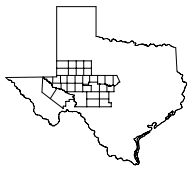


Region F
Water Planning Group

Freese and Nichols, Inc.
LBG-Guyton Associates, Inc.
Alan Plummer Associates, Inc.

MEMORANDUM

To: Ms. Carolyn Brittin, Director, Water Resources Planning, Texas Water Development Board

From: Jon S. Albright – Freese and Nichols, Inc.

Re: Amendment 1 to the 2006 *Region F Water Plan*

Date: August 1, 2006

During the approval process for the *2006 Region F Water Plan* the Texas Water Development Board (TWDB) questioned the use of the Alternative Generation Strategy for meeting steam-electric power generation needs. The Region F Plan was subsequently approved by the Board, although Region F was requested to review the strategy. Based on this review, the TWDB staff, the Colorado River Municipal Water District and Freese and Nichols determined two reasons to revise the *2006 Region F Water Plan*:

- *Errors in cost estimates.* The original cost estimates in the Region F plan presented the shortages as incremental and added them together to obtain total shortages in each decade. However, the shortages are actually cumulative, so the needed generation capacity to replace the water demand is overestimated. Correcting this error reduces the total capital costs for the strategy from about $600 million to $225 million.
- *The steam-electric demands are not specific for Region F.* The projections for steam-electric power generation are based on state-wide estimates for future power generation needs. These needs were distributed throughout the state to locations with existing power generation facilities. In Region F, this distribution results in water demands that exceed local water supplies. Therefore, it would be

more appropriate to show the demands that cannot be met in their current location as unmet needs.

The attached amendment corrects the cost estimates for the alternative generation strategy and changes the Alternative Generation Strategy from a recommended strategy to a considered strategy. As a result, there is over 24,000 acre-feet of unmet steam-electric needs in 2060.

As part of the approval process, the Region F Water Planning group:

- Approved going forward with the amendment on Monday May 22, 2006.
- Held a public hearing to be held at the CRMWD offices in Big Spring on Monday June 26, 2006. No public comment was received at this hearing.
- Did not receive written public comment by the close of the 30-day public comment period on Friday July 28, 2006.
- Approved the amendment on Monday July 31, 2006.

ES.3 Identification and Selection of Water Management Strategies

The Region F Water Planning Group identified and evaluated a wide variety of potentially feasible water management strategies in developing this plan. Water supply availability, costs and environmental impacts were determined for conservation and reuse efforts, the connection of existing supplies, and the development of new supplies. Almost every strategy suggested to the region during the planning process was analyzed.

As required by the TWDB regulations, the evaluation of water management strategies was an equitable comparison of all feasible strategies and considered the following factors:

- Evaluation of quantity, reliability, and cost of water diverted and treated
- Environmental factors
- Impacts on other water resources and on threats to agricultural and natural resources
- Significant issues affecting feasibility
- Consideration of other water management strategies affected

ES.3.1 Water Conservation and Reuse

The Region F Water Planning Group considered three major categories of water conservation: municipal, irrigation and steam-electric power generation. Overall, in Region F more than 82,000 acre-feet of water could be conserved by 2060.

The recommended water conservation activities for municipal water users in Region F are:

- Education and public awareness programs,
- Reduction of unaccounted for water through water audits and maintenance of water systems, and
- Water rate structures that discourage water waste.

Irrigation is the largest water user in Region F and the category with the largest needs. The irrigation conservation activities evaluated in as part of this plan focus on efficient irrigation practices.

ES.3.2 Recommended Water Management Strategies

Table ES-1 lists the recommended water management strategies by type for Region F. In total, the Region F plan includes water management strategies to develop approximately 210,000 acre-feet per year of new supplies by 2060, including new well fields, desalination and reuse.

The most significant strategy in the Region F plan is subordination of senior water rights. This strategy, which was developed in conjunction with the Lower Colorado Region (Region K), reserves over 39,000 acre-feet of water for use in Region F. Over 20,000 acre-feet of existing supplies will be made available to other water users through voluntary redistribution of existing supplies. Overall, with all strategies in place, by 2060 the total available supply for Region F is approximately 817,000 acre-feet per year. Irrigation demands in 15 counties are not met with this plan due to limited water supplies and lack of cost effective strategies. Steam-electric demands in four counties are not met because of lack of supplies in the demand location and uncertainty regarding how the steam-electric power industry will meet these demands.

Water quality is an important factor in Region F water supplies, particularly for municipal use. Communities in Region F are being pressured to expend limited public and private financial resources to meet water quality standards for arsenic, radionuclides, and secondary water constituents. Meeting these standards is particularly difficult for small communities in the region.

Figure ES-4 shows the comparison of surface water supply and demand for Region F with and without the subordination agreement. Figure ES-5 shows the makeup of the 817,000 acre-feet per year of supplies proposed for the region in 2060.

Table ES-1
Recommended Water Management Strategies by Type

Water Management Strategy	2060 Supply (Acre-Feet per Year)	Implementation Cost
Conservation	82,057	$43,152,601
Desalination [a]	16,221	$131,451,830
New Groundwater	31,860	$249,031,400
Infrastructure Improvements	2,206	$11,380,192
Reuse	12,710	$100,889,000
Subordination	39,106	$16,110,200
Voluntary Redistribution	17,132	$5,284,000
Other [b]	8,362	$24,157,784
Total	*209,654*	*$581,457,007*

a Includes 9,500 ac-ft of supply not assigned to a particular water user group
b Includes brush control and bottled water programs

Figure ES-4
Comparison of Supplies and Demands in Region F
With and Without the Subordination Strategy

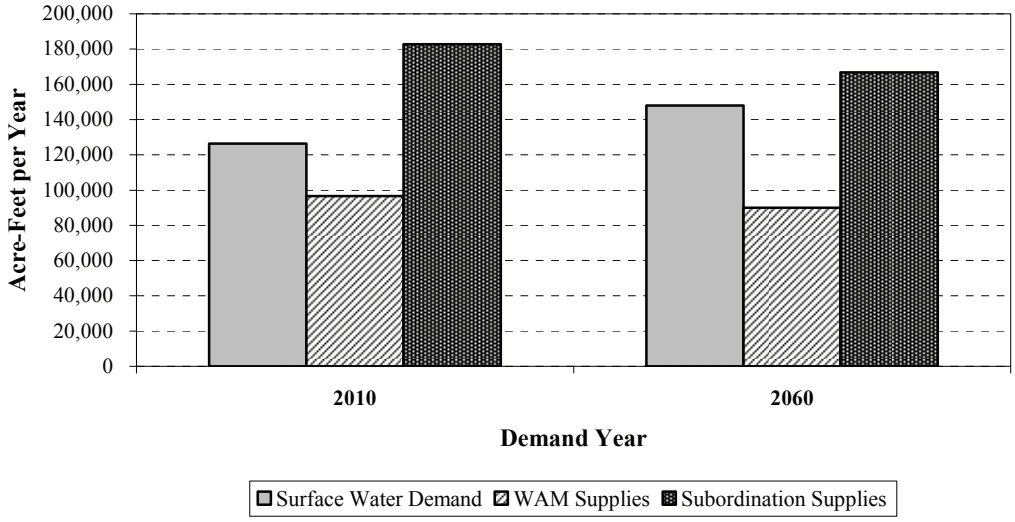
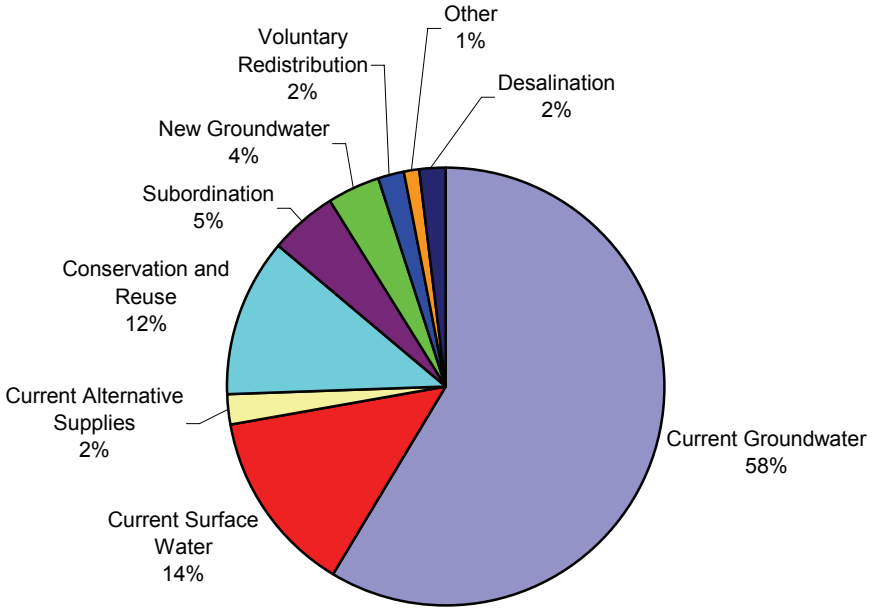


Figure ES-5
Current and Recommended Sources of Water Available to Region F as of 2060



4.5 Steam-Electric Power Needs

By 2060 the region has water needs for Steam-Electric Power Generation of almost 30,000 acre-feet. These shortages are the result of three factors:

- Little or no yield in reservoirs using Colorado WAM Run 3, which is required for use in the regional water plans by the TWDB,
- Limited groundwater supplies in Ward and Andrews Counties, and
- Increased demands that cannot be met with existing supplies, particularly in Mitchell and Ector Counties.

Table 4.5-1 compares region-wide demands to available existing supplies. In areas where there are insufficient supplies, steam-electric power generation has been limited to maximum recent historical use.

The projections for growth in steam-electric power water use in Region F are based on state-wide projections for new generation capacity and do not necessarily reflect site-specific water needs[37]. In Region F, the projected growth in water demand exceeds the water supply currently available to existing generation facilities. Because growth in demand is not site-specific, strategies may include movement of demand to other locations as well as new supply development.

Potentially Feasible Strategies

Because of an overall lack of available new water supplies at existing generation facilities, Region F has limited water use for steam-electric power generation to current use. The expected growth in water demand reflects the expected need for additional electrical generation capacity, and that additional capacity can be met using alternative technologies that require significantly less water. Therefore meeting these shortages is not limited to water management strategies.

Strategies to meet steam-electric needs include:

- Moving the power generation need to another existing facility outside of Region F with sufficient water supplies;
- Construction of a new generation facility in an area where there are sufficient water supplies to meet projected demands, either inside or outside of Region F;
- Using an alternative source of water, including brackish water (either groundwater or surface water from chloride control projects such as Mitchell County Reservoir) or treated wastewater, either inside or outside of Region F;

Table 4.5-1
Comparison of Region F Steam-Electric Water Demand Projections to Currently Available Supplies

	Name	County	2010	2020	2030	2040	2050	2060	Comments
Supply	Oak Creek Reservoir	Coke	0	0	0	0	0	0	No supply in priority order WAM
Demand	AEP Oak Creek	Coke	310	247	289	339	401	477	
Surplus (Need)			*(310)*	*(247)*	*(289)*	*(339)*	*(401)*	*(477)*	
Supply	Edwards-Trinity Plateau aquifer	Pecos	1,500	1,500	1,500	1,500	1,500	1,500	Supply based on recent use
Demand	AEP Rio Pecos	Crockett	973	776	907	1,067	1,262	1,500	Source in Pecos County
Surplus (Need)			*527*	*724*	*593*	*433*	*238*	*0*	
Supply	Ogallala aquifer	Andrews	6,375	6,375	6,375	6,375	6,375	6,375	Supply limited to recent use
Demand	Panda Odessa-Ector	Ector	6,375	9,125	10,668	12,549	14,842	17,637	Source in Andrews County
Surplus (Need)			*0*	*(2,750)*	*(4,293)*	*(6,174)*	*(8,467)*	*(11,262)*	
Supply	Champion/Colorado City System	Mitchell	0	0	0	0	0	0	No supply in priority order WAM
Demand	TXU Morgan Creek	Mitchell	9,100	7,621	8,910	10,481	12,396	14,730	
Surplus (Need)			*(9,100)*	*(7,621)*	*(8,910)*	*(10,481)*	*(12,396)*	*(14,730)*	
Supply	Twin Buttes/Nasworthy	Tom Green	0	0	0	0	0	0	No supply in priority order WAM
Demand	AEP San Angelo	Tom Green	543	777	909	1,069	1,264	1,502	
Surplus (Need)			*(543)*	*(777)*	*(909)*	*(1,069)*	*(1,264)*	*(1,502)*	
Supply	Cenozoic Pecos Alluvium	Ward	4,914	4,223	4,937	5,807	6,189	6,189	Supply limited to recent use
Demand	TXU Permian Basin	Ward	4,914	4,223	4,937	5,807	6,868	8,162	
Surplus (Need)			*0*	*0*	*0*	*0*	*(679)*	*(1,973)*	
		Total Supply	*12,789*	*12,098*	*12,812*	*13,682*	*14,064*	*14,064*	
		Total Demand	*22,215*	*22,769*	*26,620*	*31,312*	*37,033*	*44,008*	
		Total Surplus (Need)	*(9,426)*	*(10,671)*	*(13,808)*	*(17,630)*	*(22,969)*	*(29,944)*	

- Voluntary redistribution of water supplies already dedicated to another use, including purchase of existing irrigation supplies; and
- Use of alternative cooling technologies that use less water.

Region F has identified only subordination of downstream water rights as a recommended strategy. Other strategies may be employed in Region F, including the voluntary redistribution of existing water supplies, moving demand to another location desalination and use of alternative cooling technologies. However, the actual strategies are largely a business decision on the part of the power industry. An analysis of the potential costs of alternative cooling technologies is included in this plan. The other strategies have a large degree of uncertainty that makes it difficult to perform a meaningful analysis in the context of regional planning. Therefore, analyses of these strategies are not included in this plan.

Subordination of Downstream Senior Water Rights

TWDB requires the use of the TCEQ WAM for regional water planning. In the Colorado WAM, most reservoirs in Region F with a priority date after 1926 do not have a firm or safe yield. This result is largely due to the assumptions used in the Colorado WAM. Four reservoirs in Region F provide water for steam-electric power generation:

- Oak Creek Reservoir, which is owned by the City of Sweetwater;
- Champion Creek Reservoir and Lake Colorado City, which are owned by TXU and operated as system; and
- Lake Nasworthy, which is owned by the City of San Angelo.

All of these reservoirs have priority dates after 1926, so these reservoirs have no yield.

In order to address water availability issues associated with the Colorado WAM model, Region F and the Lower Colorado Region (Region K) participated in a joint modeling effort to evaluate a strategy in which lower basin senior water rights do not make priority calls on major upstream water rights. This strategy also assumes that major water rights in Region F do not make priority calls on each other. The subordination strategy is discussed in Section 4.2.3. Table 4.5-2 is a summary of the impacts of the subordination strategy on supplies used for steam-electric power generation.

Table 4.5-2
Impact of Subordination Strategy on Steam-Electric Water Supplies [a]
(Values in acre-feet per year)

Reservoir	Priority Date	Permitted Diversion	2010 Supply WAM Run 3	2010 Supply with Subord-ination	2060 Supply WAM Run 3	2060 Supply with Subord-ination
Oak Creek Reservoir	4/27/1949	10,000 [b]	0	2,118	0	1,760
Champion Creek Reservoir	4/08/1957	6,750 [c]	0	2,337	0	2,220
Lake Colorado City	11/22/1948	5,500	0	2,686	0	1,920
Lake Nasworthy [d]	3/11/1929	25,000 [e]	0	12,310 [f]	0	11,360 [f]
Total		*47,250*	*0*	*19,451*	*0*	*17,260*

a Water supply is defined as the safe yield of the reservoir.

b 4,000 acre-feet per year for industrial purposes and 6,000 acre-feet per year for municipal purposes, making the total authorized diversion from Oak Creek Reservoir 10,000 acre-feet per year. Steam-electric power generation is considered an industrial use.

c 2,700 acre-feet per year of the authorized diversions can be used for municipal purposes. However, at this time there is no municipal use from the reservoir, so the entire 6,750 acre-feet per year can be used for power generation.

d Diversions from Lake Nasworthy are backed up by storage in Twin Buttes Reservoir, which has a priority date of 5/06/1959.

e 7,000 acre-feet per year for industrial, 17,000 acre-feet per year for municipal and 1,000 acre-feet per year for irrigation, making the total authorized diversions from Lake Nasworthy 25,000 acre-feet per year.

f Yield from Twin Buttes Reservoir and Lake Nasworthy operating as a system.

The joint modeling between the two regions was conducted for planning purposes only. Neither Region F nor the Lower Colorado Region mandates the adoption of this strategy by individual water right holders. A subordination agreement is not within the authority of the Region F Water Planning Group. Such an agreement must be developed by the water rights holders themselves, including steam-electric power generators.

Impacts of the subordination strategy are discussed in Section 4.2.3.

Alternative Cooling Technologies

Region F considers alternative cooling technologies on new power generation project a likely method for developing new generation capacity within Region F. This technology, which uses air for cooling instead of water, can be utilized on any steam

cycle based power generation project, for an incremental cost. This cost, calculated on a dollar per installed megawatt basis, would be above the cost of conventional cooling.

Quantity, Reliability and Cost

Table 4.5-3 shows the results of this analysis. Using the suggested technology up to 24,306 acre-feet per year of unmet needs can be met by 2060. This technology is currently in use and is very reliable. Capital costs, which are based on the incremental difference between more conventional cooling technologies and the alternative technology, are approximately $37.5 million in 2010, increasing to $225 million by 2060.

Agricultural and Rural Issues

There are no agricultural or rural issues associated with this project.

Other Natural Resource Issues

None identified.

Significant Issues Affecting Feasibility

The implementation of this strategy is dependent upon a distribution of state-wide generation needs that may not represent the actual needs for generation within Region F. Location of new generation facilities within Region F is largely an economic issue that will be made by the power industry. Other technologies or strategies may be more attractive for meeting the need for new generation capacity.

Other Water Management Strategies Directly Affected

No other water management strategies are impacted by this project.

Recommended Water Management Strategies for Steam Electric Power Generation

Table 4.5-4 is a summary of supply and demand for steam-electric power generation with subordination of downstream water rights, the only recommended strategy in this plan. There are significant needs remaining. It is likely that other strategies may be implemented by the steam-electric power industry to meet these demands, including moving demand to other locations, use of alternative water sources such as desalination, and use of alternative generation technologies.

Table 4.5-3
Needed Generation Capacity on Incremental Cost of ACC Technology

	2010	2020	2030	2040	2050	2060
Steam Electric Needs (Ac-Ft)	4,077	5,524	8,533	12,210	17,468	24,306
Equivalent needs (GWh)	2,315	3,245	5,244	8,008	12,216	18,071
MW Capacity Needed (MW)	386	541	874	1,335	2,036	3,012
Incremental Capacity Installed (MW)	500	500	500	500	500	500
Total Capacity Installed (MW)	500	1,000	1,500	2,000	2,500	3,000
Capacity Factor of New Capacity (%)	53	37	40	46	56	69
Incremental cost of ACC (million $)	$37.5	$37.5	$37.5	$37.5	$37.5	$37.5
***Total Capital Cost** (million $)*	*$37.5*	*$75.0*	*$112.5*	*$150.0*	*$187.5*	*$225.0*
Debt Service (million $)	$3.3	$6.5	$6.5	$6.5	$6.5	$6.5
O&M (million $) *	$0.9	$1.9	$2.8	$3.8	$4.7	$5.6
***Total Annual Cost** (million $)*	*$4.2*	*$8.4*	*$9.4*	*$10.3*	*$11.2*	*$12.2*
Cost/Ac-Ft	$1,032	$1,523	$1,096	$843	$643	$500
Cost/1,000 Gal	$3.17	$4.67	$3.36	$2.59	$1.97	$1.53

* Assuming 2.5 percent of construction for O&M.

Table 4.5-4
Recommended Strategies for Steam-Electric Power Generation

Category	Name	County	2010	2020	2030	2040	2050	2060
Supply	Oak Creek Reservoir	Coke	0	0	0	0	0	0
	Subordination		310	247	289	339	401	477
	Total		310	247	289	339	401	477
Demand	AEP Oak Creek	Coke	310	247	289	339	401	477
Surplus (Need)			0	0	0	0	0	0
Supply	Edwards-Trinity Plateau aquifer	Pecos	1,500	1,500	1,500	1,500	1,500	1,500
Demand	AEP Rio Pecos	Crockett	973	776	907	1,067	1,262	1,500
Surplus (Need)			527	724	593	433	238	0
Supply	Ogallala aquifer	Andrews	6,375	6,375	6,375	6,375	6,375	6,375
Demand	Panda Odessa-Ector	Ector	6,375	9,125	10,668	12,549	14,842	17,637
Surplus (Need)			0	(2,750)	(4,293)	(6,174)	(8,467)	(11,262)
Supply	Champion/Colorado City System	Mitchell	0	0	0	0	0	0
	Subordination		5,023	4,847	4,670	4,493	4,317	4,140
	Total		5,023	4,847	4,670	4,493	4,317	4,140
Demand	TXU Morgan Creek	Mitchell	9,100	7,621	8,910	10,481	12,396	14,730
Surplus (Need)			(4,077)	(2,774)	(4,240)	(5,988)	(8,079)	(10,590)
Supply	Twin Buttes/Nasworthy	Tom Green	0	0	0	0	0	0
	Subordination		1,021	1,021	1,021	1,021	1,021	1,021
	Total		1,021	1,021	1,021	1,021	1,021	1,021
Demand	AEP San Angelo	Tom Green	543	777	909	1,069	1,264	1,502
Surplus (Need)			478	244	112	(48)	(243)	(481)
Supply	Cenozoic Pecos Alluvium	Ward	4,914	4,223	4,937	5,807	6,189	6,189
Demand	TXU Permian Basin	Ward	4,914	4,223	4,937	5,807	6,868	8,162
Surplus (Need)			0	0	0	0	(679)	(1,973)
Total Supply			*19,143*	*18,213*	*18,792*	*19,535*	*19,803*	*19,702*
Total Demand			*22,215*	*22,769*	*26,620*	*31,312*	*37,033*	*44,008*
Total Surplus (Need)			*(3,072)*	*(4,556)*	*(7,828)*	*(11,777)*	*(17,230)*	*(24,306)*

[37] Investor-Owned Utility Companies of Texas: Power Generation Water Use in Texas for the Years 2000 to 2060, prepared for the Texas Water Development Board, January 2003.

With an intention of being prudent and in consideration of relevant factors, it is recommended that during the current planning period, an additional 8,362 acre feet of water per year should be recognized as available to San Angelo from local sources due to brush control. This estimate is based on the short term availability of approximately 20 percent of the ultimate increased watershed yield based on the current status of the brush removal program.

4.10 Summary of Needs and Strategies by County

Table 4.10-1 is a summary of the recommended water management strategies for water user groups in Region F grouped by county, as well as a summary by strategy type. Table 4.10-2 shows additional strategies whose capital costs are associated with wholesale water providers. (There is some overlap for the supplies in these two tables, but no overlap in capital costs.) Only three counties, Crane, Crockett, and Loving, do not have water management strategies. The largest single category of water management strategies is conservation, totaling over 82,000 acre-feet per year in 2060. The largest contribution to this strategy comes from irrigation conservation, which contributes about 88 percent of the total. Other significant strategies include subordination, new groundwater sources, and voluntary redistribution. Altogether, these strategies result in over 200,000 acre-feet of water becoming available to water user groups by 2060, with an overall capital cost of more than $581 million.

Table 4.10-3 shows the unmet needs in Region F. All of these needs are for irrigation and steam-electric power generation. Unmet irrigation needs are the result of either insufficient groundwater supplies to meet projected demand or limited surface water availability for run-of-the-river irrigation rights from the Colorado WAM (any run-of-the-river right with a priority date after 1926 will have no supply by definition). In most cases conservation is the only cost-effective method to reduce irrigation needs. In every county except Martin County conservation was insufficient to prevent unmet needs.

In this plan, the default method to allocate groundwater was to first meet municipal, manufacturing, livestock, mining and steam-electric demands. (Steam-electric demands were limited to current use. Any growth in demand was given last priority). In most cases, irrigation was allocated water last, resulting in a need if insufficient supplies were available to meet all demands. For most of the aquifers in counties with irrigation shortages, irrigation represents

from 70 to 99 percent of the demand from these aquifers in 2010, so it is appropriate to assign water supply needs to irrigation demands. An exception is Ward County, where irrigation accounts for only 34 percent of the 2010 demand from the Cenozoic Pecos Alluvium aquifer. In Ward County there are significant demands for municipal, mining and steam-electric use. For the purposes of this plan, it was assumed that these demand categories would have priority over irrigation demand.

Unmet irrigation needs for surface water supplies are primarily the result of the priority of the water rights in each county as allocated by the Colorado and Rio Grande WAMs. In the Colorado Basin, any run-of-the-river water right with a priority date after 1926 will have no reliable supply. Water rights with priority dates senior to 1926 may not have sufficient supplies in all years. (Run-of-the-river irrigation rights were not part of the subordination analysis performed with Region K.) Although historical surface water use from these sources may be greater than indicated, the shortage may be appropriate if it is assumed that senior downstream rights make priority calls on these irrigation rights.

In most cases steam-electric power generation demands are the result of the projections exceeding available supplies at existing generation facilities. Although it is likely that the steam-electric power generation industry will meet these demands, there is a great deal of uncertainty regarding the type of strategy or the location of future generation facilities used to meet the needs. Therefore these demands have been left as unmet needs.

Table 4.10-1
Strategy Summary by County

Water User Group Name	County	Basin Name	Water Management Strategy Name	Source Name	Implementation Date	Strategy Supply Increase (Decrease) for 2010	Strategy Supply Increase (Decrease) for 2020	Strategy Supply Increase (Decrease) for 2030	Strategy Supply Increase (Decrease) for 2040	Strategy Supply Increase (Decrease) for 2050	Strategy Supply Increase (Decrease) for 2060	Capital Cost	Annual Cost 2010	Annual Cost 2020	Annual Cost 2030	Annual Cost 2040	Annual Cost 2050	Annual Cost 2060
City of Andrews	Andrews	Colorado	Voluntary Redistribution	Ogallala aquifer	2010	671	708	730	750	760	773	$0	$0	$0	$0	$0	$0	$0
City of Andrews	Andrews	Colorado	Desalination	Dockum aquifer	2020	0	1,121	1,121	1,121	1,121	1,121	$4,678,300	$0	$796,000	$796,000	$388,000	$388,000	$388,000
Irrigation	Andrews	Colorado	Conservation		2020	0	2,728	5,455	5,456	5,457	5,458	$4,041,459	$0	$146,804	$293,608	$293,608	$293,608	$293,608
Andrews County Total						*671*	*4,557*	*7,306*	*7,327*	*7,338*	*7,352*	*$8,719,759*	*$0*	*$942,804*	*$1,089,608*	*$681,608*	*$681,608*	*$681,608*
Irrigation	Borden	Brazos	Conservation		2020	0	94	189	189	189	189	$164,000	$0	$5,957	$11,915	$11,915	$11,915	$11,915
Irrigation	Borden	Colorado	Conservation		2020	0	136	271	271	271	271	$236,000	$0	$8,573	$17,145	$17,145	$17,145	$17,145
Borden County Total						*0*	*230*	*460*	*460*	*460*	*460*	*$400,000*	*$0*	*$14,530*	*$29,060*	*$29,060*	*$29,060*	*$29,060*
Coleman County WSC	Coleman	Colorado	Subordination	Lake Coleman	2010	19	19	19	18	18	18	$0	$0	$0	$0	$0	$0	$0
Brown County Other	Brown	Colorado	Voluntary Redistribution	Lake Brownwood	2010	300	300	300	300	300	300	$5,284,000	$758,000	$758,000	$297,000	$297,000	$297,000	$297,000
Irrigation	Brown	Colorado	Conservation		2020	0	93	185	185	185	185	$44,386	$0	$1,613	$3,225	$3,225	$3,225	$3,225
Brown County Total						*319*	*412*	*504*	*503*	*503*	*503*	*$5,328,386*	*$758,000*	*$759,613*	*$300,225*	*$300,225*	*$300,225*	*$300,225*
City of Bronte	Coke	Colorado	Subordination	Oak Creek Reservoir	2010	129	129	129	129	129	129	$0	$0	$0	$0	$0	$0	$0
City of Bronte	Coke	Colorado	Infrastructure Improvements	Oak Creek Reservoir	2010	0	0	0	0	0	0	$1,238,600	$21,600	$21,600	$0	$0	$0	$0
City of Bronte	Coke	Colorado	New Groundwater	Other aquifer	2010	100	100	100	100	100	100	$464,000	$57,000	$57,000	$17,000	$17,000	$17,000	$17,000
City of Bronte	Coke	Colorado	Conservation		2010	16	45	48	48	50	51	$0	$4,472	$8,743	$8,539	$8,340	$8,145	$8,023
City of Robert Lee	Coke	Colorado	Conservation		2010	16	40	44	45	46	48	$0	$4,770	$8,727	$8,524	$8,325	$8,130	$8,009
City of Robert Lee	Coke	Colorado	Infrastructure Improvements	Spence Reservoir	2010	0	0	0	0	0	0	$2,482,500	$259,000	$259,000	$43,000	$43,000	$43,000	$43,000
City of Robert Lee	Coke	Colorado	Subordination	Colorado River MWD System	2010	95	115	2	21	34	55	$0	$0	$0	$0	$0	$0	$0
City of Robert Lee	Coke	Colorado	Brush control		2010	0	0	0	0	0	0	$95,532	$19,000	$19,000	$19,000	$19,000	$19,000	$19,000
County-Other	Coke	Colorado	Subordination	Colorado River MWD System	2010	28	32	0	6	9	15	$0	$0	$0	$0	$0	$0	$0
Mining	Coke	Colorado	Subordination	Colorado River MWD System	2010	86	119	2	24	43	72	$0	$0	$0	$0	$0	$0	$0
Steam Electric Power	Coke	Colorado	Subordination	Oak Creek Reservoir	2010	310	247	289	339	401	477	$0	$0	$0	$0	$0	$0	$0
Coke County Total						*780*	*827*	*614*	*712*	*812*	*947*	*$4,280,632*	*$365,842*	*$374,070*	*$96,063*	*$95,665*	*$95,275*	*$95,032*
City of Coleman	Coleman	Colorado	Subordination	Lake Coleman	2010	6,886	6,778	6,679	6,581	6,478	6,373	$1,701,400	$148,336	$148,336	$0	$0	$0	$0
City of Coleman	Coleman	Colorado	Subordination	Hords Creek Reservoir	2010	1,390	1,360	1,330	1,300	1,270	1,240	$278,000	$24,237	$24,237	$0	$0	$0	$0
City of Coleman	Coleman	Colorado	Conservation		2010	50	109	141	163	181	187	$0	$21,311	$24,872	$23,960	$23,072	$22,202	$21,664
Coleman County WSC	Coleman	Colorado	Subordination	Lake Coleman	2010	126	114	109	103	101	99	$0	$0	$0	$0	$0	$0	$0
County-Other	Coleman	Colorado	Subordination	Lake Coleman	2010	20	19	19	18	18	18	$0	$0	$0	$0	$0	$0	$0
Irrigation	Coleman	Colorado	Subordination	Lake Coleman	2010	1,348	1,348	1,348	1,348	1,348	1,348	$0	$0	$0	$0	$0	$0	$0
Manufacturing	Coleman	Colorado	Subordination	Lake Coleman	2010	6	6	6	6	6	6	$0	$0	$0	$0	$0	$0	$0
Mining	Coleman	Colorado	Subordination	Lake Coleman	2010	17	18	18	18	18	18	$0	$0	$0	$0	$0	$0	$0
Coleman County Total						*9,843*	*9,752*	*9,650*	*9,537*	*9,420*	*9,289*	*$1,979,400*	*$193,884*	*$197,445*	*$23,960*	*$23,072*	*$22,202*	*$21,664*
City of Eden	Concho	Colorado	Bottled Water Program	Hickory aquifer	2010	0	0	0	0	0	0	$133,320	$26,874	$26,874	$8,760	$8,760	$8,760	$8,760
City of Eden	Concho	Colorado	Infrastructure Improvements	Hickory aquifer	2010	0	0	0	0	0	0	$1,367,372	$278,679	$278,679	$159,465	$159,465	$159,465	$159,465
Irrigation	Concho	Colorado	Conservation		2020	0	748	1,496	1,496	1,496	1,496	$1,591,088	$0	$57,796	$115,591	$115,591	$115,591	$115,591
Millersview-Doole WSC	Concho	Colorado	Subordination	Colorado River MWD System	2010	34	42	1	7	0	0	$0	$0	$0	$0	$0	$0	$0
Millersview-Doole WSC	Concho	Colorado	Voluntary Redistribution	Colorado River MWD System	2050	0	0	0	0	118	118	$0	$0	$0	$0	$0	$0	$0
Concho County Total						*34*	*790*	*1,497*	*1,503*	*1,614*	*1,614*	*$3,091,780*	*$305,553*	*$363,349*	*$283,816*	*$283,816*	*$283,816*	*$283,816*
Ector County UD	Ector	Colorado	Subordination	Colorado River MWD System	2010	400	613	11	151	272	478	$0	$0	$0	$0	$0	$0	$0
Irrigation	Ector	Colorado	Conservation		2020	0	243	485	485	485	485	$253,720	$0	$9,216	$18,433	$18,433	$18,433	$18,433
Irrigation	Ector	Rio Grande	Conservation		2020	0	2	5	5	5	5	$2,563	$0	$93	$186	$186	$186	$186
Manufacturing	Ector	Colorado	Subordination	Colorado River MWD System	2010	66	149	3	46	86	158	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Ector	Colorado	Conservation		2010	540	1,168	1,488	1,657	1,854	2,074	$0	$400,979	$416,656	$418,272	$419,543	$420,351	$428,145
City of Odessa	Ector	Colorado	New Groundwater	Cenozoic Pecos Alluvium	2040	0	0	0	5,799	5,794	5,790	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Ector	Colorado	Reuse		2020	0	4,293	4,273	4,262	4,258	4,256	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Ector	Colorado	Subordination	Colorado River MWD System	2010	4,419	5,633	84	1,112	1,941	3,343	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Ector	Colorado	Voluntary Redistribution	Cenozoic Pecos Alluvium	2020	0	4,708	4,708	4,708	4,708	4,708	$0	$0	$0	$0	$0	$0	$0
Ector County Total						*5,425*	*16,809*	*11,057*	*18,225*	*19,403*	*21,297*	*$256,283*	*$400,979*	*$425,965*	*$436,891*	*$438,162*	*$438,970*	*$446,764*

Note: Supplies from brush control and weather modification are not firm supplies. The total amount of supply and associated costs for these strategies are shown at the end of this table.

Table 4.10-1 Strategy Summary by County (Continued)

Water User Group Name	County	Basin Name	Water Management Strategy Name	Source Name	Implementation Date	Strategy Supply Increase (Decrease) for 2010	Strategy Supply Increase (Decrease) for 2020	Strategy Supply Increase (Decrease) for 2030	Strategy Supply Increase (Decrease) for 2040	Strategy Supply Increase (Decrease) for 2050	Strategy Supply Increase (Decrease) for 2060	Capital Cost	Annual Cost 2010	Annual Cost 2020	Annual Cost 2030	Annual Cost 2040	Annual Cost 2050	Annual Cost 2060
Irrigation	Glasscock	Colorado	Conservation		2020	0	3,631	7,262	7,262	7,262	7,262	$9,566,394	$0	$347,494	$694,988	$694,988	$694,988	$694,988
City of Big Spring	Howard	Colorado	Conservation		2010	241	603	676	698	725	754	$0	$108,944	$112,960	$109,009	$104,321	$99,734	$96,894
City of Big Spring	Howard	Colorado	Reuse		2020	0	1,855	1,855	1,855	1,855	1,855	$0	$0	$0	$0	$0	$0	$0
City of Big Spring	Howard	Colorado	Subordination	Colorado River MWD System	2010	1,345	1,672	24	299	491	796	$0	$0	$0	$0	$0	$0	$0
City of Coahoma	Howard	Colorado	Subordination	Colorado River MWD System	2010	49	61	1	11	18	29	$0	$0	$0	$0	$0	$0	$0
Irrigation	Howard	Colorado	Conservation		2020	0	327	653	653	653	653	$543,311	$0	$19,736	$39,471	$39,471	$39,471	$39,471
Manufacturing	Howard	Colorado	Subordination	Colorado River MWD System	2010	267	349	5	71	124	220	$0	$0	$0	$0	$0	$0	$0
Mining	Howard	Colorado	Subordination	Colorado River MWD System	2010	400	523	9	101	171	285	$0	$0	$0	$0	$0	$0	$0
Howard County Total						*2,302*	*5,390*	*3,223*	*3,688*	*4,037*	*4,592*	*$543,311*	*$108,944*	*$132,696*	*$148,480*	*$143,792*	*$139,205*	*$136,365*
Irrigation	Irion	Colorado	Conservation		2020	0	37	73	73	73	73	$17,614	$0	$640	$1,280	$1,280	$1,280	$1,280
Irrigation	Irion	Colorado	Weather Modification		2010	0	0	0	0	0	0	$0	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000
Irion County Total						*0*	*37*	*73*	*73*	*73*	*73*	*$17,614*	*$90,000*	*$90,640*	*$91,280*	*$91,280*	*$91,280*	*$91,280*
City of Junction	Kimble	Colorado	Subordination	Llano River	2010	991	991	991	991	991	991	$200,000	$17,437	$17,437	$0	$0	$0	$0
County-Other	Kimble	Colorado	Subordination	Llano River	2010	9	9	9	9	9	9	$0	$0	$0	$0	$0	$0	$0
Irrigation	Kimble	Colorado	Conservation		2020	0	74	147	147	147	147	$118,702	$0	$4,312	$8,624	$8,624	$8,624	$8,624
Manufacturing	Kimble	Colorado	Subordination	Llano River	2010	1,000	1,000	1,000	1,000	1,000	1,000	$200,000	$17,437	$17,437	$0	$0	$0	$0
Kimble County Total						*2,000*	*2,074*	*2,147*	*2,147*	*2,147*	*2,147*	*$518,702*	*$34,874*	*$39,186*	*$8,624*	*$8,624*	*$8,624*	*$8,624*
City of Stanton	Martin	Colorado	Voluntary Redistribution	Colorado River MWD System	2010	392	422	429	430	415	393	$0	$0	$0	$0	$0	$0	$0
Irrigation	Martin	Colorado	Conservation		2020	0	1,751	3,502	3,502	3,502	3,502	$121,659	$0	$121,659	$243,318	$243,318	$243,318	$243,318
Martin County Total						*392*	*2,173*	*3,931*	*3,932*	*3,917*	*3,895*	*$121,659*	*$0*	*$121,659*	*$243,318*	*$243,318*	*$243,318*	*$243,318*
Irrigation	Mason	Colorado	Conservation		2020	0	746	1,491	1,491	1,491	1,491	$598,026	$0	$21,723	$43,446	$43,446	$43,446	$43,446
City of Brady	McCulloch	Colorado	Conservation		2010	77	192	214	222	230	239	$0	$23,486	$27,370	$26,348	$25,353	$24,380	$23,770
City of Brady	McCulloch	Colorado	Subordination	Brady Creek Reservoir	2010	2,170	2,170	2,170	2,170	2,170	2,170	$434,000	$37,838	$37,838	$0	$0	$0	$0
County Other	McCulloch	Colorado	Bottled Water Program	Hickory aquifer	2010	0	0	0	0	0	0	$0	$3,191	$3,191	$3,191	$3,191	$3,191	$3,191
Irrigation	McCulloch	Colorado	Conservation		2020	0	1,977	394	394	394	394	$139,633	$0	$5,072	$10,144	$10,144	$10,144	$10,144
Millersview-Doole WSC	McCulloch	Colorado	Subordination	Colorado River MWD System	2010	67	81	1	14	0	0	$0	$0	$0	$0	$0	$0	$0
Millersview-Doole WSC	McCulloch	Colorado	Voluntary Redistribution	Colorado River MWD System	2050	0	0	0	0	228	228	$0	$0	$0	$0	$0	$0	$0
Richland SUD	McCulloch	Colorado	Bottled Water Program	Hickory aquifer	2010	0	0	0	0	0	0	$2,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Richland SUD	McCulloch	Colorado	Infrastructure Improvements	Hickory aquifer	2010	0	0	0	0	0	0	$1,291,720	$172,191	$172,191	$59,573	$59,573	$59,573	$59,573
McCulloch County Total						*2,314*	*4,420*	*2,779*	*2,800*	*3,022*	*3,031*	*$1,867,353*	*$244,706*	*$253,662*	*$107,256*	*$106,261*	*$105,288*	*$104,678*
City of Menard	Menard	Colorado	New Groundwater	Hickory aquifer	2010	140	139	140	140	141	141	$1,279,400	$172,500	$172,500	$61,000	$61,000	$61,000	$61,000
City of Menard	Menard	Colorado	Conservation		2010	10	24	28	30	32	33	$0	$7,332	$11,327	$11,009	$10,700	$10,397	$10,209
County-Other	Menard	Colorado	New Groundwater	Hickory aquifer	2010	20	21	20	20	19	19	$0	$0	$0	$0	$0	$0	$0
Irrigation	Menard	Colorado	Conservation		2020	0	23	46	46	46	46	$13,358	$0	$485	$970	$970	$970	$970
Menard County Total						*170*	*207*	*234*	*236*	*238*	*239*	*$1,292,758*	*$179,832*	*$184,312*	*$72,979*	*$72,670*	*$72,367*	*$72,179*
City of Midland	Midland	Colorado	Conservation		2020	930	2,320	2,903	3,110	3,310	3,521	$0	$420,493	$463,796	$461,155	$452,873	$440,673	$435,018
City of Midland	Midland	Colorado	Reuse		2010	0	5,389	5,389	5,389	5,389	5,389	$0	$0	$0	$0	$0	$0	$0
City of Midland	Midland	Colorado	Subordination	Colorado River MWD System	2010	4,488	6,055	0	0	0	0	$0	$0	$0	$0	$0	$0	$0
City of Midland	Midland	Colorado	Voluntary Redistribution	Colorado River MWD System	2030	0	0	10,000	9,800	9,600	9,400	$0	$0	$0	$4,660,000	$4,566,800	$4,473,600	$4,380,400
City of Midland	Midland	Colorado	Subordination	O.H. Ivie Reservoir	2010	17	(97)	(211)	(324)	(438)	(553)	$0	$0	$0	$0	$0	$0	$0
City of Midland	Midland	Colorado	Voluntary Redistribution	Ogallala aquifer	2010	1,237	1,237	1,237	0	0	0	$0	$0	$0	$0	$0	$0	$0
City of Midland	Midland	Colorado	Voluntary Redistribution	Ogallala aquifer	2010	3,485	3,485	3,485	0	0	0	$0	$0	$0	$0	$0	$0	$0
City of Midland	Midland	Colorado	New Groundwater	Cenozoic Pecos Alluvium	2030	0	0	13,600	13,600	13,600	13,600	$115,772,000	$0	$0	$13,080,000	$13,080,000	$2,986,000	$2,986,000
Irrigation	Midland	Colorado	Conservation		2020	0	1,800	3,600	3,600	3,600	3,600	$2,642,806	$0	$95,989	$191,977	$191,977	$191,977	$191,977
City of Odessa	Midland	Colorado	Subordination	Colorado River MWD System	2010	86	154	3	39	69	121	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Midland	Colorado	Conservation		2010	11	32	48	58	66	75	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Midland	Colorado	New Groundwater	Cenozoic Pecos Alluvium	2040	0	0	0	201	206	210	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Midland	Colorado	Reuse		2020	0	117	137	148	152	154	$0	$0	$0	$0	$0	$0	$0
City of Odessa	Midland	Colorado	Voluntary Redistribution	Cenozoic Pecos Alluvium	2020	0	92	92	92	92	92	$0	$0	$0	$0	$0	$0	$0
Midland County Total						*10,254*	*20,584*	*40,283*	*35,713*	*35,646*	*35,609*	*$118,414,806*	*$420,493*	*$559,785*	*$18,393,132*	*$18,291,650*	*$8,092,250*	*$7,993,395*

Note: Supplies from brush control and weather modification are not firm supplies. The total amount of supply and associated costs for these strategies are shown at the end of this table.

Table 4.10-1 Strategy Summary by County (Continued)

Water User Group Name	County	Basin Name	Water Management Strategy Name	Source Name	Implementation Date	Strategy Supply Increase (Decrease) for 2010	Strategy Supply Increase (Decrease) for 2020	Strategy Supply Increase (Decrease) for 2030	Strategy Supply Increase (Decrease) for 2040	Strategy Supply Increase (Decrease) for 2050	Strategy Supply Increase (Decrease) for 2060	Capital Cost	Annual Cost 2010	Annual Cost 2020	Annual Cost 2030	Annual Cost 2040	Annual Cost 2050	Annual Cost 2060
Irrigation	Mitchell	Colorado	Conservation		2020	0	865	1,729	1,729	1,729	1,729	$2,135,784	$0	$77,581	$155,162	$155,162	$155,162	$155,162
Irrigation	Mitchell	Colorado	Weather Modification		2010	0	0	0	0	0	0	$0	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Steam Electric Power	Mitchell	Colorado	Subordination	Colorado City/Champion Creek	2010	5,023	4,847	4,670	4,493	4,317	4,140	$1,004,600	$87,586	$87,586	$0	$0	$0	$0
Steam Electric Power	Mitchell	Colorado	Brush Control		2010	0	0	0	0	0	0	$906,932	$181,386	$181,386	$181,386	$181,386	$181,386	$181,386
Mitchell County Total						*5,023*	*5,712*	*6,399*	*6,222*	*6,046*	*5,869*	*$4,047,316*	*$368,972*	*$446,553*	*$436,548*	*$436,548*	*$436,548*	*$436,548*
Irrigation	Pecos	Rio Grande	Conservation		2020	0	6,300	12,600	12,600	12,600	12,600	$6,956,821	$0	$252,703	$505,405	$505,405	$505,405	$505,405
Irrigation	Reagan	Colorado	Conservation		2020	0	1,968	3,936	3,936	3,936	3,936	$190,926	$0	$190,926	$381,852	$381,852	$381,852	$381,852
Irrigation	Reeves	Rio Grande	Conservation		2020	0	5,824	11,648	11,648	11,648	11,648	$6,891,034	$0	$250,313	$500,626	$500,626	$500,626	$500,626
City of Ballinger	Runnels	Colorado	Conservation		2010	33	88	107	119	131	144	$0	$18,388	$24,012	$24,602	$25,222	$25,396	$25,803
City of Ballinger	Runnels	Colorado	Reuse		2040	0	0	0	220	220	220	$1,980,000	$0	$0	$0	$219,845	$219,845	$75,900
City of Ballinger	Runnels	Colorado	Subordination	Lake Ballinger	2010	917	930	920	910	900	890	$188,000	$16,391	$16,391	$0	$0	$0	$0
City of Ballinger	Runnels	Colorado	Voluntary Redistribution	Colorado River MWD System	2010	192	185	194	259	58	127	$0	$81,792	$78,810	$82,644	$110,334	$24,708	$54,102
Coleman County WSC	Runnels	Colorado	Subordination	Lake Coleman	2010	18	30	39	48	56	66	$0	$0	$0	$0	$0	$0	$0
County-Other	Runnels	Colorado	Subordination	Lake Ballinger	2010	23	0	0	0	0	0	$0	$0	$0	$0	$0	$0	$0
County-Other	Runnels	Colorado	Subordination	Lake Winters	2010	114	89	69	49	31	0	$0	$0	$0	$0	$0	$0	$0
County-Other	Runnels	Colorado	Voluntary Redistribution	Colorado River MWD System	2010	193	177	148	116	94	77	$0	$82,218	$75,402	$63,048	$49,416	$40,044	$32,802
Manufacturing	Runnels	Colorado	Subordination	Lake Winters	2010	54	60	65	70	74	79	$0	$0	$0	$0	$0	$0	$0
Manufacturing	Runnels	Colorado	Voluntary Redistribution	Colorado River MWD System	2010	9	10	11	12	13	15	$0	$3,834	$4,260	$4,686	$5,112	$5,538	$6,390
City of Miles	Runnels	Colorado	Subordination	OC Fisher Reservoir	2010	100	100	100	100	100	100	$0	$0	$0	$0	$0	$0	$0
Millersview-Doole WSC	Runnels	Colorado	Subordination	Colorado River MWD System	2010	25	31	0	6	0	0	$0	$0	$0	$0	$0	$0	$0
Millersview-Doole WSC	Runnels	Colorado	Voluntary Redistribution	Colorado River MWD System	2050	0	0	0	0	92	93	$0	$0	$0	$0	$0	$0	$0
City of Winters	Runnels	Colorado	Conservation		2010	21	55	63	67	71	76	$0	$12,392	$16,589	$16,353	$16,134	$15,829	$15,781
City of Winters	Runnels	Colorado	Reuse		2040	0	0	0	110	110	110	$1,660,000	$0	$0	$0	$198,000	$198,000	$53,020
City of Winters	Runnels	Colorado	Subordination	Lake Winters	2010	552	561	566	571	575	591	$144,000	$12,555	$12,555	$0	$0	$0	$0
Runnels County Total						*2,251*	*2,316*	*2,282*	*2,657*	*2,525*	*2,588*	*$3,972,000*	*$227,570*	*$228,019*	*$191,333*	*$624,063*	*$529,360*	*$263,798*
Irrigation	Schleicher	Colorado	Conservation		2020	0	89	178	178	178	178	$123,711	$0	$4,494	$8,987	$8,987	$8,987	$8,987
Irrigation	Schleicher	Rio Grande	Conservation		2020	0	18	36	36	36	36	$25,327	$0	$920	$1,840	$1,840	$1,840	$1,840
Schleicher County Total						*0*	*107*	*214*	*214*	*214*	*214*	*$149,038*	*$0*	*$5,414*	*$10,827*	*$10,827*	*$10,827*	*$10,827*
County-Other	Scurry	Colorado	Subordination	Colorado River MWD System	2010	54	66	1	12	20	33	$0	$0	$0	$0	$0	$0	$0
Irrigation	Scurry	Brazos	Conservation		2020	0	160	320	320	320	320	$303,477	$0	$11,024	$22,047	$22,047	$22,047	$22,047
Irrigation	Scurry	Colorado	Conservation		2020	0	411	823	823	823	823	$780,370	$0	$28,346	$56,693	$56,693	$56,693	$56,693
City of Snyder	Scurry	Colorado	Conservation		2010	70	154	191	205	220	234	$0	$46,943	$51,385	$50,089	$48,426	$46,643	$45,378
City of Snyder	Scurry	Colorado	Reuse		2020	0	726	726	726	726	726	$0	$0	$0	$0	$0	$0	$0
City of Snyder	Scurry	Colorado	Subordination	Colorado River MWD System	2010	511	641	9	117	194	315	$0	$0	$0	$0	$0	$0	$0
Scurry County Total						*635*	*2,158*	*2,070*	*2,203*	*2,303*	*2,451*	*$1,083,847*	*$46,943*	*$90,755*	*$128,829*	*$127,166*	*$125,383*	*$124,118*
Irrigation	Sterling	Colorado	Conservation		2020	0	45	89	90	91	92	$21,550	$0	$783	$1,566	$1,566	$1,566	$1,566
Irrigation	Sutton	Colorado	Conservation		2020	0	44	88	88	88	88	$50,783	$0	$1,845	$3,689	$3,689	$3,689	$3,689
Irrigation	Sutton	Rio Grande	Conservation		2020	0	98	196	196	196	196	$113,377	$0	$4,118	$11,926	$11,926	$11,926	$11,926
Sutton County Total						*0*	*142*	*284*	*284*	*284*	*284*	*$164,160*	*$0*	*$5,963*	*$15,615*	*$15,615*	*$15,615*	*$15,615*

Note: Supplies from brush control and weather modification are not firm supplies. The total amount of supply and associated costs for these strategies are shown at the end of this table.

Table 4.10-1 Strategy Summary by County (Continued)

Water User Group Name	County	Basin Name	Water Management Strategy Name	Source Name	Implementation Date	Strategy Supply Increase (Decrease) for 2010	Strategy Supply Increase (Decrease) for 2020	Strategy Supply Increase (Decrease) for 2030	Strategy Supply Increase (Decrease) for 2040	Strategy Supply Increase (Decrease) for 2050	Strategy Supply Increase (Decrease) for 2060	Capital Cost	Annual Cost 2010	Annual Cost 2020	Annual Cost 2030	Annual Cost 2040	Annual Cost 2050	Annual Cost 2060
County-Other	Tom Green	Colorado	Subordination	Nasworthy/Twin Buttes	2010	250	250	250	250	250	250	$0	$0	$0	$0	$0	$0	$0
Irrigation	Tom Green	Colorado	Conservation		2020	0	5,774	11,548	11,548	11,548	11,548	$2,465,727	$0	$89,566	$179,132	$179,132	$179,132	$179,132
Irrigation	Tom Green	Colorado	Subordination	Nasworthy/Twin Buttes	2010	3,377	3,273	3,170	3,066	2,693	2,860	$0	$0	$0	$0	$0	$0	$0
Manufacturing	Tom Green	Colorado	Subordination	Nasworthy/Twin Buttes	2010	2,226	2,498	2,737	2,971	3,175	3,425	$0	$0	$0	$0	$0	$0	$0
Millersview-Doole WSC	Tom Green	Colorado	Subordination	Colorado River MWD System	2010	64	87	1	19	0	0	$0	$0	$0	$0	$0	$0	$0
Millersview-Doole WSC	Tom Green	Colorado	Voluntary Redistribution	Colorado River MWD System	2050	0	0	0	0	359	408	$0	$0	$0	$0	$0	$0	$0
City of San Angelo	Tom Green	Colorado	Desalination	Other aquifer	2020	0	5,600	5,600	5,600	5,600	5,600	$40,590,000	$0	$5,621,000	$5,621,000	$2,083,200	$2,083,200	$2,083,200
City of San Angelo	Tom Green	Colorado	New Groundwater	Hickory aquifer	2030	0	0	5,000	12,000	12,000	12,000	$91,582,000	$0	$0	$5,405,000	$12,972,000	$4,980,000	$4,980,000
City of San Angelo	Tom Green	Colorado	Conservation		2010	701	1,705	2,009	2,127	2,255	2,371	$0	$395,818	$415,843	$409,987	$398,440	$385,447	$375,342
City of San Angelo	Tom Green	Colorado	Infrastructure Improvements	Spence Reservoir	2010	2,274	2,261	2,247	2,233	2,220	2,206	$5,000,000	$555,500	$555,500	$119,600	$119,600	$119,600	$119,600
City of San Angelo	Tom Green	Colorado	Subordination	Nasworthy/Twin Buttes	2010	5,436	5,078	4,752	4,431	4,141	3,804	$0	$0	$0	$0	$0	$0	$0
City of San Angelo	Tom Green	Colorado	Subordination	OC Fisher Reservoir	2010	3,762	3,643	3,525	3,407	3,288	3,170	$0	$0	$0	$0	$0	$0	$0
City of San Angelo	Tom Green	Colorado	Subordination	OH Ivie Reservoir	2010	17	(97)	(211)	(324)	(438)	(553)	$0	$0	$0	$0	$0	$0	$0
City of San Angelo	Tom Green	Colorado	Brush Control		2010	8,362	8,362	8,362	8,362	8,362	8,362	$23,020,000	$4,604,000	$4,604,000	$4,604,000	$4,604,000	$4,604,000	$4,604,000
Steam Electric Power	Tom Green	Colorado	Subordination	Nasworthy/Twin Buttes	2010	1,021	1,021	1,021	1,021	1,021	1,021	$0	$0	$0	$0	$0	$0	$0
Tom Green County Total						*27,490*	*39,455*	*50,011*	*56,711*	*56,474*	*56,472*	*$162,657,727*	*$5,555,318*	*$11,285,909*	*$16,338,719*	*$20,356,372*	*$12,351,379*	*$12,341,274*
Irrigation	Upton	Colorado	Conservation		2020	0	911	1,822	1,822	1,822	1,822	$2,441,070	$0	$88,670	$177,341	$177,341	$177,341	$177,341
Irrigation	Upton	Rio Grande	Conservation		2020	0	9	18	18	18	18	$24,657	$0	$896	$1,791	$1,791	$1,791	$1,791
Upton County Total						*0*	*920*	*1,840*	*1,840*	*1,840*	*1,840*	*$2,465,727*	*$0*	*$89,566*	*$179,132*	*$179,132*	*$179,132*	*$179,132*
County Other	Ward	Rio Grande	Voluntary Redistribution	Cenozoic Pecos Alluvium aquifer	2020	0	400	400	400	400	400	$0	$0	$0	$0	$0	$0	$0
Irrigation	Ward	Rio Grande	Conservation		2020	0	785	1,570	1,570	1,570	1,570	$368,640	$0	$13,391	$26,781	$26,781	$26,781	$26,781
Irrigation	Ward	Rio Grande	Weather Modification		2010	0	0	0	0	0	0	$0	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000
Ward County Total						*0*	*1,185*	*1,970*	*1,970*	*1,970*	*1,970*	*$368,640*	*$90,000*	*$103,391*	*$116,781*	*$116,781*	*$116,781*	*$116,781*
Irrigation	Winkler	Rio Grande	Conservation		2020	0	195	389	389	389	389	$164,628	$0	$5,980	$11,960	$11,960	$11,960	$11,960
			Conservation			2,716	44,441	80,204	80,795	81,419	82,057	$43,152,601	$1,465,328	$3,450,998	$5,308,966	$5,281,868	$5,248,446	$5,235,155
			Desalination			0	6,721	6,721	6,721	6,721	6,721	$45,268,300	$0	$6,417,000	$6,417,000	$2,471,200	$2,471,200	$2,471,200
			New Groundwater			260	260	18,860	31,860	31,860	31,860	$209,097,400	$229,500	$229,500	$18,563,000	$26,130,000	$8,044,000	$8,044,000
			Infrastructure Improvements			2,274	2,261	2,247	2,233	2,220	2,206	$11,380,192	$1,286,970	$1,286,970	$381,638	$381,638	$381,638	$381,638
			Reuse			0	12,380	12,380	12,710	12,710	12,710	$3,640,000	$0	$0	$0	$417,845	$417,845	$128,920
			Bottled Water Program			0	0	0	0	0	0	$135,320	$38,065	$38,065	$19,951	$19,951	$19,951	$19,951
			Brush Control			8,362	8,362	8,362	8,362	8,362	8,362	$24,022,464	$4,804,386	$4,804,386	$4,804,386	$4,804,386	$4,804,386	$4,804,386
			Subordination			49,812	52,817	35,735	36,825	37,174	39,106	$4,150,000	$361,817	$361,817	$0	$0	$0	$0
			Voluntary Redistribution			6,479	11,724	21,734	16,867	17,237	17,132	$5,284,000	$925,844	$916,472	$5,107,378	$5,028,662	$4,840,890	$4,770,694
			Weather Modification			0	0	0	0	0	0	$0	$280,000	$280,000	$280,000	$280,000	$280,000	$280,000
			Total for All Strategies			*69,903*	*138,966*	*186,243*	*196,373*	*197,703*	*200,154*	*$346,130,277*	*$9,391,910*	*$17,785,208*	*$40,882,319*	*$44,815,550*	*$26,508,356*	*$26,135,944*

Note: Supplies from brush control and weather modification are not firm supplies. The total amount of supply and associated costs for these strategies are shown at the end of this table.

Table 4.10-2
Strategy Summary for Wholesale Water Providers

Wholesale Water Provider	Water Management Strategy Name	Source Name	Implementation Date	Strategy Supply Increase (Decrease) for 2010	Strategy Supply Increase (Decrease) for 2020	Strategy Supply Increase (Decrease) for 2030	Strategy Supply Increase (Decrease) for 2040	Strategy Supply Increase (Decrease) for 2050	Strategy Supply Increase (Decrease) for 2060	Capital Cost	Annual Cost 2010	Annual Cost 2020	Annual Cost 2030	Annual Cost 2040	Annual Cost 2050	Annual Cost 2060
CRMWD	Reuse		2020	0	12,380	12,380	12,380	12,380	12,380	$97,249,000	$0	$12,035,000	$12,035,000	$3,555,560	$3,555,560	$3,555,560
	Subordination	CRMWD System	2010	48,027	47,133	46,240	45,347	44,453	43,560	$9,605,400	$837,443	$837,443	$0	$0	$0	$0
	New Groundwater	Cenozoic Pecos Alluvium aquifer	2040	0	0	0	6,000	6,000	6,000	$39,934,000	$0	$0	$0	$4,987,000	$4,987,000	$1,505,000
	Desalination	Capitan Reef aquifer	2030	0	0	9,500	9,500	9,500	9,500	86,183,530	0	0	12,352,556	12,352,556	4,838,556	4,838,556
CRMWD Total				*48,027*	*59,513*	*68,120*	*73,227*	*72,333*	*71,440*	*$232,971,930*	*$837,443*	*$12,872,443*	*$24,387,556*	*$20,895,116*	*$13,381,116*	*$9,899,116*
San Angelo	Subordination	San Angelo system	2010	12,310	12,120	11,930	11,739	11,280	11,360	$1,582,400	$137,961	$137,961	$0	$0	$0	$0
	Rehabilitation of Spence pipeline	CRMWD System	2010	2,274	2,261	2,247	2,233	2,220	2,206	$0	$0	$0	$0	$0	$0	$0
	Desalination	Other aquifer	2020	0	5,600	5,600	5,600	5,600	5,600	$0	$0	$0	$0	$0	$0	$0
	New Groundwater	Hickory aquifer	2030	0	0	5,000	12,000	12,000	12,000	$0	$0	$0	$0	$0	$0	$0
San Angelo Total				*14,584*	*19,981*	*24,777*	*31,572*	*31,100*	*31,166*	*$1,582,400*	*$137,961*	*$137,961*	*$0*	*$0*	*$0*	*$0*
UCRA	Subordination	OC Fisher Reservoir	2010	3,862	3,743	3,625	3,507	3,388	3,270	$772,400	$67,341	$67,341	$0	$0	$0	$0
	Reuse			0	12,380	12,380	12,380	12,380	12,380	$97,249,000	$0	$12,035,000	$12,035,000	$3,555,560	$3,555,560	$3,555,560
	Subordination			64,199	62,996	61,795	60,593	59,121	58,190	$11,960,200	$1,042,745	$1,042,745	$0	$0	$0	$0
	Infrastructure Improvements			2,274	2,261	2,247	2,233	2,220	2,206	$0	$0	$0	$0	$0	$0	$0
	New Groundwater			0	0	5,000	18,000	18,000	18,000	$39,934,000	$0	$0	$0	$4,987,000	$4,987,000	$1,505,000
	Desalination			0	5,600	15,100	15,100	15,100	15,100	$86,183,530	$0	$0	$12,352,556	$12,352,556	$4,838,556	$4,838,556
	Total for All Strategies			*66,473*	*83,237*	*96,522*	*108,306*	*106,821*	*105,876*	*$235,326,730*	*$1,042,745*	*$13,077,745*	*$24,387,556*	*$20,895,116*	*$13,381,116*	*$9,899,116*

Notes: 1. Costs for San Angelo's strategies (Rehabilitation of Spence pipeline, Desalination, and New Groundwater) are shown on Table 4.10-1 for the city of San Angelo.
2. Subordination strategies are shown in Table 4.10-2 for the sponsoring wholesale provider.

Table 4.10-3
Unmet Needs in Region F
(Values in Acre-Feet per Year)

Water User Group	County	Basin	Source(s)	2010	2020	2030	2040	2050	2060
Irrigation	Andrews	Colorado	Ogallala aquifer	(14,094)	(11,336)	(8,471)	(7,080)	(6,876)	(6,707)
Irrigation	Borden	Brazos	Ogallala aquifer	(1,019)	(924)	(827)	(824)	(821)	(819)
Irrigation	Borden	Colorado	Ogallala aquifer	(828)	(690)	(552)	(551)	(548)	(547)
Irrigation	Brown	Colorado	Trinity aquifer, run-of-river	(3,006)	(2,889)	(2,761)	(2,720)	(2,683)	(2,656)
Irrigation	Coke	Colorado	Other aquifer, run-of-river	(363)	(363)	(361)	(360)	(360)	(360)
Irrigation	Glasscock	Colorado	Edwards-Trinity aquifer, Ogallala aquifer	(27,784)	(23,750)	(19,710)	(19,290)	(18,869)	(18,460)
Steam-Electric Power	Ector	Colorado	Ogallala aquifer	0	(2,750)	(4,293)	(6,174)	(8,467)	(11,262)
Irrigation	Irion	Colorado	Run-of-river	(1,302)	(1,204)	(1,108)	(1,047)	(987)	(927)
Irrigation	Martin	Colorado	Ogallala aquifer	(788)	0	0	0	0	0
Irrigation	Menard	Colorado	Run-of-river	(2,441)	(2,398)	(2,356)	(2,337)	(2,315)	(2,296)
Irrigation	Midland	Colorado	Edwards-Trinity aquifer, Ogallala aquifer	(16,233)	(14,559)	(12,748)	(12,654)	(12,512)	(12,393)
Steam-Electric Power	Mitchell	Colorado	Champion/Colorado City System	(4,077)	(2,774)	(4,240)	(5,988)	(8,079)	(10,590)
Irrigation	Reagan	Colorado	Edwards-Trinity aquifer	(10,997)	(8,639)	(6,180)	(5,623)	(5,040)	(4,457)
Irrigation	Reeves	Rio Grande	Cenozoic Pecos Alluvium aquifer	(36,097)	(29,421)	(22,739)	(21,877)	(21,016)	(20,199)
Irrigation	Runnels	Colorado	Run-of-river	(1,358)	(1,344)	(1,325)	(1,306)	(1,287)	(1,268)
Irrigation	Tom Green	Colorado	Lipan aquifer, run-of-river	(43,713)	(37,784)	(31,858)	(31,707)	(31,821)	(31,399)
Steam-Electric Power	Tom Green	Colorado	Twin Buttes/Nasworthy System	0	0	0	(48)	(243)	(481)
Irrigation	Upton	Colorado	Edwards-Trinity aquifer	(10,672)	(9,540)	(8,401)	(8,170)	(7,940)	(7,717)
Irrigation	Ward	Rio Grande	Cenozoic Pecos Alluvium aquifer	(5,527)	(4,188)	(4,151)	(4,969)	(5,335)	(5,318)
Steam-Electric Power	Ward	Rio Grande	Cenozoic Pecos Alluvium aquifer	0	0	0	0	(679)	(1,973)
Total				*(180,299)*	*(154,553)*	*(132,081)*	*(132,725)*	*(135,878)*	*(139,829)*