

Section 6
Water Conservation and Drought Management Recommendations
[31 TAC § 357.7(a)(11)]

6.1 Water Conservation

The South Central Texas Regional Water Planning Group (SCTRWPG) strongly supports water conservation, and for the 2011 Regional Water Plan has recommended municipal, irrigation, and mining water conservation water management strategies. Water conservation strategies in the industrial and steam-electric power generation use categories are encouraged as well. Each of the water conservation water management strategies is described briefly below.

Municipal Water Conservation: The South Central Texas Regional Water Planning Group established municipal water conservation goals, as follows:

- For municipal water user groups (WUGs) with water use of 140 gpcd and greater, reduction of per capita water use by 1 percent per year until the level of 140 gpcd is reached, after which, the rate of reduction of per capita water use is one-fourth percent (0.25 percent) per year for the remainder of the planning period; and
- For municipal WUGs having year 2000 water use of less than 140 gpcd, reduction of per capita water use by one-fourth percent per year.

The municipal water conservation water management strategy included in the 2006 and 2011 Regional Water Plans is based upon water conservation Best Management Practices (BMPs) for municipal water users, as included in the Water Conservation Implementation Task Force November 2004 Report to the 79th Texas Legislature. The list of Municipal Water Conservation BMPs is as follows:

1. System Water Audit and Water Loss;
2. Water Conservation Pricing;
3. Prohibition on Wasting Water;
4. Showerhead, Aerator, and Toilet Flapper Retrofit;
5. Residential Ultra-Low Flow Toilet Replacement Programs;
6. Residential Clothes Washer Incentive Program;
7. School Education;
8. Water Survey for Single-Family and Multi-Family Customers;
9. Landscape Irrigation Conservation and Incentives;
10. Water-Wise Landscape Design and Conversion Programs;
11. Athletic Field Conservation;
12. Golf Course Conservation;
13. Metering of all New Connections and Retrofitting of Existing Connections;

14. Wholesale Agency Assistance Programs;
15. Conservation Coordinator;
16. Reuse of Reclaimed Water;
17. Public Information;
18. Rainwater Harvesting and Condensate Reuse;
19. New Construction Graywater;
20. Park Conservation; and
21. Conservation Programs for Industrial, Commercial, and Institutional Accounts.

The SCTRWPG acknowledges and supports the creation and activities of the Water Conservation Advisory Council created by House Bill 4 and Senate Bill 3 of the 80th Texas Legislature. In addition, the SCTRWPG acknowledges and supports the implementation of House Bill 2667 of the 81st Texas Legislature relating to performance standards for plumbing fixtures sold in Texas.

The Municipal Water Conservation water management strategy includes retrofit of plumbing fixtures, adoption and use of efficient clothes washers, and significant reduction of lawn and landscape watering. The combined plumbing fixtures, clothes washers, and lawn watering water conservation practices would reduce municipal water demand by 13,231 acft/yr in 2010, 31,616 acft/yr in 2030, and 72,570 acft/yr in 2060 (Section 4C.1). Of these totals, in 2010, 91 percent would be from plumbing fixtures and clothes washers, and 9 percent would be from lawn watering. In 2030, of the 31,616 acft/yr of municipal water conservation, 48 percent would be from plumbing fixture and clothes washer retrofit, and 52 percent would be from lawn irrigation, while in 2060, the 72,570 acft/yr of municipal water conservation would be 26 percent would be from plumbing fixtures and clothes washers, and 74 percent would be from lawn irrigation.

In 2010, total cost for implementation and administration of the municipal water conservation water management strategy to meet the Region L goals, as described in the municipal water conservation water management strategy (Section 4C.1), is \$8.57 million (\$648/acft/yr), increasing to \$18.47 million (\$584/acft/yr) in 2030, and to \$41.05 in 2060 (\$566/acft/yr). As the quantity of water conservation (demand reduction) increases, the unit cost decreases from \$648 per acft in 2010, to \$584 per acft in 2030, and to \$566 per acft in 2060.

Irrigation Water Conservation: The irrigation water conservation water management strategy is based upon water conservation Best Management Practices for agricultural water, as

included in the Water Conservation Implementation Task Force November 2004 Report to the 79th Texas Legislature. The list of Irrigation BMPs is as follows:

1. Irrigation Scheduling;
2. Volumetric Measurement of Irrigation Water Use;
3. Crop Residue Management and Conservation Tillage;
4. On-farm Irrigation audit;
5. Furrow Dikes;
6. Land Leveling;
7. Contour Farming;
8. Conservation of Supplemental Irrigated Farmland to Dry-Land Farmland;
9. Brush Control/Management;
10. Lining of On-Farm Irrigation Ditches;
11. Replacement of On-/farm Irrigation Ditches with Pipelines;
12. Low Pressure Center Pivot Sprinkler Irrigation Systems;
13. Drip/Micro-Irrigation System;
14. Gated and Flexible Pipe for Field Water Distribution Systems;
15. Surge Flow Irrigation for Field Water Distribution Systems;
16. Linear Move Sprinkler Irrigation Systems;
17. Lining of District Irrigation Canals;
18. Replacement of District Irrigation Canals and Lateral Canals with Pipelines;
19. Tailwater Recovery and Use System; and
20. Nursery Production Systems.

Best Management Practices of Low Energy Precision Application (LEPA) techniques are estimated to reduce water needed per acre by 20 percent of the rates estimated to have been used in Region L in year 2000. Based upon estimates that irrigation water conservation practices of LEPA, with furrow dikes, can be applied to 75 percent of the acreages that were irrigated in year 2000 in the counties of the region for which water needs have been projected, it is estimated that 23,074 acft/yr of irrigation water conservation can be accomplished at an average cost of \$137/acft/yr (Section 4C.1).

Industrial, Steam-Electric Power, and Mining Water Conservation: Best Management Practices for industrial, steam-electric power, and mining water conservation, as included in the Water Conservation Implementation Task Force November 2004 Report to the 79th Texas Legislature are as follows:

1. Industrial Water Audit;
2. Industrial Water Waste Reduction;
3. Industrial Submetering;

4. Cooling Towers;
5. Cooling Systems Other than Cooling Towers;
6. Industrial Alternative Sources and Reuse of Process Water;
7. Rinsing/Cleaning;
8. Water Treatment;
9. Boiler and Steam Systems;
10. Refrigeration (including Chilled Water);
11. Once-through Cooling;
12. Management and Employee Programs;
13. Industrial Landscape; and
14. Industrial Site Specific Conservation.

BMPs of air cooling, reuse of treated wastewater, and onsite collection and use of precipitation runoff for mining are recommended. Potential quantities and costs, however, could not be estimated due to lack of data (Section 4C.1).

Model Municipal Water Conservation Plan: The model municipal water conservation plan required for the South Central Texas Regional Water Plan is included in Appendix F, and has the following components:

- A. Utility Profile
 - I. Population and Customer Data
 - II. Water Use Data for Service Area
 - III. Water Supply System Data
 - IV. Wastewater System Data
- B. Requirements for Water Conservation Plans for Municipal Water Use by Public Water Suppliers
 1. Specific, Quantified 5 and 10 year water conservation targets and goals for municipal water use, in gallons per capita per day
 2. Metering Devices – Description Required
 3. Universal Metering – Program Required
 4. Unaccounted-For Water Use – Measures to Determine and Control
 5. Continuing Public Education & Information – Program Description Required
 6. Non-Promotional Water Rate Structure – Required, and included in Water Conservation Plan
 7. Reservoir Systems Operation Plan – Required, if Applicable
 8. Enforcement Procedure & Plan Adoption – Means of Implementation and Enforcement Requirements
 9. Coordination with the Regional Water Planning Group(s) – Documentation of consistency with Regional Water Plans
 10. Additional Requirements
 - a. Program for Leak Detection, Repair, and Water Loss Accounting
 - b. Record Management System, and
 - c. Plan Review and Update every 5 years.

Water conservation information and guidance in the development of municipal water conservation plans can be found at the following web site:

- www.tceq.state.tx.us/permitting/water_supply/water_rights/conserve.html

Model Irrigation Water Conservation Plan: There is no model irrigation water conservation plan in the South Central Texas Regional Water Plan. A form is provided by TCEQ to assist in conservation plan development for individually operated irrigation systems at the following web site:

- www.tceq.state.tx.us/assets/public/permitting/watersupply/water_rights/10238.pdf

Model Industrial/Mining Water Conservation Plan: There is no model industrial/mining water conservation plan in the South Central Texas Regional Water Plan. A form is provided by TCEQ to assist in conservation plan development for industrial/mining water use at the following web site:

- www.tceq.state.tx.us/assets/public/permitting/forms/10213.pdf

Recommendation: The South Central Texas Regional Water Planning Group strongly recommends the implementation of the Municipal, Industrial, Irrigation, Steam-Electric Power Generation, and Mining Water Conservation, and that each water user develop, implement, and maintain a Water Conservation Plan that meets or exceeds the requirements of applicable law.

6.2 Drought Management

31 TAC §357.7(a)(11) requires that the regional water plan identify: (A) factors specific to each source of water supply to be considered in determining whether to initiate a drought response; and (B) actions to be taken as part of the response. The general recommendations of the SCTRWPG regarding identification and initiation of drought responses for current water supply sources in the South Central Texas Region are listed in Table 6-1. As the SCTRWPG is a planning body only, with no implementation authority, it is emphasized that these drought responses are recommendations only. Local public and private water suppliers and water districts have been required by TCEQ to adopt a Drought Contingency Plan that contains drought triggers and responses unique to each specific entity. Furthermore, these entities have the authority and responsibility to manage their particular water supply within the bounds created by applicable

law. Therefore, the SCTRWPG encourages these entities to implement their respective plans with due consideration of the recommendations summarized in Table 6-1.

The SCTRWPG has developed a general methodology for estimating the economic impacts associated with implementation of drought management as a water management strategy.¹ Application of this methodology for regional water planning purposes has facilitated comparison of drought management to other potentially feasible water management strategies on a unit cost basis (Section 4C.2). The SCTRWPG has found, and the San Antonio Water System (SAWS) has demonstrated, that water user groups having sufficient flexibility to focus on discretionary outdoor water use first and avoid water use reductions in the commercial and manufacturing use sectors may find some degrees of drought management to be economically viable and cost-competitive with other water management strategies. Recognizing that implementation of appropriate water management strategies is a matter of local choice, the SCTRWPG recommends due consideration of economically viable drought management as an interim strategy to meet near-term needs through demand reduction until such time as economically viable long-term water supplies can be developed.

Table 6-1.
Identification and Initiation of Drought Responses

Source of Water Supply	Factors to be Considered in Initiating Drought Response(s)	Potential Drought Responses
Edwards Aquifer	<ul style="list-style-type: none"> • Local/regional well levels • Springflow maintenance • Water needs for health & safety • Availability of alternative sources 	<ul style="list-style-type: none"> • Reductions in allowable withdrawals • Implementation of Drought Contingency Plans • Increase reliance on alternative sources
Carrizo & Other Aquifers	<ul style="list-style-type: none"> • Local/regional well levels • Water stored in formation vs. use • Acceptable long-term drawdown • Production facility constraints 	<ul style="list-style-type: none"> • Implementation of Drought Contingency Plans • Groundwater district rules • Increase production facility capacity
Surface Water	<ul style="list-style-type: none"> • Streamflow/reservoir storage • Water right priority and special conditions • Dependable supply vs. use • Availability of alternative sources 	<ul style="list-style-type: none"> • Implementation of Drought Contingency Plans • Coordination with TCEQ Watermaster • Increase reliance on alternative sources

¹ SCTRWPG, “2011 Regional Water Plan, Study 3, Enhanced Water Conservation, Drought Management, and Land Stewardship,” Texas Water Development Board, San Antonio River Authority, HDR Engineering, Inc., April 2009.

Model Drought Contingency Plan for Retail Public Water Suppliers: The model municipal drought contingency plan required for the South Central Texas Regional Water Plan is included in Appendix G, and has the following components:

<u>Section</u>	<u>Contents</u>
I	Declaration of Policy, Purpose, and Intent
II	Public Involvement
III	Public Education
IV	Coordination with Regional Water Planning Groups
V	Authorization
VI	Application
VII	Definitions
VIII	Criteria for Initiation and Termination of Drought Response Stages <ul style="list-style-type: none"> • Stage 1 Triggers – Mild Water Shortage Condition • Stage 2 Triggers – Moderate Water Shortage Conditions • Stage 3 Triggers – Severe Water Shortage Conditions • Stage 4 Triggers – Critical Water Shortage Conditions • Stage 5 Triggers – Emergency Water Shortage Conditions • Stage 6 Water Allocation
IX	Drought Response Stages <ul style="list-style-type: none"> • Notification • Response(s) (See Appendix G for list of potential responses by Stage)

Information and guidance in the development of drought contingency plans can be found at the following web site:

- www.tceq.state.tx.us/permitting/water_supply/water_rights/contingency.html

Recommendation: The South Central Texas Regional Water Planning Group recommends that each municipal water supplier develop, implement, and maintain a Drought Contingency Plan that meets or exceeds the requirements of applicable law.

6.2.1 Groundwater

In the case of the Edwards Aquifer, Senate Bill 3 of the 80th Texas Legislature established a maximum annual amount of permitted withdrawals from the aquifer of 572,000 acft/yr, specific critical period management plan provisions, interim minimum annualized rates for permitted withdrawals in critical period of 320,000 acft/yr, and a Recovery Implementation Program for protection of endangered species. Thus, for purposes of water supply analyses for the 2011 South Central Texas Regional Water Plan, the permitted supply from the Edwards

Aquifer is assumed to be 320,000 acft/yr.² The Edwards Aquifer Authority (EAA) has adopted Demand Management and Critical Period rules that are consistent with Senate Bill 3 and establish trigger conditions for recognition of drought and specify reductions in withdrawals from the Edwards Aquifer when these trigger conditions are met. Subject to permitted withdrawals totaling 572,000 acft/yr, these rules reflect staged reductions in permitted withdrawals ranging from five to 40 percent during periods in which water levels in representative monitoring wells in Bexar and Uvalde Counties or discharges at Comal or San Marcos Springs have fallen below specified trigger levels. Tables 6-2 and 6-3 summarize the factors specific to the Edwards Aquifer in determining whether to initiate a drought response and the reductions in withdrawal expected as part of the response. For comprehensive information supplementing that shown in Tables 6-2 and 6-2, please refer to the rules of the EAA.

It is expected that U.S. Fish & Wildlife Service approval of an Habitat Conservation Plan will form the basis for identification of appropriate springflow levels or other measures for protection of threatened and endangered species. Until these springflow levels and/or other measures are identified and approved, appropriate timing for initiation of drought responses is uncertain. The SCTRWPG encourages the timely implementation of this Regional Water Plan as a preemptive drought response so that alternative sources of supply and/or enhanced supplies from the Edwards Aquifer will be available to satisfy regional water needs, maintain springflow, and protect endangered species to the extent required by State and Federal law.

² For planning purposes, an estimate of 320,000 acft/yr of available supply during a drought of record from the Edwards Aquifer was agreed upon by the SCTRWPG and the staff of the TWDB. This quantity is adopted as a placeholder number until the EAA obtains approval of a Habitat Conservation Plan (HCP) from the U.S. Fish and Wildlife Service.

Table 6-2.
Senate Bill 3 Critical Period Withdrawal Reduction Stages for the San Antonio Pool

Reduction Stage	Triggers Initiating Drought Response				San Antonio Pool Withdrawal Reduction
	J-17 (ft-msl)	Springflows (cfs)		J-27 (ft-msl)	
		San Marcos	Comal		
I	660	96	225	N/A	20 %
II	650	80	200	N/A	30 %
III	640	N/A	150	N/A	35 %
IV	630	N/A	100	N/A	40 %

Table 6-3.
Senate Bill 3 Critical Period Withdrawal Reduction Stages for the Uvalde Pool

Reduction Stage	Triggers Initiating Drought Response				Uvalde Pool Withdrawal Reduction
	J-17 (ft-msl)	Springflows (cfs)		J-27 (ft-msl)	
		San Marcos	Comal		
I	N/A	N/A	N/A		N/A
II	N/A	N/A	N/A	850	5 %
III	N/A	N/A	N/A	845	20 %
IV	N/A	N/A	N/A	842	35 %

Water supplies available from the Carrizo Aquifer and other aquifers in Region L are less subject to transient hydrologic drought conditions than the Edwards Aquifer and are more dependent upon water stored in the formation and the acceptability of long-term depletion or drawdown. If depletion of storage in these aquifers is occurring at an unacceptable pace (typically measured over many years, rather than a few months), there is likely to be sufficient time to amend groundwater district rules and/or develop alternative sources of supply. As with any source of water supply, production facility constraints may necessitate expedited increases in production capacity or implementation of drought contingency measures during dry periods when peak water demands are greatest.

6.2.2 Surface Water

Supplies from surface water sources such as run-of-river water rights and reservoirs are determined on the basis of minimum month availability and firm yield, respectively. Hence, the current surface water supplies presented herein are, by TWDB definition, dependable during drought. Factors that are typically considered in initiating drought response for surface water sources are low streamflow and/or low reservoir storage, since these factors can be conveniently measured and monitored. In contrast to groundwater sources, water right priority with respect to other rights and special permit conditions regarding minimum instream flows can also be important factors in determining whether to initiate drought responses for surface water sources. In the Guadalupe-San Antonio and Nueces River Basins, coordination with the TCEQ South Texas Watermaster is an essential drought response for all entities dependent upon surface water supply sources.

6.2.2.1 Potential for Emergency Transfers of Surface Water

In accordance with [31 TAC §357.5 (i)], the SCTRWPG is to consider emergency transfers of surface water including a determination of the portion of each right for non-municipal use that may be transferred without causing unreasonable damage to the property of the non-municipal water right holder. The Executive Director of TCEQ, after notice to the Governor, may issue emergency permits or temporarily suspend or amend permit conditions without notice or hearing to address emergency conditions for a limited period of not more than 120 days if an imminent threat to public health and safety exists. A person desiring to obtain an emergency authorization is required to justify the request to TCEQ. If TCEQ determines the request is justified, it may issue an emergency authorization without notice and hearing, or with notice and hearing, if practicable. Applicants for emergency authorizations are required to pay fair market value for the water they are allowed to divert, as well as any damages caused by the transfer. In transferring the quantity of water pursuant to an emergency authorization request, the Executive Director, or the TCEQ, shall allocate the requested quantity among two or more water rights held for purposes other than domestic or municipal purposes.

Surface water availability models have been developed for the streams of the South Central Texas Region (Region L) in which the locations, quantities, and reliabilities of the surface water rights of the region have been quantified as described in Section 3, entitled Water Supply Analyses. The Regional Water Plan incorporates Appendix B as a source of information

to water user groups and the TCEQ for use in cases of emergencies that result in a threat to public health and safety. Water user groups located in proximity to one or more existing surface water diversion permits for non-municipal use can readily estimate quantities of water that might be available for emergency use applications. With regard to the determination of amounts “that may be transferred without causing unreasonable damage to the property of the non-municipal water rights holder,” the SCTRWPG defers to the judgment of the TCEQ inasmuch as the TCEQ is charged with consideration of sworn applications for emergency transfer authorizations. The SCTRWPG recommends that water user groups of the region develop emergency water supply plans to be activated in the event that public health and safety are threatened.

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