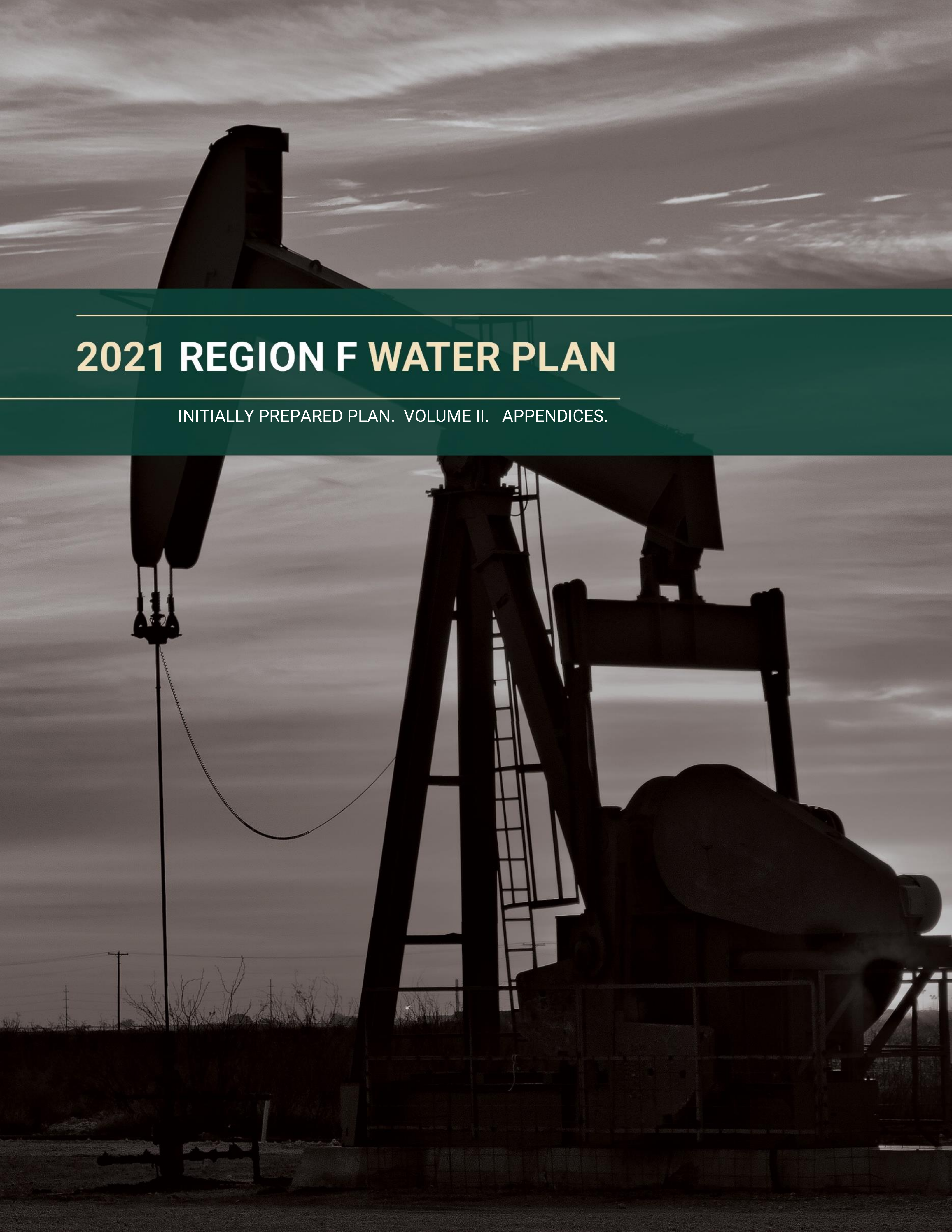
2021 REGION F WATER PLAN

INITIALLY PREPARED PLAN. VOLUME II. APPENDICES.



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APPENDIX A
CONSISTENCY MATRIX

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
Guidance Principles				
31 TAC §358.3				
358.3 (1)	The state water plan shall provide for the preparation for and response to drought conditions.	Yes	Chapters 2, 3, 5, 7	
(2)	The RWP and SWP shall serve as water supply plans under drought of record conditions.	Yes	See above	
(3)	Consideration shall be given to the construction and improvement of surface water resources and the application of principles that result in voluntary redistribution of water resources.	Yes	Chapter 5	
(4)	RWP shall provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions so that sufficient water will be available at a reasonable cost to satisfy a reasonable projected use of water to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the affected regional water planning areas and the state.	Yes	Chapters 5, 6 and 7, Appendices C and D	
(5)	RWP shall include identification of those policies and action that may be needed to meet Texas' water supply needs and prepare for and respond to drought conditions.	Yes	Chapters 5, 7 and 8	
(6)	RWPG decision-making shall be open to and accountable to the public with decisions based on accurate, objective and reliable information with full dissemination of planning results except for those matters made confidential by law.	Yes	Chapter 10	
(7)	The RWPG shall establish terms of participation in water planning efforts that shall be equitable and shall not unduly hinder participation.	Yes	Chapter 10	
(8)	Consideration of the effect of policies or water management strategies on the public interest of the state, water supply, and those entities involved in providing this supply throughout the entire state.	Yes	Chapters 5 and 8	
(9)	Consideration of all water management strategies the regional water plan determines to be potentially feasible when developing plans to meet future water needs and to respond to drought so that cost effective water management strategies which are consistent with long-term protection of the state's water resources, agricultural resources, and natural resources are considered and approved.	Yes	Chapters 5 and 6	
(10)	Consideration of opportunities that encourage and result in voluntary transfers of water resources, including but not limited to regional water banks, sales, leases, options, subordination agreements, and financing agreements.	Yes	Chapter 5	
(11)	Consideration of a balance of economic, social, aesthetic, and ecological viability.	Yes	Chapter 5 and Appendix E	
(12)	For regional water planning areas without approved regional water plans or water providers for which revised plans are not developed through the regional water planning process, the use of information from the adopted state water plan and other completed studies that are sufficient for water planning shall represent the water supply plan for that area or water provider.	NA		
(13)	All surface waters are held in trust by the state, their use is subject to rights granted and administered by the Commission, and the use of surface water is governed by the prior appropriation doctrine, unless adjudicated otherwise.	Yes	Chapter 3 and Appendix B	
(14)	Existing water rights, water contracts, and option agreements shall be protected. However, potential amendments of water rights, contracts and agreements may be considered and evaluated. Any amendments will require the eventual consent of the owner.	Yes	Chapters 3 and 5	
(15)	The production and use of groundwater in Texas is governed by the rule of capture doctrine unless and to the extent that such production and use is regulated by a groundwater conservation district as codified by the legislature at Texas Water Code §36.002 (relating to Ownership of Groundwater).	Yes	Chapter 3	§36.002
(16)	Consideration of recommendations of river and stream segments of unique ecological value to the legislature for potential protection.	Yes	Chapter 8	
(17)	Consideration of recommendation of sites of unique value for the construction of reservoirs to the legislature for potential protection.	Yes	Chapter 8	
(18)	Consideration of water planning and management activities of local, regional, state, and federal agencies, along with existing local, regional, and state water plans and information and existing state and federal programs and goals.	Yes	Chapters 1 and 5	
(19)	Designated water quality and related water uses as shown in the state water quality management plan shall be improved or maintained.	Yes	Chapter 6	
(20)	Coordination of water planning and management activities of RWPGs to identify common needs and issues and achieve efficient use of water supplies, including the Board and other relevant RWPGs, working together to identify common needs, issues, and challenges while working together to resolve conflicts in a fair, equitable, and efficient manner.	Yes	Entire RWP	
(21)	The water management strategies identified in approved RWPs to meet needs shall be described in sufficient detail to allow a state agency making a financial or regulatory decision to determine if a proposed action before the state agency is consistent with an approved RWP.	Yes	Chapter 5, Appendices C and D	

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(22)	The evaluation of water management strategies shall use environmental information in accordance with the Commission's adopted environmental flow standards under 30 TAC Chapter 298 (relating to Environmental Flow Standards for Surface Water) where applicable or, in basins where standards are not available or have not been adopted, information from existing site-specific studies or state consensus environmental planning criteria.	NA	No new appropriations are recommended	30 TAC Chapter 298
(23)	Consideration of environmental water needs including instream flows and bay and estuary inflows, including adjustments by the RWPGs to water management strategies to provide for environmental water needs including instream flows and bay and estuary needs. Consideration shall be consistent with the Commission's adopted environmental flow standards under 30 TAC Chapter 298 in basins where standards have been adopted.	NA	No new appropations are recommended. Existing instream requalations considered	30 TAC Chapter 298
(24)	Planning shall be consistent with all laws applicable to water use for the state and regional water planning area.	Yes	Entire RWP	
(25)	The inclusion of ongoing water development projects that have been permitted by the Commission or a predecessor agency.	NA	None in Region F	
(26)	Specific recommendations of water management strategies shall be based upon identification, analysis, and comparison of all water management strategies the RWPG determines to be potentially feasible so that the cost effective water management strategies which are environmentally sensitive are considered and adopted unless the RWPG demonstrates that adoption of such strategies is not appropriate. To determine cost-effectiveness, the RWPGs will use the process describedin §357.34(d)(3)(A) of this title (relating to Identificationand Evaluation of Potentially Feasible Water Management Strategies)and, to determine environmental sensitivity, the RWPGs shall use theprocess described in §357.34(d)(3)(B) of this title.	Yes	Chapter 5, and Appendix E	§357.34(d)(3)(A) §357.34(d)(3)(B)
(27)	RWPGs shall conduct their planning to achieve efficient use of existing water supplies, explore opportunities for and the benefits of developing regional water supply facilities or providing regional management of water facilities, coordinate the actions of local and regional water resource management agencies, provide substantial involvement by the public in the decision-making process, and provide full dissemination of planning results.	Yes	Chapters 5 and 10	
(28)	RWPGs must consider existing regional water planning efforts when developing their plans.	Yes	Chapters 1 and 5	
Chapter One Description of the Regional Water Planning Area				
31 TAC §357.30				
	RWPGs shall describe their regional water planning area including the following:			
357.3 (1)	Social and economic aspects of a region such as information on current population, economic activity and economic sectors heavily dependent on water resources	Yes	Chapter 1	
(2)	Current water use and major water demand centers	Yes	Chapter 1	
(3)	Current groundwater, surface water, and reuse supplies including major springs that are important for water supply or protection of natural resources	Yes	Chapter 1	
(4)	Major water providers (MWP)	Yes	Chapter 1	
(5)	Agricultural and natural resources	Yes	Chapter 1	
(6)	Identified water quality problems	Yes	Chapter 1	
(7)	Identified threats to agricultural and natural resources due to water quantity problems or water quality problems related to water supply	Yes	Chapter 1	
(8)	Summary of existing local and regional water plans	Yes	Chapter 1	
(9)	The identified historic drought(s) of record within the planning area	Yes	Chapter 1 and Chapter 7	
(10)	Current preparations for drought within the RWPA	Yes	Chapter 1, Chapter 7, and regionfwater.org	
(11)	Information compiled by the Board from water loss audits	Yes	Chapter 1	§358.6
(12)	An identification of each threat to agricultural and natural resources and a discussion of how that threat will be addressed or affected by the water management strategies evaluated in the plan.		Chapter 1 and Chapter 6	
Chapter Two Projected Non-Municipal, Municipal and Population Water Demands				
31 TAC §357.31				
357.31 (a)	RWPs shall present projected population and Water Demands by WUG as defined in §357.10 of this title (relatingto Definitions and Acronyms). If a WUG lies in one or more countiesor RWPA or river basins, data shall be reported for each river basin,RWPA, and county split.	Yes	Appendix I	§357.10
(b)	RWPs shall present projected Water Demands associated with MWPs by category of water use, including municipal, manufacturing, irrigation, steam electric power generation, mining, and livestockfor the RWPA.	Yes	Attachment 2A	

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
(c)	RWPs shall evaluate the current contractual obligations of WUGs and WWPs to supply water in addition to any demands projectedfor the WUG or WWP. Information regarding obligations to supply water to other users must also be incorporated into the water supply analysis in §357.32 of this title (relating to Water Supply Analysis)in order to determine net existing water supplies available for each WUG's own use. The evaluation of contractual obligations under thissubsection is limited to determining the amount of water secured bythe contract and the duration of the contract.	Yes	Chapter 2	§357.32
(d)	Municipal demands shall be adjusted to reflect water savings due to plumbing fixture requirements identified in theTexas Health and Safety Code, Chapter 372. RWPGs shall report how changes in plumbing fixtures would affect projected municipal Water Demands using projections with plumbing code savings provided by the Board or by methods approved by the EA.	Yes	Chapter 2, Appendix I	Texas Health and Safety Code, Chapter 372
(e)	Source of population and Water Demands. In developing RWPs, RWPGs shall use:			
(e) (1)	Population and water demand projections developed by the EA that will be contained in the next state water plan and adopted by the Board after consultation with the RWPGs, Commission, Texas Department of Agriculture, and the Texas Parks and Wildlife Department.	Yes	Chapter 2	
(e) (2)	RWPGs may request revisions of Board adopted populationor Water Demand projections if the request demonstrates that population or Water Demand projections no longer represents a reasonable estimate of anticipated conditions based on changed conditions and or new information. Before requesting a revision to population and Water Demand projections, the RWPG shall discuss the proposed revisions at a public meeting for which notice has been posted in accordance with §357.21(c) of this title (relating to Notice and Public Participation). The RWPG shall summarize public comments received on the proposed request for projection revisions. The EA shall consult with the requesting RWPG and respond to their request within 45 days after receipt of a request from an RWPG for revision of population or Water Demand projections.	Yes	Chapter 2 Adjustments to population projections were made to six cities and water demand adjustments were made to municipal and agricultural users due to prolonged extreme drought	§357.21(c)
(f)	Population and Water Demand projections shall bepresented for each Planning Decade for WUGs and MWPs.	Yes	Chapter 2, Attachment 2A	
Chapter Three Water Supply Analysis				
31 TAC §357.32				
357.32 (a)	RWPGs shall evaluate:			
(a) (1)	Source water availability during drought of record conditions.	Yes	Chapter 3	
(a) (2)	Existing water supplies that are legally and physically available to WUGs and wholesale water suppliers within the RWPA for use during the drought of record.	Yes	Chapter 3	
(b)	Consider surface water and groundwater data from the state water plan, existing water rights, contracts and option agreements relating to water rights, other planning and water supply studies, and analysis of water supplies existing in and available to the RWPA during drought of record conditions	Yes	Chapter 3	
(c)	Evaluation of the existing surface water available during drought of record shall be based on firm yield. The analysis may be based on justified operational procedures other than firm yield.	Yes	Chapter 3 and Appendix B	
(d)	Use modeled available groundwater volumes for groundwater availability, as issued by the Board, and incorporate such information in its RWP unless no modeled available groundwater volumes are provided.	Yes	Chapter 3	
(e)	Evaluate the existing water supplies for each WUG and WWP	Yes	Chapter 3	
(f)	Water supplies based on contracted agreements will be based on the terms of the contract, which may be assumed to renew upon contract termination if the contract contemplates renewal or extensions.	Yes	Chapter 3	
(g)	Evaluation results shall be reported by WUG in accordance with §357.31(a) of this title (relating to Projected Population and Water Demands) and WWPs in accordance with §357.31(b) of this title	Yes	Chapter 2, Chapter 3, Appendix I	§357.31(a) §357.31(b)
Chapter Four Identification of Water Needs				
31 TAC §357.33				
357.33 (a)	RWPs shall include comparisons of existing water supplies and projected Water Demands to identify Water Needs.	Yes	Chapter 4	
(b)	RWPGs shall compare projected Water Demands, developed in accordance with §357.31 of this title (relating to Projected Population and Water Demands), with existing water supplies available to WUGs and WWPs in a planning area, as developed in accordance with §357.32 of this title (relating to Water Supply Analysis), to determine whether WUGs will experience water surpluses or needs for additional supplies. Results shall be reported for WUGs by categories of use including municipal, manufacturing, irrigation, steam electric, mining, and livestock watering for each county or portion of a county in an RWPA. Results shall be reported for MWPs by categories of use including municipal, manufacturing, irrigation, steam electric, mining, and livestock watering for the RWPA.	Yes	Chapter 4, and Attachment 4B	§357.31 §357.32
(c)	The social and economic impacts of not meeting water needs will be evaluated by RWPGs and reported for each RWPA.	Yes	Chapter 6 and Appendix H	
(d)	Results of evaluations will be reported by WUG in accordance with §357.31(a) of this title and MWPs in accordance with §357.31(b) of this title.	Yes	Attachment 4A and 4B, Appendix I	§357.31(a) §357.31(b)

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(e)	RWPGs shall perform a secondary water needs analysisfor all WUGs and WWPs for which conservation WMSs or direct Reuse WMSs are recommended. This secondary water needs analysis shall calculate the Water Needs that would remain after assuming all recommended conservation and direct Reuse WMSs are fully implemented. The resulting secondarywater needs volumes shall be presented in the RWP by WUG and MWP and decade.	Yes	Chapter 4, Attachment 4A and 4B, Appendix I	
Chapter Five Identification and Evaluation of Potentially Feasible Water Management Strategies				
31 TAC §357.34				
357.34 (a)	RWPGs shall identify and evaluate potentially feasible WMSs and the WMSPs required to implement those strategies for all WUGs and WWPs with identified Water Needs.	Yes	Chapter 5	
(b)	RWPGs shall identify potentially feasible WMSs to meet water supply needs identified in §357.33 of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands)in accordance with the process in §357.12(b) of this title (relating to General Regional Water Planning Group Responsibilities and Procedures). Strategies shall be developed for WUGs and WWPs. The strategies shall meet new water supply obligations necessary to implement recommended WMSs of WWPs and WUGs. RWPGs shall plan for water supply during Drought of Record conditions. In developing RWPs, RWPGs shall provide WMSs to be used during a Drought of Record.	Yes	Subchapter 5A	§357.33 §357.12(b)
(c)	Potential Feasible Water Management Strategies should include, but are not limited to:			
(c) (1)	Expanded use of existing supplies including system optimization and conjunctive use of water resources, reallocation of reservoir storage to new uses, voluntary redistribution of water resources including contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements, subordination of existing water rights through voluntary agreements, enhancements of yields of existing sources, and improvement of water quality including control of naturally occurring chlorides.	Yes	Subchapters 5A.1.4 and 5C (Subordination) - Reallocation of reservoir storage is extremely limited in Region F. Due to limited supply, this strategy was not considered for Region F.	
(c) (2)	New supply development including construction and improvement of surface water and groundwater resources, brush control, precipitation enhancement, seawater desalination, brackish groundwater desalination, water supply that could be made available by cancellation of water rights based on data provided by the Commission, rainwater harvesting, and aquifer storage and recovery.	Yes	Subchapters 5A.1.5, 5A1.6 (Precipitation Enhancement), and 5C (Brush Control)- RWPG did not consider water right cancellation to be a feasible strategy for Region F.	
(c) (3)	Conservation and drought management measures including demand management.	Yes	Subchapters 5A1.1, 5B and Chapter 7	
(c) (4)	Reuse of wastewater.	Yes	Subchapter 5A.1.2	
(c) (5)	Interbasin transfers of surface water.	NA	There are no new interbasin strategies for Region F	
(c) (6)	Emergency transfers of surface water including a determination of the part of each water right for non-municipal use in the RWPA that may be transferred without causing unreasonable damage to the property of the non-municipal water rights holder in accordance with Texas Water Code §11.139 (relating to Emergency Authorizations).	Yes	Chapter 7	§11.139
(d)	All recommended WMSs and WMSPs that are entered into the State Water Planning Database and prioritized by RWPGs shall be designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one planning decade such that additional water is available during Drought of Record conditions. Any other RWPG recommendations regarding permit modifications, operational changes, and/or other infrastructure that are not designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one Planning Decade such that additional water is available during Drought of Record conditions shall be indicated as such and presented separately in the RWP and shall not be eligible for funding from the State Water Implementation Fund for Texas.	Yes	Chapter 5	
(e)	Evaluations of potentially feasible WMSs and associated WMSPs shall include the following analyses:			
(e) (1)	For the purpose of evaluating potentially feasible WMSs, the Commission's most current Water Availability Model with assumptions of no return flows and full utilization of senior water rights, is to be used. Alternative assumptions may be used with written approval from the EA who shall consider a written request from an RWPG to use assumptions other than no return flows and full utilization of senior water rights.	Yes	Appendix B	
(e) (2)	An equitable comparison between and consistent evaluation and application of all water management strategies the RWPGs determine to be potentially feasible for each water supply need.	Yes	Subchapter 5D, 5E and Attachment 5A	
(e) (3) (A)	A quantitative reporting of the net quantity, reliability, and cost of water delivered and treated for the end user's requirements during drought of record conditions, taking into account and reporting anticipated strategy water losses, incorporating factors used calculating infrastructure debt payments and may include present costs and discounted present value costs. Costs do not include distribution of water within a WUG after treatment.	Yes	Subchapters 5B, 5C, 5D, 5E, Appendices C, D, and E	

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(e) (3) (B)	A quantitative reporting of the environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico. Evaluations of effects on environmental flows shall include consideration of the Commission's adopted environmental flow standards under 30 Texas AdministrativeCode Chapter 298 (relating to Environmental Flow Standards for Surface Water). If environmental flow standards have not been established, then environmental information from existing site-specific studies, or in the absence of such information, state environmental planning criteria adopted by the Board for inclusion in the State Water Plan after coordinating with staff of the Commission and the Texas Parks and Wildlife Department to ensure that WMSs are adjusted to provide for environmental water needs including instream flows and bays and estuaries inflows.	Yes	Appendix E	30 TAC Chapter 298
(e) (3) (C)	A quantitative reporting of the impacts to agricultural resources.	Yes	Appendix E	
(e) (4)	Discussion of the plan's impact on other water resources of the state including other water management strategies and groundwater and surface water interrelationships.	Yes	Chapter 6 and Appendix C	
(e) (5)	Discussion of each threat to agricultural or natural resources identified pursuant to §357.30(7) of this title (relating to Description of the Regional Water Planning Area) including how that threat will be addressed or affected by the water management strategies evaluated	Yes	Chapter 6 and Appendix C	§357.30(7)
(e) (6)	If applicable, consideration and discussion of the provisions in Texas Water Code §11.085(k)(1) for interbasin transfers of surface water. At minimum, this consideration will include a summation of water needs in the basin of origin and in the receiving basin.	NA	There are no new interbasin strategies for Region F	§11.085(k)(1)
(e) (7)	Consideration of third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas.	Yes	Chapter 6 and Appendix E	
(e) (8)	A description of the major impacts of recommended water management strategies on key parameters of water quality identified by RWPGs as important to the use of a water resource and comparing conditions with the recommended water management strategies to current conditions using best available data.	Yes	Chapter 6 and Appendix C	
(e) (9)	Consideration of water pipelines and other facilities that are currently used for water conveyance as described in §357.22(a)(3) of this title (relating to General Considerations for Development of Regional Water Plans).	Yes	Chapter 7, Appendices C and D	§357.22(a)(3)
(e) (10)	Other factors as deemed relevant by the RWPG including recreational impacts.	Yes	Appendix C	
(f)	RWPGs shall evaluate and present potentially feasible WMSs and WMSPs with sufficient specificity to allow state agenciesto make financial or regulatory decisions to determine consistency of the proposed action before the state agency with an approved RWP.	Yes	Chapter 5 and Appendix D	
(g)	Conservation, Drought Management Measures, and Drought Contingency Plans shall be considered by RWPGs when developing the regional plans, particularly during the process of identifying, evaluating, and recommending water management strategies. RWPs shall incorporate water conservation planning and drought contingency planning in the regional water planning area.	Yes	Chapter 5 and 7	
(g) (1)	Drought management measures including water demand management. RWPGs shall consider drought management measures for each need identified in §357.33 of this title and shall include such measures for each user group to which Texas Water Code §11.1272 (relating to Drought Contingency Plans for Certain Applicants and Water Right Holders) applies. Impacts of the drought management measures on water needs must be consistent with guidance provided by the Commission in its administrative rules implementing Texas Water Code §11.1272. If a RWPG does not adopt a drought management strategy for a need it must document the reason in the RWP. Nothing in this paragraph shall be construed as limiting the use of voluntary arrangements by water users to forgo water usage during drought periods.	Yes	Chapter 7 and Subchapter 5A - Drought management considered for all uses with needs but not recommended	§357.33 §11.1272
(g) (2)	Water conservation practices. RWPGs must consider water conservation practices, including potentially applicable best management practices, for each identified Water Need.	Yes	Subchapter 5B and Appendix C	
(g) (2) (A)	RWPGs shall include water conservation practices for each user group to which Texas Water Code §11.1271 and §13.146 (relating to Water Conservation Plans) apply. The impact of these water conservation practices on Water Needs must be consistent with requirements in appropriate Commission administrative rules related to Texas Water Code §11.1271 and §13.146.	Yes	Subchapter 5B and Appendix C	§11.1271 §13.146
(g) (2) (B)	RWPGs shall consider water conservation practices for each WUG beyond the minimum requirements of subparagraph (A) of this paragraph, whether or not the WUG is subject to Texas Water Code §11.1271 and §13.146. If RWPGs do not adopt a water conservation strategy to meet an identified need, they shall document the reason in the RWP.	Yes	Subchapters 5B, 5D, 5E and Appendix C	§11.1271 §13.146

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(g) (2) (C)	For each WUG or WWP that is to obtain water froma proposed interbasin transfer to which Texas Water Code §11.085 (relating to Interbasin Transfers) applies, RWPGs shall include a Water Conservation Strategy, pursuant to Texas Water Code §11.085(l), that will result in the highest practicable level of water conservation and efficiency achievable. For these strategies, RWPGs shall determine and report projected water use savings in gallons per capita per day based on its determination of the highest practicable level of water conservation and efficiency achievable. RWPGs shall develop conservation strategies based on this determination. In preparing this evaluation, RWPGs shall seek the input of WUGs and WWPs as to what is the highest practicable level of conservation and efficiency achievable, in their opinion, and take that input into consideration. RWPGs shall develop water conservation strategies consistent with guidance provided by the Commission in its administrative rules that implement Texas Water Code §11.085. When developing water conservation strategies, the RWPGs must consider potentially applicable best management practices. Strategy evaluation in accordance with this section shall include a quantitative description of the quantity, cost, and reliability of the water estimated to be conserved under the highest practicable level of water conservation and efficiency achievable.	NA	There are no new interbasin strategies for Region F	§11.085
(g) (2) (D)	RWPGs shall consider strategies to address any issues identified in the information compiled by the Board from the water loss audits performed by retail public utilities pursuant to §358.6 of this title (relating to Water Loss Audits).	Yes	Subchapter 5B and Appendix C	§358.6
(h)	RWPs shall include a subchapter consolidating the RWPG's recommendations regarding water conservation. RWPGs shall include in the RWPs model water conservation plans pursuant to Texas Water Code §11.1271	Yes	Subchapter 5B	§11.1271
31 TAC §357.35				
357.35 (a)	RWPGs shall recommend WMSs and the WMSPs required to implement those WMSs to be used during a Drought of Record based on the potentially feasible WMSs evaluated under §357.34 of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies and Water Management Strategy Projects).	Yes	Chapter 5, Appendices C and D	§357.34
(b)	RWPGs shall recommend specific WMSs and WMSPs based upon the identification, analysis, and comparison of WMSs by the RWPG that the RWPG determines are potentially feasible so that the cost effective WMSs that are environmentally sensitive are considered and adopted unless an RWPG demonstrates that adoption of such WMSs is inappropriate. To determine cost-effectiveness and environmental sensitivity,RWPGs shall follow processes described in §357.34 of this title. The RWP may include Alternative WMSs evaluated by the processes described in §357.34 of this title.	Yes	Chapter 5, Appendices C and D	§357.34
(c)	Strategies will be selected by the RWPGs so that cost effective water management strategies, which are consistent with long-term protection of the state's water resources, agricultural resources, and natural resources are adopted.	Yes	Chapter 5, Appendices C and D	
(d)	RWPGs shall identify and recommend WMSs for allWUGs and WWPs with identified Water Needs and that meet all WaterNeeds during the Drought of Record except in cases where:	Yes	Chapter 5, Appendices C and D	
(d) (1)	no WMS is feasible. In such cases, RWPGs must explain why no WMSs are feasible; or		Chapter 5	
(d) (2)	a Political Subdivision that provides water supply other than water supply corporations, counties, or river authorities explicitly does not participate in the regional water planning process for needs located within its boundaries or extraterritorial jurisdiction.	NA	No applicable subdivisions in Region F	
(e)	Specific recommendations of water management strategies to meet an identified need will not be shown as meeting a need for a political subdivision if the political subdivision in question objects to inclusion of the strategy for the political subdivision and specifies its reasons for such objection. This does not prevent the inclusion of the strategy to meet other needs.	Yes	Chapter 5, Appendices C and D	
(f)	Recommended strategies shall protect existing water rights, water contracts, and option agreements, but may consider potential amendments of water rights, contracts and agreements, which would require the eventual consent of the owner.	Yes	Chapter 5, Appendices C and D	
(g)	RWPGs shall report the following:			
(g) (1)	Recommended WMSs, recommended WMSPs, and the associated results of all the potentially feasible WMS evaluations by WUG and MWP. If a WUG lies in one or more counties or RWPAs or river basins,data shall be reported for each river basin, RWPA, and county.	Yes	Appendix I	
(g) (2)	Calculated planning management supply factors for each WUG and MWP included in the RWP assuming all recommended WMSs are implemented. This calculation shall be based on the sum of: the total existing water supplies, plus all water supplies from recommended WMSs for each entity; divided by that entity's total projected Water Demand, within the Planning Decade. The resulting calculated management supply factor shall be presented in the plan by entity and decade for every WUG and MWP. Calculating planning management supply factors is for reporting purposes only.	Yes	Appendix I	
(g) (3)	Fully evaluated Alternative WMSs and associated WMSPs included in the adopted RWP shall be presented together in one place in the RWP.	Yes	Appendix F	
Chapter Six Impacts of Regional Water Plan and Consistency with Protection of Water Resources, Agricultural Resources, and Natural Resources				
31 TAC §357.40				

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
357.40 (a)	RWPs shall include a quantitative description of the socioeconomic impacts of not meeting the identified Water Needs pursuant to §357.33(c) of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands).	Yes	Chapter 6 and Appendix H	§357.33(c)
(b)	RWPs shall include a description of the impacts of the RWP regarding:			
(b) (1)	Agricultural resources pursuant to §357.34(e)(3)(C) of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies);	Yes	Chapter 6 and Appendix C	§357.34(d)(3)(C)
(b) (2)	Other water resources of the state including other WMSs and groundwater and surface water interrelationships pursuant to §357.34(e)(4) of this title;	Yes	Chapter 6 and Appendix C	§357.34(d)(4)
(b) (3)	Threats to agricultural and natural resources identified pursuant to §357.34(e)(5) of this title;	Yes	Chapter 6 and Appendix C	§357.34(d)(5)
(b) (4)	Third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas pursuant to §357.34(e)(7) of this title;	Yes	Appendix E	§357.34(d)(7)
(b) (5)	Major impacts of recommended WMSs on key parameters of water quality pursuant to §357.34(e)(8) of this title; and	Yes	Chapter 6	§357.34(d)(8)
(b) (6)	Effects on navigation	Yes	Chapter 6 - The Region F Plan does not have an impact on navigation	
(c)	RWPs shall include a summary of the identified Water Needs that remain unmet by the RWP.	Yes	Chapter 6	
31 TAC §357.41				
357.41	RWPGs shall describe how RWPs are consistent with the long-term protection of the state's water resources, agricultural resources, and natural resources as embodied in the guidance principles in §358.3(4) and (8) of this title (relating to Guidance Principles).	Yes	Chapter 6	§358.3(4) and (8)
Chapter Seven Drought Response Information, Activities, and Recommendations				
31 TAC §357.42				
357.42 (a)	RWPs shall consolidate and present information on current and planned preparations for, and responses to, drought conditions in the region including, but not limited to, drought of record conditions based on the following subsections.	Yes	Chapter 7	
(b)	RWPGs shall conduct an overall assessment of current preparations for drought within the RWPA including a description of how water suppliers in the RWPA identify and respond to the onset of drought. This may include information from local drought contingency plans.	Yes	Chapter 7	
(c)	RWPGs shall develop drought response recommendations regarding the management of existing groundwater and surface water sources in the RWPA designated in accordance with §357.32 of this title (relating to Water Supply Analysis), including:			
(c) (1)	Factors specific to each source of water supply to be considered in determining whether to initiate a drought response for each water source including specific recommended drought response triggers	Yes	Chapter 7	§357.32
(c) (2)	Actions to be taken as part of the drought response by the manager of each water source and the entities relying on each source, including the number of drought stages; and	Yes	Chapter 7	§357.32
(c) (3)	Triggers and actions developed in paragraphs (1) and (2) of this subsection may consider existing triggers and actions associated with existing drought contingency plans.	Yes	Chapter 7	§357.32
(d)	RWPGs shall collect information on existing major water infrastructure facilities that may be used for interconnections in event of an emergency shortage of water. In accordance with Texas Water Code §16.053(r), this information is CONFIDENTIAL INFORMATION and cannot be disseminated to the public. The associated information is to be collected by a subgroup of RWPG members in a closed meeting and submitted separately to the EA in accordance with guidance to be provided by EA.	Yes	No confidential information received	Texas Water Code §16.053(r)
(e)	RWPGs shall provide general descriptions of local drought contingency plans that involve making emergency connections between water systems or WWP systems that do not include locations or descriptions of facilities that are disallowed under subsection (d) of this section.	Yes	Chapter 7	
(f)	RWPGs may designate recommended and alternative drought management water management strategies and other recommended drought measures in the RWP including:			
(f) (1)	List and description of the recommended drought management water management strategies and associated WUGs and WWPs, if any, that are recommended by the RWPG. Information to include associated triggers to initiate each of the recommended drought management water management strategies	NA	7.6 - Region F does not recommend specific drought management strategies. Region F recommends the implementation of drought contingency plans by suppliers when appropriate to reduce demand during drought and prolong current supplies.	
(f) (2)	List and description of alternative drought management water management strategies and associated WUGs and WWPs, if any, that are included in the plan. Information to include associated triggers to initiate each of the alternative drought management water management strategies	NA	No alternative drought management strategies were included in the Region F Plan	

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
(f) (3)	List of all potentially feasible drought management water management strategies that were considered or evaluated by the RWPG but not recommended; and	NA	Region F does not recommend specific drought management strategies.	
(f) (4)	List and summary of any other recommended drought management measures, if any, that are included in the RWP, including associated triggers if applicable	NA	Region F does not recommend specific drought management strategies.	
(g)	The RWPGs shall evaluate potential emergency responsesto local drought conditions or loss of existing water supplies; theevaluation shall include identification of potential alternative watersources that may be considered for temporary emergency use by WUGsand WWPs in the event that the Existing Water Supply sources becometemporarily unavailable to the WUGs and WWPs due to unforeseeablehydrologic conditions such as emergency water right curtailment, unanticipatedloss of reservoir conservation storage, or other localized droughtimpacts. RWPGs shall evaluate, at a minimum, municipal WUGs that:	Yes	Chapter 7	
(g) (1)	have existing populations less than 7,500;			
(g) (2)	rely on a sole source for its water supply regardless of whether the water is provided by a WWP; and			
(g) (3)	all County-Other WUGs.			
(h)	RWPGs shall consider any relevant recommendations from the Drought Preparedness Council.	Yes	Chapter 7	
(i)	RWPGs shall make drought preparation and response recommendations regarding:			
(i) (1)	Development of, content contained within, and implementation of local drought contingency plans required by the Commission	Yes	Chapter 7 and Appendix G	
(i) (2)	Current drought management preparations in the RWPA including:	Yes	Chapter 7 and Appendix G	
(i) (2) (A)	drought response triggers; and		Chapter 7 and Appendix G	
(i) (2) (B)	responses to drought conditions;		Chapter 7 and Appendix G	
(i) (3)	The Drought Preparedness Council and the State Drought Preparedness Plan; and	Yes	Chapter 7 and Appendix G	
(i) (4)	Any other general recommendations regarding drought management in the region or state	Yes	Chapter 7 and Appendix G	
(j)	The RWPGs shall develop region-specific model Drought Contingency Plans.	Yes	Chapter 7, regionfwater.org	
Chapter Eight Policy Recommendations and Unique Sites				
31 TAC §357.43				
357.43 (a)	The RWPs shall contain any regulatory, administrative, or legislative recommendations developed by the RWPGs	Yes	Chapter 8	
(b)	Ecologically Unique River and Stream Segments. RWPGs may include in adopted RWPs recommendations for all or parts of river and stream segments of unique ecological value located within the RWPA by preparing a recommendation package consisting of a physical description giving the location of the stream segment, maps, and photographs of the stream segment and a site characterization of the stream segment documented by supporting literature and data. The recommendation package shall address each of the criteria for designation of river and stream segments of ecological value found in this subsection. The RWPG shall forward the recommendation package to the Texas Parks and Wildlife Department and allow the Texas Parks and Wildlife Department 30 days for its written evaluation of the recommendation. The adopted RWP shall include, if available, Texas Parks and Wildlife Department's written evaluation of each river and stream segment recommended as a river or stream segment of unique ecological value.	NA	Chapter 8 - Region F WPG does not recommend the designation of any ecologically unique stream segments	
(b) (1)	An RWPG may recommend a river or stream segment as being of unique ecological value based upon the criteria set forth in §358.2 of this title (relating to Definitions)	NA	Chapter 8 - Region F WPG does not recommend the designation of any ecologically unique stream segments	§358.2
(b) (2)	For every river and stream segment that has been designated as a unique river or stream segment by the legislature, during a session that ends not less than one year before the required date of submittal of an adopted RWP to the Board, or recommended as a unique river or stream segment in the RWP, the RWPG shall assess the impact of the RWP on these segments. 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. The assessment shall also describe the impact of the plan on the unique features cited in the region's recommendation of that segment	NA	Chapter 8- Region F WPG does not recommend the designation of any ecologically unique river or stream segments	
(c)	Unique Sites for Reservoir Construction. An RWPG may recommend sites of unique value for construction of reservoirs by including descriptions of the sites, reasons for the unique designation and expected beneficiaries of the water supply to be developed at the site. The criteria at §358.2 of this title shall be used to determine if a site is unique for reservoir construction.	NA	Chapter 8 - Region F WPG does not recommend any unique sites for reservoir development	§358.2
(d)	Any other recommendations that the RWPG believes are needed and desirable to achieve the stated goals of state and regional water planning including to facilitate the orderly development, management, and conservation of water resources and prepare for and respond to drought conditions.	Yes	Chapter 8	
(e)	RWPGs may develop information as to the potential impacts of any proposed changes in law prior to or after changes are enacted.	Yes	Chapter 8	

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
(f)	RWPGs should consider making legislative recommendations to facilitate more voluntary water transfers in the region.	Yes	Chapter 8	
Chapter Nine Infrastructure Financing Analysis				
31 TAC §357.44				
357.44	RWPGs shall assess and quantitatively report on how individuallocal governments, regional authorities, and other Political Subdivisionsin their RWPA propose to finance recommended WMSs and associated WMSPs.The assessment shall also describe what role the RWPG proposes forthe state in financing recommended WMSs and associated WMSPs, includingproposed increases in the level of state participation in fundingfor regional projects to meet needs beyond the reasonable financingcapability of local governments, regional authorities, and other politicalsubdivisions involved in building water infrastructure.	Yes	Chapter 9 and Final Plan	
Chapter Ten Public Participation and Plan Adoption				
31 TAC §357.21				
357.21 (a)	Each RWPG and any committee or subcommittee of an RWPG are subject to Chapters 551 and 552, Government Code. A copy of all materials presented or discussed at an open meeting shall be made available for public inspection prior to and following the meetings and shall meet the additional notice requirements when specifically referenced as required under other subsections. In addition to the notice requirements of Chapter 551, Government Code, the following requirements apply to RWPGs.	Yes	Chapter 10	Texas Government Code Chapter 551
(b-e)	All public notices required by the TWDB by the RWPG shall comply with 31 TAC §357.21 and shall meet the requirements specified therein.	Yes	Chapter 10	
31 TAC §357.50				
357.50 (a)	Submit their adopted RWPs to the Board every five years on a date to be disseminated by the EA, as modified by subsection (~~e~~g)(2) of this section, for approval and inclusion in the state water plan.	Yes	The Region F Water Plan will be submitted to the EA accordingly	
(b)	Prior to the adoption of the RWP, the RWPGs shall submit concurrently to the EA and the public an IPP. The IPP submitted to the EA must be in the electronic and paper format specified by the EA. Each RWPG must certify that the IPP is complete and adopted by the RWPG. In the instance of a recommended WMS proposed to be supplied from a different RWPA, the RWPG recommending such strategy shall submit, concurrently with the submission of the IPP to the EA, a copy of the IPP, or a letter identifying the WMS in the other region along with an internet link to the IPP, to the RWPG associated with the location of such strategy.	Yes	Chapter 10	
(c)	The RWPGs shall distribute the IPP in accordancewith §357.21(d)(4) of this title (relating to Notice and Public Participation).	Yes	Chapter 10	
(d)	Within 60 days of the submission of IPPs to the EA, the RWPGs shall submit to the EA, and the other affected RWPG, in writing, the identification of potential Interregional Conflicts by:	NA	NA for IPP	
(d) (1)	identifying the specific recommended WMS from another RWPG's IPP;			
(d) (2)	providing a statement of why the RWPG considers there to be an Interregional Conflict; and			
(d) (3)	providing any other information available to the RWPG that is relevant to the Board's decision.			
(e)	The RWPGs shall seek to resolve conflicts with other RWPGs and shall promptly and actively participate in any Board sponsored efforts to resolve Interregional Conflicts.	Yes	The Region F Water Plan will be submitted to the EA accordingly	
(f)	The RWPGs shall solicit, and consider the following comments when adopting an RWP:	NA	There are no known interregional conflicts between RWPs.	
(f) (1)	the EA's written comments, which shall be provided to the RWPG within 120 days of receipt of the IPP;			
(f) (2)	written comments received from any federal agency or Texas state agency, which the RWPGs shall accept after the first public hearing notice is published pursuant to §357.21(d) of this title until at least 90 days after the public hearing is held pursuant to §357.21(d) of this title; and			
(f) (3)	any written or oral comments received from the public after the first public hearing notice is published pursuant to §357.21(d) of this title until at least 60 days after the public hearing is held pursuant to §357.21(d) of this title.			
(f) (4)	The RWPGs shall revise their IPPs to incorporate negotiated resolutions or Board resolutions of any Interregional Conflicts into their final adopted RWPs.			
(f) (5)	In the event that the Board has not resolved an Interregional Conflict sufficiently early to allow an involved RWPG to modify and adopt its final RWP by the statutory deadline, all RWPGs involved in the conflict shall proceed with adoption of their RWP by excluding the relevant recommended WMS and all language relevant to the conflict and include language in the RWP explaining the unresolved Interregional Conflict and acknowledging that the RWPG may be required to revise or amend its RWP in accordance with a negotiated or Board resolution of an Interregional Conflict.			
(g)	Submittal of RWPs. RWPGs shall submit the IPP and the adopted RWPs and amendments to approved RWPs to the EA in conformance with this section.	NA	See above	

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
(g) (1)	RWPs shall include:			
(g) (1) (A)	The technical report and data prepared in accordance with this chapter and the EA's specifications;			
(g) (1) (B)	An executive summary that documents key RWP findings and recommendations; and			
(g) (1) (C)	Summaries of all written and oral comments received pursuant to subsection (f) of this section, with a response by the RWPG explaining how the plan was revised or why changes were not warranted in response to written comments received under subsection (f) of this section.			
(g) (2)	RWPGs shall submit RWPs to the EA according to the following schedule:			
(g) (2) (A)	IPPs are due every five years on a date disseminated by the EA unless an extension is approved, in writing, by the EA.			
(g) (2) (B)	Prior to submission of the IPP, the RWPGs shall upload the data, metadata and all other relevant digital information supporting the plan to the Board's State Water Planning Database. All changes and corrections to this information must be entered into the Board's State Water Planning Database prior to submittal of a final adopted plan.			
(g) (2) (C)	The RWPG shall transfer copies of all data, models, and reports generated by the planning process and used in developing the RWP to the EA. To the maximum extent possible, data shall be transferred in digital form according to specifications provided by the EA. One copy of all reports prepared by the RWPG shall be provided in digital format according to specifications provided by the EA. All digital mapping shall use a geographic information system according to specifications provided by the EA. The EA shall seek the input from the State Geographic Information Officer regarding specifications mentioned in this section.			
(g) (2) (D)	Adopted RWPs are due to the EA every five years on a date disseminated by the EA unless, at the discretion of the EA, a time extension is granted consistent with the timelines in Texas Water Code §16.053(i).			
(g) (2) (E)	Once approved by the Board, RWPs shall be made available on the Board website.			
(h)	Upon receipt of an RWP adopted by the RWPG, the Board shall consider approval of such plan based on the following criteria:	NA	See above	
(h) (1)	verified adoption of the RWP by the RWPG; and			
(h) (2)	verified incorporation of any negotiated resolution or Board resolution of any Interregional Conflicts, or in the event that an Interregional Conflict is not yet resolved, verified exclusion of the relevant recommended WMS and all language relevant to the conflict.			
(i)	Approval of RWPs by the Board. The Board may approve an RWP only after it has determined that the RWP complies with statute and rules.			
(j)	The Board shall consider approval of an RWP that includes unmet municipal Water Needs provided that the RWPG includes adequate justification, including that the RWP:			
(j) (1)	documents that the RWPG considered all potentially feasible WMSs, including Drought Management WMSs and contains an explanation why additional conservation and/or Drought Management WMSs were not recommended to address the need;			
(j) (2)	describes how, in the event of a repeat of the Drought of Record, the municipal WUGs associated with the unmet need shall ensure the public health, safety, and welfare in each Planning Decade that has an unmet need; and			
(j) (3)	explains whether there may be occasion, prior to development of the next IPP, to amend the RWP to address all or a portion of the unmet need.			
(k)	Board Adoption of State Water Plan. RWPs approved by the Board pursuant to this chapter shall be incorporated into the State Water Plan as outlined in §358.4 of this title (relating to Guidelines).			
Chapter Eleven Implementation and Comparison to the Previous Regional Water Plan				
31 TAC §357.45				
357.45 (a)	RWPGs shall describe the level of implementation of previously recommended WMSs and associated impediments to implementation in accordance with guidance provided by the board. Information on the progress of implementation of all WMSs that were recommended in the previous RWP, including conservation and Drought Management WMSs; and the implementation of WMSPs that have affected progress in meeting the state's future water needs.	Yes	Chapter 11	
(b)	RWPGs shall provide a brief summary of how the RWP differs from the previously adopted RWP with regards to:			
(b) (1)	Water demand projections	Yes	Chapter 11	
(b) (2)	Drought of record and hydrologic and modeling assumptions used in planning for the region	Yes	Chapter 11	
(b) (3)	Groundwater and surface water availability, existing water supplies, and identified water needs for WUGs and WWPs	Yes	Chapter 11	
(b) (4)	Recommended and Alternative WMSs and WMSPs.	Yes	Chapter 11	

APPENDIX B

WATER AVAILABILITY MODEL ANALYSES OF REGION F WATER SUPPLIES

APPENDIX B

Subject: Documentation of Region F Water Availability in the Rio Grande Basin

Date: March 6, 2018

Project: CMD17216

This memorandum documents the analyses for the reservoir availability and run of river supplies in the Rio Grande River Basin in Region F. The surface water supplies are based on the hydrology developed for the TCEQ Water Availability Model (WAM). Deviations from these flows were approved in an original letter dated February 9, 2018 and revised letter from the TWDB dated December 16, 2019. The letters authorize several changes to the Rio Grande WAM which are summarized below:

- Modified the Toyah Creek watershed (includes Lake Balmorhea) so that:
    - Water rights located at the San Solomon and Griffin Springs have access to the flows from the springs. This is a correction to an error in the WAM.
    - Excess spring flows (flows not diverted directly from the creek) are directed to Lake Balmorhea for storage in accordance with the Lake Balmorhea water right. The storage would then be modeled as backup for the run of river diversions.
    - Modeling reflects actual operations (upstream to downstream and senior to the rest of the basin to prevent futile priority calls by water rights on the main stem of the Pecos).
- Updated the capacity for Red Bluff Reservoir for 2020 and 2070 sediment conditions.
- Modeled Red Bluff Reservoir as a standalone reservoir by removing backups from Red Bluff Reservoir for downstream diversion by run-of-river water rights.

B1. TCEQ WAM Run 3

Consistent with TWDB rules and guidelines, existing water supplies in Region F were determined using the TCEQ WAM Run 3 to calculate the firm yield. The model version used for the 2021 Region F supplies was April 14, 2004. This version is consistent with supply evaluations under the current version of the TCEQ WAM Run 3 since 1) the hydrology of the Rio Grande WAM has not been extended and 2) no new water rights have been granted in the Region F portion of the Rio Grande Basin. The following sections describe the process used to determine the availability for each source.

B1.1 Lake Balmorhea

Excess water from the San Solomon and Griffin Springs in Pecos County is diverted to Lake Balmorhea for storage and diversion. This portion of the Pecos River was modeled in upstream to downstream order by changing the priority dates to the most senior in the WAM. This reflects actual operation of the basin and prevents run-of-the-river diversions on the Pecos River associated with the Red Bluff Irrigation District from making priority calls on spring flows. In actual operation, the Red Bluff Irrigation District water rights are dependent on releases from Red Bluff Reservoir and do not use or make calls on spring flow from San Solomon or Griffin Springs. Also, it is likely that a priority call on spring flow would be considered a futile call since almost all of the water would be lost before it reached the Red Bluff Irrigation District diversions.

The calculated firm yield of Lake Balmorhea is 18,800 acre-feet per year. A traditional safe yield analysis (safe yield diversion equals minimum storage) was not determined because the reservoir storage is much smaller than the yield (7,400 acre-feet). Because a traditional safe yield analysis was not used, sedimentation conditions were not updated for Lake Balmorhea.

B1.2 Red Bluff Reservoir

In 2013, the TWDB conducted a volumetric survey of Red Bluff Reservoir. However due to the low water levels an area-capacity-elevation curve all the way to the conservation storage was not calculated. Using the published sedimentation rate in the 2013 TWDB survey and the 1986 survey, 2020 and 2070 sediment conditions were updated from the 2016 RWP.

The total permitted diversion from Red Bluff Reservoir is 292,520 acre-feet per year. This includes multiple run-of-river diversion points downstream of the reservoir. To assess the yield of Red Bluff, releases from Red Bluff were no longer modeled and only diversion directly from Red Bluff reservoir were considered. The firm and safe yields of Red Bluff Reservoir are shown in Table 1. The information used to update sediment conditions for the Red Bluff Reservoir are shown in Table 2.

Table 1:
Red Bluff Reservoir Yield

	Yield (Ac-Ft/Yr)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Firm Yield	38,630	38,548	38,466	38,384	38,302	38,220
Safe Yield	30,050	29,980	29,910	29,840	29,770	29,700

Table 2:
Red Bluff Sedimentation

Reservoir	Drainage Area (Sq mi)	Sediment Rate (af/yr/sq mi)	Year of Initial Capacity	Capacities (Ac-ft)			Source (sediment rate)
				Initial	2020	2070	
Red Bluff	20,720	0.01	1925	310,000	279,212	268,758	TWDB, 2013

B1.3 Run of River Diversions

Forty-eight (48) water right records were identified that are associated with run-of-river irrigation in Region F. Region F defines the reliable supply for irrigation from a run-of-river supply to be the minimum annual diversion. A summary of results is included in Table 3.

Table 3:
Pecos River Basin Run-of-River Minimum Annual Diversions

WUG	Minimum Annual Diversion (Acre-Feet)
Ward County - Irrigation	881
Pecos County - Irrigation	18,672
Reeves County - Irrigation	573
Total	**20,126**

APPENDIX B

Subject: Documentation of Region F Water Availability in the Colorado Basin

Date: February 26, 2018

Project: CMD17216

This appendix documents the datasets and processes used in the Water Availability Model (WAM) analyses for Region F. The first section of the memorandum pertains to firm yields calculated under the Texas Commission on Environmental Quality (TCEQ) WAM Run 3. Run 3 is the "full authorization" model in which all water rights divert their full permitted amounts and the storage capacities of reservoirs are assumed to be at their full permitted amounts. The second section of this memorandum details the modifications to the WAM as part of the subordination strategy and for determining safe yields.

B1. Updated Reservoir Sedimentation Conditions

For these analyses, the storage volume (SV) and surface area (SA) records of the WAM were modified to reflect sediment conditions in 2020. Another version of the model was created to reflect sediment conditions in 2070. Updated sediment conditions for 2020 and 2070 for all reservoirs in Region F except Mountain Creek, Clyde, and Junction because there was no data. For Winters lake, new sedimentation values were developed for the 2021 Region F Water Plan based on the recent 2013 TWDB survey. Sediment conditions only affect Lake Brownwood and Lake O.H. Ivie under currently available supplies (TCEQ WAM Run 3) because they are the only two reservoirs with yield. The updated sediment conditions were used for all the reservoirs as part of the subordination strategy.

Winters

In 2013, the TWDB conducted a volumetric and sedimentation survey of Lake Winters and Elm Creek Reservoir. In the report, it was estimated that Lake Winters has an average loss of capacity of between 7 to 11 acre-feet-per year since impoundment due to sedimentation below the conservation pool elevation. It was estimated that Winters-Elm Creek Reservoir has an average loss of capacity between -3.5 to 11 acre-feet per year. Using the 2013 survey and an overall sedimentation rate of 11 acre-feet per year, 2020 and 2070 sediment conditions were calculated.

Table 1 shows the sedimentation rate used, the source of the rate, the initial capacity and the capacity calculated for 2020 and 2070 for each reservoir in Region F.

**Table 1:
Sedimentation**

Reservoir	Contributing Drainage Area (sq mi)	Sediment Rate (ac-ft/yr/sq mi)	Year of Initial Capacity	Initial Capacity (Ac-Ft)	2020 Capacity (Ac-Ft)	2070 Capacity (Ac-Ft)
Thomas	934	0.11	1999	200,604	198,460	193,323
Champion	186	0.51	1959	42,492	36,761	33,178
Colorado City	387	0.38	1964	31,967	22,302	14,942
Spence[1]	1,954	0.13	1999	517,272	511,927	499,227
Oak Creek[2]	238	0.50	1953	39,360	31,366	25,416
Ballinger	24	0.17	1985	6,050	5,907	5,703
Elm Creek	64	0.17	2013	7,779	7,704	7,154
Twin Buttes	2,813	0.09	1962	186,200	171,612	158,954
Nasworthy	107	0.16	1993	10,108	9,649	8,793
O.C. Fisher[3]	1,383	0.23	1962	115,743	97,335	81,431
O.H. Ivie	2,792	0.68	1990	554,340	496,757	401,848
Brady Creek	523	0.08	1963	30,430	28,038	25,946
Hords Creek	48	0.36	1948	8,640	7,391	6,527
Coleman	292	0.16	2006	38,094	37,455	35,072
Brownwood	1,181	0.11	2013	136,350	135,422	128,872

1. The authorized storage in Spence Reservoir is 488,760 ac-ft
2. The authorized storage in Oak Creek Reservoir is 30,000 ac-ft.
3. The authorized storage in O.C. Fisher Reservoir is 80,400 ac-ft

B2. TCEQ WAM Run 3

Consistent with TWDB rules and guidelines, existing water supplies in Region F were determined using a version of the TCEQ WAM Run 3. The supplies were estimated by calculating the firm yield of a given reservoir. The firm yield is the maximum division that a reservoir can meet with 100% reliability during a repeat of the drought of record. The changes outlined in this section were approved by the Deputy Executive Administrator of the TWDB on February 9, 2018. This model was received and downloaded from TCEQ on February 5, 2018. Freese and Nichols Inc. performed model runs on in February 2018.

Lake Brownwood

The following firm and safe yields for Lake Brownwood were developed based on updated 2020 and 2070 sediment conditions.

**Table 2:
Lake Brownwood Yields**

	2020	2030	2040	2050	2060	2070
Firm Yield						
2021 Plan	24,000	23,820	23,640	23,460	23,280	23,100
Safe Yield						
2021 Plan	18,900	18,760	18,620	18,480	18,340	18,200

Lake Ivie

The following firm and safe yields for Lake Ivie were developed based on updated 2020 and 2070 sediment conditions.

Table 3:
Lake Ivie Yields

	2020	2030	2040	2050	2060	2070
Firm Yield						
2021 Plan	35,700	34,580	33,460	32,340	31,220	30,100
Safe Yield						
2021 Plan	30,350	29,320	28,290	27,260	26,230	25,200

B2. Subordination

The subordination strategy (also known as the "no call" assumption) in Region F adopts the cutoff model originally developed by Region K, with a few variations. The modifications made to the WAM as well as the ways in which it differs from the version developed by Region K are outlined below. The changes to the TCEQ WAM for the subordination strategy were approved in a letter from the TWDB Executive Administrator dated October 5, 2018. This model was received from Region K on June 18, 2018 and the analyses were performed by Freese and Nichols, Inc. in July 2018.

B2.1 Base Dataset

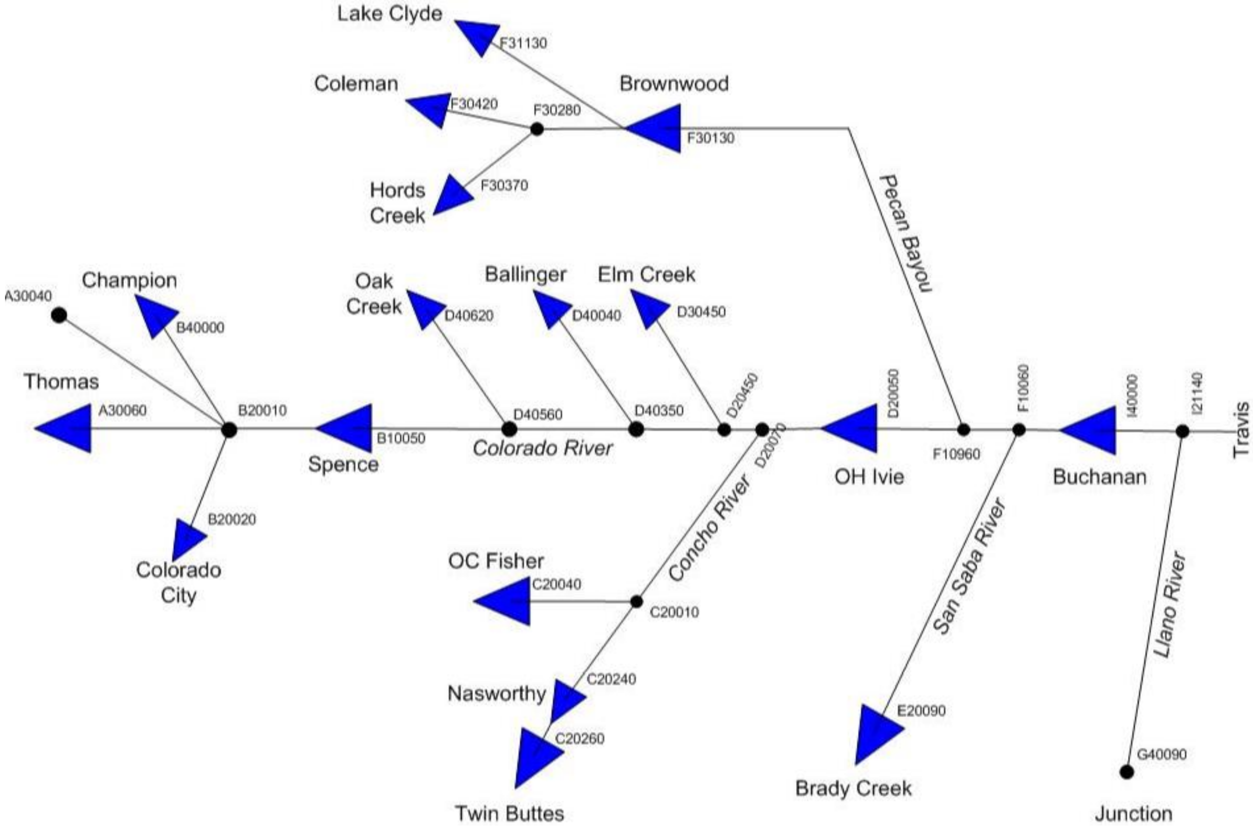
The cutoff model from Region K was used as the base dataset for the safe yield analyses. The cutoff model is a modified version of the Colorado WAM in which water rights at and downstream of Lake Buchanan are subordinated to upstream water rights. The subordination was accomplished by subtracting a value of 10,000,000 from the priority dates of subordinating water rights. For example, a water right with an original priority date of 19580521 would have a priority date of 9580521 after subtracting 10,000,000. After the priority date adjustment, water rights upstream of Lake Buchanan become senior to downstream water rights but maintain their priorities relative to one another. The Region K model has a 77-year hydrologic period-of-analysis from 1940-2016, in contrast to the TCEQ WAM that has a period-of-analysis from 1940-2013.

B2.2 Record of Modifications

Based on the cutoff model from Region K, one model was developed to simulate 2020 sediment conditions for the safe yield analyses and another was developed to simulate 2070 conditions. The modifications are summarized below and described in greater detail in the remainder of this section.

A schematic of the layout of the reservoirs in Region F is shown in Figure 1.

Figure 1:
Schematic of the Layout of Reservoirs in Region F



The following three modifications were made to each of the major reservoirs in Region F:

- Each reservoir is diverting its safe yield. For a given reservoir, diversions in the safe yield run with the same priority are distributed proportionally to their permitted amounts. If a reservoir has diversions with different priorities, the most senior diversion are met first up to their full permitted amounts before diverting under more junior priority dates.
- Each reservoir has 2020 (or 2070) sediment conditions
- Every reservoir upstream of Lake Buchanan is senior to every reservoir at or below lake Buchanan

B2.3 Modifications for Each Reservoir

The modifications made for each reservoir are described in more detail below. The reservoirs are listed in the order in which they appear in the TCEQ WAM.

Lake Thomas

- In the TCEQ WAM and the Region K WAM, there is a 7,000 ac-ft/yr municipal diversion (WR ID 61401002002) that can be met by either Lake Thomas or Spence Reservoir, and the Type 2 water right for this diversion prohibits refilling of storage.
- In the revised model, the analogous diversion is met by Lake Thomas and refilling storage is allowed (Type 1 water right). The diversion is backed up by Spence Reservoir, but the backup is not triggered because there are no shortages in the safe yield run.

Champion Creek Reservoir

- In the TCEQ WAM and the Region K WAM, Champion Creek Reservoir is modeled as having 42,500 ac-ft of storage, however the reservoir is only authorized to store 40,170 ac-ft so the WAMs include 2,330 ac-ft of inactive storage.
- After adjusting the reservoir capacity for 2020 sediment conditions, the reservoir capacity is 36,761 ac-ft, which is less than the authorized amount, so the inactive storage was removed.

Lake Colorado City

- No additional changes, other than those made for all reservoirs, were made to the modeling of Lake Colorado City.

Spence Reservoir

- The authorized storage in Spence Reservoir is 488,760 ac-ft, although the calculated capacity is greater for both 2020 and 2070 sediment conditions. For this reason, the capacity of Spence Reservoir was left at 488,760 ac-ft in the revised 2020 and 2070 models.
- Whereas in the TCEQ WAM and the Region K WAM, a 7,000 ac-ft/yr municipal diversion (WR ID 61401002002) could be met by either Lake Thomas or Spence Reservoir, the revised modeling has the analogous diversion being met by Lake Thomas and backed up by Spence Reservoir. However, the backup is not triggered during the safe yield run because there are no shortages.

O.C. Fisher Reservoir

- The authorized storage in O.C. Fisher Reservoir is 80,400 ac-ft, although the calculated capacity is greater for both 2020 and 2070 sediment conditions. For this reason, the capacity of O.C. Fisher Reservoir was changed to 80,400 ac-ft in the revised 2020 and 2070 models.

Twin Buttes Reservoir/Lake Nasworthy

- Both the TCEQ WAM and the Region K WAM have Lake Nasworthy at Control Point (CP) C20240, however the evaporation is input at CP C20260, a point directly upstream. Within the EVA file, the revised model reassigned the entries for CP C20260 to CP C20240. Lake Nasworthy is still modeled as being at CP C20240.
- Both the TCEQ WAM and the Region K WAM have Twin Buttes Reservoir at Control Point (CP) C20260, although it makes releases for a point upstream (CP C20330). In the revised model, Twin Buttes Reservoir was reassigned to CP 20330.
- The water right ID 61401318001 is associated with an irrigation diversion from Twin Buttes. In the TCEQ and Region K WAMs, it is modeled as a Type 2 water right (no refilling storage). It was changed to a Type 1 water right (with refilling storage) in the revised model.
- There are two priority dates associated with Lake Nasworthy and Twin Buttes Reservoir: 3/11/1929 and 5/6/1959. Consistent with their Certificate of Adjudication, Lake Nasworthy refills are the 1929 priority and Twin Buttes Reservoir refills at the 1959 priority. There is not enough water available from the system to fully meet the 1929 priority diversions, so the diversion amounts for the 1959 priority are set to zero in the safe yield runs.
- Whereas the TCEQ WAM and the Region K WAM includes operational rules enabling one of the two reservoirs to meet a given diversion based on storage contents, these records are removed in the revised modeling in favor of back-ups for the purposes of determining a safe yield for the two reservoirs operated as a system. This allows for cleaner modeling of the priorities of these reservoirs.

Ivie Reservoir (OH Ivie)

- In the TCEQ WAM and the Region K WAM there is a hide-the-flows “scheme” for subordinating Lake Buchanan to Ivie Reservoir, however that scheme is not necessary in the cutoff model because the water rights upstream of Lake Buchanan are all senior to water rights at Lake Buchanan and downstream of it. Consequently, WRAP code implementing that scheme was commented out in the revised model.

- In the revised model, Ivie Reservoir is modeled as being subordinate to Lake Ballinger. Ivie Reservoir is on the mainstem of the Colorado and Lake Ballinger is located on an upstream tributary. The subordination is modeled with a backup (BU record) of Ballinger's water right 61401072302 in the second simulation of the dual simulation (i.e. PX 2).

Mountain Creek

- Mountain Creek is a tributary of the Colorado River. The revised modeling of Mountain Creek Reservoir includes only two of the overall changes discussed previously: diverting its safe yield and subtracting 10,000,000 from its priority date to make it senior to rights at and downstream of Lake Buchanan. Sedimentation conditions for Mountain Creek Reservoir are the same as in the TCEQ and Region K WAMs. The reservoir is small, with only 950 ac-ft of storage according to the TCEQ WAM.

Oak Creek Reservoir

- The TCEQ and Region K WAMs model the Oak Creek Reservoir with 39,360 ac-ft of storage, but because it is only authorized to store 30,000 ac-ft, they include 9,360 ac-ft of inactive storage.
- In the 2016 Plan modeling, sedimentation was assumed to reduce the inactive pool under 2020 conditions. For example, if the 2020 capacity was estimated to be 31,366 ac-ft, then the new inactive storage would be 1,366 ac-ft. However, this approach produces counter-intuitive results for safe yield calculations, in which a year's supply is left in active storage, because a scenario with 30,000 ac-ft of storage would have a greater yield than a scenario with 31,000 ac-ft of storage and 1,000 ac-ft of inactive storage. For this reason, the Oak Creek Reservoir is modeled as having 30,000 ac-ft of storage capacity with no inactive storage under 2020 conditions. By 2070, the estimated storage capacity is less than 30,000 ac-ft.

Lake Ballinger

- Lake Ballinger is on Valley Creek, a tributary of the Colorado River. The TCEQ WAM includes 4,000 ac-ft of storage for Lake Ballinger at a 1946 priority (the Region K cutoff WAM includes this amount at a 946 priority). However, this amount includes a separate 800 ac-ft impoundment used for sediment control that fills on a non-priority basis, not a 1946 priority. For this reason, the amount of storage associated with the 1946 priority was reduced to 3,200 ac-ft in the revised model.
- Lake Ballinger has additional storage associated with a 1980 priority. In the TCEQ WAM, the total volume of Lake Ballinger increases to 6,050 ac-ft at the 1980 priority (at the 980 priority in the Region K cutoff model). With sedimentation, this amount is reduced to 5,907 ac-ft in 2020 and 5,703 in 2070.
- The revised model also includes code that subordinates Ivie Reservoir to Lake Ballinger. This is implemented with the BU record discussed previously for Ivie Reservoir combined with a PX 2 record associated with Ballinger's water right 61401072302. The PX 2 record triggers an option that excludes Ivie Reservoir's control point and all downstream control points in the determination of flow availability for Ballinger's right.
- The TCEQ WAM has additional code modeling the 800 ac-ft sediment control reservoir at a 2050 priority. The revised model changed this to a priority of 99999999 to make it the most junior in the model.
- There are three senior irrigation diversions and two senior municipal diversions backed up by Lake Ballinger that count toward Ballinger's safe yield. Because these diversions are senior, their target diversion amounts are met with 100% reliability before iterating on the 1946 diversion amount. Diversion amounts with a priority date later than 1946 are set to zero.

Lake Winters (Elm Creek)

- Lake Winters has a 560 ac-ft/yr diversion and 2,447 ac-ft of storage associated with a 1944 priority. There is an additional 600 ac-ft/yr diversion at a 1957 priority. The permitted storage capacity increases to 8,374 ac-ft at a 1979 priority. Finally, there is an additional 200 ac-ft/yr diversion at a 1983 priority. In the revised model, the full 8,374 ac-ft storage capacity is reduced to 7,704 ac-ft in 2020 due to sedimentation and to 7,154 ac-ft by 2070. The 2,447 ac-ft of storage at the 1944 priority remains the same in the revised model. The safe yield diversion is calculated for the 1944 priority; the more junior diversions are set to zero.

Brady Creek Reservoir

- The revised modeling of Brady Creek Reservoir does not include any additional changes, other than the three overall changes made for every reservoir.

Lake Clyde

- Lake Clyde is on the North Prong of Pecan Bayou, a tributary of Pecan Bayou, which is a tributary of the Colorado River. It is located upstream of Lake Brownwood and is junior in priority to Lake Brownwood. The revised model includes an instream flow requirement (IF record) to pass all water if Lake Brownwood is less than 50% full.
- If Lake Brownwood is greater than 50% full, then Lake Brownwood is subordinated to Lake Clyde. This is accomplished with a PX 2 record associated with Lake Clyde's two water rights (WR IDs 61401660301 and 61401660002). The PX 2 record triggers an option that excludes Lake Brownwood's control point and all downstream control points in the determination of flow availability for Lake Clyde's right.
- In contrast to other reservoirs, the storage capacity and area-capacity relationship for Lake Clyde for both 2020 and 2070 conditions is the same as the Colorado WAM Run 8 (current conditions) due to a lack of information about the sedimentation rate for the reservoir. The storage and area records for Lake Clyde were taken from the FNI archive because Run 8 is no longer available online through the TCEQ website.

Lake Coleman

- In the revised model, Lake Coleman is modeled similarly to Lake Clyde, which was discussed previously.
- Lake Coleman is on Jim Ned Creek, a tributary of Pecan Bayou, which is a tributary of the Colorado River. It is located upstream of Lake Brownwood and is junior in priority to Lake Brownwood. The revised model includes an instream flow requirement (IF record) to pass all water if Lake Brownwood is less than 50% full.
- If Lake Brownwood is greater than 50% full, then Lake Brownwood is subordinated to Lake Coleman. This is accomplished with a PX 2 record associated with Lake Coleman's two water rights (WR IDs 61401702301and 61401702302). The PX 2 record triggers an option that excludes Lake Brownwood's control point and all downstream control points in the determination of flow availability for Lake Coleman's right.

Hords Creek Reservoir

- In the revised model, Hords Creek Reservoir is modeled similarly to Lake Clyde and Lake Coleman, which were discussed previously.
- Hords Creek Reservoir is on Hords Creek, a tributary of Pecan Bayou, which is a tributary of the Colorado River. It is located upstream of Lake Brownwood and is junior to Lake Brownwood. The revised model includes an instream flow requirement (IF record) to pass all water if Lake Brownwood is less than 50% full.
- If Lake Brownwood is greater than 50% full, then Lake Brownwood is subordinated to Hords Creek Reservoir. This is accomplished with a PX 2 record associated with Hords Creek Reservoir's water right (WR ID 61401705301). The PX 2 record triggers an option that excludes Lake Brownwood's control point and all downstream control points in the determination of flow availability for Hords Creek Reservoir's right.

Lake Brownwood

- Lake Brownwood is located on Pecan Bayou, a tributary of the Colorado River. It is downstream of Lake Clyde, Lake Coleman, and Hords Creek Reservoir, which are all junior in priority to Lake Brownwood.

- The TCEQ and Region K WAMs model Lake Brownwood with 135,963 ac-ft of storage, but because it is only authorized to store 114,000 ac-ft, they include 21,963 ac-ft of inactive storage.
- In the 2016 Plan modeling, sedimentation was assumed to reduce the inactive pool under 2020 conditions. For example, if the 2020 capacity was estimated to be 130,613 ac-ft, then the new inactive storage would be 16,613 ac-ft. In 2070, the estimated capacity was 124,147 ac-ft, which is 10,147 ac-ft greater than the permitted amount. However, this approach produces counter-intuitive results for safe yield calculations, in which a year's supply is left in active storage, because 2070 scenarios with less dead storage have fewer evaporative losses than 2020 scenarios with more dead storage. Furthermore, the Brownwood water right states that the reservoir is "authorized to… impound therein not to exceed 114,000 ac-ft of water." For these reasons, Lake Brownwood is modeled as having 114,000 ac-ft of storage capacity with no inactive storage under 2020 or 2070 conditions.

City of Junction

- The City of Junction has a small on-channel reservoir (300 ac-ft of storage) for which the safe yield was determined. The supply is made reliable by springs located just upstream of the diversion.
- The Region K WAM has the priority of a recreational right at 11/23/1964 and an instream flow requirement and a municipal diversion at 10/14/1986, but in the revised model they are set at 11/23/964 and 10/14/986, respectively, consistent with the assumptions in the rest of the cutoff model.
- In contrast to other reservoirs in which safe yield is determined, the reservoir storage capacity remains at 300 ac-ft for both 2020 and 2070 conditions.

B2.4 Priority Date Modification for Additional Water Rights

A value of 10,000,000 was subtracted from the priority dates for all water rights at and upstream of Junction (G40090) and Brady Creek Reservoir (E20090) using the Hoffpauir Priority Date Modification Tool. The Priority Date Modification Tool, developed by Richard Hoffpauir, consists of an executable program named "Priority" which reads an input file. The input file includes a list of control points along with values to be added or subtracted from the priority dates. The priority dates are modified at the specified control points and all upstream control points.

B2.6 Safe Yield Analyses

A one-year "safe yield" refers to the annual rate at which water may be diverted from a reservoir such that the minimum observed reservoir storage volume through the simulation period-of-analysis is just above the annual diversion rate. For example, the one-year safe yield of Lake Colorado City was estimated to be 1,800 ac-ft/yr and the minimum observed storage content during the simulation was 1,868 ac-ft. The safe yields were evaluated for 17 reservoirs in the Upper Colorado River Basin for 2020 and 2070 conditions of reservoir sedimentation.

The safe yields were determined one reservoir at a time in upstream-to-downstream order, as listed in Table 4. For each reservoir, the diversion amounts for water rights at the reservoir were iteratively reduced until the minimum observed storage in the reservoir through the period-of-analysis was just above (within 100 acre-feet) the total diversion at the reservoir. The safe yield diversion amounts at the upstream reservoir were kept in place while repeating the iterative process for the next downstream reservoir. For reservoirs with multiple water rights with the same priority date, the diversion amounts at each water right were reduced simultaneously while maintaining the same relative ratios as the original authorized diversion amounts. For reservoirs with multiple water rights with varying priority dates, the diversion amount was reduced for the most junior water right first and then for the next most junior water right, and on in this pattern until the safe yield was found.

Table 4:
Results of Safe Yield Analyses for 2020 and 2070

Reservoir Name	Reservoir Identifier	Water Right Identifier	Priority Date	Use Type	Authorized Diversion (ac-ft/yr)	Safe Yield (ac-ft/yr) 2020 Scenario	Safe Yield (ac-ft/yr) 2070 Scenario
Thomas	**THOMAS**			**Total**	**30,000**	**3,725**	**3,610**
		61401002301A	9460805	MUN	22,050	2,738	2,653
		61401002301B	9460805	IN1002	950	118	114
		61401002002	9460805	MUN	7,000	869	843
Champion	**CHAMPI**			**Total**	**6,750**	**1,170**	**1,100**
		61401009301	9570408	MUN	2,700	468	440
		61401009302	9570408	IN1009	4,050	702	660
Colorado City	**COLOCI**			**Total**	**5,500**	**1,800**	**1,550**
		61401009303A	9481122	MUN	2,750	900	775
		61401009303B	9481122	IN1009	2,750	900	775
Spence	**SPENCE**			**Total**	**34,573**	**21,575**	**21,355**
		61401008301	9640817	MUN	31,573	19,703	19,502
		61401008302	9640817	IN1008	2,000	1,248	1,235
		61401008303	9640817	MIN	1,000	624	618
Oak Creek	**OAKCRK**			**Total**	**10,000**	**1,025**	**840**
		61401031301	9490427	IN1031	4,000	410	336
		61401031302	9490427	MUN	5,328	546	448
		61401031303	9490427	MUN	672	69	56
Ballinger	**BALLIN**			**Total**	**1,685**	**785**	**770**
		61401130301	9570225	MUN	60	0	0
		61401072301	9461004	MUN	1,000	160	145
		61401075301	9300207	IRR-D	36	36	36
		61401129302	9290306	MUN	49	49	49
		61401073301	9250406	IRR-D	40	40	40
		61401129301	9140611	MUN	450	450	450
		61401074301	9131103	IRR-D	50	50	50
Elm Creek-Winters	**ELMCRK**			**Total**	**1,360**	**175**	**175**
		61401095304	9830207	MUN	200	0	0
		61401095302	9570605	MUN	600	0	0
		61401095301	9441218	MUN	560	175	175
Twin Buttes[1]	**TWINBU**			**Total**	**29,000**	**0**	**0**
		61401318002	9590506	MUN	4,000	0	0
		61401318001	9590506	IRR-C	25,000	0	0
Nasworthy[1]	**NASWOR**			**Total**	**25,000**	**3,340**	**2,865**
		61401319002	9290311	MUN	17,000	2,271	1,948
		61401309003	9290311	IND	7,000	935	802
		61401319001C	9290311	IRR-C	1,000	134	115
O. C. Fisher	**OCFISH**			**Total**	**80,400**	**1,320**	**755**
		61401190001	9490527	MUN	80,400	1,320	755
O. H. Ivie	**OHIVIE**			**Total**	**113,000**	**32,340**	**28,120**
		11403676301	9780221	MUN	103,000	29,478	25,632
		11403676302	9780221	IN3676	10,000	2,862	2,488
Mountain Creek	**R1024A**			**Total**	**250**	**70**	**70**

Reservoir Name	Reservoir Identifier	Water Right Identifier	Priority Date	Use Type	Authorized Diversion (ac-ft/yr)	Safe Yield (ac-ft/yr)	
						2020 Scenario	2070 Scenario
		61401024301	9491216	MUN	250	70	70
Brady Creek	**BRADYC**			**Total**	**3,500**	**1,950**	**1,750**
		61401849001	9590902	MUN	3,000	1,671	1,499
		61401849002	9590902	IND	500	279	251
Hords Creek	**HORDSC**			**Total**	**2,240**	**180**	**146**
		61401705301	9460323	MUN	2,240	180	146
Coleman	**COLEMA**			**Total**	**9,000**	**1,792**	**1,692**
		61401702301	9580825	MUN	4,500	896	846
		61401702302	9580825	IN1702	4,500	896	846
Clyde	**LCLYDE**			**Total**	**1,200**	**75**	**75**
		61401660002	9850906	MUN	200	0	0
		61401660301	9650202	MUN	1,000	75	75
Brownwood	**BROWNW**			**Total**	**29,712**	**24,340**	**23,770**
		61402454301	9250929	MUN	15,996	13,104	12,797
		61402454302	9250929	IN2454	5,004	4,099	4,003
		61402454303	9250929	IRR-F	8,712	7,137	6,970
Junction	**G40090**			**Total**	**1,000**	**250**	**250**
		61401570002	9861014	MUN	1,000	250	250

1. Twin Buttes and Nasworthy are operated as a system and their safe yields should be added.

APPPENDIX C

WATER MANAGEMENT STRATEGY EVALUATION
TECHNICAL MEMORANDUMS

APPENDIX C

C.1 INTRODUCTION, CONSERVATION, SUBORDINATION

Introduction

In accordance with TWDB rules and guidelines, the Region F Water Planning Group has adopted a standard procedure for identifying and evaluating potentially feasible water management strategies. This procedure classifies the strategies using the TWDB's standard categories developed for regional water planning. These strategy categories include:

- Improved conservation
- Reuse
- Expanded use of existing supplies
- Development of new water supplies
- Desalination
- Developing regional water supply facilities or providing regional management of water supply facilities
- Voluntary transfer of water within the region using, but not limited to, regional water banks, sales, leases, options, subordination agreements and financing agreements; and
- Emergency transfer of water

The methodology for selecting potentially feasible strategies for each water user group (WUG) is in Chapter 5A. After the potentially feasible water management strategies were selected, each strategy was evaluated in accordance with Chapter 31 of the Texas Administrative Code, Sections 357.34 and 357.35. These statutes dictate that each strategy be evaluated based on:

- Quantity, reliability, and cost
- Environmental factors
- Impacts to agricultural and natural resources including impacts of moving water from rural and agricultural areas
- Impacts on key parameters of water quality
- Impacts on other water resources including other water management strategies
- Other factors as deemed relevant by the RWPG

This Appendix documents each potentially feasible strategy's description and evaluation in accordance to the rules as outlined above. Water management strategies were developed for water user groups to meet projected needs in the context of their current supply sources, previous supply studies and available supply within the region. Much of the water supply in Region F is from groundwater, and several of the identified needs could be met by development of new groundwater supplies. Where site-specific data was available, this information was used. When specific well fields could not be identified, assumptions regarding well capacity, depth of well and associated costs were developed based on county and aquifer. In most cases new surface water supplies are not feasible because of the lack of unappropriated water in the region.

Some strategy evaluations were performed as a group. These strategies include:

- Municipal conservation
- Irrigation conservation
- Mining reuse/recycling
- Subordination of downstream water rights
- Purchase water (voluntary transfer) strategies
- Brush control

- Weather modification

The remaining water management strategies were evaluated individually. This appendix is organized by major strategy category. Cost tables are included in Appendix D. The technical analyses for all potentially feasible strategies are summarized in a matrix in Appendix E. References are included at the of this appendix.

WUG:	**Municipal WUGs**	**Capital Cost:**	N/A
WMS Name:	**Municipal Conservation**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Conservation	**Annual Cost** (After Amortization):	$606 per acre-foot $1.86 per 1,000 gal
WMS Yield:	2,523 – 3,922 acre-feet pear year		
WMS Status:	Recommended	**Implementation:**	2020 & 2030

Strategy Description

Water conservation is a demand management strategy that pro-actively decreases future water needs. Conservation facilitates more efficient use of existing water supplies and may delay the need to develop new water supplies. An expected level of conservation is included in the demand projections from the Texas Water Development Board (TWDB) due to the natural replacement of inefficient plumbing fixtures with low flow fixtures, as mandated under the Plumbing Code. The TWDB also considers expected reductions in municipal water use due to energy efficiency requirements for dish washers and clothes washers. Additional conservation savings can potentially be achieved in the region through the implementation of conservation best management practices (BMPs). These additional conservation measures were considered for all named municipal water user groups in Region F. These conservation measures were considered for County-Other WUGs only if the County-Other WUG had an identified water need. Based on this criterion, five County-Other WUGs were evaluated for municipal conservation. Region F recognizes that it has no authority to implement, enforce, or regulate water conservation practices. These water conservation practices are intended to be guidelines. Water conservation strategies determined and implemented by the individual water user group supersede the recommendations in this plan and are considered to meet regulatory requirements for consistency with this plan.

Public water suppliers with 3,300 connections or more are required to update and submit a Water Conservation Plan (WCP) to the Texas Commission on Environmental Quality (TCEQ) every five years. Per Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code, some conservation strategies are required to be included as part of this plan. Required strategies include a program for universal metering, measures to determine and control water loss, a program of continuing public education, and a non-promotional water rate structure. If a public water supplier serves over 5,000 people, they are additionally required to have a conservation-oriented rate structure and a program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system.

Screening of BMPs

To assess the appropriateness of conservation BMPs for Region F, 70 potential strategies were identified and a screening level evaluation was conducted. The screening evaluation was performed both for entities with populations less than 20,000 and entities with populations greater than 20,000. If an entity's population crossed the 20,000 person threshold, the larger city strategies and assumptions were applied to the appropriate decades. The evaluation considered six criteria:

- Cost
- Potential Water Savings
- Time to Implement
- Public Acceptance

- Technical Feasibility
- Staff Resources

Each criterion was scored from 1 to 5 with 5 being the most favorable. Scores for all the criteria were added to create a composite score. The strategies were then ranked and selected based on their composite score. These strategies were selected for purposes of estimating savings and costs for planning purposes only. Region F supports all of the 70 BMPs an individual water user group may choose to employ and all are considered to meet regulatory requirements for consistency with this plan.

Selected Strategies for Entities under 20,000

Based on the screening level evaluation and requirements from the TCEQ, the following strategies were selected for consideration for entities in Region F with less than 20,000 people:

- Education and Outreach
- Water Audits and Leak Repair
- Rate Structure
- Water Waste Ordinance

Selected Strategies for Entities over 20,000

Based on the screening level evaluation and requirements from the TCEQ, the following strategies were selected for consideration for entities in Region F with more than 20,000 people:

- Education and Outreach
- Water Audits and Leak Repair
- Rate Structure
- Water Waste Ordinance
- Landscape Ordinance
- Time of Day Watering Limit

These strategies were evaluated individually for each water user as appropriate (greater than or less than 20,000) and the water savings and costs are aggregated for the selected strategies with the exception of the water audit and leak repair strategy. This strategy was considered separately for each water user because the quantity of savings and associated cost was quite variable. For smaller cities, a robust leak detection and repair program may not be cost effective, especially if the savings are small. This strategy is discussed separately in this Appendix.

For the purposes of strategy evaluation, each household was assumed to have an average of three people. The following assumptions were used in the evaluation of the selected municipal conservation measure.

Education and Outreach

Local officials would offer water conservation education to schools and civic associations, include information in water bills, and provide pamphlets and other materials as appropriate. It was assumed that the education and outreach programs would be needed throughout the planning period in order to maintain the level of water savings.

Potential Savings Assumptions

- Education and Outreach has an assumed water savings of 5,000 gallons per household per year with 30% adoption rate (assumes that 30% of the customers respond to this measure by reducing water use).

Costs Assumptions

- Education and Outreach has a $2.75 per person per year with a maximum cost of $15,000 for entities with a population less than 20,000.
- Education and Outreach costs $1.80 per person per year for entities with a population greater 20,000.

Rate Structure

Local officials would implement an increasing block rate structure where the unit cost of water increases as consumption increases. Increasing block rate structures discourage the inefficient use or waste of water. Many cities already have a non-promotional rate structure. This strategy assumes that the entity adopts a higher level of a non-promotional rate structure.

Potential Savings Assumptions

- Increasing block rates is projected to save 6,000 gallons per household per year with a 10% adoption rate (assumes that 10% of the customers respond to this measure by reducing water use).

Costs Assumptions

- It is likely the entity would do any rate structure modifications themselves and incur no additional costs.

Water Waste Ordinance

Local officials would implement an ordinance prohibiting water waste such as watering of sidewalks and driveways or runoff into public streets. would treat about half of

Potential Savings Assumptions

- The assumed savings are 3,000 gallons per household per year with a 30% adoption rate for entities with a population less than 20,000 and 50% adoption rate for entities with a population greater than 20,000.

Costs Assumptions

- Annual enforcement costs $2,500 per year for entities with a population less than 20,000.
- Annual enforcement costs $10,000 per year for entities with a population greater than 20,000.

Landscape Ordinance (Entities with a population greater than 20,000)

Local officials would implement an ordinance that would promote residential plantings that conserve water for all new construction.

Potential Savings Assumptions

- Landscape ordinances would only apply to only new construction.
- Would include both residential and commercial properties.
- Assumed to save 1,000 gallons per increased number of households per year with 100% adoption rate.

Costs Assumptions

- Annual enforcement cost of $10,000 per year for entities with a population greater than 20,000.

Time of Day Watering Limit Landscape Ordinance (Entities greater than 20,000)

Local officials would implement an ordinance prohibiting outdoor watering during the hottest part of the day when most of that water is lost (wasted) through evaporation. Many ordinances limit outdoor watering to between 6 p.m. and 10 a.m. on a year round basis.

Potential Savings Assumptions

- Savings of 1,000 gallons per household per year.
- 75 percent of the population would realize these savings (the other 25 percent is either not irrigating or already abide by this practice).

Costs Assumptions

- Annual enforcement cost of $10,000 per year for entities with a population greater than 20,000.

Time to Implement

For planning purposes, it is assumed that all but one of the BMPs identified here could be adopted and in place by 2023, the TWDB cutoff date for listing the water volumes in the 2020 decade. The landscape ordinance, which is an identified for entities with a population of greater than 20,000, is anticipated to be in place after 2023 but before 2030.

Quantity, Reliability and Cost

Region F as a whole is expected to save around 3,700 acre-feet per year in 2020, increasing to nearly 5,500 acre-feet of savings by 2070. Individual entities are shown to save between 3 and 1,236 acre-feet by 2070. The larger cities show greater quantities of savings due to a larger number of people and additional BMPs. As a percentage, entities are shown to save between 1 and 4 percent of their projected municipal demand. Table C- 1 shows the potential savings from the enhanced conservation measures described above over the next 50 years.

Table C- 1
Estimated Savings from Municipal Conservation (acre-feet per year)

Water User Group	2020	2030	2040	2050	2060	2070
Airline Mobile Home Park	7	7	8	9	10	10
Andrews	45	55	96	111	129	150
Andrews County-Other	14	15	17	18	20	21
Ballinger	12	12	12	12	12	12
Bangs	8	8	8	8	8	8
Balmorhea	2	2	2	2	2	2
Barstow	1	1	1	1	1	1
Big Lake	10	12	12	13	13	14
Big Spring	131	138	140	139	139	139
Brady	18	18	19	19	19	19
Bronte	3	3	3	3	3	3
Brookesmith SUD	25	25	25	25	25	25
Brownwood	61	91	91	91	91	91
Coahoma	8	8	8	8	8	8
Coleman	15	15	15	15	15	15
Coleman County-Other	1	1	1	1	1	1
Coleman County SUD	10	10	10	10	10	10
Colorado City	16	18	18	18	18	19
Concho Rural WSC	20	21	22	23	24	24
Concho County-Other	3	3	3	3	3	3
Crockett County WCID	12	13	13	13	13	13

Water User Group	2020	2030	2040	2050	2060	2070
Crane	11	12	13	13	14	14
DADS SLC	1	1	1	1	1	1
Early	9	9	9	9	9	9
Ector County Utility District	60	84	94	125	137	149
Eden	4	4	4	4	4	4
El Dorado	6	6	6	6	6	6
Fort Stockton	36	39	42	44	46	48
Goodfellow AFB	8	9	9	10	10	11
Grandfalls	1	1	1	1	2	2
Greater Gardendale WSC	12	13	15	17	19	20
Greenwood Water	3	3	4	4	4	5
Iraan	4	4	5	5	5	5
Junction	8	8	8	8	8	8
Kermit	18	18	19	19	19	19
Loraine	2	2	2	2	2	2
Madera Valley WSC	5	5	5	6	6	6
Mason	7	7	7	7	7	7
McCamey	7	7	8	8	8	8
Menard	5	5	5	5	5	5
Mertzon	3	3	3	3	3	3
Midland	631	755	816	882	944	1,012
Miles	3	3	3	3	3	3
Mitchell County Utility	5	5	5	5	5	6
Millersview-Doole WSC	13	14	14	14	14	15
Monahans	23	24	25	26	27	27
North Runnels WSC	5	5	5	5	5	5
Odessa	568	680	752	829	905	990
Pecos	29	31	33	34	35	35
Pecos WCID	9	10	11	11	12	12
Pecos County Fresh Water	2	2	3	3	3	3
Rankin	3	3	3	3	3	3
Richland SUD	3	3	3	3	3	3
Robert Lee	3	3	3	3	3	3
Runnels County-Other	2	2	2	2	2	2
San Angelo	459	532	558	592	629	668
Snyder	41	47	51	55	59	93
Santa Anna	3	4	4	4	4	4
Scurry County-Other	20	22	24	26	28	30
Sonora	9	9	9	10	10	10
Southwest Sandhills WSC	20	22	24	26	28	30
Stanton	8	9	10	10	11	11
Sterling City	3	3	3	3	3	3
Tom Green County FWSD 3	3	4	4	4	5	5
Wickett	2	2	2	2	2	2
Wink	3	4	4	4	4	5
Winters	8	9	9	9	9	9
Zephyr WSC	13	13	13	13	13	13
Total	**2,523**	**2,936**	**3,177**	**3,420**	**3,648**	**3,922**

The reliability of this supply is considered to be medium because of the uncertainty involved in the potential for savings and the degree to which public participation is needed to realize savings. Site specific data regarding residential, commercial, industrial, and other types of use would give a better estimate of the reliable supply from this strategy.

The total average annual cost across Region F for this strategy is over $1.5 million in 2020 increasing to over $2.1 million by 2070. The average unit cost across the region is approximately $606 per acre foot in 2020 and $551 per acre foot in 2070. Unit costs vary considerably between water user groups depending on the population size. Table C- 2 below shows the projected annual cost of implementing the selected conservation strategies. Generally, conservation programs are funded through a city's annual operating budget and are not capitalized. However, in some cases, an entity may choose to capitalize a portion or all of their program. These kinds of costs are difficult to estimate for each individual entity due to the wide variety of factors at play. However, all capital expenditures for conservation are considered consistent with the Region F Plan.

Table C- 2
Annual Cost per Acre-Foot of Municipal Conservation Savings

Water User Group	2020	2030	2040	2050	2060	2070
Airline Mobile Home Park	$1,263	$1,235	$1,202	$1,175	$1,153	$1,134
Andrews	$952	$942	$706	$662	$625	$592
Andrews County-Other	$1,080	$1,061	$1,046	$960	$885	$821
Ballinger	$1,107	$1,101	$1,101	$1,101	$1,101	$1,101
Bangs	$1,221	$1,214	$1,214	$1,214	$1,214	$1,214
Balmorhea	$2,472	$2,369	$2,293	$2,247	$2,212	$2,189
Barstow	$3,068	$2,943	$2,864	$2,804	$2,765	$2,731
Big Lake	$1,139	$1,113	$1,101	$1,090	$1,084	$1,079
Big Spring	$557	$618	$618	$620	$620	$620
Brady	$988	$948	$944	$935	$932	$930
Bronte	$1,647	$1,647	$1,647	$1,647	$1,647	$1,647
Brookesmith SUD	$705	$689	$688	$689	$689	$688
Brownwood	$937	$731	$735	$735	$735	$735
Coahoma	$1,222	$1,208	$1,203	$1,203	$1,203	$1,203
Coleman	$1,065	$1,061	$1,061	$1,061	$1,061	$1,061
Coleman County-Other	$5,095	$5,161	$5,161	$5,161	$5,161	$5,161
Coleman County SUD	$1,144	$1,138	$1,138	$1,138	$1,138	$1,138
Colorado City	$1,054	$986	$967	$957	$948	$938
Concho Rural WSC	$894	$839	$800	$768	$740	$714
Concho County-Other	$1,836	$1,821	$1,821	$1,821	$1,821	$1,821
Crockett County WCID	$1,106	$1,089	$1,086	$1,084	$1,083	$1,083
Crane	$1,120	$1,104	$1,092	$1,083	$1,075	$1,070
DADS SLC	$4,116	$4,116	$4,116	$4,116	$4,116	$4,116
Early	$1,176	$1,170	$1,170	$1,170	$1,170	$1,170
Ector County Utility District	$292	$832	$795	$636	$615	$598
Eden	$1,541	$1,518	$1,518	$1,518	$1,518	$1,518
El Dorado	$1,283	$1,283	$1,283	$1,283	$1,283	$1,283
Fort Stockton	$484	$448	$414	$393	$377	$363
Goodfellow AFB	$1,222	$1,185	$1,168	$1,152	$1,137	$1,123
Grandfalls	$2,804	$2,694	$2,626	$2,572	$2,535	$2,509

Water User Group	2020	2030	2040	2050	2060	2070
Greater Gardendale WSC	$1,108	$1,082	$1,061	$1,035	$939	$859
Greenwood Water	$1,716	$1,654	$1,581	$1,521	$1,471	$1,430
Iraan	$1,501	$1,459	$1,423	$1,394	$1,371	$1,351
Junction	$1,206	$1,203	$1,203	$1,203	$1,203	$1,203
Kermit	$964	$952	$941	$931	$923	$916
Loraine	$2,138	$2,099	$2,075	$2,058	$2,047	$2,039
Madera Valley WSC	$1,425	$1,390	$1,365	$1,349	$1,338	$1,330
Mason	$1,278	$1,278	$1,278	$1,278	$1,278	$1,278
McCamey	$1,264	$1,236	$1,225	$1,214	$1,207	$1,203
Menard	$1,442	$1,442	$1,442	$1,442	$1,442	$1,442
Mertzon	$1,886	$1,875	$1,875	$1,875	$1,875	$1,875
Midland	$436	$432	$433	$432	$430	$428
Miles	$1,730	$1,614	$1,614	$1,614	$1,614	$1,614
Mitchell County Utility	$1,407	$1,371	$1,361	$1,355	$1,351	$1,347
Millersview-Doole WSC	$1,088	$1,081	$1,077	$1,074	$1,071	$1,068
Monahans	$763	$720	$692	$671	$656	$645
North Runnels WSC	$1,407	$1,388	$1,383	$1,380	$1,377	$1,375
Odessa	$440	$436	$435	$432	$430	$427
Pecos	$607	$567	$538	$520	$507	$498
Pecos WCID	$1,166	$1,147	$1,131	$1,118	$1,108	$1,099
Pecos County Fresh Water	$1,985	$1,909	$1,846	$1,793	$1,750	$1,716
Rankin	$1,848	$1,776	$1,746	$1,718	$1,701	$1,690
Richland SUD	$1,712	$1,679	$1,676	$1,668	$1,666	$1,665
Robert Lee	$1,672	$1,672	$1,672	$1,672	$1,672	$1,672
Runnels County-Other	$1,953	$1,927	$1,949	$1,965	$1,978	$1,988
San Angelo	$448	$451	$453	$450	$447	$444
Snyder	$957	$949	$945	$942	$938	$720
Santa Anna	$1,623	$1,606	$1,606	$1,606	$1,606	$1,606
Scurry County-Other	$863	$793	$736	$680	$632	$589
Sonora	$1,187	$1,168	$1,161	$1,156	$1,153	$1,152
Southwest Sandhills WSC	$863	$793	$736	$680	$632	$589
Stanton	$1,199	$1,171	$1,154	$1,140	$1,131	$1,124
Sterling City	$1,759	$1,728	$1,718	$1,718	$1,718	$1,718
Tom Green County FWSD 3	$1,616	$1,540	$1,504	$1,470	$1,438	$1,409
Wickett	$2,487	$2,396	$2,338	$2,296	$2,263	$2,240
Wink	$1,665	$1,597	$1,550	$1,505	$1,474	$1,449
Winters	$1,191	$1,183	$1,183	$1,183	$1,183	$1,183
Zephyr WSC	$1,091	$1,087	$1,087	$1,087	$1,087	$1,087
Total	***$606***	***$600***	***$589***	***$574***	***$563***	***$551***

Environmental Factors
There are no identified environmental issues associated with this strategy. This strategy may have a positive impact on the environment by reducing the quantity of water needed to meet future demands.

Agricultural and Rural Impacts
Due to the limited availability of water, any municipal water user group may be competing with agricultural users for water. Reducing the demand on limited resources could have positive impacts on water availability for agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality
No impacts to natural resources or key parameters of water quality were identified for this strategy since it reduces demands and does not actually develop new supplies.

Impacts on Other Water Resources and Management Strategies
This may reduce the demand for water from other water management strategies. It may also reduce available supplies for reuse strategies. However, if much of the water saved is associated with outdoor water use, this impact would be negligible.

Other Issues Affecting Feasibility
This strategy is based on generic procedures and may not accurately reflect the actual costs or water savings that can be achieved by an individual water user group. Site specific data will be required for a better assessment for the potential for conservation in Region F. Technical and financial assistance by the State may be required to implement this strategy.

WUG:	**Multiple Municipal WUGs**	**Capital Cost:**	$16,500,000
WMS Name:	**Water Audits and Leak Repairs**	**Annual Cost** (During Amortization):	$1,152 per acre-foot $3.53 per 1,000 gal
WMS Type:	Conservation		
WMS Yield:	330 – 339 acre-feet per year	**Annual Cost** (After Amortization):	N/A
WMS Status:	Recommended	**Implementation:**	2020 and 2040

Strategy Description

Water losses in distribution systems can account for significant portions of water demand in some cases. Water losses tend to be higher in systems with fewer users per mile of pipeline. Identifying and repairing leaks in water distribution and transmission lines can help reduce demands by reducing water waste throughout the system. As part of this strategy, local officials would perform a system wide water audit and create a program of leak detection and repair, including infrastructure replacement and repair as necessary. It was assumed that the leak detection and repair program is an ongoing activity to maintain the level of water loss reductions assumed below. Advanced Metering Infrastructure (AMI) is one potential way to enhance the ability of local officials to perform water audits. While no entities in Region F have expressed interest in developing AMI at this time, development of this infrastructure is considered consistent with the 2021 Region F Water Plan.

Potential Savings Assumptions

- If TWDB water loss data was available for the entity, it was utilized.
- This strategy was considered for all cities with greater than or equal to 15% losses.
- This strategy was considered for all Water Supply Corporations (WSCs) or Special Utility Districts (SUDs) with greater than or equal to 25% losses.
- It was assumed that 20% of an entity's losses could be recovered through a water audit and leak repair program.
- If no water loss data was available, this strategy was not considered for an entity.

Costs Assumptions

- Water Audits and Leak Repairs has $5,000 base cost plus $10 per person for entities with a population less than 20,000.
- Water Audits and Leak Repairs costs $10 per person for entities with a population greater than 20,000.
- Capital costs from the Water Audits and Leak Repairs strategy and applicable debt services are calculated every twenty years, i.e., the recommended debt service period for non-reservoir infrastructure from TWDB general costing guidelines.
- It is assumed that an entity would finance repairs every 20 years, resulting in a capital cost in years 2020, 2040, and 2060.

Quantity, Reliability and Cost

The estimated quantity of supply for this strategy is uncertain due to lack of detailed data. Savings range from 18 to 118 acre-feet for individual entities with a population under 20,000 throughout the planning period. No entities with a population over 20,000 met the required loss thresholds to be considered for this strategy. Across Region F, it is estimated that nearly 330 acre-feet of supply could be obtained through a water audits and leak repairs program in 2020. This increases to around 340 acre-feet of savings by 2070. Table C- 3 shows the estimated savings by water user group.

The reliability of this supply is considered to be low due to uncertainty associated with estimated savings and the extent to which this strategy relies on individual utilities to adopt a water audits and leak repairs program, which can be costly and time intensive, especially for smaller users.

Due to the relatively high costs of implementing this strategy, especially for smaller or rural water user groups, this strategy may not be feasible. The estimated cost is shown in Table C- 4.

Table C- 3
Water Audits and Leak Repairs Savings (acre-feet per year)

Water User Group	2020	2030	2040	2050	2060	2070
Brookesmith SUD	81	81	79	78	78	78
Coleman	59	58	57	57	57	57
Millersview-Doole WSC	65	66	65	66	67	68
Sonora	106	112	114	116	117	118
Zephyr WSC	19	19	18	18	18	18
Total	**330**	**336**	**333**	**335**	**337**	**339**

Table C- 4
Water Audits and Leak Repairs Cost Per Acre-Foot

Water User Group	2020 Capital Cost	2040 Capital Cost	2060 Capital Cost	Cost ($/ac-ft/yr)					
				2020	2030	2040	2050	2060	2070
Brookesmith SUD	$1,737,000	$1,756,500	$1,756,500	$1,509	$1,509	$1,564	$1,584	$1,584	$1,584
Coleman	$1,074,800	$1,085,600	$1,085,600	$1,282	$1,304	$1,340	$1,340	$1,340	$1,340
Millersview-Doole WSC	$965,800	$1,009,100	$1,040,100	$1,045	$1,030	$1,092	$1,076	$1,092	$1,076
Sonora	$679,900	$720,800	$734,800	$451	$427	$445	$437	$442	$438
Zephyr WSC	$944,700	$954,800	$954,800	$3,498	$3,498	$3,732	$3,732	$3,732	$3,732
Total	**$5,402,200**	**$5,526,800**	**$5,571,800**	**$1,152**	**$1,131**	**$1,168**	**$1,161**	**$1,163**	**$1,156**

Environmental Factors
Environmental issues associated with this strategy are expected to be minimal since it is only the repair of infrastructure currently in place. This strategy may have a positive impact on the environment by reducing the quantity of water needed to meet future demands.

Agricultural and Rural Impacts
Due to the limited availability of water, any municipal water user group may be competing with agricultural users for water. Reducing the demand on limited resources could have positive impacts on water availability for agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality
Impacts to natural resources of key parameters of water quality are expected to be minimal since it only involves the repair of existing infrastructure and no new facilities.

Impacts on Other Water Resources and Management Strategies
This may reduce the demand for water from other water management strategies.

Other Issues Affecting Feasibility
This strategy is based on generic procedures and may not accurately reflect the actual costs or water savings that can be achieved by an individual water user group. Site specific data will be required for a better assessment for the potential for conservation in Region F. Due to high costs, many smaller and rural water user groups may find this strategy to be unfeasible. Technical and financial assistance by the State may be required to implement this strategy.

WUG:	**Irrigation WUGs**	**Capital Cost:**	$45,800,000
WMS Name:	**Irrigation Conservation**	**Annual Cost** (During Amortization):	$21 per acre-foot $0.06 per 1,000 gal
WMS Type:	Conservation		
WMS Yield:	23,000 – 60,000 acre-feet per year	**Annual Cost** (After Amortization):	$0 per acre-foot $0 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Irrigation conservation is a strategy that proactively causes a decrease in future water needs by increasing the efficiency of current irrigation practices throughout the region. The adoption of irrigation conservation will help preserve the existing water resources for continued agriculture use and provide for other demands. Irrigation efficiency increases can be achieved by implementing a combination of strategies that lead to irrigation demand reductions. These may include but are not limited to:

- Changes in irrigation equipment
- Crop type changes and crop variety changes
- Conversion from irrigated to dry land farming
- Water loss reduction in irrigation canals

Region F recognizes that it has no authority to implement, enforce, or regulate irrigation conservation practices. These water conservation practices are intended to be guidelines. Water conservation strategies determined and implemented by the individual water user group superseded the recommendations in this plan and are considered to meet regulatory requirements for consistency with this plan.

Region F recommends improvements in the efficiency of irrigation equipment as an effective water conservation strategy for irrigation within Region F. This strategy replaces less efficient irrigation systems with new equipment types with higher efficiency ratings. These can include

- Furrow irrigation (FF) – 60 percent
- Surge flow (SF) – 75 percent
- Mid-elevation sprinkler application (MESA) – 78 percent
- Low-elevation sprinkler application (LESA) – 88 percent
- Low Energy Precision Application (LEPA) – 95 percent
- Subsurface Drip Irrigation (DRIP) – 97 percent

Any changes from a less efficient irrigation technology to a more efficient irrigation technology will save water and help the water user group reach a higher water use efficiency overall.

Crop type changes and crop variety changes

Certain crops are more water intensive than others. Shifting higher water use crops to lower water use crops could generate substantial water savings. Similarly, shifting long season to short season varieties is another water savings strategy. However, lower yields are typically associated with short season varieties (assuming the same irrigation technology). Additionally, advanced plant breeding has played a major role in increasing crop productivity and enhancing the efficiency of input such as irrigation. The adoption of drought resistant varieties with high water use efficiency can be a potential water conservation strategy.

Conversion from irrigated to dryland farming

Reducing the amount of irrigated acreage in Region F will reduce the amount of water applied to crops in the area. While converting from an irrigated to dryland cropping system may be a viable economic alternative for many Region F producers, only a limited number of dryland crops may be able to be produced profitably in the area. Region F also has an extensive dryland farming community. Further conversion may be limited.

Water loss reduction in irrigation canals

Many irrigation canals in Region F are open and unlined. This allows water to be lost both to evaporation and seepage into the ground. By lining these canals, seepage can be reduced and a larger portion of the water can go towards the beneficial use of crop irrigation. Converting these canals to a pipe system would save larger amounts of water by eliminating seepage and evaporation losses. However, the cost of doing this is likely prohibitive.

Assumptions

Depending on the method employed to achieve irrigation conservation, the composition of crops grown, sources of water, and method of delivery, will impact the potential savings and costs of this strategy. Since Region F does not have data on county-specific irrigation equipment employed by crop type, a general approach to irrigation conservation savings was taken. For planning purposes, a 5% increase in irrigation efficiency was assumed in decades 2020, 2030 and 2040. The efficiency level was held constant for decades 2050, 2060, and 2070. A maximum regional efficiency level of 85% was assumed. For planning purposes, it was assumed that on average, irrigation conservation would have a capital cost of $760 per acre-foot saved. This is based on the Water Conservation Implementation Task Force Water Conservation Best Management Practices cost per acre for irrigation equipment changes indexed to December 2018 dollars.

Time to Implement

For planning purposes, it was assumed that these strategies would be implemented in phases over the first 3 decades of the planning period (2020, 2030, and 2040).

Quantity, Reliability and Cost

This strategy is estimated to save nearly 23,000 acre-feet of supply in 2020 and around 60,000 acre-feet in 2070. Savings by county are presented in Table C- 5.

The reliability of this supply is considered to be medium due to lack of data and uncertainty involved in estimating the amount of supply that can be saved and the extent to which this strategy relies on the behavior of each individual irrigator.

The region wide capital cost and annual cost per acre-foot and per thousand gallons are shown in Table C-6. The annual cost per acre-foot was estimated at $31.01 during amortization. This will vary greatly depending on the individual circumstances and irrigation conservation strategy employed by each individual irrigator.

Table C- 5
Irrigation Conservation Savings (acre-feet per year)

County Name	2020	2030	2040	2050	2060	2070
Andrews	1,018	2,037	2,037	2,037	2,037	2,037
Borden	147	295	295	295	295	295
Brown	406	650	650	650	650	650
Coke	34	69	83	83	83	83
Coleman	23	47	47	47	47	47
Concho	245	490	539	539	539	539
Crane	0	0	0	0	0	0
Crockett	7	14	20	20	20	20
Ector	38	76	113	113	113	113
Glasscock	2,050	2,050	2,050	2,050	2,050	2,050
Howard	344	688	757	757	757	757
Irion	53	105	158	158	158	158
Kimble	133	266	319	319	319	319
Loving	0	0	0	0	0	0
Martin	1,825	3,649	5,474	5,474	5,474	5,474
Mason	248	497	745	745	745	745
McCulloch	116	232	349	349	349	349
Menard	183	366	549	549	549	549
Midland	905	1,811	2,716	2,716	2,716	2,716
Mitchell	256	256	256	256	256	256
Pecos	7,167	14,335	21,502	21,502	21,502	21,502
Reagan	1,102	2,203	3,305	3,305	3,305	3,305
Reeves	2,947	5,894	8,841	8,841	8,841	8,841
Runnels	155	311	373	373	373	373
Schleicher	91	109	109	109	109	109
Scurry	378	756	983	983	983	983
Sterling	45	90	135	135	135	135
Sutton	56	112	168	168	168	168
Tom Green	2,125	4,249	5,099	5,099	5,099	5,099
Upton	520	1,040	1,560	1,560	1,560	1,560
Ward	158	316	474	474	474	474
Winkler	175	351	526	526	526	526
Total	***22,950***	***43,364***	***60,232***	***60,232***	***60,232***	***60,232***

Table C- 6
Irrigation Conservation Costs

	2020	2030	2040	2050	2060	2070
Region F Capital Cost	$17,442,684	$15,511,646	$12,819,946	$0	$0	$0
Annual Cost per acre-foot	$20.89	$20.89	$12.93	$5.85	$0.00	$0.00
Annual Cost per 1,000 gal	$0.06	$0.06	$0.04	$0.02	$0.00	$0.00

Environmental Factors

Most of the areas in Region F with significant irrigation needs rely on groundwater for irrigation. In areas where conserved groundwater finds expression as springs or base flow, conservation will have a positive impact. However, in most cases irrigation demand exceeds available supply even with implementation of advanced irrigation technologies. This strategy is expected to have a minimal impact on the environment, either positive or negative.

Agricultural and Rural Impacts

Irrigated agriculture is vital to the economy and culture of Region F. Implementation of water-conserving irrigation practices may be necessary to retain the economic viability of many areas that show significant water supply needs throughout the planning period. Water conservation measures identified as part of this strategy could have positive or negative economic impacts to agricultural communities, depending on the selected BMPs. However, the BMPs selected by the individual producer would have to be economically feasible or the producer would not implement the BMP. No agricultural acreage is expected to be taken out of production with this strategy. Some producers may choose to change crop types or convert to dry land farming, but total acreage is not expected to decrease. For purposes of this analysis, it is assumed that up to 3 percent of the total irrigated acreage is converted to dryland farming in counties with an irrigation water shortage.

Impacts to Natural Resources and Key Parameters of Water Quality

In areas where conserved water can be used to enhance the environment (increase spring flow, base flow or streamflow), irrigation conservation will positively impact natural resources and water quality. However, in areas where the demand already exceeds available supply, impacts will be minimal to none.

Impacts on Other Water Resources and Management Strategies

This may reduce the demand for water from other water management strategies involving irrigation water user groups.

Other Issues Affecting Feasibility

The most significant issue associated with the implementation of this strategy is the lack of a clear sponsor for the strategy. Although the TWDB and other state and federal agencies may sponsor many irrigation programs, for most irrigation conservation measures, the actual implementation is the responsibility of the individual irrigators. Because this strategy relies largely on individual behavior, it is difficult to quantify the actual savings that can be achieved.

The economic viability of irrigation conservation is critical to its implementation. Changing crop prices can impact the ability of a producer to implement conservation practices while maintaining profitability.

Another significant factor is the lack of detailed data on both irrigation equipment in use and the quantity of water used for individual crops. The conservation calculations included in this analysis were hampered by the lack of current data for these two items.

WUG:	**Mining WUGs**	**Capital Cost:**	$111,6600,000
WMS Name:	**Mining Conservation (Recycling)**	**Annual Cost** (During Amortization):	$655 per acre-foot $2.01 per 1,000 gal
WMS Type:	Conservation		
WMS Yield:	1,493 – 5,494 acre-feet per year	**Annual Cost** (After Amortization):	$0 per acre-foot $0 per 1,000 gal
WMS Status:	Recommended	Implementation:	2020

Strategy Description

Mining conservation or recycling is a demand management strategy that decreases future water needs by treating and reusing water used in mining operations. Mining conservation and recycling is possible for both oil and gas mining as well as sand and gravel mining. Mining recycling and conservation was considered for all mining operations in Region F.

The majority of mining demand in Region F is driven by the oil and gas boom in the Permian Basin which underlies most of Region F. Therefore, much of this discussion is focused on recycling by the oil and gas industry in the Permian Basin.

According to the September 2012 *Oil & Gas Water Use in Texas: Update to the 2011 Mining Water Use Report* done by the Bureau of Economic Geology[1], very little water was reused/recycled as of 2011 in the Permian Basin, compared to other areas in the state. However, significantly more brackish water is used in the region.

Play / Region	Type	Current (2011) %
Permian Far West	Recycled/reused	0%
	Brackish	80%
	Fresh	**20%**
Permian Midland	Recycled/reused	2%
	Brackish	30%
	Fresh	**68%**
Anadarko Basin	Recycled/reused	20%
	Brackish	30%
	Fresh	**50%**
Barnett Shale	Recycled/reused	5%
	Brackish	3%
	Fresh	**92%**
Eagle Ford Shale	Recycled/reused	0%
	Brackish	20%
	Fresh	**80%**
East Texas Basin	Recycled/reused	5%
	Brackish	0%
	Fresh	**95%**

The amount of water than can be reused/recycled is dependent on the amount of flowback. Flowback refers to the water based solution that flows back to the surface during and after the completion of the hydraulic fracturing. The fluid contains clays, chemical additives, dissolved metal ions and total dissolved solids (TDS). The volume of flowback varies across plays but is generally between 20-40% in the Permian Basin. For planning purposes, it is assumed that 20% of water used for mining purposes will be available through flowback and can be reused/recycled.

The flowback water is of low quality and requires treatment or must be blended with fresh water. The process used to recycle/reuse water can employ either conventional treatment or advanced treatment technologies. Conventional treatment technologies include flocculation, coagulation, sedimentation, filtration and lime softening. Advanced treatment technologies include reverse osmosis membranes, thermal distillation, evaporation, and/or crystallization processes and often use more energy than conventional treatment. It is assumed that 30% of the flowback water will be lost during the treatment process.

As competition for water grows, and water resources become more scarce, individual mining operators may find it more attractive to implement a reuse/recycling strategy. Reusing/recycling flow back water may also reduce brine disposal costs for the operator to help offset the cost of treatment and transportation. Ultimately, the decision to implement this strategy will be based on the economics of each individual well field. If brackish water is readily available and not in demand by other users, it may be more attractive to use brackish supplies. For planning purposes, it is assumed that adoption rates of this strategy will depend on the county mining water supply availability. In this case, the following assumptions are made:

- If there is a mining water shortage, the county will adopt this strategy 50% of the time
- If there is no mining shortage, the county will adopt this strategy 30% of the time
- If there is a surplus of mining water, the county will adopt this strategy 10% of the time

Region F recognizes that it has no authority to implement, enforce, or regulate water conservation practices. These water conservation practices are intended to be guidelines. Any water management strategies that reduce the demand for mining water are considered to meet regulatory requirements for consistency with this plan.

Quantity, Reliability and Cost

The estimated quantity available from this strategy is around 5,500 acre-feet in 2020 and nearly 1,500 acre-feet in 2070 when demands have decreased significantly. Estimated savings by county are shown in the table below. The actual quantity of water available from this strategy will vary. Since this strategy is largely dependent on each individual operator and economic factors specific to each mining operation, it is difficult to estimate the actual quantity of water that could be made available through this strategy.

The reliability of this supply is considered to be low because of the uncertainty involved in the potential for savings and the degree to which participation of mining companies is needed to realize savings.

Table C- 7
Mining Conservation (Recycling) Supplies (acre feet per year)

Mining Conservation (Recycling) Supplies						
County	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Andrews	277	260	222	176	135	104
Borden	29	39	33	21	10	5
Brown	66	66	67	67	66	66
Coke	20	20	18	16	14	12
Coleman	5	4	4	4	3	3
Concho	20	20	18	15	13	12
Crane	26	35	36	29	22	17
Crockett	315	315	43	24	7	3
Ector	28	30	27	22	18	15
Glasscock	248	248	189	134	88	63
Howard	143	143	101	59	25	13
Irion	322	322	231	28	14	7
Kimble	1	1	1	1	1	1
Loving	525	525	462	378	301	238
Martin	302	302	227	49	27	14
Mason	43	40	30	24	19	16
McCulloch	375	351	279	236	203	176
Menard	46	45	40	35	30	26
Midland	445	445	344	231	46	32
Mitchell	25	31	27	21	16	12
Pecos	539	539	539	434	67	52
Reagan	445	445	323	62	24	8
Reeves	882	882	847	693	546	434
Runnels	11	11	10	9	8	7
Schleicher	26	31	24	16	10	6

Mining Conservation (Recycling) Supplies						
County	2020	2030	2040	2050	2060	2070
Scurry	20	32	34	25	17	12
Sterling	33	40	34	22	11	6
Sutton	19	30	32	24	16	11
Tom Green	44	45	47	47	48	49
Upton	101	101	80	53	32	22
Ward	80	80	71	55	38	25
Winkler	33	49	42	32	22	16
Total	***5,494***	***5,527***	***4,482***	***3,042***	***1,897***	***1,483***

The costs associated with this strategy vary based on the amount of flowback, the geographic location of the flowback, the amount of treatment required and transportation distances required. For the purposes of this plan, a $20,000 per acre-foot capital investment for the maximum amount of water saved over the planning period was assumed. This investment was amortized over 20 years. However, individual operators may plan to invest the capital with no debt service and would likely implement capital improvements at the level needed for each decade. The costs in Table C- 8 assume a single capital investment beginning in 2020. A 10 cent per barrel ($775 per acre-foot) annual savings from not having to dispose of the brine was assumed for the decades with capital cost. If an operator continued to employ this strategy in the later decades, they may realize a net savings over treating and disposing of the brine. However, for planning purposes, the annual cost was assumed to be $0 after the capital investment is paid off.

Table C- 8
Mining Conservation (Recycling) Costs

County	Capital Cost	Annual Cost Per Acre-Foot					
		2020	2030	2040	2050	2060	2070
Andrews	$5,540,000	$632	$724	$0	$0	$0	$0
Borden	$780,000	$1,117	$632	$0	$0	$0	$0
Brown	$1,340,000	$654	$654	$0	$0	$0	$0
Coke	$400,000	$632	$632	$0	$0	$0	$0
Coleman	$100,000	$632	$984	$0	$0	$0	$0
Concho	$400,000	$632	$632	$0	$0	$0	$0
Crane	$720,000	$1,173	$672	$0	$0	$0	$0
Crockett	$6,300,000	$632	$632	$0	$0	$0	$0
Ector	$600,000	$733	$632	$0	$0	$0	$0
Glasscock	$4,960,000	$632	$632	$0	$0	$0	$0
Howard	$2,860,000	$632	$632	$0	$0	$0	$0
Irion	$6,440,000	$632	$632	$0	$0	$0	$0
Kimble	$20,000	$632	$632	$0	$0	$0	$0
Loving	$10,500,000	$632	$632	$0	$0	$0	$0
Martin	$6,040,000	$632	$632	$0	$0	$0	$0
Mason	$860,000	$632	$738	$0	$0	$0	$0
McCulloch	$7,500,000	$632	$728	$0	$0	$0	$0
Menard	$920,000	$632	$663	$0	$0	$0	$0
Midland	$8,900,000	$632	$632	$0	$0	$0	$0
Mitchell	$620,000	$970	$632	$0	$0	$0	$0
Pecos	$10,780,000	$632	$632	$0	$0	$0	$0
Reagan	$8,900,000	$632	$632	$0	$0	$0	$0
Reeves	$17,640,000	$632	$632	$0	$0	$0	$0
Runnels	$220,000	$632	$632	$0	$0	$0	$0

County	Capital Cost	Annual Cost Per Acre-Foot					
		2020	2030	2040	2050	2060	2070
Schleicher	$620,000	$903	$632	$0	$0	$0	$0
Scurry	$680,000	$1,617	$720	$0	$0	$0	$0
Sterling	$800,000	$931	$632	$0	$0	$0	$0
Sutton	$640,000	$1,595	$726	$0	$0	$0	$0
Tom Green	$980,000	$792	$757	$0	$0	$0	$0
Upton	$2,020,000	$632	$632	$0	$0	$0	$0
Ward	$1,600,000	$632	$632	$0	$0	$0	$0
Winkler	$980,000	$1,315	$632	$0	$0	$0	$0
Total	**$111,660,000**	**$655**	**$646**	**$0**	**$0**	**$0**	**$0**

Environmental Factors

There are no identified environmental issues associated with this strategy. This strategy may have a positive impact on the environment by reducing the quantity of water needed to meet future demands and reducing the waste disposal of flowback water.

Agricultural and Rural Impacts

Due to the limited availability of water, any mining operation may be competing with agricultural and rural users for water. Reducing the demand on limited resources could have positive impacts on water availability for agriculture and rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

No impacts to natural resources or key parameters of water quality were identified for this strategy since it reduces demands and does not develop new supplies. Positive impacts due to reduced wastewater discharges, which were likely disposed of through deep well injection, are possible.

Impacts on Other Water Resources and Management Strategies

This may reduce the demand for water from other water management strategies involving mining water user groups.

Other Issues Affecting Feasibility

Since this strategy relies largely on the behavior of each individual mining company, it is difficult to quantify the expected level of savings. This strategy is based on generic procedures and may not accurately reflect the actual costs or water savings that can be achieved by an individual mining operator. Site specific data will be required for a better assessment for the potential for mining conservation (recycling/reuse) in Region F.

WUG:	**Multiple**	**Capital Cost:**	$0
WMS Name:	**Subordination of Downstream Water Rights**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Subordination	**Annual Cost** (After Amortization):	N/A
WMS Yield:	43,597 – 42,993 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

The TWDB requires the use of the TCEQ Water Availability Models (WAM) for regional water planning. Most of the water rights in Region F are in the Colorado River Basin. Chapter 3 discusses the use of the WAM models for water supply estimates and the impacts to the available supplies in the Upper Colorado River Basin. The Colorado WAM assumes that senior lower basin water rights would continuously make priority calls on Region F water rights. This assumption is not in line with the historical operation of the Colorado River Basin and likely underestimates the amount of surface water supplies available in Region F.

Although the Colorado WAM does not give an accurate assessment of water supplies based on the way the basin has historically been operated, TWDB requires the regional water planning groups to use the WAM to determine supplies. Therefore, several sources in Region F have no supply by definition, even though in practice their supply may be greater than indicated by the WAM. According to the WAM, the Cities of Ballinger, Brady, Coleman, Junction, and Winters and their customers have no water supply. The Morgan Creek power plant has no supply to generate power. The Cities of Big Spring, Bronte, Coahoma, Midland, Miles, Odessa, Robert Lee, San Angelo, Snyder and Stanton do not have sufficient water to meet current demands. Overall, the Colorado WAM shows shortages that are the result of modeling assumptions and regional water planning rules rather than the historical operation of the Colorado Basin. This would indicate Region F needs to immediately spend significant funds on new water supplies, when in reality the magnitude of the indicated water shortages are not justified. Conversely, the WAM model shows more water in Region K (Lower Colorado Basin) than may actually be available.

One way for the planning process to reserve water supplies for these communities and their customers is to assume that downstream senior water rights do not make priority calls on major Region F municipal water rights, a process referred to as subordination. This assumption is similar to the methodology used to evaluate water supplies in previous water plans.

Because this strategy impacts water supplies outside of Region F, coordination with the Lower Colorado Regional Water Planning Group (Region K) was conducted. For the development of the 2006 regional water plans, a joint modeling effort was conducted with Region K and an agreement was reached for planning purposes. In subsequent planning cycles, Region K developed its own version of this subordination strategy, called the “cutoff model” that modified the priority dates for all water rights above Lakes Ivie and Brownwood. Region F has adopted the premise of the Region K’s cutoff model with only minor variations for purposes of the subordination strategy in this plan.

Figure C- 2 shows the divide between the upper and lower basin and depict which reservoirs were included in the subordination modeling. For the 2021 Region F Plan, the Region K model developed for LCRA with hydrology through December 2016 was used for subordination modeling.

The Region F model differs from the Region K model by including the City of Junction's run-of-river rights in the upper basin. Other refinements to the subordination modeling include modifications for the Pecan Bayou. To better reflect reality, an assumption was made that the upstream reservoirs hold inflows that would have been passed to Lake Brownwood under strict priority analysis if Lake Brownwood is above 50 percent of the conservation capacity. This scenario provides additional supplies in the upper watershed while allowing Lake Brownwood to make priority calls at certain times during drought, i.e., when Lake Brownwood is below 50 percent of the conservation pool.

Two reservoirs providing water to the Brazos G planning region were included in the subordination analysis. Lake Clyde is located in Callahan County and provides water to the City of Clyde. Oak Creek Reservoir is located in Region F and supplies a small amount of water to water user groups within the region. Oak Creek Reservoir is owned and operated by the City of Sweetwater, which is in the Brazos G Region. Both Clyde and Sweetwater have other sources of water in addition to the supplies in the Colorado Basin.

The subordination strategy modeling was conducted for regional water planning purposes only. By adopting this strategy, the Region F Water Planning Group does not imply that the water rights holders have agreed to relinquish the ability to make priority calls on junior water rights. The Region F Water Planning Group does not have the authority to create or enforce subordination agreements. Such agreements must be developed by the water rights holders themselves. Region F recommends and supports ongoing discussions on water rights issues in the Colorado Basin that may eventually lead to formal agreements that reserve water for Region F water rights.

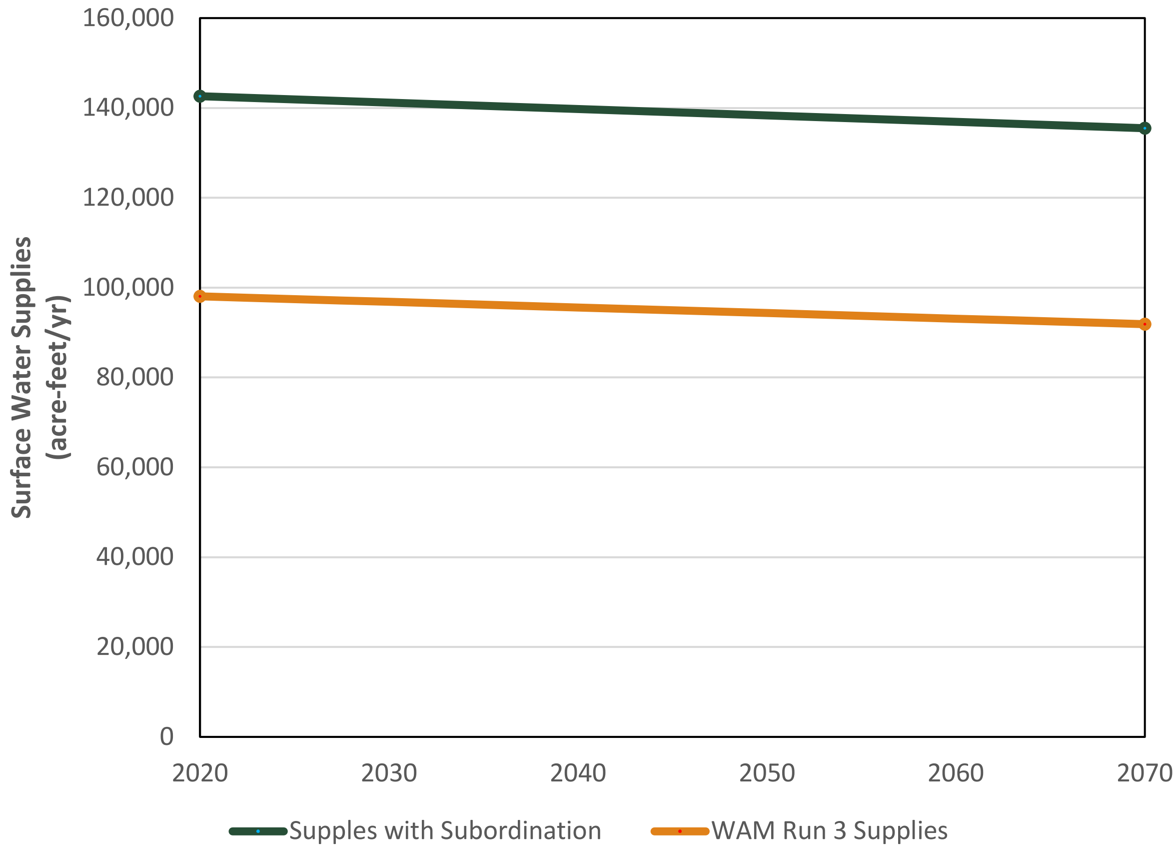
For three water suppliers, additional infrastructure was identified to fully utilize the subordinated supplies. These entities include the Cities of Odessa, Junction and Big Spring. Big Spring requires expansion of its water treatment facilities to meet its future demands. Odessa is implementing advanced treatment of the subordinated supplies to improve water quality, and Junction requires infrastructure improvements to its intake for quantity and quality concerns. Each of these improvements is discussed under Expanded Use of Existing Water Supplies in this appendix. The associated costs are shown in Appendix D.

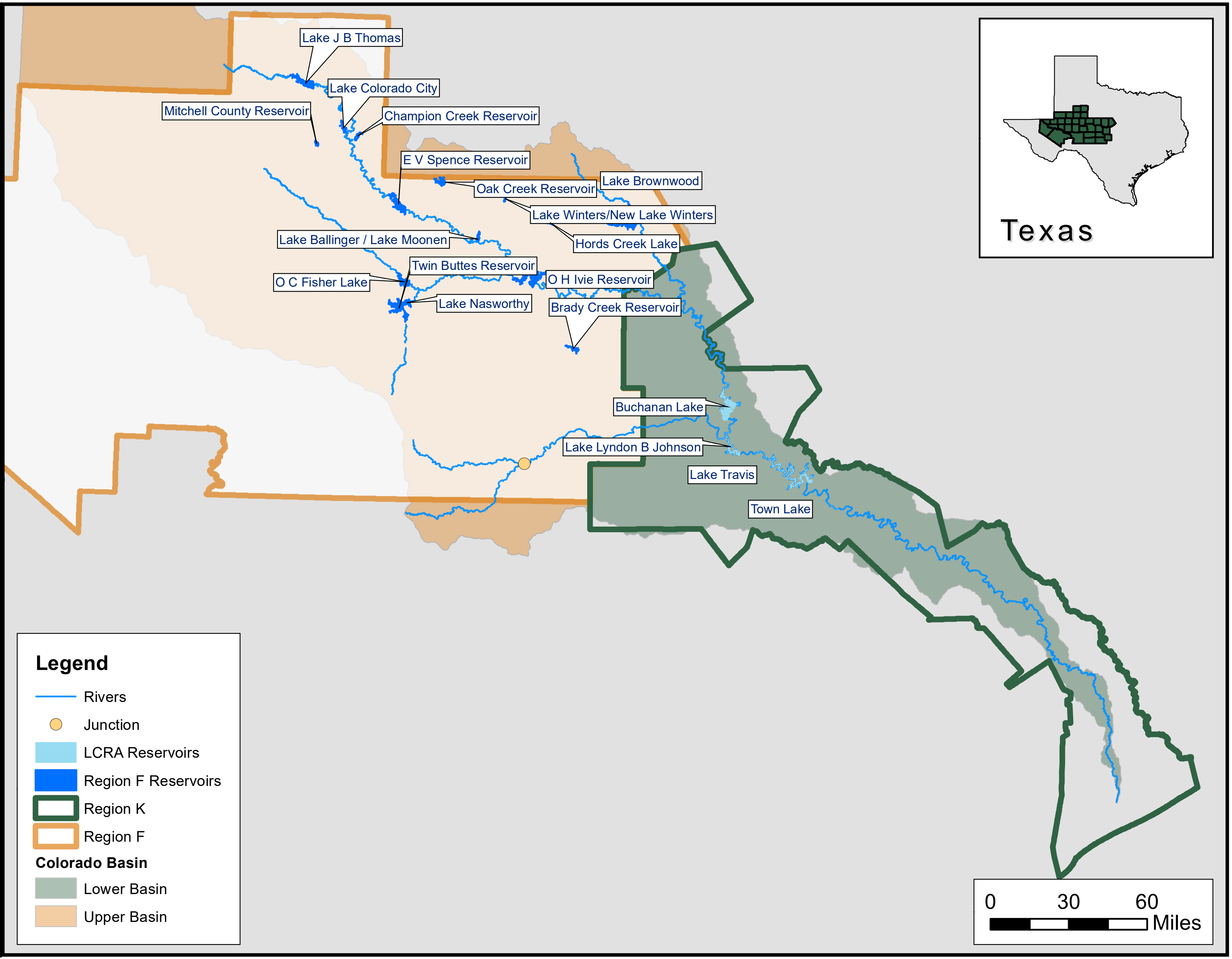
Quantity, Reliability and Cost

Approximately 43,600 acre-feet of additional supply is available through this strategy in 2020 and around 43,000 acre-feet in 2070. Figure C- 1 compares overall Region F surface water supplies with and without the subordination strategy over the planning period. Table C-9 compares the 2020 and 2070 Region F water supply sources with and without subordination.

The reliability of this strategy is considered to be medium based on the uncertainty of implementing this strategy and the current ongoing drought, which could impact supplies. The subordination strategy defined for the Region F Water Plan is for planning purposes. If an entity chooses to enter into a subordination agreement with a senior downstream water right holder, the details of the agreement (including costs, if any) will be between the participating parties. Therefore, strategy costs will not be determined for the subordination strategy. For planning purposes, capital and annual costs for the subordination strategy are assumed to be $0.

Figure C- 1
Comparison of Region F Surface Water Supplies with and without Subordination





N W E S

Subordination Strategy

Region F

DRAFTED	DESIGNED	SCALE	DATE	FILE	FN JOB NO
JLA	JLA	1:3,801,600	MARCH, 2015	Figure 5C-1.mxd	SAN11472

FIGURE C-2

Coordinate System: NAD 1983 StatePlane Texas North Central FIPS 4202 Feet

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Table C- 9
Region F Surface Water Supplies with and without Subordination

Reservoir Name	2020 Supply WAM Run 3	2020 Supply Subordination	2070 Supply WAM Run 3	2070 Supply Subordination
Lake Colorado City	0	1800	0	1550
Champion Creek Reservoir	0	1,170	0	1,100
Colorado City/Champion System	0	2,970	0	2,650
Lake Coleman	0	1,792	0	1,692
Hords Creek Lake	0	180	0	146
Coleman System	0	1,972	0	1,838
O. C. Fisher Lake[a]	0	0	0	0
Twin Buttes Reservoir[a]	0	1,670	0	1,195
Lake Nasworthy	0	See Twin Buttes	0	See Twin Buttes
San Angelo System	0	1,670	0	1,195
Lake J. B. Thomas (CRMWD System)	0	3,725	0	3,610
E.V. Spence Reservoir (CRMWD System)	0	21,575	0	21,355
O.H. Ivie Reservoir (CRMWD System)	14,285	15,193	11,709	13,067
O.H. Ivie Reservoir (Non-System)	16,065	17,147	13,491	15,053
O.H. Ivie Reservoir Total	30,350	32,340	25,200	28,120
CRMWD System Total (Thomas, Spence & Ivie)	14,285	40,493	11,709	38,032
Lake Ballinger / Lake Moonen	0	785	0	770
Lake Balmorhea	18,800	18,800	18,800	18,800
Brady Creek Reservoir	0	1,950	0	1,750
Lake Brownwood	18,900	24,340	18,200	23,770
Mountain Creek Reservoir	0	70	0	70
Oak Creek Reservoir	0	1,025	0	840
Red Bluff Reservoir	30,050	30,050	29,700	29,700
Lake Winters/ New Lake Winters	0	175	0	175
Junction ROR	0	250	0	250
TOTAL	***98,100***	***141,697***	***91,900***	***134,893***
Increase with Subordination	***43,597***		***42,993***	

[a] Supplies are less than theoretically available from the subordination model.

Environmental Factors

The WAM models assume a perfect application of the prior appropriations doctrine. A significant assumption in the model is that junior water rights routinely bypass water to meet the demands of downstream senior water rights and fill senior reservoir storage. If a downstream senior reservoir is less than full, all junior upstream rights are assumed to cease diverting and storing water until that reservoir is full, even if that reservoir does not need to be filled for that water right to meet its diversion targets. Currently in the Region F portion of the Colorado Basin, water rights divert and store inflows until downstream senior water rights make a priority call on upstream junior water rights. Many other assumptions are made in the Colorado WAM model that may be contrary to historical operation of the Colorado Basin in Region F.

Because many of the assumptions in the Colorado WAM are contrary to the actual operation of the upper portion of the basin, the model does not give a realistic assessment of stream flows in Region F. In the WAM a substantial amount of water is passed downstream to senior water rights that would not be passed based on historical operation. The subordination analysis better represents the actual operation of the basin. Therefore, a comparison of flows with and without subordination is meaningless as an assessment of impacts on streamflow in the upper basin.

Environmental impacts should be based on an assessment of the actual conditions, not a simulation of a theoretical legal framework such as the WAM. Impacts should also be assessed for a change in actions. The subordination modeling approaches the actual operation of the upper basin. There is no change in operation or distinct action taken under this strategy. The actual impacts of implementing this strategy could occur during extreme drought when a downstream senior water right may elect to make a priority call on upstream junior water rights. Flows from priority releases could be used beneficially for environmental purposes in the intervening stream reaches before the water is diverted by the senior water right. Priority calls are largely based on the decision of individual water rights holders, making it difficult to quantify impacts. However, the potential environmental impacts are considered to be low because this strategy, as modeled, assumes that operations in the basin continue as currently implemented. Existing species and habitats are established for current conditions, which will not change under this strategy.

Agricultural and Rural Impacts

The water user groups impacted the most by the Colorado WAM are small rural towns such as Ballinger, Winters and Coleman, and the rural water supply corporations supplied by these towns. These towns have developed surface water supplies because groundwater supplies of sufficient quality and quantity are not available or have water quality concerns. This strategy reserves water for these rural communities, which provides a positive impact.

Three Region F reservoirs included in the subordination strategy are permitted to provide a significant amount of water for irrigation: the Twin Buttes Reservoir/Lake Nasworthy system and Lake Brownwood. Twin Buttes Reservoir uses a pool accounting system to divide water between the City of San Angelo and irrigation users. As long as water is in the irrigation pool, water is available for irrigation. Due to drought, no water has been in the irrigation pool since 1998. The total authorized diversion for the Twin Buttes/Nasworthy system is 54,000 acre-feet per year. The two reservoirs have no firm or safe yield in the Colorado WAM. With the subordination analysis the current safe yield of the Twin Buttes/Nasworthy system is 1,670 acre-feet per year in 2020. Historical use of this reservoir system has been much higher. Therefore, even with subordination there is not sufficient water to meet both the needs of the City of San Angelo and irrigation demands. Subordination has no impact on irrigation users of Twin Buttes/Lake Nasworthy.

The reliable supply from Lake Brownwood does increase with subordination but the entire supply is not currently used. Subordination does not have an impact on rural or agricultural users of Lake Brownwood. It may have a positive impact with greater supplies. However, the occurrence of drought conditions more severe than those encountered during the historical modeling period could impact supplies available from this source.

Impacts to Natural Resources and Key Parameters of Water Quality

The subordination modeling approaches the actual operation of the upper basin. There is no change in operation or distinct action taken under this strategy. Therefore, impacts to natural resources and water quality are expected to be minimal.

Impacts on Other Water Resources and Management Strategies

All other strategies for this Plan are based on water supplies with the subordination strategy in place. The amount of water needed from some of these strategies may be higher without the subordination strategy and/or the timing for implementation may need to be sooner. Other strategies may be indirectly impacted. Changes to the assumptions made in the subordination strategy may have a significant impact on the amount of water needed from these strategies.

Other Issues Affecting Feasibility

Water supply in the Colorado Basin involves many complex legal and technical issues, as well as a variety of perspectives on these issues. There is also a long history associated with water supply development in the Colorado Basin. It is likely that a substantial study evaluating multiple subordination scenarios will be required before a full assessment of the feasibility of this strategy can be made. Legal opinions regarding the implementation of subordination agreements under Texas water law will be a large part of assessing the feasibility of the strategy.

Before assigning costs for this strategy a definitive assessment of the impacts on senior water right holders and the benefits to junior water rights holders must be determined. This assessment should consider the existing agreements and the historical development of water supply in the basin. The analysis presented in this plan is not sufficient to make that determination.

APPENDIX C

C.2 REUSE

WUG:	**Bangs**	**Capital Cost:**	$581,000
WMS Name:	**Direct Reuse**	**Annual Cost** (During Amortization):	$1,816 per acre-foot $5.57 per 1,000 gal
WMS Type:	Direct Non-Potable Reuse (Type I)		
WMS Yield:	25 acre-feet pear year	**Annual Cost** (After Amortization):	$176 per acre-foot $0.54 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Direct non-potable reuse (Type 1) has been identified as a feasible solution for the City of Bangs. The City plans on using reuse for irrigation of public parks. This evaluation is based on a generalized direct non-potable reuse strategy developed for the Region F plan. This strategy assumes that the current WWTP will need to construct the necessary improvements in order to bring a portion of the plant's effluent to Type 1 standards. If the plant's effluent already meets Type 1 standards than the cost will be significantly reduced. The strategy also assumes that along with the WWTP improvements, two miles of 6-inch transmission pipeline will need to be constructed in order to convey the reuse water from the plant to the public parks. No additional pump stations are assumed. If this strategy is pursued, additional site-specific studies will be required to determine actual quantities of water available, costs, and potential impacts.

Quantity, Reliability and Cost

For the City of Bangs, it is estimated that reuse could provide as much as 22,300 gallons per day of additional irrigation supply, or 25 acre-feet per year. Currently Bangs purchases all of its water from the BCWID#1. By reusing the water generated by the City of Bangs Wastewater Treatment Facility, the City will not need to rely as heavily on external water supplies. This strategy would supply an extremely reliable water source for irrigation purposes. The capital cost for this strategy is estimated at $581,000. This cost could be significantly less if no wastewater treatment plant improvements are needed.

Environmental Factors

The City of Bangs currently discharges its wastewater into an unnamed tributary that ultimately flows into the Colorado River. Reuse would result in a reduction in the quantity of water discharged by the City. Because of the relatively small amount of flow reduction associated with this reuse project, any possible impacts are not expected to be significant.

Agricultural and Rural Impacts

None identified.

Impacts to Natural Resources and Key Parameters of Water Quality

Reuse would result in a reduction in the quantity of water that is ultimately introduced to the Colorado River. This minimal reduction in water supply is not expected to significantly impact downstream WUGs that rely on the Colorado River for their own water needs.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

None identified.

WUG:	**Menard**	**Capital Cost:**	$696,500
WMS Name:	**Direct Non-Potable Reuse**	**Annual Cost** (During Amortization):	$820 per acre-foot $2.52 per 1,000 gal
WMS Type:	Direct Non-Potable Reuse (Type I)		
WMS Yield:	67 acre-feet per year	**Annual Cost** (After Amortization):	$88 per acre-foot $0.27 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Direct non-potable reuse (Type 1) has been identified as a feasible solution for the City of Menard. The City plans on using the reuse for the irrigation of city farms. This evaluation is based on a generalized direct non-potable reuse strategy developed for the Region F plan. This strategy assumes that the current WWTP will need to construct the necessary improvements in order to bring a portion of the plant's effluent to Type 1 standards. If the plant's effluent already meets Type 1 standards, then the cost will be significantly reduced. The strategy also assumes that along with the WWTP improvements, two miles of 6-inch transmission pipeline will need to be constructed in order to convey the reuse water from the plant to the city farms. If this strategy is pursued, additional site-specific studies will be required to determine actual quantities of water available, costs and potential impacts.

Quantity, Reliability and Cost

For the City of Menard, it is estimated that reuse could provide as much as 67 acre-feet per year of additional irrigation supply, or 0.12 MGD. Currently the water users in Menard obtain their water from wells located along the banks of the San Saba River that produce water from the San Saba Alluvium. Reduced flows in the river due to drought, therefore, have a severe impact on the availability of water. Reuse will introduce a much more reliable water source for the irrigation of the city farms.

Environmental Factors

The City of Menard currently discharges its wastewater into the San Saba River. Reuse would result in a reduction in the quantity of water discharged by the City. However, because of the relatively small amount of flow reduction associated with this reuse project, the impact is not expected to be significant.

Agricultural and Rural Impacts

The City of Menard obtains water from wells located along the banks of the San Saba River that produce water from the San Saba Alluvium. To the extent that implementing this strategy reduces the amount of water extracted from these wells to service Menard's needs, it may improve the reliability of this water source for agricultural and rural users. Also, the water will be used for agricultural purposes, providing a positive impact to agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

It is assumed that the quality of the treated effluent to the San Saba River will not change significantly. Therefore, minimal impacts to the San Saba's overall water quality are expected.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

None identified.

WUG:	**Mitchell County, Steam Electric Power**	**Capital Cost:**	$8,642,000
WMS Name:	**Reuse Sales from Colorado City**	**Annual Cost** (During Amortization):	$1,428 per acre-foot $4.38 per 1,000 gal
WMS Type:	Direct Non-Potable Reuse (Type II)		
WMS Yield:	500 acre-feet per year	**Annual Cost** (After Amortization):	$212 per acre-foot $0.65 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Colorado City plans to sell most, if not all, of their wastewater effluent to FGE Power for use as cooling water at a new power plant being built in Mitchell County. This water management strategy is a generalized direct non-potable reuse strategy developed for the Region F Plan that assumes all of Colorado City's wastewater is sold to the steam electric power industry in Mitchell County. This strategy assumes that the current WWTP will need no improvements in order to bring a portion of the plant's effluent to Type II standards. If the plant's effluent does not already meet Type II standards, then the cost will be greater than shown in this plan. The strategy assumes ten miles of 10-inch transmission pipeline will need to be constructed in order to convey the reuse water from the plant to the FGE power plant. If this strategy is pursued, additional site-specific studies will be required to determine actual quantities of water available, costs and potential impacts.

Quantity, Reliability and Cost

This strategy is based on an additional reuse supply of 500 acre-feet per year of Type II non-potable reuse supply for sales to the steam electric power industry in Mitchell County. This supply is considered to be very reliable. The cost of this strategy is estimated at $8,462,000 but may be different depending on site specific situations.

Environmental Factors

This strategy assumes that 500 acre-feet of reuse supply will be used for the steam electric power industry. This may reduce the demand on other water sources and decrease the environmental impacts of those uses.

Since Colorado City does not currently discharge their wastewater into a water body, streamflows will not be impacted.

Agricultural and Rural Impacts

None identified.

Impacts to Natural Resources and Key Parameters of Water Quality

Reuse would result in a reduction in the quantity of water discharged by the City. It is not expected to adversely impact natural resources or key parameters of water quality.

Impacts on Other Water Resources and Management Strategies

To the extent that this supply reduces the demand on other water resources that the FGE power plant in Mitchell County utilizes, this strategy may reduce competition for water from those sources.

Other Issues Affecting Feasibility

None identified.

WUG:	**Pecos**	**Capital Cost:**	$29,541,000
WMS Name:	**Direct Potable Reuse**	**Annual Cost** (During Amortization):	$4,691 per acre-foot $14.39 per 1,000 gal
WMS Type:	Direct Potable Reuse		
WMS Yield:	925 acre-feet per year	**Annual Cost** (After Amortization):	$2,443 per acre-foot $7.50 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

Pecos City is considering a direct potable reuse project that would be triggered if population and demand continues to grow rapidly around the City. Depending on the changing conditions in Pecos City, the size and timing may change. For planning purposes, it was assumed that a 2.2 MGD advanced treatment facility would be needed to treat wastewater to a potable water quality. This advanced treatment may include microfiltration and/or reverse osmosis. A 12-inch two-mile transmission line was assumed to connect the wastewater treatment facility to the advanced treatment facility. Concentrate from the treatment facility was assumed to be disposed of in a local water body, such as the Pecos River. If a suitable discharge location cannot be found, injection wells may be needed. The evaluation for this strategy is based on a generalized direct potable reuse strategy developed for the Region F plan. Site specific evaluations will be conducted as a part of the permitting process.

Quantity, Reliability and Cost

For Pecos City, it is estimated that a 2.2 MGD direct potable reuse plant could provide as much as 925 acre-feet per year, assuming 25 percent losses due to advanced treatment. Currently, Pecos City obtains all of its water supply from groundwater wells. By reusing the water generated by the City's wastewater treatment facility, the City will not rely as heavily on groundwater supplies. This strategy would supply a very reliable water source for additional potable water. Capital costs for this strategy are estimated at $29.6 million.

Environmental Factors

Pecos City currently discharges its wastewater that ultimately flows into the Pecos River. It is assumed that the waste stream from the treatment facility will be combined with unused treated effluent and discharged in a similar manner. The potential impacts of this discharge on the receiving stream will need to be evaluated prior to implementation of this strategy. If the impacts are unacceptable, an alternative method of disposal may be required. Alternative disposal methods may significantly increase the cost of the project.

Reuse would result in a reduction in the quantity of water discharged by the City. An analysis of the environmental impacts on the receiving stream will be required in the permitting process.

It is expected that construction of the advanced water treatment facility and transmission infrastructure should have minimal environmental impact.

Agricultural and Rural Impacts

No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality

Pending the water quality of the discharge stream to the Pecos River, this strategy could increase the levels of TDS and other key water quality parameters to the stream. This would be evaluated during permitting for the project.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

Direct potable reuse plants may face public opposition. They can also be challenging to permit and operate. Further studies may be needed to evaluate the long-term impacts from multiple cycles of direct reuse.

WUG:	**Pecos**	**Capital Cost:**	$34,456,000
WMS Name:	**Potable Reuse with Aquifer Storage and Recovery (ASR)**	**Annual Cost** (During Amortization):	$6,790 per acre-foot $20.83 per 1,000 gal
WMS Type:	Indirect Potable Reuse	**Annual Cost** (After Amortization):	$3,301 per acre-foot $10.13 per 1,000 gal
WMS Yield:	695 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

Population and demands in Pecos City are rapidly changing; however, if water supply is not needed for immediate demands, treated water could be stored in an underlying aquifer for later recovery. As an alternative to direct potable reuse, Pecos City is considering an indirect potable reuse strategy in conjunction with aquifer storage and recovery (ASR) in a nearby aquifer, such as the Dockum or Pecos Valley aquifers. This strategy is a generalized indirect potable reuse project combined with an ASR well field. Before construction, extensive studies will need to be conducted to determine the technical and economic feasibility of ASR in this area.

For planning purposes, it was assumed that a 2.2 MGD advanced treatment facility would be needed to treat wastewater to a suitable water quality before injection. Concentrate from the facility was assumed to be disposed of in a local water body, such as the Pecos River. If a suitable discharge location cannot be found, injection wells may be needed to dispose of the concentrate.

This strategy also includes a well field consisting of 6 injection wells for storage and recovery in a nearby aquifer, as well as associated piping and land acquisition.

Quantity, Reliability and Cost

For planning purposes, it is estimated that a 2.2 MGD direct potable reuse plant could provide as much as 925 acre-feet per year of treated water. It was assumed that this entire supply could be injected into an underlying aquifer at a similar rate as local pumping wells are withdrawing water. Recovery rates from an ASR project vary depending various factors, such as the hydrogeologic characteristics of the aquifer, storage time, pumping rate, etc. As a conservative estimate for this strategy, it was assumed that the City would be able to recover 75 percent of the water that they inject into an aquifer, which equates to 695 acre-feet per year.

By reusing, storing, and recovering the water generated by the City’s wastewater treatment facility, the City may have additional supplies to accommodate higher demands. Depending upon the recovery rates from the aquifer, this strategy would supply a moderately reliable water source for additional potable water. Capital costs for this strategy are estimated at $33.0 million.

Environmental Factors

Pecos City currently discharges its wastewater that ultimately flows into the Pecos River. It is assumed that the waste stream from the treatment facility will be combined with unused treated effluent and discharged in a similar manner. The potential impacts of this discharge on the receiving stream will need to be evaluated prior to implementation of this strategy. If the impacts are unacceptable, an alternative method of disposal may be required. Alternative disposal methods may significantly increase the cost of the project.

Reuse and storage would result in a reduction in the quantity of water discharged by the City.

Environmental impacts associated with the construction and operation of the advanced water treatment facility, transmission infrastructure, and ASR well field are considered to be minimal and could be mitigated.

Agricultural and Rural Impacts

No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality

Pending the water quality of the concentrate discharge stream to the Pecos River, this strategy could increase the levels of TDS and other key water quality parameters to the stream. This would be evaluated during permitting for the project.

Water will be treated to a level suitable for the aquifer before injection, so impacts on water quality within the aquifer are expected to be minimal to positive. Recovered water quality is dependent upon the quality of the groundwater within the aquifer and may require additional treatment before potable use.

Impacts on Other Water Resources and Management Strategies

If water demands are not immediate, ASR could provide Pecos City the ability to store water for use when needed. ASR also may increase groundwater availability for Pecos City by supplemental recharging of groundwater.

Other Issues Affecting Feasibility

The suitability of the aquifers in this area (Pecos Valley or Dockum aquifers) for ASR have not been firmly established. Extensive tests and studies will be required to evaluate hydrogeologic characteristics of the aquifer, as well as economic feasibility of the project, before implementation. Injection of water into the subsurface will likely require a Class V permit from TCEQ. It will likely also require permits from the Reeves County GCD.

WUG:	**Pecos**	**Capital Cost:**	$8,707,000
WMS Name:	**Direct Non-Potable Reuse**	**Annual Cost** (During Amortization):	$1,286 per acre-foot $3.95 per 1,000 gal
WMS Type:	Direct Non-Potable Reuse (Type I)		
WMS Yield:	560 acre-feet per year	**Annual Cost** (After Amortization):	$191 per acre-foot $0.59 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Pecos City plans to develop a "purple pipe" system to supply reuse supplies to municipal irrigation (public spaces, athletic fields, etc.). It is estimated that this supply would provide a peak amount of 1 MGD, or on average, approximately 560 acre-feet per year. For planning purposes, this strategy assumes that ten miles of pipeline, as well as transmission infrastructure (pump station, storage tank) will be needed to convey the reuse water. It was also assumed that no wastewater treatment plant improvements are needed.

Quantity, Reliability and Cost

It is estimated that Pecos City could provide a peak supply of 1 MGD of their wastewater effluent to irrigation users. This strategy would supply an extremely reliable water source for irrigation purposes and offset the user of other surface water and groundwater that irrigation users currently utilize. The capital cost for this strategy is estimated at $8,707,000. This cost is shown to be significantly less because it is assumed that no wastewater treatment plant improvements are needed.

Environmental Factors

Pecos City currently discharges its wastewater into an unnamed tributary that ultimately flows into the Pecos River. Reuse would result in a reduction in the quantity of water discharged by the City. An analysis of the environmental impacts on the receiving stream will be required in the permitting process. However, because of the relatively small amount of flow reduction associated with this reuse project, the impact is not expected to be significant.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

It is assumed that the quality of the treated effluent to the Pecos River will not change significantly. Therefore, minimal impacts to the overall water quality in the Pecos River are expected.

Impacts on Other Water Resources and Management Strategies

Irrigation users in Reeves County obtain their water supplies from surface water (Lake Balmorhea, Red Bluff Reservoir, Pecos Run-of-River) and groundwater. To the extent that implementing this strategy reduces the amount of water extracted from these supplies, it may improve the reliability of this water source for agricultural and rural users.

Other Issues Affecting Feasibility

None identified.

MWP:	**San Angelo**	**Capital Cost:**	$116,861,000
WMS Name:	**Indirect Reuse – Concho River Water Project**	**Annual Cost** (During Amortization):	$1,250 per acre-foot $3.84 per 1,000 gal
WMS Type:	Indirect Potable Reuse	**Annual Cost** (After Amortization):	$269 per acre-foot $0.83 per 1,000 gal
WMS Yield:	8,400 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

The City of San Angelo currently produces approximately 7.5 MGD (8,400 acre-feet per year) on average of treated wastewater. Historically, Tom Green County WCID #1 has used these reuse supplies for irrigation prior to taking their water supplies from Twin Buttes (when available). However, the City recently examined other potential uses for this water as part of a Long Range Water Supply Plan. The City ultimately decided to pursue the Concho River Water Project, which will repurpose this treated effluent as indirect reuse for municipal purposes. The City of San Angelo will continue to provide wastewater to the irrigators when it is not needed as a municipal supply.

The Concho River Water Project involves discharging highly treated effluent water from the City's wastewater treatment plant into the Concho River. Improvements will be made to the City's existing wastewater treatment plant to facilitate this project. The water will be diverted out of the Concho River approximately 8 miles downstream and piped to the City's water treatment plant, where it will be treated to drinking water standards.

The City is currently pursuing two necessary state permits through the TCEQ: one to release water into the Concho River and the other to divert the water at the City-owned facilities downstream. Completion of the entire project could take about five years.

When completed, the Concho River Water Project will provide about 7.5 million gallons per day on an average annual basis (~8,400 acre-feet per year). The Concho River Project will provide supply for municipal use.

Quantity, Reliability and Cost

This strategy is expected to yield 8,400 acre-feet of reliable supply. Capital costs are estimated at $116.9 million. These costs include permitting, as well as upgrades to the water and wastewater treatment facilities. During debt service, it is estimated that the unit cost for treated water will be $3.84 per thousand gallons. After the infrastructure is fully paid for, the unit price decreases to $0.83 per thousand gallons.

Environmental Factors

The environmental impacts of indirect reuse are minimal. Wastewater will be treated to state permit standards before being discharged into the Concho River. Properly designed and maintained treatment facilities should have minimal environmental impact.

Agricultural and Rural Impacts

Implementation of this strategy will result in limited water being available to the Tom Green County Water Control and Improvement District (WCID) from this particular water supply source. However, irrigation water needs in Tom Green County may be met through other water sources.

Impacts to Natural Resources and Key Parameters of Water Quality

The wastewater effluent will be highly treated, in accordance with state permits, before it is discharged into the Concho River. As a result, this should have minimal impacts on natural resources.

Impacts on Other Water Resources and Management Strategies

Implementation of this reuse strategy will make less water available for irrigation by repurposing the supply for municipal use.

Other Issues Affecting Feasibility

None identified.

APPENDIX C

C.3 EXPANDED USE OF EXISTING WATER SUPPLIES

WUG:	**Big Spring**	**Capital Cost:**	$104,651,000
WMS Name:	**New Water Treatment**	**Annual Cost** (During Amortization):	$1,128 per acre-foot $3.46 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	11,210 acre-feet pear year	**Annual Cost** (After Amortization):	$471 per acre-foot $1.45 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description
The City of Big Spring currently supplies water to Coahoma, steam electric power, and some manufacturers in Howard County. The City also plans to provide additional water to Howard County-Other and Howard County-Manufacturing. Given the current projected demand levels of these entities, the City of Big Spring will exceed their water treatment plant capacity starting in 2020. As a result, the City plans to construct a new water treatment plant in 2020.

Quantity, Reliability and Cost
The supply related to this strategy originates from CRMWD supplies and must be treated for Big Spring to use as municipal supply. This strategy assumes the construction of a new 20 MGD water treatment facility. The reliability of the supply treated by this strategy is considered to be high due CRMWD's multiple sources. The cost of this strategy is estimated to be $104.6 million.

Environmental Factors
Environmental impacts of constructing a new water treatment plant are expected to be minimal.

Agricultural and Rural Impacts
None identified.

Impacts to Natural Resources and Key Parameters of Water Quality
No impacts.

Impacts on Other Water Resources and Management Strategies
This strategy makes more treated water available to potential future customers of Big Spring in Howard County.

Other Issues Affecting Feasibility
None.

WUG:	**Brady**	**Capital Cost:**	$29,719,000
WMS Name:	**Advanced Groundwater Treatment**	**Annual Cost** (During Amortization):	$2,069 per acre-foot $6.35per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	1,200 acre-feet per year	**Annual Cost** (After Amortization):	$327 per acre-foot $1.00 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

The City of Brady obtains water from groundwater wells in the Hickory aquifer and surface water from Brady Creek Reservoir. However, drought has severely impacted Brady Creek Reservoir and the City is unable to use supply from this source at this time. Without surface water supplies to blend the Hickory supplies with, the City is unable to meet the TCEQ standards for radon and gross alpha particles. To address these water quality issues, the City of Brady plans to pursue the development of an advanced treatment facility so that their groundwater source can be used when surface water supplies are not available for blending.

For planning purposes, it was assumed that Brady would construct microfiltration and reverse osmosis facility. The treatment plant was sized to treat 1,200 acre-feet of supply, which is the amount the City intends to treat.

Quantity, Reliability and Cost

This strategy during times of drought is estimated to provide slightly over 1,200 acre-feet per year of supply to Brady by advanced treatment of groundwater to meet their overall water quality and TCEQ regulations. This supply would be used in conjunction with surface water supplies from Brady Creek Reservoir when they are available. In some years, the full 1,200 acre-feet may be used from this source. In other years, little or no groundwater may be used. On average, over an entire decade, this strategy will provide around 600 acre-feet per year. This supply is considered to be reliable. Project costs were provided by the City of Brady and are estimated at just over $29.7 million.

Environmental Factors

Construction of the treatment facility should have minimal environmental impact.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

Depending on the disposal method, this strategy may increase radionuclide concentrations of effluent discharge. However, this impact is expected to be minimal since the contaminants are already present in the water supply and thus, wastewater today.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

None identified.

WUG:	**Bronte**	**Capital Cost:**	$10,270,000
WMS Name:	**Water Treatment Plant Expansion**	**Annual Cost** (During Amortization):	$1,720 per acre-foot $5.28 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	800 acre-feet per year	**Annual Cost** (After Amortization):	$816 per acre-foot $2.50 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

The City of Bronte currently supplies treated water to Robert Lee in Coke County. Given the current projected demand levels of these entities, the City of Bronte will exceed their water treatment plant capacity starting in 2020. To provide water to all of these entities over the planning period, a 1.5 MGD expansion in 2020 of the current facility was considered.

Quantity, Reliability and Cost

The supply related to this strategy originates from other strategies being considered for Bronte but must be included for Bronte to utilize these sources as municipal supply for their residents and the residents of Robert Lee. This strategy assumes a 1.5 MGD expansion of Bronte’s current facility. The reliability of the supply treated by this strategy is considered under Bronte’s other strategies. The cost of this strategy is estimated at $10.3 million.

Environmental Factors

Environmental impacts of expanding the existing water treatment plant are expected to be minimal.

Agricultural and Rural Impacts

None identified.

Impacts to Natural Resources and Key Parameters of Water Quality

None identified.

Impacts on Other Water Resources and Management Strategies

This strategy makes more treated water available to Robert Lee, reducing Robert Lee’s need to pursue their own treatment facilities or other supplies independently.

Other Issues Affecting Feasibility

None identified.

WUG:	**Bronte**	**Capital Cost:**	$9,896,000
WMS Name:	**Rehabilitation of Oak Creek Pipeline**	**Annual Cost** (During Amortization):	$1,748 per acre-foot $5.37 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	$202 per acre-foot $0.62 per 1,000 gal
WMS Yield:	450 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description
The City of Bronte has a 13-mile, 8-inch and 10-inch pipeline to Oak Creek Reservoir in Coke County. This pipeline is over 60 years old and needs to be replaced and upsized to provide adequate capacity for the municipal demands served by the City. The proposed strategy includes a new 50,000 gallon raw water ground storage tank, upgrades to the pump station at the intake, and 13 miles of 14-inch pipeline.

Quantity, Reliability and Cost
The yield from this strategy represents the Oak Creek Reservoir subordination supply (purchased from the City of Sweetwater in Region G) that the City purchases for their residents and the residents of Robert Lee. This source is considered to be of moderate reliability because of the impact of the drought on Oak Creek's reliable supply. The estimated capital cost to rehabilitate and upsize this pipeline is approximately $9.8 million.

Environmental Factors
Environmental impacts are expected to be minimal because this is a rehabilitation of an existing project.

Agricultural and Rural Impacts
No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
None identified.

Other Issues Affecting Feasibility
The most significant factor affecting rehabilitation of the pipeline is funding. The City will have to further analyze the cost versus benefit of rehabilitating the pipeline.

WUG:	**Mason**	**Capital Cost:**	$2,605,000
WMS Name:	**Additional Treatment**	**Annual Cost** (During Amortization):	$856 per acre-foot $2.63 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	700 acre-feet per year	**Annual Cost** (After Amortization):	$594 per acre-foot $1.82 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description
To address water quality concerns associated with gross alpha particles, the City of Mason plans to pursue the development of an ion exchange facility. For planning purposes, it was assumed that this project would treat around half of Mason's supply. This water would then be blended with the City's remaining supplies to improve the overall drinking water quality and come into compliance with Maximum Contaminant Level (MCL) set by the TCEQ.

Quantity, Reliability and Cost
This strategy is estimated to treat 350 acre-feet of supply but provide over 700 acre-feet per year of supply to Mason by blending to increase their overall water quality and meet TCEQ regulations. This supply is considered to be reliable. The project is estimated to cost just over $2.6 million.

Environmental Factors
Construction of the treatment facility should have minimal environmental impact. For a town of Mason's size, it is likely that they would contract with a company to change the media filters and dispose of the waste created by the used filters. These filters would be disposed of in a properly designed waste facility and should have minimal environmental impacts.

Agricultural and Rural Impacts
This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
None identified.

Other Issues Affecting Feasibility
None.

WUG:	**Junction**	**Capital Cost:**	$7,505,000
WMS Name:	**Dredging River Intake**	**Annual Cost** (During Amortization):	$2,112 per acre-foot $6.48 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	250 acre-feet per year	**Annual Cost** (After Amortization):	N/A
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

The City of Junction currently utilizes run-of-river supplies from the S. Llano River. Without subordination, this source has no supply. When considering subordination, it is shown to have 250 acre-feet of supply. This strategy would dredge the City of Junction's intake, increasing the accessibility and reliability of the subordination supply.

Quantity, Reliability and Cost

The supply associated with this strategy of 250 acre-feet is already made available through the subordination strategy. The river dredging is necessary for the City of Junction to be able to fully access this water. The cost of this strategy is estimated at around $7.5 million dollars. During debt service, this is equal to $6.48 per thousand gallons. The only annual costs associated with this strategy are debt service, so once that is fully paid, there is no cost.

Environmental Factors

Environmental issues associated with dredging mainly center around the disposal of the dredged material. In some cases, it may be possible to find a beneficial use for the waste material such as sales to a sand or gravel operation. However, if this is not possible, a proper disposal location will need to be found. The City is currently evaluating its options. Finding a suitable disposal location can be a challenge and may increase the cost if one cannot be found near the dredging site.

Agricultural and Rural Impacts

None identified.

Impacts to Natural Resources and Key Parameters of Water Quality

This strategy assumes that the dredged material is relatively clean and not contaminated. If contamination is found, the impacts of dredging on water quality will need to be evaluated.

Impacts on Other Water Resources and Management Strategies

This strategy is expected to have minimal impacts on other water resources and management strategies.

Other Issues Affecting Feasibility

Finding a suitable location for disposal of the dredged material is a significant hurdle and may make this strategy economically infeasible if the material must be hauled a long distance. Even if a nearby disposal location can be found, this strategy may prove to be too expensive for a small entity such as Junction.

WUG:	**Multiple**	**Capital Cost:**	$7,108,000
WMS Name:	**Purchase from Provider (Voluntary Transfer)**	**Annual Cost** (During Amortization):	Varies based on WUG
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	Varies based on WUG
WMS Yield:	1,294 acre-feet per year	**Implementation:**	Varies based on WUG
WMS Status:	Recommended		

Strategy Description

The purchase from provider strategy is part of a generalized strategy in Region F that facilitates the sale of water from one entity to another. This could either be through the sale of a water right or through the sales of raw or treated water via contract. This strategy only considers new purchases or contracts that are not currently in place. In some cases, this strategy may require infrastructure to transport the water from the seller to the buyer. In other cases, there is existing infrastructure in place and only a contract is needed.

Quantity, Reliability and Cost

The reliability of this strategy is considered medium since the purchasing entity is reliant on the provider for their water supplies. The quantity of water and associated capital costs vary depending upon the entities involved. Some entities have infrastructure in place to transport water and only a contract is needed, so no capital costs are shown. Conversely, other entities need to develop infrastructure to access the water they are purchasing from a provider, thus necessitating a capital investment. Table C-10 shows the quantity of water and capital costs (if necessary) for all entities where purchasing water is a recommended strategy.

Table C- 10
Recommended Strategy - Quantity and Cost

County	Purchaser	Provider	Capital Cost	2020	2030	2040	2050	2060	2070
Coke	Robert Lee	Bronte	$0	80	80	80	80	80	80
Ector	Concho Rural WSC	UCRA (San Angelo)	$0	50	50	50	50	50	50
Ector	Greater Gardendale WSC	Odessa	$6,078,000	0	375	445	445	445	445
Runnels	Winters	Abilene	$974,000	220	220	220	220	220	220
Scurry	County-Other	Snyder (CRMWD)	$0	373	414	447	491	547	607
WMS Total			**$7,052,000**	**723**	**1,139**	**1,242**	**1,286**	**1,342**	**1,402**

Some entities plan on pursuing other strategies to meet their needs but could potentially negotiate a contract to purchase water from a provider. In these cases, this is considered as an alternative strategy. Table C- 11 shows the quantity of water and capital costs (if necessary) for entities that have this as an alternative strategy.

Table C- 11
Alternative Strategy - Quantity and Cost

County	Purchaser	Provider	Capital Cost	2020	2030	2040	2050	2060	2070
Ector	Greater Gardendale WSC	Midland FWSD No. 1	$2,946,000	0	445	445	445	445	445
Midland	Midland	CRMWD	$0	4000	4000	4000	4000	4000	4000
Ector	Grandfalls	CRMWD	$0	0	0	0	0	155	155
WMS Total			**$2,946,000**	**4,000**	**4,445**	**4,455**	**4,445**	**4,600**	**4,600**

Environmental Factors
In some instances, no new infrastructure is required to facilitate the sale of the water. In these cases, no environmental impacts are expected. Any impacts associated with new supplies developed by the provider are discussed under those individual strategies. In cases where a new infrastructure is required, the impacts from construction are expected to be temporary and minimal. Pipeline routes are assumed to be selected such that environmental impacts are minimized.

Agricultural and Rural Impacts
Many of these sales are to rural areas of a county, such as County-Other. In these cases, having a sustainable water supply will increase the vitality of the rural area. In instances where the transfer is from irrigators to municipal or manufacturing users, the impacts may be the opposite. However, irrigators may find this option financially attractive. This strategy assumes that all sales are voluntary.

Impacts to Natural Resources and Key Parameters of Water Quality
Since this does not involve the development of any new sources of water, no impacts to natural resources and key parameters of water quality are expected.

Impacts on Other Water Resources and Management Strategies
None identified.

Other Issues Affecting Feasibility
This strategy assumes that mutually agreeable contractual terms can be reached by the involved parties. This kind of contract negotiation is outside of the scope of regional planning, but the results will greatly impact the feasibility of this strategy.

MWP:	**Midland**	**Capital Cost:**	$60,804,000
WMS Name:	**Advanced RO Treatment, Expanded Use of Paul Davis Well Field**	**Annual Cost** (During Amortization):	$1,266 per acre-foot $3.89 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	$763 per acre-foot $2.34 per 1,000 gal
WMS Yield:	8,500 acre-feet per year	**Implementation:**	2040
WMS Status:	Recommended		

Strategy Description

The City of Midland is planning to pursue the development of a 9 MGD advanced treatment (RO) facility to address water quality concerns associated with existing high TDS levels in their Paul Davis Well Field groundwater supply. For planning purposes, it was assumed that this project would produce up to 8,500 acre-feet per year of finished water, based on a peaking factor of 1.2. This would enable the City to bring the total supply from their Paul Davis Well Field to 10 MGD. Treated water from this source would be blended with the rest of the City's supplies to improve the overall drinking water quality. The City currently has transmission infrastructure in place to transport this water for treatment and distribution.

Treatment losses from this facility were assumed to be 25 percent. It was assumed that the reject stream from this facility would be transported from the City's water purification plant (WPP) to their wastewater treatment plant (WWTP) for treatment, which would be available for mining use. Transmission infrastructure for the brine reject stream (piping, pump stations, storage) was included in the project costs.

Quantity, Reliability and Cost

This strategy would increase the quality and accessibility of the Paul Davis Well Field supplies available to the City of Midland. The reliability of this supply is considered medium because of MAG limitations in Andrews and Martin Counites and competition for water supply. The MAG in Andrews County is limiting to all existing users in all decades, including existing supplies to the City of Midland. The MAG in Martin County is adequate in the early decades but declines sharply over time, resulting in shortages for existing users in later decades. This strategy assumes existing irrigation users would make a voluntary transfer of their supplies to the City of Midland to support the expanded use from this source. The project is sized to produce up to an additional 8,500 acre-feet of finished water, which would bring the total supply produced from the Paul Davis Well Field to 11,200 ac-ft per year (10 MGD). It is estimated that this would require around $60 million of capital investment.

Environmental Factors

The conceptual design for this project assumes that the brine waste stream would be transported to and treated at the City's WWTP for mining use. A properly designed and maintained facility should have minimal environmental impact. Construction of the advanced treatment (RO) facility should have minimal environmental impact as well.

Agricultural and Rural Impacts

This strategy is expected to reduce available supplies to irrigation users. However, it is assumed that the transfers of water from irrigation and rural users is on a willing seller-willing buyer basis.

Impacts to Natural Resources and Key Parameters of Water Quality
It is assumed that the total amount of groundwater used from Martin county will no exceed the MAG values. Therefore, impacts to water resources should be minimal. Advanced RO treatment of groundwater from the Paul Davis Well Field will improve the water quality and availability of this supply for use by the City of Midland. The conceptual design for this project assumes that the brine waste stream would be transported to and treated at the City's WWTP, which would then be available for mining use. This is expected to have minimal effects on natural resources or water quality.

Impacts on Other Water Resources and Management Strategies
The City of Midland's water supply is currently limited by the groundwater quality it can produce from the Paul Davis Well Field. This advanced treatment (RO) facility would enable the City to produce up to 10 MGD of treated water from the Paul Davis Well Field.

Other Issues Affecting Feasibility
None identified.

MWP:	**Odessa**	**Capital Cost:**	$83,062,000
WMS Name:	**RO Treatment of Existing Supplies**	**Annual Cost** (During Amortization):	$1,111 per acre-foot $3.41 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	12,555 acre-feet per year	**Annual Cost** (After Amortization):	$738 per acre-foot $2.27 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description
To address water quality concerns associated with existing high TDS levels in CRMWD's surface water system, the City of Odessa is planning to pursue the development of an advanced treatment (RO) facility. For planning purposes, it was assumed that the RO treatment facility would have a capacity of 20 MGD. It is anticipated this treatment plant would produce on average, 14 MGD or 15,700 acre-feet per year. Treatment losses were assumed to be 20%, so this project would produce approximately 3,930 acre-feet per year of waste. The finished water produced from this facility would be blended with the rest of the City's supplies to improve the overall drinking water quality. The conceptual design for this project disposes of the brine waste stream into a nearby water body, such as a stream. Cost estimates for this project include infrastructure to transmit the brine waste stream, including a 16-inch pipeline, pump station, and ground storage tank.

Quantity, Reliability and Cost
This strategy would increase the quality and accessibility of the subordination supplies Odessa obtains from CRMWD. The reliability of this supply is considered medium, as discussed in further detail under the subordination strategy. The project is sized to produce 20 MGD of finished water at peak capacity and requires $83.1 million of capital investment. The conceptual design for this project disposes of brine waste into a nearby water body; however, the City is also considering selling its effluent to the petroleum industry.

Environmental Factors
The conceptual design for this project disposes of brine waste into a water body. Impacts to the receiving water body would need to be evaluated to ensure that environmental impacts are mitigated, and that discharges are compliant with the facility's National Pollutant Discharge Elimination System (NPDES) permits. A properly designed and maintained facility should limit environmental impacts. Construction of the treatment facility should have minimal environmental impact as well.

Agricultural and Rural Impacts
This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality
The current conceptual design for this project disposes of brine waste into a nearby stream. Impacts to the receiving water body would need to be evaluated to ensure that any impacts to natural resources or water quality are mitigated.

Impacts on Other Water Resources and Management Strategies
This advanced treatment (RO) facility would improve the water quality of the water that the City of Odessa provides to its customers.

Other Issues Affecting Feasibility
None identified.

WUG:	**Pecos**	**Capital Cost:**	$27,680,000
WMS Name:	**Advanced Water Treatment Plant**	**Annual Cost** (During Amortization):	$754 per acre-foot $2.31 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	3,360 acre-feet per year	**Annual Cost** (After Amortization):	$319 per acre-foot $0.98 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description
Pecos City has poor water quality in their existing North Worsham well field, which severely limits its use. At its current state, the water from this well field can only be blended at up to 5% of the total supply. This strategy involves developing an 8 MGD advanced water treatment plant, which will treat the blended supplies from all three of the City's well fields. This strategy will provide additional water supplies by increasing the usable supply from the North Worsham well field.

Quantity, Reliability and Cost
This strategy would increase the water quality of Pecos City's current water supply and enable the City to increase the usable supply from the North Worsham well field. The reliability of this supply is considered medium. The project is sized to produce 8 MGD of finished water and requires approximately $27.7 million of capital investment.

Environmental Factors
Construction of the treatment facility should have minimal environmental impact.

Agricultural and Rural Impacts
This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality
This strategy is expected to increase the water quality that the City produces from its three well fields and distributes for municipal use.

Impacts on Other Water Resources and Management Strategies
This advanced water treatment plant would enable the City to blend water from all three of their well fields and will increase the supply that they can use from their North Worsham well field.

Other Issues Affecting Feasibility
None identified.

WUG:	**Pecos County WCID #1**	**Capital Cost:**	$26,102,000
WMS Name:	**Transmission Pipeline**	**Annual Cost** (During Amortization):	$2,767 per acre-foot $8.49 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	750 acre-feet per year	**Annual Cost** (After Amortization):	$317 per acre-foot $0.97 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Developing additional groundwater supplies is a recommended strategy to increase the reliability of Pecos County WCID's current system. The WCID will also need a larger transmission pipeline to transport the new groundwater supplies and their existing supplies. For planning purposes, 20 miles of 18-inch pipeline were assumed. The well field expansion is costed and evaluated as a separate strategy (see Develop Edwards-Trinity Aquifer Supplies, Pecos County WCID #1).

Quantity, Reliability and Cost

This strategy is expected to transport 750 acre-feet per year (250 acre-feet per year from two additional wells plus 500 acre-feet of existing supplies). This source is already in use by the WCID and the reliability is considered high. The cost for the transmission pipeline is estimated at $26.1 million.

Environmental Factors

Environmental impacts are expected to be minimal because this is a rehabilitation of an existing project.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

Additional supply does not exceed the MAG so there are minimal impacts to existing water sources expected.

Impacts on Other Water Resources and Management Strategies

There are no impacts to other water resources or water management strategies.

Other Issues Affecting Feasibility

None.

WUG:	**Robert Lee**	**Capital Cost:**	$6,541,000
WMS Name:	**Repair and Expand Water Treatment Plant**	**Annual Cost** (During Amortization):	$2,657 per acre-foot $8.15 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	$1,284 per acre-foot $3.94 per 1,000 gal
WMS Yield:	335 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

Currently, due to the prolonged drought, the City of Robert Lee has not been able to utilize their current surface water treatment plant. If the Spence and Mountain Creek Reservoirs once again become a dependable surface water source or the City enters into a contract with a wholesale water provider, the City could reopen the plant. Bringing the plant online and up to operational standards would require considerable repairs and infrastructure expansion. This strategy is necessary for Robert Lee to utilize supplies from the subordination strategy.

Quantity, Reliability and Cost

The water treatment plant is sized for 0.6 MGD and is expected to treat 335 acre-feet per year on average. Given this source was unreliable during the recent drought, the reliability of this supply is considered to be low. The cost of this strategy is estimated at around $6.5 million.

Environmental Factors

Robert Lee previously operated a plant from these sources, so no additional environmental impacts are expected from reopening the plant.

Agricultural and Rural Impacts

This strategy should have minimal effects on agriculture since the water has traditionally been used as municipal supply for Robert Lee.

Impacts to Natural Resources and Key Parameters of Water Quality

None identified.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

This strategy is a very expensive option for an unreliable supply during drought. Robert Lee is a small, rural community and this project may cause an economic burden on the community. This strategy is included in this plan as an alternate strategy.

APPENDIX C

C.4 GROUNDWATER DEVELOPMENT

MWP:	**Brown County WID #1 (BCWID)**	**Capital Cost:**	$13,947,000
WMS Name:	**Develop Groundwater Supplies from Brown County**	**Annual Cost** (During Amortization):	$12,553 per acre-foot $7.83 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,336 per acre-foot $4.10 per 1,000 gal
WMS Yield:	806 acre-feet pear year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

BCWID is pursuing developing groundwater supplies in the Ellenburger San Saba aquifer after previously drilling a test well in the same formation. Due to the high TDS concentrations from the test well, additional treatment will be required for municipal use.

This strategy evaluates the development of 806 acre-feet of supply per year from the Ellenburger San Saba aquifer in Brown County. The conceptual design for this strategy includes one 500 gpm well drilled to a depth of 4,000 feet and 2 miles of 8-inch transmission pipeline.

Quantity, Reliability and Cost

The quantity expected to be obtained from this source is 806 acre-feet per year. The reliability of the source is considered medium due to the lack of specific information pertaining to the well field. The cost of this strategy is estimated at $14 million. This equates to $7.83 per thousand gallons during debt service.

Environmental Factors

The well would be located to minimize any potential environmental impacts. As such, the environmental impacts are expected to be minimal.

Agricultural and Rural Impacts

Development of groundwater is not expected to divert water that was previously used for agricultural and rural purposes due to the poor water quality and well depth. This strategy assumes that the groundwater rights are obtained on a willing buyer – willing seller basis which would minimize impacts to agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

The impacts to natural resources are expected to be minimal. No impacts to water quality are expected.

Impacts on Other Water Resources and Management Strategies

To the extent that this water source lessens the demand on Lake Brownwood, additional water from Lake Brownwood may be available for other use.

Other Issues Affecting Feasibility

Additional study will be needed once a more specific location for this strategy has been selected.

MWP:	**Colorado River Municipal Water District**	**Capital Cost:**	$168,324,000
WMS Name:	**Ward County Well Field Expansion and Winkler County Well Field Development**	**Annual Cost** (During Amortization):	$849 per acre-foot $2.61 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$321 per acre-foot $0.99 per 1,000 gal
WMS Yield:	22,400 acre-feet per year	**Implementation:**	2050
WMS Status:	Recommended		

Strategy Description

CRMWD currently owns and operates a well field in Ward County in the Pecos Valley aquifer. CRMWD also owns the groundwater rights to an undeveloped well field in southern Winkler County. This well field will produce water from the Pecos Valley aquifer. For the purposes of this plan, it was assumed that the Ward County Well Field Expansion and the development of the Winkler County Well Field will happen concurrently as a single strategy. Due to MAG limitations of the Pecos Valley aquifer in Ward County, all water supply from this strategy is assumed to be from the Winkler County Well Field. However, expansion of the Ward County well field is still a recommended component of this strategy.

This strategy assumes that 20 MGD (22,400 acre-feet per year) will be developed from the Winkler County Well Field, and then pumped to the Ward County Well Field for transmission to CRMWD customers using a new 36-inch pipeline and new 20 MGD pump station. The water will use the same existing transmission lines from the current Ward County Well Field to Odessa. The pumping capacity of the current transmission system will require multiple upgrades, including one new 50 MGD booster pump station and one 20 MGD pump station expansion along the existing transmission line to Odessa. An additional shared pipeline and 20 MGD pump station expansion would also be developed from Odessa to the terminal storage reservoir. A new pump station is also included to transport water from the terminal storage reservoir to Big Spring.

Quantity, Reliability and Cost

It is estimated that this strategy could provide 22,400 acre-feet per year (20 MGD) beginning in the year 2050. Water from these sources is considered to be very reliable. The capital cost for this strategy is estimated at $168.3 million.

Environmental Factors

Winkler County has no flowing water. Therefore, development of this source has very little potential of impacting springflow, baseflow in rivers, or habitats. Based on the available data, it is unlikely that the proposed pumping will have impacts on aquatic or terrestrial ecosystems. It is not anticipated that groundwater development will cause subsidence.

The Ward County Well Field already exists and has enough supply to support an expansion by CRMWD without causing any major environmental impacts.

Agricultural and Rural Impacts

The Region F water supply analysis shows sufficient water supply in Winkler County to meet local agricultural and municipal needs, as well as to support well field development by CRMWD. Well field expansion in Ward County is limited by the MAG, so all water from this strategy is shown to come from Winkler County. Therefore, this strategy should have minimal effects on agriculture and rural areas. The right of way for the small portion of additional transmission lines may temporarily affect a small amount of agricultural acreage during construction.

Impacts to Natural Resources and Key Parameters of Water Quality

None identified.

Impacts on Other Water Resources and Management Strategies

The Region F water supply analysis shows sufficient water supply in Winkler County to meet local needs and support well field development by CRMWD. Well field expansion in Ward County is limited by the MAG, so all water from this strategy is shown to come from Winkler County. Impacts to other strategies are expected to be minimal.

Other Issues Affecting Feasibility

None identified.

MWP:	**Colorado River Municipal Water District**	**Capital Cost:**	$10,440,000
WMS Name:	**Ward County Well Field Well Replacement**	**Annual Cost** (During Amortization):	$102 per acre-foot $0.31 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$76 per acre-foot $0.23 per 1,000 gal
WMS Yield:	755 – 10,500 acre-feet per year	**Implementation:**	2030
WMS Status:	Recommended		

Strategy Description

CRMWD currently owns and operates a well field in Ward County that pumps from the Pecos Valley aquifer. The integrity of the wells and pipelines will deteriorate over time, reducing the supply available to CRMWD from this strategy. As a result, CRMWD plans to actively rehabilitate and/or replace out-of-service wells in order to operate their Ward County well field at an optimal efficiency and supply the optimum amount of water from the well field throughout the planning horizon. The strategy infrastructure was sized for its ultimate capacity in 2070 but would likely be implemented in phases.

In this strategy, it was assumed that enough water wells and piping would need to be replaced per decade to enable CRMWD to withdraw the expected amount of groundwater from their Ward County well field. CRMWD already owns the land, water rights, and infrastructure to transport and treat this supply, so only water well and well field piping infrastructure were included in this project.

Quantity, Reliability and Cost

This strategy could optimize the amount of water that CRMWD obtains from their Ward County Well Field. It is estimated that this could provide an additional 755 acre-feet per year in 2030 and increase to 10,500 acre-feet per year in 2070. Water from the Ward County Well Field is considered to be reliable. The total capital cost for this strategy is estimated at $10.4 million.

Environmental Factors

The Ward County Well Field already exists and has enough supply to support replacement with new wells without causing any major environmental impacts. The construction of replacement wells should have minimal environmental impact.

Agricultural and Rural Impacts

The Region F water supply analysis shows sufficient water supply in Ward County to meet local agricultural and municipal needs and support replacement of old wells with new wells by CRMWD. Therefore, this strategy should have minimal effects on agriculture and rural areas.

Impacts to Natural Resources and Key Parameters of Water Quality

None identified.

Impacts on Other Water Resources and Management Strategies

The Region F water supply analysis shows sufficient water supply in Ward Counties to meet local needs and support replacement of old wells with new wells by CRMWD. This strategy is expected to enable CRMWD to optimize the amount of groundwater that they can withdraw from their well field in Ward County.

Other Issues Affecting Feasibility

None identified.

MWP:	**Colorado River Municipal Water District**	**Capital Cost:**	$147,558,000
WMS Name:	**Develop Additional Groundwater in Pecos, Reeves, Ward, and Winkler Co.**	**Annual Cost** (During Amortization):	$1,348 per acre-foot $4.14 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$310 per acre-foot $0.95 per 1,000 gal
WMS Yield:	10,000 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

The Colorado Municipal Water District (CRMWD) plans to pursue new groundwater development. The exact location of the wells is not yet known. For the purposes of this plan, this project will seek to develop 10,000 acre-feet of supply from Pecos, Reeves, Ward, and Winkler Counties. This project is for new groundwater supplies and does not include water rights currently held by CRMWD. Region F considers development from any single or combination of these sources to be consistent with the plan. This strategy involves the development of the groundwater, as well as the transmission of this groundwater to CRMWD's system. Some portions of this groundwater may be brackish and need additional treatment, but these supplies will not be needed until after the end of this Plan (post-2070).

This strategy includes the acquisition of groundwater rights and development of well infrastructure (water well, well field piping) in either Pecos, Reeves, Ward, and Winkler Counties. In addition, this strategy involves the development of transmission infrastructure, including pipeline, pump stations, and storage tanks, to transport the 10,000 acre-feet of groundwater supply developed in these four counties Region F by CRMWD. Since the exact location of the development of these supplies is still unknown, for planning purposes it was assumed that 40 miles of new transmission system would be needed to connect to CRMWD's transmission system in Ward County.

Quantity, Reliability and Cost

In total, this strategy will provide 10,000 acre-feet of supply per year. Since the location of the well field is not yet known, a combination of aquifers and counties was assumed.

The reliability of this strategy is considered to be high due to the large number of sources being employed. Additional study will be required once an exact location and source for the well fields have been determined and the transmission pipeline route has been defined. For planning purposes, the strategy includes the purchase of the groundwater rights, the costs to drill approximately 10 wells, and associated well field piping. In addition, the capital cost of this strategy includes the construction of 40 miles of 36-inch pipeline, 3 new pump stations and 1.25 MG of storage. The capital cost for this project is estimated at $147.6 million.

Environmental Factors

The well fields would be located to minimize any potential environmental impacts. The right of way for the transmission line may temporarily affect the environment during construction. Additional study and mitigation may be required before construction of the transmission pipeline. The pipeline may be routed to avoid environmentally sensitive areas. As such, the environmental impacts are expected to be minimal.

Agricultural and Rural Impacts

Development of groundwater may divert water that was previously used for agricultural and rural purposes. However, this strategy assumes that the groundwater rights are obtained on a willing buyer – willing seller basis which would minimize the impacts to agriculture. The right of way for the transmission line may temporarily affect a small amount of agricultural acreage during construction.

Impacts to Natural Resources and Key Parameters of Water Quality

The strategy proposes to utilize a sustainable level of groundwater. The impacts to natural resources are expected to be minimal when constructing the well field. No impacts to water quality are expected. Other natural resources may be temporarily impacted during construction of the pipeline. These impacts are expected to be minimal and the mitigation of impacts will be addressed through further study once the exact pipeline route has been selected.

Impacts on Other Water Resources and Management Strategies

This strategy could impact the Expanded Ward County and Winkler County Well Fields, but it is assumed that the new wells would be located so as not to impact these well fields. No impacts on water resources or management strategies are anticipated from the transmission pipeline.

Other Issues Affecting Feasibility

Additional study will be needed to determine feasibility and potential impacts once a more specific location for the well fields and the more defined pipeline route has been selected. Some portions of this groundwater may be also brackish and need additional treatment, but these supplies will not be needed until after the end of this Plan (post-2070).

MWP:	**Odessa**	**Capital Cost:**	$154,165,000
WMS Name:	**Develop Capitan Reef Complex Aquifer Supplies in Ward County**	**Annual Cost** (During Amortization):	$2,175 per acre-foot $6.68 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$884 per acre-foot $2.71 per 1,000 gal
WMS Yield:	8,400 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

The City of Odessa has purchased the water rights to the brackish groundwater beneath the CRMWD Ward County Well Field. Odessa is considering developing this source and supplementing the supplies produced by CRMWD. In compliance with the guidance and rules for regional water planning, the TWDB requires the use of the Modeled Available Groundwater (MAG) in regional water planning. The MAG for the Capitan Reef Complex aquifer in Ward County is severely limiting and causes the supplies from the City of Odessa's well field to be artificially shorted. This strategy is developed with the understanding that the MAG may be changed in the future to allow inclusion of this strategy in the regional water plan. Currently, Ward County does not have a GCD to enforce the MAG.

The Capitan Reef Complex aquifer in Ward County has been identified as a potential source for municipal, industrial and agricultural purposes. For the purpose of this plan, groundwater development in Ward County is not a recommended strategy due to current existing MAG limitations. However, this strategy was evaluated as a potential alternative strategy.

This strategy assumes that Odessa would pump up to 10 MGD of brackish water from the Capitan Reef Complex and treat the water on-site. It is assumed that 25% of the groundwater would be discharged as brine waste, resulting in a net supply of 8,400 acre-feet per year. The brine discharge would be injected into a deep saline formation. The treated water would then be transported using the existing infrastructure developed by CRMWD.

To provide the 10 MGD of raw groundwater, 15 new wells would need to be drilled. These wells would produce water from approximately 4,500 feet below the surface.

This strategy assumes that the wells would be spaced about 1,500 to 3,000 feet apart along the Capitan Reef Complex aquifer within the existing well field area. The wells would be connected by up to three sections of continuous well field piping. The well field would also include a new 2 MG covered ground storage tank.

This project includes a reverse osmosis water treatment plant at the well field and five disposal wells.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 950 gpm. Previous investigations indicate that the Capitan Reef Complex aquifer may be a viable source but high TDS will require advanced treatment. For this plan, the 15 new wells are assumed to supply an additional 8,400 acre-feet per year of treated water. The reliability of the supply is considered to be medium because of aquifer and water quality properties. The total capital cost is estimated at $154.2 million.

Environmental Factors

This strategy should have minimal impacts to the environment since the proposed wells are located within an existing well field and the transmission system is existing. The discharge of the brackish wastewater would be to a saline formation and would not impact its water quality. Care should be taken to ensure that the discharge wells are properly constructed such so that the brackish discharge would not impact freshwater zones.

Agricultural and Rural Impacts

This source is currently not used for agricultural or rural purposes, and likely would not be used for these purposes due to the depth of the aquifer and poor water quality. No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Capitan Reef Complex aquifer is generally poor, yielding small to large quantities of slightly saline to saline groundwater. Brackish groundwater often contains water with greater than 5,000 TDS. Very little to no water is currently used from the Capitan Reef in Ward County. Most of the groundwater pumped from the aquifer is from other areas of the formation and used for oil reservoir flooding. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy would impact the ability of CRMWD to transport additional water from the Ward County Well Field since this strategy proposes to use the same infrastructure. If constructed, it is likely that this strategy would be used conjunctively with the Ward County Expansion for CRMWD.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is whether or not the strategy is economically feasible. The necessary infrastructure to pump and treat water from the Capitan Reef Complex aquifer will be a financial challenge. This strategy is not recommended for this planning cycle. However, it was analyzed as an alternative strategy to be considered for future planning periods should the desired future condition and MAG availability support it.

MWP:	**Odessa**	**Phase 1 Capital Cost:**	$507,656,000
WMS Name:	**Develop Edwards-Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County**	**Phase 2 Capital Cost:**	$319,152,000
		Phase 1 Annual Cost (During Amortization):	$4,500 per acre-foot $13.81 per 1,000 gal
WMS Type:	Groundwater Development	**Phase 2 Annual Cost** (During Amortization):	$2,416 per acre-foot $7.41 per 1,000 gal
Phase 1 Yield:	11,200 acre-feet per year	**Phase 1 Annual Cost** (After Amortization):	$1,311 per acre-foot $4.02 per 1,000 gal
Phase 2 Yield:	16,800 acre-feet per year		
WMS Status:	Alternative	**Phase 2 Annual Cost** (After Amortization):	$1,079 per acre-foot $3.31 per 1,000 gal
		Implementation:	NA

Strategy Description

The City of Odessa is considering developing a groundwater supply in Pecos County. This supply likely would be developed in the Edwards-Trinity and/or Capitan Reef Complex. Water quality of these formations is variable, with fresh water supplies adjacent to brackish water. Due to this uncertainty, it is assumed that the supplies from this strategy would require advanced treatment.

A study is currently being conducted on the feasibility of developing this water for Odessa. The proposed transmission system is sized for a peak capacity of 50 MGD. The City would develop this project in stages with an initial development of 10 MGD average annual supply and increasing to the full capacity of the transmission system by 2070. Assuming a peaking factor of 1.5 for this source, the ultimate average annual supply from the well field would be about 37,300 acre-feet per year before treatment losses. To provide approximately this amount of water, 36 new wells would need to be drilled. These wells would produce water from approximately 2,000 to 3,000 feet below the surface.

This strategy assumes that well field piping will connect the water wells to a new 90–mile transmission line that would carry the water from Pecos County to the City of Odessa. The water treatment facility is assumed to be located near Odessa. Due to the large quantity of water to be developed, it is assumed that a new advanced water treatment facility would be built. The facility would be built in phases with Phase 1 sized for 20 MGD and a Phase 2 expansion of 30 MGD for a total ultimate capacity of 50 MGD.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 1,000 gpm. Historical industrial and agricultural use indicates that the Edwards-Trinity and Capitan Reef Complex aquifers may be a viable source, but high TDS will require advanced treatment. For this plan, the 36 new wells are assumed to supply an additional 37,300 acre-feet per year. Assuming a loss of 25 percent, the amount of reliable treated supply for municipal use is about 28,000 acre-feet per year for both phases. The reliability of the supply is considered to be medium because of the potential for competing demands and limitations of the aquifers. The total capital cost for both phases is estimated at approximately $826,808,000.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. There are several springs in the Fort Stockton area that could potentially be impacted by large development of groundwater. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Wells provide water for ranching, domestic and municipal supplies throughout the area. It is assumed that this project would acquire sufficient water rights to mitigate potential impacts to agricultural and rural areas. Studies may be required to evaluate potential impacts on the area.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. The water quality in the Capitan Reef Complex aquifer is generally poor, yielding small to large quantities of slightly saline to saline groundwater. 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. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

Other strategies for Pecos County may be impacted. Also, CRMWD is considering developing additional groundwater in Pecos County. It is likely that only one strategy for groundwater from Pecos County to Odessa will be developed.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is whether or not the strategy is economically feasible. The necessary infrastructure to pump and treat water from the Capitan Reef Complex aquifer will be a financial challenge. This strategy is not recommended for this planning cycle. However, it was analyzed as an alternative strategy to be considered for future planning periods should Odessa need additional supplies and CRMWD choose not to develop these supplies.

MWP:	**San Angelo**	**Capital Cost:**	$55,491,000
WMS Name:	**Develop Hickory Aquifer Supplies in McCulloch County**	**Annual Cost** (During Amortization):	$2,321 per acre-foot $7.12 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,037 per acre-foot $3.18 per 1,000 gal
WMS Yield:	3,040 acre-feet per year (12,000 AFY including existing and future supplies)	**Implementation:**	2030
WMS Status:	Recommended		

Strategy Description

The most recent phase of the City of San Angelo's Hickory Well Field expansion was substantially completed in June 2016. During this phase, the total pumping capacity of the well field was increased from 7,280 ac-ft per year (6.5 MGD) to 12,000 ac-ft per year (10.8 MGD) by installing five additional wells (increasing the well field to 15 total wells) and supporting infrastructure. Currently, the City can divert 2,750 acre-feet per year, plus any banked water, according to their agreement with the Hickory Underground Water District. Starting in 2026, the City's permitted supply increases to an annual amount of 10,000 acre-feet per year plus any banked water. By 2036, the project's permitted supply will reach its ultimate annual amount of 12,000 acre-feet per year. Even though the City is able to produce this ultimate amount from its Hickory Well Field, it is limited by the City's current water treatment plant capacity of 8,960 ac-ft per year (8 MGD).

The City will need to expand its well field and groundwater treatment facility to reach the maximum system capacity of 12 MGD. Additional infrastructure that will be required to reach this 12 MGD capacity include: additional wells (up to five new wells), well field piping, additional 4 MGD water treatment (radium removal) trains to increase treatment capacity, a clear well and upgraded booster pump station facilities. The additional wells would produce water from approximately 3,000 feet below the surface. Groundwater would be transported to the City of San Angelo's groundwater treatment plant through the existing 30-inch McCulloch Well Field transmission pipeline. It is assumed that San Angelo's existing and future treatment facilities will be sufficient to treat the full authorized amount of Hickory aquifer supplies.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 500 gpm per well. The Hickory aquifer is a viable source, but elevated radionuclide concentrations will require advanced treatment. The total permitted supply from the Hickory aquifer, which includes existing supplies as well as upgrades to ultimate capacity, is 12,000 acre-feet per year beginning in 2036 through the planning period. The reliability of the supply is medium to high. There is plenty of water in storage, but water quality issues and competing demands may limit the availability. This strategy is estimated to cost $55.5 million.

Environmental Factors

The proposed wells will produce water from the down-dip portion of the Hickory aquifer. Because of the 3,000 feet of overburden, there is no connection with the land surface and as a result, there would be no impact on springs or surface water sources. Subsidence would also not be a factor due to the depth of the source and the competency of the overburden. Groundwater development from this source is expected to cause minimal environmental impacts.

Agricultural and Rural Impacts

This source is currently used for agricultural, industrial, and municipal purposes. This strategy is not expected to affect other users in the area. San Angelo has the necessary water rights to produce the quantities included in this strategy.

Impacts to Natural Resources and Key Parameters of Water Quality

Much of the water from the Hickory aquifer exceeds drinking water standards for radionuclides and will be treated through ion exchange. San Angelo has an existing treatment facility for this supply. The reject water from the treatment process is disposed separately and not discharged. There are no impacts to key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

No impacts to other water resources or management strategies are identified.

Other Issues Affecting Feasibility

None identified.

MWP:	**San Angelo**	**Capital Cost:**	$102,100,000
WMS Name:	**Develop Edwards-Trinity Plateau Aquifer Supplies in Schleicher County**	**Annual Cost** (During Amortization):	$1,800 per acre-foot $5.52 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$209 per acre-foot $0.64 per 1,000 gal
WMS Yield:	4,500 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

The Edwards-Trinity Plateau aquifer in Schleicher County has been identified as a potential source for municipal, industrial and agricultural purposes. This source is currently used for agricultural purposes and may require advanced treatment for municipal use. Groundwater studies project that approximately 4,500 acre-feet per year could be produced from this source; however, that quantity is not available under MAG limitations from this source. Therefore, for the purpose of this plan, groundwater development in Schleicher County is not a recommended strategy. However, this strategy was evaluated as a potential alternative strategy if the exportation of water outside of Schleicher County was agreed upon.

To provide approximately 4,500 acre-feet per year, 18 new wells would need to be drilled. These wells would produce water from approximately 500 feet below the surface. It was estimated that the City would need to purchase approximately 4,500 acres of land above the aquifer for well construction and piping. This strategy assumes that the wells will be connected by 49,560 linear feet of well field piping, with diameters of 6-, 8-, 10-, 14-, 16-, and 20-inches. In addition, it was assumed that the groundwater well field would include a 0.25 MGD ground storage tank.

This project also includes a transmission pipeline and pump station that will transport the water from the well field to existing infrastructure located in the City of San Angelo. It is assumed that the water produced from the new well field will be blended with the existing water supply or treated at the City's water treatment plant. Desalination of new groundwater is evaluated as a separate strategy. The transmission pipeline is assumed to be a 50-mile pipeline with a diameter of 20 inches.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be moderate to low, in the 150 – 250 gpm range for individual wells. Historical municipal and agricultural use indicates that the Edwards-Trinity Plateau aquifer may be a viable source, but high TDS will require advanced treatment. For this plan, the 18 new wells are assumed to supply an additional 4,500 acre-feet per year. The reliability of the supply is considered to be medium because of the potential competing demands.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Spring flows from the Edwards-Trinity Plateau supply much of the base flow of the South Concho and other flowing streams in the area. Many of these streams are used extensively for irrigation. Wells provide water for ranching, domestic and municipal supplies throughout the area. Studies will be required to evaluate potential impacts on the area.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. 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.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

Other strategies that use the Edwards-Trinity aquifer in Schleicher County may be impacted.

Other Issues Affecting Feasibility

None identified.

MWP:	**San Angelo**	**Capital Cost:**	$327,576,000
WMS Name:	**Develop Pecos Valley, Edwards-Trinity Plateau Aquifer Supplies in Pecos Co.**	**Annual Cost** (During Amortization):	$2,604 per acre-foot $7.99 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$470 per acre-foot $1.44 per 1,000 gal
WMS Yield:	10,800 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	NA

Strategy Description

The Pecos Valley and/or Pecos Valley-Edwards-Trinity aquifer in Pecos County has been identified as a potential source for municipal, industrial, and agricultural purposes. This source may require advanced treatment for municipal use. To provide approximately 10,800 acre-feet per year, 15 new wells would need to be drilled. These wells would produce water from approximately 200 feet below the surface and are anticipated to produce between 800-1,000 gpm.

This strategy assumes 33,000 linear feet of 12 inch well field piping. This project also includes a transmission pipeline that will transport the water from the well field to existing infrastructure located in the City of San Angelo. The transmission pipeline is assumed to be a 186-mile pipeline with a diameter of 30 inches. One well field pump station and 3 booster pump stations will be needed to convey the water to San Angelo.

This strategy does not include treatment but depending upon the water quality of the well field, some or all of the water may need advanced treatment. Potential advanced treatment is included in a separate strategy for San Angelo, *Desalination of Brackish Groundwater*.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 800-1,000 gpm. In parts of the aquifer there are elevated levels of chloride and sulfate, resulting from previous oil field activities, which would require advanced treatment. If treatment is needed, the treated water supply would be 20-25% less. For this plan, the 15 new wells are assumed to supply 10,800 acre-feet per year. The reliability of the supply is considered to be medium because of potential water quality properties.

The capital cost of this strategy is $327.6 million. Unit costs during amortization are $7.99 per 1,000 gallons. Following repayment of debt, the unit costs decrease to $1.44 per 1,000 gallons, assuming no treatment is needed. Costs of treatment are evaluated in a separate strategy. This strategy is relatively expensive due to the long transmission pipeline and transport costs.

Environmental Factors

The aquifer is a proven groundwater source for industrial, agricultural, and municipal purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. Depending upon the well field location and connectivity to surface water, there may be possible impacts on the Pecos River from this strategy. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

This source is currently used for agricultural purposes. The area of potential interest is currently being used mainly for livestock and ranching. It is possible that large scale production from this aquifer could impact irrigation supplies in the Belding Farms area. This strategy could reduce the amount of water currently available to other users in the area.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in Pecos Valley and Edwards-Trinity aquifers is highly variable. This is due to there being several structural basins, the largest of which are the Pecos Trough in the west and Monument Draw Trough in the east. Water is generally better in the Monument Draw Trough. The aquifer is characterized by high levels of chloride and sulfate in excess of secondary drinking standards in some areas. In addition, naturally occurring arsenic and radionuclides occur in excess of primary drinking water standards. Water levels of the aquifer continue to decline due to increased municipal and industrial pumping.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

Other strategies for water from Pecos County may be impacted. This includes Pecos County groundwater development strategies identified for CRMWD and the City of Odessa.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is whether or not the strategy is economically feasible. The necessary infrastructure to move water from Pecos County to Tom Green County where it may need advanced treatment will be expensive. This may be too great of a financial burden for the City of San Angelo. This strategy is not recommended for this planning cycle. However, it was analyzed as a potential strategy to be considered for future use should the opportunity present itself.

WUG:	**Andrews**	**Capital Cost:**	$15,663,000
WMS Name:	**Develop Ogallala Aquifer Supplies**	**Annual Cost** (During Amortization):	$496 per acre-foot $1.52 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	2,810 acre-feet per year	**Annual Cost** (After Amortization):	$104 per acre-foot $0.32 per 1,000 gal
WMS Status:	Alternative	**Implementation:**	2020

Strategy Description

To provide additional supply, the City of Andrews plans to develop additional groundwater in two phases. The first phase involves developing new groundwater near the existing Florey Well Field and has been completed. The second phase is to develop groundwater located south of town and construct a new pipeline.

The next phase involves developing groundwater from a different location south of town. The City has drilled 16 test wells in this area and discovered the wells are slower producing than those located near the Florey Well Field. The next phase assumes 14 new wells and an 8-mile, 18-inch diameter pipeline to town. This portion is expected to be online in 2040 and the total water supply provided by the strategy is approximately 2,810 acre-feet per year.

The City recently completed a new water treatment plant to treat naturally occurring fluoride and arsenic levels found in local groundwater. It was assumed that this plant could handle any potential water quality issues that may arise. Therefore, no treatment plant was included in the evaluation and cost estimate of this strategy. If a new treatment plant is determined to be needed, the cost of this strategy will increase.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be good given the test wells and studies already performed by the City of Andrews. For this plan, the 14 new wells are assumed to supply an additional 2,810 acre-feet per year by the time the phased strategy is fully implemented. Due to limitations from the MAG, this strategy is considered alternative.

The total cost of the project will be approximately $15.6 million. This equates to $496 per acre-foot ($1.52 per 1,000 gallons) of treated water during debt service. After the infrastructure is fully paid for, the cost drops to $104 per acre-foot ($0.32 per 1,000 gallons) of treated water.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Throughout much of the aquifer, groundwater withdrawals exceed the amount of recharge, and water levels have declined fairly consistently through time. However, the City has an agreement with other users in the area to minimize the impacts of drawdown near their well field. Groundwater development from this source is expected to cause minimal environmental impacts.

Agricultural and Rural Impacts

This source is currently used for agricultural purposes. This strategy would reduce the amount of water currently available to agricultural users. It is assumed that the transfer of water rights will be between a willing buyer and willing seller, and there would be minimal impacts to agricultural users.

Impacts to Natural Resources and Key Parameters of Water Quality

There are no identified impacts to natural resources.

Impacts on Other Water Resources and Management Strategies

This strategy may impact other groundwater strategies in Andrews County due to competition for available supplies.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is the planning constraints of the Modeled Available Groundwater volume amount for the County of Andrews from the Ogallala aquifer. Due to these limitations, the supply available from the Ogallala aquifer is less than proposed for this strategy. As such, this strategy cannot be recommended in the plan at the quantities shown. However, since Andrews County does not have a GCD to enforce ground restrictions, such as MAG limits, the City could pursue this strategy independently, but it could not receive State funding to construct it.

WUG:	**Andrews**	**Capital Cost:**	$24,927,000
WMS Name:	**Develop Edwards-Trinity Plateau Aquifer Supplies (Antlers Formation)**	**Annual Cost** (During Amortization):	$891 per acre-foot $2.73 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$217 per acre-foot $0.66 per 1,000 gal
WMS Yield:	2,600 acre-feet per year	**Implementation:**	2020
WMS Status:	Alternative		

Strategy Description

The Edwards-Trinity Plateau aquifer in the Antlers formation has been identified as a potential source for additional municipal purposes. Along the southern county border, there may lie groundwater supplies suitable for development. It is unclear if this formation is truly from the Edwards-Trinity Plateau or if it is fed by leakage from the overlaying Ogallala aquifer. This potential source is only located in the southern part of Andrews County. Further study would be needed to determine if this was a feasible strategy for the specific user depending on their location within the county and local hydrogeologic conditions. This strategy assumes that 38 new wells would need to be drilled to provide approximately 2,600 acre-feet per year. These wells would produce water from approximately 150 feet deep.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 50 gpm. Historical municipal use indicates that the Edwards-Trinity Plateau outcrops may be a viable source but high TDS may require advanced treatment for municipal use, which would increase the cost if required. For this plan, the 38 new wells are assumed to supply an additional 2,600 acre-feet per year. It also includes 15 miles of 18-inch pipeline. The reliability of the supply is considered to be medium, based on the aquifer characteristics and water quality. Due to MAG limitations, this strategy is listed as Alternative. The capital costs are estimated at $24.9 million.

Environmental Factors

The aquifer is currently not used for municipal purposes in Andrews County. Wastewater discharges from this source may contain elevated TDS if the water is not treated. This strategy is not expected to have other environmental impacts. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Since this source is not currently being used to any extent in Andrews County, the strategy should not have any impacts to agricultural users. It would provide additional water to rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer can be variable, with water quality ranging from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. 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. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

No other water management strategies will be impacted.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production where the water quality is good. In addition, this project requires financing for the new facilities.

WUG:	**Andrews County Other**	**Capital Cost:**	$751,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$252 per acre-foot $0.77 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$40 per acre-foot $0.12 per 1,000 gal
WMS Yield:	250 acre-feet per year	**Implementation:**	2020
WMS Status:	Alternative		

Strategy Description
The Edwards-Trinity Plateau aquifer has been identified as a potential source for municipal, industrial and agricultural purposes. Along the southern county border, there may lie groundwater supplies suitable for development. It is unclear if this formation is truly from the Edwards-Trinity Plateau or if it is fed by leakage from the overlaying Ogallala aquifer. This potential source is only located in the southern part of Andrews County. Further study would be needed to determine if this was a feasible strategy for the specific user depending on their location within the county and local hydrogeologic conditions. This strategy assumes that five new wells would need to be drilled to provide approximately 250 acre-feet per year. These wells would produce water from approximately 150 feet below the surface.

Quantity, Reliability and Cost
The quantity and reliability of water from this source is expected to be approximately 50 gpm. Historical municipal and agricultural use indicates that the Edwards-Trinity Plateau outcrops may be a viable source but high TDS may require advanced treatment for municipal use. For this plan, the five new wells are assumed to supply an additional 250 acre-feet per year. Since there is not a specific sponsor for this strategy, it is assumed that the water would be treated at the Point of Use if needed and the infrastructure costs for treatment and transmission are not included in the costs for this strategy. The reliability of the supply is considered to be medium, based on the aquifer characteristics and water quality. The capital costs are estimated at $751,000.

Environmental Factors
The aquifer is currently not used for municipal purposes in Andrews County. Wastewater discharges from this source may contain elevated TDS if the water is not treated. This strategy is not expected to have other environmental impacts. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts
Since this source is not currently being used to any extent in Andrews County, the strategy should not have any impacts to agricultural users. It would provide additional water to rural users.

Impacts to Natural Resources and Key Parameters of Water Quality
The water quality in the Edwards-Trinity Plateau aquifer can be variable, with water quality ranging from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. 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. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies
No other water management strategies will be impacted.

Other Issues Affecting Feasibility
The most significant challenge for this strategy is locating areas with sufficient well production where the water quality is good. In addition, this project requires financing for the new facilities.

WUG:	**Andrews County Livestock**	**Capital Cost:**	$327,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$433 per acre-foot $1.33 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$50 per acre-foot $0.15 per 1,000 gal
WMS Yield:	60 acre-feet per year	**Implementation:**	2020
WMS Status:	Alternative		

Strategy Description

The Edwards-Trinity Plateau aquifer has been identified as a potential source of water for livestock in Andrews County. Water from this source ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Along the southern border of the county, there may lie undeveloped brackish groundwater supplies suitable for agricultural use. It is unclear whether supply is truly from the Edwards-Trinity Plateau or if it is fed by leakage from the overlaying Ogallala aquifer. This source is only located in the southern part of Andrews County. Further study would be needed to determine if this is a feasible strategy for the user depending on their location within the county and local hydrogeologic conditions. This strategy assumes that three new wells would need to be drilled to provide approximately 60 acre-feet per year. These wells would produce water from approximately 150 feet below the surface.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 30 gpm. For this plan, the three new wells are assumed to supply an additional 60 acre-feet per year. The reliability of the supply is considered to be low to medium, based on the unproven use of this source. Due to MAG limitations, this strategy is considered Alternative.

The total cost of the project will be approximately $327,000. This equates to $433 per acre-foot ($1.33 per 1,000 gallons) of treated water during debt service. After the infrastructure is fully paid for, the cost drops to $50 per acre-foot ($0.15 per 1,000 gallons) of treated water.

Environmental Factors

Environmental impacts from this strategy are expected to be low. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

This source is currently not used in Andrews County. This strategy should not impact current rural users. It should provide additional water for agricultural purposes.

Impacts to Natural Resources and Key Parameters of Water Quality

Water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. 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.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy could potentially impact the development of groundwater from the Edwards-Trinity Plateau aquifer for rural County-Other in Andrews County if located in the same vicinity. However, the combined supplies from these strategies do not exceed the MAG value, indicating there is sufficient supplies for both strategies.

Other Issues Affecting Feasibility

An adequate drinking water supply is an essential component of livestock production. The most significant challenge for this strategy is locating areas with sufficient well production. Generally, livestock can tolerate higher salinity levels than municipal use; however, long-term use could negatively impact overall livestock performance. This might potentially offset the positive impacts of a more reliable water supply.

WUG:	**Andrews County Manufacturing**	**Capital Cost:**	$591,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$243 per acre-foot $0.75 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$43 per acre-foot $0.13 per 1,000 gal
WMS Yield:	210 acre-feet per year	**Implementation:**	2020
WMS Status:	Alternative		

Strategy Description

There are undeveloped groundwater supplies in the Edwards-Trinity Plateau aquifer in Andrews County. Water from this source is not widely used because of low well yields in most areas. Some areas have poor water quality as well. However, there appears to be some areas within the county that have sufficient well yields to meet manufacturing water needs. This strategy assumes that four new wells would be drilled to provide approximately 210 acre-feet per year. These wells would produce water approximately 150 feet below the surface.

Quantity, Reliability and Cost

This strategy assumes that up to 210 acre-feet of water per year could be produced from the Edwards-Trinity Plateau aquifer. Reliability would be moderate to high, depending on well capacity. Due to MAG limitations, this strategy is considered Alternative.

Environmental Factors

Many areas of good well production in the Edwards-Trinity Plateau aquifer are associated with surface water discharge from springs. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Wells provide water for ranching, industrial, domestic and municipal supplies throughout the area. This strategy assumes sufficient groundwater rights would be obtained on a willing buyer-willing seller basis, which should mitigate potential impacts to agricultural and rural water users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. 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. This strategy is not expected to impact key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy may compete with other Andrews County strategies for limited supplies. However, the strategies were sized with respect to the MAG for the Edwards-Trinity Plateau aquifer, so there should be no impacts to other strategies.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production and low potential for impacts on springflows.

WWP:	**Texland Great Plains**	**Capital Cost:**	$380,000
WMS Name:	**Develop Ogallala Aquifer Supplies**	**Annual Cost** (During Amortization):	$190 per acre-foot $0.58 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$55 per acre-foot $0.17 per 1,000 gal
WMS Yield:	200 acre-feet per year	**Implementation:**	2020
WMS Status:	Alternative		

Strategy Description

Texland Great Plains is a wholesale water provider in Andrews and Gaines counties. They currently produce water from an existing well field in the Ogallala Aquifer. The MAG limits the availability for additional development from the Ogallala under regional planning rules and guidelines. However, it is anticipated that Great Plains would develop additional wells in Andrews and/or Gaines counties. This is an alternative strategy since the MAG limits in Andrews and Gaines counties. This strategy assumes one additional 250 gpm well.

Quantity, Reliability and Cost

This strategy is anticipated to provide an average of 200 acre-feet per year. The reliability of this supply is considered medium-high because the it is an existing well field in a proven aquifer. However, the MAG limitations indicate there may be competition for the water supply. The estimated cost of the additional well is $380,000.

Environmental Factors

Environmental impacts are expected to be low.

Agricultural and Rural Impacts

As some farmers cease to irrigate, Texland Great Plains may purchase their groundwater rights and drill or take over those wells as part of this strategy. It is assumed this would happen on a willing-buyer, willing-seller basis, limiting the impact on the agricultural users.

Impacts to Natural Resources and Key Parameters of Water Quality

Use of this source is not expected to impact key parameters of water quality. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

MAG availability from the Ogallala Aquifer limits official development of strategies from this source. This strategy will increase the competition for available groundwater in the area.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is MAG availability.

WUG:	**Balmorhea**	**Capital Cost:**	$1,948,000
WMS Name:	**Develop Edwards-Trinity Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,053 per acre-foot $3.23 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$140 per acre-foot $0.43 per 1,000 gal
WMS Yield:	150 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

The City of Balmorhea is evaluating a groundwater source in the Edwards-Trinity Plateau aquifer. This source has been identified as currently supplying water for municipal, industrial and agricultural uses. However, the long-term water availability and quality of the proposed well field should be assessed further. This strategy assumes that two new wells would be drilled to provide approximately 150 acre-feet per year. This well would produce water from approximately 600 feet below the surface.

This strategy also includes 5 miles of 6-inch diameter pipeline that will connect the well to the current infrastructure.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 125 gpm. Historical municipal and agricultural use indicates that the Edwards-Trinity Plateau may be a viable source for municipal use but may require some treatment or blending based on local groundwater conditions. For this plan, the new well is assumed to supply an additional 150 acre-feet per year. The reliability of the supply is considered to be high, based on the aquifer characteristics observed to contain large pools of mostly potable water. The total capital cost is estimated at $1.9 million. This strategy assumes that adequate water quality for municipal use can be reached through blending with Balmorhea's other groundwater sources. If the quality of water requires advanced treatment, costs would be higher than estimated here.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Springflows from the Edwards-Trinity Plateau supply much of the base flow of flowing streams in the area. Many of these streams are used for irrigation. Wells provide water for ranching, domestic and municipal supplies throughout the area. It is assumed that the proposed level of additional groundwater development will not impact agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from generally fresh to slightly saline in the outcrop areas, and brackishwater in subsurface portions. 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. This strategy is not expected to impact key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

No other water management strategies will be impacted.

Other Issues Affecting Feasibility

The economic viability of the project will depend upon the ability to locate groundwater of sufficient quality to blend with existing sources without advanced treatment.

WUG:	**Bronte**	**Capital Cost:**	$23,694,000
WMS Name:	**Develop Other Aquifer Supplies in Southwest Coke County**	**Annual Cost** (During Amortization):	$2,424 per acre-foot $7.44 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$340 per acre-foot $1.04 per 1,000 gal
WMS Yield:	800 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description
The Coke County Underground Water District has done some groundwater exploration in southwest Coke County. Bronte is considering developing 5 new wells in this area. It is estimated that the wells would produce around 100 gpm from a 300 ft depth and be of adequate quality for municipal use without advanced treatment. A 31-mile, 10-inch transmission pipeline would be needed to deliver these supplies to the City.

Quantity, Reliability and Cost
This strategy is estimated to supply 800 acre-feet per year. The reliability is considered medium based on the work done by the Coke County Underground Water District but the strategy is still dependent on locating wells with adequate production and water quality. The costs are estimated at $23.7 million.

Environmental Factors
Some testing and exploration has been done in this area but the long term water quality is unknown. Other environmental factors were not identified.

Agricultural and Rural Impacts
No agricultural and rural impacts are anticipated.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
Other strategies for the City of Bronte may be impacted. The need for this strategy may be reduced if Robert Lee were to develop independent supplies from one of their Alternative Water Management Strategies.

Other Issues Affecting Feasibility
Because the long-term reliability and quality of this supply is unknown, the City may need to develop other alternatives to meet long-term needs. Funding construction of this infrastructure will be a significant strain on the financial resources of the City.

WUG:	**Bronte**	**Capital Cost:**	$2,666,000
WMS Name:	**Develop Other Aquifer Supplies in Runnels County**	**Annual Cost** (During Amortization):	$2,787 per acre-foot $8.55 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$280 per acre-foot $0.86 per 1,000 gal
WMS Yield:	75 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description
This strategy is to develop two 50 gpm wells from Other Aquifer in Runnels county. The wells are estimated to produce water from 150-foot depth. A 6-inch, 9.5-mile transmission pipeline is also assumed.

Quantity, Reliability and Cost
This strategy is estimated to yield 75 acre-feet per year. The reliability is considered medium because it is dependent upon finding an area with adequate production and water quality for municipal use. The cost is estimated at $2.7 million.

Environmental Factors
The long-term water quality of this source is unknown. No other environmental concerns were identified. This strategy is unlikely to cause subsidence.

Agricultural and Rural Impacts
Bronte is a rural community. Increased water security provided by this strategy will have a positive impact on the vitality of this rural community.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
Other strategies for the City of Bronte may be impacted. The need for this strategy may be reduced if Robert Lee were to develop independent supplies from one of their Alternative Water Management Strategies.

Other Issues Affecting Feasibility
Because the long-term reliability and quality of this supply is unknown, the City may need to develop other alternatives to meet long-term needs. Funding construction of this infrastructure will be a significant strain on the financial resources of the City.

WUG:	**Brown County Mining**	**Capital Cost:**	$2,440,000
WMS Name:	**Develop Cross Timbers Aquifer Supplies**	**Annual Cost** (During Amortization):	$948 per acre-foot $2.91 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$129 per acre-foot $0.39 per 1,000 gal
WMS Yield:	210 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

The Cross Timbers formation has been identified as a potential source of water for mining in Brown County. This strategy assumes that 32 new wells would be drilled to provide approximately 210 acre-feet per year. These wells are assumed to produce water from approximately 320 feet below the surface.

Quantity, Reliability and Cost

It is assumed that for this strategy, each well will provide an additional 5 gpm for mining purposes in Coke County. This brings the total strategy yield up to 210 acre-feet per year. The reliability of the supply is considered to be low to medium, based on the unproven use of this source.

The total cost of the project will be approximately $2.4 million. This equates to $948 per acre-foot ($2.91 per 1,000 gallons) of water during debt service. After the infrastructure is fully paid for, the cost drops to $129 per acre-foot ($0.39 per 1,000 gallons) of treated water.

Environmental Factors

Environmental impacts from this strategy are expected to be low. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

None identified.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in this area tends to be poor, but should be more than adequate for mining purposes.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production.

WUG:	**Colorado City**	**Capital Cost:**	$3,744,000
WMS Name:	**Dockum Well Field Expansion**	**Annual Cost** (During Amortization):	$1,824 per acre-foot $5.60 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	170 acre-feet per year	**Annual Cost** (After Amortization):	$276 per acre-foot $0.85 per 1,000 gal
WMS Status:	Alternative	**Implementation:**	2020

Strategy Description

In compliance with the guidance and rules for regional water planning, the TWDB requires the use of Modeled Available Groundwater (MAG) in regional water planning. The MAG for the City's current well field in the Dockum aquifer is severely limiting. To meet the City's water demands, Colorado City is considering an alternative water management strategy. This strategy is not recommended for this planning cycle due to the supply volume exceeding the current MAG in the Dockum aquifer.

Colorado City currently obtains its water supply from several well fields in the Dockum aquifer. The City recently drilled two new well fields, but one was high in sulfides and must be blended with other supplies before use. There are concerns about potential oil field contamination and the City is seeking to expand groundwater development in the Dockum Aquifer. This source is currently used for municipal and agricultural purposes and has been identified as a potential supply to meet the City's needs. This strategy assumes that one new well would need to be drilled to provide approximately 170 acre-feet per year. This well would produce water approximately 200 feet below surface. It is assumed that the water quality of the new well would be equivalent to the quality of the City's original wells that no additional treatment will be needed. If adequate water quality cannot be found, advanced treatment may be needed, which would increase the estimated cost of this strategy.

Piping infrastructure is currently in place to transport water from the first field 9 miles east of town to the existing standpipe. An 8-mile pipeline, 6-inches in diameter, will connect water from the second field to the current pipeline running from the first field to the standpipe. The well pumps will be used to convey the water through the pipeline.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be 150 gpm. Historical municipal and agricultural use indicates that the Dockum aquifer may be a viable source. For this plan, the new well is assumed to supply an additional 170 acre-feet per year. The reliability of the supply is considered to be medium because of aquifer and water quality properties.

The total cost of the project will be approximately $3.7 million. This equates to $1,824 per acre-foot ($5.60 per 1,000 gallons) of treated water during debt service. After the infrastructure is fully paid for, the cost drops to $276 per acre-foot ($0.85 per 1,000 gallons) of treated water.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

This source is currently used for agricultural purposes. It is assumed that the transfer of water rights will be between a willing buyer and willing seller, and there would be minimal impacts to agricultural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Dockum aquifer is generally variable, with freshwater in outcrop areas and brine in the subsurface portions. The water tends to be very hard. Advanced treatment may be required for municipal use.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production, and funding. Due to MAG limitations, this strategy is not recommended; however, it was analyzed as an alternative strategy to be considered for future use should the DFC and MAG change.

WUG:	**Grandfalls**	**Capital Cost:**	$2,410,000
WMS Name:	**Develop Pecos Valley Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,245 per acre-foot $3.82 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	155 acre-feet per year	**Annual Cost** (After Amortization):	$148 per acre-foot $0.46 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description
Grandfalls existing water supplies are from CRMWD's Ward County Well Field. Grandfalls' contract with CRMWD for water supplies will expires in 2049. Starting in 2050, it is assumed they will need to develop their own well field in the Pecos Valley Aquifer in Ward County. This strategy assumes Grandfalls will drill two wells, connect them with necessary collection piping, and then transport the supplies to Grandfalls via a 6 mile, 6-inch transmission line.

Quantity, Reliability and Cost
This strategy is estimated to supply 155 acre-feet per year from two 100 gpm wells producing from about 200 ft below the surface in the Pecos Valley Aquifer. The reliability from this strategy is considered high. The estimated cost of this strategy is $2.4 million.

Environmental Factors
Environmental impacts are expected to be low. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts
There are no agricultural or rural issues associated with this strategy.

Impacts to Natural Resources and Key Parameters of Water Quality
The strategy proposes to utilize a sustainable level of groundwater that does not exceed the Modeled Available Groundwater (MAG). The impacts to natural resources are expected to be minimal. No impacts to water quality are expected.

Impacts on Other Water Resources and Management Strategies
No impacts on other water management strategies are anticipated.

Other Issues Affecting Feasibility
If Grandfalls is able to negotiate a new contract agreement with CRMWD for supplies from CRMWD's Ward County well field, they may not need to develop independent supplies. This would have to be negotiated at that time and would be subject to both parties reaching mutually agreeable terms.

WUG:	**Junction**	**Capital Cost:**	$3,634,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$822 per acre-foot $2.52 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$130 per acre-foot $0.40 per 1,000 gal
WMS Yield:	370 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

The City of Junction is evaluating a groundwater source in the Edwards-Trinity Plateau aquifer to back up its current supplies. Water from this source is not widely used because of low well yields and poor water quality. This source is currently used for manufacturing. This strategy assumes that seven new wells would be drilled to provide approximately 370 acre-feet per year. These wells are assumed to produce water from approximately 190 feet below the surface with elevated TDS levels. It is assumed that this water is blended with surface water. However, if it is determined that the water qualities of the two sources are incompatible, the groundwater may require advanced treatment. Costs for advanced treatment are not included. This strategy assumes that the new wells will be drilled within three miles of the City's existing infrastructure. This project includes 1,800 feet of 6-inch diameter well field collection piping and three miles of 8-inch transmission piping to connect to existing infrastructure.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 40 gpm. Historical use indicates that the Edwards-Trinity Plateau may be a viable source but may contain high TDS. For this plan, the seven new wells are assumed to supply an additional 370 acre-feet per year. The reliability of the supply is considered to be medium because of water quantity and quality issues.

Environmental Factors

The blending of slightly brackish water with Junction's existing supplies may increase the TDS levels of treated wastewater from the City. It is expected the increase will not exceed current discharge limits. No other environmental impacts are identified.

Agricultural and Rural Impacts

Wells provide water for ranching, domestic and municipal supplies throughout the area. This strategy assumes sufficient groundwater rights would be obtained on a willing buyer-willing seller basis, which should mitigate potential impacts to agricultural and rural water users.

Impacts to Natural Resources and Key Parameters of Water Quality

Water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

A significant challenge for this strategy is locating areas with sufficient well production where the water quality is good.

WUG:	**Kimble County Manufacturing**	**Capital Cost:**	$1,621,000
WMS Name:	**Develop Edwards-Trinity Aquifer Supplies**	**Annual Cost** (During Amortization):	$274 per acre-foot $0.84 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$46 per acre-foot $0.14 per 1,000 gal
WMS Yield:	500 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

There are undeveloped groundwater supplies in the Edwards-Trinity Plateau aquifer in Kimble County. Water from this source is not widely used because of low well yields in most areas. Some areas have poor water quality as well. However, there appears to be some areas within the county that have sufficient well yields to meet manufacturing water needs. This strategy assumes that 10 new wells would be drilled to provide approximately 500 acre-feet per year. These wells would produce water approximately 190 feet below the surface.

Quantity, Reliability and Cost

This strategy could meet Kimble County manufacturing water needs for consumptive use, but not for recirculated water. This strategy assumes that up to 500 acre-feet of water per year could be produced from the Edwards-Trinity Plateau aquifer. Reliability would be moderate to high, depending on well capacity.

Environmental Factors

Many areas of good well production in the Edwards-Trinity Plateau aquifer are associated with surface water discharge from springs. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Wells provide water for ranching, industrial, domestic and municipal supplies throughout the area. This strategy assumes sufficient groundwater rights would be obtained on a willing buyer-willing seller basis, which should mitigate potential impacts to agricultural and rural water users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. 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. This strategy is not expected to impact key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy may compete with other Kimble County strategies for limited supplies. However, the strategies were sized with respect to the MAG for the Edwards-Trinity Plateau aquifer, so there should be no impacts to other strategies.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production and low potential for impacts on springflows. There is also uncertainty regarding the amount of water actually needed to meet consumptive manufacturing needs in Kimble County. It is quite likely that the actual amount of water needed is overstated in the needs calculation because the surface water supplies are limited to consumptive use only in the WAM. The actual amount of surface water available for manufacturing use for recirculation is greater.

WUG:	**Menard**	**Capital Cost:**	$3,287,000
WMS Name:	**Develop Hickory Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,320 per acre-foot $4.05 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	200 acre-feet per year	**Annual Cost** (After Amortization):	$160 per acre-foot $0.51 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

The City of Menard has been actively seeking a groundwater source to add to its current supplies. Yields from the Edwards-Trinity Plateau aquifer tend to be low in Menard County and the City has been unsuccessful in locating an adequate supply from that source. An alternative is the Hickory aquifer, which underlies the City at a depth of approximately 3,600 ft. The City is planning to drill one well near its existing storage tank to provide approximately 200 acre-feet per year. This well would produce water from approximately 3,600 feet below the surface.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 620 gpm. Limited historical agricultural use indicates that the Hickory aquifer may be a viable source but elevated radionuclide concentrations will require advanced treatment. For the purpose of this plan, this strategy assumes that water from the Hickory can meet primary drinking water standards if blended with the City's existing water supply. The one new well is assumed to supply an additional 200 acre-feet per year. The reliability of the supply is considered to be medium because of water quality issues. Capital costs for this strategy are estimated at $3.3 million.

Environmental Factors

The proposed well will produce water from the down-dip portion of the Hickory aquifer. Because of the 3,000 feet of overburden, there is no connection with the land surface and as a result, no impact is expected on springs or surface water sources. Subsidence would also not be a factor due to the depth of the source and the competency of the overburden. Groundwater development from this source is expected to cause minimal environmental impacts, unless the water requires advanced treatment. If advanced treatment is required, impacts may be higher depending on the method used to dispose of the reject from the treatment process.

Agricultural and Rural Impacts

Currently, only a very small amount of water from the Hickory is used for irrigation in Menard County. Because of the relatively small amount of water from this strategy, there are no expected impacts on irrigated agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

In Menard County, the water quality of the Hickory aquifer tends to be poor. The upper portion of the aquifer contains iron in excess of the State's secondary drinking water standards. Also, much of the water from the Hickory aquifer exceeds drinking water standards for radionuclides. For this plan, this strategy assumes that water from the Hickory can meet primary drinking water standards if blended with the City's existing water supply. However, advanced treatment may be required to meet standards, significantly increasing the cost of this strategy.

Impacts on Other Water Resources and Management Strategies

Based on other users of the aquifer, such as the City of Brady, there should be sufficient supplies to meet the City's long-term water supply needs. No impacts to other strategies or water resources were identified.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production where the water quality is good. For the purposes of this plan, this strategy assumes that water from the Hickory can meet primary drinking water standards in regards to radionuclides if blended with the City's existing water supply.

WUG:	**Midland County Other**	**Capital Cost:**	$24,557,000
WMS Name:	**Develop Pecos Valley Aquifer Supplies from Roark Ranch in Winkler County**	**Annual Cost** (During Amortization):	$738 per acre-foot $2.26 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$121 per acre-foot $0.37 per 1,000 gal
WMS Yield:	2,800 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

Midland County Utility District is considering developing additional groundwater in conjunction with the Midland County Fresh Water District (FWD). This strategy would expand groundwater supplies from the Pecos Valley aquifer in Winkler County and would be transported by the existing Midland County FWD pipeline to the greater Midland area. This strategy is a recommended strategy for Midland County Utility District (County-Other).

Quantity, Reliability and Cost

At this time it is unclear how much water would be available through this strategy or how it will ultimately be transported. For planning purposes, the strategy was assumed to provide up to 2,800 acre-feet of additional water to County-Other in Midland County. It is assumed that fifteen new wells would be drilled in Winkler County and connected to the T-Bar infrastructure, if agreements can be reached with the Midland County Freshwater Supply District No. 1 and the City of Midland to provide this capacity in the transmission line from the T-Bar Well Field. For this strategy, no treatment is included. This supply is considered reliable, but the use of the T-Bar infrastructure may limit the supplies when Midland is using the full capacity of the system. The capital cost of this strategy is $24.6 million, not including the purchase of the land which is considered complete for the purposes of this plan. Further development of supply from this land may be possible beyond the quantity shown in this plan. However, at this time, not enough information is available for inclusion in the plan.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Development of groundwater may divert water that was previously used for agricultural and rural purposes. However, this strategy involves groundwater rights that were obtained on a willing buyer – willing seller basis which minimizes the impacts to agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

The strategy proposes to utilize a sustainable level of groundwater that does not exceed the Modeled Available Groundwater (MAG). The impacts to natural resources are expected to be minimal. No impacts to water quality are expected.

Impacts on Other Water Resources and Management Strategies

This strategy could limit the ability to transport water from the expansion of the T-Bar Well Field during times of peak capacity.

Other Issues Affecting Feasibility

Since this strategy proposes to use the existing T-Bar ranch pipeline, agreements must be reached between all entities involved including the Midland County Fresh Water District, the Midland County Utility District, and the City of Midland.

WUG:	**Pecos City & Madera Valley WSC**	**Capital Cost:**	$43,107,000
WMS Name:	**Partner with Madera Valley WSC & Expand Pecos Valley Aquifer Supplies**	**Annual Cost** (During Amortization):	$427 per acre-foot $1.31 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$89 per acre-foot $0.27 per 1,000 gal
WMS Yield:	8,960 acre-feet per year	**Implementation:**	2030
WMS Status:	Recommended		

Strategy Description

The Madera Valley WSC has an existing well field and 10-inch transmission line for their own use. Pecos City is considering partnering with Madera Valley to expand the well field yield by an additional 6-8 MGD of average annual supply for both users from the Pecos Valley Aquifer. This strategy assumes the full 8 MGD is developed, all with ten new 650 gpm wells. The project also includes a 24-inch transmission line for Pecos City to connect to the expanded well field.

This strategy is subject to on-going negotiations between Madera Valley WSC and Pecos City and is contingent upon the two entities reaching mutually agreeable terms for the division of water and cost.

Quantity, Reliability and Cost

This strategy would increase the supply availability to Pecos City and Madera Valley WSC by an estimated 8,960 acre-feet per year. The amount of supply to each entity is dependent upon on-going negotiations between the two parties. The reliability of this supply is considered high. The estimated total capital investment required for both parties is $43.1 million.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Pecos Valley aquifer is highly variable. However, since this is an expansion of an existing field that is currently used for municipal use, the water quality is anticipated to be good. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy respects the MAG values in Reeves County, such that there is sufficient supplies for all recommended strategies.

Other Issues Affecting Feasibility

None identified.

WUG:	**Pecos County WCID #1**	**Capital Cost:**	$3,630,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,224 per acre-foot $3.76 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$204 per acre-foot $0.63 per 1,000 gal
WMS Yield:	250 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

Developing additional groundwater supplies is a recommended strategy to increase the reliability of Pecos County WCID's current system. For this planning purpose, it is assumed that Pecos County WCID #1 will drill two additional 150 gpm wells in the Edwards-Trinity Plateau aquifer to back up current supplies. The strategy also includes 6-inch collection piping and an elevated storage tank. The transmission line replacement is costed as part of a standalone project (see Transmission Pipeline, Pecos County WCID #1) and is therefore not included in here.

Quantity, Reliability and Cost

This strategy is expected to produce an additional 250 acre-feet per year from two additional wells. This source is already in use by the WCID and the reliability is considered high. The cost for the well field expansion is estimated at $3.6 million.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

Since this is an expansion of an existing field that is currently used for municipal use, the water quality is anticipated to be good. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy is only for the well field expansion. A replacement and upsizing of the transmission line to connect this supply to the WCID's service area is also required and is discussed in a separate technical memorandum (Transmission Pipeline, Pecos County WCID#1) in the expanded use section of this appendix.

Other Issues Affecting Feasibility

None.

WUG:	**Reeves County Mining**	**Capital Cost:**	$17,465,000
WMS Name:	**Develop Pecos Valley Aquifer Supplies**	**Annual Cost** (During Amortization):	$173 per acre-foot $0.53 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	10,400 acre-feet per year	**Annual Cost** (After Amortization):	$54 per acre-foot $0.17 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

The Pecos Valley aquifer has been identified as a potential source of water for mining in Reeves County. Water from this source is highly variable, and typically hard. This strategy assumes that 75 new wells would need to be drilled to provide approximately 10,400 acre-feet per year. These wells would produce water from approximately 500 feet below the surface.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 100 gpm. Historical use indicates that the Pecos Valley aquifer may contain high levels of chloride and sulfate, resulting from previous oil field activities. It is uncertain whether these constituents are present in the portion of the aquifer that lies within Reeves County. For this plan, the new wells are assumed to supply an additional 10,400 acre-feet per year. The reliability of the supply is considered to be medium because of aquifer and water quality properties. The total cost of the project will be approximately $17.5 million.

Environmental Factors

Environmental impacts are expected to be low.

Agricultural and Rural Impacts

This strategy would marginally reduce the amount of water available to other users but since there is sufficient MAG, impacts are expected to be limited. There are no agricultural or rural issues associated with this strategy.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Pecos Valley aquifer in Reeves County is unknown. In other areas, the aquifer is characterized by high levels of chloride and sulfate in excess of secondary drinking standards. Further study is needed on the water quality in Reeves County. Use of this source is not expected to impact key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

No other water management strategies use water supplies from the Pecos Valley aquifer in Reeves County, therefore no other strategies will be impacted.

Other Issues Affecting Feasibility

None.

WUG:	**Robert Lee, Bronte**	**Capital Cost:**	$4,154,000
WMS Name:	**Develop Edwards-Trinity-Plateau Supplies in Nolan County**	**Annual Cost** (During Amortization):	$4,293 per acre-foot $13.17 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$400 per acre-foot $1.23 per 1,000 gal
WMS Yield:	75 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description
Robert Lee and Bronte are considering developing new groundwater wells in south central Nolan County, which is in Region G. These wells produce water from the Edwards Trinity aquifer. For the purposes of this strategy, it is assumed that five new wells and approximately 15 miles of 6-inch transmission pipeline would be needed.

Quantity, Reliability and Cost
This strategy will provide 75 acre-feet per year. The reliability of this strategy is considered to be low to medium since it is dependent on finding adequate water quality and quantity. Capital costs are estimated at $4.2 million.

Environmental Factors
There are no significant environmental issues associated with this strategy.

Agricultural and Rural Impacts
Robert Lee and Bronte are rural communities. Increased water security provided by this strategy will have a positive impact on the vitality of this rural community.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
If Robert Lee is able to implement one of the alternative groundwater strategies in this plan, their need to purchase from Bronte may be reduced and Bronte may be able to develop smaller quantities of future water supply. Or if Bronte were to implement this strategy, it may reduce Robert Lee's need to find additional sources of water.

Other Issues Affecting Feasibility
Since the reliability of this supply is unknown, the City should consider other alternatives to meet long-term needs as well. Funding construction of these new wells will be a significant strain on the financial resources of the City.

WUG:	**Robert Lee**	**Capital Cost:**	$7,272,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies in Tom Green**	**Annual Cost** (During Amortization):	$3,756 per acre-foot $11.53 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$556 per acre-foot $1.71 per 1,000 gal
WMS Yield:	160 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description
The City of Robert Lee is currently investigating developing groundwater in far western Tom Green County in the Edwards-Trinity Plateau aquifer. For planning purposes, this strategy includes two new 100 gpm wells and a 15-mile pipeline to Robert Lee.

Quantity, Reliability and Cost
It is assumed that each well will produce approximately 100 gpm. The reliability of this strategy is medium due to uncertainty in locating supplies of adequate quality and quantity. The total cost of the project will be approximately $7,272,000.

Environmental Factors
Environmental impacts from this strategy are expected to be low. Groundwater development from this source should be evaluated for potential impacts on springflows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts
Robert Lee is a rural community. Increased water security provided by this strategy will have a positive impact on the vitality of this rural community.

Impacts to Natural Resources and Key Parameters of Water Quality
The water quality of this aquifer is uncertain, but Robert Lee is actively searching for well locations with good water quality. No significant impacts to water quality are expected from the implementation of this strategy. No impacts to natural resources were identified.

Impacts on Other Water Resources and Management Strategies
If Robert Lee is able to implement one of the alternative groundwater strategies in this plan, their need to purchase from Bronte may be reduced and Bronte may be able to develop smaller quantities of future water supply.

Other Issues Affecting Feasibility
Since the reliability of this supply is unknown, the City should consider other alternatives to meet long-term needs as well. Funding construction of these new wells will be a significant strain on the financial resources of the City.

WUG:	**Scurry County Manufacturing**	**Capital Cost:**	$677,000
WMS Name:	**Develop Other Aquifer Supplies**	**Annual Cost** (During Amortization):	$356 per acre-foot $1.09 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	160 acre-feet per year	**Annual Cost** (After Amortization):	$56 per acre-foot $0.17 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description
The Other Aquifer (or local Dockum aquifer) has been identified as a potential source of water for manufacturing in Scurry County. This strategy assumes that five new wells would be drilled to provide approximately 160 acre-feet per year. These wells are assumed to produce water from approximately 200 feet below the surface.

Quantity, Reliability and Cost
It is assumed that each well will produce approximately 25 additional gpm of water. This equates to a total strategy yield of 160 acre-feet per year. The reliability of the supply is considered to be low to medium because of the unproven use of the source in this county.

The total cost of the project will be approximately $677,000.

Environmental Factors
Depending on the connection between the river alluvium and local streams, this strategy could impact streamflows. Reduced streamflows could have impacts to water quality and aquatic habitats.

Agricultural and Rural Impacts
This source is currently used for agricultural purposes. This strategy would marginally reduce the amount of water currently available to agricultural users. There are no other agricultural or rural issues associated with this strategy.

Impacts to Natural Resources and Key Parameters of Water Quality
The water quality in the Other Aquifer (or local Dockum formations) are generally poor, with freshwater in outcrop areas and brine in the subsurface portions. This is not an issue for manufacturing purposes. No impacts to key parameters of water quality are expected to occur as a result of this strategy.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies
None identified.

Other Issues Affecting Feasibility
The biggest issue affecting the feasibility of this strategy will be to find an area where the production of the well will be sufficient.

WUG:	**Sonora**	**Capital Cost:**	$437,000
WMS Name:	**Develop Additional Edwards-Trinity-Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,000 per acre-foot $3.07 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$114 per acre-foot $0.35 per 1,000 gal
WMS Yield:	35 acre-feet per year	**Implementation:**	2020
WMS Status:	Recommended		

Strategy Description

The City has an existing well field in the Edwards-Trinity-Plateau Aquifer near Interstate 10. This strategy is to develop two additional 30 gpm, 420-ft depth wells in the same well field and associated collection piping. Additional transmission infrastructure was not included since it is an expansion of an existing facility.

Quantity, Reliability and Cost

Based on existing productivity of wells in the area, it is estimated that the new wells would yield an additional 35 acre-feet per year. The reliability of this strategy is expected to be high. Costs for the two additional wells and associated collection piping are estimated at $437,000.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Since this is a small expansion of an existing well field, no additional agricultural or rural impacts are anticipated.

Impacts to Natural Resources and Key Parameters of Water Quality

The strategy proposes to utilize a sustainable level of groundwater that does not exceed the Modeled Available Groundwater (MAG). The impacts to natural resources are expected to be minimal. No impacts to water quality are expected.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

Since this is an expansion of the City's existing well field, no issues are anticipated that would affect the feasibility of the project.

APPENDIX C

C.5 DESALINATION

MWP:	**San Angelo**	**Capital Cost:**	$70,709,000
WMS Name:	**Desalination of Brackish Groundwater Supplies**	**Annual Cost** (During Amortization):	$1,062 per acre-foot $3.26 per 1,000 gal
WMS Type:	Treatment of New Groundwater	**Annual Cost** (After Amortization):	$615 per acre-foot $1.90 per 1,000 gal
WMS Yield:	11,200 acre-feet pear year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

This strategy assumes that supply from San Angelo's groundwater strategies in Schleicher and Pecos Counties is brackish and will require additional advanced treatment to meet drinking water standards. For planning purposes, the advanced treatment plant is assumed to be located near the proposed well field. This strategy is sized to treat 15 MGD acre-feet of raw brackish supplies. The advanced treatment processes associated with brackish water desalination result in around 25 percent losses, resulting in about 10 MGD (11,200 acre-feet) of finished water. For planning purposes, the brackish supplies are assumed to have a starting salinity of 5,000 TDS. Five 1,000-gpm deep brine injection wells were also included for concentrate disposal.

Quantity, Reliability and Cost

The treated supply made available through this strategy is estimated to be 10 MGD (11,200 acre-feet per year). It should be noted that this strategy involves supplies from other potentially feasible strategies for San Angelo and is therefore not additive. Because of the uncertainty involved with development of this source for municipal water use, the reliability of this strategy is considered moderate. The capital cost for this strategy is estimated at $70.8 million. This equates to $3.26 per thousand gallons during debt service for treatment of the brackish groundwater only. After the infrastructure is fully paid for, the price for treatment drops to $1.90 per thousand gallons.

Environmental Factors

The conceptual design for this project uses deep well injection for brine disposal. A properly designed and maintained facility should have minimal environmental impact. Construction of the treatment facility should have minimal environmental impact as well.

Agricultural and Rural Impacts

Since this strategy relies on brackish supplies that are not readily usable for agricultural or municipal users, competition for the water is expected to be minimal. Therefore, agricultural and rural impacts are expected to be minimal.

Impacts to Natural Resources and Key Parameters of Water Quality

The current conceptual design for this project uses deep well injection to dispose of the brine waste stream. If this were to change and the brine was released to a stream, impacts to the receiving water body would need to be evaluated.

Impacts on Other Water Resources and Management Strategies

Since this strategy relies on brackish supplies that cannot be used without significant treatment, impacts to other strategies will be minimal.

Other Issues Affecting Feasibility

None identified.

APPENDIX C

C.6 REGIONAL WATER MANAGEMENT STRATEGIES

WUGs:	**San Angelo, UCRA, BCWID #1**	**Capital Cost:**	N/A
WMS Name:	**Brush Control**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Regional		
WMS Yield:	550 acre-feet pear year	**Annual Cost** (After Amortization):	$456 per acre-foot $1.40 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Brush control has been identified as a potentially feasible water management strategy for Region F. It has the potential to enhance the existing supply from the region's reservoirs.

Prior to settlement, most of Texas was grassland. Along with settlement came grazing animals which, for a number of reasons, created an environment that favored shrubs and trees (brush) rather than grasslands. Brush not only increases the costs of land management and decreases the livestock carrying capacity of the land, but certain species of brush can drastically reduce water yield in a watershed. For these reasons, an effort was bought forth to control this brush and convert land back to grasslands.

In 1985, the Texas Legislature authorized the Texas State Soil and Water Conservation Board (TSSWCB) to conduct a program for the "selective control, removal, or reduction of … brush species that consume water to a degree that is detrimental to water conservation." In 1999 the TSSWCB began the Brush Control Program. In 2011, the 82nd Legislature replaced the Brush Control Program with the Water Supply Enhancement Program (WSEP). The WSEP's purpose is to increase available surface and groundwater supplies through the selective control of brush species that are detrimental to water conservation. The WSEP considers priority watersheds across the State, the need for conservation within the territory of a proposed projection based on the State Water Plan, and if the Regional Water Planning Group has identified brush control as a strategy in the State Water Plan as part of their competitive grant, cost sharing program. Five species are eligible for funding from the WSEP:

- Juniper
- Mesquite
- Salt cedar
- Huisache*
- Carrizo cane*

**These are classified as other species of interest and are conditionally eligible.*

Methods of Brush Control

A number of methods can be employed to control brush. They include mechanical, chemical, prescribed burning, bio-control, and range management. Mechanical brush control methods can range from selective cutting with a hand axe and chainsaw to large bulldozers.

Several herbicides are approved for chemical brush control. The herbicides may be applied from aircraft, from booms on tractor-pulled spray rigs, or from hand tanks. Some herbicides are also available in pellet form. The herbicides Triclopyr (Remedy®) and Clopyralid methyl (Reclaim®) are approved herbicides for ongoing TSSWCB brush programs. Arsenal is the herbicide typically used for removal of salt cedar. These chemicals were shown to achieve about 70 percent root kill in studies around the

State and in adjacent states. Specific soil temperature and foliage conditions must be met in order for chemical brush control to be effective.

Prescribed burning is also used to control brush. Burning is conducted under prescribed conditions to specifically target desired effects. There are some limitations, however, burning rarely affects moderate to heavy stands of mature mesquite. Burning only top kills the smooth-bark mesquite plants and they re-sprout profusely. In addition, for mesquite, fire only gives short-term suppression and it stimulates the development of heavier canopy cover than was present pre-burn. Fire is not usually an applicable tool in moderate to heavy cedar (juniper) because these stands suppress production of an adequate amount of grass for fire fuel. Fire can be excellent for controlling junipers over 4 feet tall, if done correctly. Prescribed burning is often not recommended for initial clearing of some heavy brush due to the concern that the fire could become too hot and sterilize the soil. Burning is often used for maintenance of brush removal that has been initially performed through some other method.

Research has shown that the Asian leaf beetle can consume substantial quantities of salt cedar in a relatively short time period, and generally does not consume other plants. Different subspecies of the Asian beetle appear to be sensitive to varying climatic conditions, and there is ongoing research on appropriate subspecies for Texas. It is recommended that this control method be integrated with chemical and mechanical removal to best control re-growth.

Range or grazing management should follow any type of upland brush control. It allows the regrowth of desirable grasses, maintaining good groundcover that hinders establishment of woody plant seedlings. Continued maintenance of brush is necessary to ensure the benefits of brush control.

Brush control is a potential water management. Predicting the amount of water that would be made available by implementing a brush control program is difficult, but some estimates have been made. For a watershed to be eligible for cost-share funds from the WSEP, a feasibility study must demonstrate increases in projected post-treatment water yield as compared to the pre-treatment conditions. Feasibility studies have been conducted and published for the following watersheds in Region F[2]:

- Lake Brownwood
- North Concho River (O.C. Fisher Lake)
- O.H. Ivie Reservoir lake basin (Lake Basin)
- O.H. Ivie Reservoir (Watershed, Upper Colorado River and Concho River)
- E.V. Spence (Upper Colorado River)
- Lake J.B. Thomas (Upper Colorado River)
- Twin Buttes Reservoir (including Lake Nasworthy)
- Upper Llano River, including South and North Llano Rivers and Junction City Lake

Twin Buttes Reservoir/Lake Nasworthy Brush Control Projects

Brush control projects are on-going to enhance the amount of water flowing into the Twin Buttes Reservoir/Lake Nasworthy complex. Twin Buttes Reservoir is used to maintain sufficient water levels in Lake Nasworthy, which serves as a water supply for the City of San Angelo.

Lake Brownwood Project

There are efforts to treat mesquite and juniper in the Lake Brownwood watershed. Lake Brownwood provides municipal, industrial and agricultural water supply to Brown County and surrounding areas.

O.H. Ivie Project

As of the writing of this plan, there is not currently an active brush control project in the O.H. Ivie watershed. However, a feasibility study has been completed and if funding was available, this project could be initiated. The Upper Colorado River Authority (UCRA) is the potential sponsor for this project.

These three projects have identified sponsors and are likely in Region F. However, others in the region may choose to pursue brush control and Region F supports those efforts and considers them consistent with this plan. The UCRA has expressed willingness to partner with other interested agencies and entities.

Although many studies have illustrated the benefits of brush control, it difficult to quantify the benefits in the context of regional water planning. This quantification is very important because in most areas where the program is being implemented, hydrologic records indicate long term declines in reservoir watershed yields (some as much as 80%). Region F has been in critical drought conditions during most of the time that the region's brush removal programs have been in place, so the monitoring programs associated with these projects may not have shown significant gains due to the lack of rainfall events. Also, the benefits from brush control are long term; it takes time for aquifers to recharge and for watersheds to return to pre-brush conditions. This fact was recognized by the various scientists during the initial planning for the Texas Brush Control Program and the preparation of numerous feasibility studies.

Based on anecdotal accounts and observations, almost everyone in the area from participating landowners to water supply and elected officials recognize the water producing value of the program. The Water Supply Enhancement Program (WSEP) annually publishes statewide water yield estimate projections that originate from computer models that have been in published brush control feasibility studies. The annual report published by the Texas State Soil and Water Conservation Board (TSSWCB) documents the results from the program and includes the extent of the completed brush work within the watershed along with status reviews to determine the brush density of treated acreage. Also, since the program is based on voluntary participation by landowners, an analysis of the completed brush control work as to the extent within each sub-basin, location of each sub-basin in relationship to the overall watershed and anticipated water production from each sub-basin should be performed. The feasibility studies and models assume removal of all of the targeted brush, which will not often happen.

The TSSWCB uses a competitive grant process to rank the most feasible projects, and allocates the WSEP cost-share funds according to the project that balances the most critical water conservation need with the highest projected water yield. Once the funding has been allocated to a project, a geospatial analysis is performed to determine the acreage that has the highest potential to yield water within the watershed. The analysis will subdivide each Project area into four priority zones – high, medium, low, and not eligible. Available funding will only be obligated for those landowners who are in the high priority zone. The TSSWCB then works through Soil and Water Conservation Districts (SWCDs) to provide technical and financial assistance to landowners. Cost-share funding is based on the actual cost and is not to exceed the average cost established in the project's implementation plan. Payments are determined by acreage times the cost-share rate times the actual cost to implement.

In order to be an effective and reliable long-term water production strategy, areas of brush once removed, must be maintained. Follow –up treatment is essential to the program and has been built into the TSSWCB landowner contracts. During the 10-year contract period landowners must perform any needed follow- up treatment. The landowners will be subjected to periodic reviews by their local SWCD or the TSSWCB to determine compliance. If a landowner is found out of compliance they will not be eligible for another WSEP contract for a period of ten years. It is important to note that any follow-up brush control is entirely the landowners' financial responsibility and they cannot receive any additional state funds for this follow-up brush control.

The Water Supply Enhancement Program for the State of Texas was not funded for 2019 but funds may be available in future years. If funding is available, Region F supports local sponsors partnering with the WSEP to implement brush control.

Quantity, Reliability, and Cost

The quantity of supply expected from this strategy is relatively small and is shown in Table C-12 below. There are no capital costs associated with this strategy, only annual operating costs. The supply from this strategy is considered to be of low reliability since brush must be continually treated to continue to provide additional supplies and must have rainfall to produce yield.

Table C- 12
Brush Control Quantities and Cost

Sponsor	Watershed	Estimated Acres Treated	Estimated Cost Per Acre (Sep 2018)	Annual Cost	Quantity (acre-feet per year)	Unit Cost ($/ac-ft)
UCRA	O.H. Ivie	1,000	$51	$51,000	60	$850
San Angelo	Twin Buttes Reservoir	586	$76	$44,000	90	$489
BCWID	Lake Brownwood	958	$163	$156,000	400	$390

Environmental Factors

The Texas Parks and Wildlife Department (TPWD) lists the potential environmental impacts of brush control as alteration of terrestrial habitat, increased sediment runoff and erosion, impacts from chemical control measures, potential for increase groundwater recharge, impacts to aquatic and terrestrial communities and ecosystem process, and influence on energy and nutrient inputs and processing.[3] Region F suggests coordinating with TPWD and other state and federal agencies regarding any brush control program.

Agricultural and Rural Impacts

Invasive brush has altered the landscape of Region F and the rest of West Texas. Restoration of much of the landscape to natural grassland conditions will benefit the ranching economy of the region as well as enhance water supplies.

Impacts to Natural Resources and Key Parameters of Water Quality

Although invasive brush has impacted water supplies and altered the natural landscape of the region and reduced runoff, in some cases the brush has provided habitat for wildlife. In addition to the environmental benefits of this habitat, some of this habitat is suitable for deer and other game. Hunting is an important part of the economy of Region F. Therefore, it may be desirable to leave portions of a watershed with brush to maintain habitat.

Impacts on Other Water Resources and Management Strategies

If the program is adequately implemented and maintained, brush control could supplement existing supplies.

Other Issues Affecting Feasibility

The most significant factor regarding the feasibility of this strategy is ongoing funding for brush control projects. In 2019, no funding was made available for this program at all. Brush control is an ongoing process that must be constantly maintained for the project to be successful. Existing programs may provide funding for the initial clearing of brush but any necessary follow-up brush control is typically the landowner's financial responsibility. Further clarification is needed as to whether the landowner will be able to receive any additional state funds for ongoing brush control maintenance. Without maintenance and monitoring, brush control will not be effective as either a range management or water management strategy.

Like other similar activities, brush control is dependent upon the ongoing cooperation and financial contributions of individual landowners. Therefore, each program should be tailored to local conditions.

WUGs:	**Irrigation Users**	**Capital Cost:**	N/A
WMS Name:	**Weather Modification**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Regional	**Annual Cost** (After Amortization):	$156 per acre-foot $0.48 per 1,000 gal
WMS Yield:	5,128 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2020

Strategy Description

Weather modification is a water management strategy currently used in Texas to increase precipitation released from clouds over a specified area typically during the dry summer months. The most common form of weather modification or rainfall enhancement is cloud seeding. Early forms of weather modification began in Texas in the 1880s by firing cannons to induce convective cloud formation. Current cloud seeding techniques are used to enhance the natural process for the formation of precipitation in a select group of convective clouds.

Convective clouds, also known as cumulus clouds, are responsible for producing the bulk of rainfall during any given year in Texas.[4] The cloud seeding process increases the availability of ice crystals, which bond with moisture in the atmosphere to form raindrops. This is accomplished by injecting a target cloud with artificial crystals, such as silver iodide, and is known as glaciogenic seeding. Hygroscopic seeding, or injecting calcium chloride into target clouds, is often used in tandem with glaciogenic seeding. Specially equipped aircraft release the seeding crystals into clouds as flares that are rich in super cooled droplets. The silver iodide crystals form water droplets from available moisture in the air. Droplets then collide with droplets transforming the ice crystal into a raindrop.

Weather modification is most often utilized as a water management strategy during the dry summers in West Texas, with the season beginning in March and ending in October. The water produced by weather modification augments existing surface and groundwater supplies. It also reduces the reliance on other supplies for irrigation during times of normal and slightly below normal rainfall. However, not all of this water is available for water demands. Some of this precipitation is lost to evaporation, evapotranspiration, and local ponds. During drought years the amount of additional rainfall produced by weather modification may not be significant. However, during wet years, the amount of water produced by weather modification may be significant.

The amount of water made available to a specific entity from this strategy is difficult to quantify, yet there are regional benefits. Four major benefits associated with weather modification include:

- Improved rangeland and agriculture due to increased precipitation
- Greater runoff to streams and rivers due to higher soil moisture
- Groundwater recharge
- Hail suppression

In Region F, there are two ongoing weather modification programs: the West Texas Weather Modification Association (WTWMA) project and the Trans Pecos Weather Modification Association (TPWMA) program.

West Texas Weather Modification Association (WTWMA) Project

The WTWMA began weather modification efforts in 1995. The intent of the rainfall enhancement program was to increase groundwater recharge, springflow, and runoff resulting in increased agricultural productivity and reduction in groundwater withdrawals. A side effect of the rain enhancement operations also include hail suppression but is not one of the main intents of the program. WTWMA has operated in eight counties covering an area of 6.6 million acres. In 2017, a total of 73 clouds were seeded as part of the WTMA's rain enhancement efforts in 24 operational days. WTWMA estimated a 10.2 percent increase in rainfall in the target area because of their operations.[5] Table C-13 shows a breakdown by county of the estimated increase in rainfall for the year 2017 from the annual report of the Texas Weather Modification Association.[6]

Table C- 13
Estimated Precipitation Increase for the Year 2017 due to WTWMA Activities

County	Inches (increase)	Rain Gage (season value)	% (increase)
Crockett	0.52	11.2	4.6%
Irion	2.21	14.77	15.0%
Reagan	1.35	12	11.3%
Schleicher	1.33	14.77	9.0%
Sterling	1.67	16.1	10.4%
Sutton	0.45	14.22	3.2%
Tom Green	2.39	13.42	17.8%
Average	**1.42**	**13.78**	**10.2%**

Data are from the West Texas Weather Modification Association.

Trans Pecos Weather Modification Association (TPWMA) Program

The TPWMA began operation in 2003. The TPWMA consists of the Ward County Irrigation District and other political entities from Culberson, Loving, Reeves, Ward and parts of Pecos County. The program's target area covers over 5.1 million acres along and to the west of the Pecos River from El Paso to Midland. In 2016, TPWMA estimated a 4.7 percent increase in precipitation from cloud seeding.[7]

Table C-14 shows a breakdown by county of the estimated increase in rainfall for the year 2016 from the annual report of the Texas Weather Modification Association[8].

Table C- 14
Estimated Precipitation Increase for the Year 2016 due to TPWMA Activities

County	Inches (Increase)	Rain Gauge (season value)	% Increase
Reeves	0.48	9.01	5.3%
Pecos	0.33	6.9	4.8%
Ward	0.95	9.67	9.8%
Loving	0.37	11.44	3.2%
Average	**0.43**	**9.36**	**4.7%**

Data are from the Texas Weather Modification Association.

Quantity, Reliability and Cost

Benefits of the weather modification programs are widespread and are difficult to quantify in the context of regional water planning. To precisely estimate the benefit of weather modification requires an estimate of how much precipitation would have occurred naturally without weather modification, and an estimate of how much of the increase in precipitation becomes directly available to a water user. The eight counties in the WTWMA target area were evaluated for their increase in precipitation and recharge potential over a 10-year period (Jennings and Green, 2014)[9]. Analysis from 2004 to 2013 performed by Ruiz-Columbiè (2014)[10] which compared seeded clouds with non-seeded clouds resulted in precipitation increases of 8 to 20 percent or up to 2 inches per year. Rain gauges within and outside the target area provided confirmatory results.

For purposes of this plan, weather modification is a recommended strategy for irrigated agriculture for counties that currently participate in an active program. It is assumed that the increase in rainfall will offset irrigation water use. To determine the water savings associated with this strategy, an estimate of the increase in annual rainfall over the growing season is applied directly to the irrigated acreages. These savings are shown by county in Table C-15.

Table C- 15
Water Savings due to Precipitation Enhancement per County

Weather Modification Program	County	Irrigated Acreage (acres)	Coverage %	Annual Increase (feet)[a]	Water Savings (ac-ft/yr)	Cost ($)	Cost per Ac-Ft ($/ac-ft)
TPWMA	Pecos	12,887	30%	0.03	106	$580	$5.45
TPWMA	Reeves	8,138	100%	0.04	326	$366	$1.13
TPWMA	Ward	3,276	100%	0.08	259	$147	$0.57
WTWMA	Crocket	13	100%	0.10	1	$1	$0.47
WTWMA	Irion	923	100%	0.22	202	$42	$0.21
WTWMA	Reagan	8,098	100%	0.23	1,869	$364	$0.19
WTWMA	Schleicher	1,412	100%	0.20	275	$64	$0.23
WTWMA	Sterling	411	100%	0.12	48	$18	$0.39
WTWMA	Sutton	341	100%	0.10	34	$15	$0.45
WTWMA	Tom Green	19,604	45%	0.23	2,007	$882	$0.44

[a] Annual increase values based on 2016 State Report for the TPWMA and the 2017 Annual Report for the WTWMA.

The reliability of water supplies from precipitation enhancement is considered to be low for two reasons. First, it is uncertain how much water is made directly available per water user. Second, during drought conditions precipitation enhancement may not result in a significant increase in water supply. (The guidelines for regional water planning in TAC §357.5(a) specifies that regional water planning evaluate supplies from water management strategies during critical drought conditions.) Cloud formations suitable for seeding may not occur frequently during drought, so benefits during drought may be negligible. However, during the drought of 2011, the WTWMA target area averaged a precipitation increase of 1.12 inches per year, the lowest of 2004-2013. Among the counties, the increase in precipitation was between 0.77 inches per year and 1.54 inches per year, resulting in half of the counties receiving over 1 inch of rainfall from cloud seeding.

The cost of operating Texas weather modification programs are approximately 4 to 5 cents per acre[11]. For the purposes of this plan, a cost of 4.5 cents per acre was applied. On average, this results in a cost of $0.48 per acre-foot of water supply.

Environmental Factors

Weather modification should have a positive impact on the environment due to the increased rainfall from storms. Possible benefits include improved wildlife habitat and landscapes. The chemicals used in weather modification should be sufficiently diluted to minimize any threat of contamination.

Agricultural and Rural Impacts

Weather modification has a positive impact on agriculture and ranching by increasing productivity. Dry land farm production, a common means of measuring the effects of rainfall enhancement, has increased in regions participating in rainfall enhancement. Another benefit of weather modification is hail suppression, which helps minimize damage from severe weather, but is not a primary goal of the TPWMA and WTWMA programs.

Dryland farming revenues can increase by $4.6 million for each additional one inch of rainfall created through weather modification (Johnson, 2014)[12].

Impacts to Natural Resources and Key Parameters of Water Quality

Increased rainfall over the target areas results increased aquifer recharge. Recharge efforts are ideal in the winter months when evapotranspiration is lowest, however no programs are known to have successfully attempted such seeding. The potential for groundwater recharge from weather modification is growing, however research methodology and seasonal climatic effects exclude recharge strategies from regional water planning presently.

No impacts to key parameters of water quality were identified for this strategy.

Impacts on Other Water Resources and Management Strategies

This strategy may reduce the demand for water from other water management strategies. Downwind impacts of increased precipitation to areas outside target areas is also an additional benefit.

Other Issues Affecting Feasibility

The most significant issue facing existing weather modification programs is funding. In many cases these programs rely on the cooperation of several entities and the availability of outside funding to continue operations. State funding for weather modification has been absent since 2002. Many of the programs that chose to contract out their operations instead of purchasing equipment with state funding have been discontinued. In addition, there is some local opposition to precipitation enhancement. This opposition has been slowly decreasing due to the TWMA’s continuing education outreach activities. Lastly, several weather modification programs have adjusted their target areas which limits continuous and reliable data for water planning regions.

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WUGs:	**Midland, San Angelo, Abilene**	**Capital Cost:**	$ TBD
WMS Name:	**West Texas Water Partnership**	**Annual Cost** (During Amortization):	$ TBD $ TBD
WMS Type:	Regional		
WMS Yield:	TBD	**Annual Cost** (After Amortization):	$ TBD $ TBD
WMS Status:	Recommended	**Implementation:**	NA

Strategy Description
The Cities of Midland, San Angelo, and Abilene have formed the West Texas Water Partnership (the Partnership) to evaluate long-term water supplies the Partnership could develop jointly. The Partnership is conducting a separate study to determine the most feasible water management strategies for these cities, but the results were not available at the writing of this Initially Prepared Plan. Additional information is anticipated before the publication of the Final Region F Water Plan.

Quantity, Reliability and Cost
Quantity, reliability, and cost will be evaluated after the specifics of the strategy are made available following the publication of the Region F Initially Prepared Plan.

Environmental Factors
Environmental factors will be evaluated after the specifics of the strategy are made available following the publication of the Region F Initially Prepared Plan.

Agricultural and Rural Impacts
Agricultural and rural impacts will be evaluated after the specifics of the strategy are made available following the publication of the Region F Initially Prepared Plan.

Impacts to Natural Resources and Key Parameters of Water Quality
Impacts to natural resources and key parameters of water quality will be evaluated after the specifics of the strategy are made available following the publication of the Region F Initially Prepared Plan.

Impacts on Other Water Resources and Management Strategies
Impacts on other water resources and water management strategies will be evaluated after the specifics of the strategy are made available following the publication of the Region F Initially Prepared Plan.

Other Issues Affecting Feasibility
Other issues affecting feasibility will be evaluated after the specifics of the strategy are made available following the publication of the Region F Initially Prepared Plan.

WUGs:	**Bronte, Ballinger, Winters, Robert Lee**	**Capital Cost:**	$115,443,000
WMS Name:	**Regional System from Lake Brownwood to Runnels and Coke Counties**	**Annual Cost** (During Amortization):	$3,904 per acre-foot $11.98 per 1,000 gal
WMS Type:	Regional	**Annual Cost** (After Amortization):	$1,005 per acre-foot $3.09 per 1,000 gal
WMS Yield:	2,802 acre-feet per year	**Implementation:**	NA
WMS Status:	Alternative		

Strategy Description

Lake Brownwood is one of the few surface water sources in Region F with a firm yield under WAM Run 3 with uncommitted supply. However, it is still susceptible to drought and has suffered in recent years. A conceptual design for a regional system providing water to the Cities of Bronte, Ballinger, Winters and Robert Lee was developed to evaluate the potential for water supply from this source. It is unclear if Brown County WID #1 would be willing to sell water to these users and an agreement would have to be reached between all parties.

Quantity, Reliability and Cost

This strategy would provide a total of 2,802 acre-feet per year to multiple users. The division of supply is shown below in Table C-16. This source is considered to be reliable. Capital costs are estimated at $115.6 million and are assumed to be split amongst the entities that would need to enter into a partnership to implement this strategy. The exact division of costs and water supply would be negotiated as part of the partnership to implement the proposed strategy.

Table C- 16
Supply to Each User (acre-feet per year)

Water User Group	Supply
Winters	729
Ballinger	1,345
Bronte	280
Robert Lee	448
Total	**2,802**

Environmental Factors

The environmental issues associated with this strategy are expected to be minimal. It is assumed that the pipeline could be routed around sensitive environmental areas if needed.

Agricultural and Rural Impacts

Although Lake Brownwood is used for agricultural supplies, there are sufficient supplies under WAM Run 3 to meet irrigation demands as well as additional municipal demands. No impacts to agriculture are expected. Each participant is a rural community. Like other water supply strategies, the high cost of this strategy may have an adverse impact on the limited financial resources of the participants and the surrounding rural area.

Impacts to Natural Resources and Key Parameters of Water Quality

None identified.

Impacts on Other Water Resources and Management Strategies

Other strategies for Bronte, Ballinger, Winters, and Robert Lee.

Other Issues Affecting Feasibility

The most significant issues affecting the feasibility of this project are sponsorship and financing. At this time it is unclear what entity would be responsible for implementing and obtaining financing for the project. The project is outside of the traditional service area of the Brown County WID, the owner of Lake Brownwood and BCWID may not be willing to sell a portion of their supply to these communities. Implementation may require development of a new political subdivision to administer and finance the project. The cost of the project is significant and would be a significant financial strain on the area.

WUGs:	**Bronte, Ballinger, Winters, Robert Lee**	**Capital Cost:**	$103,328,000
WMS Name:	**Regional System from Lake Ft. Phantom Hill to Runnels and Coke Counties**	**Annual Cost** (During Amortization):	$7,606 per acre-foot $23.34 per 1,000 gal
WMS Type:	Regional	**Annual Cost** (After Amortization):	$1,312 per acre-foot $4.03 per 1,000 gal
WMS Yield:	1,155 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	NA

Strategy Description

Fort Phantom Hill Reservoir is located in Jones County in Region G. In 2013, the City of Clyde purchased a 2,500 acre-foot water right in Fort Phantom Hill Reservoir from an abandoned steam electric power generation facility. The City of Clyde amended the water right to expand its use for municipal supply and also secured an interbasin transfer to select counties including Runnels and Coke Counties. The City of Clyde does not currently receive any supply from the reservoir. For the purposes of this strategy, it is assumed that 1,750 acre-feet of water would be available to serve Ballinger, Bronte, Robert Lee, and Winters. This strategy includes the construction of a new intake on Lake Fort Phantom Hill and a new pipeline and associated infrastructure to connect to Winters, Ballinger, and Bronte. It was assumed that existing infrastructure from Bronte to Robert Lee could be used to convey supplies to Robert Lee.

Quantity, Reliability and Cost

Many watersheds throughout the State are over-appropriated, i.e. not all water rights can be fully met at all times. Thus, the yields from a water right are often less than the amount shown in the water right. This is also the case for Fort Phantom Hill Reservoir. Based on the yield analyses, the 1,750 acre-feet of water right would translate into 1,155 acre-feet of safe yield in 2020. The yield in the remaining decades is shown below in Table C-17. The division of supply is shown below in Table C-18. This source is considered to be reliable. Capital costs are estimated at $103.0 million and are assumed to be split amongst the entities that would need to enter into a partnership to implement this strategy. The exact division of costs would be negotiated as part of the partnership to implement the proposed strategy.

Table C- 17
Yield of Water Right at Full Purchase Amount

	2020	2030	2040	2050	2060	2070
Water Right Purchase Amount	1,750	1,750	1,750	1,750	1,750	1,750
Total WMS Quantity (Safe Yield)	1,155	1,114	1,074	1,033	993	952

Table C- 18
Potential Supply by User

Water User Group	Supply (%)	2020 (ac-ft)	2070 (ac-ft)
Winters	15.1%	175	143
Ballinger	43.3%	500	413
Bronte	30.3%	350	288
Robert Lee	11.3%	130	108
Total	**100%**	**1,115**	**952**

Environmental Factors
Since this supply is from an existing reservoir and water right, the environmental impacts are expected to be minimal. The disruption from the construction of the pipeline is expected to be minor and temporary. Specific environmental studies would be required to assess impacts at the intake location and along the pipeline. It is assumed that the pipeline would be routed to avoid environmentally sensitive areas, where possible.

Agricultural and Rural Impacts
Ballinger, Bronte, Winters and Robert Lee are rural communities. Having a sustainable water supply source will improve the vitality of the rural community. No agricultural impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality
Since this strategy provides water from an existing reservoir and water right, no impacts to natural resources or water quality are expected.

Impacts on Other Water Resources and Management Strategies
This strategy utilizes water from Fort Phantom Hill Reservoir which is operated, maintained, and used by the City of Abilene. Coordination on use from this source would be needed to avoid impacting Abilene's water supplies.

Other Issues Affecting Feasibility
This strategy is dependent upon agreements between multiple parties that are outside the scope of regional water planning. The economic viability of this strategy will depend on the results of these agreements..

List of References

[1] Bureau of Economic Geology, Texas Oil & Gas Association, Austin, Texas. Oil & Gas Water Use in Texas: Update to the 2011 Mining Water Use Report. September 2012. Available online at: http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf

[2] Texas Soils and Water Conservation Board (TSSWCB), Brush Control Program, 2013 Annual Report. Available online at http://www.tsswcb.state.tx.us/en/reports

[3] Robert L. Cook, Executive Director of Texas Parks and Wildlife: Letter to Kevin Ward, Executive Director of the Texas Water Development Board, May 2004.

[4] Texas Department of Licensing and Regulation website. November 11, 2004. http://www.license.state.tx.us/weather/weathermod.htm.

[5] West Texas Weather Modification Association. 2017. 2017 Annual Report for West Texas Weather Modification Association.http://wtwma.com/WTWMA%20Annual%20Evaluation/ANNUAL%20EVALUATION%20REPORT%202017%20WTWMA.pdf

[6] Arquimedes Ruiz-Columbie, Active Influence & Scientific Management, 2014, Annual Evaluation Report 2014 State of Texas, prepared for the Texas Weather Modification Association. Available online at http://www.texasweathermodification.com.

[7] Trans Pecos Weather Modification Association. 2016. 2016 Annual Report for Trans Pecos Weather Modification Association.

[8] http://www.texasweathermodification.com/State%20Evaluation/2016.pdf

[9] Jennings, Jonathan A., and Ronald T. Green. "Rain Enhancement of Aquifer Recharge across the West Texas Weather Modification Association Target Area." The Journal of Weather Modification 46.1 (2014)

[10] Ruiz-Columbie, A., J.A. Jennings, T.R. Flanagan, S.D. Beall, and J. Wright-Puryear. 2014. An Analysis of Weather Modification Operations in Texas. Weather Modification Association Annual Meeting, Reno, NV.

[11] https://www.tdlr.texas.gov/weather/summary.htm

APPENDIX D
COST ESTIMATES

Region F Cost Estimates

As part of the 2016 Region F Water Plan, cost estimates were developed for each of the recommended water management strategies in Region F. As appropriate, these cost estimates have been updated for the 2021 regional water plan. In accordance with the Texas Water Development Board guidance the costs for water management strategies are to be updated from September 2013 dollars to September 2018 dollars. The methodology used to develop the 2021 s is described in the following sections. Where updated unit costs were not available, the Engineering News Record (ENR) Index for construction was used to increase the costs from September 2013 dollars to September 2018 dollars. An increase of 16.9% from September 2013 to September 2018 was determined using the ENR Index method.

D.1 Introduction

1. The evaluation of water management strategies requires developing cost estimates. Guidance for cost estimates may be found in the TWDB's "Second Amended General Guidelines for Fifth Cycle of Regional Water Plan Development (Exhibit C)", Section 5.5. Costs are to be reported in September 2018 dollars.
2. Standard unit costs for installed pipe, pump stations, standard treatment facilities, and well fields were developed and/or updated using the costing tool provided by the TWDB. The unit costs do not include engineering, contingency, financial and legal services, costs for land and rights-of-way, permits, environmental and archeological studies, or mitigation. The costs for these items are determined separately in the cost tables.
3. The information presented in this section is intended to be 'rule-of-thumb' guidance. Specific situations may call for alteration of the procedures and costs. Note that the costs in this memorandum provide a planning level estimate for comparison purposes.
4. It is important that when comparing alternatives that the cost estimates be similar and include similar items. If an existing reliable cost estimate is available for a project it should be used where appropriate. All cost estimates must meet the requirements set forth in the TWDB's "Second Amended General Guidelines for Fifth Cycle of Regional Water Plan Development (Exhibit C)".
5. The cost estimates have two components:
    - Initial Capital Costs: Including total construction cost of facilities, engineering and legal contingencies, environmental and archaeology studies and mitigation, land acquisition and surveying, and interest incurred during construction (3% annual interest rate less a 0.5% rate of return on investment of unspent funds).
    - Average Annual Costs: Including annual operation and maintenance costs, pumping energy costs, purchase of water and debt service.

TWDB does not require the consultant to determine life cycle or present value analysis. For most situations annual costs are sufficient for comparison purposes and a life-cycle analysis is not required.

D.2 Assumptions for Capital Costs

The unit cost and factors show in the Tables D-1 through D-7 were developed directly from the TWDB Costing Tool. These costs are the basis of the capital costs developed for this plan. If applicable, other capital costs should include:

- Engineering, contingencies, financial, and legal services
- Permitting and mitigation activities, including, but not limited to archeological/historic resources, environmental and biological analyses, mitigation activities (evaluation, land acquisition, implementation, monitoring), and other activities.
- Land purchase costs not associated with mitigation.
- Easement costs. For pipelines, this includes a permanent easement plus a temporary construction easement as well as rights to enter easements for maintenance
- Purchases of water rights.

Conveyance Systems

Standard pipeline costs used for these cost estimates are shown in Table D-1. Pump station costs are based on required Horsepower capacity of capacity (MGD) and are listed in Table D-2. The power capacity is to be determined from the hydraulic analyses included in the TWDB costing tool (or detailed analysis if available). Pipelines and pump stations are to be sized for peak pumping capacity.

- Pump efficiency is assumed to be 70 percent.
- Peaking factor of 2 times the average demand is to be used for strategies when the water is pumped directly to a water treatment plant. (or historical peaking factor, if available)
- Peaking factor of 1.2 to 1.5 can be used if there are additional water sources and/or the water is transported to a terminal storage facility.
- The target flow velocity in pipes is 5 fps and the Hazen-Williams Factor is assumed to be 120.
- Ground storage is to be provided at each booster pump station along the transmission line unless there is a more detailed design.
- Ground storage tanks should provide sufficient storage for 2.5 to 4 hours of pumping at peak capacity. Costs for ground storage are shown in Table D-3. Covered storage tanks are used for all strategies transporting treated water.

Water Treatment Plants

Water treatment plants are to be sized for peak day capacity (assume peaking factor of 2 if no specific data is available). Costs estimated include six different treatment levels of varying degree. These levels are groundwater chlorine disinfection, iron and manganese removal, simple filtration, construction of a new conventional treatment plant, expansion of a conventional treatment plant, brackish desalination, and seawater desalination. Costs are also based upon a TDS factor that will increase or decrease the cost of treatment accordingly. These costs are summarized in Table D-4. All treatment plants are to be sized for finished water capacity.

Direct Reuse

Direct reuse refers to the introduction of reclaimed water directly from a water reclamation plant to a distribution system. The following assumptions were made for direct potable and non-potable reuse strategies.

Direct Potable Reuse

Direct potable reuse (DRP) is the use of reclaimed water that is transported directly from a wastewater treatment plant to a drinking water system. In the most recent version of the TWDB costing tool, cost estimation tables for advanced water treatment facilities (AWTF) were added for direct potable reuse strategies. These costs were adapted from TWDB DPR Resource Document Table 5-1 and are summarized in Table D-5. There are two AWTF schemes listed for direct potable reuse. The primary difference between the two is the use of RO, which is included in Scheme 1, but not in Scheme 2. In order to utilize Scheme 2, nitrogen must be removed at the WWTP.

Direct Non-Potable Reuse

Non-potable reuse is the use of reclaimed water that is used directly for non-potable beneficial uses such as landscape irrigation. The TWDB costing tool currently does not have a direct non-potable reuse treatment plant improvements option, therefore the following assumptions were made.

- It was assumed that the cost of an iron and manganese removal plant would be an appropriate approximation of the improvements that would be needed at the Wastewater Treatment Plant. This cost was further refined by assuming that only upgrades to an existing facility would be required, and not construction of an entirely new plant.
- Approximately two miles of 6-inch pipeline was also included in the cost estimates for transport of the treated water to the destination. Since reuse is still relatively new, there is a lack of piping infrastructure for reuse water. It was also assumed that the pump station was included in the WWTP improvements.

New Groundwater Wells

Cost estimates required for water management strategies that include additional wells or well fields were determined through the TWDB costing tool (unless a more detailed design was available). The associated costs are shown in Table D-6. The costing tool differentiated the wells based upon purpose. The categories were Public Supply, Irrigation, and Aquifer Storage and Recovery (ASR). These cost relationships are “rule-of-thumb” in nature and are only appropriate in the broad context of the cost evaluations for the RWP process.

The cost relationships assume construction methods required for public water supply wells, including carbon steel surface casing and pipe-based, stainless steel, and wire-wrap screen. The cost estimates assume that wells would be gravel-packed in the screen sections and the surface casing cemented to their total depth. Estimates include the cost of drilling, completion, well development, well testing, pump, motor, motor controls, column pipe, installation and mobilization. The cost relationships do not include engineering, contingency, financial and legal services, land costs, or permits. A more detailed cost analysis should be completed prior to developing a project.

The costs associated with conveyance systems for multi-well systems can vary widely based on the distance between wells, terrain characteristics, well production, and distance to the treatment facility. These costs should be estimated using standard engineering approaches and site-specific information. For planning purposes, these costs were estimated using the TWDB costing tool’s assumptions for conveyance. It is important to note that conveyance costs were not included for point of use water user groups such as mining.

Other Costs

- Engineering, contingency, construction management, financial and legal costs are to be estimated at 30 percent of construction cost for pipelines and 35 percent of construction costs for pump stations, treatment facilities and reservoir projects. (This is in accordance with TWDB guidance.)
- Permitting and mitigation for transmission and treatment projects are to be estimated at $25,000 per mile. For reservoirs, mitigation and permitting costs are assumed equal to the land purchase cost, unless site specific data is available.
- Right-of-way (ROW) costs for transmission lines are estimated through costs provided by the Texas A&M University Real Estate Center (https://www.recenter.tamu.edu/data/rural-land/) which gives current land costs based on county. The ROW width is assumed to be 20 ft. If a small pipeline follows existing right-of-ways (such as highways), no additional right-of-way cost may be assumed. Large pipelines will require ROW costs regardless of routing.

Interest during construction is the total of interest accrued at the end of the construction period using a 3 percent annual interest rate on total borrowed funds, less a 0.5 percent rate of return on investment of unspent funds. This is calculated assuming that the total estimated project cost (excluding interest during construction) would be drawn down at a constant rate per month during the construction period. Factors were determined for different lengths of time for project construction.

D.3 Assumptions for Annual Costs

Annual costs are to be estimated using the following assumptions:

- Debt service for all non-reservoir infrastructure (transmission and treatment facilities) is to be annualized over 20 years unless otherwise justified. For reservoirs, this period is 40 years, but not longer than the life of the project. [Note: uniform amortization periods should be used when evaluating similar projects for an entity.]
- Annual interest rate for debt service is 3.5 percent for both reservoir and non-reservoir projects.
- Water purchase costs are to be based on wholesale rates reported by the selling entity when possible. In lieu of known rates, a typical regional cost for treated water and raw water will be developed.
- Operation and Maintenance costs are to be calculated based on the construction cost of the capital improvement. Engineering, permitting, etc. should not be included as a basis for this calculation. Per the “Second Amended General Guidelines for Fifth Cycle of Regional Water Plan Development (Exhibit C)”, O&M should be calculated at:
    - 1 percent of the construction costs for pipelines
    - 1.5 percent for dams
    - 2.5 percent of the construction costs for pump stations
    - O&M Costs for the varying levels of water treatment plant and AWTF improvements were developed by the TWDB and are shown in Table D-7 and Table D-8.
- Pumping costs are to be estimated using an electricity rate of $0.08 per Kilowatt Hour. If local data is available, this can be used.
- Power connection costs for pump stations are estimated to be $150 per HP.

Table D-1
Pipeline Costs

Diameter	Soil		Rock	
	Rural	Urban	Rural	Urban
(Inches)	($/Foot)	($/Foot)	($/Foot)	(Feet)
6	25	31	35	49
8	40	50	56	77
10	54	69	77	106
12	68	87	97	134
14	83	106	118	163
16	97	125	138	191
18	111	144	159	220
20	125	163	180	248
24	154	200	221	305
30	197	257	283	390
36	240	313	345	476
42	283	370	407	561
48	325	426	469	647
54	368	482	531	732
60	411	539	592	817
66	454	595	654	903
72	497	652	716	988
78	606	778	867	1159
84	715	904	1018	1330
90	824	1031	1169	1500
96	933	1157	1321	1671
102	1043	1284	1472	1841
108	1152	1410	1623	2012
114	1261	1536	1774	2183
120	1370	1663	1925	2353
132	1588	1915	2227	2694
144	1806	2168	2529	3036

Table D-2
Pump Station Costs

Horsepower	Booster PS Cost ($-million)	Intake PS cost ($-millions)
0	$0.00	$0.00
5	$2.75	$0.73
10	$2.84	$0.80
20	$3.00	$0.84
25	$3.08	$0.88
50	$3.49	$0.92
100	$4.31	$0.97
200	$5.96	$1.28
300	$7.60	$1.90
400	$9.25	$2.51
500	$10.89	$3.12
600	$12.53	$3.72
700	$14.18	$4.32
800	$15.82	$4.92
900	$17.46	$5.51
1,000	$19.11	$6.10
2,000	$35.55	$11.75
3,000	$37.09	$16.99
4,000	$38.31	$23.78
5,000	$39.53	$30.56
6,000	$41.09	$31.92
7,000	$42.31	$32.94
8,000	$43.52	$34.13
9,000	$44.73	$35.32
10,000	$45.94	$36.51
20,000	$58.06	$48.40
30,000	$70.18	$60.30
40,000	$82.30	$72.19
50,000	$94.42	$84.08
60,000	$106.54	$95.98
70,000	$118.66	$107.87

Note:
1. Intake PS costs include intake and pump station.
2. Adjust pump station costs upward if the pump station is designed to move large quantities of water at a low head (i.e. low horsepower).
3. Assumed multiple pump setup for all pump stations.

Table D-3
Ground Storage Tanks

Tank Volume (MG)	With Roof ($)	Without Roof ($)
0.05	833,996	413,402
0.1	901,492	432,305
0.5	1,077,270	583,324
1	1,296,813	772,047
1.5	1,516,458	960,769
2	1,736,104	1,149,595
2.5	1,955,647	1,338,317
3	2,175,292	1,527,143
3.5	2,394,938	1,715,865
4	2,614,480	1,904,588
5	3,053,771	2,282,136
6	3,492,960	2,659,683
7	3,932,251	3,037,231
8	4,371,439	3,414,779
10	5,376,487	4,444,586
12	6,603,646	5,474,393
14	7,815,600	6,504,302

Note: Costs assume steel tanks smaller than 1 MG, concrete tanks 1 MG and larger.

Table D-4
Conventional Water Treatment Plant Costs

	Level 0	Level 1	Level 2	Level 3 (new)	Level 3 (exp)	Level 4	Level 5
	Chlorine Disinfection (GW)	Iron & Manganese Removal	Simple Filtration	Conventional Treatment	Conventional Treatment	Brackish Desalination	Seawater Desalination
Capacity (MGD)	Capital Cost ($)	Capital Cost ($)	Capital Cost ($)	Capital Cost ($)	Capital Cost ($)	Capital Cost ($)	Capital Cost ($)
0	0	0	0	0	0	0	0
0.1	23,087	288,588	1,325,778	1,767,123	1,767,123	1,178,589	2,833,393
1	88,885	1,158,201	4,640,222	6,231,155	6,231,155	4,714,357	18,958,622
10	566,903	4,820,001	24,526,888	42,424,887	23,863,999	31,872,968	126,854,757
50	2,834,513	13,998,840	92,804,441	174,438,444	86,175,552	121,218,137	478,967,996
75	4,251,769	20,197,138	135,671,254	256,406,422	137,000,217	169,716,220	669,375,527
100	5,669,026	24,745,097	178,538,068	336,992,859	166,063,345	215,487,708	848,802,709
150	8,503,538	37,868,167	264,271,694	495,344,555	249,090,998	301,702,040	1,186,233,245
200	11,338,051	43,605,494	350,005,321	651,027,289	307,211,963	383,069,344	1,504,204,967

Note: Plant is sized for finished peak day capacity.

Table D-5
Advanced Water Treatment Facility Costs

Capacity (MGD)	Scheme 1 (includes RO)	Scheme 2
0	$0	$0
1	$9,918,242	$9,444,692
5	$35,384,711	$26,571,419
10	$61,298,421	$42,224,878
25	$152,259,491	$95,038,861

Table D-6
Cost Elements for Water Wells

Public Supply Well Costs						
	Well Capacity (MGD)					
Well Depth (ft)	100	175	350	700	1000	1800
150	$88,218	$112,093	$144,629			
300	$145,169	$220,377	$376,039	$425,012	$529,953	$774,816
500	$195,890	$279,843	$447,749	$512,463	$633,146	$897,247
700	$253,608	$349,804	$531,702	$612,157	$753,828	$1,044,164
1000	$306,079	$412,769	$606,910	$703,106	$862,267	$1,173,592
1500	$402,275	$528,204	$746,831	$869,263	$1,063,404	$1,414,957
2000	$563,184	$722,345	$977,702	$1,147,357	$1,395,717	$1,813,734
Irrigation Well Costs						
150	$80,455	$124,181	$211,631	$243,114	$307,828	$444,251
300	$106,690	$159,161	$258,854	$306,079	$388,283	$542,196
500	$132,926	$199,389	$309,576	$374,290	$475,734	$655,883
700	$153,913	$229,122	$353,302	$432,008	$552,690	$753,828
1000	$201,137	$295,585	$444,251	$550,941	$704,855	$946,220
1500	$281,593	$409,271	$594,667	$748,580	$956,714	$1,264,541
2000	$360,298	$519,459	$745,082	$944,471	$1,210,322	$1,584,612
ASR Well Costs						
150	$160,910	$248,360	$432,008	$487,977	$608,659	$897,247
300	$211,631	$307,828	$503,717	$575,427	$711,851	$1,021,427
500	$269,349	$379,538	$587,670	$675,122	$834,283	$1,166,596
700	$323,568	$442,502	$664,628	$766,071	$940,973	$1,297,772
1000	$418,015	$557,938	$802,801	$932,228	$1,142,111	$1,537,389
1500	$580,675	$750,330	$1,033,670	$1,210,322	$1,474,424	$1,936,165
2000	$739,836	$942,722	$1,264,541	$1,488,416	$1,808,486	$2,336,690

Table D-7
Annual Water Treatment Plant O&M Costs

	Level 0	Level 1	Level 2	Level 3 (New)	Level (Exp)	Level 4	Level 5
Capacity (MGD)	Chlorine Disinfection (GW)	Iron & Manganese Removal	Simple Filtration	Conventional Treatment	Conventional Treatment	Brackish Desalination	Seawater Desalination
0	0	0	0	0	0	0	0
0.1	5,384	37,017	103,064	68,687	68,687	83,293	374,449
1	20,729	148,561	360,725	242,201	242,201	333,171	2,505,493
10	132,211	618,256	1,906,690	1,649,029	927,579	2,252,513	16,764,602
50	661,054	1,795,616	7,214,502	6,780,314	3,349,590	8,566,679	63,298,437
75	991,582	2,590,666	10,546,914	9,966,358	5,325,113	11,994,116	88,461,912
100	1,322,109	3,174,027	13,879,327	13,098,702	6,454,779	15,228,860	112,174,269
150	1,983,163	4,857,310	20,544,152	19,253,734	9,682,012	21,321,764	156,767,698
200	2,644,218	5,593,231	27,208,977	25,305,025	11,941,137	27,072,121	198,789,531

Table D-8
Advanced Water Treatment Facility O&M Costs

Capacity (MGD)	Scheme 1 (includes RO)	Scheme 2
0	$0	$0
1	$1,186,267	$642,163
5	$4,609,938	$2,379,709
10	$8,287,126	$4,185,417
25	$18,027,189	$8,879,063

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
City of Andrews - Develop Edwards-Trinity Plateau Aquifer Supplies (Antlers Formation)

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (18 in dia., 15 miles)	$10,186,000
Primary Pump Stations (4.6 MGD)	$3,495,000
Well Fields (Wells, Pumps, and Piping)	$4,261,000
TOTAL COST OF FACILITIES	**$17,942,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$5,771,000
Environmental & Archaeology Studies and Mitigation	$469,000
Land Acquisition and Surveying (66 acres)	$77,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$668,000
TOTAL COST OF PROJECT	**$24,927,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,754,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$144,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$87,000
Pumping Energy Costs (4144130 kW-hr @ 0.08 $/kW-hr)	$332,000
TOTAL ANNUAL COST	**$2,317,000**
Available Project Yield (acft/yr)	2,600
Annual Cost of Water ($ per acft), based on PF=2	$891
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$217
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.73
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.66

HK *8/12/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
City of Andrews - Develop Ogallala Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and
a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (18 in dia., 8 miles)	$4,683,000
Primary Pump Stations (5 MGD)	$2,495,000
Well Fields (Wells, Pumps, and Piping)	$3,140,000
Storage Tanks (Other Than at Booster Pump Stations)	$945,000
TOTAL COST OF FACILITIES	**$11,263,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$3,708,000
Environmental & Archaeology Studies and Mitigation	$232,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$420,000
TOTAL COST OF PROJECT	**$15,663,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,102,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$88,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$62,000
Pumping Energy Costs (1777583 kW-hr @ 0.08 $/kW-hr)	$142,000
TOTAL ANNUAL COST	**$1,394,000**
Available Project Yield (acft/yr)	2,810
Annual Cost of Water ($ per acft), based on PF=2	$496
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$104
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.52
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.32

HK *9/20/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Andrews Co Livestock - Develop Edwards-Trinity Plateau Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$228,000
TOTAL COST OF FACILITIES	**$228,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$80,000
Environmental & Archaeology Studies and Mitigation	$8,000
Land Acquisition and Surveying (2 acres)	$2,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$9,000
TOTAL COST OF PROJECT	**$327,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$23,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,000
Pumping Energy Costs (16772 kW-hr @ 0.08 $/kW-hr)	$1,000
TOTAL ANNUAL COST	**$26,000**
Available Project Yield (acft/yr)	60
Annual Cost of Water ($ per acft), based on PF=1	$433
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$50
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$1.33
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.15
HK	*8/12/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Andrews Co Manufacturing - Develop Edwards-Trinity-Plateau Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$417,000
TOTAL COST OF FACILITIES	**$417,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$146,000
Environmental & Archaeology Studies and Mitigation	$9,000
Land Acquisition and Surveying (3 acres)	$3,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$16,000
TOTAL COST OF PROJECT	**$591,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$42,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,000
Pumping Energy Costs (56947 kW-hr @ 0.08 $/kW-hr)	$5,000
TOTAL ANNUAL COST	**$51,000**
Available Project Yield (acft/yr)	210
Annual Cost of Water ($ per acft), based on PF=1	$243
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$43
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.75
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.13

HK *8/12/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Andrews County - Other - Develop Edwards-Trinity Plateau Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$528,000
TOTAL COST OF FACILITIES	**$528,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$185,000
Environmental & Archaeology Studies and Mitigation	$13,000
Land Acquisition and Surveying (3 acres)	$4,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$21,000
TOTAL COST OF PROJECT	**$751,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$53,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,000
Pumping Energy Costs (68557 kW-hr @ 0.08 $/kW-hr)	$5,000
TOTAL ANNUAL COST	**$63,000**
Available Project Yield (acft/yr)	250
Annual Cost of Water ($ per acft), based on PF=1	$252
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$40
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.77
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.12

HK *8/12/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Balmorhea - Develop Edwards-Trinity-Plateau Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and
a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (6 in dia., 5 miles)	$669,000
Well Fields (Wells, Pumps, and Piping)	$652,000
TOTAL COST OF FACILITIES	**$1,321,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$429,000
Environmental & Archaeology Studies and Mitigation	$130,000
Land Acquisition and Surveying (13 acres)	$15,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$53,000
TOTAL COST OF PROJECT	**$1,948,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$137,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$13,000
Pumping Energy Costs (94048 kW-hr @ 0.08 $/kW-hr)	$8,000
TOTAL ANNUAL COST	**$158,000**
Available Project Yield (acft/yr)	150
Annual Cost of Water ($ per acft), based on PF=2	$1,053
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$140
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$3.23
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.43

HK *9/23/2019*

WUGNAME:	Bangs					
STRATEGY:	Direct Non-Potable Reuse For Public Parks Irrigation (Type					
AMOUNT (ac-ft/yr):	25					
CAPITAL COSTS						
Wastewater Treatment Plant Improvements	**Size**	**Quantity**	**Units**	**Unit Price**		**Cost**
Wastewater Treatment Plant Improvements	0.04 MGD	1	LS	$ 64,360	$	64,000
Engineering and Contingencies (35%)					$	22,000
Subtotal WWTP Improvements					$	86,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline	6 in.	10,560	LF	$ 30	$	321,000
Right-of-way easements		5	AC	$ 3,792	$	20,000
Engineering and Contingencies (30%)					$	96,000
Subtotal Pipeline					$	437,000
CONSTRUCTION TOTAL					$	523,000
Permitting and Mitigation					$	50,000
Interest During Construction	6 months				$	8,000
TOTAL CAPITAL COST					**$**	**581,000**
ANNUAL COSTS						**Cost**
Debt Service (3.5% for 20 years)					$	41,000
O&M					$	4,000
Electricity					$	400
Total Annual Cost					**$**	**45,400**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	1,816
Per 1,000 gallons					$	5.57
UNIT COSTS (After Amortization)						
Per Acre-Foot of treated water					$	176
Per 1,000 gallons					$	0.54

WUGNAME:	Big Spring						
STRATEGY:	New Water Treatment Plant						
AMOUNT (ac-ft/yr):	11,210						
CONSTRUCTION COSTS							
Water Treatment Plant	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Water Treatment Plant	20.0 MGD	1	LS	$	75,428,276	$	75,428,000
Land Acquisition		10	AC	$	1,104	$	11,000
Engineering and Contingencies (35%)						$	26,400,000
Subtotal Water Treatment Plant						$	101,839,000
CONSTRUCTION TOTAL						$	101,839,000
Permitting and Mitigation						$	11,000
Interest During Construction	12 months					$	2,801,000
TOTAL COST						**$**	**104,651,000**
ANNUAL COSTS							
Debt Service (3.5% for 20 years)						$	7,363,000
Operation & Maintenance						$	5,280,000
Total Annual Costs						**$**	**12,643,000**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	1,128
Per 1,000 Gallons						$	3.46
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	471
Per 1,000 Gallons						$	1.45

WUGNAME:	Brady					
STRATEGY:	Advanced Groundwater Treatment					
AMOUNT (ac-ft/yr):	1,200					
CONSTRUCTION COSTS						
Water Treatment Plant Expansion	**Size**	**Quantity**	**Unit**		**Unit Price**	**Cost**
Water Treatment Plant Expansion	1.1 MGD	1	LS	$	21,425,494	$ 21,425,000
Engineering and Contingencies						$ 7,499,000
Subtotal Water Treatment Plant Expansion						$ 28,924,000
CONSTRUCTION TOTAL						$ 28,924,000
Interest During Construction	12 months					$ 795,000
TOTAL COST						**$ 29,719,000**
ANNUAL COSTS						
Debt Service (3.5% for 20 years)						$ 2,091,000
Operation & Maintenance						$ 392,000
Total Annual Costs						**$ 2,483,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water						$ 2,069
Per 1,000 Gallons						$ 6.35
UNIT COSTS (After Amortization)						
Per Acre-Foot						$ 327
Per 1,000 Gallons						$ 1.00

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Bronte - Develop Groundwater from Other Aquifer in Runnels County

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (6 in dia., 9.5 miles)	$1,268,000
Primary Pump Stations (0.1 MGD)	$233,000
Well Fields (Wells, Pumps, and Piping)	$241,000
TOTAL COST OF FACILITIES	**$1,742,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$546,000
Environmental & Archaeology Studies and Mitigation	$257,000
Land Acquisition and Surveying (30 acres)	$49,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$72,000
TOTAL COST OF PROJECT	**$2,666,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$188,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$15,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$6,000
TOTAL ANNUAL COST	**$209,000**
Available Project Yield (acft/yr)	75
Annual Cost of Water ($ per acft), based on PF=2	$2,787
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$280
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$8.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.86

HK *9/20/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Bronte - Develop Groundwater from Other Aquifer in Southwest Coke County

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (10 in dia., 31 miles)	$11,637,000
Primary Pump Stations (1.4 MGD)	$1,628,000
Well Fields (Wells, Pumps, and Piping)	$1,002,000
TOTAL COST OF FACILITIES	**$16,815,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$5,303,000
Environmental & Archaeology Studies and Mitigation	$797,000
Land Acquisition and Surveying (88 acres)	$144,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$635,000
TOTAL COST OF PROJECT	**$23,694,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,667,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$136,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$81,000
Pumping Energy Costs (682269 kW-hr @ 0.08 $/kW-hr)	$55,000
TOTAL ANNUAL COST	**$1,939,000**
Available Project Yield (acft/yr)	800
Annual Cost of Water ($ per acft), based on PF=2	$2,424
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$340
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.44
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.04

HK *9/20/2019*

WUGNAME:	Bronte				
STRATEGY:	Rehabilitation of Oak Creek Pipeline				
AMOUNT (ac-ft/yr):	450				
CONSTRUCTION COSTS					
Pipeline Rehabilitation	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
New Pipe	14 in.	68,640	LF	$ 100	$ 6,878,000
Replace Storage Tank	0.05 MG	1	LS	$ 413,402	$ 413,000
Pump Station Rehabilitaiton and Upgrades	1.5 MGD	1	LS	$ 217,500	$ 218,000
Engineering and Contingencies (30%)					$ 2,253,000
Subtotal Pipeline					$ 9,762,000
CONSTRUCTION TOTAL					**$ 9,762,000**
Interest During Construction	6 months				$ 134,000
TOTAL CAPITAL COST					**$ 9,896,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 696,000
Electricity ($0.08/kwh)					$ 12,300
O&M					$ 78,400
Total Annual Cost					$ 786,700
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,748
Per 1,000 gallons					$ 5.37
UNIT COSTS (After Amortization)					
Per Acre-Foot of treated water					$ 202
Per 1,000 gallons					$ 0.62

WUGNAME:	Bronte				
STRATEGY:	Water Treatment Plant Expansion				
AMOUNT (ac-ft/yr):	800				
CONSTRUCTION COSTS					
Water Treatment Plant Expansion	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water Treatment Plant Expansion	1.5 MGD	1	LS	$7,210,758	$7,211,000
Engineering and Contingencies (35%)					$2,524,000
Subtotal Water Treatment Plant Expansion					$9,735,000
CONSTRUCTION TOTAL					$9,735,000
Interest During Construction	12 months				$ 535,000
TOTAL COST					**$10,270,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 723,000
Operation & Maintenance					$ 653,000
Total Annual Costs					**$ 1,376,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,720
Per 1,000 Gallons					$ 5.28
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 816
Per 1,000 Gallons					$ 2.50

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Brown Co. Mining - Develop Cross Timber Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$1,601,000
TOTAL COST OF FACILITIES	**$1,601,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$560,000
Environmental & Archaeology Studies and Mitigation	$129,000
Land Acquisition and Surveying (21 acres)	$84,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$66,000
TOTAL COST OF PROJECT	**$2,440,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$172,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$16,000
Pumping Energy Costs (132508 kW-hr @ 0.08 $/kW-hr)	$11,000
TOTAL ANNUAL COST	**$199,000**
Available Project Yield (acft/yr)	210
Annual Cost of Water ($ per acft), based on PF=1	$948
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$129
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$2.91
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.39

HK *9/18/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Colorado City - Dockum Well Field Expansion

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (6 in dia., 8 miles)	$1,160,000
Primary Pump Stations (0.3 MGD)	$944,000
Well Fields (Wells, Pumps, and Piping)	$449,000
TOTAL COST OF FACILITIES	**$2,553,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$835,000
Environmental & Archaeology Studies and Mitigation	$213,000
Land Acquisition and Surveying (26 acres)	$42,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$101,000
TOTAL COST OF PROJECT	**$3,744,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$263,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$16,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$24,000
Pumping Energy Costs (85732 kW-hr @ 0.08 $/kW-hr)	$7,000
TOTAL ANNUAL COST	**$310,000**
Available Project Yield (acft/yr)	170
Annual Cost of Water ($ per acft), based on PF=2	$1,824
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$276
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.60
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.85
HK	*9/23/2019*

WUGNAME:	CRMWD				
STRATEGY:	Develop Additional Groundwater Supplies from Pecos, Reeves, Ward and Winkler Counties				
AMOUNT (ac-ft/yr):	10,000				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Purchase Groundwater Rights		10,000	AC	$ 500	$ 5,000,000
Water wells	1000 gpm	10	EA	$ 564,351	$ 5,644,000
Well field collection		10	per well	$ 200,000	$ 2,000,000
Engineering and contingencies (35%)					$ 2,675,000
Subtotal Well field					$ 10,319,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	36 in.	211,200	LF	$ 345	$ 72,824,000
Right-of-way easements		97	AC	$ 788	$ 84,000
Engineering and Contingencies (30%)					$ 21,847,000
Subtotal Pipeline					$ 94,755,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	1100 HP	3	EA	$ 6,662,300	$ 19,987,000
Storage tank	1.25 MG	2	EA	$ 1,406,635	$ 2,813,000
Power Connection		2	LS	$ 495,000	$ 990,000
Engineering and Contingencies (35%)					$ 8,327,000
Subtotal of Pump Station(s)					$ 32,117,000
CONSTRUCTION TOTAL					$ 137,191,000
Permitting and Mitigation					$ 1,000,000
Interest During Construction	24 months				$ 9,367,000
TOTAL COST					**$ 147,558,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 10,382,000
Electricity ($0.08 kWh)					$ 1,725,000
Operation & Maintenance					$ 1,375,000
Total Annual Costs					**$ 13,482,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,348
Per 1,000 Gallons					$ 4.14
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 310
Per 1,000 Gallons					$ 0.95

WUGNAME:	CRMWD					
STRATEGY:	Ward County Well Field Expansion and Development of Winkler County Well Field					
AMOUNT (ac-ft/yr):	22,400					
CONSTRUCTION COSTS						
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Water wells		50	EA	$ 490,892	$	24,545,000
Well field pipeline	10 in.	37,000	LF	$ 107	$	3,972,000
Well field pipeline	16 in.	34,000	LF	$ 162	$	5,515,000
Well field pipeline	20 in.	2,500	LF	$ 203	$	507,000
Well field pipeline	24 in.	2,600	LF	$ 229	$	595,000
Well field pipeline	30 in.	2,500	LF	$ 286	$	716,000
Well field pipeline	36 in.	2,500	LF	$ 301	$	751,000
Power Connection Costs			LS	$ 453,000	$	453,000
Engineering and contingencies (35%)					$	12,969,000
Subtotal Well field					$	50,023,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline	36 in.	162,000	LF	$ 301	$	48,693,000
Terminal Reservoir Piping and Valves		1	LS	$ 514,000	$	514,000
Right-of-way easements		74	AC	$ 788	$	64,000
Engineering and Contingencies (30%)					$	14,762,000
Subtotal Pipeline					$	64,033,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
North Well Field PS Improvements		1	LS	$ 1,938,000	$	1,938,000
Transmission Pump Station Expansion	20 MGD	1	LS	$ 4,308,000	$	4,308,000
New Transmission Booster Pump Station	50 MGD	1	EA	$ 12,792,000	$	12,792,000
New Pump Station in Odessa	20 MGD	1	EA	$ 6,904,000	$	6,904,000
Terminal Pump Station	20 MGD	1	EA	$ 6,904,000	$	6,904,000
Engineering and Contingencies (35%)					$	11,496,000
Subtotal of Pump Station(s)					$	44,342,000
CONSTRUCTION TOTAL					$	158,398,000
Permitting and Mitigation					$	1,151,000
Interest During Construction	24 months				$	8,775,000
TOTAL COST					**$**	**168,324,000**
ANNUAL COSTS						
Debt Service (3.5% for 20 years)					$	11,843,000
Electricity ($0.08 kWh)					$	5,502,000
Operation & Maintenance					$	1,679,000
Total Annual Costs					**$**	**19,024,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	849
Per 1,000 Gallons					$	2.61
UNIT COSTS (After Amortization)						
Per Acre-Foot					$	321
Per 1,000 Gallons					$	0.99

WUGNAME:	CRMWD				
STRATEGY:	Ward County Well Field Well Replacement				
AMOUNT (ac-ft/yr):	755 - 10,500				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		10	EA	$ 552,690	$ 5,527,000
Well field collection		10	per well	$ 200,000	$ 2,000,000
Engineering and contingencies (35%)					$ 2,634,000
Subtotal Well field					$ 10,161,000
CONSTRUCTION TOTAL					$ 10,161,000
Interest During Construction	12 months				$ 279,000
TOTAL COST					**$ 10,440,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 735,000
Electricity ($0.08 kWh)					$ 2,124,000
Operation & Maintenance					$ 75,270
Total Annual Costs					**$ 2,934,270**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 102
Per 1,000 Gallons					$ 0.31
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 76
Per 1,000 Gallons					$ 0.23

WUGNAME:	Greater Gardendale WSC					
STRATEGY:	Purchase Water from Midland County FWSD No. 1					
AMOUNT (ac-ft/yr):	445					
CAPITAL COSTS						
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission Pipeline	12 in.	2,600	LF	$ 83	$	215,000
Right-of-way easements		1	AC	$ 1,104	$	1,000
Engineering and Contingencies (30%)					$	65,000
Subtotal Pipeline					$	281,000
Water Treatment						
Chlorination Facilities	1.0 MGD	1	LS	$ 88,331	$	88,331
Engineering and Contingencies (35%)					$	31,000
Subtotal Water Treatment					$	119,331
Pump Station & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Stations	40 HP	1	EA	$ 905,800	$	906,000
Storage tank	0.1 MGD	1	EA	$ 900,468	$	900,000
Power Connection		1	LS	$ 50,000	$	50,000
Engineering and Contingencies (35%)					$	650,000
Subtotal of Pump Station(s)					$	2,506,000
CONSTRUCTION TOTAL					$	2,906,331
Interest During Construction	6 months				$	40,000
TOTAL CAPITAL COST					**$**	**2,946,000**
ANNUAL COSTS						**Cost**
Debt Service (3.5% for 20 years)					$	207,000
O&M					$	35,000
Electricity ($0.08 kWh)					$	8,000
Water Purchase Price per 1,000 gal					$	798,000
Total Annual Cost					**$**	**1,048,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	2,355
Per 1,000 gallons					$	7.23
UNIT COSTS (After Amortization)						
Per Acre-Foot of treated water					$	1,890
Per 1,000 gallons					$	5.80

WUGNAME:	Greater Gardendale WSC							
STRATEGY:	Purchase Treated Water from City of Odessa							
AMOUNT (ac-ft/yr):	445							
CAPITAL COSTS								
Pipeline	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**	
Transmission Pipeline	12 in.	23,700	LF	$	54	$	1,280,000	
Transmission Pipeline	18 in.	6,100	LF	$	84	$	512,000	
Other Transmission Infrastructure						$	395,800	
Easement Acquisition		24,000	LS	$	5	$	130,000	
Engineering and Contingencies (30%)						$	656,000	
Subtotal Pipeline						$	2,973,800	
Odessa Pump Station Improvements								
Ground Storage Tank	0.15 MG	2	EA	$	225,000	$	450,000	
Booster Pump	1000 gpm	2	EA	$	60,000	$	120,000	
Other Pump Station Infrastructure						$	550,800	
Electrical Power		1	LS	$	72,000	$	72,000	
Land Acquisition		1	LS	$	48,000	$	48,000	
Engineering and Contingencies (35%)						$	417,000	
Subtotal Pump Station						$	1,657,800	
GCWSC Booster Pump Station								
Ground Storage Tank	0.26 MG	1	EA	$	480,000	$	480,000	
Chlorination System Improvements				$	60,000	$	60,000	
Other Pump Station Infrastructure						$	129,600	
Engineering and Contingencies (35%)						$	234,000	
Subtotal Pump Station						$	903,600	
CONSTRUCTION TOTAL						$	5,535,200	
Professional Services						$	502,000	
Interest During Construction		6 months				$	41,000	
TOTAL CAPITAL COST						**$**	**6,078,000**	
ANNUAL COSTS							**Cost**	
Debt Service (3.5% for 20 years)						$	428,000	
O&M						$	42,000	
Electricity ($0.08 kWh)						$	20,000	
Water Purchase Price per 1,000 gal						$	1,170,000	
Total Annual Cost						**$**	**1,660,000**	
UNIT COSTS (Until Amortized)								
Per Acre-Foot of treated water						$	3,730	
Per 1,000 gallons						$	11.45	
UNIT COSTS (After Amortization)								
Per Acre-Foot of treated water						$	2,769	
Per 1,000 gallons						$	8.50	

WUGNAME:	Junction			
STRATEGY:	Dredge River Intake			
AMOUNT (ac-ft/yr):	250			
CONSTRUCTION COSTS				
Dredging and disposal	**Quantity**	**Unit**	**Unit Price**	**Cost**
Bathymetric survey	15	AC	$ 5,000	$ 75,000
Sediment Testing (Geotech & Lab)	25	EA	$ 2,500	$ 63,000
Dredging and Disposal	75,000	CY	$ 60	$ 4,500,000
Construction Phase Services (5%)				$ 231,900
Additional Contingency (10%)				$ 486,990
Engineering and Contingencies (35%)				$ 1,704,465
Subtotal of Dredging and Disposal				$ 7,061,355
CONSTRUCTION TOTAL				$ 7,061,355
Interest During Construction	12 months			$ 194,000
Permitting				$ 250,000
TOTAL COST				**$ 7,505,000**
ANNUAL COSTS				
Debt Service (3.5% for 20 years)				$ 528,000
Total Annual Costs				**$ 528,000**
UNIT COSTS (Until Amortized)				
Per Acre-Foot of treated water				$ 2,112
Per 1,000 Gallons				$ 6.48
UNIT COSTS (After Amortization)				
Per Acre-Foot				$ -
Per 1,000 Gallons				$ -

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Junction - Develop Edwards-Trinity Plateau Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (8 in dia., 3 miles)	$627,000
Primary Pump Stations (0.7 MGD)	$863,000
Well Fields (Wells, Pumps, and Piping)	$1,017,000
TOTAL COST OF FACILITIES	**$2,507,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$846,000
Environmental & Archaeology Studies and Mitigation	$117,000
Land Acquisition and Surveying (17 acres)	$66,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$98,000
TOTAL COST OF PROJECT	**$3,634,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$256,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$16,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$22,000
Pumping Energy Costs (125946 kW-hr @ 0.08 $/kW-hr)	$10,000
TOTAL ANNUAL COST	**$304,000**
Available Project Yield (acft/yr)	370
Annual Cost of Water ($ per acft), based on PF=2	$822
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$130
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.52
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.40
HK	*9/19/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Kimble Co. Manufacturing - Develop Ellenburger San Saba Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and
a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$1,113,000
TOTAL COST OF FACILITIES	**$1,113,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$389,000
Environmental & Archaeology Studies and Mitigation	$47,000
Land Acquisition and Surveying (7 acres)	$28,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$44,000
TOTAL COST OF PROJECT	**$1,621,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$114,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$11,000
Pumping Energy Costs (149933 kW-hr @ 0.08 $/kW-hr)	$12,000
TOTAL ANNUAL COST	**$137,000**
Available Project Yield (acft/yr)	500
Annual Cost of Water ($ per acft), based on PF=1	$274
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$46
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.84
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.14

HK *9/19/2019*

Cost Estimate Summary Water Supply Project Option September 2018 Prices Menard - Develop Hickory Aquifer Supplies	
Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$2,364,000
TOTAL COST OF FACILITIES	**$2,364,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$827,000
Environmental & Archaeology Studies and Mitigation	$5,000
Land Acquisition and Surveying (1 acres)	$3,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$88,000
TOTAL COST OF PROJECT	**$3,287,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$231,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$24,000
Pumping Energy Costs (117208 kW-hr @ 0.08 $/kW-hr)	$9,000
TOTAL ANNUAL COST	**$264,000**
Available Project Yield (acft/yr)	200
Annual Cost of Water ($ per acft), based on PF=2	$1,320
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$165
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$4.05
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.51
HK	*8/13/2019*

WUGNAME:	City of Menard					
STRATEGY:	Direct Non-potable Reuse For Irrigation of City Farms (Type I)					
AMOUNT (ac-ft/yr):	67					

CAPITAL COSTS						
Wastewater Treatment Plant Improvements		**Quantity**	**Units**	**Unit Price**		**Cost**
Wastewater Treatment Plant Improvements		1	LS	$ 154,000	$	154,000
Engineering and Contingencies (30%)					$	46,200
Subtotal WWTP Improvements					$	200,200
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline	6 in	10,560	LF	$ 30	$	321,000
Right-of-way easements		5	AC	$ 3,792	$	20,000
Engineering and Contingencies (30%)					$	96,300
Subtotal Pipeline					$	437,300
CONSTRUCTION TOTAL					$	637,500
Permitting and Mitigation					$	50,000
Interest During Construction		6 months			$	9,000
TOTAL CAPITAL COST					**$**	**696,500**
ANNUAL COSTS						**Cost**
Debt Service (3.5% for 20 years)					$	49,000
O&M					$	4,738
Electricity					$	1,190
Total Annual Cost					**$**	**54,928**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	820
Per 1,000 gallons					$	2.52
UNIT COSTS (After Amortization)						
Per Acre-Foot of treated water					$	88
Per 1,000 gallons					$	0.27

WUGNAME:	Midland				
STRATEGY:	RO Treatment of Existing Supplies				
AMOUNT (ac-ft/yr):	6,500				
CONSTRUCTION COSTS					
Water Treatment Plant	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Land Acquisition		4.5	AC	$ 2,208	$ 10,000
RO Facility	9 MGD	1	LS	$ 30,214,296	$ 30,214,000
Engineering and contingencies (35%)					$ 10,575,000
Treatment Subtotal					$ 40,799,000
Brine Effluent Transmission Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	14 in.	52,800	LF	$ 135	$ 7,102,000
Right-of-way easements		24	AC	$ 2,208	$ 54,000
Engineering and Contingencies (30%)					$ 2,131,000
Subtotal of Disposal Facilities					$ 9,287,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	300 HP	2	EA	$ 1,897,500	$ 3,795,000
Storage tank	0.4 MG	2	EA	$ 1,033,325	$ 2,067,000
Power Connection		2	LS	$ 50,000	$ 100,000
Engineering and Contingencies (35%)					$ 2,087,000
Subtotal of Pump Station(s)					$ 8,049,000
CONSTRUCTION TOTAL					$ 58,135,000
Permitting and Mitigation					$ 260,000
Interest During Construction (3%)	18 months				$ 2,409,000
TOTAL COST					**$ 60,804,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 4,278,000
Electricity ($0.08 kWh)					$ 85,000
Operation & Maintenance					$ 6,402,000
Total Annual Costs					**$ 10,765,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,656
Per 1,000 Gallons					$ 5.08
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 998
Per 1,000 Gallons					$ 3.06

WUGNAME:	Midland County-Other				
STRATEGY:	Develop Groundwater from Winkler County				
AMOUNT (ac-ft/yr):	2,800				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	300 gpm	15	EA	$ 479,731	$ 7,196,000
Well field collection	6 in.	17,000	LF	$ 30	$ 516,000
Well field collection	8 in.	5,000	LF	$ 48	$ 239,000
Well field collection	10 in.	2,800	LF	$ 65	$ 183,000
Well field collection	12 in.	4,500	LF	$ 83	$ 372,000
Well field collection	18 in.	4,000	LF	$ 135	$ 541,000
Engineering and contingencies (35%)					$ 3,166,000
Subtotal Well field					$ 12,000,000
Transmission Infrastructure	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission Pipeline	18 in.	26,400	LF	$ 220	$ 5,799,000
Engineering and Contingencies (30%)					$ 2,000,000
Subtotal Transmission Infrastructure					$ 7,799,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	325 HP	1	EA	$ 2,050,600	$ 2,051,000
Storage tank	0.3 MG	1	EA	$ 967,409	$ 967,000
Power Connection		1	LS	$ 50,000	$ 50,000
Engineering and Contingencies (35%)					$ 1,074,000
Subtotal of Pump Station(s)					$ 4,142,000
CONSTRUCTION TOTAL					$ 23,941,000
Permitting and Mitigation					$ 283,000
Interest During Construction	6 months				$ 333,000
TOTAL COST					**$ 24,557,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 1,728,000
Electricity ($0.08 kWh)					$ 156,000
Operation & Maintenance					$ 182,000
Total Annual Costs					**$ 2,066,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 738
Per 1,000 Gallons					$ 2.26
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 121
Per 1,000 Gallons					$ 0.37

WUGNAME:	Mitchell County Steam Electric Power				
STRATEGY:	Direct Non-Potable Reuse for Sales from Colorado City (Type II)				
AMOUNT (ac-ft/yr):	500				
CAPITAL COSTS					
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	10 in.	52,800	LF	$ 65	$ 3,447,000
Right-of-way easements		24	AC	$ 1,544	$ 41,000
Engineering and Contingencies (30%)					$ 1,034,000
Subtotal Pipeline					$ 4,522,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	45 HP	2	EA	$ 914,600	$ 1,829,000
Storage tank	0.1 MG	1	EA	$ 901,492	$ 901,000
Power Connection		1	LS	$ 50,000	$ 50,000
Engineering and Contingencies (35%)					$ 973,000
Subtotal of Pump Station(s)					$ 3,753,000
CONSTRUCTION TOTAL					$ 8,275,000
Permitting and Mitigation					$ 250,000
Interest During Construction	6 months				$ 117,000
TOTAL CAPITAL COST					**$ 8,642,000**
ANNUAL COSTS					**Cost**
Debt Service (3.5% for 20 years)					$ 608,000
O&M					$ 89,000
Electricity ($0.08 kWh)					$ 17,000
Total Annual Cost					**$ 714,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,428
Per 1,000 gallons					$ 4.38
UNIT COSTS (After Amortization)					
Per Acre-Foot of treated water					$ 212
Per 1,000 gallons					$ 0.65

WUGNAME:	Odessa				
STRATEGY:	RO Treatment of Existing Supplies				
AMOUNT (ac-ft/yr):	15,700				
CONSTRUCTION COSTS					
Water Treatment Plant	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
RO Facility	20 MGD	1	LS	$ 56,180,506	$ 56,181,000
Engineering and contingencies (35%)					$ 19,663,000
Treatment Subtotal					$ 75,844,000
Effluent Transmission Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	16 in.	5,280	LF	$ 158	$ 835,000
Right-of-way easements		2	AC	$ 1,104	$ 3,000
Engineering and Contingencies (30%)					$ 251,000
Subtotal of Disposal Facilities					$ 1,089,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	110 HP	1	EA	$ 1,000,800	$ 1,001,000
Storage tank	0.4 MG	1	EA	$ 1,033,325	$ 1,033,000
Power Connection		1	LS	$ 50,000	$ 50,000
Engineering and Contingencies (35%)					$ 729,000
Subtotal of Pump Station(s)					$ 2,813,000
CONSTRUCTION TOTAL					$ 79,746,000
Permitting and Mitigation					$ 25,000
Interest During Construction (3%)	18 months				$ 3,291,000
TOTAL COST					**$ 83,062,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 5,844,000
Electricity ($0.08 kWh)					$ 36,000
Operation & Maintenance					$ 11,558,000
Total Annual Costs					**$ 17,438,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,111
Per 1,000 Gallons					$ 3.41
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 738
Per 1,000 Gallons					$ 2.27

WUGNAME:	Odessa				
STRATEGY:	Develop Capitan Reef Complex Aquifer Supplies in Ward County				
AMOUNT (ac-ft/yr):	8,400				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	950 gpm	15	EA	$ 3,302,735	$ 49,541,000
Ground Storage Tank	2.0 MG	1	EA	$ 1,736,104	$ 1,736,000
Wellfield Piping	30 in.	15,000	LF	$ 240	$ 3,598,000
Wellfield Piping	42 in.	15,000	LF	$ 345	$ 5,170,000
Wellfield Piping	48 in.	15,000	LF	$ 397	$ 5,956,000
Engineering and contingencies (35%)					$ 23,100,000
Well Field Subtotal					$ 89,101,000
Water Treatment Plant					
RO facility	7.5 MGD	1	LS	$ 25,803,389	$ 25,803,000
Engineering and contingencies (35%)					$ 9,031,000
Treatment Subtotal					$ 34,834,000
Disposal Facilities	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Injection Wells	1000 gpm	5	EA	$ 3,133,656	$ 15,668,000
Collection Piping	16 in.	10,000	LF	$ 118	$ 1,177,000
Power Connection		1	LS	$ 830,753	$ 831,000
Engineering and Contingencies (35%)					$ 6,187,000
Subtotal of Disposal Facilities					$ 23,863,000
CONSTRUCTION TOTAL					$ 147,798,000
Permitting and Mitigation					$ 260,000
Interest During Construction	18 months				$ 6,107,000
TOTAL COST					**$ 154,165,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 10,847,000
Electricity ($0.08 kWh)					$ 1,412,000
Operation & Maintenance					$ 6,015,000
Total Annual Costs					**$ 18,274,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 2,175
Per 1,000 Gallons					$ 6.68
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 884
Per 1,000 Gallons					$ 2.71

WUGNAME:	Odessa				
STRATEGY:	Develop Edwards Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County Phase I				
AMOUNT (ac-ft/yr):	11,200				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	1000 gpm	15	EA	$ 2,397,908	$ 35,969,000
Wellfield Piping	30 in.	21,120	LF	$ 240	$ 5,067,000
Wellfield Piping	42 in.	21,120	LF	$ 345	$ 7,279,000
Wellfield Piping	48 in.	14,780	LF	$ 397	$ 5,869,000
Engineering and contingencies (35%)					$ 18,964,000
Well Field Subtotal					$ 73,148,000
Water Treatment Plant					
RO facility	15 mgd	1	LS	$ 45,649,666	$ 45,650,000
Engineering and contingencies (35%)					$ 15,978,000
Treatment Subtotal					$ 61,628,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	54 in.	475,200	LF	$ 449	$ 213,576,000
Right-of-way easements		218	AC	$ 1,258	$ 302,000
Engineering and Contingencies (30%)					$ 64,073,000
Subtotal Pipeline					$ 277,951,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	1600 HP	2	EA	$ 9,487,500	$ 18,975,000
Storage tank	1.5 MG	2	EA	$ 1,516,458	$ 3,033,000
Power Connection		2	LS	$ 480,000	$ 960,000
Engineering and Contingencies (35%)					$ 8,039,000
Subtotal of Pump Station(s)					$ 31,007,000
Disposal Facilities	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Injection Wells	500 gpm	12	EA	$ 2,350,242	$ 28,203,000
Collection Piping	18 in.	10,000	LF	$ 135	$ 1,351,000
Power Connection		1	LS	$ 996,903	$ 997,000
Engineering and Contingencies (35%)					$ 10,693,000
Subtotal of Disposal Facilities					$ 41,244,000
CONSTRUCTION TOTAL					$ 484,978,000
Permitting and Mitigation					$ 2,567,000
Interest During Construction	18 months				$ 20,111,000
TOTAL COST					**$ 507,656,000**

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WUGNAME:	Odessa		
STRATEGY:	Develop Edwards Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County Phase I		
AMOUNT (ac-ft/yr):	11,200		
ANNUAL COSTS			
Debt Service (3.5% for 20 years)		$	35,719,000
Electricity ($0.08 kWh)		$	2,027,000
Operation & Maintenance		$	12,653,000
Total Annual Costs		**$**	**50,399,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	4,500
Per 1,000 Gallons		$	13.81
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	1,311
Per 1,000 Gallons		$	4.02

WUGNAME:	Odessa				
STRATEGY:	Develop Edwards Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County Phase II				
AMOUNT (ac-ft/yr):	16,800				

CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	1000 gpm	21	EA	$ 2,397,908	$ 50,356,000
Wellfield Piping	30 in.	31,680	LF	$ 240	$ 7,600,000
Wellfield Piping	42 in.	31,680	LF	$ 345	$ 10,919,000
Wellfield Piping	48 in.	22,180	LF	$ 397	$ 8,807,000
Engineering and contingencies (35%)					$ 27,189,000
Well Field Subtotal					$ 104,871,000
Water Treatment Plant					
RO facility	22.5 mgd	1	LS	$ 63,417,171	$ 63,417,000
Engineering and contingencies (35%)					$ 22,196,000
Treatment Subtotal					$ 85,613,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	2000 HP	3	EA	$ 11,747,600	$ 35,243,000
Storage tank	3.0 MG	3	EA	$ 2,175,292	$ 6,526,000
Power Connection		2	LS	$ 300,000	$ 600,000
Engineering and Contingencies (35%)					$ 14,829,000
Subtotal of Pump Station(s)					$ 57,198,000
Disposal Facilities	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Injection Wells	500 gpm	17	EA	$ 2,350,242	$ 39,954,000
Collection Piping	24 in.	10,000	LF	$ 188	$ 1,875,000
Power Connection		1	LS	$ 1,412,280	$ 1,412,000
Engineering and Contingencies (35%)					$ 15,134,000
Subtotal of Disposal Facilities					$ 58,375,000
CONSTRUCTION TOTAL					$ 306,057,000
Permitting and Mitigation					$ 452,000
Interest During Construction	18 months				$ 12,643,000
TOTAL COST					**$ 319,152,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 22,456,000
Electricity ($0.08 kWh)					$ 3,206,000
Operation & Maintenance					$ 14,923,000
Total Annual Costs					**$ 40,585,000**

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WUGNAME:	Odessa		
STRATEGY:	Develop Edwards Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County Phase II		
AMOUNT (ac-ft/yr):	16,800		
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	2,416
Per 1,000 Gallons		$	7.41
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	1,079
Per 1,000 Gallons		$	3.31

WUGNAME:	Pecos					
STRATEGY:	Advanced Water Treatment Plant					
AMOUNT (ac-ft/yr):	3,360					
CONSTRUCTION COSTS						
Advanced Water Treatment Plant	**Size**	**Quantity**	**Unit**		**Unit Price**	**Cost**
Advanced Water Treatment Plant	8.0 MGD	1	LS	$	19,945,589	$ 19,946,000
Land Acquisition		4	AC	$	1,544	$ 6,000
Engineering and Contingencies (35%)						$ 6,981,000
Subtotal Water Treatment Plant						$ 26,933,000
CONSTRUCTION TOTAL						$ 26,933,000
Permitting and Mitigation						$ 6,000
Interest During Construction	12 months					$ 741,000
TOTAL COST						**$ 27,680,000**
ANNUAL COSTS						
Debt Service (3.5% for 20 years)						$ 1,948,000
Operation & Maintenance						$ 1,438,000
Total Annual Costs						**$ 3,386,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water						$ 1,008
Per 1,000 Gallons						$ 3.09
UNIT COSTS (After Amortization)						
Per Acre-Foot						$ 428
Per 1,000 Gallons						$ 1.31

WUGNAME:	Pecos					
STRATEGY:	Direct Non-Potable Reuse (Type I)					
AMOUNT (ac-ft/yr):	560					
CAPITAL COSTS						
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Transmission pipeline	10 in.	52,800	LF	$ 65	$	3,447,000
Right-of-way easements		24	AC	$ 1,544	$	41,000
Engineering and Contingencies (30%)					$	1,034,000
Subtotal Pipeline					$	4,522,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Stations	50 HP	2	EA	$ 923,400	$	1,847,000
Storage tank	0.1 MG	1	EA	$ 901,492	$	901,000
Power Connection		1	LS	$ 50,000	$	50,000
Land Acquisition		12	AC	$ 1,544	$	20,000
Engineering and Contingencies (35%)					$	979,000
Subtotal of Pump Station(s)					$	3,797,000
CONSTRUCTION TOTAL					$	8,319,000
Permitting and Mitigation					$	270,000
Interest During Construction	6 months				$	118,000
TOTAL CAPITAL COST					**$**	**8,707,000**
ANNUAL COSTS						**Cost**
Debt Service (3.5% for 20 years)					$	613,000
O&M					$	90,000
Electricity ($0.08 kWh)					$	17,000
Total Annual Cost					**$**	**720,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	1,286
Per 1,000 gallons					$	3.95
UNIT COSTS (After Amortization)						
Per Acre-Foot of treated water					$	191
Per 1,000 gallons					$	0.59

WUGNAME:	Pecos							
STRATEGY:	Direct Potable Reuse							
AMOUNT (ac-ft/yr):	925							
CAPITAL COSTS								
Advanced Water Treatment Plant	**Size**	**Quantity**	**Units**		**Unit Price**		**Cost**
Advanced Water Treatment Plant	2.20 MGD	1	LS	$	17,558,000	$	17,558,000
Land Acquisition		1.1	AC	$	1,544	$	2,000
Engineering and Contingencies (35%)						$	6,145,000
Subtotal WWTP Expansion						$	23,705,000
Pipeline	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Transmission pipeline	12 in.	10,560	LF	$	83	$	874,000
Right-of-way easements		5	AC	$	1,544	$	8,000
Engineering and Contingencies (30%)						$	262,000
Subtotal Pipeline						$	1,144,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Pump Stations	150 HP	1	EA	$	1,125,300	$	1,125,000
Storage tank	0.2 MG	1	EA	$	954,225	$	954,000
Power Connection		1	LS	$	50,000	$	50,000
Land Acquisition		7	AC	$	1,544	$	12,000
Engineering and Contingencies (35%)						$	745,000
Subtotal of Pump Station(s)						$	2,886,000
Disposal Facilities							
RO Disposal Pipeline	8 in.	10,560	LF	$	48	$	505,000
Right-of-way easements		5	AC	$	1,544	$	8,000
Engineering and Contingencies (30%)						$	152,000
Subtotal Pipeline						$	665,000
CONSTRUCTION TOTAL						$	28,400,000
Permitting and Mitigation						$	350,000
Interest During Construction	12 months					$	791,000
TOTAL CAPITAL COST						**$**	**29,541,000**
ANNUAL COSTS							**Cost**
Debt Service (3.5% for 20 years)						$	2,079,000
O&M						$	2,259,000
Electricity ($0.08 kWh)						$	35,000
Total Annual Cost						**$**	**4,338,000**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	4,691
Per 1,000 gallons						$	14.39
UNIT COSTS (After Amortization)							
Per Acre-Foot of treated water						$	2,443
Per 1,000 gallons						$	7.50

WUGNAME:	Pecos							
STRATEGY:	Indirect Potable Reuse with Aquifer Storage and Recovery							
AMOUNT (ac-ft/yr):	695							
CAPITAL COSTS								
Advanced Water Treatment Plant	**Size**	**Quantity**	**Units**		**Unit Price**		**Cost**	
Advanced Water Treatment Plant	2.20 MGD	1	LS	$	17,558,000	$	17,558,000	
Land Acquisition		1.1	AC	$	1,544	$	2,000	
Engineering and Contingencies (35%)						$	6,145,000	
Subtotal WWTP Expansion						$	23,705,000	
Pipeline	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**	
Transmission pipeline	12 in.	10,560	LF	$	83	$	874,000	
Right-of-way easements		5	AC	$	1,544	$	8,000	
Engineering and Contingencies (30%)						$	262,000	
Subtotal Pipeline						$	1,144,000	
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**	
Pump Stations	150 HP	1	EA	$	1,125,300	$	1,125,000	
Storage tank	0.2 MG	1	EA	$	954,225	$	954,000	
Power Connection		1	LS	$	50,000	$	50,000	
Land Acquisition		7	AC	$	1,544	$	12,000	
Engineering and Contingencies (35%)						$	745,000	
Subtotal of Pump Station(s)						$	2,886,000	
Disposal Facilities								
RO Disposal Pipeline	8 in.	10,560	LF	$	48	$	505,000	
Right-of-way easements		5	AC	$	1,544	$	8,000	
Engineering and Contingencies (30%)						$	152,000	
Subtotal Pipeline						$	665,000	
ASR Wells	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**	
Wells	250 gpm	6	EA	$	411,020	$	2,466,000	
Well Piping		10	per well	$	100,000	$	1,000,000	
Land Acquisition		3	AC	$	1,544	$	5,000	
Engineering and Contingencies (35%)						$	1,213,000	
Subtotal of ASR Wells						$	4,684,000	
CONSTRUCTION TOTAL						$	33,084,000	
Permitting and Mitigation							450,000	
Interest During Construction	12 months					$	922,000	
TOTAL CAPITAL COST						**$**	**34,456,000**	
ANNUAL COSTS							**Cost**	
Debt Service (3.5% for 20 years)						$	2,424,000	
O&M						$	2,294,000	
Electricity ($0.08 kWh)						$	119,000	
Total Annual Cost						**$**	**4,718,000**	
UNIT COSTS (Until Amortized)								
Per Acre-Foot of treated water						$	6,788	
Per 1,000 gallons						$	20.83	
UNIT COSTS (After Amortization)								
Per Acre-Foot of treated water						$	3,301	
Per 1,000 gallons						$	10.13	

WUGNAME:	Pecos, Madera Valley WSC				
STRATEGY:	Partner with Madera Valley WSC & Expand Well Field				
AMOUNT (ac-ft/yr):	8,960				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	650 gpm	10	EA	$ 960,312	$ 9,603,000
Well field collection		10	per well	$ 200,000	$ 2,000,000
Land/Permit Acquisition		3000	AC	$ 1,544	$ 4,632,000
Engineering and contingencies (35%)					$ 4,061,000
Subtotal Well field					$ 20,296,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission Pipeline	24 in.	52,800	LF	$ 188	$ 9,901,000
Right-of-way easements		24	AC	$ 1,544	$ 37,000
Engineering and Contingencies (30%)					$ 2,970,000
Subtotal Pipeline					$ 12,908,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	250 HP	1	EA	$ 1,589,300	$ 1,589,000
Storage tank	0.80 MG	1	EA	$ 1,208,682	$ 1,209,000
Power Connection		1	LS	$ 50,000	$ 50,000
Land Acquisition		7	AC	$ 1,544	$ 11,000
Engineering and Contingencies (35%)					$ 997,000
Subtotal of Pump Station(s)					$ 3,856,000
CONSTRUCTION TOTAL					$ 37,060,000
Permitting and Mitigation					$ 4,893,000
Interest During Construction	12 months				$ 1,154,000
TOTAL COST					**$ 43,107,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 3,033,000
Electricity ($0.08 kWh)					$ 250,000
Operation & Maintenance					$ 543,000
Total Annual Costs					**$ 3,826,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 427
Per 1,000 Gallons					$ 1.31
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 89
Per 1,000 Gallons					$ 0.27

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Pecos County Mining - Develop Pecos Valley Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$3,321,000
TOTAL COST OF FACILITIES	**$3,321,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$1,162,000
Environmental & Archaeology Studies and Mitigation	$45,000
Land Acquisition and Surveying (11 acres)	$12,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$125,000
TOTAL COST OF PROJECT	**$4,665,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$328,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$33,000
Pumping Energy Costs (1642053 kW-hr @ 0.08 $/kW-hr)	$131,000
TOTAL ANNUAL COST	**$492,000**
Available Project Yield (acft/yr)	3,000
Annual Cost of Water ($ per acft), based on PF=1	$164
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$55
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.50
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.17

LJG *2/7/2020*

WUGNAME:	Pecos County WCID #1					
STRATEGY:	Develop Additional Edwards-Trinity Plateau Supplies					
AMOUNT (ac-ft/yr):	250					
CONSTRUCTION COSTS						
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Water wells	150 gpm	2	EA	$ 322,241	$	644,000
Well field collection	6 in.	500	LF	$ 35	$	18,000
Elevated Storage Tank	0.50 MG	1	EA	$ 1,951,948	$	1,952,000
Land Acquisition		1	AC	$ 1,544	$	2,000
Engineering and contingencies (35%)					$	915,000
Subtotal Well field					$	3,531,000
CONSTRUCTION TOTAL					$	3,531,000
Permitting and Mitigation					$	2,000
Interest During Construction	12 months				$	97,000
TOTAL COST					**$**	**3,630,000**
ANNUAL COSTS						
Debt Service (3.5% for 20 years)					$	255,000
Electricity ($0.08 kWh)					$	6,000
Operation & Maintenance					$	45,000
Total Annual Costs					**$**	**306,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	1,224
Per 1,000 Gallons					$	3.76
UNIT COSTS (After Amortization)						
Per Acre-Foot					$	204
Per 1,000 Gallons					$	0.63

WUGNAME:	Pecos County WCID #1				
STRATEGY:	Transmission Pipeline Replacement				
AMOUNT (ac-ft/yr):	750				
CONSTRUCTION COSTS					
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pipeline Replacement	18 in.	105,600	LF	$ 153	$ 16,113,000
Engineering and Contingencies (30%)					$ 4,834,000
Subtotal Pipeline					$ 20,947,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Stations	165 HP	2	EA	$ 1,172,100	$ 2,344,000
Storage tank	0.07 MG	1	EA	$ 856,815	$ 857,000
Power Connection		2	LS	$ 50,000	$ 100,000
Engineering and Contingencies (35%)					$ 1,155,000
Subtotal of Pump Station(s)					$ 4,456,000
CONSTRUCTION TOTAL					$ 25,403,000
Interest During Construction	12 months				$ 699,000
TOTAL COST					**$ 26,102,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 1,837,000
Electricity ($0.08 kWh)					$ 18,000
Operation & Maintenance					$ 220,000
Total Annual Costs					**$ 2,075,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 2,767
Per 1,000 Gallons					$ 8.49
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 317
Per 1,000 Gallons					$ 0.97

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Reeves County Mining - Develop Additional Groundwater (Pecos Valley Alluvium)

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$12,439,000
TOTAL COST OF FACILITIES	**$12,439,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$4,354,000
Environmental & Archaeology Studies and Mitigation	$162,000
Land Acquisition and Surveying (38 acres)	$42,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$468,000
TOTAL COST OF PROJECT	**$17,465,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,229,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$124,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treamtent Facility	$0
Pumping Energy Costs (5528792 kW-hr @ 0.08 $/kW-hr)	$442,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,795,000**
Available Project Yield (acft/yr)	10,400
Annual Cost of Water ($ per acft), based on PF=1	$173
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$54
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.53
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.17

HK *9/23/2019*

WUGNAME:	Bronte, Ballinger, Winters, and Robert Lee				
STRATEGY:	Regional System from Fort Phantom Hill to Runnels and Coke Counties				
AMOUNT (ac-ft/yr):	Winters	175			
	Ballinger	500			
	Bronte	350			
	Robert Lee	130			
	Total	1,155			

CONSTRUCTION COSTS

Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	12 in	237,600	LF	$ 96	$ 22,805,000
Transmission pipeline	10 in	105,600	LF	$ 76	$ 7,996,000
Transmission pipeline	8 in	79,200	LF	$ 55	$ 4,393,000
Right-of-way easements		158	AC	$ 1,266	$ 199,000
Engineering and Contingencies (30%)					$ 10,558,200
Subtotal Pipeline					$ 45,951,200

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Intake Pump Station	875 HP	1	EA	$ 17,053,700	$ 17,054,000
Pump Stations	875 HP	3	EA	$ 5,361,700	$ 16,085,000
Pump Stations	90 HP	2	EA	$ 960,400	$ 1,921,000
Storage tank	1 MGD	6	EA	$ 1,296,813	$ 7,781,000
Power Connection		1	LS	$ 552,000	$ 552,000
Engineering and Contingencies (35%)					$ 9,219,000
Subtotal of Pump Station(s)					$ 52,612,000

CONSTRUCTION TOTAL		$ 98,563,000
Permitting and Mitigation		$ 2,000,000
Interest During Construction	12 months	$ 2,765,000
TOTAL COST		**$ 103,328,000**
ANNUAL COSTS		
Debt Service (3.5% for 20 years)		$ 7,270,000
Electricity ($0.08 kWh)		$ 209,000
Operation & Maintenance		$ 1,306,000
Total Annual Costs		**$ 8,785,000**
UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water		$ 7,606
Per 1,000 Gallons		$ 23.34
UNIT COSTS (After Amortization)		
Per Acre-Foot		$ 1,312
Per 1,000 Gallons		$ 4.03

WUGNAME:	Bronte, Ballinger, Winters, and Robert Lee				
STRATEGY:	Lake Brownwood to Runnels and Coke Counties				
AMOUNT (ac-ft/yr):	Winters	729			
	Ballinger	1345			
	Bronte	280			
	Robert Lee	448			
	Total	2,802			
CONSTRUCTION COSTS					
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	20 in.	230,936	LF	$ 153	$ 35,238,000
Transmission pipeline	18 in.	93,471	LF	$ 135	$ 12,630,000
Transmission pipeline	12 in.	61,797	LF	$ 83	$ 5,113,000
Transmission pipeline	10 in.	54,357	LF	$ 65	$ 3,548,000
Right-of-way easements		202	AC	$ 1,724	$ 349,000
Engineering and Contingencies (30%)					$ 16,958,700
Subtotal Pipeline					$ 73,836,700
Pump Station	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station at Lake Brownwood	700 HP	1	LS	$ 14,177,100	$ 14,177,000
Booster Station #1	700 HP	1	LS	$ 4,322,000	$ 4,322,000
Storage Tank at Booster Station #1	0.75 MG	1	LS	$ 677,686	$ 677,686
Booster Station #2	700 HP	1	LS	$ 4,322,000	$ 4,322,000
Storage Tank at Booster Station #2	0.75 MG	1	LS	$ 677,686	$ 677,686
Storage Tank at High Point	0.75 MG	1	LS	$ 677,686	$ 677,686
Outlet structure at Valley Creek		1	LS	$ 172,000	$ 172,000
Booster Station #3	400 HP	1	LS	$ 2,509,800	$ 2,509,800
Storage Tank at Booster Station #3	0.50 MG	1	LS	$ 583,324	$ 583,324
Engineering and Contingencies (35%)					$ 9,841,713
Subtotal of Pump Station(s)					$ 37,960,894
CONSTRUCTION TOTAL					$ 111,798,000
Permitting and Mitigation					$ 555,000
Interest During Construction	12 months				$ 3,090,000
TOTAL COST					**$ 115,443,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 8,123,000
Electricity ($0.08 kWh)					$ 221,333
Operation & Maintenance					$ 1,226,000
Raw Water Purchase					$ 1,370,000
Total Annual Costs					**$ 10,940,333**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 3,904
Per 1,000 Gallons					$ 11.98
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 1,005
Per 1,000 Gallons					$ 3.09

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Robert Lee - Develop Edwards-Trinity-Plateua Supplies in Nolan Co.

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (6 in dia., 15.1 miles)	$2,181,000
Well Fields (Wells, Pumps, and Piping)	$555,000
TOTAL COST OF FACILITIES	**$2,736,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$849,000
Environmental & Archaeology Studies and Mitigation	$392,000
Land Acquisition and Surveying (40 acres)	$65,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$112,000
TOTAL COST OF PROJECT	**$4,154,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$292,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$27,000
Pumping Energy Costs (39439 kW-hr @ 0.08 $/kW-hr)	$3,000
TOTAL ANNUAL COST	**$322,000**
Available Project Yield (acft/yr)	75
Annual Cost of Water ($ per acft), based on PF=2	$4,293
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$400
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$13.17
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.23

HK *8/13/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Robert Lee - Develop Edwards Trinity Plateau Aquifer Supplies in Tom Green County

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (6 in dia., 15 miles)	$2,008,000
Primary Pump Stations (0.3 MGD)	$892,000
Well Fields (Wells, Pumps, and Piping)	$370,000
TOTAL COST OF FACILITIES	**$4,967,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$1,638,000
Environmental & Archaeology Studies and Mitigation	$394,000
Land Acquisition and Surveying (48 acres)	$78,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$195,000
TOTAL COST OF PROJECT	**$7,272,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$512,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$32,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$45,000
Pumping Energy Costs (146536 kW-hr @ 0.08 $/kW-hr)	$12,000
TOTAL ANNUAL COST	**$601,000**
Available Project Yield (acft/yr)	160
Annual Cost of Water ($ per acft), based on PF=2	$3,756
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$556
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$11.53
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.71

HK *9/20/2019*

WUGNAME:	Robert Lee				
STRATEGY:	Repair and Expand Water Treatment Plant				
AMOUNT (ac-ft/yr):	335				
CONSTRUCTION COSTS					
Infrastructure Improvemens	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water Treatment Plant	0.6 MGD	1	LS	$ 4,247,000	$ 4,247,000
Additional Storage	0.1 MG	1	LS	$ 432,000	$ 432,000
Other Improvements		1	LS	$ 100,000	$ 100,000
Engineering and Contingencies (35%)					$ 1,673,000
Subtotal Infrastructure Improvements					$ 6,452,000
CONSTRUCTION TOTAL					$ 6,452,000
Interest During Construction	6 months				$ 89,000
TOTAL COST					**$ 6,541,000**
ANNUAL COSTS*					
Debt Service (3.5% for 20 years)*					$ 460,000
Operation & Maintenance					$ 430,000
Total Annual Costs					**$ 890,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 2,657
Per 1,000 Gallons					$ 8.15
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 1,284
Per 1,000 Gallons					$ 3.94

WUGNAME:	San Angelo				
STRATEGY:	Concho River Water Project				
AMOUNT (ac-ft/yr):	8,400				
CONSTRUCTION COSTS					
Water Reclamation Facility	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water Reclamation Facility Improvements	12 MGD	1	LS	$22,800,000	$22,800,000
Subtotal of Water Reclamation Facility					$22,800,000
Water Treatment Plant	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water Treatment Plant Improvements	7.5 MGD	1	LS	$28,082,000	$28,082,000
Subtotal of Water Treatment Plant					$28,082,000
Conveyance Infrastructure	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Discharge Pipeline from Water Reclamation Facility to Concho River	36 in	6,865	LF	$286	$1,960,000
Concho River Intake	7.5 MGD	1	LS	$300,000	$300,000
Transfer Pump Station to Water Treatment Plant	585 HP	1	LS	$2,500,000	$2,500,000
Pipeline to Water Treatment Plant	30 in	86,590	LF	$250	$21,642,000
Subtotal of Conveyance Infrastructure					$26,402,000
Subtotal					$ 77,284,000
Contingency (30%)					$ 23,185,000
CONSTRUCTION TOTAL					$ 100,469,000
Engineering (15%)					$ 15,070,000
Permitting and Mitigation (1%)					$ 1,000,000
Land Acquisition and Survey - 40 ft Pipeline Easements					$ 322,000
TOTAL COST					**$ 116,861,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 8,220,000
Operation & Maintenance					$ 2,261,000
Total Annual Costs					**$ 10,481,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,250
Per 1,000 Gallons					$ 3.84
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 269
Per 1,000 Gallons					$ 0.83

WUGNAME:	San Angelo				
STRATEGY:	Desalination of Brackish Groundwater				
AMOUNT (ac-ft/yr):	11,200				
CONSTRUCTION COSTS					
Treatment Facilities	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
RO Treatment	10 MG	1	LS	$ 33,804,663	$ 33,805,000
Engineering and Contingencies (35%)					$ 11,832,000
Subtotal of Treatment					$ 45,637,000
Reject Facilities	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Disposal wells	1000 gpm	5	LS	$ 3,133,656	$ 15,668,000
Engineering and Contingencies (35%)					$ 5,484,000
Subtotal of Reject Facilities					$ 21,152,000
CONSTRUCTION TOTAL					$ 66,789,000
Permitting and Mitigation					$ 234,000
Interest During Construction	24 mos.				$ 3,686,000
TOTAL COST					**$ 70,709,000**
ANNUAL COSTS*					
Debt Service (3.5% for 20 years)					$ 4,975,000
Operation & Maintenance					$ 6,918,000
Total Annual Costs					**$ 11,893,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,062
Per 1,000 Gallons					$ 3.26
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 618
Per 1,000 Gallons					$ 1.90

WUGNAME:	San Angelo
STRATEGY:	Development of Edwards-Trinity Aquifer supplies in Schleicher County
AMOUNT (ac-ft/yr):	4,500

CONSTRUCTION COSTS

Well Field Facilities	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Groundwater Wells	250 gpm	18	EA	$ 315,000	$ 5,670,000
Well Field Piping	6 in	38,000	LF	$ 60	$ 2,280,000
Well Field Piping	8 in	1,000	LF	$ 80	$ 80,000
Well Field Piping	10 in	3,780	LF	$ 100	$ 378,000
Well Field Piping	14 in	1,500	LF	$ 140	$ 210,000
Well Field Piping	16 in	3,780	LF	$ 160	$ 605,000
Well Field Piping	20 in	1,500	LF	$ 200	$ 300,000
Well Field Storage Tank	0.25 MGD	1	EA	$ 250,000	$ 250,000
Site Roadways/Improvements					$ 1,239,000
Fencing/SCADA/Electrical					$ 2,196,000
Subtotal Well Field Facilities					$ 13,208,000

Conveyance Infrastructure to Water Treatment Plant	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	20 in	295,680	LF	$ 139	$ 40,952,000
Pump Station	175 HP	1	LS	$ 1,750,000	$ 1,750,000
Subtotal Conveyance Infrastucture					$ 42,702,000

Subtotal	$ 55,910,000
Contingency (30%)	$ 16,770,000
CONSTRUCTION TOTAL	$ 72,680,000
Land Acquisition and Surveying - Fees and 40 ft Pipeline Easements (4,480 Acres)	$ 17,819,000
Engineering (15%)	$ 10,900,000
Permitting and Mitigation (1%)	$ 730,000
TOTAL COST	**$ 102,100,000**
ANNUAL COSTS	
Debt Service (3.5% for 20 years)	$ 7,180,000
Operation & Maintenance	$ 941,000
Total Annual Costs	**$ 8,121,000**
UNIT COSTS (Until Amortized)	
Per Acre-Foot of treated water	$ 1,800
Per 1,000 Gallons	$ 5.52
UNIT COSTS (After Amortization)	
Per Acre-Foot	$ 209
Per 1,000 Gallons	$ 0.64

WUGNAME:	San Angelo				
STRATEGY:	Hickory Well Field Expansion in McCulloch County				
AMOUNT (ac-ft/yr):	3,040				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Aquifer Development (Wells)	500 gpm	5	EA	$ 3,173,600	$ 15,868,000
Production, Transmission, and Piping (includes Booster Pump Station Upgrades)					$ 7,420,000
Subtotal Well Field					$ 23,288,000
Water Treatment					
Groundwater Treatment Plant Expansion	4 MGD	1	LS	$ 9,808,000	$ 9,808,000
Clearwells		1	EA	$ 7,524,000	$ 7,524,000
Subtotal of Treatment					$ 17,332,000
CONSTRUCTION TOTAL					**$ 40,620,000**
Engineering Fees					$ 3,205,000
Special Services					$ 1,673,000
Fiscal Services					$ 1,765,000
Contingency					$ 8,228,000
TOTAL COST					**$ 55,491,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 3,904,000
Operation & Maintenance					$ 3,153,000
Total Annual Costs					**$ 7,057,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 2,321
Per 1,000 Gallons					$ 7.12
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 1,037
Per 1,000 Gallons					$ 3.18

WUGNAME:	San Angelo				
STRATEGY:	Development of Pecos Valley - Edwards Trinity Plateau Aquifer supplies in Pecos County				
STRATEGY NUMBER:					
AMOUNT (ac-ft/yr):	10,800				
CONSTRUCTION COSTS					
Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Groundwater rights lease		1,260	AC	$ 500	$ 630,000
Water wells	1000 gpm	15	EA	$ 564,351	$ 8,465,000
Well field piping	12 in	33,000	LF	$ 68	$ 2,253,000
Well Field Storage Tank	0.5 MG	1	EA	$ 1,077,270	$ 1,077,000
Engineering and contingencies (35%)					$ 4,349,000
Subtotal Well Field					$ 16,774,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	30 in.	982,080	LF	$ 197	$ 193,360,000
Right-of-way easements		451	AC	$ 1,545	$ 697,000
Engineering and Contingencies (30%)					$ 58,008,000
Subtotal Pipeline					$ 252,065,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	1070 HP	4	EA	$ 6,492,800	$ 25,971,000
Storage tank	1.0 MG	3	EA	$ 1,296,813	$ 3,890,000
Power Connection		4	LS	$ 642,000	$ 642,000
Engineering and Contingencies (35%)					$ 10,451,000
Subtotal of Pump Station(s)					$ 40,954,000
CONSTRUCTION TOTAL					$ 309,793,000
Permitting and Mitigation					$ 4,806,000
Interest During Construction	18 months				$ 12,977,000
TOTAL COST					**$ 327,576,000**
ANNUAL COSTS					
Debt Service (3.5% for 20 years)					$ 23,049,000
Electricity ($0.08 kWh)					$ 1,945,000
Operation & Maintenance					$ 3,129,000
Total Annual Costs					**$ 28,123,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 2,604
Per 1,000 Gallons					$ 7.99
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 470
Per 1,000 Gallons					$ 1.44

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Scurry County Manufacturing - Develop Other Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$472,000
TOTAL COST OF FACILITIES	**$472,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$165,000
Environmental & Archaeology Studies and Mitigation	$15,000
Land Acquisition and Surveying (3 acres)	$6,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$19,000
TOTAL COST OF PROJECT	**$677,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$48,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,000
Pumping Energy Costs (48576 kW-hr @ 0.08 $/kW-hr)	$4,000
TOTAL ANNUAL COST	**$57,000**
Available Project Yield (acft/yr)	160
Annual Cost of Water ($ per acft), based on PF=1	$356
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$56
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$1.09
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.17

HK *9/24/2019*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Sonora - Develop Additional Edwards-Trinity-Plateau Aquifer Supplies

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$310,000
TOTAL COST OF FACILITIES	**$310,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$108,000
Environmental & Archaeology Studies and Mitigation	$5,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$12,000
TOTAL COST OF PROJECT	**$437,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$31,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,000
Pumping Energy Costs (17520 kW-hr @ 0.08 $/kW-hr)	$1,000
TOTAL ANNUAL COST	**$35,000**
Available Project Yield (acft/yr)	35
Annual Cost of Water ($ per acft), based on PF=1	$1,000
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$114
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$3.07
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.35

HK *1/10/2020*

Cost Estimate Summary
Water Supply Project Option
September 2018 Prices
Texland Great Plains - Develop Ogallala Aquifer Supplies from Andrews or Gaines County

Cost based on ENR CCI 11170.28 for September 2018 and a PPI of 201.9 for September 2018

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$267,000
TOTAL COST OF FACILITIES	**$267,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$93,000
Environmental & Archaeology Studies and Mitigation	$8,000
Land Acquisition and Surveying (1 acres)	$1,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$11,000
TOTAL COST OF PROJECT	**$380,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$27,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,000
Pumping Energy Costs (96248 kW-hr @ 0.08 $/kW-hr)	$8,000
TOTAL ANNUAL COST	**$38,000**
Available Project Yield (acft/yr)	200
Annual Cost of Water ($ per acft), based on PF=1	$190
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$55
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.58
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.17

HK *8/12/2019*

WUGNAME:	Winters						
STRATEGY:	Purchase from Provider						
AMOUNT (ac-ft/yr):	220						
CONSTRUCTION COSTS							
Transmission Pipeline							
Pipeline	6 in.	21,120	LF	$	30	$	641,000
Right of Way Easements		10	AC	$	1,544	$	15,000
Engineering and contingencies (30%)						$	192,000
Transmission Subtotal						$	848,000
CONSTRUCTION TOTAL						$	848,000
Permitting and Mitigation						$	100,000
Interest During Construction	12 months					$	26,000
TOTAL COST						**$**	**974,000**
ANNUAL COSTS							
Debt Service (3.5% for 20 years)						$	69,000
Electricity ($0.08 kWh)						$	-
Operation & Maintenance						$	6,000
Purchase Water Cost						$	72,000
Total Annual Costs						**$**	**147,000**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	668
Per 1,000 Gallons						$	2.05
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	355
Per 1,000 Gallons						$	1.09

APPENDIX E
STRATEGY EVALUATION MATRIX AND QUANTIFIED ENVIRONMENTAL IMPACT MATRIX

INTRODUCTION

In accordance with TWDB rules and guidelines, the Region F Water Planning Group has adopted a standard procedure for ranking potential water management strategies. This procedure classifies the strategies using the TWDB's standard categories developed for regional water planning.

The strategies are ranked based upon the following categories;

- Quantity
- Reliability
- Cost
- Environmental Factors
- Agricultural Resources/Rural Areas
- Other Natural Resources
- Key Water Quality Parameters
- Third Party Social & Economic Factors

Each category is quantitatively assessed and assigned a ranking from 1 to 5. With the exception of the Environmental Factors category, **Table E-1** shows the correlation between the category and the ranking. The Environmental Factors score is taken directly from the Environmental Matrix where the environmental ramifications are evaluated in more detail.

Table E-1
Evaluation Matrix Category Ranking Correlation

Rank	Quantity	Cost per Ac-Ft	Reliability	Remaining Strategy Impacts
1	Meets 0-25% Shortage	>$5,000	Low	High
2	Meets 25-50% Shortage	$1,000-$5,000	Low to Medium	Medium
3	Meets 50-75% of Shortage	$500-$1,000	Medium	Low
4	Meets 75-100% of Shortage	$0-$500	Medium to High	None
5	Exceeds Shortage	No Cost	High	Positive Impact

Environmental/Agricultural Matrix

The Environmental/Agricultural Matrix is used to quantify the impacts and determine the score of the 'Environmental Factors' and 'Agricultural Resources' categories on the Evaluation Matrix.

The Environmental Matrix takes into consideration the following categories;

- Total Acres Impacted
- Total Wetland Acres Impacted
- Environmental Water Needs
- Habitat

- Threatened and Endangered Species
- Cultural Resources
- Bays & Estuaries
- Environmental Water Quality
- Agricultural Impacts (temporary and permanent)

Each category is quantitatively assessed and assigned a ranking from 1 to 5. The Overall Environmental Impacts column averages all of the rankings assigned to the strategy. This value is also illustrated in the Evaluation Matrix as the Environmental Factors rank. A single rank is assigned for agricultural impacts based on the quantified permanent impacts. **Table E-2** shows the correlation between the rank assigned within each category.

Table E-2
Environmental Matrix Category Ranking Correlation

Rank	Acres Impacted	Threatened and Endangered Species	Agricultural Impacts	All Remaining Categories
1	Greater than 500 Acres and/or Wetlands	Greater than 20	Greater than 2,000 acres	High Impact
2	100-500 Acres	Between 15-20	Between 50 and 2,000 acres	Medium Impact
3	50-100 Acres	Between 10-15 or 'varies'	Between 6 and 50 acres	Low Impact
4	0-50 Acres	Between 5-10	Between 0 and 5 acres	No Impact or n/a
5	None	Between 0-5 (or n/a)	Provides water to agriculture or rural	Positive

Acres Impacted

Acres Impacted refers to the total amount of area that will be impacted due to the implementation of a strategy.

Suggested land area values from the TWDB Unified Costing Model (UCM) were used for strategies that utilized the model for cost estimates. Otherwise, the following conservative assumptions were made (unless more detailed information was available);

- Each well will impact approximately 1 acre of land
- The acres impacted for pipelines is equivalent to the right of way easements required
- Reservoirs will impact an area equal to their surface area
- A conventional water treatment plant will impact 5 acres
- Pump stations will impact approximately 5 acres
- Water storage tanks will impact approximately 2 acres
- Conservation, Precipitation Enhancement and Subordination strategies will have no impact on acres

Wetland Acres

Wetland Acres refers to how many acres that are classified as wetlands are impacted by implementation of the strategy. There were no surface water strategies in Region F during this round of planning, so it was assumed that there were no impacts on wetlands.

Environmental Water Needs

Environmental Water Needs refers to how the strategy will impact the area's overall environmental water needs. Water is vital to the environmental health of a region, and so it is important to consider how strategies will impact the amount of water that will be available to the environment.

The following conservative assumptions were made (unless more detailed information was available);

- The majority of the strategies will have a low impact on environmental water needs
- Subordination strategies will have a low impact because subordination assumes that downstream senior water rights do not make priority calls on major Region F municipal water rights. This means that the water will be used upstream and will decrease the amount of water that is available to the environment downstream. However, this is the current operation of the basin, so there are no changes to the current stream environment. Subordination would improve the environmental habitats in the lakes in the upper Colorado River Basin if the basin was operated in priority order.
- Reuse will also have a medium impact if the effluent was previously used for irrigation or discharged back into the water system. This will decrease the overall amount of water that is available to the environment by diverting the effluent and using it for another purpose
- Weather Modification and Brush Control will have a positive impact on newly treated areas because both of these strategies increase the amount of water available to the environment. For areas that already employ Weather Modification and/or Brush Control, there should be minimal changes to the environmental water needs. For these areas, impacts are listed as low.

Habitat

Habitat refers to how the strategy will impact the habitat of the local area. The more area that is impacted due to the implementation of the strategy, the more the area's habitat will be disrupted.

The following conservative assumptions were made (unless more detailed information was available);

- Strategies with less than 100 acres impacted will have a low impact
- Strategies above 100 acres impacted will have a medium impact

Threatened and Endangered Species

Threatened and endangered species refers to how the strategy will impact those species in the area once implemented.

The following conservative assumptions were made (unless more detailed information was available);

- Only applicable to strategies implementing infrastructure
- Rankings were based on the amount of threatened and endangered species located within the county. This amount was found using the Texas Parks and Wildlife Database located at http://tpwd.texas.gov/gis/rtest/ and the U.S. Fish and Wildlife Service Database located at http://www.fws.gov/endangered/ .

- This ranking only includes threatened and endangered species as defined in the TWDB guidelines and does not include species without official protection such as those proposed for listing or species that are considered rare or otherwise of special concern.

Agricultural Resources

Impacts to Agricultural Resources is quantified based on the permanent impacts to water supplies to irrigation users or direct impacts to irrigated acreage. Projects with only temporary impacts, such as pipeline projects, would be classified as low impacts. Specific assumptions include:

- If the location of the strategy is known and data is available, actual impacts to agricultural lands will be used.
- If a strategy is located in a rural area of a county with significant irrigation use (>10,000 irrigated acres), it is assumed that the strategy could potentially impact agricultural lands. Since most projects will avoid direct impacts to agricultural lands, the quantity of impacts is estimated to be no more than 10% of the total area for the strategy.
- If a strategy impacts more than 2,000 acres of agricultural land, the impacts are classified as "high". If a strategy impacts between 5 and 50 acres of agricultural lands, the impacts are classified as "low". If the strategy impacts less than 5 acres, it was assumed to negligible.
- If a strategy will reduce the available water to an irrigation user (by county) by the greater of 10% current irrigation use or 5,000 ac-ft/yr, the strategy is determined to have "high" impacts. If a strategy will reduce the available water to an irrigation user (by county) by 1% of current irrigation use or 500 ac-ft/yr, the strategy is determined to have "low" impacts.
- If the entity already holds water rights for the strategy, the impacts would be "none".
- If the strategy does not impact any agricultural or rural user, "none" is selected.
- For strategies that provide water to agricultural and rural users, the strategy is rated as "positive impacts."

Cultural Resources

Cultural Resources refers to how the strategy will impact cultural resources located within the area. Cultural resources are defined as the collective evidence of the past activities and accomplishments of people. Locations, buildings and features with scientific, cultural or historic value are considered to be cultural resources.

The following conservative assumptions were made (unless more detailed information was available);

- Only applicable to strategies implementing infrastructure.
- All transmission and groundwater strategies will have a low impact on cultural resources because these strategies can be located to avoid areas of known cultural resources.
- Treatment strategies will be evaluated on an individual basis, considering location.

Bays and Estuaries

Region F is located too far away from and bays or estuaries to have a quantifiable impact. Therefore, this category was assumed to be non-applicable for every strategy.

Environmental Water Quality

Environmental Water Quality refers to the impact that the implementation of the strategy will have on the area's applicable water quality. Most strategies were assumed to have a low impact on water quality. Strategies that include conservation, weather modification, and aquifer storage and recovery, were scored as having no impact on water quality.

Entity	Entity County	Project County	Basin	Strategy	Environmental Factors														
					Acres Impacted	Wetland Acres	Acres Impacted Score	Envir Water Needs	Envir Water Needs Score	Habitat	Habitat Score	Threat and Endanger Species	Threat and Endanger Species Score	Cultural Resources	Cultural Resources Score	Bays & Estuaries	Bays & Estuaries Score	Envir Water Quality	Overall Environmental Impacts
Andrews	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	66	N/A	3	Low	3	Low	3	8	4	Low	3	None	5	3	3
Andrews	Andrews	Andrews	Colorado	Develop Ogallala Aquifer Supplies	35	N/A	4	Low	3	Low	3	8	4	Low	3	None	5	3	4
Andrews	Andrews	Andrews	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other	Andrews	Andrews	Colorado, Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	3	N/A	4	Low	3	Low	3	8	4	Low	3	None	5	3	4
County-Other	Andrews	Andrews	Colorado, Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Andrews	Andrews	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Livestock	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	2	N/A	4	Low	3	Low	3	8	4	Low	3	None	5	3	4
Manufacturing	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	3	N/A	4	Low	3	Low	3	8	4	Low	3	None	5	3	4
Mining	Andrews	Andrews	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Great Plains	Andrews, Gaines	Andrews, Gaines	Colorado, Rio Grande	Develop Ogallala Aquifer Supplies	1	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
Irrigation	Borden	Borden	Brazos	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Borden	Borden	Brazos	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Bangs	Brown	Brown	Colorado	Direct Reuse	5	N/A	4	Low	3	Low	3	14	3	Low	3	None	5	3	3
Bangs	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
BCWID #1	Brown	Brown	Colorado	Brush Control	958	N/A	1	Low	3	Medium	2	14	3	Low	3	None	5	3	3
BCWID #1	Brown	Brown	Colorado	Develop Groundwater Supplies in Brown County	6	N/A	4	Low	3	Low	3	14	3	Low	3	None	5	3	3
BCWID #1	Brown	Brown	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Brookesmith SUD	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Brookesmith SUD	Brown	Brown	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Brownwood	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Early	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Brown	Brown	Colorado, Brazos	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Brown	Brown	Colorado	Develop Cross Timbers Aquifer Supplies	21	N/A	4	Low	3	Low	3	14	3	Low	3	None	5	3	3
Mining	Brown	Brown	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Zephyr WSC	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Zephyr WSC	Brown	Brown	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Bronte	Coke	Runnels	Colorado	Develop Other Aquifer Supplies in Runnels County	30	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
Bronte	Coke	Coke	Colorado	Develop Other Aquifer Supplies in Southwest Coke County	88	N/A	3	Low	3	Low	3	13	3	Low	3	None	5	3	3
Bronte	Coke	Coke	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Bronte	Coke	Coke	Colorado	Rehabilitate Oak Creek Pipeline	7	N/A	4	Low	3	Low	3	N/A	5	Low	3	None	5	3	4
Bronte	Coke	Coke	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Bronte	Coke	Coke	Colorado	Water Treatment Plant Expansion	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Coke	Coke	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Coke	Coke	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Oak Creek (non-allocated)	Coke	Coke	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Robert Lee	Coke	Nolan	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in	40	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
Robert Lee	Coke	Tom Green	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in	42	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
Robert Lee	Coke	Coke	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Robert Lee	Coke	Coke	Colorado	Purchase from Provider (Bronte)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Robert Lee	Coke	Coke	Colorado	Repair and Expand Water Treatment Plant	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Robert Lee	Coke	Coke	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Bronte, Ballinger, Winters, Robert Lee	Coke, Runnels	Coke, Runnels	Colorado	Regional System from Lake Brownwood	230	N/A	2	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
Bronte, Ballinger, Winters, Robert Lee	Coke, Runnels	Coke, Runnels	Colorado	Regional System from Lake Fort Phantom Hill	200	N/A	2	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
Coleman	Coleman	Coleman	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Coleman	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Coleman	Coleman	Coleman	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Coleman County SUD	Coleman	Coleman	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Coleman County SUD	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
County-Other	Coleman	Coleman	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Coleman	Coleman	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Manufacturing	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Millersview-Doole WSC	Coleman	Coleman	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Coleman	Coleman	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Santa Anna	Coleman	Coleman	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other	Concho	Concho	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Eden	Concho	Concho	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Concho	Concho	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Millersview-Doole WSC	Concho	Concho	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Millersview-Doole WSC	Concho	Concho	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Mining	Concho	Concho	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Crane	Crane	Crane	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Crane	Crane	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Crockett County WCID 1	Crockett	Crockett	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Crockett	Crockett	Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Crockett	Crockett	Rio Grande	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Crockett	Crockett	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other (Future Sales)	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Ector County Utility District	Ector	Ector	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Ector County Utility District	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Ector	Ector	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Ector	Ector	Colorado, Rio Grande	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Manufacturing	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Mining	Ector	Ector	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Odessa	Ector	Ector	Colorado	Develop Capitan Reef Complex Aquifer Supplies in Ward County	27	N/A	4	Low	3	Low	3	7	4	Low	3	None	5	3	4
Odessa	Ector	Ector	Colorado	Develop Pecos Valley/Edwards-Trinity and Capitan Reef Complex in Pecos County	328	N/A	2	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
Odessa	Ector	Ector	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Odessa	Ector	Ector	Colorado	RO Treatment of Existing Supplies	14	N/A	4	Low	3	Low	3	7	4	Low	3	None	5	3	4

					Environmental Factors														
Entity	Entity County	Project County	Basin	Strategy	Acres Impacted	Wetland Acres	Acres Impacted Score	Envir Water Needs	Envir Water Needs Score	Habitat	Habitat Score	Threat and Endanger Species	Threat and Endanger Species Score	Cultural Resources	Cultural Resources Score	Bays & Estuaries	Bays & Estuaries Score	Envir Water Quality	Overall Environmental Impacts
Odessa	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Odessa (Future Sales)	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Steam Electric Power	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Purchase from Provider (Midland FWSD)	8	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Purchase from Provider (Odessa)	27	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
Rotan	Fisher	Fisher	Brazos	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Glasscock	Glasscock	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Glasscock	Glasscock	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Big Spring	Howard	Howard	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Big Spring	Howard	Howard	Colorado	New Water Treatment Plant	10	N/A	4	Low	3	Low	3	6	4	Low	3	None	5	3	4
Big Spring	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Coahoma	Howard	Howard	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Coahoma	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Howard	Howard	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Manufacturing	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Manufacturing (Future Sales)	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Mining	Howard	Howard	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Steam Electric Power	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Irion	Irion	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Irion	Irion	Colorado	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mertzon	Irion	Irion	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Irion	Irion	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Kimble	Kimble	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Junction	Kimble	Kimble	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	17	N/A	4	Low	3	Low	3	15	3	Low	3	None	5	3	3
Junction	Kimble	Kimble	Colorado	Dredging River Intake	15	N/A	4	Low	3	Low	3	15	3	Low	3	None	5	3	3
Junction	Kimble	Kimble	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Junction	Kimble	Kimble	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Manufacturing	Kimble	Kimble	Colorado	Develop Ellenburger San Saba Aquifer Supplies	7	N/A	4	Low	3	Low	3	15	3	Low	3	None	5	3	3
Manufacturing	Kimble	Kimble	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Mining	Kimble	Kimble	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Loving	Loving	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Martin	Martin	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Martin	Martin	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Stanton	Martin	Martin	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Stanton	Martin	Martin	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Mason	Mason	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mason	Mason	Mason	Colorado	Additional Treatment	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Mason	Mason	Mason	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Mason	Mason	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Brady	McCulloch	McCulloch	Colorado	Advanced Groundwater Treatment	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Brady	McCulloch	McCulloch	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Brady	McCulloch	McCulloch	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Brady Creek (non-allocated)	McCulloch	McCulloch	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Mcculloch	McCulloch	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	McCulloch	McCulloch	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Richland SUD	McCulloch	McCulloch	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Menard	Menard	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Menard	Menard	Menard	Colorado	Develop Hickory Aquifer Supplies	18	N/A	4	Low	3	Low	3	13	3	Low	3	None	5	3	3
Menard	Menard	Menard	Colorado	Direct Non-Potable Reuse	5	N/A	4	Low	3	Low	3	13	3	Low	3	None	5	3	3
Menard	Menard	Menard	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Menard	Menard	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Airline Mobile Home Park	Midland	Midland	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other	Midland	Winkler	Colorado	Develop Pecos Valley Aquifer Supplies from Winkler County	34	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
Greenwood Water	Midland	Midland	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Midland	Midland	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Midland	Midland	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Midland	Midland	Midland	Colorado	Advanced RO Treatment, Expanded Use of Paul Davis	43	N/A	4	Low	3	Low	3	5	5	Low	3	None	5	3	4
Midland	Midland	Midland	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Midland	Midland	Midland	Colorado	Purchase from Provider (CRMWD)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Midland	Midland	Midland	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Mining	Midland	Midland	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Colorado City	Mitchell	Mitchell	Colorado	Develop Dockum Aquifer Supplies	26	N/A	4	Low	3	Low	3	10	4	Low	3	None	5	3	4
Colorado City	Mitchell	Mitchell	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Mitchell	Mitchell	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Lake Colorado City (non-allocated)	Mitchell	Mitchell	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Loraine	Mitchell	Mitchell	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Mitchell	Mitchell	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mitchell County Utility	Mitchell	Mitchell	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Steam Electric Power	Mitchell	Mitchell	Colorado	Indirect Non-Potable Reuse (Sales from Colorado City)	36	N/A	4	Low	3	Low	3	10	4	Low	3	None	5	3	4
Steam Electric Power	Mitchell	Mitchell	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
CRMWD	Multiple	Winkler	Colorado	Develop Additional Groundwater Supplies in Reeves, Pecos, Ward, and Winkler Co.	131	N/A	2	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
CRMWD	Multiple	Winkler	Colorado	Expand Ward County Well Field and Develop Winkler	144	N/A	2	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
CRMWD	Multiple	Multiple	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
CRMWD	Multiple	Ward	Colorado	Ward County Well Field Well Replacement	15	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
CRMWD (non-allocated)	Multiple	Multiple	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
UCRA	Multiple	Multiple	Colorado	Brush Control	1,000	N/A	1	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
Fort Stockton	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Iraan	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4

					Environmental Factors														
Entity	Entity County	Project County	Basin	Strategy	Acres Impacted	Wetland Acres	Acres Impacted Score	Envir Water Needs	Envir Water Needs Score	Habitat	Habitat Score	Threat and Endanger Species	Threat and Endanger Species Score	Cultural Resources	Cultural Resources Score	Bays & Estuaries	Bays & Estuaries Score	Envir Water Quality	Overall Environmental Impacts
Irrigation	Pecos	Pecos	Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Pecos	Pecos	Rio Grande	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Pecos	Pecos	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Pecos County Fresh Water	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Pecos County Mining	Pecos	Pecos	Rio Grande	Develop Additional Pecos Valley Aquifer Supplies	11	N/A	4	Low	3	Low	3	N/A	5	Low	3	None	5	4	4
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Develop Pecos Valley Aquifer Supplies	4	N/A	4	Low	3	Low	3	27	1	Low	3	None	5	3	3
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Replacement of Transmission Pipeline	60	N/A	3	Low	3	Low	3	N/A	5	Low	3	None	5	3	4
Pecos WCID	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Big Lake	Reagan	Reagan	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Reagan	Reagan	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Reagan	Reagan	Colorado	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Reagan	Reagan	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Balmorhea	Reeves	Reeves	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	13	N/A	4	Low	3	Low	3	19	2	Low	3	None	5	3	3
Balmorhea	Reeves	Reeves	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Reeves	Reeves	Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Reeves	Reeves	Rio Grande	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Madera Valley WSC	Reeves	Reeves	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Reeves	Reeves	Rio Grande	Develop Pecos Valley Aquifer Supplies	38	N/A	4	Low	3	Low	3	19	2	Low	3	None	5	3	3
Mining	Reeves	Reeves	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Pecos	Reeves	Reeves	Rio Grande	Advanced Water Treatment Plant	4	N/A	4	Low	3	Low	3	Low (small acreage)	3	Low	3	None	5	3	3
Pecos	Reeves	Reeves	Rio Grande	Direct Non-Potable Reuse	36	N/A	4	Low	3	Low	3	19	2	Low	3	None	5	3	3
Pecos	Reeves	Reeves	Rio Grande	Direct Potable Reuse	18	N/A	4	Low	3	Low	3	19	2	Low	3	None	5	3	3
Pecos	Reeves	Reeves	Rio Grande	Indirect Potable Reuse with Aquifer Storage and	24	N/A	4	Low	3	Low	3	19	2	Low	3	None	5	3	3
Pecos	Reeves	Reeves	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Pecos	Reeves	Reeves	Rio Grande	Partner with Madera Valley WSC, Expand Pecos Valley Aquifer Supplies	41	N/A	4	Low	3	Low	3	19	2	Low	3	None	5	3	3
Ballinger	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Ballinger	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
County-Other	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Runnels	Runnels	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Miles	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Runnels	Runnels	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
North Runnels WSC	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
North Runnels WSC	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Winters	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Winters	Runnels	Runnels	Colorado	Purchase from Provider (Abilene)	10	N/A	4	Low	3	Low	3	14	3	Low	3	None	5	3	3
Winters	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
El Dorado	Schleicher	Schleicher	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Schleicher	Schleicher	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other	Scurry	Scurry	Colorado, Brazos	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
County-Other	Scurry	Scurry	Colorado, Brazos	Purchase from Provider (Snyder)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
County-Other	Scurry	Scurry	Colorado, Brazos	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Scurry	Scurry	Colorado, Brazos	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Manufacturing	Scurry	Scurry	Colorado	Develop Dockum Aquifer Supplies	3	N/A	4	Low	3	Low	3	11	3	Low	3	None	5	3	3
Mining	Scurry	Scurry	Colorado, Brazos	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Snyder	Scurry	Scurry	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Snyder	Scurry	Scurry	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Sterling	Sterling	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Sterling	Sterling	Colorado	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Sterling	Sterling	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Sterling City	Sterling	Sterling	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Sutton	Sutton	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Sutton	Sutton	Colorado, Rio Grande	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Sutton	Sutton	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Sonora	Sutton	Sutton	Rio Grande	Develop Additional Edwards-Trinity Aquifer Supplies	1	N/A	4	Low	3	Low	3	Low (small acreage)	3	Low	3	None	5	3	3
Sonora	Sutton	Sutton	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Sonora	Sutton	Sutton	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Abilene	Taylor, Jones	Taylor, Jones	Colorado, Brazos	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Concho Rural Water	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Concho Rural Water	Tom Green	Tom Green	Colorado	Purchase from Provider (UCRA)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
County-Other	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
DADS Supported Living Center	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Tom Green	Tom Green	Colorado	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Tom Green	Tom Green	Colorado	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Manufacturing	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Mining	Tom Green	Tom Green	Colorado	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
San Angelo	Tom Green	Tom Green	Colorado	Brush Control	586	N/A	1	Low	3	Medium	2	17	2	Low	3	None	5	3	3
San Angelo	Tom Green	Tom Green	Colorado	Desalination of Brackish Groundwater	10	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	3	3
San Angelo	Tom Green	Schleicher	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in	292	N/A	2	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
San Angelo	Tom Green	Tom Green	Colorado	Develop Hickory Aquifer Supplies	5	N/A	4	Low	3	Low	3	N/A	5	Low	3	None	5	3	4
San Angelo	Tom Green	Pecos	Colorado	Develop Pecos Valley/Edwards Trinity in Pecos County	494	N/A	2	Low	3	Medium	2	Varies	3	Low	3	None	5	3	3
San Angelo	Tom Green	Tom Green	Colorado	Indirect Potable Reuse	6	N/A	4	Low	3	Low	3	11	3	Low	3	None	5	3	3
San Angelo	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
San Angelo	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Tom Green County FWSD 3	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Upper Colorado River Authority	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Upton	Upton	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4

Entity	Entity County	Project County	Basin	Strategy	Environmental Factors														
					Acres Impacted	Wetland Acres	Acres Impacted Score	Envir Water Needs	Envir Water Needs Score	Habitat	Habitat Score	Threat and Endanger Species	Threat and Endanger Species Score	Cultural Resources	Cultural Resources Score	Bays & Estuaries	Bays & Estuaries Score	Envir Water Quality	Overall Environmental Impacts
McCamey	Upton	Upton	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Upton	Upton	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Rankin	Upton	Upton	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Barstow	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Grandfalls	Ward	Ward	Rio Grande	Develop Pecos Valley Aquifer Supplies	21	N/A	4	Low	3	Low	3	10	4	Low	3	None	5	3	4
Grandfalls	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Grandfalls	Ward	Ward	Rio Grande	Purchase from Provider (CRMWD)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	3	4
Irrigation	Ward	Ward	Rio Grande	Irrigation Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Irrigation	Ward	Ward	Rio Grande	Weather Modification	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Mining	Ward	Ward	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Monahans	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Southwest Sandhills WSC	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4
Wickett	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	Low	3	Low	3	N/A	5	N/A	4	None	5	4	4

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	Quantity (Ac-Ft/Yr)	Maximum Need	Percentage of Max Need Met	Quantity Score	Reliability	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Andrews	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Alternative	Groundwater Development	2,600	2,800	93%	4	3	$891	3	3	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	The City can pursue this strategy independently but cannot receive state funding to do so due to modeled availability constraints
Andrews	Andrews	Andrews	Colorado	Develop Ogallala Aquifer Supplies	Alternative	Groundwater Development	2,810	2,800	100%	5	3	$496	4	4	4	4	3	5	32	The most significant issue willl be locating areas with sufficient well production	The City can pursue this strategy independently but cannot receive state funding to do so due to modeled availability constraints
Andrews	Andrews	Andrews	Colorado	Municipal Conservation	Recommended	Conservation	150	2,800	5%	1	3	$952	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Andrews	Andrews	Colorado, Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	Alternative	Groundwater Development	250	275	91%	4	3	$252	4	4	4	4	3	5	31	The most significant issue willl be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability constraints
County-Other	Andrews	Andrews	Colorado, Rio Grande	Municipal Conservation	Recommended	Conservation	21	275	8%	1	3	$1,080	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Andrews	Andrews	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	2,037	10,134	20%	1	3	$21	4	4	5	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Livestock	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Alternative	Groundwater Development	60	60	100%	4	3	$433	4	4	4	4	3	5	31	The most significant issue willl be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability constraints
Manufacturing	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Alternative	Groundwater Development	210	209	100%	5	3	$243	4	4	4	4	3	5	32	The most significant issue willl be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled
Mining	Andrews	Andrews	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	277	1,186	23%	1	1	$632	3	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Great Plains*	Andrews, Gaines	Andrews, Gaines	Colorado, Rio Grande	Develop Ogallala Aquifer Supplies	Alternative	Groundwater Development	200	182	110%	5	3	$190	4	3	4	4	3	5	31	The most significant issue willl be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled
Irrigation	Borden	Borden	Brazos	Irrigation Conservation	Recommended	Conservation	295	282	105%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Borden	Borden	Brazos	Mining Conservation (Recycling)	Recommended	Conservation	39	0	101%	5	1	$1,117	2	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Bangs	Brown	Brown	Colorado	Direct Reuse	Recommended	Reuse	25	0	101%	5	5	$1,816	2	3	4	3	4	4	30	Possible public resistance to reuse of water	Adequate monitoring and oversight will be required to protect public health and safety
Bangs	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	8	0	101%	5	3	$1,221	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
BCWID #1	Brown	Brown	Colorado	Brush Control	Recommended	Regional	400	0	101%	5	2	$390	4	3	4	2	3	5	28	Brush control is an on-going process that must be continually maintained in order to receive benefits	No attributed water savings, but it is assumed that surface water supplies gained through subordination will be more reliable
BCWID #1	Brown	Brown	Colorado	Develop Groundwater Supplies in Brown County	Alternative	Groundwater Development	806	0	101%	5	3	$12,553	1	3	4	3	4	5	28	The most significant issue willl be locating areas with sufficient well production and water quality	Additional study will be needed once a more specific location for this strategy has been selected
BCWID #1	Brown	Brown	Colorado	Subordination	Recommended	Subordination	5,570	0	101%	5	3	$0	5	4	4	4	3	5	33		
Brookesmith SUD	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	25	0	101%	5	3	$705	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Brookesmith SUD	Brown	Brown	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	81	0	101%	5	3	$1,509	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Brownwood	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	91	0	101%	5	3	$937	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Early	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	9	0	101%	5	3	$1,176	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Brown	Brown	Colorado, Brazos	Irrigation Conservation	Recommended	Conservation	650	1,713	38%	3	3	$21	4	4	5	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Brown	Brown	Colorado	Develop Cross Timbers Aquifer Supplies	Recommended	Groundwater Development	210	268	78%	4	3	$948	3	3	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	
Mining	Brown	Brown	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	67	268	25%	1	1	$654	3	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Zephyr WSC	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	13	0	101%	5	3	$1,091	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Zephyr WSC	Brown	Brown	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	19	0	101%	5	3	$3,498	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Bronte	Coke	Runnels	Colorado	Develop Other Aquifer Supplies in Runnels County	Alternative	Groundwater Development	75	212	35%	3	3	$2,787	2	3	4	4	3	5	27	The most significant issue willl be locating areas with sufficient well production	
Bronte	Coke	Coke	Colorado	Develop Other Aquifer Supplies in Southwest Coke County	Recommended	Groundwater Development	800	212	377%	5	3	$2,424	2	3	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	
Bronte	Coke	Coke	Colorado	Municipal Conservation	Recommended	Conservation	3	212	1%	1	3	$1,647	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Bronte	Coke	Coke	Colorado	Rehabilitate Oak Creek Pipeline	Recommended	Expanded Use of Supply	450	212	212%	5	5	$1,748	2	4	4	4	4	5	33		

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														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Bronte	Coke	Coke	Colorado	Subordination	Recommended	Subordination	212	212	100%	4	3	$0	5	4	4	4	3	5	32		
Bronte	Coke	Coke	Colorado	Water Treatment Plant Expansion	Recommended	Expanded Use of Supply	800	212	377%	5	3	$1,720	2	4	4	4	4	5	31		
Irrigation	Coke	Coke	Colorado	Irrigation Conservation	Recommended	Conservation	83	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Coke	Coke	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	20	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Oak Creek (non-allocated)	Coke	Coke	Colorado	Subordination	Recommended	Subordination	577	0	101%	5	3	$0	5	4	4	4	3	5	33		
Robert Lee	Coke	Nolan	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Nolan County	Alternative	Groundwater Development	75	237	32%	3	3	$3,756	2	3	4	4	3	5	27	The most significant issue willl be locating areas with sufficient well production	
Robert Lee	Coke	Tom Green	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Tom Green County	Alternative	Groundwater Development	75	237	32%	3	3	$4,293	2	3	4	4	3	5	27	The most significant issue willl be locating areas with sufficient well production	
Robert Lee	Coke	Coke	Colorado	Municipal Conservation	Recommended	Conservation	3	237	1%	1	3	$1,672	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Robert Lee	Coke	Coke	Colorado	Purchase from Provider (Bronte)	Recommended	Purchase from Provider	80	237	34%	3	5	$0	5	4	4	4	3	4	32		
Robert Lee	Coke	Coke	Colorado	Repair and Expand Water Treatment Plant	Alternative	Expanded Use of Supply	335	237	141%	5	5	$2,657	2	4	4	4	TBD	5	29	Financing	1 mgd treatment expansion and new storage tank
Robert Lee	Coke	Coke	Colorado	Subordination	Recommended	Subordination	239	237	101%	5	3	$0	5	4	4	4	3	5	33		
Bronte, Ballinger, Winters, Robert Lee	Coke, Runnels	Coke, Runnels	Colorado	Regional System from Lake Brownwood	Alternative	Regional	2,802	1,058	265%	5	3	$3,904	2	3	4	4	3	3	27	Still would need to reach an agreement with Brownwood and partners.	
Bronte, Ballinger, Winters, Robert Lee	Coke, Runnels	Coke, Runnels	Colorado	Regional System from Lake Fort Phantom Hill	Alternative	Regional	1,155	1,058	109%	5	3	$7,606	1	3	4	4	3	3	26	Still would need to reach an agreement with Brownwood and partners.	
Coleman	Coleman	Coleman	Colorado	Municipal Conservation	Recommended	Conservation	15	821	2%	1	3	$1,065	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coleman	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	1,319	821	161%	5	3	$0	5	4	4	4	3	5	33		
Coleman	Coleman	Coleman	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	59	821	7%	1	3	$1,282	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coleman County SUD	Coleman	Coleman	Colorado	Municipal Conservation	Recommended	Conservation	10	227	4%	1	3	$1,144	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coleman County SUD	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	227	227	100%	4	3	$0	5	4	4	4	3	5	32		
County-Other	Coleman	Coleman	Colorado	Municipal Conservation	Recommended	Conservation	1	24	4%	1	3	$5,095	1	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	24	24	100%	4	3	$0	5	4	4	4	3	5	32		
Irrigation	Coleman	Coleman	Colorado	Irrigation Conservation	Recommended	Conservation	47	396	12%	1	3	$21	4	4	5	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	400	396	101%	5	3	$0	5	4	5	4	3	5	34		
Manufacturing	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	2	2	100%	4	3	$0	5	4	4	4	3	5	32		
Mining	Coleman	Coleman	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	5	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Santa Anna	Coleman	Coleman	Colorado	Municipal Conservation	Recommended	Conservation	4	0	101%	5	3	$1,623	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Concho	Concho	Colorado	Municipal Conservation	Recommended	Conservation	3	0	101%	5	3	$1,836	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Eden	Concho	Concho	Colorado	Municipal Conservation	Recommended	Conservation	4	0	101%	5	3	$1,541	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Concho	Concho	Colorado	Irrigation Conservation	Recommended	Conservation	539	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Concho	Concho	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	20	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Crane	Crane	Crane	Rio Grande	Municipal Conservation	Recommended	Conservation	14	0	101%	5	3	$1,120	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Crane	Crane	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	36	0	101%	5	1	$1,173	2	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Crockett County WCID 1	Crockett	Crockett	Rio Grande	Municipal Conservation	Recommended	Conservation	13	0	101%	5	3	$1,106	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	Quantity (Ac-Ft/Yr)	Maximum Need	Percentage of Max Need Met	Quantity Score	Reliability	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Irrigation	Crockett	Crockett	Rio Grande	Irrigation Conservation	Recommended	Conservation	20	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Crockett	Crockett	Rio Grande	Weather Modification	Recommended	Regional	1	0	101%	5	1	$0.47	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Crockett	Crockett	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	315	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other (Future Sales)	Ector	Ector	Colorado, Rio Grande	Subordination	Recommended	Subordination	2,500	0	101%	5	3	$0	5	4	4	4	3	5	33		
Ector County Utility District	Ector	Ector	Colorado	Municipal Conservation	Recommended	Conservation	149	1,097	14%	1	3	$292	4	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Ector County Utility District	Ector	Ector	Colorado	Subordination	Recommended	Subordination	1,097	1,097	100%	4	3	$0	5	4	4	4	3	5	32		
Irrigation	Ector	Ector	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	113	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Ector	Ector	Colorado, Rio Grande	Subordination	Recommended	Subordination	449	0	101%	5	3	$0	5	4	5	4	3	5	34		
Manufacturing	Ector	Ector	Colorado	Subordination	Recommended	Subordination	551	0	101%	5	3	$0	5	4	4	4	3	5	33		
Mining	Ector	Ector	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	30	0	101%	5	1	$733	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Odessa*	Ector	Ector	Colorado	Develop Capitan Reef Complex Aquifer Supplies in Ward County	Alternative	Groundwater Development	8,400	13,801	61%	3	3	$2,168	2	4	4	4	3	5	28	The most significant issue willl be locating areas with sufficient well production	
Odessa*	Ector	Ector	Colorado	Develop Pecos Valley/Edwards-Trinity and Capitan Reef Complex in Pecos County	Alternative	Expanded Use of Supply	28,000	13,801	203%	5			5	3	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	
Odessa*	Ector	Ector	Colorado	Municipal Conservation	Recommended	Conservation	990	13,801	7%	1	3	$440	4	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Odessa*	Ector	Ector	Colorado	RO Treatment of Existing Supplies	Recommended	Expanded Use of Supply	15,960	13,801	116%	5	N/A	$1,111	2	4	4	3	3	5	26		
Odessa*	Ector	Ector	Colorado	Subordination	Recommended	Subordination	11,493	13,801	83%	4	3	$0	5	4	4	4	3	5	32		
Odessa* (Future Sales)	Ector	Ector	Colorado	Subordination	Recommended	Subordination	3,930	13,801	28%	3	3	$0	5	4	4	4	3	5	31		
Steam Electric Power	Ector	Ector	Colorado	Subordination	Recommended	Subordination	316	316	100%	4	3	$0	5	4	4	4	3	5	32		
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Municipal Conservation	Recommended	Conservation	20	277	7%	1	3	$1,108	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Purchase from Provider (Midland FWSD)	Alternative	Purchase from Provider	445	277	161%	5	5	$2,355	2	3	4	4	3	4	30		
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Purchase from Provider (Odessa)	Recommended	Purchase from Provider	445	277	161%	5	5	$3,730	2	3	4	4	3	4	30		
Rotan	Fisher	Fisher	Colorado	Subordination	Recommended	Subordination	46	0	101%	5	3	$0	5	4	4	4	3	5	33		
Irrigation	Glasscock	Glasscock	Colorado	Irrigation Conservation	Recommended	Conservation	2,050	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Glasscock	Glasscock	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	248	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Big Spring	Howard	Howard	Colorado	Municipal Conservation	Recommended	Conservation	140	1,785	8%	1	3	$557	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Big Spring	Howard	Howard	Colorado	New Water Treatment Plant	Recommended	Expanded Use of Supply	2,420	1,785	136%	5	5	$1,128	2	4	4	4	4	5	33		
Big Spring	Howard	Howard	Colorado	Subordination	Recommended	Subordination	1,785	1,785	100%	4	3	$0	5	4	4	4	3	5	32		
Coahoma	Howard	Howard	Colorado	Municipal Conservation	Recommended	Conservation	8	152	5%	1	3	$1,222	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coahoma	Howard	Howard	Colorado	Subordination	Recommended	Subordination	152	152	100%	4	3	$0	5	4	4	4	3	5	32		
Irrigation	Howard	Howard	Colorado	Irrigation Conservation	Recommended	Conservation	757	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Manufacturing	Howard	Howard	Colorado	Subordination	Recommended	Subordination	424	424	100%	4	3	$0	5	4	4	4	3	5	32		
Manufacturing (Future Sales)	Howard	Howard	Colorado	Subordination	Recommended	Subordination	500	0	101%	5	3	$0	5	4	4	4	3	5	33		
Mining	Howard	Howard	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	143	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

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Steam Electric Power	Howard	Howard	Colorado	Subordination	Recommended	Subordination	59	45	131%	5	3	$0	5	4	4	4	3	5	33		
Irrigation	Irion	Irion	Colorado	Irrigation Conservation	Recommended	Conservation	158	507	31%	3	3	$21	4	4	5	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Irion	Irion	Colorado	Weather Modification	Recommended	Regional	202	507	40%	3	1	$0.21	4	4	5	4	4	5	30	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mertzon	Irion	Irion	Colorado	Municipal Conservation	Recommended	Conservation	3	0	101%	5	3	$1,886	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Irion	Irion	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	322	1,766	18%	1	1	$632	3	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Kimble	Kimble	Colorado	Irrigation Conservation	Recommended	Conservation	319	1,103	29%	3	3	$21	4	4	5	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Junction	Kimble	Kimble	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	370	626	59%	3	3	$822	3	3	4	4	3	5	28	The most significant issue willl be locating areas with sufficient well production	
Junction	Kimble	Kimble	Colorado	Dredging River Intake	Recommended	Expanded Use of Supply	250	626	40%	3	N/A	$2,112	2	3	4	2	2	5	21	This strategy assumes that the dredged material is relatively clean. If contamination is found, the water quality	A suitable location for disposal of the dredged material must be found
Junction	Kimble	Kimble	Colorado	Municipal Conservation	Recommended	Conservation	8	626	1%	1	3	$1,206	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Junction	Kimble	Kimble	Colorado	Subordination	Recommended	Subordination	250	626	40%	3	3	$0	5	4	4	4	3	5	31		
Manufacturing	Kimble	Kimble	Colorado	Develop Ellenburger San Saba Aquifer Supplies	Recommended	Groundwater Development	500	704	71%	3	3	$274	4	4	4	4	3	5	30	The most significant issue willl be locating areas with sufficient well production	
Manufacturing	Kimble	Kimble	Colorado	Subordination	Recommended	Subordination	228	704	32%	3	3	$0	5	4	4	4	3	5	31		
Mining	Kimble	Kimble	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	1	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Loving	Loving	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	525	3,906	13%	1	1	$632	3	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Martin	Martin	Colorado	Irrigation Conservation	Recommended	Conservation	5,474	4,882	112%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Martin	Martin	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	302	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Stanton	Martin	Martin	Colorado	Municipal Conservation	Recommended	Conservation	11	90	12%	1	3	$1,199	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Stanton	Martin	Martin	Colorado	Subordination	Recommended	Subordination	90	90	100%	4	3	$0	5	4	4	4	3	5	32		
Irrigation	Mason	Mason	Colorado	Irrigation Conservation	Recommended	Conservation	745	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mason	Mason	Mason	Colorado	Additional Treatment	Recommended	Expanded Use of Supply	700	700	100%	4	3	$856	3	4	4	5	3	5	31		
Mason	Mason	Mason	Colorado	Municipal Conservation	Recommended	Conservation	7	700	1%	1	3	$1,278	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Mason	Mason	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	43	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Brady	McCulloch	McCulloch	Colorado	Advanced Groundwater Treatment	Recommended	Expanded Use of Supply	1,200	1,420	85%	4	5	$2,069	2	4	4	3	4	4	30	Possible public resistance to reuse of water	Adequate monitoring and oversight will be required to protect public health and safety
Brady	McCulloch	McCulloch	Colorado	Municipal Conservation	Recommended	Conservation	19	1,420	1%	1	3	$988	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Brady	McCulloch	McCulloch	Colorado	Subordination	Recommended	Subordination	841	1,420	59%	3	3	$0	5	4	4	4	3	5	31		
Brady Creek (non-allocated)	McCulloch	McCulloch	Colorado	Subordination	Recommended	Subordination	1,109	0	101%	5	3	$0	5	4	4	4	3	5	33		
Irrigation	Mcculloch	McCulloch	Colorado	Irrigation Conservation	Recommended	Conservation	349	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	McCulloch	McCulloch	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	375	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Richland SUD	McCulloch	McCulloch	Colorado	Municipal Conservation	Recommended	Conservation	3	0	101%	5	3	$1,712	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Menard	Menard	Colorado	Irrigation Conservation	Recommended	Conservation	549	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Menard	Menard	Menard	Colorado	Develop Hickory Aquifer Supplies	Recommended	Groundwater Development	200	211	95%	4	3	$1,320	2	3	4	4	3	5	28	The most significant issue willl be locating areas with sufficient well production	This strategy assumes that the water will meet primary drinking standards once blended with City's existing supply
Menard	Menard	Menard	Colorado	Direct Non-Potable Reuse	Recommended	Reuse	67	211	32%	3	5	$820	3	4	4	3	4	4	30	Possible public resistance to reuse of water	Adequate monitoring and oversight will be required to protect public health and safety

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	Quantity (Ac-Ft/Yr)	Maximum Need	Percentage of Max Need Met	Quantity Score	Reliability	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Menard	Menard	Menard	Colorado	Municipal Conservation	Recommended	Conservation	5	211	2%	1	3	$1,442	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Menard	Menard	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	46	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Airline Mobile Home Park	Midland	Midland	Colorado	Municipal Conservation	Recommended	Conservation	10	0	101%	5	3	$1,263	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Midland	Winkler	Colorado	Develop Pecos Valley Aquifer Supplies from Winkler County	Recommended	Groundwater Development	2,800	0	101%	5	3	$738	3	3	4	4	3	5	30	The most significant issue willl be locating areas with sufficient well production	
Greenwood Water	Midland	Midland	Colorado	Municipal Conservation	Recommended	Conservation	5	0	101%	5	3	$1,716	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Midland	Midland	Colorado	Irrigation Conservation	Recommended	Conservation	2,716	1	271600%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Midland	Midland	Colorado	Subordination	Recommended	Subordination	8	1	800%	5	3	$0	5	4	5	4	3	5	34		
Midland	Midland	Midland	Colorado	Advanced RO Treatment, Expanded Use of Paul Davis Well Field	Recommended	Expanded Use of Supply	6,327	18,663	34%	3	3	$1,656	2	4	4	3	4	4	27		
Midland	Midland	Midland	Colorado	Municipal Conservation	Recommended	Conservation	1,012	18,663	5%	1	3	$436	4	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Midland	Midland	Midland	Colorado	Purchase from Provider (CRMWD)	Alternative	Purchase from Provider	4,000	18,663	21%	1	5	$0	5	4	4	4	3	4	30		
Midland	Midland	Midland	Colorado	Subordination	Recommended	Subordination	2,173	18,663	12%	1	3	$0	5	4	4	4	3	5	29		
Mining	Midland	Midland	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	445	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Colorado City	Mitchell	Mitchell	Colorado	Develop Dockum Aquifer Supplies	Alternative	Groundwater Development	170	183	93%	4	3	$1,824	2	4	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	This is not a recommended strategy due to DFC and MAG limits
Colorado City	Mitchell	Mitchell	Colorado	Municipal Conservation	Recommended	Conservation	19	183	10%	1	3	$1,054	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Mitchell	Mitchell	Colorado	Irrigation Conservation	Recommended	Conservation	256	1,858	14%	1	3	$21	4	4	5	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Lake Colorado City (non-allocated)	Mitchell	Mitchell	Colorado	Subordination	Recommended	Subordination	1,800	0	101%	5	3	$0	5	4	4	4	3	5	33		
Loraine	Mitchell	Mitchell	Colorado	Municipal Conservation	Recommended	Conservation	2	0	101%	5	3	$2,138	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Mitchell	Mitchell	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	31	0	101%	5	1	$970	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mitchell County Utility	Mitchell	Mitchell	Colorado	Municipal Conservation	Recommended	Conservation	6	0	101%	5	3	$1,407	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Steam Electric Power	Mitchell	Mitchell	Colorado	Indirect Non-Potable Reuse (Sales from Colorado City)	Recommended	Reuse	500	10,326	5%	1	5	$1,428	2	4	4	3	4	4	27		
Steam Electric Power	Mitchell	Mitchell	Colorado	Subordination	Recommended	Subordination	1,170	10,326	11%	1	3	$0	5	4	4	4	3	5	29		
CRMWD*	Multiple	Winkler	Colorado	Develop Additional Groundwater Supplies in Reeves, Pecos, Ward, and Winkler Co.	Alternative	Groundwater Development	10,000	17,369	58%	3	5	$1,348	2	3	3	0	4	0	20		Additional study will be needed once a more specific location for this strategy has been selected
CRMWD*	Multiple	Winkler	Colorado	Expand Ward County Well Field and Develop Winkler County Well Field	Recommended	Groundwater Development	22,400	17,369	129%	5	5	$849	3	3	4	0	4	0	24		
CRMWD*	Multiple	Multiple	Colorado	Subordination	Recommended	Subordination	25,351	17,369	146%	5	3	$0	5	4	4	4	3	5	33		
CRMWD*	Multiple	Ward	Colorado	Ward County Well Field Well Replacement	Recommended	Groundwater Development	10,343	17,369	60%	3	5	$102	4	3	4	0	4	0	23		
CRMWD* (non-allocated)	Multiple	Multiple	Colorado	Subordination	Recommended	Subordination	19,911	17,369	115%	5	3	$0	5	4	4	4	3	5	33		
UCRA	Multiple	Multiple	Colorado	Brush Control	Recommended	Regional	90	0	101%	5	2	$850	3	3	4	2	3	5	27	Brush control is an on-going process that must be continually maintained in order to receive benefits	No attributed water savings, but it is assumed that surface water supplies gained through subordination will be more
Fort Stockton	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	48	0	101%	5	3	$484	4	4	4	4	3	5	32	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Iraan	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	5	0	101%	5	3	$1,501	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Pecos	Pecos	Rio Grande	Irrigation Conservation	Recommended	Conservation	21,502	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Pecos	Pecos	Rio Grande	Weather Modification	Recommended	Regional	106	0	101%	5	1	$5.45	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Pecos	Pecos	Rio Grande	Develop Additional Pecos Valley Aquifer Supplies	Recommended	Groundwater Development	3,000	3,500	86%	4	3	$164	4	4	4	4	3	5	31		

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	Quantity (Ac-Ft/Yr)	Maximum Need	Percentage of Max Need Met	Quantity Score	Reliability	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Mining	Pecos	Pecos	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	539	3,500	15%	1	1	$632	3	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos County Fresh Water	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	3	0	101%	5	3	$1,985	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	250	0	101%	5	3	$1,224	2	3	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Replacement of Transmission Pipeline	Recommended	Expanded Use of Supply	750	0	101%	5	5	$2,767	2	4	4	4	3	5	32		
Pecos WCID	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	12	0	101%	5	3	$1,166	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Big Lake	Reagan	Reagan	Colorado	Municipal Conservation	Recommended	Conservation	14	0	101%	5	3	$1,139	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reagan	Reagan	Colorado	Irrigation Conservation	Recommended	Conservation	3,305	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reagan	Reagan	Colorado	Weather Modification	Recommended	Regional	1,869	0	101%	5	1	$0.19	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Reagan	Reagan	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	445	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Balmorhea	Reeves	Reeves	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	150	147	102%	5	3	$1,053	2	3	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	
Balmorhea	Reeves	Reeves	Rio Grande	Municipal Conservation	Recommended	Conservation	2	147	1%	1	3	$2,472	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reeves	Reeves	Rio Grande	Irrigation Conservation	Recommended	Conservation	8,841	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reeves	Reeves	Rio Grande	Weather Modification	Recommended	Regional	326	0	101%	5	1	$1.13	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Madera Valley WSC	Reeves	Reeves	Rio Grande	Municipal Conservation	Recommended	Conservation	6	0	101%	5	3	$1,425	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Reeves	Reeves	Rio Grande	Develop Pecos Valley Aquifer Supplies	Recommended	Groundwater Development	10,400	10,400	100%	4	3	$173	4	3	4	4	3	5	30	The most significant issue willl be locating areas with sufficient well production	
Mining	Reeves	Reeves	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	882	10,400	8%	1	1	$632	3	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos	Reeves	Reeves	Rio Grande	Advanced Water Treatment Plant	Recommended	Expanded Use of Supply	3,360	0	101%	5	3	$754	3	3	4	4	4	5	31		
Pecos	Reeves	Reeves	Rio Grande	Direct Non-Potable Reuse	Recommended	Reuse	560	0	101%	5	5	$1,286	2	3	4	3	4	4	30		
Pecos	Reeves	Reeves	Rio Grande	Direct Potable Reuse	Recommended	Reuse	925	0	101%	5	5	$4,961	2	3	4	3	4	4	30		
Pecos	Reeves	Reeves	Rio Grande	Indirect Potable Reuse with Aquifer Storage and Recovery	Alternative	Reuse	695	0	101%	5	3	$6,790	1	3	4	4	3	5	28	The most significant issue willl be locating areas with sufficient well production	
Pecos	Reeves	Reeves	Rio Grande	Municipal Conservation	Recommended	Conservation	35	0	101%	5	3	$607	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos	Reeves	Reeves	Rio Grande	Partner with Madera Valley WSC, Expand Pecos Valley Aquifer Supplies	Recommended	Groundwater Development	8,960	0	101%	5	3	$427	4	3	4	4	3	5	31		
Ballinger	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	12	0	101%	5	3	$1,107	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Ballinger	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	794	0	101%	5	3	$0	5	4	4	4	3	5	33		
County-Other	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	2	23	9%	1	3	$1,953	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	23	23	100%	4	3	$0	5	4	4	4	3	5	32		
Irrigation	Runnels	Runnels	Colorado	Irrigation Conservation	Recommended	Conservation	373	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Miles	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	3	48	6%	1	3	$1,730	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Runnels	Runnels	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	11	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
North Runnels WSC	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	5	162	3%	1	3	$1,407	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
North Runnels WSC	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	89	162	55%	3	3	$0	5	4	4	4	3	5	31		
Winters	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	17	226	8%	1	3	$1,191	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

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														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Winters	Runnels	Runnels	Colorado	Purchase from Provider (Abilene)	Recommended	Purchase from Provider	212	226	94%	4	5	$668	3	3	4	4	3	4	30		
Winters	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	100	226	44%	3	3	$0	5	4	4	4	3	5	31		
El Dorado	Schleicher	Schleicher	Colorado	Municipal Conservation	Recommended	Conservation	6	0	101%	5	3	$1,283	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	109	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Weather Modification	Recommended	Regional	275	0	101%	5	1	$0.23	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Schleicher	Schleicher	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	31	0	101%	5	1	$903	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Scurry	Scurry	Colorado, Brazos	Municipal Conservation	Recommended	Conservation	30	692	4%	1	3	$863	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Scurry	Scurry	Colorado, Brazos	Purchase from Provider (Snyder)	Recommended	Purchase from Provider	607	692	88%	4	5	$0	5	4	4	4	3	4	33		
County-Other	Scurry	Scurry	Colorado, Brazos	Subordination	Recommended	Subordination	85	692	12%	1	3	$0	5	4	4	4	3	5	29		
Irrigation	Scurry	Scurry	Colorado, Brazos	Irrigation Conservation	Recommended	Conservation	983	6,565	15%	1	3	$21	4	4	5	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Manufacturing	Scurry	Scurry	Colorado	Develop Dockum Aquifer Supplies	Recommended	Groundwater Development	160	156	103%	5	3	$356	4	3	4	4	3	5	31	The most significant issue willl be locating areas with sufficient well production	
Mining	Scurry	Scurry	Colorado, Brazos	Mining Conservation (Recycling)	Recommended	Conservation	34	419	8%	1	1	$1,617	2	4	4	4	3	5	24	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Snyder	Scurry	Scurry	Colorado	Municipal Conservation	Recommended	Conservation	93	814	11%	1	3	$957	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Snyder	Scurry	Scurry	Colorado	Subordination	Recommended	Subordination	814	814	100%	4	3	$0	5	4	4	4	3	5	32		
Irrigation	Sterling	Sterling	Colorado	Irrigation Conservation	Recommended	Conservation	135	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Sterling	Sterling	Colorado	Weather Modification	Recommended	Regional	48	0	101%	5	1	$0.39	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Sterling	Sterling	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	40	0	101%	5	1	$931	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Sterling City	Sterling	Sterling	Colorado	Municipal Conservation	Recommended	Conservation	3	0	101%	5	3	$1,759	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Sutton	Sutton	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	168	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Sutton	Sutton	Colorado, Rio Grande	Weather Modification	Recommended	Regional	34	0	101%	5	1	$0.45	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Sutton	Sutton	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	32	0	101%	5	1	$1,595	2	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Sonora	Sutton	Sutton	Rio Grande	Develop Additional Edwards-Trinity Aquifer Supplies	Recommended	Groundwater Development	35	0	101%	5	3	$1,000	3	3	4	4	3	5	30		
Sonora	Sutton	Sutton	Rio Grande	Municipal Conservation	Recommended	Conservation	10	0	101%	5	3	$1,187	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Sonora	Sutton	Sutton	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	118	0	101%	5	3	$451	4	4	4	4	3	5	32	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Abilene	Taylor, Jones	Taylor, Jones	Colorado, Brazos	Subordination	Recommended	Subordination	483	0	101%	5	3	$0	5	4	4	4	3	5	33		
Concho Rural Water	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	24	13	185%	5	3	$894	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Concho Rural Water	Tom Green	Tom Green	Colorado	Purchase from Provider (UCRA)	Recommended	Purchase from Provider	50	13	385%	5	5	$0	5	4	4	4	3	4	34		
County-Other	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	70	0	101%	5	3	$0	5	4	4	4	3	5	33		
DADS Supported Living Center	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	1	0	101%	5	3	$4,116	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	11	345	3%	1	3	$1,222	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	44	345	13%	1	3	$0	5	4	4	4	3	5	29		
Irrigation	Tom Green	Tom Green	Colorado	Irrigation Conservation	Recommended	Conservation	5,099	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	Quantity (Ac-Ft/Yr)	Maximum Need	Percentage of Max Need Met	Quantity Score	Reliability	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Irrigation	Tom Green	Tom Green	Colorado	Weather Modification	Recommended	Regional	2,007	0	101%	5	1	$0.44	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Manufacturing	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	37	215	17%	1	3	$0	5	4	4	4	3	5	29		
Millersview-Doole WSC	Tom Green	Concho	Colorado	Municipal Conservation	Recommended	Conservation	15	0	101%	5	3	$1,088	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Millersview-Doole WSC	Tom Green	Concho	Colorado	Subordination	Recommended	Subordination	62	0	101%	5	3	$0	5	4	4	4	3	5	33		
Millersview-Doole WSC	Tom Green	Coleman	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	68	0	101%	5	3	$1,045	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Tom Green	Tom Green	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	49	0	101%	5	1	$792	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
San Angelo*	Tom Green	Tom Green	Colorado	Brush Control	Recommended	Regional	60	13,097	0%	1	2	$489	4	3	4	2	3	5	24	Brush control is an on-going process that must be continually maintained in order to receive benefits	No attributed water savings, but it is assumed that surface water supplies gained through subordination will be more
San Angelo*	Tom Green	Tom Green	Colorado	Desalination of Brackish Groundwater	Alternative	Desalination	11,210	13,097	86%	4	3	$1,062	2	3	4	3	3	5	27		
San Angelo*	Tom Green	Schleicher	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Schleicher County	Alternative	Groundwater Development	4,500	13,097	34%	3	3	$1,800	2	3	4	4	3	5	27	The most significant issue willl be locating areas with sufficient well production	
San Angelo*	Tom Green	Tom Green	Colorado	Develop Hickory Aquifer Supplies	Recommended	Groundwater Development	3,040	13,097	23%	1	5	$2,321	2	4	4	4	3	5	28	The most significant issue willl be locating areas with sufficient well production	
San Angelo*	Tom Green	Pecos	Colorado	Develop Pecos Valley/Edwards Trinity in Pecos County	Alternative	Groundwater Development	10,800	13,097	82%	4	3	$2,604	2	3	4	4	3	5	28		The necessary infrastructure to move water from Pecos County to Tom Green County will be expensive
San Angelo*	Tom Green	Tom Green	Colorado	Indirect Potable Reuse	Recommended	Reuse	8,400	13,097	64%	3	5	$1,250	2	3	4	3	4	2	26	Possible public resistance to reuse of water	Adequate monitoring and oversight will be required to protect public health and safety
San Angelo*	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	668	13,097	5%	1	3	$448	4	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
San Angelo*	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	1,875	13,097	14%	1	3	$0	5	4	4	4	3	5	29		
Tom Green County FWSD 3	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	5	0	101%	5	3	$1,616	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Upper Colorado River Authority	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	42	0	101%	5	3	$0	5	4	4	4	3	5	33		
Irrigation	Upton	Upton	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	1,560	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
McCamey	Upton	Upton	Rio Grande	Municipal Conservation	Recommended	Conservation	8	0	101%	5	3	$1,264	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Upton	Upton	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	101	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Rankin	Upton	Upton	Rio Grande	Municipal Conservation	Recommended	Conservation	3	0	101%	5	3	$1,848	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Barstow	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	1	0	101%	5	3	$3,068	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Grandfalls	Ward	Ward	Rio Grande	Develop Pecos Valley Aquifer Supplies	Recommended	Groundwater Development	155	155	100%	4	3	$1,245	2	4	4	4	3	5	29	The most significant issue willl be locating areas with sufficient well production	
Grandfalls	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	2	155	1%	1	3	$2,804	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Grandfalls	Ward	Ward	Rio Grande	Purchase from Provider (CRMWD)	Alternative	Purchase from Provider	155	155	100%	4	5	$0	5	4	4	4	3	4	33		
Irrigation	Ward	Ward	Rio Grande	Irrigation Conservation	Recommended	Conservation	474	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Ward	Ward	Rio Grande	Weather Modification	Recommended	Regional	259	0	101%	5	1	$0.57	4	4	5	4	4	5	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Ward	Ward	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	80	0	101%	5	1	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Monahans	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	27	0	101%	5	3	$763	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Southwest Sandhills WSC	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	30	0	101%	5	3	$863	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Wickett	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	2	0	101%	5	3	$2,487	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Winkler	Winkler	Rio Grande	Irrigation Conservation	Recommended	Conservation	526	0	101%	5	3	$21	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Kermit	Winkler	Winkler	Rio Grande	Municipal Conservation	Recommended	Conservation	19	0	101%	5	3	$964	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	Quantity (Ac-Ft/Yr)	Maximum Need	Percentage of Max Need Met	Quantity Score	Reliability	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
														Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Mining	Winkler	Winkler	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	49	0	101%	5	1	$1,315	2	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Wink	Winkler	Winkler	Rio Grande	Municipal Conservation	Recommended	Conservation	5	0	101%	5	3	$1,665	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

*Wholesale water provider need includes needs of customers.

APPENDIX F
TABLE OF RECCOMENDED AND ALTERNATIVE WATER MANAGEMENT STRATEGIES

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2020	2030	2040	2050	2060	2070	
Brush Control											
BCWID	Multiple	2020	$0	$390	400	400	400	400	400	400	$390
San Angelo	Multiple	2020	$0	$489	60	60	60	60	60	60	$489
UCRA	Multiple	2020	$0	$850	90	90	90	90	90	90	$850
Develop Cross Timbers Aquifer Supplies											
Mining	Brown	2020	$2,440,000	$948	210	210	210	210	210	210	$129
Develop Edwards-Trinity Plateau Aquifer Supplies											
Junction	Kimble	2020	$3,634,000	$822	370	370	370	370	370	370	$130
Pecos County WCID #1	Pecos	2020	$3,630,000	$1,224	250	250	250	250	250	250	$204
Balmorhea	Reeves	2020	$1,948,000	$1,053	150	150	150	150	150	150	$140
Develop Ellenburger San Saba Aquifer Supplies											
Manufacturing	Kimble	2020	$1,621,000	$274	500	500	500	500	500	500	$46
Develop Hickory Aquifer Supplies											
San Angelo	Ector	2030	$55,491,000	$2,321	0	1,040	3,040	3,040	3,040	3,040	$1,037
Menard	Menard	2020	$3,287,000	$3,820	200	200	200	200	200	200	$160
Develop Other Aquifer Supplies											
Bronte	Coke	2020	$23,694,000	$2,424	800	800	800	800	800	800	$340
Manufacturing	Scurry	2020	$677,000	$356	160	160	160	160	160	160	$56
Develop Pecos Valley Aquifer Supplies											
CRMWD	Multiple	2050	$168,324,000	$849	0	0	0	22,400	22,400	22,400	$321
County-Other	Midland	2020	$24,557,000	$738	2,800	2,800	2,800	2,800	2,800	2,800	$121
Mining	Pecos	2020	$492,000	$164	3,000	3,000	3,000	3,000	3,000	3,000	$55
Mining	Reeves	2020	$17,465,000	$173	10,400	10,400	10,400	10,400	10,400	10,400	$54
Grandfalls	Ward	2050	$2,410,000	$1,245	0	0	0	155	155	155	$148
Dredging River Intake											
Junction	*Kimble*	*2020*	*$7,505,000*	*$2,112*	*250*	*250*	*250*	*250*	*250*	*250*	*$0*
Groundwater Strategies											
CRMWD	Multiple	2030	$10,440,000	$102	0	755	2,650	6,295	8,361	10,343	$76
Pecos	Reeves	2020	$43,107,000	$427	0	8,960	8,960	8,960	8,960	8,960	$89
Sonora	Sutton	2020	$437,000	$1,000	35	35	35	35	35	35	$114

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Irrigation Conservation											
Irrigation	Andrews	2020	$1,548,000	$21	1,018	2,037	2,037	2,037	2,037	2,037	$0
Irrigation	Borden	2020	$224,000	$21	147	295	295	295	295	295	$0
Irrigation	Brown	2020	$494,000	$21	406	650	650	650	650	650	$0
Irrigation	Coke	2020	$63,000	$21	34	69	83	83	83	83	$0
Irrigation	Coleman	2020	$35,000	$21	23	47	47	47	47	47	$0
Irrigation	Concho	2020	$410,000	$21	245	490	539	539	539	539	$0
Irrigation	Crockett	2020	$15,000	$21	7	14	20	20	20	20	$0
Irrigation	Ector	2020	$86,000	$21	38	76	113	113	113	113	$0
Irrigation	Glasscock	2020	$1,558,000	$21	2,050	2,050	2,050	2,050	2,050	2,050	$0
Irrigation	Howard	2020	$575,000	$21	344	688	757	757	757	757	$0
Irrigation	Irion	2020	$120,000	$21	53	105	158	158	158	158	$0
Irrigation	Kimble	2020	$242,000	$21	133	266	319	319	319	319	$0
Irrigation	Martin	2020	$4,160,000	$21	1,825	3,649	5,474	5,474	5,474	5,474	$0
Irrigation	Mason	2020	$566,000	$21	248	497	745	745	745	745	$0
Irrigation	McCulloch	2020	$265,000	$21	116	232	349	349	349	349	$0
Irrigation	Menard	2020	$418,000	$21	183	366	549	549	549	549	$0
Irrigation	Midland	2020	$2,064,000	$21	905	1,811	2,716	2,716	2,716	2,716	$0
Irrigation	Mitchell	2020	$194,000	$21	256	256	256	256	256	256	$0
Irrigation	Pecos	2020	$16,341,000	$21	7,167	14,335	21,502	21,502	21,502	21,502	$0
Irrigation	Reagan	2020	$2,512,000	$21	1,102	2,203	3,305	3,305	3,305	3,305	$0
Irrigation	Reeves	2020	$6,719,000	$21	2,947	5,894	8,841	8,841	8,841	8,841	$0
Irrigation	Runnels	2020	$283,000	$21	155	311	373	373	373	373	$0
Irrigation	Schleicher	2020	$83,000	$21	91	109	109	109	109	109	$0
Irrigation	Scurry	2020	$747,000	$21	378	756	983	983	983	983	$0
Irrigation	Sterling	2020	$102,000	$21	45	90	135	135	135	135	$0
Irrigation	Sutton	2020	$128,000	$21	56	112	168	168	168	168	$0
Irrigation	Tom Green	2020	$3,875,000	$21	2,125	4,249	5,099	5,099	5,099	5,099	$0
Irrigation	Upton	2020	$1,186,000	$21	520	1,040	1,560	1,560	1,560	1,560	$0
Irrigation	Ward	2020	$360,000	$21	158	316	474	474	474	474	$0
Irrigation	Winkler	2020	$400,000	$21	175	351	526	526	526	526	$0

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Mining Conservation (Recycling)											
Mining	Andrews	2020	$5,540,000	$632	277	260	222	176	135	104	$0
Mining	Borden	2020	$780,000	$1,117	29	39	33	21	10	5	$0
Mining	Brown	2020	$1,340,000	$654	66	66	67	67	66	66	$0
Mining	Coke	2020	$400,000	$632	20	20	18	16	14	12	$0
Mining	Coleman	2020	$100,000	$632	5	4	4	4	3	3	$0
Mining	Concho	2020	$400,000	$632	20	20	18	15	13	12	$0
Mining	Crane	2020	$720,000	$1,173	26	35	36	29	22	17	$0
Mining	Crockett	2020	$6,300,000	$632	315	315	43	24	7	3	$0
Mining	Ector	2020	$600,000	$733	28	30	27	22	18	15	$0
Mining	Glasscock	2020	$4,960,000	$632	248	248	189	134	88	63	$0
Mining	Howard	2020	$2,860,000	$632	143	143	101	59	25	13	$0
Mining	Irion	2020	$6,440,000	$632	322	322	231	28	14	7	$0
Mining	Kimble	2020	$20,000	$632	1	1	1	1	1	1	$0
Mining	Loving	2020	$10,500,000	$632	525	525	462	378	301	238	$0
Mining	Martin	2020	$6,040,000	$632	302	302	227	49	27	14	$0
Mining	Mason	2020	$860,000	$632	43	40	30	24	19	16	$0
Mining	McCulloch	2020	$7,500,000	$632	375	351	279	236	203	176	$0
Mining	Menard	2020	$920,000	$632	46	45	40	35	30	26	$0
Mining	Midland	2020	$8,900,000	$632	445	445	344	231	46	32	$0
Mining	Mitchell	2020	$620,000	$970	25	31	27	21	16	12	$0
Mining	Pecos	2020	$10,780,000	$632	539	539	539	434	67	52	$0
Mining	Reagan	2020	$8,900,000	$632	445	445	323	62	24	8	$0
Mining	Reeves	2020	$17,640,000	$632	882	882	847	693	546	434	$0
Mining	Runnels	2020	$220,000	$632	11	11	10	9	8	7	$0
Mining	Schleicher	2020	$620,000	$903	26	31	24	16	10	6	$0
Mining	Scurry	2020	$680,000	$1,617	20	32	34	25	17	12	$0
Mining	Sterling	2020	$800,000	$931	33	40	34	22	11	6	$0
Mining	Sutton	2020	$640,000	$1,595	19	30	32	24	16	11	$0
Mining	Tom Green	2020	$980,000	$792	44	45	47	47	48	49	$0
Mining	Upton	2020	$2,020,000	$632	101	101	80	53	32	22	$0
Mining	Ward	2020	$1,600,000	$632	80	80	71	55	38	25	$0
Mining	Winkler	2020	$980,000	$1,315	33	49	42	32	22	16	$0

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Municipal Conservation											
Airline Mobile Home Park	Midland	2020	$0	$1,263	7	7	8	9	10	10	$1,134
Andrews	Andrews	2020	$0	$952	45	55	96	111	129	150	$592
County-Other	Andrews	2020	$0	$1,080	14	15	17	18	20	21	$821
Ballinger	Runnels	2020	$0	$1,107	12	12	12	12	12	12	$1,101
Bangs	Brown	2020	$0	$1,221	8	8	8	8	8	8	$2,189
Balmorhea	Reeves	2020	$0	$2,472	2	2	2	2	2	2	$1,214
Barstow	Ward	2020	$0	$3,068	1	1	1	1	1	1	$2,731
Big Lake	Reagan	2020	$0	$1,139	10	12	12	13	13	14	$1,079
Big Spring	Howard	2020	$0	$557	131	138	140	139	139	139	$620
Brady	McCulloch	2020	$0	$988	18	18	19	19	19	19	$930
Bronte	Coke	2020	$0	$1,647	3	3	3	3	3	3	$1,647
Brookesmith SUD	Brown	2020	$0	$705	25	25	25	25	25	25	$688
Brownwood	Brown	2020	$0	$937	61	91	91	91	91	91	$735
Coahoma	Howard	2020	$0	$1,222	8	8	8	8	8	8	$1,203
Coleman	Coleman	2020	$0	$1,065	15	15	15	15	15	15	$1,061
County-Other	Coleman	2020	$0	$5,095	1	1	1	1	1	1	$1,138
Coleman County SUD	Coleman	2020	$0	$1,144	10	10	10	10	10	10	$5,161
Colorado City	Mitchell	2020	$0	$1,054	16	18	18	18	18	19	$938
Concho Rural WSC	Tom Green	2020	$0	$894	20	21	22	23	24	24	$1,821
County-Other	Concho	2020	$0	$1,836	3	3	3	3	3	3	$714
Crockett County WCID	Crockett	2020	$0	$1,106	12	13	13	13	13	13	$1,070
Crane	Crane	2020	$0	$1,120	11	12	13	13	14	14	$1,083
DADS SLC	Tom Green	2020	$0	$4,116	1	1	1	1	1	1	$4,116
Early	Brown	2020	$0	$1,176	9	9	9	9	9	9	$1,170
Ector County Utility District	Ector	2020	$0	$292	60	84	94	125	137	149	$598
Eden	Concho	2020	$0	$1,541	4	4	4	4	4	4	$1,518
El Dorado	Schleicher	2020	$0	$1,283	6	6	6	6	6	6	$1,283
Fort Stockton	Pecos	2020	$0	$484	36	39	42	44	46	48	$363
Goodfellow AFB	Tom Green	2020	$0	$1,222	8	9	9	10	10	11	$1,123
Grandfalls	Ward	2020	$0	$2,804	1	1	1	1	2	2	$2,509
Greater Gardendale WSC	Ector	2020	$0	$1,108	12	13	15	17	19	20	$859
Greenwood Water	Midland	2020	$0	$1,716	3	3	4	4	4	5	$1,430
Iraan	Pecos	2020	$0	$1,501	4	4	5	5	5	5	$1,351
Junction	Kimble	2020	$0	$1,206	8	8	8	8	8	8	$1,203
Kermit	Winkler	2020	$0	$964	18	18	19	19	19	19	$916

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Loraine	Mitchell	2020	$0	$2,138	2	2	2	2	2	2	$2,039
Madera Valley WSC	Reeves	2020	$0	$1,425	5	5	5	6	6	6	$1,330
Mason	Mason	2020	$0	$1,278	7	7	7	7	7	7	$1,278
McCamey	Upton	2020	$0	$1,264	7	7	8	8	8	8	$1,203
Menard	Menard	2020	$0	$1,442	5	5	5	5	5	5	$1,442
Mertzon	Irion	2020	$0	$1,886	3	3	3	3	3	3	$1,875
Midland	Midland	2020	$0	$436	631	755	816	882	944	1012	$428
Miles	Runnels	2020	$0	$1,730	3	3	3	3	3	3	$1,614
Mitchell County Utility	Mitchell	2020	$0	$1,407	5	5	5	5	5	6	$1,068
Millersview-Doole WSC	Tom Green	2020	$0	$1,088	13	14	14	14	14	15	$1,347
Monahans	Ward	2020	$0	$763	23	24	25	26	27	27	$645
North Runnels WSC	Runnels	2020	$0	$1,407	5	5	5	5	5	5	$1,375
Odessa	Ector	2020	$0	$440	568	680	752	829	905	990	$427
Pecos	Reeves	2020	$0	$607	29	31	33	34	35	35	$498
Pecos WCID	Pecos	2020	$0	$1,166	9	10	11	11	12	12	$1,716
Pecos County Fresh Water	Pecos	2020	$0	$1,985	2	2	3	3	3	3	$1,099
Rankin	Upton	2020	$0	$1,848	3	3	3	3	3	3	$1,690
Richland SUD	McCulloch	2020	$0	$1,712	3	3	3	3	3	3	$1,665
Robert Lee	Coke	2020	$0	$1,672	3	3	3	3	3	3	$1,672
County-Other	Runnels	2020	$0	$1,953	2	2	2	2	2	2	$1,988
San Angelo	Tom Green	2020	$0	$448	459	532	558	592	629	668	$444
Snyder	Scurry	2020	$0	$957	41	47	51	55	59	93	$1,606
Santa Anna	Coleman	2020	$0	$1,623	3	4	4	4	4	4	$589
County-Other	Scurry	2020	$0	$863	20	22	24	26	28	30	$720
Sonora	Sutton	2020	$0	$1,187	9	9	9	10	10	10	$1,152
Southwest Sandhills WSC	Ward	2020	$0	$863	20	22	24	26	28	30	$589
Stanton	Martin	2020	$0	$1,199	8	9	10	10	11	11	$1,124
Sterling City	Sterling	2020	$0	$1,759	3	3	3	3	3	3	$1,718
Tom Green County FWSD 3	Tom Green	2020	$0	$1,616	3	4	4	4	5	5	$1,409
Wickett	Ward	2020	$0	$2,487	2	2	2	2	2	2	$2,240
Wink	Winkler	2020	$0	$1,665	3	4	4	4	4	5	$1,449
Winters	Runnels	2020	$0	$1,191	17	12	9	9	9	9	$1,183
Zephyr WSC	Brown	2020	$0	$1,091	13	13	13	13	13	13	$1,087

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
New or Additional Treatment											
Bronte	*Coke*	*2020*	*$10,270,000*	*$1,720*	*800*	*800*	*800*	*800*	*800*	*800*	*$816*
Odessa	*Ector*	*2020*	*$83,062,000*	*$1,111*	*15,700*	*15,700*	*15,700*	*15,700*	*15,700*	*15,700*	*$738*
Big Spring	*Howard*	*2020*	*$104,651,000*	*$1,128*	*830*	*0*	*0*	*878*	*1,671*	*2,420*	*$471*
Brady	McCulloch	2020	$29,719,000	$2,069	1,200	1,200	1,200	1,200	1,200	1,200	$327
Mason	Mason	2020	$2,605,000	$856	700	700	700	700	700	700	$594
Midland	Multiple	2040	$60,804,000	$1,656			5,899	6,101	6,235	6,327	$998
Pecos	Reeves	2030	$27,680,000	$754	3,360	3,360	3,360	3,360	3,360	3,360	$319
Rehabilitation/Replacement of Pipeline											
Bronte	*Coke*	*2020*	*$9,896,000*	*$1,748*	*450*	*450*	*450*	*450*	*450*	*450*	*$202*
Pecos County WCID #1	*Pecos*	*2020*	*$26,102,000*	*$2,767*	*750*	*750*	*750*	*750*	*750*	*750*	*$317*
Reuse											
Bangs	Brown	2020	$581,000	$1,816	25	25	25	25	25	25	$176
Menard	Menard	2020	$696,500	$820	67	67	67	67	67	67	$88
Steam Electric Power	Mitchell	2020	$8,642,000	$1,428	500	500	500	500	500	500	$212
San Angelo	Multiple	2020	$116,861,000	$1,250	8,400	8,400	8,400	8,400	8,400	8,400	$269
Pecos	Reeves	2030	$29,541,000	$4,961		925	925	925	925	925	$2,443
Pecos	Reeves	2020	$8,707,000	$1,286	560	560	560	560	560	560	$191

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Subordination											
Ballinger	Runnels	2020	$0	$0	794	751	750	748	753	791	$0
County-Other	Runnels	2020	$0	$0	23	21	19	18	18	19	$0
North Runnels WSC	Runnels	2020	$0	$0	86	86	87	87	87	89	$0
Brady	McCulloch	2020	$0	$0	841	841	841	841	841	841	$0
Steam Electric Power	Mitchell	2020	$0	$0	1,170	1,156	1,142	1,128	1,114	1,100	$0
Junction	Kimble	2020	$0	$0	250	250	250	250	250	250	$0
Manufacturing	Kimble	2020	$0	$0	228	228	228	228	228	228	$0
Abilene	Taylor, Jones	2020	$0	$0	329	359	391	421	453	483	$0
Midland	Midland	2020	$0	$0	2,173	359	391	421	453	483	$0
Millersview-Doole WSC	Tom Green	2020	$0	$0	52	0	0	0	9	62	$0
Odessa	Ector	2020	$0	$0	2,451	0	0	3,492	7,263	11,493	$0
Ector County Utility District	Ector	2020	$0	$0	234	0	0	332	694	1,097	$0
Irrigation	Ector	2020	$0	$0	157	0	0	162	312	449	$0
Irrigation	Midland	2020	$0	$0	3	0	0	2	6	8	$0
Manufacturing	Ector	2020	$0	$0	186	0	0	199	381	551	$0
Steam Electric Power	Ector	2020	$0	$0	109	0	0	114	219	316	$0
Big Spring	Howard	2020	$0	$0	611	0	0	647	1,233	1,785	$0
Coahoma	Howard	2020	$0	$0	51	0	0	56	105	152	$0
Manufacturing	Howard	2020	$0	$0	147	0	0	153	293	424	$0
Steam Electric Power	Howard	2020	$0	$0	21	0	0	22	40	59	$0
Snyder	Scurry	2020	$0	$0	194	0	0	256	524	814	$0
County-Other	Scurry	2020	$0	$0	29	0	0	31	59	85	$0
Rotan	Fisher	2020	$0	$0	18	0	0	17	32	46	$0
Stanton	Martin	2020	$0	$0	31	0	0	33	62	90	$0
Irrigation	Coleman	2020	$0	$0	400	400	400	400	400	400	$0
Coleman	Coleman	2020	$0	$0	1,319	1,296	1,276	1,255	1,227	1,200	$0
Coleman County SUD	Coleman	2020	$0	$0	227	225	218	214	215	215	$0
County-Other	Coleman	2020	$0	$0	24	22	22	21	21	21	$0
Manufacturing	Coleman	2020	$0	$0	2	2	2	2	2	2	$0
County-Other	Tom Green	2020	$0	$0	70	70	70	70	70	70	$0
Bronte	Coke	2020	$0	$0	212	210	209	207	207	207	$0
Robert Lee	Coke	2020	$0	$0	237	239	240	240	240	240	$0
San Angelo	Tom Green	2020	$0	$0	1,875	1,819	1,766	1,709	1,656	1,600	$0
Upper Colorado River Authority	Tom Green	2020	$0	$0	42	37	33	30	26	23	$0

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Goodfellow Air Force Base	Tom Green	2020	$0	$0	44	42	40	38	35	33	$0
Manufacturing	Tom Green	2020	$0	$0	37	36	32	29	26	22	$0
Winters	Runnels	2020	$0	$0	100	99	98	98	98	97	$0
Brady Creek (non-allocated)	McCulloch	2020	$0	$0	1,109	1,069	1,029	989	949	909	$0
BCWID (non-allocated)	Brown	2020	$0	$0	5,440	5,466	5,492	5,518	5,544	5,570	$0
CRMWD (non-allocated)	Tom Green	2020	$0	$0	15,819	19,911	18,533	13,002	7,245	972	$0
Oak Creek (non-allocated)	Coke	2020	$0	$0	577	540	503	468	431	394	$0
Lake Colorado City (non-allocated)	Mitchell	2020	$0	$0	1,800	1,750	1,700	1,650	1,600	1,550	$0
Odessa (Future Sales)	Ector, Midland	2020	$0	$0	3,930	3,930	3,930	3,930	3,930	3,930	$0
Manufacturing, Howard (Future Sales)	Howard	2030	$0	$0	0	500	500	500	500	500	$0
Greater Gardendale WSC (Future Sales)	Ector	2030	$0	$0	0	375	445	445	445	445	$0
County-Other (Future Sales)	Ector	2030	$0	$0	0	1,200	2,500	2,500	2,500	2,500	$0
County-Other (Future Sales)	Scurry	2020	$0	$0	373	414	447	491	547	607	$0
Voluntary Transfer (Purchase)											
Robert Lee	Coke	2020	$0	$0	80	80	80	80	80	80	$0
Concho Rural WSC	Ector	2020	$0	$0	50	50	50	50	50	50	$0
Greater Gardendale WSC	Ector	2020	$6,078,000	$3,730	0	375	445	445	445	445	$2,769
Winters	Runnels	2020	$974,000	$668	220	220	220	220	220	220	$355
County-Other	Scurry	2020	$0	$0	373	414	447	491	547	607	$0
Water Audits and Leak Repairs											
Brookesmith SUD	Brown	2020	$1,737,000	$1,509	81	81	79	78	78	78	$1,584
Coleman	Coleman	2020	$1,074,800	$1,282	59	58	57	57	57	57	$1,340
Millersview-Doole WSC	Tom Green	2020	$965,800	$1,045	65	66	65	66	67	68	$1,076
Sonora	Sutton	2020	$679,900	$451	106	112	114	116	117	118	$438
Zephyr WSC	Brown	2020	$944,700	$3,498	19	19	18	18	18	18	$3,732
Weather Modification											
Irrigation	Crocket	2020	$0	$0.47	1	1	1	1	1	1	$0.47
Irrigation	Irion	2020	$0	$0.21	202	202	202	202	202	202	$0.21
Irrigation	Pecos	2020	$0	$5.45	106	106	106	106	106	106	$5.45
Irrigation	Reagan	2020	$0	$0.19	1,869	1,869	1,869	1,869	1,869	1,869	$0.19

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Irrigation	Reeves	2020	$0	$1.13	326	326	326	326	326	326	$1.13
Irrigation	Schleicher	2020	$0	$0.23	275	275	275	275	275	275	$0.23
Irrigation	Sterling	2020	$0	$0.39	48	48	48	48	48	48	$0.39
Irrigation	Sutton	2020	$0	$0.45	34	34	34	34	34	34	$0.45
Irrigation	Tom Green	2020	$0	$0.44	2,007	2,007	2,007	2,007	2,007	2,007	$0.44
Irrigation	Ward	2020	$0	$0.57	259	259	259	259	259	259	$0.57

Note: Grey italics indicates projects that are needed to access supplies from other strategies and are not included in the total to avoid double counting.

Table F-2
Summary of Alternative Strategies

Entity	County Used	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Desalination										
San Angelo	*Tom Green*	*$70,709,000*	*$1,062*	*11,210*	*11,210*	*11,210*	*11,210*	*11,210*	*11,210*	*$615*
Develop Capitan Reef Complex Aquifer Supplies										
Odessa	Ector	$154,165,000	$2,168	8,400	8,400	8,400	8,400	8,400	8,400	$884
Develop Dockum Aquifer Supplies										
Colorado City	Mitchell	$3,744,000	$1,824	170	170	170	170	170	170	$276
Develop Edwards-Trinity Plateau Aquifer Supplies										
Andrews	Andrews	$24,927,000	$891	2,600	2,600	2,600	2,600	2,600	2,600	$217
County-Other	Andrews	$751,000	$252	250	250	250	250	250	250	$40
San Angelo	Tom Green	$102,100,000	$1,800	4,500	4,500	4,500	4,500	4,500	4,500	$209
Develop Other Aquifer Supplies										
Livestock	Andrews	$327,000	$433	60	60	60	60	60	60	$50
Manufacturing	Andrews	$349,000	$243	210	210	210	210	210	210	$43
BCWID #1	Brown	$13,947,000	$12,553	806	806	806	806	806	806	$1,336
Bronte	Coke	$2,666,000	$2,787	75	75	75	75	75	75	$280
Robert Lee	Coke	$4,154,000	$4,293	75	75	75	75	75	75	$400
Robert Lee	Coke	$7,272,000	$3,756	75	75	75	75	75	75	$556
Develop Ogallala Aquifer Supplies										
Andrews	Andrews	$15,663,000	$496	2,810	2,810	2,810	2,810	2,810	2,810	$104
Great Plains	Andrews, Gaines	$676,000	$190	200	200	200	200	200	200	$55
Develop Additional Groundwater Supplies										
CRMWD	Western Region F Counties	$147,558,000	$1,348	10,000	10,000	10,000	10,000	10,000	10,000	$310
Odessa	Ector	$826,808,000	$3,249	28,000	28,000	28,000	28,000	28,000	28,000	$1,172
San Angelo	Tom Green	$327,576,000	$2,604	10,800	10,800	10,800	10,800	10,800	10,800	$470
New or Additional Water Treatment										
Robert Lee	Coke	$6,541,000	$2,657	335	335	335	335	335	335	$1,284
Potable Reuse with Aquifer Storage and Recovery										
Pecos	Reeves	$34,456,000	$6,790	0	695	695	695	695	695	$3,301
Regional Water Management Strategies										
Bronte, Ballinger, Winters, Robert Lee (Lake Brownwood)	Coke, Runnels	$115,443,000	$3,904	2,802	2,802	2,802	2,802	2,802	2,802	$1,005
Bronte, Ballinger, Winters, Robert Lee (Lake Fort Phantom Hill)	Coke, Runnels	$103,328,000	$7,606	1,155	1,155	1,155	1,155	1,155	1,155	$1,312

Table F-2
Summary of Alternative Strategies

Entity	County Used	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield 2020	2030	2040	2050	2060	2070	Last Decade Unit Cost ($/ac-ft/yr)
Voluntary Transfer (Purchase)										
Greater Gardendale WSC	Ector	$2,946,000	$2,355	0	375	445	445	445	445	$1,890
Midland	Midland	$0	$0	4000	4000	4000	4000	4000	4000	$0
Grandfalls	Ector	$0	$0	0	0	0	155	155	155	$0

Note: Grey italics indicates projects that are needed to access supplies from other strategies and are not included in the total to avoid double counting.

APPENDIX G
DROUGHT TRIGGERS AND ACTIONS

Table G-1
Drought Triggers and Actions by Water Provider

		Stage 1 - Mild Drought		Stage 2 - Moderate Drought		Stage 3 - Severe Drought		Stage 4 - Critical Drought		Stage 5 - Emergency Drought	
Water Provider	**Water Sources**	**Stage 1 Trigger**	**Response**	**Stage 2 Trigger**	**Response**	**Stage 3 Trigger**	**Response**	**Stage 4 Trigger**	**Response**	**Stage 5 Trigger**	**Response**
Brookesmith SUD (Retail)	Sales from BCWID #1	Daily water demand equals or exceeds 85% (3.4 MG) for 3 consecutive days or 4 MG on a single day.	Achieve a 5% reduction in water use. Reduce or discontinue the flush of water mains. Contact wholesale water customers. Voluntary water use restrictions.	Daily water demand equals or exceeds 90% (3.6 MG) for 3 consecutive dyas or 4 MG on a single day.	Achieve a 15% reduction in water use. May reduce or discontinue flushing of water mains and irrigation of public landscaped areas. Water use restrictions, including watering schedule and prohibition of non-essential water uses.	When imminent or actual failure of major component which would cause immediate health or safety hazard.	Achieve a 30% reduction in water use. May reduce or discontinue the flushing of water mains. Same mandatory water use restrictions as Stage 2, except more limited water schedule, prohibition of water uses, no applications for additonal water connections. Water Allocation Plan may be implemented by GM.	Emergency water shortage when major water line breaks or pump / system fail occurs and causes loss of capability.	Achieve a 50% reduction in water use. BMPs to manage critical water shortage conditions. Same mandatory water use restrictions as Stage 2 and 3, except more limited water schedule, prohibition of further water uses, no applications for additonal water connections.	N/A	N/A
Brookesmith SUD (Wholesale)	Sales from BCWID #1	Daily water demand equals or exceeds 85% (3.4 MG) for 3 consecutive days or 4 MG on a single day.	Achieve a 5% reduction in water use. Reduce or discontinue the flush of water mains. Contact wholesale water customers. Request initatation of voluntary measures. Weekly report to news media.	Daily water demand equals or exceeds 90% (3.6 MG) for 3 consecutive dyas or 4 MG on a single day.	Achieve a 15% reduction in water use. May reduce or discontinue flushing of water mains and irrigation of public landscaped areas. Request wholesale water customers to initate mandatory measures. GM will prepare for implementatoin of pro rate curtailment. Weekly report to news media.	When imminent or actual failure of major component which would cause immediate health or safety hazard.	Achieve a 30% reduction in water use. Discontinue the flushing of water mains. Request wholesale water customers to initate additional mandatory measures. GM will initiate pro rate curtailment. Weekly report to news media.Weekly report to news media.	Emergency water shortage when major water line breaks or pump / system fail occurs and causes loss of capability.	Assess severity of problem and identify actions needed and time required to solve the problem. Notify appropriate city, county, state emergency response officials, if appropriate. Undertake necessary actions, including repairs and/or clean-up as needed. Prepare post-event assessment report.	N/A	N/A
Brown County WID	Lake Brownwood	Lake Brownwood is below elevation 1,420 feet msl. (76% capacity)	Achieve a 5% reduction in water use. Advise customer of early conditions. Require customers to initiate Stage I of Drought Contingency Plans. Increase public education. Request voluntary conservation measures.	Lake Brownwood is below elevation 1,417 feet msl. (64% capacity)	Achieve a 15% reduction in water use. Request decrease in water usage. Implement watering restrictions. May reduce water delivery in accordance with pro rate curtailment.	Lake Brownwood is below elevation 1,414 feet msl. (52% capacity)	Achieve a 30% reduction in water use. Request to severely reduce water usage. Watering restrictions. District may reduce water delivery in accordance with pro rata curtailment. May utilize alternative water sources with TCEQ Director approval.	Lake Brownwood is below elevation 1,411 feet msl. (43% capacity)	Achieve a 50% reduction in water use. District may call an emergency meeting with customers. Completely restrict watering. May evaluate the need to discontinue delivery of water for second crops and non-essential uses. May reduce water delivery in accordance with pro rata curtailment. May utilize alternative water sources with TCEQ Director approval.	Lake Brownwood is below elevation 1,408 feet msl. (34% of reservoir capacity). Mechanical or system failures occur. Natural or man-made contamination. Discretion of BCWID General Manager or Board of Directors.	Declaration of an emergency water shortage condition. District will assess severity of the problem and identify actions and time to solve it. May call an emergency meeting with customers. May reduce or eliminate water delivery in accordance with pro rata. May utilize alternative water sources with TCEQ Director approval.
Brownwood	Sales from BCWID #1	Brown County WID #1 declares Stage 1 Drought. High demand on system. Drought monitor indicates drought conditions.	Achieve a 5% reduction in total water use. Voluntary watering schedule. Notify major commercial and industrial water users. Increase leak detection and repair efforts. Daily evaluatoins of SCADA system and/or operations. May consider water rate increase or water use surcharge.	Brown County WID #1 declares Stage 2 Drought. Inability to maintain 70% storage capacity over night due to high demand. Demand exceeds 85% capacity for 3 consecutive days. Demand exceeds 90% capacity for 1 day.	Achieve 15% reduction in total water use. Mandatory watering schedule. Initiate 50% reduction in irrigation of parks and landscapes. Reduce commercial and purchased wholesale use by 20%. Increase utility oversight of water waste. May consider water rate increase or water use surcharge.	Brown County WID #1 declares Stage 3 Drought. Inability to maintain 50% storage capacity over-night due to high demand. Demand exceeds 90% capacity for 3 consecutive days. Demand exceeds 95% capacity for 1 day.	Achieve 30% reduction in total water use. Mandatory watering schedule and water use restrictions. Non-essential commerical water reduced by 20%. Require wholesale customers to reduce purchased water use by 30%. Implement utility enforcement of watering schedule and water waste. May consider water rate increase or water use surcharge.	Brown County WID #1 declares Stage 4 Drought. Inability to maintain 35% storage capacity over-night due to high demand. Demand exceeds 95% capacity for 3 consecutive days. Demand exceeds 100% capacity for 1 day.	Achieve 50% reduction in total water use. Mandatory watering schedule. Reduce non-essential commercial water use by 50% to 100%. Require wholesale customers to reduce purchased water use by 50%. Increase utility enfocement of water schedule and waste. May consider water rate increase or water use surcharge.	Same triggers as Stage 4 with addition of one or more secondary triggers. Lake levels less than one year supply. Inability to achieve Stage 4 goals.	Achieve 50% reduction in total water use. Prohibit water use according to a watering schedule. Reduce non-essential commercial use by 75% to 100%. Require wholesale customers to reduce purchased water use by 50%. Increase utility enfocement of water schedule and waste. May consider water rate increase or water use surcharge.
Coleman County SUD	Lake Coleman, Hords Creek Lake	Lake Coleman lake level is equal to or less than 1705.5 ft elevation. USACE curtails the amount of water that the City can obtain from Hords Creek Lake. Daily water demand for City of Coleman equals or exceeds 3.3 MGD for 5 consecutive days.	Achieve a voluntary 10% reduction in daily water demand. GM will monitor limited water supplies and/or reduce water demand. GM will contact City and Brookesmith SUD. Lawn watering schedule restriction. Weekly news report.	Lake Coleman lake level is equal to or less than 1702 ft elevation. USACE significantly curtails the amount of water that the City can obtain from Hords Creek Lake.	Achieve a 20% reduction in daily water demand. Confer with City and Brookesmith SUD. City may modify reservoir operations. Water use restrictions and penalties. Fines for violations.	Lake Coleman lake level is equal to or less than 1700 ft elevation. USACE completely curtails the amount of water that the City can obtain from Hords Creek Lake.	Achieve a 30% reduction in total water use. Meet weekly with City and Brookesmith SUD. Consider tapping reserves in Lake Scarborough. More stringent water use restrctions and penalties.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply source(s).	Assess severeity and identify actions needed and time required to solve. Notify city, county, and/or state emergency response officials for assistance if needed. Undertake necessary actions as needed. Prepare post-event assessment report.	N/A	N/A
Colorado River Municipal Water District (CRMWD)	O.H. Ivie Reservoir	O.H. Ivie Reservoir capacity is less than 138,028 ac-ft or System capacity is less than 77,998 ac-ft.	Achieve a 2% reduction in total water use. Begin 'pump back' operation as needed. Initiate studies to evaluate alternative actions if conditions worsen. Request any or all WUGs to implement Stage 1 or their drought contingency plan.	O.H. Ivie Reservoir capacity is less than 107,060 ac-ft or System capacity is less than 58,499 ac-ft.	Achieve a 5% reduction in total water use. Notify TCEQ within 5 business days of any mandatory measures to be implemented. Request any or all WUGs to implement Stage 2 of their drought contingency plan.	O.H. Ivie Reservoir capacity is less than 76,092 ac-ft or System capacity is less than 38,999 ac-ft.	Achieve a 10% reduction in total water use. Initiate Ward County Well Field System pipeline expansion project. Initiate additional studies if conditions worsen. Request any or all WUGs to implement stage 3 of their drought contingency plan.	Emergency water shortage when a pipeline break,equiptment failure, or contamination severely limits distribution capacity.	Assess severeity and identify actions needed and time required to solve. Inform utility director to alleviate problem. Notify city, county, and/or state emergency response officials for assistance if needed. Undertake necessary actions as needed.	N/A	N/A

Table G-1
Drought Triggers and Actions by Water Provider

		Stage 1 - Mild Drought		Stage 2 - Moderate Drought		Stage 3 - Severe Drought		Stage 4 - Critical Drought		Stage 5 - Emergency Drought	
Water Provider	**Water Sources**	**Stage 1 Trigger**	**Response**	**Stage 2 Trigger**	**Response**	**Stage 3 Trigger**	**Response**	**Stage 4 Trigger**	**Response**	**Stage 5 Trigger**	**Response**
Ector County Utility District (ECUD)	Sales from Odessa	Daily water demands exceed 90% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days.	Achieve a voluntary 1 to 5% reduction in daily water demand. Raise public awareness, request voluntary reductions in nonessential water use.	Daily water demands exceed 95% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days.	Achieve a 5 to 10% reduction in daily water demand. Implement mandatory restriection on nonessential water uses. Irrigation watering schedule, mandatory water restrictions, prohibit non-essential water uses.	Daily water demands exceed 98% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days or moderate conditions have remained in effect for an extended period.	Achieve a 10 to 15% reduction in daily water demand. Implement bans on certain types of non-essential water uses. Prohibit watering of landscaped areas and non-essential uses. Other limits on industrial, commerical, or residential customers deemed necessary by the Administrator.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	Contact large water users to require they cease landscape irrigation and reduce all other water uses. Implement Severe Condition restriction as needed. Implement Emergency Response Program. City Countil may impleent a surcharge system for water use over specified volume.	N/A	N/A
Eden	City Well Field	Distribution system tank storage levels remain below 75 percent for a continuous three day period.	Achieve a voluntary 10% reduction in daily water demand. Reduce flushing of water mains. Voluntary water use restrictions.	Distribution system tank storage levels remain below 60 percent for a continuous three day period.	Achieve a 25% reduction in total daily water use. Reduce flushing of water mains, reduce park water. Irrigation watering schedule, limit hydrant use, prohibit non-essential water uses.	Distribution system tank storage levels remain below 50 percent for a continuous three day period.	Achive a 35% reduction in total daily water use. Refrain from flushing mains, park watering, filling swimming pools. Irrigation watering schedule and limitations on irrigation watering use. Unmetered water for construction under special permit is discontinued.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply sources occur.	Achive a 50% reduction in total daily water use. Refrain from flushing mains, park watering, filling swimming pools. Irrigation of landscaped areas is prohibited. Other outdoor uses are prohibited. Administorator authorized to allocate water according to water allocation plan.	N/A	N/A
Fort Stockon	City Well Field	Annually May 1 through September 30. Demand equals or exceeds 5 MG for 3 consecutive days or 6 MG on a single day.	Achieve voluntary 20% reduction in total water uses. Reduce to 4 MG daily demand. Voluntary water use restrictions.	Demand equals or exceeds 5MG for 7 consecutive days or 6 MG on a single day.	Achieve voluntary 20% reduction in total water uses. Reduce to 4 MG daily demand. Irrigation watering schedule, mandatory water use restrictions, prohibit non-essential water uses.	Demand equals or exceeds 6 MG for 7 consecutive days or 7 MG on a single day.	Achieve voluntary 33% reduction in total water use. Lower to 4MG daily demand. Requirements of Stage 2 shall remain in effect except: irrigation watering schedule further limited, watering of golf course tees is prohibited, use of water for construction purposes is discontinued.	Demand equals and exceeds 7 MG for 1 consecutive days or when static water level in the City of Fort Stockton water supply well(s) is equal to or greater than 300 feet.	Achieve voluntary 43% reduction in total water use, and reduce daily water demand to an acceptable daily demand of 4 MG. Requirements of Stage 2 and 3 shall remain in effect. Irrigation watering schedule is further limited. Prohibitition of water water outdoor and non-essential water uses.	Major water line breaks, pump or system failures that cause unprecedented loss of water system. Natural or man-made water supply contamination.	Achieve a voluntary 70 percent reduction in total water use, reduce daily water demand to 2 MG. Requirements of Stage 2, 3, and 4 shall remain in effect. Irrigation of landscaped areas is prohibited. Use of water for vehicle washing is prohibited.
Grandfalls	Sales from CRMWD	Annually May 1 through September 30. Pursuant to wholesale contract, CRMWD requests initiation of Stage 1 of the Drought Contingency Plan.	Achieve a reduction in both total water use and daily water demand. Voluntary water use restrictions.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 2 of the Drought Contingency Plan. Total daily water demand equals or exceeds 300,000 gal for 3 consecutive days, demand for 500,000 gal for a single day, continually falling treated water reservoir levels do not refill to 100% overnight.	Achieve a reduction in both total water use and daily water demand. Irrigation watering schedule, mandatory water use restrictions, prohibit non-essential water uses.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 3 of the Drought Contingency Plan. Total daily water demand equals or exceeds 400,000 gal for 3 consecutive days, demand for 600,000 gal for a single day, continually falling treated water reservoir levels do not refill to 75% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2 shall remain in effect except: irrigation watering schedule further limited, watering of golf course tees is prohibited, use of water for construction purposes is discontinued.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 4 of the Drought Contingency Plan. Total daily water demand equals or exceeds 500,000 gal for 3 consecutive days, demand for 700,000 gal for a single day, continually falling treated water reservoir levels do not refill to 50% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2 and 3 shall remain in effect except: irrigation watering schedule is further limited, prohibition of outdoor and non-essential water uses, no applications for new, additional, expanded, or increased water connections.	Major water line breaks, pump or system failures that cause unprecedented loss of water system. Natural or man-made water supply contamination. Continually falling treated water reservoir levels do not refill above 25% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2, 3, and 4 shall remain in effect except: irrigation of landscaped areas is prohibited, use of water to wash vehicles is prohibited.
Millersview-Doole	Sales from CRMWD, Groundwater	Average daily water use reaches 1.56 MGD (currently 60% of system capacity) for three consecutive days. Consideration will be given to weather conditions, time of year, and customer complaints of low water pressure.	Reduce usage by 10%. Inform the public. Implement mandatory lawn watering schedule; water restrictions; pipe insulation; monitoring water pressure in distribution system and water levels in storage tanks.	Average daily water use reaches 1.95 MGD (currently 60% of system capacity) for three consecutive days. Net storage in water usage is continually decreasing on a daily basis and falls below 720,000 gal (60% capacity) for 48 hours. Water pressures reach 35 psi in distribution system.	Reduce usage by 15%. Inform the public. Continue actions from Stage 1. Prohibit outdoor water use. Prohibit non-essential water uses (water line flusing, washing corporation vehicles). Surchase customers for non-compliance to curtailment measures.	Immiment or actual failure of major component of the system which would cause an immediate health or safety hazard. Water demand exceeding 1.95 MGD (currently 75% of system capacity) for three consecutive days. Failure of supplier to deliver contracted water. Availabl ewater supply is so low that pumps cannot pump daily water demand.	Reduce usage by 25%. Inform the publc. Prohibit water use certain commerical water users which are not essential to health and safety of the community.	N/A	N/A	N/A	N/A
Midland	Sales from CRMWD, City Well Field, O.H. Ivie Reservoir	CRMWD initiates Stage 1. Request from CRMWD due to limitation in available supplies or transmission. Demand reaches 45 MGD (94% of the treatment plant capacity) plus 50% of well field capacity for 5 consecutive days.	Achieve voluntary 10% reduction in daily water demand. Reduced flushing of water mains and increased use of alternative supply source(s) if available. Voluntary water use restrictions. Request for customers to practice water conservation and minimize or discontinue non-essential water use.	CRMWD initiates Stage 2. Request from CRMWD due to limitation in available supplies or their transmission lines. Demand reaches or exceed 55 MGD (95% of water plant's capacity) for 5 consecutive days or 60 MG in a single day.	Achieve 15% reduction in daily water demand. Implement reduced flushing of water mains, increased use of an alternative supply source(s). Irrigation watering schedule. Mandatory water use restrictions. Prohibit non-essential water uses.	CRMWD initiates Stage 3. Failure or threatening failure of a major system component will result in immediate health or safety hazard. Total daily water demand reaches the system limit.	Achieve 20% reduction in daily water demand. Reduce flushing of water mains, reduced irrigation of public landscaped areas to minimum required to avoid vegetation loss, increased use of an alternative supply source. All requirements of Stage 2 except: a more stringent iirrigation watering schedule, prohibit watering of golf course tees.	CRMWD initiates Stage 4. Treated water storage levels do no restore overnight.	Achieve a 25% reduction in daily water demand. Reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas, increased use of an alternative supply source. All requirements of Stage 2 and 3 except: more stringent outdoor watering schedules, prohibit various outdoor water uses, no applications for new, additional, expanded, or increased-in-size water connections.	Major water line breaks, or pump or system failure occurs, which cause unprecedented loss of capability to provide water service. Natural or man-made contamination of water supply sources.	Achieve a 30 day sustainable demand level which well fields can provide 25 MGD. Discontinued flushing of water mains, discontinued irrigation of public landscaped areas, use of an alternative supply source(s). All requirements of Stage 2, 3, and 4 shall remain in effect except: irrigation of landscaped areas is prohibited, use of water to wash vehicles is prohibited.

Table G-1
Drought Triggers and Actions by Water Provider

		Stage 1 - Mild Drought		Stage 2 - Moderate Drought		Stage 3 - Severe Drought		Stage 4 - Critical Drought		Stage 5 - Emergency Drought	
Water Provider	**Water Sources**	**Stage 1 Trigger**	**Response**	**Stage 2 Trigger**	**Response**	**Stage 3 Trigger**	**Response**	**Stage 4 Trigger**	**Response**	**Stage 5 Trigger**	**Response**
Odessa	Sales from CRMWD	Daily demand> 90% of treatment plant's capacity to produce or pump water for three consecutive days.	Achieve voluntary 1-5% reduction in daily water demand. Raise public awareness of need to conserve water supply. Request voluntary reductions in nonessential water use. Notify industrial users and request voluntary water use restrictions.	Daily demand> 95% of treatment plant's capacity to produce or pump water for three consecutive days.	Achieve 5-10% reduction in daily water demand. Implement mandatory restrictions on nonessential water Reduce fire hydrant flushing except where needed to maintain water quality. Irrigation watering schedule. Mandatory water use restrictions. Prohibit non-essential water uses.	Daily demand> 98% of treatment plant's capacity to produce or pump water for three consecutive days or the moderate conditions have remained in effect for an extended period.	Achieve 10-15% reduction in daily water demand. Implement ban on certain types of non-essential water uses. Consider implementation of a surcharge for excess water usage. Discontinue all fire hydrants flushing except where critical to maintaining water quality. Reduce or discontinue irrigation of public landscaped areas irrigated with the raw or potable water sources. Prohibit non-essential water uses.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	Reduce water usage as deemed necessary by the Administrator to alleviate the emergency conditions, maintain fire flows, and/or state requirements for the maintenance of distribution systems. Implement emergency response appropriate for the type and anticipated duration of the emergency. Contact all water users to require they cease landscape irrigation and reduce water uses. Implement Emergency Response Program.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	N/A
Red Bluff Power Control District	Red Bluff Lake	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Angelo	City Well Field, O.H. Ivie Reservoir	Minimum daily groundwater production coupled with the total amount of surface water available is less than a 24-month supply.	Achieve a 10% reduction in water use. Various outdoor watering use restrictions. Water usage fee.	Minimum daily groundwater production coupled with the total amount of surface water available is less than an 18-month supply.	Achieve a 15% reduction in water use. Various outdoor watering use restrictions. Water usage fee.	Minimum daily groundwater production coupled with the total amount of surface water available is less than an 12-month supply.	Achieve a 25% reuction in water use. Various outdoor watering use restrictions. Water usage fee.	N/A	N/A	N/A	N/A
Snyder	Sales from CRMWD	Begin April 1st to Sept 30th.	Voluntarily limit the use of water for nonessential purposes and to practice water conservation.	Average daily water use exceeds the plant capacity for three consecutive days. CRMWD is unable to supply the daily raw water demand.	Achieve 15% reduction in daily water demand. Visually inspect lines and repair leaks on a daily basis. Reduce landscape irrigation to half the normal irrigation schedule. Voluntary outdoor water use reductions and watering schedule.	Imminent or actual failure of a major component of the system, which would cause an immediate health or safety hazard. Water demand is exceeding the firm system capacity of 8 MGD for 3 consecutive days. Average daily water use exceeds the plant capacity for 3 consecutive days. CRMWD is unable to supply the daily water demand.	Achieve 30% reduction in daily water demand. Visually inspect lines and repair leaks on a regular basis. Irrigation watering schedule. Mandatory water use restrictions. Prohibit non-essential water uses.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply sources occur.	Achieve a maximum reduction as possible to maintain potable water delivery. Irrigation of landscaped areas is absolutely prohibited. Use of water to wash vehicles in prohibited.	N/A	N/A
Sonora	City Well Field	Average daily water consumption reaches 80% of production apacity of water system (2.01 MGD). Consumption (80%) has existed for 3 days. Weather conditions are considered to be in a drought classification determination.	Develop Information Center and designate Information Person. Advice public. Encourage voluntary reduction of water use. Contact wholesale, commercial, and industrial users and explain initiation. Implementation of system oversight and make adjustments needed.	Average daily water consumption reaches 85% of production capacity of water system (2.13 MGD). Weather conditions indicate mild drought for 5 or more days. One GST or well is taken out of service. Storage capacity (water level) is not 100% maintained during period of 85% production. Existence of any listed condition in Stage 1 for 36 hours.	Outdoor residential use (washing vehicles, landscape or recreational sprinklers, etc.) of water will be permitted only on specified days. City Administrator will monitor system function and establish hours for outside use. Information Center will keep public advised. Commercial and industrial users will be notified to insure mandatory conservation initiation.	Average daily water consumption reaches 90% of production capacity of water system (2.26 MGD). Average daily water consumption will not enable storage level to maintained and/or recover fully during low demand periods. System demand meets or exceeds 90% max. daily average. Any two conditions listed in Stage 2 occur at same time during 24-hour period.	The City Administrator will ban the use of water for: (1) vehicle washing, window washing, outdoor watering (lawn, shrub, faucet, dripping garden, etc.); (2) Public water uses not essential for health, safety, and sanitary purposes; (3) Commercial users not listed and industrial users will be controlled to the extent dictated by the City Administrator.	Average daily water consumption reaches 95% of production capacity of water system (2.39 MGD). Average daily water consumption will not enable storage level to maintained above 90% of normal water storage capacity. System demand exceeds max. daily average. Any two conditions listed in Stage 3 occur at same time during 24-hour period.	The City Administrator will ban the use of water for: (1) vehicle washing, window washing, outdoor watering (lawn, shrub, faucet, dripping garden, etc.); (2) Public water uses not essential for health, safety, and sanitary purposes; (3) Commericial users not listed and industrial users will be controlled to the extent dictated by the City Administrator. Wholesale customers shall be notified and initiate curtailment proceduers for mandatory DCP measures (if none, follow Sonora's DCP).	Average daily water consumption reaches 100% of production capacity of water system (2.51 MGD). Average daily water consumption will not enable storage level to maintained above 75% of normal water storage capacity. System demand exceeds peak daily average. Any two conditions listed in Stage 4 occur at same time during 24-hour period. Water system is contaminated. Water system fails (act of God, natural disaster, man).	The City Administrator will ban use of water for all water use, except for water needed for health and human consumption.
Upper Colorado River Authority (UCRA)	Sales from City of San Angelo	The amount of water available, to the City of San Angelo and its developed water sources is less than a 24-month supply.	Achieve a voluntary 10% reduction in daily water demand. Outdoor watering schedule and restrictions.	The amount of water available, to the City of San Angelo and its developed water sources is less than a 18-month supply.	Achieve a 15% reduction in daily water demand. Outdoor watering schedule and restrictions. Prepare for implementation of pro rata curtailment.	The amount of water available, to the City of San Angelo and its developed water sources is less than a 12-month supply.	Achieve a 20% reduction in daily water demand. Outdoor watering is prohibited. Other water uses are prohibited. UCRA Director will contact water customers. If City of San Angelo curtails water delivery to UCRA, they will initiate pro rate curtailment.	City of San Angelo's water distribution system reaches a level that exceeds the amount which may be treated or safely delivered through the system. Water system failure or emergency which limits the amount of water that may be treated or safely delivered through the City of San Angelo's system.	Assess the severity of the problem and communicate with City of San Angelo regarding any water use restriction resolutions(s) passed by the San Angelo City Council.	N/A	N/A

Table G-2
Source, Manager, and User

Source	Manager	User
Ballinger/Moonen Lake	Ballinger	Ballinger
		North Runnels WSC
		County-Other (Runnels County)
		Manufacturing (Runnels County)
Lake Balmorhea	Reeves County WCID #1	Irrigation (Reeves County)
Lake Brownwood	Brown County WID #1	Bangs
		Brookesmith SUD
		Brownwood
		Coleman County SUD
		County-Other (Brown County)
		Early
		Santa Anna
		Zephyr WSC
		Irrigation (Brown County)
		Manufacturing (Brown County)
Brady Creek Reservoir	Brady	Brady
		County-Other (McCulloch County)
Lake Coleman	Coleman	Coleman County SUD
		Coleman
		County-Other (Coleman County)
		Irrigation (Coleman County)
		Manufacturing (Coleman County)
Champion Lake	Texas Electric Service Company	Steam Electric Power (Mitchell County)
Colorado River MWD Reservoir System	CRMWD	Big Spring
		Coahoma
		County-Other (Scurry County)
		Ector County UD
		Midland
		Odessa
		Rotan
		Snyder
		Stanton
		Irrigation (Ector County)
		Irrigation (Midland County)
		Manufacturing (Ector County)
		Manufacturing (Howard County)
		Steam Electric Power (Ector County)
		Steam Electric Power (Howard County)

Table G-2
Source, Manager, and User

Source	Manager	User
Colorado River MWD Reservoir (O.H. Ivie) Non-System	CRMWD	Abilene
		Midland
		San Angelo
		Millersview-Doole WSC
		Ballinger
Hords Creek Lake	USACE	Coleman County SUD
		Coleman
		County-Other (Colemand County)
		Irrigation (Coleman County)
		Manufacturing (Coleman County)
Oak Creek	Sweetwater	Bronte
		Robert Lee
		County-Other (Coke County)
		Sweetwater
		Steam Electric Power (Coke County)
O.C. Fisher	San Angelo	San Angelo
		Goodfellow Air Force Base
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green)
		Manufacturing (Tom Green County)
Red Bluff Lake	Red Bluff Water Power Control District	Irrigation (Pecos County)
		Irrigation (Reeves County)
		Irrgation (Ward County)
San Angelo System (Twin Buttes, Nasworthy)	San Angelo	San Angelo
		Goodfellow Air Force Base
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green)
		Manufacturing (Tom Green County)
Lake Winters	Winters	County-Other (Runnels County)
		Manufacturing (Runnels County)
		Winters
Colorado Run-of-River - Brown County		Irrigation (Brown County)
Colorado Run-of-River - Coke County		Irrigation (Coke County)
Colorado Run-of-River - Coleman County		Irrigation (Coleman County)
Colorado Run-of-River - Concho County		County-Other (Concho County)
		Irrigiton (Concho County)
Colorado Run-of-River - Ector County		Irrigation (Ector County)
Colorado Run-of-River - Irion County		Irrigation (Irion County)
Colorado Run-of-River - Kimble County		Irrigation (Kimble County)
		Manufacturing (Kimble County)
		Mining (Kimble County)
Colorado Run-of-River - Kimble County	Junction	Junction

Table G-2
Source, Manager, and User

Source	Manager	User
Colorado Run-of-River - McCulloch County		Irrigation (McCulloch County)
Colorado Run-of-River - Menard County		Irrigation (Menard County)
		Menard
Colorado Run-of-River - Mitchell County		Irrigation (Mitchell County)
Colorado Run-of-River - Runnels County		Irrigation (Runnels County)
Colorado Run-of-River - Sterling County		Irrigation (Sterling County)
Colorado Run-of-River - Sutton County		Irrigation (Sutton County)
Concho Run-of River - Tom Green County	San Angelo	San Angelo
		Goodfellow Air Force Base
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green)
		Manufacturing (Tom Green County)
Rio Grande Run-Of-River - Jeff Davis County (Region E)		County-Other (Reeves County)
		Irrigation (Jeff Davis County Region E)
Rio Grande Run-of-River - Pecos County		Irrigation (Pecos County)
Capitan Reef Complex Aquifer - Pecos County		Irrgation (Pecos County)
		Livestock (Pecos County)
Cross Timbers Aquifer - Brown County		County-Other (Brown County)
		Irrigation (Brown County)
		Livestock (Brown County)
		Mining (Brown County)
Cross Timbers Aquifer - Coleman County		Irrigation (Coleman County)
Cross Timbers Aquifer - Concho County		None reported
Cross Timbers Aquifer - McCulloch County		None reported
Cross Timbers Aquifer - Runnels County		None reported
Dockum Aquifer - Andrews County		Livestock (Andrews County)
		Manufacturing (Andrews County)
Dockum Aquifer - Borden County		Livestock (Borden County)
Dockum Aquifer - Crane County		Manufacturing (Crane County)
Dockum Aquifer - Ector County		Mining (Ector County)
Dockum Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Mining (Howard County)
Dockum Aquifer - Irion County		Mining (Irion County)
Dockum Aquifer - Loving County		Livestock (Loving County)
		Mining (Loving County)

Table G-2
Source, Manager, and User

Source	Manager	User
Dockum Aquifer - Mitchell County		Colorado City
		Loraine
		Mitchell County Utililty
		County-Other (Mitchell County)
		Irrigation (Mitchell County)
		Livestock (Mitchell County)
		Manufacturing (Mitchell County)
		Mining (Mitchell County)
Dockum Aquifer - Reagan County		Irrigation (Reagan County)
Dockum Aquifer - Reeves County		Livestock (Reeves County)
		Pecos (Reeves County)
Dockum Aquifer - Scurry County		County-Other (Scurry County)
		Irrigation (Scurry County)
		Livestock (Scurry County)
		Manufacturing (Scurry County)
		Mining (Scurry County)
Dockum Aquifer - Upton County		Irrigation (Upton County)
		Manufacturing (Upton County)
Dockum Aquifer - Ward County		County-Other (Ward County)
		Irrigation (Ward County)
		Livestock (Ward County)
Dockum Aquifer - Winkler County		County-Other (Winkler County)
		Kermit
		Livestock (Winkler County)
		Manufacturing (Winkler County)
		Mining (Winkler Other)
Edwards-Trinity (Plateau) Aquifer - Andrews County		Irrigation (Andrews County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Coke County		County-Other (Coke County)
		Irrigation (Coke County)
		Livestock (Coke County)
		Mining (Coke County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Concho County		Eden
		County-Other (Concho County)
		Livestock (Concho County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Crockett County		County-Other (Crockett County)
		Crockett County WCID #1
		Irrigation (Crockett County)
		Livestock (Crockett County)
		Manufacturing (Crockett County)
		Mining (Crockett County)

Table G-2
Source, Manager, and User

Source	Manager	User
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Ector County		County-Other (Ector County)
		Greater Gardendale WSC
		Irrigation (Ector County)
		Livestock (Ector County)
		Mining (Ector County)
		Manufacturing (Ector County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Glasscock County		County-Other (Glasscock County)
		Irrigation (Glasscock County)
		Livestock (Glasscock County)
		Manufacturing (Glasscock County)
		Mining (Glasscock County)
Edwards-Trinity (Plateau) Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Manufacturing (Howard County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Irion County		County-Other (Irion County)
		Irrigation (Irion County)
		Livestock (Irion County)
		Manufacturing (Irion County)
		Mertzon
		Mining (Irion County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Kimble County		County-Other (Kimble County)
		Irrigation (Kimble County)
		Livestock (Kimble County)
		Manufacturing (Kimble County)
		Mining (Kimble County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - McCulloch County		Livestock (McCulloch County)
		Manufacturing (McCulloch County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Menard County		County-Other (Menard County)
		Irrigation (Menard County)
		Livestock (Menard County)
		Mining (Menard County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Midland County		Airline Mobile Home Park LTD
		County-Other (Midland County)
		Irrigation (Midland County)
		Livestock (Midland County)
		Midland
		Manufacturing (Midland County)
		Mining (Midland County)
		Odessa

Table G-2
Source, Manager, and User

Source	Manager	User
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Pecos County		County-Other (Pecos County)
		Fort Stockton
		Iraan
		Irrigation (Pecos County)
		Livestock (Pecos County)
		Manufacturing (Pecos County)
		Mining (Pecos County)
		Pecos County Fresh Water
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Reagan County		Big Lake
		County-Other (Reagan County)
		Irrigation (Reagan County)
		Livestock (Reagan County)
		Mining (Reagan County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Schleicher County		County-Other (Schleicher County)
		El Dorado
		Irrigation (Schleicher County)
		Livestock (Schleicher County)
		Mining (Schleicher County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Sterling County		County-Other (Sterling County)
		Irrigation (Sterling County)
		Livestock (Sterling County)
		Mining (Sterling County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Sutton County		County-Other (Sutton County)
		Irrigation (Sutton County)
		Livestock (Sutton County)
		Manufacturing (Sutton County)
		Mining (Sutton Coutny)
		Sonora
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer -Tom Green County		Concho Rural WSC
		County-Other (Tom Green County)
		Irrigation (Tom Green County)
		Livestock (Tom Green County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Upton County		County-Other (Upton County)
		Irrigation (Upton County)
		Livestock (Upton County)
		Manufacturing (Upton County)
		Mining (Upton County)
		Rankin
Ellenburger-San Saba Aquifer - Mason County		County-Other (Mason County)
		Livestock (Mason County)
Ellenburger - San Saba Aquifer - McCulloch County		Livestock (McCulloch County)
		Mining (McCulloch County)
Ellenburger - San Saba Aquifer - Menard County		Livestock (Menard County)
		Mining (Menard County)

Table G-2
Source, Manager, and User

Source	Manager	User
Hickory Aquifer - Concho County		Millerview-Doole WSC
Hickory Aquifer - Kimble County		Irrigation (Kimble County)
Hickory Aquifer - Mason County		County-Other (Mason County)
		Irrigation (Mason County)
		Livestock (Mason County)
		Mason
		Mining (Mason County)
Hickory Aquifer - McCulloch County		Brady
		County-Other (McCulloch County)
		Irrigation (McCulloch County)
		Livestock (McCulloch County)
		Manufacturing (McCulloch County)
		Millersview-Doole WSC
		Mining (McCulloch County)
Hickory Aquifer - Menard County		Irrigation (Menard County)
Hickory Aquifer - Runnels County		Miles
		Millersview-Doole WSC
Hickory Aquifer - Tom Green County		Concho Rural Water
		County-Other (Tom Green County)
		Goodfellow Air Force Base
		Manufacturing (Tom Green County)
		Millersview-Doole WSC
		Mining (Tom Green County)
		San Angelo
Igneous Aquifer - Reeves County		Irrigation (Reeves County)
		Livestock (Reeves County)
Lipan Aquifer - Concho County		Irrigation (Concho County)
Lipan Aquifer - Irion County		Mining (Irion County)
Lipan Aquifer - Runnels County		Livestock (Runnels County)
		Manufacturing (Runnels County)
		Miles
Lipan Aquifer - Sterling County		Sterling City
Lipan Aquifer - Tom Green County		Concho Rural WSC
		County-Other (Tom Green County)
		DADS Supported Living Center
		Irrigation (Tom Green County)
		Livestock (Tom Green County)
		Manufacturing (Tom Green County)
		Mining (Tom Green County)
		Tom Green County FWSD 3
Marble Falls Aquifer - Kimble County		County-Other (Kimble County)
Marble Falls Aquifer - McCulloch County		Irrigation (McCulloch County)
		Richland SUD

Table G-2
Source, Manager, and User

Source	Manager	User
Ogallala and Edwards-Trinity (High Plains) Aquifer - Andrews County		Andrews
	Great Plains Water System Inc.	County-Other (Andrews County)
		Irrigation (Andrews County)
		Livestock (Andrews County)
		Manufacturing (Andrews County)
	Great Plains Water System Inc.	Mining (Andrews County)
	Great Plains Water System Inc.	Steam Electric Power (Ector County)
		Midland
Ogallala and Edwards-Trinity (High Plains) Aquifer - Borden County		County-Other (Borden County)
		Irrigation (Borden County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Dawson County		County-Other (Borden County)
Ogallala Aquifer - Ector County		County-Other (Ector County)
		Irrigation (Ector County)
		Livestock (Ector County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Gaines County		Steam Electric Power (Ector County)
Ogallala Aquifer - Glasscock County		Livestock (Glasscock County)
		Irrigation (Glasscock County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Manufacturing (Howard County)
		Mining (Howard County)
		Steam Electric Power (Howard County)

Table G-2
Source, Manager, and User

Source	Manager	User
Ogallala and Edwards-Trinity (High Plains) Aquifer -Martin County		Ector County Utility District
		Odessa
		Manufacturing (Ector County)
		Irrigation (Ector County)
		Coahoma
		Manufacturing (Howard County)
		Steam Electric Power (Howard County)
		County-Other (Martin County)
	CRMWD	CRMWD system customers
		Irrigation (Martin County)
		Livestock (Martin County)
	University Lands	Midland
		Mining (Martin County)
	Stanton	Stanton
		Odessa
		Irrigation (Midland County)
		Snyder
		County - Other (Scurry County)
Ogallala Aquifer - Midland County		Airline Mobile Home Park LTD
		County-Other (Midland County)
		Greenwood Water
		Irrigation (Midland County)
		Livestock (Midland County)
		Manufacturing (Midland County)
		Mining (Midland County)
Other Aquifer - Borden County		County-Other (Borden County)
		Irrigation (Borden County)
		Mining (Borden County)
Other Aquifer - Coke County		Bronte (Coke County)
		County-Other (Coke County)
		Irrigation (Coke County)
		Livestock (Coke County)
		Robert Lee
Other Aquifer - Coleman County		Mining (Coleman County)
Other Aquifer - Concho County		County-Other (Concho County)
		Eden
		Irrigation (Concho County)
		Mining (Concho County)
Other Aquifer - Mason County		County - Other (Mason County)
Other Aquifer - McCulloch County		Livestock (McCulloch County)
		County-Other (McCulloch County)
Other Aquifer - Mitchell County		Livestock (Mitchell County)
Other Aquifer - Pecos County		Livestock (Pecos County)

Table G-2
Source, Manager, and User

Source	Manager	User
Other Aquifer - Runnels County		County-Other (Runnels County)
		Irrigation (Runnels County)
		Livestock (Runnels County)
		Mining (Runnels County)
Other Aquifer - Scurry County		County-Other (Scurry County)
		Livestock (Scurry County)
Pecos Valley Aquifer - Andrews County		County - Other (Andrews County)
		Livestock (Andrews County)
		Irrigation (Andrews County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Crane County		Crane
		County - Other (Crane County)
		Manufacturing (Crane County)
		Mining (Crane County)
		Livestock (Crane County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Jeff Davis County		Balmorhea
		Madera Valley WSC
		County - Other (Reeves County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Loving County		County - Other (Loving County)
		Mining (Loving County)
		Livestock (Loving County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Pecos County		Pecos County WCID #1
		Mining (Pecos County)
		Irrigation (Pecos County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Reeves County		Madera Valley WSC
		Conty - Other (Reeves County)
		Manufacturing (Reeves County)
		Mining (Reeves County)
		Livestock (Reeves County)
		Irrigation (Reeves County)

Table G-2
Source, Manager, and User

Source	Manager	User
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Ward County		Crane
		County - Other (Crane County)
		Ector County Utility District
		Odessa
		Manufacturing (Ector County)
		Irrigation (Ector County)
		Big Spring
		Coahoma
		Manufacturing (Howard County)
		Steam Electric Power (Howard County)
		Stanton
		Midland
		Odessa
		Irrigation (Midland County)
		Pecos
		Snyder
		County - Other (Scurry County)
		Grandfalls
		Monahans
		Southwest Sandhills WSC
		Wickett
		County - Other (Ward County)
		Manufacturing (Ward County)
		Mining (Ward County)
		Steam Electric Power (Ward County)
		Livestock (Ward County)
		Irrigation (Ward County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Winkler County		Midland
		Monahans
		Wink
		County - Other (Winkler County)
		Mining (Winkler County)
		Livestock (Winkler County)
		Irrigation (Winkler County)
Rustler Aquifer - Loving County		Mining (Loving County)
Rustler Aquifer - Pecos County		Irrigation (Pecos County)
		Livestock (Pecos County)
Rustler Aquifer - Reeves County		Irrigation (Reeves County)
Trinity Aquifer - Brown County		County-Other (Brown County)
		Irrigation (Brown County)
		Livestock (Brown County)
		Mining (Brown County)

Table G-3
Drought Triggers and Actions by Source

Source Name	Type (sw/ gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency
Ballinger/ Moonen Lake	sw	Water Level	1,666	1,662	1,658	same as manager			outside watering limits; request voluntary reduction of use	outside watering limits; fines for violation	prohibit outdoor use; prohibit non essential use; fines	outside watering limits; voluntary reduction of use	outside watering limits; fines for violation	prohibit outdoor use; prohibit non essential use; fines
Lake Balmorhea	sw	Capacity/ Rainfall	<70% intake pond capacity; or no rainfall for 15 consecutive days	<50% intake pond capacity; or no rainfall for 20 consecutive days	<70% intake pond capacity; or no rainfall for 15 consecutive days	same as manager			Achieve voluntary 60% reduction of use for nonessential purposes; water conservation	Achieve 85% reduction in daily water demand. Implement BMPs for supply management.	Achieve 90% reduction in total water usage. Implement BMPs for supply management.	same as manager		
Lake Brownwood	sw	Water Level	1,420	1,417	1,414	same as manager			Initiate stage 1 of DCP; increase public education; request voluntary reduction of use	Initiate stage 2 of DCP; request decrease in use; implement watering restrictions	Initiate stages 3/4 of DCP; request to severely reduce use; may curtail usage and discontinue nonessential uses	Initiate stage 1 of DCP; voluntary reduction of use	Initiate stage 2 of DCP; decrease in use; implement watering restrictions	Initiate stages 3/4 of DCP; severely reduce use; may have reduced deliveries; discontinue all nonessential uses
Brady Creek Reservoir	sw	Supply as % of Demand	supply <= 80% of consumptive needs	supply <= 70% of consumptive needs	supply <= 60% of consumptive needs	same as manager			voluntary 10% reduction of use	20% reduction of use; outdoor watering limits	30% reduction of use; prohibit outdoor water use	same as manager		
Lake Coleman	sw	Water Level	1705 or demand => 3.3 MGD for 5 consecutive days	1,702	1,700	same as manager			voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions	same as manager		
Champion Creek Reservoir	sw													
CRMWD System	sw	Reservoir Storage	< 77,998 ac-ft capacity	< 58,499 ac-ft capacity	< 38,999 ac-ft capacity	same as manager			initiate studies to evaluate alternative actions; begin 'pump back' operatoin as needed; request initiation of Stage 1 of DCPs	continue or initiate actions from Stage 1; initiate studies to evaluate alternative actions; request initiation of Stage 2 of DCPs	continue or initiate actions from Stages 1 or 2; initiate Ward County Well Field System pipeline expansion project; initiate studies to evaluate alternative actions; request initiation of Stage 3 of DCPs; implement alternative supplies	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP
Hords Creek Lake	sw	Demand/ Curtailment	COE curtails usage or demand => 3.3 MGD for 5 consecutive days	COE significantly curtails usage	COE completely curtails usage	same as manager			voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions	same as manager		

Table G-3
Drought Triggers and Actions by Source

Source Name	Type (sw/ gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency
Nasworthy	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	same as manager			watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	same as manager		
Oak Creek	sw	Water Level	10 ft. below the spillway (51.5% of capacity)	18 ft. below the spillway	19.7 ft. below the spillway	same as manager			voluntary reduction of non-essential use	limited outdoor watering; fines for violators	no outside watering; increased rates; pro rata curtailment	same as manager		
O.C. Fisher	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	same as manager			watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	same as manager		
O.H. Ivie	sw	Reservoir Storage	< 138,028 ac-ft capacity	< 107,060 ac-ft capacity	< 76,092 ac-ft capacity	same as manager			initiate studies to evaluate alternative actions; request initiation of Stage 1 of DCPs	continue or initiate actions from Stage 1; initiate studies to evaluate alternative actions; request initiation of Stage 2 of DCPs	continue or initiate actions from Stages 1 or 2; initiate studies to evaluate alternative actions; request initiation of Stage 3 of DCPs	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP
Red Bluff Lake	sw	Reservoir Storage	100,000 acre-feet	75,000 acre-feet	50,000 acre-feet	same as manager			reduce amount available to users	reduce amount available to users	reduce amount available to users	reduce irrigated acreage	reduce irrigated acreage	stop irrigation
Twin Buttes	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	same as manager			watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	same as manager		
Lake Winters	sw	Water Level	<= 50% storage	<= 40% storage	<= 30% storage	same as manager			voluntary 10% reduction of use; request customers to reduce use	mandatory measures to reduce non-essential water use by 30%; weekly contact with customers; weekly media report	mandatory measures to reduce water use by 60%; pro rata curtailment of customers; any other necessary measures	same as manager		
Colorado Run-of-River	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Rio Grande Run-of-River	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	

Table G-3
Drought Triggers and Actions by Source

Source Name	Type (sw/ gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency
Capitan Reef Complex Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Cross Timbers Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Dockum Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Edwards- Trinity (Plateau), Pecos Valley, and Trinity Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Ellenburger-San Saba Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Hickory Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Lipan Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Marble Falls Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	

Table G-3
Drought Triggers and Actions by Source

Source Name	Type (sw/ gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency
Ogallala & Edwards-Trinity (High Plains) Aquifers	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Other Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Rustler Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
Seymour Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	

APPENDIX H
SOCIOECONMIC IMPACTS OF PROJECTED SHORTAGES FOR THE REGION F REGIONAL WATER PLANNING AREA

Socioeconomic Impacts of Projected Water Shortages for the Region F Regional Water Planning Area

Prepared in Support of the 2021 Region F Regional Water Plan

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Texas Water Development Board

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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 Region F Regional Water Planning Group (Region F).

Based on projected water demands and existing water supplies, Region F 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 job losses are estimated within each planning decade (2020 through 2070). 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 F generated more than $50 billion in gross domestic product (GDP) (2018 dollars) and supported more than 424,000 jobs in 2016. The Region F estimated total population was approximately 686,000 in 2016.

It is estimated that not meeting the identified water needs in Region F would result in an annually combined lost income impact of approximately $19.6 billion in 2020 and $6.4 billion in 2070 (Table ES-1). It is also estimated that the region would lose approximately 98,000 jobs in 2020 and 39,000 in 2070.

All impact estimates are in year 2018 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 F socioeconomic impact summary

Regional Economic Impacts	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$19,624	$19,720	$17,058	$13,443	$7,750	$6,356
Job losses	98,208	100,186	88,685	71,444	43,995	38,833
Financial Transfer Impacts	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Tax losses on production and imports ($ millions)*	$2,644	$2,647	$2,266	$1,749	$937	$725
Water trucking costs ($ millions)*	$29	$29	$29	$30	$31	$32
Utility revenue losses ($ millions)*	$56	$82	$111	$139	$172	$207
Utility tax revenue losses ($ millions)*	$1	$1	$2	$3	$3	$4
Social Impacts	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Consumer surplus losses ($ millions)*	$87	$93	$149	$183	$227	$286
Population losses	18,031	18,394	16,283	13,117	8,078	7,130
School enrollment losses	3,449	3,518	3,115	2,509	1,545	1,364

* Year 2018 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.

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 Water Use, Projections, & Planning Division designed and conducted this analysis in support of Region F, 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 F Regional Water Planning Area generated more than $50 billion in GDP (2018 dollars) and supported roughly 424,000 jobs in 2016, according to the IMPLAN dataset utilized in this socioeconomic analysis. This activity accounted for 3 percent of the state's total GDP of 1.73 trillion dollars for the year based on IMPLAN. Table 1-1 lists all economic sectors ranked by the total value-added to the economy in Region F. The mining sector (including oil and gas extraction) generated close to 40 percent of the region's total value-added and was also a significant source of tax revenue. The top employers in the region were in the mining, public administration, and retail trade sectors. Region F's estimated total population was roughly 686,000 in 2016, approximately 2.5 percent of the state's total.

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.

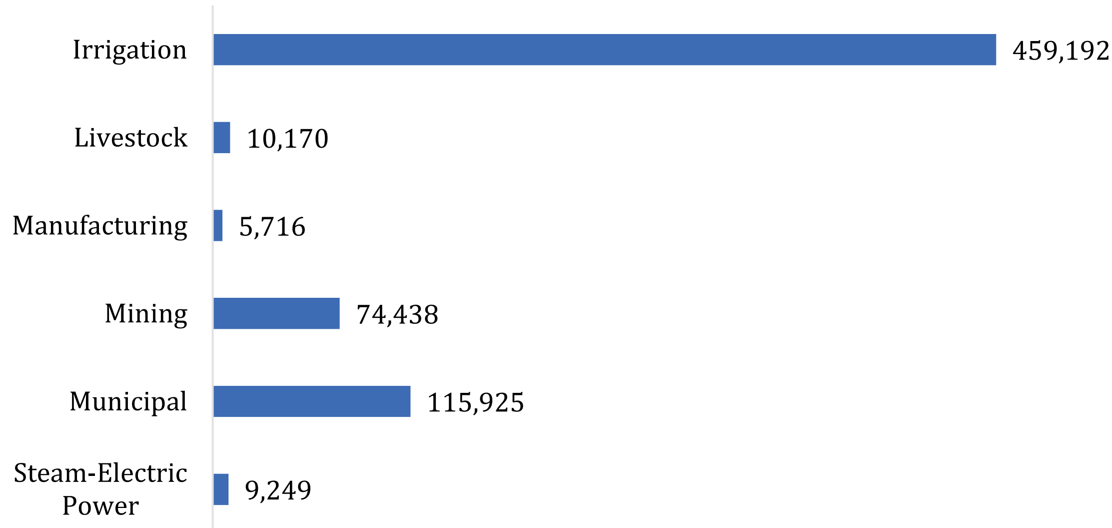
Table 1-1 Region F regional economy by economic sector*

Economic sector	Value-added ($ millions)	Tax ($ millions)	Jobs
Mining, Quarrying, and Oil and Gas Extraction	$19,711.6	$2,458.8	67,722
Public Administration	$4,274.8	$(23.0)	53,420
Real Estate and Rental and Leasing	$3,831.9	$556.6	14,285
Wholesale Trade	$3,199.8	$496.7	16,901
Manufacturing	$3,091.3	$95.4	18,614
Construction	$2,650.8	$33.3	30,015
Retail Trade	$2,203.5	$542.9	39,778
Health Care and Social Assistance	$1,743.9	$25.6	30,056
Finance and Insurance	$1,513.5	$66.2	16,366
Utilities	$1,350.0	$174.2	2,089
Accommodation and Food Services	$1,346.2	$196.9	32,131
Professional, Scientific, and Technical Services	$1,256.2	$37.8	18,165
Other Services (except Public Administration)	$1,229.4	$124.4	21,836
Transportation and Warehousing	$1,011.8	$97.2	15,793
Administrative and Support and Waste Management and Remediation Services	$719.3	$26.4	14,728
Information	$695.5	$208.0	3,546
Agriculture, Forestry, Fishing and Hunting	$412.7	$15.9	16,847
Management of Companies and Enterprises	$394.9	$9.5	3,372
Arts, Entertainment, and Recreation	$187.6	$33.8	5,317
Educational Services	$92.6	$5.4	3,175
Grand Total	**$50,917.2**	**$5,182.1**	**424,156**

*Source: 2016 IMPLAN for 536 sectors aggregated by 2-digit NAICS (North American Industry Classification System)

While the mining sector led the region in economic output, the majority (68 percent) of water use in 2016 occurred in irrigated agriculture. Notably, more than 44 percent of the state's mining water use occurred within Region F. Figure 1-1 illustrates Region F's breakdown of the 2016 water use estimates by TWDB water use category.

Figure 1-1 Region F 2016 water use estimates by water use category (in acre-feet)



Source: TWDB Annual Water Use Estimates (all values in acre-feet)

1.2 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 F 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). 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. 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 by WUG and county appears in Chapter 4 of the 2021 Region F Regional Water Plan.

Table 1-2 Regional water needs summary by water use category

Water Use Category		2020	2030	2040	2050	2060	2070
Irrigation	water needs (acre-feet per year)	13,528	17,957	18,618	19,676	22,157	24,740
	% of the category's total water demand	3%	4%	4%	4%	5%	5%
Livestock	water needs (acre-feet per year)	9	17	25	39	50	60
	% of the category's total water demand	0%	0%	0%	0%	0%	1%
Manufacturing	water needs (acre-feet per year)	1,137	1,226	1,269	1,461	1,664	1,851
	% of the category's total water demand	10%	10%	10%	12%	13%	15%
Mining	water needs (acre-feet per year)	23,009	22,916	19,702	15,080	7,993	5,880
	% of the category's total water demand	21%	21%	22%	23%	17%	17%
Municipal*	water needs (acre-feet per year)	16,030	24,159	33,381	42,081	52,530	63,829
	% of the category's total water demand	12%	16%	21%	25%	29%	34%
Steam-electric power	water needs (acre-feet per year)	12,746	12,793	12,850	12,945	13,042	13,129
	% of the category's total water demand	70%	71%	71%	72%	72%	73%
Total water needs (acre-feet per year)		**66,459**	**79,068**	**85,845**	**91,282**	**97,436**	**109,489**

* 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.
Job losses	Number of part-time and full-time jobs 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.
Population losses	Population losses accompanying job losses.
School enrollment losses	School enrollment losses (K-12) accompanying job losses.

2.1 Regional Economic Impacts

The two key measures used to assess regional economic impacts are income losses and 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.

Job Losses

The number of jobs 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, job loss estimates are not calculated for the steam-electric power category.

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 $35,000[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 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. 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

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[1] Based on staff survey of water hauling firms and historical data concerning transport costs for potable water in the recent drought in California for this estimate. There are many factors and variables that would determine actual water trucking costs including distance to, cost of water, and length of that drought.

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.

Population and School Enrollment Losses

Population loss due to water shortages, as well as the associated decline in school enrollment, are based upon the job loss estimates discussed in Section 2.1. A simplified ratio of job and net population losses are calculated for the state as a whole based on a recent study of how job layoffs impact the labor market population.[2] For every 100 jobs lost, 18 people were assumed to move out of the area. School enrollment losses are estimated as a proportion of the population lost based upon public school enrollment data from the Texas Education Agency concerning the age K-12 population within the state (approximately 19%).

[2] 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 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 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 536 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 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

Input-Output analysis using the IMPLAN software package was the primary means of estimating the value-added, jobs, and tax related impact measures. This analysis employed regional level models to determine key economic impacts. IMPLAN is an economic impact model, 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 Minnesota IMPLAN Group (MIG Inc.) which collects and sells county and state specific data and software. The year 2016 version of IMPLAN, employing data for all 254 Texas counties, was used to provide estimates of value-added, jobs, and taxes on production for the economic sectors associated with the water user groups examined in the study. IMPLAN uses 536 sector-specific Industry Codes, and those that rely on water as a primary input were assigned to their appropriate planning water user categories (irrigation, livestock, manufacturing, mining, and municipal). Estimates of value-added for a water use category were obtained by summing value-added estimates across the relevant IMPLAN sectors associated with that water use category. These calculations were also performed for job losses as well as tax losses on production and imports.

The adjusted value-added estimates used as an income measure in this analysis, as well as the job and tax estimates from IMPLAN, include 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.

Input-output models such as IMPLAN only capture backward linkages and do not include forward linkages in the economy.

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 livestock 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 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)

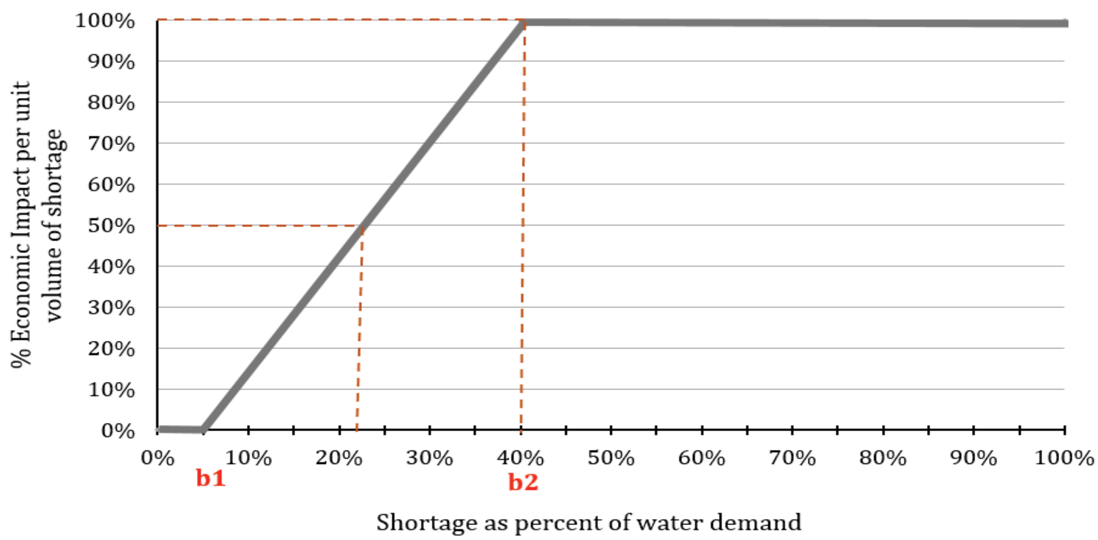

Table 3-1 Economic impact elasticity function lower and upper bounds

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., 2020, 2030, 2040, 2050, 2060, and 2070). 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. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals, and the resulting impacts are estimated. 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. Input-output models such as IMPLAN rely on a static profile of the structure of the economy as it appears today. 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.

4. 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.

5. All monetary values originally based upon year 2016 IMPLAN and other sources are reported in constant year 2018 dollars to be consistent with the water management strategy requirements in the State Water Plan.

6. 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.

7. 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.

8. 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.

9. 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 losses 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.

10. 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.

11. 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.

12. 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 population and school enrollment changes are based on regional evaluations and therefore do not necessarily reflect what might occur on a statewide basis.

13. **The results must be interpreted carefully. It is the general and relative magnitudes of 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.

14. 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.

15. 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

Nine of the 32 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 in Region F

Impact measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$4	$6	$6	$7	$8	$8
Job losses	98	137	148	170	187	200

* Year 2018 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 32 counties in the region are projected to experience water shortages in the livestock water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-2.

Table 4-2 Impacts of water shortages on livestock in Region F

Impact measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$-	$0	$1	$1	$1	$1
Jobs losses	-	11	26	41	52	63
Tax losses on production and imports ($ millions)*	$-	$0	$0	$0	$0	$0

* Year 2018 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 32 counties in the region 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 in Region F

Impacts measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$457	$535	$576	$684	$821	$982
Job losses	1,241	1,771	2,121	2,927	3,933	5,043
Tax losses on production and Imports ($ millions)*	$28	$33	$35	$42	$50	$60

* Year 2018 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

Mining water shortages in the region are projected to occur in seven of the 32 counties in the region for one or more decades within the planning horizon. Estimated impacts to this water use type appear in Table 4-4.

Table 4-4 Impacts of water shortages on mining in Region F

Impacts measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$18,617	$18,533	$15,686	$11,894	$5,970	$4,291
Job losses	94,650	94,226	79,758	60,489	30,375	21,842
Tax losses on production and Imports ($ millions)*	$2,604	$2,592	$2,194	$1,663	$834	$599

* Year 2018 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

Nineteen of the 32 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 $35,000 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 in Region F

Impacts measure	2020	2030	2040	2050	2060	2070
Income losses[1] ($ millions)*	$121	$220	$362	$426	$515	$637
Job losses[1]	2,219	4,041	6,632	7,817	9,448	11,685
Tax losses on production and imports[1] ($ millions)*	$12	$23	$37	$44	$53	$65
Trucking costs ($ millions)*	$29	$29	$29	$30	$31	$32
Utility revenue losses ($ millions)*	$56	$82	$111	$139	$172	$207
Utility tax revenue losses ($ millions)*	$1	$1	$2	$3	$3	$4

[1] Estimates apply to the water-intensive portion of non-residential municipal water use.
* Year 2018 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 Water Shortages

Steam-electric water shortages in the region are projected to occur in four of the 32 counties in the region for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-6.

Note that estimated economic impacts to steam-electric 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 in Region F

Impacts measure	2020	2030	2040	2050	2060	2070
Income Losses ($ millions)*	$424	$426	$428	$431	$434	$437

* Year 2018 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 in Region F

Impacts measure	2020	2030	2040	2050	2060	2070
Consumer surplus losses ($ millions)*	$87	$93	$149	$183	$227	$286
Population losses	18,031	18,394	16,283	13,117	8,078	7,130
School enrollment losses	3,449	3,518	3,115	2,509	1,545	1,364

* Year 2018 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 Estimated Economic Impacts for Region F

County level summary of estimated economic impacts of not meeting identified water needs by water use category and decade (in 2018 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 (Million $)*						Job losses					
County	Water Use Category	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070
ANDREWS	IRRIGATION	$0.07	$1.55	$1.98	$2.84	$3.51	$3.86	2	40	51	73	91	100
ANDREWS	LIVESTOCK	-	$0.24	$0.57	$0.88	$1.13	$1.36	-	11	26	41	52	63
ANDREWS	MANUFACTURING	$0.74	$18.63	$54.78	$155.00	$279.33	$417.54	5	117	343	970	1,748	2,613
ANDREWS	MINING	$2,415.23	$2,211.91	$1,774.79	$1,228.20	$754.04	$299.20	12,260	11,228	9,009	6,234	3,828	1,519
ANDREWS	MUNICIPAL	$0.00	$0.49	$1.84	$6.40	$13.72	$24.41	0	9	34	117	251	448
ANDREWS Total		**$2,416.05**	**$2,232.81**	**$1,833.97**	**$1,393.32**	**$1,051.73**	**$746.38**	**12,266**	**11,404**	**9,463**	**7,436**	**5,970**	**4,741**
BORDEN	IRRIGATION	-	-	$0.00	$0.01	$0.01	$0.02	-	-	0	0	0	0
BORDEN Total		**-**	**-**	**$0.00**	**$0.01**	**$0.01**	**$0.02**	**-**	**-**	**0**	**0**	**0**	**0**
BROWN	IRRIGATION	$1.14	$1.15	$1.14	$1.15	$1.14	$1.14	27	28	28	28	28	28
BROWN	MINING	$21.21	$21.98	$21.89	$22.23	$21.61	$21.54	142	147	146	149	144	144
BROWN	MUNICIPAL	$0.12	$0.12	$0.11	$0.11	$0.11	$0.11	2	2	2	2	2	2
BROWN Total		**$22.46**	**$23.24**	**$23.14**	**$23.48**	**$22.86**	**$22.79**	**171**	**177**	**176**	**178**	**174**	**174**
COKE	MUNICIPAL	$2.68	$2.64	$2.62	$2.61	$2.61	$2.61	49	48	48	48	48	48
COKE Total		**$2.68**	**$2.64**	**$2.62**	**$2.61**	**$2.61**	**$2.61**	**49**	**48**	**48**	**48**	**48**	**48**
COLEMAN	IRRIGATION	$0.17	$0.17	$0.17	$0.17	$0.17	$0.17	5	5	5	5	5	5
COLEMAN	MANUFACTURING	$1.22	$1.22	$1.22	$1.22	$1.22	$1.22	10	10	10	10	10	10
COLEMAN	MUNICIPAL	$7.62	$7.53	$7.34	$7.29	$7.28	$7.28	140	138	135	134	133	133
COLEMAN Total		**$9.01**	**$8.91**	**$8.72**	**$8.67**	**$8.66**	**$8.66**	**155**	**153**	**149**	**148**	**148**	**148**
CONCHO	MUNICIPAL	$0.07	$0.07	$0.07	$0.08	$0.08	$0.08	1	1	1	1	1	1
CONCHO Total		**$0.07**	**$0.07**	**$0.07**	**$0.08**	**$0.08**	**$0.08**	**1**	**1**	**1**	**1**	**1**	**1**
ECTOR	MUNICIPAL	$1.42	$1.55	$2.77	$5.68	$22.92	$57.07	26	28	51	104	420	1,046
ECTOR	STEAM ELECTRIC POWER	$2.16	$3.83	$5.72	$8.75	$11.35	$13.61	-	-	-	-	-	-

		Income losses (Million $)*						Job losses					
County	Water Use Category	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070
ECTOR Total		**$3.58**	**$5.38**	**$8.50**	**$14.44**	**$34.27**	**$70.68**	**26**	**28**	**51**	**104**	**420**	**1,046**
HOWARD	MANUFACTURING	-	-	-	-	$4.53	$18.06	-	-	-	-	15	59
HOWARD	MUNICIPAL	$0.98	-	-	$1.07	$8.98	$22.90	18	-	-	20	165	420
HOWARD	STEAM ELECTRIC POWER	$0.10	-	-	$0.13	$0.77	$1.40	-	-	-	-	-	-
HOWARD Total		**$1.08**	**-**	**-**	**$1.21**	**$14.27**	**$42.36**	**18**	**-**	**-**	**20**	**179**	**479**
IRION	IRRIGATION	$0.09	$0.09	$0.09	$0.09	$0.09	$0.09	3	3	3	3	3	3
IRION	MINING	$1,381.50	$1,374.78	$94.20	-	-	-	7,023	6,988	479	-	-	-
IRION Total		**$1,381.59**	**$1,374.87**	**$94.29**	**$0.09**	**$0.09**	**$0.09**	**7,025**	**6,991**	**482**	**3**	**3**	**3**
KIMBLE	IRRIGATION	$0.26	$0.26	$0.26	$0.26	$0.26	$0.26	8	8	8	8	8	8
KIMBLE	MANUFACTURING	$104.49	$121.99	$121.99	$121.99	$121.99	$121.99	312	364	364	364	364	364
KIMBLE	MUNICIPAL	$4.77	$4.72	$4.64	$4.61	$4.60	$4.60	87	87	85	85	84	84
KIMBLE Total		**$109.52**	**$126.97**	**$126.89**	**$126.86**	**$126.85**	**$126.85**	**407**	**459**	**457**	**457**	**457**	**457**
LOVING	MINING	$3,202.78	$3,202.78	$2,463.99	$1,202.04	$427.69	$571.91	16,281	16,281	12,525	6,110	2,174	2,907
LOVING Total		**$3,202.78**	**$3,202.78**	**$2,463.99**	**$1,202.04**	**$427.69**	**$571.91**	**16,281**	**16,281**	**12,525**	**6,110**	**2,174**	**2,907**
MARTIN	IRRIGATION	-	-	-	-	-	$0.18	-	-	-	-	-	4
MARTIN	MUNICIPAL	$0.04	$0.08	$0.19	$0.57	$1.11	$1.75	1	1	3	10	20	32
MARTIN Total		**$0.04**	**$0.08**	**$0.19**	**$0.57**	**$1.11**	**$1.93**	**1**	**1**	**3**	**10**	**20**	**36**
MASON	MUNICIPAL	$7.47	$7.37	$7.28	$7.23	$7.22	$7.22	137	135	133	132	132	132
MASON Total		**$7.47**	**$7.37**	**$7.28**	**$7.23**	**$7.22**	**$7.22**	**137**	**135**	**133**	**132**	**132**	**132**
MCCULLOCH	MUNICIPAL	$13.32	$13.60	$13.43	$13.50	$13.52	$13.54	244	249	246	248	248	248
MCCULLOCH Total		**$13.32**	**$13.60**	**$13.43**	**$13.50**	**$13.52**	**$13.54**	**244**	**249**	**246**	**248**	**248**	**248**
MENARD	MUNICIPAL	$1.68	$1.62	$1.57	$1.56	$1.56	$1.56	31	30	29	29	29	29
MENARD Total		**$1.68**	**$1.62**	**$1.57**	**$1.56**	**$1.56**	**$1.56**	**31**	**30**	**29**	**29**	**29**	**29**
MIDLAND	MUNICIPAL	$0.03	$111.77	$233.17	$267.70	$302.87	$341.40	0	2,049	4,275	4,908	5,553	6,259
MIDLAND Total		**$0.03**	**$111.77**	**$233.17**	**$267.70**	**$302.87**	**$341.40**	**0**	**2,049**	**4,275**	**4,908**	**5,553**	**6,259**
MITCHELL	IRRIGATION	$0.10	$0.15	$0.13	$0.11	$0.10	$0.08	2	3	2	2	2	1
MITCHELL	MUNICIPAL	-	$0.49	$0.62	$0.76	$0.94	$1.16	-	9	11	14	17	21
MITCHELL	STEAM ELECTRIC POWER	$343.68	$343.68	$343.68	$343.68	$343.68	$343.68	-	-	-	-	-	-
MITCHELL Total		**$343.78**	**$344.32**	**$344.43**	**$344.55**	**$344.71**	**$344.92**	**2**	**12**	**14**	**16**	**19**	**23**

		Income losses (Million $)*						Job losses					
County	**Water Use Category**	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
PECOS	MANUFACTURING	$156.91	$148.60	$148.60	$148.60	$148.60	$148.60	352	334	334	334	334	334
PECOS	MINING	$2,869.87	$2,869.87	$2,869.87	$2,869.87	-	-	14,588	14,588	14,588	14,588	-	-
PECOS Total		**$3,026.79**	**$3,018.47**	**$3,018.47**	**$3,018.47**	**$148.60**	**$148.60**	**14,940**	**14,922**	**14,922**	**14,922**	**334**	**334**
REEVES	MINING	$8,527.63	$8,527.63	$8,117.65	$6,313.72	$4,591.80	$3,279.86	43,348	43,348	41,264	32,094	23,341	16,672
REEVES	MUNICIPAL	$0.45	$0.50	$0.55	$0.58	$0.60	$0.62	8	9	10	11	11	11
REEVES Total		**$8,528.08**	**$8,528.13**	**$8,118.19**	**$6,314.30**	**$4,592.40**	**$3,280.48**	**43,356**	**43,357**	**41,274**	**32,105**	**23,352**	**16,684**
RUNNELS	MUNICIPAL	$4.00	$3.77	$3.59	$3.56	$3.59	$3.77	73	69	66	65	66	69
RUNNELS Total		**$4.00**	**$3.77**	**$3.59**	**$3.56**	**$3.59**	**$3.77**	**73**	**69**	**66**	**65**	**66**	**69**
SCURRY	IRRIGATION	$2.67	$2.68	$2.68	$2.68	$2.68	$2.68	51	51	51	51	51	51
SCURRY	MANUFACTURING	$187.78	$225.33	$225.33	$225.33	$225.33	$225.33	415	498	498	498	498	498
SCURRY	MINING	$198.43	$323.89	$343.57	$258.29	$174.65	$118.07	1,009	1,646	1,746	1,313	888	600
SCURRY	MUNICIPAL	$1.81	$1.60	$1.73	$2.36	$5.62	$11.66	33	29	32	43	103	214
SCURRY Total		**$390.68**	**$553.50**	**$573.31**	**$488.66**	**$408.28**	**$357.74**	**1,508**	**2,225**	**2,327**	**1,905**	**1,540**	**1,363**
TOM GREEN	MANUFACTURING	$6.18	$18.84	$24.06	$31.54	$40.49	$48.95	147	449	573	751	964	1,166
TOM GREEN	MUNICIPAL	$74.57	$62.49	$80.20	$100.73	$116.86	$134.43	1,367	1,146	1,470	1,847	2,142	2,465
TOM GREEN Total		**$80.75**	**$81.33**	**$104.26**	**$132.27**	**$157.35**	**$183.38**	**1,514**	**1,594**	**2,043**	**2,598**	**3,107**	**3,630**
WARD	MUNICIPAL	-	-	-	-	$1.19	$1.22	-	-	-	-	22	22
WARD	STEAM ELECTRIC POWER	$78.28	$78.28	$78.28	$78.28	$78.28	$78.28	-	-	-	-	-	-
WARD Total		**$78.28**	**$78.28**	**$78.28**	**$78.28**	**$79.47**	**$79.50**	**-**	**-**	**-**	**-**	**22**	**22**
REGION F Total		**$19,623.72**	**$19,719.90**	**$17,058.36**	**$13,443.46**	**$7,749.80**	**$6,356.45**	**98,208**	**100,186**	**88,685**	**71,444**	**43,995**	**38,833**

APPENDIX I
DATABASE (DB22) REPORTS

The Texas Water Development Board (TWDB) hosts a statewide database, known as DB22, which houses all the data and information from each of the 16 Regional Water Plans across the state. TWDB uses this data to assist in the development of the State Water Plan. In order to facilitate statewide data collection, there are specific requirements in how the data must be entered and reflected in DB22. In some cases, the aggregation and reporting of this data from the database differs from how the data is aggregated and reported in the written Regional Water Plan. The Regional Water Plan aims to present the data in a format that is easily understandable to stakeholders and the public. Divergence between the numbers in tables in the Plan and the DB22 reports do not necessarily represent errors.

Examples of these differences include:

> Total strategy water volumes are aggregated by water user group in the DB22 reports. If a strategy is not fully allocated to a water user group or multiple water user groups, then the total volumes may differ between the DB22 report and the Plan. This is the case for several strategies developed by major water providers.
>
> Water management strategy volumes only display the seller and the end user, not any intermediate sellers. For instance, if a Wholesale Provider sells to City A and City A sells a portion of that supply to City B, the volume sold to City B will only be shown under City B as a sale from the Wholesale Provider. The sale to City A will only show the supply used by City A. The total volume sold to City A is not shown and sale from City A to City B is not shown.

There are four database reports that do not have relevant data. Although, Region F has Alternative Water Management Strategies and Projects, they were not included in the database. Please refer to Chapter 5, Appendix C, or Appendix D for information on Alternative WMSs. There are no WMSs in Region F that require an Inter-Basin Transfer (IBT) permit. The four database reports are:

- Region F Alternative Water User Group (WUG) Water Management Strategies (WMS)
- Region F Alternative Projects Associated with Water Management Strategies (WMS)
- Region F Recommended Water Management Strategy (WMS) Supply Associated with New or Amended Inter-Basin Transfer (IBT) Permit
- Region F Water User Groups (WUGs) Recommended Water Management Strategy (WMS) Supply Associated with a New or Amended Inter-Basin Transfer (IBT) Permit and Total Recommended Conservation WMS Supply

Region F Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
ANDREWS	14,661	17,907	20,804	24,171	28,082	32,627
COUNTY-OTHER	4,415	4,925	5,426	5,923	6,425	6,927
COLORADO BASIN TOTAL	**19,076**	**22,832**	**26,230**	**30,094**	**34,507**	**39,554**
COUNTY-OTHER	13	15	16	17	19	20
RIO GRANDE BASIN TOTAL	**13**	**15**	**16**	**17**	**19**	**20**
ANDREWS COUNTY TOTAL	**19,089**	**22,847**	**26,246**	**30,111**	**34,526**	**39,574**
COUNTY-OTHER	40	41	41	41	41	41
BRAZOS BASIN TOTAL	**40**	**41**	**41**	**41**	**41**	**41**
COUNTY-OTHER	619	630	630	630	630	630
COLORADO BASIN TOTAL	**619**	**630**	**630**	**630**	**630**	**630**
BORDEN COUNTY TOTAL	**659**	**671**	**671**	**671**	**671**	**671**
COUNTY-OTHER	75	77	77	77	77	77
BRAZOS BASIN TOTAL	**75**	**77**	**77**	**77**	**77**	**77**
BANGS	2,506	2,566	2,566	2,566	2,566	2,566
BROOKESMITH SUD*	8,047	8,240	8,241	8,240	8,240	8,241
BROWNWOOD	19,926	20,406	20,406	20,406	20,406	20,406
COLEMAN COUNTY SUD*	195	199	199	199	199	199
EARLY	2,907	2,978	2,978	2,978	2,978	2,978
ZEPHYR WSC*	4,173	4,274	4,274	4,274	4,274	4,274
COUNTY-OTHER	1,932	1,977	1,976	1,977	1,977	1,976
COLORADO BASIN TOTAL	**39,686**	**40,640**	**40,640**	**40,640**	**40,640**	**40,640**
BROWN COUNTY TOTAL	**39,761**	**40,717**	**40,717**	**40,717**	**40,717**	**40,717**
BRONTE	1,085	1,085	1,085	1,085	1,085	1,085
ROBERT LEE	1,050	1,050	1,050	1,050	1,050	1,050
COUNTY-OTHER	1,185	1,185	1,185	1,185	1,185	1,185
COLORADO BASIN TOTAL	**3,320**	**3,320**	**3,320**	**3,320**	**3,320**	**3,320**
COKE COUNTY TOTAL	**3,320**	**3,320**	**3,320**	**3,320**	**3,320**	**3,320**
BROOKESMITH SUD*	41	42	42	42	42	42
COLEMAN	4,820	4,928	4,928	4,928	4,928	4,928
COLEMAN COUNTY SUD*	2,927	2,998	2,998	2,998	2,998	2,998
SANTA ANNA	1,121	1,148	1,148	1,148	1,148	1,148
COUNTY-OTHER	194	191	191	191	191	191
COLORADO BASIN TOTAL	**9,103**	**9,307**	**9,307**	**9,307**	**9,307**	**9,307**
COLEMAN COUNTY TOTAL	**9,103**	**9,307**	**9,307**	**9,307**	**9,307**	**9,307**
EDEN	1,264	1,310	1,310	1,310	1,310	1,310
MILLERSVIEW-DOOLE WSC	650	661	661	661	661	661
COUNTY-OTHER	867	881	881	881	881	881
COLORADO BASIN TOTAL	**2,781**	**2,852**	**2,852**	**2,852**	**2,852**	**2,852**
CONCHO COUNTY TOTAL	**2,781**	**2,852**	**2,852**	**2,852**	**2,852**	**2,852**
CRANE	3,645	3,926	4,152	4,365	4,542	4,692
COUNTY-OTHER	1,411	1,787	2,089	2,372	2,609	2,809
RIO GRANDE BASIN TOTAL	**5,056**	**5,713**	**6,241**	**6,737**	**7,151**	**7,501**
CRANE COUNTY TOTAL	**5,056**	**5,713**	**6,241**	**6,737**	**7,151**	**7,501**
CROCKETT COUNTY WCID 1	3,885	4,214	4,286	4,334	4,351	4,359
COUNTY-OTHER	226	172	160	152	149	147
RIO GRANDE BASIN TOTAL	**4,111**	**4,386**	**4,446**	**4,486**	**4,500**	**4,506**
CROCKETT COUNTY TOTAL	**4,111**	**4,386**	**4,446**	**4,486**	**4,500**	**4,506**
ECTOR COUNTY UTILITY DISTRICT	19,539	22,054	24,704	27,421	30,172	32,945

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

Region F Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
GREATER GARDENDALE WSC	2,547	2,876	3,221	3,575	3,934	4,295
ODESSA	125,103	144,875	161,382	178,056	194,572	212,668
COUNTY-OTHER	16,198	16,860	20,478	22,730	25,012	27,311
COLORADO BASIN TOTAL	**163,387**	**186,665**	**209,785**	**231,782**	**253,690**	**277,219**
COUNTY-OTHER	902	939	1,141	1,266	1,393	1,521
RIO GRANDE BASIN TOTAL	**902**	**939**	**1,141**	**1,266**	**1,393**	**1,521**
ECTOR COUNTY TOTAL	**164,289**	**187,604**	**210,926**	**233,048**	**255,083**	**278,740**
COUNTY-OTHER	1,341	1,429	1,429	1,429	1,429	1,429
COLORADO BASIN TOTAL	**1,341**	**1,429**	**1,429**	**1,429**	**1,429**	**1,429**
GLASSCOCK COUNTY TOTAL	**1,341**	**1,429**	**1,429**	**1,429**	**1,429**	**1,429**
BIG SPRING	29,443	30,727	31,253	31,253	31,253	31,253
COAHOMA	2,503	2,612	2,658	2,658	2,658	2,658
COUNTY-OTHER	5,364	5,597	5,692	5,692	5,692	5,692
COLORADO BASIN TOTAL	**37,310**	**38,936**	**39,603**	**39,603**	**39,603**	**39,603**
HOWARD COUNTY TOTAL	**37,310**	**38,936**	**39,603**	**39,603**	**39,603**	**39,603**
MERTZON	823	832	832	832	832	832
COUNTY-OTHER	861	870	870	870	870	870
COLORADO BASIN TOTAL	**1,684**	**1,702**	**1,702**	**1,702**	**1,702**	**1,702**
IRION COUNTY TOTAL	**1,684**	**1,702**	**1,702**	**1,702**	**1,702**	**1,702**
JUNCTION	2,632	2,657	2,657	2,657	2,657	2,657
COUNTY-OTHER	2,078	2,097	2,097	2,097	2,097	2,097
COLORADO BASIN TOTAL	**4,710**	**4,754**	**4,754**	**4,754**	**4,754**	**4,754**
KIMBLE COUNTY TOTAL	**4,710**	**4,754**	**4,754**	**4,754**	**4,754**	**4,754**
COUNTY-OTHER	82	82	82	82	82	82
RIO GRANDE BASIN TOTAL	**82**	**82**	**82**	**82**	**82**	**82**
LOVING COUNTY TOTAL	**82**	**82**	**82**	**82**	**82**	**82**
STANTON	2,693	2,967	3,164	3,339	3,469	3,572
COUNTY-OTHER	2,740	3,019	3,218	3,396	3,531	3,633
COLORADO BASIN TOTAL	**5,433**	**5,986**	**6,382**	**6,735**	**7,000**	**7,205**
MARTIN COUNTY TOTAL	**5,433**	**5,986**	**6,382**	**6,735**	**7,000**	**7,205**
MASON	2,134	2,134	2,134	2,134	2,134	2,134
COUNTY-OTHER	1,878	1,878	1,878	1,878	1,878	1,878
COLORADO BASIN TOTAL	**4,012**	**4,012**	**4,012**	**4,012**	**4,012**	**4,012**
MASON COUNTY TOTAL	**4,012**	**4,012**	**4,012**	**4,012**	**4,012**	**4,012**
BRADY	5,773	6,018	6,039	6,101	6,119	6,129
MILLERSVIEW-DOOLE WSC	1,025	1,068	1,072	1,083	1,087	1,087
RICHLAND SUD*	999	1,041	1,045	1,056	1,058	1,060
COUNTY-OTHER	838	873	874	885	888	889
COLORADO BASIN TOTAL	**8,635**	**9,000**	**9,030**	**9,125**	**9,152**	**9,165**
MCCULLOCH COUNTY TOTAL	**8,635**	**9,000**	**9,030**	**9,125**	**9,152**	**9,165**
MENARD	1,492	1,492	1,492	1,492	1,492	1,492
COUNTY-OTHER	750	750	750	750	750	750
COLORADO BASIN TOTAL	**2,242**	**2,242**	**2,242**	**2,242**	**2,242**	**2,242**
MENARD COUNTY TOTAL	**2,242**	**2,242**	**2,242**	**2,242**	**2,242**	**2,242**
AIRLINE MOBILE HOME PARK LTD	2,221	2,407	2,660	2,917	3,169	3,417
GREATER GARDENDALE WSC	1,299	1,514	1,723	1,933	2,141	2,346
GREENWOOD WATER	993	1,075	1,189	1,303	1,416	1,527
MIDLAND	141,690	164,437	179,850	194,767	208,838	223,926

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Region F Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
ODESSA	2,455	3,161	3,768	4,372	4,956	5,563
COUNTY-OTHER	20,404	22,692	24,391	27,065	29,744	32,291
COLORADO BASIN TOTAL	**169,062**	**195,286**	**213,581**	**232,357**	**250,264**	**269,070**
MIDLAND COUNTY TOTAL	**169,062**	**195,286**	**213,581**	**232,357**	**250,264**	**269,070**
COLORADO CITY	5,149	5,781	5,898	5,957	6,017	6,078
LORAINE	656	677	691	701	708	713
MITCHELL COUNTY UTILITY	1,596	1,717	1,753	1,774	1,792	1,807
COUNTY-OTHER	3,130	3,154	3,224	3,274	3,309	3,332
COLORADO BASIN TOTAL	**10,531**	**11,329**	**11,566**	**11,706**	**11,826**	**11,930**
MITCHELL COUNTY TOTAL	**10,531**	**11,329**	**11,566**	**11,706**	**11,826**	**11,930**
FORT STOCKTON	11,776	12,731	13,774	14,498	15,143	15,726
IRAAN	1,347	1,447	1,546	1,636	1,717	1,790
PECOS COUNTY FRESH WATER	748	804	858	908	954	994
PECOS COUNTY WCID 1	3,019	3,244	3,465	3,668	3,849	4,012
COUNTY-OTHER	828	998	1,159	1,311	1,446	1,568
RIO GRANDE BASIN TOTAL	**17,718**	**19,224**	**20,802**	**22,021**	**23,109**	**24,090**
PECOS COUNTY TOTAL	**17,718**	**19,224**	**20,802**	**22,021**	**23,109**	**24,090**
BIG LAKE	3,357	3,749	3,982	4,193	4,339	4,445
COUNTY-OTHER	496	554	589	619	641	657
COLORADO BASIN TOTAL	**3,853**	**4,303**	**4,571**	**4,812**	**4,980**	**5,102**
REAGAN COUNTY TOTAL	**3,853**	**4,303**	**4,571**	**4,812**	**4,980**	**5,102**
BALMORHEA	517	553	583	603	619	630
MADERA VALLEY WSC	1,541	1,650	1,738	1,798	1,845	1,879
PECOS	9,398	10,062	10,599	10,967	11,250	11,460
COUNTY-OTHER	3,669	3,928	4,137	4,282	4,392	4,474
RIO GRANDE BASIN TOTAL	**15,125**	**16,193**	**17,057**	**17,650**	**18,106**	**18,443**
REEVES COUNTY TOTAL	**15,125**	**16,193**	**17,057**	**17,650**	**18,106**	**18,443**
BALLINGER	3,864	3,966	3,966	3,966	3,966	3,966
COLEMAN COUNTY SUD*	165	169	169	169	169	169
MILES	977	1,135	1,135	1,135	1,135	1,135
MILLERSVIEW-DOOLE WSC	749	749	749	749	749	749
NORTH RUNNELS WSC*	1,594	1,656	1,672	1,684	1,693	1,700
WINTERS	2,763	2,835	2,835	2,835	2,835	2,835
COUNTY-OTHER	771	790	774	762	753	746
COLORADO BASIN TOTAL	**10,883**	**11,300**	**11,300**	**11,300**	**11,300**	**11,300**
RUNNELS COUNTY TOTAL	**10,883**	**11,300**	**11,300**	**11,300**	**11,300**	**11,300**
ELDORADO	2,104	2,104	2,104	2,104	2,104	2,104
COUNTY-OTHER	1,496	1,755	1,889	1,968	2,017	2,047
COLORADO BASIN TOTAL	**3,600**	**3,859**	**3,993**	**4,072**	**4,121**	**4,151**
COUNTY-OTHER	211	247	266	278	285	289
RIO GRANDE BASIN TOTAL	**211**	**247**	**266**	**278**	**285**	**289**
SCHLEICHER COUNTY TOTAL	**3,811**	**4,106**	**4,259**	**4,350**	**4,406**	**4,440**
COUNTY-OTHER	2,053	2,235	2,409	2,605	2,803	3,009
BRAZOS BASIN TOTAL	**2,053**	**2,235**	**2,409**	**2,605**	**2,803**	**3,009**
SNYDER	13,307	15,307	16,500	17,855	19,228	20,642
COUNTY-OTHER	4,551	4,955	5,340	5,776	6,215	6,671

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

Region F Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
COLORADO BASIN TOTAL	**17,858**	**20,262**	**21,840**	**23,631**	**25,443**	**27,313**
SCURRY COUNTY TOTAL	**19,911**	**22,497**	**24,249**	**26,236**	**28,246**	**30,322**
STERLING CITY	944	979	991	991	991	991
COUNTY-OTHER	271	281	284	284	284	284
COLORADO BASIN TOTAL	**1,215**	**1,260**	**1,275**	**1,275**	**1,275**	**1,275**
STERLING COUNTY TOTAL	**1,215**	**1,260**	**1,275**	**1,275**	**1,275**	**1,275**
COUNTY-OTHER	189	203	209	213	215	216
COLORADO BASIN TOTAL	**189**	**203**	**209**	**213**	**215**	**216**
SONORA	2,800	2,999	3,075	3,133	3,165	3,183
COUNTY-OTHER	828	892	914	933	942	948
RIO GRANDE BASIN TOTAL	**3,628**	**3,891**	**3,989**	**4,066**	**4,107**	**4,131**
SUTTON COUNTY TOTAL	**3,817**	**4,094**	**4,198**	**4,279**	**4,322**	**4,347**
CONCHO RURAL WATER	6,376	6,800	7,126	7,423	7,710	7,981
DADS Supported Living Center	253	253	253	253	253	253
GOODFELLOW AIR FORCE BASE	2,500	2,820	2,995	3,179	3,376	3,584
MILLERSVIEW-DOOLE WSC	1,825	1,931	2,019	2,097	2,170	2,237
SAN ANGELO	103,243	116,437	123,653	131,315	139,451	148,090
TOM GREEN COUNTY FWSD 3	1,132	1,265	1,340	1,419	1,502	1,589
COUNTY-OTHER	7,723	7,980	8,299	8,544	8,753	8,908
COLORADO BASIN TOTAL	**123,052**	**137,486**	**145,685**	**154,230**	**163,215**	**172,642**
TOM GREEN COUNTY TOTAL	**123,052**	**137,486**	**145,685**	**154,230**	**163,215**	**172,642**
COUNTY-OTHER	235	254	263	272	278	281
COLORADO BASIN TOTAL	**235**	**254**	**263**	**272**	**278**	**281**
MCCAMEY	2,215	2,395	2,478	2,564	2,617	2,654
RANKIN	856	926	958	991	1,012	1,026
COUNTY-OTHER	384	415	429	445	453	460
RIO GRANDE BASIN TOTAL	**3,455**	**3,736**	**3,865**	**4,000**	**4,082**	**4,140**
UPTON COUNTY TOTAL	**3,690**	**3,990**	**4,128**	**4,272**	**4,360**	**4,421**
BARSTOW	375	398	414	427	436	444
GRANDFALLS	427	453	471	486	497	505
MONAHANS	7,473	7,923	8,243	8,500	8,696	8,845
SOUTHWEST SANDHILLS WSC	1,937	2,053	2,136	2,203	2,253	2,292
WICKETT	512	543	565	582	596	606
COUNTY-OTHER	730	774	805	831	851	865
RIO GRANDE BASIN TOTAL	**11,454**	**12,144**	**12,634**	**13,029**	**13,329**	**13,557**
WARD COUNTY TOTAL	**11,454**	**12,144**	**12,634**	**13,029**	**13,329**	**13,557**
KERMIT	5,917	5,993	6,057	6,124	6,178	6,225
WINK	1,059	1,162	1,246	1,337	1,410	1,473
COUNTY-OTHER	1,057	1,662	2,156	2,686	3,114	3,483
RIO GRANDE BASIN TOTAL	**8,033**	**8,817**	**9,459**	**10,147**	**10,702**	**11,181**
WINKLER COUNTY TOTAL	**8,033**	**8,817**	**9,459**	**10,147**	**10,702**	**11,181**
REGION F POPULATION TOTAL	**715,773**	**797,589**	**858,726**	**918,597**	**977,543**	**1,039,502**

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

Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ANDREWS	4,182	5,026	5,785	6,692	7,767	9,021
COUNTY-OTHER	535	575	616	664	718	774
MANUFACTURING	580	617	617	617	617	617
MINING	3,682	3,450	2,955	2,333	1,794	1,379
LIVESTOCK	178	178	178	178	178	178
IRRIGATION	19,550	19,550	19,550	19,550	19,550	19,550
COLORADO BASIN TOTAL	**28,707**	**29,396**	**29,701**	**30,034**	**30,624**	**31,519**
COUNTY-OTHER	2	2	2	2	2	2
MINING	277	260	222	176	135	104
LIVESTOCK	32	32	32	32	32	32
IRRIGATION	815	815	815	815	815	815
RIO GRANDE BASIN TOTAL	**1,126**	**1,109**	**1,071**	**1,025**	**984**	**953**
ANDREWS COUNTY TOTAL	**29,833**	**30,505**	**30,772**	**31,059**	**31,608**	**32,472**
COUNTY-OTHER	11	11	11	11	11	11
LIVESTOCK	12	12	12	12	12	12
IRRIGATION	826	826	826	826	826	826
BRAZOS BASIN TOTAL	**849**	**849**	**849**	**849**	**849**	**849**
COUNTY-OTHER	167	167	164	164	164	164
MINING	679	927	784	494	244	121
LIVESTOCK	163	163	163	163	163	163
IRRIGATION	2,123	2,123	2,123	2,123	2,123	2,123
COLORADO BASIN TOTAL	**3,132**	**3,380**	**3,234**	**2,944**	**2,694**	**2,571**
BORDEN COUNTY TOTAL	**3,981**	**4,229**	**4,083**	**3,793**	**3,543**	**3,420**
COUNTY-OTHER	6	6	6	6	6	6
LIVESTOCK	12	12	12	12	12	12
IRRIGATION	387	387	387	387	387	387
BRAZOS BASIN TOTAL	**405**	**405**	**405**	**405**	**405**	**405**
BANGS	310	305	296	291	290	290
BROOKESMITH SUD*	1,199	1,195	1,170	1,156	1,153	1,153
BROWNWOOD	3,717	3,713	3,640	3,600	3,593	3,593
COLEMAN COUNTY SUD*	24	24	23	23	23	23
EARLY	292	287	277	271	270	270
ZEPHYR WSC*	343	339	330	325	324	324
COUNTY-OTHER	164	166	165	164	163	163
MANUFACTURING	548	651	651	651	651	651
MINING	943	948	951	952	948	944
LIVESTOCK	1,107	1,107	1,107	1,107	1,107	1,107
IRRIGATION	7,738	7,738	7,738	7,738	7,738	7,738
COLORADO BASIN TOTAL	**16,385**	**16,473**	**16,348**	**16,278**	**16,260**	**16,256**
BROWN COUNTY TOTAL	**16,790**	**16,878**	**16,753**	**16,683**	**16,665**	**16,661**
BRONTE	273	269	265	262	262	262
ROBERT LEE	295	290	286	286	285	285
COUNTY-OTHER	118	112	107	105	105	105
MINING	488	482	430	376	328	286
LIVESTOCK	306	306	306	306	306	306
IRRIGATION	689	689	689	689	689	689
COLORADO BASIN TOTAL	**2,169**	**2,148**	**2,083**	**2,024**	**1,975**	**1,933**
COKE COUNTY TOTAL	**2,169**	**2,148**	**2,083**	**2,024**	**1,975**	**1,933**

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Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
BROOKESMITH SUD*	6	6	6	6	6	6
COLEMAN	821	814	795	793	792	792
COLEMAN COUNTY SUD*	363	358	347	341	340	340
SANTA ANNA	156	154	149	149	148	148
COUNTY-OTHER	24	22	22	21	21	21
MANUFACTURING	2	2	2	2	2	2
MINING	108	107	97	86	77	69
LIVESTOCK	705	705	705	705	705	705
IRRIGATION	465	465	465	465	465	465
COLORADO BASIN TOTAL	**2,650**	**2,633**	**2,588**	**2,568**	**2,556**	**2,548**
COLEMAN COUNTY TOTAL	**2,650**	**2,633**	**2,588**	**2,568**	**2,556**	**2,548**
EDEN	206	210	207	205	204	204
MILLERSVIEW-DOOLE WSC	94	93	90	89	89	89
COUNTY-OTHER	114	112	109	108	107	107
MINING	480	474	422	367	320	279
LIVESTOCK	382	382	382	382	382	382
IRRIGATION	4,902	4,902	4,902	4,902	4,902	4,902
COLORADO BASIN TOTAL	**6,178**	**6,173**	**6,112**	**6,053**	**6,004**	**5,963**
CONCHO COUNTY TOTAL	**6,178**	**6,173**	**6,112**	**6,053**	**6,004**	**5,963**
CRANE	1,261	1,339	1,401	1,467	1,525	1,575
COUNTY-OTHER	170	207	238	268	294	316
MANUFACTURING	455	468	468	468	468	468
MINING	617	840	861	692	531	407
LIVESTOCK	72	72	72	72	72	72
RIO GRANDE BASIN TOTAL	**2,575**	**2,926**	**3,040**	**2,967**	**2,890**	**2,838**
CRANE COUNTY TOTAL	**2,575**	**2,926**	**3,040**	**2,967**	**2,890**	**2,838**
LIVESTOCK	14	14	14	14	14	14
IRRIGATION	6	6	6	6	6	6
COLORADO BASIN TOTAL	**20**	**20**	**20**	**20**	**20**	**20**
CROCKETT COUNTY WCID 1	1,533	1,641	1,655	1,672	1,677	1,680
COUNTY-OTHER	27	20	18	17	17	17
MANUFACTURING	14	15	15	15	15	15
MINING	4,500	4,500	3,100	1,700	500	200
LIVESTOCK	513	513	513	513	513	513
IRRIGATION	129	129	129	129	129	129
RIO GRANDE BASIN TOTAL	**6,716**	**6,818**	**5,430**	**4,046**	**2,851**	**2,554**
CROCKETT COUNTY TOTAL	**6,736**	**6,838**	**5,450**	**4,066**	**2,871**	**2,574**
ECTOR COUNTY UTILITY DISTRICT	2,385	2,645	2,935	3,240	3,556	3,880
GREATER GARDENDALE WSC	211	228	247	270	296	323
ODESSA	24,523	27,724	30,382	33,254	36,278	39,632
COUNTY-OTHER	2,047	2,090	2,510	2,768	3,037	3,314
MANUFACTURING	2,152	2,381	2,381	2,381	2,381	2,381
MINING	1,325	1,450	1,291	1,055	853	721
STEAM ELECTRIC POWER	4,837	4,837	4,837	4,837	4,837	4,837
LIVESTOCK	169	169	169	169	169	169
IRRIGATION	678	678	678	678	678	678
COLORADO BASIN TOTAL	**38,327**	**42,202**	**45,430**	**48,652**	**52,085**	**55,935**

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Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COUNTY-OTHER	114	116	140	154	169	185
MINING	652	714	635	519	419	355
LIVESTOCK	30	30	30	30	30	30
IRRIGATION	78	78	78	78	78	78
RIO GRANDE BASIN TOTAL	**874**	**938**	**883**	**781**	**696**	**648**
ECTOR COUNTY TOTAL	**39,201**	**43,140**	**46,313**	**49,433**	**52,781**	**56,583**
COUNTY-OTHER	161	165	160	160	159	159
MANUFACTURING	25	33	33	33	33	33
MINING	5,900	5,900	4,500	3,200	2,100	1,500
LIVESTOCK	147	147	147	147	147	147
IRRIGATION	51,254	51,254	51,254	51,254	51,254	51,254
COLORADO BASIN TOTAL	**57,487**	**57,499**	**56,094**	**54,794**	**53,693**	**53,093**
GLASSCOCK COUNTY TOTAL	**57,487**	**57,499**	**56,094**	**54,794**	**53,693**	**53,093**
BIG SPRING	6,227	6,368	6,379	6,327	6,316	6,316
COAHOMA	526	534	537	537	536	536
COUNTY-OTHER	652	650	646	644	642	642
MANUFACTURING	3,723	3,746	3,746	3,746	3,746	3,746
MINING	3,400	3,400	2,400	1,400	600	300
STEAM ELECTRIC POWER	427	427	427	427	427	427
LIVESTOCK	229	229	229	229	229	229
IRRIGATION	6,883	6,883	6,883	6,883	6,883	6,883
COLORADO BASIN TOTAL	**22,067**	**22,237**	**21,247**	**20,193**	**19,379**	**19,079**
HOWARD COUNTY TOTAL	**22,067**	**22,237**	**21,247**	**20,193**	**19,379**	**19,079**
MERTZON	101	99	96	94	94	94
COUNTY-OTHER	104	101	98	97	97	97
MANUFACTURING	6	7	7	7	7	7
MINING	4,600	4,600	3,300	2,000	1,000	500
LIVESTOCK	232	232	232	232	232	232
IRRIGATION	1,053	1,053	1,053	1,053	1,053	1,053
COLORADO BASIN TOTAL	**6,096**	**6,092**	**4,786**	**3,483**	**2,483**	**1,983**
IRION COUNTY TOTAL	**6,096**	**6,092**	**4,786**	**3,483**	**2,483**	**1,983**
JUNCTION	626	620	609	605	604	604
COUNTY-OTHER	254	248	241	237	236	236
MANUFACTURING	605	706	706	706	706	706
MINING	19	19	19	19	19	19
LIVESTOCK	320	320	320	320	320	320
IRRIGATION	2,657	2,657	2,657	2,657	2,657	2,657
COLORADO BASIN TOTAL	**4,481**	**4,570**	**4,552**	**4,544**	**4,542**	**4,542**
KIMBLE COUNTY TOTAL	**4,481**	**4,570**	**4,552**	**4,544**	**4,542**	**4,542**
COUNTY-OTHER	10	10	9	9	9	9
MINING	7,500	7,500	6,600	5,400	4,300	3,400
LIVESTOCK	32	32	32	32	32	32
RIO GRANDE BASIN TOTAL	**7,542**	**7,542**	**6,641**	**5,441**	**4,341**	**3,441**
LOVING COUNTY TOTAL	**7,542**	**7,542**	**6,641**	**5,441**	**4,341**	**3,441**
STANTON	514	552	578	605	628	646
COUNTY-OTHER	358	380	394	410	426	438
MINING	7,200	7,200	5,400	3,500	1,900	1,000

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Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
LIVESTOCK	119	119	119	119	119	119
IRRIGATION	36,491	36,491	36,491	36,491	36,491	36,491
COLORADO BASIN TOTAL	**44,682**	**44,742**	**42,982**	**41,125**	**39,564**	**38,694**
MARTIN COUNTY TOTAL	**44,682**	**44,742**	**42,982**	**41,125**	**39,564**	**38,694**
MASON	700	690	682	677	676	676
COUNTY-OTHER	231	224	218	215	214	214
MINING	1,023	941	708	568	460	372
LIVESTOCK	714	714	714	714	714	714
IRRIGATION	4,966	4,966	4,966	4,966	4,966	4,966
COLORADO BASIN TOTAL	**7,634**	**7,535**	**7,288**	**7,140**	**7,030**	**6,942**
MASON COUNTY TOTAL	**7,634**	**7,535**	**7,288**	**7,140**	**7,030**	**6,942**
BRADY	1,391	1,420	1,402	1,410	1,412	1,414
MILLERSVIEW-DOOLE WSC	148	150	147	146	147	147
RICHLAND SUD*	234	240	238	239	239	240
COUNTY-OTHER	132	135	134	135	135	135
MANUFACTURING	523	609	609	609	609	609
MINING	8,927	8,347	6,641	5,627	4,836	4,201
LIVESTOCK	651	651	651	651	651	651
IRRIGATION	2,324	2,324	2,324	2,324	2,324	2,324
COLORADO BASIN TOTAL	**14,330**	**13,876**	**12,146**	**11,141**	**10,353**	**9,721**
MCCULLOCH COUNTY TOTAL	**14,330**	**13,876**	**12,146**	**11,141**	**10,353**	**9,721**
MENARD	350	342	336	335	335	335
COUNTY-OTHER	92	89	86	85	84	84
MINING	1,086	1,071	952	827	717	622
LIVESTOCK	294	294	294	294	294	294
IRRIGATION	3,663	3,663	3,663	3,663	3,663	3,663
COLORADO BASIN TOTAL	**5,485**	**5,459**	**5,331**	**5,204**	**5,093**	**4,998**
MENARD COUNTY TOTAL	**5,485**	**5,459**	**5,331**	**5,204**	**5,093**	**4,998**
AIRLINE MOBILE HOME PARK LTD	228	236	252	273	295	318
GREATER GARDENDALE WSC	108	120	132	146	161	176
GREENWOOD WATER	211	224	244	265	288	310
MIDLAND	27,972	31,803	34,256	36,811	39,405	42,232
ODESSA	481	605	709	817	924	1,037
COUNTY-OTHER	3,253	3,506	3,689	4,050	4,441	4,819
MANUFACTURING	981	1,177	1,177	1,177	1,177	1,177
MINING	10,600	10,600	8,200	5,500	3,300	2,300
LIVESTOCK	243	243	243	243	243	243
IRRIGATION	18,107	18,107	18,107	18,107	18,107	18,107
COLORADO BASIN TOTAL	**62,184**	**66,621**	**67,009**	**67,389**	**68,341**	**70,719**
MIDLAND COUNTY TOTAL	**62,184**	**66,621**	**67,009**	**67,389**	**68,341**	**70,719**
COLORADO CITY	1,308	1,440	1,451	1,462	1,475	1,490
LORAINE	76	75	74	74	75	75
MITCHELL COUNTY UTILITY	210	217	215	217	218	220
COUNTY-OTHER	545	538	541	544	549	553
MANUFACTURING	4	5	5	5	5	5
MINING	593	738	632	493	375	290
STEAM ELECTRIC POWER	10,326	10,326	10,326	10,326	10,326	10,326

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Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
LIVESTOCK	376	376	376	376	376	376
IRRIGATION	12,787	12,787	12,787	12,787	12,787	12,787
COLORADO BASIN TOTAL	**26,225**	**26,502**	**26,407**	**26,284**	**26,186**	**26,122**
MITCHELL COUNTY TOTAL	**26,225**	**26,502**	**26,407**	**26,284**	**26,186**	**26,122**
FORT STOCKTON	4,841	5,172	5,548	5,813	6,067	6,300
IRAAN	458	485	513	540	567	591
PECOS COUNTY FRESH WATER	201	212	223	235	247	257
PECOS COUNTY WCID 1	384	398	415	433	453	472
COUNTY-OTHER	110	127	147	165	182	197
MANUFACTURING	413	433	433	433	433	433
MINING	7,700	7,700	7,700	6,200	4,800	3,700
LIVESTOCK	687	687	687	687	687	687
IRRIGATION	143,345	143,345	143,345	143,345	143,345	143,345
RIO GRANDE BASIN TOTAL	**158,139**	**158,559**	**159,011**	**157,851**	**156,781**	**155,982**
PECOS COUNTY TOTAL	**158,139**	**158,559**	**159,011**	**157,851**	**156,781**	**155,982**
BIG LAKE	730	795	834	877	906	928
COUNTY-OTHER	70	76	79	82	85	87
MINING	9,857	9,857	7,161	4,092	1,581	558
LIVESTOCK	175	175	175	175	175	175
IRRIGATION	22,031	22,031	22,031	22,031	22,031	22,031
COLORADO BASIN TOTAL	**32,863**	**32,934**	**30,280**	**27,257**	**24,778**	**23,779**
MINING	743	743	539	308	119	42
LIVESTOCK	8	8	8	8	8	8
RIO GRANDE BASIN TOTAL	**751**	**751**	**547**	**316**	**127**	**50**
REAGAN COUNTY TOTAL	**33,614**	**33,685**	**30,827**	**27,573**	**24,905**	**23,829**
BALMORHEA	203	214	225	233	238	243
MADERA VALLEY WSC	446	468	489	506	518	528
PECOS	2,916	3,065	3,215	3,322	3,405	3,468
COUNTY-OTHER	532	561	586	603	617	628
MANUFACTURING	286	305	305	305	305	305
MINING	12,600	12,600	12,100	9,900	7,800	6,200
LIVESTOCK	368	368	368	368	368	368
IRRIGATION	58,937	58,937	58,937	58,937	58,937	58,937
RIO GRANDE BASIN TOTAL	**76,288**	**76,518**	**76,225**	**74,174**	**72,188**	**70,677**
REEVES COUNTY TOTAL	**76,288**	**76,518**	**76,225**	**74,174**	**72,188**	**70,677**
BALLINGER	689	687	671	669	667	667
COLEMAN COUNTY SUD*	20	20	20	19	19	19
MILES	113	126	122	121	120	120
MILLERSVIEW-DOOLE WSC	108	105	103	101	101	101
NORTH RUNNELS WSC*	169	167	163	162	162	163
WINTERS	226	218	206	205	204	204
COUNTY-OTHER	76	74	69	68	67	66
MANUFACTURING	10	11	11	11	11	11
MINING	272	269	240	210	184	161
LIVESTOCK	705	705	705	705	705	705
IRRIGATION	3,105	3,105	3,105	3,105	3,105	3,105

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Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COLORADO BASIN TOTAL	**5,493**	**5,487**	**5,415**	**5,376**	**5,345**	**5,322**
RUNNELS COUNTY TOTAL	**5,493**	**5,487**	**5,415**	**5,376**	**5,345**	**5,322**
ELDORADO	662	652	643	639	638	638
COUNTY-OTHER	216	247	262	272	278	281
MINING	460	542	416	290	179	110
LIVESTOCK	293	293	293	293	293	293
IRRIGATION	1,160	1,160	1,160	1,160	1,160	1,160
COLORADO BASIN TOTAL	**2,791**	**2,894**	**2,774**	**2,654**	**2,548**	**2,482**
COUNTY-OTHER	31	35	37	38	39	40
MINING	161	190	146	102	62	38
LIVESTOCK	96	96	96	96	96	96
IRRIGATION	651	651	651	651	651	651
RIO GRANDE BASIN TOTAL	**939**	**972**	**930**	**887**	**848**	**825**
SCHLEICHER COUNTY TOTAL	**3,730**	**3,866**	**3,704**	**3,541**	**3,396**	**3,307**
COUNTY-OTHER	251	263	275	293	315	337
MINING	78	127	135	101	69	47
LIVESTOCK	92	92	92	92	92	92
IRRIGATION	1,698	1,698	1,698	1,698	1,698	1,698
BRAZOS BASIN TOTAL	**2,119**	**2,180**	**2,200**	**2,184**	**2,174**	**2,174**
SNYDER	1,980	2,201	2,320	2,499	2,686	2,882
COUNTY-OTHER	557	583	611	650	697	748
MANUFACTURING	156	186	186	186	186	186
MINING	202	329	348	262	177	120
LIVESTOCK	369	369	369	369	369	369
IRRIGATION	5,861	5,861	5,861	5,861	5,861	5,861
COLORADO BASIN TOTAL	**9,125**	**9,529**	**9,695**	**9,827**	**9,976**	**10,166**
SCURRY COUNTY TOTAL	**11,244**	**11,709**	**11,895**	**12,011**	**12,150**	**12,340**
STERLING CITY	276	281	281	280	280	280
COUNTY-OTHER	32	32	32	32	32	32
MINING	780	953	812	522	270	140
LIVESTOCK	234	234	234	234	234	234
IRRIGATION	899	899	899	899	899	899
COLORADO BASIN TOTAL	**2,221**	**2,399**	**2,258**	**1,967**	**1,715**	**1,585**
STERLING COUNTY TOTAL	**2,221**	**2,399**	**2,258**	**1,967**	**1,715**	**1,585**
COUNTY-OTHER	26	27	27	28	28	28
MANUFACTURING	3	3	3	3	3	3
MINING	89	144	152	114	78	53
LIVESTOCK	198	198	198	198	198	198
IRRIGATION	179	179	179	179	179	179
COLORADO BASIN TOTAL	**495**	**551**	**559**	**522**	**486**	**461**
SONORA	1,045	1,105	1,123	1,139	1,150	1,156
COUNTY-OTHER	115	119	119	120	121	122
MINING	357	576	611	459	311	211
LIVESTOCK	246	246	246	246	246	246
IRRIGATION	941	941	941	941	941	941
RIO GRANDE BASIN TOTAL	**2,704**	**2,987**	**3,040**	**2,905**	**2,769**	**2,676**
SUTTON COUNTY TOTAL	**3,199**	**3,538**	**3,599**	**3,427**	**3,255**	**3,137**

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Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
CONCHO RURAL WATER	560	576	588	604	624	646
DADS Supported Living Center	109	108	108	107	107	107
GOODFELLOW AIR FORCE BASE	513	568	596	629	666	707
MILLERSVIEW-DOOLE WSC	263	271	276	283	293	302
SAN ANGELO	17,924	19,657	20,494	21,556	22,847	24,250
TOM GREEN COUNTY FWSD 3	131	142	147	154	162	172
COUNTY-OTHER	1,011	1,001	1,037	1,065	1,088	1,106
MANUFACTURING	850	962	962	962	962	962
MINING	1,056	1,080	1,119	1,112	1,134	1,156
LIVESTOCK	1,125	1,125	1,125	1,125	1,125	1,125
IRRIGATION	42,493	42,493	42,493	42,493	42,493	42,493
COLORADO BASIN TOTAL	**66,035**	**67,983**	**68,945**	**70,090**	**71,501**	**73,026**
TOM GREEN COUNTY TOTAL	**66,035**	**67,983**	**68,945**	**70,090**	**71,501**	**73,026**
COUNTY-OTHER	28	30	30	30	31	31
MANUFACTURING	182	205	205	205	205	205
MINING	2,736	2,736	2,166	1,444	874	608
LIVESTOCK	48	48	48	48	48	48
IRRIGATION	10,195	10,195	10,195	10,195	10,195	10,195
COLORADO BASIN TOTAL	**13,189**	**13,214**	**12,644**	**11,922**	**11,353**	**11,087**
MCCAMEY	827	881	906	936	955	968
RANKIN	276	294	302	312	318	322
COUNTY-OTHER	47	48	48	50	50	51
MANUFACTURING	2	2	2	2	2	2
MINING	4,464	4,464	3,534	2,356	1,426	992
LIVESTOCK	78	78	78	78	78	78
IRRIGATION	208	208	208	208	208	208
RIO GRANDE BASIN TOTAL	**5,902**	**5,975**	**5,078**	**3,942**	**3,037**	**2,621**
UPTON COUNTY TOTAL	**19,091**	**19,189**	**17,722**	**15,864**	**14,390**	**13,708**
BARSTOW	119	125	128	132	135	137
GRANDFALLS	135	141	145	149	152	155
MONAHANS	2,518	2,628	2,704	2,785	2,846	2,895
SOUTHWEST SANDHILLS WSC	185	186	185	190	194	197
WICKETT	208	218	225	231	237	241
COUNTY-OTHER	137	141	144	148	152	154
MANUFACTURING	7	7	7	7	7	7
MINING	1,900	1,900	1,700	1,300	900	600
STEAM ELECTRIC POWER	2,502	2,502	2,502	2,502	2,502	2,502
LIVESTOCK	83	83	83	83	83	83
IRRIGATION	3,160	3,160	3,160	3,160	3,160	3,160
RIO GRANDE BASIN TOTAL	**10,954**	**11,091**	**10,983**	**10,687**	**10,368**	**10,131**
WARD COUNTY TOTAL	**10,954**	**11,091**	**10,983**	**10,687**	**10,368**	**10,131**
LIVESTOCK	1	1	1	1	1	1
COLORADO BASIN TOTAL	**1**	**1**	**1**	**1**	**1**	**1**
KERMIT	1,811	1,803	1,799	1,816	1,830	1,844
WINK	358	387	412	441	465	486
COUNTY-OTHER	188	293	378	470	545	609
MANUFACTURING	64	76	76	76	76	76

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

Region F Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MINING	787	1,169	991	756	531	373
LIVESTOCK	100	100	100	100	100	100
IRRIGATION	3,507	3,507	3,507	3,507	3,507	3,507
RIO GRANDE BASIN TOTAL	**6,815**	**7,335**	**7,263**	**7,166**	**7,054**	**6,995**
WINKLER COUNTY TOTAL	**6,816**	**7,336**	**7,264**	**7,167**	**7,055**	**6,996**
REGION F DEMAND TOTAL	**765,150**	**779,505**	**769,525**	**755,112**	**744,947**	**744,366**

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

Region F Water User Group (WUG) Category Summary

MUNICIPAL	2020	2030	2040	2050	2060	2070
POPULATION	622,738	697,545	750,008	801,928	853,242	907,937
DEMAND (acre-feet per year)	125,009	136,751	144,752	153,550	162,965	173,202
EXISTING SUPPLIES (acre-feet per year)	130,874	121,962	124,868	123,948	122,946	121,921
NEEDS (acre-feet per year)*	13,569	18,277	23,320	32,993	43,355	54,503

COUNTY-OTHER	2020	2030	2040	2050	2060	2070
POPULATION	93,035	100,044	108,718	116,669	124,301	131,565
DEMAND (acre-feet per year)	12,718	13,309	14,205	15,152	16,133	17,088
EXISTING SUPPLIES (acre-feet per year)	12,503	13,046	13,834	14,612	15,416	16,193
NEEDS (acre-feet per year)*	479	515	579	713	857	1,007

MANUFACTURING	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	11,591	12,607	12,607	12,607	12,607	12,607
EXISTING SUPPLIES (acre-feet per year)	11,705	12,603	12,549	12,111	11,080	10,897
NEEDS (acre-feet per year)*	951	1,065	1,108	1,327	1,527	1,710

MINING	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	108,841	109,847	90,970	66,812	46,251	34,478
EXISTING SUPPLIES (acre-feet per year)	89,083	89,809	76,117	60,694	50,724	45,852
NEEDS (acre-feet per year)*	21,261	21,357	17,834	12,088	7,677	5,407

STEAM ELECTRIC POWER	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	18,092	18,092	18,092	18,092	18,092	18,092
EXISTING SUPPLIES (acre-feet per year)	5,298	5,428	5,428	5,292	5,169	5,053
NEEDS (acre-feet per year)*	12,794	12,678	12,678	12,800	12,923	13,039

LIVESTOCK	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	11,958	11,958	11,958	11,958	11,958	11,958
EXISTING SUPPLIES (acre-feet per year)	12,053	12,045	12,037	12,023	12,012	12,002
NEEDS (acre-feet per year)*	9	17	25	39	50	60

IRRIGATION	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	476,941	476,941	476,941	476,941	476,941	476,941
EXISTING SUPPLIES (acre-feet per year)	467,747	463,419	461,774	459,907	456,369	453,708
NEEDS (acre-feet per year)*	13,529	17,957	19,544	21,240	24,585	27,060

*WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Category Summary 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 category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the Needs totals.

Region F Source Availability

GROUNDWATERSOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY *	2020	2030	2040	2050	2060	2070
CAPITAN REEF COMPLEX AQUIFER	PECOS	RIO GRANDE	FRESH/ BRACKISH	26,168	26,168	26,168	26,168	26,168	26,168
CAPITAN REEF COMPLEX AQUIFER	REEVES	RIO GRANDE	FRESH	1,007	1,007	1,007	1,007	1,007	1,007
CAPITAN REEF COMPLEX AQUIFER	WARD	RIO GRANDE	FRESH/ BRACKISH	103	103	103	103	103	103
CAPITAN REEF COMPLEX AQUIFER	WINKLER	RIO GRANDE	FRESH	274	274	274	274	274	274
CROSS TIMBERS AQUIFER	BROWN	COLORADO	FRESH	993	993	993	993	993	993
CROSS TIMBERS AQUIFER	COLEMAN	COLORADO	FRESH	108	108	108	108	108	108
CROSS TIMBERS AQUIFER	MCCULLOCH	COLORADO	FRESH	103	103	103	103	103	103
DOCKUM AQUIFER	ANDREWS	COLORADO	FRESH	1,319	1,319	1,319	1,319	1,319	1,319
DOCKUM AQUIFER	ANDREWS	RIO GRANDE	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	BORDEN	BRAZOS	FRESH	284	284	284	284	284	284
DOCKUM AQUIFER	BORDEN	COLORADO	FRESH	617	617	617	617	617	617
DOCKUM AQUIFER	COKE	COLORADO	FRESH/ BRACKISH	100	100	100	100	100	100
DOCKUM AQUIFER	CRANE	RIO GRANDE	FRESH	94	94	94	94	94	94
DOCKUM AQUIFER	CROCKETT	COLORADO	FRESH	2	2	2	2	2	2
DOCKUM AQUIFER	CROCKETT	RIO GRANDE	FRESH	2	2	2	2	2	2
DOCKUM AQUIFER	ECTOR	COLORADO	FRESH	13	13	13	13	13	13
DOCKUM AQUIFER	ECTOR	RIO GRANDE	FRESH	515	515	515	515	515	515
DOCKUM AQUIFER	GLASSCOCK	COLORADO	FRESH	900	900	900	900	900	900
DOCKUM AQUIFER	HOWARD	COLORADO	FRESH	1,589	1,589	1,589	1,589	1,589	1,589
DOCKUM AQUIFER	IRION	COLORADO	FRESH	150	150	150	150	150	150
DOCKUM AQUIFER	LOVING	RIO GRANDE	FRESH	453	453	453	453	453	453
DOCKUM AQUIFER	MARTIN	COLORADO	FRESH	8	8	8	8	8	8
DOCKUM AQUIFER	MIDLAND	COLORADO	FRESH/ BRACKISH	400	400	400	400	400	400
DOCKUM AQUIFER	MITCHELL	COLORADO	FRESH	14,018	14,018	14,018	14,018	14,018	14,018
DOCKUM AQUIFER	PECOS	RIO GRANDE	FRESH	8,164	8,164	8,164	8,164	8,164	8,164
DOCKUM AQUIFER	REAGAN	COLORADO	FRESH	302	302	302	302	302	302
DOCKUM AQUIFER	REAGAN	RIO GRANDE	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	REEVES	RIO GRANDE	FRESH	2,539	2,539	2,539	2,539	2,539	2,539
DOCKUM AQUIFER	SCURRY	BRAZOS	FRESH	306	306	306	306	306	306
DOCKUM AQUIFER	SCURRY	COLORADO	FRESH	903	903	903	903	903	903
DOCKUM AQUIFER	STERLING	COLORADO	FRESH	10	10	10	10	10	10
DOCKUM AQUIFER	TOM GREEN	COLORADO	FRESH/ BRACKISH	200	200	200	200	200	200
DOCKUM AQUIFER	UPTON	RIO GRANDE	FRESH	1,000	1,000	1,000	1,000	1,000	1,000
DOCKUM AQUIFER	WARD	RIO GRANDE	FRESH	2,150	2,150	2,150	2,150	2,150	2,150
DOCKUM AQUIFER	WINKLER	COLORADO	FRESH	13	13	13	13	13	13
DOCKUM AQUIFER	WINKLER	RIO GRANDE	FRESH	5,987	5,987	5,987	5,987	5,987	5,987
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	CRANE	RIO GRANDE	FRESH	4,991	4,991	4,991	4,991	4,991	4,991
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	LOVING	RIO GRANDE	FRESH	2,982	2,982	2,982	2,982	2,982	2,982
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	PECOS	RIO GRANDE	FRESH	122,899	122,899	122,899	122,899	122,899	122,899

* 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 F Source Availability

GROUNDWATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	REEVES	RIO GRANDE	FRESH	189,744	189,744	189,744	189,744	189,744	189,744
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	WARD	RIO GRANDE	FRESH	49,976	49,976	49,976	49,976	49,976	49,976
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	WINKLER	RIO GRANDE	FRESH	49,949	49,949	49,949	49,949	49,949	49,949
EDWARDS-TRINITY-PLATEAU AQUIFER	ANDREWS	COLORADO	FRESH	1,198	1,198	1,198	1,198	1,198	1,198
EDWARDS-TRINITY-PLATEAU AQUIFER	HOWARD	COLORADO	FRESH	672	672	672	672	672	672
EDWARDS-TRINITY-PLATEAU AQUIFER	MARTIN	COLORADO	FRESH	242	242	242	242	242	242
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	COKE	COLORADO	FRESH	997	997	997	997	997	997
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	CONCHO	COLORADO	FRESH	459	459	459	459	459	459
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	CROCKETT	COLORADO	FRESH	20	20	20	20	20	20
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	CROCKETT	RIO GRANDE	FRESH	5,427	5,427	5,427	5,427	5,427	5,427
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	ECTOR	COLORADO	FRESH	4,925	4,925	4,925	4,925	4,925	4,925
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	ECTOR	RIO GRANDE	FRESH	617	617	617	617	617	617
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	GLASSCOCK	COLORADO	FRESH	65,186	65,186	65,186	65,186	65,186	65,186
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	IRION	COLORADO	FRESH	3,289	3,289	3,289	3,289	3,289	3,289
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	KIMBLE	COLORADO	FRESH	1,386	1,386	1,386	1,386	1,386	1,386
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MASON	COLORADO	FRESH	18	18	18	18	18	18
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MCCULLOCH	COLORADO	FRESH	148	148	148	148	148	148
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MENARD	COLORADO	FRESH	2,594	2,594	2,594	2,594	2,594	2,594
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MIDLAND	COLORADO	FRESH	23,233	23,233	23,233	23,233	23,233	23,233
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	PECOS	RIO GRANDE	FRESH/ BRACKISH	117,309	117,309	117,309	117,309	117,309	117,309
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	REAGAN	COLORADO	FRESH	68,205	68,205	68,205	68,205	68,205	68,205
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	REAGAN	RIO GRANDE	FRESH	28	28	28	28	28	28
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SCHLEICHER	COLORADO	FRESH	6,403	6,403	6,403	6,403	6,403	6,403
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SCHLEICHER	RIO GRANDE	FRESH	1,631	1,631	1,631	1,631	1,631	1,631
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	STERLING	COLORADO	FRESH	2,495	2,495	2,495	2,495	2,495	2,495
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SUTTON	COLORADO	FRESH	388	388	388	388	388	388
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SUTTON	RIO GRANDE	FRESH	6,022	6,022	6,022	6,022	6,022	6,022
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	TOM GREEN	COLORADO	FRESH	2,797	2,797	2,797	2,797	2,797	2,797
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	UPTON	COLORADO	FRESH	18,343	18,343	18,343	18,343	18,343	18,343

* 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 F Source Availability

GROUNDWATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY *	2020	2030	2040	2050	2060	2070
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	UPTON	RIO GRANDE	FRESH	4,026	4,026	4,026	4,026	4,026	4,026
ELLENBURGER-SAN SABA AQUIFER	BROWN	COLORADO	FRESH	131	131	131	131	131	131
ELLENBURGER-SAN SABA AQUIFER	KIMBLE	COLORADO	FRESH	521	521	521	521	521	521
ELLENBURGER-SAN SABA AQUIFER	MASON	COLORADO	FRESH	3,237	3,237	3,237	3,237	3,237	3,237
ELLENBURGER-SAN SABA AQUIFER	MCCULLOCH	COLORADO	FRESH	4,364	4,364	4,364	4,364	4,364	4,364
ELLENBURGER-SAN SABA AQUIFER	MENARD	COLORADO	FRESH	309	309	309	309	309	309
HICKORY AQUIFER	BROWN	COLORADO	FRESH	12	12	12	12	12	12
HICKORY AQUIFER	COLEMAN	COLORADO	FRESH	500	500	500	500	500	500
HICKORY AQUIFER	CONCHO	COLORADO	FRESH	27	27	27	27	27	27
HICKORY AQUIFER	KIMBLE	COLORADO	FRESH	165	165	165	165	165	165
HICKORY AQUIFER	MASON	COLORADO	FRESH	13,212	13,212	13,212	13,212	13,212	13,212
HICKORY AQUIFER	MCCULLOCH	COLORADO	FRESH	24,377	24,377	24,377	24,377	24,377	24,377
HICKORY AQUIFER	MENARD	COLORADO	FRESH	2,725	2,725	2,725	2,725	2,725	2,725
IGNEOUS AQUIFER	PECOS	RIO GRANDE	FRESH	80	80	80	80	80	80
IGNEOUS AQUIFER	REEVES	RIO GRANDE	FRESH	300	300	300	300	300	300
LIPAN AQUIFER	COKE	COLORADO	FRESH/ BRACKISH	160	160	160	160	160	160
LIPAN AQUIFER	CONCHO	COLORADO	FRESH	1,893	1,893	1,893	1,893	1,893	1,893
LIPAN AQUIFER	GLASSCOCK	COLORADO	FRESH	10	10	10	10	10	10
LIPAN AQUIFER	IRION	COLORADO	FRESH	13	13	13	13	13	13
LIPAN AQUIFER	RUNNELS	COLORADO	FRESH	45	45	45	45	45	45
LIPAN AQUIFER	STERLING	COLORADO	FRESH	850	850	850	850	850	850
LIPAN AQUIFER	TOM GREEN	COLORADO	FRESH	43,568	43,568	43,568	43,568	43,568	43,568
MARBLE FALLS AQUIFER	BROWN	COLORADO	FRESH	25	25	25	25	25	25
MARBLE FALLS AQUIFER	KIMBLE	COLORADO	FRESH	100	100	100	100	100	100
MARBLE FALLS AQUIFER	MASON	COLORADO	FRESH	100	100	100	100	100	100
MARBLE FALLS AQUIFER	MCCULLOCH	COLORADO	FRESH	50	50	50	50	50	50
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	ANDREWS	COLORADO	FRESH	24,937	21,375	19,795	18,774	18,040	17,474
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	ANDREWS	RIO GRANDE	FRESH	0	0	0	0	0	0
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	BORDEN	BRAZOS	FRESH	842	699	635	597	572	555
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	BORDEN	COLORADO	FRESH	5,080	3,940	3,433	3,140	2,849	2,657
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	HOWARD	COLORADO	FRESH	19,835	17,391	16,264	15,638	15,281	15,066
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	MARTIN	COLORADO	FRESH	63,463	51,126	43,861	39,793	37,210	35,425
OGALLALA AQUIFER	ECTOR	COLORADO	FRESH	8,026	7,730	7,171	7,135	6,727	6,727
OGALLALA AQUIFER	GLASSCOCK	COLORADO	FRESH	7,925	7,673	7,372	7,058	6,803	6,570
OGALLALA AQUIFER	MIDLAND	COLORADO	FRESH	38,388	36,824	34,623	32,693	31,325	31,325
OGALLALA AQUIFER	WINKLER	RIO GRANDE	FRESH	40	40	40	40	40	40
OTHER AQUIFER	BORDEN	COLORADO	FRESH	2,598	2,598	2,598	2,598	2,598	2,598
OTHER AQUIFER	COKE	COLORADO	FRESH	2,100	2,100	2,100	2,100	2,100	2,100
OTHER AQUIFER	COLEMAN	COLORADO	FRESH	109	109	109	109	109	109
OTHER AQUIFER	CONCHO	COLORADO	FRESH	5,964	5,964	5,964	5,964	5,964	5,964

* 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 F Source Availability

GROUNDWATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY *	2020	2030	2040	2050	2060	2070
OTHER AQUIFER	MASON	COLORADO	FRESH	873	873	873	873	873	873
OTHER AQUIFER	MCCULLOCH	COLORADO	FRESH	103	103	103	103	103	103
OTHER AQUIFER	MITCHELL	COLORADO	FRESH	789	789	789	789	789	789
OTHER AQUIFER	PECOS	RIO GRANDE	FRESH	10,000	10,000	10,000	10,000	10,000	10,000
OTHER AQUIFER	RUNNELS	COLORADO	FRESH	5,001	5,001	5,001	5,001	5,001	5,001
OTHER AQUIFER	SCURRY	BRAZOS	BRACKISH	74	74	74	74	74	74
OTHER AQUIFER	SCURRY	COLORADO	FRESH	315	315	315	315	315	315
PECOS VALLEY AQUIFER	ANDREWS	RIO GRANDE	FRESH	150	150	150	150	150	150
RUSTLER AQUIFER	CRANE	RIO GRANDE	FRESH/ BRACKISH	1,000	1,000	1,000	1,000	1,000	1,000
RUSTLER AQUIFER	LOVING	RIO GRANDE	FRESH	200	200	200	200	200	200
RUSTLER AQUIFER	PECOS	RIO GRANDE	FRESH	7,043	7,043	7,043	7,043	7,043	7,043
RUSTLER AQUIFER	REEVES	RIO GRANDE	FRESH	2,387	2,387	2,387	2,387	2,387	2,387
RUSTLER AQUIFER	WARD	RIO GRANDE	FRESH	0	0	0	0	0	0
RUSTLER AQUIFER	WINKLER	RIO GRANDE	BRACKISH	500	500	500	500	500	500
SEYMOUR AQUIFER	SCURRY	BRAZOS	FRESH	10	10	10	10	10	10
TRINITY AQUIFER	BROWN	BRAZOS	FRESH	51	51	51	51	51	51
TRINITY AQUIFER	BROWN	COLORADO	FRESH	1,399	1,395	1,399	1,395	1,399	1,395
			GROUNDWATER SOURCE AVAILABILITY TOTAL	1,135,369	1,113,627	1,100,027	1,091,697	1,085,680	1,082,668

REUSE SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY *	2020	2030	2040	2050	2060	2070
DIRECT REUSE	ANDREWS	COLORADO	FRESH	560	560	560	560	560	560
DIRECT REUSE	CONCHO	COLORADO	FRESH	25	25	25	25	25	25
DIRECT REUSE	CRANE	RIO GRANDE	FRESH	73	73	73	73	73	73
DIRECT REUSE	ECTOR	COLORADO	FRESH	9,530	9,530	9,530	9,530	9,530	9,530
DIRECT REUSE	HOWARD	COLORADO	FRESH	1,855	1,855	1,855	1,855	1,855	1,855
DIRECT REUSE	MIDLAND	COLORADO	FRESH	11,211	11,211	11,211	11,211	11,211	11,211
DIRECT REUSE	MITCHELL	COLORADO	FRESH	552	552	552	552	552	552
DIRECT REUSE	RUNNELS	COLORADO	FRESH	22	22	22	22	22	22
DIRECT REUSE	WARD	RIO GRANDE	FRESH	670	670	670	670	670	670
INDIRECT REUSE	TOM GREEN	COLORADO	FRESH	8,400	8,400	8,400	8,400	8,400	8,400
			REUSE SOURCE AVAILABILITY TOTAL	32,898	32,898	32,898	32,898	32,898	32,898

SURFACE WATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY *	2020	2030	2040	2050	2060	2070
BALLINGER/MOONEN LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
BALMORHEA LAKE/RESERVOIR	RESERVOIR**	RIO GRANDE	FRESH	18,800	18,800	18,800	18,800	18,800	18,800
BRADY CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
BRAZOS LIVESTOCK LOCAL SUPPLY	BORDEN	BRAZOS	FRESH	12	12	12	12	12	12
BRAZOS LIVESTOCK LOCAL SUPPLY	BROWN	BRAZOS	FRESH	12	12	12	12	12	12
BRAZOS LIVESTOCK LOCAL SUPPLY	SCURRY	BRAZOS	FRESH	88	88	88	88	88	88
BROWNWOOD LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	18,900	18,760	18,620	18,480	18,340	18,200
COLEMAN LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
COLORADO CITY-CHAMPION LAKE/RESERVOIR SYSTEM	RESERVOIR**	COLORADO	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 F Source Availability

SURFACE WATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY *	2020	2030	2040	2050	2060	2070
COLORADO LIVESTOCK LOCAL SUPPLY	BORDEN	COLORADO	FRESH	152	152	152	152	152	152
COLORADO LIVESTOCK LOCAL SUPPLY	BROWN	COLORADO	FRESH	1,050	1,050	1,050	1,050	1,050	1,050
COLORADO LIVESTOCK LOCAL SUPPLY	COKE	COLORADO	FRESH	84	84	84	84	84	84
COLORADO LIVESTOCK LOCAL SUPPLY	COLEMAN	COLORADO	FRESH	769	769	769	769	769	769
COLORADO LIVESTOCK LOCAL SUPPLY	CONCHO	COLORADO	FRESH	223	223	223	223	223	223
COLORADO LIVESTOCK LOCAL SUPPLY	CROCKETT	COLORADO	FRESH	14	14	14	14	14	14
COLORADO LIVESTOCK LOCAL SUPPLY	ECTOR	COLORADO	FRESH	25	25	25	25	25	25
COLORADO LIVESTOCK LOCAL SUPPLY	GLASSCOCK	COLORADO	FRESH	38	38	38	38	38	38
COLORADO LIVESTOCK LOCAL SUPPLY	HOWARD	COLORADO	FRESH	39	39	39	39	39	39
COLORADO LIVESTOCK LOCAL SUPPLY	IRION	COLORADO	FRESH	57	57	57	57	57	57
COLORADO LIVESTOCK LOCAL SUPPLY	KIMBLE	COLORADO	FRESH	138	138	138	138	138	138
COLORADO LIVESTOCK LOCAL SUPPLY	MARTIN	COLORADO	FRESH	47	47	47	47	47	47
COLORADO LIVESTOCK LOCAL SUPPLY	MASON	COLORADO	FRESH	227	227	227	227	227	227
COLORADO LIVESTOCK LOCAL SUPPLY	MCCULLOCH	COLORADO	FRESH	235	235	235	235	235	235
COLORADO LIVESTOCK LOCAL SUPPLY	MENARD	COLORADO	FRESH	48	48	48	48	48	48
COLORADO LIVESTOCK LOCAL SUPPLY	MIDLAND	COLORADO	FRESH	3	3	3	3	3	3
COLORADO LIVESTOCK LOCAL SUPPLY	MITCHELL	COLORADO	FRESH	308	308	308	308	308	308
COLORADO LIVESTOCK LOCAL SUPPLY	REAGAN	COLORADO	FRESH	60	60	60	60	60	60
COLORADO LIVESTOCK LOCAL SUPPLY	RUNNELS	COLORADO	FRESH	475	475	475	475	475	475
COLORADO LIVESTOCK LOCAL SUPPLY	SCHLEICHER	COLORADO	FRESH	17	17	17	17	17	17
COLORADO LIVESTOCK LOCAL SUPPLY	SCURRY	COLORADO	FRESH	352	352	352	352	352	352
COLORADO LIVESTOCK LOCAL SUPPLY	STERLING	COLORADO	FRESH	25	25	25	25	25	25
COLORADO LIVESTOCK LOCAL SUPPLY	SUTTON	COLORADO	FRESH	172	172	172	172	172	172
COLORADO LIVESTOCK LOCAL SUPPLY	TOM GREEN	COLORADO	FRESH	317	317	317	317	317	317
COLORADO OTHER LOCAL SUPPLY	ANDREWS	COLORADO	FRESH	44	44	44	44	44	44
COLORADO OTHER LOCAL SUPPLY	ECTOR	COLORADO	FRESH	29	29	29	29	29	29
COLORADO OTHER LOCAL SUPPLY	GLASSCOCK	COLORADO	FRESH	106	106	106	106	106	106
COLORADO OTHER LOCAL SUPPLY	HOWARD	COLORADO	FRESH	61	61	61	61	61	61
COLORADO OTHER LOCAL SUPPLY	IRION	COLORADO	FRESH	93	93	93	93	93	93
COLORADO OTHER LOCAL SUPPLY	MARTIN	COLORADO	FRESH	132	132	132	132	132	132
COLORADO OTHER LOCAL SUPPLY	MIDLAND	COLORADO	FRESH	210	210	210	210	210	210
COLORADO OTHER LOCAL SUPPLY	REAGAN	COLORADO	FRESH	178	178	178	178	178	178
COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR**	COLORADO	FRESH	14,285	13,670	13,153	12,633	12,133	11,709
COLORADO RUN-OF-RIVER	BROWN	COLORADO	FRESH	276	276	276	276	276	276
COLORADO RUN-OF-RIVER	COKE	COLORADO	FRESH	16	16	16	16	16	16
COLORADO RUN-OF-RIVER	COLEMAN	COLORADO	FRESH	25	25	25	25	25	25
COLORADO RUN-OF-RIVER	CONCHO	COLORADO	FRESH	244	244	244	244	244	244
COLORADO RUN-OF-RIVER	ECTOR	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	IRION	COLORADO	FRESH	221	221	221	221	221	221
COLORADO RUN-OF-RIVER	KIMBLE	COLORADO	FRESH	1,113	1,113	1,113	1,113	1,113	1,113
COLORADO RUN-OF-RIVER	MCCULLOCH	COLORADO	FRESH	69	69	69	69	69	69
COLORADO RUN-OF-RIVER	MENARD	COLORADO	FRESH	2,090	2,090	2,090	2,090	2,090	2,090
COLORADO RUN-OF-RIVER	MITCHELL	COLORADO	FRESH	14	14	14	14	14	14
COLORADO RUN-OF-RIVER	RUNNELS	COLORADO	FRESH	262	262	262	262	262	262

* 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 F Source Availability

SURFACE WATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
COLORADO RUN-OF-RIVER	SCURRY	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	STERLING	COLORADO	FRESH	30	30	30	30	30	30
COLORADO RUN-OF-RIVER	SUTTON	COLORADO	FRESH	2	2	2	2	2	2
COLORADO RUN-OF-RIVER	TOM GREEN	COLORADO	FRESH	1,969	1,969	1,969	1,969	1,969	1,969
CRMWD DIVERTED WATER SYSTEM	RESERVOIR**	COLORADO	BRACKISH	5,760	5,760	5,760	5,760	5,760	5,760
EV SPENCE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
HORDS CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
MOUNTAIN CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
OAK CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR**	COLORADO	FRESH	16,065	15,650	15,137	14,627	14,097	13,491
RED BLUFF LAKE/RESERVOIR	RESERVOIR**	RIO GRANDE	FRESH	30,050	29,980	29,910	29,840	29,770	29,700
RIO GRANDE LIVESTOCK LOCAL SUPPLY	CRANE	RIO GRANDE	FRESH	4	4	4	4	4	4
RIO GRANDE LIVESTOCK LOCAL SUPPLY	CROCKETT	RIO GRANDE	FRESH	16	16	16	16	16	16
RIO GRANDE LIVESTOCK LOCAL SUPPLY	LOVING	RIO GRANDE	FRESH	1	1	1	1	1	1
RIO GRANDE LIVESTOCK LOCAL SUPPLY	PECOS	RIO GRANDE	FRESH	37	37	37	37	37	37
RIO GRANDE LIVESTOCK LOCAL SUPPLY	SCHLEICHER	RIO GRANDE	FRESH	6	6	6	6	6	6
RIO GRANDE LIVESTOCK LOCAL SUPPLY	SUTTON	RIO GRANDE	FRESH	214	214	214	214	214	214
RIO GRANDE LIVESTOCK LOCAL SUPPLY	WARD	RIO GRANDE	FRESH	5	5	5	5	5	5
RIO GRANDE LIVESTOCK LOCAL SUPPLY	WINKLER	RIO GRANDE	FRESH	2	2	2	2	2	2
RIO GRANDE OTHER LOCAL SUPPLY	CROCKETT	RIO GRANDE	FRESH	1,962	1,962	1,962	1,962	1,962	1,962
RIO GRANDE OTHER LOCAL SUPPLY	UPTON	RIO GRANDE	FRESH	121	121	121	121	121	121
RIO GRANDE OTHER LOCAL SUPPLY	WARD	RIO GRANDE	FRESH	33	33	33	33	33	33
RIO GRANDE RUN-OF-RIVER	PECOS	RIO GRANDE	FRESH	18,672	18,672	18,672	18,672	18,672	18,672
RIO GRANDE RUN-OF-RIVER	REEVES	RIO GRANDE	FRESH	573	573	573	573	573	573
RIO GRANDE RUN-OF-RIVER	WARD	RIO GRANDE	FRESH	881	881	881	881	881	881
SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
WINTERS LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
			SURFACE WATER SOURCE AVAILABILITY TOTAL	**138,558**	**137,318**	**136,078**	**134,838**	**133,598**	**132,358**

REGION F SOURCE AVAILABILITY TOTAl	**1,306,825**	**1,283,843**	**1,269,003**	**1,259,433**	**1,252,176**	**1,247,924**

* 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 F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ANDREWS	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	3,990	4,610	5,070	5,395	5,788	6,221
COUNTY-OTHER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	505	517	525	512	506	499
MANUFACTURING	F	DOCKUM AQUIFER | ANDREWS COUNTY	10	10	10	10	10	10
MANUFACTURING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	539	548	520	473	433	398
MINING	F	DIRECT REUSE	2,405	2,233	2,580	2,626	2,667	2,698
MINING	F	LOCAL SURFACE WATER SUPPLY	44	44	44	44	44	44
MINING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	47	45	43	39	35	32
LIVESTOCK	F	DOCKUM AQUIFER | ANDREWS COUNTY	9	9	9	9	9	9
LIVESTOCK	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	160	152	144	130	119	109
IRRIGATION	F	DIRECT REUSE	560	560	560	560	560	560
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AQUIFER | ANDREWS COUNTY	1,198	1,198	1,198	1,198	1,198	1,198
IRRIGATION	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	16,792	12,803	11,194	10,102	9,179	8,357
		COLORADO BASIN TOTAL	**26,259**	**22,729**	**21,897**	**21,098**	**20,548**	**20,135**
COUNTY-OTHER	F	PECOS VALLEY AQUIFER | ANDREWS COUNTY	2	2	2	2	2	2
MINING	F	DIRECT REUSE	277	260	222	176	135	104
LIVESTOCK	F	PECOS VALLEY AQUIFER | ANDREWS COUNTY	32	32	32	32	32	32
IRRIGATION	F	PECOS VALLEY AQUIFER | ANDREWS COUNTY	116	116	116	116	116	116
		RIO GRANDE BASIN TOTAL	**427**	**410**	**372**	**326**	**285**	**254**
		ANDREWS COUNTY TOTAL	**26,686**	**23,139**	**22,269**	**21,424**	**20,833**	**20,389**
COUNTY-OTHER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | BORDEN COUNTY	11	11	11	11	11	11
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	12	12	12	12	12	12
IRRIGATION	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | BORDEN COUNTY	826	688	624	586	561	544
		BRAZOS BASIN TOTAL	**849**	**711**	**647**	**609**	**584**	**567**
COUNTY-OTHER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | BORDEN COUNTY	21	21	18	18	18	18
COUNTY-OTHER	O	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | DAWSON COUNTY	72	72	72	72	72	72
COUNTY-OTHER	F	OTHER AQUIFER | BORDEN COUNTY	74	74	74	74	74	74
MINING	F	OTHER AQUIFER | BORDEN COUNTY	679	927	784	494	244	121
LIVESTOCK	F	DOCKUM AQUIFER | BORDEN COUNTY	11	11	11	11	11	11
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	152	152	152	152	152	152
IRRIGATION	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | BORDEN COUNTY	1,720	1,720	1,720	1,720	1,720	1,720
IRRIGATION	F	OTHER AQUIFER | BORDEN COUNTY	403	403	403	403	403	403
		COLORADO BASIN TOTAL	**3,132**	**3,380**	**3,234**	**2,944**	**2,694**	**2,571**
		BORDEN COUNTY TOTAL	**3,981**	**4,091**	**3,881**	**3,553**	**3,278**	**3,138**
COUNTY-OTHER	F	TRINITY AQUIFER | BROWN COUNTY	6	6	6	6	6	6
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	12	12	12	12	12	12
IRRIGATION	F	TRINITY AQUIFER | BROWN COUNTY	45	45	45	45	45	45
		BRAZOS BASIN TOTAL	**63**	**63**	**63**	**63**	**63**	**63**
BANGS	F	BROWNWOOD LAKE/RESERVOIR	310	305	296	291	290	290
BROOKESMITH SUD*	F	BROWNWOOD LAKE/RESERVOIR	1,199	1,195	1,170	1,156	1,154	1,154
BROWNWOOD	F	BROWNWOOD LAKE/RESERVOIR	3,717	3,713	3,640	3,600	3,593	3,593

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

Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
COLEMAN COUNTY SUD*	F	BROWNWOOD LAKE/RESERVOIR	12	12	12	12	12	12
COLEMAN COUNTY SUD*	F	COLEMAN LAKE/RESERVOIR	0	0	0	0	0	0
COLEMAN COUNTY SUD*	F	HORDS CREEK LAKE/RESERVOIR	0	0	0	0	0	0
EARLY	F	BROWNWOOD LAKE/RESERVOIR	292	287	277	271	270	270
ZEPHYR WSC*	F	BROWNWOOD LAKE/RESERVOIR	343	339	330	325	324	324
COUNTY-OTHER	F	BROWNWOOD LAKE/RESERVOIR	129	129	129	129	129	129
COUNTY-OTHER	F	CROSS TIMBERS AQUIFER | BROWN COUNTY	16	18	17	17	15	15
COUNTY-OTHER	F	TRINITY AQUIFER | BROWN COUNTY	19	19	19	18	19	19
MANUFACTURING	F	BROWNWOOD LAKE/RESERVOIR	548	651	651	651	651	651
MINING	F	CROSS TIMBERS AQUIFER | BROWN COUNTY	300	300	300	300	300	300
MINING	F	TRINITY AQUIFER | BROWN COUNTY	382	382	385	384	384	381
LIVESTOCK	F	CROSS TIMBERS AQUIFER | BROWN COUNTY	45	45	45	45	45	45
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	1,050	1,050	1,050	1,050	1,050	1,050
LIVESTOCK	F	TRINITY AQUIFER | BROWN COUNTY	12	12	12	12	12	12
IRRIGATION	F	BROWNWOOD LAKE/RESERVOIR	5,000	5,000	5,000	5,000	5,000	5,000
IRRIGATION	F	COLORADO RUN-OF-RIVER	276	276	276	276	276	276
IRRIGATION	F	CROSS TIMBERS AQUIFER | BROWN COUNTY	110	110	110	110	110	110
IRRIGATION	F	TRINITY AQUIFER | BROWN COUNTY	986	982	983	981	984	983
		COLORADO BASIN TOTAL	**14,746**	**14,825**	**14,702**	**14,628**	**14,618**	**14,614**
		BROWN COUNTY TOTAL	**14,809**	**14,888**	**14,765**	**14,691**	**14,681**	**14,677**
BRONTE	F	OAK CREEK LAKE/RESERVOIR	0	0	0	0	0	0
BRONTE	F	OTHER AQUIFER | COKE COUNTY	61	59	56	55	55	55
ROBERT LEE	F	EV SPENCE LAKE/RESERVOIR NON-SYSTEM PORTION	0	0	0	0	0	0
ROBERT LEE	F	OAK CREEK LAKE/RESERVOIR	0	0	0	0	0	0
ROBERT LEE	F	OTHER AQUIFER | COKE COUNTY	58	56	55	55	55	55
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | COKE COUNTY	25	25	25	25	25	25
COUNTY-OTHER	F	OAK CREEK LAKE/RESERVOIR	0	0	0	0	0	0
COUNTY-OTHER	F	OTHER AQUIFER | COKE COUNTY	93	87	82	80	80	80
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | COKE COUNTY	488	482	430	376	328	286
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | COKE COUNTY	91	91	91	91	91	91
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	84	84	84	84	84	84
LIVESTOCK	F	OTHER AQUIFER | COKE COUNTY	131	131	131	131	131	131
IRRIGATION	F	COLORADO RUN-OF-RIVER	11	11	11	11	11	11
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | COKE COUNTY	43	43	43	43	43	43
IRRIGATION	F	OTHER AQUIFER | COKE COUNTY	635	635	635	635	635	635
		COLORADO BASIN TOTAL	**1,720**	**1,704**	**1,643**	**1,586**	**1,538**	**1,496**
		COKE COUNTY TOTAL	**1,720**	**1,704**	**1,643**	**1,586**	**1,538**	**1,496**
BROOKESMITH SUD*	F	BROWNWOOD LAKE/RESERVOIR	6	6	6	6	6	6
COLEMAN	F	COLEMAN LAKE/RESERVOIR	0	0	0	0	0	0
COLEMAN	F	HORDS CREEK LAKE/RESERVOIR	0	0	0	0	0	0
COLEMAN COUNTY SUD*	F	BROWNWOOD LAKE/RESERVOIR	182	180	175	172	171	171
COLEMAN COUNTY SUD*	F	COLEMAN LAKE/RESERVOIR	0	0	0	0	0	0
COLEMAN COUNTY SUD*	F	HORDS CREEK LAKE/RESERVOIR	0	0	0	0	0	0
SANTA ANNA	F	BROWNWOOD LAKE/RESERVOIR	156	154	149	149	148	148
COUNTY-OTHER	F	COLEMAN LAKE/RESERVOIR	0	0	0	0	0	0

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
COUNTY-OTHER	F	HORDS CREEK LAKE/RESERVOIR	0	0	0	0	0	0
MANUFACTURING	F	COLEMAN LAKE/RESERVOIR	0	0	0	0	0	0
MANUFACTURING	F	HORDS CREEK LAKE/RESERVOIR	0	0	0	0	0	0
MINING	F	OTHER AQUIFER | COLEMAN COUNTY	108	107	97	86	77	69
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	769	769	769	769	769	769
IRRIGATION	F	COLEMAN LAKE/RESERVOIR	0	0	0	0	0	0
IRRIGATION	F	COLORADO RUN-OF-RIVER	25	25	25	25	25	25
IRRIGATION	F	CROSS TIMBERS AQUIFER | COLEMAN COUNTY	44	44	44	44	44	44
		COLORADO BASIN TOTAL	**1,290**	**1,285**	**1,265**	**1,251**	**1,240**	**1,232**
		COLEMAN COUNTY TOTAL	**1,290**	**1,285**	**1,265**	**1,251**	**1,240**	**1,232**
EDEN	F	DIRECT REUSE	25	25	25	25	25	25
EDEN	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CONCHO COUNTY	206	210	207	205	204	204
EDEN	F	OTHER AQUIFER | CONCHO COUNTY	0	0	0	0	0	0
MILLERSVIEW-DOOLE WSC	F	HICKORY AQUIFER | MCCULLOCH COUNTY	31	30	29	29	28	28
MILLERSVIEW-DOOLE WSC	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	84	90	88	86	83	75
COUNTY-OTHER	F	COLORADO RUN-OF-RIVER	38	38	38	38	38	38
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CONCHO COUNTY	42	44	42	43	44	46
COUNTY-OTHER	F	HICKORY AQUIFER | MCCULLOCH COUNTY	21	19	19	18	17	15
COUNTY-OTHER	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	13	11	10	9	8	8
COUNTY-OTHER	F	OTHER AQUIFER | CONCHO COUNTY	0	0	0	0	0	0
MINING	F	OTHER AQUIFER | CONCHO COUNTY	480	474	422	367	320	279
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CONCHO COUNTY	159	159	159	159	159	159
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	223	223	223	223	223	223
IRRIGATION	F	COLORADO RUN-OF-RIVER	206	206	206	206	206	206
IRRIGATION	F	LIPAN AQUIFER | CONCHO COUNTY	1,893	1,893	1,893	1,893	1,893	1,893
IRRIGATION	F	OTHER AQUIFER | CONCHO COUNTY	2,803	2,803	2,803	2,803	2,803	2,803
		COLORADO BASIN TOTAL	**6,224**	**6,225**	**6,164**	**6,104**	**6,051**	**6,002**
		CONCHO COUNTY TOTAL	**6,224**	**6,225**	**6,164**	**6,104**	**6,051**	**6,002**
CRANE	F	DIRECT REUSE	73	73	73	73	73	73
CRANE	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | CRANE COUNTY	1,002	1,063	1,112	1,164	1,210	1,250
CRANE	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	186	203	216	230	242	252
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | CRANE COUNTY	143	174	199	224	245	263
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	27	33	39	44	49	53
MANUFACTURING	F	DOCKUM AQUIFER | CRANE COUNTY	80	80	80	80	80	80
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | CRANE COUNTY	375	388	388	388	388	388
MINING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | CRANE COUNTY	617	840	861	692	531	407
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | CRANE COUNTY	68	68	68	68	68	68
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	4	4	4	4	4	4
		RIO GRANDE BASIN TOTAL	**2,575**	**2,926**	**3,040**	**2,967**	**2,890**	**2,838**
		CRANE COUNTY TOTAL	**2,575**	**2,926**	**3,040**	**2,967**	**2,890**	**2,838**
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	14	14	14	14	14	14

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CROCKETT COUNTY	6	6	6	6	6	6
		COLORADO BASIN TOTAL	**20**	**20**	**20**	**20**	**20**	**20**
CROCKETT COUNTY WCID 1	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CROCKETT COUNTY	1,533	1,641	1,655	1,672	1,677	1,680
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CROCKETT COUNTY	27	20	18	17	17	17
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CROCKETT COUNTY	14	15	15	15	15	15
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CROCKETT COUNTY	3,227	3,125	3,100	1,700	500	200
MINING	F	LOCAL SURFACE WATER SUPPLY	1,962	1,962	1,962	1,962	1,962	1,962
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CROCKETT COUNTY	497	497	497	497	497	497
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	16	16	16	16	16	16
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | CROCKETT COUNTY	129	129	129	129	129	129
		RIO GRANDE BASIN TOTAL	**7,405**	**7,405**	**7,392**	**6,008**	**4,813**	**4,516**
		CROCKETT COUNTY TOTAL	**7,425**	**7,425**	**7,412**	**6,028**	**4,833**	**4,536**
ECTOR COUNTY UTILITY DISTRICT	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	549	765	765	760	751	739
ECTOR COUNTY UTILITY DISTRICT	F	DIRECT REUSE	71	104	108	112	115	117
ECTOR COUNTY UTILITY DISTRICT	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	1,491	1,718	2,002	1,974	1,932	1,862
ECTOR COUNTY UTILITY DISTRICT	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	40	58	60	62	64	65
GREATER GARDENDALE WSC	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	211	145	145	144	144	144
ODESSA	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	5,644	8,016	7,923	7,800	7,658	7,549
ODESSA	F	DIRECT REUSE	732	1,086	1,116	1,145	1,171	1,196
ODESSA	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	15,334	18,017	20,720	20,263	19,713	19,020
ODESSA	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	409	605	623	637	653	667
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	1,555	1,352	1,752	2,016	2,289	2,570
COUNTY-OTHER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	64	61	58	52	48	44
COUNTY-OTHER	F	OGALLALA AQUIFER | ECTOR COUNTY	428	677	700	700	700	700
MANUFACTURING	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	438	565	509	458	412	372
MANUFACTURING	F	DIRECT REUSE	57	77	72	67	63	59
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	1,189	1,267	1,331	1,190	1,061	937
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	1,270	1,270	1,270	1,270	637	822
MANUFACTURING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	231	220	209	189	173	158
MANUFACTURING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	32	43	40	38	35	33
MINING	F	DIRECT REUSE	1,249	1,376	1,247	1,363	1,463	1,527
MINING	F	LOCAL SURFACE WATER SUPPLY	29	29	29	29	29	29
MINING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	354	270	128	116	106	97
STEAM ELECTRIC POWER	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	258	324	292	263	237	214
STEAM ELECTRIC POWER	F	DIRECT REUSE	34	44	41	39	36	34

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
STEAM ELECTRIC POWER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	701	728	765	683	609	538
STEAM ELECTRIC POWER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	1,085	1,035	978	887	809	741
STEAM ELECTRIC POWER	O	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | GAINES COUNTY	2,631	2,681	2,738	2,829	2,907	2,975
STEAM ELECTRIC POWER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	19	25	23	22	20	19
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	134	134	134	134	134	134
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	25	25	25	25	25	25
LIVESTOCK	F	OGALLALA AQUIFER | ECTOR COUNTY	10	10	10	10	10	10
IRRIGATION	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	367	461	415	373	335	302
IRRIGATION	F	DIRECT REUSE	48	63	59	55	51	48
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	998	1,035	1,086	970	864	763
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	80	80	80	80	80	80
IRRIGATION	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	27	35	32	31	28	27
IRRIGATION	F	OGALLALA AQUIFER | ECTOR COUNTY	37	37	37	37	37	37
		COLORADO BASIN TOTAL	**37,831**	**44,438**	**47,522**	**46,823**	**45,399**	**44,654**
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	114	116	140	154	169	185
MINING	F	DIRECT REUSE	452	514	435	319	219	155
MINING	F	DOCKUM AQUIFER | ECTOR COUNTY	100	100	100	100	100	100
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	100	100	100	100	100	100
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	30	30	30	30	30	30
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	78	78	78	78	78	78
		RIO GRANDE BASIN TOTAL	**874**	**938**	**883**	**781**	**696**	**648**
		ECTOR COUNTY TOTAL	**38,705**	**45,376**	**48,405**	**47,604**	**46,095**	**45,302**
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | GLASSCOCK COUNTY	161	165	160	160	159	159
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | GLASSCOCK COUNTY	25	33	33	33	33	33
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | GLASSCOCK COUNTY	5,794	5,794	4,394	3,094	1,994	1,394
MINING	F	LOCAL SURFACE WATER SUPPLY	106	106	106	106	106	106
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | GLASSCOCK COUNTY	85	85	85	85	85	85
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	38	38	38	38	38	38
LIVESTOCK	F	OGALLALA AQUIFER | GLASSCOCK COUNTY	24	24	24	24	24	24
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | GLASSCOCK COUNTY	44,701	44,701	44,701	44,701	44,701	44,708
IRRIGATION	F	OGALLALA AQUIFER | GLASSCOCK COUNTY	6,553	6,553	6,553	6,553	6,553	6,546
		COLORADO BASIN TOTAL	**57,487**	**57,499**	**56,094**	**54,794**	**53,693**	**53,093**
		GLASSCOCK COUNTY TOTAL	**57,487**	**57,499**	**56,094**	**54,794**	**53,693**	**53,093**
BIG SPRING	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	1,433	1,842	1,663	1,484	1,333	1,203
BIG SPRING	F	DIRECT REUSE	186	250	235	218	204	191
BIG SPRING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	3,893	4,137	4,350	3,856	3,432	3,031

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
BIG SPRING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	104	139	131	122	114	106
COAHOMA	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	121	154	140	126	113	102
COAHOMA	F	DIRECT REUSE	16	21	20	18	17	16
COAHOMA	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	329	347	366	327	291	257
COAHOMA	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	9	12	11	10	10	9
COUNTY-OTHER	F	DOCKUM AQUIFER | HOWARD COUNTY	52	52	52	52	52	52
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AQUIFER | HOWARD COUNTY	100	100	100	100	100	100
COUNTY-OTHER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | HOWARD COUNTY	500	498	494	492	490	490
MANUFACTURING	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	345	434	391	352	317	286
MANUFACTURING	F	DIRECT REUSE	45	59	55	52	48	45
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	938	974	1,023	914	815	720
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU AQUIFER | HOWARD COUNTY	110	110	110	110	110	110
MANUFACTURING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | HOWARD COUNTY	2,113	2,136	2,136	2,136	2,136	2,136
MANUFACTURING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	25	33	31	29	27	25
MINING	F	DOCKUM AQUIFER | HOWARD COUNTY	106	106	106	106	106	106
MINING	F	LOCAL SURFACE WATER SUPPLY	61	61	61	61	61	61
MINING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | HOWARD COUNTY	3,233	3,233	2,233	1,233	433	133
STEAM ELECTRIC POWER	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	48	60	54	49	44	40
STEAM ELECTRIC POWER	F	DIRECT REUSE	6	8	8	7	7	6
STEAM ELECTRIC POWER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	131	136	143	127	114	100
STEAM ELECTRIC POWER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | HOWARD COUNTY	232	232	232	232	232	232
STEAM ELECTRIC POWER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	3	5	4	4	4	4
LIVESTOCK	F	DOCKUM AQUIFER | HOWARD COUNTY	20	20	20	20	20	20
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU AQUIFER | HOWARD COUNTY	40	40	40	40	40	40
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	39	39	39	39	39	39
LIVESTOCK	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | HOWARD COUNTY	170	170	170	170	170	170
IRRIGATION	F	DOCKUM AQUIFER | HOWARD COUNTY	326	326	326	326	326	326
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AQUIFER | HOWARD COUNTY	422	422	422	422	422	422
IRRIGATION	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | HOWARD COUNTY	6,135	6,135	6,135	6,135	6,135	6,135
		COLORADO BASIN TOTAL	**21,291**	**22,291**	**21,301**	**19,369**	**17,762**	**16,713**
		HOWARD COUNTY TOTAL	**21,291**	**22,291**	**21,301**	**19,369**	**17,762**	**16,713**
MERTZON	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | IRION COUNTY	101	99	96	94	94	94
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | IRION COUNTY	104	101	98	97	97	97
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | IRION COUNTY	6	7	7	7	7	7
MINING	F	DOCKUM AQUIFER | IRION COUNTY	150	150	150	150	150	150

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | IRION COUNTY	2,578	2,582	2,588	1,837	837	337
MINING	F	LIPAN AQUIFER | IRION COUNTY	13	13	13	13	13	13
MINING	F	LOCAL SURFACE WATER SUPPLY	93	93	93	93	93	93
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | IRION COUNTY	175	175	175	175	175	175
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	57	57	57	57	57	57
IRRIGATION	F	COLORADO RUN-OF-RIVER	221	221	221	221	221	221
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | IRION COUNTY	325	325	325	325	325	325
		COLORADO BASIN TOTAL	**3,823**	**3,823**	**3,823**	**3,069**	**2,069**	**1,569**
		IRION COUNTY TOTAL	**3,823**	**3,823**	**3,823**	**3,069**	**2,069**	**1,569**
JUNCTION	F	COLORADO RUN-OF-RIVER	0	0	0	0	0	0
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | KIMBLE COUNTY	234	228	221	217	216	216
COUNTY-OTHER	F	MARBLE FALLS AQUIFER | KIMBLE COUNTY	20	20	20	20	20	20
MANUFACTURING	F	COLORADO RUN-OF-RIVER	0	0	0	0	0	0
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | KIMBLE COUNTY	2	2	2	2	2	2
MINING	F	COLORADO RUN-OF-RIVER	14	14	14	14	14	14
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | KIMBLE COUNTY	5	5	5	5	5	5
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | KIMBLE COUNTY	182	182	182	182	182	182
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	138	138	138	138	138	138
IRRIGATION	F	COLORADO RUN-OF-RIVER	1,099	1,099	1,099	1,099	1,099	1,099
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | KIMBLE COUNTY	400	400	400	400	400	400
IRRIGATION	F	HICKORY AQUIFER | KIMBLE COUNTY	55	55	55	55	55	55
		COLORADO BASIN TOTAL	**2,149**	**2,143**	**2,136**	**2,132**	**2,131**	**2,131**
		KIMBLE COUNTY TOTAL	**2,149**	**2,143**	**2,136**	**2,132**	**2,131**	**2,131**
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | LOVING COUNTY	10	10	9	9	9	9
MINING	F	DOCKUM AQUIFER | LOVING COUNTY	437	438	439	440	441	442
MINING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | LOVING COUNTY	2,957	2,956	2,956	2,955	2,659	1,758
MINING	F	RUSTLER AQUIFER | LOVING COUNTY	200	200	200	200	200	200
LIVESTOCK	F	DOCKUM AQUIFER | LOVING COUNTY	16	15	14	13	12	11
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | LOVING COUNTY	15	16	17	18	19	20
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	1	1	1	1	1	1
		RIO GRANDE BASIN TOTAL	**3,636**	**3,636**	**3,636**	**3,636**	**3,341**	**2,441**
		LOVING COUNTY TOTAL	**3,636**	**3,636**	**3,636**	**3,636**	**3,341**	**2,441**
STANTON	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	74	93	83	75	68	61
STANTON	F	DIRECT REUSE	10	13	12	11	10	10
STANTON	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	200	207	218	195	174	154
STANTON	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	253	255	265	291	314	331
COUNTY-OTHER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	358	380	394	410	426	438
MINING	F	DIRECT REUSE	4,485	4,485	4,485	4,485	4,485	4,485
MINING	F	LOCAL SURFACE WATER SUPPLY	132	132	132	132	132	132

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
MINING	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	2,583	2,583	783	0	0	0
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	47	47	47	47	47	47
LIVESTOCK	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	72	72	72	72	72	72
IRRIGATION	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	36,491	36,491	36,491	35,806	33,326	31,609
		COLORADO BASIN TOTAL	**44,705**	**44,758**	**42,982**	**41,524**	**39,054**	**37,339**
		MARTIN COUNTY TOTAL	**44,705**	**44,758**	**42,982**	**41,524**	**39,054**	**37,339**
MASON	F	HICKORY AQUIFER | MASON COUNTY	0	0	0	0	0	0
COUNTY-OTHER	F	ELLENBURGER-SAN SABA AQUIFER | MASON COUNTY	21	21	21	21	21	21
COUNTY-OTHER	F	HICKORY AQUIFER | MASON COUNTY	170	163	157	154	153	153
COUNTY-OTHER	F	OTHER AQUIFER | MASON COUNTY	40	40	40	40	40	40
MINING	F	HICKORY AQUIFER | MASON COUNTY	1,023	941	708	568	460	372
LIVESTOCK	F	ELLENBURGER-SAN SABA AQUIFER | MASON COUNTY	75	75	75	75	75	75
LIVESTOCK	F	HICKORY AQUIFER | MASON COUNTY	412	412	412	412	412	412
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	227	227	227	227	227	227
IRRIGATION	F	HICKORY AQUIFER | MASON COUNTY	4,966	4,966	4,966	4,966	4,966	4,966
		COLORADO BASIN TOTAL	**6,934**	**6,845**	**6,606**	**6,463**	**6,354**	**6,266**
		MASON COUNTY TOTAL	**6,934**	**6,845**	**6,606**	**6,463**	**6,354**	**6,266**
BRADY	F	BRADY CREEK LAKE/RESERVOIR	0	0	0	0	0	0
BRADY	F	HICKORY AQUIFER | MCCULLOCH COUNTY	0	0	0	0	0	0
MILLERSVIEW-DOOLE WSC	F	HICKORY AQUIFER | MCCULLOCH COUNTY	48	48	48	47	47	46
MILLERSVIEW-DOOLE WSC	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	132	145	143	142	138	124
RICHLAND SUD*	K	ELLENBURGER-SAN SABA AQUIFER | SAN SABA COUNTY	156	156	156	158	156	155
RICHLAND SUD*	K	MARBLE FALLS AQUIFER | SAN SABA COUNTY	156	156	156	158	156	155
COUNTY-OTHER	F	HICKORY AQUIFER | MCCULLOCH COUNTY	82	85	84	85	85	85
COUNTY-OTHER	F	OTHER AQUIFER | MCCULLOCH COUNTY	50	50	50	50	50	50
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MCCULLOCH COUNTY	72	72	72	72	72	72
MANUFACTURING	F	HICKORY AQUIFER | MCCULLOCH COUNTY	451	537	537	537	537	537
MINING	F	ELLENBURGER-SAN SABA AQUIFER | MCCULLOCH COUNTY	4,210	4,174	3,321	2,814	2,418	2,101
MINING	F	HICKORY AQUIFER | MCCULLOCH COUNTY	4,718	4,174	3,321	2,814	2,418	2,101
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MCCULLOCH COUNTY	3	3	3	3	3	3
LIVESTOCK	F	ELLENBURGER-SAN SABA AQUIFER | MCCULLOCH COUNTY	154	154	154	154	154	154
LIVESTOCK	F	HICKORY AQUIFER | MCCULLOCH COUNTY	206	206	206	206	206	206
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	235	235	235	235	235	235
LIVESTOCK	F	OTHER AQUIFER | MCCULLOCH COUNTY	53	53	53	53	53	53
IRRIGATION	F	COLORADO RUN-OF-RIVER	69	69	69	69	69	69
IRRIGATION	F	HICKORY AQUIFER | MCCULLOCH COUNTY	2,215	2,215	2,215	2,215	2,215	2,215
IRRIGATION	F	MARBLE FALLS AQUIFER | MCCULLOCH COUNTY	40	40	40	40	40	40
		COLORADO BASIN TOTAL	**13,050**	**12,572**	**10,863**	**9,852**	**9,052**	**8,401**
		MCCULLOCH COUNTY TOTAL	**13,050**	**12,572**	**10,863**	**9,852**	**9,052**	**8,401**
MENARD	F	COLORADO RUN-OF-RIVER	139	139	139	139	139	139
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MENARD COUNTY	87	85	84	84	83	83
COUNTY-OTHER	F	ELLENBURGER-SAN SABA AQUIFER | MENARD COUNTY	5	4	2	1	1	1

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

Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MENARD COUNTY	788	773	672	577	517	422
MINING	F	ELLENBURGER-SAN SABA AQUIFER | MENARD COUNTY	298	298	280	250	200	200
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MENARD COUNTY	240	240	240	240	240	240
LIVESTOCK	F	ELLENBURGER-SAN SABA AQUIFER | MENARD COUNTY	6	6	6	6	6	6
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	48	48	48	48	48	48
IRRIGATION	F	COLORADO RUN-OF-RIVER	1,951	1,951	1,951	1,951	1,951	1,951
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MENARD COUNTY	468	468	468	468	468	468
IRRIGATION	F	HICKORY AQUIFER | MENARD COUNTY	1,244	1,244	1,244	1,244	1,244	1,244
		COLORADO BASIN TOTAL	**5,274**	**5,256**	**5,134**	**5,008**	**4,897**	**4,802**
		MENARD COUNTY TOTAL	**5,274**	**5,256**	**5,134**	**5,008**	**4,897**	**4,802**
AIRLINE MOBILE HOME PARK LTD	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MIDLAND COUNTY	171	177	189	205	221	238
AIRLINE MOBILE HOME PARK LTD	F	OGALLALA AQUIFER | MIDLAND COUNTY	57	59	63	68	74	80
GREATER GARDENDALE WSC	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | ECTOR COUNTY	108	77	77	78	78	78
GREENWOOD WATER	F	OGALLALA AQUIFER | MIDLAND COUNTY	211	224	244	265	288	310
MIDLAND	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	4,326	0	0	0	0	0
MIDLAND	F	DIRECT REUSE	562	0	0	0	0	0
MIDLAND	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	11,753	0	0	0	0	0
MIDLAND	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	16,815	16,815	16,815	16,815	16,815	16,815
MIDLAND	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MIDLAND COUNTY	560	560	0	0	0	0
MIDLAND	F	EV SPENCE LAKE/RESERVOIR NON-SYSTEM PORTION	0	0	0	0	0	0
MIDLAND	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | ANDREWS COUNTY	1,167	1,114	926	879	844	818
MIDLAND	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	3,798	2,808	2,409	2,185	2,043	1,945
MIDLAND	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	4,873	4,673	4,502	4,332	4,161	3,991
ODESSA	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	111	175	185	192	195	198
ODESSA	F	DIRECT REUSE	14	24	26	28	30	31
ODESSA	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	301	393	483	498	502	498
ODESSA	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	8	13	15	16	17	17
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MIDLAND COUNTY	2,342	2,524	2,656	2,916	3,198	3,470
COUNTY-OTHER	F	OGALLALA AQUIFER | MIDLAND COUNTY	911	982	1,033	1,134	1,243	1,349
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MIDLAND COUNTY	196	235	235	235	235	235
MANUFACTURING	F	OGALLALA AQUIFER | MIDLAND COUNTY	638	765	765	765	765	765
MANUFACTURING	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	147	177	177	177	177	177
MINING	F	DIRECT REUSE	2,803	2,803	2,803	2,803	2,803	2,803
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MIDLAND COUNTY	6,387	6,387	4,187	1,687	0	0
MINING	F	LOCAL SURFACE WATER SUPPLY	210	210	210	210	210	210
MINING	F	OGALLALA AQUIFER | MIDLAND COUNTY	1,200	1,200	1,000	800	500	300
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MIDLAND COUNTY	96	96	96	96	96	96

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	3	3	3	3	3	3
LIVESTOCK	F	OGALLALA AQUIFER | MIDLAND COUNTY	144	144	144	144	144	144
IRRIGATION	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	5	8	7	7	6	6
IRRIGATION	F	DIRECT REUSE	1	1	1	1	1	1
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	14	16	19	18	16	15
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | MIDLAND COUNTY	6,881	6,881	6,881	6,881	6,881	6,881
IRRIGATION	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	0	1	1	1	1	1
IRRIGATION	F	OGALLALA AQUIFER | MIDLAND COUNTY	11,205	11,200	11,198	11,199	11,201	11,203
		COLORADO BASIN TOTAL	**78,018**	**60,745**	**57,350**	**54,638**	**52,748**	**52,678**
		MIDLAND COUNTY TOTAL	**78,018**	**60,745**	**57,350**	**54,638**	**52,748**	**52,678**
COLORADO CITY	F	DOCKUM AQUIFER | MITCHELL COUNTY	1,308	1,307	1,307	1,307	1,307	1,307
LORAINE	F	DOCKUM AQUIFER | MITCHELL COUNTY	76	75	74	74	75	75
MITCHELL COUNTY UTILITY	F	DOCKUM AQUIFER | MITCHELL COUNTY	210	217	215	217	218	220
COUNTY-OTHER	F	DOCKUM AQUIFER | MITCHELL COUNTY	545	538	541	544	549	553
MANUFACTURING	F	DOCKUM AQUIFER | MITCHELL COUNTY	4	5	5	5	5	5
MINING	F	DOCKUM AQUIFER | MITCHELL COUNTY	593	738	632	493	375	290
STEAM ELECTRIC POWER	F	COLORADO CITY-CHAMPION LAKE/RESERVOIR SYSTEM	0	0	0	0	0	0
LIVESTOCK	F	DOCKUM AQUIFER | MITCHELL COUNTY	48	48	48	48	48	48
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	308	308	308	308	308	308
LIVESTOCK	F	OTHER AQUIFER | MITCHELL COUNTY	20	20	20	20	20	20
IRRIGATION	F	COLORADO RUN-OF-RIVER	14	14	14	14	14	14
IRRIGATION	F	DOCKUM AQUIFER | MITCHELL COUNTY	11,189	10,915	11,010	11,128	11,207	11,291
		COLORADO BASIN TOTAL	**14,315**	**14,185**	**14,174**	**14,158**	**14,126**	**14,131**
		MITCHELL COUNTY TOTAL	**14,315**	**14,185**	**14,174**	**14,158**	**14,126**	**14,131**
FORT STOCKTON	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	4,841	5,172	5,548	5,813	6,067	6,300
IRAAN	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	458	485	513	540	567	591
PECOS COUNTY FRESH WATER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	201	212	223	235	247	257
PECOS COUNTY WCID 1	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | PECOS COUNTY	384	398	415	433	453	472
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	110	127	147	165	182	197
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	413	433	433	433	433	433
MINING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | PECOS COUNTY	500	500	500	500	500	500
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	3,700	3,700	3,700	3,700	3,700	3,700
LIVESTOCK	F	CAPITAN REEF COMPLEX AQUIFER | PECOS COUNTY	12	12	12	12	12	12
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	621	621	621	621	621	621
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	37	37	37	37	37	37
LIVESTOCK	F	OTHER AQUIFER | PECOS COUNTY	5	5	5	5	5	5
LIVESTOCK	F	RUSTLER AQUIFER | PECOS COUNTY	12	12	12	12	12	12
IRRIGATION	F	CAPITAN REEF COMPLEX AQUIFER | PECOS COUNTY	1,787	1,787	1,787	1,787	1,787	1,787
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | PECOS COUNTY	58,937	58,940	58,943	58,946	58,949	58,952

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	58,938	58,941	58,944	58,946	58,949	58,952
IRRIGATION	F	RED BLUFF LAKE/RESERVOIR	2,504	2,498	2,492	2,487	2,481	2,475
IRRIGATION	F	RIO GRANDE RUN-OF-RIVER	18,672	18,672	18,672	18,672	18,672	18,672
IRRIGATION	F	RUSTLER AQUIFER | PECOS COUNTY	2,507	2,507	2,507	2,507	2,507	2,507
		RIO GRANDE BASIN TOTAL	**154,639**	**155,059**	**155,511**	**155,851**	**156,181**	**156,482**
		PECOS COUNTY TOTAL	**154,639**	**155,059**	**155,511**	**155,851**	**156,181**	**156,482**
BIG LAKE	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | REAGAN COUNTY	730	795	834	877	906	928
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | REAGAN COUNTY	70	76	79	82	85	87
MINING	F	DIRECT REUSE	3,742	3,742	3,946	4,177	4,366	4,443
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | REAGAN COUNTY	5,937	5,937	3,037	0	0	0
MINING	F	LOCAL SURFACE WATER SUPPLY	178	178	178	178	178	178
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | REAGAN COUNTY	115	115	115	115	115	115
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	60	60	60	60	60	60
IRRIGATION	F	DOCKUM AQUIFER | REAGAN COUNTY	71	71	71	71	71	71
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | REAGAN COUNTY	21,960	21,960	21,960	21,960	21,960	21,960
		COLORADO BASIN TOTAL	**32,863**	**32,934**	**30,280**	**27,520**	**27,741**	**27,842**
MINING	F	DIRECT REUSE	743	743	539	308	119	42
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | REAGAN COUNTY	8	8	8	8	8	8
		RIO GRANDE BASIN TOTAL	**751**	**751**	**547**	**316**	**127**	**50**
		REAGAN COUNTY TOTAL	**33,614**	**33,685**	**30,827**	**27,836**	**27,868**	**27,892**
BALMORHEA	E	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | JEFF DAVIS COUNTY	96	96	96	96	96	96
MADERA VALLEY WSC	E	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | JEFF DAVIS COUNTY	60	60	60	60	60	60
MADERA VALLEY WSC	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	386	408	429	446	458	468
PECOS	F	DOCKUM AQUIFER | REEVES COUNTY	1,110	1,259	1,407	1,514	1,597	1,659
PECOS	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	1,806	1,806	1,808	1,808	1,808	1,809
COUNTY-OTHER	E	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | JEFF DAVIS COUNTY	40	40	40	40	40	40
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	492	521	546	563	577	588
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	286	305	305	305	305	305
MINING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	2,200	2,200	2,200	2,200	2,200	2,200
LIVESTOCK	F	DOCKUM AQUIFER | REEVES COUNTY	18	18	18	18	18	18
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	334	334	334	334	334	334
LIVESTOCK	F	IGNEOUS AQUIFER | REEVES COUNTY	16	16	16	16	16	16
IRRIGATION	F	BALMORHEA LAKE/RESERVOIR	18,800	18,800	18,800	18,800	18,800	18,800
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	34,874	34,880	34,886	34,891	34,897	34,903
IRRIGATION	F	IGNEOUS AQUIFER | REEVES COUNTY	219	219	219	219	219	219
IRRIGATION	F	RED BLUFF LAKE/RESERVOIR	2,504	2,498	2,492	2,487	2,481	2,475
IRRIGATION	F	RIO GRANDE RUN-OF-RIVER	573	573	573	573	573	573

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
IRRIGATION	F	RUSTLER AQUIFER | REEVES COUNTY	1,967	1,967	1,967	1,967	1,967	1,967
		RIO GRANDE BASIN TOTAL	**65,781**	**66,000**	**66,196**	**66,337**	**66,446**	**66,530**
		REEVES COUNTY TOTAL	**65,781**	**66,000**	**66,196**	**66,337**	**66,446**	**66,530**
BALLINGER	F	BALLINGER/MOONEN LAKE/RESERVOIR	0	0	0	0	0	0
BALLINGER	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	1,519	1,547	1,549	1,549	1,543	1,517
COLEMAN COUNTY SUD*	F	BROWNWOOD LAKE/RESERVOIR	10	10	10	10	10	10
COLEMAN COUNTY SUD*	F	COLEMAN LAKE/RESERVOIR	0	0	0	0	0	0
COLEMAN COUNTY SUD*	F	HORDS CREEK LAKE/RESERVOIR	0	0	0	0	0	0
MILES	F	HICKORY AQUIFER | MCCULLOCH COUNTY	48	48	45	43	40	36
MILES	F	LIPAN AQUIFER | RUNNELS COUNTY	18	17	17	17	17	17
MILES	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	28	27	25	22	21	19
MILLERSVIEW-DOOLE WSC	F	HICKORY AQUIFER | MCCULLOCH COUNTY	35	34	33	33	32	32
MILLERSVIEW-DOOLE WSC	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	97	102	100	98	95	85
NORTH RUNNELS WSC*	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	7	8	8	8	8	7
NORTH RUNNELS WSC*	F	WINTERS LAKE/RESERVOIR	0	0	0	0	0	0
WINTERS	F	WINTERS LAKE/RESERVOIR	0	0	0	0	0	0
COUNTY-OTHER	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	19	20	19	19	19	17
COUNTY-OTHER	F	OTHER AQUIFER | RUNNELS COUNTY	34	33	31	31	30	30
MANUFACTURING	F	LIPAN AQUIFER | RUNNELS COUNTY	1	2	2	2	2	2
MANUFACTURING	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	9	9	9	9	9	9
MINING	F	OTHER AQUIFER | RUNNELS COUNTY	272	269	240	210	184	161
LIVESTOCK	F	LIPAN AQUIFER | RUNNELS COUNTY	26	26	26	26	26	26
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	475	475	475	475	475	475
LIVESTOCK	F	OTHER AQUIFER | RUNNELS COUNTY	204	204	204	204	204	204
IRRIGATION	F	COLORADO RUN-OF-RIVER	197	197	197	197	197	197
IRRIGATION	F	DIRECT REUSE	22	22	22	22	22	22
IRRIGATION	F	OTHER AQUIFER | RUNNELS COUNTY	2,886	2,886	2,886	2,886	2,886	2,886
		COLORADO BASIN TOTAL	**5,907**	**5,936**	**5,898**	**5,861**	**5,820**	**5,752**
		RUNNELS COUNTY TOTAL	**5,907**	**5,936**	**5,898**	**5,861**	**5,820**	**5,752**
ELDORADO	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	662	652	643	639	638	638
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	216	247	262	272	278	281
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	460	542	416	290	179	110
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	276	276	276	276	276	276
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	17	17	17	17	17	17
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	1,160	1,160	1,160	1,160	1,160	1,160
		COLORADO BASIN TOTAL	**2,791**	**2,894**	**2,774**	**2,654**	**2,548**	**2,482**
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	31	35	37	38	39	40
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	161	190	146	102	62	38
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	90	90	90	90	90	90
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	6	6	6	6	6	6
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SCHLEICHER COUNTY	651	651	651	651	651	651
		RIO GRANDE BASIN TOTAL	**939**	**972**	**930**	**887**	**848**	**825**

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
		SCHLEICHER COUNTY TOTAL	**3,730**	**3,866**	**3,704**	**3,541**	**3,396**	**3,307**
COUNTY-OTHER	F	DOCKUM AQUIFER | SCURRY COUNTY	46	47	48	52	56	59
MINING	F	DOCKUM AQUIFER | SCURRY COUNTY	11	18	19	14	10	7
LIVESTOCK	F	DOCKUM AQUIFER | SCURRY COUNTY	1	1	1	1	1	1
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	88	88	88	88	88	88
LIVESTOCK	F	OTHER AQUIFER | SCURRY COUNTY	3	3	3	3	3	3
IRRIGATION	F	DOCKUM AQUIFER | SCURRY COUNTY	248	240	238	239	239	239
		BRAZOS BASIN TOTAL	**397**	**397**	**397**	**397**	**397**	**397**
SNYDER	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	456	637	605	586	567	549
SNYDER	F	DIRECT REUSE	59	86	85	86	87	87
SNYDER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	1,238	1,430	1,582	1,523	1,460	1,383
SNYDER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	33	48	48	48	48	49
COUNTY-OTHER	F	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	69	87	78	70	63	57
COUNTY-OTHER	F	DIRECT REUSE	9	12	11	10	10	9
COUNTY-OTHER	F	DOCKUM AQUIFER | SCURRY COUNTY	67	63	69	78	87	97
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	188	194	205	183	163	144
COUNTY-OTHER	F	OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	5	7	6	6	5	5
COUNTY-OTHER	F	OTHER AQUIFER | SCURRY COUNTY	22	22	22	22	22	22
MANUFACTURING	F	DOCKUM AQUIFER | SCURRY COUNTY	26	30	30	30	30	30
MINING	F	DOCKUM AQUIFER | SCURRY COUNTY	27	43	45	34	23	16
LIVESTOCK	F	DOCKUM AQUIFER | SCURRY COUNTY	3	3	3	3	3	3
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	352	352	352	352	352	352
LIVESTOCK	F	OTHER AQUIFER | SCURRY COUNTY	14	14	14	14	14	14
IRRIGATION	F	COLORADO RUN-OF-RIVER	0	0	0	0	0	0
IRRIGATION	F	DOCKUM AQUIFER | SCURRY COUNTY	780	764	756	758	760	757
		COLORADO BASIN TOTAL	**3,348**	**3,792**	**3,911**	**3,803**	**3,694**	**3,574**
		SCURRY COUNTY TOTAL	**3,745**	**4,189**	**4,308**	**4,200**	**4,091**	**3,971**
STERLING CITY	F	LIPAN AQUIFER | STERLING COUNTY	276	281	281	280	280	280
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | STERLING COUNTY	32	32	32	32	32	32
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | STERLING COUNTY	780	953	812	522	270	140
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | STERLING COUNTY	209	209	209	209	209	209
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	25	25	25	25	25	25
IRRIGATION	F	COLORADO RUN-OF-RIVER	30	30	30	30	30	30
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | STERLING COUNTY	869	869	869	869	869	869
		COLORADO BASIN TOTAL	**2,221**	**2,399**	**2,258**	**1,967**	**1,715**	**1,585**
		STERLING COUNTY TOTAL	**2,221**	**2,399**	**2,258**	**1,967**	**1,715**	**1,585**
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	26	27	27	28	28	28
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	3	3	3	3	3	3
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	89	144	152	114	78	53
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	26	26	26	26	26	26

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	172	172	172	172	172	172
IRRIGATION	F	COLORADO RUN-OF-RIVER	2	2	2	2	2	2
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	177	177	177	177	177	177
		COLORADO BASIN TOTAL	**495**	**551**	**559**	**522**	**486**	**461**
SONORA	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	1,045	1,105	1,123	1,139	1,150	1,156
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	115	119	119	120	121	122
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	357	576	611	459	311	211
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	32	32	32	32	32	32
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	214	214	214	214	214	214
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	941	941	941	941	941	941
		RIO GRANDE BASIN TOTAL	**2,704**	**2,987**	**3,040**	**2,905**	**2,769**	**2,676**
		SUTTON COUNTY TOTAL	**3,199**	**3,538**	**3,599**	**3,427**	**3,255**	**3,137**
CONCHO RURAL WATER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | TOM GREEN COUNTY	90	90	90	90	90	90
CONCHO RURAL WATER	F	HICKORY AQUIFER | MCCULLOCH COUNTY	43	38	37	35	34	32
CONCHO RURAL WATER	F	LIPAN AQUIFER | TOM GREEN COUNTY	410	426	438	454	474	496
CONCHO RURAL WATER	F	MOUNTAIN CREEK LAKE/RESERVOIR	0	0	0	0	0	0
CONCHO RURAL WATER	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	25	22	20	19	17	15
DADS Supported Living Center	F	LIPAN AQUIFER | TOM GREEN COUNTY	109	108	108	107	107	107
GOODFELLOW AIR FORCE BASE	F	HICKORY AQUIFER | MCCULLOCH COUNTY	238	241	242	243	244	243
GOODFELLOW AIR FORCE BASE	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	139	136	132	128	124	119
MILLERSVIEW-DOOLE WSC	F	HICKORY AQUIFER | MCCULLOCH COUNTY	86	88	90	91	93	94
MILLERSVIEW-DOOLE WSC	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	235	263	269	274	275	254
SAN ANGELO	F	COLORADO RUN-OF-RIVER	214	214	214	214	214	214
SAN ANGELO	F	HICKORY AQUIFER | MCCULLOCH COUNTY	8,294	8,305	8,319	8,337	8,358	8,379
SAN ANGELO	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	4,631	4,480	4,329	4,181	4,032	3,884
SAN ANGELO	F	SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	0	0	0	0	0	0
TOM GREEN COUNTY FWSD 3	F	LIPAN AQUIFER | TOM GREEN COUNTY	131	142	147	154	162	172
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | TOM GREEN COUNTY	594	594	594	594	594	594
COUNTY-OTHER	F	HICKORY AQUIFER | MCCULLOCH COUNTY	115	102	98	94	89	84
COUNTY-OTHER	F	LIPAN AQUIFER | TOM GREEN COUNTY	500	500	500	500	500	500
COUNTY-OTHER	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	66	57	53	50	45	40
MANUFACTURING	F	HICKORY AQUIFER | MCCULLOCH COUNTY	197	203	196	186	175	166
MANUFACTURING	F	LIPAN AQUIFER | TOM GREEN COUNTY	500	500	500	500	500	500
MANUFACTURING	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	115	115	107	98	89	81
MINING	F	HICKORY AQUIFER | MCCULLOCH COUNTY	4	4	4	3	3	3
MINING	F	LIPAN AQUIFER | TOM GREEN COUNTY	1,049	1,074	1,113	1,107	1,129	1,151
MINING	F	MOUNTAIN CREEK LAKE/RESERVOIR	0	0	0	0	0	0
MINING	F	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	3	2	2	2	2	2
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | TOM GREEN COUNTY	562	562	562	562	562	562
LIVESTOCK	F	LIPAN AQUIFER | TOM GREEN COUNTY	246	246	246	246	246	246
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	317	317	317	317	317	317
IRRIGATION	F	COLORADO RUN-OF-RIVER	1,755	1,755	1,755	1,755	1,755	1,755

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | TOM GREEN COUNTY	772	772	772	772	772	772
IRRIGATION	F	LIPAN AQUIFER | TOM GREEN COUNTY	40,524	40,475	40,418	40,403	40,352	40,298
		COLORADO BASIN TOTAL	**61,964**	**61,831**	**61,672**	**61,516**	**61,354**	**61,170**
		TOM GREEN COUNTY TOTAL	**61,964**	**61,831**	**61,672**	**61,516**	**61,354**	**61,170**
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	28	30	30	30	31	31
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	182	205	205	205	205	205
MINING	F	DIRECT REUSE	2,242	2,242	2,242	2,242	2,242	2,242
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	1,000	1,000	500	150	100	100
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	48	48	48	48	48	48
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	10,195	10,195	10,195	10,195	10,195	10,195
		COLORADO BASIN TOTAL	**13,695**	**13,720**	**13,220**	**12,870**	**12,821**	**12,821**
MCCAMEY	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | PECOS COUNTY	827	881	906	936	955	968
RANKIN	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	276	294	302	312	318	322
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	47	48	48	50	50	51
MANUFACTURING	F	DOCKUM AQUIFER | UPTON COUNTY	2	2	2	2	2	2
MINING	F	DIRECT REUSE	2,343	2,343	2,242	2,242	2,242	2,242
MINING	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	2,000	2,000	1,500	750	100	100
MINING	F	LOCAL SURFACE WATER SUPPLY	121	121	121	121	121	121
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UPTON COUNTY	78	78	78	78	78	78
IRRIGATION	F	DOCKUM AQUIFER | UPTON COUNTY	208	208	208	208	208	208
		RIO GRANDE BASIN TOTAL	**5,902**	**5,975**	**5,407**	**4,699**	**4,074**	**4,092**
		UPTON COUNTY TOTAL	**19,597**	**19,695**	**18,627**	**17,569**	**16,895**	**16,913**
BARSTOW	F	DOCKUM AQUIFER | REEVES COUNTY	45	51	56	60	63	66
BARSTOW	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	74	74	72	72	72	71
GRANDFALLS	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	135	141	145	149	0	0
MONAHANS	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	3,626	3,611	3,618	3,636	3,656	3,672
MONAHANS	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	378	394	406	418	427	434
SOUTHWEST SANDHILLS WSC	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	185	186	185	190	194	197
WICKETT	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	1,175	1,175	1,180	1,190	1,200	1,207
COUNTY-OTHER	F	DOCKUM AQUIFER | WARD COUNTY	15	15	15	15	15	15
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	122	126	129	133	137	139
MANUFACTURING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	7	7	7	7	7	7
MINING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	1,867	1,867	1,667	1,267	867	567
MINING	F	LOCAL SURFACE WATER SUPPLY	33	33	33	33	33	33
STEAM ELECTRIC POWER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	150	150	150	150	150	150

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Region F Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
LIVESTOCK	F	DOCKUM AQUIFER | WARD COUNTY	5	5	5	5	5	5
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	73	73	73	73	73	73
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	5	5	5	5	5	5
IRRIGATION	F	DIRECT REUSE	670	670	670	670	670	670
IRRIGATION	F	DOCKUM AQUIFER | WARD COUNTY	269	269	269	269	269	269
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	1,734	1,734	1,741	1,755	1,770	1,781
IRRIGATION	F	RED BLUFF LAKE/RESERVOIR	2,504	2,499	2,493	2,486	2,480	2,475
IRRIGATION	F	RIO GRANDE RUN-OF-RIVER	881	881	881	881	881	881
		RIO GRANDE BASIN TOTAL	**13,953**	**13,966**	**13,800**	**13,464**	**12,974**	**12,717**
		WARD COUNTY TOTAL	**13,953**	**13,966**	**13,800**	**13,464**	**12,974**	**12,717**
LIVESTOCK	F	DOCKUM AQUIFER | WINKLER COUNTY	1	1	1	1	1	1
		COLORADO BASIN TOTAL	**1**	**1**	**1**	**1**	**1**	**1**
KERMIT	F	DOCKUM AQUIFER | WINKLER COUNTY	1,811	1,803	1,799	1,816	1,830	1,844
WINK	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	358	387	412	441	465	486
COUNTY-OTHER	F	DOCKUM AQUIFER | WINKLER COUNTY	30	47	60	75	87	97
COUNTY-OTHER	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	158	246	318	395	458	512
MANUFACTURING	F	DOCKUM AQUIFER | WINKLER COUNTY	64	76	76	76	76	76
MINING	F	DOCKUM AQUIFER | WINKLER COUNTY	394	585	496	378	266	187
MINING	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	393	584	495	378	265	186
LIVESTOCK	F	DOCKUM AQUIFER | WINKLER COUNTY	15	15	15	15	15	15
LIVESTOCK	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	83	83	83	83	83	83
LIVESTOCK	F	LOCAL SURFACE WATER SUPPLY	2	2	2	2	2	2
IRRIGATION	F	EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	3,507	3,507	3,507	3,507	3,507	3,507
		RIO GRANDE BASIN TOTAL	**6,815**	**7,335**	**7,263**	**7,166**	**7,054**	**6,995**
		WINKLER COUNTY TOTAL	**6,816**	**7,336**	**7,264**	**7,167**	**7,055**	**6,996**
		REGION F EXISTING WATER SUPPLY TOTAL	**729,263**	**718,312**	**706,607**	**688,587**	**673,716**	**665,626**

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Region F Water User Group (WUG) Needs/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.

	(NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ANDREWS COUNTY - COLORADO BASIN						
ANDREWS	(192)	(416)	(715)	(1,297)	(1,979)	(2,800)
COUNTY-OTHER	(30)	(58)	(91)	(152)	(212)	(275)
MANUFACTURING	(31)	(59)	(87)	(134)	(174)	(209)
MINING	(1,186)	(1,128)	(288)	376	952	1,395
LIVESTOCK	(9)	(17)	(25)	(39)	(50)	(60)
IRRIGATION	(1,000)	(4,989)	(6,598)	(7,690)	(8,613)	(9,435)
ANDREWS COUNTY - RIO GRANDE BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(699)	(699)	(699)	(699)	(699)	(699)
BORDEN COUNTY - BRAZOS BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	(138)	(202)	(240)	(265)	(282)
BORDEN COUNTY - COLORADO BASIN						
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
BROWN COUNTY - BRAZOS BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(342)	(342)	(342)	(342)	(342)	(342)
BROWN COUNTY - COLORADO BASIN						
BANGS	0	0	0	0	0	0
BROOKESMITH SUD*	0	0	0	0	1	1
BROWNWOOD	0	0	0	0	0	0
COLEMAN COUNTY SUD*	(12)	(12)	(11)	(11)	(11)	(11)
EARLY	0	0	0	0	0	0
ZEPHYR WSC*	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	(261)	(266)	(266)	(268)	(264)	(263)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,366)	(1,370)	(1,369)	(1,371)	(1,368)	(1,369)
COKE COUNTY - COLORADO BASIN						
BRONTE	(212)	(210)	(209)	(207)	(207)	(207)
ROBERT LEE	(237)	(234)	(231)	(231)	(230)	(230)
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

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Region F Water User Group (WUG) Needs/Surplus

COLEMAN COUNTY - COLORADO BASIN						
BROOKESMITH SUD*	0	0	0	0	0	0
COLEMAN	(821)	(814)	(795)	(793)	(792)	(792)
COLEMAN COUNTY SUD*	(181)	(178)	(172)	(169)	(169)	(169)
SANTA ANNA	0	0	0	0	0	0
COUNTY-OTHER	(24)	(22)	(22)	(21)	(21)	(21)
MANUFACTURING	(2)	(2)	(2)	(2)	(2)	(2)
MINING	0	0	0	0	0	0
LIVESTOCK	64	64	64	64	64	64
IRRIGATION	(396)	(396)	(396)	(396)	(396)	(396)
CONCHO COUNTY - COLORADO BASIN						
EDEN	25	25	25	25	25	25
MILLERSVIEW-DOOLE WSC	21	27	27	26	22	14
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
CRANE COUNTY - RIO GRANDE BASIN						
CRANE	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
CROCKETT COUNTY - COLORADO BASIN						
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
CROCKETT COUNTY - RIO GRANDE BASIN						
CROCKETT COUNTY WCID 1	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	689	587	1,962	1,962	1,962	1,962
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
ECTOR COUNTY - COLORADO BASIN						
ECTOR COUNTY UTILITY DISTRICT	(234)	0	0	(332)	(694)	(1,097)
GREATER GARDENDALE WSC	0	(83)	(102)	(126)	(152)	(179)
ODESSA	(2,404)	0	0	(3,409)	(7,083)	(11,200)
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	1,065	1,061	1,050	831	0	0
MINING	307	225	113	453	745	932
STEAM ELECTRIC POWER	(109)	0	0	(114)	(219)	(316)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	879	1,033	1,031	868	717	579
ECTOR COUNTY - RIO GRANDE BASIN						
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
GLASSCOCK COUNTY - COLORADO BASIN						
COUNTY-OTHER	0	0	0	0	0	0

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Region F Water User Group (WUG) Needs/Surplus

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
HOWARD COUNTY - COLORADO BASIN						
BIG SPRING	(611)	0	0	(647)	(1,233)	(1,785)
COAHOMA	(51)	0	0	(56)	(105)	(152)
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	(147)	0	0	(153)	(293)	(424)
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	(7)	14	14	(8)	(26)	(45)
LIVESTOCK	40	40	40	40	40	40
IRRIGATION	0	0	0	0	0	0
IRION COUNTY - COLORADO BASIN						
MERTZON	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	(1,766)	(1,762)	(456)	93	93	93
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(507)	(507)	(507)	(507)	(507)	(507)
KIMBLE COUNTY - COLORADO BASIN						
JUNCTION	(626)	(620)	(609)	(605)	(604)	(604)
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	(603)	(704)	(704)	(704)	(704)	(704)
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,103)	(1,103)	(1,103)	(1,103)	(1,103)	(1,103)
LOVING COUNTY - RIO GRANDE BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	(3,906)	(3,906)	(3,005)	(1,805)	(1,000)	(1,000)
LIVESTOCK	0	0	0	0	0	0
MARTIN COUNTY - COLORADO BASIN						
STANTON	23	16	0	(33)	(62)	(90)
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	1,117	2,717	3,617
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	(685)	(3,165)	(4,882)
MASON COUNTY - COLORADO BASIN						
MASON	(700)	(690)	(682)	(677)	(676)	(676)
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
MCCULLOCH COUNTY - COLORADO BASIN						
BRADY	(1,391)	(1,420)	(1,402)	(1,410)	(1,412)	(1,414)
MILLERSVIEW-DOOLE WSC	32	43	44	43	38	23
RICHLAND SUD*	78	72	74	77	73	70
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	1	1	1	1	0	1

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Region F Water User Group (WUG) Needs/Surplus

LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
MENARD COUNTY - COLORADO BASIN						
MENARD	(211)	(203)	(197)	(196)	(196)	(196)
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
MIDLAND COUNTY - COLORADO BASIN						
AIRLINE MOBILE HOME PARK LTD	0	0	0	0	0	0
GREATER GARDENDALE WSC	0	(43)	(55)	(68)	(83)	(98)
GREENWOOD WATER	0	0	0	0	0	0
MIDLAND	15,882	(5,833)	(9,604)	(12,600)	(15,542)	(18,663)
ODESSA	(47)	0	0	(83)	(180)	(293)
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	213	1,013
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1)	0	0	0	(1)	0
MITCHELL COUNTY - COLORADO BASIN						
COLORADO CITY	0	(133)	(144)	(155)	(168)	(183)
LORAINE	0	0	0	0	0	0
MITCHELL COUNTY UTILITY	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
STEAM ELECTRIC POWER	(10,326)	(10,326)	(10,326)	(10,326)	(10,326)	(10,326)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,584)	(1,858)	(1,763)	(1,645)	(1,566)	(1,482)
PECOS COUNTY - RIO GRANDE BASIN						
FORT STOCKTON	0	0	0	0	0	0
IRAAN	0	0	0	0	0	0
PECOS COUNTY FRESH WATER	0	0	0	0	0	0
PECOS COUNTY WCID 1	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	(3,500)	(3,500)	(3,500)	(2,000)	(600)	500
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
REAGAN COUNTY - COLORADO BASIN						
BIG LAKE	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	263	2,963	4,063
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
REAGAN COUNTY - RIO GRANDE BASIN						
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
REEVES COUNTY - RIO GRANDE BASIN						
BALMORHEA	(107)	(118)	(129)	(137)	(142)	(147)

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Region F Water User Group (WUG) Needs/Surplus

MADERA VALLEY WSC	0	0	0	0	0	0
PECOS	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	(10,400)	(10,400)	(9,900)	(7,700)	(5,600)	(4,000)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
RUNNELS COUNTY - COLORADO BASIN						
BALLINGER	830	860	878	880	876	850
COLEMAN COUNTY SUD*	(10)	(10)	(10)	(9)	(9)	(9)
MILES	(19)	(34)	(35)	(39)	(42)	(48)
MILLERSVIEW-DOOLE WSC	24	31	30	30	26	16
NORTH RUNNELS WSC*	(162)	(159)	(155)	(154)	(154)	(156)
WINTERS	(226)	(218)	(206)	(205)	(204)	(204)
COUNTY-OTHER	(23)	(21)	(19)	(18)	(18)	(19)
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
SCHLEICHER COUNTY - COLORADO BASIN						
ELDORADO	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
SCHLEICHER COUNTY - RIO GRANDE BASIN						
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
SCURRY COUNTY - BRAZOS BASIN						
COUNTY-OTHER	(205)	(216)	(227)	(241)	(259)	(278)
MINING	(67)	(109)	(116)	(87)	(59)	(40)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,450)	(1,458)	(1,460)	(1,459)	(1,459)	(1,459)
SCURRY COUNTY - COLORADO BASIN						
SNYDER	(194)	0	0	(256)	(524)	(814)
COUNTY-OTHER	(197)	(198)	(220)	(281)	(347)	(414)
MANUFACTURING	(130)	(156)	(156)	(156)	(156)	(156)
MINING	(175)	(286)	(303)	(228)	(154)	(104)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(5,081)	(5,097)	(5,105)	(5,103)	(5,101)	(5,104)
STERLING COUNTY - COLORADO BASIN						
STERLING CITY	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
SUTTON COUNTY - COLORADO BASIN						
COUNTY-OTHER	0	0	0	0	0	0

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Region F Water User Group (WUG) Needs/Surplus

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
SUTTON COUNTY - RIO GRANDE BASIN						
SONORA	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
TOM GREEN COUNTY - COLORADO BASIN						
CONCHO RURAL WATER	8	0	(3)	(6)	(9)	(13)
DADS Supported Living Center	0	0	0	0	0	0
GOODFELLOW AIR FORCE BASE	(136)	(191)	(222)	(258)	(298)	(345)
MILLERSVIEW-DOOLE WSC	58	80	83	82	75	46
SAN ANGELO	(4,785)	(6,658)	(7,632)	(8,824)	(10,243)	(11,773)
TOM GREEN COUNTY FWSD 3	0	0	0	0	0	0
COUNTY-OTHER	264	252	208	173	140	112
MANUFACTURING	(38)	(144)	(159)	(178)	(198)	(215)
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	558	509	452	437	386	332
UPTON COUNTY - COLORADO BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	506	506	576	948	1,468	1,734
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
UPTON COUNTY - RIO GRANDE BASIN						
MCCAMEY	0	0	0	0	0	0
RANKIN	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	329	757	1,037	1,471
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
WARD COUNTY - RIO GRANDE BASIN						
BARSTOW	0	0	0	0	0	0
GRANDFALLS	0	0	0	0	(152)	(155)
MONAHANS	1,486	1,377	1,320	1,269	1,237	1,211
SOUTHWEST SANDHILLS WSC	0	0	0	0	0	0
WICKETT	967	957	955	959	963	966
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	(2,352)	(2,352)	(2,352)	(2,352)	(2,352)	(2,352)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	2,898	2,893	2,894	2,901	2,910	2,916
WINKLER COUNTY - COLORADO BASIN						
LIVESTOCK	0	0	0	0	0	0

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Region F Water User Group (WUG) Needs/Surplus

WINKLER COUNTY - RIO GRANDE BASIN						
KERMIT	0	0	0	0	0	0
WINK	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

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Region F Water User Group (WUG) Second-Tier Identified Water Needs

Second-tier needs are WUG split needs adjusted to include the implementation of recommended demand reduction and direct reuse water management strategies.

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ANDREWS COUNTY - COLORADO BASIN						
ANDREWS	147	361	619	1,186	1,850	2,650
COUNTY-OTHER	16	43	74	134	192	254
MANUFACTURING	31	59	87	134	174	209
MINING	909	868	66	0	0	0
LIVESTOCK	9	17	25	39	50	60
IRRIGATION	23	3,034	4,643	5,735	6,658	7,480
ANDREWS COUNTY - RIO GRANDE BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	658	617	617	617	617	617
BORDEN COUNTY - BRAZOS BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
BORDEN COUNTY - COLORADO BASIN						
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
BROWN COUNTY - BRAZOS BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	323	311	311	311	311	311
BROWN COUNTY - COLORADO BASIN						
BANGS	0	0	0	0	0	0
BROOKESMITH SUD*	0	0	0	0	0	0
BROWNWOOD	0	0	0	0	0	0
COLEMAN COUNTY SUD*	11	11	10	10	10	10
EARLY	0	0	0	0	0	0
ZEPHYR WSC*	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	195	200	199	201	198	197
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	979	751	750	752	749	750
COKE COUNTY - COLORADO BASIN						
BRONTE	209	207	206	204	204	204
ROBERT LEE	234	231	228	228	227	227
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

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Region F Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COLEMAN COUNTY - COLORADO BASIN						
BROOKESMITH SUD*	0	0	0	0	0	0
COLEMAN	747	741	723	721	720	720
COLEMAN COUNTY SUD*	173	170	164	161	161	161
SANTA ANNA	0	0	0	0	0	0
COUNTY-OTHER	23	21	21	20	20	20
MANUFACTURING	2	2	2	2	2	2
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	373	349	349	349	349	349
CONCHO COUNTY - COLORADO BASIN						
EDEN	0	0	0	0	0	0
MILLERSVIEW-DOOLE 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
CRANE COUNTY - RIO GRANDE BASIN						
CRANE	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
CROCKETT COUNTY - COLORADO BASIN						
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
CROCKETT COUNTY - RIO GRANDE BASIN						
CROCKETT COUNTY WCID 1	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
ECTOR COUNTY - COLORADO BASIN						
ECTOR COUNTY UTILITY DISTRICT	174	0	0	207	557	948
GREATER GARDENDALE WSC	0	74	92	115	140	166
ODESSA	1,847	0	0	2,600	6,200	10,235
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	109	0	0	114	219	316
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
ECTOR COUNTY - RIO GRANDE BASIN						
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

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Region F Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
GLASSCOCK COUNTY - COLORADO BASIN						
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
HOWARD COUNTY - COLORADO BASIN						
BIG SPRING	480	0	0	508	1,094	1,646
COAHOMA	43	0	0	48	97	144
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	147	0	0	153	293	424
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	7	0	0	8	26	45
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
IRION COUNTY - COLORADO BASIN						
MERTZON	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	1,444	1,440	225	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	454	402	349	349	349	349
KIMBLE COUNTY - COLORADO BASIN						
JUNCTION	618	612	601	597	596	596
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	603	704	704	704	704	704
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	970	837	784	784	784	784
LOVING COUNTY - RIO GRANDE BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	3,381	3,381	2,543	1,427	699	762
LIVESTOCK	0	0	0	0	0	0
MARTIN COUNTY - COLORADO BASIN						
STANTON	0	0	0	23	51	79
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
MASON COUNTY - COLORADO BASIN						
MASON	693	683	675	670	669	669
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
MCCULLOCH COUNTY - COLORADO BASIN						
BRADY	1,373	1,402	1,383	1,391	1,393	1,395
MILLERSVIEW-DOOLE WSC	0	0	0	0	0	0

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Region F Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MCCULLOCH COUNTY - COLORADO BASIN						
RICHLAND SUD*	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
MENARD COUNTY - COLORADO BASIN						
MENARD	139	131	125	124	124	124
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
MIDLAND COUNTY - COLORADO BASIN						
AIRLINE MOBILE HOME PARK LTD	0	0	0	0	0	0
GREATER GARDENDALE WSC	0	39	50	62	76	91
GREENWOOD WATER	0	0	0	0	0	0
MIDLAND	0	5,078	8,788	11,718	14,598	17,651
ODESSA	36	0	0	63	158	268
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
MITCHELL COUNTY - COLORADO BASIN						
COLORADO CITY	0	115	126	137	150	164
LORAINE	0	0	0	0	0	0
MITCHELL COUNTY UTILITY	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
STEAM ELECTRIC POWER	9,826	9,826	9,826	9,826	9,826	9,826
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	1,328	1,602	1,507	1,389	1,310	1,226
PECOS COUNTY - RIO GRANDE BASIN						
FORT STOCKTON	0	0	0	0	0	0
IRAAN	0	0	0	0	0	0
PECOS COUNTY FRESH WATER	0	0	0	0	0	0
PECOS COUNTY WCID 1	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	2,961	2,961	2,961	1,566	533	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
REAGAN COUNTY - COLORADO BASIN						
BIG LAKE	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0

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Region F Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
REAGAN COUNTY - COLORADO BASIN						
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
REAGAN COUNTY - RIO GRANDE BASIN						
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
REEVES COUNTY - RIO GRANDE BASIN						
BALMORHEA	105	116	127	135	140	145
MADERA VALLEY WSC	0	0	0	0	0	0
PECOS	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	9,518	9,518	9,053	7,007	5,054	3,566
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
RUNNELS COUNTY - COLORADO BASIN						
BALLINGER	0	0	0	0	0	0
COLEMAN COUNTY SUD*	10	10	10	9	9	9
MILES	16	31	32	36	39	45
MILLERSVIEW-DOOLE WSC	0	0	0	0	0	0
NORTH RUNNELS WSC*	158	155	151	150	150	152
WINTERS	209	206	197	196	195	195
COUNTY-OTHER	21	19	17	16	16	17
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
SCHLEICHER COUNTY - COLORADO BASIN						
ELDORADO	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
SCHLEICHER COUNTY - RIO GRANDE BASIN						
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
SCURRY COUNTY - BRAZOS BASIN						
COUNTY-OTHER	199	209	220	233	250	269
MINING	61	100	106	80	54	37
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	1,365	1,288	1,239	1,238	1,238	1,238
SCURRY COUNTY - COLORADO BASIN						
SNYDER	153	0	0	201	465	721
COUNTY-OTHER	183	183	203	263	328	393
MANUFACTURING	130	156	156	156	156	156
MINING	161	263	279	210	142	95

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Region F Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
SCURRY COUNTY - COLORADO BASIN						
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	4,788	4,511	4,343	4,341	4,339	4,342
STERLING COUNTY - COLORADO BASIN						
STERLING CITY	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
SUTTON COUNTY - COLORADO BASIN						
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
SUTTON COUNTY - RIO GRANDE BASIN						
SONORA	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
TOM GREEN COUNTY - COLORADO BASIN						
CONCHO RURAL WATER	0	0	0	0	0	0
DADS Supported Living Center	0	0	0	0	0	0
GOODFELLOW AIR FORCE BASE	128	182	213	248	288	334
MILLERSVIEW-DOOLE WSC	0	0	0	0	0	0
SAN ANGELO	4,326	6,126	7,074	8,232	9,614	11,105
TOM GREEN COUNTY FWSD 3	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	38	144	159	178	198	215
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
UPTON COUNTY - COLORADO BASIN						
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
UPTON COUNTY - RIO GRANDE BASIN						
MCCAMEY	0	0	0	0	0	0
RANKIN	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

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Region F Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
WARD COUNTY - RIO GRANDE BASIN						
BARSTOW	0	0	0	0	0	0
GRANDFALLS	0	0	0	0	150	153
MONAHANS	0	0	0	0	0	0
SOUTHWEST SANDHILLS WSC	0	0	0	0	0	0
WICKETT	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
STEAM ELECTRIC POWER	2,352	2,352	2,352	2,352	2,352	2,352
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
WINKLER COUNTY - COLORADO BASIN						
LIVESTOCK	0	0	0	0	0	0
WINKLER COUNTY - RIO GRANDE BASIN						
KERMIT	0	0	0	0	0	0
WINK	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

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Region F Water User Group (WUG) Second-Tier Identified Water Needs Summary

Second-tier needs are WUG split needs adjusted to include the implementation of recommended demand reduction and direct reuse water management strategies.

WUG CATEGORY	NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MUNICIPAL	12,029	16,681	21,594	29,980	40,125	51,007
COUNTY-OTHER	442	475	535	666	806	953
MANUFACTURING	951	1,065	1,108	1,327	1,527	1,710
MINING	18,630	18,731	15,432	10,491	6,680	4,657
STEAM ELECTRIC POWER	12,294	12,178	12,178	12,300	12,423	12,539
LIVESTOCK	9	17	25	39	50	60
IRRIGATION	11,261	13,702	14,892	15,865	16,704	17,446

Region F Source Water Balance (Availability - WUG Supply)

GROUNDWATERSOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
CAPITAN REEF COMPLEX AQUIFER	PECOS	RIO GRANDE	FRESH/ BRACKISH	24,369	24,369	24,369	24,369	24,369	24,369
CAPITAN REEF COMPLEX AQUIFER	REEVES	RIO GRANDE	FRESH	1,007	1,007	1,007	1,007	1,007	1,007
CAPITAN REEF COMPLEX AQUIFER	WARD	RIO GRANDE	FRESH/ BRACKISH	103	103	103	103	103	103
CAPITAN REEF COMPLEX AQUIFER	WINKLER	RIO GRANDE	FRESH	274	274	274	274	274	274
CROSS TIMBERS AQUIFER	BROWN	COLORADO	FRESH	522	520	521	521	523	523
CROSS TIMBERS AQUIFER	COLEMAN	COLORADO	FRESH	64	64	64	64	64	64
CROSS TIMBERS AQUIFER	MCCULLOCH	COLORADO	FRESH	103	103	103	103	103	103
DOCKUM AQUIFER	ANDREWS	COLORADO	FRESH	1,300	1,300	1,300	1,300	1,300	1,300
DOCKUM AQUIFER	ANDREWS	RIO GRANDE	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	BORDEN	BRAZOS	FRESH	284	284	284	284	284	284
DOCKUM AQUIFER	BORDEN	COLORADO	FRESH	606	606	606	606	606	606
DOCKUM AQUIFER	COKE	COLORADO	FRESH/ BRACKISH	100	100	100	100	100	100
DOCKUM AQUIFER	CRANE	RIO GRANDE	FRESH	14	14	14	14	14	14
DOCKUM AQUIFER	CROCKETT	COLORADO	FRESH	2	2	2	2	2	2
DOCKUM AQUIFER	CROCKETT	RIO GRANDE	FRESH	2	2	2	2	2	2
DOCKUM AQUIFER	ECTOR	COLORADO	FRESH	13	13	13	13	13	13
DOCKUM AQUIFER	ECTOR	RIO GRANDE	FRESH	415	415	415	415	415	415
DOCKUM AQUIFER	GLASSCOCK	COLORADO	FRESH	900	900	900	900	900	900
DOCKUM AQUIFER	HOWARD	COLORADO	FRESH	1,085	1,085	1,085	1,085	1,085	1,085
DOCKUM AQUIFER	IRION	COLORADO	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	LOVING	RIO GRANDE	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	MARTIN	COLORADO	FRESH	8	8	8	8	8	8
DOCKUM AQUIFER	MIDLAND	COLORADO	FRESH/ BRACKISH	400	400	400	400	400	400
DOCKUM AQUIFER	MITCHELL	COLORADO	FRESH	45	175	186	202	234	229
DOCKUM AQUIFER	PECOS	RIO GRANDE	FRESH	8,164	8,164	8,164	8,164	8,164	8,164
DOCKUM AQUIFER	REAGAN	COLORADO	FRESH	231	231	231	231	231	231
DOCKUM AQUIFER	REAGAN	RIO GRANDE	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	REEVES	RIO GRANDE	FRESH	1,366	1,211	1,058	947	861	796
DOCKUM AQUIFER	SCURRY	BRAZOS	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	SCURRY	COLORADO	FRESH	0	0	0	0	0	0
DOCKUM AQUIFER	STERLING	COLORADO	FRESH	10	10	10	10	10	10
DOCKUM AQUIFER	TOM GREEN	COLORADO	FRESH/ BRACKISH	200	200	200	200	200	200
DOCKUM AQUIFER	UPTON	RIO GRANDE	FRESH	790	790	790	790	790	790
DOCKUM AQUIFER	WARD	RIO GRANDE	FRESH	1,861	1,861	1,861	1,861	1,861	1,861
DOCKUM AQUIFER	WINKLER	COLORADO	FRESH	12	12	12	12	12	12
DOCKUM AQUIFER	WINKLER	RIO GRANDE	FRESH	3,673	3,461	3,541	3,627	3,713	3,768
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	CRANE	RIO GRANDE	FRESH	2,786	2,458	2,363	2,455	2,549	2,615
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	LOVING	RIO GRANDE	FRESH	0	0	0	0	295	1,195
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	PECOS	RIO GRANDE	FRESH	63,078	63,061	63,041	63,020	62,997	62,975

* 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 F Source Water Balance (Availability - WUG Supply)

GROUNDWATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	REEVES	RIO GRANDE	FRESH	151,172	151,096	151,044	151,005	150,973	150,946
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	WARD	RIO GRANDE	FRESH	0	755	2,650	6,451	8,516	10,498
EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS	WINKLER	RIO GRANDE	FRESH	28,257	27,933	27,913	27,912	27,929	27,926
EDWARDS-TRINITY-PLATEAU AQUIFER	ANDREWS	COLORADO	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	HOWARD	COLORADO	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	MARTIN	COLORADO	FRESH	242	242	242	242	242	242
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	COKE	COLORADO	FRESH	350	356	408	462	510	552
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	CONCHO	COLORADO	FRESH	52	46	51	52	52	50
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	CROCKETT	COLORADO	FRESH	14	14	14	14	14	14
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	CROCKETT	RIO GRANDE	FRESH	0	0	13	1,397	2,592	2,889
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	ECTOR	COLORADO	FRESH	1,567	1,867	1,467	1,203	1,563	1,097
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	ECTOR	RIO GRANDE	FRESH	295	293	269	255	240	224
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	GLASSCOCK	COLORADO	FRESH	14,420	14,408	15,813	17,113	18,214	18,807
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	IRION	COLORADO	FRESH	0	0	0	754	1,754	2,254
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	KIMBLE	COLORADO	FRESH	563	569	576	580	581	581
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MASON	COLORADO	FRESH	18	18	18	18	18	18
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MCCULLOCH	COLORADO	FRESH	73	73	73	73	73	73
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MENARD	COLORADO	FRESH	1,011	1,028	1,130	1,225	1,286	1,381
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	MIDLAND	COLORADO	FRESH	6,600	6,373	8,989	11,213	12,602	12,313
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	PECOS	RIO GRANDE	FRESH/ BRACKISH	47,200	46,737	46,274	45,920	45,588	45,290
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	REAGAN	COLORADO	FRESH	39,393	39,322	42,180	45,171	45,139	45,115
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	REAGAN	RIO GRANDE	FRESH	20	20	20	20	20	20
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SCHLEICHER	COLORADO	FRESH	3,629	3,526	3,646	3,766	3,872	3,938
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SCHLEICHER	RIO GRANDE	FRESH	698	665	707	750	789	812
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	STERLING	COLORADO	FRESH	605	432	573	863	1,115	1,245
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SUTTON	COLORADO	FRESH	70	14	6	43	79	104
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	SUTTON	RIO GRANDE	FRESH	3,529	3,246	3,193	3,328	3,464	3,557

* 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 F Source Water Balance (Availability - WUG Supply)

GROUNDWATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	TOM GREEN	COLORADO	FRESH	779	779	779	779	779	779
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	UPTON	COLORADO	FRESH	6,890	6,865	7,365	7,715	7,764	7,764
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	UPTON	RIO GRANDE	FRESH	1,625	1,606	2,098	2,836	3,480	3,475
ELLENBURGER-SAN SABA AQUIFER	BROWN	COLORADO	FRESH	131	131	131	131	131	131
ELLENBURGER-SAN SABA AQUIFER	KIMBLE	COLORADO	FRESH	521	521	521	521	521	521
ELLENBURGER-SAN SABA AQUIFER	MASON	COLORADO	FRESH	3,141	3,141	3,141	3,141	3,141	3,141
ELLENBURGER-SAN SABA AQUIFER	MCCULLOCH	COLORADO	FRESH	0	36	889	1,396	1,792	2,109
ELLENBURGER-SAN SABA AQUIFER	MENARD	COLORADO	FRESH	0	1	21	52	102	102
HICKORY AQUIFER	BROWN	COLORADO	FRESH	12	12	12	12	12	12
HICKORY AQUIFER	COLEMAN	COLORADO	FRESH	500	500	500	500	500	500
HICKORY AQUIFER	CONCHO	COLORADO	FRESH	27	27	27	27	27	27
HICKORY AQUIFER	KIMBLE	COLORADO	FRESH	110	110	110	110	110	110
HICKORY AQUIFER	MASON	COLORADO	FRESH	6,641	6,730	6,969	7,112	7,221	7,309
HICKORY AQUIFER	MCCULLOCH	COLORADO	FRESH	7,545	8,000	8,854	9,360	9,756	10,073
HICKORY AQUIFER	MENARD	COLORADO	FRESH	1,481	1,481	1,481	1,481	1,481	1,481
IGNEOUS AQUIFER	PECOS	RIO GRANDE	FRESH	80	80	80	80	80	80
IGNEOUS AQUIFER	REEVES	RIO GRANDE	FRESH	65	65	65	65	65	65
LIPAN AQUIFER	COKE	COLORADO	FRESH/ BRACKISH	160	160	160	160	160	160
LIPAN AQUIFER	CONCHO	COLORADO	FRESH	0	0	0	0	0	0
LIPAN AQUIFER	GLASSCOCK	COLORADO	FRESH	10	10	10	10	10	10
LIPAN AQUIFER	IRION	COLORADO	FRESH	0	0	0	0	0	0
LIPAN AQUIFER	RUNNELS	COLORADO	FRESH	0	0	0	0	0	0
LIPAN AQUIFER	STERLING	COLORADO	FRESH	574	569	569	570	570	570
LIPAN AQUIFER	TOM GREEN	COLORADO	FRESH	99	97	98	97	98	98
MARBLE FALLS AQUIFER	BROWN	COLORADO	FRESH	25	25	25	25	25	25
MARBLE FALLS AQUIFER	KIMBLE	COLORADO	FRESH	80	80	80	80	80	80
MARBLE FALLS AQUIFER	MASON	COLORADO	FRESH	100	100	100	100	100	100
MARBLE FALLS AQUIFER	MCCULLOCH	COLORADO	FRESH	10	10	10	10	10	10
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	ANDREWS	COLORADO	FRESH	3	0	0	0	0	0
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	ANDREWS	RIO GRANDE	FRESH	0	0	0	0	0	0
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	BORDEN	BRAZOS	FRESH	5	0	0	0	0	0
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	BORDEN	COLORADO	FRESH	3,339	2,199	1,695	1,402	1,111	919
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	HOWARD	COLORADO	FRESH	7,452	4,987	4,864	5,240	5,685	5,770
OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS	MARTIN	COLORADO	FRESH	19,191	7,509	2,419	0	0	0
OGALLALA AQUIFER	ECTOR	COLORADO	FRESH	7,551	7,006	6,424	6,388	5,980	5,980
OGALLALA AQUIFER	GLASSCOCK	COLORADO	FRESH	1,348	1,096	795	481	226	0
OGALLALA AQUIFER	MIDLAND	COLORADO	FRESH	24,022	22,250	20,176	18,318	17,110	17,174
OGALLALA AQUIFER	WINKLER	RIO GRANDE	FRESH	40	40	40	40	40	40
OTHER AQUIFER	BORDEN	COLORADO	FRESH	1,442	1,194	1,337	1,627	1,877	2,000

* 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 F Source Water Balance (Availability - WUG Supply)

GROUNDWATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
OTHER AQUIFER	COKE	COLORADO	FRESH	1,122	1,132	1,141	1,144	1,144	1,144
OTHER AQUIFER	COLEMAN	COLORADO	FRESH	1	2	12	23	32	40
OTHER AQUIFER	CONCHO	COLORADO	FRESH	2,681	2,687	2,739	2,794	2,841	2,882
OTHER AQUIFER	MASON	COLORADO	FRESH	833	833	833	833	833	833
OTHER AQUIFER	MCCULLOCH	COLORADO	FRESH	0	0	0	0	0	0
OTHER AQUIFER	MITCHELL	COLORADO	FRESH	769	769	769	769	769	769
OTHER AQUIFER	PECOS	RIO GRANDE	FRESH	9,995	9,995	9,995	9,995	9,995	9,995
OTHER AQUIFER	RUNNELS	COLORADO	FRESH	1,605	1,609	1,640	1,670	1,697	1,720
OTHER AQUIFER	SCURRY	BRAZOS	BRACKISH	71	71	71	71	71	71
OTHER AQUIFER	SCURRY	COLORADO	FRESH	279	279	279	279	279	279
PECOS VALLEY AQUIFER	ANDREWS	RIO GRANDE	FRESH	0	0	0	0	0	0
RUSTLER AQUIFER	CRANE	RIO GRANDE	FRESH/ BRACKISH	1,000	1,000	1,000	1,000	1,000	1,000
RUSTLER AQUIFER	LOVING	RIO GRANDE	FRESH	0	0	0	0	0	0
RUSTLER AQUIFER	PECOS	RIO GRANDE	FRESH	4,524	4,524	4,524	4,524	4,524	4,524
RUSTLER AQUIFER	REEVES	RIO GRANDE	FRESH	420	420	420	420	420	420
RUSTLER AQUIFER	WARD	RIO GRANDE	FRESH	0	0	0	0	0	0
RUSTLER AQUIFER	WINKLER	RIO GRANDE	BRACKISH	500	500	500	500	500	500
SEYMOUR AQUIFER	SCURRY	BRAZOS	FRESH	10	10	10	10	10	10
TRINITY AQUIFER	BROWN	BRAZOS	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	BROWN	COLORADO	FRESH	0	0	0	0	0	0
GROUNDWATER SOURCE WATER BALANCE TOTAI				**532,374**	**513,484**	**516,074**	**526,817**	**534,873**	**539,166**

REUSE SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
DIRECT REUSE	ANDREWS	COLORADO	FRESH	0	0	0	0	0	0
DIRECT REUSE	CONCHO	COLORADO	FRESH	0	0	0	0	0	0
DIRECT REUSE	CRANE	RIO GRANDE	FRESH	0	0	0	0	0	0
DIRECT REUSE	ECTOR	COLORADO	FRESH	0	0	0	0	0	0
DIRECT REUSE	HOWARD	COLORADO	FRESH	0	0	0	0	0	0
DIRECT REUSE	MIDLAND	COLORADO	FRESH	0	0	0	0	0	0
DIRECT REUSE	MITCHELL	COLORADO	FRESH	552	552	552	552	552	552
DIRECT REUSE	RUNNELS	COLORADO	FRESH	0	0	0	0	0	0
DIRECT REUSE	WARD	RIO GRANDE	FRESH	0	0	0	0	0	0
INDIRECT REUSE	TOM GREEN	COLORADO	FRESH	8,400	8,400	8,400	8,400	8,400	8,400
REUSE SOURCE WATER BALANCE TOTAI				**8,952**	**8,952**	**8,952**	**8,952**	**8,952**	**8,952**

SURFACE WATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
BALLINGER/MOONEN LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
BALMORHEA LAKE/RESERVOIR	RESERVOIR**	RIO GRANDE	FRESH	0	0	0	0	0	0
BRADY CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
BRAZOS LIVESTOCK LOCAL SUPPLY	BORDEN	BRAZOS	FRESH	0	0	0	0	0	0
BRAZOS LIVESTOCK LOCAL SUPPLY	BROWN	BRAZOS	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 F Source Water Balance (Availability - WUG Supply)

SURFACE WATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
BRAZOS LIVESTOCK LOCAL SUPPLY	SCURRY	BRAZOS	FRESH	0	0	0	0	0	0
BROWNWOOD LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	2,850	2,710	2,570	2,430	2,290	2,150
COLEMAN LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
COLORADO CITY-CHAMPION LAKE/RESERVOIR SYSTEM	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	BORDEN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	BROWN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	COKE	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	COLEMAN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	CONCHO	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	CROCKETT	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	ECTOR	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	GLASSCOCK	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	HOWARD	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	IRION	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	KIMBLE	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	MARTIN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	MASON	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	MCCULLOCH	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	MENARD	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	MIDLAND	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	MITCHELL	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	REAGAN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	RUNNELS	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	SCHLEICHER	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	SCURRY	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	STERLING	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	SUTTON	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	TOM GREEN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	ANDREWS	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	ECTOR	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	GLASSCOCK	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	HOWARD	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	IRION	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	MARTIN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	MIDLAND	COLORADO	FRESH	0	0	0	0	0	0
COLORADO OTHER LOCAL SUPPLY	REAGAN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	BROWN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	COKE	COLORADO	FRESH	5	5	5	5	5	5
COLORADO RUN-OF-RIVER	COLEMAN	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	CONCHO	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	ECTOR	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	IRION	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	KIMBLE	COLORADO	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 F Source Water Balance (Availability - WUG Supply)

SURFACE WATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
COLORADO RUN-OF-RIVER	MCCULLOCH	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	MENARD	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	MITCHELL	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	RUNNELS	COLORADO	FRESH	65	65	65	65	65	65
COLORADO RUN-OF-RIVER	SCURRY	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	STERLING	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	SUTTON	COLORADO	FRESH	0	0	0	0	0	0
COLORADO RUN-OF-RIVER	TOM GREEN	COLORADO	FRESH	0	0	0	0	0	0
CRMWD DIVERTED WATER SYSTEM	RESERVOIR**	COLORADO	BRACKISH	5,760	5,760	5,760	5,760	5,760	5,760
EV SPENCE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
HORDS CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
MOUNTAIN CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
OAK CREEK LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
RED BLUFF LAKE/RESERVOIR	RESERVOIR**	RIO GRANDE	FRESH	22,538	22,485	22,433	22,380	22,328	22,275
RIO GRANDE LIVESTOCK LOCAL SUPPLY	CRANE	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	CROCKETT	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	LOVING	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	PECOS	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	SCHLEICHER	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	SUTTON	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	WARD	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	WINKLER	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE OTHER LOCAL SUPPLY	CROCKETT	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE OTHER LOCAL SUPPLY	UPTON	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE OTHER LOCAL SUPPLY	WARD	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE RUN-OF-RIVER	PECOS	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE RUN-OF-RIVER	REEVES	RIO GRANDE	FRESH	0	0	0	0	0	0
RIO GRANDE RUN-OF-RIVER	WARD	RIO GRANDE	FRESH	0	0	0	0	0	0
SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
WINTERS LAKE/RESERVOIR	RESERVOIR**	COLORADO	FRESH	0	0	0	0	0	0
SURFACE WATER SOURCE WATER BALANCE TOTAl				**31,218**	**31,025**	**30,833**	**30,640**	**30,448**	**30,255**

REGION F SOURCE WATER BALANCE TOTAl	**572,544**	**553,461**	**555,859**	**566,409**	**574,273**	**578,373**

* 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 F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
ANDREWS COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	293	507	73.0%	214	501	134.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	501	537	7.2%	700	776	10.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	208	30	-85.6%	486	275	-43.4%
ANDREWS COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	9,478	18,666	96.9%	5,236	10,231	95.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	37,898	20,365	-46.3%	36,306	20,365	-43.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	28,420	1,699	-94.0%	31,070	10,134	-67.4%
ANDREWS COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	225	201	-10.7%	159	150	-5.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	325	210	-35.4%	325	210	-35.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	100	9	-91.0%	166	60	-63.9%
ANDREWS COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	31	549	1671.0%	12	408	3300.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	49	580	1083.7%	66	617	834.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	18	31	72.2%	54	209	287.0%
ANDREWS COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,348	2,773	105.7%	317	2,878	807.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,959	3,959	0.0%	1,483	1,483	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	2,611	1,186	-54.6%	1,166	0	-100.0%
ANDREWS COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,683	3,990	48.7%	1,735	6,221	258.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,270	4,182	-2.1%	9,210	9,021	-2.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,587	192	-87.9%	7,475	2,800	-62.5%
BORDEN COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	178	178	0.0%	177	175	-1.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	178	178	0.0%	175	175	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BORDEN COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	757	2,949	289.6%	760	2,667	250.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,000	2,949	-26.3%	3,977	2,949	-25.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	3,243	0	-100.0%	3,217	282	-91.2%
BORDEN COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	250	175	-30.0%	250	175	-30.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	250	175	-30.0%	250	175	-30.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BORDEN COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	679	679	0.0%	121	121	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	679	679	0.0%	121	121	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BROWN COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	204	170	-16.7%	203	169	-16.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	204	170	-16.7%	203	169	-16.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%

*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 2016 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 Needs totals.

Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
BROWN COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	6,330	6,417	1.4%	6,329	6,414	1.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	9,435	8,125	-13.9%	9,275	8,125	-12.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	3,105	1,708	-45.0%	2,946	1,711	-41.9%
BROWN COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,368	1,119	-18.2%	1,368	1,119	-18.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,353	1,119	-17.3%	1,353	1,119	-17.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BROWN COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	673	548	-18.6%	957	651	-32.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	673	548	-18.6%	957	651	-32.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BROWN COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	943	682	-27.7%	944	681	-27.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	943	943	0.0%	944	944	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	261	100.0%	0	263	100.0%
BROWN COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,825	5,873	0.8%	5,595	5,643	0.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,833	5,885	0.9%	5,603	5,653	0.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	8	12	50.0%	8	11	37.5%
COKE COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	76	118	55.3%	68	105	54.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	127	118	-7.1%	113	105	-7.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	51	0	-100.0%	45	0	-100.0%
COKE COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	763	689	-9.7%	763	689	-9.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	965	689	-28.6%	962	689	-28.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	202	0	-100.0%	199	0	-100.0%
COKE COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	431	306	-29.0%	431	306	-29.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	431	306	-29.0%	431	306	-29.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
COKE COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	170	488	187.1%	170	286	68.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	488	488	0.0%	286	286	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	318	0	-100.0%	116	0	-100.0%
COKE COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	116	119	2.6%	108	110	1.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	548	568	3.6%	528	547	3.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	432	449	3.9%	420	437	4.0%
COKE COUNTY | STEAM ELECTRIC POWER WUG TYPE						
PROJECTED DEMAND TOTAL (acre-feet per year)	247	0	-100.0%	528	0	-100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	247	0	-100.0%	528	0	-100.0%
COLEMAN COUNTY | COUNTY-OTHER WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	0	0.0%	0	0	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	24	24	0.0%	22	21	-4.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	24	24	0.0%	22	21	-4.5%
COLEMAN COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	27	69	155.6%	27	69	155.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	770	465	-39.6%	770	465	-39.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	743	396	-46.7%	743	396	-46.7%
COLEMAN COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,076	769	-28.5%	1,076	769	-28.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,076	705	-34.5%	1,076	705	-34.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
COLEMAN COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	0	0.0%	0	0	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	9	2	-77.8%	9	2	-77.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	9	2	-77.8%	9	2	-77.8%
COLEMAN COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	46	108	134.8%	46	69	50.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	108	108	0.0%	69	69	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	62	0	-100.0%	23	0	-100.0%
COLEMAN COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	344	344	0.0%	325	325	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,348	1,346	-0.1%	1,287	1,286	-0.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,004	1,002	-0.2%	962	961	-0.1%
CONCHO COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	96	114	18.8%	91	107	17.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	96	114	18.8%	91	107	17.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CONCHO COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,485	4,902	9.3%	4,485	4,902	9.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	9,734	4,902	-49.6%	9,546	4,902	-48.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	5,249	0	-100.0%	5,061	0	-100.0%
CONCHO COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	699	382	-45.4%	699	382	-45.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	699	382	-45.4%	699	382	-45.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CONCHO COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	268	480	79.1%	268	279	4.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	480	480	0.0%	279	279	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	212	0	-100.0%	11	0	-100.0%
CONCHO COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	592	346	-41.6%	566	332	-41.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	577	300	-48.0%	558	293	-47.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CRANE COUNTY | COUNTY-OTHER WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	170	170	0.0%	317	316	-0.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	170	170	0.0%	317	316	-0.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CRANE COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	172	72	-58.1%	172	72	-58.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	172	72	-58.1%	172	72	-58.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CRANE COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	455	100.0%	0	468	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	455	100.0%	0	468	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CRANE COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	617	617	0.0%	407	407	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	617	617	0.0%	407	407	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CRANE COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,262	1,261	-0.1%	1,576	1,575	-0.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,262	1,261	-0.1%	1,576	1,575	-0.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CROCKETT COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	28	27	-3.6%	17	17	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	28	27	-3.6%	17	17	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CROCKETT COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	479	135	-71.8%	437	135	-69.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	479	135	-71.8%	437	135	-69.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	1	0	-100.0%
CROCKETT COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	695	527	-24.2%	695	527	-24.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	681	527	-22.6%	681	527	-22.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CROCKETT COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	14	100.0%	0	15	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	14	100.0%	0	15	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CROCKETT COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	550	5,189	843.5%	63	2,162	3331.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,732	4,500	159.8%	63	200	217.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,182	0	-100.0%	0	0	0.0%
CROCKETT COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,533	1,533	0.0%	1,681	1,680	-0.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,533	1,533	0.0%	1,681	1,680	-0.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CROCKETT COUNTY | STEAM ELECTRIC POWER WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	0	0.0%	0	0	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	776	0	-100.0%	1,662	0	-100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	776	0	-100.0%	1,662	0	-100.0%
ECTOR COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,248	2,161	-33.5%	3,855	3,499	-9.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,451	2,161	-37.4%	5,587	3,499	-37.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	208	0	-100.0%	1,732	0	-100.0%
ECTOR COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,118	1,635	46.2%	740	1,335	80.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,432	756	-47.2%	1,345	756	-43.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	314	0	-100.0%	606	0	-100.0%
ECTOR COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	268	199	-25.7%	268	199	-25.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	265	199	-24.9%	265	199	-24.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ECTOR COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,534	3,217	-29.0%	5,123	2,381	-53.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,454	2,152	-37.7%	4,209	2,381	-43.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ECTOR COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,248	2,284	1.6%	1,256	2,008	59.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,977	1,977	0.0%	1,076	1,076	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ECTOR COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	13,438	24,481	82.2%	20,817	31,359	50.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	24,069	27,119	12.7%	38,613	43,835	13.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	10,631	2,638	-75.2%	17,796	12,476	-29.9%
ECTOR COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,817	4,728	67.8%	2,639	4,521	71.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	9,436	4,837	-48.7%	21,672	4,837	-77.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	6,619	109	-98.4%	19,033	316	-98.3%
GLASSCOCK COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	162	161	-0.6%	160	159	-0.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	162	161	-0.6%	160	159	-0.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GLASSCOCK COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	56,707	51,254	-9.6%	54,439	51,254	-5.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	56,707	51,254	-9.6%	54,439	51,254	-5.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GLASSCOCK COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	262	147	-43.9%	262	147	-43.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	262	147	-43.9%	262	147	-43.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GLASSCOCK COUNTY | MANUFACTURING WUG TYPE						

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	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	25	100.0%	0	33	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	25	100.0%	0	33	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GLASSCOCK COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,423	5,900	72.4%	798	1,500	88.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,423	5,900	72.4%	798	1,500	88.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
HOWARD COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	447	652	45.9%	408	642	57.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	896	652	-27.2%	883	642	-27.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	449	0	-100.0%	475	0	-100.0%
HOWARD COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,489	6,883	97.3%	3,230	6,883	113.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	6,722	6,883	2.4%	6,337	6,883	8.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	3,233	0	-100.0%	3,107	0	-100.0%
HOWARD COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	202	269	33.2%	187	269	43.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	316	229	-27.5%	316	229	-27.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	114	0	-100.0%	129	0	-100.0%
HOWARD COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,429	3,576	150.2%	1,363	3,322	143.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,748	3,723	35.5%	3,495	3,746	7.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,319	147	-88.9%	2,132	424	-80.1%
HOWARD COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	163	3,400	1985.9%	156	300	92.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,491	3,400	36.5%	199	300	50.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	2,328	0	-100.0%	43	0	-100.0%
HOWARD COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,358	6,091	81.4%	3,274	4,915	50.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	6,332	6,753	6.6%	6,424	6,852	6.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	2,974	662	-77.7%	3,150	1,937	-38.5%
HOWARD COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	420	100.0%	0	382	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	427	100.0%	0	427	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	7	100.0%	0	45	100.0%
IRION COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	105	104	-1.0%	97	97	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	105	104	-1.0%	97	97	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
IRION COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,108	546	-50.7%	948	546	-42.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,467	1,053	-28.2%	1,307	1,053	-19.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	359	507	41.2%	359	507	41.2%
IRION COUNTY | LIVESTOCK WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	268	232	-13.4%	268	232	-13.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	268	232	-13.4%	268	232	-13.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
IRION COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	6	100.0%	0	7	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	6	100.0%	0	7	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
IRION COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,373	2,834	106.4%	342	593	73.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,192	4,600	44.1%	342	500	46.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,819	1,766	-2.9%	0	0	0.0%
IRION COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	102	101	-1.0%	95	94	-1.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	102	101	-1.0%	95	94	-1.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KIMBLE COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	242	254	5.0%	225	236	4.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	255	254	-0.4%	237	236	-0.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	13	0	-100.0%	12	0	-100.0%
KIMBLE COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,443	1,554	7.7%	1,443	1,554	7.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,939	2,657	-9.6%	2,400	2,657	10.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,496	1,103	-26.3%	957	1,103	15.3%
KIMBLE COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	402	320	-20.4%	402	320	-20.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	402	320	-20.4%	402	320	-20.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KIMBLE COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2	2	0.0%	2	2	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	701	605	-13.7%	985	706	-28.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	699	603	-13.7%	983	704	-28.4%
KIMBLE COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	19	19	0.0%	19	19	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	19	19	0.0%	19	19	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KIMBLE COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	0	0.0%	0	0	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	627	626	-0.2%	604	604	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	627	626	-0.2%	604	604	0.0%
LOVING COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	11	10	-9.1%	10	9	-10.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	11	10	-9.1%	10	9	-10.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
LOVING COUNTY | LIVESTOCK WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	101	32	-68.3%	101	32	-68.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	101	32	-68.3%	101	32	-68.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
LOVING COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	792	3,594	353.8%	474	2,400	406.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	792	7,500	847.0%	474	3,400	617.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	3,906	100.0%	0	1,000	100.0%
MARTIN COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	131	358	173.3%	175	438	150.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	342	358	4.7%	418	438	4.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	211	0	-100.0%	243	0	-100.0%
MARTIN COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	11,165	36,491	226.8%	11,079	31,609	185.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	36,322	36,491	0.5%	33,123	36,491	10.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	25,157	0	-100.0%	22,044	4,882	-77.9%
MARTIN COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	90	119	32.2%	93	119	28.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	128	119	-7.0%	128	119	-7.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	38	0	-100.0%	35	0	-100.0%
MARTIN COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	16	0	-100.0%	21	0	-100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	41	0	-100.0%	50	0	-100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	25	0	-100.0%	29	0	-100.0%
MARTIN COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	488	7,200	1375.4%	531	4,617	769.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,527	7,200	104.1%	413	1,000	142.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	3,039	0	-100.0%	0	0	0.0%
MARTIN COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	294	537	82.7%	357	556	55.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	539	514	-4.6%	677	646	-4.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	245	0	-100.0%	320	90	-71.9%
MASON COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	225	231	2.7%	208	214	2.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	234	231	-1.3%	217	214	-1.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	9	0	-100.0%	9	0	-100.0%
MASON COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	8,353	4,966	-40.5%	7,758	4,966	-36.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	8,294	4,966	-40.1%	7,699	4,966	-35.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MASON COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,248	714	-42.8%	1,248	714	-42.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,248	714	-42.8%	1,248	714	-42.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MASON COUNTY | MINING WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,025	1,023	-0.2%	374	372	-0.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,023	1,023	0.0%	372	372	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MASON COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	0	0.0%	0	0	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	694	700	0.9%	671	676	0.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	694	700	0.9%	671	676	0.7%
MCCULLOCH COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	57	132	131.6%	59	135	128.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	92	132	43.5%	95	135	42.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	35	0	-100.0%	36	0	-100.0%
MCCULLOCH COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,400	2,324	66.0%	1,417	2,324	64.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,584	2,324	-35.2%	3,361	2,324	-30.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	2,184	0	-100.0%	1,944	0	-100.0%
MCCULLOCH COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	690	651	-5.7%	690	651	-5.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	714	651	-8.8%	714	651	-8.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	24	0	-100.0%	24	0	-100.0%
MCCULLOCH COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	299	523	74.9%	435	609	40.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	500	523	4.6%	719	609	-15.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	201	0	-100.0%	284	0	-100.0%
MCCULLOCH COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,309	8,928	68.2%	4,201	4,202	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	8,927	8,927	0.0%	4,201	4,201	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	3,618	0	-100.0%	0	0	0.0%
MCCULLOCH COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	487	492	1.0%	474	480	1.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,718	1,773	3.2%	1,740	1,801	3.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,389	1,391	0.1%	1,412	1,414	0.1%
MENARD COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	95	92	-3.2%	87	84	-3.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	95	92	-3.2%	87	84	-3.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MENARD COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,104	3,663	74.1%	2,104	3,663	74.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,530	3,663	44.8%	2,489	3,663	47.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	426	0	-100.0%	385	0	-100.0%
MENARD COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	426	294	-31.0%	426	294	-31.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	408	294	-27.9%	408	294	-27.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MENARD COUNTY | MANUFACTURING WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3	0	-100.0%	3	0	-100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	3	0	-100.0%	3	0	-100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MENARD COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,086	1,086	0.0%	622	622	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,086	1,086	0.0%	622	622	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MENARD COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	136	139	2.2%	136	139	2.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	346	350	1.2%	331	335	1.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	210	211	0.5%	195	196	0.5%
MIDLAND COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,232	3,253	-23.1%	6,510	4,819	-26.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,232	3,253	-23.1%	6,510	4,819	-26.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MIDLAND COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	33,276	18,106	-45.6%	31,981	18,107	-43.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	33,276	18,107	-45.6%	31,981	18,107	-43.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	1	100.0%	0	0	0.0%
MIDLAND COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	394	243	-38.3%	394	243	-38.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	394	243	-38.3%	394	243	-38.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MIDLAND COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	230	981	326.5%	335	1,177	251.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	230	981	326.5%	335	1,177	251.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MIDLAND COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,893	10,600	172.3%	743	3,313	345.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,893	10,600	172.3%	743	2,300	209.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MIDLAND COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	30,150	44,835	48.7%	17,053	25,019	46.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	33,238	29,000	-12.8%	48,502	44,073	-9.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	3,088	47	-98.5%	31,449	19,054	-39.4%
MITCHELL COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	843	545	-35.3%	875	553	-36.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	843	545	-35.3%	875	553	-36.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MITCHELL COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	11,519	11,203	-2.7%	11,236	11,305	0.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	11,519	12,787	11.0%	11,236	12,787	13.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	1,584	100.0%	0	1,482	100.0%
MITCHELL COUNTY | LIVESTOCK WUG TYPE						

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	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	413	376	-9.0%	413	376	-9.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	413	376	-9.0%	413	376	-9.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MITCHELL COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	4	100.0%	0	5	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	4	100.0%	0	5	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MITCHELL COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	593	593	0.0%	290	290	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	593	593	0.0%	290	290	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MITCHELL COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,360	1,594	17.2%	1,539	1,602	4.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,360	1,594	17.2%	1,539	1,785	16.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	183	100.0%
MITCHELL COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	0	0.0%	0	0	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,847	10,326	113.0%	3,994	10,326	158.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	4,847	10,326	113.0%	3,994	10,326	158.5%
PECOS COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	415	110	-73.5%	522	197	-62.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	415	110	-73.5%	522	197	-62.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
PECOS COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	126,028	143,345	13.7%	126,033	143,345	13.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	126,023	143,345	13.7%	126,023	143,345	13.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
PECOS COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	932	687	-26.3%	932	687	-26.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	932	687	-26.3%	932	687	-26.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
PECOS COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	103	413	301.0%	103	433	320.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	103	413	301.0%	103	433	320.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
PECOS COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	690	4,200	508.7%	524	4,200	701.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	690	7,700	1015.9%	524	3,700	606.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	3,500	100.0%	0	0	0.0%
PECOS COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,808	5,884	1.3%	7,529	7,620	1.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,808	5,884	1.3%	7,529	7,620	1.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REAGAN COUNTY | COUNTY-OTHER WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	70	70	0.0%	87	87	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	70	70	0.0%	87	87	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REAGAN COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	19,130	22,031	15.2%	17,537	22,031	25.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	19,130	22,031	15.2%	17,537	22,031	25.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REAGAN COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	266	183	-31.2%	266	183	-31.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	255	183	-28.2%	255	183	-28.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REAGAN COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,226	10,600	150.8%	214	4,663	2079.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,211	10,600	151.7%	199	600	201.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REAGAN COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	731	730	-0.1%	929	928	-0.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	731	730	-0.1%	929	928	-0.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REEVES COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	503	532	5.8%	594	628	5.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	503	532	5.8%	594	628	5.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REEVES COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	91,357	58,937	-35.5%	87,475	58,937	-32.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	91,357	58,937	-35.5%	87,475	58,937	-32.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REEVES COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	863	368	-57.4%	863	368	-57.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	862	368	-57.3%	862	368	-57.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REEVES COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	197	286	45.2%	233	305	30.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	197	286	45.2%	233	305	30.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REEVES COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,531	2,200	43.7%	1,288	2,200	70.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,531	12,600	723.0%	1,288	6,200	381.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	10,400	100.0%	0	4,000	100.0%
REEVES COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,576	3,458	-3.3%	4,250	4,092	-3.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,576	3,565	-0.3%	4,250	4,239	-0.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	107	100.0%	0	147	100.0%
RUNNELS COUNTY | COUNTY-OTHER WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	51	53	3.9%	10	47	370.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	252	76	-69.8%	234	66	-71.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	201	23	-88.6%	224	19	-91.5%
RUNNELS COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,367	3,105	31.2%	2,367	3,105	31.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,009	3,105	-22.5%	3,919	3,105	-20.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,642	0	-100.0%	1,552	0	-100.0%
RUNNELS COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	880	705	-19.9%	880	705	-19.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	880	705	-19.9%	880	705	-19.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
RUNNELS COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2	10	400.0%	0	11	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	48	10	-79.2%	69	11	-84.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	46	0	-100.0%	69	0	-100.0%
RUNNELS COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	177	272	53.7%	177	161	-9.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	272	272	0.0%	161	161	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	95	0	-100.0%	0	0	0.0%
RUNNELS COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	308	1,762	472.1%	121	1,723	1324.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,144	1,325	15.8%	1,100	1,274	15.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	851	417	-51.0%	988	417	-57.8%
SCHLEICHER COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	292	247	-15.4%	373	321	-13.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	269	247	-8.2%	343	321	-6.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SCHLEICHER COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,414	1,811	28.1%	1,270	1,811	42.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,414	1,811	28.1%	1,270	1,811	42.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SCHLEICHER COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	552	389	-29.5%	552	389	-29.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	535	389	-27.3%	535	389	-27.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SCHLEICHER COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	661	621	-6.1%	158	148	-6.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	621	621	0.0%	148	148	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SCHLEICHER COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	614	662	7.8%	593	638	7.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	614	662	7.8%	593	638	7.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SCURRY COUNTY | COUNTY-OTHER WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	314	406	29.3%	373	393	5.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	763	808	5.9%	1,021	1,085	6.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	449	402	-10.5%	648	692	6.8%
SCURRY COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	984	1,028	4.5%	923	996	7.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	7,305	7,559	3.5%	6,088	7,559	24.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	6,321	6,531	3.3%	5,165	6,563	27.1%
SCURRY COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	412	461	11.9%	413	461	11.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	504	461	-8.5%	504	461	-8.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	92	0	-100.0%	91	0	-100.0%
SCURRY COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3	26	766.7%	3	30	900.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	3	156	5100.0%	3	186	6100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	130	100.0%	0	156	100.0%
SCURRY COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	48	38	-20.8%	46	23	-50.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	280	280	0.0%	167	167	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	232	242	4.3%	121	144	19.0%
SCURRY COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,178	1,786	51.6%	1,647	2,068	25.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,036	1,980	-2.8%	2,963	2,882	-2.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	858	194	-77.4%	1,316	814	-38.1%
STERLING COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	33	32	-3.0%	33	32	-3.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	33	32	-3.0%	33	32	-3.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
STERLING COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	983	899	-8.5%	782	899	15.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	983	899	-8.5%	782	899	15.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
STERLING COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	322	234	-27.3%	322	234	-27.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	322	234	-27.3%	322	234	-27.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
STERLING COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	780	780	0.0%	140	140	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	780	780	0.0%	140	140	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
STERLING COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	276	276	0.0%	281	280	-0.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	276	276	0.0%	281	280	-0.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SUTTON COUNTY | COUNTY-OTHER WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	167	141	-15.6%	179	150	-16.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	167	141	-15.6%	179	150	-16.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SUTTON COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,803	1,120	-37.9%	1,629	1,120	-31.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,803	1,120	-37.9%	1,629	1,120	-31.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SUTTON COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	489	444	-9.2%	489	444	-9.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	479	444	-7.3%	479	444	-7.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SUTTON COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	3	100.0%	0	3	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	3	100.0%	0	3	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SUTTON COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	446	446	0.0%	264	264	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	446	446	0.0%	264	264	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
SUTTON COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,239	1,045	-15.7%	1,380	1,156	-16.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,239	1,045	-15.7%	1,380	1,156	-16.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
TOM GREEN COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	750	1,275	70.0%	750	1,218	62.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,306	1,011	-22.6%	1,518	1,106	-27.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	556	0	-100.0%	768	0	-100.0%
TOM GREEN COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	61,928	43,051	-30.5%	61,828	42,825	-30.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	93,579	42,493	-54.6%	92,432	42,493	-54.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	31,651	0	-100.0%	30,604	0	-100.0%
TOM GREEN COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,705	1,125	-34.0%	1,705	1,125	-34.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,688	1,125	-33.4%	1,688	1,125	-33.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
TOM GREEN COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,176	812	-31.0%	1,174	747	-36.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,387	850	-64.4%	3,531	962	-72.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,211	38	-96.9%	2,357	215	-90.9%
TOM GREEN COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,056	1,056	0.0%	1,156	1,156	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,056	1,056	0.0%	1,156	1,156	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
TOM GREEN COUNTY | MUNICIPAL WUG TYPE						

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Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	9,910	14,645	47.8%	9,147	14,099	54.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	19,054	19,500	2.3%	25,583	26,184	2.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	9,250	4,921	-46.8%	16,462	12,131	-26.3%
UPTON COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	140	75	-46.4%	140	82	-41.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	92	75	-18.5%	101	82	-18.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UPTON COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	9,473	10,403	9.8%	8,800	10,403	18.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	9,473	10,403	9.8%	8,800	10,403	18.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UPTON COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	119	126	5.9%	119	126	5.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	119	126	5.9%	119	126	5.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UPTON COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	184	100.0%	0	207	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	184	100.0%	0	207	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UPTON COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,237	7,706	81.9%	803	4,805	498.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,237	7,200	69.9%	803	1,600	99.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UPTON COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,053	1,103	4.7%	1,231	1,290	4.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,053	1,103	4.7%	1,231	1,290	4.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WARD COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	829	137	-83.5%	916	154	-83.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	749	137	-81.7%	840	154	-81.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WARD COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,995	6,058	1.1%	5,995	6,076	1.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,613	3,160	-43.7%	5,266	3,160	-40.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WARD COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	109	83	-23.9%	109	83	-23.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	109	83	-23.9%	109	83	-23.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WARD COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	16	7	-56.3%	16	7	-56.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	16	7	-56.3%	16	7	-56.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WARD COUNTY | MINING WUG TYPE						

*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 2016 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 Needs totals.

Region F Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	797	1,900	138.4%	329	600	82.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	797	1,900	138.4%	329	600	82.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WARD COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,518	5,618	123.1%	2,895	5,647	95.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,518	3,165	25.7%	2,895	3,625	25.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	155	100.0%
WARD COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,700	150	-94.4%	2,700	150	-94.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,779	2,502	-33.8%	8,269	2,502	-69.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,079	2,352	118.0%	5,569	2,352	-57.8%
WINKLER COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	210	188	-10.5%	210	609	190.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	210	188	-10.5%	631	609	-3.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	421	0	-100.0%
WINKLER COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,912	3,507	-28.6%	4,912	3,507	-28.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,912	3,507	-28.6%	4,912	3,507	-28.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WINKLER COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	389	101	-74.0%	389	101	-74.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	351	101	-71.2%	351	101	-71.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WINKLER COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	64	100.0%	0	76	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	64	100.0%	0	76	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WINKLER COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	787	787	0.0%	373	373	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	787	787	0.0%	373	373	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WINKLER COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,134	2,169	1.6%	2,295	2,330	1.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,134	2,169	1.6%	2,295	2,330	1.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REGION F						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	657,435	729,263	10.9%	618,909	665,626	7.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	837,974	765,150	-8.7%	853,311	744,366	-12.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	182,987	62,592	-65.8%	236,937	102,786	-56.6%

*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 2016 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 Needs totals.

Region F Source Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
ANDREWS COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	19,985	27,604	38.1%	12,268	20,141	64.2%
REUSE AVAILABILITY TOTAL (acre-feet per year	560	560	0.0%	560	560	0.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	77	44	-42.9%	77	44	-42.9%
BORDEN COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	2,430	9,421	287.7%	2,430	6,711	176.2%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	268	164	-38.8%	268	164	-38.8%
BROWN COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	8,329	2,611	-68.7%	8,329	2,607	-68.7%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	1,607	1,338	-16.7%	1,607	1,338	-16.7%
COKE COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	2,089	3,357	60.7%	2,089	3,357	60.7%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	386	100	-74.1%	386	100	-74.1%
COLEMAN COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	679	717	5.6%	679	717	5.6%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	1,108	794	-28.3%	1,108	794	-28.3%
CONCHO COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	7,615	8,343	9.6%	7,615	8,343	9.6%
REUSE AVAILABILITY TOTAL (acre-feet per year	224	25	-88.8%	224	25	-88.8%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	160	467	191.9%	160	467	191.9%
CRANE COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	6,998	6,085	-13.0%	6,998	6,085	-13.0%
REUSE AVAILABILITY TOTAL (acre-feet per year	73	73	0.0%	73	73	0.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	21	4	-81.0%	21	4	-81.0%
CROCKETT COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	5,539	5,451	-1.6%	5,539	5,451	-1.6%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	138	1,992	1343.5%	138	1,992	1343.5%
ECTOR COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	14,089	14,096	0.0%	12,790	12,797	0.1%
REUSE AVAILABILITY TOTAL (acre-feet per year	6,720	9,530	41.8%	7,000	9,530	36.1%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	11	54	390.9%	11	54	390.9%
GLASSCOCK COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	87,445	74,021	-15.4%	80,991	72,666	-10.3%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	40	144	260.0%	40	144	260.0%
HOWARD COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	5,317	22,096	315.6%	4,945	17,327	250.4%
REUSE AVAILABILITY TOTAL (acre-feet per year	1,855	1,855	0.0%	1,855	1,855	0.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	62	100	61.3%	62	100	61.3%
IRION COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	3,384	3,452	2.0%	3,384	3,452	2.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	288	371	28.8%	288	371	28.8%
KIMBLE COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	1,797	2,172	20.9%	1,797	2,172	20.9%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	1,237	1,251	1.1%	1,237	1,251	1.1%
LOVING COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	5,167	3,635	-29.6%	5,167	3,635	-29.6%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	10	1	-90.0%	10	1	-90.0%

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

Region F Source Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
MARTIN COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	15,570	63,713	309.2%	14,277	35,675	149.9%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	67	179	167.2%	67	179	167.2%
MASON COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	18,213	17,440	-4.2%	18,213	17,440	-4.2%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	984	227	-76.9%	984	227	-76.9%
MCCULLOCH COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	12,823	29,145	127.3%	12,823	29,145	127.3%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	233	304	30.5%	233	304	30.5%
MENARD COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	4,430	5,628	27.0%	4,430	5,628	27.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	2,329	2,138	-8.2%	2,329	2,138	-8.2%
MIDLAND COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	61,639	62,021	0.6%	54,576	54,958	0.7%
REUSE AVAILABILITY TOTAL (acre-feet per year	5,987	11,211	87.3%	5,987	11,211	87.3%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	117	213	82.1%	117	213	82.1%
MITCHELL COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	14,020	14,807	5.6%	14,020	14,807	5.6%
REUSE AVAILABILITY TOTAL (acre-feet per year	552	552	0.0%	552	552	0.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	395	322	-18.5%	395	322	-18.5%
PECOS COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	275,720	291,663	5.8%	275,720	291,663	5.8%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	4,496	18,709	316.1%	4,496	18,709	316.1%
REAGAN COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	70,342	68,535	-2.6%	70,342	68,535	-2.6%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	44	238	440.9%	44	238	440.9%
REEVES COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	198,094	195,977	-1.1%	198,094	195,977	-1.1%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	68	573	742.6%	68	573	742.6%
RESERVOIR* COUNTY						
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	115,994	103,860	-10.5%	110,194	97,660	-11.4%
RUNNELS COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	2,701	5,046	86.8%	2,701	5,046	86.8%
REUSE AVAILABILITY TOTAL (acre-feet per year	218	22	-89.9%	218	22	-89.9%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	1,410	737	-47.7%	1,410	737	-47.7%
SCHLEICHER COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	8,050	8,034	-0.2%	8,050	8,034	-0.2%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	112	23	-79.5%	112	23	-79.5%
SCURRY COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	1,615	1,608	-0.4%	1,615	1,608	-0.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	534	440	-17.6%	534	440	-17.6%
STERLING COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	3,565	3,355	-5.9%	3,565	3,355	-5.9%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	104	55	-47.1%	104	55	-47.1%
SUTTON COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	6,438	6,410	-0.4%	6,438	6,410	-0.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	105	388	269.5%	105	388	269.5%

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

Region F Source Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
TOM GREEN COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	62,036	46,565	-24.9%	62,036	46,565	-24.9%
REUSE AVAILABILITY TOTAL (acre-feet per year	8,300	8,400	1.2%	8,300	8,400	1.2%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	3,613	2,286	-36.7%	3,613	2,286	-36.7%
UPTON COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	22,600	23,369	3.4%	22,600	23,369	3.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	36	121	236.1%	36	121	236.1%
WARD COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	58,616	52,229	-10.9%	58,616	52,229	-10.9%
REUSE AVAILABILITY TOTAL (acre-feet per year	670	670	0.0%	670	670	0.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	5	919	18280.0%	5	919	18280.0%
WINKLER COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	51,045	56,763	11.2%	51,045	56,763	11.2%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	7	2	-71.4%	7	2	-71.4%
REGION F						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year	1,058,380	1,135,369	7.3%	1,034,182	1,082,668	4.7%
REUSE AVAILABILITY TOTAL (acre-feet per year	25,159	32,898	30.8%	25,439	32,898	29.3%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year	136,066	138,558	1.8%	130,266	132,358	1.6%

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

Region F Water User Group (WUG) Unmet Needs

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 are calculated by first deducting the WUG split's projected demand from the sum of its total existing water supply volume and all associated recommended water management strategy 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 updated to a zero and the unmet needs water volumes are shown as absolute values.

	WUG UNMET NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ANDREWS COUNTY - COLORADO BASIN						
ANDREWS	147	361	619	1,186	1,850	2,650
COUNTY-OTHER	16	43	74	134	192	254
MANUFACTURING	31	59	87	134	174	209
MINING	909	868	66	0	0	0
LIVESTOCK	9	17	25	39	50	60
IRRIGATION	23	3,034	4,643	5,735	6,658	7,480
ANDREWS COUNTY - RIO GRANDE BASIN						
IRRIGATION	658	617	617	617	617	617
BROWN COUNTY - BRAZOS BASIN						
IRRIGATION	323	311	311	311	311	311
BROWN COUNTY - COLORADO BASIN						
IRRIGATION	979	751	750	752	749	750
IRION COUNTY - COLORADO BASIN						
MINING	1,444	1,440	225	0	0	0
IRRIGATION	252	200	147	147	147	147
KIMBLE COUNTY - COLORADO BASIN						
IRRIGATION	970	837	784	784	784	784
LOVING COUNTY - RIO GRANDE BASIN						
MINING	3,381	3,381	2,543	1,427	699	762
MARTIN COUNTY - COLORADO BASIN						
IRRIGATION	0	0	2,392	3,346	6,004	7,844
MITCHELL COUNTY - COLORADO BASIN						
COLORADO CITY	0	115	126	137	150	164
STEAM ELECTRIC POWER	8,656	8,670	8,684	8,698	8,712	8,726
IRRIGATION	1,328	1,602	1,507	1,389	1,310	1,226
SCURRY COUNTY - BRAZOS BASIN						
MINING	61	100	106	80	54	37
IRRIGATION	1,365	1,288	1,239	1,238	1,238	1,238
SCURRY COUNTY - COLORADO BASIN						
MINING	161	263	279	210	142	95
IRRIGATION	4,788	4,511	4,343	4,341	4,339	4,342
WARD COUNTY - RIO GRANDE BASIN						
STEAM ELECTRIC POWER	2,352	2,352	2,352	2,352	2,352	2,352

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

Region F Water User Group (WUG) Unmet Needs Summary

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 Summary report are calculated by first deducting the WUG split's projected demand from the sum of its total existing water supply volume and all associated recommended water management strategy 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. Before aggregating the difference between supplies and demands to the WUG category level, calculated surpluses are updated to zero so that only the WUGs with unmet needs in the decade are included with the Needs totals. Unmet needs water volumes are shown as absolute values.

WUG CATEGORY	NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MUNICIPAL	147	476	745	1,323	2,000	2,814
COUNTY-OTHER	16	43	74	134	192	254
MANUFACTURING	31	59	87	134	174	209
MINING	5,956	6,052	3,219	1,717	895	894
STEAM ELECTRIC POWER	11,008	11,022	11,036	11,050	11,064	11,078
LIVESTOCK	9	17	25	39	50	60
IRRIGATION	10,686	13,151	16,733	18,660	22,157	24,739

Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
AIRLINE MOBILE HOME PARK LTD	F	MUNICIPAL CONSERVATION - AIRLINE MOBILE HOME PARK LTD	DEMAND REDUCTION	$1263	$1134	7	7	8	9	10	10
ANDREWS	F	MUNICIPAL CONSERVATION - ANDREWS	DEMAND REDUCTION	$952	$592	45	55	96	111	129	150
BALLINGER	F	MUNICIPAL CONSERVATION - BALLINGER	DEMAND REDUCTION	$1107	$1101	12	12	12	12	12	12
BALLINGER	F	SUBORDINATION - BALLINGER/MOONEN LAKE	F | BALLINGER/MOONEN LAKE/RESERVOIR	$0	$0	751	751	750	748	745	740
BALLINGER	F	SUBORDINATION - OH IVIE NON SYSTEM PORTION	F | OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	$0	$0	43	0	0	0	8	51
BALMORHEA	F	DEVELOP EDWARDS-TRINITY-PLATEAU AQUIFER SUPPLIES - BALMORHEA	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	$1053	$140	150	150	150	150	150	150
BALMORHEA	F	MUNICIPAL CONSERVATION - BALMORHEA	DEMAND REDUCTION	$2472	$2189	2	2	2	2	2	2
BANGS	F	MUNICIPAL CONSERVATION - BANGS	DEMAND REDUCTION	$1221	$1214	8	8	8	8	8	8
BANGS	F	REUSE - BANGS, DIRECT NON-POTABLE	F | DIRECT NON-POTABLE REUSE	$1816	$176	25	25	25	25	25	25
BARSTOW	F	MUNICIPAL CONSERVATION - BARSTOW	DEMAND REDUCTION	$3068	$2731	1	1	1	1	1	1
BIG LAKE	F	MUNICIPAL CONSERVATION - BIG LAKE	DEMAND REDUCTION	$1139	$1079	10	12	12	13	13	14
BIG SPRING	F	MUNICIPAL CONSERVATION - BIG SPRING	DEMAND REDUCTION	$557	$620	131	138	140	139	139	139
BIG SPRING	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	611	0	0	647	1,233	1,785
BRADY	F	ADVANCED GROUNDWATER TREATMENT - BRADY	F | HICKORY AQUIFER | MCCULLOCH COUNTY	$2069	$327	1,195	1,195	1,195	1,195	1,195	1,195
BRADY	F	MUNICIPAL CONSERVATION - BRADY	DEMAND REDUCTION	$988	$930	18	18	19	19	19	19
BRADY	F	SUBORDINATION - BRADY CREEK RESERVOIR	F | BRADY CREEK LAKE/RESERVOIR	$0	$0	841	841	841	841	841	841
BRONTE	F	DEVELOP OTHER AQUIFER SUPPLIES IN SOUTHWEST COKE COUNTY - BRONTE	F | OTHER AQUIFER | COKE COUNTY	$2424	$340	800	800	800	800	800	800
BRONTE	F	MUNICIPAL CONSERVATION - BRONTE	DEMAND REDUCTION	$1647	$1647	3	3	3	3	3	3
BRONTE	F	SUBORDINATION - OAK CREEK RESERVOIR	F | OAK CREEK LAKE/RESERVOIR	$0	$0	212	210	209	207	207	207
BROOKESMITH SUD*	F	MUNICIPAL CONSERVATION - BROOKESMITH SUD	DEMAND REDUCTION	$705	$688	25	25	25	25	25	25
BROOKESMITH SUD*	F	WATER AUDITS AND LEAK - BROOKESMITH SUD	DEMAND REDUCTION	$2569	$2711	80	80	78	77	77	77
BROOKESMITH SUD*	K	DROUGHT MANAGEMENT	DEMAND REDUCTION	N/A	N/A	0	0	0	0	0	0
BROWNWOOD	F	MUNICIPAL CONSERVATION - BROWNWOOD	DEMAND REDUCTION	$937	$735	61	91	91	91	91	91

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
COAHOMA	F	MUNICIPAL CONSERVATION - COAHOMA	DEMAND REDUCTION	$1222	$1203	8	8	8	8	8	8
COAHOMA	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	51	0	0	56	105	152
COLEMAN	F	MUNICIPAL CONSERVATION - COLEMA	DEMAND REDUCTION	$1065	$1061	15	15	15	15	15	15
COLEMAN	F	SUBORDINATION - HORDS CREEK LAKE	F | HORDS CREEK LAKE/RESERVOIR	$0	$0	151	146	140	135	128	122
COLEMAN	F	SUBORDINATION - LAKE COLEMAN	F | COLEMAN LAKE/RESERVOIR	$0	$0	1,168	1,150	1,136	1,120	1,099	1,078
COLEMAN	F	WATER AUDITS AND LEAK - COLEMAN	DEMAND REDUCTION	$2183	$2292	59	58	57	57	57	57
COLEMAN COUNTY SUD*	F	MUNICIPAL CONSERVATION - COLEMAN COUNTY SUD	DEMAND REDUCTION	$1144	$1138	9	9	9	9	9	9
COLEMAN COUNTY SUD*	F	SUBORDINATION - HORDS CREEK LAKE	F | HORDS CREEK LAKE/RESERVOIR	$0	$0	23	22	21	20	20	19
COLEMAN COUNTY SUD*	F	SUBORDINATION - LAKE COLEMAN	F | COLEMAN LAKE/RESERVOIR	$0	$0	180	179	173	170	170	171
COLORADO CITY	F	MUNICIPAL CONSERVATION - COLORAD	DEMAND REDUCTION	$1054	$938	16	18	18	18	18	19
CONCHO RURAL WATER	F	CONCHO RIVER WATER PROJECT - SAN ANGELO	F | COLORADO INDIRECT REUSE	$1250	$269	74	83	86	91	95	98
CONCHO RURAL WATER	F	MUNICIPAL CONSERVATION - CONCHO	DEMAND REDUCTION	$894	$714	20	21	22	23	24	24
CONCHO RURAL WATER	F	SUBORDINATION - SAN ANGELO SYSTEM	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$0	$0	8	7	6	5	4	4
COUNTY-OTHER, ANDREWS	F	MUNICIPAL CONSERVATION - ANDREWS COUNTY OTHER	DEMAND REDUCTION	$1080	$821	14	15	17	18	20	21
COUNTY-OTHER, COLEMAN	F	MUNICIPAL CONSERVATION - COLEMAN COUNTY OTHER	DEMAND REDUCTION	$5095	$5161	1	1	1	1	1	1
COUNTY-OTHER, COLEMAN	F	SUBORDINATION - HORDS CREEK LAKE	F | HORDS CREEK LAKE/RESERVOIR	$0	$0	3	2	2	2	2	2
COUNTY-OTHER, COLEMAN	F	SUBORDINATION - LAKE COLEMAN	F | COLEMAN LAKE/RESERVOIR	$0	$0	21	20	20	19	19	19
COUNTY-OTHER, CONCHO	F	MUNICIPAL CONSERVATION - CONCHO COUNTY OTHER	DEMAND REDUCTION	$1836	$1821	3	3	3	3	3	3
COUNTY-OTHER, CONCHO	F	SUBORDINATION - SAN ANGELO SYSTEM	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$0	$0	3	3	3	3	3	3
COUNTY-OTHER, ECTOR	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	N/A	$0	0	1,200	2,500	2,500	2,500	2,500
COUNTY-OTHER, MCCULLOCH	F	ADVANCED GROUNDWATER TREATME	F | HICKORY AQUIFER | MCCULLOCH COUNTY	$2069	$327	5	5	5	5	5	5
COUNTY-OTHER, MIDLAND	F	DEVELOP ADDITIONAL PECOS VALLEY AQUIFER SUPPLIES - MIDLAND COUNTY OTHER	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	$738	$121	2,800	2,800	2,800	2,800	2,800	2,800
COUNTY-OTHER, RUNNELS	F	MUNICIPAL CONSERVATION - RUNNELS COUNTY OTHER	DEMAND REDUCTION	$1953	$1988	2	2	2	2	2	2
COUNTY-OTHER, RUNNELS	F	SUBORDINATION - BALLINGER/MOONEN LAKE	F | BALLINGER/MOONEN LAKE/RESERVOIR	$0	$0	23	21	19	18	18	19

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, SCURRY	F	MUNICIPAL CONSERVATION - SCURRY COUNTY OTHER	DEMAND REDUCTION	$863	$589	20	22	24	26	28	30
COUNTY-OTHER, SCURRY	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	402	414	447	522	606	692
COUNTY-OTHER, TOM GREEN	F	CONCHO RIVER WATER PROJECT - SAN ANGELO	F | COLORADO INDIRECT REUSE	$1250	$269	29	40	43	49	54	58
COUNTY-OTHER, TOM GREEN	F	SUBORDINATION - MOUNTAIN CREEK RESERVOIR	F | MOUNTAIN CREEK LAKE/RESERVOIR	$0	$0	70	70	70	70	70	70
COUNTY-OTHER, TOM GREEN	F	SUBORDINATION - SAN ANGELO SYSTEM	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$0	$0	22	18	17	15	13	11
CRANE	F	MUNICIPAL CONSERVATION - CRANE	DEMAND REDUCTION	$1120	$1070	11	12	13	13	14	14
CROCKETT COUNTY WCID 1	F	MUNICIPAL CONSERVATION - CROCKETT COUNTY WCID	DEMAND REDUCTION	$1106	$1083	12	13	13	13	13	13
DADS Supported Living Center	F	MUNICIPAL CONSERVATION - DADS SUPPORTED LIVING CENTER	DEMAND REDUCTION	$4116	$4116	1	1	1	1	1	1
EARLY	F	MUNICIPAL CONSERVATION - EARLY	DEMAND REDUCTION	$1176	$657	9	9	9	9	9	9
ECTOR COUNTY UTILITY DISTRICT	F	MUNICIPAL CONSERVATION - ECTOR CO	DEMAND REDUCTION	$292	$598	60	84	94	125	137	149
ECTOR COUNTY UTILITY DISTRICT	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	234	0	0	332	694	1,097
EDEN	F	MUNICIPAL CONSERVATION - EDEN	DEMAND REDUCTION	$1541	$1518	4	4	4	4	4	4
ELDORADO	F	MUNICIPAL CONSERVATION - EL DORAD	DEMAND REDUCTION	$1283	$1283	6	6	6	6	6	6
FORT STOCKTON	F	MUNICIPAL CONSERVATION - FORT STO	DEMAND REDUCTION	$484	$363	36	39	42	44	46	48
GOODFELLOW AIR FORCE BASE	F	CONCHO RIVER WATER PROJECT - SAN ANGELO	F | COLORADO INDIRECT REUSE	$1250	$269	85	141	173	210	253	301
GOODFELLOW AIR FORCE BASE	F	MUNICIPAL CONSERVATION - GOODFELLOW AIR FORCE B	DEMAND REDUCTION	$1222	$1123	8	9	9	10	10	11
GOODFELLOW AIR FORCE BASE	F	SUBORDINATION - SAN ANGELO SYSTEM	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$0	$0	44	42	40	38	35	33
GRANDFALLS	F	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - GRANDFALLS	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	N/A	$148	0	0	0	155	155	155
GRANDFALLS	F	MUNICIPAL CONSERVATION - GRANDFALLS	DEMAND REDUCTION	$2804	$2509	1	1	1	1	2	2
GREATER GARDENDALE WSC	F	MUNICIPAL CONSERVATION - GREATER GARDENDALE WSC	DEMAND REDUCTION	$1108	$859	12	13	15	17	19	20
GREATER GARDENDALE WSC	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	N/A	$2769	0	375	445	445	445	445
GREENWOOD WATER	F	MUNICIPAL CONSERVATION - GREENW	DEMAND REDUCTION	$1716	$1430	3	3	4	4	4	5
IRAAN	F	MUNICIPAL CONSERVATION - IRAAN	DEMAND REDUCTION	$1501	$1351	4	4	5	5	5	5
IRRIGATION, ANDREWS	F	IRRIGATION CONSERVATION - ANDREW	DEMAND REDUCTION	$31	$0	1,018	2,037	2,037	2,037	2,037	2,037

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
IRRIGATION, BORDEN	F	IRRIGATION CONSERVATION - BORDEN	DEMAND REDUCTION	$31	$0	147	295	295	295	295	295
IRRIGATION, BROWN	F	IRRIGATION CONSERVATION - BROWN C	DEMAND REDUCTION	$31	$0	406	650	650	650	650	650
IRRIGATION, COKE	F	IRRIGATION CONSERVATION - COKE COU	DEMAND REDUCTION	$31	$0	34	69	83	83	83	83
IRRIGATION, COLEMAN	F	IRRIGATION CONSERVATION - COLEMA	DEMAND REDUCTION	$31	$0	23	47	47	47	47	47
IRRIGATION, COLEMAN	F	SUBORDINATION - LAKE COLEMAN	F | COLEMAN LAKE/RESERVOIR	$0	$0	400	400	400	400	400	400
IRRIGATION, CONCHO	F	IRRIGATION CONSERVATION - CONCHO	DEMAND REDUCTION	$31	$0	245	490	539	539	539	539
IRRIGATION, CROCKETT	F	IRRIGATION CONSERVATION - CROCKET	DEMAND REDUCTION	$31	$0	7	14	20	20	20	20
IRRIGATION, CROCKETT	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	1	1	1	1	1	1
IRRIGATION, ECTOR	F	IRRIGATION CONSERVATION - ECTOR CO	DEMAND REDUCTION	$13	$0	38	76	113	113	113	113
IRRIGATION, ECTOR	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	157	0	0	162	312	449
IRRIGATION, GLASSCOCK	F	IRRIGATION CONSERVATION - GLASSCO	DEMAND REDUCTION	$31	$0	2,050	2,050	2,050	2,050	2,050	2,050
IRRIGATION, HOWARD	F	IRRIGATION CONSERVATION - HOWARD	DEMAND REDUCTION	$31	$0	344	688	757	757	757	757
IRRIGATION, IRION	F	IRRIGATION CONSERVATION - IRION CO	DEMAND REDUCTION	$31	$0	53	105	158	158	158	158
IRRIGATION, IRION	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	202	202	202	202	202	202
IRRIGATION, KIMBLE	F	IRRIGATION CONSERVATION - KIMBLE C	DEMAND REDUCTION	$31	$0	133	266	319	319	319	319
IRRIGATION, MARTIN	F	IRRIGATION CONSERVATION - MARTIN C	DEMAND REDUCTION	$31	$0	1,825	3,649	5,474	5,474	5,474	5,474
IRRIGATION, MASON	F	IRRIGATION CONSERVATION - MASON C	DEMAND REDUCTION	$31	$0	248	497	745	745	745	745
IRRIGATION, MCCULLOCH	F	IRRIGATION CONSERVATION - MCCULLO	DEMAND REDUCTION	$31	$0	116	232	349	349	349	349
IRRIGATION, MENARD	F	IRRIGATION CONSERVATION - MENARD	DEMAND REDUCTION	$31	$0	183	366	549	549	549	549
IRRIGATION, MIDLAND	F	IRRIGATION CONSERVATION - MIDLAND	DEMAND REDUCTION	$31	$0	905	1,811	2,716	2,716	2,716	2,716
IRRIGATION, MIDLAND	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	3	0	0	2	6	8
IRRIGATION, MITCHELL	F	IRRIGATION CONSERVATION - MITCHELL	DEMAND REDUCTION	$31	$0	256	256	256	256	256	256
IRRIGATION, PECOS	F	IRRIGATION CONSERVATION - PECOS CO	DEMAND REDUCTION	$31	$0	7,167	14,335	21,502	21,502	21,502	21,502
IRRIGATION, PECOS	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$5	$5	106	106	106	106	106	106
IRRIGATION, REAGAN	F	IRRIGATION CONSERVATION - REAGAN C	DEMAND REDUCTION	$31	$0	1,102	2,203	3,305	3,305	3,305	3,305
IRRIGATION, REAGAN	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	1,869	1,869	1,869	1,869	1,869	1,869
IRRIGATION, REEVES	F	IRRIGATION CONSERVATION - REEVES C	DEMAND REDUCTION	$31	$0	2,947	5,894	8,841	8,841	8,841	8,841
IRRIGATION, REEVES	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	326	326	326	326	326	326

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
IRRIGATION, RUNNELS	F	IRRIGATION CONSERVATION - RUNNELS	DEMAND REDUCTION	$31	$0	155	311	373	373	373	373
IRRIGATION, SCHLEICHER	F	IRRIGATION CONSERVATION - SCHLEICHER COUNTY	DEMAND REDUCTION	$31	$0	91	109	109	109	109	109
IRRIGATION, SCHLEICHER	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	275	275	275	275	275	275
IRRIGATION, SCURRY	F	IRRIGATION CONSERVATION - SCURRY C	DEMAND REDUCTION	$31	$0	378	756	983	983	983	983
IRRIGATION, STERLING	F	IRRIGATION CONSERVATION - STERLING	DEMAND REDUCTION	$31	$0	45	90	135	135	135	135
IRRIGATION, STERLING	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	48	48	48	48	48	48
IRRIGATION, SUTTON	F	IRRIGATION CONSERVATION - SUTTON C	DEMAND REDUCTION	$31	$0	56	112	168	168	168	168
IRRIGATION, SUTTON	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	34	34	34	34	34	34
IRRIGATION, TOM GREEN	F	IRRIGATION CONSERVATION - TOM GRE	DEMAND REDUCTION	$31	$0	2,125	4,249	5,099	5,099	5,099	5,099
IRRIGATION, TOM GREEN	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	2,007	2,007	2,007	2,007	2,007	2,007
IRRIGATION, UPTON	F	IRRIGATION CONSERVATION - UPTON C	DEMAND REDUCTION	$31	$0	520	1,040	1,560	1,560	1,560	1,560
IRRIGATION, WARD	F	IRRIGATION CONSERVATION - WARD CO	DEMAND REDUCTION	$31	$0	158	316	474	474	474	474
IRRIGATION, WARD	F	WEATHER MODIFICATION	F | WEATHER MODIFICATION	$1	$1	259	259	259	259	259	259
IRRIGATION, WINKLER	F	IRRIGATION CONSERVATION - WINKLER	DEMAND REDUCTION	$31	$0	175	351	526	526	526	526
JUNCTION	F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - JUNCTION	F | EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | KIMBLE COUNTY	$822	$130	370	370	370	370	370	370
JUNCTION	F	MUNICIPAL CONSERVATION - JUNCTIO	DEMAND REDUCTION	$1206	$1203	8	8	8	8	8	8
JUNCTION	F	SUBORDINATION - KIMBLE COUNTY ROR	F | COLORADO RUN-OF-RIVER	$0	$0	250	250	250	250	250	250
KERMIT	F	MUNICIPAL CONSERVATION - KERMIT	DEMAND REDUCTION	$964	$916	18	18	19	19	19	19
LORAINE	F	MUNICIPAL CONSERVATION - LORAINE	DEMAND REDUCTION	$2138	$2039	2	2	2	2	2	2
MADERA VALLEY WSC	F	MUNICIPAL CONSERVATION - MADERA	DEMAND REDUCTION	$1425	$1330	5	5	5	6	6	6
MANUFACTURING, COLEMAN	F	SUBORDINATION - LAKE COLEMAN	F | COLEMAN LAKE/RESERVOIR	$0	$0	2	2	2	2	2	2
MANUFACTURING, ECTOR	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	186	0	0	199	381	551
MANUFACTURING, HOWARD	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	147	500	500	653	793	924
MANUFACTURING, KIMBLE	F	DEVELOP ADDITIONAL ELLENBURGER SAN SABA AQUIFER SUPPLIES - KIMBLE COUNTY MANUFACTURING	F | ELLENBURGER-SAN SABA AQUIFER | KIMBLE COUNTY	$274	$46	500	500	500	500	500	500
MANUFACTURING, KIMBLE	F	SUBORDINATION - KIMBLE COUNTY ROR	F | COLORADO RUN-OF-RIVER	$0	$0	228	228	228	228	228	228

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
MANUFACTURING, SCURRY	F	DEVELOP OTHER AQUIFER SUPPLIES - SCURRY COUNTY MANUFACTURING	F | OTHER AQUIFER | SCURRY COUNTY	$356	$56	160	160	160	160	160	160
MANUFACTURING, TOM GREEN	F	CONCHO RIVER WATER PROJECT - SAN ANGELO	F | COLORADO INDIRECT REUSE	$1250	$269	1	108	128	149	172	193
MANUFACTURING, TOM GREEN	F	SUBORDINATION - SAN ANGELO SYSTEM	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$0	$0	37	36	32	29	26	22
MASON	F	ADDITIONAL WATER TREATMENT - MASON	F | HICKORY AQUIFER | MASON COUNTY	$856	$594	700	690	682	677	676	676
MASON	F	MUNICIPAL CONSERVATION - MASON	DEMAND REDUCTION	$1278	$1278	7	7	7	7	7	7
MCCAMEY	F	MUNICIPAL CONSERVATION - MCCAMEY	DEMAND REDUCTION	$1264	$1203	7	7	8	8	8	8
MENARD	F	DEVELOP ADDITIONAL HICKORY AQUIFER SUPPLIES - MENARD	F | HICKORY AQUIFER | MENARD COUNTY	$1320	$160	200	200	200	200	200	200
MENARD	F	MUNICIPAL CONSERVATION - MENARD	DEMAND REDUCTION	$1442	$1442	5	5	5	5	5	5
MENARD	F	REUSE - MENARD, DIRECT NON-POTABLE	F | DIRECT NON-POTABLE REUSE	$820	$88	67	67	67	67	67	67
MERTZON	F	MUNICIPAL CONSERVATION - MERTZON	DEMAND REDUCTION	$1886	$1875	3	3	3	3	3	3
MIDLAND	F	ADVANCED TREATMENT (RO) OF PAUL DAVIS WELL FIELD SUPPLIES - MIDLAND	F | OGALLALA AND EDWARDS-TRINITY-HIGH PLAINS AQUIFERS | MARTIN COUNTY	N/A	$763	0	0	5,899	6,101	6,235	6,327
MIDLAND	F	MUNICIPAL CONSERVATION - MIDLAND	DEMAND REDUCTION	$436	$428	631	755	816	882	944	1,012
MIDLAND	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	N/A	1,844	0	0	0	0	0
MIDLAND	F	SUBORDINATION - OH IVIE NON SYSTEM PORTION	F | OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	$0	$0	329	359	391	421	453	483
MIDLAND	F	WEST TEXAS WATER PARTNERSHIP - MIDLAND	F | WEST TEXAS WATER PARTNERSHIP PLACEHOLDER | COUNTY	N/A	$0	0	15,000	15,000	15,000	15,000	15,000
MILES	F	CONCHO RIVER WATER PROJECT - SAN ANGELO	F | COLORADO INDIRECT REUSE	$1250	$269	27	43	45	49	53	59
MILES	F	MUNICIPAL CONSERVATION - MILES	DEMAND REDUCTION	$1730	$1614	3	3	3	3	3	3
MILES	F	SUBORDINATION - SAN ANGELO SYSTEM	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$0	$0	9	9	7	7	6	5
MILLERSVIEW-DOOLE WSC	F	MUNICIPAL CONSERVATION - MILLERSVIEW-DOOLE WSC	DEMAND REDUCTION	$1088	$1068	13	14	14	14	14	15
MILLERSVIEW-DOOLE WSC	F	SUBORDINATION - OH IVIE NON SYSTEM PORTION	F | OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	$0	$0	52	0	0	0	9	62
MILLERSVIEW-DOOLE WSC	F	WATER AUDITS AND LEAK - MILLERSVIEW-DOOLE WSC	DEMAND REDUCTION	$1776	$1846	65	66	65	66	67	68
MINING, ANDREWS	F	MINING CONSERVATION - ANDREWS COUNTY	DEMAND REDUCTION	$124	$0	277	260	222	176	135	104
MINING, BORDEN	F	MINING CONSERVATION - BORDEN COUNTY	DEMAND REDUCTION	$701	$0	29	39	33	21	10	5
MINING, BROWN	F	DEVELOP CROSS TIMBERS AQUIFER SUPPLIES - BROWN COUNTY, MINING	F | CROSS TIMBERS AQUIFER | BROWN COUNTY	$948	$129	210	210	210	210	210	210

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
MINING, BROWN	F	MINING CONSERVATION - BROWN COUNTY	DEMAND REDUCTION	$149	$0	66	66	67	67	66	66
MINING, COKE	F	MINING CONSERVATION - COKE COUNTY	DEMAND REDUCTION	$124	$0	20	20	18	16	14	12
MINING, COLEMAN	F	MINING CONSERVATION - COLEMAN COUNTY	DEMAND REDUCTION	$124	$0	5	4	4	4	3	3
MINING, CONCHO	F	MINING CONSERVATION - CONCHO COUNTY	DEMAND REDUCTION	$124	$0	20	20	18	15	13	12
MINING, CRANE	F	MINING CONSERVATION - CRANE COUNTY	DEMAND REDUCTION	$767	$0	26	35	36	29	22	17
MINING, CROCKETT	F	MINING CONSERVATION - CROCKETT COUNTY	DEMAND REDUCTION	$124	$0	315	315	43	24	7	3
MINING, ECTOR	F	MINING CONSERVATION - ECTOR COUNTY	DEMAND REDUCTION	$243	$0	28	30	27	22	18	15
MINING, GLASSCOCK	F	MINING CONSERVATION - GLASSCOCK COUNTY	DEMAND REDUCTION	$124	$0	248	248	189	134	88	63
MINING, HOWARD	F	MINING CONSERVATION - HOWARD COUNTY	DEMAND REDUCTION	$124	$0	143	143	101	59	25	13
MINING, IRION	F	MINING CONSERVATION - IRION COUNTY	DEMAND REDUCTION	$124	$0	322	322	231	28	14	7
MINING, KIMBLE	F	MINING CONSERVATION - KIMBLE COUNTY	DEMAND REDUCTION	$124	$0	1	1	1	1	1	1
MINING, LOVING	F	MINING CONSERVATION - LOVING COUNTY	DEMAND REDUCTION	$124	$0	525	525	462	378	301	238
MINING, MARTIN	F	MINING CONSERVATION - MARTIN COUNTY	DEMAND REDUCTION	$124	$0	302	302	227	49	27	14
MINING, MASON	F	MINING CONSERVATION - MASON COUNTY	DEMAND REDUCTION	$124	$0	43	40	30	24	19	16
MINING, MCCULLOCH	F	MINING CONSERVATION - MCCULLOCH COUNTY	DEMAND REDUCTION	$124	$0	375	351	279	236	203	176
MINING, MENARD	F	MINING CONSERVATION - MENARD COUNTY	DEMAND REDUCTION	$124	$0	46	45	40	35	30	26
MINING, MIDLAND	F	MINING CONSERVATION - MIDLAND COUNTY	DEMAND REDUCTION	$124	$0	445	445	344	231	46	32
MINING, MITCHELL	F	MINING CONSERVATION - MITCHELL COUNTY	DEMAND REDUCTION	$525	$0	25	31	27	21	16	12
MINING, PECOS	F	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - PECOS COUNTY MINING	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | PECOS COUNTY	$164	$55	3,000	3,000	3,000	3,000	3,000	3,000
MINING, PECOS	F	MINING CONSERVATION - PECOS COUNTY	DEMAND REDUCTION	$124	$0	539	539	539	434	67	52
MINING, REAGAN	F	MINING CONSERVATION - REAGAN COUNTY	DEMAND REDUCTION	$124	$0	445	445	323	62	24	8
MINING, REEVES	F	DEVELOP ADDITIONAL PECOS VALLEY AQUIFER SUPPLIES - REEVES COUNTY MINING	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	$173	$54	10,400	10,400	10,400	10,400	10,400	10,400
MINING, REEVES	F	MINING CONSERVATION - REEVES COUNTY	DEMAND REDUCTION	$124	$0	882	882	847	693	546	434
MINING, RUNNELS	F	MINING CONSERVATION - RUNNELS COUNTY	DEMAND REDUCTION	$124	$0	11	11	10	9	8	7
MINING, SCHLEICHER	F	MINING CONSERVATION - SCHLEICHER COUNTY	DEMAND REDUCTION	$445	$0	26	31	24	16	10	6
MINING, SCURRY	F	MINING CONSERVATION - SCURRY COUNTY	DEMAND REDUCTION	$1295	$0	20	32	34	25	17	12
MINING, STERLING	F	MINING CONSERVATION - STERLING COUNTY	DEMAND REDUCTION	$479	$0	33	40	34	22	11	6

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
MINING, SUTTON	F	MINING CONSERVATION - SUTTON COUNTY	DEMAND REDUCTION	$1269	$0	19	30	32	24	16	11
MINING, TOM GREEN	F	CONCHO RIVER WATER PROJECT - SAN ANGELO	F | COLORADO INDIRECT REUSE	$1250	$269	2	3	4	4	4	5
MINING, TOM GREEN	F	MINING CONSERVATION - TOM GREEN COUNTY	DEMAND REDUCTION	$314	$0	44	45	47	47	48	49
MINING, UPTON	F	MINING CONSERVATION - UPTON COUNTY	DEMAND REDUCTION	$124	$0	101	101	80	53	32	22
MINING, WARD	F	MINING CONSERVATION - WARD COUNTY	DEMAND REDUCTION	$124	$0	80	80	71	55	38	25
MINING, WINKLER	F	MINING CONSERVATION - WINKLER COUNTY	DEMAND REDUCTION	$935	$0	33	49	42	32	22	16
MITCHELL COUNTY UTILITY	F	MUNICIPAL CONSERVATION - MITCHELL COUNTY UTILITY	DEMAND REDUCTION	$1407	$1347	5	5	5	5	5	6
MONAHANS	F	MUNICIPAL CONSERVATION - MONAHA	DEMAND REDUCTION	$763	$645	23	24	25	26	27	27
NORTH RUNNELS WSC*	F	MUNICIPAL CONSERVATION - NORTH R	DEMAND REDUCTION	$1407	$1375	4	4	4	4	4	4
NORTH RUNNELS WSC*	F	SUBORDINATION - BALLINGER/MOONEN LAKE	F | BALLINGER/MOONEN LAKE/RESERVOIR	$0	$0	11	10	10	10	10	11
NORTH RUNNELS WSC*	F	SUBORDINATION - WINTERS LAKE	F | WINTERS LAKE/RESERVOIR	$0	$0	75	76	77	77	77	78
NORTH RUNNELS WSC*	G	BRA SYSTEM OPERATION MAIN STEM	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	$668	$305	72	74	69	68	68	68
ODESSA	F	MUNICIPAL CONSERVATION - ODESSA	DEMAND REDUCTION	$440	$427	568	680	752	829	905	990
ODESSA	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	2,451	2	0	3,492	7,263	11,493
PECOS	F	ADVANCED GROUNDWATER TREATMENT - PECOS CITY	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	$754	$319	3,360	3,360	3,360	3,360	3,360	3,360
PECOS	F	DIRECT NON-POTABLE REUSE - PECOS CITY	F | DIRECT NON-POTABLE REUSE	$1286	$191	560	560	560	560	560	560
PECOS	F	DIRECT POTABLE REUSE - PECOS CITY	F | DIRECT POTABLE REUSE	N/A	$2443	0	925	925	925	925	925
PECOS	F	MUNICIPAL CONSERVATION - PECOS	DEMAND REDUCTION	$607	$498	29	31	33	34	35	35
PECOS	F	PARTNER WITH MADERA VALLEY WSC & EXPAND WELL FIELD - PECOS CITY	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | REEVES COUNTY	N/A	$89	0	8,960	8,960	8,960	8,960	8,960
PECOS COUNTY FRESH WATER	F	MUNICIPAL CONSERVATION - PECOS COUNTY FRESH WATER	DEMAND REDUCTION	$1985	$1716	2	2	3	3	3	3
PECOS COUNTY WCID 1	F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - PECOS COUNTY WCID #1	F | EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS FRESH/BRACKISH | PECOS COUNTY	$1224	$204	250	250	250	250	250	250
PECOS COUNTY WCID 1	F	MUNICIPAL CONSERVATION - PECOS WCID	DEMAND REDUCTION	$1166	$1099	9	10	11	11	12	12
RANKIN	F	MUNICIPAL CONSERVATION - RANKIN	DEMAND REDUCTION	$1848	$1690	3	3	3	3	3	3
RICHLAND SUD*	F	MUNICIPAL CONSERVATION - RICHLAND	DEMAND REDUCTION	$1712	$1665	3	3	3	3	3	3

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
RICHLAND SUD*	K	MUNICIPAL CONSERVATION	DEMAND REDUCTION	N/A	N/A	0	0	0	0	0	0
ROBERT LEE	F	MUNICIPAL CONSERVATION - ROBERT LEE	DEMAND REDUCTION	$1672	$1672	3	3	3	3	3	3
ROBERT LEE	F	SUBORDINATION - OAK CREEK RESERVOIR	F | OAK CREEK LAKE/RESERVOIR	$0	$0	236	238	239	239	239	239
SAN ANGELO	F	BRUSH CONTROL - SAN ANGELO	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$489	$489	90	90	90	90	90	90
SAN ANGELO	F	CONCHO RIVER WATER PROJECT - SAN ANGELO	F | COLORADO INDIRECT REUSE	$1250	$269	7,723	7,518	7,447	7,365	7,277	7,187
SAN ANGELO	F	HICKORY WELL FIELD EXPANSION IN MCCULLOCH COUNTY - SAN ANGELO	F | HICKORY AQUIFER | MCCULLOCH COUNTY	N/A	$1037	0	1,040	3,040	3,040	3,040	3,040
SAN ANGELO	F	MUNICIPAL CONSERVATION - SAN ANGELO	DEMAND REDUCTION	$448	$444	459	532	558	592	629	668
SAN ANGELO	F	SUBORDINATION - OH IVIE NON SYSTEM PORTION	F | OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	$0	$0	329	359	391	421	453	483
SAN ANGELO	F	SUBORDINATION - SAN ANGELO SYSTEM	F | SAN ANGELO LAKES LAKE/RESERVOIR SYSTEM	$0	$0	1,547	1,460	1,375	1,288	1,203	1,117
SANTA ANNA	F	MUNICIPAL CONSERVATION - SANTA ANNA	DEMAND REDUCTION	$1623	$1606	3	4	4	4	4	4
SNYDER	F	MUNICIPAL CONSERVATION - SNYDER	DEMAND REDUCTION	$957	$720	41	47	51	55	59	93
SNYDER	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	194	0	0	256	524	814
SONORA	F	DEVELOP ADDITIONAL EDWARDS-TRINITY-PLATEAU AQUIFER SUPPLIES - SONORA	F | EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | SUTTON COUNTY	$1000	$114	35	35	35	35	35	35
SONORA	F	MUNICIPAL CONSERVATION - SONORA	DEMAND REDUCTION	$1187	$1152	9	9	9	10	10	10
SONORA	F	WATER AUDITS AND LEAK - SONORA	DEMAND REDUCTION	$763	$750	106	112	114	116	117	118
SOUTHWEST SANDHILLS WSC	F	MUNICIPAL CONSERVATION - SOUTHWEST SANDHILLS WSC	DEMAND REDUCTION	$863	$589	20	22	24	26	28	30
STANTON	F	MUNICIPAL CONSERVATION - STANTON	DEMAND REDUCTION	$1199	$1124	8	9	10	10	11	11
STANTON	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	31	0	0	33	62	90
STEAM ELECTRIC POWER, ECTOR	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	109	0	0	114	219	316
STEAM ELECTRIC POWER, HOWARD	F	SUBORDINATION - CRMWD SYSTEM	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	$0	$0	21	0	0	22	40	59
STEAM ELECTRIC POWER, MITCHELL	F	REUSE - MITCHELL COUNTY SEP, DIRECT NON-POTABLE SALES FROM COLORADO CITY	F | DIRECT NON-POTABLE REUSE	$1428	$212	500	500	500	500	500	500
STEAM ELECTRIC POWER, MITCHELL	F	SUBORDINATION - LAKE COLORADO CITY AND CHAMPION LAKE SYSTEM	F | COLORADO CITY-CHAMPION LAKE/RESERVOIR SYSTEM	$0	$0	1,170	1,156	1,142	1,128	1,114	1,100

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Region F Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
STERLING CITY	F	MUNICIPAL CONSERVATION - STERLING	DEMAND REDUCTION	$1759	$1718	3	3	3	3	3	3
TOM GREEN COUNTY FWSD 3	F	MUNICIPAL CONSERVATION - TOM GREEN COUNTY FWSD 3	DEMAND REDUCTION	$1616	$1409	3	4	4	4	5	5
WICKETT	F	MUNICIPAL CONSERVATION - WICKETT	DEMAND REDUCTION	$2487	$2240	2	2	2	2	2	2
WINK	F	MUNICIPAL CONSERVATION - WINK	DEMAND REDUCTION	$1665	$1449	3	4	4	4	4	5
WINTERS	F	MUNICIPAL CONSERVATION - WINTERS	DEMAND REDUCTION	$1191	$1183	17	12	9	9	9	9
WINTERS	F	SUBORDINATION - WINTERS LAKE	F | WINTERS LAKE/RESERVOIR	$0	$0	100	99	98	98	98	97
WINTERS	G	BRA SYSTEM OPERATION MAIN STEM	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	$668	$355	109	107	113	114	114	114
ZEPHYR WSC*	F	MUNICIPAL CONSERVATION - ZEPHYR WSC	DEMAND REDUCTION	$1091	$1087	13	13	13	13	13	13
ZEPHYR WSC*	F	WATER AUDITS AND LEAK - ZEPHYR WSC	DEMAND REDUCTION	$5958	$6384	19	19	18	18	18	18
ZEPHYR WSC*	K	DROUGHT MANAGEMENT	DEMAND REDUCTION	N/A	N/A	0	0	0	0	0	0

REGION F RECOMMENDED WMS SUPPLY TOTAL	2020	2030	2040	2050	2060	2070
REGION F RECOMMENDED WMS SUPPLY TOTAL	84,708	127,354	152,620	157,231	162,129	168,285

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Region F Recommended Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
BALMORHEA	YES	2020	DEVELOP EDWARDS-TRINITY-PLATEAU AQUIFER SUPPLIES - BALMORHEA	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD	$1,948,000
BANGS	NO	2020	DIRECT NON-POTABLE REUSE FOR PUBLIC PARKS IRRIGATION (TYPE I) - BANGS	CONVEYANCE/TRANSMISSION PIPELINE	$581,000
BIG SPRING	YES	2020	NEW WATER TREATMENT PLANT - BIG SPRING	NEW WATER TREATMENT PLANT	$104,651,000
BRADY	YES	2020	ADVANCED GROUNDWATER TREATMENT - BRADY	NEW WATER TREATMENT PLANT	$29,719,000
BRONTE	YES	2020	DEVELOP OTHER AQUIFER SUPPLIES IN SOUTHWEST COKE COUNTY - BRONTE	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD	$23,694,000
BRONTE	YES	2020	REHABILITATION OF OAK CREEK PIPELINE - BRONTE	CONVEYANCE/TRANSMISSION PIPELINE	$1,499,000
BRONTE	YES	2020	WATER TREATMENT PLANT EXPANSION - BRONTE	WATER TREATMENT PLANT EXPANSION	$6,768,000
BROOKESMITH SUD	YES	2020	WATER AUDITS AND LEAK - BROOKESMITH SUD 2020	WATER LOSS CONTROL	$1,737,000
BROOKESMITH SUD	YES	2040	WATER AUDITS AND LEAK - BROOKESMITH SUD 2040	WATER LOSS CONTROL	$1,756,500
BROOKESMITH SUD	YES	2060	WATER AUDITS AND LEAK - BROOKESMITH SUD 2060	WATER LOSS CONTROL	$1,756,500
COLEMAN	YES	2020	WATER AUDITS AND LEAK - COLEMAN 2020	WATER LOSS CONTROL	$1,074,800
COLEMAN	YES	2040	WATER AUDITS AND LEAK - COLEMAN 2040	WATER LOSS CONTROL	$1,085,600
COLEMAN	YES	2060	WATER AUDITS AND LEAK - COLEMAN 2060	WATER LOSS CONTROL	$1,085,600
COLORADO RIVER MWD	YES	2050	CRMWD - WARD COUNTY WELL FIELD EXPANSION AND DEVELOPMENT OF WINKLER COUNTY WELL FIELD	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD	$168,324,000
COLORADO RIVER MWD	YES	2030	CRMWD - WARD COUNTY WELL REPLACEMENT	MULTIPLE WELLS/WELL FIELD	$10,440,000
COUNTY-OTHER, MIDLAND	NO	2030	DEVELOP PECOS VALLEY AQUIFER SUPPLIES FROM ROARK RANCH IN WINKLER CO - MIDLAND COUNTY OTHER	MULTIPLE WELLS/WELL FIELD	$24,557,000
GRANDFALLS	NO	2050	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - GRANDFALLS	MULTIPLE WELLS/WELL FIELD	$2,410,000
GREATER GARDENDALE WSC	NO	2030	PURCHASE TREATED WATER FROM CITY OF ODESSA - GREATER GARDENDALE WSC	CONVEYANCE/TRANSMISSION PIPELINE; NEW CONTRACT; PUMP STATION	$6,078,000
IRRIGATION, ANDREWS	NO	2020	IRRIGATION CONSERVATION - ANDREWS COUNTY	CONSERVATION - AGRICULTURAL	$1,547,740
IRRIGATION, BORDEN	NO	2020	IRRIGATION CONSERVATION - BORDEN COUNTY	CONSERVATION - AGRICULTURAL	$224,124
IRRIGATION, BROWN	NO	2020	IRRIGATION CONSERVATION - BROWN COUNTY	CONSERVATION - AGRICULTURAL	$494,000
IRRIGATION, COKE	YES	2020	IRRIGATION CONSERVATION - COKE COUNTY	CONSERVATION - AGRICULTURAL	$62,837
IRRIGATION, COLEMAN	NO	2020	IRRIGATION CONSERVATION - COLEMAN COUNTY	CONSERVATION - AGRICULTURAL	$35,340
IRRIGATION, CONCHO	NO	2020	IRRIGATION CONSERVATION - CONCHO COUNTY	CONSERVATION - AGRICULTURAL	$409,807
IRRIGATION, CROCKETT	NO	2020	IRRIGATION CONSERVATION - CROCKETT COUNTY	CONSERVATION - AGRICULTURAL	$15,390
IRRIGATION, ECTOR	NO	2020	IRRIGATION CONSERVATION - ECTOR COUNTY	CONSERVATION - AGRICULTURAL	$86,184
IRRIGATION, GLASSCOCK	NO	2020	IRRIGATION CONSERVATION - GLASSCOCK COUNTY	CONSERVATION - AGRICULTURAL	$1,558,122
IRRIGATION, HOWARD	NO	2020	IRRIGATION CONSERVATION - HOWARD COUNTY	CONSERVATION - AGRICULTURAL	$575,419
IRRIGATION, IRION	NO	2020	IRRIGATION CONSERVATION - IRION COUNTY	CONSERVATION - AGRICULTURAL	$120,042
IRRIGATION, KIMBLE	NO	2020	IRRIGATION CONSERVATION - KIMBLE COUNTY	CONSERVATION - AGRICULTURAL	$242,318
IRRIGATION, MARTIN	NO	2020	IRRIGATION CONSERVATION - MARTIN COUNTY	CONSERVATION - AGRICULTURAL	$4,159,974
IRRIGATION, MASON	NO	2020	IRRIGATION CONSERVATION - MASON COUNTY	CONSERVATION - AGRICULTURAL	$566,124
IRRIGATION, MCCULLOCH	NO	2020	IRRIGATION CONSERVATION - MCCULLOCH COUNTY	CONSERVATION - AGRICULTURAL	$264,936
IRRIGATION, MENARD	NO	2020	IRRIGATION CONSERVATION - MENARD COUNTY	CONSERVATION - AGRICULTURAL	$417,582
IRRIGATION, MIDLAND	NO	2020	IRRIGATION CONSERVATION - MIDLAND COUNTY	CONSERVATION - AGRICULTURAL	$2,064,198
IRRIGATION, MITCHELL	NO	2020	IRRIGATION CONSERVATION - MITCHELL COUNTY	CONSERVATION - AGRICULTURAL	$194,362
IRRIGATION, PECOS	NO	2020	IRRIGATION CONSERVATION - PECOS COUNTY	CONSERVATION - AGRICULTURAL	$16,341,330
IRRIGATION, REAGAN	NO	2020	IRRIGATION CONSERVATION - REAGAN COUNTY	CONSERVATION - AGRICULTURAL	$2,511,534
IRRIGATION, REEVES	NO	2020	IRRIGATION CONSERVATION - REEVES COUNTY	CONSERVATION - AGRICULTURAL	$6,718,818
IRRIGATION, RUNNELS	NO	2020	IRRIGATION CONSERVATION - RUNNELS COUNTY	CONSERVATION - AGRICULTURAL	$283,176
IRRIGATION, SCHLEICHER	NO	2020	IRRIGATION CONSERVATION - SCHLEICHER COUNTY	CONSERVATION - AGRICULTURAL	$82,582
IRRIGATION, SCURRY	YES	2020	IRRIGATION CONSERVATION - SCURRY COUNTY	CONSERVATION - AGRICULTURAL	$746,829
IRRIGATION, STERLING	NO	2020	IRRIGATION CONSERVATION - STERLING COUNTY	CONSERVATION - AGRICULTURAL	$102,486
IRRIGATION, SUTTON	NO	2020	IRRIGATION CONSERVATION - SUTTON COUNTY	CONSERVATION - AGRICULTURAL	$168,968

Region F Recommended Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
IRRIGATION, TOM GREEN	NO	2020	IRRIGATION CONSERVATION - TOM GREEN COUNTY	CONSERVATION - AGRICULTURAL	$3,875,362
IRRIGATION, UPTON	NO	2020	IRRIGATION CONSERVATION - UPTON COUNTY	CONSERVATION - AGRICULTURAL	$1,185,942
IRRIGATION, WARD	NO	2020	IRRIGATION CONSERVATION - WARD COUNTY	CONSERVATION - AGRICULTURAL	$360,240
IRRIGATION, WINKLER	NO	2020	IRRIGATION CONSERVATION - WINKLER COUNTY	CONSERVATION - AGRICULTURAL	$399,798
JUNCTION	YES	2020	DEVELOP EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - JUNCTION	MULTIPLE WELLS/WELL FIELD	$3,634,000
JUNCTION	YES	2020	DREDGE RIVER INTAKE - JUNCTION	DREDGE TO RECOVER CAPACITY	$7,505,000
MANUFACTURING, KIMBLE	NO	2020	DEVELOP ADDITIONAL ELLENBURGER SAN SABA AQUIFER SUPPLIES - KIMBLE COUNTY MANUFACTURING	MULTIPLE WELLS/WELL FIELD	$1,621,000
MANUFACTURING, SCURRY	NO	2020	DEVELOP OTHER AQUIFER SUPPLIES - SCURRY COUNTY MANUFACTURING	MULTIPLE WELLS/WELL FIELD	$677,000
MASON	YES	2020	ADDITIONAL TREATMENT - MASON	NEW WATER TREATMENT PLANT	$2,605,000
MENARD	NO	2020	DEVELOP HICKORY AQUIFER SUPPLIES - MENARD	MULTIPLE WELLS/WELL FIELD	$3,287,000
MENARD	NO	2020	DIRECT NON-POTABLE REUSE FOR IRRIGATION OF CITY FARMS (TYPE I) - MENARD	CONVEYANCE/TRANSMISSION PIPELINE	$696,500
MIDLAND	YES	2040	ADVANCED TREATMENT (RO) OF PAUL DAVIS WELL FIELD SUPPLIES - MIDLAND	NEW WATER TREATMENT PLANT; PUMP STATION; CONVEYANCE/TRANSMISSION PIPELINE	$60,804,000
MIDLAND	YES	2030	WEST TEXAS WATER PARTNERSHIP - MIDLAND	CONVEYANCE/TRANSMISSION PIPELINE	$0
MILLERSVIEW-DOOLE WSC	YES	2020	WATER AUDITS AND LEAK - MILLERSVIEW-DOOLE WSC 2020	WATER LOSS CONTROL	$965,800
MILLERSVIEW-DOOLE WSC	YES	2040	WATER AUDITS AND LEAK - MILLERSVIEW-DOOLE WSC 2040	WATER LOSS CONTROL	$991,000
MILLERSVIEW-DOOLE WSC	YES	2060	WATER AUDITS AND LEAK - MILLERSVIEW-DOOLE WSC 2060	WATER LOSS CONTROL	$1,009,100
MINING, ANDREWS	NO	2020	MINING CONSERVATION - ANDREWS COUNTY	CONSERVATION - MINING	$5,540,000
MINING, BORDEN	NO	2020	MINING CONSERVATION - BORDEN COUNTY	CONSERVATION - MINING	$780,000
MINING, BROWN	NO	2020	DEVELOP CROSS TIMBERS AQUIFER SUPPLIES - BROWN COUNTY, MINING	MULTIPLE WELLS/WELL FIELD	$2,440,000
MINING, BROWN	NO	2020	MINING CONSERVATION - BROWN COUNTY	CONSERVATION - MINING	$1,340,000
MINING, COKE	NO	2020	MINING CONSERVATION - COKE COUNTY	CONSERVATION - MINING	$400,000
MINING, COLEMAN	NO	2020	MINING CONSERVATION - COLEMAN COUNTY	CONSERVATION - MINING	$100,000
MINING, CONCHO	NO	2020	MINING CONSERVATION - CONCHO COUNTY	CONSERVATION - MINING	$400,000
MINING, CRANE	NO	2020	MINING CONSERVATION - CRANE COUNTY	CONSERVATION - MINING	$720,000
MINING, CROCKETT	NO	2020	MINING CONSERVATION - CROCKETT COUNTY	CONSERVATION - MINING	$6,300,000
MINING, ECTOR	NO	2020	MINING CONSERVATION - ECTOR COUNTY	CONSERVATION - MINING	$600,000
MINING, GLASSCOCK	NO	2020	MINING CONSERVATION - GLASSCOCK COUNTY	CONSERVATION - MINING	$4,960,000
MINING, HOWARD	NO	2020	MINING CONSERVATION - HOWARD COUNTY	CONSERVATION - MINING	$2,860,000
MINING, IRION	NO	2020	MINING CONSERVATION - IRION COUNTY	CONSERVATION - MINING	$6,440,000
MINING, KIMBLE	NO	2020	MINING CONSERVATION - KIMBLE COUNTY	CONSERVATION - MINING	$20,000
MINING, LOVING	NO	2020	MINING CONSERVATION - LOVING COUNTY	CONSERVATION - MINING	$10,500,000
MINING, MARTIN	NO	2020	MINING CONSERVATION - MARTIN COUNTY	CONSERVATION - MINING	$6,040,000
MINING, MASON	NO	2020	MINING CONSERVATION - MASON COUNTY	CONSERVATION - MINING	$860,000
MINING, MCCULLOCH	NO	2020	MINING CONSERVATION - MCCULLOCH COUNTY	CONSERVATION - MINING	$7,500,000
MINING, MENARD	NO	2020	MINING CONSERVATION - MENARD COUNTY	CONSERVATION - MINING	$920,000
MINING, MIDLAND	NO	2020	MINING CONSERVATION - MIDLAND COUNTY	CONSERVATION - MINING	$8,900,000
MINING, MITCHELL	NO	2020	MINING CONSERVATION - MITCHELL COUNTY	CONSERVATION - MINING	$620,000
MINING, PECOS	NO	2020	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - PECOS, MINING	MULTIPLE WELLS/WELL FIELD	$492,000
MINING, PECOS	NO	2020	MINING CONSERVATION - PECOS COUNTY	CONSERVATION - MINING	$10,780,000
MINING, REAGAN	NO	2020	MINING CONSERVATION - REAGAN COUNTY	CONSERVATION - MINING	$8,900,000
MINING, REEVES	NO	2020	DEVELOP ADDITIONAL PECOS VALLEY AQUIFER SUPPLIES - REEVES COUNTY MINING	MULTIPLE WELLS/WELL FIELD	$17,465,000
MINING, REEVES	NO	2020	MINING CONSERVATION - REEVES COUNTY	CONSERVATION - MINING	$17,640,000
MINING, RUNNELS	NO	2020	MINING CONSERVATION - RUNNELS COUNTY	CONSERVATION - MINING	$220,000

Region F Recommended Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
MINING, SCHLEICHER	NO	2020	MINING CONSERVATION - SCHLEICHER COUNTY	CONSERVATION - MINING	$620,000
MINING, SCURRY	NO	2020	MINING CONSERVATION - SCURRY COUNTY	CONSERVATION - MINING	$680,000
MINING, STERLING	NO	2020	MINING CONSERVATION - STERLING COUNTY	CONSERVATION - MINING	$800,000
MINING, SUTTON	NO	2020	MINING CONSERVATION - SUTTON COUNTY	CONSERVATION - MINING	$640,000
MINING, TOM GREEN	NO	2020	MINING CONSERVATION - TOM GREEN COUNTY	CONSERVATION - MINING	$980,000
MINING, UPTON	NO	2020	MINING CONSERVATION - UPTON COUNTY	CONSERVATION - MINING	$2,020,000
MINING, WARD	NO	2020	MINING CONSERVATION - WARD COUNTY	CONSERVATION - MINING	$1,600,000
MINING, WINKLER	NO	2020	MINING CONSERVATION - WINKLER COUNTY	CONSERVATION - MINING	$980,000
ODESSA	YES	2020	RO TREATMENT OF EXISTING SUPPLIES - ODESSA	NEW WATER TREATMENT PLANT	$83,062,000
PECOS	YES	2020	ADVANCED GROUNDWATER TREATMENT - PECOS CITY	NEW WATER TREATMENT PLANT	$27,680,000
PECOS	YES	2020	DIRECT NON-POTABLE REUSE - PECOS CITY	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION	$8,707,000
PECOS	YES	2030	DIRECT POTABLE REUSE - PECOS CITY	CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER TREATMENT PLANT; PUMP STATION	$29,541,000
PECOS	YES	2030	PARTNER WITH MADERA VALLEY WSC & EXPAND WELL FIELD - PECOS CITY	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD	$43,107,000
PECOS COUNTY WCID 1	NO	2020	DEVELOP EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - PECOS COUNTY WCID #1	MULTIPLE WELLS/WELL FIELD	$3,630,000
PECOS COUNTY WCID 1	NO	2020	TRANSMISSION PIPELINE REPLACEMENT - PECOS COUNTY WCID #1	CONVEYANCE/TRANSMISSION PIPELINE	$26,102,000
SAN ANGELO	YES	2020	CONCHO RIVER WATER PROJECT - SAN ANGELO	CONVEYANCE/TRANSMISSION PIPELINE; WATER TREATMENT PLANT EXPANSION	$116,861,000
SAN ANGELO	YES	2030	HICKORY WELL FIELD EXPANSION IN MCCULLOCH COUNTY - SAN ANGELO	MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION	$55,491,000
SONORA	YES	2020	DEVELOP ADDITIONAL EDWARDS-TRINITY-PLATEAU AQUIFER SUPPLIES - SONORA	MULTIPLE WELLS/WELL FIELD	$437,000
SONORA	YES	2020	WATER AUDITS AND LEAK - SONORA 2020	WATER LOSS CONTROL	$679,900
SONORA	YES	2040	WATER AUDITS AND LEAK - SONORA 2040	WATER LOSS CONTROL	$707,400
SONORA	YES	2060	WATER AUDITS AND LEAK - SONORA 2060	WATER LOSS CONTROL	$720,800
STEAM ELECTRIC POWER, MITCHELL	NO	2020	DIRECT NON-POTABLE REUSE FOR SALES FROM COLORADO CITY - MITCHELL COUNTY SEP	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION	$8,642,000
WINTERS	YES	2020	PURCHASE FROM PROVIDER - WINTERS	CONVEYANCE/TRANSMISSION PIPELINE	$974,000
ZEPHYR WSC	NO	2020	WATER AUDITS AND LEAK - ZEPHYR WSC 2020	WATER LOSS CONTROL	$944,700
ZEPHYR WSC	NO	2040	WATER AUDITS AND LEAK - ZEPHYR WSC 2040	WATER LOSS CONTROL	$954,800
ZEPHYR WSC	NO	2060	WATER AUDITS AND LEAK - ZEPHYR WSC 2060	WATER LOSS CONTROL	$954,800

REGION F RECOMMENDED CAPITAL COST TOTAI	**$1,060,029,364**

Region F Alternative Water User Group (WUG) Water Management Strategies (WMS)

WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
REGION F ALTERNATIVE WMS SUPPLY TOTA											

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

Region F Alternative Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
				REGION F ALTERNATIVE CAPITAL COST TOTAL	

Region F Water User Group (WUG) Management Supply Factor

WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. To calculate the Management Supply Factor for each WUG as a whole, not split by region-county-basin, the combined total of existing and future supply is divided by the total projected demand. If a WUG is split by more than one planning region, the whole WUG's management supply factor will show up in each of its planning region's management supply factor reports.

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
AIRLINE MOBILE HOME PARK LTD	1.0	1.0	1.0	1.0	1.0	1.0
ANDREWS	1.0	0.9	0.9	0.8	0.8	0.7
BALLINGER	3.4	3.4	3.4	3.5	3.5	3.5
BALMORHEA	1.2	1.2	1.1	1.1	1.0	1.0
BANGS	1.1	1.1	1.1	1.1	1.1	1.1
BARSTOW	1.0	1.0	1.0	1.0	1.0	1.0
BIG LAKE	1.0	1.0	1.0	1.0	1.0	1.0
BIG SPRING	1.0	1.0	1.0	1.0	1.0	1.0
BRADY	1.5	1.4	1.5	1.5	1.5	1.5
BRONTE	3.9	4.0	4.0	4.1	4.1	4.1
BROOKESMITH SUD*	1.1	1.1	1.1	1.1	1.1	1.1
BROWNWOOD	1.0	1.0	1.0	1.0	1.0	1.0
COAHOMA	1.0	1.0	1.0	1.0	1.0	1.0
COLEMAN	1.7	1.7	1.7	1.7	1.6	1.6
COLEMAN COUNTY SUD*	1.0	1.0	1.0	1.0	1.0	1.0
COLORADO CITY	1.0	0.9	0.9	0.9	0.9	0.9
CONCHO RURAL WATER	1.2	1.2	1.2	1.2	1.2	1.2
COUNTY-OTHER, ANDREWS	1.0	0.9	0.9	0.8	0.7	0.7
COUNTY-OTHER, BORDEN	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, BROWN	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, COKE	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, COLEMAN	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, CONCHO	1.1	1.1	1.1	1.1	1.1	1.1
COUNTY-OTHER, CRANE	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, CROCKETT	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, ECTOR	1.0	1.5	1.9	1.9	1.8	1.7
COUNTY-OTHER, GLASSCOCK	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, HOWARD	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, IRION	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, KIMBLE	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, LOVING	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, MARTIN	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, MASON	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, MCCULLOCH	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, MENARD	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, MIDLAND	1.9	1.8	1.8	1.7	1.6	1.6
COUNTY-OTHER, MITCHELL	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, PECOS	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, REAGAN	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, REEVES	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, RUNNELS	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, SCHLEICHER	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, SCURRY	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, STERLING	1.0	1.0	1.0	1.0	1.0	1.0

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

Region F Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
COUNTY-OTHER, SUTTON	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, TOM GREEN	1.4	1.4	1.3	1.3	1.3	1.2
COUNTY-OTHER, UPTON	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, WARD	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, WINKLER	1.0	1.0	1.0	1.0	1.0	1.0
CRANE	1.0	1.0	1.0	1.0	1.0	1.0
CROCKETT COUNTY WCID 1	1.0	1.0	1.0	1.0	1.0	1.0
DADS Supported Living Center	1.0	1.0	1.0	1.0	1.0	1.0
EARLY	1.0	1.0	1.0	1.0	1.0	1.0
ECTOR COUNTY UTILITY DISTRICT	1.0	1.0	1.0	1.0	1.0	1.0
EDEN	1.1	1.1	1.1	1.1	1.1	1.1
ELDORADO	1.0	1.0	1.0	1.0	1.0	1.0
FORT STOCKTON	1.0	1.0	1.0	1.0	1.0	1.0
GOODFELLOW AIR FORCE BASE	1.0	1.0	1.0	1.0	1.0	1.0
GRANDFALLS	1.0	1.0	1.0	2.0	1.0	1.0
GREATER GARDENDALE WSC	1.0	1.8	1.8	1.6	1.5	1.4
GREENWOOD WATER	1.0	1.0	1.0	1.0	1.0	1.0
IRAAN	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, ANDREWS	1.0	0.8	0.7	0.7	0.6	0.6
IRRIGATION, BORDEN	1.0	1.1	1.0	1.0	1.0	1.0
IRRIGATION, BROWN	0.8	0.9	0.9	0.9	0.9	0.9
IRRIGATION, COKE	1.0	1.1	1.1	1.1	1.1	1.1
IRRIGATION, COLEMAN	1.1	1.1	1.1	1.1	1.1	1.1
IRRIGATION, CONCHO	1.0	1.1	1.1	1.1	1.1	1.1
IRRIGATION, CROCKETT	1.1	1.1	1.2	1.2	1.2	1.2
IRRIGATION, ECTOR	2.4	2.5	2.5	2.5	2.5	2.5
IRRIGATION, GLASSCOCK	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, HOWARD	1.0	1.1	1.1	1.1	1.1	1.1
IRRIGATION, IRION	0.8	0.8	0.9	0.9	0.9	0.9
IRRIGATION, KIMBLE	0.6	0.7	0.7	0.7	0.7	0.7
IRRIGATION, MARTIN	1.1	1.1	0.9	0.9	0.8	0.8
IRRIGATION, MASON	1.0	1.1	1.2	1.2	1.2	1.2
IRRIGATION, MCCULLOCH	1.0	1.1	1.2	1.2	1.2	1.2
IRRIGATION, MENARD	1.0	1.1	1.1	1.1	1.1	1.1
IRRIGATION, MIDLAND	1.1	1.1	1.1	1.2	1.2	1.2
IRRIGATION, MITCHELL	0.9	0.9	0.9	0.9	0.9	0.9
IRRIGATION, PECOS	1.1	1.1	1.2	1.2	1.2	1.2
IRRIGATION, REAGAN	1.1	1.2	1.2	1.2	1.2	1.2
IRRIGATION, REEVES	1.1	1.1	1.2	1.2	1.2	1.2
IRRIGATION, RUNNELS	1.0	1.1	1.1	1.1	1.1	1.1
IRRIGATION, SCHLEICHER	1.2	1.2	1.2	1.2	1.2	1.2
IRRIGATION, SCURRY	0.2	0.2	0.3	0.3	0.3	0.3
IRRIGATION, STERLING	1.1	1.2	1.2	1.2	1.2	1.2
IRRIGATION, SUTTON	1.1	1.1	1.2	1.2	1.2	1.2
IRRIGATION, TOM GREEN	1.1	1.2	1.2	1.2	1.2	1.2
IRRIGATION, UPTON	1.0	1.1	1.1	1.1	1.1	1.1
IRRIGATION, WARD	2.0	2.1	2.1	2.2	2.2	2.2
IRRIGATION, WINKLER	1.0	1.1	1.1	1.1	1.1	1.1

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

Region F Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	2020	2030	2040	2050	2060	2070
JUNCTION	1.0	1.0	1.0	1.0	1.0	1.0
KERMIT	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, ANDREWS	1.0	0.9	0.9	0.8	0.8	0.7
LIVESTOCK, BORDEN	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, BROWN	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, COKE	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, COLEMAN	1.1	1.1	1.1	1.1	1.1	1.1
LIVESTOCK, CONCHO	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, CRANE	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, CROCKETT	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, ECTOR	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, GLASSCOCK	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, HOWARD	1.2	1.2	1.2	1.2	1.2	1.2
LIVESTOCK, IRION	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, KIMBLE	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, LOVING	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, MARTIN	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, MASON	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, MCCULLOCH	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, MENARD	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, MIDLAND	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, MITCHELL	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, PECOS	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, REAGAN	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, REEVES	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, RUNNELS	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, SCHLEICHER	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, SCURRY	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, STERLING	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, SUTTON	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, TOM GREEN	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, UPTON	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, WARD	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, WINKLER	1.0	1.0	1.0	1.0	1.0	1.0
LORAINE	1.0	1.0	1.0	1.0	1.0	1.0
MADERA VALLEY WSC	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, ANDREWS	0.9	0.9	0.9	0.8	0.7	0.7
MANUFACTURING, BROWN	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, COLEMAN	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, CRANE	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, CROCKETT	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, ECTOR	1.6	1.4	1.4	1.4	1.2	1.2
MANUFACTURING, GLASSCOCK	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, HOWARD	1.0	1.1	1.1	1.1	1.1	1.1
MANUFACTURING, IRION	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, KIMBLE	1.2	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, MCCULLOCH	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, MIDLAND	1.0	1.0	1.0	1.0	1.0	1.0

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

Region F Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	2020	2030	2040	2050	2060	2070
MANUFACTURING, MITCHELL	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, PECOS	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, REEVES	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, RUNNELS	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, SCURRY	1.2	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, SUTTON	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, TOM GREEN	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, UPTON	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, WARD	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, WINKLER	1.0	1.0	1.0	1.0	1.0	1.0
MASON	1.0	1.0	1.0	1.0	1.0	1.0
MCCAMEY	1.0	1.0	1.0	1.0	1.0	1.0
MENARD	1.2	1.2	1.2	1.2	1.2	1.2
MERTZON	1.0	1.0	1.0	1.0	1.0	1.0
MIDLAND	1.7	1.3	1.4	1.3	1.2	1.1
MILES	1.2	1.2	1.2	1.2	1.2	1.2
MILLERSVIEW-DOOLE WSC	1.4	1.4	1.4	1.4	1.4	1.4
MINING, ANDREWS	0.8	0.8	1.0	1.2	1.6	2.0
MINING, BORDEN	1.0	1.0	1.0	1.0	1.0	1.0
MINING, BROWN	1.0	1.0	1.0	1.0	1.0	1.0
MINING, COKE	1.0	1.0	1.0	1.0	1.0	1.0
MINING, COLEMAN	1.0	1.0	1.0	1.0	1.0	1.0
MINING, CONCHO	1.0	1.0	1.0	1.0	1.0	1.0
MINING, CRANE	1.0	1.0	1.0	1.0	1.0	1.0
MINING, CROCKETT	1.2	1.2	1.6	2.2	4.9	10.8
MINING, ECTOR	1.2	1.1	1.1	1.3	1.6	1.9
MINING, GLASSCOCK	1.0	1.0	1.0	1.0	1.0	1.0
MINING, HOWARD	1.0	1.0	1.0	1.0	1.0	1.0
MINING, IRION	0.7	0.7	0.9	1.1	1.1	1.2
MINING, KIMBLE	1.1	1.1	1.1	1.1	1.1	1.1
MINING, LOVING	0.5	0.5	0.6	0.7	0.8	0.8
MINING, MARTIN	1.0	1.0	1.0	1.3	2.4	4.6
MINING, MASON	1.0	1.0	1.0	1.0	1.0	1.0
MINING, MCCULLOCH	1.0	1.0	1.0	1.0	1.0	1.0
MINING, MENARD	1.0	1.0	1.0	1.0	1.0	1.0
MINING, MIDLAND	1.0	1.0	1.0	1.0	1.1	1.5
MINING, MITCHELL	1.0	1.0	1.0	1.0	1.0	1.0
MINING, PECOS	1.0	1.0	1.0	1.2	1.5	2.0
MINING, REAGAN	1.0	1.0	1.0	1.1	2.8	7.8
MINING, REEVES	1.1	1.1	1.1	1.3	1.7	2.1
MINING, RUNNELS	1.0	1.0	1.0	1.0	1.0	1.0
MINING, SCHLEICHER	1.0	1.0	1.0	1.0	1.0	1.0
MINING, SCURRY	0.2	0.2	0.2	0.2	0.2	0.2
MINING, STERLING	1.0	1.0	1.0	1.0	1.0	1.0
MINING, SUTTON	1.0	1.0	1.0	1.0	1.0	1.0
MINING, TOM GREEN	1.0	1.0	1.0	1.0	1.0	1.0
MINING, UPTON	1.1	1.1	1.2	1.5	2.1	3.0
MINING, WARD	1.0	1.0	1.0	1.0	1.0	1.0

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

Region F Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
MINING, WINKLER	1.0	1.0	1.0	1.0	1.0	1.0
MITCHELL COUNTY UTILITY	1.0	1.0	1.0	1.0	1.0	1.0
MONAHANS	1.6	1.5	1.5	1.5	1.4	1.4
NORTH RUNNELS WSC*	1.0	1.0	1.0	1.0	1.0	1.0
ODESSA	1.0	1.0	1.0	1.0	1.0	1.0
PECOS	2.4	5.5	5.3	5.2	5.1	5.0
PECOS COUNTY FRESH WATER	1.0	1.0	1.0	1.0	1.0	1.0
PECOS COUNTY WCID 1	1.7	1.7	1.6	1.6	1.6	1.6
RANKIN	1.0	1.0	1.0	1.0	1.0	1.0
RICHLAND SUD*	1.4	1.4	1.4	1.5	1.5	1.4
ROBERT LEE	1.0	1.0	1.0	1.0	1.0	1.0
SAN ANGELO	1.3	1.2	1.3	1.2	1.1	1.0
SANTA ANNA	1.0	1.0	1.0	1.0	1.0	1.0
SNYDER	1.0	1.0	1.0	1.0	1.0	1.0
SONORA	1.1	1.1	1.1	1.1	1.1	1.1
SOUTHWEST SANDHILLS WSC	1.1	1.1	1.1	1.1	1.1	1.2
STANTON	1.1	1.0	1.0	1.0	1.0	1.0
STEAM ELECTRIC POWER, ECTOR	1.0	1.0	1.0	1.0	1.0	1.0
STEAM ELECTRIC POWER, HOWARD	1.0	1.0	1.0	1.0	1.0	1.0
STEAM ELECTRIC POWER, MITCHELL	0.2	0.2	0.2	0.2	0.2	0.2
STEAM ELECTRIC POWER, WARD	0.1	0.1	0.1	0.1	0.1	0.1
STERLING CITY	1.0	1.0	1.0	1.0	1.0	1.0
TOM GREEN COUNTY FWSD 3	1.0	1.0	1.0	1.0	1.0	1.0
WICKETT	5.7	5.4	5.3	5.2	5.1	5.0
WINK	1.0	1.0	1.0	1.0	1.0	1.0
WINTERS	1.0	1.0	1.1	1.1	1.1	1.1
ZEPHYR WSC*	1.1	1.1	1.1	1.1	1.1	1.1

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

Region F Recommended Water Managment Strategy (WMS) Supply Associated with a New or Amended Inter-Basin Transfer (IBT) Permit

IBT WMS supply is the portion of the total WMS benefitting WUGs that will require a new or amended IBT permit that is not considered exempt under the Texas Water Code § 11.085.

			IBT WMS SUPPLY (ACRE-FEET PER YEAR)					
WMS NAME	SOURCE BASIN	RECIPIENT WUG BASIN	2020	2030	2040	2050	2060	2070

Region F Water User Groups (WUGs)
Recommended Water Managment Strategy (WMS) Supply Associated with a
New or Amended Inter-Basin Transfer (IBT) Permit and Total Recommended Conservation WMS Supply

IBT WMS supply is the portion of the total WMS benefitting the WUG basin split listed that will require a new or amended IBT permit that is not considered exempt under the Texas Water Code § 11.085. Total conservation supply represents all conservation WMS volumes recommended within the WUG's region-basin geographic split.

BENEFITTING WUG NAME | BASIN	WMS SOURCE ORIGIN BASIN | WMS NAME	WMS SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070

Region F Sponsored Recommended Water Management Strategy (WMS) Supplies Unallocated* to Water User Groups (WUG)

WMS NAME	WMS SPONSOR	SOURCE NAME	UNALLOCATED STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
BRUSH CONTROL - BCWID	BROWN COUNTY WID #1	F | BROWNWOOD LAKE/RESERVOIR	400	400	400	400	400	400
BRUSH CONTROL - UCRA	UPPER COLORADO RIVER AUTHORITY	F | OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	60	60	60	60	60	60
CONCHO RIVER WATER PROJECT - SAN ANGELO	UPPER COLORADO RIVER AUTHORITY	F | COLORADO INDIRECT REUSE	459	464	474	483	492	499
SUBORDINATION - BRADY CREEK RESERVOIR	BRADY	F | BRADY CREEK LAKE/RESERVOIR	1,109	1,069	1,029	989	949	909
SUBORDINATION - CRMWD SYSTEM	COLORADO RIVER MWD	F | COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	15,819	19,911	18,533	13,002	7,245	972
SUBORDINATION - LAKE BROWNWOOD	BROWN COUNTY WID #1	F | BROWNWOOD LAKE/RESERVOIR	5,440	5,466	5,492	5,518	5,544	5,570
SUBORDINATION - OAK CREEK RESERVOIR	SWEETWATER	F | OAK CREEK LAKE/RESERVOIR	577	540	503	468	431	394
WARD COUNTY WELL FIELD EXPANSION AND DEVELOPMENT OF WINKLER COUNTY WELL FIELD - CRMWD	COLORADO RIVER MWD	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WINKLER COUNTY	0	0	0	22,400	22,400	22,400
WARD COUNTY WELL FIELD WELL REPLACEMENT - CRMWD	COLORADO RIVER MWD	F | EDWARDS-TRINITY-PLATEAU AND PECOS VALLEY AQUIFERS | WARD COUNTY	0	755	2,650	6,296	8,361	10,343
TOTAL UNALLOCATED STRATEGY SUPPLIES			**23,864**	**28,665**	**29,141**	**49,616**	**45,882**	**41,547**

* Strategy supplies created through the WMS that have not been assigned to a WUG will be allocated to the entity responsible for the water through an‘unassigned water volumes’ entity. Only strategy supplies associated with an 'unassigned water volume' entity are shown in this report, and may not represent all strategy supplies associated with the listed WMS.

Region F Water User Group (WUG) Strategy Supplies by Water Management Strategy (WMS) Type

WMS TYPE *	STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
DIRECT POTABLE REUSE	0	925	925	925	925	925
GROUNDWATER WELLS & OTHER	24,135	49,125	57,016	57,368	57,501	57,593
INDIRECT REUSE	7,941	7,936	7,926	7,917	7,908	7,901
IRRIGATION CONSERVATION	22,950	43,364	60,232	60,232	60,232	60,232
MUNICIPAL CONSERVATION	2,859	3,272	3,507	3,752	3,982	4,258
OTHER CONSERVATION	5,494	5,527	4,482	3,042	1,897	1,483
OTHER DIRECT REUSE	1,152	1,152	1,152	1,152	1,152	1,152
OTHER STRATEGIES	5,217	5,217	5,217	5,217	5,217	5,217
OTHER SURFACE WATER	14,960	10,836	12,163	17,626	23,315	29,524
AQUIFER STORAGE & RECOVERY	0	0	0	0	0	0
NEW MAJOR RESERVOIR	0	0	0	0	0	0
DROUGHT MANAGEMENT	0	0	0	0	0	0
SEAWATER DESALINATION	0	0	0	0	0	0
GROUNDWATER DESALINATION	0	0	0	0	0	0
CONJUNCTIVE USE	0	0	0	0	0	0
TOTAL STRATEGY SUPPLIES	**84,708**	**127,354**	**152,620**	**157,231**	**162,129**	**168,285**

* WMS type descriptions can be found on the interactive state water plan website at http://texasstatewaterplan.org/ using the 'View data for' drop-down menus to navigate to a specific WMS Type page. The data used to create each WMS type value is available in Appendix 3 of the Guidelines for Regional Water Planning Data Deliverable (Exhibit D) document at http://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/doc/current_docs/contract_docs/ExhibitD.pdf

Region F Water User Group (WUG)
Recommended Water Management Strategy (WMS) Supplies by Source Type

SOURCE SUBTYPE*	STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
AQUIFER STORAGE & RECOVERY	0	0	0	0	0	0
GROUNDWATER	24,135	49,125	57,016	57,368	57,501	57,593
GROUNDWATERTOTAL STRATEGY SUPPLIES	**24,135**	**49,125**	**57,016**	**57,368**	**57,501**	**57,593**
DIRECT NON-POTABLE REUSE	1,152	1,152	1,152	1,152	1,152	1,152
DIRECT POTABLE REUSE	0	925	925	925	925	925
INDIRECT NON-POTABLE REUSE	0	0	0	0	0	0
INDIRECT POTABLE REUSE	7,941	7,936	7,926	7,917	7,908	7,901
REUSE TOTAL STRATEGY SUPPLIES	**9,093**	**10,013**	**10,003**	**9,994**	**9,985**	**9,978**
ATMOSPHERE	5,127	5,127	5,127	5,127	5,127	5,127
GULF OF MEXICO	0	0	0	0	0	0
LIVESTOCK LOCAL SUPPLY	0	0	0	0	0	0
OTHER LOCAL SUPPLY	0	0	0	0	0	0
RAINWATER HARVESTING	0	0	0	0	0	0
RESERVOIR	5,020	4,955	4,989	5,018	5,068	5,194
RESERVOIR SYSTEM	9,552	5,493	6,786	12,220	17,859	23,942
RUN-OF-RIVER	478	478	478	478	478	478
SURFACE WATERTOTAL STRATEGY SUPPLIES	**20,177**	**16,053**	**17,380**	**22,843**	**28,532**	**34,741**
REGION F TOTAL STRATEGY SUPPLIES	**53,405**	**75,191**	**84,399**	**90,205**	**96,018**	**102,312**

* A full list of source subtype definitions can be found in section 3 of the Guidelines for Regional Water Planning Data Deliverable (Exhibit D) document at http://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/doc/current_docs/contract_docs/ExhibitD.pdf.

Region F 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.

BROWN COUNTY WID #1 - WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
PROJECTED WHOLESALE CONTRACT DEMANDS	11,939	12,016	11,880	11,807	11,793	11,794
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**11,939**	**12,016**	**11,880**	**11,807**	**11,793**	**11,794**
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	11,939	12,016	11,880	11,807	11,793	11,794
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**11,939**	**12,016**	**11,880**	**11,807**	**11,793**	**11,794**

COLORADO RIVER MWD - WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
PROJECTED WHOLESALE CONTRACT DEMANDS	78,771	63,361	66,028	68,933	71,891	75,368
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**78,771**	**63,361**	**66,028**	**68,933**	**71,891**	**75,368**
GROUNDWATER SALES TO WHOLESALE CUSTOMERS	40,079	31,885	35,586	34,005	32,270	30,535
REUSE SALES TO WHOLESALE CUSTOMERS	1,855	1,855	1,855	1,855	1,855	1,855
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	30,350	29,320	28,290	27,260	26,230	25,200
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**72,284**	**63,060**	**65,731**	**63,120**	**60,355**	**57,590**

MIDLAND - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
PROJECTED RETAIL WUG DEMANDS	27,972	31,803	34,256	36,811	39,405	42,232
PROJECTED WHOLESALE CONTRACT DEMANDS	11,357	11,387	11,387	11,387	11,387	11,387
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**39,329**	**43,190**	**45,643**	**48,198**	**50,792**	**53,619**
GROUNDWATER SALES TO RETAIL CUSTOMERS	34,093	21,297	20,150	19,879	19,702	19,578
REUSE SALES TO RETAIL CUSTOMERS	562	0	0	0	0	0
SURFACE WATER SALES TO RETAIL CUSTOMERS	9,199	4,673	4,502	4,332	4,161	3,991
REUSE SALES TO WHOLESALE CUSTOMERS	11,211	11,211	11,211	11,211	11,211	11,211
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	147	177	177	177	177	177
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**55,212**	**37,358**	**36,040**	**35,599**	**35,251**	**34,957**

ODESSA - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
PROJECTED RETAIL WUG DEMANDS	25,004	28,329	31,091	34,071	37,202	40,669
PROJECTED WHOLESALE CONTRACT DEMANDS	16,158	16,468	16,758	17,063	17,379	17,703
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**41,162**	**44,797**	**47,849**	**51,134**	**54,581**	**58,372**
GROUNDWATER SALES TO RETAIL CUSTOMERS	16,052	19,028	21,841	21,414	20,885	20,202
REUSE SALES TO RETAIL CUSTOMERS	746	1,110	1,142	1,173	1,201	1,227
SURFACE WATER SALES TO RETAIL CUSTOMERS	5,755	8,191	8,108	7,992	7,853	7,747
GROUNDWATER SALES TO WHOLESALE CUSTOMERS	4,254	4,658	5,078	4,737	4,406	4,061
REUSE SALES TO WHOLESALE CUSTOMERS	9,729	9,803	9,796	9,790	9,783	9,777
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	1,525	2,007	1,884	1,767	1,657	1,557
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**38,061**	**44,797**	**47,849**	**46,873**	**45,785**	**44,571**

SAN ANGELO - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
PROJECTED RETAIL WUG DEMANDS	17,924	19,657	20,494	21,556	22,847	24,250
PROJECTED WHOLESALE CONTRACT DEMANDS	1,938	2,049	2,077	2,110	2,147	2,188
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**19,862**	**21,706**	**22,571**	**23,666**	**24,994**	**26,438**

Region F Major Water Provider (MWP) Existing Sales and Transfers

GROUNDWATER SALES TO RETAIL CUSTOMERS	8,294	8,305	8,319	8,337	8,358	8,379
SURFACE WATER SALES TO RETAIL CUSTOMERS	4,845	4,694	4,543	4,395	4,246	4,098
GROUNDWATER SALES TO WHOLESALE CUSTOMERS	666	655	641	623	602	581
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	389	370	350	328	306	284
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**14,194**	**14,024**	**13,853**	**13,683**	**13,512**	**13,342**

Region F Major Water Provider (MWP) Water Management Strategy (WMS) Summary

MWPs are entities of 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).'MWP Retail Customers' denotes recommended WMS supply used by the WUG. 'Transfers Related to Wholesale Customers' denotes a WWP or WUG/WWP selling or transferring recommended WMS supply to another entity. Supply associated with the MWP's wholesale transfers will only display if it is listed as the main seller in the State Water Planning database, even if multiple sellers are involved with the sale o water to WUGs. Unallocated water volumes represent MWP recommended WMS supply not currently allocated to a customer of the MWP.'Total MWP Related WMS Supply' will display if the MWP's WMS is related to more than one WMS supply type (retail, wholesale, and/or unallocated). Associated WMS Projects are listed when the MWP is one of the project's sponsors. Report contains draft data and is subject to change.

BROWN COUNTY WID #1 | BRUSH CONTROL - BCWID

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
RELATED UNALLOCATED WMS WATER VOLUMES	400	400	400	400	400	400

BROWN COUNTY WID #1 | SUBORDINATION - LAKE BROWNWOOD

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
RELATED UNALLOCATED WMS WATER VOLUMES	5,440	5,466	5,492	5,518	5,544	5,570

COLORADO RIVER MWD | SUBORDINATION - CRMWD SYSTEM

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	10,389	6,421	7,822	13,382	19,145	25,351
RELATED UNALLOCATED WMS WATER VOLUMES	15,819	19,911	18,533	13,002	7,245	972
TOTAL MWP RELATED WMS SUPPLY	26,208	26,332	26,355	26,384	26,390	26,323

COLORADO RIVER MWD | SUBORDINATION - OH IVIE NON SYSTEM PORTION

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	1,082	1,077	1,173	1,263	1,376	1,562

COLORADO RIVER MWD | WARD COUNTY WELL FIELD EXPANSION AND DEVELOPMENT OF WINKLER COUNTY WELL FIELD - CRMWD

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
RELATED UNALLOCATED WMS WATER VOLUMES	0	0	0	22,400	22,400	22,400
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
CRMWD - WARD COUNTY WELL FIELD EXPANSION AND DEVELOPMENT OF WINKLER COUNTY WELL FIELD	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD					

COLORADO RIVER MWD | WARD COUNTY WELL FIELD WELL REPLACEMENT - CRMWD

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
RELATED UNALLOCATED WMS WATER VOLUMES	0	755	2,650	6,296	8,361	10,343
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
CRMWD - WARD COUNTY WELL REPLACEMENT	MULTIPLE WELLS/WELL FIELD					

MIDLAND | ADVANCED TREATMENT (RO) OF PAUL DAVIS WELL FIELD SUPPLIES - MIDLAND

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	0	5,899	6,101	6,235	6,327
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
ADVANCED TREATMENT (RO) OF PAUL DAVIS WELL FIELD SUPPLIES - MIDLAND	NEW WATER TREATMENT PLANT; PUMP STATION; CONVEYANCE/TRANSMISSION PIPELINE					

Region F Major Water Provider (MWP) Water Management Strategy (WMS) Summary

MIDLAND | MUNICIPAL CONSERVATION - MIDLAND						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	631	755	816	882	944	1,012

MIDLAND | SUBORDINATION - CRMWD SYSTEM						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	1,844	0	0	0	0	0

MIDLAND | SUBORDINATION - OH IVIE NON SYSTEM PORTION						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	329	359	391	421	453	483

MIDLAND | WEST TEXAS WATER PARTNERSHIP - MIDLAND						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	15,000	15,000	15,000	15,000	15,000
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
WEST TEXAS WATER PARTNERSHIP - MIDLAND	CONVEYANCE/TRANSMISSION PIPELINE					

ODESSA | MUNICIPAL CONSERVATION - ODESSA						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	568	680	752	829	905	990

ODESSA | SUBORDINATION - CRMWD SYSTEM						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	2,451	2	0	3,492	7,263	11,493
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
RO TREATMENT OF EXISTING SUPPLIES - ODESSA	NEW WATER TREATMENT PLANT					

SAN ANGELO | BRUSH CONTROL - SAN ANGELO						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	90	90	90	90	90	90

SAN ANGELO | CONCHO RIVER WATER PROJECT - SAN ANGELO						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	7,723	7,518	7,447	7,365	7,277	7,187
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	677	882	953	1,035	1,123	1,213
TOTAL MWP RELATED WMS SUPPLY	8,400	8,400	8,400	8,400	8,400	8,400
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
CONCHO RIVER WATER PROJECT - SAN ANGELO	CONVEYANCE/TRANSMISSION PIPELINE; WATER TREATMENT PLANT EXPANSION					

SAN ANGELO | HICKORY WELL FIELD EXPANSION IN MCCULLOCH COUNTY - SAN ANGELO	
	WATER VOLUMES (ACRE-FEET PER YEAR)

Region F Major Water Provider (MWP) Water Management Strategy (WMS) Summary

DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	1,040	3,040	3,040	3,040	3,040

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
HICKORY WELL FIELD EXPANSION IN MCCULLOCH COUNTY - SAN ANGELO	MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION

SAN ANGELO | MUNICIPAL CONSERVATION - SAN ANGELO

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	459	532	558	592	629	668

SAN ANGELO | SUBORDINATION - OH IVIE NON SYSTEM PORTION

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	329	359	391	421	453	483

SAN ANGELO | SUBORDINATION - SAN ANGELO SYSTEM

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	1,547	1,460	1,375	1,288	1,203	1,117
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	123	115	105	97	87	78
TOTAL MWP RELATED WMS SUPPLY	1,670	1,575	1,480	1,385	1,290	1,195

APPENDIX J
IMPLEMENTATION SURVEY

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Has Sponsor taken affirmative vote or actions?*	If yes, in what year did this occur?	If yes, by what date is the action on schedule for implementation?	At what level of implementation is the project currently?*	If not implemented, why?* (When "If other, please	What impediments presented to implementation?* (When "If other,	Current water supply project yield (ac-ft/yr)	Funds expended to date ($)	Project Cost ($)	Year the project is online?*	Is this a phased project?*	(Phased) Ultimate volume (ac-ft/yr)	(Phased) Ultimate project cost ($)	Year project reaches maximum capacity?*	What is the project funding source(s)?*	Funding Mechanism if Other?	Included in 2021 plan?*	Does the project or WMS involve reallocation of flood control?*	Does the project or WMS provide any measurable flood risk reduction?*
F	ADDITIONAL TREATMENT - MASON	2020	PROJECT SPONSOR(S): MASON	Yes	Unavailable	NA	Acquisition and design phase			700		838,000	2023	No	NA	NA	NA	TWDB - Other	NA	Yes	No	No
F	ADVANCED GROUNDWATER TREATMENT - BRADY	2020	PROJECT SPONSOR(S): BRADY	Yes	Unavailable	NA	Under construction	NA	NA	400		20,398,000	2023	No	NA	NA	NA	TWDB - Other	NA	Yes	No	No
F	BRUSH CONTROL - SAN ANGELO	2020	WMS SELLER: SAN ANGELO; WMS SUPPLY RECIPIENT: MANUFACTURING, TOM GREEN	No	NA	NA	Currently operating	Financing	Access to funding	NA	0	0	2020	No	NA	NA	NA	Other	TSSWCD	Yes	No	No
F	BRUSH CONTROL - SAN ANGELO	2020	WMS SELLER: UPPER COLORADO RIVER AUTHORITY; WMS SUPPLY RECIPIENT: COUNTY-OTHER, TOM GREEN	No	NA	NA	Currently operating	Financing	Access to funding	NA	0	0	2020	No	NA	NA	NA	Other	TSSWCD	Yes	No	No
F	BRUSH CONTROL - SAN ANGELO	2020	WMS SUPPLY RECIPIENT: SAN ANGELO	No	NA	NA	Currently operating	Financing	Access to funding	NA	0	0	2020	No	NA	NA	NA	Other	TSSWCD	Yes	No	No
F	DESALINATION OF OTHER AQUIFER SUPPLIES IN TOM GREEN COUNTY - CONCHO RURAL WSC	2020	PROJECT SPONSOR(S): CONCHO RURAL WATER CORPORATION	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	5,131,000		No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL DOCKUM AQUIFER SUPPLIES - HOWARD COUNTY LIVESTOCK	2020	PROJECT SPONSOR(S): LIVESTOCK (HOWARD)	No	NA	NA	NA	NA	NA	NA	NA	512,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL DOCKUM AQUIFER SUPPLIES - HOWARD COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (HOWARD)	No	NA	NA	NA	NA	NA	NA	NA	989,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL DOCKUM AQUIFER SUPPLIES - IRION COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (IRION)	No	NA	NA	NA	NA	NA	NA	NA	782,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL DOCKUM AQUIFER SUPPLIES - MARTIN COUNTY LIVESTOCK	2020	PROJECT SPONSOR(S): LIVESTOCK (MARTIN)	No	NA	NA	NA	NA	NA	NA	NA	339,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL DOCKUM AQUIFER SUPPLIES - MARTIN COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (MARTIN)	No	NA	NA	NA	NA	NA	NA	NA	677,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL DOCKUM AQUIFER SUPPLIES - MARTIN COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (MARTIN)	No	NA	NA	Not implemented	NA	NA	NA	NA	4,219,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - ANDREWS COUNTY LIVESTOCK	2020	PROJECT SPONSOR(S): LIVESTOCK (ANDREWS)	No	NA	NA	NA	NA	NA	NA	NA	238,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - ANDREWS COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (ANDREWS)	No	NA	NA	Not implemented	NA	NA	NA	NA	3,515,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - COKE COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (COKE)	No	NA	NA	NA	NA	NA	NA	NA	678,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - CROCKETT COUNTY SEP	2020	WMS SUPPLY RECIPIENT: STEAM ELECTRIC POWER, CROCKETT	No	NA	NA	Not implemented	NA			0	0		NA	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - IRION COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (IRION)	No	NA	NA	NA	NA	NA	NA	NA	2,057,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - JUNCTION	2020	PROJECT SPONSOR(S): JUNCTION	No	NA	NA	NA	NA	NA	NA	NA	3,555,000	NA	NA	NA	NA	NA	NA	NA	Yes	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - KIMBLE COUNTY MANUFACTURING	2020	PROJECT SPONSOR(S): MANUFACTURING (KIMBLE)	No	NA	NA	NA	NA	NA	NA	NA	305,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - MARTIN COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (MARTIN)	No	NA	NA	NA	NA	NA	NA	NA	2,356,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - MCCULLOCH COUNTY LIVESTOCK	2020	PROJECT SPONSOR(S): LIVESTOCK (MCCULLOCH)	No	NA	NA	NA	NA	NA	NA	NA	62,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL HICKORY AQUIFER SUPPLIES - COLEMAN COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (COLEMAN)	No	NA	NA	NA	NA	NA	NA	NA	814,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL HICKORY AQUIFER SUPPLIES - CONCHO COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (CONCHO)	No	NA	NA	NA	NA	NA	NA	NA	1,626,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP ADDITIONAL HICKORY AQUIFER SUPPLIES - MENARD	2020	PROJECT SPONSOR(S): MENARD	Yes	2020		Acquisition and design phase	NA	NA	200	Unavailable	6,120,000	2023	No	NA	NA	NA	TWDB - Other	NA	Yes	No	No
F	DEVELOP ADDITIONAL OGALLALA AQUIFER SUPPLIES - HOWARD COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (HOWARD)	No	NA	NA	NA	NA	NA	NA	NA	127,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP EDWARDS-TRINITY AQUIFER SUPPLIES IN NOLAN COUNTY - BRONTE	2020	PROJECT SPONSOR(S): BRONTE	No	NA	NA	Not implemented	Too soon	NA	NA	NA	7,350,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	DEVELOP EDWARDS-TRINITY PLATEAU AQUIFER SUPPLIES - PECOS COUNTY WCID #1	2020	PROJECT SPONSOR(S): PECOS COUNTY WCID #1	Yes	2020	unavailable	Feasibility study ongoing	Too soon	NA	NA	NA	2,456,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	DEVELOP LOCAL ALLUVIUM AQUIFER SUPPLIES - SCURRY COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (SCURRY)	No	NA	NA	NA	NA	NA	NA	NA	140,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP OTHER AQUIFER SUPPLIES - RUNNELS COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (RUNNELS)	No	NA	NA	NA	NA	NA	NA	NA	140,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - ANDREWS COUNTY LIVESTOCK	2020	PROJECT SPONSOR(S): LIVESTOCK (ANDREWS)	No	NA	NA	NA	NA	NA	NA	NA	68,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - WARD COUNTY STEAM ELECTRIC POWER	2020	PROJECT SPONSOR(S): STEAM ELECTRIC POWER (WARD)	No	NA	NA	NA	NA	NA	NA	NA	2,682,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - WINKLER COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (WINKLER)	No	NA	NA	Not implemented	NA	NA	NA	NA	1,908,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DIRECT AND/OR INDIRECT REUSE FOR MUNICIPAL USE - SAN ANGELO	2020	PROJECT SPONSOR(S): SAN ANGELO									150,000,000		No	NA	NA	NA	NA	NA	Yes	No	No
F	DIRECT NON-POTABLE REUSE FOR GOLF COURSE IRRIGATION (TYPE I) - EDEN	2020	PROJECT SPONSOR(S): EDEN	Yes	Unavailable	NA	Currently operating	NA	NA	25	Unavailable	485,700	2020	No	NA	NA	NA	NA	NA	No	No	No
F	DIRECT NON-POTABLE REUSE FOR IRRIGATION OF CITY FARMS (TYPE I) - MENARD	2020	PROJECT SPONSOR(S): MENARD	No	NA	NA	Not implemented	NA	NA	NA	NA	1,288,800	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	DIRECT NON-POTABLE REUSE FOR IRRIGATION OF INDUSTRIAL AND MUNICIPAL PARKS (TYPE I) - SONORA	2020	PROJECT SPONSOR(S): SONORA	No	NA	NA	Not implemented	If other, please	No longer considere	NA	NA	495,800	NA	NA	NA	NA	NA	NA	NA	No	No	No
F	DIRECT NON-POTABLE REUSE FOR PUBLIC PARKS IRRIGATION (TYPE I) - BANGS	2020	PROJECT SPONSOR(S): BANGS	No	NA	NA	Not implemented	NA	NA	NA	NA	422,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	DIRECT NON-POTABLE REUSE FOR SALES FROM COLORADO CITY (TYPE II) - MITCHELL COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (MITCHELL)	No	NA	NA	NA	NA	NA	NA	NA	932,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DIRECT NON-POTABLE REUSE WATER FROM CITY OF MIDLAND - ANDREWS COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (ANDREWS)	Yes			Under construction	NA	NA	NA	NA	28,197,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DIRECT NON-POTABLE REUSE WATER FROM CITY OF MIDLAND - MARTIN COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (MARTIN)	Yes			Under construction	NA	NA	NA	NA	17,827,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DIRECT NON-POTABLE REUSE WATER FROM CITY OF MIDLAND - MIDLAND COUNTY MINING	2020	PROJECT SPONSOR(S): MINING (MIDLAND)	Yes			Under construction	NA	NA	11200	NA	3,349,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	DIRECT POTABLE REUSE - BROWNWOOD	2020	PROJECT SPONSOR(S): BROWNWOOD	No	NA	NA	Not implemented	If other, please	No longer considere	NA	NA	8,500,000	NA	NA	NA	NA	NA	NA	NA	No	No	No
F	DIRECT POTABLE REUSE - WINTERS	2020	PROJECT SPONSOR(S): WINTERS	No	NA	NA	Not implemented	If other, please	No longer considere	NA	NA	3,354,000	NA	NA	NA	NA	NA	NA	NA	No	No	No
F	DREDGE RIVER INTAKE - JUNCTION	2020	PROJECT SPONSOR(S): JUNCTION	No	NA	NA	Not implemented	Financing		412	NA	4,268,000		No	NA	NA	NA	NA	NA	Yes	No	No
F	DROUGHT MANAGEMENT	2020	WUG REDUCING DEMAND: RICHLAND SUD	No	NA	NA	Not implemented	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F	HICKORY WELL FIELD EXPANSION IN MCCULLOCH COUNTY - SAN ANGELO	2020	PROJECT SPONSOR(S): SAN ANGELO	Yes			Currently operating	NA		8960	Unavailable	27,104,000	2023	Yes	12000	NA	2030	TWDB - SWIFT		Yes	No	No
F	IRRIGATION CONSERVATION - ANDREWS COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (ANDREWS)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	2,442,635	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - BORDEN COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (BORDEN)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	259,545	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - BROWN COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (BROWN)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	488,956	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - COKE COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (COKE)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	75,036	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Has Sponsor taken affirmative vote or actions?*	If yes, in what year did this occur?	If yes, by what date is the action on schedule for implementation?	At what level of implementation is the project currently?*	If not implemented, why?* (When "If other, please	What impediments presented to implementation?* (When "If other,	Current water supply project yield (ac-ft/yr)	Funds expended to date ($)	Project Cost ($)	Year the project is online?*	Is this a phased project?*	(Phased) Ultimate volume (ac-ft/yr)	(Phased) Ultimate project cost ($)	Year project reaches maximum capacity?*	What is the project funding source(s)?*	Funding Mechanism if Other?	Included in 2021 plan?*	Does the project or WMS involve reallocation of flood control?*	Does the project or WMS provide any measurable flood risk reduction?*
F	IRRIGATION CONSERVATION - COLEMAN COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (COLEMAN)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	50,050	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - CONCHO COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (CONCHO)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	690,261	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - CROCKETT COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (CROCKETT)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	44,948	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - ECTOR COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (ECTOR)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	136,208	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - GLASSCOCK COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (GLASSCOCK)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	1,474,382	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - HOWARD COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (HOWARD)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	469,541	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - IRION COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (IRION)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	136,695	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - KIMBLE COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (KIMBLE)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	212,004	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - MARTIN COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (MARTIN)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	3,415,035	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - MASON COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (MASON)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	785,265	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - MCCULLOCH COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (MCCULLOCH)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	340,568	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - MENARD COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (MENARD)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	245,115	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - MIDLAND COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (MIDLAND)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	3,193,710	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - MITCHELL COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (MITCHELL)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	149,747	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - PECOS COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (PECOS)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	12,287,243	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - REAGAN COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (REAGAN)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	1,802,385	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - REEVES COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (REEVES)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	8,755,013	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - RUNNELS COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (RUNNELS)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	309,894	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - SCHLEICHER COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (SCHLEICHER)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	54,015	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - SCURRY COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (SCURRY)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	575,107	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - STERLING COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (STERLING)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	87,848	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - SUTTON COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (SUTTON)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	168,968	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - TOM GREEN COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (TOM GREEN)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	7,263,438	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - UPTON COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (UPTON)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	897,195	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - WARD COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (WARD)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	533,618	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	IRRIGATION CONSERVATION - WINKLER COUNTY	2020	PROJECT SPONSOR(S): IRRIGATION (WINKLER)	No	NA	NA	Currently operating	NA	NA	Varies	Vaires	478,920	2020	No	NA	NA	NA	Other	Vaires by User	Yes	No	No
F	MINING CONSERVATION - ANDREWS COUNTY	2020	PROJECT SPONSOR(S): MINING (ANDREWS)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	5,540,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - BORDEN COUNTY	2020	PROJECT SPONSOR(S): MINING (BORDEN)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,300,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - BROWN COUNTY	2020	PROJECT SPONSOR(S): MINING (BROWN)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,340,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - COKE COUNTY	2020	PROJECT SPONSOR(S): MINING (COKE)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	680,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - COLEMAN COUNTY	2020	PROJECT SPONSOR(S): MINING (COLEMAN)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	160,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - CONCHO COUNTY	2020	PROJECT SPONSOR(S): MINING (CONCHO)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	680,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - CRANE COUNTY	2020	PROJECT SPONSOR(S): MINING (CRANE)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,200,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - CROCKETT COUNTY	2020	PROJECT SPONSOR(S): MINING (CROCKETT)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	2,580,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - ECTOR COUNTY	2020	PROJECT SPONSOR(S): MINING (ECTOR)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	3,020,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - GLASSCOCK COUNTY	2020	PROJECT SPONSOR(S): MINING (GLASSCOCK)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	4,800,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - HOWARD COUNTY	2020	PROJECT SPONSOR(S): MINING (HOWARD)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	3,840,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - IRION COUNTY	2020	PROJECT SPONSOR(S): MINING (IRION)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	4,700,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - KIMBLE COUNTY	2020	PROJECT SPONSOR(S): MINING (KIMBLE)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	20,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - LOVING COUNTY	2020	PROJECT SPONSOR(S): MINING (LOVING)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,480,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - MARTIN COUNTY	2020	PROJECT SPONSOR(S): MINING (MARTIN)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	4,940,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - MASON COUNTY	2020	PROJECT SPONSOR(S): MINING (MASON)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,440,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - MCCULLOCH COUNTY	2020	PROJECT SPONSOR(S): MINING (MCCULLOCH)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	12,500,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - MENARD COUNTY	2020	PROJECT SPONSOR(S): MINING (MENARD)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,520,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - MIDLAND COUNTY	2020	PROJECT SPONSOR(S): MINING (MIDLAND)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	5,460,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - MITCHELL COUNTY	2020	PROJECT SPONSOR(S): MINING (MITCHELL)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,040,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - PECOS COUNTY	2020	PROJECT SPONSOR(S): MINING (PECOS)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,500,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - REAGAN COUNTY	2020	PROJECT SPONSOR(S): MINING (REAGAN)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	5,900,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - REEVES COUNTY	2020	PROJECT SPONSOR(S): MINING (REEVES)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	3,680,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - RUNNELS COUNTY	2020	PROJECT SPONSOR(S): MINING (RUNNELS)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	380,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - SCHLEICHER COUNTY	2020	PROJECT SPONSOR(S): MINING (SCHLEICHER)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,020,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - SCURRY COUNTY	2020	PROJECT SPONSOR(S): MINING (SCURRY)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	680,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - STERLING COUNTY	2020	PROJECT SPONSOR(S): MINING (STERLING)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,340,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - SUTTON COUNTY	2020	PROJECT SPONSOR(S): MINING (SUTTON)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,060,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - TOM GREEN COUNTY	2020	PROJECT SPONSOR(S): MINING (TOM GREEN)	No	NA	NA	NA	NA	NA	Not measured	Unavailable	1,620,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - UPTON COUNTY	2020	PROJECT SPONSOR(S): MINING (UPTON)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	5,940,000	2020	No	NA	NA	NA	Other	Private	Yes	No	No
F	MINING CONSERVATION - WARD COUNTY	2020	PROJECT SPONSOR(S): MINING (WARD)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	1,340,000		No	NA	NA	NA	NA	NA	Yes	No	No
F	MINING CONSERVATION - WINKLER COUNTY	2020	PROJECT SPONSOR(S): MINING (WINKLER)	No	NA	NA	Currently operating	NA	NA	Not measured	Unavailable	1,640,000		No	NA	NA	NA	NA	NA	Yes	No	No
F	MUNICIPAL CONSERVATION - ANDREWS	2020	WUG REDUCING DEMAND: ANDREWS	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BALLINGER	2020	WUG REDUCING DEMAND: BALLINGER	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BANGS	2020	WUG REDUCING DEMAND: BANGS	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BIG LAKE	2020	WUG REDUCING DEMAND: BIG LAKE	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BIG SPRING	2020	WUG REDUCING DEMAND: BIG SPRING	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BORDEN COUNTY OTHER	2020	WUG REDUCING DEMAND: COUNTY-OTHER, BORDEN	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Has Sponsor taken affirmative vote or actions?*	If yes, in what year did this occur?	If yes, by what date is the action on schedule for implementation?	At what level of implementation is the project currently?*	If not implemented, why?* (When "If other, please	What impediments presented to implementation?* (When "If other,	Current water supply project yield (ac-ft/yr)	Funds expended to date ($)	Project Cost ($)	Year the project is online?*	Is this a phased project?*	(Phased) Ultimate volume (ac-ft/yr)	(Phased) Ultimate project cost ($)	Year project reaches maximum capacity?*	What is the project funding source(s)?*	Funding Mechanism if Other?	Included in 2021 plan?*	Does the project or WMS involve reallocation of flood control?*	Does the project or WMS provide any measurable flood risk reduction?*
F	MUNICIPAL CONSERVATION - BRADY	2020	WUG REDUCING DEMAND: BRADY	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BRONTE	2020	WUG REDUCING DEMAND: BRONTE	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BROOKESMITH SUD	2020	WUG REDUCING DEMAND: BROOKESMITH SUD	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - BROWNWOOD	2020	WUG REDUCING DEMAND: BROWNWOOD	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - COAHOMA	2020	WUG REDUCING DEMAND: COAHOMA	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - COLEMAN	2020	WUG REDUCING DEMAND: COLEMAN	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - COLEMAN COUNTY SUD	2020	WUG REDUCING DEMAND: COLEMAN COUNTY SUD	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - COLORADO CITY	2020	WUG REDUCING DEMAND: COLORADO CITY	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - CONCHO RURAL WSC	2020	CORPORATION	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - CRANE	2020	WUG REDUCING DEMAND: CRANE	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - CROCKETT COUNTY WCID	2020	WUG REDUCING DEMAND: CROCKETT COUNTY WCID #1	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - EARLY	2020	WUG REDUCING DEMAND: EARLY	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - ECTOR COUNTY UD	2020	WUG REDUCING DEMAND: ECTOR COUNTY UD	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - EDEN	2020	WUG REDUCING DEMAND: EDEN	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - EL DORADO	2020	WUG REDUCING DEMAND: ELDORADO	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - FORT STOCKTON	2020	WUG REDUCING DEMAND: FORT STOCKTON	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - GREATER GARDENDALE WSC	2020	WUG REDUCING DEMAND: GREATER GARDENDALE WSC	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - IRAAN	2020	WUG REDUCING DEMAND: IRAAN	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - JUNCTION	2020	WUG REDUCING DEMAND: JUNCTION	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - KERMIT	2020	WUG REDUCING DEMAND: KERMIT	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - LORAINE	2020	WUG REDUCING DEMAND: LORAINE	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MADERA VALLEY WSC	2020	WUG REDUCING DEMAND: MADERA VALLEY WSC	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MASON	2020	WUG REDUCING DEMAND: MASON	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MCCAMEY	2020	WUG REDUCING DEMAND: MCCAMEY	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MCCULLOCH COUNTY OTHER	2020	WUG REDUCING DEMAND: COUNTY-OTHER, MCCULLOCH	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MENARD	2020	WUG REDUCING DEMAND: MENARD	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MERTZON	2020	WUG REDUCING DEMAND: MERTZON	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MIDLAND	2020	WUG REDUCING DEMAND: MIDLAND	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MIDLAND COUNTY OTHER	2020	WUG REDUCING DEMAND: COUNTY-OTHER, MIDLAND	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MILES	2020	WUG REDUCING DEMAND: MILES	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MILLERSVIEW-DOOLE WSC	2020	WUG REDUCING DEMAND: MILLERSVIEW-DOOLE WSC	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MITCHELL COUNTY OTHER	2020	WUG REDUCING DEMAND: COUNTY-OTHER, MITCHELL	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - MONAHANS	2020	WUG REDUCING DEMAND: MONAHANS	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - ODESSA	2020	WUG REDUCING DEMAND: ODESSA	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - PECOS	2020	WUG REDUCING DEMAND: PECOS	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - PECOS WCID	2020	WUG REDUCING DEMAND: PECOS COUNTY WCID #1	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - RANKIN	2020	WUG REDUCING DEMAND: RANKIN	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - REEVES COUNTY OTHER	2020	WUG REDUCING DEMAND: COUNTY-OTHER, REEVES	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - RICHLAND SUD	2020	WUG REDUCING DEMAND: RICHLAND SUD	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - ROBERT LEE	2020	WUG REDUCING DEMAND: ROBERT LEE	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - SAN ANGELO	2020	WUG REDUCING DEMAND: SAN ANGELO	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - SANTA ANNA	2020	WUG REDUCING DEMAND: SANTA ANNA	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - SNYDER	2020	WUG REDUCING DEMAND: SNYDER	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - SONORA	2020	WUG REDUCING DEMAND: SONORA	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - STANTON	2020	WUG REDUCING DEMAND: STANTON	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - STERLING CITY	2020	WUG REDUCING DEMAND: STERLING CITY	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - WARD COUNTY OTHER	2020	WUG REDUCING DEMAND: COUNTY-OTHER, WARD	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - WINK	2020	WUG REDUCING DEMAND: WINK	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - WINKLER COUNTY OTHER	2020	WUG REDUCING DEMAND: COUNTY-OTHER, WINKLER	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - WINTERS	2020	WUG REDUCING DEMAND: WINTERS	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	MUNICIPAL CONSERVATION - ZEPHYR WSC	2020	WUG REDUCING DEMAND: ZEPHYR WSC	Yes	On-going	On-going	Currently operating	NA	NA	Not measured	0	0	2020	Yes	NA	NA	2070	Other	Budgets	Yes	No	No
F	NEW GROUNDWATER FROM LOCAL ALLUVIUM AQUIFER - SCURRY COUNTY LIVESTOCK	2020	PROJECT SPONSOR(S): LIVESTOCK (SCURRY)	No	NA	NA	NA	NA	NA	NA	NA	143,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	REHABILITATION OF OAK CREEK PIPELINE - BRONTE	2020	PROJECT SPONSOR(S): BRONTE	No	NA	NA	Not implemented	Too soon	NA	NA	NA	1,499,000	2023	No	NA	NA	NA	NA	NA	Yes	No	No
F	REUSE - MINING, CROCKETT - SALES FROM CROCKETT WCID #1	2020	WMS SELLER: CROCKETT COUNTY WCID #1; WMS SUPPLY RECIPIENT: MINING, CROCKETT	No	NA	NA	Not implemented	NA			0	0		NA	NA	NA	NA	NA	NA	No	No	No
F	RO TREATMENT OF EXISTING SUPPLIES - ODESSA	2020	PROJECT SPONSOR(S): ODESSA	Yes			Permit application submitted/per	Too soon	NA	NA	NA	62,309,000	2023	No	NA	NA	NA	NA	NA	Yes	No	No
F	TECHNOLOGY	2020	WUG REDUCING DEMAND: STEAM ELECTRIC POWER, WARD	No	NA	NA	Not implemented	If other, please	not planning to implement		0	0		No	NA	NA	NA	NA	NA	No	No	No
F	STEAM ELECTRIC POWER CONSERVATION - COKE COUNTY SEP	2020	PROJECT SPONSOR(S): STEAM ELECTRIC POWER (COKE)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	50,490,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	STEAM ELECTRIC POWER CONSERVATION - ECTOR COUNTY SEP	2020	PROJECT SPONSOR(S): STEAM ELECTRIC POWER (ECTOR)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	56,090,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	STEAM ELECTRIC POWER CONSERVATION - MITCHELL COUNTY SEP	2020	PROJECT SPONSOR(S): STEAM ELECTRIC POWER (MITCHELL)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	16,830,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	SUBORDINATION - BALLINGER/MOONEN LAKE	2020	WMS SELLER: BALLINGER; WMS SUPPLY RECIPIENT: COUNTY-OTHER, RUNNELS	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - BALLINGER/MOONEN LAKE	2020	WMS SELLER: BALLINGER; WMS SUPPLY RECIPIENT: MANUFACTURING, RUNNELS	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - BALLINGER/MOONEN LAKE	2020	WMS SUPPLY RECIPIENT: BALLINGER	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - BRADY CREEK RESERVOIR	2020	WMS SUPPLY RECIPIENT: BRADY	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD BRACKISH WATER SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: MINING, COKE	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD BRACKISH WATER SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: MINING, HOWARD	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: BIG SPRING; WMS SUPPLY RECIPIENT: COAHOMA	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: BIG SPRING; WMS SUPPLY RECIPIENT: MANUFACTURING, HOWARD	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: COUNTY-OTHER, WARD	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: IRRIGATION, ECTOR	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: MIDLAND	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: MILLERSVIEW-DOOLE WSC	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Has Sponsor taken affirmative vote or actions?*	If yes, in what year did this occur?	If yes, by what date is the action on schedule for implementation?	At what level of implementation is the project currently?*	If not implemented, why?* (When "If other, please	What impediments presented to implementation?* (When "If other,	Current water supply project yield (ac-ft/yr)	Funds expended to date ($)	Project Cost ($)	Year the project is online?*	Is this a phased project?*	(Phased) Ultimate volume (ac-ft/yr)	(Phased) Ultimate project cost ($)	Year project reaches maximum capacity?*	What is the project funding source(s)?*	Funding Mechanism if Other?	Included in 2021 plan?*	Does the project or WMS involve reallocation of flood control?*	Does the project or WMS provide any measurable flood risk reduction?*
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: SNYDER	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: COLORADO RIVER MWD; WMS SUPPLY RECIPIENT: STANTON	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: MILLERSVIEW-DOOLE WSC; WMS SUPPLY RECIPIENT: BALLINGER	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: ODESSA; WMS SUPPLY RECIPIENT: COUNTY-OTHER, ECTOR	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: ODESSA; WMS SUPPLY RECIPIENT: ECTOR COUNTY UD	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: ODESSA; WMS SUPPLY RECIPIENT: MANUFACTURING, ECTOR	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - CRMWD SYSTEM	2020	WMS SELLER: SNYDER; WMS SUPPLY RECIPIENT: COUNTY-OTHER, SCURRY	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - HORDS CREEK LAKE	2020	WMS SUPPLY RECIPIENT: COLEMAN	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - LAKE COLEMAN	2020	WMS SELLER: COLEMAN; WMS SUPPLY RECIPIENT: COLEMAN COUNTY SUD	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - LAKE COLEMAN	2020	WMS SELLER: COLEMAN; WMS SUPPLY RECIPIENT: COUNTY-OTHER, COLEMAN	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - LAKE COLEMAN	2020	WMS SELLER: COLEMAN; WMS SUPPLY RECIPIENT: MANUFACTURING, COLEMAN	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - LAKE COLEMAN	2020	WMS SUPPLY RECIPIENT: COLEMAN	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - LAKE COLEMAN	2020	WMS SUPPLY RECIPIENT: IRRIGATION, COLEMAN	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - LAKE COLORADO CITY AND CHAMPION LAKE SYSTEM	2020	WMS SUPPLY RECIPIENT: STEAM ELECTRIC POWER, MITCHELL	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - SAN ANGELO SYSTEM	2020	WMS SELLER: SAN ANGELO; WMS SUPPLY RECIPIENT: MANUFACTURING, TOM GREEN	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - SAN ANGELO SYSTEM	2020	WMS SELLER: UPPER COLORADO RIVER AUTHORITY; WMS SUPPLY RECIPIENT: MILES	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - SAN ANGELO SYSTEM	2020	WMS SUPPLY RECIPIENT: SAN ANGELO	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - WINTERS LAKE	2020	WMS SELLER: WINTERS; WMS SUPPLY RECIPIENT: COUNTY-OTHER, RUNNELS	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - WINTERS LAKE	2020	WMS SELLER: WINTERS; WMS SUPPLY RECIPIENT: MANUFACTURING, RUNNELS	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	SUBORDINATION - WINTERS LAKE	2020	WMS SUPPLY RECIPIENT: WINTERS	No	NA	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	2020	NA	NA	Yes	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - BALLINGER	2020	PROJECT SPONSOR(S): BALLINGER	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	47,093,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - COKE COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (COKE)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	11,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - HOWARD COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (HOWARD)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	1,833,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - MARTIN COUNTY MANUFACTURING	2020	PROJECT SPONSOR(S): MANUFACTURING (MARTIN)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	14,500	NA	No	NA	NA	NA	NA	NA	No	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - MCCULLOCH COUNTY MANUFACTURING	2020	PROJECT SPONSOR(S): MANUFACTURING (MCCULLOCH)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	142,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - MCCULLOCH COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (MCCULLOCH)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	347,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - SCURRY COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (SCURRY)	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	75,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - UCRA	2020	PROJECT SPONSOR(S): UPPER COLORADO RIVER AUTHORITY	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	32,233,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	VOLUNTARY TRANSFER (PURCHASE) - WINTERS	2020	PROJECT SPONSOR(S): WINTERS	No	NA	NA	Not implemented	If other, please	Not applicable	NA	NA	696,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	WARD COUNTY WELL FIELD EXPANSION AND DEVELOPMENT OF WINKLER COUNTY WELL FIELD - CRMWD	2020	PROJECT SPONSOR(S): COLORADO RIVER MWD	Yes			Sponsor has taken official action t	Too soon	NA	NA	NA	139,916,000		No	NA	NA	NA	NA	NA	Yes	No	No
F	WATER AUDITS AND LEAK - BALLINGER	2020	PROJECT SPONSOR(S): BALLINGER	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	2,669,400	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - BIG LAKE	2020	PROJECT SPONSOR(S): BIG LAKE	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	2,708,800	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - BORDEN COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (BORDEN)	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	701,400	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - BRONTE	2020	PROJECT SPONSOR(S): BRONTE	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	900,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - COAHOMA	2020	PROJECT SPONSOR(S): COAHOMA	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	848,000	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - EL DORADO	2020	PROJECT SPONSOR(S): ELDORADO	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	1,471,200	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - JUNCTION	2020	PROJECT SPONSOR(S): JUNCTION	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	1,891,700	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - MADERA VALLEY WSC	2020	PROJECT SPONSOR(S): MADERA VALLEY WSC	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	1,673,300	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - MASON	2020	PROJECT SPONSOR(S): MASON	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	1,568,400	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - MCCAMEY	2020	PROJECT SPONSOR(S): MCCAMEY	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	1,698,600	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - MENARD	2020	PROJECT SPONSOR(S): MENARD	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	1,183,200	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - MITCHELL COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (MITCHELL)	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	3,361,800	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - PECOS	2020	PROJECT SPONSOR(S): PECOS	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	6,834,400	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - RANKIN	2020	PROJECT SPONSOR(S): RANKIN	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	876,900	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - SONORA	2020	PROJECT SPONSOR(S): SONORA	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	2,486,600	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	WATER AUDITS AND LEAK - WARD COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (WARD)	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	2,946,700	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER AUDITS AND LEAK - WINKLER COUNTY OTHER	2020	PROJECT SPONSOR(S): COUNTY-OTHER (WINKLER)	No	NA	NA	Not implemented	If other, please	Not applicable	Varies	NA	1,787,400	NA	No	NA	NA	NA	NA	NA	No	No	No
F	WATER TREATMENT PLANT EXPANSION - BIG SPRING	2020	PROJECT SPONSOR(S): BIG SPRING	Yes		2023	Sponsor has taken official action t	NA	NA	11200	NA	16,930,000	2023	No	NA	NA	NA	NA	NA	Yes	No	No
F	WATER TREATMENT PLANT EXPANSION - BRONTE	2020	PROJECT SPONSOR(S): BRONTE	No	NA	NA	NA	NA	NA	NA	NA	6,768,000	2023	No	NA	NA	NA	NA	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, CROCKETT	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, IRION	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, PECOS	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, REAGAN	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, REEVES	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, SCHLEICHER	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, STERLING	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, SUTTON	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, TOM GREEN	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	WEATHER MODIFICATION	2020	WMS SUPPLY RECIPIENT: IRRIGATION, WARD	Yes	On-going	On-going	Currently operating	NA	NA	Varies	0	0	2020	No	NA	NA	NA	Other	NA	Yes	No	No
F	ABILENE REDUCTION FOR WEST TEXAS WATER PARTNERSHIP	2030	WMS SELLER: ABILENE; WMS SUPPLY RECIPIENT: MIDLAND	No	NA	NA	Not implemented	If other, please	No longer considere	NA	0	0	NA	No	NA	NA	NA	NA	NA	No	No	No
F	ABILENE REDUCTION FOR WEST TEXAS WATER PARTNERSHIP	2030	WMS SELLER: ABILENE; WMS SUPPLY RECIPIENT: SAN ANGELO	No	NA	NA	Not implemented	If other, please	No longer considere	NA	0	0	NA	No	NA	NA	NA	NA	NA	No	No	No
F	ABILENE REDUCTION FOR WEST TEXAS WATER PARTNERSHIP	2030	WMS SELLER: SAN ANGELO; WMS SUPPLY RECIPIENT: MANUFACTURING, TOM GREEN	No	NA	NA	Not implemented	If other, please	No longer considere	NA	0	0	NA	No	NA	NA	NA	NA	NA	No	No	No
F	ABILENE REDUCTION FOR WEST TEXAS WATER PARTNERSHIP	2030	WMS SELLER: UPPER COLORADO RIVER AUTHORITY; WMS SUPPLY RECIPIENT: COUNTY-OTHER, TOM GREEN	No	NA	NA	Not implemented	If other, please	No longer considere	NA	0	0	NA	No	NA	NA	NA	NA	NA	No	No	No
F	ADDITIONAL T-BAR RANCH SUPPLIES WITH TREATMENT - MIDLAND	2030	PROJECT SPONSOR(S): MIDLAND	No	NA	NA	Not implemented	If other, please	No longer considere	NA	NA	52,199,000	NA	NA	NA	NA	NA	NA	NA	No	No	No

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Has Sponsor taken affirmative vote or actions?*	If yes, in what year did this occur?	If yes, by what date is the action on schedule for implementation?	At what level of implementation is the project currently?*	If not implemented, why?* (When "If other, please	What impediments presented to implementation?* (When "If other,	Current water supply project yield (ac-ft/yr)	Funds expended to date ($)	Project Cost ($)	Year the project is online?*	Is this a phased project?*	(Phased) Ultimate volume (ac-ft/yr)	(Phased) Ultimate project cost ($)	Year project reaches maximum capacity?*	What is the project funding source(s)?*	Funding Mechanism if Other?	Included in 2021 plan?*	Does the project or WMS involve reallocation of flood control?*	Does the project or WMS provide any measurable flood risk reduction?*
F	ASR OF EXISTING SURFACE WATER SUPPLIES IN WARD COUNTY WELL FIELD - CRMWD	2030	PROJECT SPONSOR(S): COLORADO RIVER MWD	No	NA	NA	Not implemented	If other, please	No longer considere	NA	NA	10,184,000	NA	NA	NA	NA	NA	NA	NA	No	No	No
F	DEVELOP PECOS VALLEY AQUIFER SUPPLIES - MIDLAND COUNTY OTHER	2030	PROJECT SPONSOR(S): COUNTY-OTHER (MIDLAND)	Yes	NA	NA	Sponsor has taken official action t	NA	NA	2500	NA	62,699,000	NA	No	NA	NA	NA	NA	NA	Yes	No	No
F	WEST TEXAS WATER PARTNERSHIP - MIDLAND	2030	PROJECT SPONSOR(S): MIDLAND	No	NA	NA	Feasibility study ongoing	NA	NA	NA	NA	26,116,800	NA	NA	NA	NA	NA	NA	NA	Yes	No	No
F	WEST TEXAS WATER PARTNERSHIP - SAN ANGELO	2030	PROJECT SPONSOR(S): SAN ANGELO	No	NA	NA	Feasibility study ongoing	NA	NA	NA	NA	39,175,200	NA	NA	NA	NA	NA	NA	NA	Yes	No	No
F	DESALINATION OF BRACKISH SURFACE WATER (CRMWD DIVERTED WATER SYSTEM) - CRMWD	2040	PROJECT SPONSOR(S): COLORADO RIVER MWD	No	NA	NA	Not implemented	If other, please	No longer considere	NA	NA	34,819,000	NA	NA	NA	NA	NA	NA	NA	No	No	No
F	DESALINATION OF OTHER AQUIFER SUPPLIES IN TOM GREEN COUNTY - SAN ANGELO	2050	PROJECT SPONSOR(S): SAN ANGELO	No	NA	NA	Not implemented	If other, please	No longer considere	NA	NA	57,967,000	NA	NA	NA	NA	NA	NA	NA	No	No	No