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**Chapter 4: Comparison of Water
Demands with Water Supplies to
Determine Needs
2026 Initially Prepared Plan**

**Prepared for:
East Texas Regional Water Planning Group**

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Chapter 4. Comparison of Water Demands with Water Supplies to Determine Needs



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Appendix 4-A: Comparison of First-Tier Water Needs for Each MWP [to be prepared]



LIST OF ABBREVIATIONS

SABBREVIATION	DESCRIPTION
AFY	acre-feet per year
ETRWPA	East Texas Regional Water Planning Area
ETRWPG	East Texas Regional Water Planning Group
FWSD	Fresh Water Supply District
MUD	Municipal Utility District
MWA	Municipal Water Authority
MWP	Major Water Provider
RWP	Regional Water Plan
RWPA	Regional Water Planning Area
RWPG	Regional Water Planning Group
SRA	Sabine River Authority
SUD	Special Utility District
TWDB	Texas Water Development Board
WCID	Water Control and Improvement District
WSC	Water Supply Corporation
WMSs	Water Management Strategies
WUG	Water User Group
WWP	Wholesale Water Provider



4 COMPARISON OF WATER DEMANDS WITH WATER SUPPLIES TO DETERMINE NEEDS

This chapter describes the comparison of estimated current water supply for drought-of-record conditions from Chapter 3 and projected water demand from Chapter 2. From this comparison, water needs (shortages) or surpluses under drought-of-record conditions have been estimated. Water shortages identified from this comparison are defined as first-tier water needs. In addition, a secondary analysis was conducted to determine needs after conservation and direct reuse strategies have been implemented. Water shortages identified from this analysis are defined as second-tier water needs. Listings of the First-Tier and Second-Tier water needs by water user group are included in the Executive Summary, [Appendix ES-A Reports 06 and 07](#), respectively. [\[To be prepared.\]](#)

As discussed in Chapter 3, allocations of existing water supplies were based on the most restrictive of current water rights, contracts, water treatment capacities, available yields for surface water, and production capacities for groundwater. The allocation process did not directly address water quality issues, which were found to be minimal for the East Texas Regional Water Planning Area (ETRWPA). Water quality issues could potentially impact local usability of some water supplies, nonetheless.

The comparison of current water supply and projected water demand in the ETRWPA is evaluated on a regional basis, by county, by water user group (WUG) and by Major Water Provider (MWP). Section 4.1 presents a regional comparison of current and projected supplies, demands, and water needs. Section 4.2 presents a county-by-county comparison of current and projected First-Tier water needs. Section 4.3 presents the current and projected First-Tier water needs for each WUG. Section 4.4 discusses First-Tier water needs for the MWPs in the region. Section 4.5 discusses water needs for WUGs and MWPs, after savings from conservation and direct reuse strategies are applied (second-tier water needs).

4.1 REGIONAL COMPARISON OF SUPPLIES AND DEMANDS

As discussed in Chapter 3, it is estimated that the ETRWPA has approximately 3.0 million acre-feet (ac-ft) of fresh water supplies. However, not all of these water supplies have been developed for use by water user groups yet, i.e., no infrastructure has been developed to access these supplies. Undeveloped (or unconnected) water supplies are identified by comparing the supplies that are developed for each individual entity to use, to the total regional water supply sources. In the ETRPWA, the undeveloped fresh water supplies are estimated to be around 2.0 million ac-ft per year throughout the planning period. Additional infrastructure and/or contracts are needed to utilize these sources. Additional details on supply versus demand (DB27 Report) are provided in [Appendix ES-A, Report 03](#). [\[To be prepared.\]](#)

Table 4.1 and Figure 4.1 summarize and compare the total available, developed, and existing water supplies to the total projected water demands over the planning period for the ETRWPA. Available freshwater supplies are the maximum raw water supplies that could be cumulatively produced during a drought of record regardless of whether the supply is physically or legally available. While developed supplies exceed the projected WUG demands, not all developed supplies are currently accessible to water users due to constraints in their individual supply, infrastructure, or contracts with their water providers. Therefore, inaccessible developed supplies are excluded from the region's existing supplies presented. Consequently, projected demands for water users exceed the existing supplies throughout the planning horizon (2030-2080). As shown in Table 4.2, regional water needs (shortages) are shown to be nearly 19,000 ac-ft/yr in 2030 and increase to over 205,000 ac-ft/yr in 2080. However, as shown by the undeveloped freshwater supplies, the Region is a water-rich region with adequate supply to meet projected water demands through 2080 through project and water management strategy



implementation.

Table 4.1 Summary of Supply and Demand for the East Texas Regional Water Planning Area (ac-ft/yr)

	2030	2040	2050	2060	2070	2080
Available Freshwater Supplies	3,060,589	3,053,232	3,046,038	3,037,891	3,029,761	3,022,171
Undeveloped Supplies	2,080,623	2,062,259	2,048,512	2,034,766	2,018,885	2,003,245
Existing Supplies	979,966	990,973	997,526	1,003,125	1,010,876	1,018,926
WUG Demands	755,106	803,748	852,417	897,825	942,672	987,594
Difference between Supply and Demand*	224,860	187,225	145,109	105,300	68,204	31,332

*The difference between supply and demand does not reflect the water needs within Region I, as some WUGs have surpluses and some have shortages.

Values subjected to change until the end of the planning cycle.

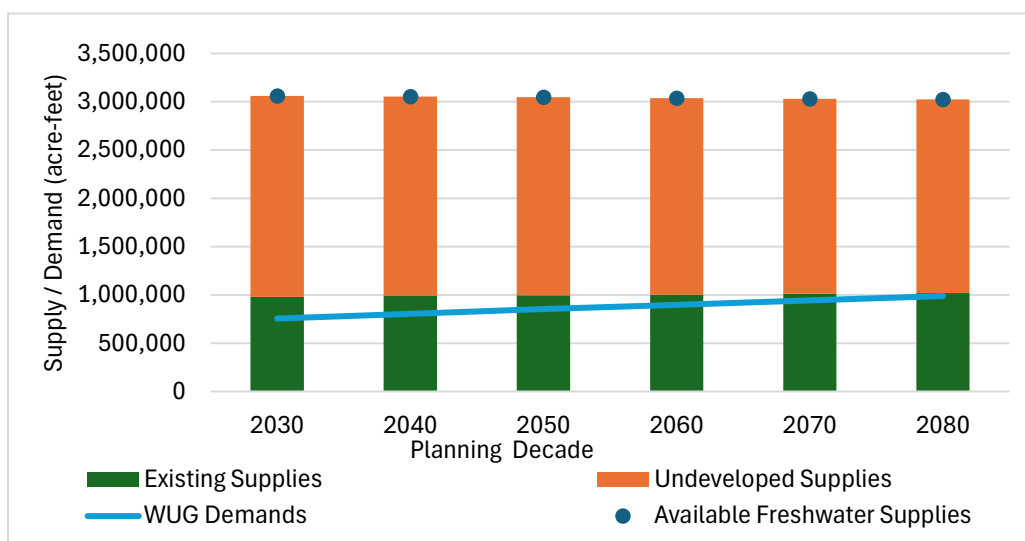


Figure 4.1 Comparison of Regional Water Supplies to Demands

Table 4.2 and Figure 4.2 summarize regional water needs by category of water use. On a regional basis, there are needs for each water use type. By far, the greatest needs are identified for manufacturing. Lesser needs are identified for municipal, livestock, steam electric power, mining, and irrigation categories. Most of the manufacturing needs are the result of considerable growth in demand and supplies that are limited to existing contract amounts or reported usage. Other non-municipal (mining, livestock, irrigation) needs are largely associated with demands that have not been realized to date and do not have a current water supply or are limited by modeled available groundwater in the regional water plan. The municipal needs arise from population growth and increasing demand, while the capacity of current infrastructure remains limited. It is likely that additional contract water will be needed to meet the municipal demand.

Table 4.2 Summary of Projected Regional Needs by Water Use Type (ac-ft/yr)

Water Use Type	2030	2040	2050	2060	2070	2080
Municipal	537	528	761	1,390	1,982	2,871
Manufacturing	8,661	41,712	79,026	116,016	153,086	190,233
Mining	1,120	1,194	1,268	1,350	1,435	1,527

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Steam Electric Power	8,765	8,930	9,061	9,045	9,033	9,041
Irrigation	215	215	215	215	215	215
Livestock	0	0	0	156	571	782
Total	19,298	52,579	90,331	128,172	166,322	204,669

*Values subjected to change until the end of the planning cycle.

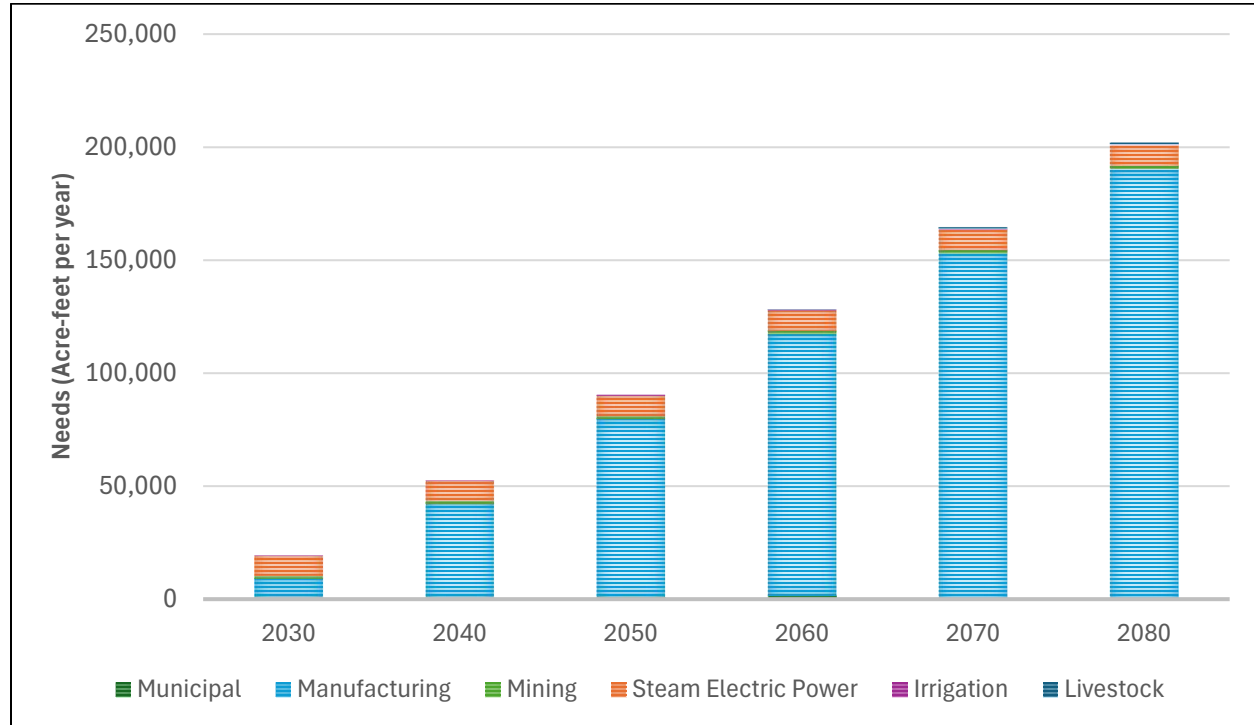


Figure 4.2 Projected Regional Needs by Water Use Type (ac-ft/yr)

4.2 FIRST-TIER WATER NEEDS BY COUNTY

First-Tier water needs are identified by comparing the current supplies allocated to water users from Chapter 3 to the projected demands from Chapter 2, in accordance with TWDB rules. Table 4.4 shows the projected First-Tier water needs by county for each decade of the planning period in ac-ft/yr and Table 4.5 shows this information as a percentage of demand. In general, some shortages exist throughout the region. Seventeen of the twenty counties in the ETRWPA are identified with needs over the planning horizon, with Jefferson, Jasper, and Orange counties having the largest projected needs by volume in 2080. As discussed previously, the region has sufficient developed supplies to meet these shortages, however, some of these supplies are unallocated due to existing constraints of individual entities. Figure 4.3 shows the amount of unallocated supplies by county in the region. The “Source-Balance” data table in [Appendix ES-A, Report 09](#) lists each water source and the amount of water that is available for future use. [\[To be prepared.\]](#)



Table 4.3 Summary of Projected First-Tier Water Needs by County (ac-ft/yr)

County	2030	2040	2050	2060	2070	2080
Anderson	2,296	2,296	2,296	2,296	2,296	2,296
Angelina	2,925	3,133	3,343	3,558	3,774	3,995
Cherokee	124	209	371	449	571	717
Hardin	0	0	0	0	0	0
Henderson*	2,108	2,127	2,202	2,472	2,992	3,609
Houston	113	111	111	170	396	396
Jasper	455	2,589	4,802	7,097	9,476	11,943
Jefferson	5,142	35,793	70,285	104,603	138,926	173,253
Nacogdoches	0	30	62	115	167	218
Newton	0	0	0	0	0	0
Orange	4,408	4,573	4,704	4,688	4,676	4,684
Panola	5	6	6	6	6	6
Polk*	0	0	0	0	0	0
Rusk	0	0	0	0	26	61
Sabine	0	0	0	97	96	96
San Augustine	0	0	0	0	0	0
Shelby	841	934	1,053	1,148	1,239	1,325
Smith*	588	481	794	1,166	1,369	1,753
Trinity*	215	215	215	215	215	215
Tyler	78	82	87	92	97	102
Total	19,298	52,579	90,331	128,172	166,322	204,669

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

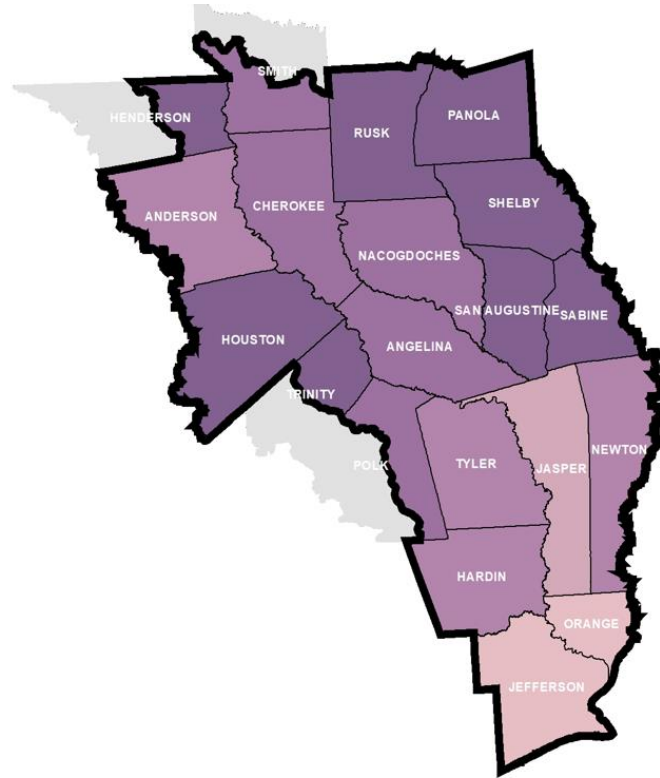
Values subjected to change until the end of the planning cycle.



Table 4.4 Summary of Projected First-Tier Water Needs by County (Percentage of Demand)

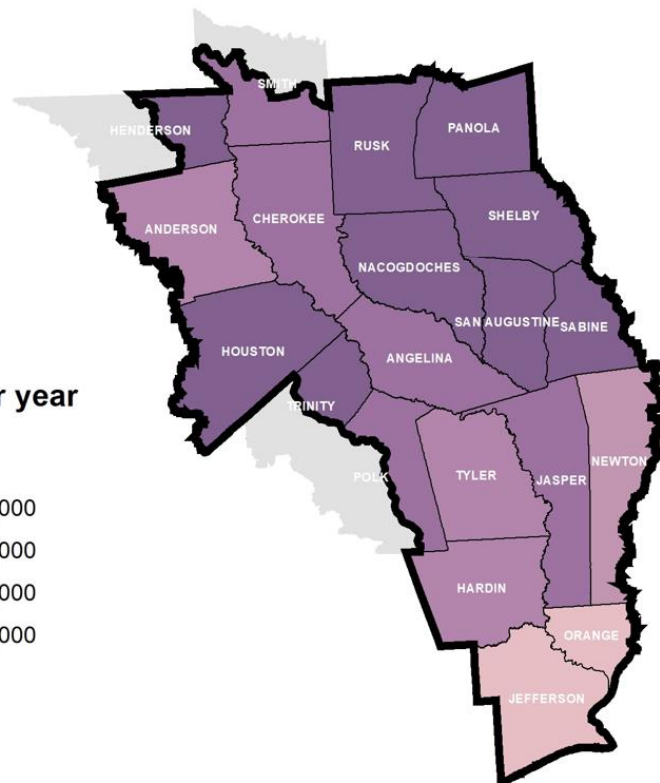
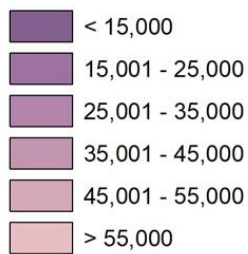
County	2030	2040	2050	2060	2070	2080
Anderson	11%	11%	11%	11%	11%	11%
Angelina	15%	16%	17%	17%	18%	19%
Cherokee	1%	2%	4%	4%	6%	7%
Hardin	0%	0%	0%	0%	0%	0%
Henderson*	23%	23%	24%	26%	31%	36%
Houston	1%	1%	1%	2%	4%	4%
Jasper	1%	3%	6%	9%	12%	14%
Jefferson	2%	10%	18%	24%	30%	35%
Nacogdoches	0%	0%	0%	1%	1%	1%
Newton	0%	0%	0%	0%	0%	0%
Orange	3%	3%	3%	3%	3%	3%
Panola	0%	0%	0%	0%	0%	0%
Polk*	0%	0%	0%	0%	0%	0%
Rusk	0%	0%	0%	0%	0%	0%
Sabine	0%	0%	0%	4%	4%	4%
San Augustine	0%	0%	0%	0%	0%	0%
Shelby	7%	7%	8%	8%	9%	9%
Smith*	1%	1%	1%	2%	2%	2%
Trinity*	27%	28%	29%	30%	31%	32%
Tyler	2%	2%	2%	3%	3%	3%
Total	3%	7%	11%	14%	18%	21%

*A single asterisk next to a country’s name denotes that the county is split by more than one planning region.
 Values subjected to change until the end of the planning cycle.



2030

acre - feet per year



2080

Figure 4.3 Unallocated Supplies



4.3 FIRST-TIER WATER NEEDS BY WATER USER GROUP

The comparison of First-Tier water needs by water user group is presented in Table 4.5. There are 31 different WUGs across 16 counties in the ETRWPA with identified needs that cannot be met by existing infrastructure and supply. The needs by the WUGs below range from 1% to 100% of their respective demands. These projected needs total nearly 205,000 ac-ft/yr by 2080. This is similar to the projected needs identified in the 2021 East Texas Regional Water Plan. Specific needs are addressed in subsequent subsections.

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Table 4.5 Water User Groups with Projected Needs (ac-ft/yr)

Water User Group	County	2030	2040	2050	2060	2070	2080	Needs as % of Demand
Steam Electric Power	Anderson	2,296	2,296	2,296	2,296	2,296	2,296	100%
Manufacturing	Angelina	2,145	2,314	2,488	2,671	2,859	3,055	42%
Mining	Angelina	780	819	855	887	915	940	100%
Alto Rural WSC	Cherokee	124	209	306	414	533	665	31%
Southern Utilities*	Cherokee	0	0	65	35	38	52	5%
Athens*	Henderson	0	0	15	17	19	20	28%
Chandler	Henderson	0	0	43	281	573	934	25%
Edom WSC*	Henderson	21	24	23	24	26	27	64%
Mining*	Henderson	26	42	60	89	123	166	35%
Steam Electric Power*	Henderson	2,061	2,061	2,061	2,061	2,061	2,061	53%
Livestock*	Henderson	0	0	0	0	190	401	3%
Livestock	Houston	0	0	0	59	285	285	5%
TDCJ Eastham Unit	Houston	113	111	111	111	111	111	10%
Manufacturing	Jasper	455	2,589	4,802	7,097	9,476	11,943	10%
Manufacturing	Jefferson	5,142	35,793	70,285	104,603	138,925	173,250	34%
Trinity Bay Conservation District*	Jefferson	0	0	0	0	1	3	2%
D & M WSC	Nacogdoches	0	30	62	115	167	218	9%
Steam Electric Power	Orange	4,408	4,573	4,704	4,688	4,676	4,684	44%
Elysian Fields WSC*	Panola	5	6	6	6	6	6	100%
Jacobs WSC	Rusk	0	0	0	0	26	58	4%
West Gregg SUD*	Rusk	0	0	0	0	0	3	3%
Livestock	Sabine	0	0	0	97	96	96	9%
Manufacturing	Shelby	841	934	1,053	1,148	1,239	1,325	53%
Ben Wheeler WSC*	Smith	1	0	1	2	3	3	42%
Liberty Utilities Silverleaf Water*	Smith	0	5	27	48	69	90	17%
Southern Utilities*	Smith	0	0	69	337	410	681	2%
County-Other*	Smith	273	143	33	0	0	0	7%
Manufacturing*	Smith	0	0	311	405	490	558	9%
Mining	Smith	314	333	353	374	397	421	76%
Irrigation*	Trinity	215	215	215	215	215	215	39%
Manufacturing	Tyler	78	82	87	92	97	102	69%
Total		19,298	52,579	90,331	128,172	166,322	204,669	

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

Values subjected to change until the end of the planning cycle.



4.3.1 Identified Needs for Municipal

A total of 15 municipal water user groups are shown to have a water shortage at some point during the planning horizon. Among the WUGs with needs, City of Chandler, Alto Rural WSC, and Southern Utilities are projected to have the largest needs by volume. The needs represent as much as 25% and 31% on average over the planning horizons for the City of Chandler and Alto Rural WSC, respectively, while the needs represent only 2% on average of Southern Utilities' demand in Smith County. Municipal water needs over 100 ac-ft per year are also identified for TDCJ Eastham Unit and D & M WSC. All other municipal WUGS that show water shortages are below 100 ac-ft per year.

4.3.2 Identified Needs for Manufacturing

Manufacturing water needs in are projected to comprise around 86 percent of the region's First-Tier water needs throughout the planning horizon (2030-2080), with shortages ranging from around 9,000 ac-ft per year in 2030 to over 190,000 ac-ft per year in 2080, as shown in Table 4.2. The majority of the manufacturing need in the region are in Jefferson County, ranging from approximately 5,000 ac-ft in 2030 to approximately 173,000 ac-ft in 2080. The projected increase in needs are associated with potential future industrial facilities in Jefferson County that do not currently have contracts or infrastructure in place for water supply. Water needs are also shown for manufacturing entities in Angelina and Jasper counties due to increased demands above the facilities' existing supplies.

4.3.3 Identified Needs for Mining

Mining water needs around 1,000 ac-ft per year are identified in Angelina county in 2080, representing 100% of its projected demand.¹ Additionally, mining needs are projected in three other counties (Henderson, Houston, and Smith). Most of these mining needs are also expected to increase over time. Mining needs are due to infrastructure constraints, limited allocation to their historical use as infrastructure constraints are not known, and lack of remaining groundwater supply in their associated counties.

4.3.4 Identified Needs for Livestock

Livestock water needs are projected to occur by 2060, when Henderson and Houston counties are identified to have needs. The projected livestock water needs for Henderson and Houston counties range from around 300 ac-ft to less than 500 ac-ft, representing at most 5% of their respective prospective demand over in 2080.

4.3.5 Identified Needs for Steam Electric Power

Steam electric power water needs exceeding 2,000 ac-ft per year are identified in Anderson, Henderson, and Orange counties. Water supply shortages are primarily due to increases in demand above generation capacities of current facilities. Some of this need is predicated on power facilities that are proposed and whose demands are accounted for in the 2026 ETRWP, but do not have an existing source of water supply.

4.3.6 Identified Needs for Irrigation

The projected irrigation water needs for Trinity County are estimated around 200 ac-ft, representing no

¹ Ongoing investigation is being conducted to evaluate the existing supply for the mining demand in Angelina county as part of the regional water planning effort, and it is expected the needs shown in this section will reduce.

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more than 40% of their respective prospective demand over the planning horizon (2030-2080). Irrigation needs are primarily due to groundwater well capacity limitation.

4.4 FIRST-TIER WATER NEEDS BY MAJOR WATER PROVIDER

The comparison of First-Tier water needs for each MWP is presented in Appendix 4-A. Two MWPs were identified with projected needs in the ETRWPA over the planning cycle, while the rest of the MWPs have either no needs or surplus of water above their demands. The MWPs with needs within the region are shown in Table 4.6 and discussed below. MWPs with surpluses within the region are shown in Table 4.7. The table values were determined using existing supplies and existing contract demands but exclude potential future customers.

In addition to these providers, several MWPs are planning WMSs to increase the reliability of their supplies and to meet the needs of potential future customers. These providers and the recommended strategies are discussed in Chapter 5B.

Table 4.6 Major Water Providers with Projected Regional Needs for Current Customers (ac-ft/yr)

Water Provider	2030	2040	2050	2060	2070	2080
Athens Municipal Water Authority	835	198	-891	-1839	-2,966	-3,698
Upper Neches River Municipal Water Authority	-33,137	-35,184	-37,232	-39,234	-41,239	-43,259
Total	-32,302	-34,986	-38,123	-41,073	-44,205	-46,957

*Values subjected to change until the end of the planning cycle.



Table 4.7 Major Water Providers with Projected Regional Surpluses or No Water Supply Needs for Current Customers (ac-ft/yr)

Water Provider	2030	2040	2050	2060	2070	2080
Angelina-Nacogdoches WCID No. 1	8,422	7,705	6,967	6,205	5,419	4,605
City of Beaumont	0	0	0	0	0	0
City of Carthage	2,528	2,513	2,503	2,496	2,486	2,473
City of Center (a)	TBD	TBD	TBD	TBD	TBD	TBD
City of Jacksonville	2,221	2,112	2,067	2,035	2,005	1,980
City of Lufkin	7,028	6,928	6,856	6,768	6,680	6,590
City of Nacogdoches	9,797	9,128	8,453	7,668	6,881	6,089
City of Port Arthur	0	0	0	0	0	0
City of Tyler	26,955	22,574	17,598	14,759	11,767	8,615
Houston Co. WCID 1	322	333	366	349	346	350
Lower Neches Valley Authority	578,166	570,268	566,258	562,923	559,776	556,778
Panola Co. FWSD 1	5,980	5,196	4,662	3,628	2,844	2,060
Sabine River Authority of Texas	967,421	967,104	966,751	966,470	966,153	965,836
Total	1,608,841	1,593,861	1,582,481	1,573,301	1,564,357	1,555,376

(a) The City of Center is expected to have sufficient water supply to meet its demand per the discussion between the Region I Consultant with the City in September 2024. Exact surplus values are to be determined.

*Values subjected to change until the end of the planning cycle.

4.4.1 Athens Municipal Water Authority (AMWA)

The maximum projected need for AMWA is 3,698 ac-ft per year in Year 2080. Most of this need is associated with operational constraints of Lake Athens paired with increasing demand growth projected for the City of Athens and existing demand for the Athens Fish Hatchery. Several water management strategies are being considered for AMWA to meet this need, including reuse from return flows from the Athens Fish Hatchery and developing groundwater supplies from the Carrizo-Wilcox aquifer.

4.4.2 Upper Neches River Municipal Water Authority (UNRMWA)

The UNRMWA has contractual demands that exceed the reliable supply from its Lake Palestine system. The long-term strategy to meet these demands and other potential future demands is to develop additional supplies in the Neches River basin.

4.5 SECOND-TIER WATER NEEDS ANALYSIS [TO BE COMPLETED UPON COMPLETION OF CHAPTER 5]

The Second-Tier water needs analysis compares the currents and projects supplies and demands after reductions from conservation and direct reuse. Conservation and direct reuse are both characterized as water management strategies (WMS), which will be further discussed in Chapter 5B and Chapter 5C. Appendix ES-A, Report 07 contains listings of the second-tier water needs by water user group and major water provider.

Figure 4.4 illustrates the reduction of water needs within the region after applying conservation and direct

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reuse strategies. Conservation was applied to all municipal WUGs with a reported per-capita usage above 140 gallons per capita per day (GPCD), whether there was a need or not, therefore, needs were only reduced if an entity had a need. Overall, conservation and direct reuse decreased the total needs within the region by over 100 ac-ft per year (~0.1 percent) in 2020 and nearly 7,900 ac-ft per year (~3.9 percent) by 2070. A large portion of this reduction is attributed to the City of Beaumont's municipal conservation strategy.

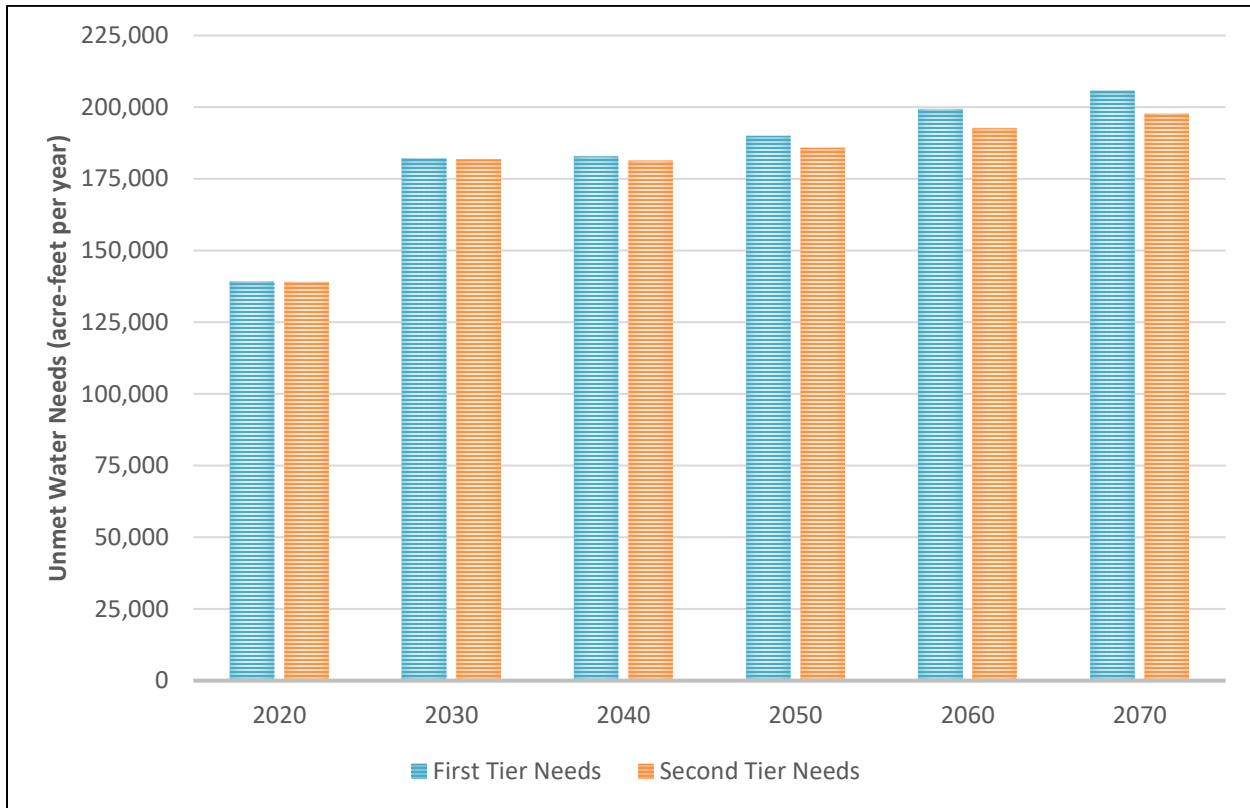


Figure 4.4 Regional Secondary Needs Comparison

Appendix 4-A

Comparison of First-Tier Water Needs for Each MWP

[Pending]