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CHAPTER 11 : IMPLEMENTATION AND COMPARISON TO THE PREVIOUS REGIONAL WATER PLAN

This chapter presents a discussion and survey of water management strategy projects that were recommended in the 2011 Regional Water Plan and have since been implemented, as well as providing a summary comparison of the 2016 Regional Water Plan to the 2011 Regional Water Plan with respect to population, demands, water availability and supplies, and water management strategies.

11.1 IMPLEMENTATION

In past planning cycles, recommended water management strategies from previous plans were not tracked to determine their status of implementation, other than to remove the strategy as recommended once the supply from the strategy became an existing supply. As part of the 2016 Region K Plan, the Texas Water Development Board (TWDB) is requiring a survey of 2011 Plan water management strategy implementation. This implementation survey requests information related to the implementation status of all water management strategies recommended in the 2011 Region K Plan.

The TWDB has created an implementation survey template that was used to collect the required information from the Water User Groups (WUGs) and Wholesale Water Providers in the region. Information was collected through survey data, discussions with planning group members, discussions with WUGs throughout the current planning cycle, and some research. *Appendix 11A* contains two versions of the Implementation Template used to record the survey results. *Table 11A.1* is a shortened summary version of the results presented for readability purposes. *Table 11A.2* is the full version of the TWDB template containing all of the information, presented to meet TWDB requirements.

In general, water management strategies related to return flows, conservation, reuse, drought management, and new water sale contracts and contract amendments have been implemented to some extent since the 2011 Region K Water Plan. Nearly 50 percent of the water management strategies recommended in the 2011 Region K Water Plan were found to have been implemented. Many of the implemented strategies have no associated capital costs and limited data available as to specific water supply or demand reduction volume numbers. Supply numbers that were provided in the surveys have been included in the results tables in *Appendix 11A*. Many of these particular strategies are on-going and will continue to be recommended and implemented during future planning cycles.

Results showed that only five water management strategies that were recommended in the 2011 Region K Water Plan and have capital costs have been implemented to the point of operation. These projects include the following:

- City of Austin Direct Reuse
- Purchase Water from the City of Austin for Hays County-Other
- Expansion of the Trinity Aquifer by the City of Goldthwaite
- Reuse by the Highland Lakes Communities

- Expansion of the Carrizo-Wilcox Aquifer by the City of Smithville

The two reuse projects are considered to be on-going, and reuse for the City of Austin and for WUGs surrounding the Highland Lakes will continue to be recommended in future planning cycles. Implementation costs were not readily available, but water supply volumes are included as provided.

A number of additional strategies recommended in the 2011 Region K Water Plan are underway, but not currently to the point of operation. This includes strategies that have permit applications submitted, or are in some stage of planning, design, or construction. The following projects have been started, but have not been completed:

- HCPUA Pipeline project for the City of Buda
- Development of the Saline Zone of the Edwards-BFZ Aquifer
- Goldthwaite Channel Dam
- HB 1437 On-Farm Conservation
- Development of the Hickory Aquifer by the City of Llano
- LCRA Off-Channel Reservoir
- Water Right Permit Amendment for Steam-Electric, Matagorda County

See *Appendix 11A* for additional information related to these and the rest of the water management strategies that were recommended in the 2011 Region K Water Plan.

11.2 COMPARISON TO THE PREVIOUS REGIONAL WATER PLAN

This section discusses how the 2016 Regional Water Plan compares to the 2011 Regional Water Plan, with respect to population, water demands, water supplies, and water management strategies.

11.2.1 Population Projections

Overall for Region K, there is a population projection increase of approximately 23,000 for Year 2020 between the 2011 Region K Plan and the 2016 Region K Plan. By 2060, the 2016 Region K Plan shows a population projection that is approximately 96,500 higher than the 2060 population projection in the 2011 Region K Plan. The year 2070 was not used for comparison purposes because the 2011 Region K Plan did not include the 2070 decade. The rate of population projection growth by planning decade is approximately 0.5% greater than was shown in the 2011 Region K Plan. Tabular data and bar graphs comparing the two (2) plans can be found in *Appendix 11B*.

Population estimates for each county have changed between the 2011 Region K Plan and the 2016 Region K Plan. The following counties have a higher population projection predicted by Year 2060 in the 2016 RWP: Bastrop, Colorado, Gillespie, Hays (partial), Travis, Wharton (partial), and Williamson (partial). The following counties have a smaller population projection predicted by Year 2060 in the 2016 Region

K Plan, as compared to the 2011 Region K Plan: Blanco, Burnet, Fayette, Llano, Matagorda, Mills, and San Saba.

Population projection growth rates have also changed between the 2011 Region K Plan and the 2016 Region K Plan. The following counties have a slower population projection growth rate in the 2016 Region K Plan, as compared to the 2011 Region K Plan: Blanco, Burnet, Fayette, Llano, San Saba, and Williamson (partial). The following counties have a faster population projection growth rate in the 2016 Region K Plan, as compared to the 2011 Region K Plan: Bastrop, Colorado, Gillespie, Hays (partial), Matagorda, Mills, Travis, and Wharton (partial).

These changes by county are summarized in *Table 11.1*.

Table 11.1 Comparison of 2016 Region K Plan and 2011 Region K Plan with respect to the 2060 Population Projections and Overall Projection Growth Rates by County

County	Population in Year 2060 (2016 RWP)	Population Growth Rate (2016 RWP)
Bastrop	Increase	Increase
Blanco	Decrease	Decrease
Burnet	Decrease	Decrease
Colorado	Increase	Increase
Fayette	Decrease	Decrease
Gillespie	Increase	Increase
Hays (partial)	Increase	Increase
Llano	Decrease	Decrease
Matagorda	Decrease	Increase
Mills	Decrease	Increase
San Saba	Decrease	Decrease
Travis	Increase	Increase
Wharton (partial)	Increase	Increase
Williamson (partial)	Increase	Decrease
Total (Region K)	Increase	Increase

11.2.2 Water Demand Projections

Overall for Region K, there is an increase in water demand of approximately 3,000 acre-feet/year for Year 2020 between the 2011 Region K Plan and the 2016 Region K Plan. By 2060, the 2016 Region K Plan shows a total water demand that is approximately 19,000 acre-feet/year higher than the 2060 total water demand in the 2011 Region K Plan. The year 2070 was not used for comparison purposes because the 2011 Region K Plan did not include the 2070 decade. The rate of water demand growth by planning decade is approximately 0.3% greater than was shown in the 2011 Region K Plan. Tabular data and bar graphs comparing the two (2) plans can be found in *Appendix 11B*.

Water demand projections for each usage category have changed between the 2011 Region K Plan and the 2016 Region K Plan. The following water usage categories have a higher water demand predicted by Year 2060 in the 2016 Region K Plan: Livestock, Irrigation, Manufacturing, and Mining.

The following water usage categories have a smaller water demand predicted by Year 2060 in the 2016 Region K Plan: Municipal and Steam-Electric Power Generation.

Water demand projection growth rates for each usage category have also changed between the 2011 Region K Plan and the 2016 Region K Plan. The following water usage categories had a slower water demand projection growth rate in the 2016 Region K Plan, as compared to the 2011 Region K Plan: Manufacturing and Steam-Electric Power Generation. Water demand projections for Livestock were constant across the planning decades and showed no growth in either plan.

The following water usage categories had a faster water demand projection growth rate in the 2016 Region K Plan: Municipal, Irrigation, and Mining.

These changes are summarized in *Table 11.2*.

Table 11.2 Water Demand Change by Water Usage Category in Year 2060 since 2011 RWP

Water Usage Category	Water Demand in Year 2060 (2016 Region K Plan)	Water Demand Growth Rate (2016 Region K Plan)
Municipal	Decrease	Increase
Livestock	Increase	No Change
Irrigation	Increase	Increase
Manufacturing	Increase	Decrease
Mining	Increase	Increase
Steam-Electric Power Generation	Decrease	Decrease
Total Water Demand	Increase	Increase

Table 11-3 identifies counties that have a higher projected water demand by Year 2060 in the 2016 Region K Plan than was shown in the 2011 Region K Plan. In addition, the usage category that has the greatest impact on that county's growth is shown in *Table 11.3*.

Table 11.3 Counties with Year 2060 Total Water Demand Increase from 2011 Region K Plan

County	Total Water Demand Increase in Year 2060 (acre-feet/year)	Greatest Water Usage Increase
Bastrop	8,136	Mining
Blanco	69	Irrigation
Burnet	6,093	Mining
Gillespie	1,160	Manufacturing
Hays (partial)	8,813	Municipal
San Saba	3,103	Irrigation
Travis	4,185	Manufacturing
Wharton (partial)	54,604	Irrigation

Table 11.4 identifies counties that have a lower projected water demand by Year 2060 than was shown in the 2011 Region K Plan. In addition, the usage category that has the greatest impact on each county's decrease is shown in Table 11.4.

Table 11.4 Counties with Year 2060 Total Water Demand Decrease from 2011 RWP

County	Total Water Demand Decrease in Year 2060 (acre-feet/year)	Greatest Water Usage Decrease
Colorado	-28,425	Mining
Fayette	-21,929	Steam-Electric Power
Llano	-14,398	Steam-Electric Power
Matagorda	-854	Steam-Electric Power
Mills	-85	Municipal
Williamson (partial)	-1,685	Municipal

11.2.3 Drought of Record and Hydrologic Assumptions

The Drought-of-Record for the 2016 Region K Water Plan remained the same as the 2011 Region K Water Plan, occurring from 1947-1957. The Region K Cutoff Model was used in both plans for determining the surface water availability numbers. In the 2011 Region K Plan, the period of record was from 1940-1998, with a critical dry year of 1956. For the 2016 Region K Plan, the period of record was extended through 2013, creating a new critical dry year of 2011.

11.2.4 Groundwater and Surface Water Availability and Water Supplies

Overall for Region K, the total water source availability in the 2016 Region K Plan has decreased from the availability in the 2011 Region K Plan. In the 2011 Region K Plan, the total water availability for 2020 was approximately 1.34 million acre-feet/year, with 72 percent surface water and 28 percent groundwater. The total water availability for 2060 was approximately 1.32 million acre-feet/year, with the same percentages of surface water and groundwater as 2020. In the 2016 Region K Plan, the total water availability for 2020 is approximately 1.29 million acre-feet/year, with 75 percent surface water and 25 percent groundwater. The total water availability for 2060 was approximately 1.31 million acre-feet/year, with 74 percent groundwater and 26 percent groundwater. The availability of reclaimed water increases over the decades in the 2016 Region K Plan, which is the reason for the increased total availability from 2020 to 2060.

Figure 11.1 shows a comparison of water availability by type of source, for 2020 and 2060, in the 2011 Region K Plan and the 2016 Region K Plan.

Figure 11.1 Comparison of Water Availability by Type of Source for 2020 and 2060

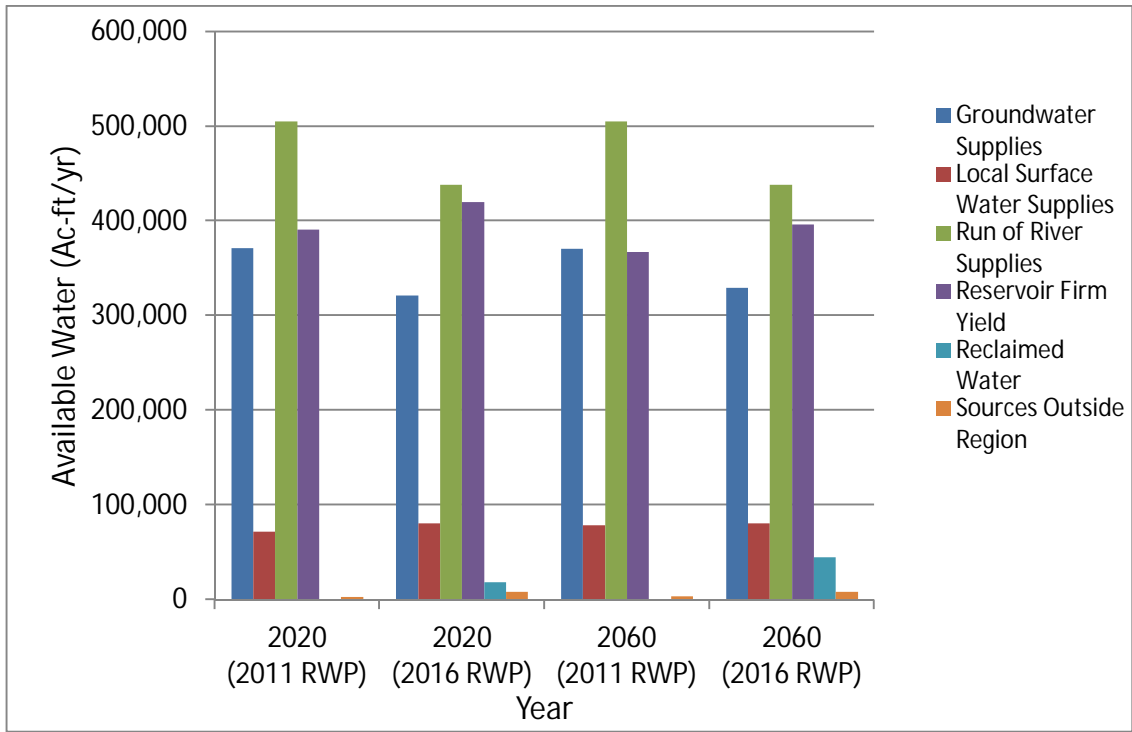
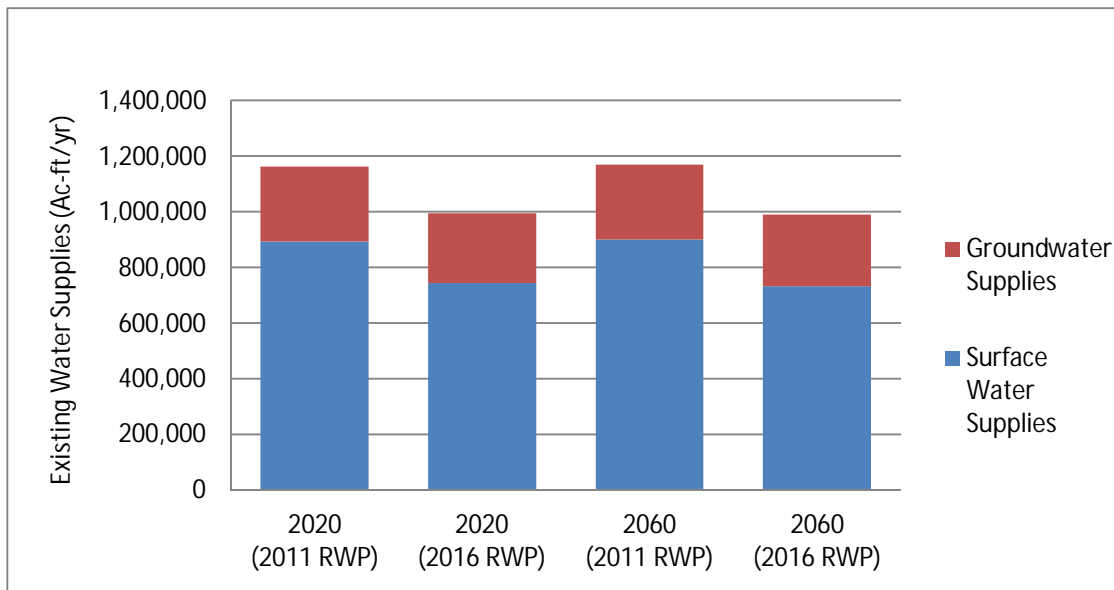


Figure 11.2 provides a comparison of the existing surface water and groundwater supplies in Region K for the 2011 Region K Plan and 2016 Region K Plan, shown for the 2020 and 2060 planning decades.

Figure 11.2 Comparison of Existing Water Supplies for 2020 and 2060



11.2.5 Water Needs

Water needs in the region are determined by comparing the demands to the existing supplies. Overall, water needs for Region K have increased in the 2016 Region K Plan as compared to the 2011 Region K Plan. Total increased needs for the region in 2060 are approximately 80,000 ac-ft/yr. A large portion of this increase is due to decreased available supply for irrigation, as determined by the Region K Cutoff Model for the 2016 Region K Plan. *Table 11.5* shows a comparison of the 2060 needs by county for the 2011 Region K Plan and the 2016 Region K Plan.

Table 11.5 Comparison of Water Needs by County for 2020 and 2060

County	2060 Water Need from 2011 Region K Plan	2060 Water Need from 2016 Region K Plan	Comparison (positive = increased need)
	(acre-feet/year)	(acre-feet/year)	(acre-feet/year)
Bastrop	28,145	32,730	4,585
Blanco	64	209	145
Burnet	8,136	8,769	633
Colorado	20,398	42,130	21,732
Fayette	29,069	3,824	(25,245)
Gillespie	-	566	566
Hays	13,255	16,970	3,715
Llano	2,627	534	(2,093)
Matagorda	148,959	170,093	21,134
Mills	787	587	(200)
San Saba	5	125	120
Travis	91,964	85,617	(6,347)
Wharton	26,852	87,545	60,693
Williamson	-	-	-
Total (Region K)	370,261	449,699	79,438

Firm water needs for both wholesale water providers in the region (LCRA and City of Austin) in 2060 decreased when comparing the 2016 Region K Plan to the 2011 Region K Plan. The decrease in needs for LCRA was related to an increase in firm availability numbers, while the decrease in needs for the City of Austin was related to a decrease in demand.

11.2.6 Recommended Water Management Strategies

Due to the removal of the LCRA-SAWS Water Project (LSWP) from consideration as a recommended water management strategy, as well as the ongoing drought and the new source of State funding known as SWIFT, the water management strategies identified in the 2016 Region K Plan are quite different from the identified water management strategies in the 2011 Region K Plan. The next two sections identify only the differences between the two plans.

There are several recommended water management strategies that were in the 2011 Region K Plan, but are no longer recommended in the 2016 Region K Plan. Those strategies include the following:

- Additional Municipal Conservation
- Development of New Rice Varieties
- Conjunctive Use of Groundwater (Includes Overdrafts)
- Development of Ellenburger-San Saba Aquifer
- Development of Other Aquifer
- Development of Saline Zone of Edwards-BFZ Aquifer
- Expand Supply from STPNOC Reservoir
- Expansion of Other Aquifer
- Expansion of Queen City Aquifer
- Expansion of Yegua-Jackson Aquifer
- Goldthwaite Channel Dam
- LCRA Contract Reductions
- Purchase Water from COA
- Temporary Drought Period Use of Gulf Coast Aquifer
- Water Allocation
- Water Transfer

There are also many recommended water management strategies in the 2016 Region K Plan that are new and were not in the 2011 Region K Plan. They include the following:

- Conservation (Sprinkler Irrigation)
- Development of New Groundwater for Fayette Power Project
- Prairie Site Reservoir
- Mid-Basin Reservoir
- LCRA – Expand Use of Carrizo-Wilcox Aquifer in Bastrop County
- COA Aquifer Storage and Recovery
- Longhorn Dam Operation Improvements
- Rainwater Harvesting
- Long Lake Enhanced Storage
- COA Other Reuse
- Capture Local Inflows to Lady Bird Lake

- Indirect Potable Reuse through Lady Bird Lake
- Lake Austin Operations
- Expansion of Edwards-BFZ Aquifer
- Expansion of Marble Falls Aquifer
- Groundwater Importation – Hays County Pipeline
- BSEACD Edwards/Middle Trinity ASR
- BSEACD Saline Edwards ASR
- Buena Vista Regional Project
- East Lake Buchanan Regional Project
- Marble Falls Regional Project
- Water Purchase
- Brush Control
- Alternate Canal Delivery

11.2.7 Alternative Water Management Strategies

There are several alternative water management strategies included in the 2011 Region K Plan, but are no longer included as alternative strategies in the 2016 Region K Plan. Those strategies include the following:

- Desalination of Ellenburger-San Saba Aquifer
- Expansion of Gulf Coast Aquifer
- On-farm Conservation
- Irrigation Division Delivery System Improvements
- Conjunctive Use of Groundwater (Includes Overdrafts)
- Off-channel Storage in Additional Reservoirs

There are also several alternative water management strategies in the 2016 Region K Plan that are new and were not in the 2011 Region K Plan. They include the following:

- COA Brackish Groundwater Desalination (Down-dip)
- Reclaimed Water Bank Infiltration to Colorado Alluvium
- LCRA Aquifer Storage and Recovery
- Import Return Flows from Williamson County
- Supplement Bay and Estuary Inflows with Brackish Groundwater
- Baylor Creek Reservoir

- Direct Potable Reuse

APPENDIX 11A

*IMPLEMENTATION SURVEY TEMPLATE FOR 2011 REGION K PLAN
PROJECTS*

**Table 11A.1 - Summary of TWDB Template Containing Survey Results of
Implementation Status of Water Management Strategies from the 2011
Region K Water Plan**

**Table 11A.2 - Full TWDB Template Containing Survey Results of Implementation
Status of Water Management Strategies from the 2011 Region K Water
Plan**

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APPENDIX 11B

***COMPARISON TABLES AND GRAPHS FOR POPULATION AND
DEMAND PROJECTIONS***