisioned Yields from this SSLGC Expanded Carrizo Project WMS, the SSLGC Expanded Brackish Wilcox Project WMS (refer to Section 5.2.28), and the CVLGC Carrizo Project WMS (Refer to Section 5.2.19). For planning purposes, pipelines and pump station costs are only shared between the CVLGC Carrizo Project WMS and this SSLGC Expanded Carrizo Project WMS. A cost estimate summary for the SSLGC Expanded Carrizo Project is provided in Table 5.2.29-6.

**Table 5.2.29-6 Cost Estimate Summary for the SSLGC Expanded Carrizo Project**

| Item | Estimated Costs |
|---|---|
| Primary Pump Station (19.9 MGD) | $6,505,000 |
| Transmission Pipeline (36-42 in. dia., 41.2 miles) | $70,846,000 |
| Transmission Pump Station(s) and Storage Tank(s) | $2,749,000 |
| Well Fields (Wells, Pumps, and Piping) | $22,410,000 |
| Water Treatment Plant (6 MGD) | $27,941,000 |
| Integration, Relocations, Backup Generator & Other | $849,000 |
| **TOTAL COST OF FACILITIES** | **$131,300,000** |
| | |
| - Planning (3%) | $3,939,000 |
| - Design (7%) | $9,191,000 |
| - Construction Engineering (1%) | $1,313,000 |
| Legal Assistance (2%) | $2,626,000 |
| Fiscal Services (2%) | $2,626,000 |
| Pipeline Contingency (15%) | $10,627,000 |
| All Other Facilities Contingency (20%) | $12,091,000 |
| Environmental & Archaeology Studies and Mitigation | $580,000 |
| Land Acquisition and Surveying (564 acres) | $1,570,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $5,689,000 |
| **TOTAL COST OF PROJECT** | **$181,552,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $12,715,000 |
| O&M | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $941,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $231,000 |
| Water Treatment Plant | $2,031,000 |
| Pumping Energy Costs (14,418,785 kW-hr @ 0.09 $/kW-hr) | $1,298,000 |
| **TOTAL ANNUAL COST** | **$17,216,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,190 |
| **Annual Cost of Water ($ per acft)*** | $7,861 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $2,055 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $24.12 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $6.31 |
| * Based on a Peaking Factor of 1.25. | |

## 5.2.29.5 Implementation Considerations

Implementation of the SSLGC Expanded Carrizo Project includes the following considerations:

- Detailed feasibility evaluation, including test drilling and aquifer and water quality testing, followed by more detailed groundwater modeling to confirm results of this preliminary evaluation;
- Verification of available groundwater quantity and well productivity;
- Verification of water quality for concentrations of dissolved constituents, such as TDS, chloride, sulfate, iron, manganese, and hydrogen sulfide;
- Verification that blended Carrizo Aquifer and Wilcox Aquifer water is compatible with other water sources being used by customers and will meet all water quality requirements in the end user's distribution system;
- Potential for differing water qualities/chemical constituents in the water;
- Regulations by and obtaining permits from the GCGCD, including the renewal of pumping permits; and
- Competition with others in the area for groundwater in the Carrizo-Wilcox Aquifer, including the following:
    - Private water purveyors;
    - Public water purveyors in the area; and/or
    - Future oil and gas drilling operations.
- Additional implementation considerations may include impacts on the following:
    - Endangered and threatened species;
    - Water levels in the aquifer;
    - Baseflow in streams; and
    - Wetlands.

## 5.2.30 Victoria ASR Project

The SCTRWPG identified the Victoria ASR Project as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.30.1 Description of Water Management Strategy

Through most of its history, the City of Victoria (Victoria) relied on locally available groundwater supplies withdrawn from the Gulf Coast Aquifer. To support continued growth, limit aquifer drawdown, and maintain water quality, Victoria obtained a new surface water appropriation (P#5466) in the 1990s that authorized diversions from the Guadalupe River. However, because the appropriation is subject to other senior water rights and includes special conditions requiring streamflow passage for environmental protection, the supplies available under P#5466 are limited during drought. Since the 1990s, Victoria has obtained six additional surface water rights senior in priority to P#5466 from willing sellers.

In 2014, Victoria conducted a study to assess the feasibility of ASR as a water supply source during periods of drought. Based on the favorable results, Victoria plans to firm up its existing water supply with the addition of an ASR project to its water system. Figure 5.2.30-1 shows an approximate location for the Victoria ASR Project.

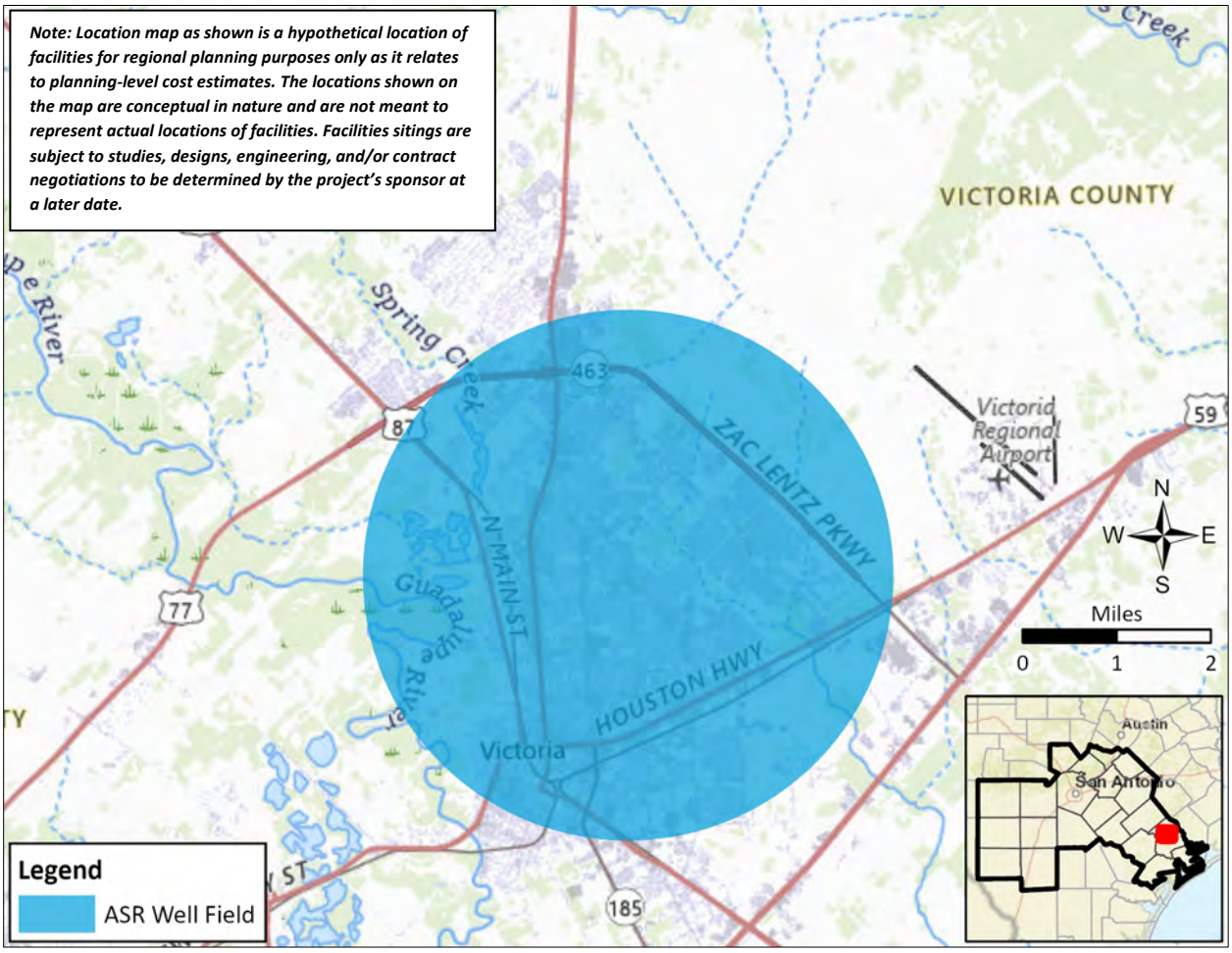



**Figure 5.2.30-1 Approximate Location of the Victoria ASR Project**

Like any ASR project, the purpose is to store water during times of plenty and to recover the water during times of shortage. The Victoria ASR Project was designed to consider both the short-term and long-term timeframes. For the short-term or annual cycle, water is stored during winter and spring and recovered during the summer. For the long-term or multi-year cycle, water is stored over several years or even decades to provide emergency supply during a major drought.

As of the time of writing, Victoria has one ASR well undergoing cycle testing, which is the process of recharging and recovering ASR water. The ASR well was a retrofit of an existing well, Well #19, which underwent extensive reconditioning and repair to convert it to a functioning ASR well. Victoria is authorized to perform cycle testing of Well #19 under a Class V Underground Injection Control Permit through the TCEQ. As of December 2021, Victoria has established storage of approximately 615 acft in the Gulf Coast Aquifer. The targeted total storage volume is approximately 165,000 acft, including 83,000 acft of buffer zone water.

The Victoria ASR Project involves conducting the necessary studies and testing to obtain the required TCEQ permits for implementation of new ASR wells; acquisition of necessary well drilling and production permits; and design and construction of wells, pipelines, and other associated ASR facilities.

### 5.2.30.2 Available Yield

This WMS has a firm yield of 7,900 acft/yr and is planned for full completion by 2030. Table 5.2.30-1 provides a summary of the available yield for the Victoria ASR Project.

**Table 5.2.30-1 Available Yield for the Victoria ASR Project (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Victoria ASR Project | 7,900 | 7,900 | 7,900 | 7,900 | 7,900 | 7,900 |

The City of Victoria currently has six surface water rights totaling 27,007 acft/yr. When the City has excess treated water in its distribution system, that water will be injected via the proposed ASR wells for storage in the Gulf Coast Aquifer. The City will be able to recover the stored water for treatment and distribution. Feasibility studies have determined that the ASR project's objectives can be met utilizing the existing WTP's rated capacity of 25.2 MGD.

The project will increase the firm supply incrementally up to 7,900 acft/yr. The targeted stored water volume within the aquifer will be 82,000 acft with an additional 83,000 acft buffer zone volume that would remain in the aquifer, resulting in a target total storage volume of 165,000 acft. Nationwide, recovery rates for ASR typically range from 70-90%, allowing for 10-30% water loss. In the case of the Victoria ASR project, the buffer zone storage allows for up to 50% water loss, or water that is not recovered and remains in the aquifer. As mentioned previously, Victoria already has one ASR well that was retrofitted to convert it from a conventional groundwater well to an ASR well. As of 2021, the City of Victoria has established storage of approximately 615 acft in the Gulf Coast Aquifer.

Capacity of the ASR well field is dependent on the aquifer recharge capacity, which is estimated to be 2.3 MGD (1,600 gpm) per well, based on recent studies and information obtained from cycle testing of the City's existing, retrofitted ASR well. The recovery rate is estimated to be 4.53 MGD (3,100 gpm) per

well. When fully developed, the ASR Project is anticipated to include 5 to 10 wells that are collectively capable of groundwater recovery at a rate of approximately 23.0 MGD (16,000 gpm) and recharge at a rate of approximately 1.2 MGD (800 gpm).

### 5.2.30.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.30-2 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.30-2 Summary of Potential Project Effects on Environmental Factors for the Victoria ASR Project**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 5,521 |
| Potential Species Impact Score | 3 |
| Potential Habitat Impact Score | 1 |
| Potential Stream Construction Impact Score | 1 |
| Potential Stream Flow / Water Quality Impact Score | 2 |
| Potential Cultural Resources Impact Score | 1,566 |

#### Environmental Considerations

Since the potential project could occur within various locations within Victoria, the environmental constraints analysis encompassed the area within city limits. Individual project components can likely be sited to avoid sensitive habitat features. It was assumed that there would not be significant project impacts in the Guadalupe River.

##### Vegetation and Land Use, and Agricultural Resources

The project area occurs in the Gulf Prairies and Marshes ecoregion and includes a mix of developed urban area and undeveloped vegetation communities. As mapped by TPWD [1], the dominant vegetation types in the project area are urban low intensity, Gulf Coast coastal prairie, urban high intensity, row crops, floodplain hardwood forest, and floodplain grassland. Much of the urban uses in the project area would be expected to contain maintained lawns and landscape species.

Based on TPWD vegetation mapping, the Victoria ASR project area includes 703 acres of agricultural resources mapped as row crops and 4,818 acres mapped as coastal prairie that may be used for livestock grazing or hay production.

##### Aquatic Resources

The project area contains approximately 10 linear miles of intermittent streams and 5.5 linear miles of perennial streams. The Guadalupe River flows generally north to south along the western side of the city

[1] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

and has an extensive floodplain area; Pacedo Creek flows generally northwest to southeast through the eastern side of the city. The NWI mapping shows 29.5 acres of emergent wetlands, 216 acres of forested wetlands, and 56 acres of ponds. The Texas Integrated Report of 303(d) listed water bodies [2] identifies the water bodies or segments in Texas that do not meet assigned water quality standards. Segment 1803 of the Guadalupe River is classified as an impaired stream segment. The project area does not contain ecologically significant stream segments as designated by TPWD.

The project will require an on-site delineation of streams, ponds, and wetlands. Well facilities can typically be sited to avoid impacts to waters of the United States, including wetlands. Stream crossings for pipeline construction, if applicable, would result in temporary stream impacts that would require USACE permitting. Pipeline stream crossings are typically covered by USACE Nationwide Permit 58, Utility Line Activities for Water and Other Substances. A preconstruction notification to the USACE is required under certain conditions, including if there would be permanent impacts to more than 0.1 acre of waters of the United States. The USACE permit requires no change will occur in preconstruction contours of waters of the United States. Utility crossings under streams (e.g., through horizontal directional drilling) would not require a USACE permit.

### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened, endangered, and candidate species and species of concern that may occur in Victoria County [3, 4]. Suitable habitat may occur for the proposed federally endangered tricolored bat (*Perimyotis subflavus*), and the monarch butterfly (*Danaus plexippus*), which is a candidate species for federal listing as threatened or endangered. Because of the developed nature of much of the project area, suitable habitat is not expected to occur for most state-listed species; however, suitable habitat for species that utilize open, sparsely vegetated areas, such as the state-threatened Texas horned lizard (*Phrynosoma cornutum*) is possible.

There is low to moderate potential for suitable habitat for several wildlife species designated by TPWD as SGCN: American bumblebee (*Bombus pensylvanicus*), southern crawfish frog (*Lithobates areolatus areolatus*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Anaxyrus woodhousii*), western burrowing owl (*Athene cunicularia hypugaea*), eastern spotted skunk (*Spilogale putorius*), and plains spotted skunk (*Spilogale interrupta*). In addition, SGCN bat species may utilize structures and could, therefore, occur in developed areas. SGCN species do not have formal protected status but are being monitored by TPWD.

Site-specific field surveys would be required to determine the quality of habitat and potential for impacts to federal and state-listed species. Coordination with USFWS and TPWD may be required to mitigate species impacts. If TWDB funding/financing will be used for the project, formal coordination with TPWD would likely be required to obtain its recommendations on minimizing impacts to protected

[2] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d).* https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24tixr

[3] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Victoria County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[4] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Victoria County. https://ipac.ecosphere.fws.gov/location/index

species and sensitive habitats. If suitable habitat occurs, TPWD may request preconstruction surveys to search for and relocate any protected species that occur in the project area.

Migratory birds may occur or nest in the project area. The federal MBTA protects birds, nests, and eggs unless permitted by USFWS. TPWD recommendations for project due diligence typically include a recommendation to conduct preconstruction nest surveys or to avoid vegetation clearing during the general bird nesting season from March 15 to September 15. Preconstruction surveys for active bird nests are recommended.

## Cultural Considerations

For the proposed project, a background literature review of the project area was performed. The background literature review identified 257 cultural resources within the approximate 15,952-acre project area (Table 5.2.30-3) [5]. These cultural resources are eight archaeological sites, two NRHP-listed historic districts, two NRHP-eligible historic districts with 29 contributing resources, 87 NRHP-listed historic properties, one NRHP-eligible historic property, four SALs, 28 RTHLs, six cemeteries, eight NRHP-eligible 1936 Texas Centennial Markers, and 83 OTHMs. Note that there are several cultural resources with multiple resource types. Out of the eight archaeological sites, two are NRHP-listed, two are eligible for NRHP-listing, and four remain undetermined for listing on the NRHP. One of the cemeteries (Evergreen) is a designated Historic Texas Cemetery. Additionally, the historical map review identified 816 potential historic-age buildings/structures that are within the project area [6].

In the State of Texas, all human burials are protected by law [7], and warrant avoidance with a minimum 100-foot avoidance buffer. If human burials are encountered in the project area and the remains are determined to be Native American, they will be managed in accordance with procedures established through coordination with the THC, and work in the affected area could only resume per THC authorization.

A probability model was used to assess the overall potential of buried prehistoric archaeological deposits in the project area and alignment, which included low, medium, and high potential zones. The model indicated that 13.3% of the project alignment had a high likelihood of containing significant unidentified archaeological resources, 27.3% had a moderate likelihood, and 59.4% had a low likelihood. Areas with greater archaeological probability are located near previously known archaeological sites, historic features, and landforms adjacent to existing drainage systems.

A cultural assessment score was developed for the project area that considered the probability model of archaeological potential information, as well as the presence of previously recorded cultural resources and known potential historic-age structures. Using the probability model data, a mean score was first calculated for the project area. Next, the cultural resources within the project area were evaluated according to its NRHP eligibility and SAL designation. The values attributed to each resource type

[5] Texas Historical Commission (THC). 2024. Texas Archeological and Historical Sites Atlas. Available at: https://atlas.thc.texas.gov/. Accessed October 2024.
[6] U.S. Geological Survey (USGS). 2024. TopoView: historical topographic map collection. Published by the U.S. Geological Survey (USGS). Available at: http://ngmdb.usgs.gov/maps/TopoView. Accessed September 2024.
[7] According to the Texas Health and Safety Code Section 711 General Provisions Relating to Cemeteries and the Texas Administrative Code, Title 13, THC, Chapter 22 Cemeteries.

include: NRHP-listed or NRHP-eligible districts and properties or archaeological sites, SALs, and cemeteries which each received 5 points; NRHP undetermined archaeological sites received 2.5 points; and NRHP ineligible archaeological sites received 0.5 point. In addition, RTHLs, potential historic-age structures, historic-age linear features (e.g., historic trails), contributing resources to NRHP districts, and historical markers each received 1 point. For cultural resources with multiple resource types, the values of each resource type were calculated and used to determine the overall assessment score. The points for all cultural resources within the project area were tabulated and added to the mean score for a total cultural assessment score. Based on this methodology, the overall calculated cultural resources assessment score for the project equaled 1,566.

Projects controlled by or located on land owned by a political subdivision of the State of Texas must comply with the ACT. A project that is permitted, licensed, or partially funded by the federal government must also comply with Section 106 of the NHPA. According to the background review results, eight archaeological sites, two NRHP-listed historic districts, two NRHP-eligible historic districts with 29 contributing resources, 87 NRHP-listed historic properties, one NRHP-eligible historic property, four SALs, 28 RTHLs, six cemeteries, eight NRHP-eligible 1936 Texas Centennial Markers, 83 OTHMs, and 816 potential historic-age structures are located within the project area. The probability model for the project indicates a high to moderate likelihood of buried deposits; and the project assessment score is 1,566. Based on these results, SWCA recommends a cultural resources assessment for the final design plan, as well as a buffer zone of at least 100 feet between the cemeteries and the proposed development.

**Table 5.2.30-3 Cultural Resources Results for the Victoria ASR Project**

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| 41VT7 | Archaeological site | Historic | Undetermined |
| 41VT10 (Victoria City Park) | Archaeological site / SAL | Historic | Eligible |
| 41VT105 (McNamara House) | Archaeological site / Historic property / RTHL / OTHM | Historic | Listed |
| 41VT112 | Archaeological site / SAL | Prehistoric | Eligible |
| 41VT134 (Schuhmacher Company Building) | Archaeological site / Historic property / SAL | Historic | Listed |
| 41VT138 | Archaeological site | Historic | Undetermined |
| 41VT142 | Archaeological site | Prehistoric | Undetermined |
| 41VT143 | Archaeological site | Historic | Undetermined |
| Bernhard Electric Building | Historic District | Historic | Listed |
| De Leon Plaza and Bandstand | Historic District / OTHMs | Historic | Listed |
| Nine Rivers – Victoria Heights | Historic District | Historic | Eligible |
| Auto Showroom | Contributing Resource | Historic | Eligible |
| Bungalow (N=3) | Contributing Resource | Historic | Eligible |
| Residence (N=2) | Contributing Resource | Historic | Eligible |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| Restaurant | Contributing Resource | Historic | Eligible |
| Shop (N=2) | Contributing Resource | Historic | Eligible |
| WPA Address Marker on Street (N=4) | Contributing Resource | Historic | Eligible |
| Original Townsite | Historic District | Historic | Eligible |
| Bungalow (N=3) | Contributing Resource | Historic | Eligible |
| Former Garage | Contributing Resource | Historic | Eligible |
| House (N=3) | Contributing Resource | Historic | Eligible |
| Mansion (N=2) | Contributing Resource | Historic | Eligible |
| Multiple Dwelling Bungalow | Contributing Resource | Historic | Eligible |
| Residence (N=3) | Contributing Resource | Historic | Eligible |
| WPA Address Marker on Street (N=3) | Contributing Resource | Historic | Eligible |
| Alden, C. R., Building | Historic Property | Historic | Listed |
| Alonso, Frank, House | Historic Property | Historic | Listed |
| Barden – O'Connor House | Historic Property | Historic | Listed |
| Barnes, W. C., House | Historic Property | Historic | Listed |
| Bernhard Electric Building | Historic Property | Historic | Listed |
| Bettin, Max, House | Historic Property | Historic | Listed |
| B'nai Isreal | Historic Property | Historic | Listed |
| Braman House | Historic Property | Historic | Listed |
| Buhler, Theodore, House | Historic Property | Historic | Listed |
| Building at 205 East Constitution | Historic Property | Historic | Listed |
| Burrough – Daniel House | Historic Property | Historic | Listed |
| Calhoun Bakery (Gone) | Historic Property | Historic | Listed |
| Callender House | Historic Property / RTHL / OTHM | Historic | Listed |
| City of Victoria Pumping Plant – Waterworks | Historic Property / RTHL | Historic | Listed |
| Clark, Robert, House | Historic Property / RTHL / OTHM | Historic | Listed |
| Clegg, John H., House | Historic Property | Historic | Listed |
| Crain, F. H., House | Historic Property | Historic | Listed |
| Farmers and Merchants Cotton Gin Warehouse | Historic Property | Historic | Listed |
| Fleming--Welder House | Historic Property / RTHL / OTHM | Historic | Listed |
| Fossati's | Historic Property / RTHL / OTHM | Historic | Listed |
| Fox, Jacob, House | Historic Property / RTHL / OTHM | Historic | Listed |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| Gaylord – Levy House | Historic Property | Historic | Listed |
| Gervais House | Historic Property | Historic | Listed |
| Goldman, A., Building | Historic Property | Historic | Listed |
| Gramann House | Historic Property | Historic | Listed |
| Hauschild, George and Adele, House (Gone) | Historic Property | Historic | Listed |
| Hauschild, George H., Building | Historic Property / RTHL | Historic | Listed |
| Hiller House (501 E. Church) | Historic Property | Historic | Listed |
| Hiller House (3003 N. Vine) | Historic Property | Historic | Listed |
| Hill – Howard House | Historic Property / RTHL | Historic | Listed |
| House at 1602 North Moody | Historic Property | Historic | Listed |
| House at 304 West Stayton | Historic Property | Historic | Listed |
| House at 306 East Forrest | Historic Property | Historic | Listed |
| House at 401 East Stayton | Historic Property | Historic | Listed |
| House at 402 W. Colorado | Historic Property | Historic | Listed |
| House at 604 East Santa Rosa | Historic Property | Historic | Listed |
| Jecker, E. J., House | Historic Property / RTHL / OTHM | Historic | Listed |
| Jecker, J. T., House | Historic Property | Historic | Listed |
| Jordan--Koch House | Historic Property | Historic | Listed |
| Keef – Filley Building | Historic Property | Historic | Listed |
| Krenek House (Gone) | Historic Property | Historic | Listed |
| Lander – Hopkins House | Historic Property | Historic | Listed |
| Lane – Tarkington House | Historic Property | Historic | Listed |
| Lawrence House | Historic Property | Historic | Listed |
| Levi – Welder House | Historic Property / RTHL | Historic | Listed |
| Little House | Historic Property | Historic | Listed |
| Magnolia Service Station No. 122 (Gone) | Historic Property | Historic | Listed |
| Martin – Fiek-Thumford, Vera, House | Historic Property | Historic | Listed |
| McCabe Building (Gone) | Historic Property | Historic | Listed |
| McCan – Nave House | Historic Property | Historic | Listed |
| McDonald House | Historic Property | Historic | Listed |
| McFaddin, James, House | Historic Property / RTHL / OTHM | Historic | Listed |
| Mitchell, Guy, House | Historic Property | Historic | Listed |
| Mohris – Abschier House | Historic Property | Historic | Listed |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| Murphy, Mrs. J. V., House | Historic Property | Historic | Listed |
| Nave, Royston, Memorial | Historic Property | Historic | Listed |
| O'Connor, Thomas M., House | Historic Property / RTHL / OTHM | Historic | Listed |
| O'Connor – Proctor Building | Historic Property | Historic | Listed |
| Old Brownson School | Historic Property | Historic | Listed |
| Old Federal Building and Post Office | Historic Property / RTHL / OTHM | Historic | Listed |
| Old Municipal Assembly Hall (Gone) | Historic Property | Historic | Listed |
| Old Victoria County Courthouse | Historic Property / OTHM | Historic | Listed |
| Our Lady of Lourdes Catholic Church | Historic Property / OTHM | Historic | Listed |
| Pela House | Historic Property / RTHL / OTHM | Historic | Listed |
| Phillips, Judge Alexander H., House | Historic Property / RTHL | Historic | Listed |
| Pickering House | Historic Property | Historic | Listed |
| Presbyterian Iglesia Nicea | Historic Property | Historic | Listed |
| Proctor House | Historic Property / RTHL / OTHM | Historic | Listed |
| Proctor--Vandenberge House | Historic Property / RTHL / OTHM | Historic | Listed |
| Randall Building | Historic Property | Historic | Listed |
| Roselle--Smith House | Historic Property | Historic | Listed |
| Schroeder House | Historic Property | Historic | Listed |
| Sengele, Alphonse T., House | Historic Property / RTHL / OTHM | Historic | Listed |
| Sigmund House | Historic Property | Historic | Listed |
| Tasin House | Historic Property | Historic | Listed |
| Texas Company Filling Station | Historic Property | Historic | Listed |
| Townsend--Wilkins House | Historic Property | Historic | Listed |
| Trinity Lutheran Church | Historic Property | Historic | Listed |
| Vandenberge, J. V., House | Historic Property | Historic | Listed |
| Victoria County Monument | Historic Property / OTHM | Historic | Listed |
| Weber--Schuchert House | Historic Property | Historic | Listed |
| Welder, Robert H., House | Historic Property | Historic | Listed |
| Wheeler, William, House | Historic Property | Historic | Listed |
| Woodhouse House | Historic Property / RTHL / OTHM | Historic | Listed |
| Zahn, Herman and Alvina, House | Historic Property | Historic | Listed |
| WPA Tile on Concrete Marker Post | Historic Property | Historic | Eligible |
| Victoria County Courthouse | SAL | Historic | Undetermined |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| Beck Ranch Headquarters | RTHL | Historic | Undetermined |
| Friedrech and Margaretha Hiller House | RTHL / OTHM | Historic | Undetermined |
| Huston-Tilotson College | RTHL | Historic | Undetermined |
| J. Meredith Tatton House | RTHL / OTHM | Historic | Undetermined |
| Mundt Place | RTHL / OTHM | Historic | Undetermined |
| Old L.D. Heaton Home | RTHL / OTHM | Historic | Undetermined |
| Power Home | RTHL / OTHM | Historic | Undetermined |
| Robert L. Dabney House | RTHL / OTHM | Historic | Undetermined |
| Catholic Cemetery #1 | Cemetery | Historic | Undetermined |
| Catholic Cemetery #2 | Cemetery | Historic | Undetermined |
| Catholic Cemetery #3 | Cemetery | Historic | Undetermined |
| Evergreen | Cemetery / OTHM | Historic | Undetermined |
| Memorial Park | Cemetery / OTHM | Historic | Undetermined |
| Resurrection | Cemetery | Historic | Undetermined |
| Beck Ranch Headquarters | OTHM | Historic | Undetermined |
| Brownson's Bank | OTHM | Historic | Undetermined |
| Camp Henry E. McCulloch | OTHM | Historic | Undetermined |
| Camp Victoria | OTHM | Historic | Undetermined |
| Case, Viola | OTHM | Historic | Undetermined |
| Cunningham, Abel Seymour | OTHM | Historic | Undetermined |
| De Leon, Agapito | OTHM | Historic | Undetermined |
| De Leon, Dona Patricia De La Garza | OTHM | Historic | Undetermined |
| De Leon, Felix | OTHM | Historic | Undetermined |
| De Leon, Fernando | OTHM | Historic | Undetermined |
| De Leon, Silvestre | OTHM | Historic | Undetermined |
| First Baptist Church of Victoria | OTHM | Historic | Undetermined |
| First English Evangelical Lutheran Church | OTHM | Historic | Undetermined |
| First Presbyterian Church | OTHM | Historic | Undetermined |
| First United Methodist Church | OTHM | Historic | Undetermined |
| Hauschild Opera House | OTHM | Historic | Undetermined |
| Henderson House | OTHM | Historic | Undetermined |
| Hill-O'Connor-Howard House | OTHM | Historic | Undetermined |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| Home County of William Pinckney McLean | OTHM | Historic | Undetermined |
| January, Captain James P. | OTHM | Historic | Undetermined |
| Levi, Abraham, House | OTHM | Historic | Undetermined |
| Lorenzo Dow Heaton Home | OTHM | Historic | Undetermined |
| Lowe, Alexander, House | OTHM | Historic | Undetermined |
| Memorial Square | OTHM | Historic | Undetermined |
| Mitchell School | OTHM | Historic | Undetermined |
| Mount Salem American Baptist Church | OTHM | Historic | Undetermined |
| Phillips-Sale House | OTHM | Historic | Undetermined |
| Pioneer Marker | OTHM | Historic | Undetermined |
| Pridham, Peter Underhay | OTHM | Historic | Undetermined |
| Saint Mary's Catholic Church | OTHM | Historic | Undetermined |
| Smith, William Robert | OTHM | Historic | Undetermined |
| Southern Pacific Railroad Depot, Site of | OTHM | Historic | Undetermined |
| Stapp, Darwin M. | OTHM | Historic | Undetermined |
| The Victoria Advocate | OTHM | Historic | Undetermined |
| Tonkawa Bank | OTHM | Historic | Undetermined |
| Trinity Evangelical Lutheran Church | OTHM | Historic | Undetermined |
| Van Bibber, John | OTHM | Historic | Undetermined |
| Victor Marion Rose | OTHM | Historic | Undetermined |
| Victoria Advocate | OTHM | Historic | Undetermined |
| Victoria County Honor Roll | OTHM | Historic | Undetermined |
| Victoria County, C.S.A. | OTHM | Historic | Undetermined |
| Victoria Pumping Station | OTHM | Historic | Undetermined |
| Webster Chapel United Methodist Church | OTHM | Historic | Undetermined |
| Weisiger, Robert S. | OTHM | Historic | Undetermined |
| Weisiger, Sidney Roper | OTHM | Historic | Undetermined |
| Wood, John Howland | OTHM | Historic | Undetermined |
| Don Martin de Leon | 1936 Texas Centennial Marker / OTHM | Historic | Eligible |
| Edward Conrad | 1936 Texas Centennial Marker / OTHM | Historic | Eligible |

| Resource Name | Resource Type | Prehistoric / Historic | NRHP Eligibility |
|---|---|---|---|
| Home of Empresario Martin de Leon | 1936 Texas Centennial Marker / OTHM | Historic | Eligible |
| John J. Linn | 1936 Texas Centennial Marker / OTHMs | Historic | Eligible |
| Site of Round Top House | 1936 Texas Centennial Marker / OTHM | Historic | Eligible |
| Site of Victoria's First Church | 1936 Texas Centennial Marker / OTHM | Historic | Eligible |
| Victor Marion Rose | 1936 Texas Centennial Marker / OTHM | Historic | Eligible |
| Victoria County | 1936 Texas Centennial Marker / OTHM | Historic | Eligible |
| None (N=816) | Buildings / Structures | Historic | – |
| **Assessment Score Total** | **All** | **All** | **1,566** |

### 5.2.30.4 Engineering and Costing

Preliminary engineering and costing analyses were performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for water recharge, recovery, and collection. The City would utilize the existing, conventional WTP at its existing capacity to treat the recovered water. A cost estimate summary for the Victoria ASR Project is provided in Table 5.2.30-4.

### Table 5.2.30-4 Cost Estimate Summary for the Victoria ASR Project

| Item | Estimated Costs |
|---|---|
| Pump Stations | $1,673,000 |
| Transmission Pipeline (42 in. dia., 1.1 miles) | $2,349,000 |
| Well Fields (Wells, Pumps, and Piping) | $32,365,000 |
| Integration, Relocations, Backup Generator & Other | $36,000 |
| **TOTAL COST OF FACILITIES** | **$36,423,000** |
| | |
| - Planning (3%) | $1,093,000 |
| - Design (7%) | $2,550,000 |
| - Construction Engineering (1%) | $364,000 |
| Legal Assistance (2%) | $728,000 |
| Fiscal Services (2%) | $728,000 |
| Pipeline Contingency (15%) | $352,000 |
| All Other Facilities Contingency (20%) | $6,815,000 |
| Environmental & Archaeology Studies and Mitigation | $889,000 |
| Land Acquisition and Surveying (112 acres) | $801,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $1,648,000 |
| **TOTAL COST OF PROJECT** | **$52,391,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $3,684,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $348,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $42,000 |
| Pumping Energy Costs (3,487,294 kW-hr @ 0.09 $/kW-hr) | $314,000 |
| **TOTAL ANNUAL COST** | **$4,388,000** |
| | |
| **Available Project Yield (acft/yr)** | 7,900 |
| **Annual Cost of Water ($ per acft)*** | $555 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $89 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.70 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.27 |
| *Based on a Peaking Factor of 1.0 | |

### 5.2.30.5 Implementation Considerations

Implementation of the Victoria ASR Project includes the following considerations:

- The City currently holds a Class V injection well permit for the existing ASR well. Additional wells will also require Class V injection well permit coverage. Key requirements for permits to construct and operate a Class V injection well are mechanical integrity of the well, pollution control, demonstration of recoverability in the permitting process, and periodic reports;
- The run-of-river permits will not need to be amended for injection and recovery operations;
- Although ASR projects are not subject to regulation by the Victoria County GCD, design of all wells should be permitted according to GCD rules, and all injection and recovery water quality and hydraulic data should be reported to the GCD. Additionally, as a precautionary measure, TCEQ recommends obtaining appropriate GCD permits for all ASR wells if additional water is extracted from the well during cycle testing or normal operations; and
- It may be necessary to obtain the following permits and/or authorizations for pipelines and other conveyance infrastructure:
  - USACE Sections 10 and 404 Dredge and Fill Permits for pipelines;
  - GLO sand and gravel removal permits;
  - GLO easement for use of state-owned land;
  - TPWD sand, gravel, and marl permit; and
  - Archaeological surveys for pipeline alignments and facility footprints.
- Additional studies, investigations, and/or agency coordination will be necessary prior to full implementation, including but not limited to the following:
  - Feasibility studies;
  - ASR well testing and monitoring;
  - ASR cycle testing;
  - Design of infrastructure;
  - Local coordination with municipalities, county, or railroads for roadway, railroad, and utility crossings;
  - Environmental studies;
  - Potential stream/wetland mitigation plans;
  - Site-specific protected species habitat evaluations and presence/absence surveys; and
  - Cultural resources surveys.

## 5.2.31 Victoria Groundwater-Surface Water Exchange

The SCTRWPG identified the Victoria Groundwater-Surface Water Exchange WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.31.1 Description of Water Management Strategy

Historically, the City of Victoria (Victoria) has relied primarily on locally-available groundwater supplies withdrawn from the Gulf Coast Aquifer. To support continued growth, limit drawdowns in aquifer levels, and maintain water quality, Victoria obtained a surface water appropriation (P#5466) in the 1990s, authorizing up to 20,000 acft/yr of diversions from the Guadalupe River. However, the firm yield of P#5466 is significantly limited during a repeat of the drought of record because it is subject to senior water rights and special conditions requiring inflow passage for environmental protection.

To address the limited firm supply of P#5466, Victoria obtained six surface water rights senior in priority that total 7,007 acft/yr. Each of these rights has been amended to allow diversions for municipal uses at the same location as P#5466. Two of these water rights, totaling 4,939 acft/yr, include provisions for offset of surface water diversions with discharged groundwater during drought. This groundwater offset effectively firms up these previously interruptible surface water rights. The approximate location of the Victoria Groundwater-Surface Water Exchange WMS is shown on Figure 5.2.31-1.

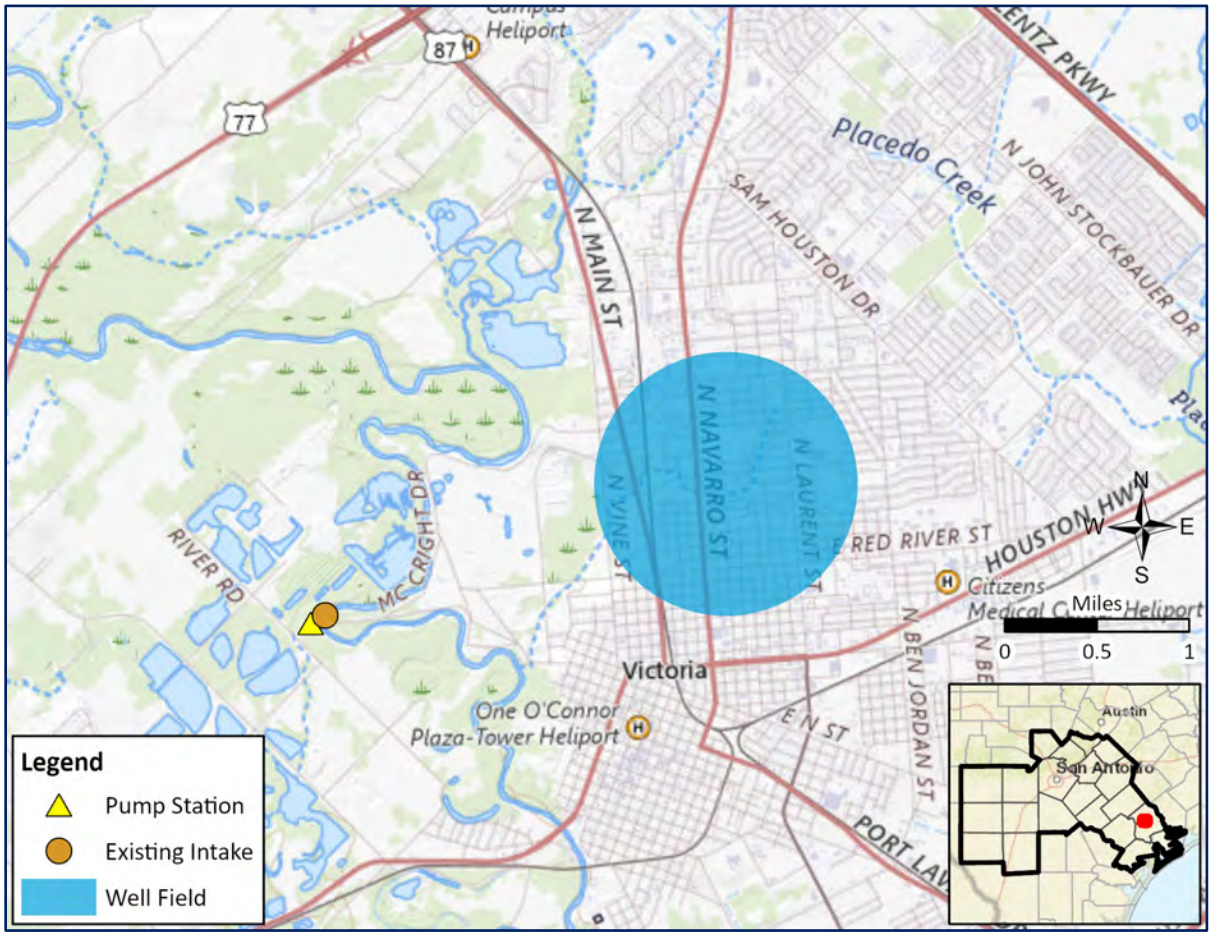



**Figure 5.2.31-1 Approximate Location of the Victoria Groundwater-Surface Water Exchange WMS**

The Victoria Groundwater-Surface Water Exchange WMS involves the City of Victoria pursuing amendments of the remaining surface water rights that do not already authorize groundwater offset, enabling the City to enhance the firm surface water supply available to Victoria. The Victoria Groundwater-Surface Water Exchange WMS would utilize new and existing infrastructure to pump groundwater that would then be conveyed to a nearby tributary of the Guadalupe River. Existing infrastructure includes the City's SWTP, wells, pipelines, and diversion intake and pump station located along the Guadalupe River (Figure 5.2.31-2). New infrastructure would include pipelines from the various wells and an outfall structure to discharge groundwater into the creek.

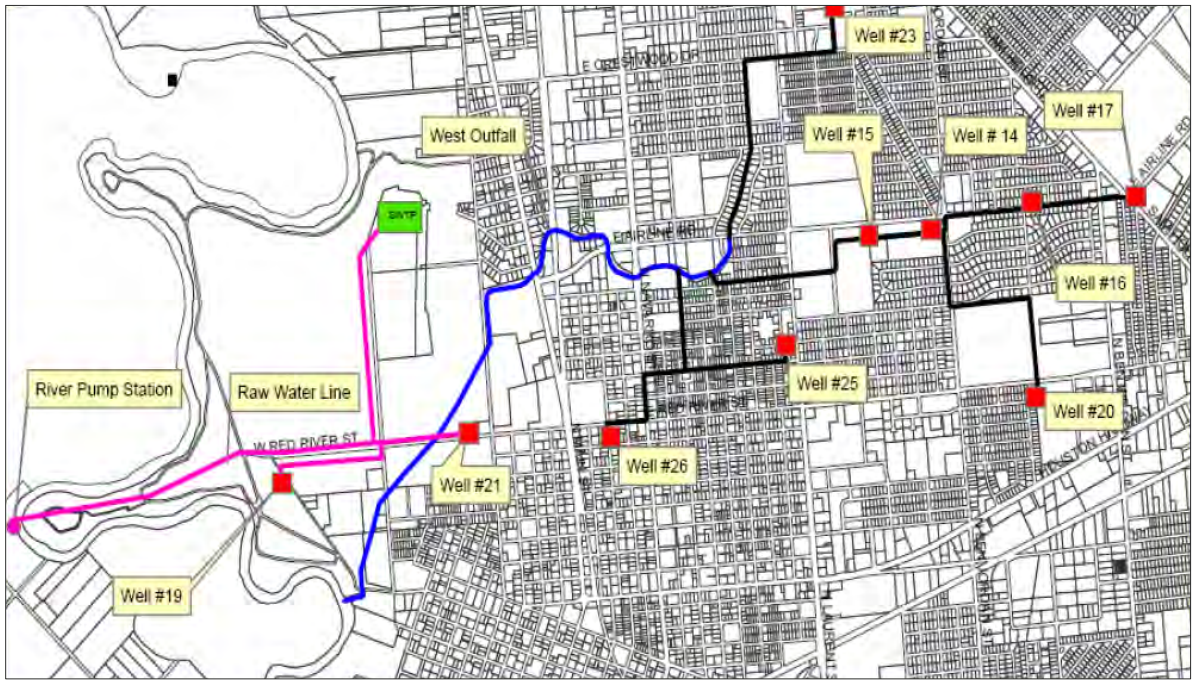



**Figure 5.2.31-2 Existing Infrastructure for the Victoria Groundwater-Surface Water Exchange WMS**

### 5.2.31.2 Available Yield

This WMS has a firm yield of 7,240 acft/yr and is planned for implementation by 2030. Table 5.2.31-1 provides a summary of the available yield for the Victoria Groundwater-Surface Water Exchange WMS.

**Table 5.2.31-1 Available Yield for the Victoria Groundwater-Surface Water Exchange WMS (acft/yr)**

| WMS | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Victoria Groundwater-Surface Water Exchange | 7,240 | 7,240 | 7,240 | 7,240 | 7,240 | 7,240 |

The firm yield was estimated by selecting the limiting constraint (lowest volume available) among the following three factors:

- **Surface Water Rights Eligible for Amendment:** Of the seven existing surface water rights, five permits totaling 22,068 acft/yr in authorized diversion volumes can potentially be amended to authorize groundwater offset during drought.

- **Physical Well Production Capacity:** Victoria's existing wells included in this WMS have infrastructure and physical characteristics capable of producing a total of approximately 22,902 acft/yr.
- **Authorized Well Production Volume:** Victoria's existing wells included in this WMS are permitted through the Victoria County GCD, which authorizes a total production volume of 7,240 acft/yr.

The following sections provide additional information regarding the three factors summarized above.

## Surface Water Rights Eligible for Amendment

Victoria has seven existing surface water rights that authorize diversions of up to 27,007 acft/yr in total. Two of these permits, totaling 4,939 acft/yr, already include provisions for offset of surface water diversions with discharged groundwater during drought. Therefore, Victoria has up to 22,068 acft/yr in additional surface water rights that could potentially be amended to authorize groundwater offset during drought. Surface water rights held by Victoria are summarized in Table 5.2.31-2.

**Table 5.2.31-2 Victoria Surface Water Rights**

| Water Right CA or Permit No. | Priority Date | Authorized Diversion Volume (acft/yr) | Authorized Offset Volume (acft/yr) | Potential Groundwater Offset Volume [1] (acft/yr) |
|---|---|---|---|---|
| 3844 | 8/16/1918 | 608 | 0 | 608 |
| 3858 | 6/27/1951 | 1,000 | 0 | 1,000 |
| 3860 | 8/15/1951 | 260 | 0 | 260 |
| 3862 | 12/12/1951 | 263 | 263 | 0 |
| 3606 | 7/10/1978 | 4,676 | 4,676 | 0 |
| 4117 | 4/2/1984 | 200 | 0 | 200 |
| 5466 | 5/28/1993 | 20,000 | 0 | 20,000 |
| **Total** | **All** | **27,007** | **4,939** | **22,068** |

[1] The potential groundwater offset volume represents the diversion volumes associated with surface water rights that could potentially be amended to authorize groundwater offset during drought.

## Physical Well Production Capacity

The City has 10 existing wells that were initially considered for this WMS. However, two of the wells (Wells 19 and 21) are not included in the WMS because their geographic location is not favorable for connecting to the network of the other eight wells. Furthermore, Well 19 was converted to an ASR well and is included in the Victoria ASR Project (refer to Section 5.2.30 for the WMS). Table 5.2.31-3 provides the tested capacities of the eight Victoria wells that are included in this WMS. As detailed in this table, physical groundwater production capacity (22,902 acft/yr).

**Table 5.2.31-3 Victoria Well Capacities and Authorized Production Volumes [1]**

| Well No. | Physical Production Capacity (gpm) | Physical Production Capacity (cfs) | Physical Production Capacity (acft/yr) | Authorized Production Capacity (acft/yr) |
|---|---|---|---|---|
| 14 | 1,560 | 3.48 | 2,516 | 825 |
| 15 | 2,100 | 4.68 | 3,387 | 1,158 |
| 16 | 1,557 | 3.47 | 2,511 | 1,344 |
| 17 | 1,529 | 3.41 | 2,466 | 285 |
| 20 | 1,538 | 3.43 | 2,481 | 623 |
| 23 | 1,830 | 4.08 | 2,952 | 333 |
| 25 | 1,705 | 3.8 | 2,750 | 1,264 |
| 26 | 2,380 | 5.3 | 3,839 | 1,408 |
| **Total** | **14,199** | **31.65** | **22,902** | **7,240** |

[1] Victoria also has Wells 19 and 21, which are not included in this table, nor in the firm yield estimate for the Victoria Groundwater-Surface Water Exchange WMS because their location and/or their use was converted for ASR purposes.

### Authorized Well Production Volume

The City is authorized by the Victoria County GCD to produce a combined total of 7,240 acft/yr from the eight wells included in this WMS. Table 5.2.31-3 provides the authorized well production capacities for the wells included in this WMS.

## 5.2.31.3 Environmental Factors

The project was evaluated to determine its potential impacts on environmental factors. Table 5.2.31-4 provides a quantitative reporting of the project's potential effects on environmental factors. This information is further described in subsequent subsections.

**Table 5.2.31-4 Summary of Potential Project Effects on Environmental Factors for the Victoria Groundwater-Surface Water Exchange WMS**

| Environmental Factor | Acreage or Impact Score |
|---|---|
| Potential Agricultural Acreage Impacts (No. Acres) | 1 |
| Potential Species Impact Score | 2 |
| Potential Habitat Impact Score | 1 |
| Potential Stream Construction Impact Score | 1 |
| Potential Stream Flow / Water Quality Impact Score | 1 |
| Potential Cultural Resources Impact Score | 0 |

## Environmental Considerations

Potential environmental issues associated with this WMS are rather limited because the physical facilities and surface water and groundwater permits are already in place. Primary environmental concerns would likely be related to potential changes in surface water quality in the Guadalupe River resulting from the offset discharge of groundwater. These concerns could be addressed by integration of special conditions in future surface water rights amendments to authorize groundwater offset like those included in amended CA#18-3862 and P#3606. Such special conditions include compliance with applicable water quality standards, weekly water quality monitoring of both groundwater discharged and the Guadalupe River upstream and downstream of the groundwater discharge, water sample analyses for multiple constituents, biotic and aquatic habitat sampling, and limitation of groundwater discharge to 33% of the flow in the river.

### Vegetation and Land Use

The project area lies in both the Post Oak Savanah and Western Gulf Coastal Plain ecoregions and within mostly urban areas within Victoria, Texas. As mapped by TPWD [1], dominant vegetation types in the project area consist of urban low and high intensity; these mapping categories reflect urban development and associated lawns and landscaping that are typically dominated by non-native vegetation. The project area also contains riparian vegetation, mapped by TPWD as floodplain grassland and floodplain hardwood forest, in riparian zones associated with the Guadalupe River.

Based on TPWD vegetation mapping, the project has the potential to impact 1 acre of agricultural resources mapped as row crops. The project proposes to utilize existing facilities and infrastructure; therefore, environmental vegetation, land use and agricultural impacts from construction are expected to be minimal. Existing project pipeline easements would continue to require long-term maintenance (mowing, woody vegetation clearing) to maintain easement access. Maintenance of easements and any required revegetation provides the opportunity to plant native species that are beneficial to native wildlife. Revegetation plans are typically completed during preliminary studies and design phases of projects. It is up to the sponsors of each WMS to determine the best course of action regarding revegetation.

### Aquatic Resources

The project area includes unnamed, mapped streams and a diversion pump station on the Guadalupe River. NWI mapping shows approximately 2.5 acres of emergent, forested/shrub, and riverine wetlands in the project area.

Segment 1803 of the Guadalupe River is classified as an impaired stream segment in the Texas Integrated Report of 303(d)-listed water bodies occur in the project area [2]. This list identifies the water bodies or segments in Texas that do not meet assigned water quality standards. The Lower Guadalupe River within the project area is listed as an ecologically significant stream segment by TPWD. Because

[1] Texas Parks and Wildlife Department (TPWD). 2024. Ecological Mapping Systems of Texas. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

[2] Texas Commission on Environmental Quality (TCEQ). 2024. *2024 Texas Integrated Report of Surface Water Quality for the Clean Water Act Section 305(b) and 303(d)*. https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir

the project proposes to discharge groundwater to the Guadalupe River, this could result in changes to the water quality in the river that could affect sensitive aquatic resources, especially during low-flow/drought conditions. Since the project will utilize existing facilities, no stream/wetland delineations or USACE permitting would be required.

#### Threatened, Endangered, and Species of Concern

Appendix 5D provides a summary of threatened and endangered species and SGCN that may occur in Victoria County [3, 4]. Suitable habitat may occur for the proposed federally endangered tricolored bat (*Perimyotis subflavus*) and the monarch butterfly (*Danaus plexippus*), which is a candidate species for federal listing as threatened or endangered. The Guadalupe River in the project area may contain suitable habitat for federally endangered freshwater mussels. As discussed above, groundwater discharges to the Guadalupe River may affect surface water quality. Since freshwater mussels are sensitive to water quality impacts, the potential for water quality impacts to protected mussel species should be evaluated. If the project is anticipated to affect endangered freshwater mussels, USFWS consultation would be required.

Suitable habitat may occur for state-listed threatened species and numerous wildlife, plant, and insect species designated by TPWD as SGCN. These species do not have formal protected status but are being monitored by TPWD. Migratory birds may occur in the project area, particularly in riparian zones and wetland areas. Habitat and species impacts are expected to be minimal since the project will use existing infrastructure.

### Cultural Considerations

Projects in Texas can come under the purview of the NHPA and the ACT. Both are administered by lead federal agencies and the SHPO of Texas at the THC in Austin, Texas. Projects that are permitted, licensed, or partially funded by the federal government must comply with Section 106 of the NHPA and take into consideration the undertaking's effects on historic properties, defined as any property listed in, or eligible for listing in, the NRHP. A project on land owned or operated by a political subdivision of the State of Texas is required under the ACT to assess whether it will impact cultural resources that meet the criteria for listing as an SAL. Because the project will primarily involve the use of existing infrastructure, there WMS is not expected to have an adverse impact on cultural resources. If the project approach is modified to include more extensive facilities, then a cultural resources evaluation may be necessary to determine whether a cultural resources investigation is warranted.

## 5.2.31.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for conveyance of withdrawn water to a tributary of the Guadalupe River and costs associated with amending surface water rights for groundwater offset facilities, O&M costs required for water pipelines

[3] Texas Parks and Wildlife Department (TPWD). 2024. Annotated County Lists of Rare Species – Victoria County. Last Update: August 22, 2024. https://tpwd.texas.gov/gis/rtest/

[4] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation Resource List – Victoria County. https://ipac.ecosphere.fws.gov/location/index

and wells, and pumping energy costs. Cost estimates assume that the sponsor will utilize some existing infrastructure, including groundwater wells and pump stations, Guadalupe River intake, pipelines, and conventional WTP. A cost estimate summary for the Victoria Groundwater-Surface Water Exchange is provided in Table 5.2.31-5.

**Table 5.2.31-5 Cost Estimate Summary for the Victoria Groundwater-Surface Water Exchange WMS**

| Item | Estimated Costs |
|---|---|
| Well Field Piping | $10,040,000 |
| **TOTAL COST OF FACILITIES** | **$10,040,000** |
| | |
| Planning (3%) | $301,000 |
| Design (7%) | $703,000 |
| Construction Engineering (1%) | $100,000 |
| Legal Assistance (2%) | $201,000 |
| Fiscal Services (2%) | $201,000 |
| All Other Facilities Contingency (20%) | $2,008,000 |
| Environmental & Archaeology Studies and Mitigation | $156,000 |
| Interest During Construction (3.5% for 1 year with a 0.5% ROI) | $446,000 |
| **TOTAL COST OF PROJECT** | **$14,156,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (1.8 percent, 20 years) | $996,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $100,000 |
| Pumping Energy Costs (4,877,836 kW-hr @ 0.073 $/kW-hr) | $356,000 |
| **TOTAL ANNUAL COST** | **$1,305,000** |
| | |
| **Available Project Yield (acft/yr)** | 7,240 |
| **Annual Cost of Water ($ per acft)*** | $180 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $63 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.55 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.19 |
| *Based on a Peaking Factor of 1.0. | |

### 5.2.31.5 Implementation Considerations

Implementation of the Victoria Groundwater-Surface Water Exchange WMS includes the following considerations:

- Amendments to existing TCEQ surface water rights will be necessary to authorize groundwater offset during drought. Coordination with TCEQ prior to submittal of permit amendments is recommended.
- Acquisition of private land for construction of facilities through either negotiations or condemnation; and
- It may be necessary to obtain the following permits or authorizations for the outfall structure and new well field pipelines:
  - USACE Sections 10 and 404 dredge and fill permits;
  - GLO sand and gravel removal permits;
  - GLO easement for use of state-owned land; and
  - TPWD sand, gravel, and marl permit.
- Project implementation may require the following additional studies and/or agency coordination:
  - Feasibility studies;
  - Design of infrastructure;
  - Local coordination with municipalities, county, or railroads for roadway, railroad, and utility crossings;
  - Environmental studies;
  - Potential stream/wetland mitigation plans;
  - Site-specific protected species habitat evaluations and presence/absence surveys; and
  - Cultural resources surveys.

## 5.2.32 Weather Modification

The SCTRWPG identified the Weather Modification WMS as a potentially-feasible strategy and designated it as a Recommended strategy in the 2026 RWP.

### 5.2.32.1 Description of Water Management Strategy

The Weather Modification WMS consists of cloud seeding by aircraft to increase precipitation and suppress hail formation. The WMS is sponsored by Irrigation WUGs in Atascosa, Bexar, Frio, Karnes, Medina, Uvalde, and Wilson Counties.

The South Texas Weather Modification Association (STWMA) has been intermittently performing cloud seeding in the SCTRWPA and in other Regional Water Planning Areas since the late 1990s. Figure 5.2.32-1 provides a map of counties in which the STWMA performed cloud seeding in 2011 and identifies which of these counties are in the SCTRWPA. Cloud seeding operations are typically performed in the late spring to early fall. The STWMA partners with weather modification scientists and engineers to conduct micro-regionalized meteorological modeling to estimate the precipitation increases attributed to cloud seeding operations.

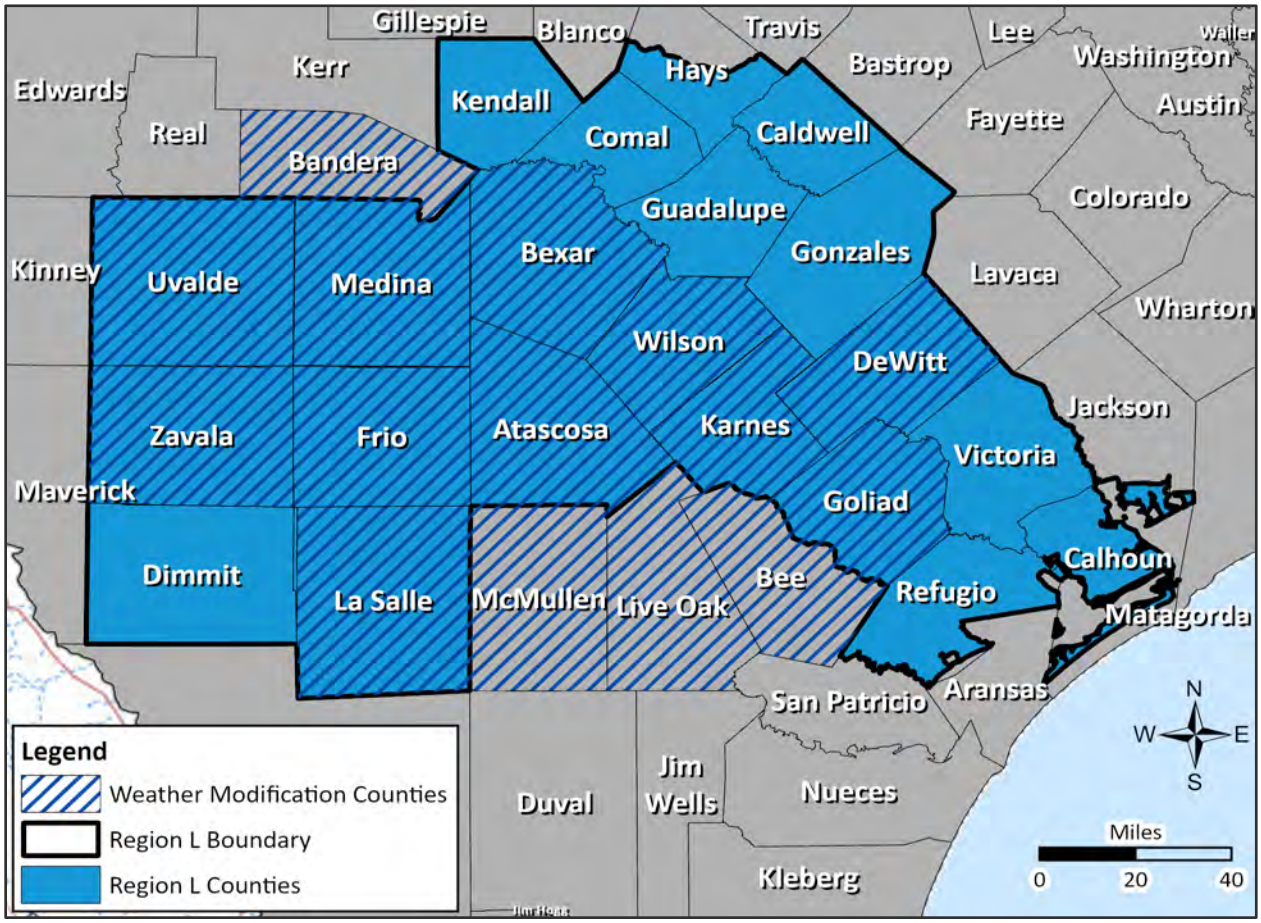



**Figure 5.2.32-1 Counties with Weather Modification Operations in 2011**

Cloud seeding involves introducing hygroscopic flares and/or glaciogenic flares into clouds by an airplane prior to a rainfall event. These flares are similar in size and function to emergency highway flares and contain a type of salt, typically sodium chloride (NaCl) or calcium chloride (CaCl). The flares are dispensed from aircraft flying immediately below or in the updraft regions of clouds. When the flares are burned, they dispense salt particles into the clouds, acting as additional cloud condensation nuclei that attract water vapor. The water vapor condenses and forms cloud droplets in addition to those that are already naturally occurring in the clouds. These droplets then undergo a process known as collision-coalescence or warm rain, in which they grow in size and collide with each other, forming larger droplets that eventually reach rain drop size

### 5.2.32.2 Available Yield

This WMS has a firm yield of 76,579 acft/yr and is planned for implementation in the 2030 decade. Table 5.2.32-1 provides a summary of the available yield for the Weather Modification WMS.

**Table 5.2.32-1 Available Yield for the Weather Modification WMS (acft/yr)**

| WUG | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation, Atascosa | 20,462 | 20,462 | 20,462 | 20,462 | 20,462 | 20,462 |
| Irrigation, Bexar | 2,975 | 2,975 | 2,975 | 2,975 | 2,975 | 2,975 |
| Irrigation, Frio | 12,109 | 12,109 | 12,109 | 12,109 | 12,109 | 12,109 |
| Irrigation, Karnes | 10,998 | 10,998 | 10,998 | 10,998 | 10,998 | 10,998 |
| Irrigation, Medina | 13,683 | 13,683 | 13,683 | 13,683 | 13,683 | 13,683 |
| Irrigation, Uvalde | 5,499 | 5,499 | 5,499 | 5,499 | 5,499 | 5,499 |
| Irrigation, Wilson | 10,853 | 10,853 | 10,853 | 10,853 | 10,853 | 10,853 |
| **Total** | **76,579** | **76,579** | **76,579** | **76,579** | **76,579** | **76,579** |

The 2011 STWMA Annual Report [1], prepared by Dr. Arquimedes Ruiz-Columbié of Texas Tech University, was referenced to determine the available yield of the Weather Modification WMS. Year 2011 was selected because it represents a significant drought year. The annual report provides county-level volumetric increases in precipitation, measured in acft/yr, which would be representative of precipitation increases realized for each county during a repeat of the drought of record.

The 2011 STWMA Annual Report evaluated the cloud seeding project from June 4, 2011, to September 29, 2011. During this period, 31 clouds in the SCTRWPA had initial seeding events and 53 clouds in the SCTRWPA had extended seeding events. TITAN and NEXRAD radars were used to perform a micro-regionalization analysis that estimated the performance of the cloud seeding based on increases in precipitation per county, with different zones receiving downwind benefits. The modeling results indicate that weather modification operations in 2011 resulted in an additional 99,700 acft/yr of precipitation that fell upon the SCTRWPA (Table 5.2.32-2).

[1] Ruiz-Columbié, A. 2011. *South Texas Weather Modification Association Annual Evaluation Report 2011*. https://www.southtexasweathermodification.com/project.html

**Table 5.2.32-2 Weather Modification Operations and County-Level Precipitation Increases in 2011**

| County [1] | Initial Seeding Events | Extended Seeding Events | Volumetric Precipitation Increase in 2011 (acft/yr) |
|---|---|---|---|
| Atascosa | 8 | 15 | 23,200 |
| Bexar | 2 | 4 | 9,500 |
| Frio | 3 | 5 | 15,500 |
| Karnes | 10 | 12 | 13,500 |
| Medina | 3 | 9 | 18,300 |
| Uvalde | 0 | 1 | 5,500 |
| Wilson | 5 | 7 | 14,200 |
| **Total** | **31** | **53** | **99,700** |

[1] In 2011, weather modification was also performed in non-Region L counties, including Bandera, Bee, McMullen, and Live Oak Counties.

The county-level estimates of volumetric precipitation increases in Table 5.2.32-2 represent benefits to not only the sponsors of this WMS (Irrigation WUGs in seven counties) but also to non-Irrigation WUGs, such as municipal and livestock WUGs. To quantify the yield of the Weather Modification WMS and its direct benefits to Irrigation WUG sponsors, the county-level volumetric precipitation increases were multiplied by the proportion of land area within each county identified as "Land in Farms" by the 2022 USDA Census [2]. This acreage is the same value used to estimate water demands associated with irrigation uses in the 2026 SCTRWP and represents the area of agricultural land used for crops, pasture, or grazing. The resulting available yield for the seven Irrigation WUGs in the SCTRWPA totals 76,579 acft/yr. Table 5.2.32-3 provides a summary of the county-level available yields, calculated by applying each county's proportion of Land in Farms to total county land area.

**Table 5.2.32-3 County-Level Yields Based on Proportion of County Land Area and Land in Farms**

| County | Total County Land Area (acres) | Total Land Area Designated as Land in Farms [1] (acres) | Proportion of Land in Farms to Total County Land Area | Available Yield (acft/yr) |
|---|---|---|---|---|
| Atascosa | 780,504 | 688,382 | 88% | 20,462 |
| Bexar | 793,805 | 248,545 | 31% | 2,975 |
| Frio | 725,438 | 566,717 | 78% | 12,109 |
| Karnes | 478,559 | 389,854 | 81% | 10,998 |
| Medina | 848,228 | 634,224 | 75% | 13,683 |
| Uvalde | 993,226 | 993,079 | 100% | 5,499 |
| Wilson | 514,388 | 393,148 | 76% | 10,853 |
| **Total** | **All** | **All** | **All** | **76,579** |

[1] Source: 2022 USDA Census of Agriculture.

[2] U.S. Department of Agriculture, National Agricultural Statistics Service. 2022. *2022 Census of Agriculture – County Data, Texas. Irrigation, Table 10.*

### 5.2.32.3 Environmental Factors

#### Environmental Considerations

##### Vegetation, Land Use, and Agricultural Resources

Due to the identified available yield that this WMS may contribute to irrigation supplies, a potential for beneficial effects on native vegetation communities and agricultural resources exists. Published literature on the potential environmental effects of cloud-seeding salts is limited; however, the potential for negative effects on vegetation and/or crops from cloud-seeding chemicals cannot be ruled out.

##### Aquatic Resources

The potential for increased water yields for irrigation could result in beneficial impacts on water quantity due to potential increased runoff into streams, wetlands, and other aquatic features. However, these same aquatic features could also experience negative impacts to water quality due to increased runoff of fertilizers and pesticides as well as potential negative impacts from cloud-seeding chemicals.

##### Threatened, Endangered, and Species of Concern

The potential for increased water yields for irrigation could result in beneficial impacts on protected species that rely on aquatic habitats, such as streams, wetlands, and other aquatic features. However, many rare and protected aquatic species are sensitive to water quality impacts, which may occur because of increased runoff of fertilizers and pesticides as well as potential negative impacts from cloud-seeding chemicals.

#### Cultural Considerations

This WMS is not anticipated to have significant effects on cultural resources.

### 5.2.32.4 Engineering and Costing

Preliminary engineering and costing analyses have been performed using 2026 Regional Water Planning methods. Black & Veatch utilized the Uniform Costing Model, which includes standard costing procedures and methods for calculating unit costs. The costing procedures include all facilities required for weather modification activities within the SCTRWPA. Capital costs and O&M costs were provided by the STWMA. A cost estimate summary for the Weather Modification WMS is provided in Table 5.2.32-4.

The total cost of the project includes planning level cost estimates for planning, design, and construction, which were calculated by applying a certain percentage to the facilities costs. Unlike traditional water infrastructure projects, the Weather Modification WMS does not include significant costs associated with design because it is limited to design of flares, mechanisms that attach flares to aircrafts, or elements similar in scope and cost. Therefore, the design cost percentage was reduced from 7% to 3% and then applied to the facilities costs.

**Table 5.2.32-4 Cost Estimate Summary for the Weather Modification WMS**

| Item | Estimated Costs |
|---|---|
| Airplanes and Associated Infrastructure | $905,000 |
| **TOTAL COST OF FACILITIES** | **$905,000** |
| | |
| Planning (3%) | $27,000 |
| Design (7%) | $27,000 |
| Construction Engineering (1%) | $9,000 |
| Legal Assistance (2%) | $18,000 |
| Fiscal Services (2%) | $18,000 |
| All Other Facilities Contingency (20%) | $181,000 |
| **TOTAL COST OF PROJECT** | **$1,185,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 10 years) | $143,000 |
| Operation and Maintenance | $329,000 |
| **TOTAL ANNUAL COST** | **$472,000** |
| | |
| **Available Project Yield (acft/yr)** | 76,579 |
| **Annual Cost of Water ($ per acft)*** | $6 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $4 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.01 |
| *Based on a Peaking Factor of 1.0. | |

### 5.2.32.5 Implementation Considerations

Implementation considerations for the Weather Modification WMS include the following:

- Federal Aviation Administration (FAA) certification of flare rack installations on aircraft is likely to be necessary.
- Restrictions or prohibitions of cloud seeding operations over large population centers (e.g., San Antonio city limits) may be established.
- Operators should ensure adequate training is provided and standard operating procedures are developed regarding proper handling and clean-up of cloud-seeding salts is available. If a spill is unavoidable, operators should take actions to minimize impacts to soils, vegetation, aquatic resources, and wildlife habitats.

# 5.3 Water Conservation Information and Recommendations

The purpose of this subchapter is to provide a consolidated resource that presents conservation recommendations, including considerations of applicable BMPs appropriate for the SCTRWPA.

The SCTRWPG strongly supports water conservation and generally recommends water conservation for all WUGs in every use category. For the 2026 SCTRWP, the SCTRWPG designated Municipal Water Conservation (refer to Section 5.2.1) and Non-Municipal Water Conservation (refer to Section 5.2.2) as Recommended WMSs. Additional information regarding water conservation is included in subsequent sections.

## 5.3.1 Water Conservation in the 2026 South Central Texas Regional Water Plan

Water conservation is incorporated into the 2026 SCTRWP in the form of passive conservation approaches in the TWDB water demand projections, and also as active approaches in the Municipal and Non-Municipal Water Conservation WMSs.

### 5.3.1.1 Plumbing Code Savings

Expected water-efficiency savings are incorporated into the current TWDB municipal water demand projections (refer to Chapter 2) and include estimated or anticipated savings due to state and federal specifications for fixture and appliance design. The savings projected by the TWDB include complete replacement of existing plumbing fixtures to water-efficient fixtures by the year 2045. The projections also assume that all new construction includes water-efficient plumbing fixtures.

Chapter 2, Appendix 2B includes a summary of each municipal WUG's per capita water use and anticipated plumbing code savings on a per capita water use basis and a volumetric basis. The estimated plumbing code savings in the SCTRWPA is estimated to increase from 19,379 acft/yr in 2030 to 102,085 acft/yr in 2080, as shown in Table 5.3-1.

**Table 5.3-1 Estimated Plumbing Code Savings from Passive Water Conservation (acft/yr)**

| Region | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Region L Total | 19,379 | 39,432 | 54,525 | 71,267 | 88,828 | 102,085 |

### 5.3.1.2 GPCD Goals

Per capita water use goals are recommended and described in the Municipal Water Conservation WMS in Section 5.2.1 of the 2026 RWP. Goals are recommended for each planning decade and are based on a WUG's projected 2030 per capita water use. The SCTRWPG established the following Municipal Water Conservation goals for the 2026 RWP:

- For municipal WUGs having year 2030 water use of 140 GPCD or greater, the goal is to reduce per capita water use by 10% per decade until 140 GPCD is reached; after which, the goal is to reduce per capita water use by 2.5% per decade for the remainder of the planning period;

- For municipal WUGs having year 2030 water use between 80 GPCD and 139 GPCD, the goal is to reduce per capita water use by 2.5% per decade for the remainder of the planning period or until 80 GPCD is reached; and
- For municipal WUGs having year 2030 water use less than 80 GPCD, the goal is to maintain per capita water use at or below 80 GPCD throughout the planning horizon.

Section 5.2.1 of the 2026 SCTRWP includes a table of GPCD goals by WUG for each decade of the planning horizon.

#### 5.3.1.3 Water Conservation as Water Management Strategies

Water conservation measures are defined as practices, techniques, programs, and technologies that will protect water resources, reduce consumption of water, reduce the loss or waste of water, or improve the efficiency in the use of water so that a water supply is made available for future or alternative uses. The conservation WMSs (refer to Sections 5.2.1 and 5.2.2) include information, recommendations, and BMPs for all use types. For municipal and irrigation conservation, WUG-specific demand reductions and cost estimates were developed. The following sections summarize the recommended conservation strategies included in the 2026 SCTRWP.

##### 5.3.1.3.1 Municipal Water Conservation

The Municipal Water Conservation WMS is a Recommended strategy for every municipal WUG in the SCTRWPA with a 2030 GPCD greater than 80. The Municipal Water Conservation WMS is not recommended for municipal WUGs with water of 80 GPCD or lower. For the 2026 RWP, conservation is not a Recommended strategy for Randolph Air Force Base, Port Oconnor Improvement District, County Line SUD, and East Medina County SUD because they have GPCDs less than 80.

Two municipal strategies – water loss mitigation and water use reduction – are recommended to reach the target GPCDs. As deteriorating infrastructure can have high rates of water loss, water loss mitigation is recommended through leak detection and repair, installation of AMI, and utility water audits. Water loss mitigation is estimated to save approximately 14,549 acft/yr in 2030, increasing to 17,034 acft/yr in 2080. Water use reduction includes non-capital efforts to reduce the consumption of water. Water use reduction is estimated to save approximately27,692 acft/yr in 2030 and 178,677 acft/yr in 2080.

Beginning in 2004, the Water Conservation Implementation Task Force developed a BMP guide for municipal users [1]. In 2007, the Task Force was succeeded by the WCAC, enacted by the 80th Texas Legislature with the passage of SB 3 and HB 4. The council's primary roles include monitoring trends in water conservation implementation and technologies for potential inclusion as BMPs. Since its inception, WCAC has continually worked with TWDB and TCEQ to update the "Best Management Practices Guide."

[1] Water Conservation Implementation Task Force. 2004. *Report to the 79th Legislature, Texas Water Development Board, Special Report*.

A variety of conservation measures are recommended as described in the WCAC Municipal BMP Guide [2], any combination of which can be used to meet the specific goals for a municipality or utility. Conservation can be achieved using a variety of strategies, including the following:

- **Conservation Analysis and Planning**
  - Conservation Coordinator
  - Cost-Effectiveness Analysis
  - Water Survey for Single-Family and Multi-Family Customers
  - Customer Characterization
- **Financial**
  - Water Conservation Pricing
  - Wholesale Agency Assistance Programs
- **System Operations**
  - Metering of all New Connections and Retrofitting of Existing Connections
  - System Water Audit and Water Loss
- **Landscaping**
  - Athletic Field Conservation
  - Golf Course Conservation
  - Landscape Irrigation Conservation and Incentives
  - Park Conservation
  - Residential Landscape Irrigation Evaluations
  - Outdoor Watering Schedule
- **Education and Public Awareness**
  - Public Information
  - School Education
  - Public Outreach and Education
  - Partnerships with Nonprofit Organizations
- **Rebate, Retrofit, and Incentive Programs**
  - Conservation Programs for Industrial, Commercial, and Institutional Accounts
  - Residential Clothes Washer Incentive Program

[2] Texas Water Development Board (TWDB). 2019. *Best Management Practices for Municipal Water Users*.

- Residential Toilet Replacement Programs
- Showerhead, Aerator, and Toilet Flapper Retrofit Program
- Water-Wise Landscape Design and Conversion Programs
- Customer Conservation Rebates
- Plumbing Assistance Programs for Economically Disadvantaged Customers

- **Conservation Technology**
  - New Construction Graywater
  - Rainwater Harvesting and Condensate Reuse [3]
  - Reuse of Reclaimed Water [3]
- **Regulatory Enforcement**
  - Prohibition of Wasting Water
  - Conservation Ordinance Planning and Development

The SCTRWPG acknowledges and supports the activities of the WCAC created by HB 4 and SB 3 of the 80th Texas Legislature. In addition, the SCTRWPG acknowledges and supports the implementation of HB 2667 of the 81st Texas Legislature relating to performance standards for plumbing fixtures sold in Texas.

Costs for implementation and administration of the Municipal Water Conservation WMSs to meet the Region L goals is developed individually for WUGs. Total costs for water loss mitigation over the planning horizon is estimated to be $6,188,281,000. The costs for water use reduction, including non-capital approaches for conservation, were included in the annual costs at an average of $305/acft of water savings.

#### 5.3.1.3.2 Non-Municipal Water Conservation

The 2026 RWP is the first Region L Regional Water Plan to include Non-Municipal Water Conservation as a Recommended WMS. The WMS arose from the SCTRWPG's collective desire to address significant unmet irrigation needs in previous RWPs. Inclusion of the Recommended strategy in the Regional and State Water Plans enables certain entities to apply for financial assistance from certain funding sources, such as SWIFT.

Non-Municipal Water Conservation is included as a Recommended strategy for all Irrigation WUGs with an identified water need. For the 2026 RWP, this includes 15 irrigation WUGs in Atascosa, Bexar,

[3] While Rainwater Harvesting, Condensate Reuse, and Reuse of Reclaimed Water are included in the Water Conservation Advisory Council (WCAC) Municipal Best Management Practices (BMP) Guide as water conservation measures, they are not classified as water conservation measures by the TWDB for regional water planning purposes or in DB27.

Caldwell, Calhoun, Comal, Dimmit, Goliad, Guadalupe, Karnes, La Salle, Medina, Uvalde, Victoria, Wilson, and Zavala Counties.

The SCTRWPG recommends non-municipal water conservation to improve irrigation efficiencies to reduce the quantity of water use in agriculture per acre irrigated. Irrigation water conservation is recommended as a WMS in counties where irrigation needs are identified or created through groundwater conversions and transfers, but the SCTRWPG supports conservation for irrigation in the entire region. The recommended conservation measures for irrigation include soil moisture monitoring, irrigation scheduling, real-time use metering and monitoring, and soil conservation tillage. Total yield from all measures is 17,720 acft/yr in the SCTRWPA by 2080.

The SCTRWPG further supports and recommends the implementation of water conservation measures included in the WCAC Agricultural BMP Guide [4]. The list of agricultural BMPs is as follows:

- **Information Gathering and Education Practices**
  - Cost Effectiveness Analysis
  - On-Farm Irrigation Audit
- **Cropping and Management Practices**
  - Crop Residue Management and Conservation Tillage
  - Irrigation Scheduling
  - Volumetric Measurement of Irrigation Water Use
- **Land Management Systems**
  - Brush Control/Management[5]
  - Contour Farming
  - Furrow Dikes
  - Land Leveling
- **On Farm Water Delivery Systems**
  - Drip/Micro-Irrigation System
  - Gated and Flexible Pipe for Field Water Distribution Systems
  - Linear Move Sprinkler Irrigation Systems
  - Lining of On-Farm Irrigation Ditches
  - Low Pressure Center Pivot Sprinkler Irrigation Systems

[4] Texas Water Development Board (TWDB). 2013. *Best Management Practices for Agricultural Water Users*.
[5] While brush control/management is included in the Water Conservation Advisory Council (WCAC) Agricultural BMP Guide, it is not classified as a water conservation measure by the TWDB for regional water planning purposes or in DB27.

- Replacement of On-Farm Irrigation Ditches with Pipelines
- Surge Flow Irrigation for Field Water Distribution Systems

- **Water District Delivery Systems**
  - Lining of District Irrigation Canals
  - Replacement of Irrigation District Canals and Lateral Canals with Pipelines
- **Miscellaneous Systems**
  - Nursery Production Systems
  - Tailwater Recovery and Reuse System [6]

Total cost for implementation and administration of the Non-Municipal Water Conservation WMS is estimated to be $48,271,000 ($347 per acft/yr).

Sufficient data are not currently available for manufacturing, steam-electric power, and mining use categories for the South Central Texas Region to enable accurate demand reduction volumes and costs. However, the SCTRWPG strongly supports and recommends implementation of water conservation efforts for all WUGs. The WCAC developed an Industrial BMP Guide [7], which includes the following Industrial BMPs:

- **Conservation Analysis and Planning**
  - Cost Effectiveness Analysis
  - Industrial Site Specific Conservation
  - Industrial Water Audit
- **Educational Practices**
  - Management and Employee Programs
- **System Operations**
- **Boiler and Steam Systems**
- **Industrial Alternative Sources and Reuse of Process Water[8]**
- **Industrial Submetering**
- **Industrial Water Waste Reduction**

[6] While Tailwater Recovery and Reuse System is included in the Water Conservation Advisory Council (WCAC) Agricultural BMP Guide, it is not classified as a water conservation measure by the TWDB for regional water planning purposes or in DB27.
[7] Texas Water Development Board (TWDB). 2013. *Best Management Practices for Industrial Water Users*.
[8] While Reuse of Process Water is included in the Water Conservation Advisory Council (WCAC) Industrial BMP Guide, it is not classified as a water conservation measure by the TWDB for manufacturing and steam-electric power uses in the regional water plan or in DB27. It is, however, considered by the TWDB as a water conservation measure for mining uses in the regional water plan and DB27.

- Refrigeration
- Rinsing/Cleaning
- Water Treatment

- **Cooling Systems Management**
  - Cooling Systems (other than Cooling Towers)
  - Cooling Towers
  - Once-Through Cooling
- **Landscaping**
  - Industrial Facility Landscaping

### 5.3.2 Recent and Recommended Water Conservation Legislation and Policies

Since the publication of the most-recent *Water Conservation Advisory Council Report to the 88th Texas Legislature* (2022), the Texas State Legislature made a significant investment in water infrastructure through the passage of SB 28 and Senate Joint Resolution (SJR) 75 providing for the creation of the Texas Water Fund. In addition, SB 30 authorized a one-time, $1 billion supplemental appropriation of general revenue to the Texas Water Fund, contingent on enactment of SB 28 and approval of SJR 75 by voters. Proposition 6 (the proposition for SJR 75), creating the Texas Water Fund to assist in financing water projects in Texas, passed on November 7, 2023, with more than 77% in favor. The Texas Water Fund, managed by TWDB, prioritizes investment in water loss mitigation and other water strategies. The 88th Legislative Session also established the TexMesonet Hydrometeorology Network and create the TexMesonet Advisory Committee through HB 2759 to support a statewide evapotranspiration (ET) network.

In 2024, the WCAC issued a report entitled, *Water Conservation Advisory Council Report to the 89th Texas Legislature*, which the following two additional legislative recommendations:

1. The Council recommends that the Texas Legislature replenish funding in the Agricultural Water Conservation Fund sufficient to support the TWDB's grant and loan program for a total of $15,000,000 for the next 10 years.

2. Increase appropriations by $1,200,000 for the biennium to the TWDB to develop and support a statewide ET network within the TexMesonet. Funding will be used for:
   - Up to 2.5 new full-time equivalent staff positions;
   - Contracting a study on existing TexMesonet weather stations regarding siting requirements to calculate ET (study of fetch);
   - Resources to update existing sites to accommodate ET measurements; and
   - Grants and/or contracts with agencies to provide technical assistance.

### 5.3.3 Model Water Conservation Plans

Pursuant to TWDB Exhibit C, model water conservation plans are available on the TCEQ website:

- Municipal Water Use by Public Water Supplier (TCEQ-10218): https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/10218.docx
- Wholesale Public Water Suppliers (TCEQ-20162): https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/20162.docx
- Manufacturing/Industrial Use (TCEQ-20839): https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/20839.docx
- Mining Use (TCEQ-20840): https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/20840.docx
- Agricultural Uses:
  - Agriculture Non-Irrigation (TCEQ-10541): https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/10541.docx
  - Individually-Operated Irrigation System (TCEQ-10238): https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/10238.docx
  - Agricultural Water Suppliers Providing Water to More Than One User (TCEQ-10244): https://www.tceq.texas.gov/downloads/permitting/water-rights/water-conservation/10244.docx

# Appendix 5A: Guiding Principles of the South Central Texas Regional Water Planning Group

# South Central Texas Regional Water Planning Group

# Bylaws and Guiding Principles[1]




[1]These Bylaws and Guiding Principles are current as of February 17, 2022

Table of Contents

Acronyms ..... 1

Preamble ..... 2

SCTRWPG BYLAWS ..... 4

ARTICLE I NAMES ..... 4

Section 1 Organization ..... 4

Section 2 Regional Water Planning Area ..... 4

ARTICLE II ESTABLISHMENT AND PURPOSE ..... 4

ARTICLE III PRINCIPAL ADMINISTRATIVE OFFICE ..4

ARTICLE IV RESPONSIBILITIES ..... 5

ARTICLE V VOTING MEMBERSHIP ..... 5

Section 1 Composition ..... 5

Section 2 Terms of Office ..... 5

Section 3 Conditions of Membership ..... 5

Section 4 Selection of Members ..... 6

Section 5 Attendance ..... 7

Section 6 Code of Conduct ..... 7

Section 7 Removal of Voting Members ..... 8

ARTICLE VI NON-VOTING MEMBERSHIP ..... 10

Section 1 Mandatory Members ..... 10

Section 2 Discretionary Members ..... 10

Section 3 Code of Conduct ..... 11

ARTICLE VII DESIGNATED ALTERNATES ..... 11

ARTICLE VIII OFFICERS ..... 11
Section 1 Officers; Restrictions and Terms of Office ..... 11
Section 2 Selection ..... 12
Section 3 Removal of Officers ..... 12
Section 4 Vacancies of Officers ..... 13
Section 5 Duties of Each Officer ..... 13
Section 6 Executive Committee ..... 14
ARTICLE IX MEETINGS ..... 14
Section 1 Open Meetings and Notice ..... 14
Section 2 Regular or Called Meetings ..... 15
Section 3 Agenda ..... 15
Section 4 Quorum ..... 15
Section 5 Applicability of Robert's Rules of Order ..... 15
Section 6 Public Meetings Required by Law ..... 16
Section 7 Minutes ..... 16
Section 8 Protocols for Public Communication at Regional Water Planning Group Meetings ..... 16
ARTICLE X MAKING DECISIONS ..... 16
Section 1 Applicability; No Written Proxies ..... 18
Section 2 Decision-Making Process ..... 18
Section 3 Alternative Dispute Resolution ..... 19

Section 4 Final Adoption of Regional Water Plan; Amendments.....20
ARTICLE XI BOOKS AND RECORDS.....21
Section 1 Required Documents and Retainment.. .....21
Section 2 Inspection and Copying.....21
Section 3 Availability of Reports .....21
ARTICLE XII COMMITTEES .....21
Section 1 Establishment.....21
Section 2 Membership.....21
Section 3 Officers.....22
Section 4 Meetings .....22
Section 5 Books and Records.....22
Section 6 Code of Conduct.....22
ARTICLE XIII COMPENSATION AND REIMBURSEMENT .....23
Section 1 Compensation .....23
Section 2 Reimbursement.....23
ARTICLE XIV CONTRACTUAL SERVICES .....23
ARTICLE XV ADOPTING AND AMENDING THE BYLAWS.....24
SCTRWPG GUIDING PRINCIPLES .....25

PRINCIPLE I APPROPRIATENESS AND ADEQUACY OF HOW DEMAND AND NEED ARE DETERMINED.....25

PRINCIPLE II ROLE OF REGIONAL WATER PLANNING GROUPS IN INFLUENCING POPULATION GROWTH AND LAND USE.....25

PRINCIPLE III CONFLICTS OF INTERESTS WITH RESPECT TO PLANNING GROUP MEMBERS.....26

PRINCIPLE IV THE ROLE OF THE PLANNING GROUP IN INFLUENCING WATER DEVELOPMENT PLANS OF WATER SUPPLIERS .....27

PRINCIPLE V THE ROLE OF THE PLANNING GROUP IN INFLUENCING PERMITTING ENTITIES .....27

PRINCIPLE VI THE ADEQUACY OF EVALUATING THE PLAN'S EFFECTS ON FRESHWATER INFLOWS TO SAN ANTONIO BAY, AND THE ADEQUACY OF ENVIRONMENTAL ASSESSMENTS OF INDIVIDUAL WATER MANAGEMENT STRATEGIES .....28

PRINCIPLE VII MINIMUM STANDARDS FOR WATER MANAGEMENT STRATEGIES .....29

PRINCIPLE VIII RECOMMENDED WATER MANAGEMENT STRATEGIES .....29

PRINCIPLE IX MANAGEMENT SUPPLY.....30

PRINCIPLE X THE ROLE OF REUSE WITHIN THE REGIONAL WATER PLAN .....31

PRINCIPLE XI IDENTIFYING SPECIAL STUDIES OR EVALUATIONS DEEMED IMPORTANT TO ENHANCE THE 2026 PLAN, THE IDENTIFICATION OF OUTSIDE FUNDING SOURCES, AND THE EXTENT TO WHICH INNOVATIVE STRATEGIES SHOULD BE USED……31

# Acronyms

| | |
|---|---|
| **SCTRWPG:** | **South Central Texas Regional Water Planning Group** |
| **South Texas RWPA:** | **South Texas RWPA** |
| **TAC:** | **Texas Administrative Code** |
| **TCEQ:** | **Texas Commission on Environmental Quality** |
| **TDA:** | **Texas Department of Agriculture** |
| **TPWD:** | **Texas Parks and Wildlife Department** |
| **TWDB:** | **Texas Water Development Board** |

# Preamble

In 2015, the SCTRWPG developed, adopted, and began to pursue the *2021 Plan Enhancement Process* to improve and clarify the principles by which the SCTRWPG develops its regional water plans.

The TAC requires regional water planning groups to consider timely agency and public comments after the submittal of the Initially Prepared Plan (IPP), and to include in the final adopted plan summaries of all timely written and oral comments received, along with a planning group response explaining any resulting revisions, or justification as to why revisions are unwarranted (*see* 31 TAC § 357.21). To thoroughly consider the comments received from agencies and members of the public, former Chair of the SCTRWPG, Con Mims formed a workgroup comprised of SCTRWPG members and their staff, representing a broad mix of stakeholder interests groups across the region. Many comments received gave rise to fundamental questions central to regional water planning processes and philosophies, the implications of which required the utmost attention of the full SCTRWPG. The workgroup recommended adding the *2021 Plan Enhancement Process* to Chapter 8 (*Policy Recommendations & Unique Sites*) of the 2016 South Central Texas Regional Water Plan. Adopted by SCTRWPG in late 2015, the *2021 Plan Enhancement Process* sought to improve and clarify the principles that guide SCTRWPG decisions.

Beginning in February 2016, the SCTRWPG took up the issues identified by *2021 Plan Enhancement Process* as topics requiring careful consideration of the full Planning Group. From February 2016 to November 2017, the fruits of *2021 Plan Enhancement Process* came to bear in the

form of the eleven SCTRWPG Guiding Principles contained herein.

The SCTRWPG Guiding Principles reflect the consensus driven decision making process outlined in Article X, section 2 of the SCTRWPG Bylaws, and generally serve several purposes. From the outset of *2021 Plan Enhancement Process*, the intent has been to provide a thorough response to the comments received following the adoption of the 2015 IPP. The SCTRWPG Guiding Principles serve as a response to the questions raised by those public and agency comments, and identified in the *2021 Plan Enhancement Process*.

Secondly, the Guiding Principles serve as a touchstone for which to reference during the making of any and all SCTRWPG decisions. In this way, the Guiding Principles supplement the SCTRWPG Bylaws, as well as the Water Planning Rules set out in Chapter 357 of the TAC.

Lastly, this document seeks to reconcile competing interests at the onset of the planning process, develop a shared understanding of the approach to the planning process, and to encourage consensus based decision making throughout the planning cycle. The Guiding Principles may also serve to inform future policy recommendations by the SCTRWG. In the *2021 South Central Texas (Region L) Regional Water Plan*, the SCTRWPG included an Other Recommendation (No. 8.8.4), recommending a similar process to other planning groups as it resulted in a shared understanding among the planning group members on how the related specific issues would be addressed during the regional water planning process.

# SCTRWPG BYLAWS

## ARTICLE I NAMES

### Section 1 Organization

The official name of this organization shall be the “South Central Texas Regional Water Planning Group” (SCTRWPG).

### Section 2 Regional Water Planning Area

The official name of the regional water planning area designated as Region L by the TWDB in accordance with 31 TAC Chapter 357 on February 19, 1998, shall be the “South Central Texas Regional Water Planning Area” (South Central Texas RWPA). The South Central Texas RWPA consists of Atascosa, Bexar, Caldwell, Calhoun, Comal, DeWitt, Dimmit, Frio, Goliad, Gonzales, Guadalupe, Karnes, Kendall, La Salle, Medina, Refugio, Uvalde, Victoria, Wilson, Zavala and part of Hays Counties.

## ARTICLE II ESTABLISHMENT AND PURPOSE

The SCTRWPG was established by appointment of an initial coordinating body of the TWDB on February 19, 1998, and subsequent additional appointments by the initial coordinating body. The purpose of the SCTRWPG shall be to provide comprehensive regional water planning and to carry out the related responsibilities placed on regional water planning groups by state law, including Texas Water Code Chapter 16 and TWDBrules, including 31 TAC Chapters 355, 357 and 358, in and for theSouth Central RWPA.

## ARTICLE III PRINCIPAL ADMINISTRATIVE OFFICE

The principal administrative office of the SCTRWPG shall be the principal business offices of the San Antonio River Authority. The administrative officer of the SCTRWPG for purposes of the Texas Open Records Act shall be designated and hold office until replaced by the SCTRWPG. The Chair of the SCTRWPG shall ensure that the mailing address and physical address of the principal office and administrative officer are provided to all

members of the SCTRWPG and the Executive Administrator of the TWDB.

## ARTICLE IV RESPONSIBILITIES

The SCTRWPG shall have the responsibility for performing the functions defined in Texas Water Code, Chapter 16 and in 31 TAC Chapters 355, 357 and 358 related to regional water planning groups for the South Central Texas RWPA. Foremost among those responsibilities shall be the development of a regional water plan for the South Central Texas RWPA that identifies both short and long-term water supply needs and recommends water management strategies for addressing them.

## ARTICLE V VOTING MEMBERSHIP

### Section 1 Composition

The initial voting members of the SCTRWPG include the initial coordinating body appointed by the TWDB on February 19, 1998, plus the additional voting members appointed by the initial coordinating body to ensure adequate representation of the interests comprising the South Central Texas RWPA stated in Texas Water Code §16.053(c), if present and other interests determined by the SCTRWPG, to include representatives appointed by Groundwater Management Areas in accordance with Section §16.053(c). Thereafter, the voting membership of the SCTRWPG shall include persons added and exclude those removed as provided under this Article and any 31 TAC § 357.4(g)(4) member selected for voting membership under Article VI.

### Section 2 Terms of Office

Except for members appointed by Groundwater Management Areas under Texas Water Code Section §16.053(c). Terms of office for voting members shall be five years.

### Section 3 Conditions of Membership

In order to be eligible for voting membership on the SCTRWPG, a candidate must represent the interest for which a member is sought, be willing to participate in the regional water planning process, and abide by these Bylaws.

## Section 4 Selection of Members

At least forty-five calendar days prior to the expiration of the term of a voting member, or within two weeks following a Planning Group meeting at which the Planning Group decides to replace a voting member, the SCTRWPG will post public notice on its website and any other relevant websites and notify via email the county clerk in each county located in whole or in part in the SCTRWPG region, identifying the particular interest for which nominations are sought, stating the conditions of membership, delineating the method for submitting nominations, and establishing a deadline for submission of nominations between thirty and forty-five calendar days from the date that public notice was posted. Members of the SCTRWPG may also submit nominations in the manner prescribed in the public notice.

The Executive Committee will receive and process the nominations and after the deadline for submitting nominations, will recommend a nominee for the position to the voting membership as a whole, giving strong consideration to a consensus nominee from those individuals and entities that collectively represent that interest. The Executive Committee shall consider and report all nominations received but may consider only persons who meet the conditions of membership. The voting membership as a whole is not bound by the recommendation of the Executive Committee and may consider any nominee who meets the conditions of membership.

The voting members shall attempt to make a decision for a successor by consensus. If efforts to reach consensus fail, the Chair shall call for a vote on a nominee. An affirmative vote of a majority of the voting membership shall be required to elect a nominee as a new voting member. If voting fails to select a new voting member, the voting members shall consider other nominations until a new member can be selected by consensus or affirmative majority vote of the voting membership.

In addition to selecting new voting members to fill vacancies caused by removal, resignation or the expiration of a term, the

voting members may add members to ensure adequate representation of the interests comprising the South Central Texas RWPA by using the selection process set forth in this section. In both the consideration of nominees and the selection of new voting members, the Executive Committee and other voting members shall strive to achieve geographic, ethnic and gender diversity.

Outgoing voting members shall be given the opportunity to fully participate in the selection process for their successors and shall serve until successors take office. However, no member shall participate in a vote in which he/she is a nominee.

A membership created by a Groundwater Management Area in accordance with Texas Water Code §16.053(c) shall be maintained by that Groundwater Management Area. The Planning Group shall notify a Groundwater Management Area of a vacancy created by its appointed member.

## Section 5 Attendance

All members shall make a good faith effort to attend all SCTRWPG meetings and hearings. Records of attendance shall be kept by the Secretary at all SCTRWPG meetings and hearings and presented as part of the minutes. Voting members of the SCTRWPG who have missed three consecutive regular meetings, or at least one-half of all meetings in the preceding twelve months, shall be considered to have engaged in excessive absenteeism and are subject to removal from membership under Section 7 of this Article. The Planning Group shall notify any Groundwater Management Area of excessive absenteeism, as defined in this section, of a member appointed by that Groundwater Management Area under Texas Water Code §16.053(c) and request its consideration of replacing that member. Members are encouraged to notify the Chair if they will miss a meeting and/or send a designated alternate.

## Section 6 Code of Conduct

Members and designated alternates of the SCTRWPG shall ethically conduct the business of the SCTRWPG and shall avoid

any form or appearance of a conflict of interest, real or apparent, by observing the following:

(a) No member or designated alternate of the SCTRWPG shall knowingly:
    (1) Solicit or accept gratuities, favors or anything of monetary value from suppliers or potential suppliers of services, materials or equipment, including subcontractors under recipient contracts or any other person who has a substantial financial interest in the regional water plan; or
    (2) Participate in the selection, award or administration of a procurement where the member or designated alternate has a financial or other substantive interest in the organization being considered for award. Such conflict may be due to any of the following having a financial or familial relationship with the organization:
        i) the member or designated alternate;
        ii) the member's or designated alternate's family;
        iii) the member's or designated alternate's business partner(s); or
        iv) a person or organization that employs, or is about to employ any of the persons listed in (i)-(iii) above; or
    (3) Participates in any deliberation, decision or vote that would constitute a conflict of interest under federal, state or local law.
(b) Potential conflicts of interest shall be clearly stated by the voting member or designated alternate prior to any deliberation or action on an agenda item with which the voting member or designated alternate may be in conflict. Where the potential conflict is restricted to a divisible portion of an agenda item, the Chair may divide the agenda item into parts for deliberation and voting purposes. An abstention from participation in deliberations, decisions or voting and the reasons therefore shall be noted in the minutes.

## Section 7 Removal of Voting Members

(a) Grounds for Removal of Voting Members. The following shall constitute grounds for removal of a voting member:
    (1) Engaging in excessive absenteeism as defined under Section 5 of this Article;

(2) Incapacity;
(3) Failure to abide by the code of conduct provisions set forth under Section 6 of this Article;
(4) appointment of a successor by the voting members upon expiration of the member's term;
(5) Change in status so that the member no longer represents the interest he/she was selected to represent;
(6) Falsifying documents;
(7) Any other serious violation of these Bylaws as may be determined by the voting members; or
(8) The voting member's designated alternate engages in any acts described in subdivisions (3), (6) or (7) of this subsection.

(b) Process for Removing Voting Members. Voting members may be removed at any time for any of the grounds for removal of voting members set forth in subsection (a) of this section. Any member with knowledge or suspicion that a voting member or designated alternate has engaged in acts or that events have occurred constituting grounds for removal under subsection (a) of this section shall report such information or suspicion to the Chair. The Chair, upon discovering or receiving such information, shall make a written request to that member for an explanation as to why he/she should not be removed from voting membership. The member shall make written response to the Chair within fifteen calendar days from the date of receipt of the Chair's request. Within five calendar days of receipt of the member's response, the Chair shall forward copies of the response to the Executive Committee. The Chair shall place an item on the next meeting agenda calling for the removal of the member if, 1) after meeting the Executive Committee continues to suspect that grounds for removal may exist; 2) the member fails to make a timely response to the Chair's request; or 3) the Chair or a majority of the Executive Committee requests its inclusion on the agenda after reviewing the written response from the accused member. At the meeting, the member subject to the possible removal action may request evidence of why he/she should not be removed. The voting members may remove the member by affirmative vote of a majority of the voting membership. The member subject to

the removal action shall not participate in any way in the removal decision, nor shall his/her membership count as part of the total voting membership for purposes of calculating the vote.

(c) A Groundwater Management Area whose appointed member has acted in a way that constitutes grounds for removal, under subsection (a), above, shall be so notified by the Planning Group with a request for the Groundwater Management Area's consideration of replacement of that member.

## ARTICLE VI NON-VOTING MEMBERSHIP

### Section 1 Mandatory Members

The voting members of the SCTRWPG shall add the non-voting members set forth in 31 TAC §357.4(g)(1)-(g)(3) and (g)(5) and accept the designees appointed by the entities set forth therein. Such designees shall have no terms of office and shall serve until replaced by the designating entity. However, if the voting members decide by consensus or affirmative majority vote of the voting membership, that a particular designee is hindering the regional water planning efforts of the SCTRWPG, the Chair shall make a written request to the entity within ten calendar days requesting the designation of another person to serve as the entity's designee.

### Section Discretionary Members

The voting members of the SCTRWPG may add or remove as a non-voting member an entity set forth in 31 TAC §357.4(h) by consensus or by a majority vote of the voting membership. If an entity is added, the Chair shall make a written request within ten calendar days to the entity requesting the designation of a person to serve until replaced by the designating entity or until the entity is removed as a non-voting member. However, if the voting members determine by consensus or by a majority vote of the voting membership that a particular entity's designee is hindering the regional water planning efforts of the SCTRWPG but also that the entity should remain as a non-voting member, the Chair shall make a written request to the entity within ten calendar days

requesting the designation of another person to serve as the entity's designee.

### Section 3 Code of Conduct

All non-voting members shall comply with the code of conduct provisions under Section 6 Article V of these Bylaws.

## ARTICLE VII DESIGNATED ALTERNATES

Each member may designate an alternate to represent him/her when he/she is unable to attend a meeting or hearing. Each member must notify the Chair of the name of the member's designated alternate prior to the meeting or hearing at which the designated alternate will appear on behalf of the member. If the member fails to provide such notice, the Chair may forbid the participation of the designated alternate at the meeting or hearing. The Chair shall not recognize the designation of more than one alternate per member at any given time.

The designated alternate shall enjoy the same voting privileges, or lack thereof, and shall be bound by the same duties, terms and conditions as the member they represent, except as otherwise provided in these Bylaws. However, a designated alternate for a voting member who serves as an officer shall not be allowed to serve in the capacity as an officer in the member's absence.

Because it is important in achieving consensus for all members to participate actively, keep up-to-date on the progress of the group, and develop a common base of information, members shall in good faith attempt to minimize the number of time they are absent from meetings or are represented by their designated alternates.

The Administrative Officer shall maintain a current list of all members and their designated alternates.

## ARTICLE VIII OFFICERS

### Section 1 Officers; Restrictions and Terms of Office

Voting members of the SCTRWPG shall elect from the voting membership a Chair, Vice-Chair and Secretary to serve as officers. Each officer shall serve a term of one calendar year.

Except as provided under Section 4 of this Article, an officer shall serve a term of one calendar year. Except as provided under Section 4 of this Article, an officer shall serve until his/her successor takes office. No two voting members representing the same interest shall serve as officers at the same time. Elections shall be held annually, with no restrictions on the number of consecutive terms an individual may serve as an officer other than those that apply because of his/her status as a voting member under these Bylaws.

## Section 2 Selection

Officers shall be elected at the first meeting of each calendar year. Nominations shall be made from the floor by voting members. The voting members shall elect officers from among the nominees by consensus or by affirmative vote of a majority of the voting membership.

## Section 3 Removal of Officers

Any officer may be removed from office for any of the grounds for removal of voting members set forth under Article V of these Bylaws, or for repeated failure to carry out the duties of the office, by a consensus or by majority vote of the voting membership. Removal of an officer shall be set as an agenda item at the next scheduled meeting upon written request signed by five voting members to the Chair or Secretary. The Chair or Secretary receiving the request shall notify the officer in writing that he/she shall be subject to a removal action at the next scheduled meeting. At that meeting, the officer subject to the possible removal action may present evidence of why he/she should not be removed. If the Chair is the subject of the possible removal action, The Vice-Chair shall preside over the meeting during the agenda item concerning the Chair's removal. The officer subject to the removal action shall not participate in any way in the removal decision, nor shall his/her membership count as part of the total membership for purposes of calculating the vote. The notice of the meeting shall be posted in accordance with the Open Meetings Act and shall state that the issue of possibly removing the officer will be on

the agenda. Any vacancy caused by the removal shall be filled as provided under Section 4 of this Article.

## Section 4 Vacancies of Officers

Whenever an officer vacancy exists, the vacancy shall be filled at the next properly noticed SCTRWPG meeting. Nominations shall be made from the floor by voting members. The voting members shall elect a replacement officer from among the nominees by consensus or by affirmative vote of a majority of the voting membership. The next highest-ranking officer shall serve in the vacant position until a successor takes office, unless the office of the Secretary becomes vacant, in which case the Chair shall appoint a willing voting member to serve as Secretary until the successor to the Secretary takes office. The person selected to fill a vacancy for an officer shall serve for the unexpired term of his/her predecessor in office.

## Section 5 Duties of Each Officer

(a) Chair: The Chair shall be the executive officer of the SCTRWPG. The Chair will preside at all meetings of the SCTRWPG and perform all duties provided by these Bylaws. The Chair may establish and appoint such committees as may be necessary or desirable to assist in conducting the business of the SCTRWPG, or as may be directed by the SCTRWPG. If the Chair is unable to carry out his/her duties, the Vice-Chair shall assume the duties of the Chair.

(b) Vice-Chair: The Vice-Chair shall assist the Chair in the discharge of his/her duties and, in the absence of the Chair, shall assume the Chair's full responsibilities and duties. In the event the Chair is unable to carry out his/her duties, the Vice-Chair shall serve as Chair until the SCTRWPG elects a new Chair under Section 4 of this Article. The Vice-Chair shall perform other duties as assigned by the Chair or these Bylaws.

(c) Secretary: The Secretary or the Administrative Officer shall maintain the minutes and take attendance of the SCTRWPG meetings. The minutes and attendance shall be kept as part of the SCTRWPG official records. The Secretary, or the Administrative Officer, shall ensure that all notices are

properly posted as provided in the Bylaws, as required by law and as required by the Texas Open Meetings Act. The Secretary shall perform other duties as assigned by the Chair or these Bylaws. If both the Chair and Vice-Chair are unable to carry out the duties of the Chair, the Secretary shall assume the duties of the Chair.

## Section 6 Executive Committee

The Executive Committee shall be composed of five SCTRWPG members, including the Chair, Vice-Chair, Secretary and two members-at-large. No two voting members representing the same interest shall serve as members of the Executive Committee at the same time. The two members-at-large shall be elected annually in the same manner and with the same terms as set forth for the election of officers under this Article. Members-at-large shall be removed and their vacancies filled in the manner prescribed for officers under this Article.

The Executive Committee shall be responsible for carrying out the duties imposed on it in these Bylaws. The voting members of the SCTRWPG may delegate any administrative decisions to the Executive Committee unless provided otherwise in these Bylaws.

All meetings of the Executive Committee shall comply with the provisions related to meetings generally as set forth in Article IX of these Bylaws.

# ARTICLE IX MEETINGS

## Section 1 Open Meetings and Notice

All meetings of the SCTRWPG, its committees and/or sub-groups, shall be posted and open to the public in the manner of a governmental body under the Texas Open Meetings Act and as set forth in TWDB rules. All actions of the SCTRWPG shall be deliberated and undertaken in open meeting, unless otherwise authorized by the Texas Open Meetings Act. The time and place of meetings shall be set to facilitate, to the greatest extent possible, the participation of the public in the regional water planning process. Copies of all materials presented or discussed

shall be made available for public inspection prior to and following any meeting of the SCTRWPG, to the extent reasonably possible.

## Section 2 Regular or Called Meetings

At the first meeting of each calendar year, the SCTRWPG shall establish and adopt a regular meeting schedule for the ensuing year. The Chair or a majority of the voting members of the SCTRWPG may also call a special or emergency meeting of the SCTRWPG. The Secretary or Administrative Officer shall ensure that an advance notice and an agenda for regular meetings will be provided to the full membership of the SCTRWPG at least seven calendar days in advance by first class U.S. Mail, facsimile or electronic mail. Supporting information and member-requested materials shall be distributed to the full membership with the notice and agenda or at the meeting, as deemed appropriate by the Chair.

## Section 3 Agenda

The Secretary of the SCTRWPG shall ensure that agendas are prepared and distributed for all meetings, in accordance with this Article. Items shall be placed on the agenda at the request of anyvoting member of the SCTRWPG. Copies of the agenda and all supporting information shall be made available for public inspection prior to and following any meeting of the SCTRWPG.

## Section 4 Quorum

A quorum of the SCTRWPG shall be a simple majority of the voting members or their designated alternates excluding vacancies. No less than a quorum shall be necessary to conduct any business of the SCTRWPG.

## Section 5 Applicability of Robert's Rules of Order

Except as otherwise provided in these Bylaws, meetings of the SCTRWPG shall be conducted under the provisions of the most current edition of Robert's Rules of Order. However, failure to follow such rules shall not constitute grounds for appeal of an action or a decision of the SCTRWPG.

## Section 6 Public Meetings Required by Law

The SCTRWPG shall post notice and conduct public meetings specifically required by statute and/or TWDB rule, including those set forth for preplanning, draft regional water plan presentation, adoption of amendments to the regional water plan, and final regional water plan adoption, in accordance with the requirements of the relevant state law and/or TWDB rules. Notification requirements may be different from those in Section 1 of this Article and are specifically delineated in Texas Water Code §16.053 and/or31 TAC §357.12.

## Section 7 Minutes

(a) The Secretary shall ensure that minutes of all meetings of the SCTRWPG are prepared. The minutes shall:
   (1) state the subject of each deliberation;
   (2) indicate each vote, order, decision or other action taken;
   (3) indicate those members in attendance, noting the presence of a quorum, and noting the presence of those members of the public who participate in the course of the meeting;
   (4) represent an accurate summary of the meeting's record; and state any other information required by these Bylaws to be included in the minutes.

(b) The Secretary shall ensure that true copies of the minutes are provided to the full membership as soon as possible following the meeting.

## Section 8 Protocols for Public Communication at Regional Water Planning Group Meetings

(a) Oral Comments on Issues under the South Central Texas Regional Water Planning Group (Region L) Jurisdiction. Any person wishing to make an oral presentation at a Region L planning group meeting on any matter under Region L's jurisdiction must complete a registration form that indicates the agenda item or other topic on which they wish to comment, along with the speaker's name, address and other relevant information. Any person making an oral presentation to the

Region L planning group may distribute related materials to the planning group at the meeting.

(b) Time Allocation. The presiding officer may limit the length of time for each speaker to three (3) minutes. Speakers may not trade or donate time to other speakers with permission from the presiding officer, and repetitive testimony shall be minimized or disallowed at the discretion of the presiding officer.

(c) Time to Speak. Citizens to be heard will be given an opportunity to speak at the beginning of the meeting prior to any actions by the Region L planning group. The presiding officer has the discretion to allow citizens to speak at another time in the meeting if it is deemed relevant to the planning group's deliberations by the presiding officer and is not disruptive to the conduct of the meeting.

(d) Rules of Decorum. Speakers and members of the audience must avoid disruptive behavior that interferes with the orderly conduct of a public meeting. Placards, banners, and hand-held signs are not allowed in planning group meetings, and speakers and members of the audience must avoid personal affronts, profanity, booing, excessive noise, and other disruptive conduct. The presiding officer may direct that anyone who disrupts a meeting be removed from the room. Members of the planning group, if recognized by the presiding officer, may ask clarifying questions of a speaker, but no extended verbal exchange between the planning group members and the speaker will be permitted.

(e) Recording. Any person making an audio or video recording of all or any part of a planning group meeting must do so in a manner that is not disruptive to the meeting. During a meeting, members of the public must remain in or behind the public seating area and are not permitted to record from any other area of the meeting room.

## ARTICLE X MAKING DECISIONS

### Section 1 Applicability; No Written Proxies

(a) Unless the method for making a particular decision is set forth in these Bylaws, the SCTRWPG, its committees and subgroups shall make all decisions using the process set forth in Section 2 of this Article

(b) Written proxies shall not be allowed in any decision-making by the SCTRWPG, its committees or its subgroups. However, designated alternates shall be allowed to participate in decision making as set forth in these Bylaws. (Moved to Article VII)

### Section 2 Decision-Making Process

(a) Use of Consensus. The SCTRWPG shall attempt to make decisions using a consensus decision-making process. Consensus is an agreement built by identifying and exploring all members' interests and by assembling a package agreement which satisfies these interests to the greatest extent possible. A consensus is reached when all voting members agree that their major interests have been taken into consideration and addressed in a satisfactory manner so that they can support the decision of the group. The process of building consensus involves the development of alternatives and the assessment of the impacts of those alternatives.

Consensus does not necessarily mean unanimity. Some members may strongly endorse a particular solution while others may accept it as a workable agreement. A member can participate in the consensus without embracing each element of the agreement with the same fervor as other members, or necessarily having each of his/her interests satisfied to the fullest extent. In a consensus agreement, the members recognize that, given the combination of gains and trade-offs in the decision package and given the current circumstances and alternative options, the resulting agreement is the best one the voting members can make at this time.

(b) Failure to Reach Consensus. If after good faith negotiations it appears likely to the Chair that the voting members will be unable to reach consensus, the Chair shall entertain the following:

(1) a motion to put the issue to a vote to be conclusively decided by agreement of a majority of the voting membership; or
(2) a motion to put the issue to a vote as to whether to submit the issue to Alternative Dispute Resolution ("ADR") as set forth under Section 3 of this Article and identifying the members that shall participate in the ADR procedure ("ADR members"), such motion to be decided either by consensus or agreement of not less than a majority of the voting membership.

(c) Decision-Making Process for Committees. Committees established in accordance with these Bylaws shall use the process described in subsection (a) and (b)(1), above.

## Section 3 Alternative Dispute Resolution

(a) If a vote under Section 2 (b)(2) of this Article prevails, the ADR members shall agree upon the method of ADR and the use of a mutually acceptable impartial third party to facilitate resolution of the dispute. The ADR procedures shall be in writing, shall be executed by all ADR members before ADR begins, and shall include the following:
(1) The type or series of ADR criteria determined by all ADR members to be appropriate for the size and complexity of the issue, project or proposed action in dispute;
(2) The length of time to be allowed the parties to engage in any ADR procedure;
(3) The name(s) of the impartial third party who will facilitate any process, procedure or method by which a resolution may be agreed upon;
(4) An agreement between all ADR members as to the method of payment for any costs associated with an ADR procedure, such method being subject to approval by the SCTRWPG;
(5) An agreement between all ADR members that the impartial third party may not compel the ADR members to

enter into a binding agreement, nor shall the impartial third party have the authority to sanction or penalize any ADR member;

(6) An agreement between all ADR members that, by mutual consent, they may permit persons who are not ADR members to be included as participants in discussion and as experts;

(7) An agreement between all ADR members that they will continue with ADR procedures through the time frame established in subdivision (2) of this subsection until a settlement is reached, one of the ADR members withdraws from the process, or the impartial third party concludes and informs the parties that ADR measures are not working; and

(8) An agreement between all ADR members that any ADR procedure used shall provide the method(s) by which any agreement between the parties shall become effective, such as a change order to a plan or a written agreement governing the issue.

(b) An agreement or settlement reached under this section shall not become binding on the ADR members until all ADR members agree in writing to all of the terms of the agreement or settlement.

(c) If the ADR members reach an agreement on the issue, the voting members shall once again consider the issue using the decision-making process set forth under Section 2 of this Article. However, if the voting members fail to reach consensus on the issue a second time, the Chair shall call for a vote as provided under Section 2(b)(1) of this Article. The parties shall use the procedures set forth in this Article until the issue is resolved or abandoned.

## Section 4 Final Adoption of Regional Water Plan; Amendments

The voting members of the SCTRWPG shall finally adopt the regional water plan for the South Central Texas RWPA and any amendments thereto in accordance with this article.

## ARTICLE XI BOOKS AND RECORDS

### Section 1 Required Documents and Retainment

Records of the SCTRWPG, in accordance with the Public Information Act, shall be kept at the principal office of the SCTRWPG for a period of at least five years. Minutes shall be maintained at the principal office of the SCTRWPG for as long asthe SCTRWPG exists and for a period of five years thereafter.

### Section 2 Inspection and Copying

Records of the SCTRWPG shall be available for inspection and copying at the principal administrative office during normal business hours. Procedures and fees for copying and inspection shall be the same as those used by the political subdivision housing the principal office of the SCTRWPG for inspection and copying of its own public records.

### Section 3 Availability of Reports

All reports, planning documents and work products resulting fromprojects funded by the TWDB shall be made available to the TWDB, the TPWD and the TCEQ or their successor agencies. At least one copy of the approved regional water plan shall be placed in the county clerk's office for each county and in at least one public library of each county having land within the South Central Texas RWPA, in accordance with state law.

## ARTICLE XII COMMITTEES

### Section 1 Establishment

The SCTRWPG may by motion establish committees and subgroups to assist and advise the SCTRWPG in the development of the regional water management plan. The committee or subgroup may be formed to address specific issues assigned by the SCTRWPG and may have a specified term of membership.

### Section 2 Membership

Membership in the committees and subgroups shall generally follow the requirements and procedures of Article V of these Bylaws; membership of the committees and subgroups should be inclusive, rather than exclusive, in nature; the interests identified

in the initial coordinating body will be invited to participate, as well as other interests that have been identified. Appointment to committees or subgroups shall be made by the Chair. The terms of office for all members of committees and subgroups shall be either upon the expiration of the term, if any, specified by the SCTRWPG in the establishing motion for the committee or subgroup, or upon the expiration of the persons' membership in the SCTRWPG.

## Section 3 Officers

The Chair, Vice-Chair and Secretary of a committee or subgroup established by the SCTRWPG shall be elected from the members of the committee or subgroup. The Chair, Vice-Chair and Secretary of the committee or subgroup established by the SCTRWPG shall be elected to their respective offices by a majority affirmative vote of the members of the committee or subgroup. Additional committee or subgroup officers with associated responsibilities may be created as necessary by a majority affirmative vote of the members of the committee or subgroup. The additional officers shall be elected by a majority affirmative vote of the members of the committee or subgroup.

## Section 4 Meetings

Requirements and procedures for committee or subgroup meetings shall follow those established in Article IX of these Bylaws, including requirements for notice. Committees or subgroups may adopt their own rules of procedure, if authorized by the SCTRWPG and the rules are not in conflict with state law, TWDB rules or these Bylaws.

## Section 5 Books and Records

Requirements and procedures for committee or subgroup books and records shall follow those established for the SCTRWPG in Article XI of these Bylaws.

## Section 6 Code of Conduct

Members of a committee or subgroup are subject to the requirements of Article V, Section 6 of these Bylaws.

## ARTICLE XIII COMPENSATION AND REIMBURSEMENT

### Section 1 Compensation

Members of the SCTRWPG are not to be compensated for their time.

### Section 2 Reimbursement

Reimbursement of a SCTRWPG member's expenses will be issued from the local agency funds made available through interlocal funding agreements. Requests for reimbursement of travel and other expenses must meet the following requirements to be eligible:

a. The member must submit a completed Expense Report and appropriate receipts.
b. Requested reimbursement for travel expenses must be in conformance with the State rate that is in effect at the time the travel was conducted.
c. The Administrative Agency will issue a check to the member after the completed expense report has been approved by the Chair or Vice-Chair of the SCTRWPG and the mileage and rates have been verified.

All expenses, except those specifically listed below, are eligible for reimbursement under this policy:

a. Cost incurred by a SCTRWPG member eligible for reimbursement by the member's employer.

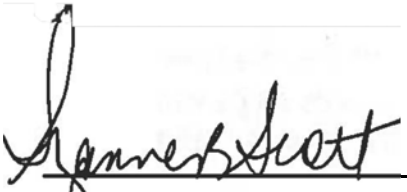
## ARTICLE XIV CONTRACTUAL SERVICES

The voting members of the SCTRWPG shall make all decisions related to final approval of persons or entities selected to provide contractual services for the SCTRWPG, including all services related to preparation, development or revisions of the regional water plan for the South Central Texas RWPA. However, the voting members may delegate to the Executive Committee the authority to make all administrative decisions concerning amendments to TWDB Research and Planning Fund grant contracts for services related to regional water planning, except

those decisions concerning amendments related to scopes of work and budgets.

## ARTICLE XV ADOPTING AND AMENDING THE BYLAWS

These Bylaws shall have full force and effect upon approval and adoption by the voting members of the SCTRWPG, acting on behalf of the interests comprising the South Central Texas RWPA, and upon submission to the TWDB in compliance with 31 TAC § 357.4. The voting members shall adopt these Bylaws and any amendment thereto by consensus or by affirmative vote of not less than two-thirds of the voting membership. The Secretary shall ensure that proposed amendments to the Bylaws are provided to the full membership no later than ten calendar days prior to the next regular meeting of the SCTRWPG when such amendments are to be considered.



November 7, 2019

Chair, SCTRWPG Date

# SCTRWPG GUIDING PRINCIPLES

## PRINCIPLE I APPROPRIATENESS ANDADEQUACY OF HOW DEMAND AND NEED ARE DETERMINED

Adopted: August 4, 2016; Amended: February 17, 2022

The SCTRWPG generally defers to the TWDB on matters related to population and water demand projections. However, the SCTRWPG retains the duty to review TWDB projections on a case by case basis. Where the SCTRWPG finds a discrepancy in TWDB's projections, and can adequately justify its findings by verifying one or more of the "criteria for adjustment," TWDB – in consultation with TDA, TCEQ, and TPWD – may adjust population and/or water demand projections accordingly (see *generally General Guidelines for Development of the 2026 Regional Water Plan*). Consistent with Chapter 8 of the 2021 Regional Water Plan for Region L, the SCTRWPG supports greater TWDB flexibility through relaxation of current methodological assumptions holding regional and state population projection totals fixed (see Chapter 8.9.3 *Population and Water Demand Projections)*. Water demand projections used in developing the Regional Water Plan should be consensus figures arrived at by using TWDB data along with local input from the cities, counties, and groundwater districts.

## PRINCIPLE II ROLE OF REGIONAL WATER PLANNING GROUPS IN INFLUENCING POPULATION GROWTH AND LAND USE

Adopted August 4, 2016

Where the concepts of population growth and land use necessarily interrelate with the Regional Water Plan, the SCTRWPG shall, to the greatest extent possible, develop strategies to meet future projected demands. However, it is neither the role, nor the responsibility of the SCTRWPG to

influence population growth or land use. While the SCTRWPG has a duty to remain cognizant of the sensitive relationship between the Regional Water Plan, population growth and land use, decisions concerning permitting and influencing population growth are inherently local, and remain wholly independent from the regional water planning process.

## PRINCIPLE III CONFLICTS OF INTERESTS WITH RESPECT TO PLANNING GROUP MEMBERS

Adopted August 4, 2016

### a) Active Planning Group Members

All disclosures pursuant to Article V, Section 6 of the SCTRWPG Bylaws, are the responsibility of the planning group member or designated alternate who has the potential conflict of interest. Therefore, disclosures are the responsibility of the planning group member or designated alternate. If the voting member choses to abstain from participation in deliberations, decisions, or voting, pursuant to Article V, Section 6 of the SCTRWPG Bylaws, the reason for abstention shall be noted in the minutes.

*SCTRWPG Bylaw Excerpt*

> *Potential conflicts of interest shall be clearly stated by the voting member or designated alternate prior to any deliberation or action on an agenda item with which the joint member or designated alternate may be in conflict. Where the potential conflict is restricted to a divisible portion of an agenda item, the Chair may divide the agenda item into parts for deliberation and voting purpose. An abstention from participation in deliberations, decisions or voting and the reason therefore shall be noted in the minutes.* (see *SCTRWPG Bylaws*, Article V, Section 6, (b))

### b) Nomination Process

Where the SCTRWPG is soliciting nominations to fill vacancies on

the planning group, nominators shall provide information regarding the nominee's current employer, and provide a description of the nominee's experience that qualifies him/her for the position in the interest group being sought to represent.

Additionally, nominees shall agree to abide by the Code of Conduct, which is incorporated in the SCTRWPG Bylaws (see *SCTRWPG Bylaws*, Article V, Section 6). As per the Bylaws, the Executive Committee will conduct an interview process whereby nominees will be evaluated. Prior to the interview, nominees will be provided a copy of the Bylaws. During the interview process, nominees will be asked if they are willing to agree to the Bylaws, and specifically, if they are willing to comply with the Code of Conduct.

## PRINCIPLE IV THE ROLE OF THE PLANNING GROUP IN INFLUENCING WATER DEVELOPMENT PLANS OF WATER SUPPLIERS

Adopted: November 3, 2016

The role of the SCTRWPG is to ensure water needs are met with identified potentially feasible water management strategies. It is not the role of the SCTRWPG to influence or interfere with local water planning decisions. In the absence of a planning group recommended potentially feasible water management strategy to meet an identified need, the SCTRWPG may evaluate and report, as required, the social, environmental and economic impacts of not meeting the identified need.

## PRINCIPLE V THE ROLE OF THE PLANNINGGROUP IN INFLUENCING PERMITTING ENTITIES

Adopted: November 3, 2016

Decisions made at the planning group level are non-regulatory, and are intended for planning purposes only. While some decisions made by the SCTRWPG could inevitably affect some decisions made by the governing boards of permitting entities, it is neither the responsibility, nor the role of the SCTRWPG to

influence or interfere with the regulatory decisions made by the governing boards of permitting entities.

## PRINCIPLE VI THE ADEQUACY OF EVALUATING THE PLAN'S EFFECTS ON FRESHWATER INFLOWS TO SAN ANTONIO BAY, AND THE ADEQUACY OF ENVIRONMENTAL ASSESSMENTS OF INDIVIDUAL WATER MANAGEMENT STRATEGIES

Adopted: November 2, 2017

The SCTRWPG's evaluation of the Plan's effect on instream flows and freshwater inflows to the San Antonio Bay, and Plan's environmental assessments of individual water management strategies are currently meeting the regulations and statutes for regional water planning. The SCTRWPG believes a structural reorganization of the data presented will benefit the understanding of the Plan's environmental assessments. The SCTRWPG will:

**a)** Initiate environmental assessments earlier into the regional planning process;
**b)** Eliminate environmental assessment comparisons of current plan to past plans;
**c)** Consolidate threatened and endangered species information into the appendix rather than repeating in each water management strategy write-up;
**d)** Update baseline year data to most current for potential impacts to vegetation and terrestrial habitat;
**e)** Adjust distances for cultural resource sites;
**f)** Include current conditions and streamflow protected by environmental flow standards in updated tabular form improving the way in which the data is presented;
**g)** Include target flow regimes based on environmental freshwater inflow standards in updated tabular form improving the way in which the data is presented; and
**h)** Include high level narrative of climate variability.

The SCTRWPG believes this environmental assessment structural reorganization will reflect realistic environmental impacts of the recommended water management strategies for both the public and planning group members.

## PRINCIPLE VII MINIMUM STANDARDS FORWATER MANAGEMENTSTRATEGIES

Adopted: November 2, 2017

For a proposed strategy to be designated by the SCTRWPG as a water management strategy in the regional water plan, the proposed strategy must:

**a)** supply water, reduce water demands, or otherwise satisfy one or more identified needs;
**b)** include an evaluation and description consistent with standards used by the SCTRWPG and its technical consultants as required by TWDB Rules;
**c)** satisfy all relevant requirements established by the TWDB, including environmental flow standards;
**d)** identify one or more entities, with sufficient ability and willingness to implement the strategy, as being the strategy's sponsor(s);
**e)** identify all entities, as reasonably possible, who own any existing or planned infrastructure or existing permit that could be affected by the proposed strategy as being strategy participants; and
**f)** identify groundwater conservation districts or TCEQ with jurisdiction over the proposed strategy.

## PRINCIPLE VIII RECOMMENDED WATER MANAGEMENT STRATEGIES

Adopted: November 2, 2017

The SCTRWPG strives to develop a regional water plan that recommends water management strategies sufficient to supply

water to all identified needs projected in the planning horizon for the region.

The SCTRWPG prefers designating water management strategies as recommended or alternative using a consensus approach while respecting the strategy sponsor(s)' wishes.

Prior to designating any water management strategies as recommended, the SCTRWPG will review the water management strategies to evaluate costs and environmental sensitivity of eachwater management strategy per TWDB Rules.

## PRINCIPLE IX MANAGEMENT SUPPLY

Adopted: November 2, 2017

The cumulative supply of the recommended water management strategies may include an amount of supply in excess of the amount needed to meet regional needs as considered necessary by the SCTRWPG to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability.

*Identified Needs without a Recommended Water Management Strategy*

For water needs that are not satisfied by recommended water management strategies, the SCTRWPG will provide a narrative explaining why the need is not satisfied.

*Alternative Strategies in the Regional Water Plan*

The SCTRWPG will include alternative water management strategies that sponsors wish to have identified as alternatives to one or more of their recommended water management strategies.

*Conceptual Approaches (Water Management Strategies Needing Further Study) in the Regional Water Plan*

The SCTRWPG will acknowledge conceptual and innovative approaches to developing water supplies, reducing water

demand, and increasing efficiency of supplying water as may be proposed by others, but need further study.

## PRINCIPLE X THE ROLE OF REUSE WITHIN THE REGIONAL WATER PLAN

Adopted: November 2, 2017

The SCTRWPG generally defers to the TWDB rules for regional water planning as contained in the TAC on matters related to surface water supply analysis. For surface water supply analysis, the SCTRWPG will use the most current Water Availability Models from the TCEQ to evaluate supplies, as required by section

357.32 (c) of the TAC. As per section 357.32 of the TAC, the SCTRWPG will assume full utilization of existing water rights and no return flows when using Water Availability Models.

The SCTRWPG agrees that effluent will be depicted in the Regional Water Plan only in cases of direct and/ or indirect reuse water management strategies, or where a preexisting contract for the supply of reuse is in place. Additionally, the SCTRWPG will not use effluent in the estimates of cumulative effects absent a direct and/or indirect reuse water management strategy or a preexisting contract

## PRINCIPLE XI IDENTIFYING SPECIAL STUDIES OR EVALUATIONS DEEMED IMPORTANT TO ENHANCE THE 2026 PLAN, THE IDENTIFICATION OF OUTSIDE FUNDING SOURCES, AND THE EXTENT TO WHICH INNOVATIVE STRATEGIES SHOULD BE USED

Adopted: November 2, 2017;
Amended: February 17, 2022

The SCTRWPG recognizes that there are no identifiable outside funding sources for special studies or evaluations. However, the SCTRWPG remains willing to consider evaluating any proposed water management strategies and special studies allowable under section 357.34 of the TAC.

*Notes*

*Notes*




**South Central Texas Regional Water Planning Group**
**c/o San Antonio River Authority**
**100 East Guenther Street**
**San Antonio, Texas 78204**

# Appendix 5B: Water Management Strategies Considered and Evaluated to Meet Identified Needs

# Appendix 5B: Water Management Strategies Considered and Evaluated to Meet Identified Needs

| Every WUG Entity with an Identified Need | | | WMSs to be considered by statute[1] | | | | | | | | | | | | Additional WMSs to be considered by rule | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG Name | Maximum Need 2030-2080 (af/yr) | Conservation - water use reduction | Conservation - water loss mitigation | Drought management | Rreuse | Management of existing supplies | Development of large-scale marine seawater or brackish groundwater | Conjunctive use | Acquisition of available existing supplies | Development of new supplies | Development of regional water supply or regional management of water supply facilities | Voluntary transfer of water (including regional water banks, sales, leases, options, subordination agreements, and financing agreements) | Emergency transfer of water under Section 11.139 | System optimization, reallocation of reservoir storage to new uses, contracts, water marketing, enhancement of yield, improvement of water quality | New surface water supply | New groundwater supply | Brush management; precipitation enhancement | Interbasin transfers of surface water | Aquifer storage and recovery | Cancellation of water rights | Rainwater harvesting |
| 1 | Alamo Heights | 488 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 2 | Aqua WSC [2, 3] | 67 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 3 | Atascosa Rural WSC | 2,436 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 4 | Benton City WSC | 716 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 5 | Bexar County WCID 10 | 1,154 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 6 | Boerne | 13,812 | PF | PF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF |
| 7 | C Willow Water | 61 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 8 | Canyon Lake Water Service (Texas Water Company) [3] | 18,379 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | PF | PF | nPF | nPF | nPF | nPF | nPF |
| 9 | Carrizo Hill WSC | 67 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 10 | Castroville | 1,322 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 11 | Cibolo | 2,321 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 12 | Clear Water Estates Water System (Texas Water Company) | 3,596 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 13 | Converse | 552 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 14 | County Line SUD | 11,808 | nPF | nPF | PF | PF | PF | PF | nPF | PF | PF | nPF | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 15 | County-Other, Comal | 17,204 | PF | PF | nPF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | PF | nPF | nPF | nPF | PF |
| 16 | County-Other, Guadalupe | 584 | PF | PF | nPF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | PF |

| Every WUG Entity with an Identified Need | | | WMSs to be considered by statute[1] | | | | | | | | | | | | Additional WMSs to be considered by rule | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG Name | Maximum Need 2030-2080 (af/yr) | Conservation - water use reduction | Conservation - water loss mitigation | Drought management | Rreuse | Management of existing supplies | Development of large-scale marine seawater or brackish groundwater | Conjunctive use | Acquisition of available existing supplies | Development of new supplies | Development of regional water supply or regional management of water supply facilities | Voluntary transfer of water (including regional water banks, sales, leases, options, subordination agreements, and financing agreements) | Emergency transfer of water under Section 11.139 | System optimization, reallocation of reservoir storage to new uses, contracts, water marketing, enhancement of yield, improvement of water quality | New surface water supply | New groundwater supply | Brush management; precipitation enhancement | Interbasin transfers of surface water | Aquifer storage and recovery | Cancellation of water rights | Rainwater harvesting |
| 17 | County-Other, Hays [3] | 0 | PF | PF | nPF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF |
| 18 | County-Other, Kendall | 926 | PF | PF | nPF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | PF |
| 19 | County-Other, Victoria | 297 | PF | PF | nPF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | PF | nPF | nPF | nPF | PF |
| 20 | Creedmoor-Maha WSC [3] | 0 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 21 | Crystal Clear SUD | 17,211 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 22 | East Central SUD | 7,269 | PF | PF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 23 | East Medina County SUD | 58 | nPF | nPF | PF | nPF | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | PF | nPF | nPF |
| 24 | El Oso WSC [3] | 0 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 25 | Elmendorf | 1,016 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 26 | Fair Oaks Ranch | 689 | PF | PF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 27 | Fort Sam Houston | 14,151 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 28 | Garden Ridge | 4,081 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 29 | Goforth SUD [3] | 0 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 30 | Green Valley SUD | 3,381 | PF | PF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 31 | Hondo | 288 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 32 | Irrigation, Calhoun | 9,173 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 33 | Irrigation, Dimmit | 4,336 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 34 | Irrigation, Goliad | 184 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 35 | Irrigation, Guadalupe | 20 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 36 | Irrigation, Karnes | 744 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF |
| 37 | Irrigation, La Salle | 413 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |

| Every WUG Entity with an Identified Need | | | WMSs to be considered by statute[1] | | | | | | | | | | | | Additional WMSs to be considered by rule | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG Name | Maximum Need 2030-2080 (af/yr) | Conservation - water use reduction | Conservation - water loss mitigation | Drought management | Rreuse | Management of existing supplies | Development of large-scale marine seawater or brackish groundwater | Conjunctive use | Acquisition of available existing supplies | Development of new supplies | Development of regional water supply or regional management of water supply facilities | Voluntary transfer of water (including regional water banks, sales, leases, options, subordination agreements, and financing agreements) | Emergency transfer of water under Section 11.139 | System optimization, reallocation of reservoir storage to new uses, contracts, water marketing, enhancement of yield, improvement of water quality | New surface water supply | New groundwater supply | Brush management; precipitation enhancement | Interbasin transfers of surface water | Aquifer storage and recovery | Cancellation of water rights | Rainwater harvesting |
| 38 | Irrigation, Medina | 23,948 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF |
| 39 | Irrigation, Uvalde | 18,625 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF |
| 40 | Irrigation, Victoria | 200 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 41 | Irrigation, Wilson | 331 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF |
| 42 | Irrigation, Zavala | 14,189 | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 43 | Kendall West Utility | 490 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 44 | Kirby | 270 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | PF |
| 45 | KT Water Development | 4,471 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 46 | Kyle | 2,287 | PF | PF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | PF |
| 47 | La Coste | 5 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 48 | Leon Valley | 1,129 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | PF |
| 49 | Live Oak | 228 | PF | PF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 50 | Livestock, Hays | 12 | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 51 | Lockhart | 908 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 52 | Lytle | 447 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 53 | Manufacturing, Bexar | 1,755 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 54 | Manufacturing, Caldwell | 14 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 55 | Manufacturing, Calhoun | 8,741 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 56 | Manufacturing, Kendall | 53 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 57 | Manufacturing, Victoria | 46,815 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 58 | Manufacturing, Wilson | 17 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |

| Every WUG Entity with an Identified Need | | | WMSs to be considered by statute[1] | | | | | | | | | | | | Additional WMSs to be considered by rule | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG Name | Maximum Need 2030-2080 (af/yr) | Conservation - water use reduction | Conservation - water loss mitigation | Drought management | Rreuse | Management of existing supplies | Development of large-scale marine seawater or brackish groundwater | Conjunctive use | Acquisition of available existing supplies | Development of new supplies | Development of regional water supply or regional management of water supply facilities | Voluntary transfer of water (including regional water banks, sales, leases, options, subordination agreements, and financing agreements) | Emergency transfer of water under Section 11.139 | System optimization, reallocation of reservoir storage to new uses, contracts, water marketing, enhancement of yield, improvement of water quality | New surface water supply | New groundwater supply | Brush management; precipitation enhancement | Interbasin transfers of surface water | Aquifer storage and recovery | Cancellation of water rights | Rainwater harvesting |
| 59 | Manufacturing, Zavala | 877 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 60 | Martindale WSC | 434 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 61 | Maxwell SUD | 3,838 | PF | PF | PF | nPF | PF | PF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 62 | McCoy WSC | 185 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 63 | Mining, Atascosa | 4,478 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 64 | Mining, Comal | 13,268 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 65 | Mining, Dimmit | 5,451 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 66 | Mining, Frio | 4,036 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 67 | Mining, Gonzales | 3,779 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 68 | Mining, Guadalupe | 428 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 69 | Mining, Karnes | 1,440 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 70 | Mining, La Salle | 4,867 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 71 | Mining, Medina | 4,604 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 72 | Mining, Uvalde | 2,676 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 73 | Mining, Victoria | 408 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 74 | Mining, Zavala | 3,664 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 75 | Natalia | 13 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 76 | New Braunfels | 88,362 | PF | PF | PF | PF | PF | nPF | PF | PF | PF | PF | nPF | nPF | PF | nPF | PF | nPF | nPF | PF | nPF | nPF |
| 77 | Oak Hills WSC | 1,568 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 78 | Pearsall | 745 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 79 | Picosa WSC | 273 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |

| Every WUG Entity with an Identified Need | | | WMSs to be considered by statute[1] | | | | | | | | | | | | Additional WMSs to be considered by rule | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG Name | Maximum Need 2030-2080 (af/yr) | Conservation - water use reduction | Conservation - water loss mitigation | Drought management | Rreuse | Management of existing supplies | Development of large-scale marine seawater or brackish groundwater | Conjunctive use | Acquisition of available existing supplies | Development of new supplies | Development of regional water supply or regional management of water supply facilities | Voluntary transfer of water (including regional water banks, sales, leases, options, subordination agreements, and financing agreements) | Emergency transfer of water under Section 11.139 | System optimization, reallocation of reservoir storage to new uses, contracts, water marketing, enhancement of yield, improvement of water quality | New surface water supply | New groundwater supply | Brush management; precipitation enhancement | Interbasin transfers of surface water | Aquifer storage and recovery | Cancellation of water rights | Rainwater harvesting |
| 80 | Runge | 7 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 81 | San Antonio Water System | 40,390 | PF | PF | PF | PF | PF | PF | nPF | PF | PF | PF | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 82 | San Marcos | 15,788 | PF | PF | PF | PF | PF | nPF | nPF | nPF | PF | PF | PF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 83 | Schertz | 9,676 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 84 | Seguin | 234 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | PF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 85 | Selma | 3,680 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 86 | Shavano Park | 389 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 87 | South Buda WCID 1 | 3,119 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 88 | Springs Hill WSC | 7,115 | PF | PF | PF | nPF | PF | nPF | nPF | PF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 89 | Steam-Electric Power, Victoria | 666 | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 90 | Texas State University | 619 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 91 | The Oaks WSC | 178 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 92 | Uvalde | 717 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 93 | Victoria | 8,510 | PF | PF | PF | nPF | PF | nPF | PF | nPF | PF | nPF | PF | nPF | nPF | PF | PF | nPF | nPF | PF | nPF | nPF |
| 94 | Ville Dalsace Water Supply | 113 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |
| 95 | Wimberley WSC | 2,056 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF | nPF |
| 96 | Wingert Water Systems | 175 | PF | PF | PF | nPF | PF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF | PF | nPF | nPF | nPF | nPF | nPF |

[1] Texas Water Code §16.053(e)(5)

[2] Aqua WSC is split between Region K and Region L, with the majority of its area within Region K. Region K evaluated and recommended one or more brackish groundwater development strategies that would benefit Aqua WSC. Refer to the 2026 Region K Regional Water Plan for more information.

| Every WUG Entity with an Identified Need | | | WMSs to be considered by statute[1] | | | | | | | | | | | | Additional WMSs to be considered by rule | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | WUG Name | Maximum Need 2030-2080 (af/yr) | Conservation - water use reduction | Conservation - water loss mitigation | Drought management | Rreuse | Management of existing supplies | Development of large-scale marine seawater or brackish groundwater | Conjunctive use | Acquisition of available existing supplies | Development of new supplies | Development of regional water supply or regional management of water supply facilities | Voluntary transfer of water (including regional water banks, sales, leases, options, subordination agreements, and financing agreements) | Emergency transfer of water under Section 11.139 | System optimization, reallocation of reservoir storage to new uses, contracts, water marketing, enhancement of yield, improvement of water quality | New surface water supply | New groundwater supply | Brush management; precipitation enhancement | Interbasin transfers of surface water | Aquifer storage and recovery | Cancellation of water rights | Rainwater harvesting |

[3] WUGs are split between Region L and other regions (Regions K, P, and/or N). Information in the table represents Region L portion of WUG.

nPF = considered but determined 'not potentially feasible' (may include WMSs that were initially identified as potentially feasible)

PF = considered 'potentially feasible' and therefore evaluated

# Appendix 5C: Implementation Status of Certain Water Management Strategies

# Appendix 5C: Implementation Status of Certain WMSs

| REGIONAL WATER PLAN WMS/PROJECT DATA | | | | | | | ANTICIPATED/ESTIMATED (OR ACTUAL[1]) IMPLEMENTATION ACTIVITIES AND DATES | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PERMITTING STATUS (as applicable) | | | | | | | | | PLANNING, DESIGN, AND CONSTRUCTION STATUS | | | | | | | |
| | | | | | | | | STATE WATER RIGHT STATUS | | | | FEDERAL 404 PERMIT STATUS (if applicable) | | DESALINATION PERMIT STATUS | | OTHER KEY PERMITS | GEOTECH/DESIGN | LAND ACQUISITION | | CONSTRUCTION | | | TOTAL FUNDS EXPENDED TO DATE | Other significant activities completed (summary) |
| Figure No. | Water Management Strategy/Project Name | Project Sponsor | WMS Project Sponsor Region | Online Decade | Capital Cost | Anticipated Footprint Acreage (acres) | SPONSOR AUTHORIZATION | Anticipated (or actual) TCEQ application filed (date) | Anticipated (or actual) State Water Right Permit Administratively Complete (date) | Anticipated (or actual) Draft State Water Right Permit Issued (date) | Anticipated (or actual) Date Final State Water Right Permit Issued (date) | Anticipated (or actual) application for permit filed (date) | Anticipated (or actual) permit issuance (date) | Anticipated (or actual) diversion permit issued (date) | Anticipated (or actual) Discharge/ Disposal Permit Issued (date) | Summary of other permits and status (summary) | Generally describe the types and amount (as %s) of geotechnical/ reconnaissance/ engineering feasibility or other technical, testing, and/or design work etc. performed to date (summary) | Percent Land Acquisition Completed (%) | Anticiptated land acquisition completion (date) | Anticipated start of construction (Date) | Percent construction completed (%) | Anticipated construction completion (date) | Rough approximation of the total expenditures, to date, on ALL activities related to project implementation to date (millions of $s) | |
| | | | | | | | Date(s) that the sponsor took an affirmative vote or other action to make expenditures necessary to construct or file applications for state or federal permits (date(s)) | | | | | | | | | | | | | | | | |
| 5C-1 | ARWA DPR (Phase 3) Project | Alliance Regional Water Authority (ARWA) | L | 2060 | $ 119,879,000 | 188 | N/A | N/A | N/A | N/A | N/A | 2055 | 2056 | N/A | TPDES Discharge Permit Amendment for RO concentrate disposal, anticipated issuance in 2055 | N/A | A Feasibility Study has been conducted, reflecting 0.5% of the effort. | 0% | 2056 | 2056 | 0% | 2060 | $0.05M | N/A - None |
| 5C-2 | Caldwell Brackish Partnership Project | BVRT, County Line SUD, Maxwell SUD | L | 2040 | $ 292,793,000 | ~135 (includes pipeline ROW, storage tank(s), WTP, wells, collection lines, and pump station(s)) | Contract for feasibility report was executed on October 20, 2023 | N/A | N/A | N/A | N/A | 2028 | 2031 | GCD permits anticipated by 2030 | N/A | Class I Injection Well permit anticipated by 2030 | Feasibility report with preliminary hydrogeology has been completed. | 0% | Groundwater leases anticipated by 2027, ROW anticipated by 2031 | 2030 | 0% | 2033 | $0.25M split between the three utilities | Presentations to key stakeholders |
| 5C-3 | CRWA Expanded Brackish Carrizo-Wilcox Project | Canyon Regional Water Authority (CRWA) | L | 2040 | $ 236,210,000 | 368 | No board action has been taken | N/A | N/A | N/A | N/A | 2036 | 2037 | N/A | 2038 | Building, Environmental Assessment, Pretreatment | Geotechnical-0%; feasibility-0%; design-0% | 0% | 2034 | 2038 | 0% | 2040 | $0M | As of January 2025, CRWA is pursuing a feasibility study for this project |
| 5C-4 | GBRA Lower Basin New Appropriation Project | Guadalupe-Blanco River Authority (GBRA) | L | 2040 | $ 249,823,000 | 2,037 | No board action has been taken | 8/5/2009 | 10/18/2017 | 2026 | 2030 | 2033 | 2037 | N/A | N/A | N/A | Water rights feasibility study in 2008 | 0% | 2035 | 2037 | 0% | 2039 | $1M | N/A - None |
| 5C-5 | GBRA WaterSECURE | Guadalupe-Blanco River Authority (GBRA) | L | 2040 | $ 6,093,657,000 | 12,000 | No board action has been taken | Varies - Eight WRs obtained between 1940 to 2008 | Varies - Eight WRs obtained between 1940 to 2008 | Varies - Eight WRs obtained between 1940 to 2008 | Varies - Eight WRs obtained between 1940 to 2008 | 2027 | 2030 | N/A | N/A | Class I Injection Well permit anticipated by 2028 | Finishing the feasibility study in Spring 2025 | 0% | 2028 | 2028 | 0% | 2033 | $5M | N/A - None |
| 5C-6 | Gonzales & Guadalupe Brackish Partnership Project | BVRT, County Line SUD, Maxwell SUD | L | 2040 | $ 421,443,000 | ~225 (includes pipeline ROW, storage tank(s), WTP, wells, collection lines, and pump station(s)) | Contract for feasibility report was executed on October 20, 2023 | N/A | N/A | N/A | N/A | 2028 | 2031 | GCD permits anticipated by 2030 | N/A | Class I Injection Well permit anticipated by 2030 | Feasibility report with preliminary hydrogeology has been completed. | 0% | Groundwater leases anticipated by 2027, ROW anticipated by 2031 | 2030 | 0% | 2033 | $0.25M split between the three utilities | Presentations to key stakeholders |
| 5C-7 | Medina County Regional ASR Project | East Medina County SUD and Yancey WSC | L | 2040 | $ 319,445,000 | 95 | Medina County took action on Interlocal Agreement and authorized prelminary funding of $92,000 for the Medina County Regional Water Alliance. Funds covered administrative, legal, and technical assistance to complete a pre-feasibility study for ASR. | N/A | N/A | N/A | N/A | 2036 | 2037 | N/A | N/A | Class V Injection Well permit anticipated by 2037; Transfer of Edwards Aquifer Authority Permits anticipated in 2035 | Feasibility report with preliminary hydrogeology has been completed. | 0% | 2035 | 2035 | 0% | 2040 | $0.092M | Pre-feasibility report for ASR completed. Monthly meetings underway. |
| 5C-8 | NBU Potable Reuse Project | New Braunfels | L | 2040 | $ 38,220,000 | 73 | N/A - Anticipated in 2030 | 2033 | N/A | N/A | N/A | N/A | N/A | N/A | TPDES Discharge Permit Amendment for RO concentrate disposal, anticipated issuance in 2035 | N/A | Project has been identified in NBU's 2024 WRP | 100% | 1957 | 2035 | 0% | 2038 | $0M | Project has been identified in NBU's 2024 WRP |
| 5C-9 | SAWS Expanded Brackish Groundwater Project | San Antonio Water System (SAWS) | L | 2040 | $ 319,181,000 | 361 | 2014 | N/A | N/A | N/A | N/A | To Be Determined (TBD) | TBD | N/A | N/A | Varies – Five Class I Injection Well permits obtained between 2008 and 2011 | 5%. Concept study was completed end of 2013 prepared by B&V which included pipeline routing, requirements, well construction and well locations and integration conveyance. | 0% | 2035 | 2035 | 0% | 2040 | $209M | N/A - None |
| 5C-10 | SAWS Regional Wilcox Project | San Antonio Water System (SAWS) | L | 2050 | $ 1,267,722,000 | 1,597 | No action has been taken. | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0% | 2045 | 2045 | 0% | 2050 | $0M | N/A - None |

[1] Any date entered that is prior to adoption of the Regional Water Plan is assumed to be an "actual" date.

**Figure 5C-1 Anticipated Implementation Timeline for the ARWA DPR (Phase 3) WMS**

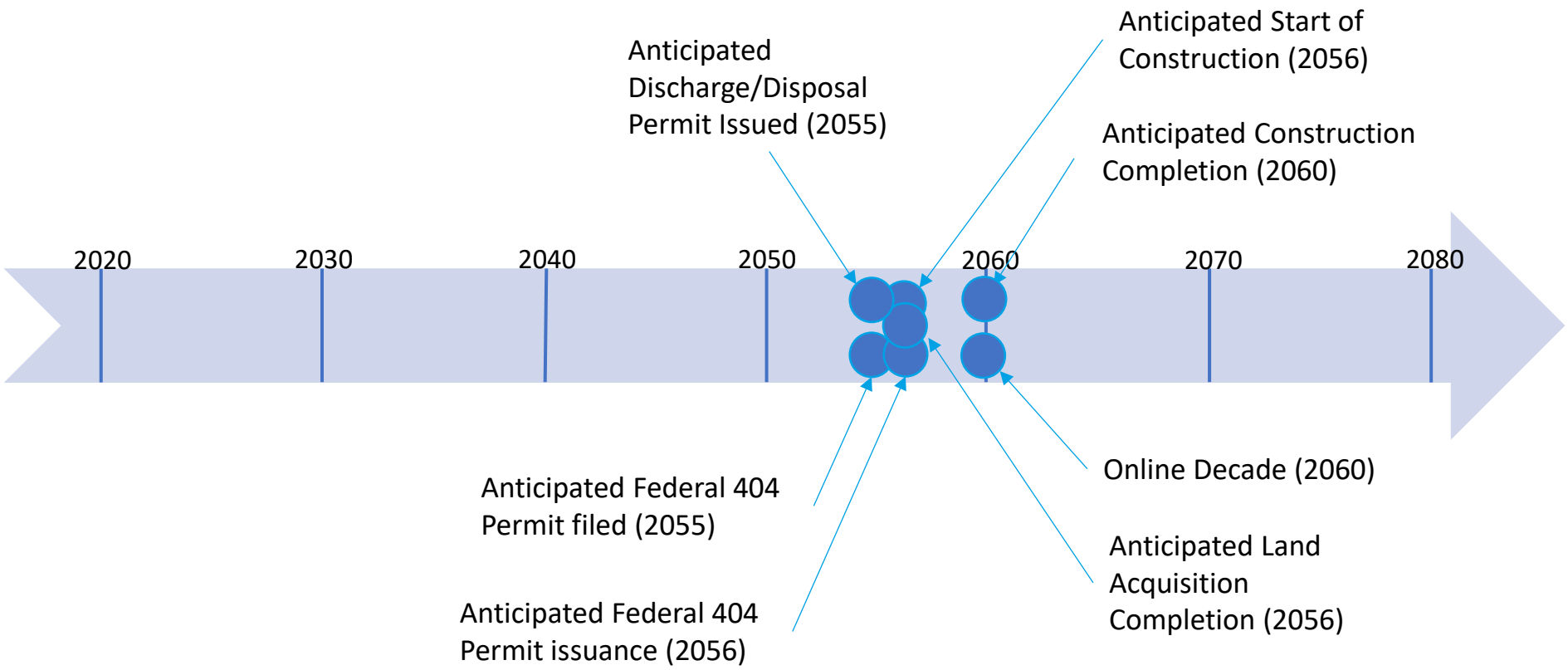


**Figure 5C-2 Anticipated Implementation Timeline for the Caldwell Brackish Partnership Project**

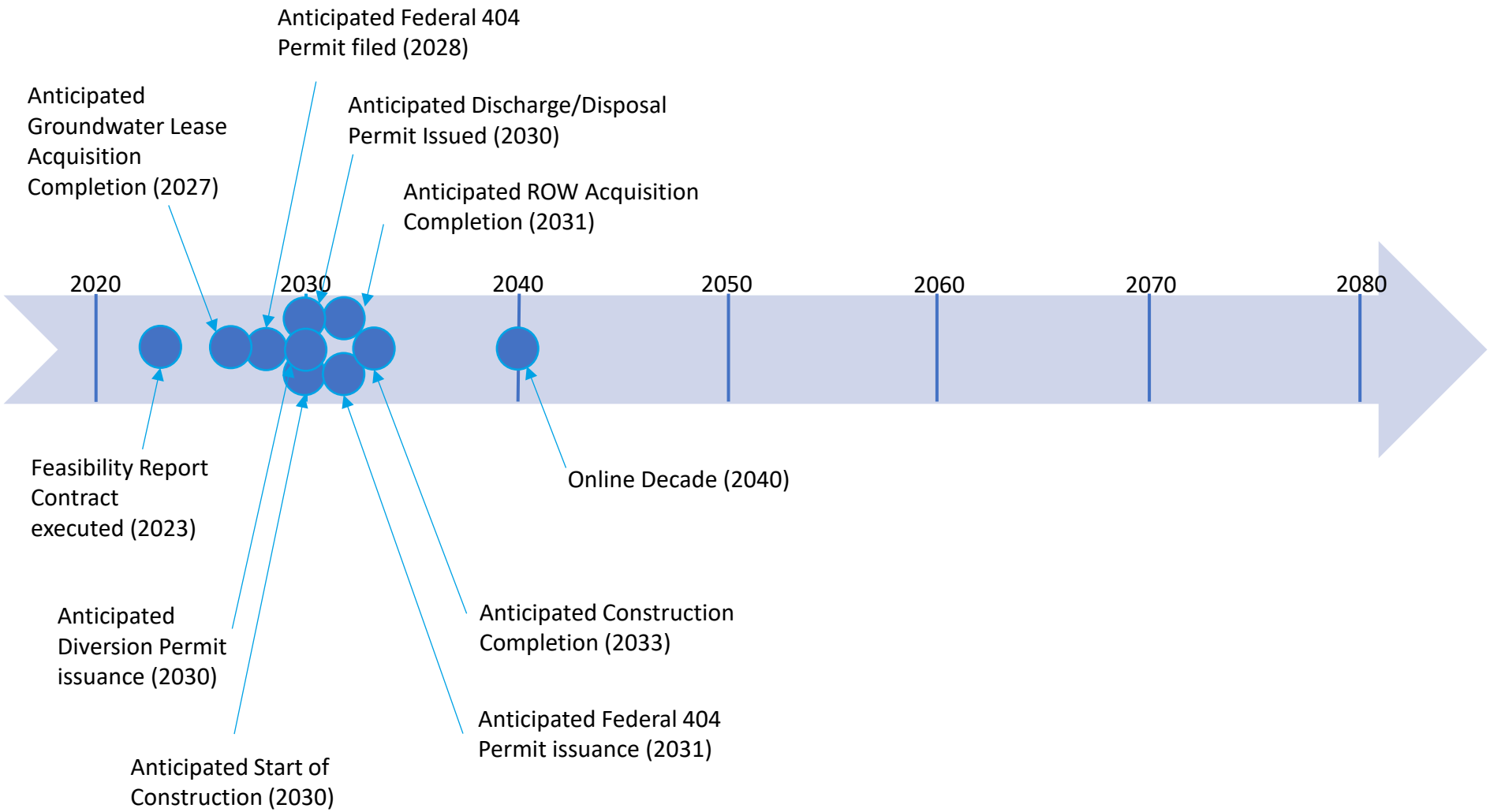


**Figure 5C-3 Anticipated Implementation Timeline for the CRWA Expanded Brackish Carrizo-Wilcox Project**

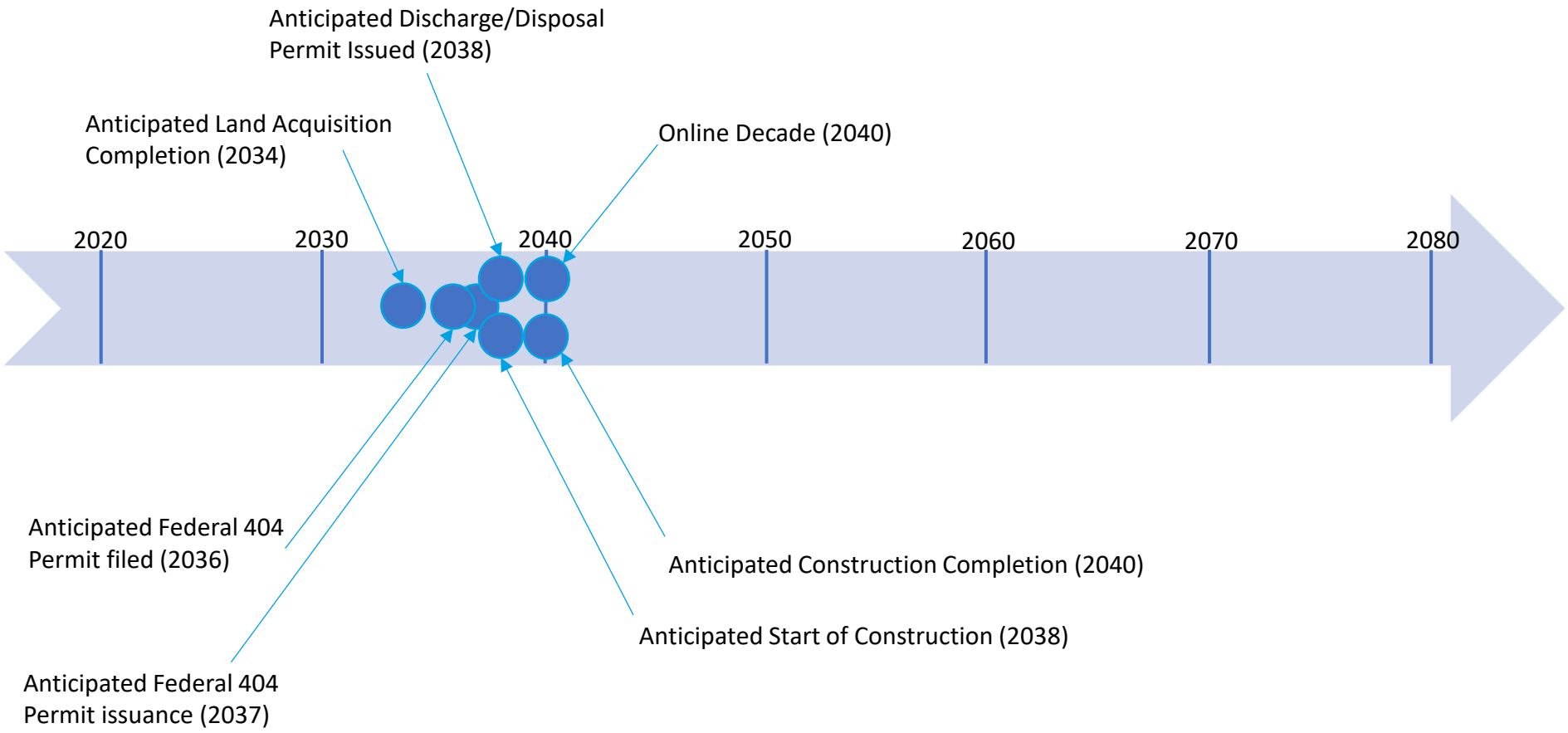


**Figure 5C-4 Anticipated Implementation Timeline for GBRA Lower Basin New Appropriation Project**

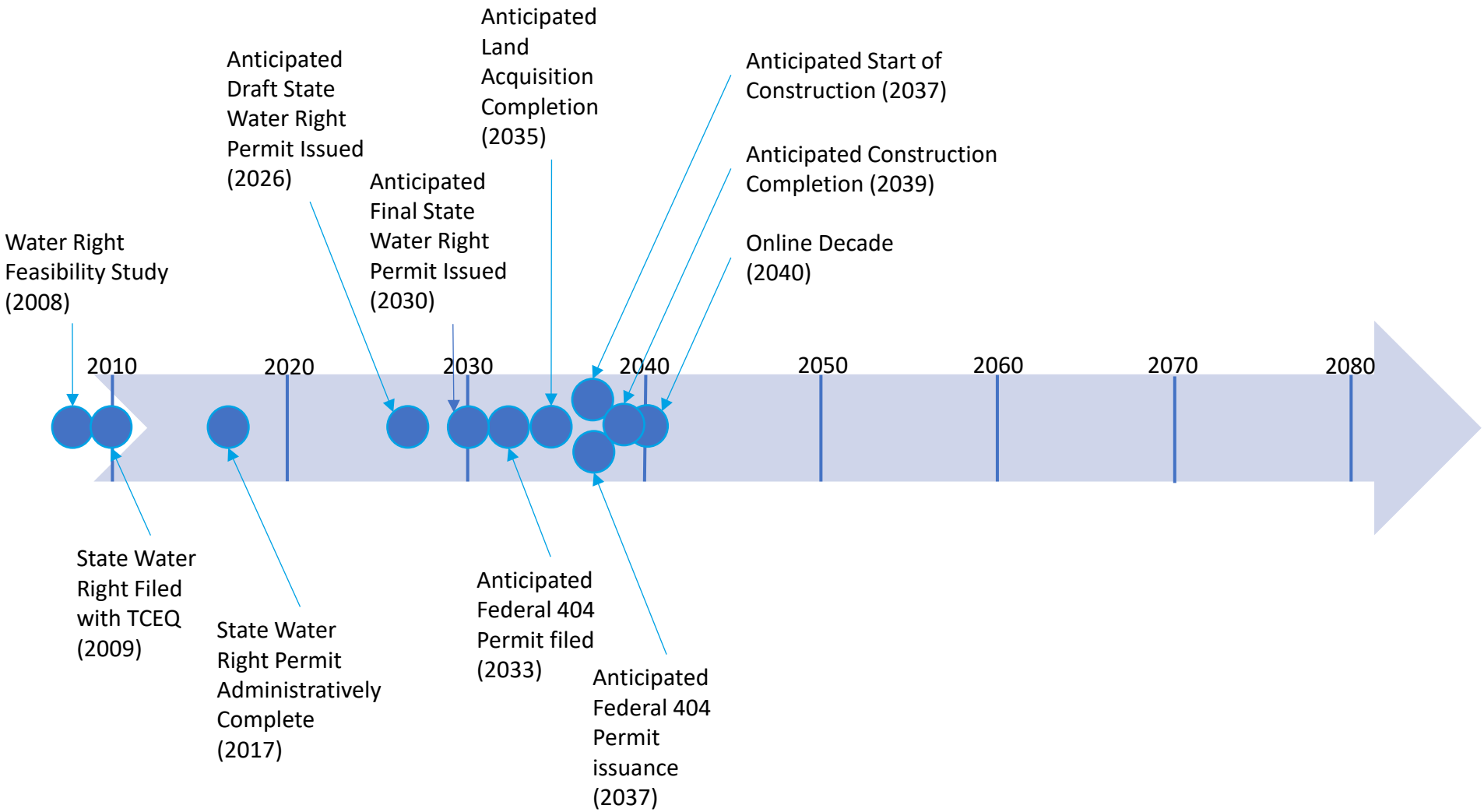


**Figure 5C-5 Anticipated Implementation Timeline for the GBRA WaterSECURE WMS**

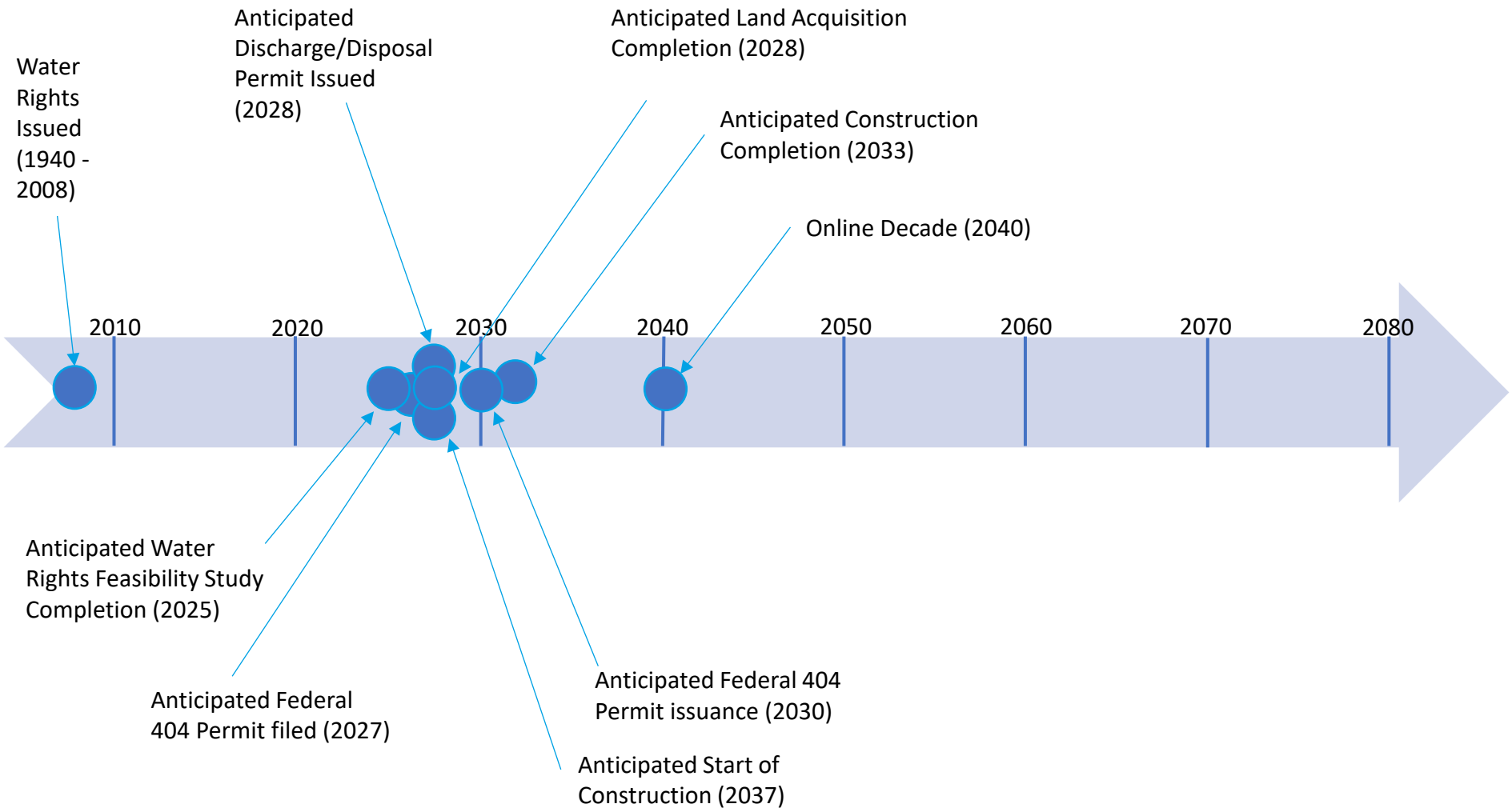


**Figure 5C-6 Anticipated Implementation Timeline for the Gonzales & Guadalupe Brackish Partnership Project**

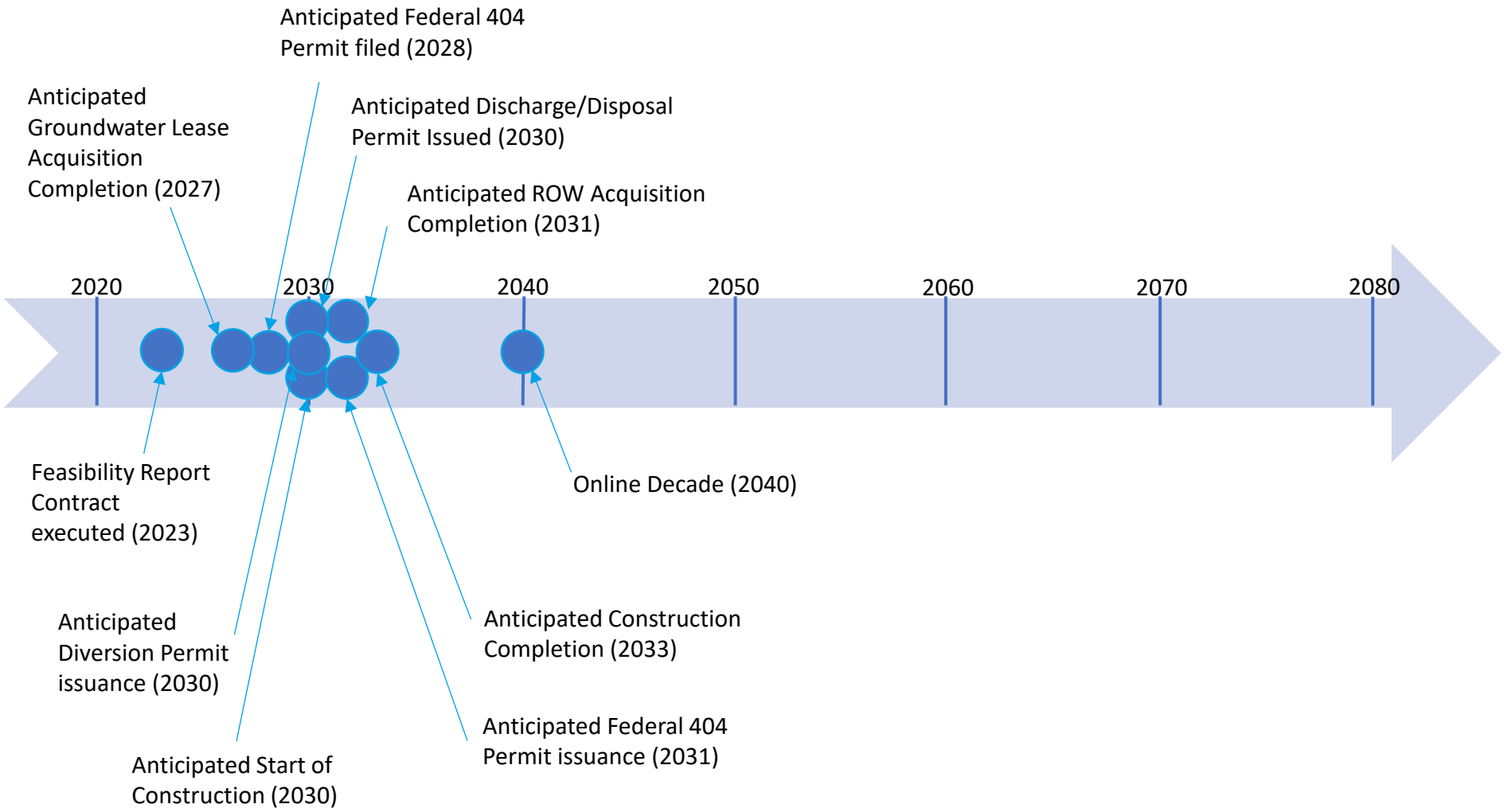


**Figure 5C-7 Anticipated Implementation Timeline for the Medina County Regional ASR**

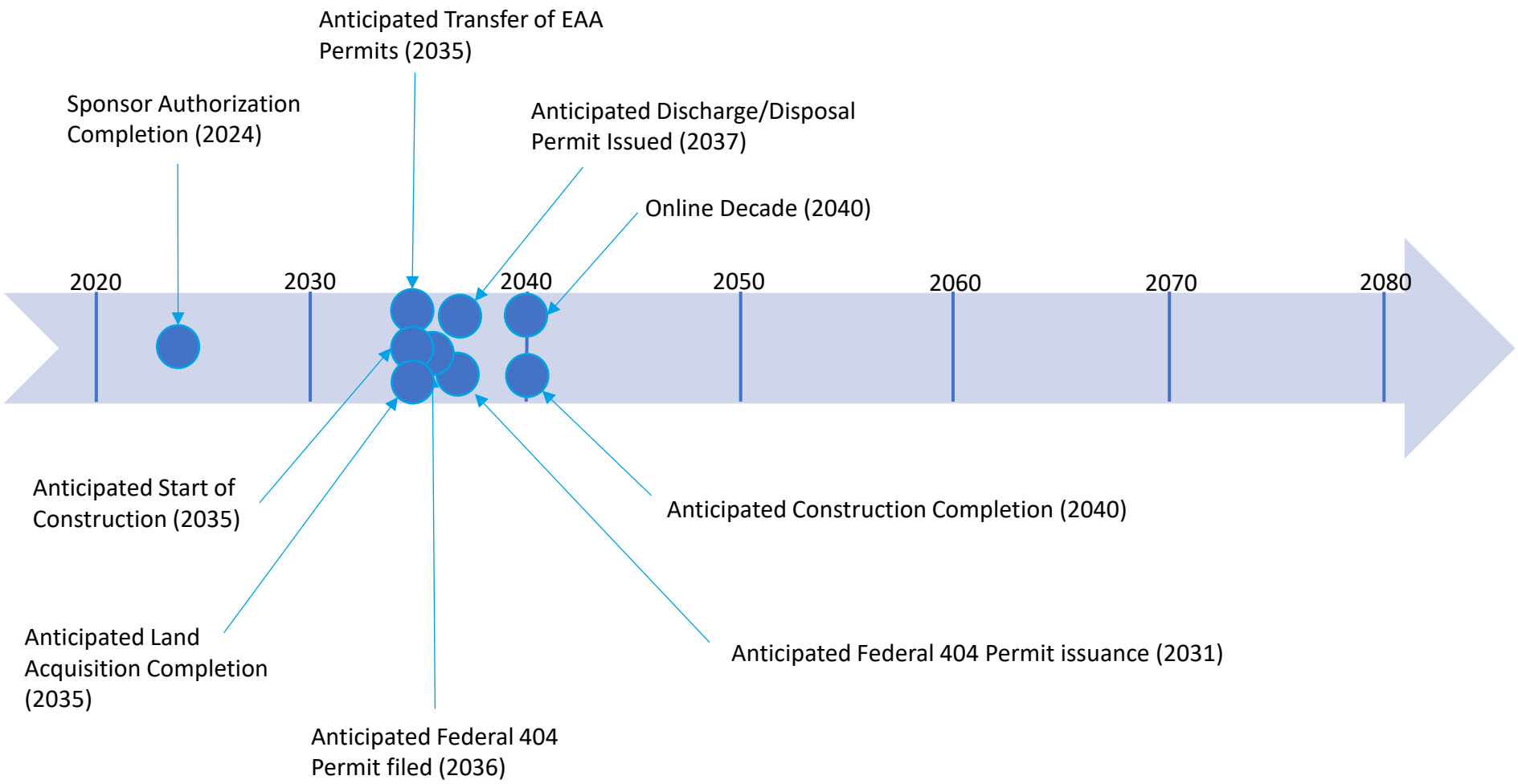


**Figure 5C-8 Anticipated Implementation Timeline for the NBU Potable Reuse Project**

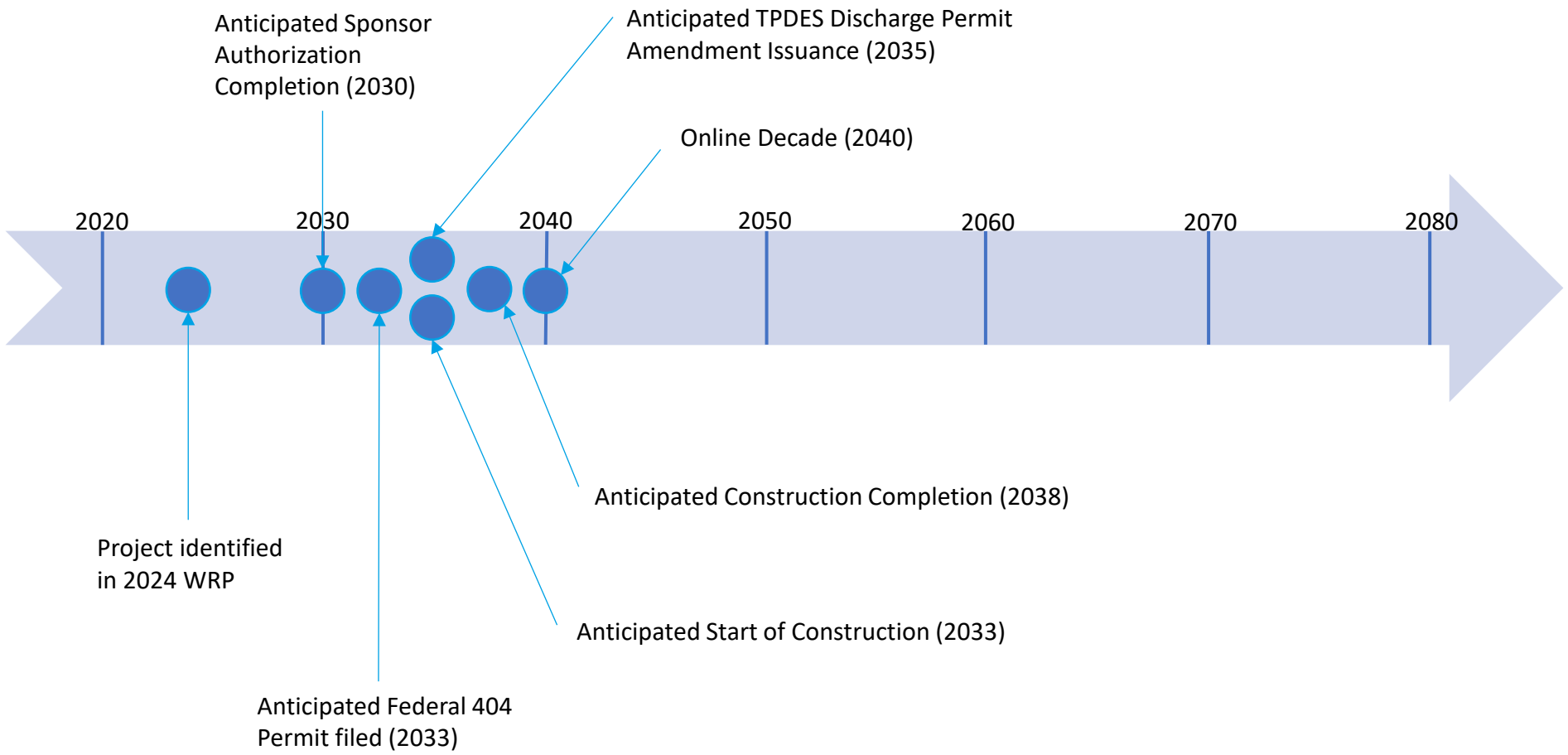


**Figure 5C-9 Anticipated Implementation Timeline for the SAWS Expanded Brackish Groundwater Project**

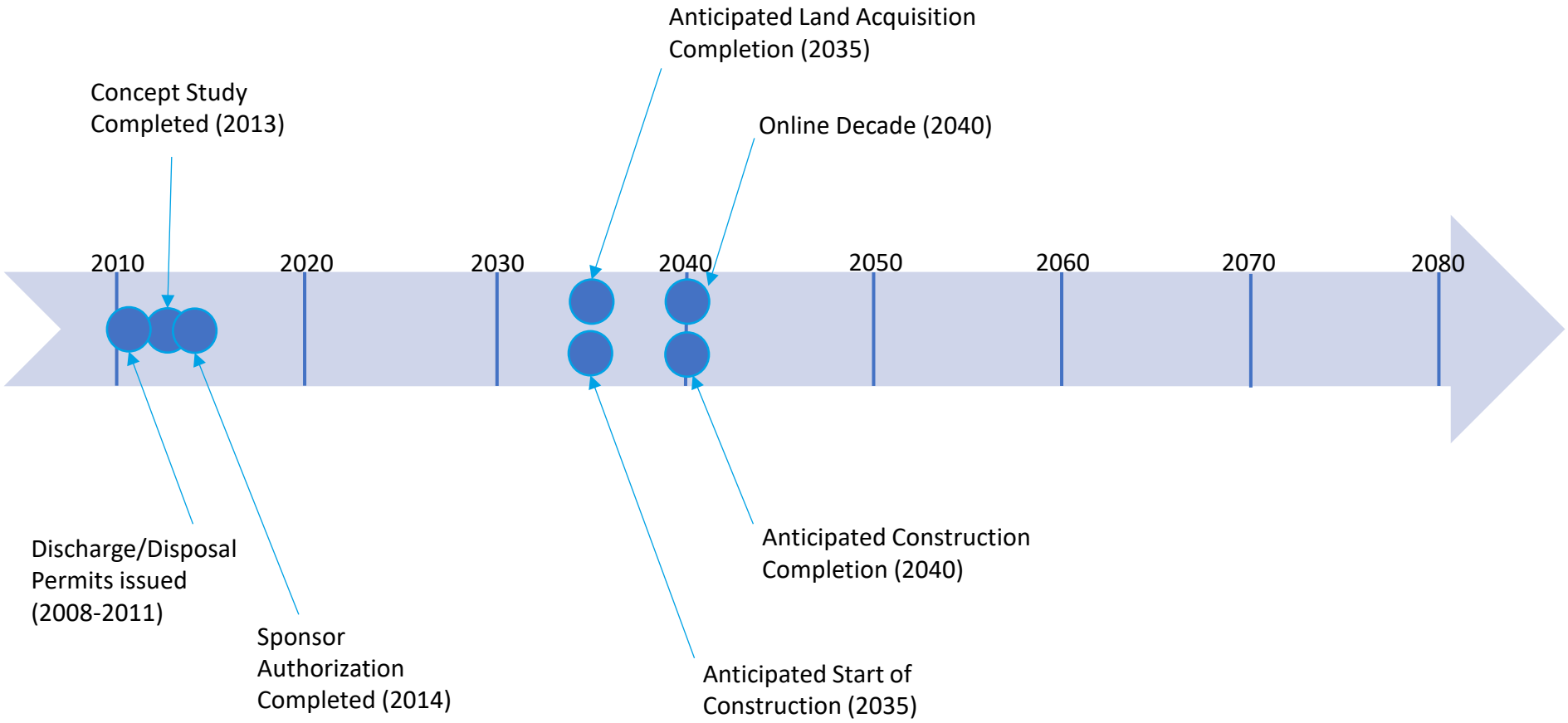
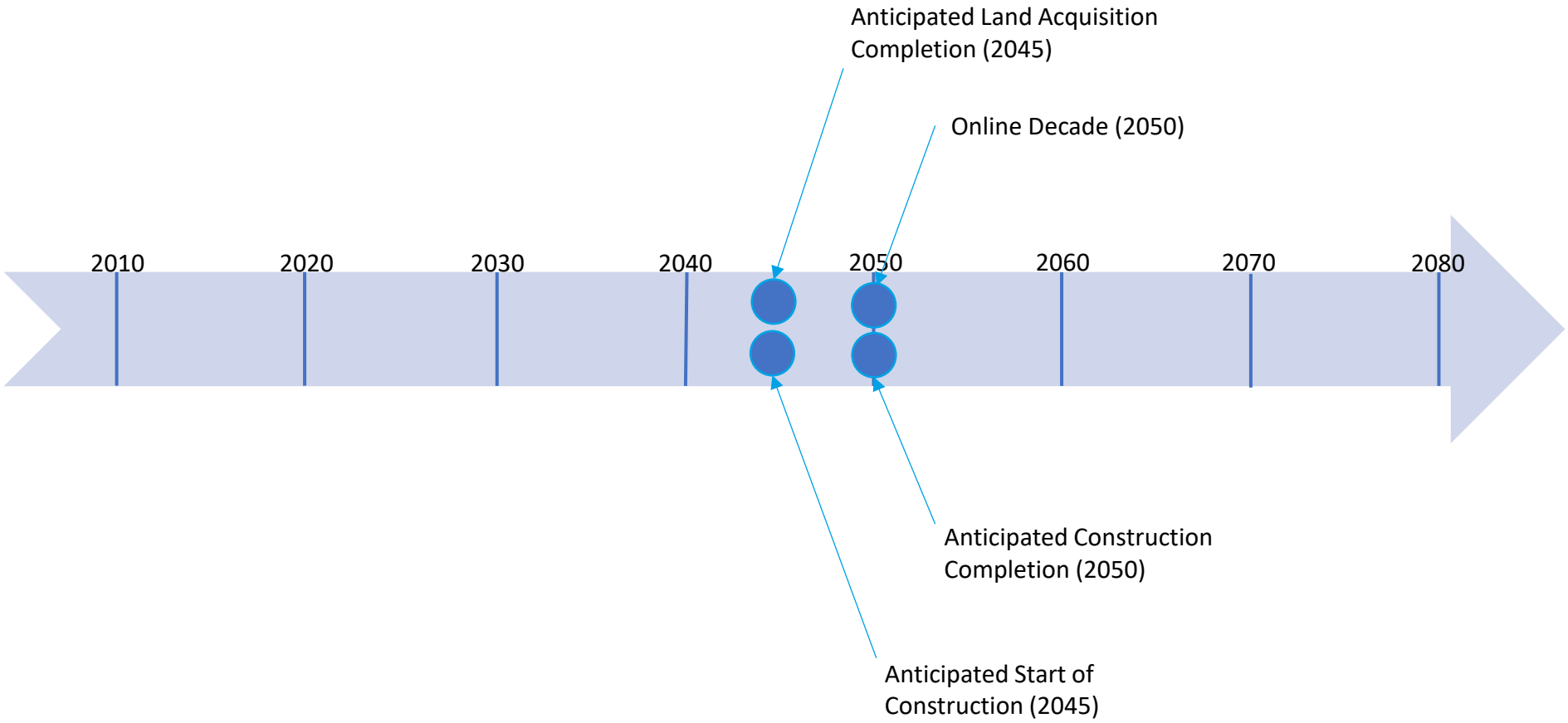


**Figure 5C-10 Anticipated Implementation Timeline for the SAWS Regional Wilcox Project**



# Appendix 5D: Threatened and Endangered Species and Species of Greatest Conservation Need by County

# Appendix 5D: Threatened and Endangered Species and Species of Greatest Conservation Need by County

This appendix provides summaries of threatened and endangered species and SGCN for certain counties in the SCTRWPA. These tables support the WMS evaluations that are summarized in Subchapter 5.2. The methodology and sources used to evaluate WMSs are described at the beginning of Subchapter 5.2.

Information and data sources used to evaluate WMS impacts were current as of the time of writing, including the TPWD county species lists that were published on August 22, 2024. The TPWD's county species lists were subsequently updated on January 15, 2025, which was after the SCTRWPG performed the WMS evaluations and designated the Recommended strategies.

Most of the updates included in the January 15, 2025, version of the TPWD county species lists reflect additions, deletions, or revisions of SGCN, and the monarch butterfly (migratory) was added as a federal candidate species for each project county evaluated in this plan. Project implementation would require independent review of impacts to threatened and endangered species and SGCN as part of the regulatory permitting for the project.

This appendix includes tables with columns showing the Federal Status and State Status for threatened and endangered species and SGCN. The following provides a list of acronyms used in the Federal Status and State Status columns of the tables:

- DL: Federally Delisted
- E: Federally Listed or State Listed Endangered
- N/A: Not Applicable
- PE: Federally Proposed Endangered
- SAT: Federally Listed Threatened by Similarity of Appearance
- SGCN: Species of Greatest Conservation Need
- T: Federally Listed or State Listed Threatened

## Table 5D-1 Atascosa County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: a wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in Opuntia cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony |
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Scaled Quail | *Callipepla squamata* | N/A | SGCN | In general, preferred habitat is arid-semiarid, mixed shrub-grassland. Common shrubs of preferred habitat include acacia (Acacia spp.), sand sagebrush (Artemesia filifolia), four-winged saltbush (Atriplex canescens), cacti (Opuntia spp.), honey mesquite (Prosopis glandulosa), sumacs (Rhus aromatica, R. microphylla, R. trilobata), yucca (Yucca spp.), and snakeweed (Xanthocephalum sarothrae). |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| White-Tailed Hawk | *Buteo albicaudatus* | N/A | T | Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson's warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Crustaceans** | | | | |
| Nueces Crayfish | *Procambarus nueces* | N/A | SGCN | Known only from one small sluggish stream tributary to the Nueces River; slightly sinuous channel with natural debris impeding flow; substrate of sand and gravel, also silt covered in deeper pooled areas; riparian edges of grasses, sedges, and herbaceous plants in mostly unshaded area. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Ghost-Faced Bat | *Mormoops megalophylla* | N/A | SGCN | Winter roosts are in large limestone caves. Buildings and rock crevasses provide roosts, as well. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Ocelot | *Leopardus pardalis* | E | E, SGCN | Restricted to mesquite-thorn scrub and live-oak mottes; avoids open areas. Dense mixed brush below four feet; thorny shrublands; dense chaparral thickets; breeds and raises young June-November. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons. Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade |
| **Mollusks** | | | | |
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Prairie Skink | *Plestiodon septentrionalis* | N/A | SGCN | The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions. |
| Tamaulipan Spot-Tailed Earless | *Holbrookia subcaudalis* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Awnless Leastdaisy | *Chaetopappa imberbis* | N/A | SGCN | In woodlands on loams of Carrizo sand (TEX-LL specimens Carr 23875, 12507). Flowering and fruiting during Mar - May. |
| Bristle Nailwort | *Paronychia setacea* | N/A | SGCN | Flowering vascular plant endemic to eastern southcentral Texas, occurring in sandy soils. |
| Burridge Greenthread | *Thelesperma burridgeanum* | N/A | SGCN | Sandy open areas; annual; flowering March-Nov; fruiting March-June. |
| Drummond's Rushpea | *Hoffmannseggia drummondii* | N/A | SGCN | Open areas on sandy clay; perennial. |
| Elmendorf's Onion | *Allium elmendorfii* | N/A | SGCN | Grassland openings in oak woodlands on deep, loose, well-drained sands; in Coastal Bend, on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands; to the north it occurs in post oak-black hickory-live oak woodlands over Queen City and similar Eocene formations; one anomalous specimen found on Llano Uplift in wet pockets of granitic loam; perennial; flowering March-April, May. |
| Greenman's Bluet | *Houstonia parviflora* | N/A | SGCN | Grass pastures. Feb- Apr. (Correll and Johnston 1970). |
| Low Spurge | *Euphorbia peplidion* | N/A | SGCN | Occurs in a variety of vernally-moist situations in a number of natural regions; annual; flowering Feb-April; fruiting March-April. |
| Parks' Jointweed | *Polygonella parksii* | N/A | SGCN | Mostly found on deep, loose, whitish sand blowouts (unstable, deep, xeric, sandhill barrens) in Post Oak Savanna landscapes over the Carrizo and Sparta formations; also occurs in early successional grasslands, along rights-of-way, and on mechanically disturbed areas; flowering June late October or September-November. |
| Sandhill Woolywhite | *Hymenopappus carrizoanus* | N/A | SGCN | Disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations; flowering April-June. |
| South Texas Spikesedge | *Eleocharis austrotexana* | N/A | SGCN | Occurring in miscellaneous wetlands at scattered locations on the coastal plain; perennial; flowering/fruiting Sept. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Texas Beebalm | *Monarda viridissima* | N/A | SGCN | Endemic perennial herb of the Carrizo Sands; deep, well-drained sandy soils in openings of post oak woodlands; flowers white. |
| Texas Peachbush | *Prunus texana* | N/A | SGCN | Occurs at scattered sites in various well drained sandy situations; deep sand, plains and sand hills, grasslands, oak woods, 0-200 m elevation; perennial; flowering Feb-Mar; Fruiting Apr-Jun. |

## Table 5D-2 Bexar County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Cascade Caverns Salamander | *Eurycea latitans* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Eastern Tiger Salamander | *Ambystoma tigrinum* | N/A | SGCN | Terrestrial adults occur under cover objects or in burrows around lentic freshwater habitats, such as ponds, lakes, bottomland wetlands, or upland ephemeral pools, closely associated with sandy or loamy soils that are easy to burrow. Need fishless pools to breed. |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Texas Salamander | *Eurycea neotenes* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Valdina Farms Sinkhole | *Eurycea troglodytes* | N/A | SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Arachnids** | | | | |
| Cokendolpher Cave Harvestman | *Texella cokendolpheri* | E | SGCN | Small, eyeless harvestman; karst features in north and northwest Bexar County |
| Government Canyon Bat Cave Meshweaver | *Cicurina vespera* | E | SGCN | Small, eyeless, or essentially eyeless spider; karst features in north and northwest Bexar County |
| Government Canyon Bat Cave Spider | *Neoleptoneta microps* | E | SGCN | Small, eyeless, or essentially eyeless spider; karst features in north and northwest Bexar County |
| Madla Cave Meshweaver | *Cicurina madla* | E | SGCN | Small, eyeless, or essentially eyeless spider; karst features in north and northwest Bexar County |
| No Accepted Common Name | *Tartarocreagris amblyopa* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Tartarocreagris reyesi* | N/A | SGCN | Habitat description is not available at this time. |
| Reddell's Cave Millipede | *Speodesmus reddelli* | N/A | SGCN | Habitat description is not available at this time. |
| Robber Baron Cave Meshweaver | *Cicurina baronia* | E | SGCN | Small, eyeless, or essentially eyeless spider; karst features in north and northwest Bexar County |
| **Arthropods** | | | | |
| Ivy's Cave Millipede | *Speodesmus ivyi* | N/A | SGCN | Habitat description is not available at this time. |
| Sickled Cave Millipede | *Speodesmus falcatus* | N/A | SGCN | Habitat description is not available at this time. |
| **Birds** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black-Capped Vireo | *Vireo atricapilla* | DL | SGCN | Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Golden-Cheeked Warbler | *Setophaga chrysoparia* | E | E, SGCN | Ashe juniper in mixed stands with various oaks (Quercus spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony |
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson's warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Crustaceans** | | | | |
| Cascade Cave Amphipod | *Stygobromus dejectus* | N/A | SGCN | Subaquatic crustacean; subterranean obligate; in pools |
| Ezell's Cave Amphipod | *Stygobromus flagellatus* | N/A | SGCN | Known only from artesian wells |
| No Accepted Common Name | *Mexiweckelia hardeni* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Speocirolana hardeni* | N/A | SGCN | Habitat description is not available at this time. |
| **Fish** | | | | |
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |
| River Darter | *Percina shumardi* | N/A | SGCN | In Texas limited to eastern streams including Red River southward to the Neches River, and a disjunct population in the Guadalupe and San Antonio river systems east of the Balcones Escarpment. Confined to large rivers and lower parts of major tributaries; usually found in deep chutes and riffles where current is swift and bottom composed of coarse gravel or rock. |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| Toothless Blindcat | *Trogloglanis pattersoni* | PE | T, SGCN | Restricted to five artesian wells penetrating the San Antonio Pool of the Edwards Aquifer; found at depths of 305-582 m. |
| Widemouth Blindcat | *Satan eurystomus* | PE | T, SGCN | Restricted to five artesian wells penetrating the San Antonio Pool of the Edwards Aquifer; found at depths of 305-582 m. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Helotes Mold Beetle | *Batrisodes venyivi* | E | SGCN | Small, eyeless mold beetle; karst features in northwestern Bexar County and northeastern Medina County |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Manfreda Giant-Skipper | *Stallingsia maculosus* | N/A | SGCN | Most skippers are small and stout-bodied; name derives from fast, erratic flight; at rest most skippers hold front and hind wings at different angles; skipper larvae are smooth, with the head and neck constricted; skipper larvae usually feed inside a leaf shelter and pupate in a cocoon made of leaves fastened together with silk |
| No Accepted Common Name | *Pygarctia lorula* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Nectopsyche texana* | N/A | SGCN | Riparian, Riverine |
| No Accepted Common Name | *Batrisodes shadeae* | N/A | SGCN | This species was recently described from a single cave in Bexar Co., Texas (Chandler et al., 2009). |
| No Accepted Common Name | *Lymantes nadineae* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Bombus variabilis* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Megachile parksi* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Rhadine exilis* | N/A | SGCN | Small, essentially eyeless ground beetle; karst features in north and northwest Bexar County |
| No Accepted Common Name | *Rhadine infernalis* | N/A | SGCN | Small, essentially eyeless ground beetle; karst features in north and northwest Bexar County |
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore |
| Black Bear | *Ursus americanus* | N/A | T, SGCN | Generalist. Historically found throughout Texas. In Chisos, prefers higher elevations where pinyon-oaks predominate; also occasionally sighted in desert scrub of Trans-Pecos (Black Gap Wildlife Management Area) and Edwards Plateau in juniper-oak habitat. For ssp. luteolus, bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Bottomland hardwoods and large tracts of inaccessible forested areas. |
| Black-Tailed Prairie Dog | *Cynomys ludovicianus* | N/A | SGCN | Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Ghost-Faced Bat | *Mormoops megalophylla* | N/A | SGCN | Winter roosts are in large limestone caves. Buildings and rock crevasses provide roosts, as well. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade |
| **Mollusks** | | | | |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019] |
| Lilliput | *Toxolasma parvum* | N/A | SGCN | Reported from small streams, where it may penetrate into the headwaters, to large rivers, oxbows, sloughs, lakes, ponds, canals, borrow pits, and reservoirs. Primarily occurs in still to slow currents in mud and sand substrates (Coker et al. 1921; Read 1954; Neck and Metcalf 1988; Williams et al. 2008; Watters et al. 2009). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| Mimic Cavesnail | *Phreatodrobia imitata* | N/A | SGCN | Subaquatic; only known from two wells penetrating the Edwards Aquifer |
| No Accepted Common Name | *Phreatodrobia conica* | N/A | SGCN | Habitat description is not available at this time. |
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| Tampico Pearlymussel | *Cyrtonaias tampicoensis* | N/A | SGCN | Reported from streams to rivers, reservoirs, and canals. In riverine habitats often found in nearshore habitats such as banks and backwaters, to include pools and oxbows, in mud or sand or among cobble and boulders with still to moderate currents (Howells et al. 1996). |
| Tapered Pondhorn | *Uniomerus declivis* | N/A | SGCN | It likely occurs in streams, rivers, oxbows, marshes, swamps, lakes, canals, ponds, and reservoirs in still to moderate currents in mud, sand, or gravel substrates. Also probably occurs in woody debris such as logjams and exposed roots of riparian trees (Williams et al. 2008). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Plateau Spot-Tailed Earless Lizard | *Holbrookia lacerata* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Prairie Skink | *Plestiodon septentrionalis* | N/A | SGCN | The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions. |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Tamaulipan Spot-Tailed Earless Lizard | *Holbrookia subcaudalis* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Awnless Leastdaisy | *Chaetopappa imberbis* | N/A | SGCN | In woodlands on loams of Carrizo sand (TEX-LL specimens Carr 23875, 12507). Flowering and fruiting during Mar - May. |
| Big Red Sage | *Salvia pentstemonoides* | N/A | SGCN | Moist to seasonally wet, steep limestone outcrops on seeps within canyons or along creek banks; occasionally on clayey to silty soils of creek banks and terraces, in partial shade to full sun; basal leaves conspicuous for much of the year; flowering June-October |
| Bigflower Cornsalad | *Valerianella stenocarpa* | N/A | SGCN | Usually along creekbeds or in vernally moist grassy open areas (Carr 2015). |
| Bracted Twistflower | *Streptanthus bracteatus* | T | SGCN | Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer |
| Bristle Nailwort | *Paronychia setacea* | N/A | SGCN | Flowering vascular plant endemic to eastern southcentral Texas, occurring in sandy soils |
| Buckley Tridens | *Tridens buckleyanus* | N/A | SGCN | Occurs in juniper-oak woodlands on rocky limestone slopes; Perennial; Flowering/Fruiting April-Nov |
| Burridge Greenthread | *Thelesperma burridgeanum* | N/A | SGCN | Sandy open areas; Annual; Flowering March-Nov; Fruiting March-June |
| Correll's False Dragon-Head | *Physostegia correllii* | N/A | SGCN | Wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May-September |
| Elmendorf's Onion | *Allium elmendorfii* | N/A | SGCN | Grassland openings in oak woodlands on deep, loose, well-drained sands; in Coastal Bend, on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands; to the north it occurs in post oak-black hickory-live oak woodlands over Queen City and similar Eocene formations; one anomalous specimen found on Llano Uplift in wet pockets of granitic loam; Perennial; Flowering March-April, May |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Glass Mountains Coral-Root | *Hexalectris nitida* | N/A | SGCN | Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept |
| Gravelbar Brickellbush | *Brickellia dentata* | N/A | SGCN | Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; Perennial; Flowering June-Nov; Fruiting June-Oct |
| Greenman's Bluet | *Houstonia parviflora* | N/A | SGCN | Grass pastures. Feb- Apr. (Correll and Johnston 1970). |
| Hairy Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. stellatus* | N/A | SGCN | Rare throughout range, in habitats similar to those of var. platanifolius - usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; Perennial; Flowering April-Oct; Fruiting May-Sept |
| Heller's Marbleseed | *Onosmodium helleri* | N/A | SGCN | Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; Perennial; Flowering March-May |
| Hill Country Wild-Mercury | *Argythamnia aphoroides* | N/A | SGCN | Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; Perennial; Flowering April-May with fruit persisting until midsummer |
| Low Spurge | *Euphorbia peplidion* | N/A | SGCN | Occurs in a variety of vernally-moist situations in a number of natural regions; Annual; Flowering Feb-April; Fruiting March-April |
| Narrowleaf Brickellbush | *Brickellia eupatorioides var. gracillima* | N/A | SGCN | Moist to dry gravelly alluvial soils along riverbanks but also on limestone slopes; Perennial; Flowering/Fruiting April-Nov |
| Net-Leaf Bundleflower | *Desmanthus reticulatus* | N/A | SGCN | Mostly on clay prairies of the coastal plain of central and south Texas; Perennial; Flowering April-July; Fruiting April-Oct |
| Osage Plains False Foxglove | *Agalinis densiflora* | N/A | SGCN | Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct |
| Parks' Jointweed | *Polygonella parksii* | N/A | SGCN | Mostly found on deep, loose, whitish sand blowouts (unstable, deep, xeric, sandhill barrens) in Post Oak Savanna landscapes over the Carrizo and Sparta formations; also occurs in early successional grasslands, along right-of-ways, and on mechanically disturbed areas; flowering Junelate October or September-November |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Plateau Loosestrife | *Lythrum ovalifolium* | N/A | SGCN | Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; Perennial; Flowering/Fruiting April-Nov |
| Sandhill Woolywhite | *Hymenopappus carrizoanus* | N/A | SGCN | Disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations; flowering April-June |
| Siler's Huaco | *Manfreda sileri* | N/A | SGCN | Rare in a variety of grasslands and shrublands on dry sites; Perennial; Flowering April-July; Fruiting June-July |
| South Texas Rushpea | *Caesalpinia phyllanthoides* | N/A | SGCN | Tamaulipan thorn shrublands or grasslands on very shallow sandy to clayey soils over calcareous sandstone and caliche; flowering in spring, sometimes later in growing season, perhaps in response to rainfall |
| Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Platanifolius* | N/A | SGCN | Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; Perennial; Flowering April-May; Fruiting May-Aug. |
| Texas Almond | *Prunus minutiflora* | N/A | SGCN | Wide-ranging but scarce, in a variety of grassland and shrubland situations, mostly on calcareous soils underlain by limestone but occasionally in sandier neutral soils underlain by granite; Perennial; Flowering Feb-May and Oct; Fruiting Feb-Sept |
| Texas Amorpha | *Amorpha roemeriana* | N/A | SGCN | Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; Perennial; Flowering May-June; Fruiting June-Oct |
| Texas Fescue | *Festuca versuta* | N/A | SGCN | Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; Perennial; Flowering/Fruiting April-June |
| Texas Peachbush | *Prunus texana* | N/A | SGCN | Occurs at scattered sites in various well drained sandy situations; deep sand, plains and sand hills, grasslands, oak woods, 0-200 m elevation; Perennial; Flowering Feb-Mar; Fruiting Apr-Jun |
| Texas Seymeria | *Seymeria texana* | N/A | SGCN | Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; Annual; Flowering May-Nov; Fruiting July-Nov |
| Threeflower Penstemon | *Penstemon triflorus var. triflorus* | N/A | SGCN | Occurs sparingly on rock outcrops and in grasslands associated with juniper-oak woodlands (Carr 2015). |
| Tree Dodder | *Cuscuta exaltata* | N/A | SGCN | Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct |
| Turnip-Root Scurfpea | *Pediomelum cyphocalyx* | N/A | SGCN | Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Woolly Butterfly-Weed | *Oenothera cinerea ssp. parksii* | N/A | SGCN | Flats and hills of red sand of Rio Grande Plains (Raven and Gregory 1972). April-Oct. |
| Wright's Milkvetch | *Astragalus wrightii* | N/A | SGCN | On sandy or gravelly soils; Flowering/fruiting: April and May |

## Table 5D-3 Caldwell County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Houston Toad | *Anaxyrus houstonensis* | E | E, SGCN | Terrestrial and aquatic: Primary terrestrial habitat is forests with deep sandy soils. Juveniles and adults are presumed to move through areas of less suitable soils using riparian corridors. Aquatic habitats can include any water body from a tire rut to a large lake. |
| San Marcos Salamander | *Eurycea nana* | T | T, SGCN | Aquatic; springs and associated water. |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Texas Blind Salamander | *Eurycea rathbuni* | E | E, SGCN | Aquatic and subterranean; streams and caves. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black Rail | *Laterallus jamaicensis* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia. |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in Opuntia cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands. |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Rufa Red Knot | *Calidris canutus rufa* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Swallow-Tailed Kite | *Elanoides forficatus* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson’s warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Yellow Rail | *Coturnicops noveboracensis* | N/A | SGCN | Breeding: Emergent wetlands, grass or sedge marshes and wet meadows in freshwater situations. Some breeding territories in these wet meadows contain firm footing and only a few remnant pools of water (Berkey 1991). These areas can range from damp to 38 cm (15 inches) of water but the average depth used for nesting is 8 to 15 cm (3 to 6 inches) (Savaloja 1981). Non-breeding: Grain fields in winter and when migrating. Winters in both freshwater and brackish marshes, as well as in dense, deep grass. During fall migration, will use many open habitats, from rice paddies to dry hayfields. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Fish** | | | | |
| Fountain Darter | *Etheostoma fonticola* | E | E, SGCN | Known only from the spring-fed San Marcos and Comal rivers in dense beds of aquatic plants growing close to bottom; may be found in slowand fast-flowing habitats. |
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Darter | *Percina apristis* | N/A | T, SGCN | Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water. |
| Guadalupe Roundnose Minnow | *Dionda flavipinnis* | N/A | SGCN | Endemic to Guadalupe and southern Colorado drainages; primarily restricted to clear spring-fed waters that have slight temperature variations. |
| Headwater Catfish | *Ictalurus lupus* | N/A | T, SGCN | Originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers. |
| River Darter | *Percina shumardi* | N/A | SGCN | In Texas limited to eastern streams including Red River southward to the Neches River, and a disjunct population in the Guadalupe and San Antonio river systems east of the Balcones Escarpment. Confined to large rivers and lower parts of major tributaries; usually found in deep chutes and riffles where current is swift and bottom composed of coarse gravel or rock. |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Comanche Harvester Ant | *Pogonomyrmex comanche* | N/A | SGCN | Habitat description is not available at this time. |
| **Mammals** | | | | |
| Aransas Short-Tailed Shrew | *Blarina hylophaga plumbea* | N/A | SGCN | Excavates burrows in sandy soils underlying mottes of live oak trees or in areas with little to no ground cover. |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges; woodlands. Prefer wooded, brushy areas; tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. |
| Seminole Bat | *Lasiurus seminolus* | N/A | SGCN | Pine-oak and long-leaf pine in east Texas. Habitats include pine, mixed pine-hardwood, and hardwood forests of uplands and bottomlands, particularly pine-dominated forests, including mature pine and pine-hardwood corridors in managed pine forest landscapes (Menzel et al. 1998, 1999, 2000; Carter et al. 2004; Marks and Marks 2006; Perry and Thill 2007; Perry et al. 2007; Hein et al. 2008; Ammerman et al. 2012). |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| **Mollusks** | | | | |
| Edwards Plateau Liptooth | *Millerelix gracilis* | N/A | SGCN | Habitat description is not available at this time. |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]. |
| Guadalupe Orb | *Cyclonaias necki* | E | E, SGCN | Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Awnless Leastdaisy | *Chaetopappa imberbis* | N/A | SGCN | In woodlands on loams of Carrizo sand (TEX-LL specimens Carr 23875, 12507). Flowering and fruiting during Mar - May. |
| Green Hawthorn | *Crataegus viridis var. glabriuscula* | N/A | SGCN | In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above/near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct. |
| Heller's Marbleseed | *Onosmodium helleri* | N/A | SGCN | Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; perennial; flowering March-May. |
| Hill Country Wild-Mercury | *Argythamnia aphoroides* | N/A | SGCN | Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; perennial; flowering April-May with fruit persisting until midsummer. |
| Sandhill Woolywhite | *Hymenopappus carrizoanus* | N/A | SGCN | Disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations; flowering April-June. |
| Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Platanifolius* | N/A | SGCN | Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; perennial; flowering April-May; fruiting May-Aug. |
| Texas Beebalm | *Monarda viridissima* | N/A | SGCN | Endemic perennial herb of the Carrizo Sands; deep, well-drained sandy soils in openings of post oak woodlands; flowers white. |
| Texas Sandmint | *Rhododon ciliatus* | N/A | SGCN | Open sandy areas in the Post Oak Belt of east-central Texas; annual; flowering April-Aug; fruiting May-Aug. |
| Texas Tauschia | *Tauschia texana* | N/A | SGCN | Occurs in loamy soils in deciduous forests or woodlands on river and stream terraces; perennial; flowering/fruiting Feb-April. |

## Table 5D-4 Calhoun County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Black-Spotted Newt | *Notophthalmus meridionalis* | N/A | T, SGCN | Terrestrial and aquatic: Terrestrial habitats used by adults are typically poorly drained clay soils that allow for the formation of ephemeral wetlands. A wide variety of vegetation associations are known to be used, such as thorn scrub and pasture. Aquatic habitats used for reprodution are a variety of ephemeral and permanent water bodies. |
| Southern Crawfish Frog | *Lithobates areolatus areolatus* | N/A | SGCN | Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands. |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black Rail | *Laterallus jamaicensis* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Black Skimmer | *Rynchops niger* | N/A | SGCN | Primarily coastal waters, including bays, estuaries, lagoons and mudflats in migration and winter (AOU 1983); also quiet waters of rivers and lakes (Stiles and Skutch 1989). Rest on mudflats, sandbars, beaches. |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Henslow's Sparrow | *Centronyx henslowii* | N/A | SGCN | Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |
| Northern Aplomado Falcon | *Falco femoralis septentrionalis* | E | E, SGCN | Open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains and valleys with scattered mesquite, yucca, and cactus; nests in old stick nests of other bird species. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Reddish Egret | *Egretta rufescens* | N/A | T, SGCN | Resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Rufa Red Knot | *Calidris canutus rufa* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Swallow-Tailed Kite | *Elanoides forficatus* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| White-Tailed Hawk | *Buteo albicaudatus* | N/A | T | Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson’s warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Yellow Rail | *Coturnicops noveboracensis* | N/A | SGCN | Breeding: Emergent wetlands, grass or sedge marshes and wet meadows in freshwater situations. Some breeding territories in these wet meadows contain firm footing and only a few remnant pools of water (Berkey 1991). These areas can range from damp to 38 cm (15 inches) of water but the average depth used for nesting is 8 to 15 cm (3 to 6 inches) (Savaloja 1981). Non-breeding: Grain fields in winter and when migrating. Winters in both freshwater and brackish marshes, as well as in dense, deep grass. During fall migration, will use many open habitats, from rice paddies to dry hayfields. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Fish** | | | | |
| Alligator Gar | *Atractosteus spatula* | N/A | SGCN | From the Red River to the Rio Grande (Hubbs et al. 2008); occurs in the Trinity River upstream of Lake Livingston. Found in rivers, streams, lakes, swamps, bayous, bays and estuaries typically in pools and backwater habitats. Floodplains inundated with flood waters provide spawning and nursery habitats. |
| Atlantic Guitarfish | *Rhinobatos lentiginosus* | N/A | SGCN | Gulf of Mexico. |
| Atlantic Tarpon | *Megalops atlanticus* | N/A | SGCN | Gulf of Mexico. |
| Black Grouper | *Mycteroperca bonaci* | N/A | SGCN | Gulf of Mexico. |
| Blacknose Shark | *Carcharhinus acronotus* | N/A | SGCN | Gulf of Mexico. |
| Blue Marlin | *Makaira nigricans* | N/A | SGCN | Gulf of Mexico. |
| Bull Shark | *Carcharhinus leucas* | N/A | SGCN | Gulf of Mexico. |
| Caribbean Sharpnose Shark | *Rhizoprionodon porosus* | N/A | SGCN | Gulf of Mexico. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Cobia | *Rachycentron canadum* | N/A | SGCN | Gulf of Mexico. |
| Dusky Shark | *Carcharhinus obscurus* | N/A | SGCN | Gulf of Mexico. |
| Finetooth Shark | *Carcharhinus isodon* | N/A | SGCN | Gulf of Mexico. |
| Giant Manta Ray | *Manta birostris* | T | SGCN | Gulf of Mexico. |
| Great Hammerhead | *Sphyrna mokarran* | N/A | T, SGCN | Gulf of Mexico. |
| Greater Amberjack | *Seriola dumerili* | N/A | SGCN | Gulf of Mexico. |
| Lemon Shark | *Negaprion brevirostris* | N/A | SGCN | Gulf of Mexico. |
| Oceanic Whitetip Shark | *Carcharhinus longimanus* | T | T, SGCN | Gulf of Mexico. |
| Opossum Pipefish | *Microphis brachyurus* | N/A | SGCN | Adults are only found in low salinity waters of estuaries or freshwater tributaries within 30 miles of the coast (Gilmore 1992), where they also give birth. Young move or are carried into more saline waters off the coast after birth. Newly released larvae must have conditions near 18 ppt salinity for at least two weeks after birth to survive, indicating a physiology adapted for downstream transport to estuarine and marine environments (Frias-Torres 2002). Juvenile migration toward the ocean depends on water flow regimes, salinity, and vegetation for cover and capturing prey (Frias-Torres 2002). Seawalls, docks, and riprap construction destroy habitat and poor water quality and alteration of flow regimes may prevent migration (NMFS 2009). |
| Sailfish | *Istiophorus platypterus* | N/A | SGCN | Gulf of Mexico. |
| Saltmarsh Topminnow | *Fundulus jenkinsi* | N/A | SGCN | Occupies estuaries and the edges of saltmarsh habitats along the Gulf coast in salinities of 4-20 ppt in Spartina dominated tidal creeks and wetlands (Peterson & Ross 1991; Peterson & Turner 1994; Lopez et al. 2010; and Griffith 1974). Requires access to small interconnected tidal creeks for feeding and reproduction. Spawning occurs from March to August during high tide events (Robertson Thesis, 2016). Non-migratory. |
| Sandbar Shark | *Carcharhinus plumbeus* | N/A | SGCN | Gulf of Mexico. |
| Scalloped Hammerhead Shark | *Sphyrna lewini* | N/A | SGCN | Gulf of Mexico. |
| Scamp | *Mycteroperca phenax* | N/A | SGCN | Gulf of Mexico. |
| Shortfin Mako Shark | *Isurus oxyrinchus* | N/A | SGCN | Habitat description is not available at this time. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Silky Shark | *Carcharhinus falciformis* | N/A | SGCN | Gulf of Mexico. |
| Smalltail Shark | *Carcharhinus porosus* | N/A | SGCN | Gulf of Mexico. |
| Southern Flounder | *Paralichthys lethostigma* | N/A | SGCN | This is an estuarine-dependent species that inhabits riverine, estuarine and coastal waters, and prefers muddy, sandy, or silty substrates (Reagan and Wingo 1985). Individuals can tolerate wide temperature (~5-35°C) and salinity ranges (0-60 ppt). Southern Flounder spawn in offshore waters of the Gulf of Mexico from October to February (Reagan and Wingo 1985). The oceanic larval stage is pelagic and lasts 30–60 days. Metamorphosing individuals enter estuaries and migrate towards low-salinity headwaters, where settlement occurs (Burke et al. 1991, Walsh et al. 1999). The young fish enter the bays during late winter and early spring, occupying seagrass; some may move further into coastal rivers and bayous. Juveniles remain in estuaries until the onset of sexual maturation (approximately two years), at which time they migrate out of estuaries to join adults on the inner continental shelf. Adult southern flounder leave the bays during the fall for spawning in the Gulf of Mexico. They spawn for the first time when two years old at depths of 50 to 100 feet. Although most of the adults leave the bays and enter the Gulf for spawning during the winter, some remain behind and spend winter in the bays. Those in the Gulf will reenter the bays in the spring. The spring influx is gradual and does not occur with large concentrations that characterize the fall emigration. |
| Speckled Hind | *Epinephelus drummondhayi* | N/A | SGCN | Gulf of Mexico. |
| Spinner Shark | *Carcharhinus brevipinna* | N/A | SGCN | Gulf of Mexico. |
| Swordfish | *Xiphias gladius* | N/A | SGCN | Gulf of Mexico. |
| Texas Silverside | *Menidia clarkhubbsi* | N/A | SGCN | This coastal species inhabits ponds, shallow bays, and estuaries. It is an all-female species that relies on fertilization from males of Menidia beryllina or M. peninsulae. Identification is near impossible unless using genetic techniques (Chernoff 2002). |
| White Marlin | *Kajikia albida* | N/A | SGCN | Gulf of Mexico. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| **Mammals** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Atlantic Spotted Dolphin | *Stenella frontalis* | N/A | T, SGCN | Inhabit warm tropical, subtropical, and temperate waters throughout the Atlantic Ocean, including the Gulf of Mexico. Commonly found along the continental shelf and coastal waters that are 65-820 feet deep, usually inside or near 185 m contour (within 250-350 km of coast); occassionally found in deeper waters. Often dive to 30-200 feet preying upon fish, invertebrates, and cephalopods. |
| Blainville's Beaked Whale | *Mesoplodon densirostris* | N/A | SGCN | Not applicable. |
| Blue Whale | *Balaenoptera musculus* | E | E, SGCN | Inhabits tropical, subtropical, temperate, and subpolar waters worldwide, but are infrequently sighted in the Gulf of Mexico. They migrate seasonally between summer feeding grounds and winter breeeding grounds, but specifics vary. Commonly observed at the surface in open ocean. |
| Bottlenosed Dolphin | *Tursiops truncatus* | N/A | SGCN | Habitat description is not available at this time. |
| Bryde's Whale | *Balaenoptera edeni brydei* | N/A | E, SGCN | Gulf of Mexico. |
| Clymene Dolphin | *Stenella clymene* | N/A | SGCN | Habitat description is not available at this time. |
| Cuvier's Beaked Whale | *Ziphius cavirostris* | N/A | T, SGCN | Inhabit tropical, subtropical, and temperate waters world wide, including the Gulf of Mexico. Commonly found in water over 3,300 feet deep near the continetal shelf near steep slopes or canyons, avoiding coastal areas. Mostly pelagic apparently confined by the 1,000 meter bathymetric contour. Frequently make deep dives to capture prey (squids and fishes). |
| Dwarf Sperm Whale | *Kogia simus* | N/A | T, SGCN | Inhabits tropical and temperate waters world wide, Commonly found in deep waters near the continental shelf and rarely seen at the surface, but may be more coastal than the pygmy sperm whale (Kogia breviceps). Dives to great depths (1,000 feet) to hunt for squid, fish, and crustaceans. Migration patterns are unknown. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges; woodlands. Prefer wooded, brushy areas; tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| False Killer Whale | *Pseudorca crassidens* | N/A | T, SGCN | Inhabit tropical, subtropical, and temperate waters world wide, including the Gulf of Mexico. Commonly found in deep, offshore waters deeper than 3,300 feet, making dives of up to 2,000 meters to catch their prey (fishes and squids). Gulf of Mexico distinct population segment is not well studied. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Finback Whale | *Balaenoptera physalus* | E | E, SGCN | Inhabit tropical, subtropical, temperate, and subpolar waters worldwide, but are less common in the tropics preferring cooler water. Commonly found in deep, offshore waters and migrate in the open ocean from the poles (feeding grounds) to warmer waters in the winter to give birth. They feed on krill, squid, and small schooling fish sometimes with other baleen whale species. They are very rare in the Gulf of Mexico and reported sightings are likely vagrants (Witt et al. 2011). |
| Gervais's Beaked Whale | *Mesoplodon europaeus* | N/A | T, SGCN | Inhabit tropical, subtropical, and temperate waters of the northern Atlantic Ocean, Gulf of Mexico, and Caribbean. Commonly found in deep water and open ocean where they prey upon squids. They are difficult to distinguish from others in their family (Mesoplodon) and are cryptic and skittish, but the most commonly stranded species on the US southeastern coast. Migration patterns are unknown. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Humpback Whale | *Megaptera novaeangliae* | E | SGCN | Inhabits tropical, subtropical, temperate, and subpolar waters world wide. Migrate up to 5,000 miles between colder water (feeding grounds) and warmer water (calving grounds) each year. They will use both open ocean and coastal waters, sometimes including inshore areas such as bays, and are often found near the surface; however, this species is rare in the Gulf of Mexico. The northwest Atlantic/Gulf of Mexico distinct population segment is not considered at risk of extinction and is not listed as Endangered under the Endangered Species Act. |
| Killer Whale | *Orcinus orca* | N/A | T, SGCN | Inhabits tropical, subtropical, temperate, and polar waters world wide. In the Gulf of Mexico, they are commonly found in oceanic waters ranging from 256-2,652 meters deep beyond the 1,000 meter isobath and a very rarely found over the continental shelf and may be entirely absent from nearshore waters. May come in contact with pelagic longline fisheries targeting tunas and billfishes. |
| Minke Whale | *Balaenoptera acutorostrata* | N/A | SGCN | Gulf of Mexico. |
| Mountain Lion | *Puma concolor* | | | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| North Atlantic Right Whale | *Eubalaena glacialis* | N/A | SGCN | Inhabits subtropical and temperate waters in the northern Atlantic. Commonly found in coastal waters or clsoe to the continental shelf near the surface. They migrate from feeding grounds in cooler waters (Canada and New England) to warmer waters of the southeast US (South Carolina, Georgia, and Florida) to give birth in the fall/winter - both areas are identified as critical habitat by NOAA-NMFS. Nursery areas are in shallow, coastal waters. This species is very rare in the Gulf of Mexico and the few reported sightings are likely vagrants (Ward-Geiger etal 2011). |
| Padre Island Kangaroo Rat | *Dipodomys compactus compactus* | N/A | SGCN | Dunes and open sandy areas near the coast. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. |
| Pygmy Killer Whale | *Feresa attenuata* | N/A | T, SGCN | Inhabit tropical and subtropical waters worldwide, including the Gulf of Mexico. Commonly found in deeper, offshore waters where they dive for their prey (squids and fishes), but may occassionally occur close to shore. They are very rare and migration patterns are unknown. |
| Pygmy Sperm Whale | *Kogia breviceps* | N/A | T, SGCN | Inhabits tropical, subtropical, and temperate waters world wide. Commonly found in deep water over the continental slope and rarely seen at the surface. Dives to great depths (over 1,000 feet) to hunt for squid, fish, and crustaceans.Migration patterns are unknown. |
| Rice's Whale | *Balaenoptera ricei* | E | E, SGCN | Gulf of Mexico. |
| Roughtoothed Dolphin | *Steno bredanensis* | N/A | T, SGCN | Inhabits tropical, subtropical, and temperate waters worldwide, including the Gulf of Mexico. Records in Texas are only known from strandings. Commonly found in deep, oceanic water over 1,500-2,000 meters deep and ranging in temperature from 17-25 degrees Celsius. May associate with other cetaceans. Prey on squids and fish. No known migration patterns. |
| Sei Whale | *Balaenoptera borealis* | E | E, SGCN | Gulf of Mexico. |
| Short-Finned Pilot Whale | *Globicephala macrorhynchus* | N/A | T, SGCN | Inhabit tropical, subtropical, and temperate waters worldwide, including the Gulf of Mexico. Commonly found in deeper waters (>1,000 feet) and continental shelf where they make deep dives to capture squid, but may come closer to shore. Migration patterns unknown. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Sperm Whale | *Physeter macrocephalus* | E | E, SGCN | Inhabits tropical, subtropical, and temperate waters world wide, avoiding icey waters. Distribution is highly dependent on their food source (squids, sharks, skates, and fish), breeding, and composition of the pod. In general, this species migrates from north to south in the winter and south to north in the summer; however, individuals in tropical and temperate waters don't seem to migrate at all. Routinely dive to catch their prey (2,000-10,000 feet) and generally occupies water at least 3,300 feet deep near ocean trenches. |
| Spinner Dolphin | *Stenella longirostris* | N/A | SGCN | Habitat description is not available at this time. |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| West Indian Manatee | *Trichechus manatus* | T | T, SGCN | Large rivers, brackish water bays, coastal waters. Warm waters of the tropics, in rivers and brackish bays but may also survive in salt water habitats. Very sensitive to cold water temperatures. Rarely occurring as far north as Texas. Gulf and bay system; opportunistic, aquatic herbivore. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade. |
| **Mollusks** | | | | |
| Live Oak Glass | *Nesovitrea suzannae* | N/A | SGCN | Habitat description is not available at this time. |
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Atlantic Hawksbill Sea Turtle | *Eretmochelys imbricata* | E | E, SGCN | Inhabit tropical and subtropical waters worldwide, in the Gulf of Mexico, especially Texas. Hatchling and juveniles are found in open, pelagic ocean and closely associated with floating lgae/seagrass mats. Juveniles then migrate to shallower, coastal areas, mainly coral reefs and rocky areas, but also in bays and estuaries near mangroves when reefs are absent; seldom in water lmore than 65 feet deep. They feed on sponges, jellyfish, sea urchins, molluscs, and crustaceans. Nesting occurs from April to November high up on the beach where there is vegetation for cover and little or no sand. Some migrate, but others stay close to foraging areas - females are philopatric. |
| Common Garter Snake | *Thamnophis sirtalis* | N/A | SGCN | Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Green Sea Turtle | *Chelonia mydas* | T | T, SGCN | Inhabits tropical, subtropical, and temperate waters worldwide, including the Gulf of Mexico. Adults and juveniles occupy inshore and nearshore areas, including bays and lagoons with reefs and seagrass. They migrate from feeding grounds (open ocean) to nesting grounds (beaches/barrier islands) and some nesting does occur in Texas (April to September). Adults are herbivorous feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds. |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Kemp's Ridley Sea Turtle | *Lepidochelys kempii* | E | E, SGCN | Inhabits tropical, subtropical, and temperate waters of the northwestern Atlantic Ocean and Gulf of Mexico. Adults are found in coastal waters with muddy or sandy bottoms. Some males migrate between feeding grounds and breeeding grounds, but some don't. Females migrate between feeding and nesting areas, often returning to the same destinations. Nesting in Texas occurs on a smaller scale compared to other areas (i.e. Mexico). Hatchlings are quickly swept out to open water and are rarely found nearshore. Similarly, juveniles often congregate near floating algae/seagrass mats offshore, and move into nearshore, coastal, neritic areas after 1-2 years and remain until they reach maturity. They feed primarily on crabs, but also snails, clams, other crustaceans and plants, juveniles feed on sargassum and its associated fauna; nests April through August. |
| Leatherback Sea Turtle | *Dermochelys coriacea* | E | E, SGCN | Inhabit tropical, subtropical, and temperate waters worldwide, including the Gulf of Mexico. Nesting is not common in Texas (March to July). Most pelagic of the seaturtles with the longest migration (>10,000 miles) between nesting and foraging sites. Are able to dive to depths of 4,000 feet. They are omnivorous, showing a preference for jellyfish. |
| Loggerhead Sea Turtle | *Caretta caretta* | T | T, SGCN | Inhabits tropical, subtropical, and temperate waters worldwide, including the Gulf of Mexico. They migrate from feeding grounds to nesting beaches/barrier islands and some nesting does occur in Texas (April to September). Beaches that are narrow, steeply sloped, with coarse-grains and are preffered for nesting. Newly hatched individuals depend on floating alage/seaweed for protection and foraging, which eventually transport them offshore and into open ocean. Juveniles and young adults spend their lives in open ocean, offshore before migrating to coastal areas to breed and nest. Foraging areas for adults include shallow continental shelf waters. |
| Prairie Skink | *Plestiodon septentrionalis* | N/A | SGCN | The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions. |
| Salt Marsh Snake | *Nerodia clarkii* | N/A | SGCN | This species is generally restricted to the brackish marshes and islands of the mid and upper coastline. It can be found further inland in shallow freshwater marshes. |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Texas Diamondback Terrapin | *Malaclemys terrapin littoralis* | N/A | SGCN | Coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive. Bay islands are important habitats. Nests on oyster shell beaches. |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Scarlet Snake | *Cemophora lineri* | N/A | T, SGCN | Terrestrial: Prefers well drained soils with a variety of forest, grassland, and scrub habitats. |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| Western Massasauga | *Sistrurus tergeminus* | N/A | SGCN | Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands. |
| **Plants** | | | | |
| Coastal Gay-Feather | *Liatris bracteata* | N/A | SGCN | Coastal prairie grasslands of various types, from salty prairie on low- lying somewhat saline clay loams to upland prairie on nonsaline clayey to sandy loams; flowering in fall. |
| Indianola Beakrush | *Rhynchospora indianolensis* | N/A | SGCN | Locally abundant in cattle pastures in some areas (at least during wet years), possibly becoming a management problem in such sites; perennial; flowering/fruiting April-Nov. |
| Marsh-Elder Dodder | *Cuscuta attenuata* | N/A | SGCN | Parasitizes a particular sumpweed (Iva annua) almost exclusively as well as ragweed and heath aster. Host plants typically found in open, disturbed habitats like fallow fields and creek bottomlands; annual; flowering late summer through October. |
| Sand Brazos Mint | *Brazoria arenaria* | N/A | SGCN | Sandy areas in South Texas; annual; flowering/fruiting March-April. |
| Seaside Beebalm | *Monarda maritima* | N/A | SGCN | Occurs in grasslands and pastures on sandy soil near the coast (Carr 2015). |
| Texas Peachbush | *Prunus texana* | N/A | SGCN | Occurs at scattered sites in various well drained sandy situations; deep sand, plains and sand hills, grasslands, oak woods, 0-200 m elevation; perennial; flowering Feb-Mar; fruiting Apr-Jun. |
| Texas Willkommia | *Willkommia texana var. texana* | N/A | SGCN | Mostly in sparsely vegetated shortgrass patches within taller prairies on alkaline or saline soils on the Coastal Plain (Carr 2015). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Threeflower Broomweed | *Thurovia triflora* | N/A | SGCN | Near coast in sparse, low vegetation on a veneer of light colored silt or fine sand over saline clay along drier upper margins of ecotone between between salty prairies and tidal flats; further inland associated with vegetated slick spots on prairie mima mounds; flowering September-November. |
| Velvet Spurge | *Euphorbia innocua* | N/A | SGCN | Open or brushy areas on coastal sands and the South Texas Sand Sheet; perennial; flowering Sept-April; fruiting Nov-July. |

## Table 5D-5 Comal County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Blanco River Springs Salamander | *Eurycea pterophila* | N/A | SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Cascade Caverns Salamander | *Eurycea latitans* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| San Marcos Salamander | *Eurycea nana* | T | T, SGCN | Aquatic; springs and associated water. |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Texas Blind Salamander | *Eurycea rathbuni* | E | E, SGCN | Aquatic and subterranean; streams and caves. |
| Texas Salamander | *Eurycea neotenes* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Arachnids** | | | | |
| No Accepted Common Name | *Texella brevidenta* | N/A | SGCN | Habitat description is not available at this time |
| No Accepted Common Name | *Cicurina puentecilla* | N/A | SGCN | Habitat description is not available at this time |
| No Accepted Common Name | *Cicurina reclusa* | N/A | SGCN | Habitat description is not available at this time |
| No Accepted Common Name | *Almuerzothyas comalensis* | N/A | SGCN | Spring obligate. Known only from Comal Springs, Comal County. Fine scale habitat requirements unknown. |
| **Arthropods** | | | | |
| Ivy's Cave Millipede | *Speodesmus ivyi* | N/A | SGCN | Habitat description is not available at this time. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Black-Capped Vireo | *Vireo atricapilla* | DL | SGCN | Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Golden-Cheeked Warbler | *Setophaga chrysoparia* | E | E, SGCN | Ashe juniper in mixed stands with various oaks (Quercus spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony |
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson’s warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Crustaceans** | | | | |
| Ezell's Cave Amphipod | *Stygobromus flagellatus* | N/A | SGCN | Known only from artesian wells |
| No Accepted Common Name | *Palaemonetes texanus* | N/A | SGCN | Collected in Comal and Hays counties (Middel Guadalupe and San Marcos watersheds). |
| No Accepted Common Name | *Artesia subterranea* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Mexiweckelia hardeni* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Texanobathynella bowmani* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Nitocrellopsis texana* | N/A | SGCN | Habitat description is not available at this time. |
| Peck's Cave Amphipod | *Stygobromus pecki* | E | E, SGCN | Small, aquatic crustacean; lives underground in the Edwards Aquifer; collected at Comal Springs and Hueco Springs |
| **Fish** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| American Eel | *Anguilla rostrata* | N/A | SGCN | Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration. |
| Burrhead Chub | *Macrhybopsis marconis* | N/A | SGCN | Occurs in the San Antonio and Guadalupe rivers; remnant populations may exist in the Edwards Plateau portion of the Colorado River. Occupies flowing water over coarse sand and fine gravel substrates in medium to large streams; found to be most abundant in riffles over large gravel and cobble. |
| Fountain Darter | *Etheostoma fonticola* | E | E, SGCN | Known only from the spring-fed San Marcos and Comal rivers in dense beds of aquatic plants growing close to bottom; may be found in slow- and fast-flowing habitats. |
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |
| Guadalupe Darter | *Percina apristis* | N/A | T, SGCN | Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water. |
| Guadalupe Roundnose Minnow | *Dionda flavipinnis* | N/A | SGCN | Endemic to Guadalupe and southern Colorado drainages; primarily restricted to clear spring-fed waters that have slight temperature variations. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Nueces Roundnose Minnow | *Dionda texensis* | N/A | SGCN | Endemic to the headwaters of the Nueces River; habitat unknown but likely similar to Devils River Minnow (Often found in association with spring outflows over gravel-cobble substrate and adjacent to aquatic macrophytes; may inhabit a microhabitat associated with the interface between spring runs and the river). |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Comal Springs Diving Beetle | *Comaldessus stygius* | N/A | SGCN | Known only from the outflows at Comal Springs; aquatic; diving beetles generally inhabit the water column |
| Comal Springs Dryopid Beetle | *Stygoparnus comalensis* | E | E, SGCN | Dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood |
| Comal Springs Riffle Beetle | *Heterelmis comalensis* | E | E, SGCN | Comal and San Marcos Springs |
| Edwards Aquifer Diving Beetle | *Haideoporus texanus* | N/A | SGCN | Habitat poorly known; known from an artesian well in Hays County |
| No Accepted Common Name | *Rhadine insolita* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Rhadine speca* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Pseudocentroptiloides morihari* | N/A | SGCN | Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation |
| No Accepted Common Name | *Ochrotrichia capitana* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Neotrichia juani* | N/A | SGCN | Specimens were collected from perennial and ephemeral rivers, and small spring-fed streams (Harris and Tiemann 1993). |
| No Accepted Common Name | *Xiphocentron messapus* | N/A | SGCN | Habitat description is not available at this time. |
| Purse Casemaker Caddisfly | *Hydroptila melia* | N/A | SGCN | Habitat description is not available at this time. |
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Black-Tailed Prairie Dog | *Cynomys ludovicianus* | N/A | SGCN | Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Ghost-Faced Bat | *Mormoops megalophylla* | N/A | SGCN | Winter roosts are in large limestone caves. Buildings and rock crevasses provide roosts, as well. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| Wwhite-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade |
| **Mollusks** | | | | |
| Edwards Plateau Liptooth | *Millerelix gracilis* | N/A | SGCN | Habitat description is not available at this time. |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019] |
| Glossy Wolfsnail | *Euglandina texasiana* | N/A | SGCN | Habitat description is not available at this time. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Fatmucket | *Lampsilis bergmanni* | E | T, SGCN | Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Reported in lakes at Kerrville, Texas, which suggests it may occasionally persist in some impoundment conditions (Robert G. Howells, personal communication). (Mussels of Texas, 2020) |
| Guadalupe Orb | *Cyclonaias necki* | E | E, SGCN | Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020] |
| Horseshoe Liptooth | *Daedalochila hippocrepis* | N/A | SGCN | Terrestrial snail known only from the steep, wooded hillsides of Landa Park in New Braunfels |
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| No Accepted Common Name | *Phreatodrobia conica* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia micra* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia plana* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia rotunda* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Stygopyrgus bartonensis* | N/A | SGCN | Habitat description is not available at this time. |
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| Tampico Pearlymussel | *Cyrtonaias tampicoensis* | N/A | SGCN | Reported from streams to rivers, reservoirs, and canals. In riverine habitats often found in nearshore habitats such as banks and backwaters, to include pools and oxbows, in mud or sand or among cobble and boulders with still to moderate currents (Howells et al. 1996). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Plateau Spot-Tailed Earless Lizard | *Holbrookia lacerata* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Tamaulipan Spot-Tailed Earless Lizard | *Holbrookia subcaudalis* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Bigflower Cornsalad | *Valerianella stenocarpa* | N/A | SGCN | Usually along creekbeds or in vernally moist grassy open areas (Carr 2015). |
| Bracted Twistflower | *Streptanthus bracteatus* | T | SGCN | Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer |
| Buckley Tridens | *Tridens buckleyanus* | N/A | SGCN | Occurs in juniper-oak woodlands on rocky limestone slopes; Perennial; Flowering/Fruiting April-Nov |
| Canyon Mock-Orange | *Philadelphus texensis var. ernestii* | N/A | SGCN | Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Comal Snakewood | *Colubrina stricta* | N/A | SGCN | In El Paso County, found in a patch of thorny shrubs in colluvial deposits and sandy soils at the base of an igneous rock outcrop; the historic Comal County record does not describe the habitat; in Mexico ,found in shrublands on calcareous, gravelly, clay soils with woody associates; flowering late spring or early summer |
| Darkstem Noseburn | *Tragia nigricans* | N/A | SGCN | Occurs in oak-juniper woodlands on mesic limestone slopes and canyon bottoms; Perennial; Flowering/Fruiting April-Oct |
| Glass Mountains Coral-Root | *Hexalectris nitida* | N/A | SGCN | Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept |
| Gravelbar Brickellbush | *Brickellia dentata* | N/A | SGCN | Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; Perennial; Flowering June-Nov; Fruiting June-Oct |
| Greenman's Bluet | *Houstonia parviflora* | N/A | SGCN | Grass pastures. Feb- Apr. (Correll and Johnston 1970). |
| Heller's Marbleseed | *Onosmodium helleri* | N/A | SGCN | Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; Perennial; Flowering March-May |
| Hill Country Wild-Mercury | *Argythamnia aphoroides* | N/A | SGCN | Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; Perennial; Flowering April-May with fruit persisting until midsummer |
| Lindheimer's Tickseed | *Desmodium lindheimeri* | N/A | SGCN | Known in Texas only from three locations; US habitat is uncertain; has been found along rocky bed of dry ravine and among brush on the banks, steep ravine banks, dry caliche flat roadsides, in shallow soil on outcrops; occurred in deep to partial shade and openings in live oak-juniper woodland associations on the Edwards Limestone; flowering August-October or November. |
| Narrowleaf Brickellbush | *Brickellia eupatorioides var. gracillima* | N/A | SGCN | Moist to dry gravelly alluvial soils along riverbanks but also on limestone slopes; Perennial; Flowering/Fruiting April-Nov |
| Net-Leaf Bundleflower | *Desmanthus reticulatus* | N/A | SGCN | Mostly on clay prairies of the coastal plain of central and south Texas; Perennial; Flowering April-July; Fruiting April-Oct |
| Osage Plains False Foxglove | *Agalinis densiflora* | N/A | SGCN | Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Plateau Loosestrife | *Lythrum ovalifolium* | N/A | SGCN | Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; Perennial; Flowering/Fruiting April-Nov |
| Plateau Milkvine | *Matelea edwardsensis* | N/A | SGCN | Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June |
| Scarlet Leather-Flower | *Clematis texensis* | N/A | SGCN | Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; Perennial; Flowering March-July; Fruiting May-July |
| Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Platanifolius* | N/A | SGCN | Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; Perennial; Flowering April-May; Fruiting May-Aug. |
| Texas Almond | *Prunus minutiflora* | N/A | SGCN | Wide-ranging but scarce, in a variety of grassland and shrubland situations, mostly on calcareous soils underlain by limestone but occasionally in sandier neutral soils underlain by granite; Perennial; Flowering Feb-May and Oct; Fruiting Feb-Sept |
| Texas Amorpha | *Amorpha roemeriana* | N/A | SGCN | Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; Perennial; Flowering May-June; Fruiting June-Oct |
| Texas Barberry | *Berberis swaseyi* | N/A | SGCN | Shallow calcareous stony clay of upland grasslands/shrublands over limestone as well as in loamier soils in openly wooded canyons and on creek terraces; Perennial; Flowering/Fruiting March-June |
| Texas Claret-Cup Cactus | *Echinocereus coccineus var. paucispinus* | N/A | SGCN | Mountains, hills, and mesas, igneous and limestone, oak-juniper-pinyon woodland or juniper woodland on limestone mesas, mostly rocky habitats but also in alluvial basins, grasslands, or among mesquite or other shrubs. Flowering March - April (Powell and Weedin 2004). |
| Texas Fescue | *Festuca versuta* | N/A | SGCN | Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; Perennial; Flowering/Fruiting April-June |
| Texas Mock-Orange | *Philadelphus texensis var. texensis* | N/A | SGCN | Limestone slopes and ravines, slopes in oak-juniper woodlands; variety texensis has a more westward range than var. ernestii; it is known from Bandera, Bexar, Edwards, Kendall, Medina, Real, and Uvalde counties in central Texas; Flowering Apr–May; fruiting Jun–Oct (Freeman 2017). |
| Texas Seymeria | *Seymeria texana* | N/A | SGCN | Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; Annual; Flowering May-Nov; Fruiting July-Nov |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Tree Dodder | *Cuscuta exaltata* | N/A | SGCN | Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct |
| Turnip-Root Scurfpea | *Pediomelum cyphocalyx* | N/A | SGCN | Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015). |
| Warnock's Coral-Root | *Hexalectris warnockii* | N/A | SGCN | In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years |
| Wright's Milkvetch | *Astragalus wrightii* | N/A | SGCN | On sandy or gravelly soils; Flowering/fruiting: April and May |

## Table 5D-6 Gonzales County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black Rail | *Laterallus jamaicensis* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia. |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Rufa Red Knot | *Calidris canutus rufa* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Swallow-Tailed Kite | *Elanoides forficatus* | | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson’s warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Yellow Rail | *Coturnicops noveboracensis* | N/A | SGCN | Breeding: Emergent wetlands, grass or sedge marshes and wet meadows in freshwater situations. Some breeding territories in these wet meadows contain firm footing and only a few remnant pools of water (Berkey 1991). These areas can range from damp to 38 cm (15 inches) of water but the average depth used for nesting is 8 to 15 cm (3 to 6 inches) (Savaloja 1981). Non-breeding: Grain fields in winter and when migrating. Winters in both freshwater and brackish marshes, as well as in dense, deep grass. During fall migration, will use many open habitats, from rice paddies to dry hayfields. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Fish** | | | | |
| Burrhead Chub | *Macrhybopsis marconis* | N/A | SGCN | Occurs in the San Antonio and Guadalupe rivers; remnant populations may exist in the Edwards Plateau portion of the Colorado River. Occupies flowing water over coarse sand and fine gravel substrates in medium to large streams; found to be most abundant in riffles over large gravel and cobble. |
| Fountain Darter | *Etheostoma fonticola* | E | E, SGCN | Known only from the spring-fed San Marcos and Comal rivers in dense beds of aquatic plants growing close to bottom; may be found in slow- and fast-flowing habitats. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |
| Guadalupe Darter | *Percina apristis* | N/A | T, SGCN | Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water. |
| River Darter | *Percina shumardi* | N/A | SGCN | In Texas limited to eastern streams including Red River southward to the Neches River, and a disjunct population in the Guadalupe and San Antonio river systems east of the Balcones Escarpment. Confined to large rivers and lower parts of major tributaries; usually found in deep chutes and riffles where current is swift and bottom composed of coarse gravel or rock. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Bombus variabilis* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Melanoplus alexanderi* | N/A | SGCN | Primarily in open oak or pine/oak savannah type habitats with fine grain loamy sand to sandy loam soils. |
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Eeastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges; woodlands. Prefer wooded, brushy areas; tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. |
| Seminole Bat | *Lasiurus seminolus* | N/A | SGCN | Pine-oak and long-leaf pine in east Texas. Habitats include pine, mixed pine-hardwood, and hardwood forests of uplands and bottomlands, particularly pine-dominated forests, including mature pine and pine-hardwood corridors in managed pine forest landscapes (Menzel et al. 1998, 1999, 2000; Carter et al. 2004; Marks and Marks 2006; Perry and Thill 2007; Perry et al. 2007; Hein et al. 2008; Ammerman et al. 2012). |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade. |
| **Mollusks** | | | | |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Fatmucket | *Lampsilis bergmanni* | E | T, SGCN | Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Reported in lakes at Kerrville, Texas, which suggests it may occasionally persist in some impoundment conditions (Robert G. Howells, personal communication). (Mussels of Texas 2020). |
| Guadalupe Orb | *Cyclonaias necki* | E | E, SGCN | Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]. |
| Lilliput | *Toxolasma parvum* | N/A | SGCN | Reported from small streams, where it may penetrate into the headwaters, to large rivers, oxbows, sloughs, lakes, ponds, canals, borrow pits, and reservoirs. Primarily occurs in still to slow currents in mud and sand substrates (Coker et al. 1921; Read 1954; Neck and Metcalf 1988; Williams et al. 2008; Watters et al. 2009). |
| Louisiana Fatmucket | *Lampsilis hydiana* | N/A | SGCN | Reported from streams to rivers, may penetrate into headwaters, oxbows, lakes, canals, and reservoirs. Reported to occur in still to moderate currents in sand, mud, and gravel substrates. In riverine systems it is found primarily in nearshore habitats such as banks, backwaters and oxbows (Howells et al. 1996; Randklev et al. 2013a; Randklev et al. 2014a; Tsakiris and Randklev 2016). It adapts readily to reservoirs and can cope with flow modification stemming from river impoundment (Randklev et al. 2016). |
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| Pondmussel | *Sagittunio subrostratus* | N/A | SGCN | Reported from streams to rivers, where it can invade headwater systems but is rarely in large river systems. Can also inhabit natural and artificial ponds, lakes, reservoirs, and canals. In riverine habitat typically occurs in backwaters, pools, sloughs, and oxbows in little to no current in substrates of mud or sand (Parmalee and Bogan 1998; Williams et al. 2008; Watters et al. 2009; Haag and Cicerello 2016; Watters 2018). |
| Tampico Pearlymussel | *Cyrtonaias tampicoensis* | N/A | SGCN | Reported from streams to rivers, reservoirs, and canals. In riverine habitats often found in nearshore habitats such as banks and backwaters, to include pools and oxbows, in mud or sand or among cobble and boulders with still to moderate currents (Howells et al. 1996). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Prairie Skink | *Plestiodon septentrionalis* | N/A | SGCN | The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Awnless Leastdaisy | *Chaetopappa imberbis* | N/A | SGCN | In woodlands on loams of Carrizo sand (TEX-LL specimens Carr 23875, 12507). Flowering and fruiting during Mar - May. |
| Bristle Nailwort | *Paronychia setacea* | N/A | SGCN | Flowering vascular plant endemic to eastern southcentral Texas, occurring in sandy soils. |
| Crestless Onion | *Allium canadense var. ecristatum* | N/A | SGCN | Occurs on poorly drained sites on sandy substrates within coastal prairies of the Coastal Bend area (Carr 2015). |
| Drummond's Rushpea | *Hoffmannseggia drummondii* | N/A | SGCN | Open areas on sandy clay; perennial. |
| Elmendorf's Onion | *Allium elmendorfii* | N/A | SGCN | Grassland openings in oak woodlands on deep, loose, well-drained sands; in Coastal Bend, on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands; to the north it occurs in post oak-black hickory-live oak woodlands over Queen City and similar Eocene formations; one anomalous specimen found on Llano Uplift in wet pockets of granitic loam; Perennial; Flowering March-April, May. |
| Green Hawthorn | *Crataegus viridis var. glabriuscula* | N/A | SGCN | In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above/near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct. |
| Heartleaf Evening-Primrose | *Oenothera cordata* | N/A | SGCN | Occurs in post oak woodlands on sandy soils on the coastal plain (Carr 2015). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Hill Country Wild-Mercury | *Argythamnia aphoroides* | N/A | SGCN | Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; perennial; flowering April-May with fruit persisting until midsummer. |
| Low Spurge | *Euphorbia peplidion* | N/A | SGCN | Occurs in a variety of vernally-moist situations in a number of natural regions; annual; flowering Feb-April; fruiting March-April . |
| Net-Leaf Bundleflower | *Desmanthus reticulatus* | N/A | SGCN | Mostly on clay prairies of the coastal plain of central and south Texas; perennial; flowering April-July; fruiting April-Oct. |
| Sandhill Woolywhite | *Hymenopappus carrizoanus* | N/A | SGCN | Disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations; flowering April-June. |
| Sayersville Blue Eyes | *Nemophila sayersensis* | N/A | SGCN | Open fields and woodland margins on deep loose nutrient-poor sand (Simpson, Helfgott and Neff 2001). Mar-May. |
| Texas Beebalm | *Monarda viridissima* | N/A | SGCN | Endemic perennial herb of the Carrizo Sands; deep, well-drained sandy soils in openings of post oak woodlands; flowers white. |
| Texas Milk Vetch | *Astragalus reflexus* | N/A | SGCN | Grasslands, prairies, and roadsides on calcareous and clay substrates; annual; flowering Feb-June; fruiting April-June. |
| Texas Peachbush | *Prunus texana* | N/A | SGCN | Occurs at scattered sites in various well drained sandy situations; deep sand, plains and sand hills, grasslands, oak woods, 0-200 m elevation; perennial; flowering Feb-Mar; fruiting Apr-Jun. |
| Texas Pinkroot | *Spigelia texana* | N/A | SGCN | Woodlands on loamy soils; perennial; flowering March-Nov; fruiting April-Nov. |
| Texas Sandmint | *Rhododon ciliatus* | N/A | SGCN | Open sandy areas in the Post Oak Belt of east-central Texas; annual; flowering April-Aug; fruiting May-Aug. |
| Topeka Purple-Coneflower | *Echinacea atrorubens* | N/A | SGCN | Occurring mostly in tallgrass prairie of the southern Great Plains, in blackland prairies but also in a variety of other sites like limestone hillsides; perennial; flowering Apr-June. |
| Wright's Milkvetch | *Astragalus wrightii* | N/A | SGCN | On sandy or gravelly soils; flowering/fruiting: April and May. |

## Table 5D-7 Guadalupe County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Texas Blind Salamander | *Eurycea rathbuni* | E | E, SGCN | Aquatic and subterranean; streams and caves. |
| Texas Salamander | *Eurycea neotenes* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black Rail | *Laterallus jamaicensis* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia. |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands. |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony. |
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Swallow-Tailed Kite | *Elanoides forficatus* | | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson's warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |
| Yellow Rail | *Coturnicops noveboracensis* | N/A | SGCN | Breeding: Emergent wetlands, grass or sedge marshes and wet meadows in freshwater situations. Some breeding territories in these wet meadows contain firm footing and only a few remnant pools of water (Berkey 1991). These areas can range from damp to 38 cm (15 inches) of water but the average depth used for nesting is 8 to 15 cm (3 to 6 inches) (Savaloja 1981). Non-breeding: Grain fields in winter and when migrating. Winters in both freshwater and brackish marshes, as well as in dense, deep grass. During fall migration, will use many open habitats, from rice paddies to dry hayfields. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Crustaceans** | | | | |
| Bifurcated Cave Amphipod | *Stygobromus bifurcatus* | N/A | SGCN | Habitat description is not available at this time. |
| **Fish** | | | | |
| American Eel | *Anguilla rostrata* | N/A | SGCN | Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration. |
| Fountain Darter | *Etheostoma fonticola* | E | E, SGCN | Known only from the spring-fed San Marcos and Comal rivers in dense beds of aquatic plants growing close to bottom; may be found in slow- and fast-flowing habitats. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |
| Guadalupe Darter | *Percina apristis* | N/A | T, SGCN | Endemic to the Guadalupe River Basin; found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water. |
| Guadalupe Roundnose Minnow | *Dionda flavipinnis* | N/A | SGCN | Endemic to Guadalupe and southern Colorado drainages; primarily restricted to clear spring-fed waters that have slight temperature variations. |
| Nueces Roundnose Minnow | *Dionda texensis* | N/A | SGCN | Endemic to the headwaters of the Nueces River; habitat unknown but likely similar to Devils River Minnow (Often found in association with spring outflows over gravel-cobble substrate and adjacent to aquatic macrophytes; may inhabit a microhabitat associated with the interface between spring runs and the river). |
| Plateau Shiner | *Cyprinella lepida* | N/A | T, SGCN | Edwards Plateau portion of Nueces basin, mainstem and tributaries of Nueces, Frio, and Sabinal rivers; may also be endemic to upper reaches of the Guadalupe River; clear, cool, spring-fed headwater creeks; usually over gravel and limestone substrates. |
| River Darter | *Percina shumardi* | N/A | SGCN | In Texas limited to eastern streams including Red River southward to the Neches River, and a disjunct population in the Guadalupe and San Antonio river systems east of the Balcones Escarpment. Confined to large rivers and lower parts of major tributaries; usually found in deep chutes and riffles where current is swift and bottom composed of coarse gravel or rock. |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Comal Springs Diving Beetle | *Comaldessus stygius* | N/A | SGCN | Known only from the outflows at Comal Springs; aquatic; diving beetles generally inhabit the water column. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Comal Springs Dryopid Beetle | *Stygoparnus comalensis* | E | E, SGCN | Dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood. |
| Comal Springs Riffle Beetle | *Heterelmis comalensis* | E | E, SGCN | Comal and San Marcos Springs. |
| Edwards Aquifer Diving Beetle | *Haideoporus texanus* | N/A | SGCN | Habitat poorly known; known from an artesian well in Hays County. |
| No Accepted Common Name | *Rhadine insolita* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Rhadine speca* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Pseudocentroptiloides morihari* | N/A | SGCN | Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation. |
| No Accepted Common Name | *Ochrotrichia capitana* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Neotrichia juani* | N/A | SGCN | Specimens were collected from perennial and ephemeral rivers, and small spring-fed streams (Harris and Tiemann 1993). |
| No Accepted Common Name | *Xiphocentron messapus* | N/A | SGCN | Habitat description is not available at this time. |
| Purse Casemaker Caddisfly | *Hydroptila melia* | N/A | SGCN | Habitat description is not available at this time. |
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Black-Tailed Prairie Dog | *Cynomys ludovicianus* | N/A | SGCN | Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges; woodlands. Prefer wooded, brushy areas; tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Ghost-Faced Bat | *Mormoops megalophylla* | N/A | SGCN | Winter roosts are in large limestone caves. Buildings and rock crevasses provide roosts, as well. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade. |
| **Mollusks** | | | | |
| Edwards Plateau Liptooth | *Millerelix gracilis* | N/A | SGCN | Habitat description is not available at this time. |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]. |
| Glossy Wolfsnail | *Euglandina texasiana* | N/A | SGCN | Habitat description is not available at this time. |
| Guadalupe Fatmucket | *Lampsilis bergmanni* | E | T, SGCN | Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Reported in lakes at Kerrville, Texas, which suggests it may occasionally persist in some impoundment conditions (Robert G. Howells, personal communication). (Mussels of Texas, 2020). |
| Guadalupe Orb | *Cyclonaias necki* | E | E, SGCN | Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]. |
| Horseshoe Liptooth | *Daedalochila hippocrepis* | N/A | SGCN | Terrestrial snail known only from the steep, wooded hillsides of Landa Park in New Braunfels. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| No Accepted Common Name | *Phreatodrobia conica* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia micra* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia plana* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia rotunda* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Stygopyrgus bartonensis* | N/A | SGCN | Habitat description is not available at this time. |
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| Tampico Pearlymussel | *Cyrtonaias tampicoensis* | N/A | SGCN | Reported from streams to rivers, reservoirs, and canals. In riverine habitats often found in nearshore habitats such as banks and backwaters, to include pools and oxbows, in mud or sand or among cobble and boulders with still to moderate currents (Howells et al. 1996). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Plateau Spot-Tailed Earless Lizard | *Holbrookia lacerata* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Tamaulipan Spot-Tailed Earless Lizard | *Holbrookia subcaudalis* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Bigflower Cornsalad | *Valerianella stenocarpa* | N/A | SGCN | Usually along creekbeds or in vernally moist grassy open areas (Carr 2015). |
| Bracted Twistflower | *Streptanthus bracteatus* | T | SGCN | Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer. |
| Buckley Tridens | *Tridens buckleyanus* | N/A | SGCN | Occurs in juniper-oak woodlands on rocky limestone slopes; Perennial; Flowering/Fruiting April-Nov. |
| Canyon Mock-Orange | *Philadelphus texensis var. ernestii* | N/A | SGCN | Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October. |
| Comal Snakewood | *Colubrina stricta* | N/A | SGCN | In El Paso County, found in a patch of thorny shrubs in colluvial deposits and sandy soils at the base of an igneous rock outcrop; the historic Comal County record does not describe the habitat; in Mexico, found in shrublands on calcareous, gravelly, clay soils with woody associates; flowering late spring or early summer. |
| Darkstem Noseburn | *Tragia nigricans* | N/A | SGCN | Occurs in oak-juniper woodlands on mesic limestone slopes and canyon bottoms; perennial; flowering/fruiting April-Oct. |
| Glass Mountains Coral-Root | *Hexalectris nitida* | N/A | SGCN | Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; perennial; flowering June-Sept; fruiting July-Sept. |
| Gravelbar Brickellbush | *Brickellia dentata* | N/A | SGCN | Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; perennial; flowering June-Nov; fruiting June-Oct. |
| Greenman's Bluet | *Houstonia parviflora* | N/A | SGCN | Grass pastures. Feb- Apr. (Correll and Johnston 1970). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Heller's Marbleseed | *Onosmodium helleri* | N/A | SGCN | Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; perennial; flowering March-May. |
| Hill Country Wild-Mercury | *Argythamnia aphoroides* | N/A | SGCN | Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; perennial; flowering April-May with fruit persisting until midsummer. |
| Lindheimer's Tickseed | *Desmodium lindheimeri* | N/A | SGCN | Known in Texas only from three locations; US habitat is uncertain; has been found along rocky bed of dry ravine and among brush on the banks, steep ravine banks, dry caliche flat roadsides, in shallow soil on outcrops; occurred in deep to partial shade and openings in live oak-juniper woodland associations on the Edwards Limestone; flowering August-October or November. |
| Narrowleaf Brickellbush | *Brickellia eupatorioides var. gracillima* | N/A | SGCN | Moist to dry gravelly alluvial soils along riverbanks but also on limestone slopes; perennial; flowering/fruiting April-Nov. |
| Net-Leaf Bundleflower | *Desmanthus reticulatus* | N/A | SGCN | Mostly on clay prairies of the coastal plain of central and south Texas; perennial; flowering April-July; fruiting April-Oct. |
| Osage Plains False Foxglove | *Agalinis densiflora* | N/A | SGCN | Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; prairies, dry limestone soils; annual; flowering Aug-Oct. |
| Plateau Loosestrife | *Lythrum ovalifolium* | N/A | SGCN | Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; perennial; flowering/fruiting April-Nov. |
| Plateau Milkvine | *Matelea edwardsensis* | N/A | SGCN | Occurs in various types of juniper-oak and oak-juniper woodlands; perennial; flowering March-Oct; fruiting May-June. |
| Scarlet Leather-Flower | *Clematis texensis* | N/A | SGCN | Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; perennial; flowering March-July; fruiting May-July. |
| Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Platanifolius* | N/A | SGCN | Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; perennial; flowering April-May; fruiting May-Aug. |
| Texas Almond | *Prunus minutiflora* | N/A | SGCN | Wide-ranging but scarce, in a variety of grassland and shrubland situations, mostly on calcareous soils underlain by limestone but occasionally in sandier neutral soils underlain by granite; perennial; flowering Feb-May and Oct; fruiting Feb-Sept. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Texas Amorpha | *Amorpha roemeriana* | N/A | SGCN | Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; perennial; flowering May-June; fruiting June-Oct. |
| Texas Barberry | *Berberis swaseyi* | N/A | SGCN | Shallow calcareous stony clay of upland grasslands/shrublands over limestone as well as in loamier soils in openly wooded canyons and on creek terraces; Pperennial; flowering/fruiting March-June. |
| Texas Claret-Cup Cactus | *Echinocereus coccineus var. paucispinus* | N/A | SGCN | Mountains, hills, and mesas, igneous and limestone, oak-juniper-pinyon woodland or juniper woodland on limestone mesas, mostly rocky habitats but also in alluvial basins, grasslands, or among mesquite or other shrubs. Flowering March - April (Powell and Weedin 2004). |
| Texas Fescue | *Festuca versuta* | N/A | SGCN | Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; perennial; flowering/fruiting April-June. |
| Texas Mock-Orange | *Philadelphus texensis var. texensis* | N/A | SGCN | Limestone slopes and ravines, slopes in oak-juniper woodlands; variety texensis has a more westward range than var. ernestii; it is known from Bandera, Bexar, Edwards, Kendall, Medina, Real, and Uvalde counties in central Texas; flowering Apr–May; fruiting Jun–Oct (Freeman 2017). |
| Texas Seymeria | *Seymeria texana* | N/A | SGCN | Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; annual; flowering May-Nov; fruiting July-Nov. |
| Tree Dodder | *Cuscuta exaltata* | N/A | SGCN | Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; annual; flowering May-Oct; fruiting July-Oct. |
| Turnip-Root Scurfpea | *Pediomelum cyphocalyx* | N/A | SGCN | Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015). |
| Warnock's Coral-Root | *Hexalectris warnockii* | N/A | SGCN | In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years. |
| Wright's Milkvetch | *Astragalus wrightii* | N/A | SGCN | On sandy or gravelly soils; flowering/fruiting: April and May. |

## Table 5D-8 Hays County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Barton Springs Salamander | *Eurycea sosorum* | E | E, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Blanco Blind Salamander | *Eurycea robusta* | N/A | T, SGCN | Aquatic and subterranean; streams and caves. |
| Blanco River Springs Salamander | *Eurycea pterophila* | N/A | SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Pedernales River Springs Salamander | *Eurycea sp. 6* | N/A | N/A | Aquatic; springs, streams and caves with rocky or cobble beds. |
| San Marcos Salamander | *Eurycea nana* | T | T, SGCN | Aquatic; springs and associated water. |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates |
| Texas Blind Salamander | *Eurycea rathbuni* | E | E, SGCN | Aquatic and subterranean; streams and caves. |
| Texas Salamander | *Eurycea neotenes* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Arachnids** | | | | |
| No Accepted Common Name | *Texella diplospina* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Texella grubbsi* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Texella mulaiki* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Texella renkesae* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Tartarocreagris grubbsi* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Cicurina ezelli* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Cicurina russelli* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Cicurina ubicki* | N/A | SGCN | Habitat description is not available at this time. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black-Capped Vireo | *Vireo atricapilla* | DL | SGCN | Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer. |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in Opuntia cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands. |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Golden-Cheeked Warbler | *Setophaga chrysoparia* | E | E, SGCN | Ashe juniper in mixed stands with various oaks (Quercus spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony. |
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson's warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Crustaceans** | | | | |
| Balcones Cave Amphipod | *Stygobromus balconis* | N/A | SGCN | Subaquatic, subterranean obligate amphipod. |
| Bifurcated Cave Amphipod | *Stygobromus bifurcatus* | N/A | SGCN | Habitat description is not available at this time. |
| Ezell's Cave Amphipod | *Stygobromus flagellatus* | N/A | SGCN | Known only from artesian wells |
| No Accepted Common Name | *Palaemonetes texanus* | N/A | SGCN | Collected in Comal and Hays counties (Middel Guadalupe and San Marcos watersheds). |
| No Accepted Common Name | *Artesia subterranea* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Texiweckelia texensis* | N/A | SGCN | Habitat description is not available at this time. |
| Purgatory Cave Shrimp | *Calathaemon holthuisi* | N/A | SGCN | Last known collection was in San Marcos, Hays Co. (Ezell's Cave) (Reddell 1994). |
| Texas Troglobitic Water Slater | *Lirceolus smithii* | N/A | T, SGCN | Subaquatic, subterranean obligate, aquifer. |
| **Fish** | | | | |
| American Eel | *Anguilla rostrata* | N/A | SGCN | Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration. |
| Fountain Darter | *Etheostoma fonticola* | E | E, SGCN | Known only from the spring-fed San Marcos and Comal rivers in dense beds of aquatic plants growing close to bottom; may be found in slowand fast-flowing habitats. |
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Darter | *Percina apristis* | N/A | T, SGCN | Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water. |
| Guadalupe Roundnose Minnow | *Dionda flavipinnis* | N/A | SGCN | Endemic to Guadalupe and southern Colorado drainages; primarily restricted to clear spring-fed waters that have slight temperature variations. |
| Headwater Catfish | *Ictalurus lupus* | N/A | T, SGCN | Originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers. |
| Ironcolor Shiner | *Notropis chalybaeus* | N/A | SGCN | Found only in northeastern streams from the Sabine to the Red River with the exception of an isolated population found in the San Marcos River headwaters. Found primarily in acidic, tannin-stained, non-turbid, sluggish Coastal Plain streams and rivers of low to moderate gradient. Occurs in aggregation, often at the upstream ends of pools, with a moderate to sluggish current and sand, mud, silt or detritus substrates. Usually associated with aquatic vegetation. |
| Nueces Roundnose Minnow | *Dionda texensis* | N/A | SGCN | Endemic to the headwaters of the Nueces River; habitat unknown but likely similar to Devils River Minnow (Often found in association with spring outflows over gravel-cobble substrate and adjacent to aquatic macrophytes; may inhabit a microhabitat associated with the interface between spring runs and the river). |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Comal Springs Diving Beetle | *Comaldessus stygius* | N/A | SGCN | Known only from the outflows at Comal Springs; aquatic; diving beetles generally inhabit the water column. |
| Comal Springs Dryopid Beetle | *Stygoparnus comalensis* | E | E, SGCN | Dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood. |
| Comal Springs Riffle Beetle | *Heterelmis comalensis* | E | E, SGCN | Comal and San Marcos Springs. |
| Edwards Aquifer Diving Beetle | *Haideoporus texanus* | N/A | SGCN | Habitat poorly known; known from an artesian well in Hays County. |
| No Accepted Common Name | *Rhadine austinica* | N/A | SGCN | Habitat description is not available at this time. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| No Accepted Common Name | *Rhadine insolita* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Batrisodes grubbsi* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Procloeon distinctum* | N/A | SGCN | Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation. |
| No Accepted Common Name | *Plauditus texanus* | N/A | SGCN | Larvae are associated with small to medium limestone cobble and macrophytes in shallow riffles of clear, cool, alkaline streams (P. McCafferty, personal communication, December 2003). |
| No Accepted Common Name | *Xiphocentron messapus* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Ochrotrichia capitana* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Neotrichia juani* | N/A | SGCN | Specimens were collected from perennial and ephemeral rivers, and small spring-fed streams (Harris and Tiemann 1993). |
| San Marcos Saddle-Case Caddisfly | *Protoptila arca* | N/A | SGCN | Known from an artesian well in Hays County; locally very abundant; swift, well-oxygenated warm water about 1-2 m deep; larvae and pupal cases abundant on rocks. |
| Texas Austrotinodes Caddisfly | *Austrotinodes texensis* | N/A | SGCN | Appears endemic to the karst springs and spring runs of the Edwards Plateau region; flow in type locality swift but may drop significantly during periods of little drought; substrate coarse and ranges from cobble and gravel to limestone bedrock; many limestone outcroppings also found along the streams. |
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. |
| Seminole Bat | *Lasiurus seminolus* | N/A | SGCN | Pine-oak and long-leaf pine in east Texas. Habitats include pine, mixed pine-hardwood, and hardwood forests of uplands and bottomlands, particularly pine-dominated forests, including mature pine and pine-hardwood corridors in managed pine forest landscapes (Menzel et al. 1998, 1999, 2000; Carter et al. 2004; Marks and Marks 2006; Perry and Thill 2007; Perry et al. 2007; Hein et al. 2008; Ammerman et al. 2012). |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| **Mollusks** | | | | |
| Balcones Spike | *Fusconaia iheringi* | N/A | SGCN | Habitat not yet described. |
| Edwards Plateau Liptooth | *Millerelix gracilis* | N/A | SGCN | Habitat description is not available at this time. |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]. |
| Glossy Wolfsnail | *Euglandina texasiana* | N/A | SGCN | Habitat description is not available at this time. |
| Guadalupe Fatmucket | *Lampsilis bergmanni* | E | T, SGCN | Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Reported in lakes at Kerrville, Texas, which suggests it may occasionally persist in some impoundment conditions (Robert G. Howells, personal communication). (Mussels of Texas 2020). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Orb | *Cyclonaias necki* | E | E, SGCN | Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]. |
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| No Accepted Common Name | *Phreatodrobia conica* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia micra* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia plana* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia punctata* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Phreatodrobia rotunda* | N/A | SGCN | Habitat description is not available at this time. |
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Texas Fatmucket | *Lampsilis bracteata* | E | T, SGCN | Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Past authorities have reported this species intolerant of reservoir conditions but recent surveys suggest it may persist in some impoundment conditions (Howells 2010c; Randklev et al. 2017b). [Mussel of Texas 2019]. |
| Texas Fawnsfoot | *Truncilla macrodon* | T | T, SGCN | Occurs in large rivers but may also be found in medium-sized streams. Is found in protected near shore areas such as banks and backwaters but also riffles and point bar habitats with low to moderate water velocities. Typically occurs in substrates of mud, sandy mud, gravel and cobble. Considered intolerant of reservoirs (Randklev et al. 2010; Howells 2010o; Randklev et al. 2014b,c; Randklev et al. 2017a,b). [Mussels of Texas 2019]. |
| Texas Pimpleback | *Cyclonaias petrina* | E | E, SGCN | Occurs in medium-size streams to large rivers primarily in riffles and runs. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2019]. |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |
| Common Garter Snake | *Thamnophis sirtalis* | N/A | SGCN | Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Plateau Spot-Tailed Earless Lizard | *Holbrookia lacerata* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Map Turtle | *Graptemys versa* | N/A | SGCN | Aquatic: Primarily a river turtle but can also be found in reservoirs. Can be found in deep and shallow water with sufficient basking sites (emergent rocks and woody debris). |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Bigflower Cornsalad | *Valerianella stenocarpa* | N/A | SGCN | Usually along creekbeds or in vernally moist grassy open areas (Carr 2015). |
| Bracted Twistflower | *Streptanthus bracteatus* | T | SGCN | Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer. |
| Buckley Tridens | *Tridens buckleyanus* | N/A | SGCN | Occurs in juniper-oak woodlands on rocky limestone slopes; perennial; flowering/fruiting April-Nov. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Canyon Mock-Orange | *Philadelphus texensis var. ernestii* | N/A | SGCN | Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October. |
| Darkstem Noseburn | *Tragia nigricans* | N/A | SGCN | Occurs in oak-juniper woodlands on mesic limestone slopes and canyon bottoms; perennial; flowering/fruiting April-Oct. |
| Glass Mountains Coral-Root | *Hexalectris nitida* | N/A | SGCN | Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; perennial; flowering June-Sept; fruiting July-Sept. |
| Gravelbar Brickellbush | *Brickellia dentata* | N/A | SGCN | Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; perennial; flowering June-Nov; fruiting June-Oct. |
| Hall's Prairie Clover | *Dalea hallii* | N/A | SGCN | In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; perennial; flowering May-Sept; fruiting June-Sept. |
| Heller's Marbleseed | *Onosmodium helleri* | N/A | SGCN | Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; perennial; flowering March-May. |
| Hill Country Wild-Mercury | *Argythamnia aphoroides* | N/A | SGCN | Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; perennial; flowering April-May with fruit persisting until midsummer. |
| Narrowleaf Brickellbush | *Brickellia eupatorioides var. gracillima* | N/A | SGCN | Moist to dry gravelly alluvial soils along riverbanks but also on limestone slopes; perennial; flowering/fruiting April-Nov. |
| Net-Leaf Bundleflower | *Desmanthus reticulatus* | N/A | SGCN | Mostly on clay prairies of the coastal plain of central and south Texas; perennial; flowering April-July; fruiting April-Oct. |
| Osage Plains False Foxglove | *Agalinis densiflora* | N/A | SGCN | Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; prairies, dry limestone soils; annual; flowering Aug-Oct. |
| Plateau Loosestrife | *Lythrum ovalifolium* | N/A | SGCN | Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; perennial; flowering/fruiting April-Nov. |
| Plateau Milkvine | *Matelea edwardsensis* | N/A | SGCN | Occurs in various types of juniper-oak and oak-juniper woodlands; perennial; flowering March-Oct; fruiting May-June. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Scarlet Leather-Flower | *Clematis texensis* | N/A | SGCN | Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; perennial; flowering March-July; fruiting May-July. |
| Stanfield's Beebalm | *Monarda stanfieldii* | N/A | SGCN | Largely confined to granite sands along the middle course of the Colorado River and its tributaries; perennial. |
| Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Platanifolius* | N/A | SGCN | Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; perennial; flowering April-May; fruiting May-Aug. |
| Texas Amorpha | *Amorpha roemeriana* | N/A | SGCN | Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; perennial; flowering May-June; fruiting June-Oct. |
| Texas Barberry | *Berberis swaseyi* | N/A | SGCN | Shallow calcareous stony clay of upland grasslands/shrublands over limestone as well as in loamier soils in openly wooded canyons and on creek terraces; perennial; flowering/fruiting March-June. |
| Texas Claret-Cup Cactus | *Echinocereus coccineus var. paucispinus* | N/A | SGCN | Mountains, hills, and mesas, igneous and limestone, oak-juniper-pinyon woodland or juniper woodland on limestone mesas, mostly rocky habitats but also in alluvial basins, grasslands, or among mesquite or other shrubs. Flowering March - April (Powell and Weedin 2004). |
| Texas Fescue | *Festuca versuta* | N/A | SGCN | Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; perennial; flowering/fruiting April-June. |
| Texas Seymeria | *Seymeria texana* | N/A | SGCN | Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; annual; flowering May-Nov; fruiting July-Nov. |
| Texas Wild-Rice | *Zizania texana* | E | E, SGCN | Spring-fed river, in clear, cool, swift water mostly less than 1 m deep, with coarse sandy soils rather than finer clays; flowering year-round, peaking March-June. |
| Threeflower Penstemon | *Penstemon triflorus var. triflorus* | N/A | SGCN | Occurs sparingly on rock outcrops and in grasslands associated with juniper-oak woodlands (Carr 2015). |
| Tree Dodder | *Cuscuta exaltata* | N/A | SGCN | Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; annual; flowering May-Oct; fruiting July-Oct. |
| Turnip-Root Scurfpea | *Pediomelum cyphocalyx* | N/A | SGCN | Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Warnock's Coral-Root | *Hexalectris warnockii* | N/A | SGCN | In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oakpinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years. |

## Table 5D-9 Kendall County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Blanco River Springs Salamander | *Eurycea pterophila* | N/A | SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Cascade Caverns Salamander | *Eurycea latitans* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates |
| Texas Salamander | *Eurycea neotenes* | N/A | T, SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Valdina Farms Sinkhole Salamander | *Eurycea troglodytes* | N/A | SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black-Capped Vireo | *Vireo atricapilla* | DL | SGCN | Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer. |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Golden-Cheeked Warbler | *Setophaga chrysoparia* | E | E, SGCN | Ashe juniper in mixed stands with various oaks (Quercus spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer. |
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson’s warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Zone-Tailed Hawk | *Buteo albonotatus* | N/A | T, SGCN | Arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions. |
| **Crustaceans** | | | | |
| Balcones Cave Amphipod | *Stygobromus balconis* | N/A | SGCN | Subaquatic, subterranean obligate amphipod. |
| Bifurcated Cave Amphipod | *Stygobromus bifurcatus* | N/A | SGCN | Habitat description is not available at this time. |
| Cascade Cave Amphipod | *Stygobromus dejectus* | N/A | SGCN | Subaquatic crustacean; subterranean obligate; in pools. |
| **Fish** | | | | |
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |
| Guadalupe Darter | *Percina apristis* | N/A | T, SGCN | Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water. |
| Headwater Catfish | *Ictalurus lupus* | N/A | T, SGCN | Originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers. |
| Plateau Shiner | *Cyprinella lepida* | N/A | T, SGCN | Edwards Plateau portion of Nueces basin, mainstem and tributaries of Nueces, Frio, and Sabinal rivers; may also be endemic to upper reaches of the Guadalupe River; clear, cool, spring-fed headwater creeks; usually over gravel and limestone substrates. |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| **Insects** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Rhadine speca* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Baetodes alleni* | N/A | SGCN | Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation. |
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Black Bear | *Ursus americanus* | N/A | T, SGCN | Generalist. Historically found throughout Texas. In Chisos, prefers higher elevations where pinyon-oaks predominate; also occasionally sighted in desert scrub of Trans-Pecos (Black Gap Wildlife Management Area) and Edwards Plateau in juniper-oak habitat. For ssp. luteolus, bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Bottomland hardwoods and large tracts of inaccessible forested areas. |
| Black-Tailed Prairie Dog | *Cynomys ludovicianus* | N/A | SGCN | Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges; woodlands. Prefer wooded, brushy areas; tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Ghost-Faced Bat | *Mormoops megalophylla* | N/A | SGCN | Winter roosts are in large limestone caves. Buildings and rock crevasses provide roosts, as well. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Llano Pocket Gopher | *Geomys texensis texensis* | N/A | SGCN | Found in deep, brown loamy sands or gravelly sandy loams and is isolated from other species of pocket gophers by intervening shallow stony to gravelly clayey soils. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade. |
| **Mollusks** | | | | |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]. |
| Guadalupe Fatmucket | *Lampsilis bergmanni* | E | T, SGCN | Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Reported in lakes at Kerrville, Texas, which suggests it may occasionally persist in some impoundment conditions (Robert G. Howells, personal communication). (Mussels of Texas, 2020). |
| Guadalupe Orb | *Cyclonaias necki* | E | E, SGCN | Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]. |
| Horseshoe Liptooth | *Daedalochila hippocrepis* | N/A | SGCN | Terrestrial snail known only from the steep, wooded hillsides of Landa Park in New Braunfels. |
| No Accepted Common Name | *Phreatodrobia micra* | N/A | SGCN | Habitat description is not available at this time. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| Tampico Pearlymussel | *Cyrtonaias tampicoensis* | N/A | SGCN | Reported from streams to rivers, reservoirs, and canals. In riverine habitats often found in nearshore habitats such as banks and backwaters, to include pools and oxbows, in mud or sand or among cobble and boulders with still to moderate currents (Howells et al. 1996). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Plateau Spot-Tailed Earless Lizard | *Holbrookia lacerata* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Tamaulipan Spot-Tailed Earless | *Holbrookia subcaudalis* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Basin Bellflower | *Campanula reverchonii* | N/A | SGCN | Among scattered vegetation on loose gravel, gravelly sand, and rock outcrops on open slopes with exposures of igneous and metamorphic rocks; may also occur on sandbars and other alluvial deposits along major rivers; flowering May-July. |
| Big Red Sage | *Salvia pentstemonoides* | N/A | SGCN | Moist to seasonally wet, steep limestone outcrops on seeps within canyons or along creek banks; occasionally on clayey to silty soils of creek banks and terraces, in partial shade to full sun; basal leaves conspicuous for much of the year; flowering June-October. |
| Bigflower Cornsalad | *Valerianella stenocarpa* | N/A | SGCN | Usually along creekbeds or in vernally moist grassy open areas (Carr 2015). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Bracted Twistflower | *Streptanthus bracteatus* | T | SGCN | Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer. |
| Buckley Tridens | *Tridens buckleyanus* | N/A | SGCN | Occurs in juniper-oak woodlands on rocky limestone slopes; Perennial; Flowering/Fruiting April-Nov. |
| Canyon Bean | *Phaseolus texensis* | N/A | SGCN | Narrowly endemic to rocky canyons in eastern and southern Edwards Plateau occurring on limestone soils in mixed woodlands, on limestone cliffs and outcrops, frequently along creeks. Flowering: May-Oct. |
| Canyon Mock-Orange | *Philadelphus texensis var. ernestii* | N/A | SGCN | Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October. |
| Canyon Sedge | *Carex edwardsiana* | N/A | SGCN | Dry-mesic decidous and deciduous-juniper woodlands in canyons and ravines, usually in clay loams very high in calcium on rocky banks and slopes just above streams and stream beds. Carex edwardsiana usually grows near C. planostachys. Fruiting spring (Ball, Reznicek, and 2003). |
| Darkstem Noseburn | *Tragia nigricans* | N/A | SGCN | Occurs in oak-juniper woodlands on mesic limestone slopes and canyon bottoms; perennial; flowering/fruiting April-Oct. |
| Glass Mountains Coral-Root | *Hexalectris nitida* | N/A | SGCN | Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; perennial; flowering June-Sept; fruiting July-Sept. |
| Hairy Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Stellatus* | N/A | SGCN | Rare throughout range, in habitats similar to those of var. platanifolius - usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; perennial; flowering April-Oct; fruiting May-Sept. |
| Hall's Prairie Clover | *Dalea hallii* | N/A | SGCN | In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; perennial; flowering May-Sept; fruiting June-Sept. |
| Heller's Marbleseed | *Onosmodium helleri* | N/A | SGCN | Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; perennial; flowering March-May. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Hill Country Wild-Mercury | *Argythamnia aphoroides* | N/A | SGCN | Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; perennial; flowering April-May with fruit persisting until midsummer. |
| Plateau Milkvine | *Matelea edwardsensis* | N/A | SGCN | Occurs in various types of juniper-oak and oak-juniper woodlands; perennial; flowering March-Oct; fruiting May-June. |
| Scarlet Leather-Flower | *Clematis texensis* | N/A | SGCN | Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; perennial; flowering March-July; fruiting May-July. |
| Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Platanifolius* | N/A | SGCN | Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; perennial; flowering April-May; fruiting May-Aug. |
| Texas Amorpha | *Amorpha roemeriana* | N/A | SGCN | Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; perennial; flowering May-June; fruiting June-Oct. |
| Texas Fescue | *Festuca versuta* | N/A | SGCN | Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; perennial; flowering/fruiting April-June. |
| Texas Mock-Orange | *Philadelphus texensis var. texensis* | N/A | SGCN | Limestone slopes and ravines, slopes in oak-juniper woodlands; variety texensis has a more westward range than var. ernestii; it is known from Bandera, Bexar, Edwards, Kendall, Medina, Real, and Uvalde counties in central Texas; flowering Apr–May; fruiting Jun–Oct (Freeman 2017). |
| Texas Seymeria | *Seymeria texana* | N/A | SGCN | Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; annual; flowering May-Nov; fruiting July-Nov. |
| Threeflower Penstemon | *Penstemon triflorus var. triflorus* | N/A | SGCN | Occurs sparingly on rock outcrops and in grasslands associated with juniper-oak woodlands (Carr 2015). |
| Tree Dodder | *Cuscuta exaltata* | N/A | SGCN | Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; annual; flowering May-Oct; fruiting July-Oct. |
| Turnip-Root Scurfpea | *Pediomelum cyphocalyx* | N/A | SGCN | Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015). |
| Wright's Milkvetch | *Astragalus wrightii* | N/A | SGCN | On sandy or gravelly soils; flowering/fruiting: April and May. |

## Table 5D-10 Medina County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Valdina Farms Sinkhole Salamander | *Eurycea troglodytes* | N/A | SGCN | Aquatic; springs, streams and caves with rocky or cobble beds. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Arachnids** | | | | |
| No Accepted Common Name | *Cicurina medina* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Eidmannella nasuta* | N/A | SGCN | Habitat description is not available at this time. |
| Reddell's Cave Millipede | *Speodesmus reddelli* | N/A | SGCN | Habitat description is not available at this time. |
| **Arthropods** | | | | |
| Sickled Cave Millipede | *Speodesmus falcatus* | N/A | SGCN | Habitat description is not available at this time. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black-Capped Vireo | *Vireo atricapilla* | DL | SGCN | Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands. |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Golden-Cheeked Warbler | *Setophaga chrysoparia* | E | E, SGCN | Ashe juniper in mixed stands with various oaks (Quercus spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Scaled Quail | *Callipepla squamata* | N/A | SGCN | In general, preferred habitat is arid-semiarid, mixed shrub-grassland. Common shrubs of preferred habitat include acacia (Acacia spp.), sand sagebrush (Artemesia filifolia), four-winged saltbush (Atriplex canescens), cacti (Opuntia spp.), honey mesquite (Prosopis glandulosa), sumacs (Rhus aromatica, R. microphylla, R. trilobata), yucca (Yucca spp.), and snakeweed (Xanthocephalum sarothrae). |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson's warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Crustaceans** | | | | |
| No Accepted Common Name | *Mexiweckelia hardeni* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Seborgia hershleri* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Brackenridgia reddelli* | N/A | SGCN | Habitat description is not available at this time. |
| **Fish** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Manfreda Giant-Skipper | *Stallingsia maculosus* | N/A | SGCN | Most skippers are small and stout-bodied; name derives from fast, erratic flight; at rest most skippers hold front and hind wings at different angles; skipper larvae are smooth, with the head and neck constricted; skipper larvae usually feed inside a leaf shelter and pupate in a cocoon made of leaves fastened together with silk. |
| No Accepted Common Name | *Ochrotrichia capitana* | N/A | SGCN | Habitat description is not available at this time. |
| **Mammals** | | | | |
| Black-Tailed Prairie Dog | *Cynomys ludovicianus* | N/A | SGCN | Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Frio Pocket Gopher | *Geomys texensis bakeri* | N/A | SGCN | Associated with nearly level Atco soil, which is well-drained and consists of sandy surface layers with loam extending to as deep as two meters. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Ghost-Faced Bat | *Mormoops megalophylla* | N/A | SGCN | Winter roosts are in large limestone caves. Buildings and rock crevasses provide roosts, as well. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| Western Pipistrelle | *Parastrellus hesperus* | | | Desert to pine-oak woodland. Cliffs and rock crevices provide roosts. |
| White-Nosed Coati | *Nasua narica* | | | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade. |
| **Mollusks** | | | | |
| Edwards Plateau Liptooth | *Millerelix gracilis* | N/A | SGCN | Habitat description is not available at this time. |
| **Reptiles** | | | | |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Bigflower Cornsalad | *Valerianella stenocarpa* | N/A | SGCN | Usually along creekbeds or in vernally moist grassy open areas (Carr 2015). |
| Bracted Twistflower | *Streptanthus bracteatus* | T | SGCN | Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer. |
| Bristle Nailwort | *Paronychia setacea* | N/A | SGCN | Flowering vascular plant endemic to eastern southcentral Texas, occurring in sandy soils. |
| Buckley Tridens | *Tridens buckleyanus* | N/A | SGCN | Occurs in juniper-oak woodlands on rocky limestone slopes; perennial; flowering/fruiting April-Nov. |
| Burridge Greenthread | *Thelesperma burridgeanum* | N/A | SGCN | Sandy open areas; annual; flowering March-Nov; fruiting March-June. |
| Canyon Bean | *Phaseolus texensis* | N/A | SGCN | Narrowly endemic to rocky canyons in eastern and southern Edwards Plateau occurring on limestone soils in mixed woodlands, on limestone cliffs and outcrops, frequently along creeks. Flowering: May-Oct. |
| Darkstem Noseburn | *Tragia nigricans* | N/A | SGCN | Occurs in oak-juniper woodlands on mesic limestone slopes and canyon bottoms; perennial; flowering/fruiting April-Oct. |
| Hairy Sycamore-Leaf Snowbell | *Styrax platanifolius ssp. Stellatus* | N/A | SGCN | Rare throughout range, in habitats similar to those of var. platanifolius - usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; perennial; flowering April-Oct; fruiting May-Sept. |
| Longstalk Heimia | *Ammannia grayi* | N/A | SGCN | Moist or subirrigated alkaline or gypsiferous clayey soils along unshaded margins of cienegas and other wetlands; occurs sparingly on an alkaline, somewhat saline silt loam on terraces of spring-fed streams in grassland; also occurs common in moderately alkaline clay along perennial stream and in subirrigated wetlands atop poorly-defined spring system; also occurs in low, wetland area along highway right-of-way; flowering May-September. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Plateau Loosestrife | *Lythrum ovalifolium* | N/A | SGCN | Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; perennial; flowering/fruiting April-Nov. |
| Plateau Milkvine | *Matelea edwardsensis* | N/A | SGCN | Occurs in various types of juniper-oak and oak-juniper woodlands; perennial; flowering March-Oct; fruiting May-June. |
| Sandhill Woolywhite | *Hymenopappus carrizoanus* | N/A | SGCN | Disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations; flowering April-June. |
| Scarlet Leather-Flower | *Clematis texensis* | N/A | SGCN | Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; perennial; flowering March-July; fruiting May-July. |
| Texas Almond | *Prunus minutiflora* | N/A | SGCN | Wide-ranging but scarce, in a variety of grassland and shrubland situations, mostly on calcareous soils underlain by limestone but occasionally in sandier neutral soils underlain by granite; perennial; flowering Feb-May and Oct; fruiting Feb-Sept. |
| Texas Amorpha | *Amorpha roemeriana* | N/A | SGCN | Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; perennial; flowering May-June; fruiting June-Oct. |
| Texas Barberry | *Berberis swaseyi* | N/A | SGCN | Shallow calcareous stony clay of upland grasslands/shrublands over limestone as well as in loamier soils in openly wooded canyons and on creek terraces; perennial; flowering/fruiting March-June. |
| Texas Fescue | *Festuca versuta* | N/A | SGCN | Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; perennial; flowering/fruiting April-June. |
| Texas Mock-Orange | *Philadelphus texensis var. texensis* | N/A | SGCN | Limestone slopes and ravines, slopes in oak-juniper woodlands; variety texensis has a more westward range than var. ernestii; it is known from Bandera, Bexar, Edwards, Kendall, Medina, Real, and Uvalde counties in central Texas; Flowering Apr–May; fruiting Jun–Oct (Freeman 2017). |
| Texas Peachbush | *Prunus texana* | N/A | SGCN | Occurs at scattered sites in various well drained sandy situations; deep sand, plains and sand hills, grasslands, oak woods, 0-200 m elevation; perennial; flowering Feb-Mar; fruiting Apr-Jun. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Tobusch Fishhook Cactus | *Sclerocactus brevihamatus ssp. Tobuschii* | T | E, SGCN | Shallow, moderately alkaline, stony clay and clay loams over massive fractured limestone; usually on level to slightly sloping hilltops; occasionally on relatively level areas on steeper slopes, and in rocky floodplains; usually open areas within a mosaic of oak-juniper woodlands, occasionally in pine-oak woodlands, rarely in cenizo shrublands or little bluestem grasslands; sites are usually open with only herbaceous cover, although the cactus may be somewhat protected by rocks, grasses, or spikemosses; flowering (late January/early February-March (rarely early April). |
| Woolly Butterfly-Weed | *Oenothera cinerea ssp. Parksii* | N/A | SGCN | Flats and hills of red sand of Rio Grande Plains (Raven and Gregory 1972). April-Oct. |

## Table 5D-11 Victoria County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Southern Crawfish Frog | *Lithobates areolatus areolatus* | N/A | SGCN | Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands. |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Attwater's Greater Prairie-Chicken | *Tympanuchus cupido attwateri* | E | E, SGCN | Open prairies of mostly thick grass one to three feet tall; sandhill country with bunch grass, sage, and shinnery oak. From near sea level to 200 feet along coastal plain on upper two-thirds of Texas coast; males form communal display flocks during late winter-early spring; booming grounds important; breeding February-July. |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black Rail | *Laterallus jamaicensis* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Henslow's Sparrow | *Centronyx henslowii* | N/A | SGCN | Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony. |
| Least Tern | *Sternula antillarum* | DL | SGCN | Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Reddish Egret | *Egretta rufescens* | N/A | T, SGCN | Resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear. |
| Rufa Red Knot | *Calidris canutus rufa* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Swallow-Tailed Kite | *Elanoides forficatus* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| White-Tailed Hawk | *Buteo albicaudatus* | N/A | T | Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson’s warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |
| Yellow Rail | *Coturnicops noveboracensis* | N/A | SGCN | Breeding: Emergent wetlands, grass or sedge marshes and wet meadows in freshwater situations. Some breeding territories in these wet meadows contain firm footing and only a few remnant pools of water (Berkey 1991). These areas can range from damp to 38 cm (15 inches) of water but the average depth used for nesting is 8 to 15 cm (3 to 6 inches) (Savaloja 1981). Non-breeding: Grain fields in winter and when migrating. Winters in both freshwater and brackish marshes, as well as in dense, deep grass. During fall migration, will use many open habitats, from rice paddies to dry hayfields. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Fish** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| American Eel | *Anguilla rostrata* | N/A | SGCN | Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration. |
| Guadalupe Bass | *Micropterus treculii* | N/A | SGCN | Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures. |
| Guadalupe Darter | *Percina apristis* | N/A | T, SGCN | Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Southern Flounder | *Paralichthys lethostigma* | N/A | SGCN | This is an estuarine-dependent species that inhabits riverine, estuarine and coastal waters, and prefers muddy, sandy, or silty substrates (Reagan and Wingo 1985). Individuals can tolerate wide temperature (~5-35°C) and salinity ranges (0-60 ppt). Southern Flounder spawn in offshore waters of the Gulf of Mexico from October to February (Reagan and Wingo 1985). The oceanic larval stage is pelagic and lasts 30–60 days. Metamorphosing individuals enter estuaries and migrate towards low-salinity headwaters, where settlement occurs (Burke et al. 1991, Walsh et al. 1999). The young fish enter the bays during late winter and early spring, occupying seagrass; some may move further into coastal rivers and bayous. Juveniles remain in estuaries until the onset of sexual maturation (approximately two years), at which time they migrate out of estuaries to join adults on the inner continental shelf. Adult southern flounder leave the bays during the fall for spawning in the Gulf of Mexico. They spawn for the first time when two years old at depths of 50 to 100 feet. Although most of the adults leave the bays and enter the Gulf for spawning during the winter, some remain behind and spend winter in the bays. Those in the Gulf will reenter the bays in the spring. The spring influx is gradual and does not occur with large concentrations that characterize the fall emigration. |
| Spotted Sucker | *Minytrema melanops* | N/A | SGCN | Found primarily in east Texas streams from the Red to the Brazos river basins. An isolated, disjunct population occurs in the Llano River near Junction downstream to about Mason; this may be an introduced population. Typically in clear creeks with firm substrates. |
| Texas Shiner | *Notropis amabilis* | N/A | SGCN | In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Comanche Harvester Ant | *Pogonomyrmex comanche* | N/A | SGCN | Habitat description is not available at this time. |
| No Accepted Common Name | *Tortopus circumfluus* | N/A | SGCN | Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation. |
| No Accepted Common Name | *Tricorythodes curvatus* | N/A | SGCN | AR, OK, TX; mayflies distinguished by aquatic larval stage; adult stage generally found in bankside vegetation. |
| **Mammals** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges; woodlands. Prefer wooded, brushy areas; tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie |
| Tricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons. Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade. |
| **Mollusks** | | | | |
| False Spike | *Fusconaia mitchelli* | E | E, SGCN | Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]. |
| Guadalupe Orb | *Cyclonaias necki* | E | E, SGCN | Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Lilliput | *Toxolasma parvum* | N/A | SGCN | Reported from small streams, where it may penetrate into the headwaters, to large rivers, oxbows, sloughs, lakes, ponds, canals, borrow pits, and reservoirs. Primarily occurs in still to slow currents in mud and sand substrates (Coker et al. 1921; Read 1954; Neck and Metcalf 1988; Williams et al. 2008; Watters et al. 2009). |
| Louisiana Fatmucket | *Lampsilis hydiana* | N/A | SGCN | Reported from streams to rivers, may penetrate into headwaters, oxbows, lakes, canals, and reservoirs. Reported to occur in still to moderate currents in sand, mud, and gravel substrates. In riverine systems it is found primarily in nearshore habitats such as banks, backwaters and oxbows (Howells et al. 1996; Randklev et al. 2013a; Randklev et al. 2014a; Tsakiris and Randklev 2016). It adapts readily to reservoirs and can cope with flow modification stemming from river impoundment (Randklev et al. 2016). |
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| Pondmussel | *Sagittunio subrostratus* | N/A | SGCN | Reported from streams to rivers, where it can invade headwater systems but is rarely in large river systems. Can also inhabit natural and artificial ponds, lakes, reservoirs, and canals. In riverine habitat typically occurs in backwaters, pools, sloughs, and oxbows in little to no current in substrates of mud or sand (Parmalee and Bogan 1998; Williams et al. 2008; Watters et al. 2009; Haag and Cicerello 2016; Watters 2018). |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Tampico Pearlymussel | *Cyrtonaias tampicoensis* | N/A | SGCN | Reported from streams to rivers, reservoirs, and canals. In riverine habitats often found in nearshore habitats such as banks and backwaters, to include pools and oxbows, in mud or sand or among cobble and boulders with still to moderate currents (Howells et al. 1996). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Cagle's Map Turtle | *Graptemys caglei* | N/A | T, SGCN | Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge. |
| Common Garter Snake | *Thamnophis sirtalis* | N/A | SGCN | Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Prairie Skink | *Plestiodon septentrionalis* | N/A | SGCN | The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions. |
| Pygmy Rattlesnake | *Sistrurus miliarius* | N/A | SGCN | The pygmy rattlesnake occurs in a variety of wooded habitats from bottomland coastal hardwood forests to upland savannas. The species is frequently found in association with standing water. |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Texas Diamondback Terrapin | *Malaclemys terrapin littoralis* | N/A | SGCN | Coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive. Bay islands are important habitats. Nests on oyster shell beaches. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| Western Massasauga | *Sistrurus tergeminus* | N/A | SGCN | Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands. |
| **Plants** | | | | |
| Awnless Leastdaisy | *Chaetopappa imberbis* | N/A | SGCN | In woodlands on loams of Carrizo sand (TEX-LL specimens Carr 23875, 12507). Flowering and fruiting during Mar - May. |
| Coastal Gay-Feather | *Liatris bracteata* | N/A | SGCN | Coastal prairie grasslands of various types, from salty prairie on low- lying somewhat saline clay loams to upland prairie on nonsaline clayey to sandy loams; flowering in fall. |
| Crestless Onion | *Allium canadense var. ecristatum* | N/A | SGCN | Occurs on poorly drained sites on sandy substrates within coastal prairies of the Coastal Bend area (Carr 2015). |
| Heartleaf Evening-Primrose | *Oenothera cordata* | N/A | SGCN | Occurs in post oak woodlands on sandy soils on the coastal plain (Carr 2015). |
| Indianola Beakrush | *Rhynchospora indianolensis* | N/A | SGCN | Locally abundant in cattle pastures in some areas (at least during wet years), possibly becoming a management problem in such sites; perennial; flowering/fruiting April-Nov. |
| Jones's Rainlilly | *Zephyranthes jonesii* | N/A | SGCN | Hardpan swales and other seasonally moist low areas (Jones 1977). Flowering mid summer--early fall (Jul--Oct) (Flagg, Smith & Flory 2002). |
| Texas Peachbush | *Prunus texana* | N/A | SGCN | Occurs at scattered sites in various well drained sandy situations; deep sand, plains and sand hills, grasslands, oak woods, 0-200 m elevation; perennial; flowering Feb-Mar; fruiting Apr-Jun. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Texas Pinkroot | *Spigelia texana* | N/A | SGCN | Woodlands on loamy soils; perennial; flowering March-Nov; fruiting April-Nov. |
| Texas Tauschia | *Tauschia texana* | N/A | SGCN | Occurs in loamy soils in deciduous forests or woodlands on river and stream terraces; perennial; flowering/fruiting Feb-April. |
| Threeflower Broomweed | *Thurovia triflora* | N/A | SGCN | Near coast in sparse, low vegetation on a veneer of light colored silt or fine sand over saline clay along drier upper margins of ecotone between between salty prairies and tidal flats; further inland associated with vegetated slick spots on prairie mima mounds; flowering September-November. |
| Two-Flower Stick-Pea | *Calliandra biflora* | N/A | SGCN | primarily in open areas on caliche outcrops or in shallow sandy soils over caliche; perennial; flowering/fruiting May-Aug. |
| Welder Machaeranthera | *Psilactis heterocarpa* | N/A | SGCN | Grasslands , varying from midgrass coastal prairies, and open mesquite-huisache woodlands on nearly level, gray to dark gray clayey to silty soils; known locations mapped on Victoria clay, Edroy clay, Dacosta sandy clay loam over Beaumont and Lissie formations; flowering September-November. |
| Wright's Trichocoronis | *Trichocoronis wrightii var. wrightii* | N/A | SGCN | Most records from Texas are historical, perhaps indicating a decline as a result of alteration of wetland habitats; annual; flowering Feb-Oct; fruiting Feb-Sept. |

## Table 5D-12 Wilson County - Threatened and Endangered Species and Species of Greatest Conservation Need Summary

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Amphibians** | | | | |
| Strecker's Chorus Frog | *Pseudacris streckeri* | N/A | SGCN | Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |
| Woodhouse's Toad | *Anaxyrus woodhousii* | N/A | SGCN | Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied. |
| **Birds** | | | | |
| Bald Eagle | *Haliaeetus leucocephalus* | DL | N/A | Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. |
| Bank Swallow | *Riparia riparia* | N/A | SGCN | Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover. |
| Black Rail | *Laterallus jamaicensis* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia |
| Brewer's Blackbird | *Euphagus cyanocephalus* | N/A | SGCN | Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983). |
| Cactus Wren | *Campylorhynchus brunneicapillus* | N/A | SGCN | Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in Opuntia cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost. |
| Chestnut-Collared Longspur | *Calcarius ornatus* | N/A | SGCN | Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Common Nighthawk | *Chordeiles minor* | N/A | SGCN | Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface. |
| Franklin's Gull | *Leucophaeus pipixcan* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night. |
| Interior Least Tern | *Sternula antillarum athalassos* | DL | E | Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony. |
| Lark Bunting | *Calamospiza melanocorys* | N/A | SGCN | Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields. |
| Loggerhead Shrike | *Lanius ludovicianus* | N/A | SGCN | Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles. |
| Mottled Duck | *Anas fulvigula* | N/A | SGCN | Estuaries, ponds, lakes, secondary bays. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Mountain Plover | *Charadrius montanus* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. |
| Northern Bobwhite | *Colinus virginianus* | N/A | SGCN | Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grassbrush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999). |
| Piping Plover | *Charadrius melodus* | T | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Pyrrhuloxia | *Cardinalis sinuatus* | N/A | SGCN | Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood. |
| Sanderling | *Calidris alba* | N/A | SGCN | Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike. |
| Snowy Plover | *Charadrius nivosus* | N/A | SGCN | Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast. |
| Sprague's Pipit | *Anthus spragueii* | N/A | SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields. |
| Swallow-Tailed Kite | *Elanoides forficatus* | | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees. |
| Western Burrowing Owl | *Athene cunicularia hypugaea* | N/A | N/A | Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| White-Faced Ibis | *Plegadis chihi* | N/A | T | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats. |
| Whooping Crane | *Grus americana* | E | E, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio. |
| Willet | *Tringa semipalmata* | N/A | SGCN | Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989). |
| Wilson's Warbler | *Cardellina pusilla* | N/A | SGCN | Wilson’s warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America. |
| Wood Stork | *Mycteria americana* | N/A | T, SGCN | The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Yellow Rail | *Coturnicops noveboracensis* | N/A | SGCN | Breeding: Emergent wetlands, grass or sedge marshes and wet meadows in freshwater situations. Some breeding territories in these wet meadows contain firm footing and only a few remnant pools of water (Berkey 1991). These areas can range from damp to 38 cm (15 inches) of water but the average depth used for nesting is 8 to 15 cm (3 to 6 inches) (Savaloja 1981). Non-breeding: Grain fields in winter and when migrating. Winters in both freshwater and brackish marshes, as well as in dense, deep grass. During fall migration, will use many open habitats, from rice paddies to dry hayfields. |
| Yellow-Billed Cuckoo | *Coccyzus americanus* | T | SGCN | In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas. |
| **Fish** | | | | |
| River Darter | *Percina shumardi* | N/A | SGCN | In Texas limited to eastern streams including Red River southward to the Neches River, and a disjunct population in the Guadalupe and San Antonio river systems east of the Balcones Escarpment. Confined to large rivers and lower parts of major tributaries; usually found in deep chutes and riffles where current is swift and bottom composed of coarse gravel or rock. |
| **Insects** | | | | |
| American Bumblebee | *Bombus pensylvanicus* | N/A | SGCN | Habitat description is not available at this time. |
| Comanche Harvester Ant | *Pogonomyrmex comanche* | N/A | SGCN | Habitat description is not available at this time. |
| Manfreda Giant-Skipper | *Stallingsia maculosus* | N/A | SGCN | Most skippers are small and stout-bodied; name derives from fast, erratic flight; at rest most skippers hold front and hind wings at different angles; skipper larvae are smooth, with the head and neck constricted; skipper larvae usually feed inside a leaf shelter and pupate in a cocoon made of leaves fastened together with silk. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| **Mammals** | | | | |
| Big Free-Tailed Bat | *Nyctinomops macrotis* | N/A | SGCN | Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. |
| Cave Myotis Bat | *Myotis velifer* | N/A | SGCN | Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore. |
| Eastern Spotted Skunk | *Spilogale putorius* | N/A | SGCN | Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges; woodlands. Prefer wooded, brushy areas; tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available. |
| Ghost-Faced Bat | *Mormoops megalophylla* | N/A | SGCN | Winter roosts are in large limestone caves. Buildings and rock crevasses provide roosts, as well. |
| Hoary Bat | *Lasiurus cinereus* | N/A | SGCN | Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways. |
| Mountain Lion | *Puma concolor* | N/A | SGCN | Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains; riparian zones. |
| Plains Spotted Skunk | *Spilogale interrupta* | N/A | SGCN | Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. |
| Ttricolored Bat | *Perimyotis subflavus* | PE | SGCN | Forest, woodland and riparian areas are important. Caves are very important to this species. |
| White-Nosed Coati | *Nasua narica* | N/A | T, SGCN | Woodlands, riparian corridors and canyons.Most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade. |
| **Mollusks** | | | | |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Louisiana Fatmucket | *Lampsilis hydiana* | N/A | SGCN | Reported from streams to rivers, may penetrate into headwaters, oxbows, lakes, canals, and reservoirs. Reported to occur in still to moderate currents in sand, mud, and gravel substrates. In riverine systems it is found primarily in nearshore habitats such as banks, backwaters and oxbows (Howells et al. 1996; Randklev et al. 2013a; Randklev et al. 2014a; Tsakiris and Randklev 2016). It adapts readily to reservoirs and can cope with flow modification stemming from river impoundment (Randklev et al. 2016). |
| Mapleleaf | *Quadrula quadrula* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016). |
| Pimpleback | *Cyclonaias pustulosa* | N/A | SGCN | Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009). |
| Pistolgrip | *Tritogonia verrucosa* | N/A | SGCN | Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008). |
| Tampico Pearlymussel | *Cyrtonaias tampicoensis* | N/A | SGCN | Reported from streams to rivers, reservoirs, and canals. In riverine habitats often found in nearshore habitats such as banks and backwaters, to include pools and oxbows, in mud or sand or among cobble and boulders with still to moderate currents (Howells et al. 1996). |
| **Reptiles** | | | | |
| American Alligator | *Alligator mississippiensis* | SAT | N/A | Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments. |
| Eastern Box Turtle | *Terrapene carolina* | N/A | SGCN | Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Keeled Earless Lizard | *Holbrookia propinqua* | N/A | SGCN | Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, were it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999). |
| Prairie Skink | *Plestiodon septentrionalis* | N/A | SGCN | The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions. |
| Slender Glass Lizard | *Ophisaurus attenuatus* | N/A | SGCN | Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil. |
| Tamaulipan Spot-Tailed Earless Lizard | *Holbrookia subcaudalis* | N/A | SGCN | Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999). |
| Texas Horned Lizard | *Phrynosoma cornutum* | N/A | T, SGCN | Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area. |
| Texas Tortoise | *Gopherus berlandieri* | N/A | T, SGCN | Terrestrial: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils. When inactive occupies shallow depressions dug at base of bush or cactus; sometimes in underground burrow or under object. Eggs are laid in nests dug in soil near or under bushes. |
| Western Box Turtle | *Terrapene ornata* | N/A | SGCN | Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species. |
| **Plants** | | | | |
| Awnless Leastdaisy | *Chaetopappa imberbis* | N/A | SGCN | In woodlands on loams of Carrizo sand (TEX-LL specimens Carr 23875, 12507). Flowering and fruiting during Mar - May. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Big Red Sage | *Salvia pentstemonoides* | N/A | SGCN | Moist to seasonally wet, steep limestone outcrops on seeps within canyons or along creek banks; occasionally on clayey to silty soils of creek banks and terraces, in partial shade to full sun; basal leaves conspicuous for much of the year; flowering June-October. |
| Bigflower Cornsalad | *Valerianella stenocarpa* | N/A | SGCN | Usually along creekbeds or in vernally moist grassy open areas (Carr 2015). |
| Bristle Nailwort | *Paronychia setacea* | N/A | SGCN | Flowering vascular plant endemic to eastern south-central Texas, occurring in sandy soils. |
| Burridge Greenthread | *Thelesperma burridgeanum* | N/A | SGCN | Sandy open areas; annual; flowering March-Nov; fruiting March-June. |
| Drummond's Rushpea | *Hoffmannseggia drummondii* | N/A | SGCN | Open areas on sandy clay; perennial. |
| Elmendorf's Onion | *Allium elmendorfii* | N/A | SGCN | Grassland openings in oak woodlands on deep, loose, well-drained sands; in Coastal Bend, on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands; to the north it occurs in post oak-black hickory-live oak woodlands over Queen City and similar Eocene formations; one anomalous specimen found on Llano Uplift in wet pockets of granitic loam; perennial; flowering March-April, May. |
| Green Hawthorn | *Crataegus viridis var. glabriuscula* | N/A | SGCN | In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above\near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct. |
| Greenman's Bluet | *Houstonia parviflora* | N/A | SGCN | Grass pastures. Feb- Apr. (Correll and Johnston 1970). |
| Heartleaf Evening-Primrose | *Oenothera cordata* | N/A | SGCN | Occurs in post oak woodlands on sandy soils on the coastal plain (Carr 2015). |
| Low Spurge | *Euphorbia peplidion* | N/A | SGCN | Occurs in a variety of vernally-moist situations in a number of natural regions; annual; flowering Feb-April; fruiting March-April. |
| Net-Leaf Bundleflower | *Desmanthus reticulatus* | N/A | SGCN | Mostly on clay prairies of the coastal plain of central and south Texas; perennial; flowering April-July; fruiting April-Oct. |
| Parks' Jointweed | *Polygonella parksii* | N/A | SGCN | Mostly found on deep, loose, whitish sand blowouts (unstable, deep, xeric, sandhill barrens) in Post Oak Savanna landscapes over the Carrizo and Sparta formations; also occurs in early successional grasslands, along right-of-ways, and on mechanically disturbed areas; flowering June-late October or September-November. |
| Texas Beebalm | *Monarda viridissima* | N/A | SGCN | Endemic perennial herb of the Carrizo Sands; deep, well-drained sandy soils in openings of post oak woodlands; flowers white. |
| Texas Peachbush | *Prunus texana* | N/A | SGCN | Occurs at scattered sites in various well drained sandy situations; deep sand, plains and sand hills, grasslands, oak woods, 0-200 m elevation; perennial; flowering Feb-Mar; fruiting Apr-Jun. |

| Species Common Name | Species Scientific Name | Federal Status | State Status | Suitable Habitat |
|---|---|---|---|---|
| Wright's Trichocoronis | *Trichocoronis wrightii var. wrightii* | N/A | SGCN | Most records from Texas are historical, perhaps indicating a decline as a result of alteration of wetland habitats; annual; flowering Feb-Oct; fruiting Feb-Sept. |

# Appendix 5E: Miscellaneous Water Management Strategy Cost Estimate Summaries

# Table of Contents

**Appendix 5E: Miscellaneous Water Management Strategy Cost Estimate Summaries ..... 5E-1**
5E.1 Edwards Transfers ..... 5E-1
5E.2 Fresh Groundwater Development ..... 5E-14
5E.3 Brackish Groundwater Development ..... 5E-29
5E.4 Facilities Expansion ..... 5E-36
5E.5 Reuse Water ..... 5E-53

## LIST OF TABLES

Table 5E.1-1 Edwards Transfers WMS: Alamo Heights ..... 5E-2
Table 5E.1-2 Edwards Transfers WMS: Bexar County WCID 10 ..... 5E-3
Table 5E.1-3 Edwards Transfers WMS: Castroville ..... 5E-4
Table 5E.1-4 Edwards Transfers WMS: Converse ..... 5E-5
Table 5E.1-5 Edwards Transfers WMS: Fort Sam Houston ..... 5E-6
Table 5E.1-6 Edwards Transfers WMS: Hondo ..... 5E-7
Table 5E.1-7 Edwards Transfers WMS: Kirby ..... 5E-8
Table 5E.1-8 Edwards Transfers WMS: Leon Valley ..... 5E-9
Table 5E.1-9 Edwards Transfers WMS: Lytle ..... 5E-10
Table 5E.1-10 Edwards Transfers WMS: Selma ..... 5E-11
Table 5E.1-11 Edwards Transfers WMS: Uvalde ..... 5E-12
Table 5E.1-12 Edwards Transfers WMS: Ville Dalsace Water Supply ..... 5E-13
Table 5E.2-1 Fresh Groundwater Development WMS: Atascosa Rural WSC ..... 5E-15
Table 5E.2-2 Fresh Groundwater Development WMS: Clear Water Estates Water System (Texas Water Company) ..... 5E-16
Table 5E.2-3 Fresh Groundwater Development WMS: County-Other, Comal ..... 5E-17
Table 5E.2-4 Fresh Groundwater Development WMS: County-Other, Victoria ..... 5E-18
Table 5E.2-5 Fresh Groundwater Development WMS: Crystal Clear SUD Carrizo-Wilcox Project ..... 5E-19
Table 5E.2-6 Fresh Groundwater Development WMS: Crystal Clear SUD Trinity Project ..... 5E-20
Table 5E.2-7 Fresh Groundwater Development WMS: Elmendorf ..... 5E-21
Table 5E.2-8 Fresh Groundwater Development WMS: Garden Ridge ..... 5E-22
Table 5E.2-9 Fresh Groundwater Development WMS: KT Water Development ..... 5E-23
Table 5E.2-10 Fresh Groundwater Development WMS: Martindale WSC ..... 5E-24
Table 5E.2-11 Fresh Groundwater Development WMS: Springs Hill WSC (Mesa Trail) ..... 5E-25
Table 5E.2-12 Fresh Groundwater Development WMS: Springs Hill WSC (Wilson) ..... 5E-26
Table 5E.2-13 Fresh Groundwater Development WMS: Uvalde County Mining ..... 5E-27
Table 5E.2-14 Fresh Groundwater Development WMS: Wingert Water Systems ..... 5E-28

Table 5E.3-1 Brackish Groundwater Development WMS: Caldwell Brackish Partnership Project ..... 5E-30
Table 5E.3-2 Brackish Groundwater Development WMS: Gonzales and Guadalupe Brackish Partnership Project ..... 5E-31
Table 5E.3-3 Brackish Groundwater Development WMS: County Line SUD Brackish Trinity Project ..... 5E-32
Table 5E.3-4 Brackish Groundwater Development WMS: County Line SUD Brackish Edwards Project ..... 5E-33
Table 5E.3-5 Brackish Groundwater Development WMS: Maxwell SUD Brackish Trinity Project ..... 5E-34
Table 5E.3-6 Brackish Groundwater Development WMS: S S WSC Brackish Carrizo-Wilcox Project ..... 5E-35
Table 5E.4-1 Facilities Expansion WMS: Canyon Regional Water Authority Lake Dunlap WTP Expansion ..... 5E-37
Table 5E.4-2 Facilities Expansion WMS: Canyon Regional Water Authority Hays Caldwell WTP Expansion ..... 5E-38
Table 5E.4-3 Facilities Expansion WMS: County Line SUD SH-21 Booster Site ..... 5E-39
Table 5E.4-4 Facilities Expansion WMS: County Line SUD High Road Booster Site ..... 5E-40
Table 5E.4-5 Facilities Expansion WMS: County Line SUD Bobwhite Booster Site ..... 5E-41
Table 5E.4-6 Facilities Expansion WMS: Guadalupe-Blanco River Authority Western Canyon WTP Expansion ..... 5E-42
Table 5E.4-7 Facilities Expansion WMS: New Braunfels Utilities South WTP Expansion ..... 5E-43
Table 5E.4-8 Facilities Expansion WMS: New Braunfels Utilities South WTP 2 ..... 5E-44
Table 5E.4-9 Facilities Expansion WMS: New Braunfels Utilities South WTP 2 (Expansion 1) ..... 5E-45
Table 5E.4-10 Facilities Expansion WMS: New Braunfels Utilities South WTP 2 (Expansion 2) ..... 5E-46
Table 5E.4-11 Facilities Expansion WMS: New Braunfels Utilities – Seguin Interconnect ..... 5E-47
Table 5E.4-12 Facilities Expansion WMS: San Antonio Water System Southeast Integration Pipeline ..... 5E-48
Table 5E.4-13 Facilities Expansion WMS: SAWS Expanded ASR Treatment Plant ..... 5E-49
Table 5E.4-14 Facilities Expansion WMS: Springs Hill WSC Zone 2 Transmission Main ..... 5E-50
Table 5E.4-15 Facilities Expansion WMS: Springs Hill WSC Gamecock WTP ..... 5E-51
Table 5E.4-16 Facilities Expansion WMS: CPS Energy Direct Recycle Pipeline (Bexar Co. Steam-Electric) ..... 5E-52
Table 5E.5-1 Reuse Water WMS: Boerne Non-Potable Reuse ..... 5E-54
Table 5E.5-2 Reuse Water WMS: County Line SUD Non-Potable Reuse ..... 5E-55
Table 5E.5-3 Reuse Water WMS: Fair Oaks Ranch Non-Potable Reuse ..... 5E-56
Table 5E.5-4 Reuse Water WMS: Guadalupe-Blanco River Authority Stein Falls WWTF ..... 5E-57
Table 5E.5-5 Reuse Water WMS: Kyle Non-Potable Reuse ..... 5E-58
Table 5E.5-6 Reuse Water WMS: New Braunfels Utilities Direct Potable Reuse ..... 5E-59
Table 5E.5-7 Reuse Water WMS: San Marcos Non-Potable Reuse ..... 5E-60
Table 5E.5-8 Reuse Water WMS: San Marcos Potable Reuse ..... 5E-61

Table 5E.5-9 Reuse Water WMS: San Antonio River Authority Non-Potable Reuse ..... 5E-62
Table 5E.5-10 Reuse Water WMS: San Antonio Water System Direct Non-Potable Reuse ..... 5E-63
Table 5E.5-11 Reuse Water WMS: San Antonio Water System Direct Potable Reuse (Alternative) ..... 5E-64

# Appendix 5E: Miscellaneous Water Management Strategy Cost Estimate Summaries

This appendix provides miscellaneous cost estimate summaries for WMSs that have multiple projects associated with them. The summaries are organized by the WMS name.

## 5E.1 Edwards Transfers

The Edwards Transfers WMS is described in Section 5.2.4. Cost estimate summary tables are included for the following Edwards Transfers WMS projects:

5E.1-1 Alamo Heights

5E.1-2 Bexar County WCID 10

5E.1-3 Castroville

5E.1-4 Converse

5E.1-5 Fort Sam Houston

5E.1-6 Hondo

5E.1-7 Kirby

5E.1-8 Leon Valley

5E.1-9 Lytle

5E.1-10 Selma

5E.1-11 Uvalde

5E.1-12 Ville Dalsace Water Supply

## Table 5E.1-1 Edwards Transfers WMS: Alamo Heights

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $62,000 |
| **TOTAL COST OF FACILITIES** | **$62,000** |
| | |
| - Planning (3%) | $2,000 |
| - Design (7%) | $4,000 |
| - Construction Engineering (1%) | $1,000 |
| Legal Assistance (2%) | $1,000 |
| Fiscal Services (2%) | $1,000 |
| All Other Facilities Contingency (20%) | $12,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $3,000 |
| **TOTAL COST OF PROJECT** | **$86,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $6,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Purchase of Water (200 acft/yr @ 1,928 $/acft) | $386,000 |
| **TOTAL ANNUAL COST** | **$393,000** |
| | |
| **Available Project Yield (acft/yr)** | 200 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-2 Edwards Transfers WMS: Bexar County WCID 10

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $124,000 |
| **TOTAL COST OF FACILITIES** | **$124,000** |
| | |
| - Planning (3%) | $4,000 |
| - Design (7%) | $9,000 |
| - Construction Engineering (1%) | $1,000 |
| Legal Assistance (2%) | $2,000 |
| Fiscal Services (2%) | $2,000 |
| All Other Facilities Contingency (20%) | $25,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $6,000 |
| **TOTAL COST OF PROJECT** | **$173,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $12,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Purchase of Water (400 acft/yr @ 1,928 $/acft) | $771,000 |
| **TOTAL ANNUAL COST** | **$784,000** |
| | |
| **Available Project Yield (acft/yr)** | 400 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-3 Edwards Transfers WMS: Castroville

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $309,000 |
| **TOTAL COST OF FACILITIES** | **$309,000** |
| | |
| - Planning (3%) | $9,000 |
| - Design (7%) | $22,000 |
| - Construction Engineering (1%) | $3,000 |
| Legal Assistance (2%) | $6,000 |
| Fiscal Services (2%) | $6,000 |
| All Other Facilities Contingency (20%) | $62,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $14,000 |
| **TOTAL COST OF PROJECT** | **$431,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $30,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $3,000 |
| Purchase of Water (1,000 acft/yr @ 1,928 $/acft) | $1,928,000 |
| **TOTAL ANNUAL COST** | **$1,961,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,000 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-4 Edwards Transfers WMS: Converse

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $62,000 |
| **TOTAL COST OF FACILITIES** | **$62,000** |
| | |
| - Planning (3%) | $2,000 |
| - Design (7%) | $4,000 |
| - Construction Engineering (1%) | $1,000 |
| Legal Assistance (2%) | $1,000 |
| Fiscal Services (2%) | $1,000 |
| All Other Facilities Contingency (20%) | $12,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $3,000 |
| **TOTAL COST OF PROJECT** | **$86,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $6,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Purchase of Water (200 acft/yr @ 1,928 $/acft) | $386,000 |
| **TOTAL ANNUAL COST** | **$393,000** |
| | |
| **Available Project Yield (acft/yr)** | 200 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-5 Edwards Transfers WMS: Fort Sam Houston

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $3,878,000 |
| **TOTAL COST OF FACILITIES** | **$3,878,000** |
| | |
| - Planning (3%) | $116,000 |
| - Design (7%) | $271,000 |
| - Construction Engineering (1%) | $39,000 |
| Legal Assistance (2%) | $78,000 |
| Fiscal Services (2%) | $78,000 |
| All Other Facilities Contingency (20%) | $776,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $171,000 |
| **TOTAL COST OF PROJECT** | **$5,407,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $380,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $39,000 |
| Purchase of Water (12,550 acft/yr @ 1,928 $/acft) | $24,196,000 |
| **TOTAL ANNUAL COST** | **$24,615,000** |
| | |
| **Available Project Yield (acft/yr)** | 12,550 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-6 Edwards Transfers WMS: Hondo

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $108,000 |
| **TOTAL COST OF FACILITIES** | **$108,000** |
| | |
| - Planning (3%) | $3,000 |
| - Design (7%) | $8,000 |
| - Construction Engineering (1%) | $1,000 |
| Legal Assistance (2%) | $2,000 |
| Fiscal Services (2%) | $2,000 |
| All Other Facilities Contingency (20%) | $22,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $5,000 |
| **TOTAL COST OF PROJECT** | **$151,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $11,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Purchase of Water (350 acft/yr @ 1,928 $/acft) | $675,000 |
| **TOTAL ANNUAL COST** | **$687,000** |
| | |
| **Available Project Yield (acft/yr)** | 350 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-7 Edwards Transfers WMS: Kirby

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $46,000 |
| **TOTAL COST OF FACILITIES** | **$46,000** |
| | |
| - Planning (3%) | $1,000 |
| - Design (7%) | $3,000 |
| Legal Assistance (2%) | $1,000 |
| Fiscal Services (2%) | $1,000 |
| All Other Facilities Contingency (20%) | $9,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $3,000 |
| **TOTAL COST OF PROJECT** | **$64,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $5,000 |
| Operation and Maintenance | |
| Purchase of Water (150 acft/yr @ 1,928 $/acft) | $289,000 |
| **TOTAL ANNUAL COST** | **$294,000** |
| | |
| **Available Project Yield (acft/yr)** | 150 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-8 Edwards Transfers WMS: Leon Valley

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $309,000 |
| **TOTAL COST OF FACILITIES** | **$309,000** |
| | |
| - Planning (3%) | $9,000 |
| - Design (7%) | $22,000 |
| - Construction Engineering (1%) | $3,000 |
| Legal Assistance (2%) | $6,000 |
| Fiscal Services (2%) | $6,000 |
| All Other Facilities Contingency (20%) | $62,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $14,000 |
| **TOTAL COST OF PROJECT** | **$431,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $30,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $3,000 |
| Purchase of Water (1,000 acft/yr @ 1,928 $/acft) | $1,928,000 |
| **TOTAL ANNUAL COST** | **$1,961,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,000 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-9 Edwards Transfers WMS: Lytle

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $62,000 |
| **TOTAL COST OF FACILITIES** | **$62,000** |
| | |
| - Planning (3%) | $2,000 |
| - Design (7%) | $4,000 |
| - Construction Engineering (1%) | $1,000 |
| Legal Assistance (2%) | $1,000 |
| Fiscal Services (2%) | $1,000 |
| All Other Facilities Contingency (20%) | $12,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $3,000 |
| **TOTAL COST OF PROJECT** | **$86,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $6,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Purchase of Water (200 acft/yr @ 1,928 $/acft) | $386,000 |
| **TOTAL ANNUAL COST** | **$393,000** |
| | |
| **Available Project Yield (acft/yr)** | 200 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-10 Edwards Transfers WMS: Selma

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $773,000 |
| **TOTAL COST OF FACILITIES** | **$773,000** |
| | |
| - Planning (3%) | $23,000 |
| - Design (7%) | $54,000 |
| - Construction Engineering (1%) | $8,000 |
| Legal Assistance (2%) | $15,000 |
| Fiscal Services (2%) | $15,000 |
| All Other Facilities Contingency (20%) | $155,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $34,000 |
| **TOTAL COST OF PROJECT** | **$1,077,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $76,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $8,000 |
| Purchase of Water (2,500 acft/yr @ 1,928 $/acft) | $4,820,000 |
| **TOTAL ANNUAL COST** | **$4,904,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,500 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-11 Edwards Transfers WMS: Uvalde

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $108,000 |
| **TOTAL COST OF FACILITIES** | **$108,000** |
| | |
| - Planning (3%) | $3,000 |
| - Design (7%) | $8,000 |
| - Construction Engineering (1%) | $1,000 |
| Legal Assistance (2%) | $2,000 |
| Fiscal Services (2%) | $2,000 |
| All Other Facilities Contingency (20%) | $22,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $5,000 |
| **TOTAL COST OF PROJECT** | **$151,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $11,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Purchase of Water (350 acft/yr @ 1,928 $/acft) | $675,000 |
| **TOTAL ANNUAL COST** | **$687,000** |
| | |
| **Available Project Yield (acft/yr)** | 350 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

### Table 5E.1-12 Edwards Transfers WMS: Ville Dalsace Water Supply

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $31,000 |
| **TOTAL COST OF FACILITIES** | **$31,000** |
| | |
| - Planning (3%) | $1,000 |
| - Design (7%) | $2,000 |
| Legal Assistance (2%) | $1,000 |
| Fiscal Services (2%) | $1,000 |
| All Other Facilities Contingency (20%) | $6,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $2,000 |
| **TOTAL COST OF PROJECT** | **$44,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $3,000 |
| Operation and Maintenance | |
| Purchase of Water (100 acft/yr @ 1,928 $/acft) | $193,000 |
| **TOTAL ANNUAL COST** | **$196,000** |
| | |
| **Available Project Yield (acft/yr)** | 100 |
| **Annual Cost of Water ($ per acft)*** | $1,961 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,931 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.93 |
| *Based on a peaking factor of 1 | |

## 5E.2 Fresh Groundwater Development

The Fresh Groundwater Development WMS is described in Section 5.2.5. Cost estimate summary tables are included for the following Fresh Groundwater Development WMS projects:

5E.2-1 Atascosa Rural WSC

5E.2-2 Clear Water Estates Water System (Texas Water Company)

5E.2-3 County-Other, Comal

5E.2-4 County-Other, Victoria

5E.2-5 Crystal Clear SUD – Carrizo-Wilcox Project

5E.2-6 Crystal Clear SUD – Trinity Project

5E.2-7 Elmendorf

5E.2-8 Garden Ridge

5E.2-9 KT Water Development

5E.2-10 Martindale WSC

5E.2-11 Springs Hill (Mesa Trail)

5E.2-12 Springs Hill (Wilson)

5E.2-13 Uvalde County Mining

5E.2-14 Wingert Water Systems

### Table 5E.2-1 Fresh Groundwater Development WMS: Atascosa Rural WSC

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $4,899,000 |
| Water Treatment Plant (2 MGD) | $1,795,000 |
| **TOTAL COST OF FACILITIES** | **$6,694,000** |
| | |
| - Planning (3%) | $201,000 |
| - Design (7%) | $469,000 |
| - Construction Engineering (1%) | $67,000 |
| Legal Assistance (2%) | $134,000 |
| Fiscal Services (2%) | $134,000 |
| All Other Facilities Contingency (20%) | $1,339,000 |
| Environmental & Archaeology Studies and Mitigation | $76,000 |
| Land Acquisition and Surveying (9 acres) | $71,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $299,000 |
| **TOTAL COST OF PROJECT** | **$9,484,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $667,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $49,000 |
| Water Treatment Plant | $592,000 |
| Pumping Energy Costs (72,304 kW-hr @ 0.09 $/kW-hr) | $7,000 |
| **TOTAL ANNUAL COST** | **$1,315,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,200 |
| **Annual Cost of Water ($ per acft)*** | $1,096 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $540 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $3.36 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.66 |
| *Based on a peaking factor of 1 | |

## Table 5E.2-2 Fresh Groundwater Development WMS: Clear Water Estates Water System (Texas Water Company)

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $2,721,000 |
| Water Treatment Plant (1.5 MGD) | $1,648,000 |
| **TOTAL COST OF FACILITIES** | **$4,369,000** |
| | |
| - Planning (3%) | $131,000 |
| - Design (7%) | $306,000 |
| - Construction Engineering (1%) | $44,000 |
| Legal Assistance (2%) | $87,000 |
| Fiscal Services (2%) | $87,000 |
| All Other Facilities Contingency (20%) | $874,000 |
| Environmental & Archaeology Studies and Mitigation | $108,000 |
| Land Acquisition and Surveying (9 acres) | $100,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $199,000 |
| **TOTAL COST OF PROJECT** | **$6,305,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $444,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $27,000 |
| Water Treatment Plant | $544,000 |
| **TOTAL ANNUAL COST** | **$1,015,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,500 |
| **Annual Cost of Water ($ per acft)*** | $677 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $381 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $2.08 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.17 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-3 Fresh Groundwater Development WMS: County-Other, Comal

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $2,892,000 |
| Water Treatment Plant (1.8 MGD) | $1,795,000 |
| **TOTAL COST OF FACILITIES** | **$4,687,000** |
| | |
| - Planning (3%) | $141,000 |
| - Design (7%) | $328,000 |
| - Construction Engineering (1%) | $47,000 |
| Legal Assistance (2%) | $94,000 |
| Fiscal Services (2%) | $94,000 |
| All Other Facilities Contingency (20%) | $937,000 |
| Environmental & Archaeology Studies and Mitigation | $115,000 |
| Land Acquisition and Surveying (3 acres) | $108,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $213,000 |
| **TOTAL COST OF PROJECT** | **$6,764,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $476,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $29,000 |
| Water Treatment Plant | $592,000 |
| Pumping Energy Costs (1,539,320 kW-hr @ 0.09 $/kW-hr) | $139,000 |
| **TOTAL ANNUAL COST** | **$1,236,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,000 |
| **Annual Cost of Water ($ per acft)*** | $1,236 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $760 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $3.79 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.33 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-4 Fresh Groundwater Development WMS: County-Other, Victoria

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $703,000 |
| **TOTAL COST OF FACILITIES** | **$703,000** |
| | |
| - Planning (3%) | $21,000 |
| - Design (7%) | $49,000 |
| - Construction Engineering (1%) | $7,000 |
| Legal Assistance (2%) | $14,000 |
| Fiscal Services (2%) | $14,000 |
| All Other Facilities Contingency (20%) | $141,000 |
| Environmental & Archaeology Studies and Mitigation | $49,000 |
| Land Acquisition and Surveying (3 acres) | $47,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $34,000 |
| **TOTAL COST OF PROJECT** | **$1,079,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $76,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $7,000 |
| Pumping Energy Costs (8,934 kW-hr @ 0.09 $/kW-hr) | $1,000 |
| **TOTAL ANNUAL COST** | **$84,000** |
| | |
| **Available Project Yield (acft/yr)** | 300 |
| **Annual Cost of Water ($ per acft)*** | $279 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $26 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.86 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.08 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-5 Fresh Groundwater Development WMS: Crystal Clear SUD Carrizo-Wilcox Project

| Item | Estimated Costs |
|---|---|
| Transmission Pipeline (16 in. dia., 7.6 miles) | $10,464,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $3,100,000 |
| Well Fields (Wells, Pumps, and Piping) | $3,981,000 |
| Water Treatment Plant (0.7 MGD) | $1,051,000 |
| **TOTAL COST OF FACILITIES** | **$18,596,000** |
| | |
| - Planning (3%) | $558,000 |
| - Design (7%) | $1,302,000 |
| - Construction Engineering (1%) | $186,000 |
| Legal Assistance (2%) | $372,000 |
| Fiscal Services (2%) | $372,000 |
| Pipeline Contingency (15%) | $1,570,000 |
| All Other Facilities Contingency (20%) | $1,626,000 |
| Environmental & Archaeology Studies and Mitigation | $592,000 |
| Land Acquisition and Surveying (123 acres) | $1,348,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $862,000 |
| **TOTAL COST OF PROJECT** | **$27,384,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,927,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $159,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $40,000 |
| Water Treatment Plant | $347,000 |
| Pumping Energy Costs (95,639 kW-hr @ 0.09 $/kW-hr) | $9,000 |
| **TOTAL ANNUAL COST** | **$2,482,000** |
| | |
| **Available Project Yield (acft/yr)** | 280 |
| **Annual Cost of Water ($ per acft)*** | $8,864 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,982 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $27.20 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $6.08 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-6 Fresh Groundwater Development WMS: Crystal Clear SUD Trinity Project

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $3,460,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $1,404,000 |
| Integration, Relocations, Backup Generator & Other | $19,000 |
| **TOTAL COST OF FACILITIES** | **$12,586,000** |
| | |
| - Planning (3%) | $378,000 |
| - Design (7%) | $881,000 |
| - Construction Engineering (1%) | $126,000 |
| Legal Assistance (2%) | $252,000 |
| Fiscal Services (2%) | $252,000 |
| All Other Facilities Contingency (20%) | $977,000 |
| Environmental & Archaeology Studies and Mitigation | $301,000 |
| Land Acquisition and Surveying (68 acres) | $749,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $574,000 |
| **TOTAL COST OF PROJECT** | **$18,231,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,281,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $126,000 |
| Pumping Energy Costs (376,463 kW-hr @ 0.09 $/kW-hr) | $34,000 |
| **TOTAL ANNUAL COST** | **$1,441,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,988 |
| **Annual Cost of Water ($ per acft)*** | $725 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $80 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $2.22 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.25 |
| *Based on a peaking factor of 0 | |

### Table 5E.2-7 Fresh Groundwater Development WMS: Elmendorf

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $1,981,000 |
| Water Treatment Plant (1 MGD) | $1,402,000 |
| **TOTAL COST OF FACILITIES** | **$3,383,000** |
| | |
| - Planning (3%) | $102,000 |
| - Design (7%) | $237,000 |
| - Construction Engineering (1%) | $34,000 |
| Legal Assistance (2%) | $68,000 |
| Fiscal Services (2%) | $68,000 |
| All Other Facilities Contingency (20%) | $677,000 |
| Environmental & Archaeology Studies and Mitigation | $72,000 |
| Land Acquisition and Surveying (6 acres) | $67,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $153,000 |
| **TOTAL COST OF PROJECT** | **$4,861,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $342,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $20,000 |
| Water Treatment Plant | $463,000 |
| Pumping Energy Costs (30,798 kW-hr @ 0.09 $/kW-hr) | $3,000 |
| **TOTAL ANNUAL COST** | **$828,000** |
| | |
| **Available Project Yield (acft/yr)** | 847 |
| **Annual Cost of Water ($ per acft)*** | $978 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $574 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $3.00 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.76 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-8 Fresh Groundwater Development WMS: Garden Ridge

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $3,213,000 |
| Water Treatment Plant (1.5 MGD) | $1,648,000 |
| **TOTAL COST OF FACILITIES** | **$4,861,000** |
| | |
| - Planning (3%) | $146,000 |
| - Design (7%) | $340,000 |
| - Construction Engineering (1%) | $49,000 |
| Legal Assistance (2%) | $97,000 |
| Fiscal Services (2%) | $97,000 |
| All Other Facilities Contingency (20%) | $972,000 |
| Environmental & Archaeology Studies and Mitigation | $108,000 |
| Land Acquisition and Surveying (9 acres) | $100,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $221,000 |
| **TOTAL COST OF PROJECT** | **$6,991,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $492,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $32,000 |
| Water Treatment Plant | $544,000 |
| **TOTAL ANNUAL COST** | **$1,068,000** |
| | |
| **Available Project Yield (acft/yr)** | 750 |
| **Annual Cost of Water ($ per acft)*** | $1,424 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $768 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $4.37 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.36 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-9 Fresh Groundwater Development WMS: KT Water Development

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $5,253,000 |
| Water Treatment Plant (3.5 MGD) | $2,631,000 |
| **TOTAL COST OF FACILITIES** | **$7,884,000** |
| | |
| - Planning (3%) | $237,000 |
| - Design (7%) | $552,000 |
| - Construction Engineering (1%) | $79,000 |
| Legal Assistance (2%) | $158,000 |
| Fiscal Services (2%) | $158,000 |
| All Other Facilities Contingency (20%) | $1,577,000 |
| Environmental & Archaeology Studies and Mitigation | $186,000 |
| Land Acquisition and Surveying (16 acres) | $173,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $358,000 |
| **TOTAL COST OF PROJECT** | **$11,362,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $799,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $53,000 |
| Water Treatment Plant | $868,000 |
| **TOTAL ANNUAL COST** | **$1,720,000** |
| | |
| **Available Project Yield (acft/yr)** | 486 |
| **Annual Cost of Water ($ per acft)*** | $3,539 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,895 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $10.86 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $5.81 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-10 Fresh Groundwater Development WMS: Martindale WSC

| Item | Estimated Costs |
|---|---|
| Intake Pump Stations (0 MGD) | $661,000 |
| Transmission Pipeline (6 in. dia., 0.2 miles) | $160,000 |
| Well Fields (Wells, Pumps, and Piping) | $109,000 |
| Integration, Relocations, Backup Generator & Other | $2,000 |
| **TOTAL COST OF FACILITIES** | **$932,000** |
| | |
| - Planning (3%) | $28,000 |
| - Design (7%) | $65,000 |
| - Construction Engineering (1%) | $9,000 |
| Legal Assistance (2%) | $19,000 |
| Fiscal Services (2%) | $19,000 |
| Pipeline Contingency (15%) | $24,000 |
| All Other Facilities Contingency (20%) | $154,000 |
| Environmental & Archaeology Studies and Mitigation | $94,000 |
| Land Acquisition and Surveying (9 acres) | $122,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $48,000 |
| **TOTAL COST OF PROJECT** | **$1,514,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $106,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $3,000 |
| Intake and Pump Stations (2.5% of Cost of Facilities) | $17,000 |
| Pumping Energy Costs (27,469 kW-hr @ 0.09 $/kW-hr) | $2,000 |
| **TOTAL ANNUAL COST** | **$128,000** |
| | |
| **Available Project Yield (acft/yr)** | 240 |
| **Annual Cost of Water ($ per acft)*** | $533 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $92 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.64 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.28 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-11 Fresh Groundwater Development WMS: Springs Hill WSC (Mesa Trail)

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $930,000 |
| **TOTAL COST OF FACILITIES** | **$930,000** |
| | |
| - Planning (3%) | $28,000 |
| - Design (7%) | $65,000 |
| - Construction Engineering (1%) | $9,000 |
| Legal Assistance (2%) | $19,000 |
| Fiscal Services (2%) | $19,000 |
| All Other Facilities Contingency (20%) | $186,000 |
| Environmental & Archaeology Studies and Mitigation | $34,000 |
| Land Acquisition and Surveying (3 acres) | $31,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $43,000 |
| **TOTAL COST OF PROJECT** | **$1,364,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $96,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $9,000 |
| **TOTAL ANNUAL COST** | **$105,000** |
| | |
| **Available Project Yield (acft/yr)** | 205 |
| **Annual Cost of Water ($ per acft)*** | $512 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $44 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.57 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.13 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-12 Fresh Groundwater Development WMS: Springs Hill WSC (Wilson)

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $1,230,000 |
| Water Treatment Plant (1.8 MGD) | $1,795,000 |
| **TOTAL COST OF FACILITIES** | **$4,705,000** |
| | |
| - Planning (3%) | $141,000 |
| - Design (7%) | $329,000 |
| - Construction Engineering (1%) | $47,000 |
| Legal Assistance (2%) | $94,000 |
| Fiscal Services (2%) | $94,000 |
| All Other Facilities Contingency (20%) | $741,000 |
| Environmental & Archaeology Studies and Mitigation | $123,000 |
| Land Acquisition and Surveying (21 acres) | $229,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $217,000 |
| **TOTAL COST OF PROJECT** | **$6,870,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $483,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $22,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $17,000 |
| Water Treatment Plant | $592,000 |
| Pumping Energy Costs (22,760 kW-hr @ 0.09 $/kW-hr) | $2,000 |
| **TOTAL ANNUAL COST** | **$1,116,000** |
| | |
| **Available Project Yield (acft/yr)** | 95 |
| **Annual Cost of Water ($ per acft)*** | $11,747 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $6,663 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $36.05 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $20.45 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-13 Fresh Groundwater Development WMS: Uvalde County Mining

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $1,147,000 |
| **TOTAL COST OF FACILITIES** | **$1,147,000** |
| | |
| - Planning (3%) | $34,000 |
| - Design (7%) | $80,000 |
| - Construction Engineering (1%) | $11,000 |
| Legal Assistance (2%) | $23,000 |
| Fiscal Services (2%) | $23,000 |
| All Other Facilities Contingency (20%) | $229,000 |
| Environmental & Archaeology Studies and Mitigation | $70,000 |
| Land Acquisition and Surveying (10 acres) | $59,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $55,000 |
| **TOTAL COST OF PROJECT** | **$1,731,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $122,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $11,000 |
| Pumping Energy Costs (41,694 kW-hr @ 0.09 $/kW-hr) | $4,000 |
| **TOTAL ANNUAL COST** | **$137,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,400 |
| **Annual Cost of Water ($ per acft)*** | $98 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $11 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.30 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.03 |
| *Based on a peaking factor of 1 | |

### Table 5E.2-14 Fresh Groundwater Development WMS: Wingert Water Systems

| Item | Estimated Costs |
|---|---|
| Well Fields (Wells, Pumps, and Piping) | $488,000 |
| Water Treatment Plant (0.1 MGD) | $348,000 |
| **TOTAL COST OF FACILITIES** | **$836,000** |
| | |
| - Planning (3%) | $25,000 |
| - Design (7%) | $58,000 |
| - Construction Engineering (1%) | $8,000 |
| Legal Assistance (2%) | $17,000 |
| Fiscal Services (2%) | $17,000 |
| All Other Facilities Contingency (20%) | $167,000 |
| Environmental & Archaeology Studies and Mitigation | $43,000 |
| Land Acquisition and Surveying (3 acres) | $41,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $40,000 |
| **TOTAL COST OF PROJECT** | **$1,252,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $88,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $5,000 |
| Water Treatment Plant | $115,000 |
| **TOTAL ANNUAL COST** | **$208,000** |
| | |
| **Available Project Yield (acft/yr)** | 35 |
| **Annual Cost of Water ($ per acft)*** | $5,939 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $3,423 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $18.22 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $10.50 |
| *Based on a peaking factor of 1 | |

## 5E.3 Brackish Groundwater Development

The Brackish Groundwater Development WMS is described in Section 5.2.6. Cost estimate summary tables are included for the following Brackish Groundwater Development WMS projects:

5E.3-1 Caldwell Brackish Partnership Project

5E.3-2 Gonzales & Guadalupe Brackish Partnership Project

5E.3-3 County Line SUD - Trinity Project

5E.3-4 County Line SUD - Brackish Edwards Project

5E.3-5 Maxwell WSC - Trinity Project

5E.3-6 S S WSC - Brackish Carrizo-Wilcox Project

### Table 5E.3-1 Brackish Groundwater Development WMS: Caldwell Brackish Partnership Project

| Item | Estimated Costs |
|---|---|
| Pump Station(s) (11 MGD) | $5,297,000 |
| Transmission Pipeline (30 in. dia., 18.2 miles) | $68,105,000 |
| Well Fields (Wells, Pumps, and Piping) | $41,140,000 |
| Storage Tank(s) (Other Than at Booster Pump Stations) | $9,677,000 |
| Water Treatment Plant (11 MGD) | $83,899,000 |
| Integration, Relocations, Backup Generator & Other | $163,000 |
| **TOTAL COST OF FACILITIES** | **$208,281,000** |
| | |
| - Planning (3%) | $6,248,000 |
| - Design (7%) | $14,580,000 |
| - Construction Engineering (1%) | $2,083,000 |
| Legal Assistance (2%) | $8,331,000 |
| Fiscal Services (2%) | $4,166,000 |
| Pipeline Contingency (15%) | $10,216,000 |
| All Other Facilities Contingency (20%) | $28,035,000 |
| Environmental & Archaeology Studies and Mitigation | $680,000 |
| Land Acquisition and Surveying (136 acres) | $961,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $9,212,000 |
| **TOTAL COST OF PROJECT** | **$292,793,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $20,645,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,191,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $132,000 |
| Water Treatment Plant | $15,731,000 |
| Pumping Energy Costs (20,667,380 kW-hr @ 0.09 $/kW-hr) | $1,860,000 |
| Purchase of Water (11,201 ac-ft/yr @ 125 $/ac-ft) | $1,400,000 |
| **TOTAL ANNUAL COST** | **$40,904,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,176 |
| **Annual Cost of Water ($ per acft)*** | $6,490 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $3,214 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $19.91 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $9.86 |
| *Based on a peaking factor of 1.1 | |

## Table 5E.3-2 Brackish Groundwater Development WMS: Gonzales and Guadalupe Brackish Partnership Project

| Item | Estimated Costs |
|---|---|
| Pump Station(s) (14.3 MGD) | $9,582,000 |
| Transmission Pipeline (30 in. dia., 32.1 miles) | $120,519,000 |
| Well Fields (Wells, Pumps, and Piping) | $50,289,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $11,964,000 |
| Water Treatment Plant (14.3 MGD) | $98,447,000 |
| Integration, Relocations, Backup Generator & Other | $499,000 |
| **TOTAL COST OF FACILITIES** | **$300,344,000** |
| | |
| - Planning (3%) | $9,010,000 |
| - Design (7%) | $21,024,000 |
| - Construction Engineering (1%) | $3,003,000 |
| Legal Assistance (2%) | $12,014,000 |
| Fiscal Services (2%) | $6,007,000 |
| Pipeline Contingency (15%) | $18,078,000 |
| All Other Facilities Contingency (20%) | $35,965,000 |
| Environmental & Archaeology Studies and Mitigation | $1,115,000 |
| Land Acquisition and Surveying (229 acres) | $1,632,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $13,251,000 |
| **TOTAL COST OF PROJECT** | **$421,443,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $29,618,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,861,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $395,000 |
| Water Treatment Plant | $18,459,000 |
| Pumping Energy Costs (42,795,949 kW-hr @ 0.09 $/kW-hr) | $3,852,000 |
| Purchase of Water (14,562 ac-ft/yr @ 125 $/ac-ft) | $1,820,000 |
| **TOTAL ANNUAL COST** | **$56,005,000** |
| | |
| **Available Project Yield (acft/yr)** | 8,558 |
| **Annual Cost of Water ($ per acft)*** | $6,544 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $3,083 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $20.08 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $9.46 |
| *Based on a peaking factor of 1.1 | |

### Table 5E.3-3 Brackish Groundwater Development WMS: County Line SUD Brackish Trinity Project

| Item | Estimated Costs |
|---|---|
| Pump Stations (1.1 MGD) | $737,000 |
| Transmission Pipeline (10 in. dia., 0.1 miles) | $138,000 |
| Well Fields (Wells, Pumps, and Piping) | $9,602,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $1,784,000 |
| Water Treatment Plant (1.5 MGD) | $26,726,000 |
| Integration, Relocations, Backup Generator & Other | $3,000 |
| **TOTAL COST OF FACILITIES** | **$38,990,000** |
| - Planning (3%) | $1,170,000 |
| - Design (7%) | $2,729,000 |
| - Construction Engineering (1%) | $390,000 |
| Legal Assistance (2%) | $780,000 |
| Fiscal Services (2%) | $780,000 |
| Pipeline Contingency (15%) | $21,000 |
| All Other Facilities Contingency (20%) | $7,771,000 |
| Environmental & Archaeology Studies and Mitigation | $308,000 |
| Land Acquisition and Surveying (22 acres) | $321,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,731,000 |
| **TOTAL COST OF PROJECT** | **$54,991,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $3,869,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $115,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $18,000 |
| Water Treatment Plant | $5,011,000 |
| Pumping Energy Costs (146,342 kW-hr @ 0.09 $/kW-hr) | $13,000 |
| **TOTAL ANNUAL COST** | **$9,026,000** |
| **Available Project Yield (acft/yr)** | 500 |
| **Annual Cost of Water ($ per acft)*** | $18,052 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $10,314 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $55.39 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $31.65 |
| *Based on a peaking factor of 1.25 | |

### Table 5E.3-4 Brackish Groundwater Development WMS: County Line SUD Brackish Edwards Project

| Item | Estimated Costs |
|---|---|
| Pump Stations (1.7 MGD) | $795,000 |
| Transmission Pipeline (12 in. dia., 0.1 miles) | $156,000 |
| Well Fields (Wells, Pumps, and Piping) | $8,279,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $1,784,000 |
| Water Treatment Plant (2 MGD) | $31,093,000 |
| Integration, Relocations, Backup Generator & Other | $5,000 |
| **TOTAL COST OF FACILITIES** | **$42,112,000** |
| | |
| - Planning (3%) | $1,263,000 |
| - Design (7%) | $2,948,000 |
| - Construction Engineering (1%) | $421,000 |
| Legal Assistance (2%) | $842,000 |
| Fiscal Services (2%) | $842,000 |
| Pipeline Contingency (15%) | $23,000 |
| All Other Facilities Contingency (20%) | $8,391,000 |
| Environmental & Archaeology Studies and Mitigation | $353,000 |
| Land Acquisition and Surveying (25 acres) | $365,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,871,000 |
| **TOTAL COST OF PROJECT** | **$59,431,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $4,182,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $102,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $20,000 |
| Water Treatment Plant | $6,219,000 |
| Pumping Energy Costs (198,139 kW-hr @ 0.09 $/kW-hr) | $18,000 |
| **TOTAL ANNUAL COST** | **$10,541,000** |
| | |
| **Available Project Yield (acft/yr)** | 500 |
| **Annual Cost of Water ($ per acft)*** | $21,082 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $12,718 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $64.69 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $39.02 |
| *Based on a peaking factor of 1.25 | |

### Table 5E.3-5 Brackish Groundwater Development WMS: Maxwell SUD Brackish Trinity Project

| Item | Estimated Costs |
|---|---|
| Transmission Pipeline (16 in. dia., 1 miles) | $2,056,000 |
| Well Fields (Wells, Pumps, and Piping) | $2,591,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $1,024,000 |
| Water Treatment Plant (0.3 MGD) | $7,111,000 |
| **TOTAL COST OF FACILITIES** | **$12,782,000** |
| - Planning (3%) | $383,000 |
| - Design (7%) | $895,000 |
| - Construction Engineering (1%) | $128,000 |
| Legal Assistance (2%) | $256,000 |
| Fiscal Services (2%) | $256,000 |
| Pipeline Contingency (15%) | $308,000 |
| All Other Facilities Contingency (20%) | $2,145,000 |
| Environmental & Archaeology Studies and Mitigation | $89,000 |
| Land Acquisition and Surveying (17 acres) | $239,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $569,000 |
| **TOTAL COST OF PROJECT** | **$18,050,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,270,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $57,000 |
| Water Treatment Plant | $1,346,000 |
| Pumping Energy Costs (9,321 kW-hr @ 0.09 $/kW-hr) | $1,000 |
| **TOTAL ANNUAL COST** | **$2,674,000** |
| **Available Project Yield (acft/yr)** | 230 |
| **Annual Cost of Water ($ per acft), based on PF=1** | $11,626 |
| **Annual Cost of Water After Debt Service ($ per acft), based on PF=1** | $6,104 |
| **Annual Cost of Water ($ per 1,000 gallons), based on PF=1** | $35.67 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1** | $18.73 |
| *Based on a peaking factor of 1 | |

### Table 5E.3-6 Brackish Groundwater Development WMS: S S WSC Brackish Carrizo-Wilcox Project

| Item | Estimated Costs |
|---|---|
| Transmission Pipeline (12 in. dia., 0.1 miles) | $107,000 |
| Transmission Pump Station(s) & Storage Tank(s) | $1,587,000 |
| Well Fields (Wells, Pumps, and Piping) | $9,853,000 |
| Water Treatment Plant (1.4 MGD) | $26,187,000 |
| **TOTAL COST OF FACILITIES** | **$37,734,000** |
| | |
| - Planning (3%) | $1,132,000 |
| - Design (7%) | $2,641,000 |
| - Construction Engineering (1%) | $377,000 |
| Legal Assistance (2%) | $755,000 |
| Fiscal Services (2%) | $755,000 |
| Pipeline Contingency (15%) | $16,000 |
| All Other Facilities Contingency (20%) | $7,525,000 |
| Environmental & Archaeology Studies and Mitigation | $166,000 |
| Land Acquisition and Surveying (39 acres) | $135,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,666,000 |
| **TOTAL COST OF PROJECT** | **$52,902,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $3,722,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $111,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $10,000 |
| Water Treatment Plant | $4,959,000 |
| Pumping Energy Costs (144,699 kW-hr @ 0.09 $/kW-hr) | $13,000 |
| **TOTAL ANNUAL COST** | **$8,815,000** |
| | |
| **Available Project Yield (acft/yr)** | 705 |
| **Annual Cost of Water ($ per acft)*** | $12,504 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $7,224 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $38.37 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $22.17 |
| *Based on a peaking factor of 2 | |

## 5E.4 Facilities Expansion

The Facilities Expansion WMS is described in Section 5.2.8. Cost estimate summary tables are included for the following Facilities Expansion WMS projects:

5E.4-1 CRWA Lake Dunlap WTP Expansion

5E.4-2 CRWA Hays Caldwell WTP Expansion

5E.4-3 County Line SUD SH21 Booster Site

5E.4-4 County Line SUD High Road Booster Site

5E.4-5 County Line SUD Bobwhite Booster Site

5E.4-6 GBRA Western Canyon WTP Expansion

5E.4-7 NBU South WTP Expansion

5E.4-8 NBU South WTP 2

5E.4-9 NBU South WTP 2 (Expansion 1)

5E.4-10 NBU South WTP 2 (Expansion 2)

5E.4-11 NBU–Seguin Interconnect

5E.4-12 SAWS Southeast Integrated Pipeline

5E.4-13 SAWS Expanded ASR Treatment Plant

5E.4-14 Springs Hill WSC Zone 2 Transmission Main

5E.4-15 Springs Hill WSC Gamecock WTP

5E.4-16 CPS Energy Direct Recycle Pipeline (Bexar Co. Steam-Electric)

## Table 5E.4-1 Facilities Expansion WMS: Canyon Regional Water Authority Lake Dunlap WTP Expansion

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant (2 MGD) | $9,889,000 |
| **TOTAL COST OF FACILITIES** | **$9,889,000** |
| | |
| - Planning (3%) | $297,000 |
| - Design (7%) | $692,000 |
| - Construction Engineering (1%) | $99,000 |
| Legal Assistance (2%) | $198,000 |
| Fiscal Services (2%) | $198,000 |
| All Other Facilities Contingency (20%) | $1,978,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $434,000 |
| **TOTAL COST OF PROJECT** | **$13,785,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $970,000 |
| Operation and Maintenance | |
| Water Treatment Plant | $893,000 |
| **TOTAL ANNUAL COST** | **$1,863,000** |
| | |
| **Available Project Yield (acft/yr)** | 59 |
| **Annual Cost of Water ($ per acft)*** | $31,576 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $15,136 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $96.89 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $46.44 |
| *Based on a peaking factor of 1 | |

## Table 5E.4-2 Facilities Expansion WMS: Canyon Regional Water Authority Hays Caldwell WTP Expansion

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant (2 MGD) | $9,889,000 |
| **TOTAL COST OF FACILITIES** | **$9,889,000** |
| | |
| - Planning (3%) | $297,000 |
| - Design (7%) | $692,000 |
| - Construction Engineering (1%) | $99,000 |
| Legal Assistance (2%) | $198,000 |
| Fiscal Services (2%) | $198,000 |
| All Other Facilities Contingency (20%) | $1,978,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $434,000 |
| **TOTAL COST OF PROJECT** | **$13,785,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $970,000 |
| Operation and Maintenance | |
| Water Treatment Plant | $893,000 |
| **TOTAL ANNUAL COST** | **$1,863,000** |
| | |
| **Available Project Yield (acft/yr)** | 406 |
| **Annual Cost of Water ($ per acft)*** | $4,589 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $2,200 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $14.08 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $6.75 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-3 Facilities Expansion WMS: County Line SUD SH-21 Booster Site

| Item | Estimated Costs |
|---|---|
| Transmission Pump Station(s) & Storage Tank(s) | $1,500,000 |
| **TOTAL COST OF FACILITIES** | **$1,500,000** |
| | |
| - Planning (3%) | $45,000 |
| - Design (7%) | $105,000 |
| - Construction Engineering (1%) | $15,000 |
| Legal Assistance (2%) | $30,000 |
| Fiscal Services (2%) | $30,000 |
| All Other Facilities Contingency (20%) | $300,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $67,000 |
| **TOTAL COST OF PROJECT** | **$2,106,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $148,000 |
| Operation and Maintenance | |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $38,000 |
| Pumping Energy Costs (399,102 kW-hr @ 0.09 $/kW-hr) | $36,000 |
| **TOTAL ANNUAL COST** | **$222,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,120 |
| **Annual Cost of Water ($ per acft)*** | $198 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $66 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.61 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.20 |
| *Based on a peaking factor of 1.5 | |

### Table 5E.4-4 Facilities Expansion WMS: County Line SUD High Road Booster Site

| Item | Estimated Costs |
|---|---|
| Transmission Pump Station(s) & Storage Tank(s) | $1,000,000 |
| **TOTAL COST OF FACILITIES** | **$1,000,000** |
| | |
| - Planning (3%) | $30,000 |
| - Design (7%) | $70,000 |
| - Construction Engineering (1%) | $10,000 |
| Legal Assistance (2%) | $20,000 |
| Fiscal Services (2%) | $20,000 |
| All Other Facilities Contingency (20%) | $200,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $45,000 |
| **TOTAL COST OF PROJECT** | **$1,409,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $99,000 |
| Operation and Maintenance | |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $25,000 |
| Pumping Energy Costs (789,308 kW-hr @ 0.09 $/kW-hr) | $24,000 |
| **TOTAL ANNUAL COST** | **$148,000** |
| | |
| **Available Project Yield (acft/yr)** | 76 |
| **Annual Cost of Water ($ per acft)*** | $1,947 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $645 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.98 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.98 |
| *Based on a peaking factor of 1.5 | |

### Table 5E.4-5 Facilities Expansion WMS: County Line SUD Bobwhite Booster Site

| Item | Estimated Costs |
|---|---|
| Transmission Pump Station(s) & Storage Tank(s) | $2,000,000 |
| **TOTAL COST OF FACILITIES** | **$2,000,000** |
| | |
| - Planning (3%) | $60,000 |
| - Design (7%) | $140,000 |
| - Construction Engineering (1%) | $20,000 |
| Legal Assistance (2%) | $40,000 |
| Fiscal Services (2%) | $40,000 |
| All Other Facilities Contingency (20%) | $400,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $89,000 |
| **TOTAL COST OF PROJECT** | **$2,803,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $197,000 |
| Operation and Maintenance | |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $50,000 |
| Pumping Energy Costs (789,308 kW-hr @ 0.09 $/kW-hr) | $71,000 |
| **TOTAL ANNUAL COST** | **$318,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,240 |
| **Annual Cost of Water ($ per acft)*** | $142 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $54 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.44 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.17 |
| *Based on a peaking factor of 1.5 | |

## Table 5E.4-6 Facilities Expansion WMS: Guadalupe-Blanco River Authority Western Canyon WTP Expansion

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant (5 MGD) | $16,986,000 |
| **TOTAL COST OF FACILITIES** | **$16,986,000** |
| | |
| - Planning (3%) | $510,000 |
| - Design (7%) | $1,189,000 |
| - Construction Engineering (1%) | $170,000 |
| Legal Assistance (2%) | $340,000 |
| Fiscal Services (2%) | $340,000 |
| All Other Facilities Contingency (20%) | $3,397,000 |
| Environmental & Archaeology Studies and Mitigation | $25,000 |
| Land Acquisition and Surveying (3 acres) | $27,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $747,000 |
| **TOTAL COST OF PROJECT** | **$23,731,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,670,000 |
| Operation and Maintenance | |
| Water Treatment Plant | $1,314,000 |
| **TOTAL ANNUAL COST** | **$2,984,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,245 |
| **Annual Cost of Water ($ per acft)*** | $2,397 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,055 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $7.35 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.24 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-7 Facilities Expansion WMS: New Braunfels Utilities South WTP Expansion

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant Expansion (8 MGD) | $24,083,000 |
| **TOTAL COST OF FACILITIES** | **$24,083,000** |
| | |
| - Planning (3%) | $722,000 |
| - Design (7%) | $1,686,000 |
| - Construction Engineering (1%) | $241,000 |
| Legal Assistance (2%) | $482,000 |
| Fiscal Services (2%) | $482,000 |
| All Other Facilities Contingency (20%) | $4,817,000 |
| Environmental & Archaeology Studies and Mitigation | $40,000 |
| Land Acquisition and Surveying (4 acres) | $44,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,060,000 |
| **TOTAL COST OF PROJECT** | **$33,657,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $2,368,000 |
| Operation and Maintenance | |
| Water Treatment Plant | $1,736,000 |
| **TOTAL ANNUAL COST** | **$4,104,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,800 |
| **Annual Cost of Water ($ per acft)*** | $604 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $255 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.85 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.78 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-8 Facilities Expansion WMS: New Braunfels Utilities South WTP 2

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant Expansion (4 MGD) | $60,620,000 |
| **TOTAL COST OF FACILITIES** | **$60,620,000** |
| | |
| - Planning (3%) | $1,819,000 |
| - Design (7%) | $4,243,000 |
| - Construction Engineering (1%) | $606,000 |
| Legal Assistance (2%) | $1,212,000 |
| Fiscal Services (2%) | $1,212,000 |
| All Other Facilities Contingency (20%) | $12,124,000 |
| Environmental & Archaeology Studies and Mitigation | $40,000 |
| Land Acquisition and Surveying (2 acres) | $44,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $2,663,000 |
| **TOTAL COST OF PROJECT** | **$84,583,000** |
| Debt Service (3.5 percent, 20 years) | $5,951,000 |
| Water Treatment Plant | $4,386,000 |
| **TOTAL ANNUAL COST** | **$10,337,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,800 |
| **Annual Cost of Water ($ per acft)*** | $1,520 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $645 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $4.66 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $1.98 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-9 Facilities Expansion WMS: New Braunfels Utilities South WTP 2 (Expansion 1)

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant (4 MGD) | $14,620,000 |
| **TOTAL COST OF FACILITIES** | **$14,620,000** |
| | |
| - Planning (3%) | $439,000 |
| - Design (7%) | $1,023,000 |
| - Construction Engineering (1%) | $146,000 |
| Legal Assistance (2%) | $292,000 |
| Fiscal Services (2%) | $292,000 |
| All Other Facilities Contingency (20%) | $2,924,000 |
| Environmental & Archaeology Studies and Mitigation | $20,000 |
| Land Acquisition and Surveying (2 acres) | $22,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $643,000 |
| **TOTAL COST OF PROJECT** | **$20,421,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,437,000 |
| Operation and Maintenance | |
| Water Treatment Plant | $1,174,000 |
| **TOTAL ANNUAL COST** | **$2,611,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,800 |
| **Annual Cost of Water ($ per acft)*** | $384 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $173 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.18 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.53 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-10 Facilities Expansion WMS: New Braunfels Utilities South WTP 2 (Expansion 2)

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant (4 MGD) | $14,620,000 |
| **TOTAL COST OF FACILITIES** | **$14,620,000** |
| | |
| - Planning (3%) | $439,000 |
| - Design (7%) | $1,023,000 |
| - Construction Engineering (1%) | $146,000 |
| Legal Assistance (2%) | $292,000 |
| Fiscal Services (2%) | $292,000 |
| All Other Facilities Contingency (20%) | $2,924,000 |
| Environmental & Archaeology Studies and Mitigation | $20,000 |
| Land Acquisition and Surveying (2 acres) | $22,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $643,000 |
| **TOTAL COST OF PROJECT** | **$20,421,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,437,000 |
| Operation and Maintenance | |
| Water Treatment Plant | $1,174,000 |
| **TOTAL ANNUAL COST** | **$2,611,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,800 |
| **Annual Cost of Water ($ per acft)*** | $384 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $173 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.18 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.53 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-11 Facilities Expansion WMS: New Braunfels Utilities – Seguin Interconnect

| Item | Estimated Costs |
|---|---|
| Intake Pump Stations (0 MGD) | $2,525,000 |
| Transmission Pipeline (14 in. dia., 5 miles) | $8,808,000 |
| Integration, Relocations, Backup Generator & Other | $55,000 |
| **TOTAL COST OF FACILITIES** | **$11,388,000** |
| | |
| - Planning (3%) | $342,000 |
| - Design (7%) | $797,000 |
| - Construction Engineering (1%) | $114,000 |
| Legal Assistance (2%) | $228,000 |
| Fiscal Services (2%) | $228,000 |
| Pipeline Contingency (15%) | $1,321,000 |
| All Other Facilities Contingency (20%) | $516,000 |
| Environmental & Archaeology Studies and Mitigation | $199,000 |
| Land Acquisition and Surveying (35 acres) | $387,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $503,000 |
| **TOTAL COST OF PROJECT** | **$16,023,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,124,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $89,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $63,000 |
| Pumping Energy Costs (906,248 kW-hr @ 0.09 $/kW-hr) | $82,000 |
| Purchase of Water (2,500 acft/yr @ 100 $/acft) | $250,000 |
| **TOTAL ANNUAL COST** | **$1,608,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,500 |
| **Annual Cost of Water ($ per acft)*** | $643 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $194 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.97 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.59 |
| *Based on a peaking factor of 1.3 | |

### Table 5E.4-12 Facilities Expansion WMS: San Antonio Water System Southeast Integration Pipeline

| Item | Estimated Costs |
|---|---|
| Intake Pump Stations (21 MGD) | $9,160,000 |
| Transmission Pipeline (36 in. dia., 9.5 miles) | $46,917,000 |
| Integration, Relocations, Backup Generator & Other | $333,000 |
| **TOTAL COST OF FACILITIES** | **$56,410,000** |
| | |
| - Planning (3%) | $1,692,000 |
| - Design (7%) | $3,949,000 |
| - Construction Engineering (1%) | $564,000 |
| Legal Assistance (2%) | $1,128,000 |
| Fiscal Services (2%) | $1,128,000 |
| Pipeline Contingency (15%) | $7,038,000 |
| All Other Facilities Contingency (20%) | $1,899,000 |
| Environmental & Archaeology Studies and Mitigation | $336,000 |
| Land Acquisition and Surveying (40 acres) | $436,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $2,413,000 |
| **TOTAL COST OF PROJECT** | **$76,993,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $5,394,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $472,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $229,000 |
| Pumping Energy Costs (5,459,393 kW-hr @ 0.09 $/kW-hr) | $491,000 |
| **TOTAL ANNUAL COST** | **$6,586,000** |
| | |
| **Available Project Yield (acft/yr)** | 21,000 |
| **Annual Cost of Water ($ per acft)*** | $314 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $57 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $0.96 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.17 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-13 Facilities Expansion WMS: SAWS Expanded ASR Treatment Plant

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant (30 MGD) | $66,425,000 |
| **TOTAL COST OF FACILITIES** | **$66,425,000** |
| | |
| - Planning (3%) | $1,993,000 |
| - Design (7%) | $4,650,000 |
| - Construction Engineering (1%) | $664,000 |
| Legal Assistance (2%) | $1,329,000 |
| Fiscal Services (2%) | $1,329,000 |
| All Other Facilities Contingency (20%) | $13,285,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $2,915,000 |
| **TOTAL COST OF PROJECT** | **$92,590,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $6,515,000 |
| Operation and Maintenance | |
| Water Treatment Plant | $4,650,000 |
| **TOTAL ANNUAL COST** | **$11,165,000** |
| | |
| **Available Project Yield (acft/yr)** | 33,600 |
| **Annual Cost of Water ($ per acft)*** | $332 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $138 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.42 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-14 Facilities Expansion WMS: Springs Hill WSC Zone 2 Transmission Main

| Item | Estimated Costs |
|---|---|
| Intake Pump Stations (0 MGD) | $1,540,000 |
| Transmission Pipeline (16 in. dia., 19.3 miles) | $40,463,000 |
| Integration, Relocations, Backup Generator & Other | $36,000 |
| **TOTAL COST OF FACILITIES** | **$42,039,000** |
| | |
| - Planning (3%) | $1,261,000 |
| - Design (7%) | $2,943,000 |
| - Construction Engineering (1%) | $420,000 |
| Legal Assistance (2%) | $841,000 |
| Fiscal Services (2%) | $841,000 |
| Pipeline Contingency (15%) | $6,069,000 |
| All Other Facilities Contingency (20%) | $315,000 |
| Environmental & Archaeology Studies and Mitigation | $629,000 |
| Land Acquisition and Surveying (122 acres) | $1,341,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,842,000 |
| **TOTAL COST OF PROJECT** | **$58,541,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $4,117,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $405,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $39,000 |
| Pumping Energy Costs (596,959 kW-hr @ 0.09 $/kW-hr) | $54,000 |
| **TOTAL ANNUAL COST** | **$4,615,000** |
| | |
| **Available Project Yield (acft/yr)** | 2,240 |
| **Annual Cost of Water ($ per acft)*** | $2,060 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $222 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $6.32 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.68 |
| *Based on a peaking factor of 1 | |

### Table 5E.4-15 Facilities Expansion WMS: Springs Hill WSC Gamecock WTP

| Item | Estimated Costs |
|---|---|
| Water Treatment Plant (4 MGD) | $38,169,000 |
| **TOTAL COST OF FACILITIES** | **$45,901,000** |
| | |
| - Planning (3%) | $1,377,000 |
| - Design (7%) | $3,213,000 |
| - Construction Engineering (1%) | $459,000 |
| Legal Assistance (2%) | $918,000 |
| Fiscal Services (2%) | $918,000 |
| All Other Facilities Contingency (20%) | $9,180,000 |
| Environmental & Archaeology Studies and Mitigation | $130,000 |
| Land Acquisition and Surveying (19 acres) | $210,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $2,024,000 |
| **TOTAL COST OF PROJECT** | **$64,330,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $4,523,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $192,000 |
| Water Treatment Plant | $3,098,000 |
| Pumping Energy Costs (893,963 kW-hr @ 0.09 $/kW-hr) | $80,000 |
| **TOTAL ANNUAL COST** | **$7,894,000** |
| | |
| **Available Project Yield (acft/yr)** | 3,200 |
| **Annual Cost of Water ($ per acft)*** | $2,467 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,053 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $7.57 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.23 |
| *Based on a peaking factor of 1 | |

## Table 5E.4-16 Facilities Expansion WMS: CPS Energy Direct Recycle Pipeline (Bexar Co. Steam-Electric)

| Item | Estimated Costs |
|---|---|
| Intake Pump Stations (0 MGD) | $13,441,000 |
| Transmission Pipeline (54 in. dia., 9 miles) | $48,285,000 |
| Integration, Relocations, Backup Generator & Other | $480,000 |
| **TOTAL COST OF FACILITIES** | **$62,206,000** |
| | |
| - Planning (3%) | $1,866,000 |
| - Design (7%) | $4,354,000 |
| - Construction Engineering (1%) | $622,000 |
| Legal Assistance (2%) | $1,244,000 |
| Fiscal Services (2%) | $1,244,000 |
| Pipeline Contingency (15%) | $7,243,000 |
| All Other Facilities Contingency (20%) | $2,784,000 |
| Environmental & Archaeology Studies and Mitigation | $319,000 |
| Land Acquisition and Surveying (59 acres) | $652,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $2,667,000 |
| **TOTAL COST OF PROJECT** | **$85,201,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $5,961,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $488,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $336,000 |
| Pumping Energy Costs (7,871,546 kW-hr @ 0.09 $/kW-hr) | $708,000 |
| **TOTAL ANNUAL COST** | **$7,493,000** |
| | |
| **Available Project Yield (acft/yr)** | 5,000 |
| **Annual Cost of Water ($ per acft)*** | $1,499 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $306 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $4.60 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.94 |
| *Based on a peaking factor of 1 | |

## 5E.5 Reuse Water

The Reuse Water WMS is described in Section 5.2.9. Cost estimate summary tables are included for the following Reuse Water WMS projects:

5E.5-1 Boerne Non-Potable Reuse

5E.5-2 County Line SUD Non-Potable Reuse

5E.5-3 Fair Oaks Ranch Non-Potable Reuse

5E.5-4 Guadalupe-Blanco River Authority

5E.5-5 Kyle Non-Potable Reuse

5E.5-6 New Braunfels Utilities Potable Reuse

5E.5-7 San Marcos Non-Potable Reuse

5E.5-8 San Marcos Potable Reuse

5E.5-9 San Antonio River Authority Non-Potable Reuse

5E.5-10 San Antonio Water System Direct Non-Potable Reuse

5E.5-11 San Antonio Water System Direct Potable Reuse (Alternative)

### Table 5E.5-1 Reuse Water WMS: Boerne Non-Potable Reuse

| Item | Estimated Costs |
|---|---|
| Pump Stations | $1,033,000 |
| Storage Tanks (Other Than at Booster Pump Stations) | $6,039,000 |
| Integration, Relocations, Backup Generator & Other | $16,000 |
| **TOTAL COST OF FACILITIES** | **$7,088,000** |
| | |
| - Planning (3%) | $213,000 |
| - Design (7%) | $496,000 |
| - Construction Engineering (1%) | $71,000 |
| Legal Assistance (2%) | $142,000 |
| Fiscal Services (2%) | $142,000 |
| All Other Facilities Contingency (20%) | $1,418,000 |
| Environmental & Archaeology Studies and Mitigation | $51,000 |
| Land Acquisition and Surveying (7 acres) | $56,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $314,000 |
| **TOTAL COST OF PROJECT** | **$9,991,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $702,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $61,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $26,000 |
| Pumping Energy Costs (283,766,340 kW-hr @ 0.09 $/kW-hr) | $24,000 |
| **TOTAL ANNUAL COST** | **$813,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,500 |
| **Annual Cost of Water ($ per acft)*** | $542 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $74 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.66 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.23 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-2 Reuse Water WMS: County Line SUD Non-Potable Reuse

| Item | Estimated Costs |
|---|---|
| Pump Stations (3 MGD) | $1,387,000 |
| Transmission Pipeline (14 in. dia., 1.9 miles) | $3,563,000 |
| Water Treatment Plant (3 MGD) | $32,555,000 |
| Integration, Relocations, Backup Generator & Other | $16,000 |
| **TOTAL COST OF FACILITIES** | **$37,521,000** |
| | |
| - Planning (3%) | $1,126,000 |
| - Design (7%) | $2,626,000 |
| - Construction Engineering (1%) | $375,000 |
| Legal Assistance (2%) | $750,000 |
| Fiscal Services (2%) | $750,000 |
| Pipeline Contingency (15%) | $534,000 |
| All Other Facilities Contingency (20%) | $6,792,000 |
| Environmental & Archaeology Studies and Mitigation | $93,000 |
| Land Acquisition and Surveying (29 acres) | $223,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,651,000 |
| **TOTAL COST OF PROJECT** | **$52,441,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $3,690,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $36,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $35,000 |
| Water Treatment Plant | $2,777,000 |
| Pumping Energy Costs (262,488 kW-hr @ 0.09 $/kW-hr) | $24,000 |
| **TOTAL ANNUAL COST** | **$6,562,000** |
| | |
| **Available Project Yield (acft/yr)** | 560 |
| **Annual Cost of Water ($ per acft)*** | $11,715 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $5,126 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $35.95 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $15.73 |
| *Based on a peaking factor of 1.5 | |

### Table 5E.5-3 Reuse Water WMS: Fair Oaks Ranch Non-Potable Reuse

| Item | Estimated Costs |
|---|---|
| Pump Stations | $732,000 |
| Transmission Pipeline (12 in. dia., 1 miles) | $2,003,000 |
| Integration, Relocations, Backup Generator & Other | $5,000 |
| **TOTAL COST OF FACILITIES** | **$2,740,000** |
| | |
| - Planning (3%) | $82,000 |
| - Design (7%) | $192,000 |
| - Construction Engineering (1%) | $27,000 |
| Legal Assistance (2%) | $55,000 |
| Fiscal Services (2%) | $55,000 |
| Pipeline Contingency (15%) | $301,000 |
| All Other Facilities Contingency (20%) | $147,000 |
| Environmental & Archaeology Studies and Mitigation | $29,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $118,000 |
| **TOTAL COST OF PROJECT** | **$3,746,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $263,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $20,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $18,000 |
| Pumping Energy Costs (75,254 kW-hr @ 0.09 $/kW-hr) | $7,000 |
| **TOTAL ANNUAL COST** | **$308,000** |
| | |
| **Available Project Yield (acft/yr)** | 425 |
| **Annual Cost of Water ($ per acft)*** | $725 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $106 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $2.22 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.32 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-4 Reuse Water WMS: Guadalupe-Blanco River Authority Stein Falls WWTF

| Item | Estimated Costs |
|---|---|
| Pump Stations | $24,456,000 |
| Integration, Relocations, Backup Generator & Other | $275,000 |
| **TOTAL COST OF FACILITIES** | **$29,262,000** |
| | |
| - Planning (3%) | $878,000 |
| - Design (7%) | $2,048,000 |
| - Construction Engineering (1%) | $293,000 |
| Legal Assistance (2%) | $585,000 |
| Fiscal Services (2%) | $585,000 |
| All Other Facilities Contingency (20%) | $4,946,000 |
| Environmental & Archaeology Studies and Mitigation | $176,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $1,299,000 |
| **TOTAL COST OF PROJECT** | **$41,535,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $2,903,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $48,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $611,000 |
| Pumping Energy Costs (4,515,488 kW-hr @ 0.09 $/kW-hr) | $406,000 |
| **TOTAL ANNUAL COST** | **$3,968,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,064 |
| **Annual Cost of Water ($ per acft)*** | $3,729 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $1,001 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $11.44 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $3.07 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-5 Reuse Water WMS: Kyle Non-Potable Reuse

| Item | Estimated Costs |
|---|---|
| Pump Stations | $3,005,000 |
| Transmission Pipeline (16 in. dia., 5 miles) | $6,906,000 |
| Integration, Relocations, Backup Generator & Other | $96,000 |
| **TOTAL COST OF FACILITIES** | **$10,007,000** |
| | |
| - Planning (3%) | $300,000 |
| - Design (7%) | $700,000 |
| - Construction Engineering (1%) | $100,000 |
| Legal Assistance (2%) | $200,000 |
| Fiscal Services (2%) | $200,000 |
| Pipeline Contingency (15%) | $1,036,000 |
| All Other Facilities Contingency (20%) | $620,000 |
| Environmental & Archaeology Studies and Mitigation | $215,000 |
| Land Acquisition and Surveying (66 acres) | $939,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $463,000 |
| **TOTAL COST OF PROJECT** | **$14,780,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $1,033,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $70,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $75,000 |
| Pumping Energy Costs (283,766,340 kW-hr @ 0.09 $/kW-hr) | $141,000 |
| **TOTAL ANNUAL COST** | **$1,319,000** |
| | |
| **Available Project Yield (acft/yr)** | 3,105 |
| **Annual Cost of Water ($ per acft)*** | $425 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $92 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.30 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.28 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-6 Reuse Water WMS: New Braunfels Utilities Direct Potable Reuse

| Item | Estimated Costs |
|---|---|
| Pump Stations | $2,562,000 |
| Transmission Pipeline (24 in. dia., 5 miles) | $14,216,000 |
| Advanced Water Treatment Facility (14 MGD) | $67,979,000 |
| Integration, Relocations, Backup Generator & Other | $74,000 |
| **TOTAL COST OF FACILITIES** | **$84,831,000** |
| | |
| - Planning (3%) | $2,545,000 |
| - Design (7%) | $5,938,000 |
| - Construction Engineering (1%) | $848,000 |
| Legal Assistance (2%) | $1,697,000 |
| Fiscal Services (2%) | $1,697,000 |
| Pipeline Contingency (15%) | $2,132,000 |
| All Other Facilities Contingency (20%) | $14,123,000 |
| Environmental & Archaeology Studies and Mitigation | $200,000 |
| Land Acquisition and Surveying (73 acres) | $721,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $3,727,000 |
| **TOTAL COST OF PROJECT** | **$118,459,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $8,330,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $143,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $64,000 |
| Water Treatment Plant | $6,566,000 |
| Pumping Energy Costs (1,219,281 kW-hr @ 0.09 $/kW-hr) | $110,000 |
| **TOTAL ANNUAL COST** | **$15,213,000** |
| | |
| **Available Project Yield (acft/yr)** | 7,800 |
| **Annual Cost of Water ($ per acft)*** | $1,950 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $882 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.98 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.71 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-7 Reuse Water WMS: San Marcos Non-Potable Reuse

| Item | Estimated Costs |
|---|---|
| Pump Stations | $6,957,000 |
| Integration, Relocations, Backup Generator & Other | $70,000 |
| **TOTAL COST OF FACILITIES** | **$7,027,000** |
| | |
| - Planning (3%) | $211,000 |
| - Design (7%) | $492,000 |
| - Construction Engineering (1%) | $70,000 |
| Legal Assistance (2%) | $141,000 |
| Fiscal Services (2%) | $141,000 |
| All Other Facilities Contingency (20%) | $1,405,000 |
| Environmental & Archaeology Studies and Mitigation | $135,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $311,000 |
| **TOTAL COST OF PROJECT** | **$9,933,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $694,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $174,000 |
| Pumping Energy Costs (1,140,626 kW-hr @ 0.09 $/kW-hr) | $103,000 |
| **TOTAL ANNUAL COST** | **$972,000** |
| | |
| **Available Project Yield (acft/yr)** | 1,971 |
| **Annual Cost of Water ($ per acft)*** | $493 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $141 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $1.51 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.43 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-8 Reuse Water WMS: San Marcos Potable Reuse

| Item | Estimated Costs |
|---|---|
| Transmission Pipeline (24 in. dia., 2.2 miles) | $5,385,000 |
| Water Treatment Plant (5 MGD) | $67,942,000 |
| Integration, Relocations, Backup Generator & Other | $14,500,000 |
| **TOTAL COST OF FACILITIES** | **$87,827,000** |
| | |
| - Planning (3%) | $2,635,000 |
| - Design (7%) | $6,148,000 |
| - Construction Engineering (1%) | $771,000 |
| Legal Assistance (2%) | $1,757,000 |
| Fiscal Services (2%) | $1,757,000 |
| Pipeline Contingency (15%) | $808,000 |
| All Other Facilities Contingency (20%) | $16,488,000 |
| Land Acquisition and Surveying (26 acres) | $210,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $3,851,000 |
| **TOTAL COST OF PROJECT** | **$122,317,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (1.6 percent, 20 years) | $7,177,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (0.25% of Cost of Facilities) | $50,000 |
| **TOTAL ANNUAL COST** | **$7,227,000** |
| | |
| **Available Project Yield (acft/yr)** | 4,705 |
| **Annual Cost of Water ($ per acft)*** | $1,536 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $11 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $4.71 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.03 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-9 Reuse Water WMS: San Antonio River Authority Non-Potable Reuse

| Item | Estimated Costs |
|---|---|
| Integration, Relocations, Backup Generator & Other | $101,950,000 |
| **TOTAL COST OF FACILITIES** | **$101,950,000** |
| | |
| - Planning (3%) | $3,059,000 |
| - Design (7%) | $7,137,000 |
| - Construction Engineering (1%) | $1,020,000 |
| Legal Assistance (2%) | $2,039,000 |
| Fiscal Services (2%) | $2,039,000 |
| All Other Facilities Contingency (20%) | $20,390,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $4,474,000 |
| **TOTAL COST OF PROJECT** | **$142,108,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $9,999,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $1,020,000 |
| **TOTAL ANNUAL COST** | **$11,019,000** |
| | |
| **Available Project Yield (acft/yr)** | 6,750 |
| **Annual Cost of Water ($ per acft)*** | $1,632 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $151 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.01 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $0.46 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-10 Reuse Water WMS: San Antonio Water System Direct Non-Potable Reuse

| Item | Estimated Costs |
|---|---|
| Pump Stations | $27,481,000 |
| Transmission Pipeline (30 in. dia., 70 miles) | $238,901,000 |
| Integration, Relocations, Backup Generator & Other | $17,296,000 |
| **TOTAL COST OF FACILITIES** | **$283,678,000** |
| | |
| - Planning (3%) | $8,510,000 |
| - Design (7%) | $19,857,000 |
| - Construction Engineering (1%) | $2,837,000 |
| Legal Assistance (2%) | $5,674,000 |
| Fiscal Services (2%) | $5,674,000 |
| Pipeline Contingency (15%) | $35,835,000 |
| All Other Facilities Contingency (20%) | $8,955,000 |
| Environmental & Archaeology Studies and Mitigation | $2,899,000 |
| Land Acquisition and Surveying (928 acres) | $10,205,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $11,922,000 |
| **TOTAL COST OF PROJECT** | **$396,046,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $26,649,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $2,562,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $687,000 |
| Pumping Energy Costs (283,766,340 kW-hr @ 0.09 $/kW-hr) | $25,539,000 |
| **TOTAL ANNUAL COST** | **$55,437,000** |
| | |
| **Available Project Yield (acft/yr)** | 5,000 |
| **Annual Cost of Water ($ per acft)*** | $11,087 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $5,758 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $34.02 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $17.67 |
| *Based on a peaking factor of 1 | |

### Table 5E.5-11 Reuse Water WMS: San Antonio Water System Direct Potable Reuse (Alternative)

| Item | Estimated Costs |
|---|---|
| Pump Stations | $15,684,000 |
| Transmission Pipeline (42 in. dia., 9.6 miles) | $69,818,000 |
| Advanced Water Treatment Facility (22.5 MGD) | $165,521,000 |
| Integration, Relocations, Backup Generator & Other | $624,000 |
| **TOTAL COST OF FACILITIES** | **$251,647,000** |
| | |
| - Planning (3%) | $7,549,000 |
| - Design (7%) | $17,615,000 |
| - Construction Engineering (1%) | $2,516,000 |
| Legal Assistance (2%) | $5,033,000 |
| Fiscal Services (2%) | $5,033,000 |
| Pipeline Contingency (15%) | $10,473,000 |
| All Other Facilities Contingency (20%) | $36,366,000 |
| Environmental & Archaeology Studies and Mitigation | $337,000 |
| Land Acquisition and Surveying (132 acres) | $1,331,000 |
| Interest During Construction (3.5% for 1 years with a 0.5% ROI) | $10,962,000 |
| **TOTAL COST OF PROJECT** | **$348,862,000** |
| | |
| **ANNUAL COST** | |
| Debt Service (3.5 percent, 20 years) | $24,503,000 |
| Operation and Maintenance | |
| Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities) | $704,000 |
| Intakes and Pump Stations (2.5% of Cost of Facilities) | $392,000 |
| Advanced Water Treatment Facility | $19,801,000 |
| Pumping Energy Costs (10,238,349 kW-hr @ 0.09 $/kW-hr) | $921,000 |
| **TOTAL ANNUAL COST** | **$46,321,000** |
| | |
| **Available Project Yield (acft/yr)** | 25,000 |
| **Annual Cost of Water ($ per acft)*** | $1,853 |
| **Annual Cost of Water After Debt Service ($ per acft)*** | $873 |
| **Annual Cost of Water ($ per 1,000 gallons)*** | $5.69 |
| **Annual Cost of Water After Debt Service ($ per 1,000 gallons)*** | $2.68 |
| *Based on a peaking factor of 1 | |

FINAL PLAN

# CHAPTER 6: IMPACTS OF THE REGIONAL WATER PLAN AND CONSISTENCY WITH PROTECTION OF RESOURCES

South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**6.0 Impacts of the Regional Water Plan and Consistency with Protection of Resources .....6-1**

6.1 Cumulative Effects of Regional Water Plan Implementation and Consistency with Long-Term Protection of the State's Water, Agricultural, and Natural Resources .....6-1

6.1.1 Hydrologic Models .....6-1

6.1.2 Water Resources .....6-2

6.1.3 Agricultural Resources .....6-30

6.1.4 Natural Resources .....6-32

6.1.5 Effects on Navigation .....6-51

6.1.6 Environmental Benefits and Concerns .....6-52

6.2 Socioeconomic Impacts of Not Meeting Identified Water Needs .....6-52

6.3 Description of Unmet Needs .....6-53

6.3.1 Boerne .....6-56

6.3.2 County-Other, Comal .....6-57

6.3.3 County-Other, Guadalupe .....6-57

6.3.4 County-Other, Hays .....6-58

## APPENDICES

Appendix 6A: Texas Water Development Board (TWDB) Socioeconomic Impacts of Projected Water Shortages for the South Central Texas (Region L) Regional Water Planning Area

## LIST OF TABLES

Table 6-1 Hydrologic Models Used for Cumulative Effects Analysis .....6-2

Table 6-2 Carrizo-Wilcox Water Management Strategies .....6-5

Table 6-3 Cumulative Effects Analysis of Surface Water-Groundwater Flux Changes (cfs) .....6-15

Table 6-4 Guadalupe Estuary – Spring Season Environmental Flow Standard Permitting Frequencies .....6-26

Table 6-5 Guadalupe Estuary - Summer Season Environmental Flow Standard Permitting Frequencies .....6-27

Table 6-6 Impacts of Recommended Water Management Strategy Types on Key Parameters of Water Quality .....6-29

Table 6-7 Summary of Potential Agricultural Acreage Impacts for Water Management Strategies .....6-30

Table 6-8 Ecologically Significant River and Stream Segments Identified by TPWD in the South Central Texas Regional Water Planning Area .....6-39

Table 6-9 Potential Impacts of Different Types of Project Components .....6-42

Table 6-10 Summary of Potential Impacts to Endangered, Threatened, and Species of Greatest Conservation Need from Water Management Strategies ..... 6-44
Table 6-11 Summary of Potential Impacts to Vegetation and Land Use ..... 6-46
Table 6-12 Summary of Potential Stream Construction Impacts ..... 6-47
Table 6-13 Summary of Potential Stream Flow/Water Quality Impacts ..... 6-49
Table 6-14 Summary of Potential Impacts to Cultural Resources from Water Management Strategies ..... 6-50
Table 6-15 Potential Income and Job Losses Attributed to Not Meeting Identified Water Needs by Use Type [1] ..... 6-53
Table 6-16 Summary of Unmet Needs for the South Central Texas Region (acft/yr) ..... 6-54

## LIST OF FIGURES

Figure 6-1 Flowchart for Assessment of Cumulative Effects of Regional Water Plan Implementation on Water Resources ..... 6-3
Figure 6-2 Comal and San Marcos Springs in Drought of Record ..... 6-4
Figure 6-3 Trinity Aquifer Well Hydrographs ..... 6-6
Figure 6-4 Trinity Aquifer Drawdown (feet) from 2010 to 2060 ..... 6-7
Figure 6-5 Carrizo-Wilcox Aquifer Well Hydrographs ..... 6-8
Figure 6-6 Carrizo Aquifer Drawdown (feet) from 2010 to 2080 ..... 6-9
Figure 6-7 Upper Wilcox Aquifer Drawdown (feet) from 2010 to 2080 ..... 6-10
Figure 6-8 Gulf Coast Aquifer Well Hydrographs from 2000 to 2080 ..... 6-11
Figure 6-9 Jasper Aquifer Drawdown (feet) from 2000 to 2080 ..... 6-12
Figure 6-10 Evangeline Aquifer Drawdown (feet) from 2000 to 2080 ..... 6-13
Figure 6-11 Chicot Aquifer Drawdown (feet) from 2000 to 2080 ..... 6-14
Figure 6-12 Flow Assessment Locations ..... 6-16
Figure 6-13 Monthly Median Streamflows for the Guadalupe River Above Comal River at New Braunfels ..... 6-17
Figure 6-14 Flow Curves for the Guadalupe River Above Comal River at New Braunfels ..... 6-18
Figure 6-15 Monthly Median Streamflows for the San Marcos River at Luling ..... 6-18
Figure 6-16 Flow Curves for the San Marcos River at Luling ..... 6-19
Figure 6-17 Monthly Median Streamflows for the Guadalupe River at Victoria ..... 6-20
Figure 6-18 Flow Curves for the Guadalupe River at Victoria ..... 6-20
Figure 6-19 Monthly Median Streamflows for the San Antonio River Near Falls City ..... 6-21
Figure 6-20 Flow Curves for the San Antonio River Near Falls City ..... 6-21
Figure 6-21 Monthly Median Streamflows for the San Antonio River at Goliad ..... 6-22
Figure 6-22 Flow Curves for the San Antonio River at Goliad ..... 6-22
Figure 6-23 Monthly Median Streamflows for the Guadalupe River at Diversion Dam and Saltwater Barrier Near Tivoli ..... 6-23
Figure 6-24 Flow Curves for the Guadalupe River at Diversion Dam and Saltwater Barrier Near Tivoli ..... 6-23

Figure 6-25 Monthly Median Streamflows for the Guadalupe Estuary ..... 6-24
Figure 6-26 Flow Curves for the Guadalupe Estuary ..... 6-25
Figure 6-27 Spring Season Flow Curves for the Guadalupe Estuary ..... 6-25
Figure 6-28 Summer Season Flow Curves for the Guadalupe Estuary ..... 6-26
Figure 6-29 Ecologically Significant Stream and River Segments for Region L ..... 6-28
Figure 6-30 Gould's Vegetational Areas within Region L ..... 6-34

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft/yr | Acre-Feet per Year |
| ARWA | Alliance Regional Water Authority |
| ASR | Aquifer Storage and Recovery |
| BFZ | Balcones Fault Zone |
| cfs | Cubic Foot per Second |
| CRWA | Canyon Regional Water Authority |
| CVLGC | Cibolo Valley Local Government Corporation |
| DFC | Desired Future Condition |
| DB27 | 2027 Regional and State Water Planning Database |
| DO | Dissolved Oxygen |
| EAA | Edwards Aquifer Authority |
| EAHCP | Edwards Aquifer Habitat Conservation Plan |
| GAM | Groundwater Availability Model |
| GBRA | Guadalupe-Blanco River Authority |
| GIS | Geographic Information System |
| GMA | Groundwater Management Area |
| IH | Interstate Highway |
| IPP | Initially Prepared Plan |
| MAG | Modeled Available Groundwater |
| msl | Mean Sea Level |
| NBU | New Braunfels Utilities |
| Region K | Lower Colorado Region |
| Region L | South Central Texas Region |
| RWP | Regional Water Plan |
| RWPG | Regional Water Planning Group |
| SAWS | San Antonio Water System |
| SCTRWP | South Central Texas Regional Water Plan |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SGCN | Species of Greatest Conservation Need |
| SSLGC | Schertz-Seguin Local Government Corporation |
| SUD | Special Utility District |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |

| | |
|---|---|
| TDS | Total Dissolved Solids |
| TPWD | Texas Parks and Wildlife Department |
| TWDB | Texas Water Development Board |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | United States Geological Survey |
| VISPO | Voluntary Irrigation Suspension Program Option |
| WSC | Water Supply Corporation |
| WMS | Water Management Strategy |
| WUG | Water User Group |

# 6.0 Impacts of the Regional Water Plan and Consistency with Protection of Resources

The 2026 South Central Texas (Region L) Regional Water Plan (SCTRWP) provides for the orderly development, management, and conservation of water resources to meet the region's near and long-term water needs during drought. This chapter describes the impacts of the 2026 SCTRWP and how the 2026 SCTRWP is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. The chapter also presents a description of unmet needs, and the socioeconomic impacts of not meeting those needs.

## 6.1 Cumulative Effects of Regional Water Plan Implementation and Consistency with Long-Term Protection of the State's Water, Agricultural, and Natural Resources

In 2015, the 84th Texas Legislature designated five river or stream segments in the South Central Texas Regional Water Planning Area (SCTRWPA) as having unique ecological value. In accordance with Title 31 of the Texas Administrative Code (TAC) Section 357.43(b)(2), Regional Water Planning Groups (RWPGs) must assess the impact of the regional water plan (RWP) on designated unique river or stream segments. The rules state, "The assessment shall be a quantitative analysis of the impact of the plan on the flows important to the river or stream segment, as determined by the RWPG, comparing current conditions to conditions with implementation of all recommended water management strategies (WMSs). The assessment shall also describe the impact of the plan on the unique features cited in the region's recommendation of that segment." To comply with these requirements and to assess the consistency with long-term protection of the state's resources, the South Central Texas Regional Water Planning Group (SCTRWPG) performed a cumulative effects analysis of full implementation of the SCTRWP. The following sections summarize the results of the cumulative effects analysis and describe the consistency with long-term protection of resources.

### 6.1.1 Hydrologic Models

Table 6-1 provides the details of any hydrologic models used for the Cumulative Effects Analysis, including the model name, version date, model input/output files used, date model used, and any relevant comments. Hydrologic variance requests from the SCTRWPG and approvals by the TWDB are documented in Appendix 3B.

**Table 6-1 Hydrologic Models Used for Cumulative Effects Analysis**

| Model Name | Version Date | Input/Output Files Used | Date Model Used | Comments |
|---|---|---|---|---|
| Texas Commission on Environmental Quality (TCEQ) Full Authorization WAM for the Guadalupe-San Antonio River Basin | October 1, 2023 | WRAP SIM input file extensions: DAT, DIS, FLO, EVA, FAD, HIS<br>WRAP SIM output file extensions: OUT<br>WRAP TAB input file extensions: TIN<br>WRAP TAB output file extensions: TOU | January 2025 | N/A – None |
| Flow Regime Application Tool (FRAT) v4.0.xlsb | January 13, 2012 | Inputs:<br>WAM generated regulated and available flows<br>qnday daily disaggregation of monthly flows<br>Pulse Translation<br>Output:<br>Monthly e-flow pass-through requirements | January 2025 | N/A – None |
| 2021 GMA 7 Model Files | August 12, 2022 | Input: GAM RUN 21-012 MAG:<br>Modeled Available Groundwater for the aquifers in Groundwater Management Area 7 | December 2024 | Edwards-Trinity Aquifer |
| 2021 GMA 13 GAM Modeling Files | January 14, 2022 | Input: GAM RUN 21-018 MAG:<br>Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson aquifers in Groundwater Management Area 13 | December 2024 | Carrizo-Wilcox Aquifer |
| 2021 GMA 15 Model Files | August 16, 2022 | Input: GAM RUN 21-020 MAG:<br>Modeled Available Groundwater for the Gulf Coast Aquifer System in Groundwater Management Area 15 | December 2024 | Chicot, Evangeline, Burkeville Aquifers |

### 6.1.2 Water Resources

The cumulative effects of implementing the Recommended WMSs described in the 2026 SCTRWP are quantified through long-term simulation of natural hydrologic processes including groundwater flow, precipitation, streamflow, aquifer recharge, springflow, and evaporation because they are affected by human influences such as aquifer pumpage, reservoirs, and diversions. Figure 6-1 illustrates the connectivity of the various groundwater and surface water models, as well as the WMSs of the 2026 SCTRWP.

The 2026 SCTRWP recognizes and honors all laws and existing permits applicable to water use for the state and regional water planning areas and, in the case of groundwater, recognizes and takes into account the programs and rules of groundwater conservation districts (GCDs) within the South Central Texas Water Planning Region, as well as Texas Water Development Board (TWDB) rules and guidance for regional water planning.

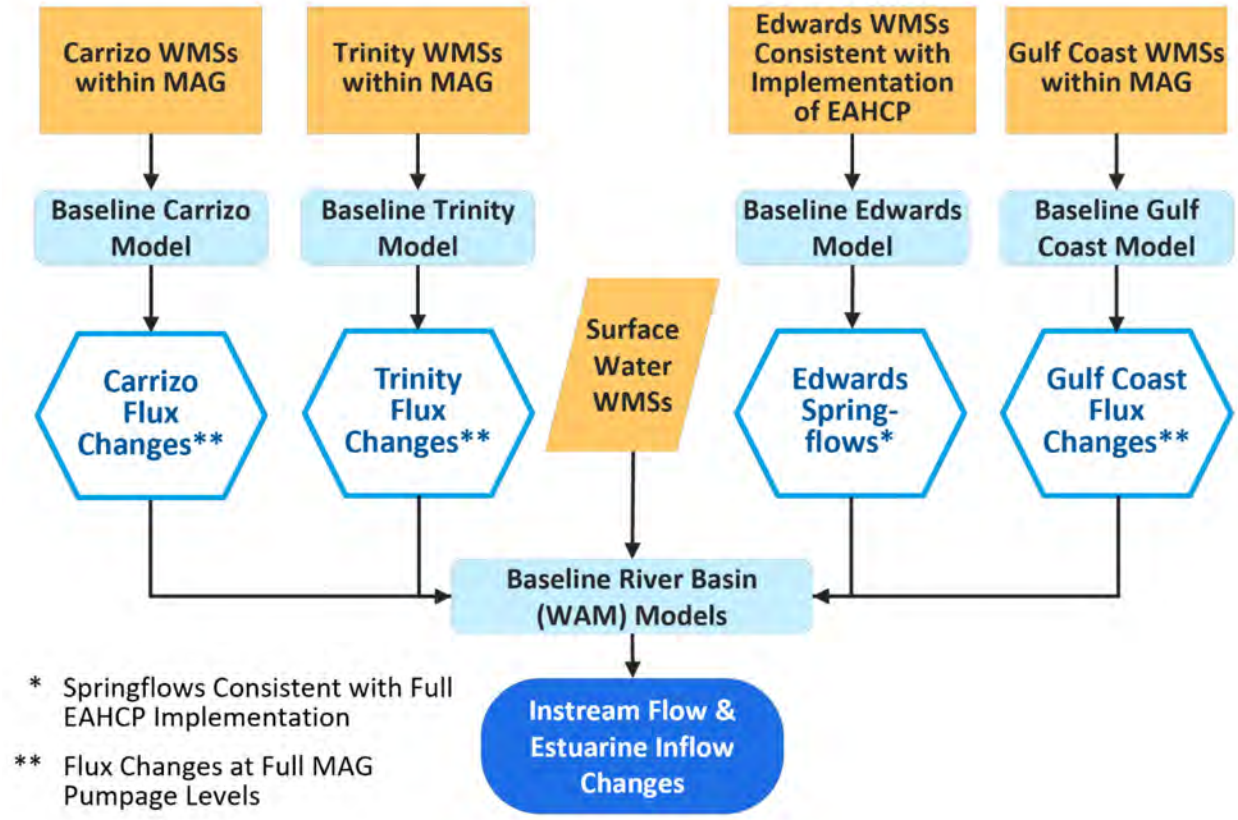



**Figure 6-1 Flowchart for Assessment of Cumulative Effects of Regional Water Plan Implementation on Water Resources**

### 6.1.2.1 Groundwater and Springs

Cumulative effects of plan implementation for the Edwards-Balcones Fault Zone (BFZ) Aquifer are based on full implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP), and for the Carrizo-Wilcox, Gulf Coast, and Trinity Aquifers are based on simulated impacts of the full implementation of the modeled available groundwater (MAGs) within each Groundwater Management Area (GMA). Each of these is described separately below.

The EAHCP was approved in 2013 by the U.S. Fish and Wildlife Service (USFWS). The 2026 SCTRWP assumes full implementation of the EAHCP. Furthermore, the SCTRWPG agreed that springflows associated with EAHCP implementation be used in evaluating existing supplies and potentially feasible surface WMSs for the 2026 SCTRWP.

The EAHCP includes four flow protection measures: Voluntary Irrigation Suspension Program Option (VISPO), Conservation Program, Use of San Antonio Water System (SAWS) Aquifer Storage and Recovery (ASR) with Tiered Leases and Pumping Off-Set, and Stage V Reductions. As of the issuance of this plan,

each of these measures has been implemented to some degree. Figure 6-2 illustrates the effects of each measure on springflow at Comal and San Marcos Springs and reflects a May 2019 update to the EAHCP, which approves an adaptive management action that increases the forbearance in the VISPO program to 41,795 acre-feet per year (acft/yr) [1]. The green bars on Figure 6-2 represent SAWS forbearance in excess of the original forbearance amounts shown in the Interlocal Agreement between Edwards Aquifer Authority (EAA) and SAWS for use of the ASR facility for springflow protection, and the red bars represent SAWS forbearance less than the original forbearance amounts shown in the Interlocal Agreement.

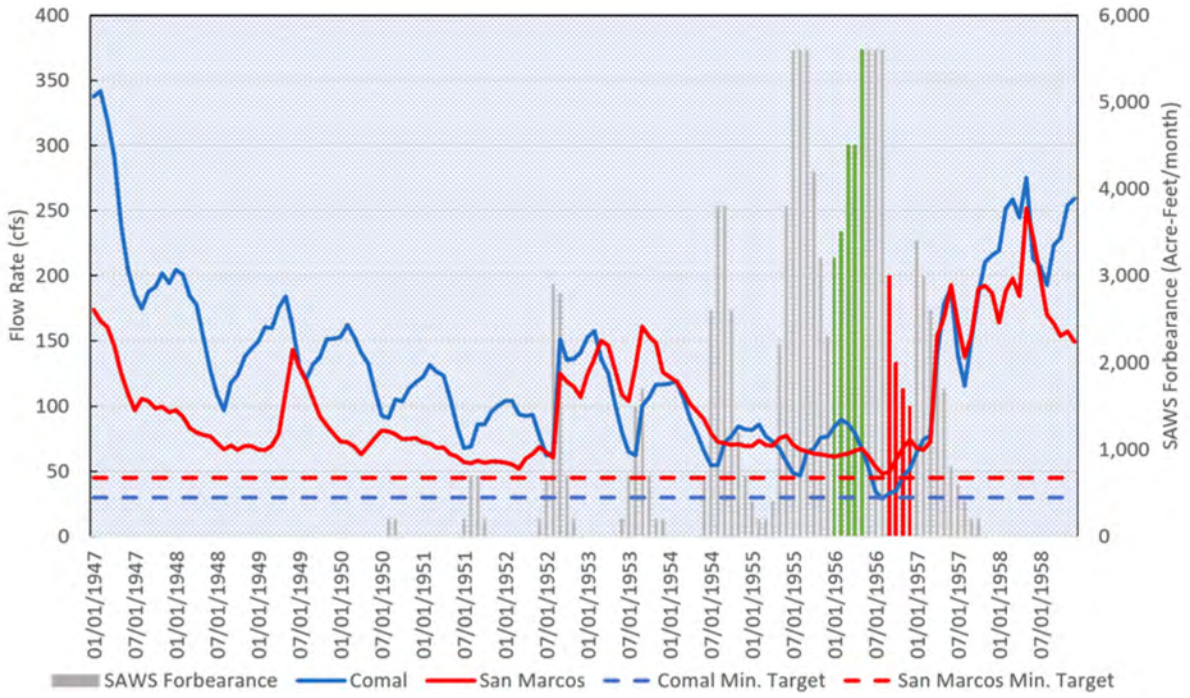



**Figure 6-2 Comal and San Marcos Springs in Drought of Record**

#### 6.1.2.1.1 Effects of Pumpage on Aquifers

The long-term cumulative effects of recommended WMSs in the 2026 SCTRWP on the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers presented herein are based on model simulations performed by the TWDB in determining the MAG consistent with the Desired Future Condition (DFC) of the aquifers. For this analysis, it was assumed that the MAGs were fully implemented/produced, and therefore, the analysis was performed on the final simulations conducted by the TWDB for each aquifer to determine the MAGs. Drawdowns and hydrographs presented are all based on these model simulation results. In considering the effects of full MAG utilization for these three aquifers, the SCTRWPG recognizes that actual withdrawals may increase more slowly through time as local and export uses grow to full permitted or MAG levels.

##### 6.1.2.1.1.1 Trinity Aquifer

The 2026 SCTRWP includes twelve recommended WMSs with source water from the Trinity Aquifer: Groundwater Conversions, seven Fresh Groundwater Development, three Brackish Groundwater

[1] One acft is approximately 325,851 gallons.

Development, and New Braunfels Utilities (NBU) Trinity Well Field Expansion. Figure 6-3 illustrates hydrographs for representative Trinity Aquifer wells in Kendall and Bexar Counties for pumping consistent with full utilization of the MAG. Figure 6-4 illustrates maximum predicted drawdowns in the Trinity Aquifer associated with full utilization of the MAG from 2010 to 2080.

#### 6.1.2.1.1.2 Carrizo-Wilcox Aquifer

The 2026 SCTRWP includes multiple recommended WMSs with source water from the Carrizo-Wilcox Aquifer. Table 6-2 lists these WMSs in the Carrizo-Wilcox Aquifer by county. Figure 6-5 illustrates hydrographs for representative Carrizo-Wilcox Aquifer wells in Gonzales and Wilson Counties for pumping consistent with full utilization of the MAG. Figure 6-6 and Figure 6-7 illustrate predicted drawdowns in the Carrizo and Upper Wilcox Aquifers associated with full utilization of the MAG for 2010 to 2080.

**Table 6-2 Carrizo-Wilcox Water Management Strategies**

| Water Management Strategy | Source County/Counties |
|---|---|
| Nine (9) Fresh Groundwater Development | Various |
| Three (3) Brackish Groundwater Development | Various |
| ARWA Project (Phase 2) | Caldwell |
| CRWA Brackish Carrizo-Wilcox Project | Guadalupe and Wilson |
| CRWA Wells Ranch (Phase 3) | Gonzales |
| CVLGC Carrizo Project | Wilson |
| GBRA WaterSECURE | Gonzales |
| SAWS Expanded Local Carrizo Project | Bexar |
| SAWS Expanded Brackish Wilcox Project | Wilson |
| SAWS Regional Wilcox Project | Wilson |
| SSLGC Expanded Brackish Wilcox Project | Gonzales |
| SSLGC Expanded Carrizo Project | Guadalupe |

#### 6.1.2.1.1.3 Gulf Coast Aquifer System

The 2026 SCTRWP includes two recommended WMSs with source water from the Gulf Coast Aquifer System: Victoria Groundwater-Surface Water Exchange and Fresh Groundwater Development for Victoria County-Other. Figure 6-8 illustrates hydrographs for representative Gulf Coast Aquifer System wells in Goliad and Victoria Counties for pumping consistent with full utilization of the MAG. Figure 6-9, Figure 6-10, and Figure 6-11 illustrate predicted drawdowns in the Jasper, Evangeline, and Chicot Aquifers (the three main aquifer units within the Gulf Coast Aquifer System) associated with full utilization of the MAG for 2000 to 2080.

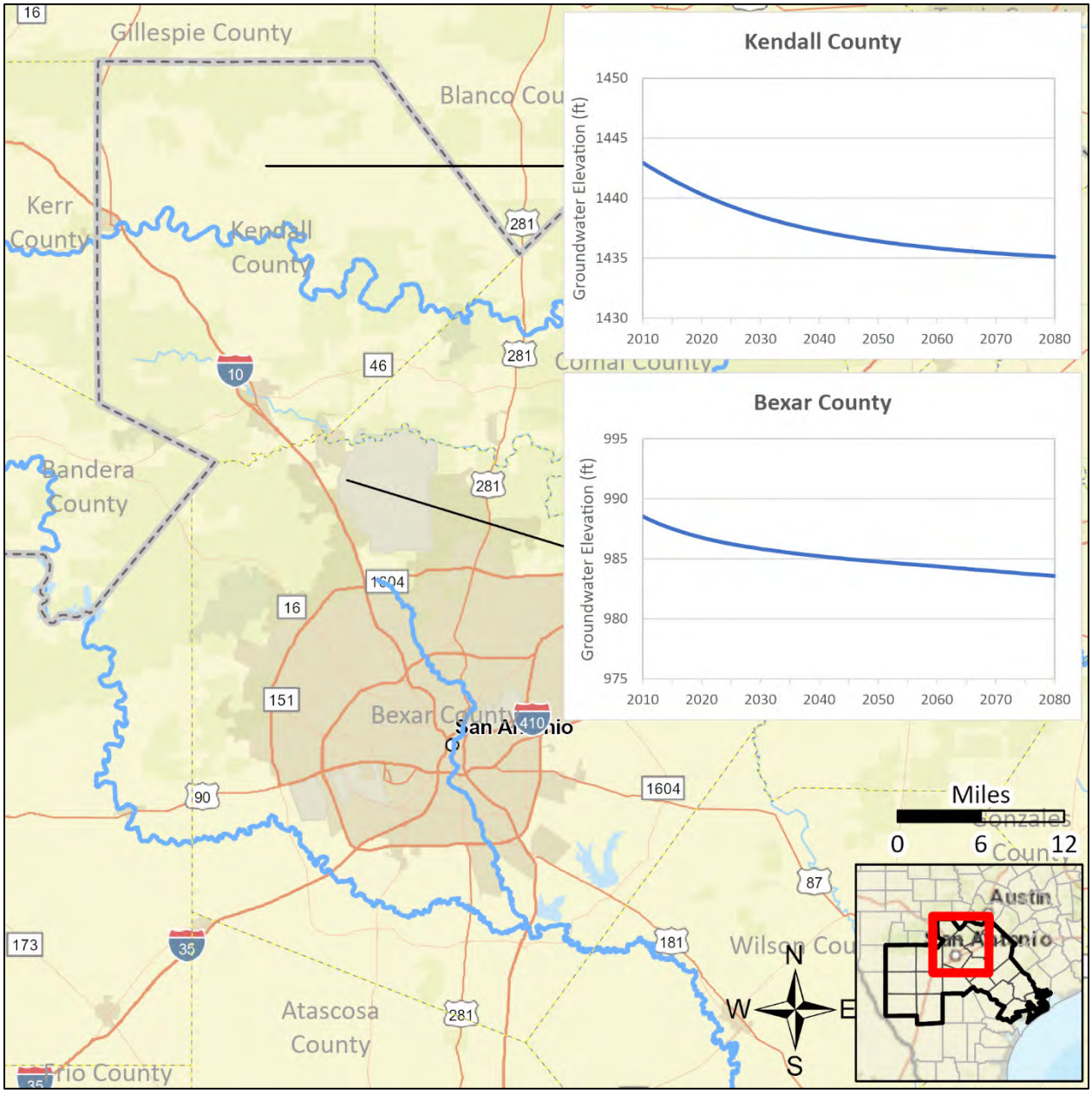



**Figure 6-3 Trinity Aquifer Well Hydrographs**

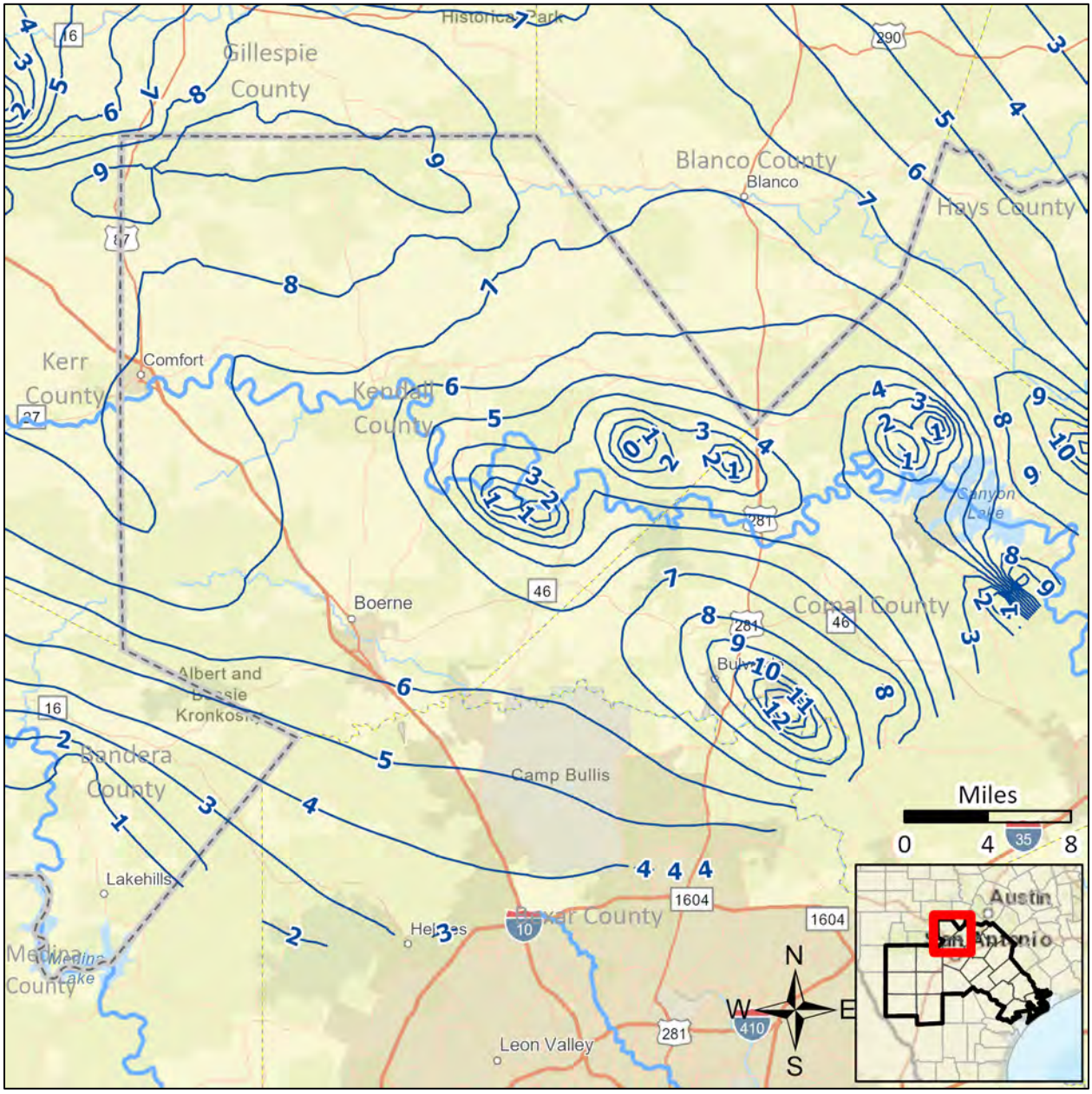



**Figure 6-4 Trinity Aquifer Drawdown (feet) from 2010 to 2060**

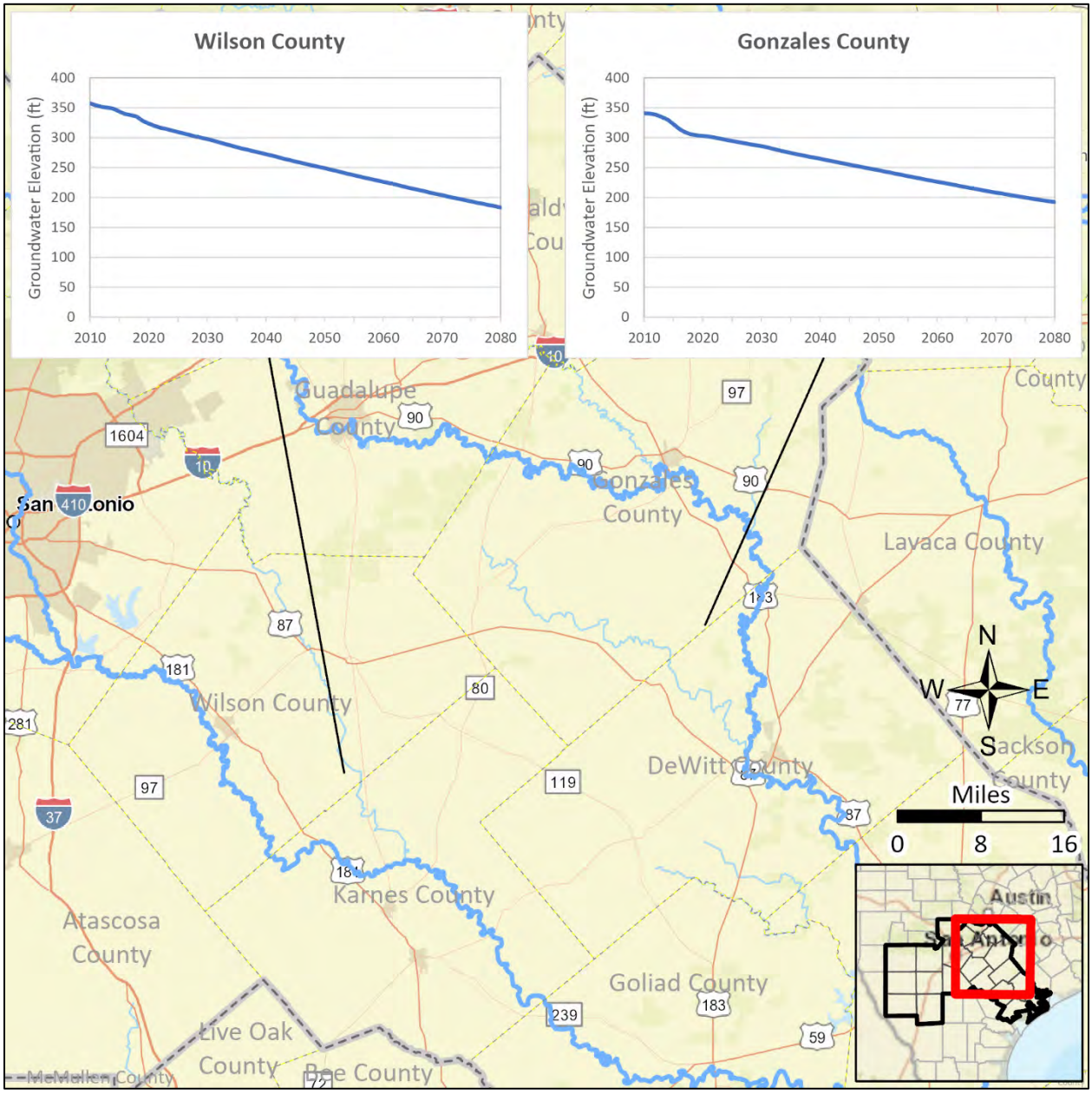



**Figure 6-5 Carrizo-Wilcox Aquifer Well Hydrographs**

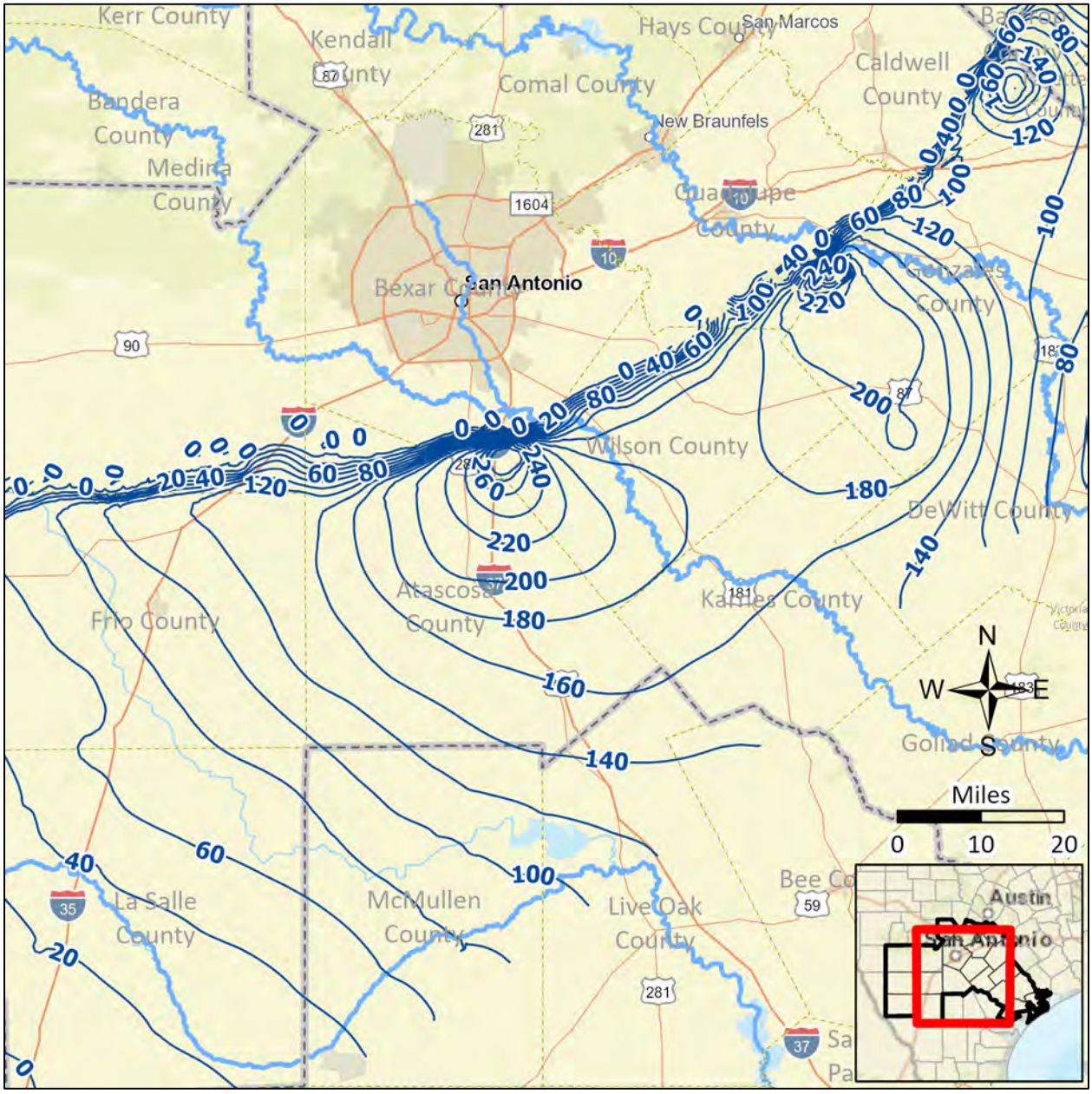



**Figure 6-6 Carrizo Aquifer Drawdown (feet) from 2010 to 2080**

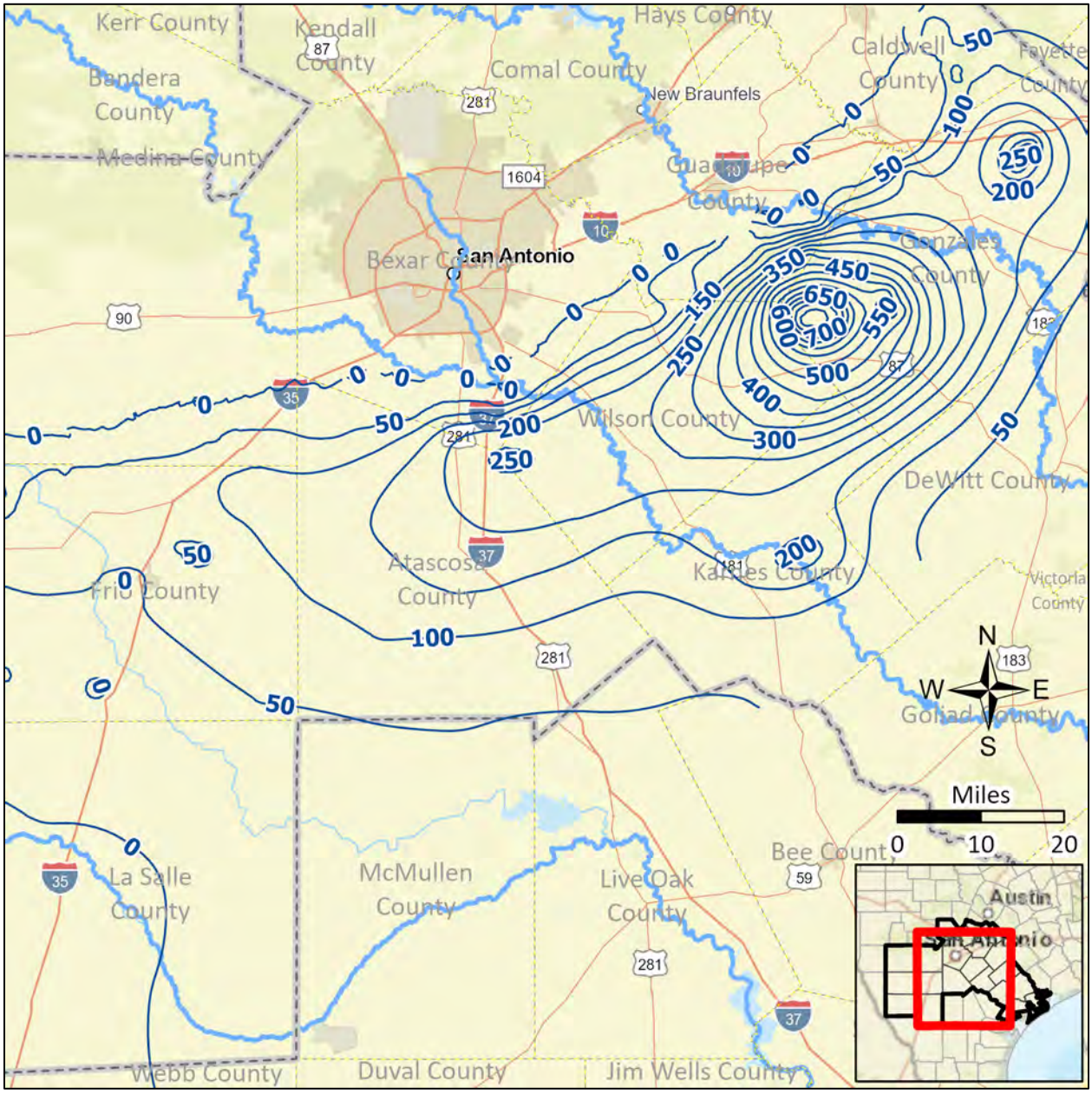



**Figure 6-7 Upper Wilcox Aquifer Drawdown (feet) from 2010 to 2080**

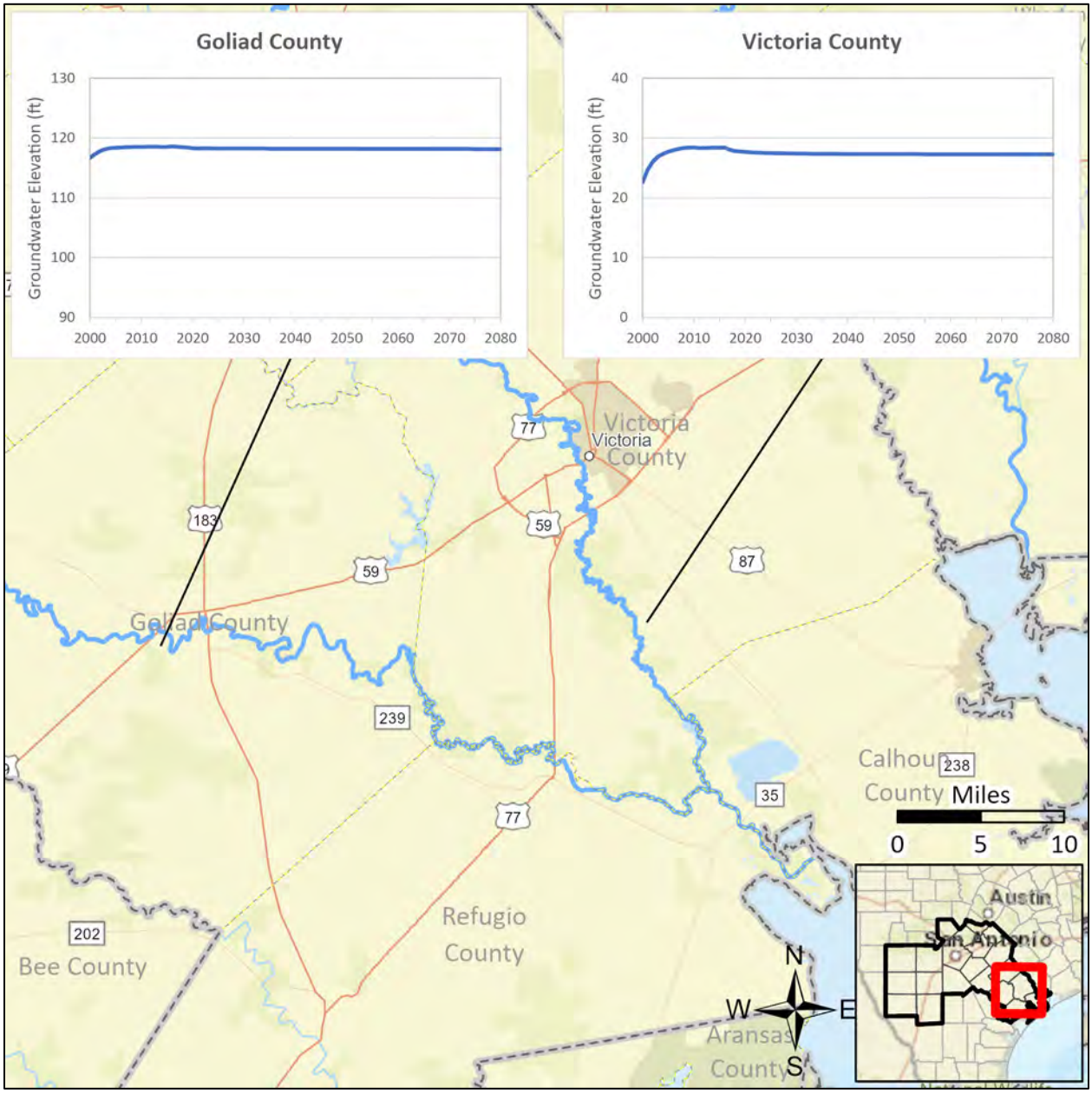



**Figure 6-8 Gulf Coast Aquifer Well Hydrographs from 2000 to 2080**

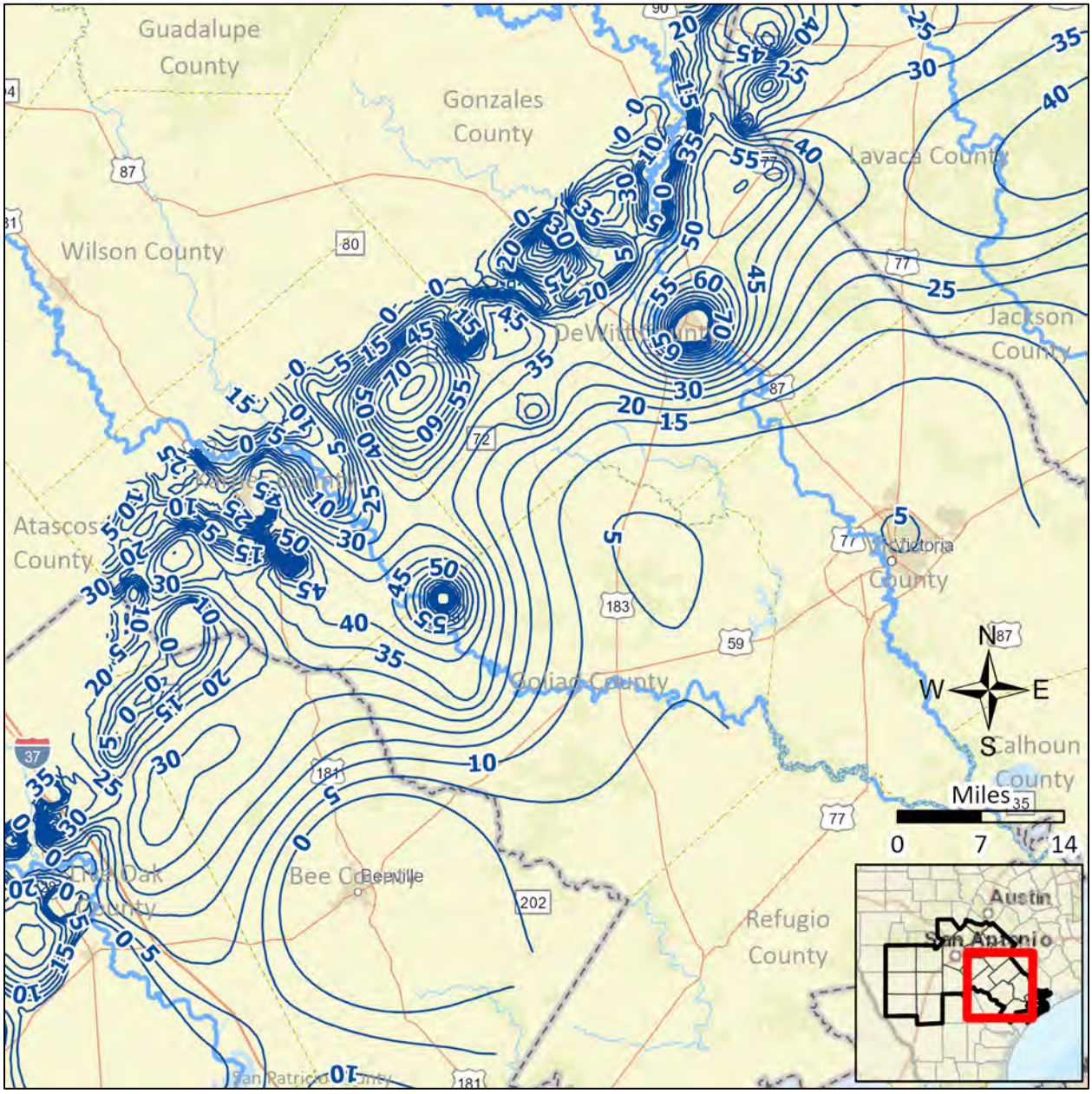



**Figure 6-9 Jasper Aquifer Drawdown (feet) from 2000 to 2080**

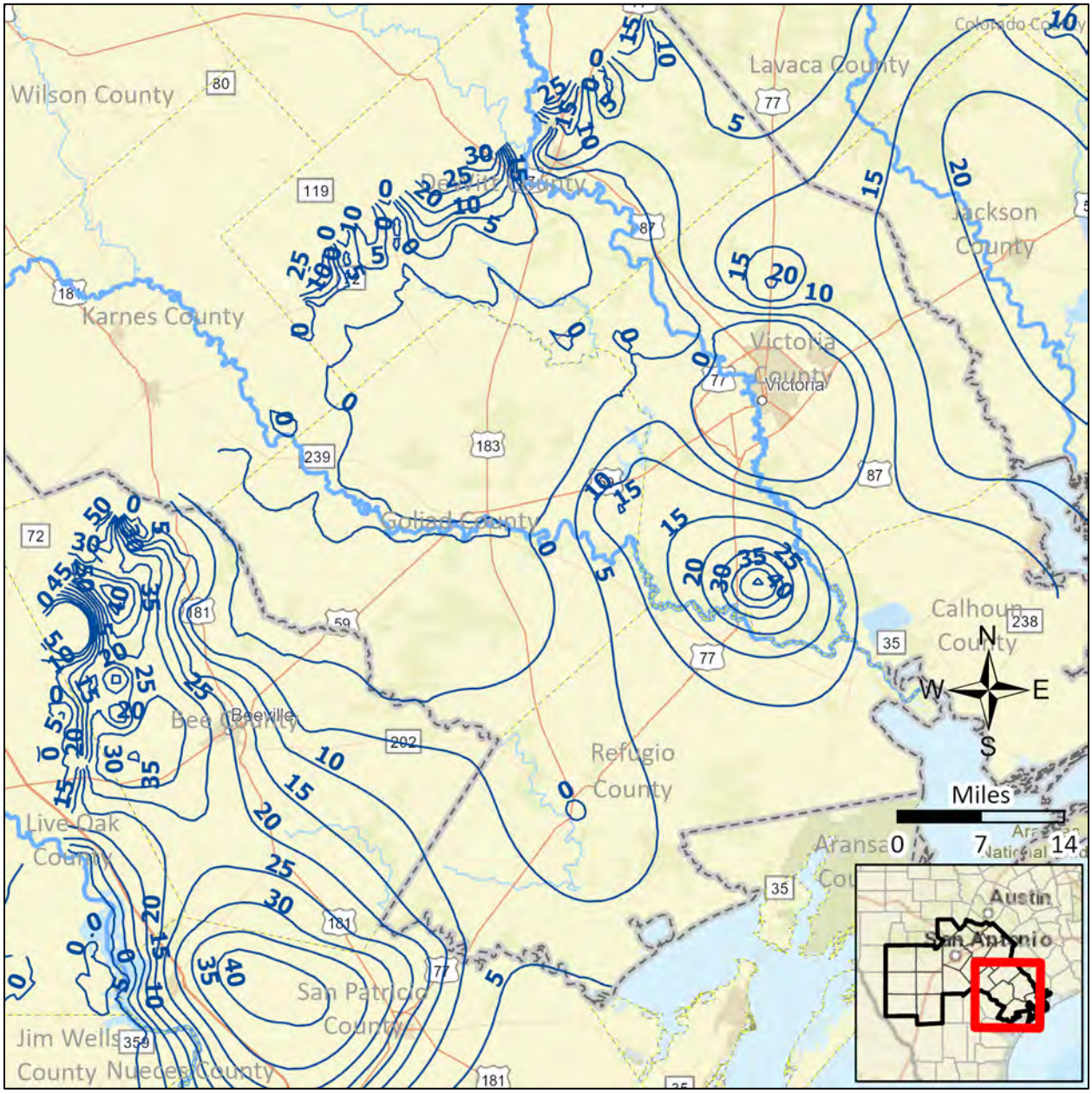



**Figure 6-10 Evangeline Aquifer Drawdown (feet) from 2000 to 2080**

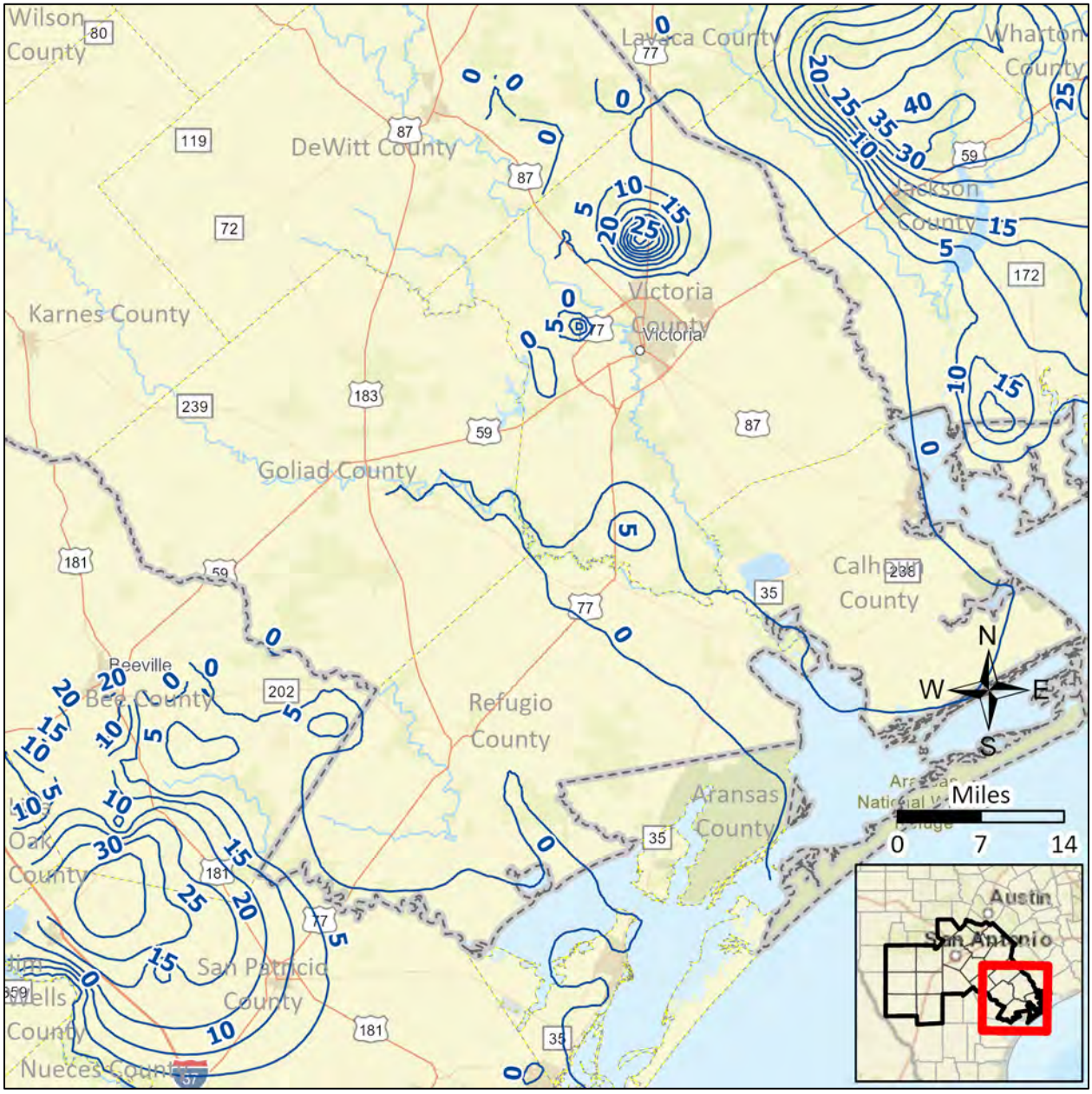



**Figure 6-11 Chicot Aquifer Drawdown (feet) from 2000 to 2080**

#### 6.1.2.1.2 Effects of Aquifer Pumpage on Streamflow

In the 2026 SCTRWP, increases in groundwater pumpage are expected to outpace long-term recharge rates, which inevitably lead to aquifer-wide drawdowns. In many ways, GCDs have accounted and planned for this through the setting of DFCs, which translate to the MAG values used in developing the 2026 SCTRWP. With declining groundwater levels, surface water-groundwater interactions (or fluxes) change over time. For example, if an aquifer currently contributes flux (or base flow) to a stream where the aquifer outcrops and long-term groundwater production associated with a recommended WMS results in regional drawdown and reduced flux contribution to the stream, then streamflows will be reduced. These streamflow reductions would be expected to occur gradually over time and manifest at diffuse locations within the stream segment traversing the aquifer outcrop.

Groundwater Availability Models (GAMs) consistent with the MAG pumpage for the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers were used to extract the effects of long-term MAG pumpage on surface water-groundwater fluxes and estimate maximum expected streamflow changes, measured in cubic feet per second (cfs). Table 6-3 summarizes the maximum predicted effects of MAG levels of pumpage, consistent with recommended WMSs in the 2026 SCTRWP, on long-term surface water-groundwater fluxes and streamflow during the planning period. Negative values indicate water is flowing FROM the aquifer TO the stream (i.e., a gaining stream). Positive values indicate water is flowing TO the aquifer FROM the stream (i.e., a losing stream). Streamflow Change is the difference between the Baseline Flux and the Flux with full implementation of the 2026 SCTRWP. These streamflow reductions associated with MAG levels of pumpage have been included in the Guadalupe-San Antonio Water Availability Model for simulation of associated effects on instream flows at selected locations and freshwater inflows to the Guadalupe Estuary. Streamflow reductions shown in Table 6-3 may be mitigated somewhat by the positive effects of recommended ASR projects by GBRA (Carrizo Aquifer, San Marcos River), New Braunfels (Trinity Aquifer, Guadalupe River), and Victoria (Gulf Coast Aquifer, Guadalupe River).

**Table 6-3 Cumulative Effects Analysis of Surface Water-Groundwater Flux Changes (cfs)**

| Aquifer | Watershed | Baseline Flux | Flux with Plan | Streamflow Change |
|---|---|---|---|---|
| Trinity | Cibolo Creek | -5.1 | -4.4 | -0.7 |
| Trinity | Guadalupe River | -17.1 | -16.6 | -0.5 |
| Trinity | Blanco River | 14.5 | 14.9 | -0.4 |
| Carrizo-Wilcox | San Antonio River | 21.3 | 22.6 | -1.3 |
| Carrizo-Wilcox | Cibolo Creek | 4.1 | 5.5 | -1.4 |
| Carrizo-Wilcox | Guadalupe River | 11.1 | 20 | -8.9 |
| Carrizo-Wilcox | San Marcos River | 3.4 | 11.8 | -8.4 |
| Gulf Coast | San Antonio River | -24.5 | -24.5 | 0.0 |
| Gulf Coast | Guadalupe River | 2.2 | 2.3 | -0.1 |

### 6.1.2.2 Effects of Water Management Strategies on Instream Flows and Freshwater Inflows to Bays and Estuaries

Potential cumulative effects of implementing the 2026 SCTRWP on instream flows and freshwater inflows to bays and estuaries have been assessed for seven locations in the Guadalupe-San Antonio River Basin, as shown on Figure 6-12. Cumulative effects for stream and estuary locations in the Nueces River Basin have not been assessed, as there are no recommended WMSs in the 2026 SCTRWP expected to significantly affect flows in the Nueces River Basin or freshwater inflows to the Nueces Estuary




| |
|---|
| 1. Guadalupe River above Comal River @ New Braunfels |
| 2. San Marcos River @ Luling |
| 3. Guadalupe River @ Victoria |
| 4. San Antonio River near Falls City |
| 5. San Antonio River @ Goliad |
| 6. Guadalupe River @ Saltwater Barrier near Tivoli |
| 7. Guadalupe Estuary |

**Figure 6-12 Flow Assessment Locations**

The cumulative effects of implementation of the 2026 SCTRWP at selected locations in the Guadalupe – San Antonio River Basin are summarized on Figure 6-13 through Figure 6-28 and are further described in subsequent sections. The "Baseline (Year 2080)" bars and flow curves for the Guadalupe-San Antonio basin include full implementation of the EAHCP, effects of surface water-groundwater flux changes

shown in Table 6-3, full utilization of existing water rights, and no return flows from treated wastewater effluent discharges. The "With Regional Water Plan (Year 2080)" bars and flow curves are representative of the simulated cumulative effects of the 2026 SCTRWP on flows, with inclusion of all recommended WMSs. The "Environmental Flow Standard" flow curve shows the applicable environmental flow standards, in accordance with TAC §298.30.

#### 6.1.2.2.1 Guadalupe River Above Comal River at New Braunfels

Streamflows in the Guadalupe River above the Comal River at New Braunfels (Figure 6-13 and Figure 6-14) are not expected to change significantly during the planning period. The figure shows that the streamflows with and without the implementation of WMS are at or above the environmental flow standards.

Since there is no established environmental flow standard at the Guadalupe River above Comal River at New Braunfels, a pulse flow translation calculation was used to shift the environmental flow requirements upstream using the established regime at the Guadalupe River at Gonzales. The environmental flows on Figure 6-14 are shown for informational purposes only.

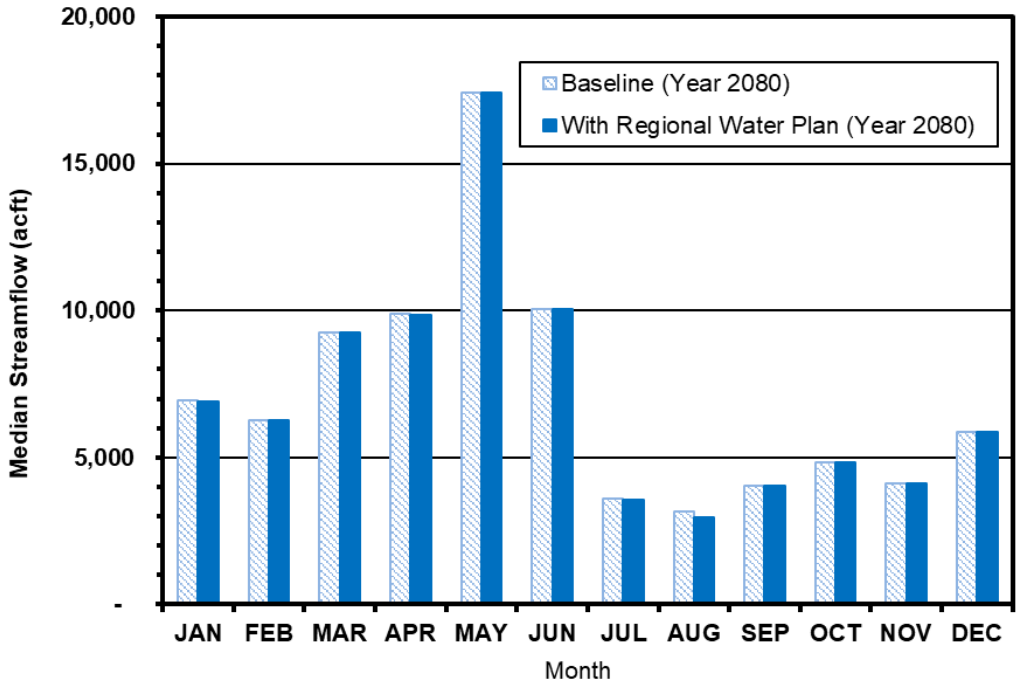



**Figure 6-13 Monthly Median Streamflows for the Guadalupe River Above Comal River at New Braunfels**

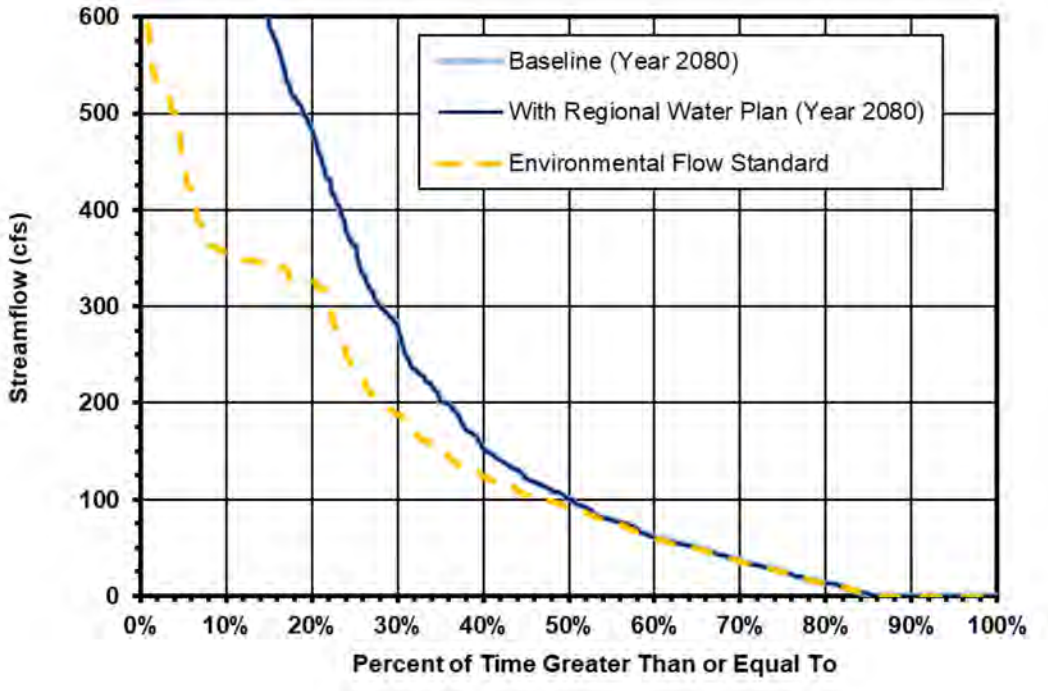



**Figure 6-14 Flow Curves for the Guadalupe River Above Comal River at New Braunfels**

#### 6.1.2.2.2 San Marcos River at Luling

For the San Marcos River at Luling (Figure 6-15 and Figure 6-16), streamflows are expected to show little to no change with implementation of the 2026 SCTRWP. The environmental flows on Figure 6-16 are shown for informational purposes only.

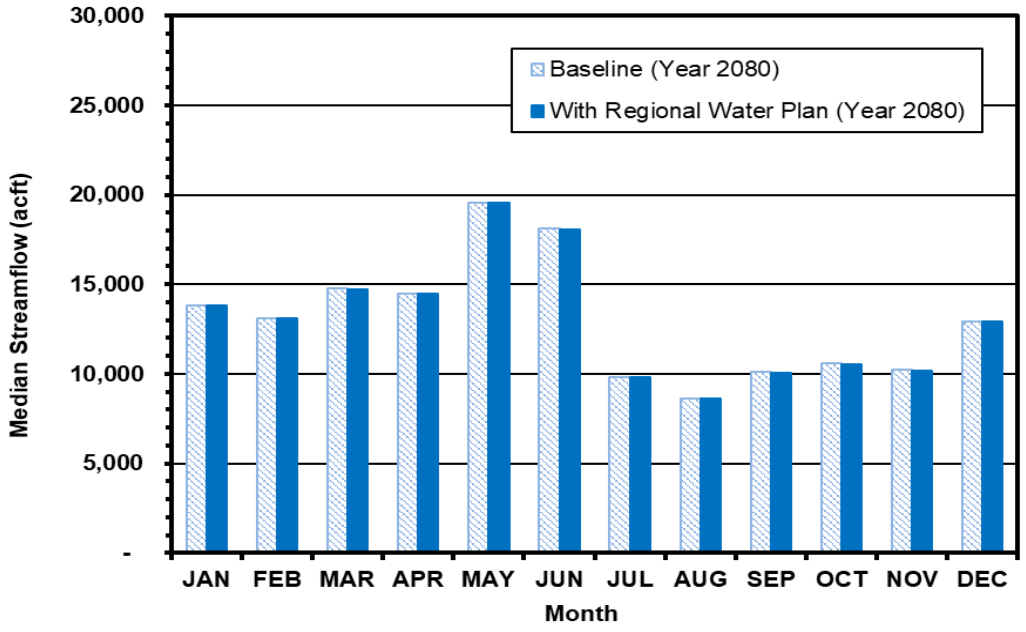



**Figure 6-15 Monthly Median Streamflows for the San Marcos River at Luling**

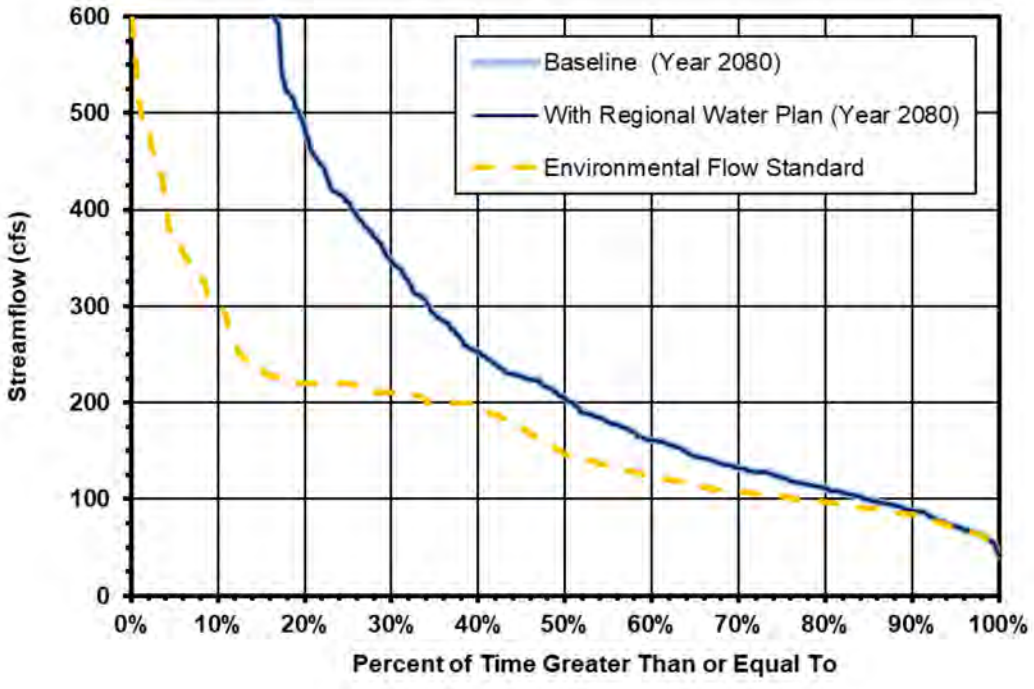



**Figure 6-16 Flow Curves for the San Marcos River at Luling**

#### 6.1.2.2.3 Guadalupe River at Victoria

Guadalupe River at Victoria (Figure 6-17 and Figure 6-18) streamflows with full implementation of the 2026 SCTRWP in 2080 are expected to be similar or slightly lower compared to the Baseline (Year 2080). The small variations may be due to decreases in surface water-groundwater flux associated with several groundwater strategies in the Trinity and Carrizo-Wilcox Aquifers. Note that the GBRA Mid Basin water right, Permit 12378, is included in the Baseline simulation and the Plan simulation as a component of the WaterSECURE WMS. Differences in modeling Permit 12378 as a stand-alone right in the Baseline versus as a component of the Recommended WMS may also contribute to differences in streamflow. Streamflows in the lower portion of the flow regime remain largely unchanged with implementation of the 2026 SCTRWP. The environmental flows on Figure 6-18 are shown for informational purposes only.

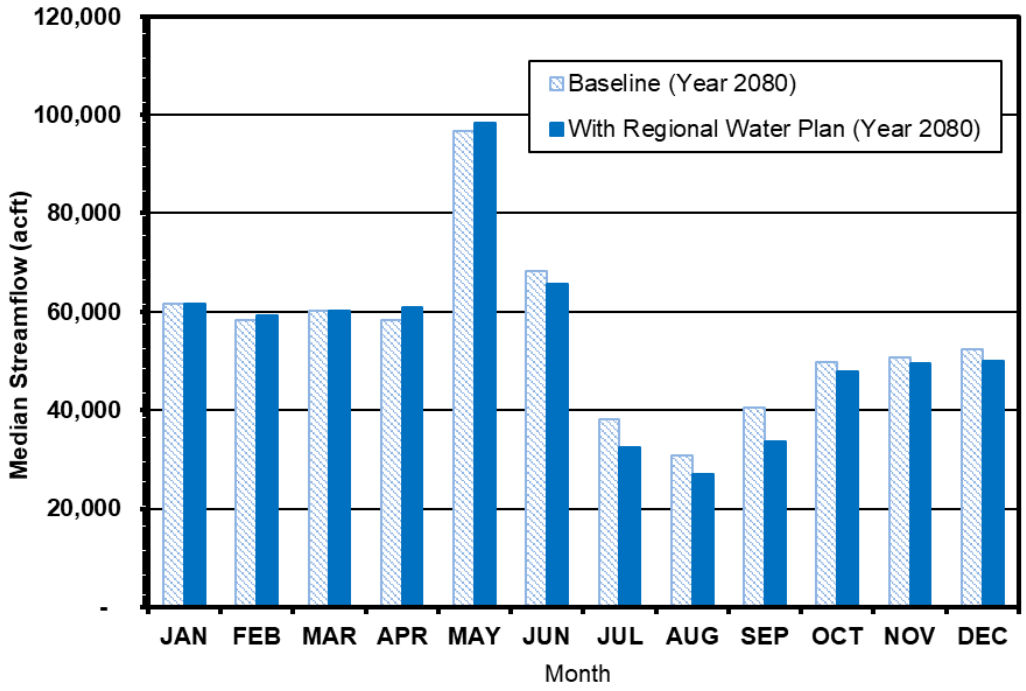



**Figure 6-17 Monthly Median Streamflows for the Guadalupe River at Victoria**

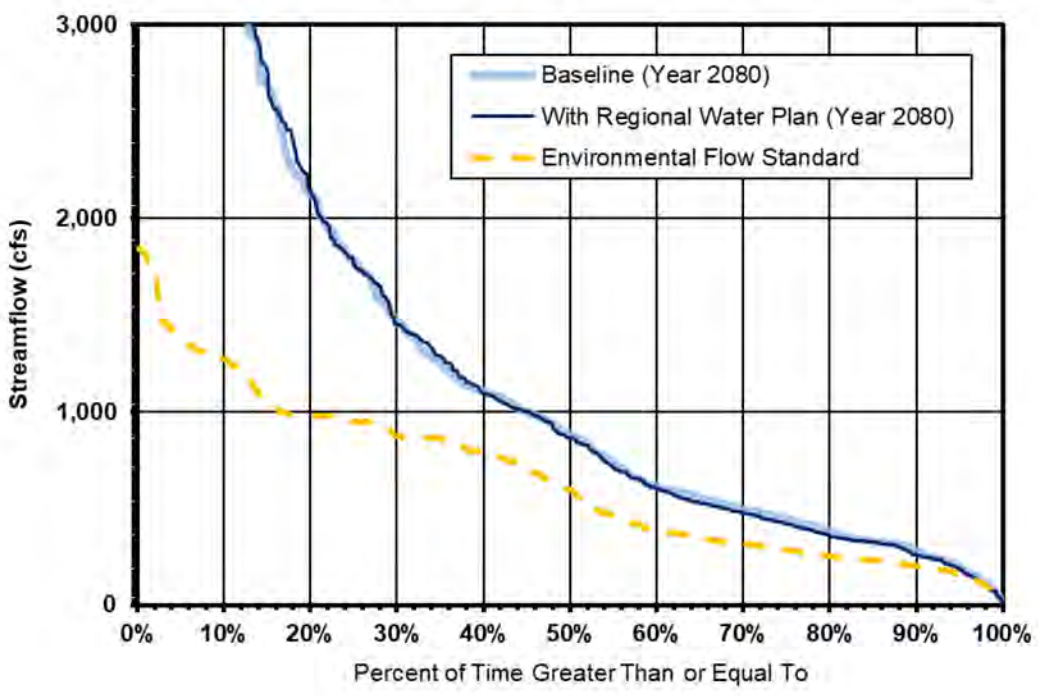



**Figure 6-18 Flow Curves for the Guadalupe River at Victoria**

#### 6.1.2.2.4 San Antonio River Near Falls City

Comparisons indicate that streamflows with full implementation of the 2026 SCTRWP in 2080 at the San Antonio River at Falls City (Figure 6-19 and Figure 6-20) are expected to remain generally unchanged for the highest 80 percent (%) of streamflows and will slightly decrease during low flow periods. The environmental flows on Figure 6-20 are shown for informational purposes only.

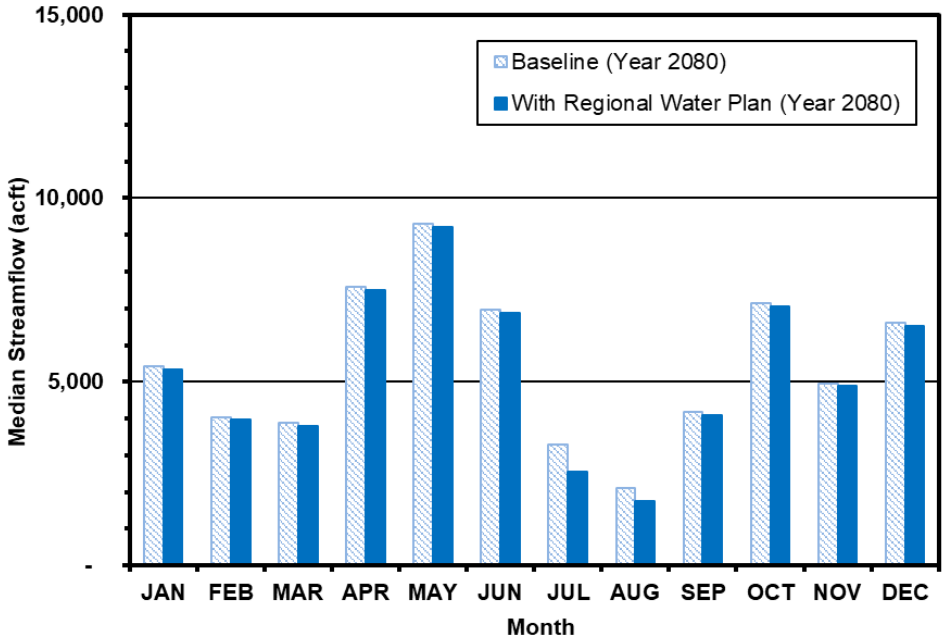



**Figure 6-19 Monthly Median Streamflows for the San Antonio River Near Falls City**

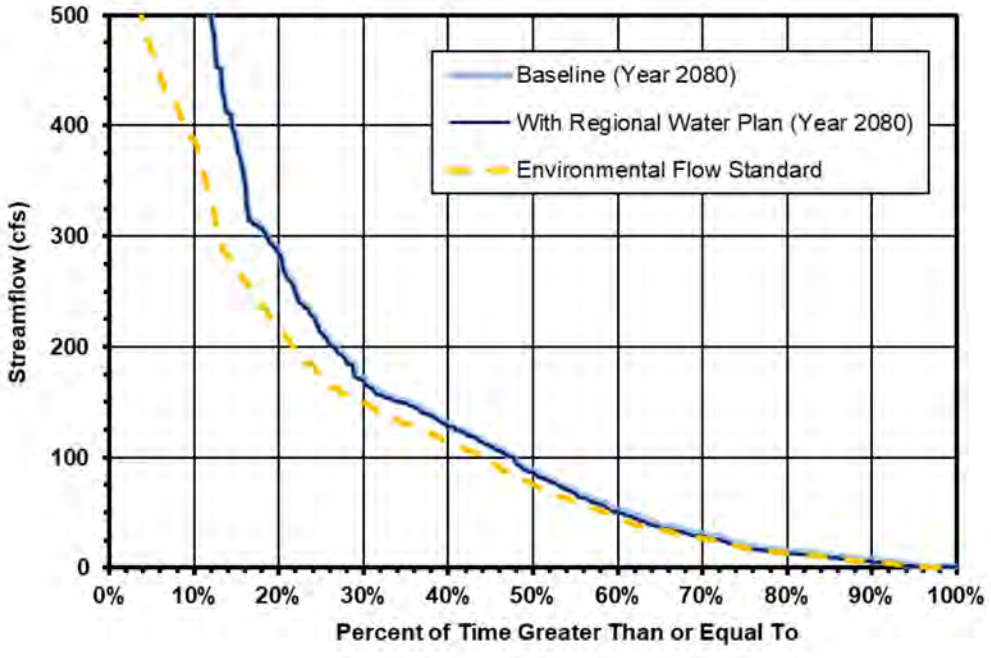



**Figure 6-20 Flow Curves for the San Antonio River Near Falls City**

#### 6.1.2.2.5 San Antonio River at Goliad

Comparisons indicate that streamflows with full implementation of the 2026 SCTRWP in 2080 at the San Antonio River at Goliad (Figure 6-21 and Figure 6-22) are expected to remain generally unchanged for the highest 80% of streamflows and will slightly decrease during low flow periods.

WMSs affecting flows in the San Antonio River at Goliad include the CRWA Siesta Project. The decreases may also be due to anticipated decreases in the surface water-groundwater flux associated with several groundwater strategies in the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers. The environmental flows on Figure 6-22 are shown for informational purposes only.

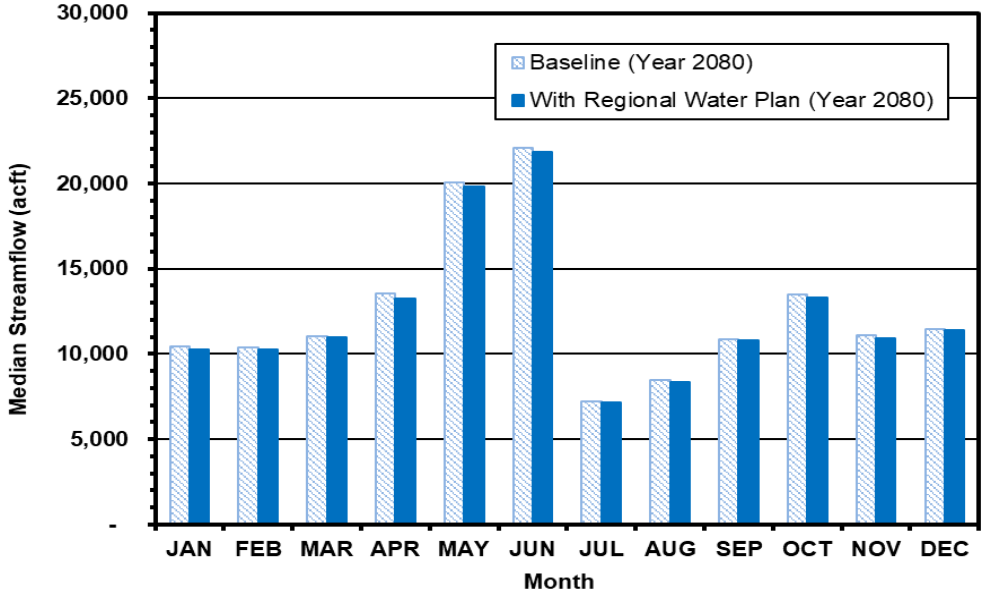



**Figure 6-21 Monthly Median Streamflows for the San Antonio River at Goliad**

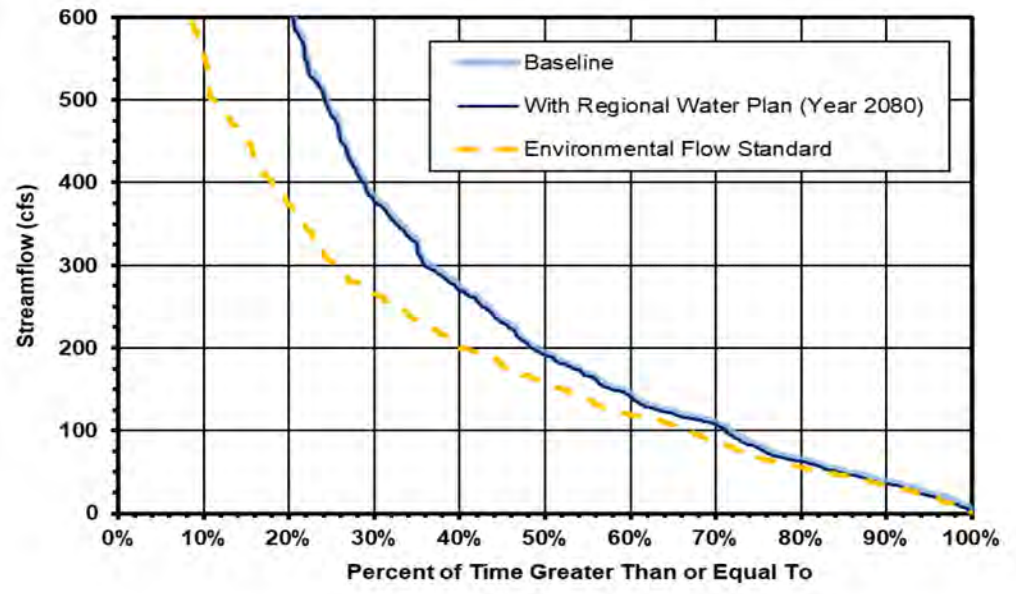



**Figure 6-22 Flow Curves for the San Antonio River at Goliad**

#### 6.1.2.2.6 Guadalupe River at the Saltwater Barrier Near Tivoli

Streamflows/inflows for the Guadalupe River at the GBRA Diversion Dam and Saltwater Barrier near Tivoli (Figure 6-23 and Figure 6-24) generally decrease with full implementation of all recommended WMSs in the 2026 SCTRWP. There are no environmental flow standards shown on Figure 6-24 because no environmental flow standards are established for the control point near Tivoli, and there are no environmental flow standards downstream of Tivoli that could be used to translate the flow requirements upstream.

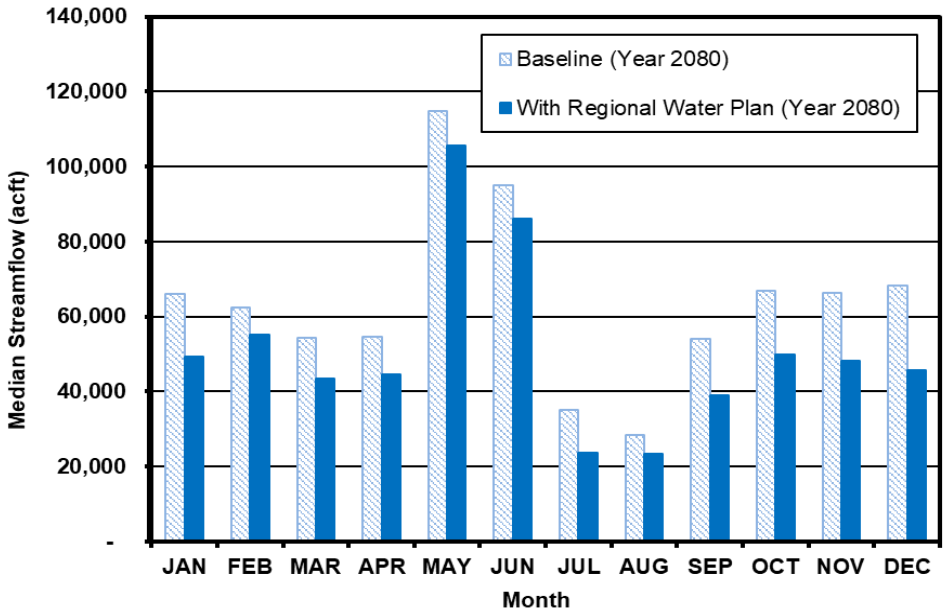



**Figure 6-23 Monthly Median Streamflows for the Guadalupe River at Diversion Dam and Saltwater Barrier Near Tivoli**

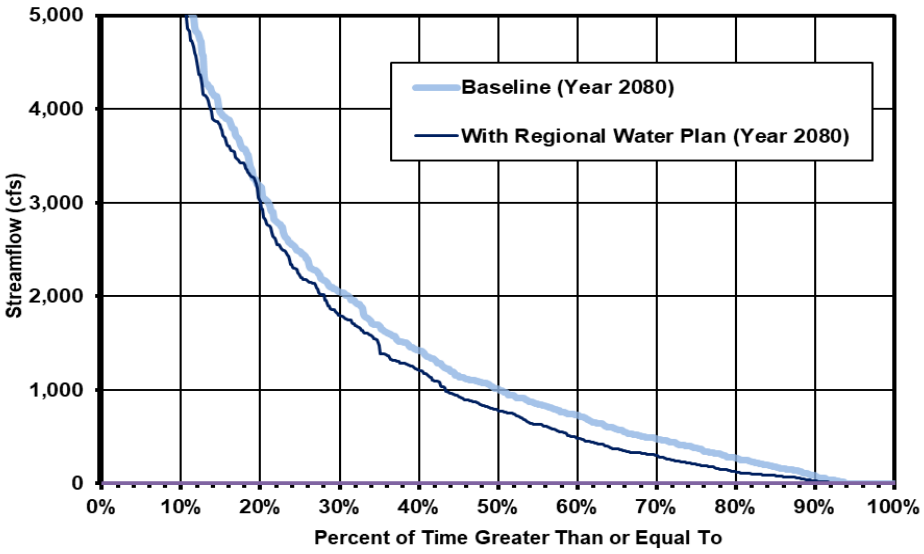



**Figure 6-24 Flow Curves for the Guadalupe River at Diversion Dam and Saltwater Barrier Near Tivoli**

#### 6.1.2.2.7 Guadalupe Estuary

Streamflows/inflows for the Guadalupe Estuary (Figure 6-25 and Figure 6-26) generally decrease with full implementation of all recommended WMSs in the 2026 SCTRWP. The Guadalupe Estuary (San Antonio Bay and Estuary System) seasonal freshwater inflow standards for the spring and summer seasons are plotted on Figure 6-27 and Figure 6-28, respectively. Summaries of the anticipated modeled permitting frequency changes for the various inflow regimes are shown in Table 6-4 and Table 6-5 for the spring and summer seasons, respectively. The modeled permitting frequencies for the inflow flow regimes are all within the ranges specified in 30 TAC §298.380(a). Figure 6-27 and Figure 6-28 are shown for informational purposes only.

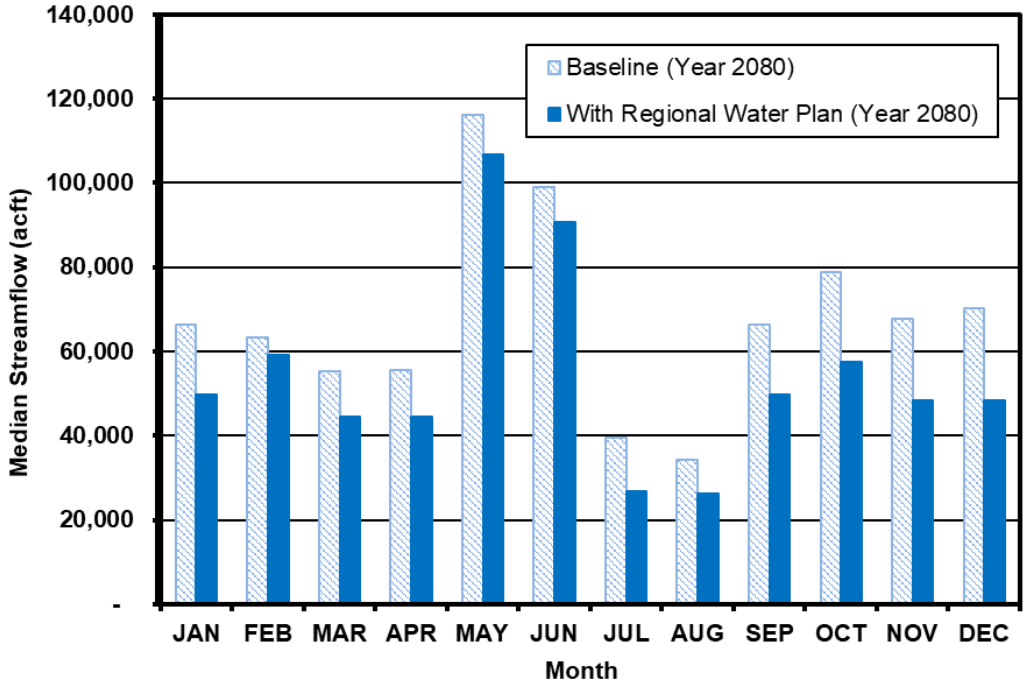



**Figure 6-25 Monthly Median Streamflows for the Guadalupe Estuary**

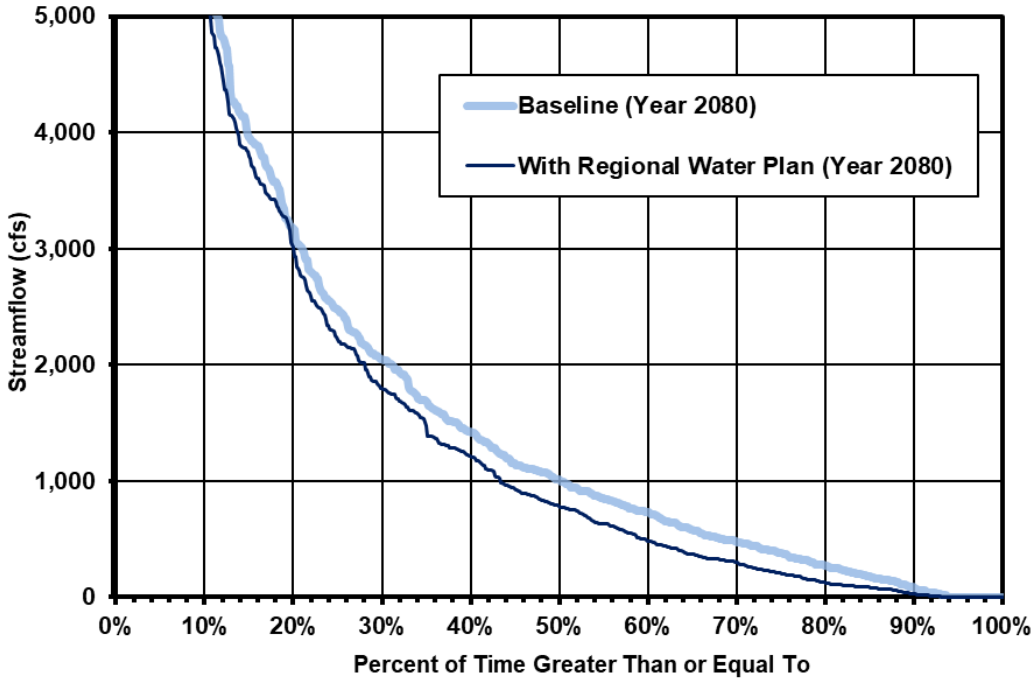



**Figure 6-26 Flow Curves for the Guadalupe Estuary**

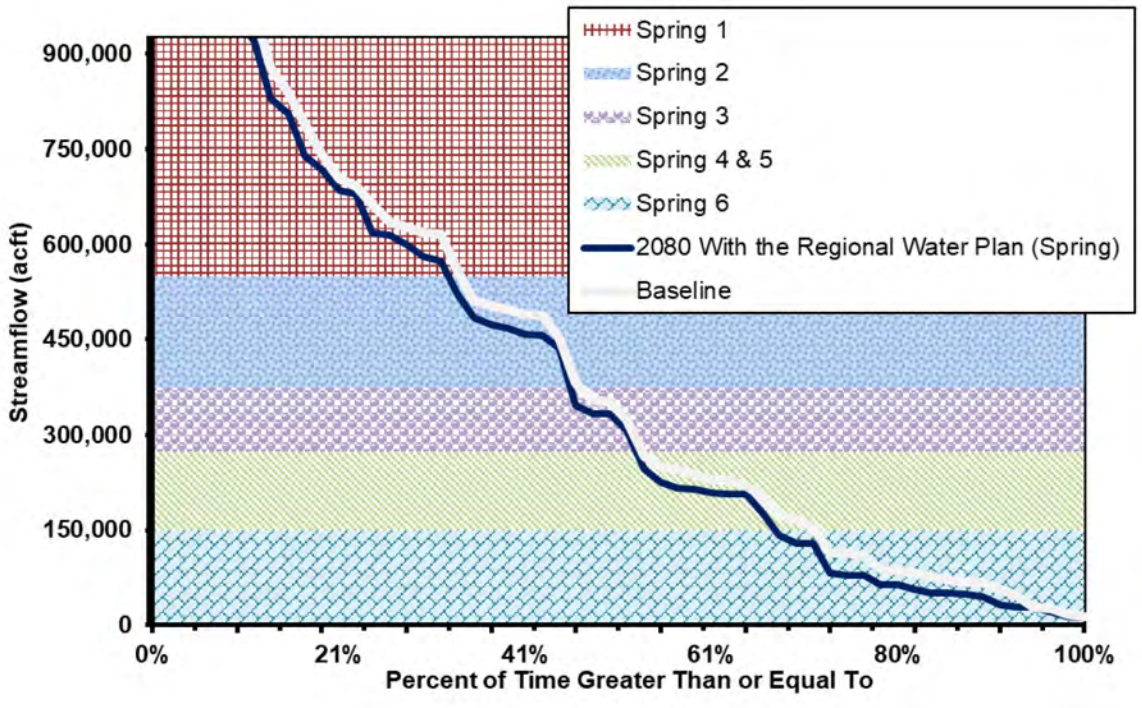



**Figure 6-27 Spring Season Flow Curves for the Guadalupe Estuary**

**Table 6-4 Guadalupe Estuary – Spring Season Environmental Flow Standard Permitting Frequencies**

| Inflow Regime | Modeled Permitting Frequency Change | Guadalupe Bay System Freshwater Inflow Standard for Spring |
|---|---|---|
| Spring 1 | Δ = -0.2% | shall not be decreased by more than 5% |
| Spring 2 | Δ = 0.3% | shall not be decreased by more than 5% |
| Spring 2 and 3 | Δ = 0.7% | shall not be decreased by more than 5% |
| Spring 4 and 5 | 52.5% of total years with Plan | shall not be increased to more than 67% of the total years |
| Spring 6 | Δ = 4.2% | shall not be increased by more than 8% |

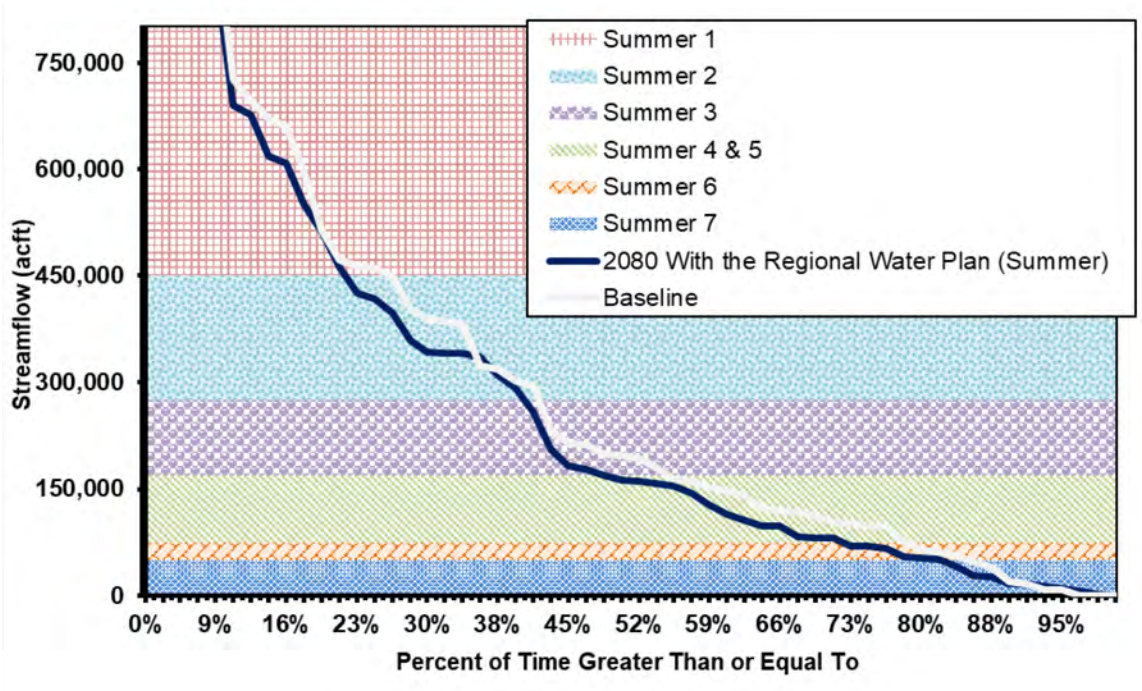



**Figure 6-28 Summer Season Flow Curves for the Guadalupe Estuary**

**Table 6-5 Guadalupe Estuary - Summer Season Environmental Flow Standard Permitting Frequencies**

| Inflow Regime | Modeled Permitting Frequency Change | Guadalupe Bay System Freshwater Inflow Standard for Summer |
|---|---|---|
| Summer 1 | Δ = -4.1 | shall not be decreased by more than 5% |
| Summer 2 | Δ = 3.1% | shall not be decreased by more than 5% |
| Summer 1 and 2 | Δ = -1.0% | shall not be decreased by more than 5% |
| Summer 4 and 5 | 0.0% | shall not be increased to more than 10% |
| Summer 7 | Δ = 2.9% | shall not be increased by more than 8% |

#### 6.1.2.3 Effects of Water Management Strategies on Stream Segments Designated as Having Unique Ecological Value

As recommended by the SCTRWPG in the 2011, 2016, and 2021 SCTRWPs, the legislature designated five Region L river and stream segments in 2015 as having unique ecological value (Figure 6-29), as follows:

1. The Nueces River from the northern boundary of Region L (downstream) to United States Geological Survey (USGS) gauge #08190000 (at Laguna);
2. The Frio River from the northern boundary of Region L (downstream) to USGS gauge #08195000 (at Concan);
3. The Sabinal River from the northern boundary of Region L (downstream) to its intersection with State Highway 187 (located approximately 2.7 miles upstream of USGS gauge #08198000 near Sabinal);
4. The San Marcos River extending from a point 0.4 miles upstream from its intersection with State Highway Loop 82 (in San Marcos) to its intersection with Interstate Highway 35; and
5. The Comal River from its intersection with East Klingemann Street in New Braunfels to its confluence with the Guadalupe River.

Implementation of the 2026 SCTRWP is not expected to have an effect on the Nueces, Frio, and Sabinal River segments designated as having unique ecological value, as no WMSs are recommended within or upstream of these segments. As shown on Figure 6-2, implementation of the 2026 SCTRWP, including full implementation of the EAHCP, is expected to increase long-term average spring discharges, which should serve to preserve or enhance the unique ecological value of the designated Comal River and San Marcos River segments.

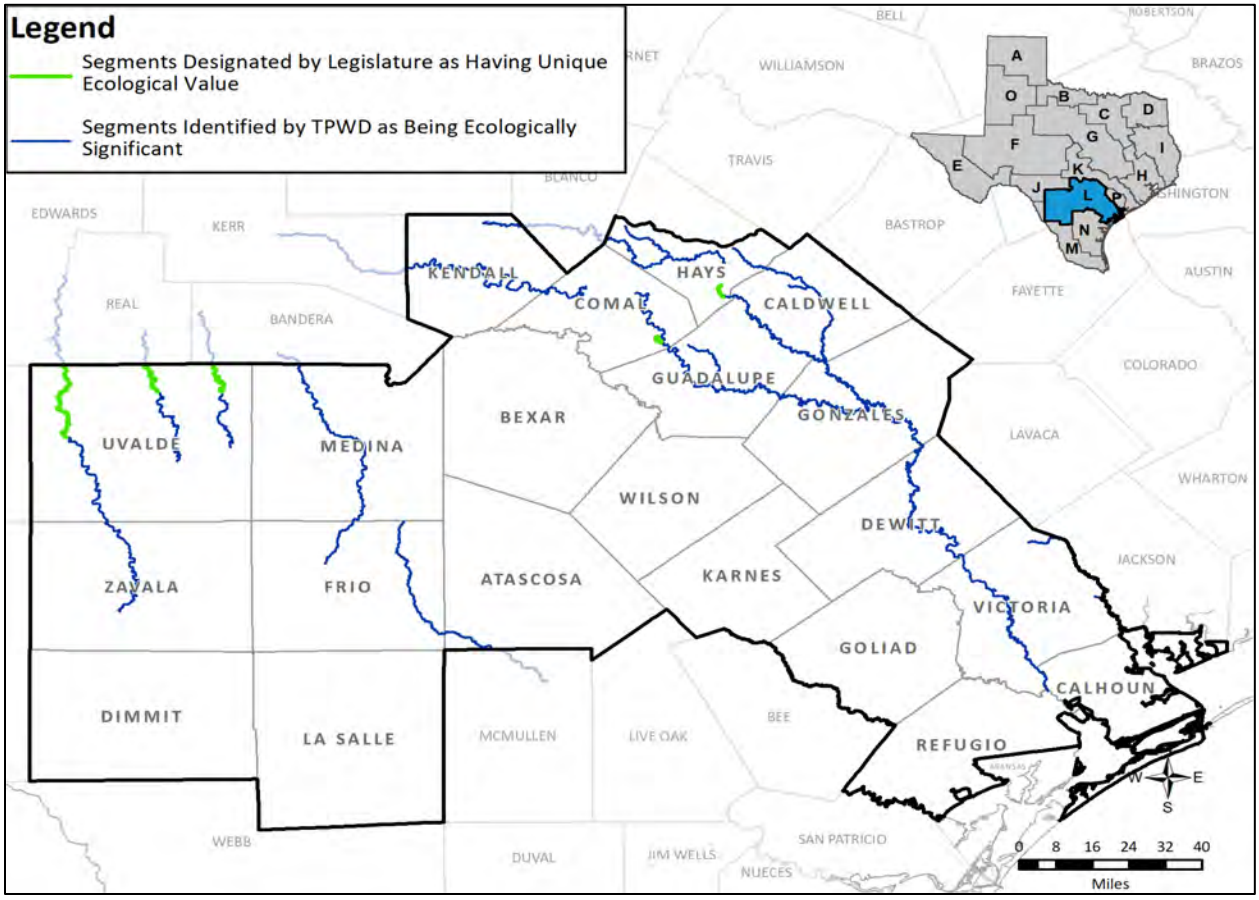



**Figure 6-29 Ecologically Significant Stream and River Segments for Region L**

### 6.1.2.4 Impacts of Water Management Strategies on Key Water Quality Parameters

In accordance with 31 TAC §357.40(b)(5), the SCTRWPG must consider the major impacts of recommended WMSs on key parameters of water quality. Furthermore, the SCTRWP must include a comparison of conditions with the recommended WMSs to current conditions using best available data (31 TAC Section 357.34(d)(8).

The SCTRWPG selected the following water quality parameters to be considered in a qualitative water quality analysis:

- Chlorides;
- Sulfates;
- Total Dissolved Solids (TDS);
- Dissolved Oxygen (DO);
- pH Range;
- Indicator Bacteria;
- Temperature; and
- Nitrates.

Potential water quality impacts considered herein are associated with source and receiving water characteristics, treatment requirements, blending compatibility, and treated effluent quality and quantity. For the purposes of this general assessment, it is assumed that wastewater treatment standards and plant performance will continue to improve over time. Other applicable assumptions are consistent with those described in Chapter 6.1 regarding cumulative effects of RWP implementation.

Table 6-6 identifies water quality parameters that are potentially affected by types of WMSs. As it is understood that any future wastewater discharges, potable water deliveries, and/or reuse water use will be in compliance with TCEQ requirements, water quality impact scores presented herein may be viewed as relative indicators of concern or risk among water quality parameters potentially affecting or affected by a project.

**Table 6-6 Impacts of Recommended Water Management Strategy Types on Key Parameters of Water Quality**

| Water Quality Parameter | Expanded Surface Water | New Reservoirs | Groundwater-Surface Water | Expanded Groundwater | ASR | Indirect Reuse | Voluntary Redistribution | Water Conservation | Direct Potable Reuse | Brush Management |
|---|---|---|---|---|---|---|---|---|---|---|
| TDS | ● | ● | ● | ● | | ● | ● | ● | | ● |
| DO | ● | ● | | ● | | ● | ● | | | ● |
| pH | ● | ● | ● | ● | | ● | ● | | | |
| Bacteria | ● | ● | | ● | | ● | ● | | | |
| Temperature | ● | ● | ● | ● | | ● | ● | | | ● |
| Nitrates | ● | ● | | ● | | ● | ● | ● | | |

Individual WMSs are expected to have minor, if any, impacts on water quality. However, cumulative impacts of multiple strategies, combined with external factors such as extreme weather conditions could result in effects on aquatic species and habitats. For example, many fish and freshwater mussel species are sensitive to changes in DO, temperature, salinity, and ammonia nitrogen. All of these parameters may be exacerbated in low flow and drought conditions. Rare and protected species tend to be the most sensitive to water quality impacts.

The SCTRWPG has addressed the potential effects of 2026 SCTRWP implementation on recreation and aquatic life through application of the environmental flow standards adopted by the TCEQ in the technical evaluation of surface WMSs involving new appropriations. The cumulative effects analyses (Chapter 6.1) and environmental assessment (Chapter 6.2) also provide information relevant to potential effects of plan implementation on recreation and aquatic life.

These strategies could potentially impact domestic water use and agricultural water use: Drought Management, Fresh Groundwater Development, Brackish Groundwater Development, Groundwater Conversions, Edwards Transfers, Reuse Water, ARWA Carrizo-Wilcox Project (Phase 2), ARWA DPR Project (Phase 3), CRWA Expanded Brackish Carrizo-Wilcox Project, CRWA Siesta Project, CRWA Wells Ranch (Phase 3) Project, CVLGC Carrizo Project, GBRA Lower Basin New Appropriation, GBRA WaterSECURE, Medina County Regional ASR Project, NBU Trinity Well Field Expansion, SAWS Expanded Local Carrizo Project, SAWS Expanded Brackish Groundwater Project, SAWS Regional Wilcox Project, SSLGC Expanded Brackish Wilcox Project, SSLGC Expanded Carrizo Project, Victoria Groundwater-Surface

Water Exchange, and Weather Modification. Some strategies may provide benefits to domestic use, such as Municipal Water Conservation, Rainwater Harvesting, and Weather Modification. Strategies such as Non-Municipal Water Conservation, Rainwater Harvesting, and Weather Modification may benefit agricultural water use.

### 6.1.3 Agricultural Resources

Agricultural resources may be impacted by the 2026 SCTRWP through the conversion of agricultural land uses to well fields, water treatment facilities, pipelines, or other appurtenant structures. Additionally, the redistribution of water from rural and agricultural areas would reduce the amount of water available for irrigation and livestock purposes.

#### 6.1.3.1 Impacts on Agricultural Resources

To evaluate potential impacts on agricultural resources, construction impacts for each of the WMSs were estimated based on the acreage of agricultural land impacted according to TPWD mapping. Table 6-7 summarizes these impacts for Recommended WMSs. WMSs with an "N/A" do not have conceptual geographic location information and a resulting agricultural acreage impact. Impacts are described for each of these WMSs in Section 5.2. Overall, construction activities for the combined WMS have the potential to affect 82,694 acres of agricultural land, including 52,685 acres of land mapped by TPWD as row crops, 13,524 acres of land mapped as tame/disturbance grassland, 26,455 acres mapped as coastal prairie and 30 acres mapped as sandyland grassland, which may include areas used for grazing and hay production.

**Table 6-7 Summary of Potential Agricultural Acreage Impacts for Water Management Strategies**

| No. | Water Management Strategy | Potential Agricultural Acreage Impacts (No. of Acres) |
|---|---|---|
| 1 | Municipal Water Conservation | N/A |
| 2 | Non-municipal Water Conservation | N/A |
| 3 | Drought Management | N/A |
| 4 | Edwards Transfers | N/A |
| 5 | Fresh Groundwater Development | N/A |
| 6 | Brackish Groundwater Development | N/A |
| 7 | Groundwater Conversions | N/A |
| 8 | Facilities Expansion | N/A |
| 9 | Reuse Water | N/A |
| 10 | Brush Management | N/A |
| 11 | Rainwater Harvesting | N/A |
| 12 | Surface Water Rights | N/A |
| 13 | Balancing Storage | N/A |

| No. | Water Management Strategy | Potential Agricultural Acreage Impacts (No. of Acres) |
|---|---|---|
| 14 | ARWA Carrizo-Wilcox Project (Phase 2) | 89 |
| 15 | ARWA DPR Project (Phase 3) | 139 |
| 16 | CRWA Expanded Brackish Carrizo-Wilcox Project | 5 |
| 17 | CRWA Siesta Project | 35 |
| 18 | CRWA Wells Ranch (Phase 3) Project | 28 |
| 19 | CVLGC Carrizo Project | 976 |
| 20 | GBRA Lower Basin New Appropriation | 29,748 |
| 21 | GBRA WaterSECURE | 36,551 |
| 22 | Medina County Regional ASR | 3,284 |
| 23 | NBU ASR | 1,714 |
| 24 | NBU Trinity Well Field Expansion | 0 |
| 25 | SAWS Expanded Local Carrizo Project | 1,270 |
| 26 | SAWS Expanded Brackish Groundwater Project | 184 |
| 27 | SAWS Regional Wilcox Project | 2,973 |
| 28 | SSLGC Expanded Brackish Wilcox Project | 21 |
| 29 | SSLGC Expanded Carrizo Project | 155 |
| 30 | Victoria ASR | 5,521 |
| 31 | Victoria Groundwater-Surface Water Exchange | 1 |
| 32 | Weather Modification | N/A |

### 6.1.3.2 Impacts of Voluntary Redistribution of Water from Rural and Agricultural Areas

The 2026 SCTRWP considered voluntary transfer or redistribution of water resources to meet projected needs. Voluntary redistribution is the acquisition of water by willing buyers from willing sellers, subject to conditions of existing groundwater management plans and rules of GCDs, in the case of groundwater supplies, and subject to existing surface water permits and water available from such permits (refer to subchapter 3.3 for descriptions of methods used in determining quantities of groundwater and surface water available to meet projected water demands in the 2026 SCTRWP). Voluntary transfers of water include the underlying principles that (1) a local area's projected needs are met before consideration is given to movement of water from rural and agricultural areas to meet projected needs at more distant locations; (2) compensation will be made to water owners for water to meet projected needs of others; and (3) an evaluation is made of the social and economic impacts of voluntary transfers of water from rural and agricultural areas.

In the development of the SCTRWP, the following principles were followed: (1) water conservation has been the first WMS recommended to meet projected needs (shortages) of water user groups (WUGs);

and (2) all other recommended WMSs including movement of water from rural and agricultural areas must be based on the voluntary transfer concept and principles. The WMSs of the 2026 SCTRWP were selected and sized in compliance with DFCs and MAG constraints so as to limit impacts upon the supplies of water projected to be needed for use in rural and agricultural areas. For the 2026 SCTRWP, the Edwards Transfers WMS was the only WMS identified that would utilize redistribution of water from rural and agricultural areas through conversions for municipal or manufacturing use.

Implementation of redistribution could result in (1) drawdown of the water table, increasing local area pump lifts in the aquifer areas from which groundwater would be obtained; and would (2) provide payments to landowners for groundwater and to holders of surface water permits for use of surface water at rates negotiated between buyer and seller. Voluntary redistribution of water from rural and agricultural areas is likely to result in reduction of areas engaged in active crop production, and/or changes in crop species and productivity. In addition, implementation of voluntary transfer or redistribution of water resources would be expected to result in construction and associated expenditures in local areas where such projects are constructed, but neither the economic benefits of such expenditures, nor the subsequent economic development that might result from such expenditures, are estimated in this plan.

### 6.1.4 Natural Resources

#### 6.1.4.1 Regional Environment

The SCTRWPA spans southern Texas from Hays and Caldwell Counties in the north to the Guadalupe Estuary on the Gulf Coast, to the headwaters of the Nueces River in Uvalde County. The region exhibits a unique biological diversity as a consequence of its location in an area of transition between major vegetational and faunal regions to the north, east, and south (respectively, the Balconian, Texan, and Tamaulipan) [2], and its position astride migration corridors important to numerous bird, bat, and insect populations. Locally, the prairie and coastal ecoregions circumscribe sets of habitats, plants, and animals distinct from those of the Central Texas Plateau and the more tropical affinities of the Southern Texas Plains. The major population centers in Region L are located along the eastern and southern margins of the Edwards Plateau, where a series of rugged, wooded canyons are traversed by clear, spring fed streams intimately associated with the cavernous limestone Edwards Aquifer that provides the present major water supply for the region.

Omernik [3] utilized criteria that included topography, climate, vegetation type, and land use characteristics to divide the United States into ecological regions, or ecoregions, that exhibit more or less distinct sets of physical habitats and species. According to updated classification based on Omernik's criteria, Region L includes parts of five Ecoregions: the Edwards Plateau, Southern Texas Plains, Texas Blackland Prairies, East Central Texas Plains, and the Western Gulf Coastal Plains [4]. Focusing specifically on Texas, and excluding explicit land use criteria, Gould [5] delineated 10 vegetational areas, which generally correspond to the portions of Omernik's Ecoregions that extend into the state. The corresponding names for the vegetational areas found in Region L are the Edwards

[2] Blair, W. Frank. 1950. *The Biotic Provinces of Texas*. Texas Journal of Science 2(1):93-117, 1950.
[3] Omernik, James M. 1987. *Ecoregions of the Conterminous United States*. Annals of the Association of American Geographers, 77(1) pp. 118-125.
[4] Griffith, G.E., Bryce, S.A., Omernik, J.M., Comstock, J.A., Rogers, A.C., Harrison, B., Hatch, S.L., and Bezanson, D. 2004. *Ecoregions of Texas* (color poster with map, descriptive text, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:2,3000,000).
[5] Gould, F.W. 1975. *The Grasses of Texas*. Texas A&M University Press, College Station, Texas.

Plateau, South Texas Plains, Blackland Prairies, Post Oak Savannah, and the Gulf Prairies and Marshes (Figure 6-30).

The Edwards Plateau vegetational area encompasses approximately 24 million acres of tall or mid-grass understory and a brushy, savanna-type overstory complex. Soils are generally shallow over limestone or caliche. Prevalent woody species include live oak (*Quercus virginiana*) and other oaks (*Q. fusiformis*, *Q. buckleyi*, *Q sinuata* var. *breviloba*), ashe junipers (*Juniperus ashei*), cedar elm (*Ulmus crassifolia*), mesquite (*Prosopis* sp.), various species of acacia (*Acacia* sp.), and sumacs (*Rhus* ssp., including the prairie flame-leaf (*Rhus copallina* var. *lanceolata*). The most important climax grasses of this area include switchgrass (*Panicum virgatum*), several species of bluestem (*Schizachyrium* and *Andropogon* spp.), gramas (*Bouteloua* spp.), Indiangrass (*Sorghastrum nutans*), Canadian wild rye (*Elymus canadensis*), buffalograss (*Buchloe dactyloides*), and curly mesquite (*Hilaria belangeri*) [6].

As a result of land management practices since European settlement, the proportion of juniper and mesquite have increased into this presumed climax of largely grassland or savannah, except on the steeper slopes, which have continually supported dense cedar-oak woodlands. Bald cypress (*Taxodium distichum*) occurs along perennial streams and rivers, while pecan (*Carya illinoinensis*), Arizona and little walnut (*Juglans major, J. microcarpa*), hackberry (*Celtis laevigata*), black and sandbar willow (*Salix nigra, S. interior*), and eastern cottonwood (*Populus deltoides*) are more widely distributed in riparian areas of both perennial and intermittent streams. Cultivated fields are generally in the relatively broad, level stream valleys where deeper alluvial soils have accumulated [7]. Upland agriculture consists primarily of livestock grazing and harvest of cedar and oak for fence posts and firewood, respectively.

The South Texas Plains vegetational area encompasses approximately 20 million acres of level to rolling topography, with elevations ranging from 1,000 ft-mean sea level (msl) to about sea level. Soil types cover a wide range, from clays to sandy loams, creating variations in soil drainage and moisture-holding capacities. Although there are large areas of cultivated land, most of the area is still used as rangeland. The South Texas Plains region originally supported a grassland or savannah climax vegetation.[8] However, extended periods of grazing and the reduction of fire have affected these plant communities and led to an increase of woody plant species within the area. Species which have increased in the area include honey mesquite (*Prosopis glandulosa*), post oak (*Q. stellata*), live oak, several acacias (*Acacia* spp.), and members of the cactus family (Cactaceae). Distinct differences in climax plant communities and successional patterns occur on the many range sites that are found in this region.

Elevations in the Blackland Prairies vegetational area range from 300 to 800 ft-msl. Uniform, dark-colored calcareous clays, which are interspersed with gray acid sandy loams, constitute the fertile blackland soils. According to Thomas, most of this region is, or has been, under cultivation, although there are some excellent native hay meadows and a few unplowed ranches remaining [9]. The characteristic vegetation of the Blackland Prairies, which includes little bluestem (*Schizachyrium scoparium*) as the climax dominant grass species of the region, is considered to be a true prairie. Big

[6] Correll, D.S., and M.C. Johnston. 1979. *Manual of Vascular Plants of Texas*. Texas Research Foundation, Renner, Texas.
[7] Ibid.
[8] Thomas, G.W, Op. Cit., 1975.
[9] Thomas, G.. 1975. *Texas Plants – An Ecological Summary*. In: F.W. Gould. 1975. Texas Plants – a Checklist and Ecological Summary. Texas Agricultural Experiment Station, MP-585/Rev., College Station, Texas.

bluestem (*Andropogon gerardi*), Indiangrass, switchgrass, sideoats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), tall dropseed (*Sporobolus asper*), silver bluestem (*Bothriochloa saccharoides*), and Texas wintergrass (*Nasella leucotricha*) are other important grasses found in the region [10]. If heavy grazing is allowed, Texas wintergrass, buffalograss, Texas grama (*Bouteloua rigidiseta*), smutgrass (*Sporobolus indicus*), and many annuals may increase or invade the prairies, causing deterioration of the native communities [11]. Other locally invasive species include mesquite in the southern portion of the Blackland Prairies, and post oak and blackjack oak in areas that include medium to light-textured soils. Grasses that have been used to seed improved pastures within the Blackland Prairies include dallisgrass (*Paspalum dilatatum*), common and coastal bermudagrass (*Cynodon dactylon*), and some native species.

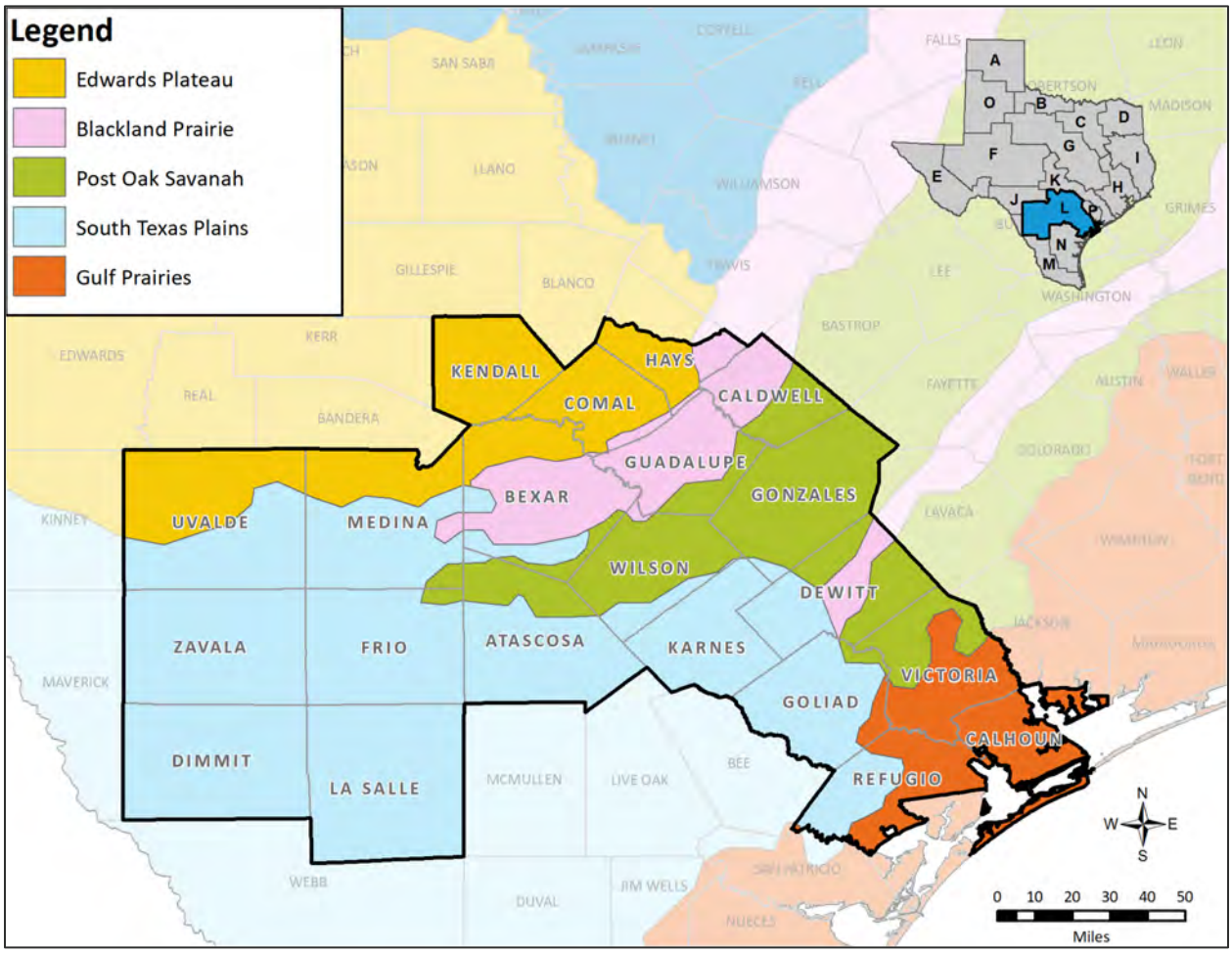



**Figure 6-30 Gould's Vegetational Areas within Region L**

The Post Oak Savannah vegetational area, which covers approximately 8.5 million acres, consists of gently rolling or hilly country, with elevations ranging from 300 to 800 ft-msl. Upland soils of the region include light-colored acid sandy loams or sands. Bottomland soils contain light brown to dark gray acidic soils, with textures which range from sandy loams to clays. This area is characterized by pasturelands which include frequent stands of woodland and occasional areas of cropland. The dominant species of

[10] Correll, D.S., and M.C. Johnston, Op. Cit., 1979.
[11] Ibid.

the Post Oak Savannah is post oak, which occurs in open stands with a ground cover of grasses [12]. Other associated species include blackjack oak (*Quercus marilandica*), black hickory (*Carya texana*), cedar elm (*Ulmus crassifolia*), and eastern redcedar (*Juniperus virginiana*). This vegetation type is considered to be either a part of the Eastern Deciduous Forest association or as part of the Prairie association [13, 14, 15, 16]. During the last few decades, many areas of open savannah have been converted into dense woodland stands of post oak and winged elm (*Ulmus alata*). This has occurred as a result of overgrazing, abandonment from cultivation, and removal of fire. Grazing is the major land use of both upland and bottomland sites within this vegetation type. Large acreages of both upland and bottomland forests have been cleared for grazing and most of these are in tame pasture.

The Gulf Prairies and Marshes vegetational area of Texas consists of about 9,500,000 acres. This nearly level, slowly drained plain is less than 150 ft-msl in elevation and is cut by sluggish rivers, creeks, bayous, and sloughs. Habitats include coastal salt marshes, dunes, prairies, river bottoms, and freshwater ponds. Soil types include acid sands, sandy loams, and clays. The upland prairie soils tend to be heavier textured acid clays or clay loams. Much of the region is fertile farmland or pastureland. The climax vegetation of the region is mostly tall grass prairie or post oak savannah [17]. Principal grasses are big bluestem, little bluestem, seacoast bluestem (*S. scoparium* var. *litoralis*), Indiangrass, eastern gamma grass (*Tripsacum dactyloides*), Texas wintergrass, switchgrass, and gulf cordgrass (*Spartina* spp.). Seashore saltgrass (*Distichlis spicata*) occurs on moist saline sites within the area. Since the region is used heavily for ranching and agriculture, this extensive disturbance has allowed invader species, such as mesquite, huisache (*Acacia smallii*), prickly pear (*Opuntia* spp.), acacia (*Acacia* spp.), ragweed (*Ambrosia psilostachya*), broomweed (*Xanthocephalum* spp.) and others to become well established [18, 19]. Heavy grazing and/or abandoned farmland has changed the predominant grasses to species such as broomsedge (*Andropogon virginicus*), smutgrass, and threeawns (*Aristida* spp.), and introduced bermudagrass, fescue (*Festuca* spp.), and dallisgrass.

Within this area, large acreages of both upland and bottomland forests have been cleared for grazing, and much of this land is planted with domestic grasses. Major creek and river floodplains may retain more or less well-developed hardwood forests, but upland areas are generally cleared for cultivation or pasturage. However, uplands support scattered, dense, shrubby thickets of oak, huisache, and mesquite and occasional freshwater marshes in relict drainages. Principal tree and shrub species normally

[12] Ibid.
[13] Tharp, B.C. 1939. *The Vegetation of Texas.* Texas Acad. Sci., Anson Jones Press, Houston.
[14] Braun, E.L. 1950. *Deciduous Forests of Eastern North America*. Hafner Publishing Co., Inc., New York.
[15] Weaver, J.E. and F.E. Clements. 1938. *Plant Ecology*. 2nd Ed. McGraw-Hill Book Co., New York.
[16] Daubenmire, Rexford. 1978. *Plant Geography with Special Reference to North America*. Academic Press, New York.
[17] Correll, D.S., and M.C. Johnston, Op. Cit., 1979.
[18] Johnston, M.C. 1988. *The Vascular Plants of Texas, A List Updating the Manual of the Vascular Plants of Texas*. Austin, Texas..
[19] Thomas, G.W, Op. Cit., 1975.

observed in upland areas include live oak, post oak, cedar elm, hackberry, honey mesquite, huisache, and yaupon (*Ilex vomitoria*) [20, 21, 22].

In addition to the physiographic and biological diversity of Region L, it is also the location of a unique, region-wide geologic feature called the Edwards Aquifer. The Edwards Aquifer, together with the karst geology of its recharge zone and the remaining major perennial springs, constitute a unique set of habitats in which a significant concentration of isolated, endemic species has developed. The porous to cavernous limestones and dolomites making up the Edwards Aquifer are also a significant groundwater source that presently for City of San Antonio and numerous other users. The Edwards Aquifer is the only underground aquatic habitat in Texas in which vertebrate species live [23], and it supports a surprisingly diverse ecosystem. The aquifer has three parts: the drainage or catchment area (contribution zone), the recharge zone, and the reservoir zone (artesian zone). Input to the aquifer comes from rainfall over the watershed as a whole, but recharge occurs primarily in the beds of streams atop or traversing the recharge zone. The recharge zone consists of a band of fractured and cavernous limestone (karst geology) through which surface water enters the aquifer. In addition to the aquatic fauna of the aquifer, the karst limestones in the upland portions of the recharge and contributing zones also harbor a number of endemic, terrestrial cave species.

Where rivers flowing across the plateau have carved deep canyons and exposed the base of the Edwards Limestone, spring fed streams arise and flow south and eastward over the less permeable older formations to the recharge zone, at the base of which a set of large springs (e.g., Leona, San Antonio, Comal, and San Marcos Springs) emerge that support still more species of limited distribution. In addition to their importance as water supplies, the large springs and their associated rivers are also of regional economic importance as scenic and recreational destinations.

Species listed by the federal or state governments as endangered or threatened, species that are candidates for listing as endangered and threatened, and species of greatest conservation need (SGCN) as designated by the TPWD are listed in Appendix 5D and discussed in terms of the potential impacts of each WMS in Section 5.2 of the 2026 SCTRWP (Volume 2). Many of the listed endangered species are associated with the canyons, caves, and springs on the eastern and southern edges of the Edwards Plateau (Hays and Comal Counties, and northern Bexar County) and in the wetland and brackish environments of Calhoun and Refugio Counties.

Listed species tend to fall into one of two broad categories. One category includes widespread, but rare, species whose populations do not appear to be dependent on specific habitat resources that are (at this time) in limited supply (e.g., foraging, and nesting areas). These include many of the birds, such as the eagles and hawks that suffered population declines as a result of persistent pesticide toxicity, and Whooping Cranes that were decimated by market hunting. Other listed species tend to be rare because

[20] U.S. Bureau of Reclamation. 1974. *Palmetto Bend Project – Texas Final Environmental Impact Statement*. Bureau of Reclamation, U.S. Department of the Interior.
[21] Soil Conservation Service. 1978. *Soil Survey of Calhoun County, Texas*. Soil Conservation Service, Temple, Texas.
[22] Texas Department of Water Resources. 1977 (Reprinted 1978). *Land Use/Land Cover Maps of Texas*. Austin, Texas. LP-62.
[23] Edwards, R.J., Longley, G., Moss, R., Ward, J., Mathews, R., and Stewart, B. 1989. *A Classification of Texas Aquatic Communities with Special Consideration toward the Conservation of Endangered and Threatened Taxa*. Vol. 41, No. 3, The Texas Journal of Science, University of Texas at Austin, Austin, Texas.

their habitat requirements are met in only a few locations. This second category includes migratory songbirds with specific nesting requirements (e.g., Golden-cheeked Warbler) and reaches the extremes of endemism in the spring and cave species found along the edges of the Edwards Plateau in Bexar, Comal, Guadalupe, and Hays Counties.

In addition to listed threatened and endangered species, several non-native invasive aquatic species pose significant risk to ecosystems and water projects within Region L. These species include the zebra mussel (*Dreissena polymorpha*), apple snail (*Pomacea* sp.), tilapia (*Oreochromis aurea*), and sailfin catfish (*Pterygoplichthys disjunctivus*). These non-native invasive species can consume native aquatic vegetation, compete with native species for food items, and disrupt habitat for native species.

The zebra mussel is native to Eurasia and made its way to North America around 1988, when it was first detected in Lake Saint Claire, Michigan. This species is a broadcast spawner with potential to attach itself on many surfaces in lakes and rivers, including boats, anchors, docks, and machinery. The microscopic larval stage (called veligers) is easily transported in bilge water, ballast water, live wells, and other methods of moving water overland from infested areas to other waterways [24]. Once thought to be thermally limited to cold water, the species appears to adapt quickly, and it is unclear whether there will be any limit to the southern limit of their range expansion in North America [25].

The zebra mussel is a filter feeder with propensity for reaching extremely high densities, with proven ability to clarify water of infested waterways and negatively impact native species by effectively removing plankton at the base of the food chain [26]. Zebra mussels create millions of dollars in damage per year to hydroelectric powerplants and water-processing infrastructure, with an estimated price tag of $3.1 billion from 1991-2001. Zebra mussels may also create taste and odor issues in the affected waterbody [27].

The zebra mussel was confirmed within Lake Texoma in April 2009 and has since spread south to other parts of Texas. The species was first detected in Lake Belton in 2013 and has continued its steady progression south. TPWD indicates 21 Texas lakes are classified as infested (established, reproducing populations); including Canyon Lake in Comal County [28]. TPWD currently identifies zebra mussel positive lakes (adults or larvae are detected) at nine locations, including Lakes Dunlap, McQueeney, and Placid in Guadalupe County. TPWD maintains a regularly updated webpage with map showing lakes with positive zebra mussel identifications and maps, located at https://tpwd.texas.gov/huntwild/wild/species/exotic/zebramusselmap.phtml.

[24] Churchill, C.J. and S. Baldys. 2012. *USGS zebra mussel monitoring program for North Texas— Fact sheet 2012-3077*. Prepared for U.S. Department of Interior and U.S. Geological Survey. Available online at: https://pubs.usgs.gov/fs/2012/3077/pdf/fs2012-3077.pdf. Accessed August 2020

[25] Olson, J., J.J. Robertson, T.M. Swannack, R.F. McMahon, W.H. Nowlin, and A.N. Schwalb. 2018. *Dispersal of zebra mussels, Dreissena polymorpha, downstream of an invaded reservoir*. Aquatic Invasions, 13(2): 199-209.

[26] Ibid.

[27] Churchill and Baldys. 2012.

[28] Texas Parks and Wildlife Department (TPWD). 2020 (Updated March 2025). *The zebra mussel threat*. Available online at: https://tpwd.texas.gov/huntwild/wild/species/exotic/zebramusselmap.phtml. Accessed September 2025.

A more recent invasive species in Region L, the apple snail is a large (up to 15cm), aquatic gastropod originally from Argentina. Apple snails are voracious predators of aquatic plants and may reach significant densities, thereby stripping the local ecosystem of plant life. Additionally, apple snails are known to carry rat lungworm (*Angiostongylus cantonensis*), a parasite that infects humans and other mammals [29]. Severe infections from the parasite may cause eosinophilic meningitis and scar the brain. Apple snails were first documented in Texas in 1990 and have primarily remained in the southeastern part of the state, mostly around Houston [30]. However, 105 apple snails and many egg sacs were discovered when the San Antonio River was drained along the River Walk at the end of October 2019 [31]. This may represent a significant range expansion for the species within Texas. The apple snails lay bright pink egg masses above the waterline, which is often the first indication a waterbody is infested [32].

Other aquatic invasive species of concern include tilapia (*Oreochromis aurea*) and sailfin catfish (*Pterygoplichthys disjunctivus*). These non-native invasive species can compete with native species for food items and disrupt habitat for native species.

In support of the regional water planning process, TPWD screened Texas rivers and streams for reaches or segments that support significant biological resources or functions, or whose continued flows were deemed critical to the maintenance of a downstream resource or public property. The TPWD used available studies, existing data, and in-house expertise to evaluate a segment's ecological importance based on factors related to biological or hydrologic function, presence of riparian conservation areas, high water quality or exceptional aquatic life or high aesthetic value, and threatened or endangered species or unique communities. Stream reaches identified by TPWD as Ecologically Significant River and Stream Segments in Region L are listed, along with the listing criteria employed in the identification process, in a TPWD report [33]. Table 6-8 summarizes the segments and the ecological importance identified by the TPWD. Segment locations are shown on Figure 6-29. Five of these river or stream segments were recommended by the SCTRWPG to be designated by the Texas Legislature as having unique ecological value. In 2015, the Texas Legislature designated the recommended stream segments as having unique ecological value.

[29] Ibid.
[30] Texas Invasive Species Institute (TISI). 2014. Apple snail— *Pomacea maculata.* Available online at: http://www.tsusinvasives.org/home/database/pomacea-maculata. Accessed August 2020.
[31] Patton, M.C. 2020. *Texans encouraged to report sighting of giant apple snails*. KSAT. San Antonio, Texas.
[32] Texas Invasives Database (TID). 2019. *Pomacea maculate*— Apple snail. Available online at: https://www.texasinvasives.org/animal_database/detail.php?symbol=15 Accessed August 2020.
[33] Texas Parks and Wildlife Department (TPWD). 2005. *Ecologically Significant River and Stream Segments of Region L (South Central) Regional Water Planning Area*. WRTS-2005-01.

## Table 6-8 Ecologically Significant River and Stream Segments Identified by TPWD in the South Central Texas Regional Water Planning Area

| Segment Name | Biological Function | Hydrologic Function | Riparian Conservation | Water Quality Aquatic Life/Uses | Endangered or Threatened Species or Unique Communities |
|---|---|---|---|---|---|
| Aransas River | Extensive estuarine wetland habitat | Water quality and flood attenuation performed by estuarine and freshwater wetlands. | | | Reddish egret (ST), piping plover (FT, ST), white-faced ibis (ST), and wood stork (ST) |
| Arenosa Creek | | | | Ecoregion stream | |
| Blanco River | | Edwards and Trinity Aquifers Discharge | Blanco State Park | Overall use | Blanco blind salamander (ST) |
| Carpers Creek | | | | Ecoregion stream | Diverse benthic macroinvertebrate community |
| Comal River | Significant overall habitat value | Edwards Aquifer Discharge | Landa Park | High water quality and exceptional aquatic life use | Fountain darter (FE/SE), Comal Springs riffle beetle (FE), Comal Springs dryopid beetle (FE), Peck's Cave amphipod (FE/SE), and Comal blind salamander (ST). |
| Cypress Creek | | Trinity Aquifer Discharge, Edwards Aquifer Contributing Zone | | Overall use | |
| Frio River | Texas Natural River Systems Nominee | Edwards Aquifer Recharge and Discharge | Garner State Park | Overall use, aesthetic value | Multiple spring-dependent listed species |
| Garcitas Creek | Estuarine wetlands display significant overall habitat value | | | Ecoregion stream | One of few locales where the Texas palmetto occurs naturally |
| Geronimo Creek | | | | Ecoregion stream | |
| Guadalupe River, Upper | | Edwards Aquifer Discharge | Guadalupe River State Park | Overall use, #2 scenic river in Texas | |

| Segment Name | Biological Function | Hydrologic Function | Riparian Conservation | Water Quality Aquatic Life/Uses | Endangered or Threatened Species or Unique Communities |
|---|---|---|---|---|---|
| Guadalupe River, Middle | | | | | Contains two of only four known remaining populations of the Golden orb (C, ST) |
| Guadalupe River, Lower | Freshwater and marine wetlands display significant overall habitat value | | Victoria Municipal Park, Guadalupe Delta WMA | Overall use | Whooping crane (FE, SE), unique and extensive marsh communities |
| Honey Creek | Significant overall habitat value. | Groundwater discharge and recharge. | Honey Creek State Natural Area | | Presence of several species of concern |
| Mission River | Freshwater and marine wetlands provide significant overall habitat value | Water quality and flood attenuation performed by estuarine and freshwater wetlands. | | | |
| Nueces River | Texas Natural River System nominee | Edwards Aquifer Recharge and Discharge | | Aesthetic, Top 100 Texas Natural Areas List | Multiple spring-dependent species |
| Sabinal River | Texas Natural River System nominee | Edwards Aquifer Recharge and Discharge | | Aesthetic | Multiple spring-dependent species |
| San Marcos River, Upper | Significant overall habitat value. | Edwards Aquifer Discharge | Multiple University and City parks, San Marcos River State Scientific Area | Overall use | Fountain darter (FE/SE), Texas blind salamander (FE/SE), San Marcos salamander (FT/ST), Texas wild rice (FE/SE) and Comal Springs riffle beetle (FE). |
| San Marcos River, Lower | | | Palmetto State Park | | Significant due to presence of the American eel and the Golden orb (C, ST) |
| San Miguel Creek | | | | Ecoregion stream | |
| West Nueces River | | Edwards Aquifer Discharge and Recharge | | | Multiple spring-dependent species |

| Segment Name | Biological Function | Hydrologic Function | Riparian Conservation | Water Quality Aquatic Life/Uses | Endangered or Threatened Species or Unique Communities |
|---|---|---|---|---|---|
| West Verde Creek | | Edwards Aquifer Discharge and Recharge | Hill County State Natural Area | | Multiple spring-dependent species |

FE=Federally Endangered
FT=Federally Threatened
C=Federal Candidate Species
SE=State Endangered
ST=State Threatened
Source: Norris, Chad W., Daniel W. Moulton, Albert El-Hage and David Bradsby. 2005. *Ecologically Significant River & Stream Segments of Region L (South Central) Regional Water Planning Area*. Texas Parks and Wildlife Department, Austin, Texas.

### 6.1.4.2 Impacts on Environmental Factors

The environmental impacts of implementation of WMSs in the 2026 SCTRWP were evaluated for construction effects and operational effects. Construction effects are generally due to temporary or permanent disturbances of vegetation and soils, although in specific locations and circumstances, waste disposal, construction in aquatic habitats, noise, or airborne particulates may also be important factors. Operational effects may include, but is not limited to, impacts to vegetation, habitats, or endangered species through ongoing maintenance practices or changes in streamflows, water quality, or groundwater availability from ongoing project operations. The potential environmental effects of each WMS were evaluated individually, and the results are summarized in Section 5.2 of the 2026 SCTRWP (Volume 2). Individual WMSs may each result in negligible or minor construction or operational impacts, but, taken as a whole, the entire suite of WMSs may result in more substantial impacts to specific resources. The evaluation in this section focuses on the cumulative impact of all recommended WMSs included in the 2026 SCTRWP.

It should be noted that the information available for analysis of potential impacts of WMSs has changed substantially since similar analyses were performed for regional water plans prior to 2016. Earlier analyses were heavily dependent on paper maps and the transfer of information by hand to those maps. Lengths of pipelines and reservoir areas were also determined by measurements on available maps of variable scale. For the 2016 and 2026 SCTRWPs, information used to evaluate potential environmental impacts resulting from WMSs was primarily produced using Geographic Information Systems (GIS) shapefiles and recent aerial photography. This method of analysis allows for a more site-specific evaluation of the potential issues associated with a specific WMS. Much of the baseline data used to perform the analyses are readily available in GIS shapefiles, including TPWD vegetation mapping, stream and wetland data, soil map units, etc. In addition, recent aerial photography of the project areas provides an opportunity to evaluate potential habitat impacts based on the actual vegetation type that exists within the project areas rather than a large-scale evaluation of general vegetation types.

The environmental assessments of individual WMSs should be regarded as high-level preliminary reviews in the sense that neither environmental nor engineering site-specific studies have been performed to verify the published data used, finalize facility locations and operational routines, and identify locations where risks to environmental resources can be avoided or minimized and compensation for unavoidable impacts can be proposed. Most of the facilities evaluated herein have been designed and located only in a conceptual sense; the actual locations of intakes, pipeline rights-of-

way, reservoirs, and other project features will not be finally determined until site-specific field studies and land acquisition programs have been completed. As each individual WMS undergoes detailed designs and environmental permitting, many, if not most, of the potential impacts discussed in the respective WMSs evaluations can be avoided or significantly mitigated by relocation of project elements or changes in construction methods (for example, directional drilling under streams for pipeline construction). This is particularly the case with respect to facilities such as pipelines and individual well pads and less so for reservoirs, for which there may be limited suitable sites.

Potential adverse terrestrial environmental and cultural resources impacts are minimized in the 2026 SCTRWP by the recommendation of strategies that maximize the efficient use of existing surface water resources, or which develop groundwater supplies, including brackish groundwater. These WMSs avoid the extensive habitat conversions and streamflow changes that can accompany comparable new surface water development. The estimated new firm water supplies provided by the WMSs recommended in the 2026 SCTRWP are included in the impact summary tables (Table 6-9 through Table 6-14).

Proposed facilities for the recommended WMSs may include facilities with relatively small footprints, such as wells or pump stations, or those with larger footprints, such as major pipelines or storage reservoirs. As previously discussed, facility construction involves both temporary and permanent impacts. However, there is typically flexibility in the siting of facilities that can avoid or minimize environmental impacts. Table 6-9 summarizes the types of potential environmental and cultural impacts associated with the various facility types.

**Table 6-9 Potential Impacts of Different Types of Project Components**

| Facility Type | Potential Temporary Impacts | Potential Permanent or Long-term Impacts |
|---|---|---|
| Well Fields | • Construction: soil disturbance, noise, dust<br>• Disturbance of buried archaeological sites | • Well pad clearing<br>• Groundwater drawdown |
| Pump Stations; Water Treatment Plants | • Construction: soil disturbance, noise, dust<br>• Disturbance of buried archaeological sites | • Conversion of native vegetation or agricultural areas to industrial land use<br>• Treated water outfalls: water quality changes |
| Pipelines | • Construction: soil disturbance, noise, dust<br>• Disturbance of buried archaeological sites<br>• Soil erosion/sedimentation of streams<br>• Trenching of stream crossings: dewatering of construction area or temporary stream diversions | • Long-term maintenance (e.g., mowing), conversion of vegetation community<br>• Introduction of non-native plant species |
| Intakes/ Outfalls | • Construction: soil disturbance, noise, dust<br>• Disturbance of buried archaeological sites<br>• Soil erosion/sedimentation of streams<br>• Dewatering of construction area | • Water quality changes<br>• Water quantity/flow changes |

| Facility Type | Potential Temporary Impacts | Potential Permanent or Long-term Impacts |
|---|---|---|
| Reservoirs | • Construction: soil disturbance, noise, dust<br>• Disturbance of buried archaeological sites<br>• Soil erosion/sedimentation of streams | • Loss of native woody or herbaceous vegetation<br>• Loss of agricultural area |

In conjunction with applicable environmental regulatory and permitting requirements, field studies conducted prior to design and easement procurement can substantially reduce the potential to adversely affect unique habitats, endangered species, historic and prehistoric sites, and other resources that are present only at specific locations. For example, where sensitive resources at stream crossings cannot be adequately protected or avoided, horizontal directional drilling can be considered as a construction option to avoid disturbance of aquatic habitats.

Five recommended strategies, the GBRA New Appropriation (Lower Basin), GBRA WaterSECURE, NBU ASR Project, Medina County ASR and Victoria ASR Project include off-channel reservoirs or ASR facilities that will be used to ensure firm supplies throughout a drought comparable to the most severe on record. This water supply storage is necessary because the existing water rights and the unappropriated water are either not physically present during low flow periods or are unavailable due to the demands of senior water rights or environmental flow needs. Protection of senior water rights and compliance with environmental flow standards effectively minimizes effects of these projects on low streamflows. Several of the recommended WMSs include transmission pipelines that traverse several ecologically distinct regions, which can increase the number of habitat types affected by the project and thereby increase the potential for adverse effects to particular species.

The WMSs that include development of large amounts of groundwater may reduce the potential environmental and cultural resources impacts compared to development of similar volumes of surface water. However, local residents of the areas that would be affected have expressed concerns about declining well levels and potential impacts to springs and streamflows. Development of a large amount of groundwater from the Carrizo-Wilcox Aquifer will result in some reductions in streamflow in both the San Antonio and Guadalupe Rivers and in inflows to the Guadalupe Estuary. Groundwater drawdowns may also affect seasonal flow in streams systems that include groundwater contributions.

The location and extent of potential disturbances to environmental and cultural resources are based on the descriptions and environmental assessments of the WMSs in Chapter 5.2 (Volume 2). Pipeline routes were produced digitally, and pipeline lengths and areas were calculated using ArcMap GIS software. A 100 foot wide construction corridor was assumed for all pipelines. Areas of reservoirs and ancillary facilities such as water treatment plants, pump stations, storage units, and wells were based on conceptual designs developed for the RWP.

For recommended WMSs, the environmental impacts assessment was completed using a matrix approach to perform a series of parallel evaluations of each WMS for its potential to impact the following resource categories:

- Endangered and Threatened Species;
- Vegetation and Land Use;
- Water Quality and Aquatic Habitats; and

- Cultural Resources.

The impacts assessment approach is described for each resource category in the following sections.

#### 6.1.4.2.1 Endangered and Threatened Species

The potential impacts of the individual WMSs were first evaluated with respect to state- or federally listed endangered and threatened species, federal candidate species, and state species of concern using a two-part index system.

First, each WMS was evaluated with respect to its potential impact on the species present by assigning a numerical value from 0 to 2 according to the relative size of project habitat impacts:

- 0 - No or negligible habitat impacts;
- 1 - Minimal habitat impacts; or
- 2 - Moderate or greater potential habitat impacts.

Second, the number of federal- or state-listed, or proposed listed, endangered and threatened species or candidate species with potential habitat impacts was tabulated for each WMS. This analysis was based on current county species lists produced by TPWD and USFWS.

The habitat and species impact assessment scores are listed, and the overall endangered and threatened species impact values for each of the State Water Plans are presented in Table 6-10.

As was observed in the 2016 and 2021 SCTRWP analyses, higher species impact scores are associated with projects requiring long pipelines and multi-county projects, as well as projects that include reservoir construction.

**Table 6-10 Summary of Potential Impacts to Endangered, Threatened, and Species of Greatest Conservation Need from Water Management Strategies**

| No. | Water Management Strategy | Habitat Impact Score | Potential Species Impact Score |
|---|---|---|---|
| 1 | Municipal Water Conservation | N/A | N/A |
| 2 | Non-municipal Water Conservation | N/A | N/A |
| 3 | Drought Management | N/A | N/A |
| 4 | Edwards Transfers | N/A | N/A |
| 5 | Fresh Groundwater Development | N/A | N/A |
| 6 | Brackish Groundwater Development | N/A | N/A |
| 7 | Groundwater Conversions | N/A | N/A |
| 8 | Facilities Expansion | N/A | N/A |
| 9 | Reuse Water | N/A | N/A |
| 10 | Brush Management | N/A | N/A |
| 11 | Rainwater Harvesting | N/A | N/A |

| No. | Water Management Strategy | Habitat Impact Score | Potential Species Impact Score |
|---|---|---|---|
| 12 | Surface Water Rights | N/A | N/A |
| 13 | Balancing Storage | N/A | N/A |
| 14 | ARWA Carrizo-Wilcox Project (Phase 2) | 2 | 8 |
| 15 | ARWA DPR Project (Phase 3) | 2 | 8 |
| 16 | CRWA Expanded Brackish Carrizo-Wilcox Project | 2 | 4 |
| 17 | CRWA Siesta Project | 1 | 5 |
| 18 | CRWA Wells Ranch (Phase 3) Project | 1 | 5 |
| 19 | CVLGC Carrizo Project | 2 | 10 |
| 20 | GBRA Lower Basin New Appropriation | 2 | 13 |
| 21 | GBRA WaterSECURE | 2 | 21 |
| 22 | Medina County Regional ASR | 2 | 5 |
| 23 | NBU ASR | 1 | 2 |
| 24 | NBU Trinity Well Field Expansion | 1 | 7 |
| 25 | SAWS Expanded Local Carrizo Project | 1 | 6 |
| 26 | SAWS Expanded Brackish Groundwater Project | 1 | 6 |
| 27 | SAWS Regional Wilcox Project | 2 | 7 |
| 28 | SSLGC Expanded Brackish Wilcox Project | 1 | 9 |
| 29 | SSLGC Expanded Carrizo Project | 1 | 9 |
| 30 | Victoria ASR | 1 | 3 |
| 31 | Victoria Groundwater-Surface Water Exchange | 1 | 2 |
| 32 | Weather Modification | N/A | N/A |

#### 6.1.4.2.2 Vegetation and Land Use

To evaluate potential impacts on vegetation and wildlife habitats and land use, each of the WMSs was evaluated based on the area of each habitat type disturbed by construction activities and the level of potential impacts on those resources. The potential level, or severity, of impacts to vegetation and land use was evaluated by assigning an expected impact score:

- 0 - No or negligible vegetation impacts, or mostly affecting existing urban area;
- 1 - Low to moderate impacts = low level of permanent vegetation loss and/or vegetation conversion of pipeline corridors; or
- 2 - Moderate to high impacts = habitat is permanently removed through inundation or construction.

The impact score of each type of disturbance was then multiplied by the estimated area in acres of non-urban vegetation impacts. Adjusted impact values are summed for the habitats potentially affected by each WMS, and overall vegetation and habitat scores are shown in Table 6-11.

**Table 6-11 Summary of Potential Impacts to Vegetation and Land Use**

| No. | Water Management Strategy | Potential Habitat Impact Score |
|---|---|---|
| 1 | Municipal Water Conservation | N/A |
| 2 | Non-municipal Water Conservation | N/A |
| 3 | Drought Management | N/A |
| 4 | Edwards Transfers | N/A |
| 5 | Fresh Groundwater Development | N/A |
| 6 | Brackish Groundwater Development | N/A |
| 7 | Groundwater Conversions | N/A |
| 8 | Facilities Expansion | N/A |
| 9 | Reuse Water | N/A |
| 10 | Brush Management | N/A |
| 11 | Rainwater Harvesting | N/A |
| 12 | Surface Water Rights | N/A |
| 13 | Balancing Storage | N/A |
| 14 | ARWA Carrizo-Wilcox Project (Phase 2) | 2 |
| 15 | ARWA DPR Project (Phase 3) | 2 |
| 16 | CRWA Expanded Brackish Carrizo-Wilcox Project | 2 |
| 17 | CRWA Siesta Project | 1 |
| 18 | CRWA Wells Ranch (Phase 3) Project | 1 |
| 19 | CVLGC Carrizo Project | 2 |
| 20 | GBRA Lower Basin New Appropriation | 2 |
| 21 | GBRA WaterSECURE | 2 |
| 22 | Medina County Regional ASR | 2 |
| 23 | NBU ASR | 2 |
| 24 | NBU Trinity Well Field Expansion | 2 |
| 25 | SAWS Expanded Local Carrizo Project | 1 |
| 26 | SAWS Expanded Brackish Groundwater Project | 1 |
| 27 | SAWS Regional Wilcox Project | 2 |

| No. | Water Management Strategy | Potential Habitat Impact Score |
|---|---|---|
| 28 | SSLGC Expanded Brackish Wilcox Project | 2 |
| 29 | SSLGC Expanded Carrizo Project | 2 |
| 30 | Victoria ASR | 1 |
| 31 | Victoria Groundwater-Surface Water Exchange | 1 |
| 32 | Weather Modification | N/A |

#### 6.1.4.2.3 Water Quality and Aquatic Habitats

Potential impacts to water quality and aquatic habitats were assessed in two ways: (1) direct impacts to streams during construction of pipeline crossings and/or intake or outfall structures; and (2) potential impacts to stream flow regimes.

For construction impacts, the general level of potential project impacts, both temporary and permanent, was assigned a rating as follows:

- 0 - No stream impacts;
- 1 - Low to moderate impacts; or
- 2 - Moderate to high impacts.

This rating was multiplied by a factor representing the number of potential stream crossings and intake or outfall structures:

- 0 - No stream crossings or structures;
- 1 - From 1 to 25 potential crossings and structures;
- 2 - From 26 to 50 potential crossings and structures;
- 3 - From 51 to 75 potential crossings and structures; or
- 4 - 76 or more potential crossings and structures.

Results of the construction impacts analysis are provided in Table 6-12.

**Table 6-12 Summary of Potential Stream Construction Impacts**

| No. | Water Management Strategy | Potential Stream Construction Impact Score |
|---|---|---|
| 1 | Municipal Water Conservation | N/A |
| 2 | Non-municipal Water Conservation | N/A |
| 3 | Drought Management | N/A |
| 4 | Edwards Transfers | N/A |
| 5 | Fresh Groundwater Development | N/A |
| 6 | Brackish Groundwater Development | N/A |

| No. | Water Management Strategy | Potential Stream Construction Impact Score |
|---|---|---|
| 7 | Groundwater Conversions | N/A |
| 8 | Facilities Expansion | N/A |
| 9 | Reuse Water | N/A |
| 10 | Brush Management | N/A |
| 11 | Rainwater Harvesting | N/A |
| 12 | Surface Water Rights | N/A |
| 13 | Balancing Storage | N/A |
| 14 | ARWA Carrizo-Wilcox Project (Phase 2) | 4 |
| 15 | ARWA DPR Project (Phase 3) | 2 |
| 16 | CRWA Expanded Brackish Carrizo-Wilcox Project | 2 |
| 17 | CRWA Siesta Project | 3 |
| 18 | CRWA Wells Ranch (Phase 3) Project | 2 |
| 19 | CVLGC Carrizo Project | 5 |
| 20 | GBRA Lower Basin New Appropriation | 3 |
| 21 | GBRA WaterSECURE | 6 |
| 22 | Medina County Regional ASR | 2 |
| 23 | NBU ASR | 1 |
| 24 | NBU Trinity Well Field Expansion | 0 |
| 25 | SAWS Expanded Local Carrizo Project | 2 |
| 26 | SAWS Expanded Brackish Groundwater Project | 2 |
| 27 | SAWS Regional Wilcox Project | 4 |
| 28 | SSLGC Expanded Brackish Wilcox Project | 4 |
| 29 | SSLGC Expanded Carrizo Project | 4 |
| 30 | Victoria ASR | 1 |
| 31 | Victoria Groundwater-Surface Water Exchange | 1 |
| 32 | Weather Modification | N/A |

For potential stream flow and water quality impacts, the general level of potential project impacts, both temporary and permanent, was assigned a rating as follows:

- 0 - No stream impacts;
- 1 - Low to moderate impacts; or

- 2 - Moderate to high impacts.

This rating was multiplied by a factor representing types of potential stream and water quality impacts, as presented in Chapter 6.1.1.3. For this factor, a point was assigned for each of the following:

- Potential streamflow reductions;
- Potential alterations to streamflow hydrograph (e.g., seasonal alterations);
- Potential changes to bay inflows; and
- Increased groundwater use in the Trinity or Carrizo-Wilcox aquifers.

Results of the stream flow and water quality impacts analysis are provided in Table 6-13.

**Table 6-13 Summary of Potential Stream Flow/Water Quality Impacts**

| No. | Water Management Strategy | Potential Stream Flow/ Water Quality Impact Score |
|---|---|---|
| 1 | Municipal Water Conservation | N/A |
| 2 | Non-municipal Water Conservation | N/A |
| 3 | Drought Management | N/A |
| 4 | Edwards Transfers | N/A |
| 5 | Fresh Groundwater Development | N/A |
| 6 | Brackish Groundwater Development | N/A |
| 7 | Groundwater Conversions | N/A |
| 8 | Facilities Expansion | N/A |
| 9 | Reuse Water | N/A |
| 10 | Brush Management | N/A |
| 11 | Rainwater Harvesting | N/A |
| 12 | Surface Water Rights | N/A |
| 13 | Balancing Storage | N/A |
| 14 | ARWA Carrizo-Wilcox Project (Phase 2) | 2 |
| 15 | ARWA DPR Project (Phase 3) | 1 |
| 16 | CRWA Expanded Brackish Carrizo-Wilcox Project | 1 |
| 17 | CRWA Siesta Project | 3 |
| 18 | CRWA Wells Ranch (Phase 3) Project | 1 |
| 19 | CVLGC Carrizo Project | 2 |
| 20 | GBRA Lower Basin New Appropriation | 5 |
| 21 | GBRA WaterSECURE | 5 |
| 22 | Medina County Regional ASR | 2 |

| No. | Water Management Strategy | Potential Stream Flow/ Water Quality Impact Score |
|---|---|---|
| 23 | NBU ASR | 1 |
| 24 | NBU Trinity Well Field Expansion | 1 |
| 25 | SAWS Expanded Local Carrizo Project | 1 |
| 26 | SAWS Expanded Brackish Groundwater Project | 1 |
| 27 | SAWS Regional Wilcox Project | 1 |
| 28 | SSLGC Expanded Brackish Wilcox Project | 2 |
| 29 | SSLGC Expanded Carrizo Project | 2 |
| 30 | Victoria ASR | 2 |
| 31 | Victoria Groundwater-Surface Water Exchange | 1 |
| 32 | Weather Modification | N/A |

#### 6.1.4.2.4 Cultural Resources

As outlined in Chapter 5.2, a cultural resources probability model was conducted for individual WMSs based on conceptual project site locations. Results of the potential cultural resources impact scores are summarized in Table 6-14. The impact scores were assigned a rating as follows:

- 0 - No or negligible impacts;
- 1 - Minimal and/or temporary impacts, mostly expansions to existing facilities; minor study and permitting requirements; or
- 2 - Moderate potential impacts, may include new transmission lines, moderate study, and permitting requirements.

The impact rating score was then multiplied by the number of proposed WMS projects to yield an overall potential impact score.

**Table 6-14 Summary of Potential Impacts to Cultural Resources from Water Management Strategies**

| No. | Water Management Strategy | Potential Cultural Resources Impact Score |
|---|---|---|
| 1 | Municipal Water Conservation | N/A |
| 2 | Non-municipal Water Conservation | N/A |
| 3 | Drought Management | N/A |
| 4 | Edwards Transfers | N/A |
| 5 | Fresh Groundwater Development | N/A |
| 6 | Brackish Groundwater Development | N/A |
| 7 | Groundwater Conversions | N/A |

| No. | Water Management Strategy | Potential Cultural Resources Impact Score |
|---|---|---|
| 8 | Facilities Expansion | N/A |
| 9 | Reuse Water | N/A |
| 10 | Brush Management | N/A |
| 11 | Rainwater Harvesting | N/A |
| 12 | Surface Water Rights | N/A |
| 13 | Balancing Storage | N/A |
| 14 | ARWA Carrizo-Wilcox Project (Phase 2) | 72 |
| 15 | ARWA DPR Project (Phase 3) | 103 |
| 16 | CRWA Expanded Brackish Carrizo-Wilcox Project | 31 |
| 17 | CRWA Siesta Project | 95 |
| 18 | CRWA Wells Ranch (Phase 3) Project | 57 |
| 19 | CVLGC Carrizo Project | 105 |
| 20 | GBRA Lower Basin New Appropriation | 242 |
| 21 | GBRA WaterSECURE | 1,233 |
| 22 | Medina County Regional ASR | 144 |
| 23 | NBU ASR | 132 |
| 24 | NBU Trinity Well Field Expansion | 219 |
| 25 | SAWS Expanded Local Carrizo Project | 61 |
| 26 | SAWS Expanded Brackish Groundwater Project | 174 |
| 27 | SAWS Regional Wilcox Project | 292 |
| 28 | SSLGC Expanded Brackish Wilcox Project | 59 |
| 29 | SSLGC Expanded Carrizo Project | 109 |
| 30 | Victoria ASR | 1,566 |
| 31 | Victoria Groundwater-Surface Water Exchange | 0 |
| 32 | Weather Modification | N/A |

### 6.1.5 Effects on Navigation

None of the WMSs recommended for implementation in the 2026 SCTRWP are expected to have any direct effects on navigation.

### 6.1.6 Environmental Benefits and Concerns

The SCTRWPG has identified the following potentially significant environmental benefits and concerns associated with the implementation of the 2026 SCTRWP.

#### 6.1.6.1 Environmental Benefits

- Emphasis on conservation, drought management, reuse, groundwater development, and use of existing surface water rights avoids or delays projects with greater impacts.
- Implementation of the EAHCP and development of non-Edwards supplies contribute to springflow maintenance and endangered species protection.
- Plan avoids impacts associated with development of new mainstem reservoirs.
- Increased reliance on ASR facilitates storage during wet periods for use during dry periods without evaporation and terrestrial habitat losses.
- Increased reliance on brackish groundwater resources, potentially reducing reliance on fresh groundwater.
- Projects are not expected to have adverse effects on the Nueces, Frio, and Sabinal River segments designated as having unique ecological value.
- Projects will not exceed environmental flow standards.

#### 6.1.6.2 Environmental Concerns

- Reductions in instream flows and freshwater inflows to bays and estuaries associated with surface water supply and direct consumptive reuse projects.
- Projects located in stream segments identified by TPWD as ecologically significant.
- Effects on small springs and reductions in flux entering streams from aquifers associated with groundwater development.
- Identified environmental impacts are likely to be exacerbated by increasing frequency of extreme weather events and droughts.

## 6.2 Socioeconomic Impacts of Not Meeting Identified Water Needs

Identified water needs are potential water supply shortages calculated by subtracting the projected water demands from existing water supplies (Refer to Chapter 4). The SCTRWPG identified 96 individual WUGs that demonstrated shortages or needs during the 2030 to 2080 planning period. All counties within the SCTRWPA, except DeWitt and Refugio Counties, have identified needs in at least one decade during the 50-year planning horizon. The identified water needs are presented in Chapter 4 of the 2026 SCTRWP.

In accordance with 31 TAC §357.40(a) RWPs must include a quantitative description of the socioeconomic impacts of not meeting identified water needs. The TWDB prepares region-specific socioeconomic analyses of not meeting identified needs and provides reports to RWPGs for inclusion in RWPs. In June 2025, the TWDB provided the SCTRWPG with the *Socioeconomic Impacts of Projected Water Shortages for the South Central Texas (Region L) Regional Water Planning Area* for inclusion in the 2026 SCTRWP (Appendix 6A). The TWDB released an addendum to the report on August 22, 2025, in

response to potentially inflated impact estimates for the manufacturing water use sector. The addendum cites several factors contributing to upwardly biased estimates during the planning cycle, including abnormal data collection results accompanying the COVID-19 pandemic; and increased data suppression within the U.S. Census County Business Pattern Employment Data. Additional information is available on the TWDB's website: https://www.twdb.texas.gov/waterplanning/data/analysis/index.asp.

The results of the report show that Region L could experience $29.83 billion in income losses annually and almost 148,463 job losses in 2030 if no WMSs are implemented to meet projected shortages. In 2030, potential income losses in 2030 are allocated among water use sectors as follows:

- Irrigation: < 1%;
- Livestock: 0%
- Manufacturing: 31%;
- Mining: 68%;
- Municipal: 1%; and
- Steam-Electric Power Generation: < 1%.

Similarly, the SCTRWPA could experience $16.76 billion in income losses and about 145,580 job losses in 2080 if no WMSs are implemented to meet projected shortages. In 2080, potential income losses in 2030 are allocated among water use sectors as follows:

- Irrigation: < 1%;
- Livestock: 0%
- Manufacturing: 72%;
- Mining: 11%;
- Municipal: 17%; and
- Steam-Electric Power Generation: < 1%.

The potential income and job losses attributed to not meeting identified water needs, by use type, are shown in Table 6-14.

**Table 6-15 Potential Income and Job Losses Attributed to Not Meeting Identified Water Needs by Use Type [1]**

| Use Type | 2030 Estimated Income Losses ($ millions) [2] | 2030 Estimated Job Losses | 2080 Estimated Income Losses ($ millions) [2] | 2080 Estimated Job Losses |
|---|---|---|---|---|
| Irrigation | $35 | 1,001 | $36 | 1,018 |
| Livestock | $- | - | $- | - |
| Manufacturing | $9,192 | 73,986 | $12,102 | 96,365 |
| Mining | $20,254 | 69,356 | $1,796 | 12,138 |
| Municipal | $319 | 4,121 | $2,798 | 36,060 |
| Steam-Electric | $30 | - | $30 | - |
| **Total** | **29,830** | **148,463** | **16,763** | **145,581** |

[1] Entries denoted by a dash (-) indicate no estimated economic impact.
[2] Income losses in Year 2023 dollars, rounded.

## 6.3 Description of Unmet Needs

An unmet need is the portion of an identified water need that is not met by recommended WMSs. In accordance with TWDB rules in 31 TAC §357.50(j), RWPGs must provide a summary of any unmet water

needs in the plan and provide adequate justification for any unmet municipal needs included in the final adopted SCTRWP.

The 2026 SCTRWP includes unmet needs for the irrigation, manufacturing, mining, municipal, and steam-electric power use sectors. The 2026 SCTRWP did not recommend WMSs to meet some needs for manufacturing, mining, and steam-electric power, as strategies to meet those needs may be cost-prohibitive or infeasible to implement. The SCTRWPG recommended conservation and drought management WMSs to meet irrigation needs. This is the first SCTRWP to include Non-Municipal Water Conservation and Irrigation Drought Management as Recommended WMSs. The WMSs arose from the SCTRWPG's collective desire to address significant unmet irrigation needs in previous regional water plans. For the 2026 SCTRWP, there are unmet municipal needs for Boerne and County-Other WUGs in Comal, Guadalupe, and Hays Counties.

Table 6-16 summarizes the needs that remain unmet in the 2026 SCTRWP after implementation of Recommended WMSs. WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The unmet needs shown in the WUG Unmet Needs report from the 2027 Regional and State Water Planning Database (DB27) are calculated by first deducting the WUG's split projected demand from the sum of its total existing water supply volumes and all associated Recommended WMS water volumes. If the WUG split has a greater future supply volume than projected demand in any given decade, this amount is considered a surplus volume. In order to display only unmet needs associated with the WUG split, these surplus volumes are shown as zero, and the unmet needs water volumes are shown as absolute values.

**Table 6-16 Summary of Unmet Needs for the South Central Texas Region (acft/yr)**

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Boerne | Kendall | 0 | 0 | 0 | 44 | 1,803 | 4,014 |
| 2 | County-Other, Comal | Comal | 0 | 0 | 0 | 5,034 | 8,048 | 11,677 |
| 3 | County-Other, Guadalupe | Guadalupe | 0 | 0 | 0 | 107 | 259 | 426 |
| 4 | County-Other, Hays | Hays | 0 | 0 | 0 | 854 | 5,120 | 11,918 |
| 5 | Irrigation, Calhoun | Calhoun | 9,025 | 8,946 | 8,867 | 8,787 | 8,716 | 8,643 |
| 6 | Irrigation, Dimmit | Dimmit | 4,251 | 4,200 | 4,148 | 4,096 | 4,052 | 4,009 |
| 7 | Irrigation, Goliad | Goliad | 136 | 0 | 0 | 0 | 0 | 0 |
| 8 | Irrigation, Guadalupe | Guadalupe | 6 | 0 | 0 | 0 | 0 | 0 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 9 | Irrigation, La Salle | La Salle | 331 | 279 | 229 | 176 | 134 | 91 |
| 10 | Irrigation, Medina | Medina | 19,527 | 18,945 | 18,384 | 16,686 | 15,279 | 13,858 |
| 11 | Irrigation, Uvalde | Uvalde | 15,526 | 14,845 | 11,063 | 10,382 | 9,822 | 9,261 |
| 12 | Irrigation, Victoria | Victoria | 179 | 167 | 155 | 143 | 133 | 122 |
| 13 | Irrigation, Zavala | Zavala | 13,422 | 12,954 | 12,485 | 12,016 | 11,618 | 11,222 |
| 14 | Manufacturing, Bexar | Bexar | 16 | 338 | 673 | 1,020 | 1,381 | 1,755 |
| 15 | Manufacturing, Caldwell | Caldwell | 9 | 0 | 0 | 0 | 0 | 0 |
| 16 | Manufacturing, Calhoun | Calhoun | 0 | 28 | 1,981 | 4,153 | 6,405 | 8,741 |
| 17 | Manufacturing, Kendall | Kendall | 43 | 45 | 47 | 49 | 51 | 53 |
| 18 | Manufacturing, Victoria | Victoria | 38,960 | 40,419 | 41,932 | 43,501 | 45,128 | 46,815 |
| 19 | Manufacturing, Wilson | Wilson | 5 | 7 | 9 | 11 | 14 | 17 |
| 20 | Manufacturing, Zavala | Zavala | 732 | 759 | 787 | 816 | 846 | 877 |
| 21 | Mining, Atascosa | Atascosa | 3,300 | 3,613 | 3,919 | 4,208 | 4,478 | 0 |
| 22 | Mining, Comal | Comal | 2,967 | 5,084 | 7,218 | 9,340 | 11,386 | 13,268 |
| 23 | Mining, Dimmit | Dimmit | 5,451 | 5,451 | 5,451 | 5,451 | 5,451 | 0 |
| 24 | Mining, Frio | Frio | 4,034 | 4,035 | 4,035 | 4,036 | 4,036 | 0 |
| 25 | Mining, Gonzales | Gonzales | 3,631 | 3,664 | 3,702 | 3,740 | 3,779 | 0 |
| 26 | Mining, Guadalupe | Guadalupe | 428 | 428 | 428 | 428 | 428 | 0 |
| 27 | Mining, Karnes | Karnes | 1,440 | 1,440 | 1,440 | 1,440 | 1,440 | 0 |
| 28 | Mining, La Salle | La Salle | 4,867 | 4,867 | 4,867 | 4,867 | 4,867 | 0 |
| 29 | Mining, Medina | Medina | 3,042 | 3,436 | 3,783 | 4,098 | 4,375 | 4,604 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 30 | Mining, Uvalde | Uvalde | 209 | 428 | 655 | 871 | 1,079 | 1,276 |
| 31 | Mining, Victoria | Victoria | 338 | 357 | 374 | 387 | 399 | 408 |
| 32 | Mining, Zavala | Zavala | 3,664 | 3,664 | 3,664 | 3,664 | 3,664 | 0 |
| 33 | Steam Electric Power, Victoria | Victoria | 666 | 666 | 666 | 666 | 666 | 666 |
| **All** | **Total** | **All** | **136,205** | **139,065** | **140,962** | **151,071** | **164,857** | **153,721** |

### 6.3.1 Boerne

Boerne is located in southeastern Kendall County and exhibits needs in the 2070 and 2080 decades. The SCTRWPG coordinated with Boerne to discuss population, water demands, existing supplies, and water management strategies, including discussions regarding potential additional strategies to address unmet needs. All potentially feasible strategies were considered to meet Boerne's needs, including Municipal Water Conservation, Drought Management, Reuse Water, Rainwater Harvesting, and Entity Purchase to Meet Shortages. Most of the potentially feasible strategies were ultimately included as Recommended strategies in the 2026 SCTRWP; however, the volume of WMSs does not resolve the unmet needs beginning in 2070.

As discussed previously, Municipal Water Conservation and Drought Management were both included as Recommended WMSs for Boerne in all decades of the planning horizon. The yields of the Municipal Water Conservation and Drought Management WMSs (7,407 acft/yr) were developed using methodology selected by the SCTRWPG, as they reflect realistic and achievable goals. Boerne's 2030 GPCD (adjusted to include passive conservation savings) is 189 GPCD. After application of the Municipal Water Conservation WMS, their resulting GPCD in the 2080 decade would be 127 GPCD. Additional conservation efforts to address unmet needs may not be feasible. The Drought Management WMS applies a 10% reduction in outdoor residential landscape irrigation. Even applying a 30% reduction, which is the maximum value that can be applied using the TWDB's Drought Management Costing Tool, Boerne would still have unmet needs.

Based on discussions with Boerne, they indicate that the 2026 SCTRWP water demand projections exceed those of their internal planning data and that they will meet their needs. Because Boerne's planning information indicates that they have sufficient supplies to meet demands, they have elected to not include additional WMSs in the 2026 SCTRWP. In case of a repeat of the drought of record, Boerne responded that they will impose additional drought restrictions to meet public health, safety, and welfare needs during each planning decade with unmet needs. Other potential strategies to ensure public health, safety, and welfare needs may include implementation of new or existing emergency interconnections with other water providers, annexation by water providers that have supply surplus, or purchase of hauled water via trucked water systems.

Should Boerne provide new project information, the 2026 SCTRWP may be amended to address unmet municipal needs before adoption of the next Initially Prepared Plan (IPP), anticipated to be in 2030.

### 6.3.2 County-Other, Comal

Comal County is located in the northern portion of the region. As discussed in Chapter 2 and Chapter 4, the municipal water demand projections and resulting needs in the northern portions of the region are projected to increase significantly over the planning horizon, especially along the Interstate Highway (IH-35) corridor. In particular, water demands for County-Other, Comal are projected to increase by 525% between 2030 and 2080.

County-Other WUGs are rural communities and water systems that fall below the municipal WUG thresholds (utilities less than 100 acft/yr annual retail sales or rural areas not served by a utility). All potentially feasible strategies were considered to meet the WUG's needs, including Municipal Water Conservation, Rainwater Harvesting, Fresh Groundwater Development, and Entity Purchase to Meet Shortages. Most of the potentially feasible strategies were ultimately included as Recommended strategies in the 2026 SCTRWP; however, the volume of WMSs does not resolve the unmet needs beginning in 2060.

As discussed previously, municipal water conservation was included as a Recommended WMS for County-Other, Comal in all decades of the planning horizon. Due to the decentralized nature of County-Other WUGs and the reduced ability to create and enforce restrictions on outdoor residential landscape irrigation, the municipal drought management WMS was not identified as a potentially feasible strategy to meet needs. The yields of the conservation WMS were developed using methodology selected by the SCTRWPG, as they reflect realistic and achievable goals. Additional conservation and/or drought management WMSs were not recommended because it would be infeasible to develop aggressive conservation and drought management programs to meet all of the unmet needs for the County-Other WUG, as it is composed of primarily rural, dispersed, or small utilities.

Additional WMSs were not included in the 2026 SCTRWP for County-Other, Comal because remaining MAG availabilities from existing supply sources (Trinity Aquifer and Edwards-BFZ) are not sufficient to meet needs between 2060 and 2080. Furthermore, it may be cost-prohibitive to develop large-scale strategies that could resolve or meet unmet needs for County-Other because of its dispersed nature. Meeting public health, safety, and welfare needs during a repeat of the drought of record may include implementation of new or existing emergency interconnections with other water providers, annexation by water providers with supply surplus, or purchase of hauled water via trucked water systems.

Should small water providers or other entities provide new project information, the 2026 SCTRWP may be amended to address unmet municipal needs before adoption of the next IPP, anticipated to be in 2030.

### 6.3.3 County-Other, Guadalupe

Guadalupe County is located in the northern portion of the region. As discussed in Chapter 2 and Chapter 4, the municipal water demand projections and resulting needs in the northern portions of the region are projected to increase significantly over the planning horizon, especially along the IH-35

corridor. In particular, water demands for County-Other, Guadalupe are projected to increase by 457% between 2030 and 2080.

County-Other WUGs are rural communities and water systems that fall below the municipal WUG thresholds (utilities less than 100 acft/yr annual retail sales or rural areas not served by a utility). All potentially feasible strategies were considered to meet the WUG's needs, including Municipal Water Conservation and Rainwater Harvesting. All of the potentially feasible strategies were ultimately included as Recommended strategies in the 2026 SCTRWP; however, the volume of WMSs does not resolve the unmet needs beginning in 2060.

As discussed previously, municipal water conservation was included as a Recommended WMS for County-Other, Guadalupe in all decades of the planning horizon. Due to the decentralized nature of County-Other WUGs and the reduced ability to create and enforce restrictions on outdoor residential landscape irrigation, the municipal drought management WMS was not identified as a potentially feasible strategy to meet needs. The yields of the conservation WMS were developed using methodology selected by the SCTRWPG, as they reflect realistic and achievable goals. Additional conservation and/or drought management WMSs were not recommended because it would be infeasible to develop aggressive conservation and drought management programs to meet all of the unmet needs for the County-Other WUG, as it is composed of primarily rural, dispersed, or small utilities.

Additional WMSs were not included in the 2026 SCTRWP for County-Other, Guadalupe because it may be cost-prohibitive to develop large-scale strategies that could resolve or meet unmet needs for County-Other due to its dispersed nature. Meeting public health, safety, and welfare needs during a repeat of the drought of record may include implementation of new or existing emergency interconnections with other water providers, annexation by water providers with supply surplus, or purchase of hauled water via trucked water systems.

Should small water providers or other entities provide new project information, the 2026 SCTRWP may be amended to address unmet municipal needs before adoption of the next IPP, anticipated to be in 2030.

### 6.3.4 County-Other, Hays

Hays County is located in the northern portion of the region. As discussed in Chapter 2 and Chapter 4, the municipal water demand projections and resulting needs in the northern portions of the region are projected to increase significantly over the planning horizon, especially along the IH-35 corridor. In particular, water demands for County-Other, Hays are projected to increase by 1,005% between 2030 and 2080.

County-Other WUGs are rural communities and water systems that fall below the municipal WUG thresholds (utilities less than 100 acft/yr annual retail sales or rural areas not served by a utility). All potentially feasible strategies were considered to meet the WUG's needs, including Municipal Water Conservation, Rainwater Harvesting, and Entity Purchase to Meet Shortages. All of the potentially feasible strategies were ultimately included as Recommended strategies in the 2026 SCTRWP; however, the volume of WMSs does not resolve the unmet needs beginning in 2060.

As discussed previously, municipal water conservation was included as a Recommended WMS for County-Other, Hays in all decades of the planning horizon. Due to the decentralized nature of County-Other WUGs and the reduced ability to create and enforce restrictions on outdoor residential landscape irrigation, the municipal drought management WMS was not identified as a potentially feasible strategy to meet needs. The yields of the conservation WMS were developed using methodology selected by the SCTRWPG, as they reflect realistic and achievable goals. Additional conservation and/or drought management WMSs were not recommended because it would be infeasible to develop aggressive conservation and drought management programs to meet all of the unmet needs for the County-Other WUG, as it is composed of primarily rural, dispersed, or small utilities.

Additional WMSs were not included in the 2026 SCTRWP for County-Other, Hays because remaining MAG availabilities from existing supply sources (Trinity Aquifer and Edwards-BFZ) are not sufficient to meet needs between 2060 and 2080. Based on discussions with the Hays Trinity Groundwater Conservation District, volumes of groundwater available for new or amended permits is extremely limited and expected to reach zero before 2036. Hays County is split between Region L and the Lower Colorado Region (Region K). Based on interregional coordination, the Region K portion of County-Other Hays will also demonstrate unmet needs in the 2026 Lower Colorado Regional Water Plan.

Furthermore, it may be cost-prohibitive to develop large-scale strategies that could resolve or meet unmet needs for County-Other because of its dispersed nature. Meeting public health, safety, and welfare needs during a repeat of the drought of record may include implementation of new or existing emergency interconnections with other water providers, annexation by water providers with supply surplus, or purchase of hauled water via trucked water systems.

Should small water providers or other entities provide new project information, the 2026 SCTRWP may be amended to address unmet municipal needs before adoption of the next IPP, anticipated to be in 2030.

# Appendix 6A: Texas Water Development Board (TWDB) Socioeconomic Impacts of Projected Water Shortages for the South Central Texas (Region L) Regional Water Planning Area

# Socioeconomic Impacts of Projected Water Shortages for the South Central Texas (Region L) Regional Water Planning Area

**Prepared in Support of the 2026 Region L Regional Water Plan**

Dr. John R. Ellis

Projections & Socioeconomic Analysis,
Water Supply Planning
Texas Water Development Board

June 2025

# Table of Contents


Executive Summary ..... 1
1 Introduction ..... 4
1.1 Regional Economic Summary ..... 4
1.2 Regional Water Use Summary ..... 6
1.3 Identified Regional Water Needs (Potential Shortages) ..... 6
2 Impact Assessment Measures ..... 8
2.1 Regional Economic Impacts ..... 9
2.2 Financial Transfer Impacts ..... 10
2.3 Social Impacts ..... 11
3 Socioeconomic Impact Assessment Methodology ..... 12
3.1 Analysis Context ..... 12
3.2 IMPLAN Model and Data ..... 12
3.3 Elasticity of Economic Impacts ..... 13
3.4 Analysis Assumptions and Limitations ..... 14
4 Analysis Results ..... 18
4.1 Impacts for Irrigation Water Shortages ..... 18
4.2 Impacts for Livestock Water Shortages ..... 18
4.3 Impacts of Manufacturing Water Shortages ..... 19
4.4 Impacts of Mining Water Shortages ..... 19
4.5 Impacts for Municipal Water Shortages ..... 20
4.6 Impacts of Steam-Electric Power Water Shortages ..... 20
4.7 Regional Social Impacts ..... 21
Appendix A - County Level Summary of Estimated Economic Impacts ..... 22

# Executive Summary

Evaluating the social and economic impacts of not meeting identified water needs is a required analysis in the regional water planning process. The Texas Water Development Board (TWDB) estimates these impacts for regional water planning groups (RWPGs) and summarizes the impacts in the state water plan. The analysis presented is for the South Central Texas Regional Water Planning Group (Region L).

Based on projected water demands and existing water supplies, Region L identified water needs (potential shortages) that could occur within its region under a repeat of the drought of record for six water use categories (irrigation, livestock, manufacturing, mining, municipal and steam-electric power). The TWDB then estimated the annual socioeconomic impacts of those needs—if they are not met—for each water use category and as an aggregate for the region.

This analysis was performed using an economic impact modeling software package, IMPLAN (Impact for Planning Analysis), as well as other economic analysis techniques, and represents a snapshot of socioeconomic impacts that may occur during a single year repeat of the drought of record with the further caveat that no mitigation strategies are implemented. Decade-specific impact estimates assume that growth occurs, and future shocks are imposed on an economy at 10-year intervals. The estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

For regional economic impacts, income losses and jobs potentially at risk are estimated within each planning decade (2030 through 2080). The income losses represent an approximation of gross domestic product (GDP) that would be foregone if water needs are not met.

The analysis also provides estimates of financial transfer impacts, which include tax losses (state, local, and utility tax collections); water trucking costs; and utility revenue losses. In addition, social impacts are estimated, encompassing lost consumer surplus (a welfare economics measure of consumer wellbeing); as well as population and school enrollment losses.

IMPLAN data reported that Region L generated more than $152 billion in gross domestic product (GDP) (2023 dollars) and supported more than 1.48 million jobs in 2021. The Region L estimated total population was approximately 3.06 million in 2021.

It is estimated that not meeting the identified water needs in Region L would result in an annually combined lost income impact of approximately $29.8 billion in 2030, decreasing to $16.8 billion in 2080 (Table ES-1). In 2030, the region could lose approximately 148,400 jobs, and by 2080 at risk job losses would decrease (primarily due to reductions in mining demands and needs) to approximately 145,600 if anticipated needs are not mitigated.

All impact estimates are in year 2023 dollars and were calculated using a variety of data sources and tools including the use of a region-specific IMPLAN model, data from TWDB annual water use

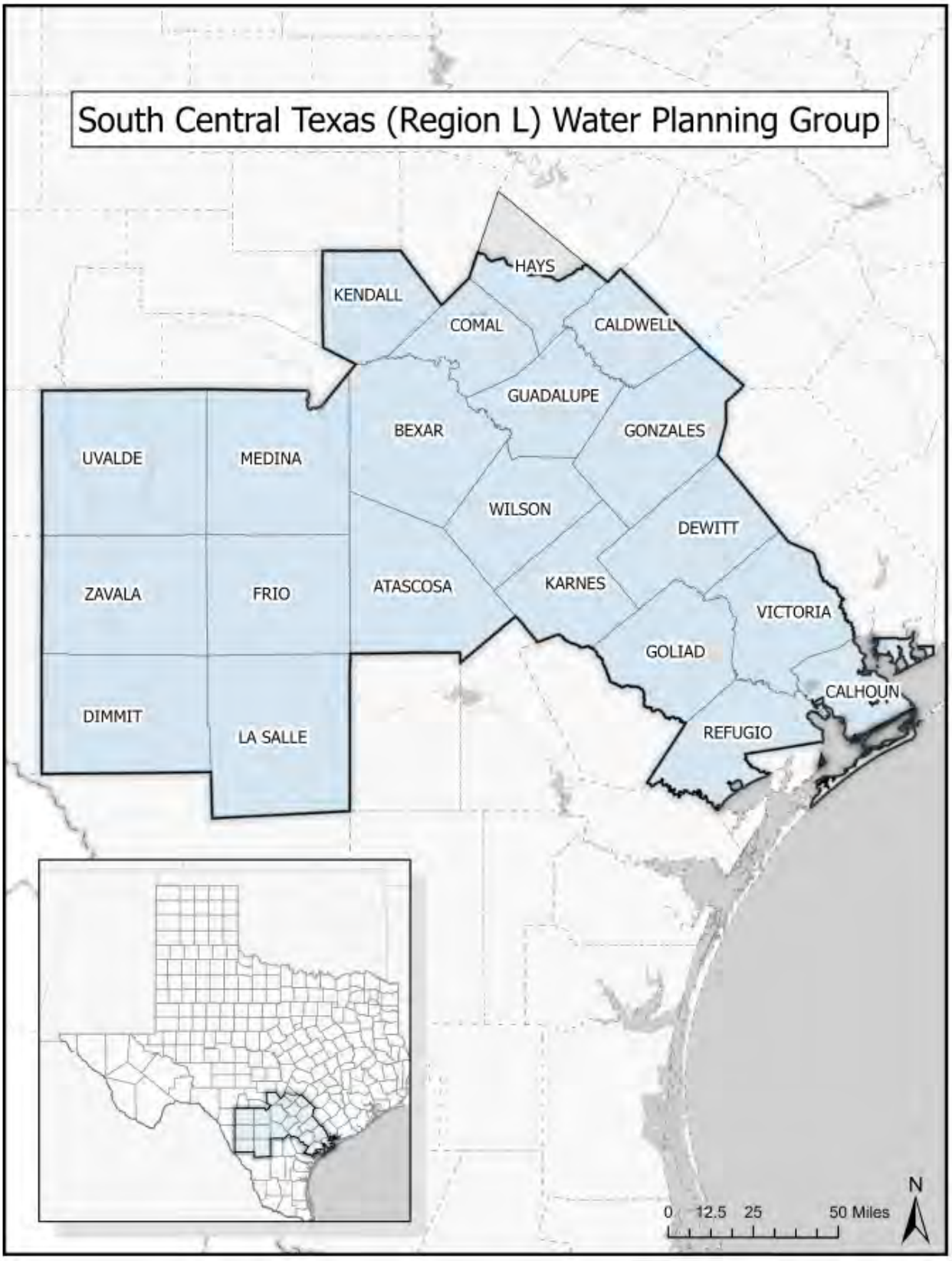
estimates, the U.S. Census Bureau, Texas Agricultural Statistics Service, and the Texas Municipal League.

**Table ES-1 Region L socioeconomic impact summary**

| Regional Economic Impacts | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $29,830 | $30,815 | $32,126 | $33,578 | $35,289 | $16,763 |
| **At risk job losses** | 148,463 | 156,161 | 167,856 | 180,974 | 196,508 | 145,580 |
| **Financial Transfer Impacts** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| **Tax losses on production and imports ($ millions)*** | $2,711 | $2,774 | $2,850 | $2,929 | $3,019 | $712 |
| **Water trucking costs ($ millions)*** | $6 | $6 | $6 | $15 | $26 | $107 |
| **Utility revenue losses ($ millions)*** | $154 | $305 | $516 | $865 | $1,245 | $1,704 |
| **Utility tax revenue losses ($ millions)*** | $2 | $5 | $9 | $16 | $23 | $31 |
| **Social Impacts** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| **Consumer surplus losses ($ millions)*** | $52 | $127 | $264 | $611 | $1,304 | $2,428 |
| **At risk population out-migration** | 21,260 | 22,362 | 24,037 | 25,916 | 28,140 | 20,847 |
| **At risk school enrollment losses** | 3,880 | 4,081 | 4,387 | 4,730 | 5,136 | 3,805 |

* Year 2023 dollars, rounded**.** Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

**Figure ES-1 Region L Planning Area Map**



# 1 Introduction

Water shortages during a repeat of the drought of record would likely curtail or eliminate certain economic activity in businesses and industries that rely heavily on water. Insufficient water supplies could not only have an immediate and real impact on the regional economy in the short term, but they could also adversely and chronically affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages could disrupt activity in homes, schools and government, and could adversely affect public health and safety. For these reasons, it is important to evaluate and understand how water supply shortages during drought could impact communities throughout the state.

As part of the regional water planning process, RWPGs must evaluate the social and economic impacts of not meeting water needs (31 Texas Administrative Code §357.33 (c)). Due to the complexity of the analysis and limited resources of the planning groups, the TWDB has historically performed this analysis for the RWPGs upon their request. Staff of the TWDB's Projections & Socioeconomic Analysis department designed and conducted this analysis in support of Region L, and those efforts for this Region as well as the other 15 regions allow consistency and a degree of comparability in the approach.

This document summarizes the results of the analysis and discusses the methodology used to generate the results. Section 1 provides a snapshot of the region's economy and summarizes the identified water needs in each water use category, which were calculated based on the RWPG's water supply and demand established during the regional water planning process. Section 2 defines each of ten impact assessment measures used in this analysis. Section 3 describes the methodology for the impact assessment and the approaches and assumptions specific to each water use category (i.e., irrigation, livestock, manufacturing, mining, municipal, and steam-electric power). Section 4 presents the impact estimates for each water use category with results summarized for the Region as a whole. Appendix A presents a further breakdown of the socioeconomic impacts by county.

## 1.1 Regional Economic Summary

The Region L Regional Water Planning Area generated more than $152 billion in gross domestic product (2023 dollars) and supported more than 1.48 million jobs in the year 2021, according to the IMPLAN dataset utilized in this socioeconomic analysis. This activity accounted for approximately 8 percent of the state's total gross domestic product of 1.9 trillion dollars for the year 2021 based on IMPLAN. Table 1-1 lists all economic sectors ranked by the total value-added to the economy in Region L. The finance and insurance and manufacturing sectors generated 24 percent of the region's total value-added and were also significant sources of tax revenue. The top employers in the region were in the health care and social assistance, retail trade, and accommodation and food services sectors. Region L's estimated total population was roughly 3,061,000, which comprises approximately 10.4 percent of the state's total population in 2021.

To gain deeper insights into Region L's economy, it is helpful to examine Region L's industry types. Region L consists of 222 4-digit NAICS (North American Industry Classification System) industries

in the year 2021 with an employment share of 9.6 percent total jobs in Texas and 8.5 percent of the state's total tax revenue. Trade played a pivotal role in the Region's economy, indicating connections with external markets. Major export commodities included insurance, automobiles, and natural gas & crude petroleum. Major import commodities included scientific research & development services, advertising, public relations, & related services, and pharmaceuticals.

This represents a snapshot of the regional economy as a whole, and it is important to note that not all economic sectors were included in the TWDB socioeconomic impact analysis. Data considerations prompted use of only the more water-intensive sectors within the economy because damage estimates could only be calculated for those economic sectors which had both reliable income and water use estimates.

**Table 1-1 Region L regional economy by economic sector***

| Economic sector | Value-added ($ millions) | Tax ($ millions) | Jobs |
|---|---|---|---|
| Finance and Insurance | $19,160.31 | $1,049.45 | 120,803 |
| Manufacturing | $17,542.18 | $259.32 | 72,967 |
| Health Care and Social Assistance | $13,794.86 | ($418.96) | 178,812 |
| Professional, Scientific, and Technical Services | $12,463.15 | $90.73 | 121,694 |
| Retail Trade | $10,777.03 | $2,312.27 | 152,183 |
| Wholesale Trade | $10,662.76 | $1,566.26 | 45,565 |
| Real Estate and Rental and Leasing | $10,423.06 | $1,347.49 | 77,040 |
| Mining, Quarrying, and Oil and Gas Extraction | $10,022.89 | $1,801.51 | 22,851 |
| Accommodation and Food Services | $7,642.09 | $38.86 | 146,446 |
| Administrative and Support and Waste Management and Remediation Services | $7,242.88 | $143.11 | 118,681 |
| Construction | $7,071.39 | ($254.10) | 100,270 |
| Transportation and Warehousing | $6,619.45 | $81.94 | 82,508 |
| Other Services (except Public Administration) | $6,491.97 | $527.15 | 109,658 |
| Information | $5,693.25 | $1,611.11 | 21,884 |
| Utilities | $1,513.27 | $344.26 | 3,037 |
| Educational Services | $1,380.23 | $13.53 | 27,474 |
| Management of Companies and Enterprises | $1,370.33 | $62.04 | 19,706 |
| Arts, Entertainment, and Recreation | $1,344.56 | $92.97 | 26,322 |
| Agriculture, Forestry, Fishing and Hunting | $896.49 | ($41.29) | 33,313 |
| **Grand Total** | **$152,112.15** | **$10,627.67** | **1,481,215** |

*Source: 2021 IMPLAN for 546 sectors aggregated by 2-digit NAICS

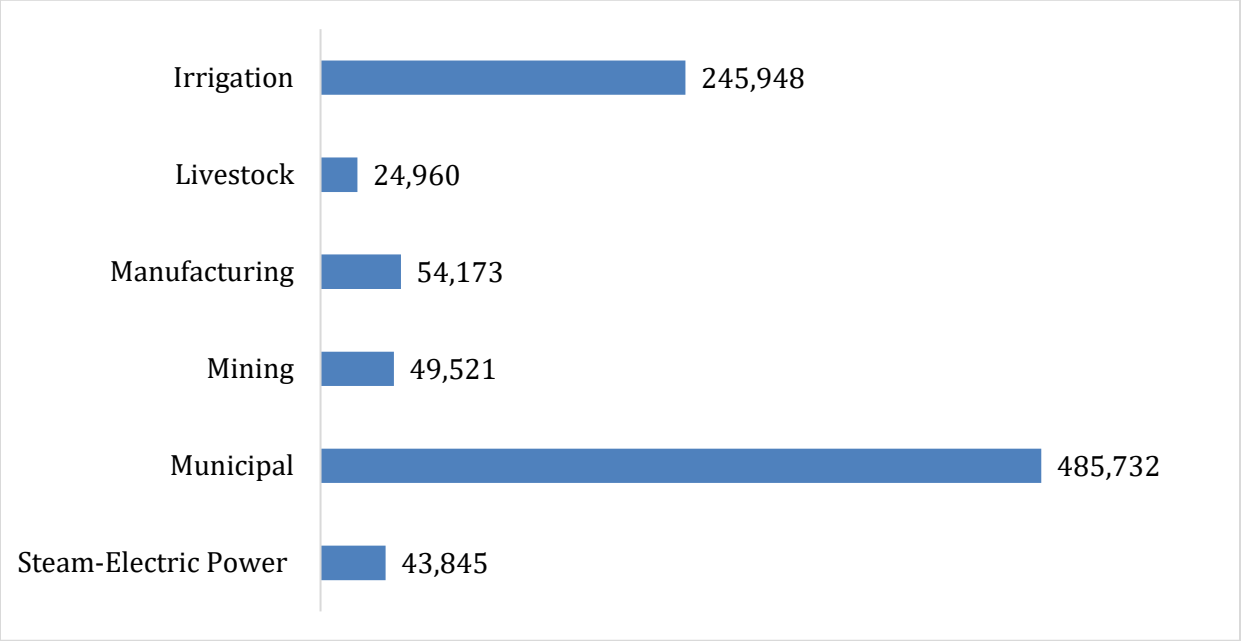
Note that for some sectors, taxes may be negative. This is due to federal subsidies in the sector and the subsequent net value in taxes collected and subsidies paid results in a negative tax payment (i.e., the subsidies paid were larger than the taxes collected for the year). Due to the Covid-19

pandemic, many sectors received more subsidies in the year 2021 than previous years, and the resulting net value for taxes is negative.

## 1.2 Regional Water Use Summary

While the manufacturing sector led the Region in economic output, the majority (54 percent) of water use occurred in the municipal water use category in 2021. Irrigated agriculture accounted for approximately 27 percent of Region L's water use in 2021. Figure 1-1 illustrates Region L's breakdown of the 2021 water use estimates by TWDB water use category.

**Figure 1-1 Region L 2021 water use estimates by water use category (in acre-feet)**




Source: TWDB Annual Water Use Estimates (all values in acre-feet)

## 1.3 Identified Regional Water Needs (Potential Shortages)

As part of the regional water planning process, the TWDB adopted water demand projections for water user groups (WUG) in Region L with input from the planning group. WUG-level demand projections were established for utilities that provide more than 100 acre-feet of annual water supply, combined rural areas (designated as county-other), and county-wide water demand projections for five non-municipal categories (irrigation, livestock, manufacturing, mining and steam-electric power) per (31 TAC § 357.10(43)). The RWPG then compared demands to the existing water supplies of each WUG to determine potential shortages, or needs, by decade.

Table 1-2 summarizes the region's identified water needs in the event of a repeat of the drought of record (needs identified in the Initially Prepared Plans). Demand management, such as conservation, or the development of new infrastructure to increase supplies, are water

management strategies that may be recommended by the planning group to address those needs. This analysis assumes that no strategies are implemented, and that the identified needs correspond to future water shortages. Note that projected water needs generally increase over time, primarily due to anticipated population growth, economic growth, or declining supplies. To provide a general sense of proportion, total projected needs as an overall percentage of total demand by water use category are also presented in aggregate in Table 1-2. Projected needs for individual water user groups within the aggregate can vary greatly and may reach 100% for a given WUG and water use category. A detailed summary of water needs appears in Chapter 4 of the 2026 Region L Regional Water Plan.

**Table 1-2 Regional water needs summary by water use category***

| Water Use Category | | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|
| **Irrigation** | water needs (acre-feet per year) | 71,258 | 71,187 | 71,793 | 71,862 | 71,927 | 71,979 |
| | % of the category's total water demand | 23% | 23% | 23% | 23% | 23% | 23% |
| **Livestock** | water needs (acre-feet per year) | 12 | 12 | 12 | 12 | 12 | 12 |
| | % of the category's total water demand | 0% | 0% | 0% | 0% | 0% | 0% |
| **Manufacturing** | water needs (acre-feet per year) | 39,765 | 41,606 | 45,440 | 49,562 | 53,838 | 58,272 |
| | % of the category's total water demand | 36% | 36% | 38% | 40% | 42% | 44% |
| **Mining** | water needs (acre-feet per year) | 34,771 | 37,867 | 40,936 | 43,930 | 46,782 | 20,956 |
| | % of the category's total water demand | 47% | 49% | 50% | 51% | 53% | 43% |
| **Municipal**** | water needs (acre-feet per year) | 38,660 | 69,433 | 111,065 | 184,152 | 264,266 | 361,827 |
| | % of the category's total water demand | 7% | 11% | 16% | 24% | 31% | 38% |
| **Steam-Electric Power** | water needs (acre-feet per year) | 666 | 666 | 666 | 666 | 666 | 666 |
| | % of the category's total water demand | 1% | 1% | 1% | 1% | 1% | 1% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Total water needs (acre-feet per year)** | **185,132** | **220,771** | **269,912** | **350,184** | **437,491** | **513,712** |

*Entries denoted by a dash (-) indicate no identified water need for a given water use category.

** Municipal category consists of residential and non-residential (commercial and institutional) subcategories.

# 2 Impact Assessment Measures

A required component of the regional and state water plans is to estimate the potential economic and social impacts of potential water shortages during a repeat of the drought of record. Consistent with previous water plans, ten impact measures were estimated and are described in Table 2-1.

**Table 2-1 Socioeconomic impact analysis measures**

| **Regional economic impacts** | **Description** |
|---|---|
| **Income losses - value-added** | The value of output less the value of intermediate consumption; it is a measure of the contribution to gross domestic product (GDP) made by an individual producer, industry, sector, or group of sectors within a year. Value-added measures used in this report have been adjusted to include the direct, indirect, and induced monetary impacts on the region. |
| **Income losses - electrical power purchase costs** | Proxy for income loss in the form of additional costs of power as a result of impacts of water shortages. |
| **At risk job losses** | Number of part-time and full-time jobs at risk of being lost due to the shortage. These values have been adjusted to include the direct, indirect, and induced employment impacts on the region. |
| **Financial transfer impacts** | **Description** |
| **Tax losses on production and imports** | Sales and excise taxes not collected due to the shortage, in addition to customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes, and special assessments less subsidies. These values have been adjusted to include the direct, indirect and induced tax impacts on the region. |
| **Water trucking costs** | Estimated cost of shipping potable water. |
| **Utility revenue losses** | Foregone utility income due to not selling as much water. |
| **Utility tax revenue losses** | Foregone miscellaneous gross receipts tax collections. |

| Social impacts | Description |
|---|---|
| **Consumer surplus losses** | A welfare measure of the lost value to consumers accompanying restricted water use. |
| **At risk population out-migration** | Potential population losses accompanying potential job losses. |
| **At risk school enrollment losses** | Potential school enrollment losses (K-12) accompanying potential job losses. |

## 2.1 Regional Economic Impacts

The two key measures used to assess regional economic impacts are income losses and at risk job losses. The income losses presented consist of the sum of value-added losses and the additional purchase costs of electrical power.

### *Income Losses - Value-added Losses*

Value-added is the value of total output less the value of the intermediate inputs also used in the production of the final product. Value-added is similar to GDP, a familiar measure of the productivity of an economy. The loss of value-added due to water shortages is estimated by input-output analysis using the IMPLAN software package, and includes the direct, indirect, and induced monetary impacts on the region. The indirect and induced effects are measures of reduced income as well as reduced employee spending for those input sectors which provide resources to the water shortage impacted production sectors.

### *Income Losses - Electric Power Purchase Costs*

The electrical power grid and market within the state is a complex interconnected system. The industry response to water shortages, and the resulting impact on the region, are not easily modeled using traditional input/output impact analysis and the IMPLAN model. Adverse impacts on the region will occur and are represented in this analysis by estimated additional costs associated with power purchases from other generating plants within the region or state. Consequently, the analysis employs additional power purchase costs as a proxy for the value-added impacts for the steam-electric power water use category, and these are included as a portion of the overall income impact for completeness.

For the purpose of this analysis, it is assumed that power companies with insufficient water will be forced to purchase power on the electrical market at a projected higher rate of 5.60 cents per kilowatt hour. This rate is based upon the average day-ahead market purchase price of electricity in Texas that occurred during the recent drought period in 2011. This price is assumed to be comparable to those prices which would prevail in the event of another drought of record.

### *At Risk Job Losses*

The number of jobs at risk of being lost due to the economic impact is estimated using IMPLAN output associated with each TWDB water use category. Because of the difficulty in predicting outcomes and a lack of relevant data, at risk job loss estimates are not calculated for the steam-electric power category. Furthermore, the estimates of such job losses for the remaining water use sectors do not consider conversion to hybrid or remote employment, as IMPLAN employment estimates are based on the establishment locations.

## 2.2 Financial Transfer Impacts

Several impact measures evaluated in this analysis are presented to provide additional detail concerning potential impacts on a portion of the economy or government. These financial transfer impact measures include lost tax collections (on production and imports), trucking costs for imported water, declines in utility revenues, and declines in utility tax revenue collected by the state. These measures are not solely adverse, with some having both positive and negative impacts. For example, cities and residents would suffer if forced to pay large costs for trucking in potable water. Trucking firms, conversely, would benefit from the transaction. Additional detail for each of these measures follows.

### *Tax Losses on Production and Imports*

Reduced production of goods and services accompanying water shortages adversely impacts the collection of taxes by state and local government. The regional IMPLAN model is used to estimate reduced tax collections associated with the reduced output in the economy. Impact estimates for this measure include the direct, indirect, and induced impacts for the affected sectors.

### *Water Trucking Costs*

In instances where water shortages for a municipal water user group are estimated by RWPGs to exceed 80 percent of water demands, it is assumed that water would need to be trucked in to support basic consumption and sanitation needs. For water shortages of 80 percent or greater, a fixed, maximum of $45,500[1] per acre-foot of water applied as an economic cost. This water trucking cost was utilized for both the residential and non-residential portions of municipal water needs.

### *Utility Revenue Losses*

Lost utility income is calculated as the price of water service multiplied by the quantity of water not sold during a drought shortage. Such estimates are obtained from utility-specific pricing data provided by the Texas Municipal League, where available, for both water and wastewater. These

[1] Based on a TWDB staff survey of year 2023 water trucking costs in the state. There are many factors and variables that would determine actual water trucking costs including distance, cost of water, and length of drought.

water rates are applied to the potential water shortage to estimate forgone utility revenue as water providers sold less water during the drought due to restricted supplies.

### *Utility Tax Losses*

Foregone utility tax losses include estimates of forgone miscellaneous gross receipts taxes[2]. Reduced water sales reduce the amount of utility tax that would be collected by the State of Texas for water and wastewater service sales.

## 2.3 Social Impacts

### *Consumer Surplus Losses for Municipal Water Users*

Consumer surplus loss is a measure of impact to the wellbeing of municipal water users when their water use is restricted. Consumer surplus is the difference between how much a consumer is willing and able to pay for a commodity (i.e., water) and how much they actually have to pay. The difference is a benefit to the consumer's wellbeing since they do not have to pay as much for the commodity as they would be willing to pay. Consumer surplus may also be viewed as an estimate of how much consumers would be willing to pay to keep the original quantity of water which they used prior to the drought. Lost consumer surplus estimates within this analysis only apply to the residential portion of municipal demand, with estimates being made for reduced outdoor and indoor residential use. Lost consumer surplus estimates varied widely by location and degree of water shortage.

### *At Risk Population and School Enrollment Losses*

Population at risk of out-migration due to water shortages, as well as the associated decline in school enrollment, are based upon the at risk job loss estimates discussed in Section 2.1. A simplified ratio of at risk jobs and population losses are calculated for the state as a whole based on a recent study of how job layoffs impact the labor market population.[3] For every 100 jobs lost, 14 people were assumed to move out of the area. This ratio does not consider conversion to hybrid or remote employment and subsequent impacts to the labor market population. School enrollment losses are estimated as a proportion of the population at risk of out-migration based upon public school enrollment data from the Texas Education Agency concerning the age K-12 population within the state (approximately 18%).

---

[2] https://comptroller.texas.gov/taxes/misc-gross-receipts/

[3] Foote, Andrew, Grosz, Michel, Stevens, Ann. "Locate Your Nearest Exit: Mass Layoffs and Local Labor Market Response." University of California, Davis. April 2015, http://paa2015.princeton.edu/papers/150194. The study utilized Bureau of Labor Statistics data regarding layoffs between 1996 and 2013, as well as Internal Revenue Service data regarding migration, to model the change in the population as the result of a job layoff event. The study found that layoffs impact both out-migration and in-migration into a region, and that a majority of those who did move following a layoff moved to another labor market rather than an adjacent county.

# 3 Socioeconomic Impact Assessment Methodology

This portion of the report provides a summary of the methodology used to estimate the potential economic impacts of future water shortages. The general approach employed in the analysis was to obtain estimates for at risk income and job losses on the smallest geographic level that the available data would support, tie those values to their accompanying historic water use estimate, and thereby determine a maximum impact per acre-foot of water shortage for each of the socioeconomic measures. The calculations of economic impacts are based on the overall composition of the economy divided into many underlying economic sectors. Sectors in this analysis refer to one or more of the 546 specific production sectors of the economy designated within IMPLAN, the economic impact modeling software used for this assessment. Economic impacts within this report are estimated for approximately 330 of these economic sectors, with the focus on the more water-intensive production sectors. The economic impacts for a single water use category consist of an aggregation of impacts to multiple, related IMPLAN economic sectors.

## 3.1 Analysis Context

The context of this socioeconomic impact analysis involves situations where there are physical shortages of groundwater or surface water due to a recurrence of drought of record conditions. Anticipated shortages for specific water users may be nonexistent in earlier decades of the planning horizon, yet population growth or greater industrial, agricultural or other sector demands in later decades may result in greater overall demand, exceeding the existing supplies. Estimated socioeconomic impacts measure what would happen if water user groups experience water shortages for a period of one year. Actual socioeconomic impacts would likely become larger as drought of record conditions persist for periods greater than a single year.

## 3.2 IMPLAN Model and Data

The Input-Output (I-O) model provides a framework to analyze an event like a water shortage during a one-year repeat of the drought of record that impacts interdependent economic sectors. IMPLAN cloud is used as the primary software for estimating the value-added, jobs, and tax related impact measures. IMPLAN is a widely-accepted software model that combines data and analytics to empower a greater understanding of different economic impacts utilizing the foundations of I-O modeling techniques. This analysis employed regional level models, developed utilizing Regional Water Planning Area counties, to determine key economic impacts. IMPLAN was originally developed by the U.S. Forestry Service in the 1970's to model economic activity at varying geographic levels. The model is currently maintained by the IMPLAN Group LLC (implan.com) which collects and sells county and state specific data and software.

IMPLAN currently combines information for 546 IMPLAN industry sectors. For the purpose of this socioeconomic impact analysis, all water-intensive industries are consolidated into six water user categories (irrigation, livestock, manufacturing, mining, municipal, and steam-electric power). Estimates of value-added for a water use category is obtained by summing value-added estimates across the relevant IMPLAN sectors associated with that water use category, for which there is

estimated water use in Texas. A similar approach was followed to estimate the number of at risk jobs as well as tax losses on production and imports.

IMPLAN categorizes the impact of water shortage events on value-added, jobs, and tax estimates into three components:

- ***Direct effects*** representing the initial change in the industry analyzed;
- ***Indirect effects*** that are changes in inter-industry transactions as supplying industries respond to reduced demands from the directly affected industries; and,
- ***Induced effects*** that reflect changes in local spending that result from reduced household income among employees in the directly and indirectly affected industry sectors.

## 3.3 Elasticity of Economic Impacts

The economic impact of a water need is based on the size of the water need relative to the total water demand for each water user group. Smaller water shortages, for example, less than 5 percent, are generally anticipated to result in no initial negative economic impact because water users are assumed to have a certain amount of flexibility in dealing with small shortages. As a water shortage intensifies, however, such flexibility lessens and results in actual and increasing economic losses, eventually reaching a representative maximum impact estimate per unit volume of water. To account for these characteristics, an elasticity adjustment function is used to estimate impacts for the income, tax and job loss measures. Figure 3-1 illustrates this general relationship for the adjustment functions. Negative impacts are assumed to begin accruing when the shortage reaches the lower bound 'b1' (5 percent in Figure 3-1), with impacts then increasing linearly up to the 100 percent impact level (per unit volume) once the upper bound reaches the 'b2' level shortage (40 percent in Figure 3-1).

To illustrate this, if the total annual value-added for manufacturing in the region was $2 million and the reported annual volume of water used in that industry is 10,000 acre-feet, the estimated economic measure of the water shortage would be $200 per acre-foot. The economic impact of the shortage would then be estimated using this value-added amount as the maximum impact estimate ($200 per acre-foot) applied to the anticipated shortage volume and then adjusted by the elasticity function. Using the sample elasticity function shown in Figure 3-1, an approximately 22 percent shortage in the manufacturing category would indicate an economic impact estimate of 50% of the original $200 per acre-foot impact value (i.e., $100 per acre-foot).

Such adjustments are not required in estimating lost consumer surplus, utility revenue losses, or utility tax losses. Estimates of lost consumer surplus rely on utility-specific demand curves with the lost consumer surplus estimate calculated based on the relative percentage of the utility's water shortage. Estimated changes in population and school enrollment are indirectly related to the elasticity of job losses.

Assumed values for the lower and upper bounds 'b1' and 'b2' vary by water use category and are presented in Table 3-1.

**Figure 3-1 Example economic impact elasticity function (as applied to a single water user's shortage)**

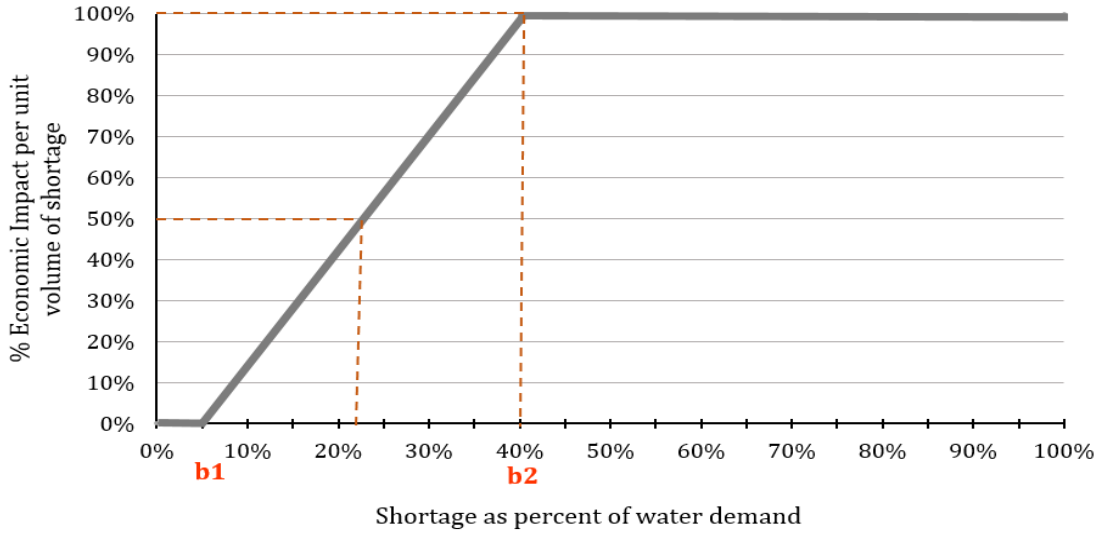



**Table 3-1 Economic impact elasticity function lower and upper bounds**

| Water use category | Lower bound (b1) | Upper bound (b2) |
|---|---|---|
| **Irrigation** | **5%** | **40%** |
| **Livestock** | **5%** | **10%** |
| **Manufacturing** | **5%** | **40%** |
| **Mining** | **5%** | **40%** |
| **Municipal (non-residential water intensive subcategory)** | **5%** | **40%** |
| **Steam-electric power** | **N/A** | **N/A** |

## 3.4 Analysis Assumptions and Limitations

The modeling of complex systems requires making many assumptions and acknowledging the model's uncertainty and limitations. This is particularly true when attempting to estimate a wide range of socioeconomic impacts over a large geographic area and into future decades. Some of the key assumptions and limitations of this methodology include:

1. The foundation for estimating the socioeconomic impacts of water shortages resulting from a drought are the water needs (potential shortages) that were identified by RWPGs as part of the

regional water planning process. These needs have some uncertainty associated with them but serve as a reasonable basis for evaluating the potential impacts of a drought of record event.

2. All estimated socioeconomic impacts are snapshots for years in which water needs were identified (i.e., 2030, 2040, 2050, 2060, 2070, and 2080). The estimates are independent and distinct "what if" scenarios for each particular year, and water shortages are assumed to be temporary events resulting from a single year recurrence of drought of record conditions. The evaluation assumed that no recommended water management strategies are implemented. Note that the estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

3. Because the overarching context of this analysis is a one-year repeat drought of record, it is assumed that water-related utilities and companies would not implement mitigation measures or shock absorbers within such a short timeframe. Therefore, estimated impacts to the economy in this report may appear higher than if mitigation strategies were implemented in the short-term. If faced with drought over a longer timeframe, individual utilities and companies might alter their behavior to induce more efficient use of the limited water supplies available to them.

4. Input-output models such as IMPLAN rely on a static profile of the structure of the economy as it appears today. IMPLAN Input-output analysis is a backward-looking model, as it only reflects effects of input industries. This presumes that the relative contributions of all sectors of the economy would remain the same, regardless of changes in technology, availability of limited resources, and other structural changes to the economy that may occur in the future. Changes in water use efficiency will undoubtedly take place in the future as supplies become more stressed. Use of the static IMPLAN structure was a significant assumption and simplification considering the 50-year time period examined in this analysis. To presume an alternative future economic makeup, however, would entail positing many other major assumptions that would very likely generate as much or more error.

5. This is not a form of cost-benefit analysis. That approach to evaluating the economic feasibility of a specific policy or project employs discounting future benefits and costs to their present value dollars using some assumed discount rate. The methodology employed in this effort to estimate the economic impacts of future water shortages did not use any discounting methods to weigh future costs differently through time.

6. All monetary values originally based upon year 2021 IMPLAN and other sources are reported in constant year 2023 dollars to be consistent with the water management strategy requirements in the State Water Plan.

7. IMPLAN based loss estimates (income-value-added, jobs, and taxes on production and imports) are calculated only for those IMPLAN sectors for which the TWDB's Water Use Survey (WUS) data was available and deemed reliable. Every effort is made in the annual WUS effort to capture all relevant firms who are significant water users. Lack of response to the WUS, or omission of relevant firms, impacts the loss estimates.

8. Impacts are annual estimates. The socioeconomic analysis does not reflect the full extent of impacts that might occur as a result of persistent water shortages occurring over an extended duration. The drought of record in most regions of Texas lasted several years.

9. Loss in value-added estimates are the primary estimate of the economic impacts within this report. One may be tempted to add consumer surplus impacts to obtain an estimate of total adverse economic impacts to the region, but the consumer surplus measure represents the change to the wellbeing of households (and other water users), not an actual change in the flow of dollars through the economy. The two measures (value-added and consumer surplus) are both valid impacts but ideally should not be summed.

10. The value-added, jobs, and taxes on production and import impacts include the direct, indirect and induced effects to capture backward linkages in the economy described in Section 2.1. Population and school enrollment at risk of out-migration also indirectly include such effects as they are based on the associated losses in employment. The remaining measures (consumer surplus, utility revenue, utility taxes, additional electrical power purchase costs, and potable water trucking costs), however, do not include any induced or indirect effects.

11. The majority of impacts estimated in this analysis may be more conservative (i.e., smaller) than those that might actually occur under drought of record conditions due to not including impacts in the forward linkages in the economy. Input-output models such as IMPLAN only capture backward linkages on suppliers (including households that supply labor to directly affected industries). While this is a common limitation in this type of economic modeling effort, it is important to note that forward linkages on the industries that use the outputs of the directly affected industries can also be very important. A good example is impacts on livestock operators. Livestock producers tend to suffer substantially during droughts, not because there is not enough water for their stock, but because reductions in available pasture and higher prices for purchased hay have significant economic effects on their operations. Food processors could be in a similar situation if they cannot get the grains or other inputs that they need. These effects are not captured in IMPLAN, resulting in conservative impact estimates.

12. The model does not reflect dynamic economic responses to water shortages as they might occur, nor does the model reflect economic impacts associated with a recovery from a drought of record including:
    a. The likely significant economic rebound to some industries immediately following a drought, such as landscaping;

b. The cost and time to rebuild liquidated livestock herds (a major capital investment in that industry);
c. Direct impacts on recreational sectors (i.e., stranded docks and reduced tourism); or,
d. Impacts of negative publicity on Texas' ability to attract population and business in the event that it was not able to provide adequate water supplies for the existing economy.

13. Estimates for job losses and the associated population and school enrollment changes may exceed what would actually occur. In practice, firms may be hesitant to lay off employees, even in difficult economic times. Estimates of potential population and school enrollment changes are based on regional evaluations and therefore do not necessarily reflect what might occur on a statewide basis.

14. **The results must be interpreted carefully. It is the general and relative magnitudes of at risk impacts as well as the changes of these impacts over time that should be the focus rather than the absolute numbers.** Analyses of this type are much better at predicting relative percent differences brought about by a shock to a complex system (i.e., a water shortage) than the precise size of an impact. To illustrate, assuming that the estimated economic impacts of a drought of record on the manufacturing and mining water user categories are $2 and $1 million, respectively, one should be more confident that the economic impacts on manufacturing are twice as large as those on mining and that these impacts will likely be in the millions of dollars. But one should have less confidence that the actual total economic impact experienced would be $3 million.

15. The methodology does not capture "spillover" effects between regions – or the secondary impacts that occur outside of the region where the water shortage is projected to occur.

16. The methodology that the TWDB has developed for estimating the economic impacts of unmet water needs, and the assumptions and models used in the analysis, are specifically designed to estimate potential economic effects at the regional and county levels. Although it may be tempting to add the regional impacts together in an effort to produce a statewide result, the TWDB cautions against that approach for a number of reasons. The IMPLAN modeling (and corresponding economic multipliers) are all derived from regional models – a statewide model of Texas would produce somewhat different multipliers. As noted in point 14 within this section, the regional modeling used by TWDB does not capture spillover losses that could result in other regions from unmet needs in the Region analyzed, or potential spillover gains if decreased production in one region leads to increases in production elsewhere. The assumed drought of record may also not occur in every region of Texas at the same time, or to the same degree.

# 4 Analysis Results

This section presents estimates of potential economic impacts that could reasonably be expected in the event of water shortages associated with a drought of record and if no recommended water management strategies were implemented. Projected economic impacts for the six water use categories (irrigation, livestock, manufacturing, mining, municipal, and steam-electric power) are reported by decade.

## 4.1 Impacts for Irrigation Water Shortages

Eleven of the 21 counties in the Region are projected to experience water shortages in the irrigated agriculture water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-1. Note that tax collection impacts were not estimated for this water use category. IMPLAN data indicates a negative tax impact (i.e., increased tax collections) for the associated production sectors, primarily due to past subsidies from the federal government. However, it was not considered realistic to report increasing tax revenues during a drought of record.

**Table 4-1 Impacts of water shortages on irrigation**

| Impact measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $35 | $35 | $36 | $36 | $36 | $36 |
| **At risk job losses** | 1,001 | 1,001 | 1,016 | 1,017 | 1,017 | 1,018 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.2 Impacts for Livestock Water Shortages

One of the 21 counties in the Region are projected to experience water shortages in the livestock water use category, although it does not result in an economic or social impact. Estimated impacts to this water use category appear in Table 4-2.

**Table 4-2 Impacts of water shortages on livestock**

| Impact measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $- | $- | $- | $- | $- | $- |
| **At risk job losses** | - | - | - | - | - | - |
| **Tax losses on production and** | $- | $- | $- | $- | $- | $- |

| imports ($ millions)* |
|---|

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.3 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the Region are projected to occur in seven of the 21 counties for at least one decade of the planning horizon. Estimated impacts to this water use category appear in Table 4-3.

**Table 4-3 Impacts of water shortages on manufacturing**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $9,192 | $9,568 | $9,999 | $10,553 | $11,259 | $12,102 |
| **At risk job losses** | 73,986 | 77,134 | 80,664 | 85,014 | 90,268 | 96,365 |
| **Tax losses on production and Imports ($ millions)*** | $331 | $344 | $360 | $381 | $409 | $444 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.4 Impacts of Mining Water Shortages

Twelve of the 21 counties in the Region are projected to experience water shortages in the mining water use category. Estimated impacts to this water use type appear in Table 4-4.

**Table 4-4 Impacts of water shortages on mining**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses ($ millions)*** | $20,254 | $20,709 | $21,150 | $21,531 | $21,892 | $1,796 |
| **At risk job losses** | 69,356 | 71,932 | 74,417 | 76,507 | 78,496 | 12,138 |
| **Tax losses on production and Imports ($ millions)*** | $2,366 | $2,409 | $2,450 | $2,486 | $2,521 | $147 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.5 Impacts for Municipal Water Shortages

Fourteen of the 21 counties in the Region are projected to experience water shortages in the municipal water use category for one or more decades within the planning horizon.

Impact estimates were made for two sub-categories within municipal water use: residential and non-residential. Non-residential municipal water use includes commercial and institutional users, which are further divided into non-water-intensive and water-intensive subsectors including car wash, laundry, hospitality, health care, recreation, and education. Lost consumer surplus estimates were made only for needs in the residential portion of municipal water use. Available IMPLAN and TWDB Water Use Survey data for the non-residential, water-intensive portion of municipal demand allowed these sectors to be included in income, jobs, and tax loss impact estimate.

Trucking cost estimates, calculated for shortages exceeding 80 percent, assumed a fixed, maximum cost of $45,500 per acre-foot to transport water for municipal use. The estimated impacts to this water use category appear in Table 4-5.

**Table 4-5 Impacts of water shortages on municipal water users**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income losses[1] ($ millions)*** | $319 | $472 | $911 | $1,429 | $2,072 | $2,798 |
| **At risk job losses[1]** | 4,121 | 6,094 | 11,759 | 18,437 | 26,726 | 36,060 |
| **Tax losses on production and imports[1] ($ millions)*** | $14 | $20 | $39 | $62 | $90 | $121 |
| **Trucking costs ($ millions)*** | $6 | $6 | $6 | $15 | $26 | $107 |
| **Utility revenue losses ($ millions)*** | $154 | $305 | $516 | $865 | $1,245 | $1,704 |
| **Utility tax revenue losses ($ millions)*** | $2 | $5 | $9 | $16 | $23 | $31 |

[1] Estimates apply to the water-intensive portion of non-residential municipal water use.
* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.6 Impacts of Steam-Electric Power Water Shortages

One of the 21 counties in the Region are projected to experience water shortages in the steam-electric water category. Estimated impacts to this water use category appear in Table 4-6.

Note that estimated economic impacts to steam-electric power water users:

- Are reflected as an income loss proxy in the form of estimated additional purchasing costs for power from the electrical grid to replace power that could not be generated due to a shortage;
- Do not include estimates of impacts on jobs. Because of the unique conditions of power generators during drought conditions and lack of relevant data, it was assumed that the industry would retain, perhaps relocating or repurposing, their existing staff in order to manage their ongoing operations through a severe drought.
- Do not presume a decline in tax collections. Associated tax collections, in fact, would likely increase under drought conditions since, historically, the demand for electricity increases during times of drought, thereby increasing taxes collected on the additional sales of power.

**Table 4-6 Impacts of water shortages on steam-electric power**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Income Losses ($ millions)*** | $30 | $30 | $30 | $30 | $30 | $30 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

## 4.7 Regional Social Impacts

Projected changes in population, based upon several factors (household size, population, and job loss estimates), as well as the accompanying change in school enrollment, were also estimated and are summarized in Table 4-7.

**Table 4-7 Region-wide social impacts of water shortages**

| Impacts measure | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| **Consumer surplus losses ($ millions)*** | $52 | $127 | $264 | $611 | $1,304 | $2,428 |
| **At risk population out-migration** | 21,260 | 22,362 | 24,037 | 25,916 | 28,140 | 20,847 |
| **At risk school enrollment losses** | 3,880 | 4,081 | 4,387 | 4,730 | 5,136 | 3,805 |

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

# Appendix A - County Level Summary of Regional Estimated Economic Impacts

County level summary of estimated regional economic impacts of not meeting identified water needs by water use category and decade (in 2023 dollars, rounded). Values are presented only for counties with projected economic impacts for at least one decade.

**(* Entries denoted by a dash (-) indicate no estimated economic impact)**

| | | Income losses ($ millions) | | | | | | At risk job losses | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **County** | **Water Use Category** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Atascosa | Mining | $ 1,440.27 | $ 1,576.88 | $ 1,710.43 | $ 1,836.57 | $ 1,954.41 | $ - | 5,242 | 5,739 | 6,226 | 6,685 | 7,114 | - |
| Atascosa | Municipal | $ 1.72 | $ 2.33 | $ 2.97 | $ 3.40 | $ 4.02 | $ 4.97 | 22 | 30 | 38 | 44 | 52 | 64 |
| **Atascosa Total** | | $ 1,442.00 | $ 1,579.21 | $ 1,713.41 | $ 1,839.96 | $ 1,958.43 | $ 4.97 | 5,264 | 5,770 | 6,264 | 6,728 | 7,165 | 64 |
| Bexar | Manufacturing | $ - | $ - | $ 45.34 | $ 177.63 | $ 383.22 | $ 661.67 | - | - | 333 | 1,304 | 2,814 | 4,858 |
| Bexar | Municipal | $ 181.80 | $ 207.54 | $ 225.99 | $ 244.27 | $ 276.93 | $ 359.47 | 2,346 | 2,678 | 2,917 | 3,152 | 3,574 | 4,639 |
| **Bexar Total** | | $ 181.80 | $ 207.54 | $ 271.33 | $ 421.90 | $ 660.14 | $ 1,021.14 | 2,346 | 2,678 | 3,249 | 4,457 | 6,387 | 9,497 |
| Caldwell | Manufacturing | $ 5.90 | $ 6.56 | $ 7.22 | $ 7.87 | $ 8.53 | $ 9.18 | 55 | 61 | 67 | 73 | 79 | 85 |
| Caldwell | Municipal | $ 0.06 | $ 0.59 | $ 1.24 | $ 5.24 | $ 20.06 | $ 39.46 | 1 | 7 | 16 | 67 | 239 | 454 |
| **Caldwell Total** | | $ 5.96 | $ 7.14 | $ 8.46 | $ 13.12 | $ 28.59 | $ 48.64 | 55 | 68 | 82 | 139 | 318 | 539 |
| Calhoun | Irrigation | $ 5.83 | $ 5.83 | $ 5.83 | $ 5.83 | $ 5.83 | $ 5.83 | 314 | 314 | 314 | 314 | 314 | 314 |
| Calhoun | Manufacturing | $ - | $ - | $ - | $ 28.72 | $ 125.10 | $ 277.09 | - | - | - | 130 | 565 | 1,251 |
| **Calhoun Total** | | $ 5.83 | $ 5.83 | $ 5.83 | $ 34.55 | $ 130.93 | $ 282.92 | 314 | 314 | 314 | 444 | 879 | 1,565 |
| Comal | Mining | $ 141.28 | $ 380.75 | $ 610.70 | $ 790.24 | $ 963.35 | $ 1,122.58 | 962 | 2,592 | 4,158 | 5,380 | 6,558 | 7,642 |
| Comal | Municipal | $ 9.29 | $ 66.03 | $ 257.90 | $ 459.37 | $ 733.30 | $ 1,030.60 | 120 | 852 | 3,328 | 5,928 | 9,464 | 13,300 |
| **Comal Total** | | $ 150.58 | $ 446.78 | $ 868.60 | $ 1,249.61 | $ 1,696.65 | $ 2,153.18 | 1,082 | 3,444 | 7,486 | 11,308 | 16,022 | 20,943 |
| Dimmit | Irrigation | $ 3.18 | $ 3.18 | $ 3.18 | $ 3.18 | $ 3.18 | $ 3.18 | 66 | 66 | 66 | 66 | 66 | 66 |
| Dimmit | Mining | $ 4,243.36 | $ 4,243.36 | $ 4,243.36 | $ 4,243.36 | $ 4,243.36 | $ - | 14,024 | 14,024 | 14,024 | 14,024 | 14,024 | - |
| Dimmit | Municipal | $ - | $ - | $ - | $ 0.01 | $ 0.14 | $ 0.24 | - | - | - | 0 | 2 | 3 |
| **Dimmit Total** | | $ 4,246.54 | $ 4,246.54 | $ 4,246.54 | $ 4,246.55 | $ 4,246.68 | $ 3.41 | 14,090 | 14,090 | 14,090 | 14,090 | 14,092 | 69 |
| Frio | Mining | $ 3,188.65 | $ 3,189.44 | $ 3,189.44 | $ 3,190.23 | $ 3,190.23 | $ - | 10,518 | 10,521 | 10,521 | 10,523 | 10,523 | - |
| Frio | Municipal | $ 0.81 | $ 3.18 | $ 5.53 | $ 5.97 | $ 6.49 | $ 7.09 | 10 | 41 | 71 | 77 | 84 | 92 |
| **Frio Total** | | $ 3,189.46 | $ 3,192.62 | $ 3,194.97 | $ 3,196.20 | $ 3,196.72 | $ 7.09 | 10,528 | 10,562 | 10,592 | 10,600 | 10,607 | 92 |
| Goliad | Irrigation | $ 0.00 | $ - | $ - | $ - | $ - | $ - | 0 | - | - | - | - | - |
| **Goliad Total** | | $ 0.00 | $ - | $ - | $ - | $ - | $ - | 0 | - | - | - | - | - |

| | | Income losses ($ millions) | | | | | | At risk job losses | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **County** | **Water Use Category** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Gonzales | Mining | $ 2,593.36 | $ 2,616.93 | $ 2,644.07 | $ 2,671.21 | $ 2,699.07 | $ - | 8,671 | 8,750 | 8,840 | 8,931 | 9,024 | - |
| **Gonzales Total** | | $ 2,593.36 | $ 2,616.93 | $ 2,644.07 | $ 2,671.21 | $ 2,699.07 | $ - | 8,671 | 8,750 | 8,840 | 8,931 | 9,024 | - |
| Guadalupe | Mining | $ 323.19 | $ 323.19 | $ 323.19 | $ 323.19 | $ 323.19 | $ - | 1,009 | 1,009 | 1,009 | 1,009 | 1,009 | - |
| Guadalupe | Municipal | $ 7.77 | $ 44.35 | $ 124.49 | $ 204.88 | $ 293.96 | $ 398.09 | 100 | 572 | 1,607 | 2,644 | 3,794 | 5,137 |
| **Guadalupe Total** | | $ 330.96 | $ 367.54 | $ 447.68 | $ 528.07 | $ 617.15 | $ 398.09 | 1,110 | 1,582 | 2,616 | 3,654 | 4,803 | 5,137 |
| Hays | Municipal | $ 29.15 | $ 55.29 | $ 148.78 | $ 288.88 | $ 448.22 | $ 588.52 | 376 | 714 | 1,920 | 3,728 | 5,784 | 7,595 |
| **Hays Total** | | $ 29.15 | $ 55.29 | $ 148.78 | $ 288.88 | $ 448.22 | $ 588.52 | 376 | 714 | 1,920 | 3,728 | 5,784 | 7,595 |
| Karnes | Irrigation | $ 0.08 | $ 0.08 | $ 0.70 | $ 0.70 | $ 0.70 | $ 0.70 | 2 | 2 | 15 | 15 | 15 | 15 |
| Karnes | Mining | $ 1,138.29 | $ 1,138.29 | $ 1,138.29 | $ 1,138.29 | $ 1,138.29 | $ - | 3,755 | 3,755 | 3,755 | 3,755 | 3,755 | - |
| **Karnes Total** | | $ 1,138.37 | $ 1,138.37 | $ 1,138.99 | $ 1,138.99 | $ 1,138.99 | $ 0.70 | 3,756 | 3,756 | 3,770 | 3,770 | 3,770 | 15 |
| Kendall | Manufacturing | $ 3,393.70 | $ 3,551.55 | $ 3,709.39 | $ 3,867.24 | $ 4,025.09 | $ 4,182.93 | 40,378 | 42,256 | 44,134 | 46,012 | 47,890 | 49,768 |
| Kendall | Municipal | $ - | $ 2.17 | $ 51.20 | $ 121.00 | $ 190.68 | $ 268.87 | - | 28 | 661 | 1,562 | 2,461 | 3,470 |
| **Kendall Total** | | $ 3,393.70 | $ 3,553.72 | $ 3,760.60 | $ 3,988.24 | $ 4,215.77 | $ 4,451.81 | 40,378 | 42,284 | 44,795 | 47,574 | 50,351 | 53,238 |
| La Salle | Irrigation | $ 0.03 | $ 0.03 | $ 0.03 | $ 0.03 | $ 0.03 | $ 0.03 | 1 | 1 | 1 | 1 | 1 | 1 |
| La Salle | Mining | $ 3,847.50 | $ 3,847.50 | $ 3,847.50 | $ 3,847.50 | $ 3,847.50 | $ - | 12,691 | 12,691 | 12,691 | 12,691 | 12,691 | - |
| **La Salle Total** | | $ 3,847.53 | $ 3,847.53 | $ 3,847.53 | $ 3,847.53 | $ 3,847.53 | $ 0.03 | 12,692 | 12,692 | 12,692 | 12,692 | 12,692 | 1 |
| Medina | Irrigation | $ 9.87 | $ 9.91 | $ 9.94 | $ 9.97 | $ 10.00 | $ 10.02 | 247 | 248 | 249 | 250 | 250 | 251 |
| Medina | Mining | $ 257.38 | $ 290.71 | $ 320.07 | $ 346.72 | $ 370.16 | $ 389.54 | 1,752 | 1,979 | 2,179 | 2,360 | 2,520 | 2,652 |
| Medina | Municipal | $ 9.53 | $ 9.96 | $ 11.78 | $ 14.83 | $ 17.92 | $ 20.39 | 123 | 129 | 152 | 191 | 231 | 263 |
| **Medina Total** | | $ 276.78 | $ 310.58 | $ 341.80 | $ 371.52 | $ 398.07 | $ 419.95 | 2,123 | 2,356 | 2,580 | 2,802 | 3,002 | 3,166 |
| Uvalde | Irrigation | $ 9.73 | $ 9.73 | $ 9.73 | $ 9.73 | $ 9.73 | $ 9.73 | 207 | 207 | 207 | 207 | 207 | 207 |
| Uvalde | Mining | $ 136.13 | $ 154.66 | $ 173.87 | $ 192.15 | $ 209.74 | $ 226.41 | 927 | 1,053 | 1,184 | 1,308 | 1,428 | 1,541 |
| Uvalde | Municipal | $ 3.87 | $ 2.98 | $ 1.99 | $ 1.07 | $ 0.39 | $ - | 50 | 38 | 26 | 14 | 5 | - |
| **Uvalde Total** | | $ 149.73 | $ 167.37 | $ 185.58 | $ 202.94 | $ 219.86 | $ 236.14 | 1,184 | 1,299 | 1,417 | 1,529 | 1,640 | 1,749 |
| Victoria | Manufacturing | $ 5,720.25 | $ 5,934.47 | $ 6,156.61 | $ 6,386.98 | $ 6,625.86 | $ 6,873.55 | 32,912 | 34,145 | 35,423 | 36,748 | 38,123 | 39,548 |
| Victoria | Mining | $ 47.86 | $ 50.56 | $ 52.96 | $ 54.80 | $ 56.50 | $ 57.78 | 250 | 264 | 277 | 286 | 295 | 302 |
| Victoria | Municipal | $ 74.25 | $ 76.12 | $ 76.62 | $ 75.94 | $ 75.17 | $ 74.28 | 958 | 982 | 989 | 980 | 970 | 959 |
| Victoria | Steam Electric Power | $ 29.67 | $ 29.67 | $ 29.67 | $ 29.67 | $ 29.67 | $ 29.67 | - | - | - | - | - | - |
| **Victoria Total** | | $ 5,872.04 | $ 6,090.81 | $ 6,315.86 | $ 6,547.39 | $ 6,787.21 | $ 7,035.28 | 34,121 | 35,391 | 36,688 | 38,015 | 39,388 | 40,808 |
| Wilson | Manufacturing | $ 0.62 | $ 1.68 | $ 3.15 | $ 4.98 | $ 8.34 | $ 12.37 | 5 | 13 | 24 | 37 | 62 | 92 |

| | | Income losses ($ millions) | | | | | | At risk job losses | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **County** | **Water Use Category** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** | **2030** | **2040** | **2050** | **2060** | **2070** | **2080** |
| Wilson | Municipal | $ 1.07 | $ 1.69 | $ 2.70 | $ 3.82 | $ 5.16 | $ 6.44 | 14 | 22 | 35 | 49 | 67 | 83 |
| **Wilson Total** | | $ 1.69 | $ 3.37 | $ 5.84 | $ 8.80 | $ 13.51 | $ 18.81 | 18 | 34 | 58 | 87 | 129 | 176 |
| Zavala | Irrigation | $ 6.74 | $ 6.74 | $ 6.74 | $ 6.74 | $ 6.74 | $ 6.74 | 163 | 163 | 163 | 163 | 163 | 163 |
| Zavala | Manufacturing | $ 71.52 | $ 74.16 | $ 76.90 | $ 79.73 | $ 82.66 | $ 85.69 | 636 | 660 | 684 | 709 | 735 | 762 |
| Zavala | Mining | $ 2,896.49 | $ 2,896.49 | $ 2,896.49 | $ 2,896.49 | $ 2,896.49 | $ - | 9,554 | 9,554 | 9,554 | 9,554 | 9,554 | - |
| **Zavala Total** | | $ 2,974.75 | $ 2,977.39 | $ 2,980.12 | $ 2,982.96 | $ 2,985.89 | $ 92.43 | 10,353 | 10,377 | 10,401 | 10,426 | 10,453 | 925 |
| **Region L Total** | | **$ 29,830.23** | **$ 30,814.56** | **$ 32,125.99** | **$ 33,578.43** | **$ 35,289.40** | **$ 16,763.11** | **148,463** | **156,161** | **167,856** | **180,974** | **196,508** | **145,580** |

# Addendum to Socioeconomic Impact Analysis for the 2026 Regional Water Plans

After the release of the socioeconomic impact analysis regional reports, the TWDB determined that a portion of the multi-faceted socio-economic impact estimates likely include upwardly biased impact results. It appears that the baseline value-added per acre-foot, used to determine the final drought degree adjusted impact estimates, may be inflated for the manufacturing water use sector. A similar conclusion applies for the estimates for jobs at risk and tax collections within that sector since all three measures rely upon a similar calculation procedure and required datasets.

Initial estimates for the value-added per acre-foot of water use are obtained using IMPLAN data coupled with TWDB Water Use Survey data. These calculations are limited to production subsectors (4-digit NAICS codes) for which TWDB Water Use Survey data was available and deemed reliable. These value-added estimates are adjusted downward, if necessary, to better correspond to the footprint of the data collected in the Water Use Survey. This is done to better match the productivity estimate from IMPLAN with the quantitative estimate of the water used to produce that output. The adjustment process involves using the proportion of the number of firms surveyed in the Water Use Survey versus the number of firms in the U.S. Census County Business Pattern data, limited to those firms with more than 50 employees. This approach assumes that the Water Use Survey captures water use from the larger water users in the state for the manufacturing sector.

Historically, this methodology has served the socio-economic impact estimation effort well, yet several factors have combined to result in likely upwardly biased estimates during this cycle that include:

- Adherence to the usual 5-year increment to access baseline IMPLAN value-added estimates prompted use of year 2021 data, a year with significant economic impacts as well as data collection issues prompted by the COVID pandemic, and
- Increased data suppression (reduced geographic data coverage) within the U.S. Census County Business Pattern Employment Data

This addendum is to make consumers of this analysis aware of the potentially skewed results for the manufacturing sector. Factors that are at play in this likely overestimated impact include: abnormal data collection results accompanying the COVID pandemic resulting in much higher than normal impact estimates for this water use sector, and reality-check values for the value-added per acre-foot of water that are almost non-existent within the research literature. The few research-based values that do exist, however, apply for periods ten or more years ago and/or foreign countries. Neither of these sources are deemed as being reliable for determining a reasonable upper bound or reliable estimate for this unique impact measure. The net effect is believed to overstate large projected income losses, jobs at risk, and tax collections within the manufacturing sector. This likely impacts a number of the sixteen planning regions but cannot be conclusively determined prior to planning groups needing to adopt their final regional water plans.

FINAL PLAN

# CHAPTER 7: DROUGHT RESPONSE INFORMATION, ACTIVITIES, AND RECOMMENDATIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**7.0 Drought Response Information, Activities, and Recommendations ..... 7-1**

7.1 Droughts of Record in the Regional Water Planning Area ..... 7-1

7.1.1 Current Drought of Record ..... 7-1

7.1.2 Potential Droughts of Record ..... 7-2

7.1.3 Drought Indicators ..... 7-2

7.2 Uncertainty and Droughts Worse Than the Drought of Record ..... 7-6

7.2.1 Planning Factors Associated with Uncertainty ..... 7-6

7.2.2 Measures to Plan Beyond Meeting Needs During Drought of Record ..... 7-7

7.2.3 Potential Measures and Responses Available During Droughts Worse Than the Drought of Record ..... 7-7

7.3 Current Drought Preparations and Response ..... 7-8

7.3.1 Overall Current Drought Preparations in South Central Texas Region ..... 7-8

7.3.2 Drought Response Triggers and Actions ..... 7-8

7.3.3 Regional Water Supplier Roles in Droughts ..... 7-9

7.4 Existing and Potential Emergency Interconnects ..... 7-10

7.5 Drought Water Management Strategies ..... 7-11

7.5.1 Municipal Drought Management ..... 7-11

7.5.2 Irrigation Drought Management ..... 7-14

7.5.3 Livestock Drought Management ..... 7-15

7.6 Emergency Responses to Local Drought Conditions or Loss of Municipal Supply ..... 7-15

7.6.1 Sole Source: Groundwater ..... 7-19

7.6.2 Sole Source: Surface Water ..... 7-20

7.7 Other Drought-Related Considerations and Recommendations ..... 7-21

7.7.1 Monitoring and Assessment ..... 7-21

7.7.2 Drought Preparedness Council Recommendations ..... 7-21

7.8 Region-Specific Drought Response Recommendations and Model Drought Contingency Plans ..... 7-23

7.8.1 Recommended Surface Water Triggers and Responses ..... 7-23

7.8.2 Recommended Groundwater Triggers and Responses ..... 7-26

7.8.3 Recommended Triggers and Responses for Irrigation and Steam-Electric Uses ..... 7-28

7.8.4 Model Drought Contingency Plans ..... 7-29

## APPENDICES

Appendix 7A: Summary of Drought Response Measures

Appendix 7B: Existing and Potential Emergency Interconnection Information

Appendix 7C: Drought Preparedness Council Letter to Region L, Dated February 8, 2024

## LIST OF TABLES

Table 7-1 Yield for the Municipal Drought Management WMS (acft/yr) ..... 7-11
Table 7-2 Irrigation Drought Management WMS Yield (acft/yr) ..... 7-14
Table 7-3 WUGs Identified for Emergency Drought Response Evaluation ..... 7-16
Table 7-4 Emergency Water Shortage Responses for Groundwater Dependent WUGs ..... 7-20
Table 7-5 Emergency Water Shortage Responses for Surface Water Dependent WUGs ..... 7-20
Table 7-6 Surface Water Drought Contingency Plan for GBRA ..... 7-24
Table 7-7 Groundwater Drought Contingency Plan for SAWS ..... 7-27

## LIST OF FIGURES

Figure 7-1 NOAA Climate Divisions in the South Central Texas Region ..... 7-3
Figure 7-2 Palmer Drought Severity Index: Division 6 ..... 7-4
Figure 7-3 Palmer Drought Severity Index: Division 7 ..... 7-4
Figure 7-4 Palmer Drought Severity Index: Division 8 ..... 7-5
Figure 7-5 Palmer Drought Severity Index: Division 9 ..... 7-5
Figure 7-6 EAA Critical Period Management Plan for the Uvalde Pool ..... 7-28
Figure 7-7 EAA Critical Period Management Plan for the San Antonio Pool ..... 7-29

# List of Abbreviations

| | |
|---|---|
| % | Percent |
| acft/yr | Acre-Feet per Year |
| amsl | Above Mean Sea Level |
| BFZ | Balcones Fault Zone |
| cfs | Cubic Feet per Second |
| DCP | Drought Contingency Plan |
| DWDOR | Drought Worse than the Drought of Record |
| EAA | Edwards Aquifer Authority |
| El | Elevation |
| ft-msl | Feet Mean Sea Level |
| GBRA | Guadalupe-Blanco River Authority |
| GSA | Guadalupe-San Antonio |
| HSD | Hybrid Synthetic Drought |
| EAHCP | Edwards Aquifer Habitat Conservation Plan |
| NOAA | National Oceanic and Atmospheric Administration |
| PDSI | Palmer Drought Severity Index |
| Region L | South Central Texas Region |
| RWP | Regional Water Plan |
| RWPG | Regional Water Planning Group |
| SAWS | San Antonio Water System |
| SCTRWP | South Central Texas Regional Water Plan |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SUD | Special Utility District |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| TPWD | Texas Parks and Wildlife Department |
| TWC | Texas Water Code |
| TWDB | Texas Water Development Board |
| USGS | United States Geological Survey |
| VISPO | Voluntary Irrigation Suspension Program Option |
| WAM | Water Availability Model |
| WCID | Water Control and Improvement District |
| WMS | Water Management Strategy |
| WSC | Water Supply Corporation |

| | |
|---|---|
| WUG | Water User Group |
| WWP | Wholesale Water Provider |

# 7.0 Drought Response Information, Activities, and Recommendations

Droughts are of great importance to the planning and management of water resources in Texas. Although droughts can occur in all climatic zones, they have the greatest potential to become environmental disasters in dry or arid regions like Texas. It is not uncommon for mild droughts to occur over short periods of time in Texas; however, there is no concrete way to predict how long or severe a drought will be while it is occurring. The only defense available to drought-prone water user groups (WUGs), such as those in the South Central Texas (Region L) Regional Water Planning Area (SCTRWPA), is proper planning and preparation for worst-case scenarios. This requires understanding of drought patterns and the historical droughts in the region.

Over the last several decades, demands for water have increased significantly and are expected to continue growing in the SCTRWPA (refer to Chapter 2). With growing demand and the threat of climate change contributing to water scarcity, planning is even more important to prevent shortages, deterioration of water quality, and lifestyle/financial impacts on water suppliers and users. This chapter presents information on drought preparedness in the SCTRWPA, including regional droughts of record, current drought preparations and response, existing and potential emergency interconnects, emergency responses to local drought conditions, region-specific drought response recommendations, drought water management strategies (WMSs), and other drought-related considerations and recommendations.

## 7.1 Droughts of Record in the Regional Water Planning Area

One of the best tools in drought preparedness is a thorough understanding of the drought of record, or the worst drought to occur for an area during the available period of record. However, there are many ways that the "worst drought" can be defined (degree of dryness, agricultural impacts, socioeconomic impacts, effects of precipitation, etc.). Regional water planning focuses on hydrological drought, which is typically the type of drought associated with the largest shortfalls in surface and/or subsurface water supply. The frequency and severity of hydrological drought is often defined on a watershed or river basin scale, although it could be different from one area to the next, even within a planning region.

### 7.1.1 Current Drought of Record

In terms of severity and duration, the devastating drought of the 1950s is considered the drought of record for most of the state, including the South Central Texas Region. By 1956, 244 of the 254 counties were considered disaster areas. This drought lasted almost a decade in many places and affected not only Texas but other states throughout the nation as well. The 1950s drought has been used by water resource engineers and managers as a benchmark drought for water supply planning since the regional water planning process was implemented.

For the Guadalupe-San Antonio (GSA) River Basin within the SCTRWPA, the drought of the 1950s remains the drought of record. In the upper portions of the GSA River Basin, the 1950s drought started in summer of 1947 and continued into early 1957. In the lower basin area near the Gulf Coast, the drought was a 3-year period between 1954 and 1956.

Until recently, the 1950s drought was the drought of record for the Nueces River Basin as well. However, the 1990s drought was severe and prolonged enough that it is now considered the drought of record for the Nueces River Basin within the SCTRWPA.

### 7.1.2 Potential Droughts of Record

Although the 1950s and 1990s droughts are considered the drought of record for the GSA River Basin and the Nueces River Basin, respectively, there have been several droughts that have been considered as potential droughts of records. Two recent droughts, in 2008 and 2011, have been discussed, but not widely accepted, as potential new droughts of record for parts of the state.

In 2011, decreased precipitation led to substantial declines in streamflow throughout the state, resulting in severe drought. Record high temperatures also occurred June through August, leading to increased evaporation rates. The net evaporation was so high that by August 4, 2011, state climatologist John Nielson-Gammon declared 2011 to be the worst one-year drought on record in Texas [1]. The 2011 water year statewide annual precipitation was 11.27 inches, more than 2 inches below the previous record in 1956 of 13.91 inches. While the 2011 water year drought was severe and can provide helpful information to water planners and managers throughout the state, the duration of the 1950s and 1990s droughts combined with the overall severity in the South Central Texas Region suggests that these are still the best choices as the drought of record for regional planning purposes for the GSA River Basin and the Nueces River Basin, respectively.

### 7.1.3 Drought Indicators

#### 7.1.3.1 Water Availability Modeling

Engineers and planners often use surface water models to demonstrate the effects of historical droughts on water supply. Surface water effects are more readily observed than groundwater effects, and reservoir supplies that were not built before historic droughts can be assessed using historic hydrology. The primary tool used to observe the performance of reservoirs and surface water supplies under historic drought conditions in the SCTRWPA is the Texas Commission on Environmental Quality (TCEQ) water availability model (WAM). The TCEQ has developed WAMs for individual river and coastal basins. For the SCTRWPA, the relevant WAMs include the GSA River Basin WAM, Nueces River Basin WAM, Lavaca-Guadalupe Coastal Basin WAM, San Antonio-Nueces Coastal Basin WAM, and Nueces-Rio Grande Coastal Basin WAM.

The GSA WAM is used for the 2026 South Central Texas Regional Water Plan (SCTRWP) to determine the available flow and firm yields for surface water projects and to observe the cumulative effects on the SCTRWPA. The GSA WAM includes hydrologic information from 1934 through 1989 and supports the use of the 1950s drought as the drought of record for all reservoirs within the SCTRWPA. The Nueces WAM includes hydrologic information from 1934 through 1996 and supports the use of the 1990s drought as the drought of record for all reservoirs within the SCTRWPA. However, the GSA WAM and Nueces WAM

[1] Winters, K.E. A historical perspective on precipitation, drought severity, and streamflow in Texas during 1951–56 and 2011. U.S. Geological Survey Scientific Investigations Report 2013–5113, p.1 http://pubs.usgs.gov/sir/2013/5113. 2013.

have not been updated to include hydrology and precipitation information to assess periods of drought after 1989 and 1996, respectively.

### 7.1.3.2 Drought Indices

Most of the South Central Texas Region lies in Texas Climate Divisions 7 and 9, with small portions contained within Climate Divisions 6 and 8 (Figure 7-1). Several drought indices have been developed to assess drought severity using climatic and other quantitative inputs, such as precipitation, temperature, streamflow, soil moisture, and groundwater and reservoir levels. The Palmer Drought Severity Index (PDSI) was one of the first comprehensive efforts using precipitation and temperature for estimating the moisture of a region [2]. Index values range from as low as -10 for severe drought and up to +10 indicating wetter-than-normal conditions. As of the time of writing, PDSI information is available from the National Oceanic and Atmospheric Administration (NOAA) for climate regions across the country through 2024, which makes the PDSI a helpful tool for analyzing droughts that are not included in the TCEQ WAMs.

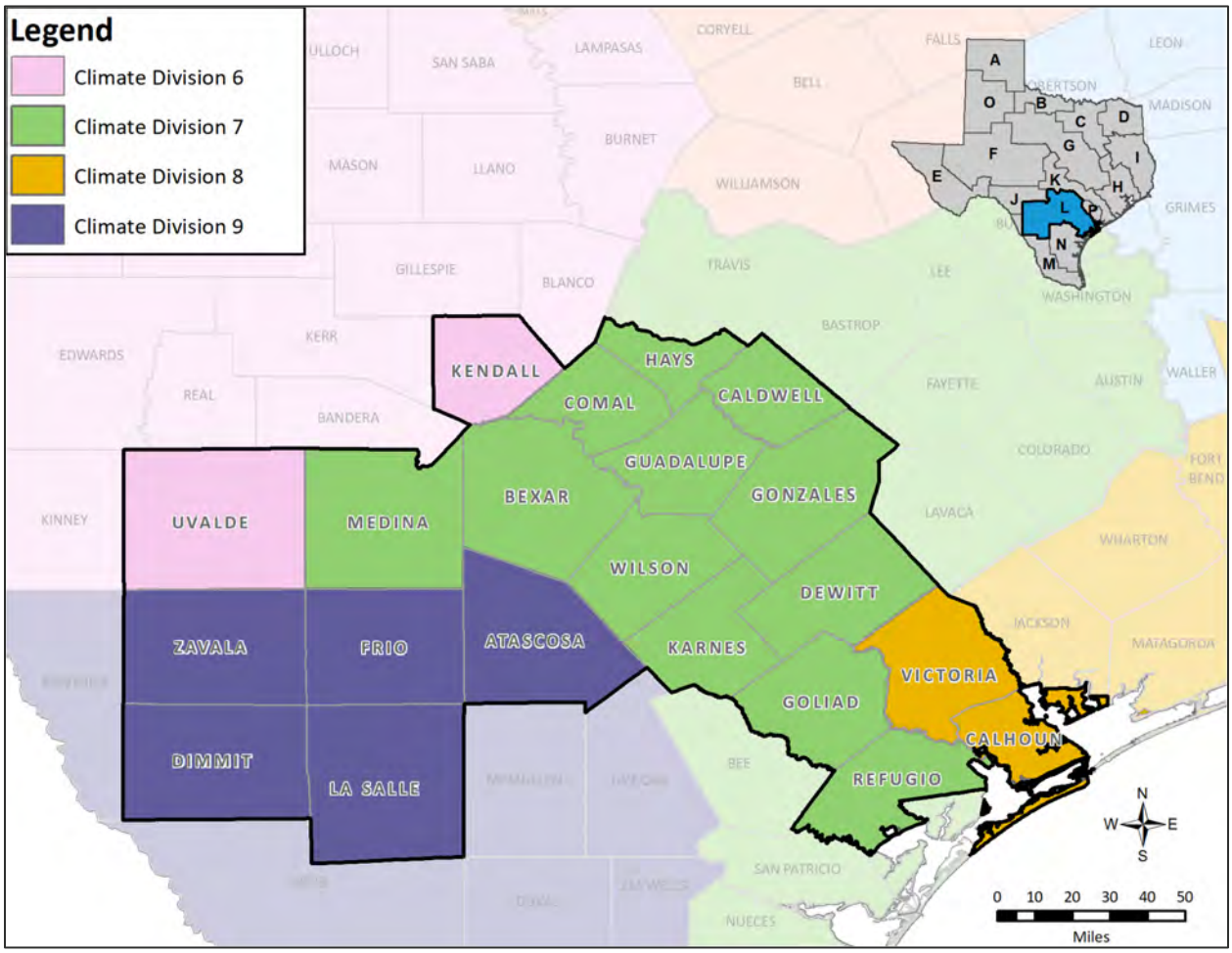



**Figure 7-1 NOAA Climate Divisions in the South Central Texas Region**

[2] Historical Palmer Drought Indices, National Oceanic and Atmospheric Administration (NOAA). National Centers for Environmental Information. https://www.ncei.noaa.gov/access/monitoring/historical-palmers/overview

Graphs of yearly PDSI values for Texas Climate Divisions 6, 7, 8, and 9 show that while the 1908 drought and more recent droughts in the early 21st century were severe, the drought of the 1950s was the most intense over a longer period of time, supporting the continued use of this drought as the drought of record for Region L (Figure 7-2 through Figure 7-5).

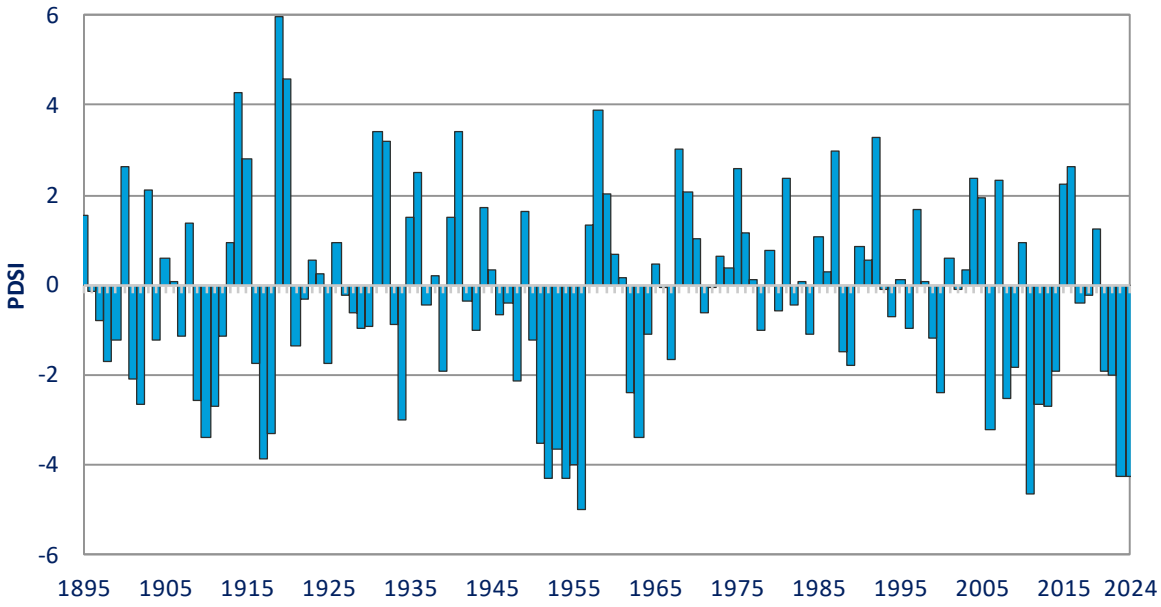



**Figure 7-2 Palmer Drought Severity Index: Division 6**

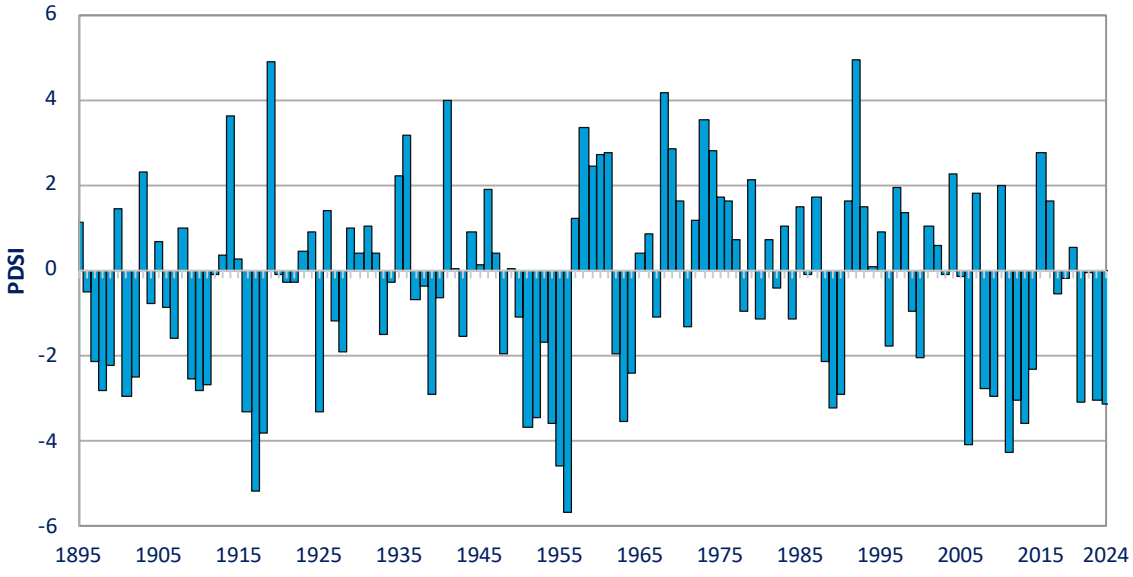



**Figure 7-3 Palmer Drought Severity Index: Division 7**

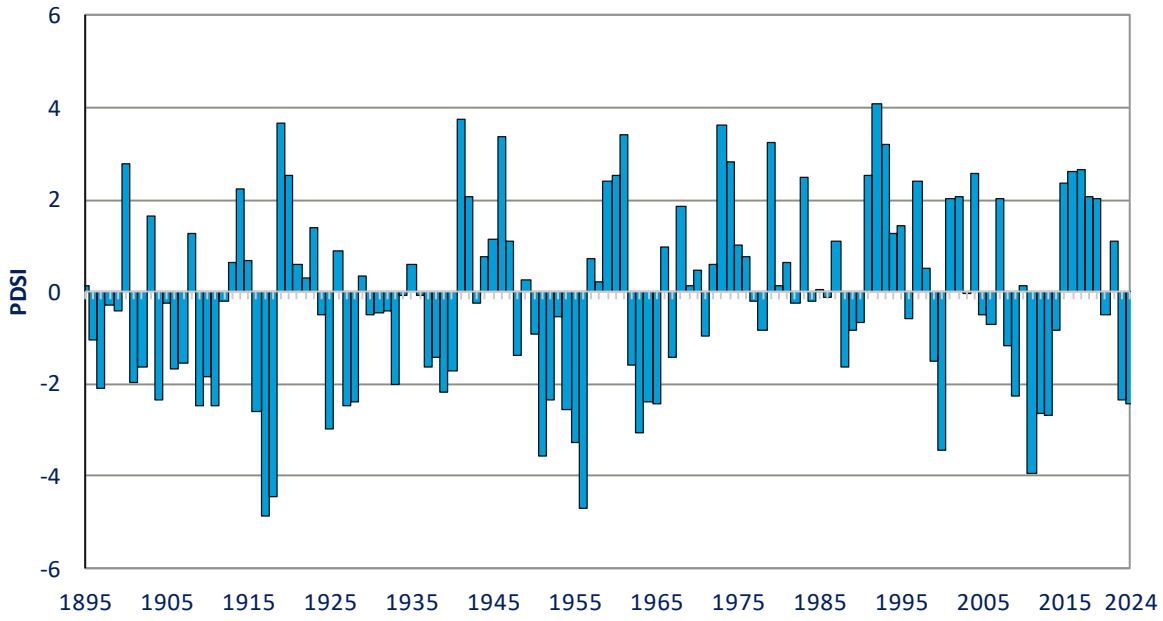



**Figure 7-4 Palmer Drought Severity Index: Division 8**

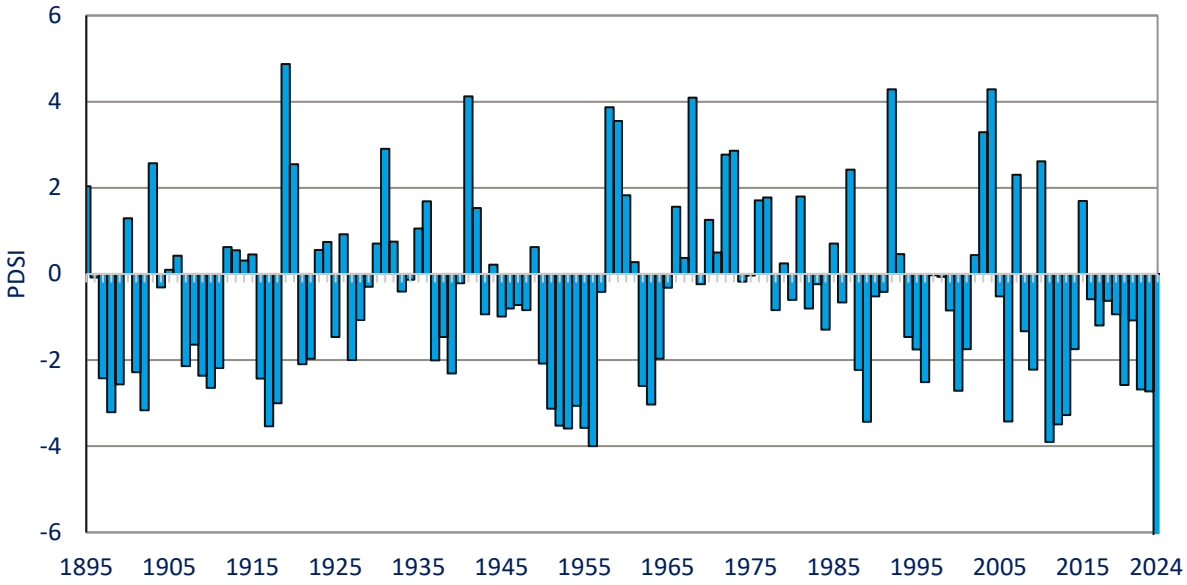



**Figure 7-5 Palmer Drought Severity Index: Division 9**

## 7.2 Uncertainty and Droughts Worse Than the Drought of Record

Regional Water Plans (RWPs) in Texas have historically considered and addressed water supply needs during a repeat of the drought of record. For the 6th cycle of regional water planning the Texas Water Development Board (TWDB) enables regional water planning groups (RWPGs) to choose to consider scenarios and/or qualitatively address uncertainty and a drought worse than the drought of record (DWDOR) in their region. For the 2026 RWPs, RWPGs must include a separate subsection that addresses planning for uncertainty and DWDOR. Specifically, the TWDB identified three items that must be addressed; the following sections describe the South Central Texas Regional Water Planning Group's (SCTRWPG) responses to each item.

### 7.2.1 Planning Factors Associated with Uncertainty

For the 2026 RWPs, the TWDB requires RWPs to include a summary of how the region incorporated planning for uncertainty in its RWP and the region's basis, or policy, for inclusion. This could include general discussion on planning factors, any drivers of uncertainty associated with those factors, and how the RWPG made planning decisions to acknowledge or address that uncertainty. If the RWP does not include any measures to address uncertainty, this subsection must include a statement to that effect.

The SCTRWPG incorporated planning for uncertainty and DWDOR by including data derived from water providers who used climate forecasting and variability tools to plan for DWDOR. For example, the 2026 SCTRWP includes data consistent with San Antonio Water System's (SAWS) 2024 Draft Water Management Plan, which applied a Hybrid Synthetic Drought (HSD) to estimate supplies, demands, and WMS firm yields. The HSD merged the drought of record conditions with the intensity of the 2011-2014 drought and is a reasonable approximation of climate-enhanced drought for the near-term since it already represents such an extreme condition.

The SCTRWPG recognizes that there is known, unquantified uncertainty associated with estimating population, water demands, hydrologic conditions, and WMS firm yields. On a region-wide basis, the SCTRWPG considered planning for uncertainty and DWDOR, such as incorporation of forecasting tools and climate models to evaluate supplies or application of a safety factor. However, the SCTRWPG chose not to plan for uncertainty or DWDOR on a regional scale at this time because forecasting tools have not been able to provide the resolution needed for water planning on a regional basis.

Instead, the SCTRWPG included a Legislative and Other Recommendation in Chapter 8 that recognizes that down-scaling of climate models is becoming more sophisticated, and the results are being considered in other planning efforts and models, such as WAMs. In Chapter 8, the SCTRWPG recommends that the:

1. Texas Legislature fund relevant studies and down-scaled regional models to incorporate available climate variability into the Regional Water Planning process; and
2. TWDB to reassess available climate models and consider incorporating them into Regional Water Planning.

### 7.2.2 Measures to Plan Beyond Meeting Needs During Drought of Record

For the 2026 RWPs, the TWDB requires RWPs to include a summary of the key assumptions, analyses, strategies, and projects that are already included in the 2026 RWP calculations and recommendations (if applicable) that go beyond just meeting identified water needs anticipated under a drought of record (i.e., those things that will provide some additional measure of protection to withstand a DWDOR such as use of safe-yield or inclusion of strategies that provide water volumes in excess of the identified water need, such as management supply factor, etc.).

The SCTRWPG considered incorporating planning measures that could address a DWDOR, such as a management supply (safety) factor to develop supplies in excess of projected needs. However, the SCTRWPG recognizes that supplies are understood best by the water suppliers and suggests that WUGs consider their demand projections, along with water supply volumes and reliability, to determine whether a safety factor or other planning measure would be appropriate to incorporate as a WUG-specific planning measure. Therefore, the SCTRWPG chose not to incorporate region-wide planning measures to address a DWDOR at this time.

### 7.2.3 Potential Measures and Responses Available During Droughts Worse Than the Drought of Record

For the 2026 RWPs, the TWDB requires RWPs to include a summary of the potential additional types of measures and responses that are not part of the recommendations in the 2026 RWP, but that would likely be available to certain water providers or users in the event of the near-term onset of a DWDOR.

In the event of a near-term onset of a DWDOR, WUGs and wholesale water providers (WWPs) within the SCTRWPA that do not have adequate management supplies could implement various measures and responses that would likely be available and capable of providing additional demand reductions or additional water supply capacities to withstand a DWDOR.

The following provides examples of demand management and water supply measures that WUGs or WWPs could implement during a DWDOR:

- Demand Management Measures:
  - For WUGs and WWPs that do not already have the Drought Management WMS included as a Recommended strategy in the SCTRWP: Implement Drought Management reductions associated with outdoor watering restrictions, conversion of irrigated crops to dry farming, or temporary suspension of water use.
  - For WUGs and WWPs with the Drought Management WMS included as a Recommended strategy in the SCTRWP: Implement additional drought management measures beyond those in the plan.
- Water Supply Measures:
  - Pursue new direct potable reuse to extend existing supplies.
  - Pursue a new groundwater well(s), given aquifer availability.
  - Pursue a new brackish groundwater well(s) with desalination, given aquifer availability.

- Pursue a new plan to blend brackish groundwater with existing water supply without additional desalination.
- Implement efforts to mitigate water loss.
- Implement new or existing emergency interconnects with other water providers.
- Purchase hauled water via trucked water systems.

## 7.3 Current Drought Preparations and Response

### 7.3.1 Overall Current Drought Preparations in South Central Texas Region

All WUGs and WWPs in the South Central Texas Region prepare for drought by participating in the regional water planning process, which attempts to meet projected water demands during a drought of severity equivalent to the drought of record. WUGs and WWPs that provide accurate information to TWDB and consider recommendations accepted by the SCTRWPG should be able to supply water to customers throughout drought periods. In addition, all WWPs and most municipalities develop individual drought contingency plans (DCPs) or emergency action plans to be implemented at various stages of a drought. Common responses include restriction of irrigation practices to certain days and times, the limitation of vehicle washing to those times or to commercial providers, and prohibiting washing of impervious surfaces. Several DCPs include restrictions on irrigation for golf courses specifically, as well as other athletic fields. Less-common responses include surcharges for usage above a certain allotment.

Throughout Texas, including the GSA River Basin, water rights are issued under the prior appropriation system. Curtailment of water rights has become necessary in recent droughts. The South Texas Watermaster Program is responsible for managing surface water rights in an area in South Central Texas according to "run-of-the-river" rights. The program has jurisdiction over the GSA and Nueces River Basins, as well as the Lavaca River Basin. Six watermaster deputies patrol the fifty counties in the jurisdictional area and enforce compliance with water rights.

### 7.3.2 Drought Response Triggers and Actions

Through timely implementation of drought response measures, it is possible to meet the goals of a DCP by avoiding, minimizing, or mitigating risks and impacts of water shortages and drought. To accomplish this, DCPs are built around a collection of drought triggers and responses that are based on various drought stages. Generally, stages are similar for all DCPs but can vary from entity to entity. Stage I normally represents mild water shortage conditions, and the severity of the situation will increase through the stages until emergency water conditions are reached and, in some cases, a water allocation stage is determined.

The TWDB provided RWPGs a list of entities that submit DCPs in accordance with statutory requirements in Texas Water Code (TWC) §11.1272. The SCTRWPG gathered and reviewed DCPs from each WUG included in the TWDB's list to identify and describe the drought management measures for WWPs, WUGs, and County-Other suppliers. The SCTRWPG reviewed each DCP to consider the stage, trigger, and response information during development of the drought management WMS (refer to Section 5.2.3). The majority of DCPs in the SCTRWPA have a voluntary Stage I and mandatory Stage II

and III categories. Most entities included a Stage IV, and a few entities specified a Stage V and/or Stage VI scenario. Target reductions, triggers, and responses are included for most stages. Drought management measures, represented by the drought triggers and responses in DCPs, are summarized for Region L entities in Appendix 7A.

In accordance with Title 31 of the Texas Administrative Code (TAC) §357.42(b)(2), the SCTRWPG considered whether there exist any unnecessary or counterproductive variations in drought response strategies. The SCTRWPG recognizes that each entity develops drought response measures and tailors them to their own unique circumstances and goals. In an effort to ensure that local water managers can continue to manage their local water supplies, the SCTRWPG chose to deem no variations in drought response strategies as unnecessary or counterproductive.

### 7.3.3 Regional Water Supplier Roles in Droughts

The TCEQ defines a DCP as "a strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies." The TCEQ requires all wholesale public water suppliers, retail public water suppliers serving 3,300 connections or more, and irrigation districts to submit DCPs. Public water suppliers serving fewer than 3,300 connections are required to have a DCP on file but are not required to submit it to TCEQ. In accordance with the requirements of 30 TAC §288(b), DCPs must be updated every five years and adopted by retail public water providers. According to a TCEQ handbook, the underlying philosophy of drought contingency planning includes the following:

- While often unpreventable, short-term water shortages and other water supply emergencies can be anticipated;
- The potential risks and impacts of drought or other emergency conditions can be considered and evaluated in advance of an actual event; and, most importantly; and
- Response measures and best management practices can be determined with implementation procedures defined, again in advance, to avoid, minimize, or mitigate the risks and impacts of drought-related shortages and other emergencies.

Model DCPs are available on TCEQ's website; however, it is not possible to create a model DCP that will adequately address local concerns throughout the State of Texas. The conditions that define a water shortage can be location-specific because most communities in the South Central Texas Region rely primarily on local water supplies. For example, some communities rely on reservoirs that are regularly operated at full conditions. In this case, a shortage could exist when the supplies are at 75 percent (%) capacity. Other reservoirs may rarely refill and be considered a concern at 25% capacity. Similarly, unique aquifer systems are considered at risk under location-specific conditions. While the approach to planning may be different among entities, all DCPs should include the following items:

- Specific, quantified targets for water use reductions;
- Drought response stages;
- Triggers to begin and end each stage;
- Supply management measures;

- Demand management measures;
- Descriptions of drought indicators;
- Notification procedures;
- Enforcement procedures;
- Procedures for granting exceptions;
- Public input to the plan;
- Ongoing public education;
- Adoption of plan; and
- Coordination with regional water planning group.

For water suppliers such as those in the SCTRWPA, the primary goal of DCP development is to have a plan that can ensure an uninterrupted supply of water in an amount that can satisfy essential human needs. A secondary but also important goal is to minimize negative impacts on quality of life, the economy, and the local environment. To meet these goals, action needs to be taken quickly, which is why an approved DCP needs to be in place before drought conditions occur.

In accordance with 30 TAC §288, most Region L entities have submitted DCPs to TCEQ for implementation when local shortages occur. May 1, 2024, was the most recent deadline for DCP submittals. The SCTRWPG obtained, reviewed, and considered DCPs for these WUGs and WWPs (Appendix 7A). These plans identify multiple triggers for initiation and termination of drought stages, responses to be implemented, and reduction targets for each stage. The plans also include information regarding public notification procedures and enforcement measures. Some WUGs or WWPs have included a method of granting a variance should the need arise.

## 7.4 Existing and Potential Emergency Interconnects

A goal of the regional planning process is to ensure a connected supply that meets or exceeds drought of record demands for the next 50 years. However, it is also important for regions to plan for emergency supplies in the event of a prolonged drought or an interruption/impairment of supply from an existing source. An emergency interconnection between two collaborating municipal water user groups (WUGs) can serve as an alternative means of providing emergency drinking water in lieu of trucking in supply or other expensive options. In accordance with 30 TAC §357 regional water planning guidelines, information was collected regarding existing emergency interconnections and potential future emergency interconnections that could be used in event of an emergency shortage of water.

High level information was collected regarding existing and potential emergency interconnections. In January 2020, a survey was emailed to WUGs in the SCTRWPA to request information regarding existing and future potential emergency interconnections. As part of the survey, where individual municipalities were asked to confirm or update interconnect information including the emergency water user and provider. Non-confidential information from the previous reports and surveys was compiled and used as the basis for information requests for the 2026 SCTRWP efforts.

In the South Central Texas Region, 51 existing emergency interconnections were identified among 39 WUGs, and seven potential emergency interconnects were identified. Of the 39 WUGs with existing interconnections, 30 WUGs had one interconnection, six WUGs had two interconnections, and three WUGs had three interconnections. Existing and potential emergency interconnection information for the SCTRWPA is summarized in Appendix 7B.

## 7.5 Drought Water Management Strategies

Regional water planning guidelines in 30 TAC §357.7(a)(7)(B) state, "Regional water plan development shall include an evaluation of all water management strategies the regional water planning group determines to be potentially feasible, including drought management measures including water demand management." As defined here, drought management means the periodic activation of approved DCPs resulting in short-term demand reduction and/or rationing. This reduction in demand is then considered a "supply" source. Using this approach, an entity may make the conscious decision not to develop firm water supplies greater than or equal to projected water demands with the understanding that demands will have to be reduced or go unmet during times of drought. Using this rationale, an economic impact of not meeting projected water demands can be estimated and compared with the costs of other potentially feasible WMSs in terms of annual unit costs.

The methodology and results of this analysis for Municipal, Irrigation, and Livestock Drought Management WMSs can be found in more detail in Section 5.2.3.

### 7.5.1 Municipal Drought Management

The Municipal Drought Management WMS was applied to whole WUGs in all decades, regardless of split region, which exhibited municipal needs before the application of water management strategies in any decade in the planning horizon. For the 2026 planning cycle, the SCTRWPG selected 10% demand reduction for all applicable WUGs, unless otherwise specified. The volumetric yields of implementing the Municipal Drought Management WMS are summarized in Table 7-1, reported in acre-feet per year (acft/yr) [3].

The Municipal Drought Management WMS was included as a Recommended strategy for all municipal WUGs, except for County-Other WUGs. Due to the decentralized nature of County-Other WUGs and the reduced ability to create and enforce restrictions on outdoor residential landscape irrigation, the Municipal Drought Management WMS was not identified as a potentially feasible strategy to meet needs.

**Table 7-1 Yield for the Municipal Drought Management WMS (acft/yr) [1]**

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 1 | Air Force Village II Inc | Bexar | 8 | 8 | 8 | 8 | 8 | 8 |
| 2 | Alamo Heights | Bexar | 88 | 88 | 88 | 88 | 88 | 88 |
| 3 | Aqua WSC [2] | Bexar | 10 | 11 | 13 | 14 | 16 | 18 |

[3] One acft is approximately 325,851 gallons.

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 4 | Atascosa Rural WSC | Bexar | 100 | 117 | 132 | 145 | 159 | 176 |
| 5 | Benton City WSC | Atascosa | 158 | 176 | 192 | 202 | 213 | 225 |
| 6 | Bexar County WCID 10 | Bexar | 71 | 80 | 88 | 95 | 103 | 113 |
| 7 | Boerne | Kendall | 213 | 293 | 396 | 516 | 653 | 810 |
| 8 | C Willow Water | Wilson | 7 | 8 | 8 | 9 | 10 | 11 |
| 9 | Canyon Lake Water Service (Texas Water Company) [2] | Comal | 827 | 1,131 | 1,323 | 1,448 | 1,916 | 2,432 |
| 10 | Carrizo Hill WSC | Dimmit | 3 | 4 | 4 | 5 | 6 | 9 |
| 11 | Castroville | Medina | 59 | 64 | 71 | 82 | 92 | 99 |
| 12 | Cibolo | Guadalupe | 207 | 252 | 301 | 353 | 413 | 482 |
| 13 | Clear Water Estates Water System (Texas Water Company) | Comal | 8 | 11 | 15 | 21 | 27 | 34 |
| 14 | Converse | Bexar | 284 | 285 | 285 | 285 | 285 | 285 |
| 15 | County Line SUD | Hays | 314 | 628 | 1,004 | 1,297 | 1,464 | 1,556 |
| 16 | Creedmoor-Maha WSC [2] | Hays | 112 | 202 | 292 | 381 | 472 | 563 |
| 17 | Crystal Clear SUD | Hays | 531 | 893 | 1,008 | 1,136 | 1,285 | 1,456 |
| 18 | Cuero | DeWitt | 76 | 76 | 76 | 75 | 75 | 75 |
| 19 | East Central SUD | Guadalupe | 472 | 535 | 592 | 644 | 702 | 767 |
| 20 | East Medina County SUD | Medina | 84 | 90 | 94 | 97 | 100 | 103 |
| 21 | El Oso WSC [2] | Karnes | 61 | 64 | 66 | 68 | 71 | 75 |
| 22 | Elmendorf | Bexar | 28 | 38 | 51 | 68 | 85 | 117 |
| 23 | Fair Oaks Ranch | Bexar | 74 | 88 | 95 | 98 | 99 | 99 |
| 24 | Fayette WSC [2] | Bexar | 0 | 0 | 1 | 1 | 1 | 1 |
| 25 | Fort Sam Houston | Comal | 47 | 47 | 47 | 47 | 47 | 47 |
| 26 | Garden Ridge | Caldwell | 211 | 261 | 311 | 368 | 436 | 517 |
| 27 | Goforth SUD [2] | Gonzales | 359 | 569 | 845 | 1,218 | 1,646 | 2,135 |
| 28 | Gonzales | Comal | 48 | 48 | 47 | 47 | 46 | 46 |
| 29 | Green Valley SUD | Calhoun | 380 | 508 | 652 | 805 | 980 | 1,179 |
| 30 | Guadalupe-Blanco River Authority | Medina | 91 | 127 | 123 | 119 | 115 | 110 |
| 31 | Hondo | Karnes | 59 | 57 | 55 | 56 | 56 | 56 |
| 32 | Karnes City | Kendall | 17 | 18 | 19 | 20 | 21 | 22 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 33 | Kendall West Utility | Bexar | 18 | 23 | 29 | 36 | 45 | 54 |
| 34 | Kirby | Comal | 63 | 71 | 72 | 72 | 72 | 72 |
| 35 | KT Water Development | Hays | 19 | 29 | 43 | 60 | 80 | 102 |
| 36 | Kyle | Medina | 542 | 809 | 1,102 | 1,235 | 1,279 | 1,312 |
| 37 | La Coste | Bexar | 11 | 11 | 11 | 11 | 11 | 12 |
| 38 | Leon Valley | Bexar | 142 | 172 | 172 | 172 | 172 | 172 |
| 39 | Live Oak | Caldwell | 85 | 85 | 85 | 85 | 85 | 85 |
| 40 | Lockhart | Caldwell | 141 | 153 | 166 | 179 | 192 | 205 |
| 41 | Luling | Caldwell | 38 | 38 | 39 | 41 | 42 | 44 |
| 42 | Lytle | Atascosa | 25 | 26 | 28 | 29 | 31 | 33 |
| 43 | Martindale WSC | Caldwell | 33 | 44 | 49 | 54 | 60 | 66 |
| 44 | Maxwell SUD | Caldwell | 197 | 265 | 356 | 479 | 644 | 711 |
| 45 | McCoy WSC [2] | Atascosa | 73 | 77 | 81 | 85 | 90 | 96 |
| 46 | Natalia | Medina | 11 | 11 | 11 | 12 | 12 | 11 |
| 47 | New Braunfels | Comal | 1,529 | 2,177 | 3,004 | 4,010 | 5,161 | 12,958 |
| 48 | Oak Hills WSC | Wilson | 78 | 91 | 105 | 121 | 140 | 162 |
| 49 | Pearsall | Frio | 74 | 85 | 92 | 93 | 95 | 96 |
| 50 | Picosa WSC | Wilson | 23 | 27 | 30 | 34 | 37 | 41 |
| 51 | Pleasanton | Atascosa | 111 | 121 | 132 | 144 | 157 | 171 |
| 52 | Port Lavaca | Calhoun | 79 | 76 | 72 | 68 | 64 | 60 |
| 53 | Runge | Karnes | 11 | 11 | 12 | 13 | 14 | 14 |
| 54 | S S WSC | Wilson | 165 | 191 | 216 | 238 | 264 | 294 |
| 55 | San Antonio Water System | Bexar | 26,865 | 29,834 | 31,670 | 33,099 | 34,211 | 35,879 |
| 56 | San Marcos | Hays | 1,168 | 1,646 | 2,028 | 2,309 | 2,491 | 2,608 |
| 57 | Schertz | Guadalupe | 574 | 699 | 830 | 960 | 1,111 | 1,283 |
| 58 | Seguin | Guadalupe | 537 | 633 | 679 | 706 | 734 | 763 |
| 59 | Selma | Bexar | 108 | 131 | 153 | 173 | 197 | 224 |
| 60 | Shavano Park | Bexar | 73 | 83 | 91 | 99 | 108 | 118 |
| 61 | South Buda WCID 1 | Hays | 47 | 77 | 116 | 168 | 229 | 298 |
| 62 | Springs Hill WSC | Guadalupe | 443 | 525 | 617 | 713 | 822 | 1,418 |
| 63 | Texas State University | Hays | 42 | 42 | 42 | 42 | 42 | 42 |
| 64 | The Oaks WSC | Bexar | 15 | 17 | 19 | 20 | 22 | 24 |

| No. | Water User Group | County | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| 65 | Universal City | Bexar | 184 | 194 | 197 | 198 | 199 | 199 |
| 66 | Uvalde | Uvalde | 135 | 133 | 129 | 125 | 121 | 116 |
| 67 | Victoria | Victoria | 670 | 680 | 683 | 680 | 676 | 672 |
| 68 | Victoria County WCID 1 | Victoria | 11 | 11 | 12 | 12 | 12 | 12 |
| 69 | Ville Dalsace Water Supply | Medina | 3 | 4 | 4 | 4 | 4 | 4 |
| 70 | Water Services | Bexar | 80 | 86 | 91 | 96 | 101 | 108 |
| 71 | Wimberley WSC | Hays | 44 | 64 | 91 | 126 | 167 | 214 |
| 72 | Wingert Water Systems | Comal | 14 | 16 | 18 | 19 | 19 | 19 |
| 73 | Yancey WSC | Medina | 54 | 57 | 59 | 61 | 63 | 65 |
| **All** | **Total** | **All** | **39,542** | **46,302** | **51,738** | **56,697** | **61,766** | **74,551** |

[1] Based on 10% demand reduction (acft/yr) unless otherwise stated.

[2] WUGs are split between Region L and other regions (Regions K, P, and/or N). Values in the table represent Region L portion of WUG's yield.

### 7.5.2 Irrigation Drought Management

Irrigation Drought Management is a demand reduction strategy associated with irrigation-related, voluntary reductions of groundwater during severe drought conditions.

This strategy is recommended for irrigation WUGs demonstrating needs that do not fall under the Edwards Aquifer Authority's (EAA) jurisdiction, as the EAA implements water restrictions by curtailment of water from the Edwards-Balcones Fault Zone (BFZ) Aquifer. The EAA's Critical Period Management Plan helps sustain aquifer and spring flow levels during times of drought by temporarily reducing the authorized withdrawal amounts of EAA permit holders.

It is assumed that the growth of agriculture would be reduced based on water available, and during severe drought conditions, farmers that use groundwater would reduce their usage by 10%. The PDSI is a resource that could be used for determining triggers for drought management strategies. The volumes of water saved are shown in Table 7-2.

**Table 7-2 Irrigation Drought Management WMS Yield (acft/yr)**

| Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation, Caldwell | 34 | 34 | 34 | 34 | 34 | 34 |
| Irrigation, Calhoun | 1,046 | 1,046 | 1,046 | 1,046 | 1,046 | 1,046 |
| Irrigation, Dimmit | 189 | 189 | 189 | 189 | 189 | 189 |
| Irrigation, Goliad | 313 | 313 | 313 | 313 | 313 | 313 |
| Irrigation, Guadalupe | 28 | 28 | 28 | 28 | 28 | 28 |
| Irrigation, Karnes | 82 | 82 | 82 | 82 | 82 | 82 |

| Water User Group | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|
| Irrigation, La Salle | 394 | 394 | 394 | 394 | 394 | 394 |
| Irrigation, Victoria | 1,109 | 1,109 | 1,109 | 1,109 | 1,109 | 1,109 |
| Irrigation, Wilson | 1,223 | 1,223 | 1,223 | 1,223 | 1,223 | 1,223 |
| Irrigation, Zavala | 4,257 | 4,257 | 4,257 | 4,257 | 4,257 | 4,257 |
| **Total** | **8,675** | **8,675** | **8,675** | **8,675** | **8,675** | **8,675** |

### 7.5.3 Livestock Drought Management

The Livestock Drought Management WMS is recommended for only one Livestock WUG in Region L, which is Livestock – Hays County. The Texas Parks and Wildlife Department (TPWD) owns and operates the A.E. Wood State Fish Hatchery, which accounts for the majority of Livestock demands in Hays County, estimated at 2,432 acft/yr. During typical years, the hatchery relies on surface water from the Guadalupe River and recycled water from their facility. However, water availability modeling for the 2026 Plan indicates that the hatchery's Guadalupe Run-of-River water rights do not have a firm yield during a repeat of the drought of record. During periods of drought, the TPWD would rely on their recycled water or reuse supplies, which would provide 2,420 acft/yr, resulting in a need of 12 acft/yr.

Based on conversations with staff from the TPWD A.E. Wood State Fish Hatchery, the facility would implement a drought management strategy, thereby temporarily suspending operations until conditions improve. Costs are not associated with this strategy, as the facility will continue operations and no capital investment is required.

## 7.6 Emergency Responses to Local Drought Conditions or Loss of Municipal Supply

The regional and state water plans aim to prepare entities for worst case drought scenarios using the drought of record described in Section 7.1. However, entities may experience significant local drought or loss of municipal supply. As described in Section 7.3, many DCPs identify responses to critical or emergency water shortages; however, it is less common for small municipalities or County-Other WUGs to have DCPs.

While rare, it is important to have a backup plan in case of infrastructure failure or water supply contamination. This is especially important for 1) entities that have historically reported having less than 180 days of available water supply to the TCEQ; 2) County-Other WUGs; or 3) small entities that rely on a sole source of supply.

The following entities reported having less than 180 days of available water supply to the TCEQ:

- Amber Creek Mobile Home Park (Comal County);
- Concan WSC (Uvalde County);
- Frio Cielo Ranch Association Water System (Uvalde County); and
- Windmill WSC (Uvalde County).

The SCTRWPG performed an evaluation in accordance with 31 TAC §357.42(g) to assess emergency response options for WUGs that reported having less than 180 days of available water supply to the TCEQ, all County-Other WUGs, and small WUGs with a 2030 projected population estimate less than 7,500 and a sole supply source. All "County-Other" WUGs were considered. Results of the evaluation are summarized in Table 7-3.

A broad range of emergency situations could result in the loss of reliable municipal supply, and it is not possible to plan one solution to meet any possible emergency; for that reason, a range of possible responses was selected for each entity according to source type and location.

**Table 7-3 WUGs Identified for Emergency Drought Response Evaluation**

| Water User Group | 2030 Population | Source | Type |
|---|---|---|---|
| 3009 Water | 1,465 | Trinity Aquifer | Groundwater |
| Air Force Village II Inc | 536 | Edwards-BFZ Aquifer | Groundwater |
| Asherton | 684 | Carrizo-Wilcox Aquifer | Groundwater |
| Batesville WSC | 860 | Carrizo-Wilcox Aquifer | Groundwater |
| Bexar County WCID 10 | 6,201 | Edwards-BFZ Aquifer | Groundwater |
| Big Wells | 418 | Carrizo-Wilcox Aquifer | Groundwater |
| C Willow Water | 664 | Carrizo-Wilcox Aquifer | Groundwater |
| Carrizo Hill WSC | 663 | Carrizo-Wilcox Aquifer | Groundwater |
| Carrizo Springs | 4,507 | Carrizo-Wilcox Aquifer | Groundwater |
| Castroville | 6,496 | Edwards-BFZ Aquifer | Groundwater |
| Charlotte | 1,235 | Carrizo-Wilcox Aquifer | Groundwater |
| Clear Water Estates Water System (Texas Water Company) | 898 | Trinity Aquifer | Groundwater |
| Cotulla | 3,404 | Carrizo-Wilcox Aquifer | Groundwater |
| County-Other, Atascosa | 885 | Carrizo-Wilcox Aquifer<br>Edwards-BFZ Aquifer<br>Queen City Aquifer | Groundwater |
| County-Other, Bexar | 2,077 | Carrizo-Wilcox Aquifer<br>Edwards-BFZ Aquifer<br>Trinity Aquifer | Groundwater |
| County-Other, Caldwell | 703 | Carrizo-Wilcox Aquifer<br>Queen City Aquifer | Groundwater |
| County-Other, Calhoun | 1,934 | Gulf Coast Aquifer System | Groundwater |
| County-Other, Comal | 20,649 | Canyon Lake/Reservoir<br>Edwards-BFZ Aquifer<br>Trinity Aquifer | Surface Water & Groundwater |

| Water User Group | 2030 Population | Source | Type |
|---|---|---|---|
| County-Other, DeWitt | 7,225 | Gulf Coast Aquifer System | Groundwater |
| County-Other, Dimmit | 1,903 | Carrizo-Wilcox Aquifer | Groundwater |
| County-Other, Frio | 3,827 | Carrizo-Wilcox Aquifer | Groundwater |
| County-Other, Goliad | 5,308 | Gulf Coast Aquifer System | Groundwater |
| County-Other, Gonzales | 1,153 | Carrizo-Wilcox Aquifer | Groundwater |
| County-Other, Guadalupe | 1,712 | Canyon Lake/Reservoir<br>Guadalupe Run-of-River<br>Carrizo-Wilcox Aquifer<br>Edwards-BFZ Aquifer | Surface Water & Groundwater |
| County-Other, Hays | 19,329 | Canyon Lake/Reservoir<br>Highland Lakes Lake/Reservoir System<br>Edwards-BFZ Aquifer<br>Trinity Aquifer | Surface Water & Groundwater |
| County-Other, Karnes | 2,096 | Gulf Coast Aquifer System<br>Yegua-Jackson Aquifer | Groundwater |
| County-Other, Kendall | 20,679 | Canyon Lake/Reservoir<br>Edwards-Trinity-Plateau Aquifer<br>Trinity Aquifer | Surface Water & Groundwater |
| County-Other, La Salle | 2,276 | Carrizo-Wilcox Aquifer | Groundwater |
| County-Other, Medina | 5,628 | Carrizo-Wilcox Aquifer<br>Edwards-BFZ Aquifer<br>Leona Gravel Aquifer<br>Trinity Aquifer | Groundwater |
| County-Other, Refugio | 2,662 | Gulf Coast Aquifer System | Groundwater |
| County-Other, Uvalde | 4,608 | Buda Limestone Aquifer<br>Edwards-BFZ Aquifer<br>Leona Gravel Aquifer<br>Trinity Aquifer | Groundwater |
| County-Other, Victoria | 24,631 | Gulf Coast Aquifer System | Groundwater |
| County-Other, Wilson | 5,997 | Carrizo-Wilcox Aquifer | Groundwater |
| County-Other, Zavala | 1,153 | Carrizo-Wilcox Aquifer | Groundwater |
| Crystal City | 5,925 | Carrizo-Wilcox Aquifer | Groundwater |
| Dilley | 5,260 | Carrizo-Wilcox Aquifer | Groundwater |
| Encinal WSC | 1,043 | Carrizo-Wilcox Aquifer | Groundwater |
| Falls City | 476 | Carrizo-Wilcox Aquifer | Groundwater |

| Water User Group | 2030 Population | Source | Type |
|---|---|---|---|
| Floresville | 5,859 | Carrizo-Wilcox Aquifer | Groundwater |
| Goliad | 1,495 | Gulf Coast Aquifer System | Groundwater |
| Jourdanton | 4,958 | Carrizo-Wilcox Aquifer | Groundwater |
| Karnes City | 2,314 | Carrizo-Wilcox Aquifer | Groundwater |
| Kendall County WCID 1 | 2,873 | Trinity Aquifer | Groundwater |
| Kendall West Utility | 2,819 | Trinity Aquifer | Groundwater |
| Kenedy | 3,447 | Gulf Coast Aquifer System | Groundwater |
| KT Water Development | 2,652 | Trinity Aquifer | Groundwater |
| La Coste | 1,327 | Edwards-BFZ Aquifer | Groundwater |
| Loma Alta Chula Vista Water System | 323 | Carrizo-Wilcox Aquifer | Groundwater |
| Luling | 5,656 | Carrizo-Wilcox Aquifer | Groundwater |
| Lytle | 3,572 | Edwards-BFZ Aquifer | Groundwater |
| Moore WSC | 558 | Carrizo-Wilcox Aquifer | Groundwater |
| Natalia | 1,134 | Edwards-BFZ Aquifer | Groundwater |
| Nixon | 2,249 | Carrizo-Wilcox Aquifer | Groundwater |
| Oak Hills WSC | 6,027 | Carrizo-Wilcox Aquifer | Groundwater |
| Picosa WSC | 3,591 | Carrizo-Wilcox Aquifer | Groundwater |
| Point Comfort | 556 | Texana Lake/Reservoir | Surface Water |
| Port Oconnor Improvement District | 839 | Gulf Coast Aquifer System | Groundwater |
| Poteet | 2,734 | Carrizo-Wilcox Aquifer | Groundwater |
| Poth | 1,550 | Carrizo-Wilcox Aquifer | Groundwater |
| Quail Creek MUD | 1,319 | Gulf Coast Aquifer System | Groundwater |
| Randolph Air Force Base | 1,280 | Edwards-BFZ Aquifer | Groundwater |
| Refugio | 2,549 | Gulf Coast Aquifer System | Groundwater |
| Runge | 876 | Gulf Coast Aquifer System | Groundwater |
| Sabinal | 1,292 | Edwards-BFZ Aquifer | Groundwater |
| Seadrift | 905 | Gulf Coast Aquifer System | Groundwater |
| Shavano Park | 1,804 | Edwards-BFZ Aquifer | Groundwater |
| Smiley | 4744 | Carrizo-Wilcox Aquifer | Groundwater |
| South Buda WCID 1 | 4,066 | Trinity Aquifer | Groundwater |
| Stockdale | 1,458 | Carrizo-Wilcox Aquifer | Groundwater |

| Water User Group | 2030 Population | Source | Type |
|---|---|---|---|
| Sunko WSC | 4,145 | Carrizo-Wilcox Aquifer | Groundwater |
| The Oaks WSC | 1,277 | Trinity Aquifer | Groundwater |
| Three Oaks WSC | 1,455 | Carrizo-Wilcox Aquifer | Groundwater |
| Tri Community WSC | 1,396 | Guadalupe Run-of-River | Surface Water |
| Universal City | 198 | Edwards-BFZ Aquifer | Groundwater |
| Victoria County WCID 1 | 1,709 | Gulf Coast Aquifer System | Groundwater |
| Ville Dalsace Water Supply | 410 | Edwards-BFZ Aquifer | Groundwater |
| Waelder | 1,016 | Queen City Aquifer | Groundwater |
| Water Services | 5,678 | Trinity Aquifer | Groundwater |
| West Medina WSC | 1,003 | Edwards-BFZ Aquifer | Groundwater |
| Wimberley WSC | 5,272 | Trinity Aquifer | Groundwater |
| Windmill WSC | 1,516 | Austin Chalk Aquifer | Groundwater |
| Wingert Water Systems | 1,638 | Trinity Aquifer | Groundwater |
| Woodsboro | 1,278 | Gulf Coast Aquifer System | Groundwater |
| Yancey WSC | 6,316 | Edwards-BFZ Aquifer | Groundwater |
| Yorktown | 1,826 | Gulf Coast Aquifer System | Groundwater |
| Zavala County WCID 1 | 1,219 | Carrizo-Wilcox Aquifer | Groundwater |

### 7.6.1 Sole Source: Groundwater

Entities dependent on groundwater as a sole supply source are encouraged to actively monitor water levels in wells, especially in high-demand periods. Water levels can be used to trigger drought responses, and to guide expansion of wellfields or deepening of wells. Additionally, groundwater quality may be an indicator of decreasing availability from a well or well field. Potential emergency responses for entities that rely solely on groundwater are shown in Table 7-4.

**Table 7-4 Emergency Water Shortage Responses for Groundwater-Dependent WUGs**

| Emergency Shortage Cause | Responses |
|---|---|
| Insufficient Well Production | • Highest stage drought restrictions.<br>• Deepen wells (if possible).<br>• Interconnects with other systems (if possible).<br>• Truck in water.<br>• Long term: facility improvements, system evaluation, and phased improvement plan. |
| Water Treatment Plant Failure | • Highest stage drought restrictions.<br>• Interconnects with other systems (if possible).<br>• Truck in water.<br>• Long term: facility improvements, system evaluation, and phased improvement plan. |
| Groundwater Quality | • Immediate testing.<br>• Highest stage drought restrictions.<br>• Additional emergency treatment (if possible).<br>• Interconnects with other systems (if possible).<br>• Truck in water.<br>• Long term: supply or treatment facility improvements, system evaluation, and phased improvement plan. |

### 7.6.2 Sole Source: Surface Water

Entities that are dependent solely on surface water are encouraged to consider expansion of alternate water supplies, including fresh and brackish groundwater, where available. Potential emergency responses for entities that rely solely on surface water are listed in Table 7-5.

**Table 7-5 Emergency Water Shortage Responses for Surface Water Dependent WUGs**

| Emergency Shortage Cause | Responses |
|---|---|
| Insufficient Surface Water Rights | • Purchase additional surface water.<br>• Coordinate short term contract/transfer with nearby entity.<br>• Interconnect with other systems.<br>• Truck in water.<br>• Activate highest stage drought restrictions.<br>• Long term: purchase/contract additional water rights, add storage, and add a groundwater source. |
| Water Treatment Plant Failure | • Interconnect with other systems.<br>• Truck in water.<br>• Activate highest stage drought restrictions.<br>• Long term: facility improvements, system evaluation, and phased improvement plan. |

| Emergency Shortage Cause | Responses |
|---|---|
| Surface Water Contamination | • Perform immediate testing.<br>• Pump and store safe water in any existing storage facilities.<br>• Interconnect with systems that have alternate supplies.<br>• Truck in water.<br>• Initiate emergency communication with boil water notices or other guidance to customers.<br>• Activate highest stage drought restrictions.<br>• Long term: emergency response plan including communications, provision of safe water to critical facilities, etc. |

## 7.7 Other Drought-Related Considerations and Recommendations

### 7.7.1 Monitoring and Assessment

The SCTRWPG recommends that all entities monitor state and local drought conditions to prepare and facilitate decisions. Several state and local agencies monitor and report on conditions with up-to-date information, including the following:

- SAWS Drought Restrictions: http://www.saws.org/conservation/droughtrestrictions/
- Guadalupe-Blanco River Authority (GBRA) Drought/Conservation: http://www.gbra.org/drought/default.aspx
- EAA Edwards Aquifer Conditions: http://www.edwardsaquifer.org
- TWDB Drought Information: http://waterdatafortexas.org/drought/
- TCEQ Drought Information: https://www.tceq.texas.gov/response/drought
- Palmer Drought Severity Index: http://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers/
- Regional Planning Group Information: http://www.regionltexas.org/

### 7.7.2 Drought Preparedness Council Recommendations

The SCTRWPG supports the efforts of the Texas Drought Preparedness Council and recommends that entities review information developed by the council. The council was established by the legislature in 1999 and is composed of representatives from 16 state agencies, as well as appointees of the governor. The council is responsible for assessment and public reporting of drought monitoring and water supply conditions, advising the governor on significant drought conditions, recommending response plans for drought-related disasters, advising regional water planning groups on drought-related issues in the regional water plans, coordinating local, state, and federal drought-response planning, and submitting a report to the legislature every odd numbered year.

The Drought Preparedness Council provided a letter to the SCTRWPG on February 8, 2024, which included three recommendations (See Appendix 7C). The following summarizes those recommendations and the SCTRWPG's response to each.

1. **Planning for DWDOR.**

   a. Drought Preparedness Council Recommendation No. 1:
   The regional water plans and state water plan shall serve as water supply plans under drought of record conditions. The DPC encourages regional water planning groups to consider planning for drought conditions worse than the drought of record, including scenarios that reflect greater rainfall deficits and/or higher surface temperatures.

   b. SCTRWPG Response to Recommendation No. 1:
   As described in Section 7.2, the SCTRWPG considered planning for a DWDOR for the 2026 SCTRWP. However, the SCTRWPG chose not to incorporate it at this time because forecasting tools have not been able to provide the resolution needed for water planning on a regional basis.

   Instead, the SCTRWPG included a Legislative and Other Recommendation in Chapter 8 that recognizes that down-scaling of climate models is becoming more sophisticated, and the results are being considered in other planning efforts and models, such as WAMs. In Chapter 8, the SCTRWPG recommends that:

      1) the Texas Legislature fund relevant studies and down-scaled regional models to incorporate available climate variability into the Regional Water Planning process; and

      2) the TWDB to reassess available climate models and consider incorporating them into Regional Water Planning.

**2. Incorporating Projected Future Reservoir Evaporation Rates in Water Availability Assessments.**

   a. Drought Preparedness Council Recommendation No. 2:
   The Drought Preparedness Council encourages regional water planning groups to incorporate projected future reservoir evaporation rates in their assessments of future surface water availability.

   b. SCTRWPG Response to Recommendation No. 2:
   Historical reservoir evaporation rates are incorporated into the WAMs used by the SCTRWPG to estimate surface water availability for the 2026 SCTRWP. However, incorporation of projected future reservoir evaporation rates would require development of climate models. The SCTRWPG considered incorporation of climate models but chose not to incorporate them for the 2026 SCTRWP because forecasting tools have not been able to provide the resolution needed for water planning on a regional basis.

   As described previously, the SCTRWPG understands that incorporation of down scaled climate models is being considered for inclusion in WAMs, which would incorporate

projected future reservoir evaporation rates. In Chapter 8, the SCTRWPG recommends incorporating these models into Regional Water Planning efforts.

**3. Evaluating Alternative, Emergency Water Supplies for Entities That Reported Having Less Than 180 Days of Water Supply to the TCEQ.**

a. Drought Preparedness Council Recommendation No. 3:
The Drought Preparedness Council encourages regional water planning groups to identify in their plans utilities within their boundaries that reported having less than 180 days of available water supply to the TCEQ during the current or preceding planning cycle. For systems that appeared on the 180-day list, RWPGs should perform the evaluation required by 31 TAC §357.42(g), if it has not already been completed for that system.

b. SCTRWPG Response to Recommendation No. 3:
In Section 7.6, the SCTRWPG identified entities that reported having less than 180 days of available water supply to the TCEQ. For these systems and other vulnerable entities, the SCTRWPG performed an evaluation to identify potential alternative water sources for temporary emergency use by WUGs and WWPs in the event of water supplies becoming temporarily unavailable.

## 7.8 Region-Specific Drought Response Recommendations and Model Drought Contingency Plans

The SCTRWPG acknowledges that DCPs are a useful drought management tool for entities with both surface and groundwater sources and recommends that all entities consider adopting a DCP in preparation for drought conditions. The SCTRWPG also recommends that, in accordance with TCEQ guidelines, entities update their DCPs every five years because triggers can change as wholesale and retail water providers reassess their contracts and supplies.

### 7.8.1 Recommended Surface Water Triggers and Responses

Surface water accounts for approximately 19% of 2030 existing municipal supplies in the SCTRWPA. With such a variety of supply sources, it is difficult to create a set of triggers and responses that will fit the needs of all WUGs in the SCTRWPA. The SCTRWPG recognizes that supplies are understood best by the operators and suggests that WUGs review DCPs that their water providers have adopted.

For entities without DCPs supplying themselves with local surface water, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for GBRA is presented in Table 7-6. GBRA was selected as a representative example because it provides water to several entities throughout the SCTRWPA and relies on various types of surface water. The GBRA DCP includes five water stages ranging from "Mild Water Shortage" to "Emergency Water Shortage." The triggers depend on parameters such as storage levels, reservoir elevations, and system failures. The responses include categories ranging from home irrigation limits to pool and fountain restrictions.

**Table 7-6 Representative Example of a Surface Water Drought Contingency Plan [1]**

| Drought Stage | Water Type | Trigger | Response |
|---|---|---|---|
| Stage 1 – Mild Water Shortage | Canyon Reservoir | Reservoir less than or equal to Elevation (El) 895 feet mean sea level (ft-msl) | • Achieve voluntary 5% reduction in comparison to the average monthly usage of contracted water for that time period of the calendar year |
| | Luling Water Right | Flow at United States Geological Survey (USGS) 08172000 drops below 130 cubic feet per second (cfs) | • Achieve voluntary 5% reduction in comparison to the average monthly usage of contracted water for that time period of the calendar year |
| | Lower Basin Water Right | When combined average daily flow at the USGS Guadalupe River at Victoria Gauging Station #08176500 and USGS San Antonio River at Goliad Gauging #08188500 drops below 400 cfs. | • Achieve voluntary reduction of 5% in comparison to their average monthly usage of contracted water for that time period of the calendar year |
| Stage 2 – Moderate Water Shortage | Canyon Reservoir | Reservoir less than or equal to El 890 ft-msl | • Achieve voluntary 10% reduction in comparison to the average monthly usage of contracted water for that time period of the calendar year |
| | Luling Water Right | Flow at USGS 08172000 drops below 80 cfs | • Achieve voluntary 10% reduction in comparison to the average monthly usage of contracted water for that time period of the calendar year |
| | Lower Basin Water Right | When combined average daily flow at the USGS Guadalupe River at Victoria Gauging Station #08176500 and USGS San Antonio River at Goliad Gauging #08188500 drops below 250 cfs. | • Achieve voluntary reduction of 10% in comparison to their average monthly usage of contracted water for that time period of the calendar year |
| Stage 3 – Severe Water Shortage | Canyon Reservoir | Reservoir less than or equal to El 885 ft-msl | • Achieve voluntary 15% reduction in comparison to the average monthly usage of contracted water for that time period of the calendar year |
| | Luling Water Right | Flow at USGS 08172000 drops below 40 cfs | • Initiate allocation of water supplies on a pro rata basis in accordance with TWC §11.039; 15% curtailment percentage. |
| | Lower Basin Water Right | When combined average daily flow at the USGS Guadalupe River at Victoria Gauging Station #08176500 and USGS San Antonio River at Goliad Gauging #08188500 drops below 150 cfs. | • Initiate allocation of water supplies on a pro rata basis in accordance with TWC §11.039. The curtailment percentage in effect will be 15%<br>• Suspend water deliveries to agricultural users with contracts for interruptible water |

| Drought Stage | Water Type | Trigger | Response |
|---|---|---|---|
| Stage 4 – Critical Water Shortage | Canyon Reservoir | Reservoir less than or equal to El 880 ft-msl | • Initiate allocation of water supplies on a pro rata basis in accordance with TWC §11.039; 15% curtailment percentage. |
| | Luling Water Right | • Loss of capability to provide water service<br>• Contamination of supply source<br>• GBRA determines water levels are reduced to a condition that could lead to loss of service with 180 days or less | • Initiate allocation of water supplies on a pro rata basis in accordance with TWC §11.039; GBRA Board to establish curtailment percentage.<br>• Assess severity of problem and identify actions needed and time require to solve problem<br>• Inform utility direction of each wholesale water customer and suggest actions<br>• Notify city, county, and/or state emergency response officials<br>• Complete repairs and/or clean-up |
| | Lower Basin Water Right | • Loss of capability to provide water service<br>• Contamination of supply source<br>• GBRA determines water levels are reduced to a condition that could lead to loss of service with 180 days or less | • Initiate allocation of water supplies on a pro rata basis in accordance with TWC §11.039; GBRA Board to establish curtailment percentage<br>• Assess severity of problem and identify actions needed and time require to solve problem<br>• Inform utility direction of each wholesale water customer and suggest actions<br>• Notify city, county, and/or state emergency response officials<br>• Complete repairs and/or clean-up |
| Stage 5 – Emergency Water Shortage | Canyon Reservoir | Reservoir less than or equal to El 865 ft-msl | • Initiate allocation of water supplies on a pro rata basis in accordance with TWC §11.039; 30% curtailment percentage |
| | Lower Basin Water Right | • Loss of capability to provide water service<br>• Contamination of supply source<br>• May occur at any time and is not dependent on being preceded by Stages 1 through 4 | • Achieve voluntary reduction of 50% in total domestic water usage during each month of this stage<br>• General Manager convenes emergency session to consider emergency rules or responses |

| Drought Stage | Water Type | Trigger | Response |
|---|---|---|---|
| Stage 6 – Emergency Water Shortage | Canyon Reservoir | • Loss of capability to provide water service<br>• Contamination of supply source<br>• GBRA determines water levels are reduced to a condition that could lead to loss of service with 180 days or less | • Initiate allocation of water supplies on a pro rata basis in accordance with TWC §11.039; GBRA Board to establish curtailment percentage.<br>• Assess severity of problem and identify actions needed and time require to solve problem<br>• Inform utility direction of each wholesale water customer and suggest actions<br>• Notify city, county, and/or state emergency response officials<br>• Complete repairs and/or clean-up |

[1] This representative example is summarized from the GBRA DCP.

### 7.8.2 Recommended Groundwater Triggers and Responses

Entities in the SCTRWPA utilize both brackish and non-brackish wells in four major formations. With such a variety of supply sources, it is difficult to create a set of triggers and responses that will fit the needs of each WUG in the SCTRWPA. The SCTRWPG recognizes that supplies are understood best by the operators and suggests that WUGs review DCPs that their water providers have adopted.

For entities without DCPs supplying themselves with local groundwater, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for SAWS is presented in Table 7-7. SAWS was selected as a representative example because it is the largest provider of groundwater in the SCTRWPA. The DCP includes four water stages. The triggers depend on parameters, such as supply and well levels. The responses include categories ranging from residential irrigation limits to commercial and irrigation use reductions.

**Table 7-7 Representative Example of a Groundwater Drought Contingency Plan [1]**

| Drought Stage | Trigger | Response |
|---|---|---|
| Stage 1 | Edwards Aquifer (Well J-17) 10 day rolling average level falls to 660 ft-msl | • No water waste<br>• Lawn watering is limited to 1 day per week at restricted times unless by handheld device<br>• Residential fountains and indoor commercial fountains may operate at any stage of drought; outdoor commercial fountains must have a variance in order to operate<br>• No person may wash an impervious outdoor ground covering<br>• Golf courses, parks, and fields must submit conservation plans and follow irrigation schedule<br>• Use of recycled water. With no potable water backup for irrigation is allowed-without waste- any day. If the customer has posted proper approved signage<br>• Vehicles may only be washed at commercial locations or once per week on Saturday or Sunday with no water waste |
| Stage 2 | Edwards Aquifer (Well J-17) 10 day rolling average level falls to 650 ft-msl | • All Stage 1 responses<br>• Irrigation system, sprinkler, or soaker hose watering limited to 1 day per week at further restricted times unless by handheld device<br>• Drip irrigation and handheld device watering allowed any day at restricted times |
| Stage 3 | Stage 3 water use reduction measures may be implemented when Edwards Aquifer (Well J-17) 10 day rolling average level falls to 640 ft-msl | • All Stages 1 and 2 responses<br>• A surcharge is assessed on all accounts used or assumed to be used for landscape irrigation |
| Stage 4 | Stage 4 water use reduction measures may be implemented when the Edwards Aquifer (Well J-17) drops to 630 ft-msl and/or if the total supply of water from the Edwards Aquifer and other sources is projected to be insufficient to meet customer demand. Stage 4 restrictions may be declared at the discretion of the City Manager. | • All Stages 1, 2, and 3 responses<br>• A surcharge is assessed on all accounts used or assumed to be used for landscape irrigation<br>• Drip irrigation allowed once a week, following restricted schedule<br>• Additional restrictions may be established at the discretion of the President/CEO of SAWS, in consultation with the City Manager |

[1] This representative example is summarized from the SAWS DCP.

### 7.8.3 Recommended Triggers and Responses for Irrigation and Steam-Electric Uses

As mentioned previously, it is difficult to create a set of drought triggers and responses that will fit the needs of all WUGs in the SCTRWPA. For entities supplying significant amounts of water to customers for irrigation and steam-electric uses, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region.

Examples of triggers and responses from the EAA Critical Period/Drought Management Plan for the Uvalde Pool and the San Antonio Pool are presented in Figure 7-6 and Figure 7-7. EAA was selected as a representative example because their Critical Period Management Plan applies to municipal, industrial, and irrigation users that are authorized to withdraw more than 3 acft. The Critical Period Management Plan includes five critical period water stages for the Uvalde Pool (Uvalde County) and the San Antonio Pool (Atascosa, Bexar, Caldwell, Comal, Guadalupe, Hays, and Medina Counties). The triggers depend on 10-day average spring flow (cfs) and index well levels (above mean sea level [amsl]), and the responses are stepwise, mandatory withdrawal reductions.

| Critical Period Stage | J-27 Index Well Level above mean sea level (amsl) | % of Water Reduction |
|---|---|---|
| No Stage indicates stable levels | 850 feet or above | 0% |
| Stage 1 | N/A | 0% |
| Stage 2 | Less than 850 feet | 5% |
| Stage 3 | Less than 845 feet | 20% |
| Stage 4 | Less than 842 feet | 35% |
| Stage 5 | Less than 840 feet | 44% |

**Figure 7-6 EAA Critical Period Management Plan for the Uvalde Pool**

For irrigation uses, the SCTRWPG suggests review of the Voluntary Irrigation Suspension Program Option (VISPO) of the Edwards Aquifer Habitat Conservation Plan (EAHCP). VISPO is available for irrigation users who wish to help protect spring flow for federally listed threatened and endangered species that rely heavily on the Comal and San Marcos Springs. The enrollment term is for a period of five years. VISPO compensates enrolled irrigation permit holders for enrollment and also pays an additional suspension rate in years when irrigation suspension is required due to index well levels. VISPO is triggered when the J-17 index well in Bexar County is at or below 635 feet on October 1; the response is for enrolled permit holders to suspend irrigation for the following calendar year. If VISPO is not triggered, then the permit holder may use or lease enrolled water permits during the non-suspension years. More information regarding the EAHCP VISPO can be found on the EAA website: https://www.edwardsaquifer.org/.

| Critical Period Stage | J-17 Index Well Level above mean sea level (amsl) | San Marcos Springs Flow cubic feet per second (cfs) | Comal Springs Flow cubic feet per second (cfs) | % of Water Reduction |
|---|---|---|---|---|
| No Stage indicates stable levels | 660 feet or above | 96 or above | 225 or above | 0% |
| Stage 1 | less than 660 feet | less than 96 | less than 225 | 20% |
| Stage 2 | Less that 650 feet | less than 80 | Less than 200 | 30% |
| Stage 3 | Less than 640 feet | Not Applicable | Less than 150 | 35% |
| Stage 4 | Less than 630 feet | Not Applicable | Less than 100 | 40% |
| Stage 5 | Less than 625 feet | Not Applicable | Less than 45/40* | 44% |

*Stage 5 Comal Springs Flow - to enter this stage based on the springflow, the reading must be less than 45 cfs on a ten-day rolling average, or less than 40 cfs based on a three-day rolling average. To leave this stage, the ten-day rolling average must be 45 cfs or greater.

**Figure 7-7 EAA Critical Period Management Plan for the San Antonio Pool**

### 7.8.4 Model Drought Contingency Plans

The TCEQ has prepared model DCPs for wholesale and retail water suppliers to provide guidance and suggestions to entities regarding the preparation of DCPs. Not all items in the model will apply to every system's situation, but the overall model can be used as a starting point for most entities. For entities wishing to develop a new DCP, the SCTRWPG suggests using the TCEQ model DCPs in conjunction with drought contingency measures such as those described in Sections 7.8.1, 7.8.2, and 7.8.3. The TCEQ model DCPs can be found on their website:
https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/contingency.html

# Appendix 7A: Summary of Drought Response Measures

# Appendix 7A: Summary of Drought Response Measures

| | | | Triggers | | | | | | | | | | Responses | | | | | | | | | | Water Supply Source | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entity Name | DCP Date | Stage Number | WWP | Demand/Capacity Based | Failure/Contamination | Groundwater Level | Season | Reservoir Level | Supply-Based | Well Pumping Time/Flow | Storage Tank Recovery Time | Other | Assessment and Identification | Water Rate Change or Surcharge | Irrigation Schedule | Mandatory Reduction | Notification of Public Agencies or Specific Users | Prohibited Use | Discontinue Water Diversions | Potential Suspend Service | Water Allocation | Others | Surface Water | Ground Water | Water Source |
| Aqua WSC | 2024 | 1 | | ● | | | | | | | | | | | ● | | ● | | | | | | | ● | Carrizo-Wilcox Aquifer |
| | | 2 | | ● | ● | | | | ● | | | | | | ● | | ● | ● | | | | | | | |
| | | 3 | | ● | ● | | | | ● | ● | | ● | | | | | ● | ● | | | | | | | |
| | | 4 | | | ● | | | | | | | ● | ● | ● | | ● | ● | ● | | ● | | ● | | | |
| Atascosa Rural WSC | 2024 | 1 | | | | | | | ● | ● | | | | | ● | | ● | | | | | | | ● | Edwards-BFZ Aquifer |
| | | 2 | | | | ● | | | ● | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 3 | | | | ● | | | ● | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 4 | | | | ● | | | ● | ● | | | | | | ● | ● | ● | | | | | | | |
| Benton City WSC | 2024 | 1 | | | | | ● | | | | | | | | ● | | ● | | | | | ● | | ● | Carrizo-Wilcox Aquifer |
| | | 2 | | ● | | | | | | | | | | | ● | ● | ● | ● | | | | ● | | | |
| | | 3 | | ● | | | | | ● | | ● | | | | ● | ● | ● | ● | | | | ● | | | |
| | | 4 | | ● | ● | | | | | | | | | | | ● | ● | ● | | | | ● | | | |
| | | 5 | | ● | ● | | | | | | | | | | | ● | ● | ● | | | | | | | |
| Bexar Medina Atascosa Counties WCID | 2024 | 1 | | | | | | ● | | | | | | | | | ● | | | | | | ● | | Medina Lake/Reservoir |
| | | 2 | | | | | | ● | | | | | ● | | | | ● | | | | | | | | |
| | | 3 | | | | | | ● | | | | | | | | | ● | | ● | | ● | ● | | | |
| | | 4 | | | | | | ● | | | | | ● | | | | ● | | ● | ● | ● | | | | |
| City of Boerne | 2022 | 1 | | | ● | | | | ● | | ● | ● | | | ● | ● | ● | ● | | | | ● | ● | ● | Boerne City Lake, Trinity Aquifer, Canyon Reservoir |
| | | 2 | | | ● | | | | ● | | ● | ● | | | ● | ● | ● | ● | | | | ● | | | |
| | | 3 | | | ● | | | | ● | | ● | ● | | | ● | ● | ● | ● | | | | ● | | | |
| | | 4 | | | ● | | | | ● | | ● | ● | | ● | ● | ● | ● | ● | | | | | | | |
| Canyon Lake WSC (Texas Water Company) | 2024 | 1 | | ● | | | | ● | | ● | | ● | | | ● | | ● | | | | | ● | ● | ● | Canyon Lake/Reservoir; Trinity Aquifer |
| | | 2 | | ● | | | | ● | | ● | | ● | | | ● | ● | ● | | ● | | | ● | | | |
| | | 3 | | ● | | | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | | | |
| | | 4 | | ● | | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | |
| | | 5 | | | | | | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | |
| | | Emergency | | | ● | | | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | |

| | | | Triggers | | | | | | | | | | Responses | | | | | | | | | | Water Supply Source | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entity Name | DCP Date | Stage Number | WWP | Demand/Capacity Based | Failure/Contamination | Groundwater Level | Season | Reservoir Level | Supply-Based | Well Pumping Time/Flow | Storage Tank Recovery Time | Other | Assessment and Identification | Water Rate Change or Surcharge | Irrigation Schedule | Mandatory Reduction | Notification of Public Agencies or Specific Users | Prohibited Use | Discontinue Water Diversions | Potential Suspend Service | Water Allocation | Others | Surface Water | Ground Water | Water Source |
| Canyon Regional Water Authority | 2024 | 1 | | | | | | ● | | | | | | | | | ● | | | | | | ● | ● | Carrizo-Wilcox Aquifer, Canyon Lake/Reservoir, Guadalupe River |
| | | 2 | | | | | | ● | | | | | | | | | ● | | | | | | | | |
| | | 3 | | | | | | ● | | | | | | | | | ● | | | | | | | | |
| | | 4 | | | | | | ● | | | | | | ● | ● | ● | ● | | | ● | ● | | | | |
| | | 5 | | | | | | ● | | | | | | ● | ● | ● | ● | | | ● | ● | | | | |
| | | 6 | | | ● | | | ● | | | | ● | ● | ● | ● | ● | ● | | | ● | ● | | | | |
| Chaparral Water System, Hays (Aqua Texas) | 2024 | Voluntary Conservation | ● | | | | | | | | | | | | ● | | ● | | | | | ● | | | |
| | | 1 | ● | ● | | ● | | | ● | ● | ● | | | | ● | | ● | | | ● | ● | | | ● | Carrizo-Wilcox Aquifer |
| | | 2 | ● | ● | | ● | | | ● | ● | ● | | | | ● | | ● | | | ● | ● | | | | |
| | | 3 | ● | ● | | ● | | | ● | ● | ● | | | ● | ● | ● | ● | | | ● | ● | | | | |
| | | 4 | ● | ● | | ● | | | ● | ● | ● | | | ● | ● | ● | ● | ● | | ● | ● | | | | |
| City of Cibolo | 2024 | 1 | ● | | | | | ● | ● | | | | | | ● | ● | ● | | | | | ● | ● | ● | Edwards-BFZ Aquifer, Carrizo-Wilcox Aquifer, Canyon Lake/Reservoir |
| | | 2 | ● | | | | | ● | ● | | | | | | ● | ● | ● | | | | | ● | | | |
| | | 3 | ● | | | | | ● | ● | | | | | | ● | ● | ● | | | | | ● | | | |
| | | 4 | ● | | | | | ● | ● | | | ● | ● | | ● | ● | ● | | | | | ● | | | |
| | | 5 | ● | | | | | ● | ● | | | | | | ● | ● | ● | ● | | | | ● | | | |
| | | 6 | ● | ● | ● | | | | | | | | ● | | ● | ● | ● | | | | | | | | |
| City of Converse | 2015 | 1 | ● | | | ● | | | | ● | | | ● | ● | ● | ● | | ● | | | | ● | | ● | Carrizo-Wilcox Aquifer, Edwards-BFZ Aquifer |
| | | 2 | ● | | | ● | | | | ● | | | ● | ● | ● | ● | | ● | | | | ● | | | |
| | | 3 | ● | | | ● | | | | ● | | | ● | ● | ● | ● | | ● | | | | ● | | | |
| | | 4 | ● | | | ● | | | | ● | | | ● | ● | ● | ● | | ● | | | | ● | | | |
| | | 5 | ● | | | ● | | | | ● | | | ● | ● | ● | ● | | ● | | | | ● | | | |
| | | Failure/Emergency | | | ● | | | | | | | ● | | | | | ● | | | | | ● | | | |
| Crystal Clear SUD | 2024 | 1 | | | | | | ● | | ● | | | | | ● | | ● | | | | | ● | ● | ● | Carrizo-Wilcox Aquifer, Edwards-BFZ Aquifer, Canyon Lake/Reservoir |
| | | 2 | | | | | | ● | | ● | | | | | ● | | ● | ● | | | | | | | |
| | | 3 | | | | | | ● | | ● | | | | | ● | | ● | ● | | | | | | | |
| | | 4 | | | | | | ● | | ● | | | | | ● | | ● | ● | | | | | | | |
| | | 5 | | | | | | ● | | ● | | | | | ● | | ● | ● | | | | | | | |
| | | 6 | ● | | ● | | | | | | | | | | | ● | ● | | | ● | ● | | | | |

| | | | Triggers | | | | | | | | | | Responses | | | | | | | | | | Water Supply Source | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entity Name | DCP Date | Stage Number | WWP | Demand/Capacity Based | Failure/Contamination | Groundwater Level | Season | Reservoir Level | Supply-Based | Well Pumping Time/Flow | Storage Tank Recovery Time | Other | Assessment and Identification | Water Rate Change or Surcharge | Irrigation Schedule | Mandatory Reduction | Notification of Public Agencies or Specific Users | Prohibited Use | Discontinue Water Diversions | Potential Suspend Service | Water Allocation | Others | Surface Water | Ground Water | Water Source |
| County Line Special Utilities District | 2024 | 1 | ● | | | | | | | ● | ● | | | | ● | | | | | | | | | | |
| | | 2 | ● | | | | | | | ● | ● | | | | ● | | | ● | | | | | | | |
| | | 3 | ● | | | | | | | ● | ● | | | | ● | | | ● | | | | | ● | ● | Canyon Lake/Reservoir, Carrizo-Wilcox Aquifer, Edwards-BFZ Aquifer |
| | | 4 | ● | | | | | | | ● | ● | | | | ● | | | ● | | | ● | | | | |
| | | 5 | | | ● | | | | | | | | | | ● | | | ● | | | | ● | | | |
| East Central SUD | 2024 | 1 | ● | | | | | | | | | ● | ● | | ● | | ● | | | | | ● | | | |
| | | 2 | ● | ● | ● | | | | | | ● | ● | ● | | ● | ● | ● | ● | | | | ● | | | |
| | | 3 | ● | ● | | ● | | ● | | | ● | ● | ● | | ● | ● | ● | ● | | | | ● | ● | ● | Caririzo-Wilcox Aquifer, Edwards-BFZ Aquifer, Trinity Aquifer, Canyon Lake/Reservoir |
| | | 4 | ● | | ● | | | | | | | ● | ● | | ● | ● | ● | ● | | | | ● | | | |
| | | 5 | ● | | ● | | | | | | | ● | ● | | ● | ● | ● | ● | | | ● | ● | | | |
| Goforth Special Utility District | 2023 | Conservation Period | | | | | ● | | | | | | | | | | ● | | | | | | | | |
| | | 1 | ● | ● | | | | | ● | | | | ● | | ● | | ● | ● | | | | | | | |
| | | 2 | ● | ● | | | | | ● | | ● | | ● | | ● | ● | ● | ● | | | | | ● | ● | Canyon Lake/Reservoir, Carrizo-Wilcox Aquifer, Trinity Aquifer, Edwards-BFZ Aquifer |
| | | 3 | ● | ● | | | | | ● | | ● | | ● | | ● | ● | ● | ● | | | | | | | |
| | | 4 | ● | ● | ● | | | | | | | | ● | | ● | ● | ● | ● | | | ● | | | | |
| City of Gonzales | 2024 | 1 | | | | ● | | | | | | | | | ● | | ● | | | | | ● | | | |
| | | 2 | | | | ● | | | | | | | | | ● | | ● | ● | | | | ● | | | |
| | | 3 | | | | ● | | | | | | | | | ● | ● | ● | ● | | | ● | ● | ● | ● | Carrizo-Wilcox Aquifer, Guadalupe Run-of-River |
| | | 4 | | | | ● | | | | | | | | | ● | ● | ● | ● | | | ● | ● | | | |
| | | 5 | | | ● | | | | | | | | | | | ● | ● | ● | | | ● | ● | | | |
| Guadalupe Blanco River Authority | 2024 | 1 | | | | | | ● | | ● | | | ● | ● | | ● | ● | | | | | | | | |
| | | 2 | | | | | | ● | | ● | | | ● | ● | | ● | ● | | | | | | | | |
| | | 3 | | | | | | ● | | ● | | | ● | ● | | ● | ● | | | ● | ● | | ● | ● | Canyon Lake/Reservoir, Guadalupe Run-Of-River, Carrizo-Wilcox Aquifer |
| | | 4 | | | ● | | | ● | | | | | ● | ● | | ● | ● | | | | ● | | | | |
| | | 5 | | | | | | ● | | | | | ● | ● | | ● | ● | | | | ● | | | | |
| | | 6 | | | ● | | | ● | | | | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | |

| | | | Triggers | | | | | | | | | | Responses | | | | | | | | | | Water Supply Source | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entity Name | DCP Date | Stage Number | WWP | Demand/Capacity Based | Failure/Contamination | Groundwater Level | Season | Reservoir Level | Supply-Based | Well Pumping Time/Flow | Storage Tank Recovery Time | Other | Assessment and Identification | Water Rate Change or Surcharge | Irrigation Schedule | Mandatory Reduction | Notification of Public Agencies or Specific Users | Prohibited Use | Discontinue Water Diversions | Potential Suspend Service | Water Allocation | Others | Surface Water | Ground Water | Water Source |
| Green Valley SUD | 2023 | 1 | ● | | | | | | | | | | ● | | ● | | ● | | | | | | | | |
| | | 2 | ● | ● | ● | | | | ● | | ● | | ● | | ● | ● | ● | ● | | | | | | | |
| | | 3 | ● | ● | | | | | ● | | | | ● | | ● | ● | ● | ● | | | | | ● | ● | Trinity Aquifer, Carrizo-Wilcox Aquifer, Canyon Lake/Reservoir, Edwards-BFZ Aquifer |
| | | 4 | ● | | ● | | | | | | | | | | | ● | ● | ● | | ● | ● | | | | |
| Kendall West Utility | 2024 | 1 | | ● | | | | ● | | ● | | ● | | | ● | | ● | ● | | | | | | | |
| | | 2 | | ● | | | | ● | | ● | | ● | | | ● | | ● | ● | | | | | | | |
| | | 3 | | ● | | | | ● | ● | ● | ● | ● | | | ● | | ● | ● | | | | | | | |
| | | 4 | | ● | | | | ● | ● | ● | ● | ● | | | ● | | ● | ● | ● | | ● | | | ● | Trinity Aquifer |
| | | 5 | | | | | | ● | | | | | | | ● | | ● | ● | ● | | ● | | | | |
| | | Emergency | ● | | ● | | | | | | ● | | | | ● | | ● | ● | ● | | ● | | | | |
| City of Kyle | 2024 | 1 | | | ● | | ● | | ● | | | | | | ● | | ● | | | | | | | | |
| | | 2 | | | ● | | | | ● | | | | | | ● | | ● | ● | | | | | ● | ● | Carrizo-Wilcox Aquifer, Canyon Lake/Reservoir, Edwards-BFZ Aquifer, |
| | | 3 | | | ● | | | | ● | | | | | | ● | | ● | ● | | ● | | | | | |
| City of Lockhart | 2024 | 1 | | ● | | | | | | | | | | | ● | | ● | | | | | | | | |
| | | 2 | | ● | | | | | | | | | | | ● | | ● | ● | | | | | | | |
| | | 3 | | ● | | | | | | | | | | | ● | | ● | ● | | | | | | | |
| | | 4 | | ● | ● | | | | | | | | | | ● | | ● | ● | | | | | | ● | Carrizo-Wilcox Aquifer |
| | | 5 | | | ● | | | | | | | | | | ● | | ● | ● | | | | | | | |
| | | 6 | | ● | | | | | | | | | | ● | | ● | ● | ● | | | ● | ● | | | |
| City of New Braunfels | 2019 | 1 | | | | ● | | ● | | | | | | | ● | | | ● | | | | ● | | | |
| | | 2 | | | | ● | | ● | | | | | | | ● | | | ● | | | | ● | | | |
| | | 3 | | | | ● | | ● | | | | | | | ● | | | ● | | | | ● | ● | ● | Edwards-BFZ Aquifer, Trinity Aquifer, Carrizo-Wilcox Aquifer, Guadalupe Run-Of-River, Canyon Lake/Reservoir, Direct Reuse |
| | | 4 | | | ● | | ● | | ● | | | ● | | | | | | | | | | | | | |
| City of Pleasanton | 2020 | 1 | | ● | | | | | | | | ● | | | ● | | | | | | | | | | |
| | | 2 | | ● | | | | | | | | ● | | | ● | ● | | | | | | | | ● | Carrizo-Wilcox Aquifer |
| | | 3 | | ● | | | | | | | | ● | | | ● | ● | | | | | | | | | |
| | | 4 | | ● | ● | | | | | | | | | | ● | ● | ● | | | | ● | | | | |

| | | | Triggers | | | | | | | | | | Responses | | | | | | | | | | Water Supply Source | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entity Name | DCP Date | Stage Number | WWP | Demand/Capacity Based | Failure/Contamination | Groundwater Level | Season | Reservoir Level | Supply-Based | Well Pumping Time/Flow | Storage Tank Recovery Time | Other | Assessment and Identification | Water Rate Change or Surcharge | Irrigation Schedule | Mandatory Reduction | Notification of Public Agencies or Specific Users | Prohibited Use | Discontinue Water Diversions | Potential Suspend Service | Water Allocation | Others | Surface Water | Ground Water | Water Source |
| Plum Creek | 2024 | Voluntary Conservation | | | | | ● | | | | | | | | ● | | ● | | | | | | | | |
| | | 1 | | ● | | | | | ● | ● | | | | | ● | ● | ● | ● | | ● | | | | | |
| | | 2 | | ● | | | | | ● | ● | | | | | ● | ● | ● | ● | | ● | ● | | | | |
| | | 3 | | ● | | | | | ● | ● | | | | | ● | ● | ● | ● | | ● | ● | | | ● | Carrizo-Wilcox Aquifer, Edwards Aquifer, Leona Aquifer |
| | | 4 | ● | | ● | | | ● | | | | | | | | ● | ● | ● | | ● | ● | | | | |
| | | 5 | ● | | | | | | | ● | | | | | | ● | ● | ● | | | | | | | |
| | | Emergency | ● | | | | | ● | ● | ● | | | | | | ● | ● | ● | | | | | | | |
| City of Port Lavaca | 2023 | 1 | ● | | | ● | | | | | | | | | ● | | ● | | | | | | | | |
| | | 2 | ● | | | ● | | | | | | | | | ● | | ● | ● | | | | | | | |
| | | 3 | ● | | | ● | | | | | | ● | | | ● | | ● | ● | | | | | | | Guadalupe Run-of-River |
| | | 4 | | ● | ● | ● | | | | | | | | | ● | | ● | ● | | | | | ● | | |
| | | 5 | | | ● | | | | | | | | | | ● | | ● | ● | | | | | | | |
| | | 6 | | | | | | | | | | ● | | ● | | | ● | | | | ● | | | | |
| City of San Marcos | 2024 | 1 | | ● | ● | | | ● | ● | | | | | | ● | | | ● | | ● | | | | | |
| | | 2 | | ● | ● | | | ● | ● | | | | | | ● | | | ● | | ● | | | ● | ● | Canyon Lake/Reservoir, Edwards-BFZ Aquifer, Carrizo-Wilcox Aquifer, Direct Reuse |
| | | 3 | | ● | ● | | | ● | ● | | | | | | ● | | | ● | | ● | | | | | |
| | | 4 | | ● | ● | | | ● | ● | | | | | | ● | | | ● | | ● | | ● | | | |
| SAWS | 2024 | 1 | | | | | | ● | | ● | | | | | ● | | ● | ● | | | | | | | |
| | | 2 | | | | | | ● | | ● | | | | | ● | | ● | ● | | | | | | | |
| | | 3 | | | | | | ● | | ● | | | | ● | ● | | ● | ● | | | | | ● | ● | Trinity Aquifer, Edwards-BFZ Aquifer, Direct Reuse, Canyon Lake/Reservoir, Carrizo-Wilcox Aquifer, |
| | | 4 | | | | | | ● | ● | ● | | | | ● | ● | | ● | ● | | | | | | | |
| | | 5 | | | | | | ● | ● | ● | | | | | ● | | ● | ● | | | | | | | |
| City of Schertz | 2023 (resubmitted from 2013) | 1 | ● | ● | ● | | | | | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 2 | ● | ● | ● | | | | | ● | | | | | ● | ● | ● | ● | | | | | | ● | Carrizo-Wilcox Aquifer, Edwards-BFZ Aquifer, |
| | | 3 | ● | ● | ● | | | | | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 4 | ● | ● | ● | | | | | ● | | | | ● | | ● | ● | ● | | ● | ● | | | | |
| City of Seguin | 2024 | 1 | ● | ● | | | | | ● | | ● | ● | | ● | ● | | ● | ● | | ● | | | | | |
| | | 2 | ● | ● | | ● | | ● | ● | | ● | ● | | ● | ● | ● | ● | ● | | ● | | | | | |
| | | 3 | ● | ● | | ● | | ● | | | ● | ● | | ● | ● | ● | ● | ● | | ● | | | ● | ● | Canyon Lake/Reservoir, Carrizo-Wilcox Aquifer, Direct Reuse, Guadalupe Run-of-River |
| | | 4 | ● | ● | ● | ● | | ● | | | ● | ● | | ● | ● | ● | ● | ● | | ● | | | | | |
| | | 5 | | | ● | | | | ● | | | | | ● | | ● | ● | ● | | ● | | | | | |

| | | | Triggers | | | | | | | | | | Responses | | | | | | | | | | Water Supply Source | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entity Name | DCP Date | Stage Number | WWP | Demand/Capacity Based | Failure/Contamination | Groundwater Level | Season | Reservoir Level | Supply-Based | Well Pumping Time/Flow | Storage Tank Recovery Time | Other | Assessment and Identification | Water Rate Change or Surcharge | Irrigation Schedule | Mandatory Reduction | Notification of Public Agencies or Specific Users | Prohibited Use | Discontinue Water Diversions | Potential Suspend Service | Water Allocation | Others | Surface Water | Ground Water | Water Source |
| City of Selma | 2024 | 1 | | | | | | | | | | | | | | ● | ● | ● | | | | | | ● | Carrizo-Wilcox Aquifer, Edwards-BFZ Aquifer |
| | | 2 | | | | | | | | | | | | | | ● | ● | ● | | | | | | | |
| | | 3 | | | | | | | | | | | | | | ● | ● | ● | | | | | | | |
| | | 4 | | | ● | | | | | | | | | | | ● | ● | ● | | | ● | | | | |
| SJWTX Triple Peak Plan (Canyon Lake Water Service [Texas Water Company]) | 2024 | 1 | | ● | | | | ● | | ● | | ● | | | ● | | ● | | | | | ● | ● | ● | Canyon Lake/Reservoir; Trinity Aquifer |
| | | 2 | | ● | | | | ● | | ● | | ● | | | ● | ● | ● | | ● | | | ● | | | |
| | | 3 | | ● | | | | ● | | ● | ● | ● | ● | | ● | ● | ● | ● | ● | | ● | ● | | | |
| | | 4 | | ● | | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | |
| | | 5 | | | | | | ● | | | | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | |
| | | Emergency | | | ● | | | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | |
| S.S. WSC | 2024 | 0 | | | | | | | | | | ● | | | ● | ● | ● | | | ● | | | | ● | Carrizo-Wilcox Aquifer |
| | | 1 | | ● | | | | | | | | ● | | | ● | ● | ● | | | ● | | | | | |
| | | 2 | | ● | | | | | ● | | ● | ● | | | ● | ● | ● | ● | | ● | | | | | |
| | | 3 | | ● | | | | | ● | | ● | ● | | | ● | ● | ● | ● | | ● | | | | | |
| | | 4 | | ● | | | | | ● | | ● | ● | | | ● | ● | ● | ● | | ● | | | | | |
| | | 5 | | | ● | | | | | | | | | ● | | ● | ● | ● | | ● | ● | | | | |
| Sunilandings Utilities | 2022 | 1 | | | | ● | ● | | | | | | | | | | ● | | | | | | | ● | Gulf Coast Aquifer System |
| | | 2 | | | | | | ● | | | | | | | ● | ● | ● | ● | | | | | | | |
| | | 3 | | | | | | ● | | | | | | | | ● | ● | ● | | | | | | | |
| | | 4 | | | ● | | | ● | | | | | | | | ● | ● | ● | | | | | | | |
| | | 5 | | | ● | | | ● | | | | | | | | ● | ● | | | | ● | | | | |
| Springs Hill WSC | 2024 | 1 | ● | ● | ● | | | | ● | | | | ● | ● | ● | | ● | ● | | | | | | ● | ● | Canyon Lake/Reservoir, Carrizo-Wilcox Aquifer |
| | | 2 | ● | ● | ● | | | | ● | | | | ● | ● | ● | ● | ● | ● | ● | | | ● | | | |
| | | 3 | ● | ● | ● | | | | ● | | | | ● | ● | ● | ● | ● | ● | | | | ● | | | |
| | | 4 | ● | | ● | | | | | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| Universal City | 2023 (DRAFT) | 1 | | | | | | | | ● | | | | | ● | ● | ● | ● | | | | | | ● | Carrizo-Wilcox Aquifer, Edwards-BFZ Aquifer, Direct Reuse |
| | | 2 | | | | | | | | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 3 | | | | | | | | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 4 | ● | | ● | | | | ● | ● | | | | ● | ● | ● | ● | ● | | ● | | | | | |

| | | | Triggers | | | | | | | | | | Responses | | | | | | | | | | Water Supply Source | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Entity Name | DCP Date | Stage Number | WWP | Demand/Capacity Based | Failure/Contamination | Groundwater Level | Season | Reservoir Level | Supply-Based | Well Pumping Time/Flow | Storage Tank Recovery Time | Other | Assessment and Identification | Water Rate Change or Surcharge | Irrigation Schedule | Mandatory Reduction | Notification of Public Agencies or Specific Users | Prohibited Use | Discontinue Water Diversions | Potential Suspend Service | Water Allocation | Others | Surface Water | Ground Water | Water Source |
| City of Uvalde | 2005 | 1 | | | | | | | | ● | | | | | ● | ● | ● | ● | | | | | | ● | Edwards-BFZ Aquifer |
| | | 2 | | | | | | | | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 3 | | | | | | | | ● | | | | | ● | ● | ● | ● | | | | | | | |
| | | 4 | | | | | | | | ● | | | | | | | ● | | | | | | | | |
| City of Victoria | 2024 | 1 | | | | ● | | | | ● | | | | | ● | | ● | | | | | | ● | ● | Canyon Lake/Reservoir, Gulf Coast Aquifer System, Guadalupe Run-of-River |
| | | 2 | | | | ● | | | | ● | | | | | ● | | ● | | | | | | | | |
| | | 3 | | ● | | | | ● | | | | | | | ● | | ● | ● | | | | ● | | | |
| | | 4 | | ● | | | | ● | | | | | | | ● | | ● | ● | | | | | | | |
| | | 5 | | ● | ● | | | | | | | | | | ● | | ● | ● | | | | | | | |
| | | 6 | | ● | | | | | | | | | | ● | ● | | ● | ● | | ● | ● | | | | |
| Victoria County WCID No. 1 | 2023 | 1 | | ● | | | ● | | | | | | | | ● | | ● | ● | | | | | | ● | Gulf Coast Aquifer System |
| | | 2 | | ● | | | | | | | | | | | ● | ● | ● | ● | | | | | | | |
| | | 3 | | ● | | | | | | | | | | ● | ● | ● | ● | ● | | | ● | | | | |
| | | 4 | | ● | | | | | | | | | | ● | ● | ● | ● | ● | | | ● | | | | |
| | | 5 | | | ● | | | | | | | | | ● | | ● | ● | ● | | | ● | | | | |

# Appendix 7B: Existing and Potential Emergency Interconnection Information

# Appendix 7B: Existing and Potential Emergency Interconnection Information

**Table 7B-1: Existing Emergency Interconnections**

| No. | Emergency User | Emergency Provider |
|---|---|---|
| 1 | 90 Ranch WSC | East Medina County SUD |
| 2 | Alamo Heights | SAWS |
| 3 | Benton City WSC | Lytle |
| 4 | Cadillac Water | SAWS |
| 5 | Cibolo | Green Valley SUD |
| 6 | City of Seguin | Springs Hill WSC |
| 7 | Creedmoore-Maha WSC | Aqua WSC |
| 8 | Creedmoore-Maha WSC | City of Austin |
| 9 | Crystal Clear | Springs Hill WSC |
| 10 | East Central SUD | La Vernia |
| 11 | East Central SUD | Springs Hill WSC |
| 12 | East Medina County SUD Unit 1 | Natalia |
| 13 | El Oso WSC | Karnes City |
| 14 | Fair Oaks Ranch | SAWS |
| 15 | Gonzales County WSC | City of Smiley |
| 16 | Gonzales County WSC | City of Gonzales |
| 17 | Green Valley SUD | City of Cibolo |
| 18 | Green Valley SUD | Schertz |
| 19 | Green Valley SUD | Springs Hill WSC |
| 20 | Kyle | City of San Marcos |
| 21 | Leon Valley | SAWS |
| 22 | Live Oak | SAWS |
| 23 | Live Oak | Selma |
| 24 | Live Oak | Universal City |
| 25 | Lytle | Benton City WSC |
| 26 | Marion | CRWA |
| 27 | Marion | Green Valley SUD |
| 28 | Martindale WSC | Maxwell WSC |
| 29 | Medina County WCID 2 | West Medina WSC |
| 30 | Natalia | East Medina County WSC |
| 31 | Oak Village North | Rim Rock Ranch |
| 32 | Polonia WSC | Polonia WSC North |
| 33 | Polonia WSC North | Lockhart |
| 34 | Polonia WSC South | Lockhart |
| 35 | Rim Rock Ranch | Oak Village North |
| 36 | Schertz | SAWS |
| 37 | Selma | Live Oak |

| No. | Emergency User | Emergency Provider |
|---|---|---|
| 38 | Selma | Universal City |
| 39 | Shavano Park | SAWS |
| 40 | Smiley | Gonzales WSC |
| 41 | South Buda WCID 1 | Southwest Water Co. |
| 42 | Southwest Water Co. | SAWS |
| 43 | Springs Hill WSC | Canyon Regional WA |
| 44 | Springs Hill WSC | City of Sequin |
| 45 | Springs Hill WSC | Green Valley SUD |
| 46 | Stockdale | Sunko WSC |
| 47 | Sunko WSC | Stockdale |
| 48 | Texas State University | San Marcos |
| 49 | West Medina WSC | D'Hanis |
| 50 | West Medina WSC | Hondo |
| 51 | Yancey WSC | SAWS |

## Table 7B-2: Potential Emergency Interconnections

| No. | Potential Emergency User | Potential Emergency Provider |
|---|---|---|
| 1 | Atascosa Rural WSC | East Medina SUD |
| 2 | Cibolo | Schertz |
| 3 | County Line SUD | City of Kyle |
| 4 | Crystal Clear WSC | San Marcos |
| 5 | Crystal Clear WSC | NBU |
| 6 | East Medina County SUD | Atascosa Rural WSC |
| 7 | Wimberley WSC | County-Other, Hays (Aqua Texas) |

# Appendix 7C: Drought Preparedness Council Letter to Region L, Dated February 8, 2024

# Drought Preparedness Council

February 8, 2024

Region L Planning Group
c/o: Tim Andruss
Region L Chair
100 East Guenther Street
San Antonio, Texas 78283-9980

Dear Mr. Andruss,

The Drought Preparedness Council, which is comprised of representatives from 16 state agencies as well as appointees of the governor, would like to offer its assistance on drought-related issues encountered during the planning process. Authorized and established in 1999 as part of the 76th Texas Legislature, the council was created to carry out the provisions of Sections 16.055 and 16.0551 of the Texas Water Code. Its responsibilities include assessing and public reporting of drought monitoring and water supply conditions; advising the governor on significant drought conditions; recommending response plans for drought-related disasters; advising regional water planning groups on drought-related issues in the regional water plans; coordinating local, state, and federal drought-response planning; and submitting a report to the legislature every odd-numbered year.

Council members represent a broad swath of state agencies, including Texas Division of Emergency Management, Texas Water Development Board, Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, Texas Department of Agriculture, Texas A&M AgriLife Extension Service, Texas State Soil and Water Conservation Board, Texas Department of Housing and Community Affairs, Texas A&M Forest Service, Texas Department of Transportation, Texas Department of Economic Development, Office of the State Climatologist, Public Utilities Commission, Electric Reliability Council of Texas and Texas Health and Human Services Commission. Each member brings expertise in his or her field, and the greatest strength of the council lies in its ability to utilize the knowledge and skills of its members for the betterment of Texas. The council includes members of the emergency management community who can guide regional groups in the emergency management process, including how to request resources, and can provide instructions to local emergency management partners.

The council is aware that your regional water planning group is developing its 2026 Regional Water Plan, including its drought chapter. Per Title 31 of Texas Administrative Code Section 357.42(h),

regional water planning groups are required to consider "any relevant recommendations from the Drought Preparedness Council." As chairman of the council, I would like to extend the council's assistance on any drought related issues that you may come across while working through the regional water planning process. Additionally, the council and I offer the following recommendations:

1. The regional water plans and state water plan shall serve as water supply plans under drought of record conditions. The DPC encourages regional water planning groups to consider planning for drought conditions worse than the drought of record, including scenarios that reflect greater rainfall deficits and/or higher surface temperatures.
2. The Drought Preparedness Council encourages regional water planning groups to incorporate projected future reservoir evaporation rates in their assessments of future surface water availability.
3. The Drought Preparedness Council encourages regional water planning groups to identify in their plans utilities within their boundaries that reported having less than 180 days of available water supply to the Texas Commission on Environmental Quality during the current or preceding planning cycle. For systems that appeared on the 180-day list, RWPGs should perform the evaluation required by Texas Administrative Code Section 357.42(g), if it has not already been completed for that system.

If you have any questions for the council or would like to attend the Drought Preparedness Council's quarterly meetings, please contact John Honoré at John.Honore@tdem.texas.gov.

Sincerely,



**W. Nim Kidd, MPA, CEM**
Chief, Texas Division of Emergency Management
Chair, Drought Preparedness Council
Chair, Texas Emergency Management Council
Vice Chancellor for Disaster and Emergency Services
The Texas A&M University System

FINAL PLAN

# CHAPTER 8: POLICY RECOMMENDATIONS AND UNIQUE SITES

## South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**8.0 Policy Recommendations and Unique Sites ..... 8-1**

8.1 Ecologically Unique River and Stream Segments ..... 8-1

8.1.1 Legislative Designation of Five Unique Stream Segments ..... 8-1

8.1.2 Recognition of Potential Additional Stream Segments of Unique Ecological Value ..... 8-1

8.2 Unique Sites for Reservoir Construction ..... 8-2

8.3 Other Policy and Legislative Recommendations ..... 8-2

8.3.1 Funding Water Projects for a Growing Region ..... 8-2

8.3.2 Sponsorship and Implementation of Irrigation Strategies ..... 8-3

8.3.3 Groundwater ..... 8-3

8.3.4 Surface Water ..... 8-4

8.3.5 Conservation ..... 8-5

8.3.6 Water System Capacity ..... 8-5

8.3.7 Innovative Strategies ..... 8-6

8.3.8 Water Quality and Data Collection ..... 8-7

8.3.9 Consideration of Climate Variability in Regional Water Planning ..... 8-7

# List of Abbreviations

| | |
|---|---|
| acft/yr | Acre-Foot per Year |
| DFC | Desired Future Condition |
| GAM | Groundwater Availability Model |
| GCD | Groundwater Conservation District |
| GMA | Groundwater Management Area |
| gpm | Gallon per Minute |
| HB | House Bill |
| MAG | Modeled Available Groundwater |
| PWS | Public Water System |
| Region L | South Central Texas Region |
| RWPG | Regional Water Planning Group |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| TPWD | Texas Parks and Wildlife Department |
| TWC | Texas Water Code |
| TWDB | Texas Water Development Board |
| WAM | Water Availability Model |
| WMS | Water Management Strategy |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |

# 8.0 Policy Recommendations and Unique Sites

Chapter 31, Section 357.43 of the Texas Administrative Code (TAC) specifies that Regional Water Plans shall include recommendations on regulatory, administrative, or legislative issues. The South Central Texas (Region L) Regional Water Planning Group (SCTRWPG) establishes these recommendations to facilitate the orderly development, management, and conservation of water resources.

The following chapter provides recommendations for designation of ecologically unique river and stream segments, unique sites for reservoir construction, and any other recommendations that the SCTRWPG believes are needed and desirable to achieve the stated goals of state and regional water planning.

## 8.1 Ecologically Unique River and Stream Segments

Regional Water Planning Groups (RWPGs) may choose to adopt recommendations in Regional Water Plans for all or parts of river and stream segments as being of unique ecological value, based on criteria defined in 31 TAC §358.2(6). The following subsections provide information regarding unique stream segments recommendations by the SCTRWPG.

### 8.1.1 Legislative Designation of Five Unique Stream Segments

In the 2011 and 2016 Region L Regional Water Plans, the SCTRWPG recommended five stream segments as having unique ecological value for designation by the Texas Legislature. In 2015, House Bill 1016 (HB 1016, 84th Texas Legislature) designated five river or stream segments as being of unique ecological value. The SCTRWPG is appreciative of legislative action in the form of HB 1016.

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature adequately fund the Texas Commission on Environmental Quality (TCEQ) and other entities in monitoring the water quality of the five river and stream segments designated as being of unique ecological value within the South Central Texas Regional Water Planning Area (SCTRWPA).

**Other Recommendation:** None.

### 8.1.2 Recognition of Potential Additional Stream Segments of Unique Ecological Value

The SCTRWPG believes that designating ecologically unique stream segments raises public awareness and voluntary stewardship that can result in the preservation of the character and environmental function of these segments. The SCTRWPG recognizes the ecologically significant stream segments designated by Texas Parks and Wildlife Department (TPWD) in July 2005. The SCTRWPG shall consider these stream segments as a guide for recommending additional stream segments of unique ecological value for future legislative designation.

**Legislative Recommendation:** The SCTRWPG recommends increased Texas Water Development Board (TWDB) funding to be allocated for future planning cycles to conduct analyses necessary for designation of additional stream segments as segments of unique ecological value.

**Other Recommendation:** None.

## 8.2 Unique Sites for Reservoir Construction

Regional Water Plans may include RWPG recommendations to designate sites of unique value for construction of reservoirs based on criteria defined in 31 TAC §358.2(7). At this time, the SCTRWPG does not recommend any unique reservoir sites for inclusion in the 2026 Region L Regional Water Plan.

**Legislative Recommendation:** None.

**Other Recommendation:** None.

## 8.3 Other Policy and Legislative Recommendations

### 8.3.1 Funding Water Projects for a Growing Region

#### 8.3.1.1 Project Studies and Implementation

The SCTRWPA is located in one of the fastest growing regions of the United States. Region L comprises 21 counties with a current population of 3.0 million people. Based on board-approved projections from the TWDB, the population is projected to increase to 3.9 million people in 2030, 4.7 million people by 2040, and 7.6 million people by the end of the 50-year planning horizon in 2080. Water User Groups (WUGs) and wholesale water providers (WWPs) have the responsibility of meeting the water needs of these future Texans.

**Legislative Recommendation:** In order to meet the water needs of the State and to support the growing population and economy, the SCTRWPG recommends the Texas Legislature allocate funding to state and local governmental entities to support studies water management strategies (WMSs) and implementation of water supply projects.

**Other Recommendation:** None.

#### 8.3.1.2 Lengthening Financing Terms

The price of water has increased tremendously over the past 30 years, raising utility concerns regarding water affordability for rate payers. The TWDB's current loan and funding programs have 30-year financing terms available for most types of projects. However, many of these projects have a project life greater than 50 years, placing the financial burden on rate payers now when it would be used by future rate payers. Lengthening the financing terms to 40 or 50 years would mean utilities would pay for these projects over a longer period of time, which could enable utilities more flexibility to ensure affordable rates for residents.

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature pass legislation that enables the TWDB loan and funding programs to provide 40- and 50-year financing terms, in addition to the current 30-year financing term available. This lengthened financing term would allow payment for projects over a longer period of time, which could help with water affordability.

**Other Recommendation:** None.

### 8.3.2 Sponsorship and Implementation of Irrigation Strategies

The SCTRWPG finds that, given the complexity of the factors that influence decisions regarding the development of agricultural water supplies (e.g., commodity prices; variability of quality and quantity of local, privately-owned water resources; broad geographic distribution of needs; and other economic considerations of individual agricultural producers) as well as the lack of appropriate WUGs or WWPs to serve as sponsors of WMSs meant to address irrigation needs, it is not practical for the SCTRWPG to develop WMSs designed to develop new water supplies or infrastructure for agricultural water users for projected irrigation water shortages and substantially limits the SCTRWPG's ability to conceive of and evaluate discrete strategies to supply water for future water needs in many cases.

The SCTRWPG recognizes one of the obstacles encountered by RWPGs and irrigation water users in developing WMSs to supply water for irrigation needs is the lack of an eligible sponsor for potential WMSs.

**Legislative Recommendation:** None.

**Other Recommendation:** The SCTRWPG recommends that the TWDB evaluate revisions to the regional water planning rules and guidance to allow entities other than WUGs and WWPs to serve as sponsors of WMSs related solely to irrigation and to receive funding to implement WMSs designed to address irrigation water needs.

### 8.3.3 Groundwater

#### 8.3.3.1 Groundwater Management

The SCTRWPG respects the rules and regulations of groundwater conservation districts (GCDs), as it does those of all other subdivisions of the state and state agencies. The SCTRWPG respects the decision of the Texas Supreme Court that groundwater is a private property right (Chapter 36 of the Texas Water Code [TWC]). The SCTRWPG believes that all rules adopted by GCDs pursuant to administrative procedures established under Chapter 36 of the TWC should be based on standards of rationality, equity, and scientific evidence to support the achievement of desired future conditions (DFCs) established by a groundwater management area (GMA). The SCTRWPG supports the use of aquifer monitoring programs implemented by GCDs within a GMA to evaluate achievement of and compliance with DFCs.

The SCTRWPG recognizes that the development of brackish groundwater resources is an important water supply strategy in meeting the state’s projected water demands.

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature support the development of brackish groundwater resources as an important water supply strategy by funding additional studies and research to assess the quality, quantity, and treatability of potential supplies, providing financial assistance for brackish groundwater supply projects, and promoting efficient permitting of these projects by regulatory agencies.

**Other Recommendation:** The SCTRWPG recommends the TWDB included the following explanatory note in the state water plan and database at appropriate locations:

"For each groundwater management area (GMA) within the region, the representatives of the member groundwater conservation district (GCDs) have adopted desired future conditions (DFCs) for the relevant aquifers. To ensure consistency with the DFCs, TWDB limits groundwater availability for each aquifer to the associated modeled available groundwater (MAG) for planning purposes. This water planning limitation has resulted in reductions to the yield of existing groundwater supplies and future groundwater supplies (as water management strategies [WMSs]) in this plan. This result should not be misconstrued as a recommendation of the SCTRWPG to the associated GCDs to make any adjustments to the associated DFC or to TWDB to make any adjustment to the associated MAG. The SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater in accordance with their permits. The SCTRWPG recognizes and supports the authority and responsibility of GCDs to manage groundwater resources to achieve DFCs."

#### 8.3.3.2 Notice of Groundwater Projects

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature develop a process requiring WMS sponsors to provide public notice to county officials describing the WMSs with a groundwater source within the county where the potential WMS is located.

**Other Recommendation:** None.

#### 8.3.3.3 Groundwater Availability Model Updates

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature provide adequate funding to the TWDB to revise and improve, at a minimum, on a 10-year basis, the groundwater availability models (GAMs) used to develop DFCs and determine modeled available groundwater (MAG) estimates.

**Other Recommendation:** The SCTRWPG recommends the TWDB initiate a program that provides the necessary information, technical expertise, and experience to update and improve the GAMs on a 10-year basis to support the permitting efforts of GCDs, the joint planning efforts of GMAs, and the regional water planning efforts of the RWPGs.

### 8.3.4 Surface Water

#### 8.3.4.1 Surface Water Availability Model Updates

Although a new drought of record has not occurred for the Guadalupe-San Antonio Basin since the 1950s, appropriate updates to the related Water Availability Models (WAMs) would increase the simulation period by at least 50 percent and facilitate development of improved estimates of channel losses and missing streamflow records (especially those during the drought of record) throughout the watersheds. Furthermore, an extension of the Guadalupe-San Antonio WAM naturalized flow set would enhance the permitting process by providing additional hydrologic data used in the determination of the attainment frequencies associated with freshwater inflow regimes.

**Legislative Recommendation:** Periodic updates to the Guadalupe-San Antonio and Nueces WAMs should be performed at least every 10 years so that hydrologic data included in the models is within 10 years of the current date. The SCTRWPG recommends the Texas Legislature fund the TCEQ to update the WAMs for the Guadalupe-San Antonio River Basin and Nueces River Basin to include the most-

recent available hydrologic data, and continue allocating funding to update the WAMs on a 10-year basis.

**Other Recommendation:** The SCTRWPG recommends the TCEQ design and implement a systematic process for WAM updates, which would document any changes and associate those changes with official numbered versions of each of the WAMs.

### 8.3.5 Conservation

The SCTRWPG appreciates and supports recently passed legislation (Senate Bill 28, Senate Joint Resolution 75, and Senate Bill 30) by the 88th Texas Legislature to establish and fund a statewide water public awareness program. These actions will further general mainstream municipal conservation efforts. The SCTRWPG also recognizes that additional steps need to be taken to promote sustainable landscapes, thereby substantially reducing the quantities of water used (and potentially wasted) for municipal landscape irrigation.

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature provide adequate funding to promote sustainable landscaping practices that conserve water with the statewide public education programs.

**Other Recommendation:** The SCTRWPG encourages and recommends communities within Region L to adopt and/or incentivize efforts to promote sustainable landscaping practices and conserve water, where feasible.

### 8.3.6 Water System Capacity

Rules in 30 TAC §290.45 include requirements for minimum water system capacity. Currently, the rules require a minimum of 0.6 gallons per minute (gpm) per connection for the total public water system capacity, as well as capacities for individual water treatment plants, groundwater wells, ground storage tanks, raw water pump stations, transfer pump stations, and others. The 0.6 gpm requirement converts to 315,360 gallons per year per connection, or 0.97 acre-feet per year (acft/yr) per connection. This represents a substantial cost to develop reserve capacities that are unlikely to be used.

TAC §290.45(g) provides a process for a Public Water System (PWS) to request a waiver for an Alternative Capacity Requirement:

> *Any water system requesting to use an alternative capacity requirement must demonstrate to the satisfaction of the executive director that approving the request will not compromise the public health or result in a degradation of service or water quality and comply with the requirements found in §290.46(x) and (y) of this title.*

30 TAC §290.45(g).

**Legislative Recommendation:** None.

**Other Recommendation:** The SCTRWPG recommends that the TCEQ perform the following:

- Perform a systematic review of the Minimum Water System Capacity requirements to ensure the following:

- Maintaining public health
- Availability of firm water supplies to meet customer demand during a repeat of the drought of record
- Maintaining water quality

- The SCTRWPG recommends the Minimum Water System Capacity review include the following:
  - Review the model to ensure it meets the 21st century needs of rapid population growth in the state
    - Maximum daily demand
    - Safety factor
    - Equivalency ratio calculation
    - Required justification
    - Ensure a balance of maintaining available water supplies during drought while avoiding the need for PWSs to lock up water supplies that may never be used preventing other PWS access to water resources.

### 8.3.7 Innovative Strategies

#### 8.3.7.1 Assistance for Alternative Rangeland Management

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature increase funding to the Texas State Soil and Water Conservation Board Water Supply Enhancement Program for the purpose of implementing brush control and rangeland management practices.

**Other Recommendation:** None.

#### 8.3.7.2 One Water

In recent years, municipalities have begun to view water resources from a holistic, systemwide approach, known as One Water. One Water is a decentralized concept that views all water resources as valuable. The majority of laws and regulations in Texas are not structured in such a way as to encourage or incentivize One Water approaches. In December 2019, the Meadows Center for Water and the Environment published a report entitled, *Regulatory Impediments to Implementing One Water in Texas*. According to the 2019 Meadows Center Report:

One Water projects are still not the norm. This is, in part, due to the current regulatory framework's inability to accommodate more innovative water reuse strategies, where the risk to public health is significant or not well understood. For example, federal drinking water regulations are necessary to protect public drinking water supplies, but they create onerous regulatory hurdles for smaller, onsite systems that may seek to use alternative sources, such as rainwater. Additionally, although onsite non-potable reuse of blackwater is a hallmark of the One Water approach, existing regulations in Texas make it extremely difficult for developers to construct onsite blackwater reuse systems. Finally, the lack of regulations that govern water reuse in Texas could actually stymie the development of One Water projects as developers often prefer clear regulatory and permitting paths over case-by-case decision making by regulators.

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature review existing state laws regarding rainwater, non-potable on-site reuse, direct potable reuse, and blackwater reuse systems to enable and incentivize implementation of One Water Projects.

**Other Recommendation:** The SCTRWPG recommends the TWDB and TCEQ (1) financially support research for determining appropriate technology and risk mitigation approaches necessary to significantly expand One Water with appropriate protections for the public, environment, and worker health, in consideration of and with respect to impacts on existing water rights; and (2) assist the funding and development of incentive programs to advance One Water in Texas.

### 8.3.8 Water Quality and Data Collection

The primary focus of the regional water planning process is to ensure that water supplies are identified in sufficient quantity to meet future water demands; however, the SCTRWPG recognizes that the quality of those water supplies is also important to protect. Protecting groundwater and surface water supplies from contamination not only helps to reduce the cost to treat water to public drinking water standards, but also reduces pollutants that may harm the ecological health of the basin.

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature fully fund the cooperative, federal-state-local program of basic water data collection, including (1) stream gages-quantity and quality; (2) groundwater monitoring-water levels and quality; (3) hydrographic surveys and sediment accumulation in reservoirs; (4) water surface evaporation rates; (5) water use data for all WUGs; (6) population projections; and (7) Clean Rivers Program.

**Other Recommendation:** The SCTRWPG recommends the TCEQ and local governments promote practices and/or regulations to avoid or mitigate threats to water quality in surface water and groundwater sources.

### 8.3.9 Consideration of Climate Variability in Regional Water Planning

Regional Water Plans are based on drought of record conditions using historical data; however, climate models indicate the potential for an increase in the number of dry days with increased evaporation along with more intense rainfall events, which impacts water supply and demand. Historically, the TWDB has not used climate models to predict impacts to future water resources in Texas because forecasting tools have not been able to provide the resolution needed for water planning. The SCTRWPG recognizes that down-scaling of climate models is becoming more sophisticated, and the results are being considered in other planning efforts and models (including WAMs). Similar incorporation into future regional water plans is needed to ensure meeting customer demand under climate enhanced drought conditions.

**Legislative Recommendation:** The SCTRWPG recommends the Texas Legislature fund relevant studies and down-scaled regional models to incorporate available climate variability into the Regional Water Planning process.

**Other Recommendation:** The SCTRWPG recommends the TWDB to reassess available climate models and consider incorporating them into regional water planning.

FINAL PLAN

# CHAPTER 9: IMPLEMENTATION AND COMPARISON TO THE PREVIOUS REGIONAL WATER PLAN

South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**9.0 Implementation and Comparison to the Previous Regional Water Plan ..... 9-1**

9.1 Implementation of Previous Regional Water Plan ..... 9-1

9.2 Assessment of Progress Toward Regionalization ..... 9-1

9.3 Comparison to Previous Regional Water Plan ..... 9-2

9.3.1 Water Demand Projections ..... 9-3

9.3.2 Drought of Record and Assumptions ..... 9-5

9.3.3 Source Water Availability ..... 9-9

9.3.4 Existing Water Supplies ..... 9-11

9.3.5 Identified Water Needs ..... 9-13

9.3.6 Recommended and Alternative Water Management Strategies and Water Management Strategy Projects ..... 9-15

## LIST OF APPENDICES

Appendix 9A: Implementation Survey Results

## LIST OF TABLES

Table 9-1 Comparison of Hydrologic and Modeling Assumptions in the 2021 SCTRWP and the 2026 SCTRWP ..... 9-5

## LIST OF FIGURES

Figure 9-1 Municipal Water Demand Projections ..... 9-4

Figure 9-2 Non-Municipal Water Demand Projections ..... 9-4

Figure 9-3 Total Water Demand Projections ..... 9-5

Figure 9-4 Groundwater Availability ..... 9-9

Figure 9-5 Surface Water Availability ..... 9-10

Figure 9-6 Total Water Availability ..... 9-11

Figure 9-7 Existing Water Supplies for Municipal Water User Groups ..... 9-12

Figure 9-8 Existing Water Supplies for Non-Municipal Water User Groups ..... 9-12

Figure 9-9 Existing Water Supplies for All Water User Groups ..... 9-13

Figure 9-10 Municipal Water Needs ..... 9-14

Figure 9-11 Non-Municipal Water Needs ..... 9-14

Figure 9-12 Total Identified Water Needs ..... 9-15

# List of Abbreviations

| | |
|---|---|
| % | percent |
| acft/yr | Acre-foot per Year |
| ASR | Aquifer Storage and Recovery |
| BFZ | Balcones Fault Zone |
| DFC | Desired Future Condition |
| EAA | Edwards Aquifer Authority |
| EAHCP | Edwards Aquifer Habitat Conservation Plan |
| FERC | Federal Energy Regulatory Commission |
| FRAT | Flow Regime Application Tool |
| GMA | Groundwater Management Area |
| MAG | Modeled Available Groundwater |
| Region L | South Central Texas Region |
| RWPA | Regional Water Planning Area |
| RWPG | Regional Water Planning Group |
| SV/SA | Storage Volume/Surface Area |
| SCTRWP | South Central Texas Regional Water Plan |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| TWDB | Texas Water Development Board |
| WAM | Water Availability Model |
| WMS | Water Management Strategy |
| WMSP | Water Management Strategy Project |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |
| WWTP | Wastewater Treatment Plant |

# 9.0 Implementation and Comparison to the Previous Regional Water Plan

The purpose of this chapter is to document the level of implementation of previously recommended water management strategies (WMSs), provide an assessment of progress toward achieving economies of scale, and summarize the differences between this 2026 South Central Texas (Region L) Regional Water Plan (SCTRWP) and the 2021 SCTRWP. The following sections provide more information regarding each of these topics.

## 9.1 Implementation of Previous Regional Water Plan

The Texas Water Development Board (TWDB) requires regional water planning groups (RWPGs) to report the level of implementation and identified, reported implementation impediments to the development of previously recommended WMSs and Water Management Strategy Projects (WMSPs) that have affected progress in meeting water needs. For the 2026 SCTRWP, this task assesses the implementation of WMSs and WMSPs included in the previous water plan, which was the 2021 SCTRWP.

To assess the level of implementation of the 2021 SCTRWP, the South Central Texas Regional Water Planning Group (SCTRWPG) distributed a survey to water user groups (WUGs) and wholesale water providers (WWPs) in the South Central Texas Regional Water Planning Area (SCTRWPA) that had WMSs and or WMSPs included in the 2021 SCTRWP. The survey consisted of a spreadsheet provided by the TWDB that requested information regarding several aspects of the proposed WMSs and WMSPs, including the following questions.

1. Has the sponsor taken affirmative vote or actions?
2. What is the status of the WMS project or WMS recommended in the 2021 SCTRWP?
3. If project has not been started or no longer being pursued, please tell us why.
4. Please select one or more project impediments. If an impediment is not listed, provide information in the “Other” text field.
5. What funding types are being used for the project?

As of October 2, 2025, the SCTRWPG received survey responses regarding 43 of the 241 WMSs or WMSPs. Appendix 9A includes survey results that were received from sponsors.

## 9.2 Assessment of Progress Toward Regionalization

In accordance with Title 31 of the Texas Administrative Code (TAC) §357.45(b), RWPGs must “assess the progress of the [Regional Water Planning Area (RWPA)] in encouraging cooperation between WUGs for the purpose of achieving economies of scale and otherwise incentivizing WMSs that benefit the entire RWPA.”

Several WMSs in the 2026 SCTRWP focus on cooperative agreements among WUGs and WWPs. The 2026 SCTRWP includes 16 WMSs that serve more than one WUG. The 2021 SCTRWP had 18 WMSs that served more than one WUG and to the knowledge of the SCTRWPG, three of these have been implemented since adoption of the 2021 SCTRWP.

For many years, the SCTRWPG has encouraged cooperation and collaboration among WUGs for the purpose of achieving economies of scale. In the SCTRWPA, there are several existing partnerships that coordinate to develop and deliver water supplies, such as Alliance Regional Water Authority, Canyon Regional Water Authority, Cibolo Valley Local Government Corporations, and Schertz-Seguin Local Government Corporation. New to this 6th cycle of planning is the Medina County Regional Water Alliance, which is developing the Medina County Regional Aquifer Storage and Recovery (ASR) Project (refer to Section 5.2.22) to share water supplies and costs of infrastructure development.

Development of the Edwards Aquifer Habitat Conservation Plan (EAHCP) is another example of a local partnership in the SCTRWPA that encourages coordination to achieve economies of scale. The EAHCP protects federally-listed species that live in the Edwards Aquifer and the Comal and San Marcos Springs. It protects covered species through habitat protection, flow protection, and supporting measures, such as water quality monitoring, biological monitoring, and applied research. The partners participating in the EAHCP include the following:

- Edwards Aquifer Authority (EAA);
- The City of New Braunfels;
- The City of San Marcos;
- The City of San Antonio acting by and through its San Antonio Water System Board of Trustees;
- Guadalupe-Blanco River Authority;
- Texas State University;
- Texas Parks and Wildlife Department; and
- U.S. Fish and Wildlife Service.

This assessment demonstrates that the prevailing approach for entities within the SCTRWPA is to coordinate and collaborate in order to achieve regionalization. Based on the array of collaborative projects and partnerships, the SCTRWPA has been successful in encouraging cooperation among WUGs for the purpose of achieving economies of scale or otherwise incentivizing WMSs that benefit the entire SCTRWPA. The SCTRWPG is committed to encouraging continued cooperation among WUGs and is always looking for ways to achieve economies of scale for the benefit of the region and the state.

## 9.3 Comparison to Previous Regional Water Plan

Each update to the SCTRWP is an opportunity for the SCTRWPG to evaluate the changes in the region's water use and conservation goals, and to lay out a path toward meeting future water needs. Every five-year cycle of planning includes a reevaluation of current and future demands, supplies currently being used, and development of a range of WMSs and WMSPs that can be used to meet projected needs. This section focuses on changes that have occurred since the previous plan was adopted, including providing comparisons for the following:

- Water demand projections;
- Droughts of record;
- Source water availabilities;
- Existing water supplies;

- Identified water needs; and
- Recommended and alternative WMSs and WMSPs.

### 9.3.1 Water Demand Projections

With each regional water planning cycle, population and water demand projections can potentially change for each WUG. Population can change because of updated data, either from the latest census or better estimates from the Texas State Demographer. Water demands can change because of changes in population or variations in per capita water use values, which are affected by conservation efforts, drought measures, and shifts in water use patterns. The TWDB collaborated with RWPGs to develop the adopted demand projections for the region's WUGs. Population and municipal demands were estimated for utilities and rural areas for the municipal WUG projections. Other users were aggregated into geographical areas defined by county and river basin boundaries, such as irrigation and steam-electric power generation, to form the demand projections for non-municipal WUGs. TWDB estimated demands using historical data and recent studies for each category to establish the base year. The base year was used with a rate of change to project decadal estimates over the 50-year planning horizon from 2030 to 2080.

In general, water demand projections in the 2021 SCTRWP and the 2026 SCTRWP demonstrate similar growth trends. However, the magnitude of the growth in water demands over the planning horizon is greater in the 2026 SCTRWP (37 percent [%]) than the 2021 SCTRWP (25%). Between 2030 and 2080, municipal water demand projections for the 2026 SCTRWP are higher than the 2021 SCTRWP. In the 2021 SCTRWP, municipal water demands ranged from 485,978 acre-feet per year (acft/yr) [1] in 2030 to 700,477 acft/yr by the 2070 decade (Figure 9-1). In the 2026 plan, municipal water demand ranges from 530,751 acft/yr in 2030 to 856,949 acft/yr in 2070, and then to 956,362 acft/yr by 2080.

Non-municipal demands for the 2026 SCTRWP are projected to remain relatively flat over the planning period (Figure 9-2), decreasing slightly in 2080. The 2026 SCTRWP non-municipal water demand projections are generally lower than those projected in the 2021 SCTRWP, except for the 2060 and 2070 decades. The 2021 SCTRWP projected demands range from 628,970 acft/yr in 2030 to 619,651 acft/yr in 2070. In the 2026 SCTRWP, non-municipal water demand ranges from 604,220 acft/yr in 2030 to 636,338 acft/yr in 2070 and then to 601,075 acft/yr by 2080.

The total water demand projections for the 2026 SCTRWP increase from 1,134,971 acft/yr in 2030 to 1,557,437 acft/yr in 2080 (Figure 9-3).

[1] One acft is approximately 325,851 gallons.

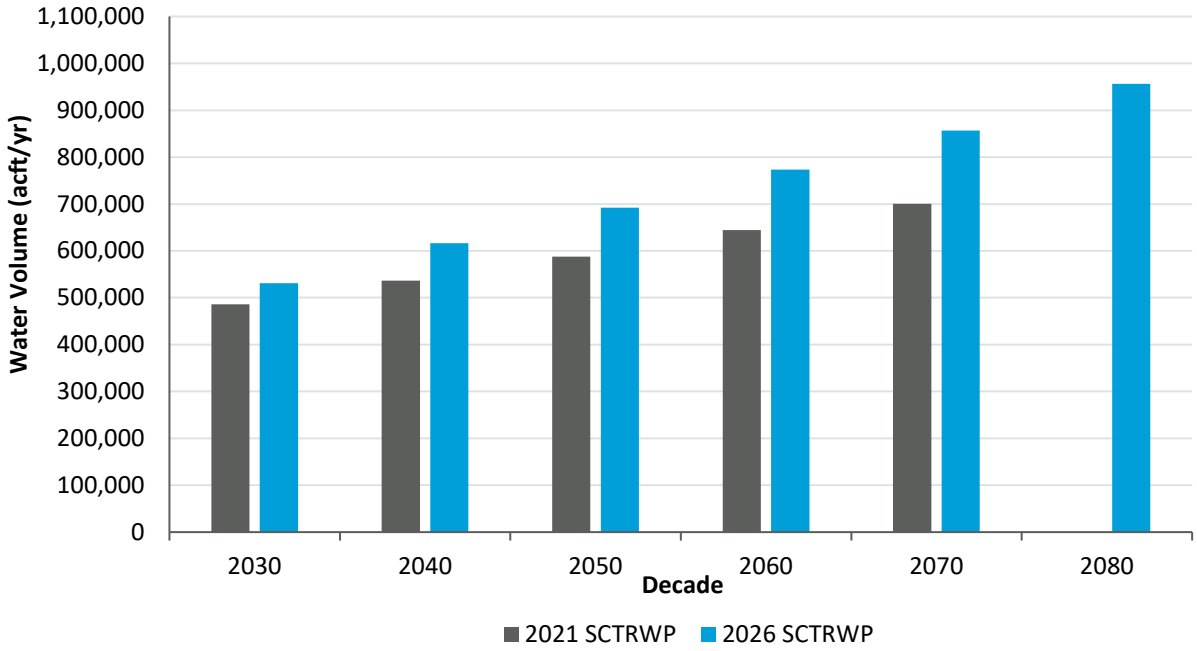



**Figure 9-1 Municipal Water Demand Projections**

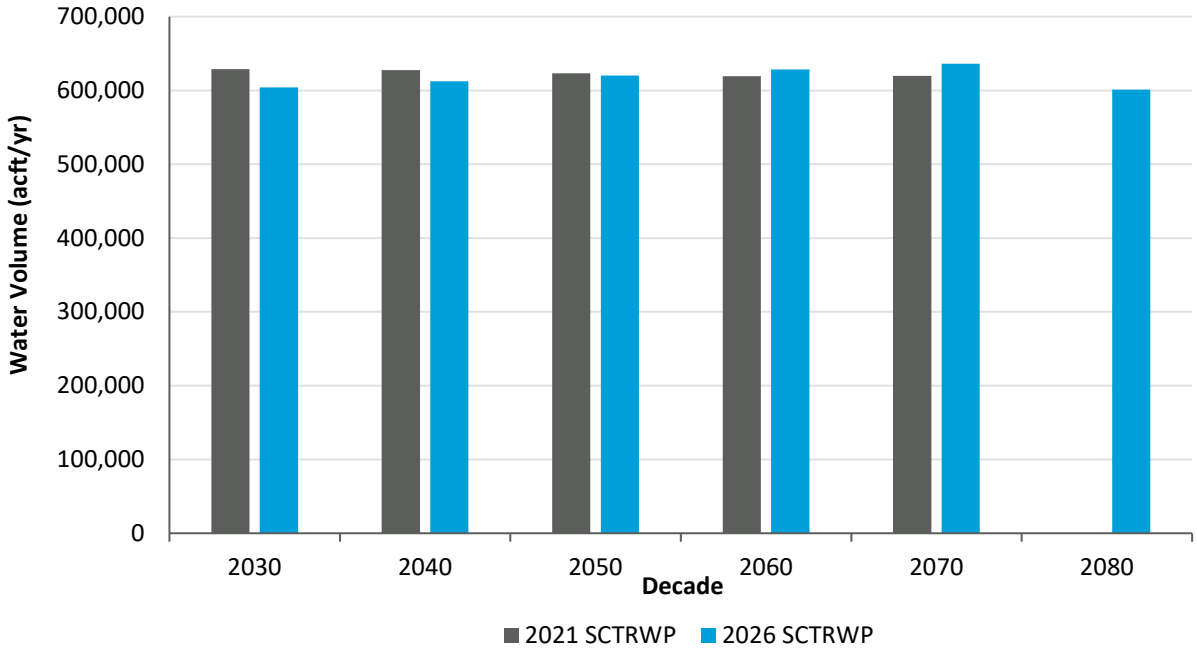



**Figure 9-2 Non-Municipal Water Demand Projections**

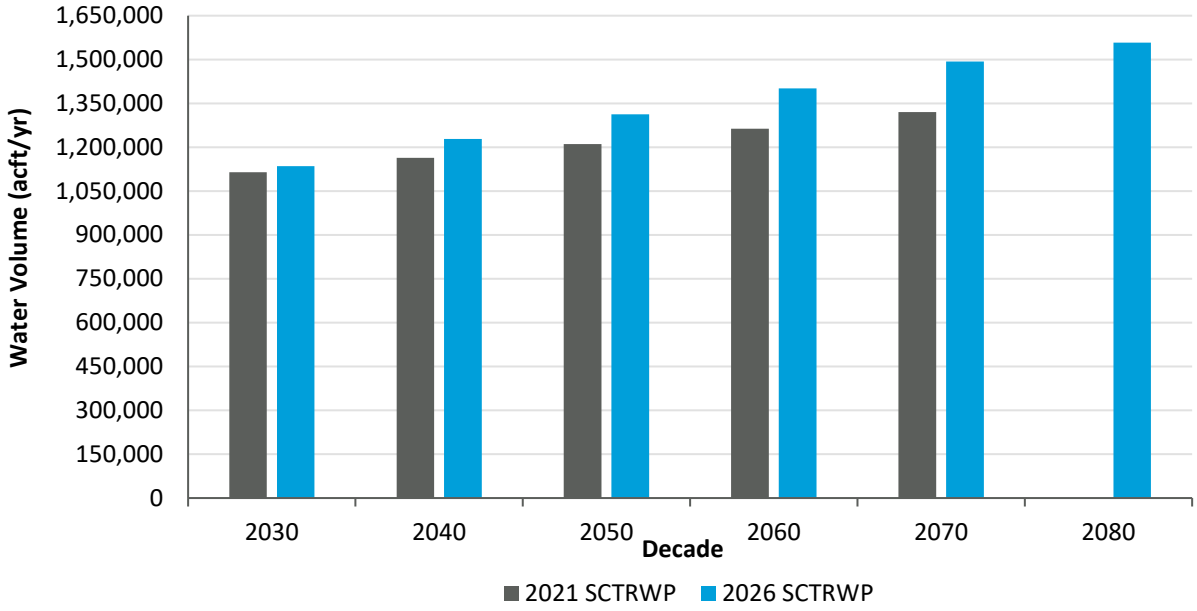



**Figure 9-3 Total Water Demand Projections**

### 9.3.2 Drought of Record and Assumptions

The drought of record in the Guadalupe-San Antonio River Basin is the drought of the 1950s and did not change from the 2021 SCTRWP. The drought of record for the Nueces River Basin is the drought of the 1990s and did not change from the 2021 SCTRWP. Water modeling assumptions associated with both plans are listed in Table 9-1. Refer to Appendix 3B for correspondence between the SCTRWPG and TWDB regarding the hydrologic assumptions and variances.

**Table 9-1 Comparison of Hydrologic and Modeling Assumptions in the 2021 SCTRWP and the 2026 SCTRWP**

| Assumption Category | 2021 SCTRWP | 2026 SCTRWP (Emphasis Added to Denote Change from 2021 SCTRWP) |
|---|---|---|
| Surface Water | Water Availability Model (WAM) Run 3 may be used for Surface Water Rights Modeling for existing supplies, WMS evaluations, and cumulative effects evaluation. Use of the Region L WAM may be used to establish existing supply for Canyon Reservoir and power plant reservoirs, Braunig, Calaveras, and Coleto Creek (daily time step simulation with no use of effluent or other changes to any water rights). | SCTRWPG used the Texas Commission on Environmental Quality (TCEQ) WAM Run 3 and an alternative surface water model, the "Region L WAM" to assess surface water availabilities. The Region L WAM was used to estimate surface water availabilities for certain reservoirs, including Canyon Reservoir, Victor Braunig Lake, Calaveras Lake, and Coleto-Creek Reservoir. The unmodified WAM Run 3 was used to evaluate firm yields for all other reservoirs in the SCTRWPA. |
| Surface Water | WAM Run 3 assumes the following:<br>a. Full exercise of surface water rights<br>b. Zero effluent discharges unless specifically required by a surface water | WAM Run 3 assumes the following:<br>a. Full exercise of surface water rights<br>b. Zero effluent discharges unless specifically required by a surface water right |

| Assumption Category | 2021 SCTRWP | 2026 SCTRWP (Emphasis Added to Denote Change from 2021 SCTRWP) |
|---|---|---|
| | right (hydropower, industrial rights, City of Victoria, etc.) | (hydropower, industrial rights, City of Victoria, etc.) |
| Surface Water | Version Dates for WAM Run 3:<br>• Guadalupe-San Antonio River Basin: 10/17/2014<br>• Nueces River Basin: 1/7/2013<br>San Antonio-Nueces Coastal Basin: 1/7/2013<br>• Lavaca-Guadalupe Coastal Basin: 7/30/2015 | Version Dates for WAM Run 3:<br>• Guadalupe-San Antonio River Basin: **10/1/2023**<br>• Nueces River Basin: **10/1/2023**<br>• San Antonio-Nueces Coastal Basin: **10/1/2023**<br>• Lavaca-Guadalupe Coastal Basin: **10/1/2023** |
| Surface Water | Period of Record for WAM Run 3:<br>• Guadalupe-San Antonio River Basin: 1934 to 1989<br>• Nueces River Basin: 1934 to 1996<br>• San Antonio-Nueces Coastal Basin: 1948 to 1998<br>• Lavaca-Guadalupe Coastal Basin: 1940 to 1996 | Period of Record for WAM Run 3:<br>• Guadalupe-San Antonio River Basin: 1934 to 1989<br>• Nueces River Basin: 1934 to 1996<br>• San Antonio-Nueces Coastal Basin: 1948 to 1998<br>• Lavaca-Guadalupe Coastal Basin: 1940 to 1996 |
| Drought of Record | • Guadalupe- San Antonio River Basin: 1950s<br>• Nueces River Basin: 1990s | • Guadalupe- San Antonio River Basin: 1950s<br>• Nueces River Basin: 1990s |
| Surface Water | The Region L WAM is used to establish existing supply for Canyon Reservoir and power plant reservoirs of Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir. This model simulates Federal Energy Regulatory Commission (FERC) requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe River Trout Unlimited, and various water rights and daily operations dependent on Canyon Reservoir. The model uses a daily time step simulation with no use of effluent or other changes to water rights. The Region L WAM more accurately considers reservoir operations in its analysis, including operation of the power plant reservoirs subject to authorized consumptive uses, with makeup diversions as needed to maintain full conservation storage to the extent possible, subject to senior water rights, instream flow considerations, and/or applicable contractual provisions. | The Region L WAM is used to establish existing supply for Canyon Reservoir and power plant reservoirs of Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir. This model simulates FERC requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe River Trout Unlimited, and various water rights and daily operations dependent on Canyon Reservoir. The model uses a daily time step simulation with no use of effluent or other changes to water rights. The Region L WAM more accurately considers reservoir operations in its analysis, including operation of the power plant reservoirs subject to authorized consumptive uses, with makeup diversions as needed to maintain full conservation storage to the extent possible, subject to senior water rights, instream flow considerations, and/or applicable contractual provisions. |

| Assumption Category | 2021 SCTRWP | 2026 SCTRWP (Emphasis Added to Denote Change from 2021 SCTRWP) |
|---|---|---|
| Surface Water | The Flow Regime Application Tool (FRAT) will be used, in conjunction with the TCEQ WAM Run 3, to evaluate environmental flows for new surface water WMSs. FRAT converts between monthly time step simulations and daily time step simulations. | The FRAT will be used, in conjunction with the TCEQ WAM Run 3, to evaluate environmental flows for new surface water WMSs. FRAT converts between monthly time step simulations and daily time step simulations. |
| Surface Water | Anticipated sedimentation was incorporated into WAM Run 3 models and the Region L WAM. The storage volume/surface area (SV/SA) tables for Canyon Reservoir, Victor Braunig Lake, Calaveras Lake, and Coleto-Creek Reservoir were adjusted to reflect sedimentation for the 2020 and 2070 planning decades. | Anticipated sedimentation was incorporated into WAM Run 3 models and the Region L WAM. The SV/SA tables for Canyon Reservoir, Victor Braunig Lake, Calaveras Lake, and Coleto-Creek Reservoir were adjusted to reflect sedimentation for the **2030 and 2080 planning decades**. |
| Surface Water | Evaluations of WMS and cumulative effects were performed in accordance with environmental flow standards adopted in 30 TAC §298, as applicable. | Evaluations of WMS and cumulative effects were performed in accordance with environmental flow standards adopted in 30 TAC §298, as applicable. |
| Surface Water | Period of record for simulations: Guadalupe- San Antonio River Basin (1934-1989, Critical Drought = 1950s) and Nueces River Basin (1934-1997, Critical Drought = 1990s) | Period of record for simulations: Guadalupe-San Antonio River Basin (1934-1989, Critical Drought = 1950s) and Nueces River Basin (1934-1997, Critical Drought = 1990s) |
| Surface Water | For all areas within the planning region, livestock water demand is generally assumed to be supplied 50% from quantified groundwater sources and 50% from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. | For all areas within the planning region, livestock water demand is generally assumed to be supplied 50% from quantified groundwater sources and 50% from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. |
| Groundwater | Groundwater availabilities were provided by TWDB as modeled available groundwater (MAG) estimates or desired future condition (DFC) compatible groundwater availability estimates, except in the following instances where the SCTRWPG developed RWPG-estimated groundwater availabilities:<br>• Trinity Aquifer: Bexar County<br>• Edwards-Balcones Fault Zone (BFZ) Aquifer in Portions Regulated by the EAA: Atascosa, Bexar, Comal, Guadalupe, Haus, Medina, and Uvalde Counties<br>• Edwards-BFZ Aquifer: Frio County | Groundwater availabilities were provided by TWDB as MAG estimates or DFC compatible groundwater availability estimates, except in the following instances where the SCTRWPG developed RWPG-estimated groundwater availabilities:<br>• **Carrizo Wilcox Aquifer: Karnes County**<br>• Edwards-BFZ Aquifer in Portions Regulated by the EAA: Atascosa, Bexar, Comal, Guadalupe, Haus, Medina, and Uvalde Counties<br>• Edwards-BFZ Aquifer: Frio County<br>• Leona Gravel Aquifer: Medina County<br>• San Marcos River Alluvium Aquifer: Caldwell County |

| Assumption Category | 2021 SCTRWP | 2026 SCTRWP (Emphasis Added to Denote Change from 2021 SCTRWP) |
|---|---|---|
| | • Leona Gravel Aquifer: Medina County<br>• San Marcos River Alluvium Aquifer: Caldwell County | |
| Groundwater | MAG and DFC-compatible groundwater availabilities were sourced from the following TWDB MAG Reports that were published by TWDB on or before June 1, 2018:<br>• GR16-026 MAG (Groundwater Management Area [GMA] 7);<br>• GR16-023 MAG (GMA 9)<br>• GR16-033 MAG (GMA 10)<br>• GR17-027 MAG (GMA13)<br>• GR16-025 MAG (GMA 15) | MAG and DFC-compatible groundwater availabilities were sourced from the following TWDB MAG Reports that were published on or before **April 12, 2023:**<br>• **GR21-012 MAG (GMA 7);**<br>• **GR21-014 MAG (GMA 9)**<br>• **GR21-015 MAG (GMA 10)**<br>• **GR21-018 MAG (GMA 13)**<br>• **GR21-020 MAG (GMA 15)** |
| Groundwater | Allocations of existing supplies and future supplies (as WMS supply volumes) in an aquifer/county/basin were performed in accordance with TWDB rules that require total supplies to be less than or equal to groundwater availabilities, preventing any overallocation. | Allocations of existing supplies and future supplies (as WMS supply volumes) in an aquifer/county/basin were performed in accordance with TWDB rules that require total supplies to be less than or equal to groundwater availabilities, preventing any overallocation. |
| Groundwater | For evaluations of existing supplies, groundwater was allocated to individual WUGs using the process documented in Section 3.1.2 of the 2021 SCTRWP. This methodology uses information from WUG surveys, water demand projections, historical water use groundwater pumping information, and infrastructure capacities. | For evaluations of existing supplies, groundwater was allocated to individual WUGs using the process documented in **Section 3.4 of the 2026 SCTRWP**. This methodology uses information from WUG surveys, historical water use groundwater pumping information, and infrastructure capacities. |
| Groundwater | When evaluating existing supplies, WMS evaluations, and cumulative effects evaluation, the SCTRWPG will use the process established during the 2016 Planning Cycle (Section 8.3.1 of the 2016 SCTRWP) to determine the amount of groundwater allocated to individual groundwater permits. | **It should be noted that for long-term planning purposes, programs contained within the EAHCP and associated with its fifteen-year incidental take permit may be adjusted as the plan is resubmitted for approval upon the expiration of the permit in 2028.** |
| Reuse | For evaluations of reuse availabilities, existing supplies, and future supplies (as WMS supply volumes), reuse volumes were estimated based on the estimates of water returned to a utility's wastewater treatment plants (WWTPs) for each decade, less the amount of reuse volumes already being utilized as existing supplies. | For evaluations of reuse availabilities, existing supplies, and future supplies (as WMS supply volumes), reuse volumes were estimated based on the estimates of water returned to a utility's WWTPs for each decade, less the amount of reuse volumes already being utilized as existing supplies. |

| Assumption Category | 2021 SCTRWP | 2026 SCTRWP (Emphasis Added to Denote Change from 2021 SCTRWP) |
|---|---|---|
| | The amount of water returned to a utility's WWTP was estimated using information from WWTP owners and operators, discharge permits, and site-specific information, such as projected water demands, adjusted for water conservation and drought management strategies. If discharge permit information was used, the amount of water returned to a utility was estimated to be 50% of the utility's permitted design flow. | The amount of water returned to a utility's WWTP was estimated using information from WWTP owners and operators, discharge permits, and site-specific information, such as projected water demands, adjusted for water conservation and drought management strategies. If discharge permit information was used, the amount of water returned to a utility was estimated to be 50% of the utility's permitted design flow. **For discharge permits with multiple phases, estimates for the near-term decade (2030) were based on 50% of the design flow in the Existing or Interim I Phase; for decades 2040-2080, estimates were based on 50% of the design flow in the Final Phase.** |

### 9.3.3 Source Water Availability

Water sources in the SCTRWPA include groundwater from 16 distinct groundwater sources with different geologic and management conditions and surface water within nine river and coastal basins. Treated effluent from wastewater treatment plants, called reclaimed water or reuse, is also considered as a water supply source. Figure 9-4 shows that groundwater availability has increased during the 2026 planning cycle and remains relatively constant through 2080.

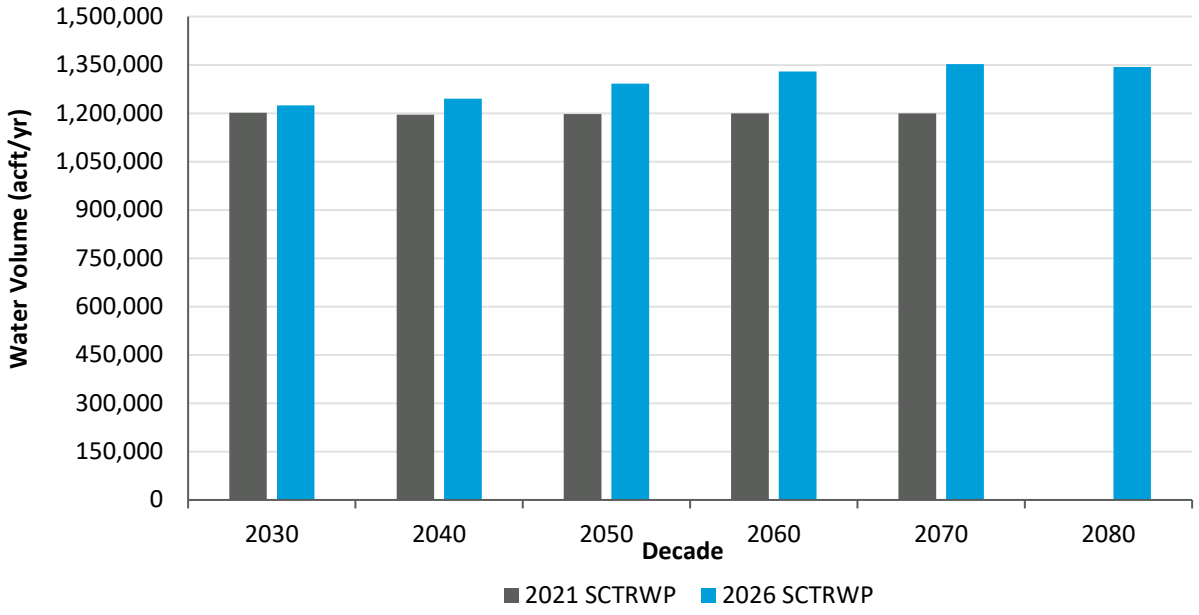



**Figure 9-4 Groundwater Availability**

Surface water sources in the SCTRWPA include run-of-river, major reservoirs, and local surface water. Surface water availability accounts for about 16% of water availability in the region and is greater in each decade of the 2026 SCTRWP, compared to the 2021 SCTRWP (Figure 9-5).

The total water availability is notably higher throughout the planning period in the 2026 SCTRWP. Availability ranges from 1,628,668 acft/yr in 2030 to 1,770,607 acft/yr in 2080, averaging 1,721,402 acft/yr in the 2026 SCTRWP. Whereas the average total source availability in the 2021 SCTRWP was 1,484,230 acft/yr (Figure 9-6). Total water availability includes surface water, groundwater, and reuse availabilities. In the 2026 SCTRWP, reuse availability is approximately 100,000 acft/yr higher than in the 2021 SCTRWP, contributing to the difference in total availability between the two plans.

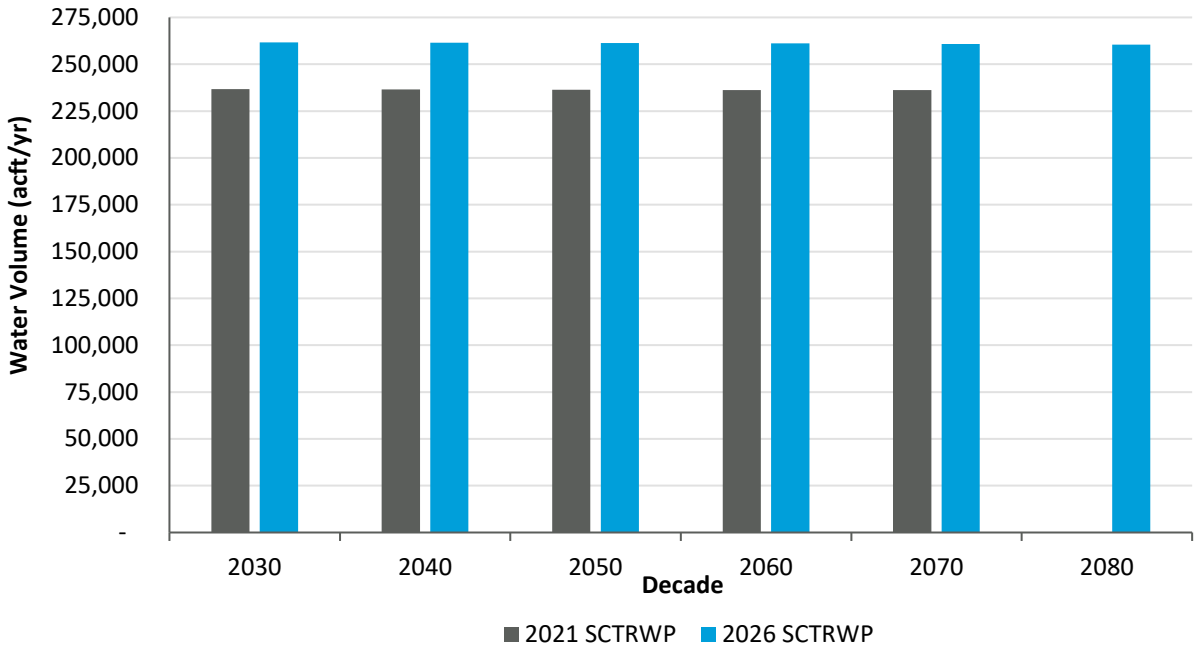



**Figure 9-5 Surface Water Availability**

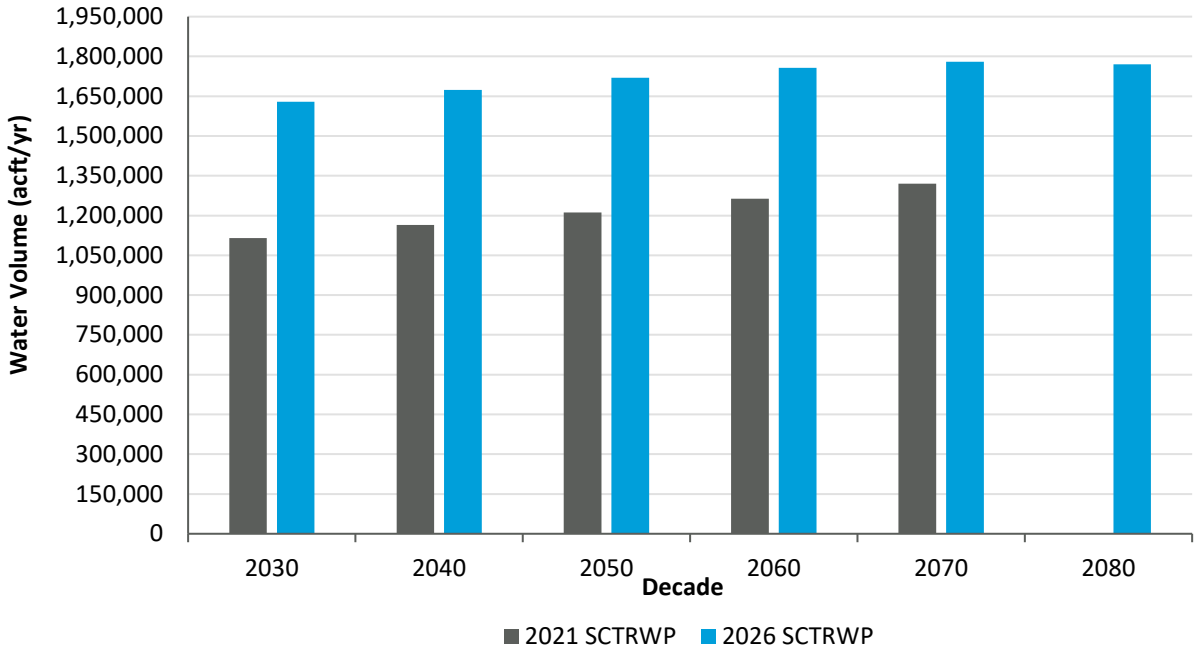



**Figure 9-6 Total Water Availability**

### 9.3.4 Existing Water Supplies

Existing water supplies in the 2026 SCTRWP have increased since those projected in the 2021 SCTRWP. Existing municipal supplies in the 2026 SCTRWP have increased, on average, by 144,180 acft/yr from 2030 through 2070 compared to the 2021 SCTRWP (Figure 9-7). Existing water supplies for non-municipal WUGs in the 2026 SCTRWP have increased by an average of 59,442 acft/yr from 2030 to 2070, compared to the 2021 SCTRWP (Figure 9-8). Finally, total existing supplies in the 2026 SCTRWP have increased by an average of 203,622 acft/yr compared to the 2021 SCTRWP. The most notable difference appears in the 2040 decade, where the 2026 SCTRWP estimates existing water supplies to be 209,408 acft/yr greater than those projected in the 2021 SCTRWP (Figure 9-9).

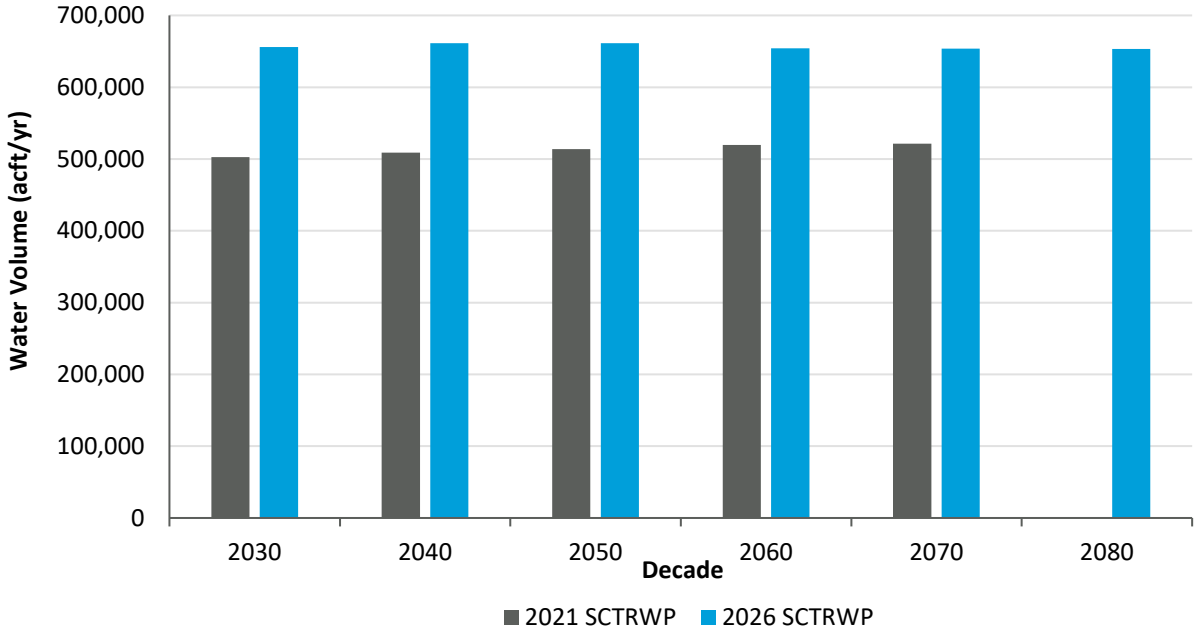



**Figure 9-7 Existing Water Supplies for Municipal Water User Groups**

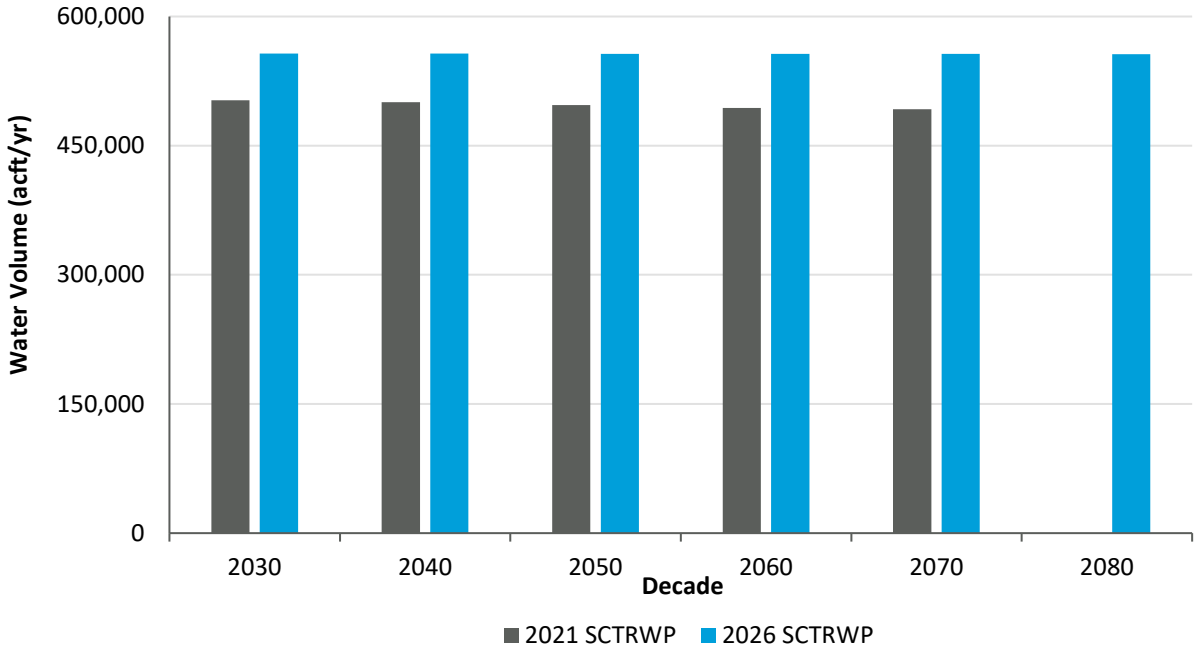



**Figure 9-8 Existing Water Supplies for Non-Municipal Water User Groups**

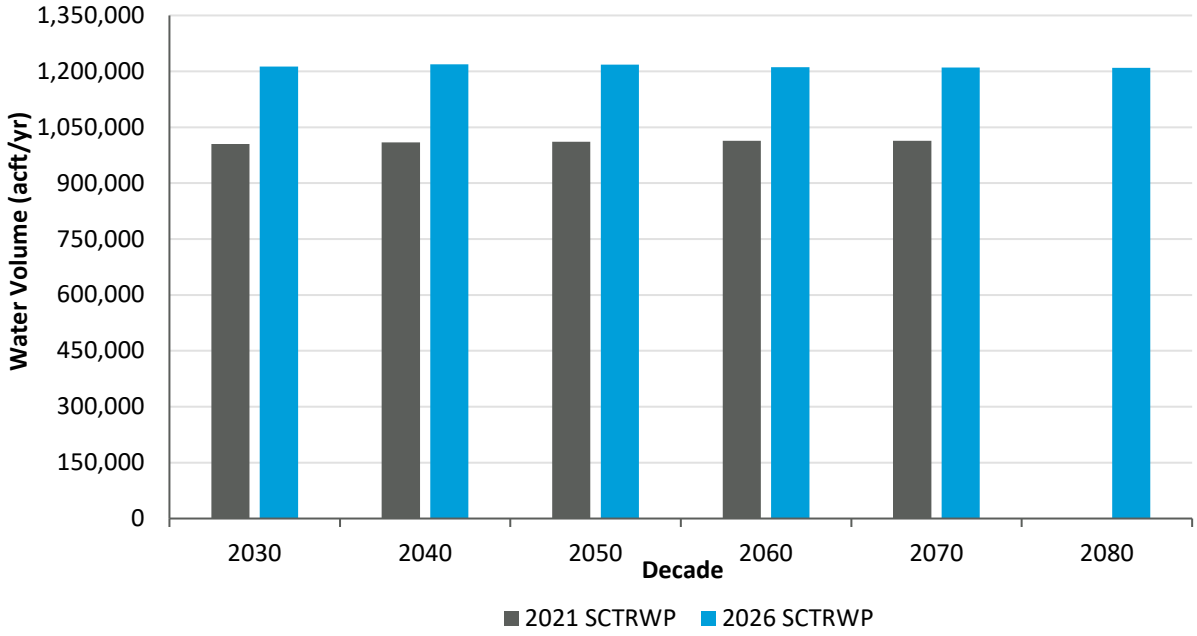



**Figure 9-9 Existing Water Supplies for All Water User Groups**

### 9.3.5 Identified Water Needs

Municipal water need projections increase for each decade in both the 2021 and 2026 SCTRWPs (Figure 9-10). Non-municipal water need projections have decreased in the 2026 SCTRWP compared to the 2021 SCTRWP (Figure 9-11), which is probably a function of the decreased non-municipal demand projections between the 2021 SCTRWP and the 2026 SCTRWP. The total identified water needs in the 2026 SCTRWP are projected to increase from 185,132 acft/yr in 2030 to 513,712 acft/yr in the 2080 decade (Figure 9-12).

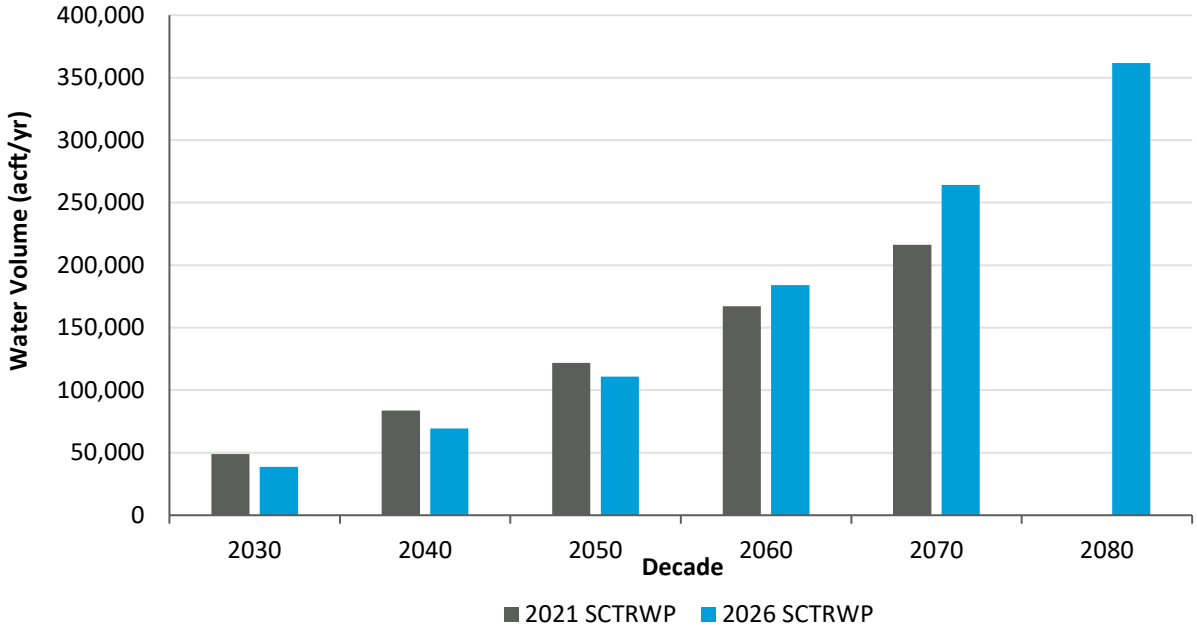



**Figure 9-10 Municipal Water Needs**

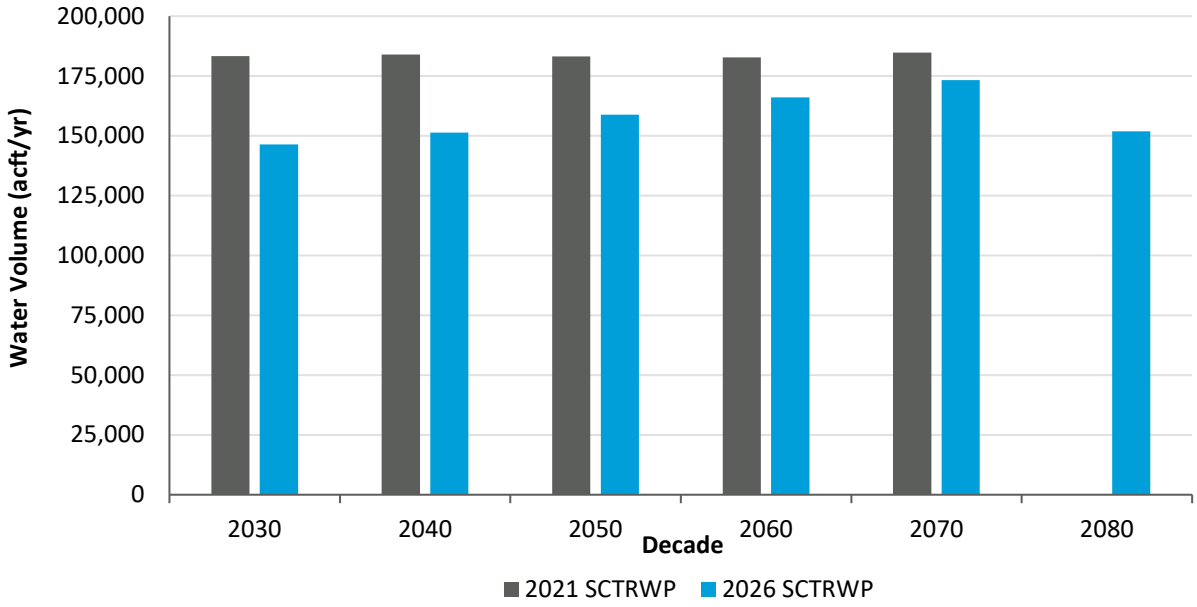



**Figure 9-11 Non-Municipal Water Needs**

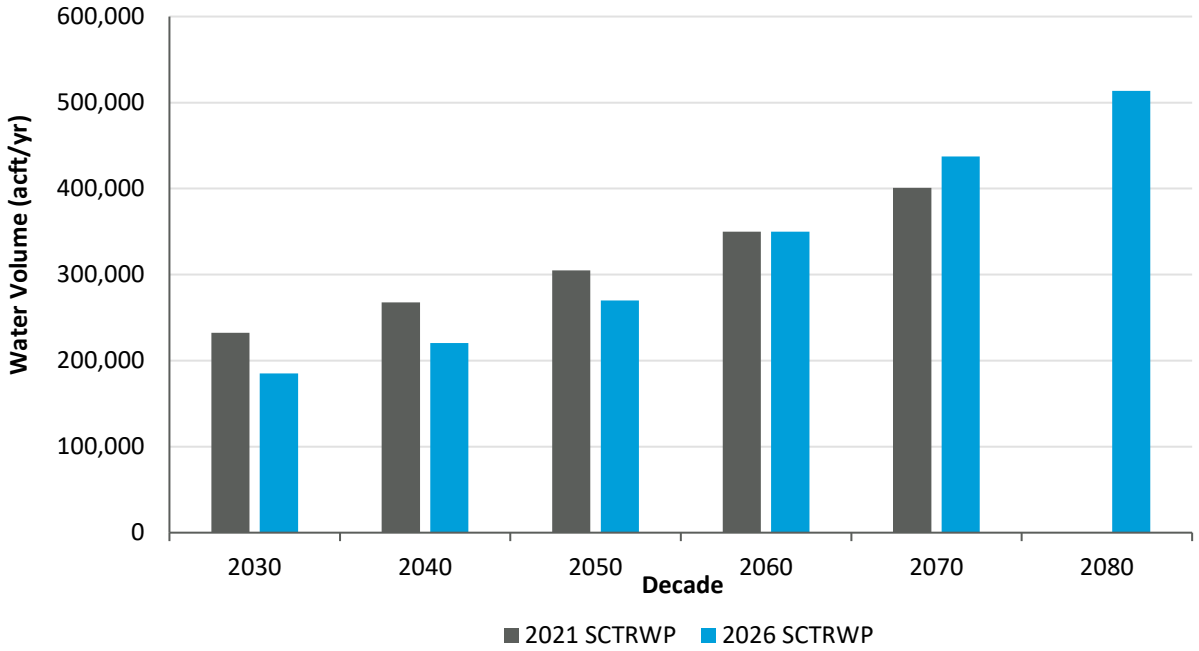



**Figure 9-12 Total Identified Water Needs**

### 9.3.6 Recommended and Alternative Water Management Strategies and Water Management Strategy Projects

The volume of recommended and alternative WMSs in the 2026 SCTRWP is 182,350 acft/yr greater than the 2021 SCTRWP. The volume of recommended and alternative strategies in the 2026 Plan for the final decade of the planning horizon (2080) is 894,127 acft/yr [2] and 25,000 acft/yr, respectively. The volume of recommended strategies and alternative strategies in the 2021 SCTRWP for the final decade of the planning horizon (2070) is 736,777 acft/yr and 0 acft/yr, respectively. The 2021 SCTRWP did not include any alternative strategies; whereas the 2026 SCTRWP includes one alternative strategy (Reuse Water – San Antonio Water System, Direct Potable Reuse Project).

The 2021 SCTRWP recommended 92 WMSs and the 2026 SCTRWP recommends 489 WMSs. The greater number of WMSs in the 2026 SCTRWP can primarily be attributed to how the Municipal Water Conservation WMSs were characterized in the 2027 Regional and State Water Planning Database (DB27). In the 2026 SCTRWP, there are 280 Municipal Water Conservation WMSs; generally, each municipal WUG has a water use reduction strategy and a water loss mitigation strategy. However, the 2021 SCTRWP only included one Municipal Water Conservation WMS that benefited municipal WUGs.

The 2021 SCTRWP included 57 WMSPs; whereas the 2026 SCTRWP includes 364 WMSPs. Similarly, the difference in the number of WMSPs between the two SCTRWPs is primarily due to the approach used to characterize Municipal Water Conservation WMSPs in DB27. In the 2021 SCTRWP, there were no

[2] The total volume of 894,127 acft/yr reflects firm yields of recommended strategies as presented in Chapter 5. Minor differences from database totals (e.g., 981,520 acft/yr in 2080) are due to the inclusion of certain unavailable supplies and other adjustments not reflected in Chapter 5.

Municipal Conservation WMSPs; whereas the 2026 SCTRWP includes 138 Advanced Metering Infrastructure WMSPs and 116 Leak Detection and Repair-Pipeline Replacement WMSPs. Both of these WMSPs are associated with the Municipal Water (Water Loss Mitigation) Conservation WMSs.

# Appendix 9A: Implementation Survey Results

# Appendix 9A: Implementation Survey Results

| Column A | Column B | Column C | Column D | Column E | Column F | Column G | Column H | Column I | Column J | Column K | Column L | Column M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Planning Region | WMS or WMS Project Name | Database Online Decade | Related Sponsor Entity and/or Benefitting WUGs | Implementation Survey Record Type | Database ID | Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10)) | What is the status of the WMS project or WMS recommended in the 2022 SWP? | If the project has not been started or no longer is being pursued, please explain why by adding information in this column. | Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K. | If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided. | What funding type(s) are being used for the project? (Select all that apply) | Optional Comments |
| L | ARWA Phase 3 | 2060 | Project Sponsor(s): Alliance Regional Water Authority | Recommended WMS Project | 4137 | No | Project/WMS not started | The project is not needed until the 2060 decade, so effort has not been expended on it at this point in time. | Economic feasibility/financing | | Unknown | |
| L | ARWA/GBRA Shared Facilities Project | 2020 | Project Sponsor(s): Guadalupe-Blanco River Authority; Alliance Regional Water Authority | Recommended WMS Project | 2665 | Yes | Project/WMS started | | Other | Delays in acquiring easements and delays in construction completion. | State | |
| L | Boerne Non-Potable Reuse Project | 2020 | Project Sponsor(s): Boerne | Recommended WMS Project | 4202 | No | Project/WMS completed | | | | Unknown | |
| L | Brackish Wilcox Groundwater for SS WSC | 2060 | Project Sponsor(s): S S WSC | Recommended WMS Project | 2210 | No | Project/WMS not started | Project will start once access to Carrizo waters begins to diminish and/or is no longer viable to support our water provision requirements. | Other | Time has not come to start this backup project yet. When it does, however, the permitting process will not be fun and neither will paying for it. | State; Federal; Private | As to funding, SS WSC will avail itself of any funding available to build out this capacity as needed. |
| L | Drought Management - Kirby | 2020 | WUG Reducing Demand: Kirby | Recommended Demand Reduction Strategy Without WMS Project | 11148 | Yes | Project/WMS completed | | | | Unknown | |
| L | Drought Management - Leon Valley | 2020 | WUG Reducing Demand: Leon Valley | Recommended Demand Reduction Strategy Without WMS Project | 11152 | Yes | Project/WMS completed | | | | | We have a critical drought management ordinance which is funded by the city. |

| Planning Region | WMS or WMS Project Name | Database Online Decade | Related Sponsor Entity and/or Benefitting WUGs | Implementation Survey Record Type | Database ID | Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10)) | What is the status of the WMS project or WMS recommended in the 2022 SWP? | If the project has not been started or no longer is being pursued, please explain why by adding information in this column. | Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K. | If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided. | What funding type(s) are being used for the project? (Select all that apply) | Optional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | Drought Management - S S WSC | 2020 | WUG Reducing Demand: S S WSC | Recommended Demand Reduction Strategy Without WMS Project | 32759 | Yes | Project/WMS started | | Other | Folks who insist on dumping 100,000 gals/mo. of treated water on the ground for St. Augustine lawns in the Texas August heat at noon, and folks who don't care about money (pay $3,000 water bills/mo. and not batting an eye). State needs to mandate zeroscaping or ban watering lawns with municipal/public water resources (private irrigation wells can be exempt). | Private | SS WSC uses year-round conservation via our Drought Response Plan as included in our Tariff. |
| L | Drought Management - SAWS | 2020 | WUG Reducing Demand: San Antonio Water System | Recommended Demand Reduction Strategy Without WMS Project | 32619 | Yes | Project/WMS completed | | Other | No impediments. Project completed. | Unknown | |
| L | Drought Management - Seguin | 2020 | WUG Reducing Demand: Seguin | Recommended Demand Reduction Strategy Without WMS Project | 32764 | Yes | Project/WMS completed | | Contract/permit constraints | | Private | |
| L | Drought Management - The Oaks WSC | 2020 | WUG Reducing Demand: The Oaks WSC | Recommended Demand Reduction Strategy Without WMS Project | 32769 | No | Project/WMS started | | Economic feasibility/financing | | Private | |
| L | Drought Management - Universal City | 2020 | WUG Reducing Demand: Universal City | Recommended Demand Reduction Strategy Without WMS Project | 11178 | Yes | Project/WMS completed | | Water supply constraints | | Unknown | |
| L | Edwards Transfers | 2020 | WMS Supply Recipient: Leon Valley | Recommended WMS Supply Without WMS Project | 18461 | Yes | Project/WMS not started | Not sure how to answer these questions. | Water supply constraints | | Private | The City funds all water transfers. |
| L | Edwards Transfers | 2020 | WMS Supply Recipient: Leon Valley | Recommended WMS Supply Without WMS Project | 18463 | Yes | Project/WMS not started | Not sure how to answer these questions. | Water supply constraints | | Private | The City funds all water transfers. |

| Planning Region | WMS or WMS Project Name | Database Online Decade | Related Sponsor Entity and/or Benefitting WUGs | Implementation Survey Record Type | Database ID | Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10)) | What is the status of the WMS project or WMS recommended in the 2022 SWP? | If the project has not been started or no longer is being pursued, please explain why by adding information in this column. | Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K. | If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided. | What funding type(s) are being used for the project? (Select all that apply) | Optional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | Edwards Transfers | 2020 | WMS Supply Recipient: Universal City | Recommended WMS Supply Without WMS Project | 100612 | Yes | Project/WMS completed | | Economic feasibility/financing; Water supply constraints; Contract/permit constraints | | Unknown | |
| L | Edwards Transfers | 2030 | WMS Supply Recipient: Universal City | Recommended WMS Supply Without WMS Project | 100614 | Yes | Project/WMS completed | | Economic feasibility/financing; Water supply constraints; Contract/permit constraints | | Unknown | |
| L | Entity Purchase to Meet Shortages - SAWS | 2020 | WMS Seller: San Antonio Water System; WMS Supply Recipient: Kirby | Recommended WMS Supply Without WMS Project | 101055 | Yes | Project/WMS completed | | | | Unknown | |
| L | Entity Purchase to Meet Shortages - SAWS | 2020 | WMS Seller: San Antonio Water System; WMS Supply Recipient: The Oaks WSC | Recommended WMS Supply Without WMS Project | 101028 | No | Project/WMS no longer being pursued | | | | | |
| L | Fair Oaks Ranch Non-Potable Reuse Project | 2030 | Project Sponsor(s): Fair Oaks Ranch | Recommended WMS Project | 4203 | Yes | Project/WMS started | | Shift in timeline; Contract/permit constraints; Other | Easement acquisition | Unknown | City plans to issue bonds to fund this project. |
| L | FE - CPS Direct Recycle Pipeline | 2030 | Project Sponsor(s): San Antonio Water System | Recommended WMS Project | 2107 | Yes | Project/WMS not started | TBD. This water management strategy is assigned to CPS Energy. This should not have been included in SAWS implementation survey. | Other | TBD | Unknown | This is a CPS Energy Water Management Strategy. |
| L | FE - NBU Seguin Interconnect | 2020 | Project Sponsor(s): New Braunfels | Recommended WMS Project | 4244 | Yes | Project/WMS not started | The supply is available; however, it is not immediately needed for NBU's system. NBU is currently working through infrastructure options with other entities to make best use of this water for others or for NBU in the future. | Shift in timeline | | Unknown | |
| L | FE - NBU South WTP Expansion | 2030 | Project Sponsor(s): New Braunfels | Recommended WMS Project | 4243 | No | Project/WMS not started | Not scheduled to start. | | | | |

| Planning Region | WMS or WMS Project Name | Database Online Decade | Related Sponsor Entity and/or Benefitting WUGs | Implementation Survey Record Type | Database ID | Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10)) | What is the status of the WMS project or WMS recommended in the 2022 SWP? | If the project has not been started or no longer is being pursued, please explain why by adding information in this column. | Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K. | If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided. | What funding type(s) are being used for the project? (Select all that apply) | Optional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | FE - SAWS Expanded ASR Treatment Plant | 2030 | Project Sponsor(s): San Antonio Water System | Recommended WMS Project | 4245 | Yes | Project/WMS started | | Other | No impediments at this time. On schedule. | Unknown | Project on time for 2030 completion. |
| L | FE - SAWS Western Integrated Pipeline (Phase 2) | 2020 | Project Sponsor(s): San Antonio Water System | Recommended WMS Project | 2339 | Yes | Project/WMS completed | | Other | No impediments as the project is completed and online. | Unknown | Project Completed. |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: Fair Oaks Ranch | Recommended Demand Reduction Strategy Without WMS Project | 31652 | Yes | Project/WMS started | | | | | City Water Conservation Plan and Drought Contingency Plan revised in 2023, and additional water use restrictions being considered in 2025. |
| L | Municipal Water Conservation | 2050 | WUG Reducing Demand: Kyle | Recommended Demand Reduction Strategy Without WMS Project | 31703 | Yes | Project/WMS started | | Other | This is an evergreen WMP | | Funded through City funds |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: New Braunfels | Recommended Demand Reduction Strategy Without WMS Project | 31805 | Yes | Project/WMS started | | | | | |
| L | Municipal Water Conservation | 2060 | WUG Reducing Demand: S S WSC | Recommended Demand Reduction Strategy Without WMS Project | 8734 | Yes | Project/WMS started | | Other | See response in previous section regarding water conservation. | Private | See previous responses about drought conservation. |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: San Antonio Water System | Recommended Demand Reduction Strategy Without WMS Project | 31860 | Yes | Project/WMS completed | | Other | No impediments. | Unknown | Ongoing water management strategy. |
| L | Municipal Water Conservation | 2050 | WUG Reducing Demand: Seguin | Recommended Demand Reduction Strategy Without WMS Project | 31883 | Yes | Project/WMS completed | | Contract/permit constraints | | Private | |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: Sunko WSC | Recommended Demand Reduction Strategy Without WMS Project | 8716 | Yes | Project/WMS completed | | | | Private | |

| Planning Region | WMS or WMS Project Name | Database Online Decade | Related Sponsor Entity and/or Benefitting WUGs | Implementation Survey Record Type | Database ID | Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10)) | What is the status of the WMS project or WMS recommended in the 2022 SWP? | If the project has not been started or no longer is being pursued, please explain why by adding information in this column. | Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K. | If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided. | What funding type(s) are being used for the project? (Select all that apply) | Optional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | Municipal Water Conservation | 2060 | WUG Reducing Demand: Universal City | Recommended Demand Reduction Strategy Without WMS Project | 31934 | Yes | Project/WMS completed | | Economic feasibility/financing; Water supply constraints | | Unknown | |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: Boerne | Recommended Demand Reduction Strategy Without WMS Project | 8610 | No | Project/WMS completed | | | | Unknown | |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: Kenedy | Recommended Demand Reduction Strategy Without WMS Project | 8682 | No | Project/WMS not started | not aware of any project. need more information | Other | not enough details about project | Unknown | need more information about the project to make a more inform decision. |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: Leon Valley | Recommended Demand Reduction Strategy Without WMS Project | 31709 | No | Project/WMS not started | We are experiencing a major increase in development and are increasing our water supply accordingly. | Water supply constraints | | | The City Purchases all water rights. |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: Moore WSC | Recommended Demand Reduction Strategy Without WMS Project | 31815 | No | Project/WMS completed | | Economic feasibility/financing | | Federal | |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: Schertz | Recommended Demand Reduction Strategy Without WMS Project | 31887 | No | Project/WMS not started | Projects are planned for subsequent planning cycles. We are supporting other sponsors for regional needs. | Shift in timeline | | Unknown | |
| L | Municipal Water Conservation | 2020 | WUG Reducing Demand: The Oaks WSC | Recommended Demand Reduction Strategy Without WMS Project | 8736 | No | | | | | | |
| L | NBU - Trinity Development | 2030 | Project Sponsor(s): New Braunfels | Recommended WMS Project | 1815 | Yes | Project/WMS started | | | | State | |
| L | New Braunfels Utilities ASR | 2020 | Project Sponsor(s): New Braunfels | Recommended WMS Project | 2437 | Yes | Project/WMS started | | | | State | |
| L | Recycled Water Program - SAWS | 2030 | Project Sponsor(s): San Antonio Water System | Recommended WMS Project | 2105 | No | Project/WMS not started | Not yet the decade identified for implementation. | Other | Not yet the decade identified for implementation. | Unknown | |

| Planning Region | WMS or WMS Project Name | Database Online Decade | Related Sponsor Entity and/or Benefitting WUGs | Implementation Survey Record Type | Database ID | Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10)) | What is the status of the WMS project or WMS recommended in the 2022 SWP? | If the project has not been started or no longer is being pursued, please explain why by adding information in this column. | Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K. | If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided. | What funding type(s) are being used for the project? (Select all that apply) | Optional Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | SAWS - Expanded Brackish Wilcox Project | 2040 | Project Sponsor(s): San Antonio Water System | Recommended WMS Project | 2338 | Yes | Project/WMS not started | Not yet the identified decade of need. | Other | Not yet the decade identified for implementation. | Unknown | Not yet the decade identified for implementation. |
| L | SAWS - Expanded Local Carrizo | 2040 | Project Sponsor(s): San Antonio Water System | Recommended WMS Project | 2103 | Yes | Project/WMS not started | Included in future CIP budget. Project comes on line in approx 2031 and 2032 for Phases 1 and 2. | Other | No impediments at this time. | Unknown | Project on schedule for implementation. |
| L | SAWS Advanced Meter Infrastructure | 2020 | Project Sponsor(s): San Antonio Water System | Recommended WMS Project | 4322 | Yes | Project/WMS completed | | Other | No impediments as the project is to be completed by the end of 2025. | Unknown | Project on schedule for completion by the end of 2025. |

FINAL PLAN

# CHAPTER 10: PUBLIC PARTICIPATION AND PLAN ADOPTION

## South Central Texas Regional Water Plan

B&V PROJECT NO. 411170

PREPARED FOR

South Central Texas Regional Water Planning Group

2 OCTOBER 2025

BLACK & VEATCH

# Table of Contents

**10.0 Public Participation and Plan Adoption ..... 10-1**
10.1 Plan Enhancement Process ..... 10-1
10.2 Interregional Coordination ..... 10-2
10.3 Public Participation ..... 10-2
10.3.1 Regional Water Planning Group Meetings ..... 10-4
10.3.2 Workgroups ..... 10-5
10.3.3 Coordination with Water User Groups and Wholesale Water Providers ..... 10-6
10.3.4 Rural Outreach ..... 10-7
10.4 Initially Prepared Plan Adoption ..... 10-13
10.4.1 Public Hearing and Meeting on the Initially Prepared Plan ..... 10-13
10.4.2 TWDB Comments on the Initially Prepared Plan ..... 10-14
10.4.3 Public and Other Agency Comments on the Initially Prepared Plan ..... 10-14
10.5 Final Regional Water Plan Adoption ..... 10-14

## APPENDICES

Appendix 10A: Texas Water Development Board (TWDB) Comment Letter on the Initially Prepared Plan (IPP)
Appendix 10B: Responses to Texas Water Development Board (TWDB) Comments on the Initially Prepared Plan (IPP)
Appendix 10C: Responses to Public and Agency Comments on the Initially Prepared Plan (IPP)

## LIST OF TABLES

Table 10-1 SCTRWPG Voting Members for the 6th Cycle of Regional Water Planning ..... 10-4
Table 10-2 Rural Entity Level of Engagement for the 2026 SCTRWP ..... 10-8

## LIST OF FIGURES

Figure 10-1 Meetings Held to Develop the 2026 SCTRWP ..... 10-3

# List of Abbreviations

| | |
|---|---|
| acft/yr | Acre-feet Per Year |
| ARWA | Alliance Regional Water Authority |
| ASR | Aquifer Storage and Recovery |
| CRWA | Canyon Regional Water Authority |
| DCP | Drought Contingency Plan |
| DPR | Direct Potable Reuse |
| GCD | Groundwater Conservation District |
| GCUWCD | Gonzales County Underground Water Conservation District |
| GMA | Groundwater Management Area |
| IPP | Initially Prepared Plan |
| MAG | Modeled Available Groundwater |
| MWP | Major Water Provider |
| PWS | Public Water System |
| Region J | Plateau Region |
| Region K | Lower Colorado Region |
| Region L | South Central Texas Region |
| Region M | Rio Grande Region |
| Region N | Coastal Bend Region |
| Region P | Lavaca Region |
| RWP | Regional Water Plan |
| RWPG | Regional Water Planning Group |
| SAWS | San Antonio Water System |
| SCTRWPA | South Central Texas Regional Water Planning Area |
| SCTRWPG | South Central Texas Regional Water Planning Group |
| SUD | Special Utility District |
| TAC | Texas Administrative Code |
| TPWD | Texas Parks and Wildlife Department |
| TWDB | Texas Water Development Board |
| WCID | Water Control and Improvement District |

| | |
|---|---|
| WSC | Water Supply Corporation |
| WMS | Water Management Strategy |
| WUG | Water User Group |
| WWP | Wholesale Water Provider |

# 10.0 Public Participation and Plan Adoption

Public participation and engagement are foundational elements of the regional water planning process. Development of the 2026 South Central Texas (Region L) Regional Water Plan (SCTRWP) was accomplished through quarterly South Central Texas Regional Water Planning Group (SCTRWPG) meetings, workgroup meetings, coordination with water user groups (WUGs) and wholesale water providers (WWPs), coordination with other planning regions, and active public participation throughout the planning process. This chapter documents these key activities, including the Plan Enhancement Process, Interregional Coordination, public participation, and adoption of the Initially Prepared Plan (IPP) and Final SCTRWP.

## 10.1 Plan Enhancement Process

Beginning in 2015 and following submittal of the final 2016 SCTRWP, the SCTRWPG undertook the 2021 Plan Enhancement Process whereby the planning group, as a whole, discussed and took appropriate action to (1) thoroughly consider comments received from agencies and members of the public; and (2) improve the 2021 SCTRWP. The 2021 Plan Enhancement Process sought to improve and clarify the principles that guide SCTRWPG decisions. The result of the 2021 Plan Enhancement Process was establishment of the SCTRWPG Guiding Principles. These Guiding Principles were subsequently reviewed and updated for the 2026 planning cycle and are included in Appendix 5A of Chapter 5.

The Guiding Principles serve as a touchstone for which to reference when the SCTRWPG makes decisions. The Guiding Principles also seek to reconcile competing interests at the onset of the planning process, develop a shared understanding of the approach to regional water planning, and encourage consensus-based decision making throughout the planning cycle.

The following provides a list of the 11 Guiding Principles:

- Appropriateness and adequacy of how demand and need are determined;
- Role of Regional Water Planning Groups in influencing population growth and land use;
- Conflicts of interests with respect to planning group members;
- The role of the planning group in influencing water development plans of water suppliers;
- The role of the planning group in influencing permitting entities;
- The adequacy of evaluating the plan's effects on freshwater inflows to San Antonio Bay, and the adequacy of environmental assessments of individual water management strategies (WMSs);
- Minimum standards for WMSs;
- Recommended WMSs;
- Management supply;
- The role of reuse within the Regional Water Plan; and
- Identifying special studies or evaluations deemed important to enhance the 2021 Plan, the identification of outside funding sources, and the extent to which innovative strategies should be used.

## 10.2 Interregional Coordination

The South Central Texas Regional Water Planning Area (SCTRWPA) is bordered by five adjacent planning areas, including: Plateau (Region J), Lower Colorado (Region K), Rio Grande (Region M), Coastal Bend (Region N), and Lavaca (Region P). Notably, Hays County is split between Region L and Region K. Coordination with Region K was required for existing water supplies from Canyon Lake, as well as for shared WUGs in Hays and Caldwell Counties. Coordination with Region P was required for existing water supplies and potential water management strategy supplies provided by the Lavaca-Navidad River Authority. Coordination with Region N was necessary for shared WUGs in Karnes and Atascosa Counties.

To the extent necessary, coordination with each of these regions was accomplished through chair correspondence, regional water planning group (RWPG) liaisons, and/or technical consultant collaboration. Subjects of coordination, correspondence, or collaboration included projected demands, confirmation of WUG allocations among regions, and specific WMSs of interest. The 2026 Regional Water Plan (RWP) includes two recommended WMSs that allocate yield to Buda, which is a WUG in Hays County within Region K. These two WMSs are the Alliance Regional Water Authority (ARWA) Carrizo-Wilcox Project (Phase 2) and the ARWA Direct Potable Reuse (DPR) Project (Phase 3). The SCTRWPG is aware of no interregional conflicts involving recommended WMSs included in the 2026 SCTRWP.

## 10.3 Public Participation

Public participation was integral to all phases of development of the 2026 SCTRWP. In accordance with Title 31 of the Texas Administrative Code (TAC) §357.21, the SCTRWPG conducted all business in meetings posted and held in accordance with the Texas Open Meetings Act, Texas Government Code Chapter 551, with a copy of all meeting materials presented or discussed available for public inspection prior to and following public meetings.

The SCTRWPG abides by the Open Meetings Act [1] and Public Information Act [2], which require members of governmental bodies to participate in education training and open records training pursuant to Sections 551.005 and 552.012 of the Texas Government Code, respectively. These Acts in conjunction determine how open meetings are operated and public information is made available to the public. More information can be found on the Office of the Texas Attorney General website (https://www.texasattorneygeneral.gov/). The SCTRWPG met all requirements under the Texas Open Meetings Act and Public Information Act in accordance with 31 TAC §§357.12, 357.21, and 357.50(f).

To develop the 2026 SCTRWP, the SCTRWPG held 65 public meetings between 2021 and 2025 (Figure 10-1). These meetings included quarterly RWPG meetings and workgroup meetings, which are further described in subsequent sections.

[1] Office of the Texas Attorney General. "Open Meetings Act." https://www.texasattorneygeneral.gov/open-government/open-meetings-act-training.

[2] Office of the Texas Attorney General. "Public Information Act." https://www.texasattorneygeneral.gov/open-government/governmental-bodies/pia-and-oma-training-resources/public-information-act-training.




**Figure 10-1 Meetings Held to Develop the 2026 SCTRWP**

### 10.3.1 Regional Water Planning Group Meetings

The SCTRWPG holds quarterly meetings to convene all members of the SCTRWPG to consider and act on items to develop the SCTRWP. To develop the 2026 RWP the SCTRWPG held 20 meetings beginning in February 2021 until the final 2026 Regional Water Plan (RWP) was adopted in October 2025.

All SCTRWPG meetings were preceded by required notice and open to the public. Opportunities for public comment were available at the beginning and end of every SCTRWPG meeting, and summaries of public comments received were included in the approved minutes of each meeting. Communication of information was facilitated and supported by the Region L website [3] maintained by the plan administrator (San Antonio River Authority) and by the Texas Water Development Board (TWDB) website [4]. Throughout the planning process, SCTRWPG members, San Antonio River Authority, and the technical and public participation consultants provided responses to inquiries from the public.

Voting members of RWPGs represent specific interest categories (i.e., the public, agriculture, municipalities, counties, industries, environment, and others) rather than geographic locations. While members may reside or work in a particular area within the region, their primary responsibility is to represent the interests of their designated stakeholder group across the entire regional water planning area. Table 10-1 provides a list of the 32 Voting Members of the SCTRWPG, as of the adoption date of the Final 2026 SCTRWP. The table also provides each voting member's interest group and location(s) of interest.

**Table 10-1 SCTRWPG Voting Members for the 6th Cycle of Regional Water Planning**

| No. | Interest Category [1] | Voting Member Name | County (Location of Interest) |
|---|---|---|---|
| 1 | Agricultural | Thomas Jungman | Karnes |
| 2 | Agricultural | Weldon Riggs | Atascosa, Bexar, Karnes, and Wilson |
| 3 | Agricultural | Adam Yablonski | Medina |
| 4 | Counties | Travis Pruski | Wilson |
| 5 | Counties | Andra Wisian | Kendall |
| 6 | Electric Generating Utilities | Ryan Bayle | Hays and Goliad |
| 7 | Environmental | Charlie Flatten | Bexar, Comal, Kendall, Hays, and Medina |
| 8 | Environmental | Vanessa Puig-Williams | Hays and Caldwell |
| 9 | Groundwater Management Areas (GMAs) | Darrell Brownlow | Atascosa, Bexar, Caldwell, Dimmit, Frio, Gonzales, Guadalupe, Karnes, La Salle, Medina, Uvalde, Wilson, and Zavala |
| 10 | GMAs | Curt Campbell | Bexar, Comal, Hays, Kendall, and Medina |
| 11 | GMAs | Terrell Graham | Calhoun, DeWitt, Goliad, Karnes, Refugio, and Victoria |

[3] San Antonio River Authority, 2025. "South Central Texas Regional Water Planning Group." Region L Website - http://www.regionltexas.org/.
[4] Texas Water Development Board, 2025. "Regional Water Planning." TWDB Website, Regional Water Planning page - http://www.twdb.texas.gov/waterplanning/rwp/index.asp.

| No. | Interest Category [1] | Voting Member Name | County (Location of Interest) |
|---|---|---|---|
| 12 | GMAs | Vic Hilderbran | Uvalde |
| 13 | GMAs | Daniel Meyer | Bexar, Caldwell, Comal, Guadalupe, Hays, Medina, and Uvalde |
| 14 | Industries | Jason Ammerman | Calhoun |
| 15 | Industries | Dan Yoxall | Bexar |
| 16 | Municipalities | Ryan Kelso | New Braunfels |
| 17 | Municipalities | Paul Kite | San Marcos |
| 18 | Municipalities | Gary Middleton | Victoria |
| 19 | Municipalities | Robert Puente | Bexar |
| 20 | Public | Dianne Wassenich | Bexar |
| 21 | River Authorities | John Byrum | Uvalde, Zavala, Frio, La Salle, Dimmit, Atascosa, and Medina |
| 22 | River Authorities | Steve Metzler | Bexar, Goliad, Karnes, and Wilson |
| 23 | River Authorities | Jonathan Stinson | Comal, Kendall, Hays, Caldwell, Guadalupe, Gonzales, DeWitt, Victoria, Calhoun, and Refugio |
| 24 | Small Businesses | Darren Simmons | Bexar |
| 25 | Small Businesses | Mitchell Sowards | Bexar |
| 26 | Water Districts | Tim Andruss | Victoria |
| 27 | Water Districts | Debbie Farmer | Dimmit, La Salle, Zavala |
| 28 | Water Districts | Roland Ruiz | Caldwell, Hays, Comal, Guadalupe, Bexar, Medina, and Uvalde |
| 29 | Water Districts (Non-Groundwater District) | Humberto Ramos | Atascosa, Bexar, Caldwell, Comal, Guadalupe, Hays, Wilson |
| 30 | Water Districts | Aarin Teague | Atascosa, Frio, Wilson, and Karnes |
| 31 | Water Utilities | Scooter Mangold | Medina |
| 32 | Water Utilities | Andrew McBride | Guadalupe, Bexar, Comal |

[1] RWPG voting members represent specific interest categories across the entire SCTRWPA, not just their local area. While they may live or work in one part of the region, their role is to advocate for the interests of their stakeholder group region-wide.

### 10.3.2 Workgroups

Similar to previous cycles, the SCTRWPG established workgroups that focus on issues of particular importance or concern within the SCTRWPA. Each workgroup was charged to identify issue(s) and to develop potential resolutions and consensus recommendations for consideration and potential action by the SCTRWPG. Topics of discussion for each workgroup are reflected in the minutes of the SCTRWPG meetings and throughout the 2026 SCTRWP. Support for these workgroups was provided by the San

Antonio River Authority, technical consultant team, water utilities, state agencies, groundwater conservation districts (GCDs), contracted researchers, and other stakeholders.

The SCTRWPG established six workgroups for development of the 2026 SCTRWP. The following provides a list of the workgroups in alphabetical order, along with their respective meeting date(s).

- Groundwater Availabilities – April 2024
- Modeling and Reuse Workgroup – No meetings were held
- Policy and Legislative Recommendations – April 2024, June 2024, July 2024, August 2024, September 2024, December 2024, and January 2025
- Population and Water Demands – April 2022, November 2022, December 2022 (three meetings), January 2023, March 2023, April 2023, May 2023, June 2023, and July 2023
- Rural Communities Outreach – July 2023, April 2024, June 2024, and July 2024
- Staff Workgroup – January 2021, April 2021, July 2021, October 2021, January 2022, April 2022, July 2022, October 2022, January 2023, April 2023, July 2023, October 2023, January 2024, April 2024, July 2024, October 2024, January 2025, February 2025, August 2025, and September 2025

The Staff Workgroup comprises the SCTRWPG Executive Committee, representatives of the plan administrator, the TWDB, water suppliers, the technical consultant team, and any other person or entity wishing to attend. Meetings are convened at least one week in advance of each SCTRWPG meeting. Staff Workgroup meetings provide an opportunity for preliminary review of materials prepared by the technical consultant team, refinement of SCTRWPG meeting agendas, and preparation of administrative matters for consideration and potential action by the SCTRWPG. Over the course of the 6$^{th}$ planning cycle, there were 43 workgroup meetings.

### 10.3.3 Coordination with Water User Groups and Wholesale Water Providers

The technical consultant met and/or corresponded with representatives of WWPs and WUGs throughout development of the 2026 SCTRWP. All WWPs and WUGs were afforded opportunities to provide information and feedback regarding preferred contact information, population projections, water demand projections, existing supplies, drought contingency plans (DCPs), emergency interconnections, WMSs, and implementation status of WMSs. The majority of these touch points were facilitated through emailed surveys, supplemented with direct emails, phone calls, meetings, and other methods. Outreach efforts included the following:

- Contact survey;
- Overview of regional water planning webinar;
- Population and demands survey;
- Evaluation of infeasible projects from the 2021 SCTRWP survey;
- Supplies and strategy survey;
- Water management strategy project implementation surveys;
- Request for updated DCPs;
- Rural outreach letters; and

- Personalized emails to WUGs and WWPs regarding needs and the development of individualized strategies.

During the 6th planning cycle, the SCTRWPG was in continuous communication with WWPs and WUGs with regards to contract demands, WMSs, and population and demand projections. These meetings and correspondence generally focused on accurate representation of existing water supplies and contractual commitments, projected water demands, and potentially feasible WMSs sponsored by the WWPs or WUG to meet future needs.

### 10.3.4 Rural Outreach

The SCTRWPG supports input from all stakeholder groups in the development of this RWP. Throughout the planning cycle, the SCTRWPG offered hybrid in-person and virtual attendance options for meetings all RWPG and workgroup meetings. As it is important for stakeholders to attend these regular SCTRWPG meetings, this model facilitated greater attendance across the region's geographic area.

The SCTRWPG conducted outreach specifically to rural entities in the planning area to support plan development. The SCTRWPG established the Rural Communities Outreach Workgroup to bring together rural stakeholders and introduce the regional water planning process, facilitate engagement and coordination, gather feedback from stakeholders, and develop strategies to support rural communities. The Rural Communities Outreach Workgroup held four meetings in 2023 and 2024 to discuss WMSs to benefit rural communities and entities. Members of the committee included Adam Yablonski, Travis Pruski, Dianne Wassenich, Roland Ruiz, and Thomas Jungman. The workgroup partnered with or invited the following interest groups to these meetings:

- Region L Members with interests in Agriculture, River Authorities, Water Districts, Small Business, Counties, and Public;
- AgriLife Extension;
- Texas Department of Agriculture;
- TWDB Agricultural Water Conservation Program;
- Texas State Soil & Water Conservation Board;
- Texas Farm Bureau;
- GCD Representatives; and
- County Judges.

In March 2024, TWDB identified and compiled a list of 122 entities within the SCTRWPA that meet the rural political subdivision definition in accordance with Texas Water Code 15.001(14). As 84 of these entities are associated with unique, identified WUGs/WWPs, these entities also received other surveys and outreach as described in Section 10.3.3.

In May 2024, the SCTRWPG sent letters to all identified rural entities providing general information regarding Regional and State Water Planning, how to engage with the planning process, upcoming SCTRWPG meetings, and TWDB resources and key water supply planning information for the recipient's county. The letter also provided instructions on how to submit any WMSs for inclusion in the 2026 SCTRWP.

A summary of rural entity engagement during the 6th cycle of water planning is presented in Table 10-2. The general response rate of rural WUG and WWP outreach during development of the 2026 SCTRWP was approximately 60%.

**Table 10-2 Rural Entity Level of Engagement for the 2026 SCTRWP**

| Public Water System (PWS) Name | Water User Group Name | Level of Engagement |
|---|---|---|
| City of Alamo Heights | Alamo Heights | Coordinated population/demand revision request; Completed water supplies survey |
| Aqua Water Supply Corporation (WSC) | Aqua WSC | Did not complete surveys or provide feedback |
| City of Asherton | Asherton | Did not complete surveys or provide feedback |
| Atascosa Rural WSC | Atascosa Rural WSC | Completed contact list survey; Completed water supplies survey; Completed WMS survey |
| Batesville WSC | Batesville WSC | Did not complete surveys or provide feedback |
| Benton City WSC | Benton City WSC | Did not complete surveys or provide feedback |
| City of Big Wells | Big Wells | Did not complete surveys or provide feedback |
| Carrizo Hill WSC | Carrizo Hill WSC | Did not complete surveys or provide feedback |
| City of Carrizo Springs | Carrizo Springs | Completed contact list survey |
| City of Castroville | Castroville | Coordinated population/demand revision request; Completed water supplies survey |
| City of Charlotte | Charlotte | Did not complete surveys or provide feedback |
| Concan WSC | Concan WSC | Coordinated population/demand projections |
| City of Cotulla | Cotulla | Completed contact list survey; Completed water supplies survey |
| City of Christine | County-Other, Atascosa | Did not provide feedback to rural outreach letter |
| Port Alto WSC | County-Other, Calhoun | Did not provide feedback to rural outreach letter |
| Canyon Lake Estates Water Supply | County-Other, Comal | Did not provide feedback to rural outreach letter |
| Eagles Peak Ranch WSC | County-Other, Comal | Did not provide feedback to rural outreach letter |
| Kings Point WSC | County-Other, Comal | Did not provide feedback to rural outreach letter |
| Spring Branch Indian Hills Estates WSC | County-Other, Comal | Did not provide feedback to rural outreach letter |
| City of Nordheim | County-Other, DeWitt | Did not provide feedback to rural outreach letter |

| Public Water System (PWS) Name | Water User Group Name | Level of Engagement |
|---|---|---|
| Fannin Community | County-Other, Goliad | Did not provide feedback to rural outreach letter |
| Goliad County WSC - Berclair Water System | County-Other, Goliad | Did not provide feedback to rural outreach letter |
| Goliad County WSC - La Bahia | County-Other, Goliad | Did not provide feedback to rural outreach letter |
| Cedar Oak Mesa WSC | County-Other, Hays | Did not provide feedback to rural outreach letter |
| LSR WSC | County-Other, Hays | Did not provide feedback to rural outreach letter |
| Skyline Ranch Estates WSC | County-Other, Hays | Did not provide feedback to rural outreach letter |
| Wimberley Oaks WSC | County-Other, Hays | Did not provide feedback to rural outreach letter |
| Sherwood-Mt Pisgah WSC | County-Other, Kendall | Did not provide feedback to rural outreach letter |
| Fowlerton WSC | County-Other, La Salle | Did not provide feedback to rural outreach letter |
| Gardendale WSC | County-Other, La Salle | Did not provide feedback to rural outreach letter |
| Highway 90 Ranch WSC | County-Other, Medina | Did not provide feedback to rural outreach letter |
| Laurel Canyon Ranch Water System | County-Other, Medina | Did not provide feedback to rural outreach letter |
| New Alsace WSC | County-Other, Medina | Did not provide feedback to rural outreach letter |
| City of Austwell | County-Other, Refugio | Did not provide feedback to rural outreach letter |
| Refugio County WCID 1 | County-Other, Refugio | Did not provide feedback to rural outreach letter |
| Town of Bayside | County-Other, Refugio | Did not provide feedback to rural outreach letter |
| Highway 117 WSC | County-Other, Uvalde | Did not provide feedback to rural outreach letter |
| Utopia WSC | County-Other, Uvalde | Did not provide feedback to rural outreach letter |
| Victoria County Water Control and Improvement District (WCID) 2 | County-Other, Victoria | Did not provide feedback to rural outreach letter |
| City of Crystal City | Crystal City | Did not complete surveys or provide feedback |
| City of Cuero | Cuero | Coordinated population/demand projections |
| City of Devine | Devine | Did not complete surveys or provide feedback |

| Public Water System (PWS) Name | Water User Group Name | Level of Engagement |
|---|---|---|
| City of Dilley | Dilley | Did not complete surveys or provide feedback |
| East Central Special Utility District (SUD) Palm Park Water | East Central SUD | Coordinated population/demand revision request |
| East Medina County SUD | East Medina County SUD | Completed water supplies survey |
| East Medina County SUD Unit 1 | East Medina County SUD | Did not provide feedback to rural outreach letter |
| East Medina County SUD Unit 2 | East Medina County SUD | Did not provide feedback to rural outreach letter |
| East Medina County SUD Unit 3 | East Medina County SUD | Did not provide feedback to rural outreach letter |
| El Oso WSC | El Oso WSC | Did not complete surveys or provide feedback |
| Fashing Peggy Water System | El Oso WSC | Did not provide feedback to rural outreach letter |
| City of Elmendorf | Elmendorf | Coordinated population/demand revision request; Completed water supplies survey |
| Encinal WSC | Encinal WSC | Did not complete surveys or provide feedback |
| Fair Oaks Ranch Utilities | Fair Oaks Ranch | Completed contact list survey; Coordinated population/demand revision request; Completed WMS survey |
| City of Falls City | Falls City | Completed contact list survey |
| Fayette WSC West | Fayette WSC | Did not complete surveys or provide feedback |
| City of Floresville | Floresville | Completed water supplies survey |
| City of Garden Ridge | Garden Ridge | Coordinated population/demand revision request; Completed water supplies survey |
| City of Goliad | Goliad | Did not complete surveys or provide feedback |
| City of Gonzales | Gonzales | Completed contact list survey |
| Gonzales County WSC | Gonzales County WSC | Coordinated population/demand revision request |
| GBRA Calhoun County Rural Water System | Guadalupe-Blanco River Authority | On behalf of PWS, GBRA: Coordinated population/demand revision request; Completed water supplies survey; Completed WMS survey |
| GBRA Cordillera Ranch | Guadalupe-Blanco River Authority | On behalf of PWS, GBRA: Coordinated population/demand revision request; Completed water supplies survey; Completed WMS survey |
| GBRA Johnson Ranch Subdivision | Guadalupe-Blanco River Authority | On behalf of PWS, GBRA: Coordinated population/demand revision request; Completed water supplies survey; Completed WMS survey |

| Public Water System (PWS) Name | Water User Group Name | Level of Engagement |
|---|---|---|
| GBRA Lomas Water Co Comal Trace | Guadalupe-Blanco River Authority | On behalf of PWS, GBRA: Coordinated population/demand revision request; Completed water supplies survey; Completed WMS survey |
| City of Hondo | Hondo | Coordinated population/demand revision request |
| City of Jourdanton | Jourdanton | Did not complete surveys or provide feedback |
| City of Karnes City | Karnes City | Did not complete surveys or provide feedback |
| Kendall County WCID 1 | Kendall County WCID 1 | Completed contact list survey; Coordinated population/demand revision request; Completed water supplies survey; Completed WMS survey |
| City of Kenedy | Kenedy | Did not complete surveys or provide feedback |
| City of Kirby | Kirby | Completed water supplies survey |
| Knippa WSC | Knippa WSC | Completed contact list survey |
| City of La Coste | La Coste | Completed contact list survey; Completed water supplies survey |
| City of La Vernia | La Vernia | Coordinated population/demand revision request; Completed water supplies survey |
| City of Leon Valley | Leon Valley | Completed contact list survey; Coordinated population/demand revision request; Completed water supplies survey |
| City of Live Oak | Live Oak | Completed contact list survey |
| City of Luling | Luling | Did not complete surveys or provide feedback |
| Warm Springs Rehab Hospital | Luling | Did not provide feedback to rural outreach letter |
| City of Lytle | Lytle | Did not complete surveys or provide feedback |
| City of Marion | Marion | Did not complete surveys or provide feedback |
| McCoy WSC | McCoy WSC | Completed water supplies survey; Completed WMS survey |
| Medina County WCID 2 | Medina County WCID 2 | Did not complete surveys or provide feedback |
| Medina River West WSC | Medina River West WSC | Did not complete surveys or provide feedback |
| Moore WSC | Moore WSC | Completed contact list survey |
| City of Natalia | Natalia | Completed contact list survey |
| City of Nixon | Nixon | Did not complete surveys or provide feedback |

| Public Water System (PWS) Name | Water User Group Name | Level of Engagement |
|---|---|---|
| Oak Hills WSC | Oak Hills WSC | Did not complete surveys or provide feedback |
| City of Pearsall | Pearsall | Completed contact list survey |
| Picosa WSC | Picosa WSC | Did not complete surveys or provide feedback |
| City of Pleasanton | Pleasanton | Coordinated population/demand revision request |
| City of Point Comfort | Point Comfort | Completed water supplies survey |
| Polonia WSC | Polonia WSC | Did not complete surveys or provide feedback |
| Polonia WSC North | Polonia WSC | Did not provide feedback to rural outreach letter |
| Polonia WSC South | Polonia WSC | Did not provide feedback to rural outreach letter |
| City of Port Lavaca | Port Lavaca | Coordinated population/demand revision request; Completed water supplies survey |
| La Salle WCID 1-A | Port Oconnor Improvement District | Did not provide feedback to rural outreach letter |
| Port Oconnor Improvement District | Port Oconnor Improvement District | Completed water supplies survey |
| City of Poteet | Poteet | Completed water supplies survey; Completed WMS survey |
| City of Poth | Poth | Did not complete surveys or provide feedback |
| Quail Creek Mud | Quail Creek MUD | Did not complete surveys or provide feedback |
| City of Refugio | Refugio | Provided detailed conservation efforts |
| City of Runge | Runge | Completed contact list survey |
| S S WSC Main office | S S WSC | Completed water supplies survey |
| City of Sabinal | Sabinal | Completed contact list survey |
| San Antonio Water System (SAWS) Geronimo Forest Water System | SAWS | On behalf of PWS, SAWS: Coordinated population/demand revision request; Completed water supplies survey; Completed WMS survey |
| SAWS Mountain Laurel | SAWS | On behalf of PWS, SAWS: Coordinated population/demand revision request; Completed water supplies survey; Completed WMS survey |
| City of Seadrift | Seadrift | Completed contact list survey |
| City of Shavano Park | Shavano Park | Coordinated population/demand projections |
| City of Smiley | Smiley | Did not complete surveys or provide feedback |

| Public Water System (PWS) Name | Water User Group Name | Level of Engagement |
|---|---|---|
| City of Stockdale | Stockdale | Attended Rural and Community Outreach Workgroup meetings |
| Sunko WSC | Sunko WSC | Completed contact list survey; Completed water supplies survey |
| Three Oaks WSC | Three Oaks WSC | Completed water supplies survey |
| Tri Community WSC | Tri Community WSC | Completed water supplies survey |
| City of Uvalde | Uvalde | Coordinated population/demand revision request |
| Victoria County WCID 1 | Victoria County WCID 1 | Did not complete surveys or provide feedback |
| City of Waelder | Waelder | Did not complete surveys or provide feedback |
| West Medina WSC | West Medina WSC | Did not complete surveys or provide feedback |
| Wimberley WSC | Wimberley WSC | Completed water supplies survey |
| Windmill WSC | Windmill WSC | Completed contact list survey; Coordinated population/demand revision request; Completed water supplies survey |
| Town of Woodsboro | Woodsboro | Completed water supplies survey |
| City of Yoakum | Yoakum | Coordinated population/demand revision request |
| City of Yorktown | Yorktown | Completed water supplies survey |
| Zavala County WCID 1 | Zavala County WCID 1 | Did not complete surveys or provide feedback |

## 10.4 Initially Prepared Plan Adoption

The IPP was adopted by the SCTRWPG during the regularly-scheduled RWPG meeting on February 20, 2025. The adopted IPP was submitted to the TWDB and made available for review and comment to the public on March 3, 2025, in accordance with 31 TAC §357.21(h)(7). Copies of the IPP were made available to county clerks and public libraries throughout the region. The following sections provide information on public hearings and meetings, comments from the TWDB, and comments from the public and other agencies.

### 10.4.1 Public Hearing and Meeting on the Initially Prepared Plan

In accordance with 31 TAC §357.21(h), the SCTRWPG held one public hearing on May 21, 2025, to present a summary of the IPP and to receive public testimony. The public hearing was held in-person in San Antonio and virtually. Both virtual and in-person attendees were provided opportunities to provide public testimony as oral and/or written comments. No oral or written comments were submitted to the SCTRWPG during the public hearing.

In addition, the SCTRWPG held a virtual information session to present the IPP to and answer questions from the public regarding the IPP.

### 10.4.2 TWDB Comments on the Initially Prepared Plan

On June 23, 2025, the TWDB provided written comments on the Region L IPP. Appendix 10A provides the letter from the TWDB in its entirety. Responses to these comments, as approved by consensus of the SCTRWPG during its August 28, 2025, meeting are shown in Appendix 10B, and the changes are reflected in appropriate locations throughout the Final, Adopted 2026 SCTRWP.

### 10.4.3 Public and Other Agency Comments on the Initially Prepared Plan

The SCTRWPG accepted written comments regarding the IPP from the public and state and federal agencies through July 20, 2025. A total of 17 written comments were received from the public and from other state and federal agencies. Responses to these comments, as approved by consensus of the SCTRWPG during its August 28, 2025, meeting are shown in Appendix 10C, and the changes are reflected in appropriate locations throughout the adopted 2026 SCTRWP.

## 10.5 Final Regional Water Plan Adoption

The 2026 SCTRWP was certified complete and adopted by a majority vote of the SCTRWPG at its regularly-scheduled meeting on October 2, 2025. The Final, Adopted 2026 SCTRWP and other final deliverables were submitted to the TWDB on October 20, 2025, for approval and integration into the 2027 State Water Plan.

# Appendix 10A: Texas Water Development Board (TWDB) Comment Letter on the Initially Prepared Plan (IPP)

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

June 23, 2025

Curt Campbell
Region L Chair
c/o Cow Creek GCD
201 E. San Antonio Ave, Ste 100
Boerne, TX 78006

Derek E. Boese
General Manager
San Antonio River Authority
100 E. Guenther St.
San Antonio, TX 78204

Re: Texas Water Development Board Comments for the South Central Texas Regional Water Planning Group (Region L) Initially Prepared Plan, Contract No. 2148302564

Dear Mr. Campbell and Mr. Boese:

Texas Water Development Board (TWDB) staff have completed their review of the Initially Prepared Plan (IPP) submitted by March 3, 2025 on behalf of the Region L Regional Water Planning Group (RWPG). The attached comments follow this format:

- **Level 1:** Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and,
- **Level 2:** Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

Please note that 31 Texas Administrative Code (TAC) § 357.50(f) requires the RWPG to consider timely agency and public comment. Section 357.50(g)(1)(D) requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revisions or why changes are not warranted. Copies of TWDB's Level 1 and 2 written comments and the region's responses to each comment must be included in the final, adopted regional water plan (Contract Exhibit C, Section 2.12.2).

Standard to all planning groups is the necessity to include certain content in the final regional water plans that was not yet available at the time that IPPs were prepared and submitted. Accordingly, the final regional water plans must incorporate the following:

1. An analysis of socioeconomic impacts of not meeting the region's identified needs (31 TAC § 357.40(a)). TWDB will provide a socioeconomic impact analysis report for

each region by July 2025 for inclusion in the final regional water plan. Relevant sections in the plan must be updated accordingly.
2. Completed results from the 2021 Regional Water Plan implementation survey must be presented in the plan, as well as submitting an electronic version of the survey spreadsheet (31 TAC § 357.45(a)).
3. Documentation that comments received on the IPP, including but not limited to TWDB's, were considered in the development of the final plan (31 TAC § 357.50(f)).
4. Certification, in the form of a cover letter from the planning group Chair or Sponsor to the TWDB, that the final, regional water plan is complete and adopted by the RWPG (31 TAC § 357.50(h)(1)).

The following provisions apply to finalizing regional water planning data:

1. If the IPP included PDF copies of the State Water Planning Database (DB27) reports, a final, updated version of all these reports, as appropriate, must be included in the final plan. TWDB *anticipates* final versions of the reports will be available in the Secure Agency Reporting Application by **September 24, 2025**.
2. Continued review of DB27 data is still being performed. If issues arise during staff's ongoing data review, they will be communicated promptly to the planning group to resolve. Please anticipate the need to respond to additional comments regarding data integrity, including any source overallocations, prior to the adoption of the final regional water plans.
3. Please ensure that all numerical values presented in region developed tables throughout the final, adopted regional water plan are consistent with the data reported in DB27.
4. For the purpose of development and adoption of the 2027 State Water Plan, water management strategy and other data entered by the RWPG in DB27 will take precedence over any data discrepancies presented in the final regional water plan (Contract Exhibit C, Section 2.13.1).
5. Any remaining data revisions to DB27 must be communicated to rwpdataentry@twdb.texas.gov no later than **September 22, 2025**.

Additionally, the following final electronic files must be submitted alongside the final regional plan deliverable, including any remaining files that may not have been provided at the time of the submission of the IPP but that were used in developing the final plan (31 TAC § 357.50(g)(2)(C), Contract Exhibit C, Section 2.12.2):

1. All hydrologic model input/output or other model files used in determining water availability.
2. Geographic Information System data deliverables in accordance with Contract Exhibit D, Section 2.5.
3. All other files on which the plan is based (e.g. spreadsheets, maps, etc).

The following standard requirements that apply to recommended water management strategies must also be adhered to in all final regional water plans:

1. Regional water plans may include:
    a. the development of additional water supply sources and supply volumes,

   b. the conveyance and delivery of additional supply volumes to a point intake at a water user group,
   c. the treatment of additional supply volumes at the front end of a water user group's retail system,
   d. additional treatment and related eligible components that are directly related to additional supplies provided through direct reuse, and
   e. infrastructure costs that are associated with development of additional water supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies beyond the existing capacity of current facilities.
2. Regional water plan may not include:
   a. any recommended strategies, projects, or costs that are associated with replacing, rehabilitating, or maintaining water supply infrastructure that already exists, or
   b. the costs of any retail distribution lines or other distribution network infrastructure costs with the narrow exception for those strategies directly associated with replacement costs that are for the primary purpose of achieving conservation savings via water loss reduction (§ 357.34(e)(3)(A), Contract Exhibit C, Sections 2.5.2.14 and 2.5.2.15).

As a reminder, the deadline to submit the final, adopted regional water plan and associated material to the TWDB is **October 20, 2025**. It is imperative that you provide the TWDB with information on how you intend to address all TWDB comments well in advance of adoption of the final regional water plan to ensure that all the Level 1 responses are sufficiently responsive for the TWDB Executive Administrator to recommend that the TWDB Board consider approval of your plan in a timely and efficient manner. Your TWDB Regional Water Planner will review and provide feedback to ensure all IPP comments and associated plan revisions have been addressed adequately. Failure to adequately address any Level 1 comments may result in the delay of the TWDB Board approval of your final regional water plan.

Additionally, if the region includes new strategies, or makes significant revisions to its strategy evaluations based on the public comment period, please ensure those significant revisions are pointed out and provided to your TWDB Regional Water Planner to preview in advance of adopting the final regional water plan to ensure that those too will meet all requirements.

Note that the electronic copy of a final report(s) or other deliverable(s) must comply with the requirements and standards specified in 1 Texas Administrative Code (TAC) Chapters 206 and 213 (related to Accessibility and Usability of State Web Sites). Web Content Accessibility Guidelines (WCAG) 2.1 Level AA Standard – WCAG 2.1 Quick Reference can be found at: https://www.w3.org/WAI/WCAG21/quickref/.

If you have any questions regarding these comments or would like to discuss your approach to addressing any of these comments, please do not hesitate to contact Michele Foss of our Regional Water Planning staff at (512) 463-9225 or Michele.Foss@twdb.texas.gov. TWDB

staff will be available to assist you in any way possible to ensure successful completion of your final regional water plan.

Thank you for all the time and effort that the RWPG members, the Sponsor, and your consultants have put into developing your draft regional water plan and for the additional effort that will still be required to obtain TWDB Board approval. We look forward to celebrating another successful regional water planning cycle!

Sincerely,

Temple McKinnon
Temple McKinnon (Jun 23, 2025 16:06 CDT)

Matt Nelson
Deputy Executive Administrator of Planning

Attachment

c w/att.: Caye Castillo, San Antonio River Authority
Brian Mast, San Antonio River Authority
Lauren Gonzalez, Black & Veatch
Jaime Burke, Black & Veatch
Alicia Smiley, Black & Veatch
Reem Zoun, TWDB Office of Planning
Temple McKinnon, TWDB Water Supply Planning
Sarah Lee, TWDB Water Supply Planning
Kevin Smith, TWDB Water Supply Planning
Michele Foss, TWDB Water Supply Planning

# Texas Water Development Board (TWDB) comments on the Initially Prepared 2026 South Central Texas (Region L) Regional Water Plan.

**Level 1: Comments, questions, and data revisions that must be satisfactorily addressed to meet statutory, agency rule, and/or contract requirements.**

1. Chapter 2.3.4.2, Table 2-11. The livestock water demand for the Region L/Hays County split is listed in Table 2-11 as 2,828 acre-feet/year. The TWDB Board-adopted livestock water demand for this water user group (WUG) split is 2,712 acre-feet/year. This incorrect number, in turn, affects the total water demand which should be listed as 24,641 acre-feet/year. Likewise in Table 2-12, the Board-adopted Colorado river basin splits for the livestock water demand in Region L is incorrect, causing the total in the table to be incorrect. Please revise these water demand projections presented in these tables so they are consistent with Board-adopted projections in the final, adopted regional water plan. [31 Texas Administrative Code (TAC) § 357.31(a); 31 TAC § 357.31(e)(1)]

2. Section 3.3.1.3. The plan discusses local surface water supplies used for livestock but does not specify whether the local water supplies are firm. Please acknowledge whether the local supplies are firm or not in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.6]

3. Section 4.2 and the state water planning database (DB27). Tables 4-1, 4-2, 4-3, and 4-4, Table 4-4 and 4-11 appear to present information on projected water needs that is inconsistent with data reported in DB27 for decades 2040-2080. For example, the total needs reported in Tables 4-1, 4-2, 4-3, and 4-4, are inconsistent with the total needs for the region in DB27; the municipal needs total is inconsistent in Table 4-4; and the Comal County needs total is inconsistent in Table 4-11. Please review all data in the tables and revise as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.33(c)]

4. Chapter 5 and DB27. Unit costs reported in DB27 appear high for the following strategies: Municipal Water Conservation - Water Use Reduction - Kendall County WCID 1 ($43,305), and Municipal Water Conservation - Water Loss Mitigation - Sunko WSC ($207,786). Please confirm that the calculated unit costs are correct in DB27, or correct as appropriate, and that costs were considered in strategy recommendations in the final, adopted regional water plan. [31 TAC § 357.34(e)(2)]

5. Section 5.2. The plan does not appear to include a quantitative measure for assessing reliability of water supplies for water management strategy (WMS) evaluations. The matrix provided in Table 5.2-2 provides a qualitative rating of low to high. Additional reliability considerations presented in Table 5.2-3 only appear to be based on a quantified measure for the aquifer storage and recovery (ASR) strategies. Please provide a quantitative basis for reliability used in the evaluations of all water management strategies in the final, adopted regional water plan—ensuring that any recommended strategies provide a firm water supply throughout drought of record conditions. [31 TAC § 357.34(e)(3)(A)]

6. Section 5.1.5 and Appendix 5C. The plan in Appendix 5C appropriately includes the implementation status required by 31 Texas Administrative Code § 357.34(g) for the San Antonio Water System (SAWS) Regional Wilcox Project, however this project does not appear to be included in the applicable strategies listed in Section 5.1.5. Please add this strategy to the list in Section 5.1.5 in the final, adopted regional water plan. [31 TAC § 357.34(g)]

7. Section 5.2.30. It is unclear in the plan whether strategy water supply volumes represented for the Victoria ASR have been reduced to reflect the expected percent of actual water supply recovery from the aquifer. Please clearly state the expected percent of recovery for this project and, as appropriate, the lesser net volumes of the expected water supply yields for this strategy. If the strategy supply volumes do not reflect the lesser, expected percent of recovery, please modify the supply volume as appropriate in the final, adopted regional water plan and in DB27. [Contract Exhibit C, Section 2.5.2.4]

8. Section 5.2.22 and Section 5.2.23. For ASR strategies (e.g., Medina County Regional ASR Project and New Braunfels Utility (NBU) ASR Project) that plan on storage in saline aquifers, please reflect expected losses as greater than zero resulting in a percent of recovery less than 100 percent or provide an explanation for how these sites could possibly result in 100 percent recovery. For example, an ASR recovery of as low as 70 percent within saline formations would not be unexpected. [31 TAC § 357.34(e)(3)(A); Contract Exhibit C, Section 2.5.2.4]

9. Section 5.2.25. It is unclear from the evaluation of the SAWS Expanded Local Carrizo Project, whether the 12 new wells are groundwater production wells or ASR wells. If they are ASR wells, please include the anticipated recovery efficiency percentage and adjusted available supply yield, as appropriate, in the final, adopted regional water plan and DB27. [Contract Exhibit C, Section 2.5.2.4]

10. Section 5.2.1.1.1 and DB27. Based on data entered into DB27, the demand reduction volumes appear to be equivalent to over 40 percent of total demands for the following municipal water user groups in at least one planning decade: 3009 Water, Air Force Village II Inc., Alamo Heights, Aqua WSC, Carrizo Springs, Clear Water Estates Water System, Concan WSC, Cotulla, Cuero, El Oso WSC, Fair Oaks Ranch, Fort Sam Houston, Garden Ridge, Gonzales, Gonzales County WSC, Hondo, Kenedy, KT Water Development, Loma Alta Chula Vista Water System, New Braunfels, San Marcos, Shavano Park, Three Oaks WSC, Uvalde, Victoria, Ville Dalsace Water Supply, and Zavala County WCID 1. As these volumes appear high, please add discussion to support the magnitude of the demand reduction volume for these water user groups in the final, adopted regional water plan. [31 TAC § 357.34(j)(2)(B)]

11. Section 5.2.1.2.2, Table 5.2.1.7, Table 5.2.1.7, and DB27. Municipal water use reduction and water loss mitigation strategies are recommended separately, however the plan states that advanced metering infrastructure (AMI) is included in water use reduction strategies. For regional water planning purposes, AMI is to be included under water loss mitigation strategies. Please revise the municipal conservation description, yields, cost information, and reconcile updates in DB27 as appropriate to correctly group AMI with water loss mitigation in the final, adopted

regional water plan. [Contract Scope of Work, Task 5C; Contract Exhibit C, Section 2.5.2.5; Contract Exhibit D, Appendix 17]

12. Section 5.2.9 and Section 5.2.15. The plan does not appear to describe how population and water demands were used to determine the availability of supplies from the recommended reuse strategies. Please provide additional details on how the region estimated availability of future reuse—including how projected population and water demands were considered in the determination—in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.3]

13. Section 5.2.2.1, Table 5.2.2-1, Table 5.2.2-2, and DB27. The water savings and costs for irrigation conservation strategies are presented by irrigation WUG in Table 5.2.2-1 and 5.2.2-2, however these individual projects have been entered as one project within DB27 (WMSProjectId 5801). Projects may not be aggregated and presented as a single capital cost representing multiple projects that would be located in multiple locations and funded by separate sponsors or implemented separately. Please work with TWDB's Water Supply and Strategy Analysis team to revise the irrigation conservation project data in DB27 to present separate strategies and projects for the irrigation WUGs in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

14. Section 5.2.21 and DB27. The capital costs for the Guadalupe-Blanco River Authority (GBRA) WaterSECURE strategy projects appear to include costs for separate projects that have been entered into DB27 as one, aggregated recommended project, including a new off-channel reservoir, ASR wellfield, and brackish groundwater wellfield. Planning groups may not, in general, aggregate multiple facilities into a single cost estimate. Additionally, for state water plan reporting purposes, the following major projects with associated facilities must at minimum be costed separately in the final, adopted regional water plan and entered in DB27 as unique projects: 1) new major reservoir infrastructure, 2) ASR facility, and 3) brackish desalination well field infrastructure. The projects will then be linked to the appropriate supply under a main GBRA WaterSECURE WMS grouping and will not impact GBRA funding options with TWDB. Please work with TWDB's Water Supply and Strategy Analysis team to address these data issues, including flagging this WMS as a conjunctive use strategy, if appropriate. [Contract Exhibit C, Section 2.5.2.12; 31 TAC § 357.34(g)]

15. Sections 5.2.20 and 5.2.21. The evaluations for the GBRA Lower Basin New Appropriation and GBRA WaterSECURE strategies do not appear to separately present the estimated mitigation land areas and associated estimates of the acquisition cost. Please provide an estimated separate acreage and cost related to land acquisition (or range) for both the reservoir footprint and mitigation within the appropriate section of the plan or costing sheet, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

16. Chapter 5. The plan includes water treatment plant (WTP) expansion and other strategy types that include a WTP expansion as a stated project component. Any portion of strategies or costs that are associated with replacing portions of existing supply, including WTP capacity, are prohibited from being included in the regional water plans. The types of facilities and associated capital or other costs that may be

included in a regional water plan must be directly associated with development of additional supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies. Please confirm that only the portion of WTP facilities (and costs) required to increase the treated water supply volume (not to replace lost capacity) are included in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.15]

17. Section 5.1, Section 5.2, Table 5.1-2, and DB27. Information on strategies shown in Table 5.1-2 and presented in Section 5.2 appears to be presented inconsistently between the plan and DB27. For example, municipal conservation (including water use reduction and water loss mitigation) is not included as a recommended water management strategy in DB27 for East Medina County SUD, but is listed as a recommended strategy for this WUG in Table 5.1-2. Further, Chapter 5.2.1 presents zero yield for conservation savings. Please review the recommended strategy and project information presented to ensure that strategy and project information included in DB27 are consistent with those presented in the final, adopted regional water plan. Additionally, please consider including a footnote or asterisk for Table 5.2.1-6 and Table 5.2.1-7 to clarify that yields presented as zero are not included as recommended strategies. [31 TAC § 357.35(g)(1)]

18. Section 5.1, Table 5.1-2, and Section 5.2.33. Table 5.1-2 includes several WUGs with references to Section 5.2.33 for the evaluation of “Entity Purchase to Meet Shortages” as a recommended strategy, however Section 5.2.33 does not appear to be included in the plan. Please include a copy of the evaluation for this strategy in the final, adopted regional water plan. [31 TAC § 357.34(e); Contract Scope of Work, Task 5B]

19. Chapter 5.2 and DB27. Project costing information for the following projects present total capital costs that differ from the project capital costs included in DB27: WMSProjectIds 5108, 5110, 5111, 5792, 2112, 5116, and 5764. For example, DB27 reports total capital cost of $56,315,000 for WMSProjectId 5111, Brackish Groundwater Development – County Line SUD Edwards Project. Table 5.2.6-10 on Page 5.2.6-31 lists total capital costs of $20,907,000 for the same project. Please review the costing information for these projects and revise as necessary to ensure that all project capital costs in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

20. Section 5.2, Table 5.2.8-1, and DB27. It is unclear whether certain project yields presented in the plan are correctly reported in DB27. For example, in Table 5.2.8-1, the yield shown for the County Line SUD SH 21 Booster Site project (WMSProjectId 5461) is “N/A” and the associated footnote states “this infrastructure project does not include available yields as the supply source is associated with the WUG's existing surplus or other WMS”; however, yields of at least 4,697 acre-feet per year are reported in DB27 for the related strategy beginning in 2030. Additionally, the SAWS Southeast Integration Pipeline project (WMSProjectId 2339) included in Table 5.2.8-1 shares the same yield designation of “NA” and corresponding footnote regarding available yields as above, however yields of 21,000 acre-feet per year are shown in DB27 for the related strategy beginning in 2030. Please confirm data reporting and

clarify which specific strategy these projects are related to in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

21. Chapter 5.2.8, Table 5.2.8-1, and DB27. The online decade for the GBRA Western Canyon Water Treatment Plant facility expansion project (WMSProjectId 2109) appears to be reported inconsistently between the plan and DB27. For example, the online decade is 2060 in DB27, however the plan presents the online decade as 2030 in Table 5.2.8-1 and on Page 5.2.8-2. Please review the online decade for this project and revise as necessary to ensure that the online decade in DB27 is consistent with that presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

22. Section 5.1, Section 5.2, Table 5.1-2, and DB27. Information on strategies shown in Table 5.1-2 and presented in Section 5.2 appears to be presented inconsistently between the plan and DB27. For example, the GBRA WaterSECURE project is shown as a recommended water management strategy in DB27 for South Buda WCID 1 and Wimberley WSC but is not listed as a recommended strategy for these WUGs in Table 5.1-2. Please review the recommended strategy and project information presented to ensure that strategy and project information included in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

23. Sections 5.2.16, 5.2.17, 5.2.8, and 5.2.20. The plan does not appear to include explanations for the following recommended strategy volumes that remain 100% unallocated to any WUGs: Canyon Regional Water Authority (CRWA) - Expanded Brackish Carrizo-Wilcox, CRWA - Siesta Project, FE - CRWA Hays Caldwell WTP Expansion, and GBRA - Lower Basin New Appropriation. Please provide a specific explanation for why each of these strategies remaining 100% unallocated to WUGs in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.3]

24. Section 6.3 and DB27. The unmet needs data in Table 6-15 presented for irrigation WUGs and the region total is inconsistent with unmet needs data reported in DB27. Please review this data and revise Table 6-15 as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.40(c)]

25. Section 9.2. The counts of water management strategies benefitting more than one WUG provided on page 9-1 is inconsistent with strategies reported in DB22 and DB27 as benefitting more than one WUG. Please review the data reported in TWDB Secure Agency Reporting Application (SARA) Report ID 125 and either reconcile the counts presented in Section 9.2 to align with the report or clarify the difference in counts reported in the final, adopted regional water plan. [31 TAC § 357.45(b)(1)]

26. Geographic Information System (GIS) data deliverables do not include all of the required attribute fields listed in Table 1 of Exhibit D, Section 2.5.2.1. Please include the following attribute fields in all submitted WMS project GIS data: Status for polygons, and ShapeDescription for all geographies, with the final GIS files submitted. [Contract Exhibit D, Section 2.5.2.1]

27. The draft plan submittal did not include an electronic copy of existing surface water right data within the region utilizing the TWDB required template. Please ensure

water right data is provided using the TWDB provided template, with the final electronic files submitted. [Contract Exhibit C, Section 2.3.6]

**Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.**

1. Table 3-7, page 3-22. Please consider adding "TWDB Water Use Survey" to the methodology for the San Marcos River Alluvium split in Caldwell County to be more consistent with the technical memo (p 3C-10). The citation currently provided in the main report is incorrect as Report 12 does not actually provide production values but does identify Martindale WSC as the sole pumper from SMRA. Max water use survey (WUS) intake by Martindale WSC is 261 acre-feet in 2003, making the WUS dataset the likely source for the provided availability value.

2. Table 3-7, page 3-22. Please consider adding additional detail in the report text to supplement the brief methodology description in Table 3-7 for the Edwards Aquifer Authority (EAA)-related Edwards (BFZ) Aquifer splits. Based on publicly available EAA permit data alone, it is unclear how the total 296,553 AF/yr reliable supply value was derived and how it was divided to the different counties.

3. Table 3-7, page 3-22. Please specify the published source of the pumping data cited for the Leona Gravel split in Medina County.

4. Figure 3-2, page 3-3. Please consider adding missing Trinity subcrop & outcrop designations in the map legend.

5. Figure 3-3, page 3-6. Please consider adding missing outcrop/subcrop designations for Hickory, Sparta & Yegua-Jackson in the map legend.

6. Figure 3-4, page 3-10. Please consider adding a legend as EAA/Plum Creek/BSEACD designations are difficult to see with the current labeling scheme.

7. Page 3-2. Please consider rephrasing "16 aquifers" to "16 distinct groundwater sources with different geologic and management conditions" since this number includes several aquifer splits that are technically the same aquifer (ex. Edwards BFZ in EAA vs outside of EAA) and also includes groundwater sources that TWDB does not officially consider to be "aquifers."

8. The plan uses the terms 'recycled' and 'reuse' interchangeably (e.g. Section 5.2.9). The TWDB has different definitions for each term. Please consider consistently using the terms 'recycled' (as defined in Section 3.5.3 of Exhibit D) and 'reuse' (as defined in Section 1.7.3 of Exhibit C) in the final plan.

9. Appendix 3D. Please consider revising the title of Appendix 3D and its associated table to clarify that it includes water rights for all permitted surface water supply sources assessed in the plan.

10. Chapter 3. Please consider including the sedimentation rates for major reservoirs in the final plan.

11. Chapter 4. Please consider adding a statement indicating that second-tier major water provider needs are included in Appendix 4A, as all of Region L's major water providers are also WUGs.

12. Section 5.1.5 and Appendix 5C. The region appears to have included the implementation status required by 31 TAC § 357.34(g) for certain brackish groundwater strategies that are MAG limited and therefore do not meet the threshold of 10,000 acre-feet/year, however they appear to be included in the assessment due to the envisioned yield. Please consider adding a statement to clarify this for the applicable strategies listed in Section 5.1.5.

13. Section 5.1.3. Page 5.1-19, 3rd bullet. The sentence regarding the ASR assessment for Crystal Clear appears incomplete. Please review and consider revising as necessary.

14. Section 5.1.3. Page 5.1-19, 4th bullet. If only a portion of Fort Sam Houston's needs have been met, please consider including an ASR assessment for the remainder of the needs.

15. Chapter 5.2, Table 5.2.1-2. Three of the four column headers in the table contain the same title of “Pre-1995 Average Use to the 1995 Standard”. Please review and consider revising as necessary.

16. Chapter 5.2. On Page 5.2.1-11, the second bullet point states “For municipal WUGs having year 2030 water use between 80 GPCD and 139 GPCD, the goal is to reduce per capita water use by 2.5 percent per year for the remainder of the planning period or until 80 GPCD is reached”. Please review and confirm if this goal should reflect a reduction of 2.5 percent per decade, which would be consistent with the goal stated in the first bullet point, and update if necessary.

17. Chapter 5.2. On Page 5.2-4, there is a statement indicating that ASR projects have a water loss of 90 to 95 percent. Please clarify if this statement was meant to indicate expected recovery/yield of 90 to 95 percent (5 to 10 percent water loss)?

18. Section 5.2.11. The introduction paragraph in the evaluation for Rainwater Harvesting includes a typo referring to "the Fresh Groundwater Development WMS." Please consider correcting this in the final plan.

19. Section 7.6. The emergency response analysis for the 2026 regional water plans should have been based on projected 2030 populations to align with the planning horizon. While the region included the analysis for the applicable WUGs please consider updating Table 7-3 to reflect the decade 2030 for the analysis for municipal WUG population, instead of “2020”.

20. Chapter 10. Please consider providing a list of rural entities that were not responsive to regional water planning group outreach efforts in the final plan.

# Region L_2026 RWP_TWDB IPP Comment Letter

Final Audit Report 2025-06-23

| | |
|---|---|
| Created: | 2025-06-23 |
| By: | Sarah Lee (sarah.lee@twdb.texas.gov) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAAwjmtmUvWXrOpNY1j198X7zfZRurosLLH |

## "Region L_2026 RWP_TWDB IPP Comment Letter" History

Document created by Sarah Lee (sarah.lee@twdb.texas.gov)
2025-06-23 - 7:05:11 PM GMT

Document emailed to Michele Foss (michele.foss@twdb.texas.gov) for approval
2025-06-23 - 7:05:47 PM GMT

Email viewed by Michele Foss (michele.foss@twdb.texas.gov)
2025-06-23 - 7:17:19 PM GMT

Sarah Lee (sarah.lee@twdb.texas.gov) replaced approver Michele Foss (michele.foss@twdb.texas.gov) with Kevin Smith (kevin.smith@twdb.texas.gov)
2025-06-23 - 8:39:55 PM GMT

Document emailed to Kevin Smith (kevin.smith@twdb.texas.gov) for approval
2025-06-23 - 8:39:55 PM GMT

Email viewed by Kevin Smith (kevin.smith@twdb.texas.gov)
2025-06-23 - 8:51:35 PM GMT

Document approved by Kevin Smith (kevin.smith@twdb.texas.gov)
Approval Date: 2025-06-23 - 8:55:21 PM GMT - Time Source: server

Document emailed to Sarah Lee (sarah.lee@twdb.texas.gov) for approval
2025-06-23 - 8:55:24 PM GMT

Document approved by Sarah Lee (sarah.lee@twdb.texas.gov)
Approval Date: 2025-06-23 - 9:04:26 PM GMT - Time Source: server

Document emailed to Temple McKinnon (temple.mckinnon@twdb.texas.gov) for signature
2025-06-23 - 9:04:27 PM GMT

Email viewed by Temple McKinnon (temple.mckinnon@twdb.texas.gov)
2025-06-23 - 9:06:00 PM GMT

Document e-signed by Temple McKinnon (temple.mckinnon@twdb.texas.gov)
Signature Date: 2025-06-23 - 9:06:31 PM GMT - Time Source: server

Agreement completed.
2025-06-23 - 9:06:31 PM GMT

# Appendix 10B: Responses to Texas Water Development Board (TWDB) Comments on the Initially Prepared Plan (IPP)

# APPENDIX 10B Responses to Texas Water Development Board (TWDB) Comments on the Initially Prepared Plan (IPP)

The TWDB reviewed the 2026 Region L IPP and issued a formal comment letter dated June 23, 2025. A complete copy of this letter is provided in Appendix 10A. The TWDB's comments are categorized into two levels, as follows:

- Level 1: Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and,
- Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

The following sections present the TWDB's comments alongside the SCTRWPG's responses. For ease of reference, this appendix is divided into Section 10B.1 for Level 1 comments and Section 10B.2 for Level 2 comments.

For reference, Appendix 10A includes the TWDB's comment letter in its entirety, and Appendix 10C includes the SCTRWPG's responses to comments from the public and other agencies.

## 10B.1 Level 1 Comments

The SCTRWPG received 27 Level 1 comments from the TWDB. The following presents the TWDB's comments and the SCTRWPG's responses.

### 10B.1.1 Level 1, Comment No. 1

Chapter 2.3.4.2, Table 2-11. The livestock water demand for the Region L/Hays County split is listed in Table 2-11 as 2,828 acre-feet/year. The TWDB Board- adopted livestock water demand for this water user group (WUG) split is 2,712 acre- feet/year. This incorrect number, in turn, affects the total water demand which should be listed as 24,641 acre-feet/year. Likewise in Table 2-12, the Board-adopted Colorado river basin splits for the livestock water demand in Region L is incorrect, causing the total in the table to be incorrect. Please revise these water demand projections presented in these tables so they are consistent with Board-adopted projections in the final, adopted regional water plan. [31 Texas Administrative Code (TAC) § 357.31(a); 31 TAC § 357.31(e)(1)]

**SCTRWPG Response to Comment:**

The livestock water demands in Table 2-12 have been corrected.

### 10B.1.2 Level 1, Comment No. 2

Section 3.3.1.3. The plan discusses local surface water supplies used for livestock but does not specify whether the local water supplies are firm. Please acknowledge whether the local supplies are firm or not in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.6]

**SCTRWPG Response to Comment:**

Section 3.3.1.3, regarding the firm yield of local surface water supplies, has been revised as follows:

> Local surface water supplies used for livestock are considered firm, based on historical reliability and the assumption that ranchers will manage livestock populations in accordance with the availability of these dependable sources.

### 10B.1.3 Level 1, Comment No. 3

Section 4.2 and the state water planning database (DB27). Tables 4-1, 4-2, 4-3, and 4-4, Table 4-4 and 4-11 appear to present information on projected water needs that is inconsistent with data reported in DB27 for decades 2040-2080. For example, the total needs reported in Tables 4-1, 4-2, 4-3, and 4-4, are inconsistent with the total needs for the region in DB27; the municipal needs total is inconsistent in Table 4-4; and the Comal County needs total is inconsistent in Table 4-11. Please review all data in the tables and revise as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.33(c)]

**SCTRWPG Response to Comment:**

Tables in Chapter 4 have been revised to be consistent with data reported in DB27 for Canyon Lake Water Service (Texas Water Company) in Comal County. Revised tables include Tables 4-1, 4-2, 4-3, 4-4, 4-11, 4-13, and 4-14. Associated figures have also been updated.

### 10B.1.4 Level 1, Comment No. 4

Chapter 5 and DB27. Unit costs reported in DB27 appear high for the following strategies: Municipal Water Conservation - Water Use Reduction - Kendall County WCID 1 ($43,305), and Municipal Water Conservation - Water Loss Mitigation - Sunko WSC ($207,786). Please confirm that the calculated unit costs are correct in DB27, or correct as appropriate, and that costs were considered in strategy recommendations in the final, adopted regional water plan. [31 TAC § 357.34(e)(2)]

**SCTRWPG Response to Comment:**

The Municipal Water Conservation – Water Use Reduction and Water Loss Mitigation strategies have been revised as a result of TWDB Level 1, Comment 11, and the unit costs in DB27 have been updated accordingly. The calculated unit costs reflect full implementation of capital improvements associated with each strategy.

The revised calculated unit costs for the WUGs identified in the TWDB's comment have been revised, as follows:

- Municipal Water Conservation – Water Use Reduction – Kendall County WCID 1 ($305/acft)
- Municipal Water Conservation – Water Loss Mitigation – Sunko WSC ($30,163/acft)

The SCTRWPG strongly supports water conservation and the considered costs when recommending strategies for the 2026 RWP. The Municipal Water Conservation WMS is a Recommended strategy for every municipal WUG in the SCTRWPA with a 2030 GPCD greater than 80. It is important to note that

unit costs are calculated by dividing total strategy cost by the potential yield. Therefore, strategies with relatively low water yield and high capital costs will result in higher unit costs. This relationship was considered during the evaluation and recommendation of WMSs.

### 10B.1.5 Level 1, Comment No. 5

Section 5.2. The plan does not appear to include a quantitative measure for assessing reliability of water supplies for water management strategy (WMS) evaluations. The matrix provided in Table 5.2-2 provides a qualitative rating of low to high. Additional reliability considerations presented in Table 5.2-3 only appear to be based on a quantified measure for the aquifer storage and recovery (ASR) strategies. Please provide a quantitative basis for reliability used in the evaluations of all water management strategies in the final, adopted regional water plan— ensuring that any recommended strategies provide a firm water supply throughout drought of record conditions. [31 TAC § 357.34(e)(3)(A)]

**SCTRWPG Response to Comment:**

Section 5.2 regarding Reliability has been revised, as follows:

> Reliability is an assessment of the availability of the specified water quantity to the user over time. Quantifiably, the water volumes presented in this plan for recommended strategies are firm supplies that are 100% reliable during Drought of Record conditions, per TWDB planning guidelines. Considering other factors that can affect long-term availability, such as potential future modeling or rule changes that are beyond the scope of this planning effort, the SCTRWPG developed additional qualified reliability reporting in the form of a reliability evaluation matrix (Table 5.2 2) that was used in conjunction with other implementation considerations to also qualify the reliability of WMSs shown in Table 5.2 3.

Additionally, the qualitative reliability assessments for ASR projects in Table 5.2-3 have been revised, as follows: "Reliability is considered high. Successful ASR projects typically require extensive site-specific analyses, feasibility studies, and cycle testing prior to full implementation."

### 10B.1.6 Level 1, Comment No. 6

Section 5.1.5 and Appendix 5C. The plan in Appendix 5C appropriately includes the implementation status required by 31 Texas Administrative Code § 357.34(g) for the San Antonio Water System (SAWS) Regional Wilcox Project, however this project does not appear to be included in the applicable strategies listed in Section 5.1.5. Please add this strategy to the list in Section 5.1.5 in the final, adopted regional water plan. [31 TAC § 357.34(g)]

**SCTRWPG Response to Comment:**

Section 5.1.5 regarding the implementation status of certain WMSs has been updated to be consistent with Appendix 5C, which includes the SAWS Regional Wilcox Project.

### 10B.1.7 Level 1, Comment No. 7

Section 5.2.30. It is unclear in the plan whether strategy water supply volumes represented for the Victoria ASR have been reduced to reflect the expected percent of actual water supply recovery from

the aquifer. Please clearly state the expected percent of recovery for this project and, as appropriate, the lesser net volumes of the expected water supply yields for this strategy. If the strategy supply volumes do not reflect the lesser, expected percent of recovery, please modify the supply volume as appropriate in the final, adopted regional water plan and in DB27. [Contract Exhibit C, Section 2.5.2.4]

**SCTRWPG Response to Comment:**

The Available Yield section of Section 5.2.30 has been updated to provide additional details about expected water loss for the Victoria ASR Project. The strategy supply volumes already reflect the expected percent recovery; therefore, there is no change to the strategy supply volumes.

> The project will increase the firm supply incrementally up to 7,900 acft/yr. The targeted stored water volume within the aquifer will be 82,000 acft with an additional 83,000 acft buffer zone volume that would remain in the aquifer, resulting in a target total storage volume of 165,000 acft. Nationwide, recovery rates for ASR typically range from 70-90%, allowing for 10-30% water loss. In the case of the Victoria ASR project, the buffer zone storage allows for up to 50% water loss, or water that is not recovered and remains in the aquifer. As mentioned previously, Victoria already has one ASR well that was retrofitted to convert it from a conventional groundwater well to an ASR well. As of 2021, the City of Victoria has established storage of approximately 615 acft in the Gulf Coast Aquifer.

### 10B.1.8 Level 1, Comment No. 8

Section 5.2.22 and Section 5.2.23. For ASR strategies (e.g., Medina County Regional ASR Project and New Braunfels Utility (NBU) ASR Project) that plan on storage in saline aquifers, please reflect expected losses as greater than zero resulting in a percent of recovery less than 100 percent or provide an explanation for how these sites could possibly result in 100 percent recovery. For example, an ASR recovery of as low as 70 percent within saline formations would not be unexpected. [31 TAC § 357.34(e)(3)(A); Contract Exhibit C, Section 2.5.2.4]

**SCTRWPG Response to Comment:**

Sections 5.2.22 and 5.2.23 have been updated to clarify expected water losses for the Medina County Regional ASR Project and New Braunfels Utilities ASR Project, respectively. References to zero water loss have been removed, and additional detail has been added to reflect realistic recovery rates based on project-specific and industry data. The following language has been added to the sections:

- Medina County Regional ASR Project. 5.2.22.2 Available Yield, 3rd Paragraph.

  > The target storage volume is 63,700 acft, which includes approximately 60,000 acft of stored water and 3,700 acft of buffer zone volume for a 700-ft thick aquifer and an estimated porosity of 15%. Per the Preliminary Feasibility Report for this project, prepared by RESPEC Company, LLC, “The radius of the stored water “bubble” surrounding an ASR wellfield in the Trinity Aquifer will depend upon the target storage volume (TSV), storage aquifer thickness, and bulk porosity of the aquifer. A preliminary estimate of the TSV is 36 months at the wellfield recovery capacity, currently estimated at an average day demand of 16 MGD. This volume is approximately 60,000 acft of stored drinking water, available for recovery, plus the buffer zone volume, which is never recovered”, equating to a water loss of 5.8%.

- NBU ASR Project. 5.2.23.2 Available Yield, 4th Paragraph.

  The project will increase NBU's firm supply incrementally by 7,000 acft/yr. The stored water volume of water within the aquifer will be 7,000 acft with an additional 7,000 acft buffer zone volume that would remain in the aquifer, resulting in a target storage volume of 14,000 acft. Nationwide, recovery rates for ASR typically range from 70-90%, allowing for 10-30% water loss. In the case of the NBU ASR project, the buffer zone storage allows for up to 50% water loss, or water that is not recovered and remains in the aquifer.

### 10B.1.9 Level 1, Comment No. 9

Section 5.2.25. It is unclear from the evaluation of the SAWS Expanded Local Carrizo Project, whether the 12 new wells are groundwater production wells or ASR wells. If they are ASR wells, please include the anticipated recovery efficiency percentage and adjusted available supply yield, as appropriate, in the final, adopted regional water plan and DB27. [Contract Exhibit C, Section 2.5.2.4]

**SCTRWPG Response to Comment:**

Section 5.2.25 regarding the SAWS Expanded Local Carrizo Project has been revised to clarify that the 12 new wells will primarily be used for groundwater production, as follows:

5.2.25.1 Description of Water Management Strategy

SAWS currently produces approximately 9,900 acft/yr of groundwater from the Carrizo Aquifer from wells located at the SAWS H2Oaks Center in southern Bexar County. This WMS includes expansion of the current well field to produce an additional 21,000 acft/yr of water from 12 new wells in the Carrizo-Wilcox Aquifer in Bexar County (Figure 5.2.25-1). The well fields would be located northeast of the H2Oaks Center, where the groundwater will be treated for delivery through SAWS' distribution system. The project will be constructed in three phases, all of which are anticipated to be implemented by 2030. The wells will primarily be used for production of native groundwater from the Carrizo-Wilcox Aquifer. Given the proximity of the Expanded Local Carrizo Project's well field to the existing SAWS ASR system, SAWS is exploring the feasibility of having the wells serve a secondary function to perform recharge and recovery of ASR water.

### 10B.1.10 Level 1, Comment No. 10

Section 5.2.1.1.1 and DB27. Based on data entered into DB27, the demand reduction volumes appear to be equivalent to over 40 percent of total demands for the following municipal water user groups in at least one planning decade: 3009 Water, Air Force Village II Inc., Alamo Heights, Aqua WSC, Carrizo Springs, Clear Water Estates Water System, Concan WSC, Cotulla, Cuero, El Oso WSC, Fair Oaks Ranch, Fort Sam Houston, Garden Ridge, Gonzales, Gonzales County WSC, Hondo, Kenedy, KT Water Development, Loma Alta Chula Vista Water System, New Braunfels, San Marcos, Shavano Park, Three Oaks WSC, Uvalde, Victoria, Ville Dalsace Water Supply, and Zavala County WCID 1. As these volumes appear high, please add discussion to support the magnitude of the demand reduction volume for these water user groups in the final, adopted regional water plan. [31 TAC § 357.34(j)(2)(B)]

**SCTRWPG Response to Comment:**

Section 5.2.1 has been revised to add discussion to support the magnitude of the demand reduction volumes for the WUGs referenced in TWDB Comment No. 10, as follows:

> Many WUGs have high baseline GPCDs (220+). Because the municipal conservation strategy applies a higher reduction for WUGs with GPCD above 140, and because these entities remain above that threshold throughout most of or all of the planning horizon, the cumulative savings are proportionally higher. Furthermore, a separate Drought Management WMS (Refer to Section 5.2.3) applies additional demand reduction volumes associated with temporary demand reductions during drought conditions. While these demand reductions represent a significant decrease from current usage levels, they are considered achievable and are aligned with state water planning goals.

### 10B.1.11 Level 1, Comment No. 11

Section 5.2.1.2.2, Table 5.2.1.7, Table 5.2.1.7, and DB27. Municipal water use reduction and water loss mitigation strategies are recommended separately, however the plan states that advanced metering infrastructure (AMI) is included in water use reduction strategies. For regional water planning purposes, AMI is to be included under water loss mitigation strategies. Please revise the municipal conservation description, yields, cost information, and reconcile updates in DB27 as appropriate to correctly group AMI with water loss mitigation in the final, adopted regional water plan. [Contract Scope of Work, Task 5C; Contract Exhibit C, Section 2.5.2.5; Contract Exhibit D, Appendix 17]

**SCTRWPG Response to Comment**:

The WMS Municipal Conservation - Water Loss Mitigation has been updated to include both AMI and Leak Detection and Repair. The WMS Municipal Conservation - Water Use Reduction has been updated to include non-capital cost conservation improvements. The descriptions, yields, cost information, and DB27 information has been updated to reflect these changes in Section 5.2.1.

### 10B.1.12 Level 1, Comment No. 12

Section 5.2.9 and Section 5.2.15. The plan does not appear to describe how population and water demands were used to determine the availability of supplies from the recommended reuse strategies. Please provide additional details on how the region estimated availability of future reuse—including how projected population and water demands were considered in the determination—in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.3]

**SCTRWPG Response to Comment:**

1. Section 5.2.9.2, regarding the evaluation of submitted water reuse strategies, has been revised to include additional language: "Population and demand projections show increase over time for all WUGs requesting reuse strategies, so this amount of water should continue to be available."
2. Section 5.2.15.2, regarding the available yield for ARWA DPR Project (Phase 3), has been revised to include additional language: "Population and demand projections show increase over time for ARWA customers, so this amount of water should continue to be available."

### 10B.1.13 Level 1, Comment No. 13

Section 5.2.2.1, Table 5.2.2-1, Table 5.2.2-2, and DB27. The water savings and costs for irrigation conservation strategies are presented by irrigation WUG in Table 5.2.2-1 and 5.2.2-2, however these individual projects have been entered as one project within DB27 (WMSProjectId 5801). Projects may not be aggregated and presented as a single capital cost representing multiple projects that would be located in multiple locations and funded by separate sponsors or implemented separately. Please work with TWDB's Water Supply and Strategy Analysis team to revise the irrigation conservation project data in DB27 to present separate strategies and projects for the irrigation WUGs in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

**SCTRWPG Response to Comment:**

The SCTRWPG coordinated with TWDB to revise DB27 in order to separate the irrigation conservation strategies into individual projects for each Irrigation WUG. No change has been made to the final plan report.

### 10B.1.14 Level 1, Comment No. 14

Section 5.2.21 and DB27. The capital costs for the Guadalupe-Blanco River Authority (GBRA) WaterSECURE strategy projects appear to include costs for separate projects that have been entered into DB27 as one, aggregated recommended project, including a new off-channel reservoir, ASR wellfield, and brackish groundwater wellfield. Planning groups may not, in general, aggregate multiple facilities into a single cost estimate. Additionally, for state water plan reporting purposes, the following major projects with associated facilities must at minimum be costed separately in the final, adopted regional water plan and entered in DB27 as unique projects: 1) new major reservoir infrastructure, 2) ASR facility, and 3) brackish desalination well field infrastructure. The projects will then be linked to the appropriate supply under a main GBRA WaterSECURE WMS grouping and will not impact GBRA funding options with TWDB. Please work with TWDB's Water Supply and Strategy Analysis team to address these data issues, including flagging this WMS as a conjunctive use strategy, if appropriate. [Contract Exhibit C, Section 2.5.2.12; 31 TAC § 357.34(g)]

**SCTRWPG Response to Comment:**

As indicated in Section 5.2.21, the WaterSECURE WMS is a unified program that is anticipated to be implemented and funded at the same time and not in phases. The SCTRWPG coordinated with TWDB to show the major components separately within DB27 to be consistent with the TWDB reporting practices; however, this change is for reporting purposes only and the total costs have not changed.

### 10B.1.15 Level 1, Comment No. 15

Sections 5.2.20 and 5.2.21. The evaluations for the GBRA Lower Basin New Appropriation and GBRA WaterSECURE strategies do not appear to separately present the estimated mitigation land areas and associated estimates of the acquisition cost. Please provide an estimated separate acreage and cost related to land acquisition (or range) for both the reservoir footprint and mitigation within the appropriate section of the plan or costing sheet, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

**SCTRWPG Response to Comment:**

Sections 5.2.20 and 5.2.21 for the GBRA Lower Basin New Appropriation WMS and GBRA Water Secure WMS, respectively, have been revised to include additional language that includes land areas and associated acquisition costs, as follows:

- GBRA Lower Basin New Appropriation WMS

  Land acquisition includes 2,000 acres for the reservoir footprint at an assumed cost of $11 million and a mitigation cost for the same acreage of $11 million. Pipeline and pump station land acquisition assumes 37.2 acres will be needed at a cost of $204,000 and a mitigation cost for the same acreage of $107,000.

- GBRA Water Secure WMS

  The costs developed for GBRA WaterSECURE are based on external costs provided by GBRA. Land acquisition includes 2,562 acres for the reservoir footprint at an assumed cost of $13.0 million, and an additional 438 acres of mitigation area surrounding the reservoir at an assumed cost of $2.2 million. Pipeline and other facilities land acquisition assumes 5,217 acres will be needed at a cost of $186.7 million.

### 10B.1.16 Level 1, Comment No. 16

Chapter 5. The plan includes water treatment plant (WTP) expansion and other strategy types that include a WTP expansion as a stated project component. Any portion of strategies or costs that are associated with replacing portions of existing supply, including WTP capacity, are prohibited from being included in the regional water plans. The types of facilities and associated capital or other costs that may be included in a regional water plan must be directly associated with development of additional supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies. Please confirm that only the portion of WTP facilities (and costs) required to increase the treated water supply volume (not to replace lost capacity) are included in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.15]

**SCTRWPG Response to Comment:**

The SCTRWPG confirms that all WMSs that include a WTP expansion as a project component are directly associated with development of additional supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies.

WMSs with WTP expansions have been revised to include clarifying language, as follows:

> Only the portion of WTP facilities and associated costs that are directly required to increase the treated water supply volume—excluding any components related to replacement of existing capacity—are included in this RWP.

### 10B.1.17 Level 1, Comment No. 17

Section 5.1, Section 5.2, Table 5.1-2, and DB27. Information on strategies shown in Table 5.1-2 and presented in Section 5.2 appears to be presented inconsistently between the plan and DB27. For example, municipal conservation (including water use reduction and water loss mitigation) is not

included as a recommended water management strategy in DB27 for East Medina County SUD, but is listed as a recommended strategy for this WUG in Table 5.1-2. Further, Chapter 5.2.1 presents zero yield for conservation savings. Please review the recommended strategy and project information presented to ensure that strategy and project information included in DB27 are consistent with those presented in the final, adopted regional water plan. Additionally, please consider including a footnote or asterisk for Table 5.2.1-6 and Table 5.2.1-7 to clarify that yields presented as zero are not included as recommended strategies. [31 TAC § 357.35(g)(1)]

**SCTRWPG Response to Comment:**

Table 5.1-2 summarizing recommended water management strategies by WUG has been revised to show municipal water conservation is not recommended for Randolph Air Force Base, Port Oconnor Improvement District, County Line SUD, and East Medina County SUD, as these WUGs have a 2030 water use below the threshold of 80 GPCD and do not qualify for the WMS.

Tables 5.2.1-6 and 5.2.1-7 have been revised to add a clarifying statement with an asterisk, as follows:

> WUGs with zero yields in every decade are shown in this table for consistency with other tables in this section; however, if a WMS does not demonstrate a firm yield under drought of record conditions, it is not considered a Recommended strategy.

### 10B.1.18 Level 1, Comment No. 18

Section 5.1, Table 5.1-2, and Section 5.2.33. Table 5.1-2 includes several WUGs with references to Section 5.2.33 for the evaluation of “Entity Purchase to Meet Shortages” as a recommended strategy, however Section 5.2.33 does not appear to be included in the plan. Please include a copy of the evaluation for this strategy in the final, adopted regional water plan. [31 TAC § 357.34(e); Contract Scope of Work, Task 5B]

**SCTRWPG Response to Comment:**

All references to Section 5.2.33 have been removed and replaced with "N/A".

### 10B.1.19 Level 1, Comment No. 19

Chapter 5.2 and DB27. Project costing information for the following projects present total capital costs that differ from the project capital costs included in DB27: WMSProjectIds 5108, 5110, 5111, 5792, 2112, 5116, and 5764. For example, DB27 reports total capital cost of $56,315,000 for WMSProjectId 5111, Brackish Groundwater Development – County Line SUD Edwards Project. Table 5.2.6-10 on Page 5.2.6-31 lists total capital costs of $20,907,000 for the same project. Please review the costing information for these projects and revise as necessary to ensure that all project capital costs in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

**SCTRWPG Response to Comment:**

The SCTRWPG coordinated with TWDB to update DB27 costs to be consistent with costs in the final, adopted regional water plan.

### 10B.1.20 Level 1, Comment No. 20

Section 5.2, Table 5.2.8-1, and DB27. It is unclear whether certain project yields presented in the plan are correctly reported in DB27. For example, in Table 5.2.8-1, the yield shown for the County Line SUD SH 21 Booster Site project (WMSProjectId 5461) is "N/A" and the associated footnote states "this infrastructure project does not include available yields as the supply source is associated with the WUG's existing surplus or other WMS"; however, yields of at least 4,697 acre-feet per year are reported in DB27 for the related strategy beginning in 2030. Additionally, the SAWS Southeast Integration Pipeline project (WMSProjectId 2339) included in Table 5.2.8- 1 shares the same yield designation of "NA" and corresponding footnote regarding available yields as above, however yields of 21,000 acre-feet per year are shown in DB27 for the related strategy beginning in 2030. Please confirm data reporting and clarify which specific strategy these projects are related to in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

**SCTRWPG Response to Comment:**

The SCTRWPG confirms that all project yields presented in Section 5.2.8 are consistent with those reported in DB27. To improve clarity, Section 5.2.8 has been revised to better illustrate the relationship between each project and its corresponding strategy. Specifically, Table 5.2.8-1 has been divided into two separate tables: one for the Facilities Expansion WMSs that include a yield and project; and another for the Water Management Strategy Projects (WMSPs) that do not have a standalone yield but are instead related to another WMS with an associated yield.

### 10B.1.21 Level 1, Comment No. 21

Chapter 5.2.8, Table 5.2.8-1, and DB27. The online decade for the GBRA Western Canyon Water Treatment Plant facility expansion project (WMSProjectId 2109) appears to be reported inconsistently between the plan and DB27. For example, the online decade is 2060 in DB27, however the plan presents the online decade as 2030 in Table 5.2.8-1 and on Page 5.2.8-2. Please review the online decade for this project and revise as necessary to ensure that the online decade in DB27 is consistent with that presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

**SCTRWPG Response to Comment:**

The SCTRWPG coordinated with TWDB to revise DB27 to be consistent with the online decade reported in the final, adopted regional water plan for the GBRA Western Canyon Water Treatment Plant facility expansion project (2030).

### 10B.1.22 Level 1, Comment No. 22

Section 5.1, Section 5.2, Table 5.1-2, and DB27. Information on strategies shown in Table 5.1-2 and presented in Section 5.2 appears to be presented inconsistently between the plan and DB27. For example, the GBRA WaterSECURE project is shown as a recommended water management strategy in DB27 for South Buda WCID 1 and Wimberley WSC but is not listed as a recommended strategy for these WUGs in Table 5.1-2. Please review the recommended strategy and project information presented to ensure that strategy and project information included in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

**SCTRWPG Response to Comment:**

The SCTRWPG coordinated with TWDB to update DB27 to show consistent water purchases from GBRA for South Buda WCID 1 and Wimberley WSC, and also for Goforth SUD and Crystal Clear SUD. These WUGs currently plan to purchase water from GBRA's general supply; however, for purposes of the 2026 Regional Water Plan, the WUGs are shown as customers of the GBRA WaterSECURE WMS in the 2027 Regional and State Water Planning Database (DB27). Table 5.1-2 has been revised to include a footnote indicating their plans to purchase from GBRA's general supply and that the WaterSECURE purchase is for regional water planning purposes only.

### 10B.1.23 Level 1, Comment No. 23

Sections 5.2.16, 5.2.17, 5.2.8, and 5.2.20. The plan does not appear to include explanations for the following recommended strategy volumes that remain 100% unallocated to any WUGs: Canyon Regional Water Authority (CRWA) - Expanded Brackish Carrizo-Wilcox, CRWA - Siesta Project, FE - CRWA Hays Caldwell WTP Expansion, and GBRA - Lower Basin New Appropriation. Please provide a specific explanation for why each of these strategies remaining 100% unallocated to WUGs in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.3]

**SCTRWPG Response to Comment:**

Each strategy with unallocated recommended strategy volumes have been revised to add the following language in the Available Yield section:

> All or a portion of yield from this WMS remains unallocated to a specific WUG because the project sponsor is a WWP and has chosen to instead have a surplus management supply. Surplus management supply is when the cumulative supply of the Recommended WMSs is in excess of the amount needed to meet regional needs to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability. Rather than assigning volumes from a specific project to individual WUGs in the plan, the WWP contracts with customers from their general water supply portfolio or surplus. This approach allows for flexibility in meeting future demands and accommodating evolving customer needs. As such, the strategy volumes are included in the plan to reflect the WWP's capacity to meet regional needs, even though specific allocations to WUGs are not identified at this time.

### 10B.1.24 Level 1, Comment No. 24

Section 6.3 and DB27. The unmet needs data in Table 6-15 presented for irrigation WUGs and the region total is inconsistent with unmet needs data reported in DB27. Please review this data and revise Table 6-15 as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.40(c)]

**SCTRWPG Response to Comment:**

Table 6-15 has been revised for consistency with data reported in DB27 for irrigation WUGs.

### 10B.1.25 Level 1, Comment No. 25

Section 9.2. The counts of water management strategies benefitting more than one WUG provided on page 9-1 is inconsistent with strategies reported in DB22 and DB27 as benefitting more than one WUG. Please review the data reported in TWDB Secure Agency Reporting Application (SARA) Report ID 125 and either reconcile the counts presented in Section 9.2 to align with the report or clarify the difference in counts reported in the final, adopted regional water plan. [31 TAC § 357.45(b)(1)]

**SCTRWPG Response to Comment:**

The data associated with the number of WMSs that benefit more than one WUG in the 2021 and 2026 SCTRWP have been revised to be consistent with data included in DB27.

### 10B.1.26 Level 1, Comment No. 26

Geographic Information System (GIS) data deliverables do not include all of the required attribute fields listed in Table 1 of Exhibit D, Section 2.5.2.1. Please include the following attribute fields in all submitted WMS project GIS data: Status for polygons, and ShapeDescription for all geographies, with the final GIS files submitted. [Contract Exhibit D, Section 2.5.2.1]

**SCTRWPG Response to Comment:**

The GIS data deliverables have been revised to include the following as attribute fields: Status for polygons and ShapeDescription.

### 10B.1.27 Level 1, Comment No. 27

The draft plan submittal did not include an electronic copy of existing surface water right data within the region utilizing the TWDB required template. Please ensure water right data is provided using the TWDB provided template, with the final electronic files submitted. [Contract Exhibit C, Section 2.3.6]

**SCTRWPG Response to Comment:**

An electronic copy of existing surface water right data on the required TWDB template has been included in the electronic files submitted with the final, adopted regional water plan.

## 10B.2 Level 2 Comments

The SCTRWPG received 20 Level 2 comments from the TWDB. The following summarizes comments and the SCTRWPG's responses.

### 10B.2.1 Level 2, Comment No. 1

Table 3-7, page 3-22. Please consider adding "TWDB Water Use Survey" to the methodology for the San Marcos River Alluvium split in Caldwell County to be more consistent with the technical memo (p 3C-10). The citation currently provided in the main report is incorrect as Report 12 does not actually provide production values but does identify Martindale WSC as the sole pumper from SMRA. Max water use survey (WUS) intake by Martindale WSC is 261 acre-feet in 2003, making the WUS dataset the likely source for the provided availability value.

**SCTRWPG Response to Comment:**

The description for availability methodology footnote "i" has been revised in Table 3-7, as follows:

> I = Published Reports/Data: TWDB "Report 12, Groundwater Resources of Caldwell County, Texas" (1966). Maximum Historic TWDB Water Use Survey Detailed Groundwater Pumpage by County (1980-2021). The maximum historic annual production from "Other Aquifers" under the Entity "Non-Surveyed Estimate" in Caldwell County was 813 acft in 1990. Based on this historic data, and the assumption that one-third of this is from the San Marcos Alluvium, the minimum supply from the San Marcos Alluvium is 271 acft/yr.

### 10B.2.2 Level 2, Comment No. 2

Table 3-7, page 3-22. Please consider adding additional detail in the report text to supplement the brief methodology description in Table 3-7 for the Edwards Aquifer Authority (EAA)-related Edwards (BFZ) Aquifer splits. Based on publicly available EAA permit data alone, it is unclear how the total 296,553 AF/yr reliable supply value was derived and how it was divided to the different counties.

**SCTRWPG Response to Comment:**

The last paragraph of Section 3.3.2.2, RWPG-Estimated Groundwater Availabilities, has been revised to include the identification of counties as follows:

> For portions of the Edwards-BFZ Aquifer that are regulated by EAA, the groundwater availabilities and existing supplies are based on the drought year reliable supply of EAA-issued permits. The EAA Act limits permitted withdrawals to 572,000 acre-feet per year (acft/yr); however, during a drought year, the reliable supply of these permits is reduced by 41% to 73%, depending on the pool (county of permitted use) and permitted use type. Therefore, the total reliable supply or total groundwater availabilities for the EAA-regulated portions of the Edwards-BFZ Aquifer is 296,553 acft/yr, including estimated exempt federal and domestic and livestock production.

### 10B.2.3 Level 2, Comment No. 3

Table 3-7, page 3-22. Please specify the published source of the pumping data cited for the Leona Gravel split in Medina County.

**SCTRWPG Response to Comment:**

This information came from Medina County GCD directly. Availability footnote has been revised in Table 3-7, as follows:

> Published Reports/Data: Average Historic Leona Gravel Aquifer Groundwater Pumpage (2010-2019) provided by Medina County GCD.

### 10B.2.4 Level 2, Comment No. 4

Figure 3-2, page 3-3. Please consider adding missing Trinity subcrop & outcrop designations in the map legend.

**SCTRWPG Response to Comment:**

Figure 3-2 has been revised to add the missing designations in the map legend.

### 10B.2.5 Level 2, Comment No. 5

Figure 3-3, page 3-6. Please consider adding missing outcrop/subcrop designations for Hickory, Sparta & Yegua-Jackson in the map legend.

**SCTRWPG Response to Comment:**

Figure 3-3 has been revised to add the missing designations in the map legend.

### 10B.2.6 Level 2, Comment No. 6

Figure 3-4, page 3-10. Please consider adding a legend as EAA/Plum Creek/BSEACD designations are difficult to see with the current labeling scheme.

**SCTRWPG Response to Comment:**

Figure 3-4 has been revised to improve the visibility of the designations in the map.

### 10B.2.7 Level 2, Comment No. 7

Page 3-2. Please consider rephrasing "16 aquifers" to "16 distinct groundwater sources with different geologic and management conditions" since this number includes several aquifer splits that are technically the same aquifer (ex. Edwards BFZ in EAA vs outside of EAA) and also includes groundwater sources that TWDB does not officially consider to be "aquifers."

**SCTRWPG Response to Comment:**

Language in Section 3-2 has been revised to clarify that the groundwater sources are "16 distinct groundwater sources with different geologic and management conditions." For consistency, Section 3.2.2 was also revised to clarify that the groundwater sources include major aquifers, minor aquifers, and "other groundwater sources the TWDB does not officially consider to be 'aquifers'."

### 10B.2.8 Level 2, Comment No. 8

The plan uses the terms 'recycled' and 'reuse' interchangeably (e.g. Section 5.2.9). The TWDB has different definitions for each term. Please consider consistently using the terms 'recycled' (as defined in Section 3.5.3 of Exhibit D) and 'reuse' (as defined in Section 1.7.3 of Exhibit C) in the final plan.

**SCTRWPG Response to Comment:**

Section 5.2.9 and other sections within the Final plan have been revised to use the term "reuse," where appropriate.

### 10B.2.9 Level 2, Comment No. 9

Appendix 3D. Please consider revising the title of Appendix 3D and its associated table to clarify that it includes water rights for all permitted surface water supply sources assessed in the plan.

**SCTRWPG Response to Comment:**

The title of Appendix 3D has been revised to "Permitted Surface Water Rights and Reliability Assessment."

### 10B.2.10 Level 2, Comment No. 10

Chapter 3. Please consider including the sedimentation rates for major reservoirs in the final plan.

**SCTRWPG Response to Comment:**

Section 3.3.1.2, regarding Sedimentation Methodology, has been revised to include the sedimentation rates for major reservoirs, as follows: “Sedimentation rates used for major reservoirs in the applicable WAMs included:

- Calaveras Lake: 29.05 acft/yr;
- Canyon Reservoir: 114.98 acft/yr;
- Coleto Creek Reservoir: 55.76 acft/yr; and
- Victor Braunig Lake: 4.23 acft/yr.”

### 10B.2.11 Level 2, Comment No. 11

Chapter 4. Please consider adding a statement indicating that second-tier major water provider needs are included in Appendix 4A, as all of Region L's major water providers are also WUGs.

**SCTRWPG Response to Comment:**

Section 4.2.4 has been revised to include a reference to the second-tier major water provider needs in Appendix 4A, as follows: "Water needs for MWPs are summarized by use type in Table 4-14. Second-tier major water provider needs are included in Appendix 4A."

### 10B.2.12 Level 2, Comment No. 12

Section 5.1.5 and Appendix 5C. The region appears to have included the implementation status required by 31 TAC § 357.34(g) for certain brackish groundwater strategies that are MAG limited and therefore do not meet the threshold of 10,000 acre-feet/year, however they appear to be included in the assessment due to the envisioned yield. Please consider adding a statement to clarify this for the applicable strategies listed in Section 5.1.5.

**SCTRWPG Response to Comment:**

Section 5.1.5 has been revised to include a footnote, as follows:

> This brackish groundwater strategy is subject to Modeled Available Groundwater (MAG) limitations and does not meet the 10,000 acft/yr threshold; however, it has been included in the implementation status assessment due to the strategy’s envisioned yield being greater than 10,000 acft/yr.

### 10B.2.13 Level 2, Comment No. 13

Section 5.1.3. Page 5.1-19, 3rd bullet. The sentence regarding the ASR assessment for Crystal Clear appears incomplete. Please review and consider revising as necessary.

**SCTRWPG Response to Comment:**

The third bullet on page 5.1-19 in Section 5.1.3 has been revised to include the full statement, as follows:

> A full strategy evaluation of the potential for ASR projects to meet Crystal Clear SUD's significant identified water needs was not conducted because implementation of ASR may be considered cost-prohibitive compared to the cost of surface water and/or groundwater projects. Their needs have been met through a variety of cost-effective WMSs, which are listed in Table 5.1-2.

### 10B.2.14 Level 2, Comment No. 14

Section 5.1.3. Page 5.1-19, 4th bullet. If only a portion of Fort Sam Houston's needs have been met, please consider including an ASR assessment for the remainder of the needs.

**SCTRWPG Response to Comment:**

The fourth bullet on page 5.1-19 in Section 5.1.3 has been revised, as follows:

> A full strategy evaluation of the potential for ASR projects to meet Fort Sam Houston's significant identified water needs was not conducted because their needs have been met through a variety of cost-effective WMSs, which are listed in Table 5.1-2.

### 10B.2.15 Level 2, Comment No. 15

Chapter 5.2, Table 5.2.1-2. Three of the four column headers in the table contain the same title of "Pre-1995 Average Use to the 1995 Standard". Please review and consider revising as necessary.

**SCTRWPG Response to Comment:**

The column headers in Table 5.2.1-2 have been revised to the following: "Pre-1995 Average Use to 2014 Standard" and "1995 Average Use to 2014 Standard."

### 10B.2.16 Level 2, Comment No. 16

Chapter 5.2. On Page 5.2.1-11, the second bullet point states "For municipal WUGs having year 2030 water use between 80 GPCD and 139 GPCD, the goal is to reduce per capita water use by 2.5 percent per year for the remainder of the planning period or until 80 GPCD is reached". Please review and confirm if this goal should reflect a reduction of 2.5 percent per decade, which would be consistent with the goal stated in the first bullet point, and update if necessary.

**SCTRWPG Response to Comment:**

The second bullet in Section 5.2.1.2.1 has been revised to reflect a per capita water use reduction of 2.5% per decade, as follows:

> For municipal WUGs having year 2030 water use between 80 GPCD and 139 GPCD, the goal is to reduce per capita water use by 2.5% per decade for the remainder of the planning period or until 80 GPCD is reached.

### 10B.2.17 Level 2, Comment No. 17

Chapter 5.2. On Page 5.2-4, there is a statement indicating that ASR projects have a water loss of 90 to 95 percent. Please clarify if this statement was meant to indicate expected recovery/yield of 90 to 95 percent (5 to 10 percent water loss)?

**SCTRWPG Response to Comment:**

Subchapter 5.2 relating to water loss assumptions for ASR WMSs has been revised, as follows:

> Aquifer Storage and Recovery: ASR strategies have losses due to recovery efficiency from the aquifer. Nationwide, recovery rates for ASR typically range from 70-90 percent (%), allowing for 10-30% water loss. Each WMS evaluation uses its own project-specific estimated percent water loss.

### 10B.2.18 Level 2, Comment No. 18

Section 5.2.11. The introduction paragraph in the evaluation for Rainwater Harvesting includes a typo referring to "the Fresh Groundwater Development WMS." Please consider correcting this in the final plan.

**SCTRWPG Response to Comment:**

The introductory paragraph of Section 5.2.11 has been revised from "Fresh Groundwater Development" to "Rainwater Harvesting."

### 10B.2.19 Level 2, Comment No. 19

Section 7.6. The emergency response analysis for the 2026 regional water plans should have been based on projected 2030 populations to align with the planning horizon. While the region included the analysis for the applicable WUGs please consider updating Table 7-3 to reflect the decade 2030 for the analysis for municipal WUG population, instead of “2020”.

**SCTRWPG Response to Comment:**

Table 7-3 has been revised to use population data from the 2030 decade for the emergency response analysis. Additionally, with the updated population data, there were additional WUGs that were added to the evaluation, including Karnes City, Kendall County WCID 1, Kenedy, Randolph Air Force Base, The Oaks WSC, Universal City, Ville Dalsace Water Supply, and Yancey WSC.

### 10B.2.20 Level 2, Comment No. 20

Chapter 10. Please consider providing a list of rural entities that were not responsive to regional water planning group outreach efforts in the final plan.

**SCTRWPG Response to Comment:**

A new table, Table 10-2, has been added to identify the level of engagement of rural entities during the SCTRWPG's outreach efforts.

# Appendix 10C: Responses to Public and Agency Comments on the Initially Prepared Plan (IPP)

# APPENDIX 10C Responses to Public and Agency Comments on the Initially Prepared Plan (IPP)

This appendix provides a summary of comments received from the public and agencies regarding the 2026 Region L IPP, and provides responses from the SCTRWPG to those comments.

For reference, Appendix 10A includes the TWDB's comment letter in its entirety, and Appendix 10B includes the SCTRWPG's responses to TWDB comments.

## 10C.1 Summary of Comments Received

On May 21, 2025, the SCTRWPG held one public hearing to present a summary of the IPP and to receive public testimony as oral and/or written comments. Between May 21, 2025, and July 20, 2025, the SCTRWPG invited public feedback on its IPP. During the public comment period, written comments were accepted by the San Antonio River Authority, the Region L administrative agent, via mail and email.

During the public comment period, the SCTRWPG received 17 written comments from the public and agencies. No oral or written comments were submitted to the SCTRWPG during the public hearing. Aside from the TWDB, the Texas Parks and Wildlife Department (TPWD) was the only state or federal agency that submitted comments on the IPP.

Table 10C-1 includes a summary of comments received from the public and agencies regarding the IPP. Of the 17 comments received, 11 expressed similar concerns opposing proposed groundwater projects in the Carrizo-Wilcox Aquifer in Gonzales County. Due to their similarity, these comments were summarized collectively, and the SCTRWPG provided a single, consolidated response in Section 10C.4.

**Table 10C-1 Summary of Public and Agency Comments Submitted to the SCTRWPG Regarding the IPP**

| No. | Commenter Type | Commenter | Date Received |
|---|---|---|---|
| 1 | Public | Aqua WSC | 5/21/2025 |
| 2 | Public | Canyon Regional Water Authority (CRWA) | 7/18/2025 |
| 3 | Public (Gonzales County) | Ted Boriack | 5/22/2025 |
| 4 | Public (Gonzales County) | T Carroll | 7/11/2025 |
| 5 | Public (Gonzales County) | Anonymous | 7/12/2025 |
| 6 | Public (Gonzales County) | Lori Benes | 7/15/2025 |
| 7 | Public (Gonzales County) | Deidra D. Voigt | 7/15/2025 |
| 8 | Public (Gonzales County) | Michael Oakes | 7/17/2025 |
| 9 | Public (Gonzales County) | Jeanette Soefje | 7/18/2025 |
| 10 | Public (Gonzales County) | Mary Ann Menning | 7/19/2025 |
| 11 | Public (Gonzales County) | Ted Boriack | 7/20/2025 |

| No. | Commenter Type | Commenter | Date Received |
|---|---|---|---|
| 12 | Public (Gonzales County) | Nancy Foster | 7/20/2025 |
| 13 | Public (Gonzales County) | Jim Holster | 7/20/2025 |
| 14 | Public | Francis Comeaux | 5/13/2025 |
| 15 | Public | Francis Comeaux | 5/27/2025 |
| 16 | Public | Milan J. Michalec | 7/20/2025 |
| 17 | Agency | Marty Kelly, Water Resources Program Coordinator at the TPWD | 7/20/2025 |

Subsequent sections provide summaries of these comments and SCTRWPG responses. If applicable, the SCTRWPG's response describes revisions made to the final 2026 RWP to address the comment.

## 10C.2 Aqua Water Supply Corporation

Emily O'Leary, Manager of Engineering at Aqua Water Supply Corporation (WSC), submitted a comment letter to Region L on May 21, 2025. The letter informs the RWPG that Polonia WSC has merged with Aqua WSC; requests an update to the potential emergency interconnects table (Table 7B-2); and requests an update to the Potentially Feasible WMS table (Appendix 5B).

**SCTRWPG Response to Comment(s):**

1. The Water User Group (WUG) list for the 2026 South Central Texas Regional Water Plan was finalized at the May 5, 2022, meeting and submitted to the TWDB on July 28, 2022. This information and other WUG name revisions will be updated in the 2031 cycle. The SCTRWPG acknowledges the comment and recommends no changes to the 2026 RWP.
2. In response to your comment, Table 7B-2 in Appendix 7B has been updated to indicate that the potential emergency interconnection should be with Hays County-Other (Aqua Texas).
3. The SCTRWPG identified potentially feasible WMSs in late 2023 and early 2024, forming the basis for the Task 5B Scope of Work and associated funding. Adding a new WMS, such as large-scale marine seawater or brackish groundwater development, would require SCTRWPG approval and subsequent evaluation of the strategy for inclusion in the plan, which is not feasible at this stage of the planning process. However, in response to your comment, a footnote has been added to the table of Potentially Feasible WMSs (Appendix 5B) stating that Region K evaluated and recommended one or more brackish groundwater development strategies that would benefit Aqua WSC.

## 10C.3 Canyon Regional Water Authority

Chelsea Hawkins, Water Resources Manager at CRWA submitted a comment letter to Region L on July 18, 2025. The letter included the following requests:

1. Correct Modeled Available Groundwater (MAG)-constrained yields in the Wells Ranch (Phase 3) WMS.
2. Update cost estimates using sponsor-supplied data for the Wells Ranch (Phase 3) WMS.
3. Revise customer allocations for the Wells Ranch (Phase 3) WMS, as follows:
    a. Remove three customers: Converse; Marion; and Martindale WSC.
    b. Add five customers: County Line SUD [1]; East Central SUD; Green Valley SUD; Maxwell SUD; and Springs Hill WSC.
4. Revise Major Water Providers (MWPs) definition and identify CRWA as a MWP.

**SCTRWPG Response to Comment(s):**

1. In response to your comment, the 2026 RWP has been revised to update the MAG-constrained yields for the Wells Ranch (Phase 3) WMS and to ensure consistency between the RWP and DB27.

2-3. The SCTRWPG required all project sponsors submit new project requests and provide project details by established deadlines to allow sufficient time for review and evaluation of WMSs. The deadline for submitting external cost estimates and customer allocation changes was September 2, 2024. Since the information was submitted after this deadline, the SCTRWPG acknowledges the comment and recommends no changes to the 2026 RWP at this time.

4. MWPs are defined as a WUG or WWP of particular significance to the region's water supply, as determined by the RWPG. The SCTRWPG reviewed and considered multiple options for defining MWPs at its August 1, 2024, meeting and voted to adopt a MWP definition as any WUG or WWP with 2080 demands greater than 30,000 acre-feet per year (acft/yr). CRWA does not meet the current criteria for MWP designation because the WWP has contract demands of ~21,000 acft/yr in 2080. The SCTRWPG recognizes the importance of CRWA's role in regional water supply and will revisit the MWP definition in the next planning cycle. Stakeholder input, including from CRWA, will be considered during that process to ensure the definition reflects evolving regional needs.

## 10C.4 Public Comments Related to Gonzales County

Ten individuals submitted 11 comments opposing proposed groundwater projects involving the Carrizo-Wilcox Aquifer in Gonzales County. They expressed concerns about over-permitting, potential water quality degradation from Aquifer Storage and Recovery (ASR), and the lack of direct representation for Gonzales County on the SCTRWPG.

[1] Note: CRWA communicated to the SCTRWPG on August 21, 2025, that they were no longer requesting County Line SUD to be included in the requested addition of customers.

**SCTRWPG Response to Comment(s):**

Thank you for sharing your concerns; the SCTRWPG appreciates stakeholder engagement and encourages continued involvement in regional water planning efforts. The SCTRWPG acknowledges the comments and recommends no changes to the 2026 RWP at this time. The following provides additional information and resources in response to your comments.

1. Groundwater management and permitting authority resides with local GCDs. In Gonzales County, the Gonzales County Underground Water Conservation District (GCUWCD) regulates groundwater through permitting processes; all permitting comments may be directed to them.
2. ASR projects are subject to review and regulatory oversight by local and state agencies to ensure that stored water does not compromise the integrity of or adversely affect water quality in an aquifer.
3. Gonzales County is represented in the SCTRWPG through at-large members who serve the entire region, as well as through interest categories like the Public, Environment, Counties, and others. Specifically, Gonzales County has direct representation via its Groundwater Management Area (GMA 13), which ensures local groundwater interests are included in the planning process.

## 10C.5 Francis Comeaux

Mr. Comeaux submitted two public comments dated May 13, 2025, and May 27, 2025. The following summarizes those comments and provides the SCTRWPG's responses.

### 10C.5.1 May 13, 2025, Comments

Mr. Comeaux requested that the Executive Summary be revised to include the following columns or information in tables:

1. List of affected water district(s)
2. Project Start Date, or if already started, % complete
3. Target Date for water availability, near completion date
4. Project acre-ft/year

**SCTRWPG's Response to Comment(s):**

The Executive Summary meets TWDB requirements for content and the 30-page limit, as outlined in Exhibit C, Section 1.4. Given space constraints and that the information is already included in the 2026 RWP, the SCTRWPG acknowledges the comment and recommends no changes at this time.

Additionally, the TWDB's Interactive State Water Plan provides a useful resource for reviewing, compiling, and comparing WUGs, WMSs, and associated projects. The Interactive State Water Plan is available at: https://2027.texasstatewaterplan.org/.

### 10C.5.2 May 27, 2025, Comments

Mr. Comeaux's May 27th comment letter included several comments, summarized as follows:

1. Revisions to the Executive Summary, including adding voting member affiliations and additional data summaries;
2. Clarification as to existing supply data differences between Chapter 3 and Appendix 3A for Canyon Lake Water Service (Texas Water Company);
3. Clarification of volumes of water allocated to customers for the GBRA WaterSECURE WMS
4. Revisions to Table 5.1-2 regarding WMSs for WUGs
5. Revisions to Table 9-1 regarding hydrologic assumptions

**SCTRWPG Response to Comment(s):**

1. Composition of the SCTRWPG follows all applicable statutes, TWDB rules, SCTRWPG bylaws, and the SCTRWPG's Guiding Principles. While each county commissioners court is not individually represented on the SCTRWPG, Counties as a whole are represented through designated interest categories, and all members are responsible for considering the needs of the entire region. In response to your comment, voting member affiliations have been added to Chapter 10 for reference.
2. The differences noted for Canyon Lake Water Service (Texas Water Company) between Chapter 3 and the DB27 reports in Appendix 3A are due to the WUG's service area spanning both the Guadalupe and San Antonio basins in Comal County. The table in your letter includes only the existing supplies in the Guadalupe basin, which accounts for the discrepancy. The SCTRWPG acknowledges the comment and recommends no changes at this time.
3. Canyon Lake Water Service (Texas Water Company) is shown in the RWP as purchasing 12,000 acft/yr from the GBRA WaterSECURE WMS. Yield allocation volumes are provided to the SCTRWPG by project sponsors and customers, and are typically based on agreements between the seller and purchaser, reflecting factors such as demand, infrastructure capacity, and other relevant considerations. The SCTRWPG acknowledges the comment and recommends no changes at this time.
4. Customer yield allocations are already included in the final, adopted RWP. Table 5.1-2 has not been modified, as it is meant to refer the reader to individual WMSs for additional information.
5. In response to your comment, Table 9-1, has been updated with bold text to visually highlight changes in hydrologic assumptions between the 2021 and 2026 RWPs.

## 10C.6 Milan J. Michalec

Mr. Michalec submitted a comment letter on July 20, 2025, that requested revision of the definitive statement that "Boerne will purchase water from GBRA's WaterSECURE Project" to instead state that "Boerne may purchase water from GBRA's WaterSECURE Project." Mr. Michalec raised similar concerns about definitive language used for purchases by Canyon Lake Water Service Company (Texas Water

Company), County Line SUD, and Goforth SUD. He recommended verifying written commitments from these entities and revising the language accordingly until formal participation is confirmed.

**SCTRWPG Response to Comment(s):**

Boerne has separately requested removal of the water purchase from the GBRA WaterSECURE project, resulting in changes to Chapters 5 and 6.

Yield allocation volumes are provided to the SCTRWPG by project sponsors and customers, and are typically based on agreements between the seller and the purchaser, reflecting factors such as demand, infrastructure capacity, and other relevant considerations. The SCTRWPG verifies the sale with the applicable customers and sellers that they wish for the purchase and sale to be shown in the RWP. Therefore, the SCTRWPG acknowledges the comments and recommends no changes at this time.

## 10C.7 Texas Parks and Wildlife Department

Staff from TPWD participate as an ex officio member on each RWPG. TPWD staff reviewed the Region L 2026 IPP and provided written comments in a letter dated July 20, 2025. TPWD's review focused on the IPP's treatment of environmental water needs, habitat impacts, species of concern, invasive species, and consistency with applicable planning rules.

TPWD commended Region L for its strong emphasis on water conservation, reuse, and drought contingency planning, and for designating five stream segments as ecologically unique. The department raised concerns about increased groundwater development and new surface water appropriations and their potential adverse impacts on small springs, groundwater-surface water interactions, and instream flows and freshwater inflows.

The TPWD included several recommendations to project sponsors:

- To address concerns about declining freshwater mussel populations, coordinate with TPWD to develop plans to avoid impacts to aquatic resources or relocate aquatic resources outside of a project area.
- To prevent the transmission of invasive species, avoid transporting water from affected water bodies or enact mitigative measures to prevent transfer of invasive species.

The TPWD recommended the following to the SCTRWPG regarding the IPP:

1. Update tables in Chapter 5 and Appendix 5D with the most-recent lists of federal and state listed species and Species of Greatest Conservation Need (TPWD updated the state lists in January 2025).
2. For any WMSs that involve the transfer of surface water, address the threat of the spread of invasive exotic species and their potential negative environmental impacts.
3. Include additional language regarding invasive species, such as identification of infested water bodies and inclusion of mitigation measures to prevent the spread of invasive species through water transfers.

**SCTRWPG Response to Comment(s):**

1. The evaluations of environmental factors for WMSs, as presented in Chapter 5, Appendix 5D, and Chapter 6 were conducted between June and November 2024 using the best available data at that time. As with previous planning cycles, we have maintained consistency by basing our assessments on the data current during the evaluation period. Because TPWD's updated species data was released after completion of these evaluations, the WMS evaluations and subsequent summaries in Appendix 5D and Chapter 6 have not been revised to reflect the lists updated by TPWD in January 2025. The SCTRWPG remains committed to incorporating the most current TPWD lists available for WMS evaluations in the next cycle, anticipated to start in late 2028 through 2029.

   It is also important to note that individual project sponsors will conduct more detailed environmental reviews during the feasibility, design, permitting, funding, and implementation phases of each project. Their reviews will incorporate the most current data and regulatory guidance available at that time.

2. The 2026 RWP does not include any WMSs that involve the transfer of surface water to another water body. As such, WMS evaluations have not been revised to specifically address the threat of invasive species in that context. However, Section 6.1.4.1 of Chapter 6 includes extensive narrative on invasive species, recognizing their potential ecological and economic impacts and the importance of monitoring and mitigation.

3. The 2026 RWP has not been revised to include this additional language, as there is already an extensive narrative in Chapter 6. For example, the 2026 RWP includes the following language in Section 6.1.4.1:

   > The zebra mussel was confirmed within Lake Texoma in April 2009 and has since spread south to other parts of Texas. The species was first detected in Lake Belton in 2013 and has continued its steady progression south. TPWD indicates 21 Texas lakes are classified as infested (established, reproducing populations); including Canyon Lake in Comal County. TPWD currently identifies zebra mussel positive lakes (adults or larvae are detected) at nine locations, including Lakes Dunlap, McQueeney, and Placid in Guadalupe County. TPWD maintains a regularly updated webpage with map showing lakes with positive zebra mussel identifications and maps, located at https://tpwd.texas.gov/huntwild/wild/species/exotic/zebramusselmap.phtml.