6

Water supply needs

QUICK FACTS

If no additional water supplies are developed or water management strategies such as conservation are implemented, water users face a potential water shortage of 3.1 million acre-feet per year in 2020 and 6.9 million acre-feet per year in 2070 in the event of a repeat of the drought of record.

Without additional supplies being developed through the recommended strategies and projects, approximately one-quarter of Texas' population would have less than half of the municipal water supplies they will require in 2070.

In aggregate, population growth leads to Texas' municipal water users potentially facing water shortages almost 15 times larger in 2070 (approximately 3.1 million acre-feet) than in 2020 (approximately 215,000 acre-feet) unless recommended strategies and projects are implemented.

Without additional water supplies, the annual economic losses resulting from drought of record water shortages are estimated to range from approximately $110 billion in 2020 to $153 billion in 2070.

There are significant irrigation water needs that would remain unmet under drought even if the plan is fully implemented, largely due to managed depletion of aquifers and a lack of economically feasible alternatives.

When existing water supplies—water that is already anticipated to be legally and physically available during a drought of record—are less than the projected water demands required to support regular economic and domestic activities, potential water shortages exist. These potential water shortages are referred to as identified water supply needs. The identified water needs discussion in this chapter focuses on aggregated, total needs that, for the purpose of clarity, assume none of the water management strategies are implemented.

Water shortages pose enormous risks to the Texas economy and public health and safety. Economically, a perceived lack of water in a region can bias decision makers against starting a new business or expanding their existing enterprise in Texas. More fundamentally, public health and safety depend on adequate water supplies for drinking water, sanitation, and hygiene. Water shortages resulting from inadequate planning and implementation can also strain water resources that have already been developed as water supplies.

To determine if existing water supply is adequate to support the demands of Texas' rapidly growing population, expanding economy, and vital natural resources, the regional water planning groups compared projected water demand to existing water supplies. More than 17,000 comparisons over the 50-year planning horizon revealed foreseeable water supply surpluses and potential shortages in a repeat of the drought of record based on existing supplies.

Once planning groups have identified potential shortages, they evaluate and recommend water management strategies to meet those water supply needs. Strategies for meeting or reducing potential shortages include conservation, groundwater wells, new reservoirs, and desalination plants, all of which are discussed in Chapter 7.

Planning groups reported the economic and socioeconomic impacts of not implementing water management strategies and summarized the specific subset of total water needs that, unfortunately, could not feasibly be met by the plan during drought of record conditions. These *unmet* needs constitute a small portion of the total identified needs and are not anticipated to negatively impact public health or safety.

Because the state water plan is based on providing water supplies under drought conditions when water demands are usually highest and supplies are lowest, its implementation will also generally support most of the same water demands under average or wetter hydrologic conditions. Significant portions of identified water needs in this state water plan, particularly certain irrigation needs, are not, however, entirely attributable to an onset of drought conditions. Instead, those needs are associated largely with 1) either declining groundwater supplies combined with a lack of economically feasible strategies to replace that irrigation supply or 2) increases in future demand in high-growth urban areas. Even under average hydrologic conditions, irrigated agriculture requires significant water supplies to support it, and although strategies are recommended to address needs to the extent economically feasible, sizable portions of those irrigation demands will likely be unmet even under average hydrologic periods, due largely to the managed and unmanaged depletion of aquifers.

When considering potential water shortages, it is also important to keep in mind that the significance of an identified water need is best judged not in terms of the magnitude of its nominal volume, but rather in comparison to the entire water demand of that entity with the need. For example, a water need (potential shortage) of 10,000 acre-feet that represents only 5 percent of one entity's entire demand is actually much less concerning to that entity than a nominally, much smaller, 10 acre-foot shortage that comprises 50 percent of the total demand of a different entity.

6.1 Identification of water needs

For the purposes of this state planning perspective, the TWDB aggregates data provided by the planning groups and identifies water needs for each water use category and water user group for each decade over the next 50 years. In some instances, these aggregated existing water supplies over a combined geographic area may appear sufficient to meet all the water needs within that area, but in fact are not distributed user by user in a manner that would meet all needs. Therefore, for many geographic areas that as a whole may appear to have sufficient supplies, individual entities may experience shortages and others may have surpluses. In these situations, water needs might be met by implementing water management strategies such as the transfer or reallocation of surplus water supplies from one water provider to another. Delivery and treatment of additional water supplies from these strategies may or may not require new or expanded water infrastructure.

In 2020, Texas faces a near-term potential water shortage of slightly more than 3.1 million acre-feet in a drought of record. By 2070, the potential shortage more than doubles to nearly 6.9 million acre-feet (Table 6-1). These needs vary considerably by water use category (Figure 6-1). Although all 16 regions face water needs in all planning decades, the magnitude of needs varies significantly between regional water planning areas (Table 6-2). Region C faces the greatest combined overall increase in water needs from 2020 to 2070, with water needs increasing to more than

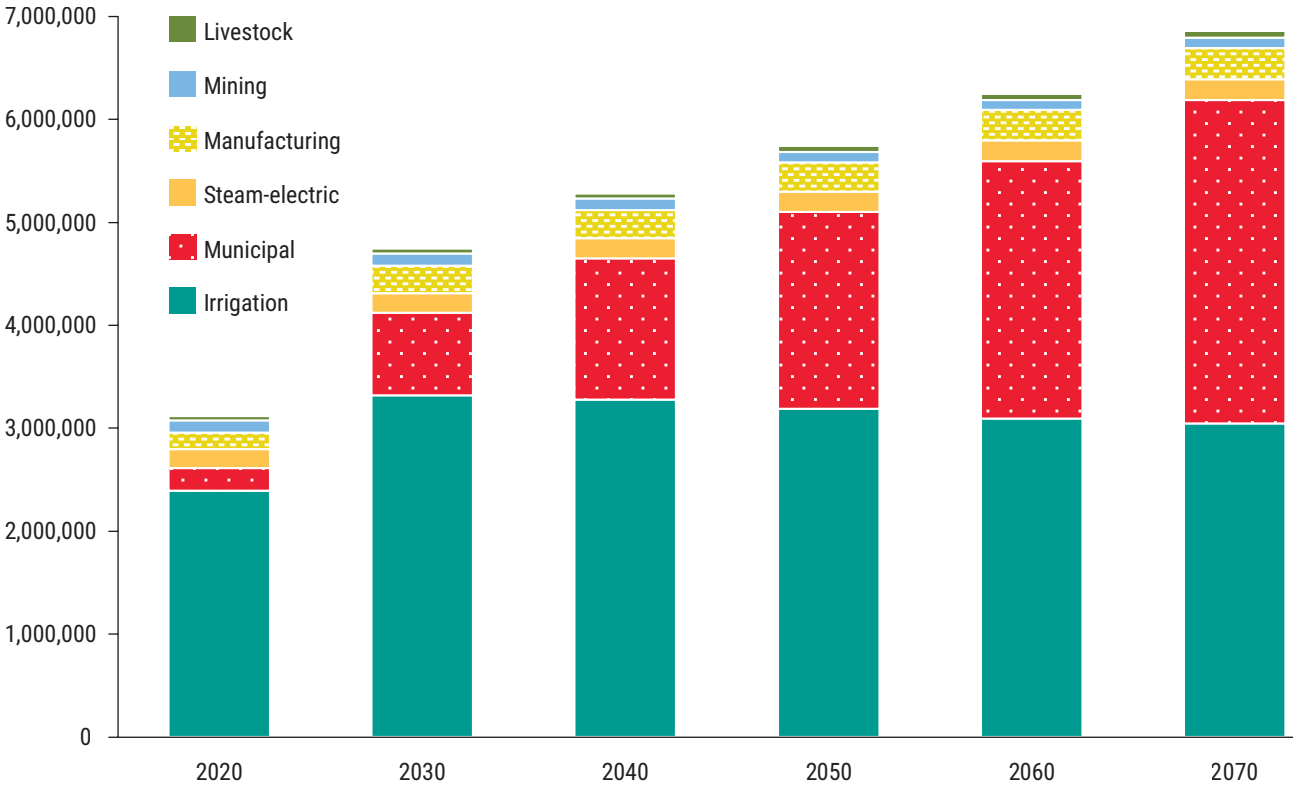
Table 6-1. Projected annual water needs by water use category (acre-feet)

Category	2020	2030	2040	2050	2060	2070[b]	Percent change
Irrigation	2,396,000	3,319,000	3,280,000	3,188,000	3,094,000	3,046,000	27
Municipal	215,000	802,000	1,371,000	1,912,000	2,502,000	3,144,000	1,362
Steam-electric	187,000	192,000	196,000	199,000	201,000	203,000	9
Manufacturing	159,000	264,000	275,000	286,000	295,000	301,000	89
Mining	119,000	123,000	111,000	102,000	96,000	101,000	-15
Livestock	40,000	44,000	48,000	54,000	60,000	63,000	58
Texas[a]	**3,116,000**	**4,744,000**	**5,281,000**	**5,741,000**	**6,248,000**	**6,858,000**	**120**

[a] *Statewide totals may vary between tables due to rounding.*

[b] *In 2070, 77 percent of statewide irrigation water needs remain unmet by the plan. Non-irrigation unmet needs represent 6 percent of statewide unmet needs.*

*Figure 6-1. Projected annual water needs by water use category (acre-feet)**



** Water use categories are presented in the order listed in the legend.*

1.2 million acre-feet in 2070, while Region P does not anticipate an increase in its water needs over the same period. This is primarily driven by the differences in population growth.

6.2 Municipal needs

Municipal water users face the greatest overall increase as a relative share of all state water needs over the planning horizon, from 7 percent of all state water needs in 2020 to 46 percent in

Table 6-2. Projected annual water needs by region (acre-feet)

Region	2020	2030	2040	2050	2060	2070
A	148,000	394,000	411,000	394,000	369,000	378,000
B	25,000	26,000	30,000	32,000	36,000	41,000
C	66,000	307,000	530,000	769,000	1,016,000	1,278,000
D	81,000	87,000	91,000	98,000	106,000	117,000
E	61,000	66,000	76,000	89,000	104,000	119,000
F	63,000	72,000	75,000	81,000	91,000	103,000
G	211,000	255,000	291,000	345,000	404,000	478,000
H	145,000	405,000	578,000	667,000	769,000	883,000
I	139,000	182,000	183,000	190,000	199,000	206,000
J	6,000	6,000	7,000	8,000	8,000	9,000
K	283,000	281,000	289,000	291,000	297,000	319,000
L	204,000	232,000	268,000	305,000	350,000	401,000
M	937,000	924,000	926,000	937,000	953,000	970,000
N	15,000	31,000	36,000	40,000	45,000	49,000
O	726,000	1,467,000	1,483,000	1,485,000	1,493,000	1,500,000
P	8,000	8,000	8,000	8,000	8,000	8,000
Texas[a]	**3,118,000**	**4,743,000**	**5,282,000**	**5,739,000**	**6,248,000**	**6,859,000**

[a] *Statewide totals may vary between tables due to rounding.*

2070 (Table 6-1). Except for Region P, each region faces at least some potential municipal water shortages over the next 50 years unless strategies are implemented. Municipal water needs are projected to become the highest water use category by 2070, after remaining second only to irrigation needs through the year 2060.

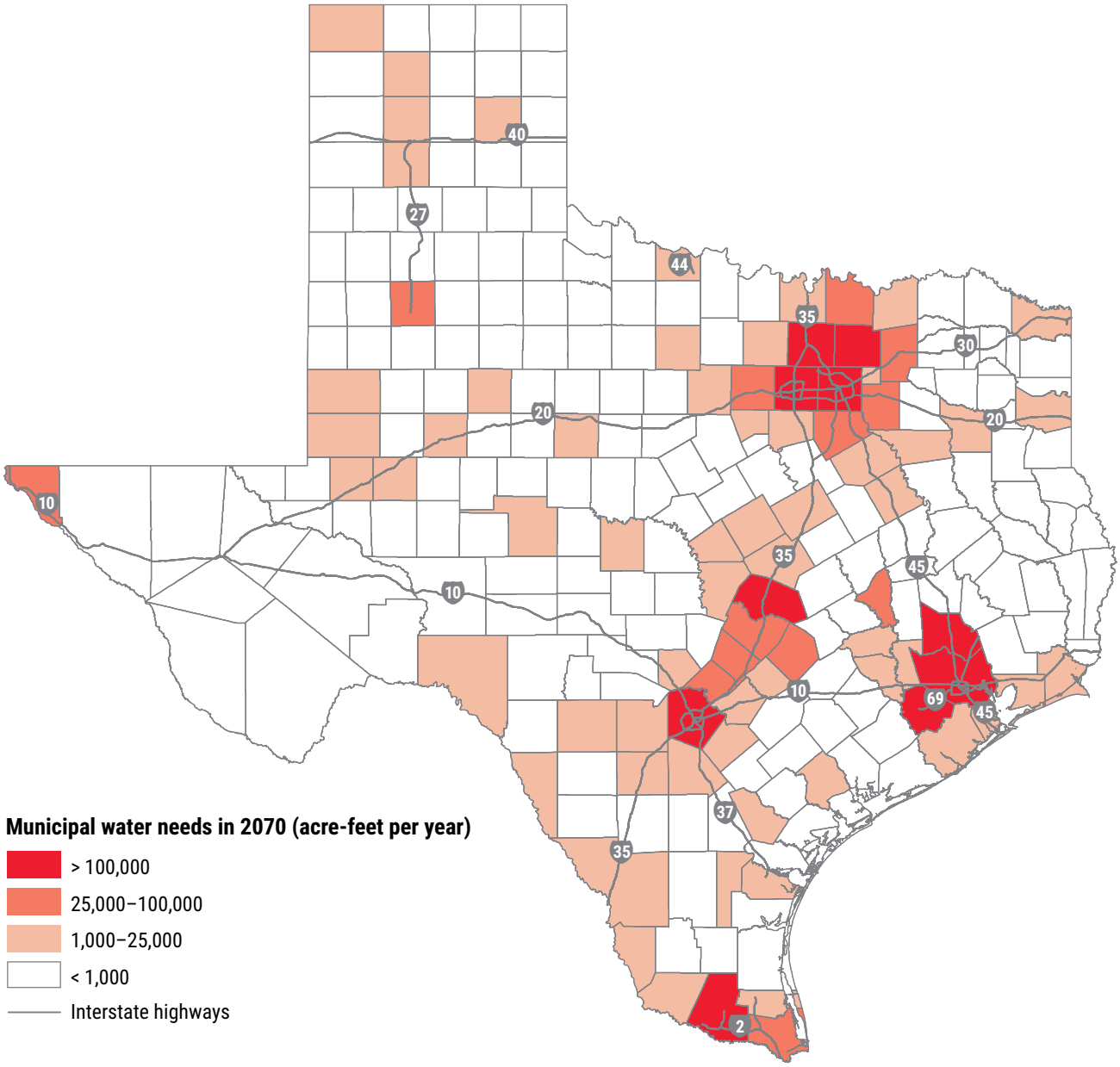
For each decade of the planning period, Region C has the largest annual municipal needs, increasing from approximately 43,000 acre-feet in 2020 to more than 1.2 million acre-feet in 2070 (Appendix C). In 2070, municipal needs would vary widely across the state, with 10 counties facing municipal water needs of more than 100,000 acre-feet (Figure 6-2).

Texas' growing population faces highly variable degrees of potential municipal water shortages over the next 50 years, with the severity of shortages ranging significantly among individual water users. Shortages that constitute a larger percentage of an entity's total demand indicate a more severe potential shortage (Figure 6-3) that would likely cause economic harm. The ability to absorb modest shortages through temporary measures such as drought management will depend in large part on the amount of demand hardening that has already occurred within the service area of an entity. In other words, areas that have already implemented significant conservation measures will, by the nature of their lower and more efficient water use, have less room to maneuver to lower water use during a drought without economic harm.

If no recommended municipal water management strategies are implemented by the onset of another drought of record,

- approximately 78 percent (40.4 million) of all Texans in 2070 would face at least a 10 percent water shortage in their cities and residences;
- approximately 26 percent (13.3 million) of all Texans in 2070 would have less than half of the municipal water supplies they require; and
- the estimated population who might have less than 10 percent of the water supplies they require increases from 166,000 in 2020 to nearly 550,000 in 2070.

Figure 6-2. Projected municipal water needs by county in 2070



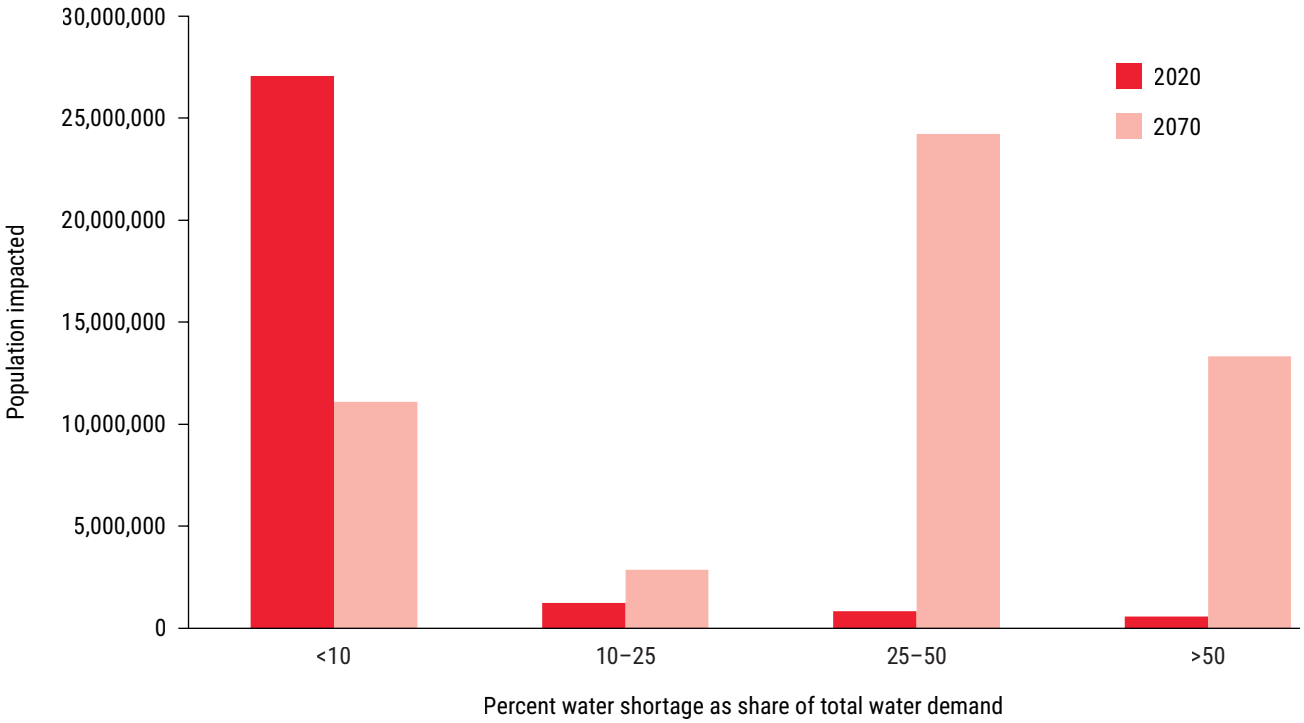
6.3 Non-municipal needs

From 2020 to 2070, of the non-municipal water use categories, irrigation has the highest volume of water needs statewide, while livestock has the lowest (Table 6-1). A breakdown of annual water needs by region and water use category is included in Appendix C.

Irrigation water needs are projected to peak in 2030 at approximately 3.3 million acre-feet per year and then gradually decline to just over 3 million acre-feet in 2070. Region M has the greatest volume of irrigation water needs in 2020, but Region O has the greatest volume of needs from 2030 to 2070.

Manufacturing water needs are greatest in Region I. Total statewide manufacturing water needs nearly double over the planning period, increasing from 159,000 acre-feet per year in 2020 to 301,000 acre-feet in 2070.

Figure 6-3. Projected statewide population impacted by municipal water needs in 2020 and 2070



Steam-electric water needs are greatest in Region G and reach a statewide maximum of 203,000 acre-feet per year in 2070.

Mining water needs are greatest in Region G. Mining needs increase slightly in the near term, peaking at 123,000 acre-feet in 2030, and are relatively constant for the remainder of the planning horizon.

Livestock water needs are greatest in Region I. The statewide total increases from 2020 to 2070 but remains no more than 63,000 acre-feet per year.

6.4 Major water provider needs

The *major water provider* classification was modified by rule prior to this state water plan to provide the regions more flexibility in addressing the intentionally subjective term *major* as appropriate in each region. By and large, this category includes mostly the same entities that have been planned for as major water providers in previous state water plans. Major water providers are water user groups or wholesale water providers identified by regional water planning groups to be of particular significance to a region's water supply.

A single entity such as Dallas Water Utilities may be considered a water user group, wholesale water provider, and also a major water provider. Major water providers include public or private entities, such as river authorities, water districts, municipal utility districts, or water supply corporations that deliver and sell large volumes of untreated and treated water for municipal, manufacturing, irrigation, and steam-electric use on a wholesale or retail basis. The identified water needs of major water providers are based on aggregating the water needs of their customer water user groups and are used for developing major provider water management strategies. To avoid double counting water user needs in the plans, the needs of major water providers are not included in the total water needs presented in the regional or state water plans. Instead, only the

potential shortages are presented for individual water user groups to calculate needs.

In 2020, 103 out of a total of 219 major water providers identified by the planning groups face shortages, with annual total statewide shortages of approximately 1.1 million acre-feet, increasing to 4.7 million acre-feet in 2070.

6.5 Impacts of not meeting identified water needs

Insufficient water supplies would negatively affect existing businesses and industry, future economic development efforts, and public health and safety in Texas. Because of water's importance to the state, planning groups are required to include the economic and social impacts of not mitigating future water needs in their water plans. At the request of the planning groups, the TWDB assisted with this requirement by assessing the socioeconomic impacts of not meeting water needs and providing that information to each region.

The economic impact portion of the analysis measures potential impacts of unmet water needs, including effects of economic losses to regions from reduced economic output for agricultural, industrial, and commercial water uses. The TWDB performed the analysis using a static economic impact modeling software package, IMPLAN (Impact for Planning Analysis), as well as other economic analysis techniques. This analysis represents a snapshot estimate of statewide socioeconomic impacts in the event of a single year repeat of the drought of record, with the fundamental assumption that no water management strategies are implemented to reduce the identified water needs.

The social impact portion of the analysis focuses on potential demographic effects, including changes in population and school enrollment, by incorporating results from potential job losses due to unmet water needs. The analysis estimates how changes in a region's economy could affect patterns of migration from a region. This relied partially on a simplified ratio of job and net population losses calculated for the state as a whole, based on a recent study of how job layoffs impact the labor market population (Foote and others, 2015).

Because statewide water needs more than double during the planning horizon, from 3.1 to 6.9 million acre-feet (Table 6-1), the associated economic and social impacts also rise significantly over the 50 years (Table 6-3). The estimated statewide impacts of not meeting the identified water needs in Texas would result in an annual combined lost income of $110 billion in 2020, increasing to $153 billion by 2070. Lost jobs would increase from 615,000 in 2020 to almost 1.4 million in 2070. To put these impact estimates in perspective, the projected annual lost income estimates for 2020 account for approximately 6 percent of the 2018 annual gross domestic product, which was approximately $1.8 trillion (BEA, 2020).

Projected impacts vary with the magnitude of needs over time as well as with the changes in estimated lost income per acre-foot of water needs, which range greatly between economic sectors as shown in Figure 6-4.

In attempting to estimate a wide range of socioeconomic impacts over a large geographic area for 50 years, the impact model requires making many assumptions and acknowledging the model's uncertainty and limitations. Those include a lack of reliable water use data for significant portions of the economy, coupled with limited knowledge concerning how a given economic sector might respond to a long-term drought.

Because of data and methodological limitations, the model cannot capture all economic impacts. As a result, the actual economic impacts are likely significantly larger than those that resulted from this analysis.

*Table 6-3. Projected statewide annual socioeconomic impacts from not meeting water needs**

Impact measure	2020	2030	2040	2050	2060	2070
Income loss (billions of dollars)[a]	$110	$128	$128	$132	$140	$153
Job loss	615,000	785,000	883,000	1,019,000	1,179,000	1,371,000
Population loss	113,000	144,000	162,000	187,000	217,000	252,000

** These statewide impacts vary from the impact results presented in the regional water plans (Appendix D) and online dashboards. This is primarily due to a difference in the quantity of water needs used to estimate the impacts. The results included in the regional water plans and online dashboards were from an analysis conducted in September 2019 to allow for public comment in the draft regional plans. Final regional water plans included updated water needs estimates, and the TWDB performed the statewide impact estimates in this chapter based upon the final needs data in November 2020.*

[a] *Year 2018 dollars, rounded.*

Analysis of this type is better at predicting relative percent differences brought about by a shock to a complex system (such as a water shortage imposed upon a regional economy) than the precise size of an impact. It is the general and relative magnitudes of impacts as well as the changes of these impacts over time that should be the focus rather than the absolute numbers. Key assumptions and limitations behind the analysis include the following:

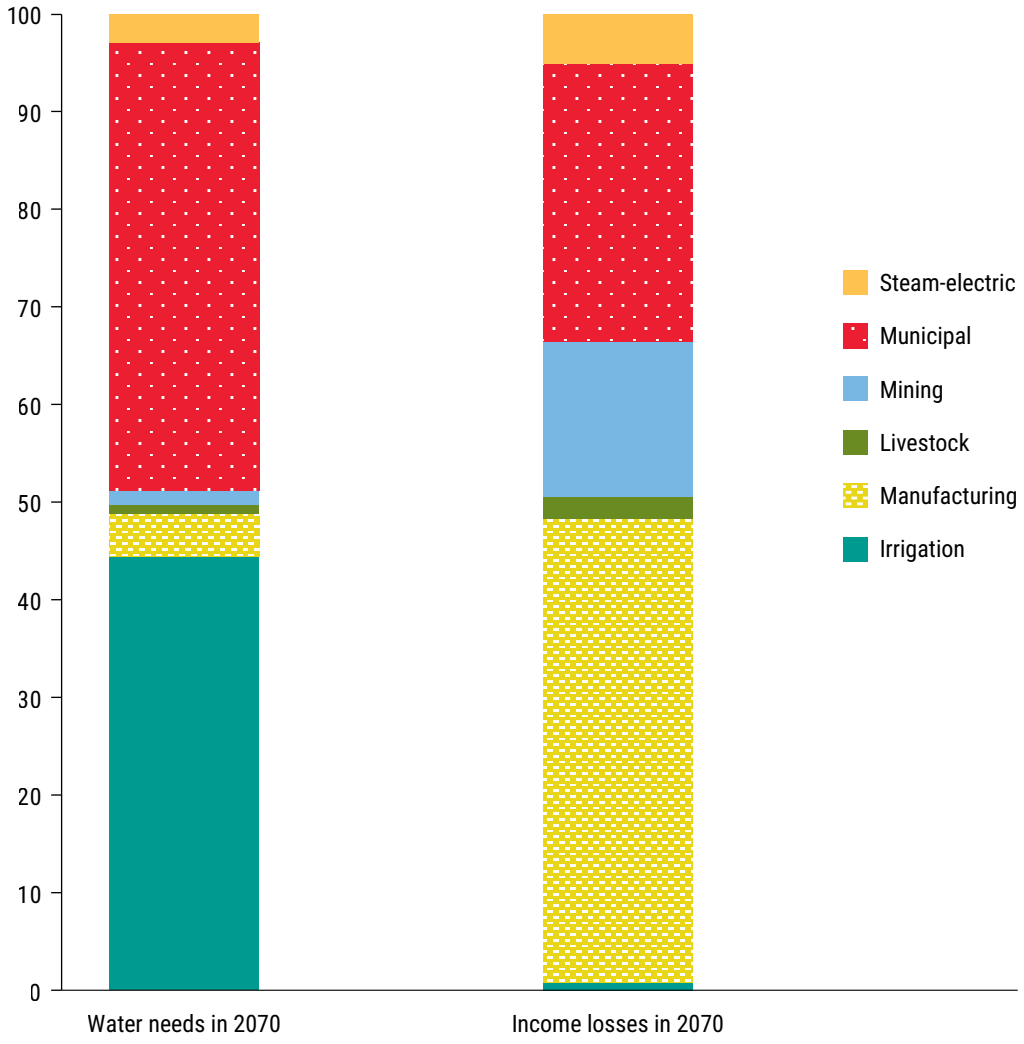
- Changes in the future structure of the Texas economy are not considered.
- All estimated socioeconomic impacts are snapshots of a one-year repeat of the drought of record. These independent and distinct *what if* scenarios for each planning region for each particular year with water shortages are assumed to be temporary events, thereby underestimating the total impacts of a longer term drought event.
- The analysis focuses only on the water-intensive economic sectors for which the TWDB has adequate water use estimates. Other water use sectors contribute to the value of production in the state economy, but the TWDB does not have sufficient data to include them. For example, data limitations for many of the commercial sectors within municipal use precluded an estimate of the adverse impacts of water shortages in those sectors.
- Lost income within forwardly linked sectors of the economy is not considered. Traditional input-output analysis using IMPLAN or similar models cannot determine the adverse impacts on downstream sectors within the economy.
- The significant economic spillover impacts (indirect and induced) on adjoining regions are not accounted for.
- The analysis does not attempt to estimate the possible impacts of lost growth opportunities over time due to chronic water shortages. Possible building moratoriums and similar longer term impacts were not examined.
- The analysis does not attempt to estimate or include many other significant impacts that a drought of record would have, such as to dryland farming, because these activities are not directly associated with water needs identified in the regional plans.

Additional detail on the methodologies and the impact estimate results for each planning group and county, along with the final regional impact reports, are available on the TWDB website at www.twdb.texas.gov/waterplanning/data/analysis.

6.6 Water needs not met by implementing the plan

An unmet water need is the portion of an identified water need that would not be met even after implementing all the recommended water management strategies. This generally occurs when a planning group cannot identify a feasible water management strategy to address the potential

*Figure 6-4. Estimated relative percent share, by sector statewide, of water needs and potential income losses in 2070**



** Water use sectors are presented in the order listed in the legend.*

shortage. Most unmet needs are within the irrigation water use category (Tables 6-4 and 6-5). For many irrigation water users, the returns on investments are likely insufficient for the water supply projects that would be required to maintain or increase irrigation water supplies under drought of record conditions.

Statewide, more than 30 percent of the total projected irrigation demand and less than 1 percent of the total projected municipal demand in 2070 would be unmet by the plan. Many of the unmet municipal needs are associated with the limits imposed by modeled available groundwater values associated with desired future conditions and, in practice, may be less, depending upon future regulatory decisions.

Six planning groups (Regions C, D, F, G, I, and J) were unable to identify potentially feasible strategies to fully meet all identified municipal water needs for 25 water user groups. Reasons for this ranged from a lack of economically feasible supply alternatives to pending changes in local regulations that were anticipated to mitigate the shortage. Municipal unmet needs account for approximately 1 percent or less of municipal demands for these regions in most decades.

Table 6-4. Statewide projected annual water needs that are unmet by the plan (acre-feet)

Water use category	2020	2030	2040	2050	2060	2070
Irrigation	1,917,000	2,724,000	2,512,000	2,421,000	2,377,000	2,336,000
Steam-electric	122,000	94,000	94,000	94,000	95,000	95,000
Manufacturing	110,000	1,000	1,000	1,000	1,000	1,000
Mining	52,000	46,000	41,000	35,000	29,000	32,000
Municipal	18,000	1,000	2,000	3,000	4,000	6,000
Livestock	9,000	2,000	3,000	4,000	5,000	7,000
Total	**2,228,000**	**2,868,000**	**2,653,000**	**2,558,000**	**2,511,000**	**2,477,000**

Table 6-5. Projected annual unmet water needs by region and water use category (acre-feet) *– continued on next page*

Region	Water use category	2020	2030	2040	2050	2060	2070
A	Irrigation	81,000	260,000	123,000	66,000	48,000	42,000
B	Irrigation	15,000	15,000	16,000	14,000	14,000	13,000
B	Mining	1,000	<500	<500	<500	<500	<500
B	Steam-electric	2,000	0	0	0	0	0
C	Irrigation	3,000	3,000	3,000	3,000	3,000	3,000
C	Mining	5,000	5,000	5,000	5,000	5,000	6,000
C	Municipal	<500	<500	<500	<500	<500	<500
C	Steam-electric	7,000	7,000	7,000	7,000	7,000	7,000
D	Irrigation	<500	<500	<500	<500	<500	<500
D	Manufacturing	1,000	0	0	0	0	0
D	Municipal	<500	<500	<500	1,000	1,000	2,000
E	Irrigation	13,000	10,000	15,000	15,000	15,000	15,000
E	Mining	<500	1,000	1,000	<500	1,000	1,000
F	Irrigation	11,000	13,000	17,000	19,000	22,000	25,000
F	Livestock	<500	<500	<500	<500	<500	<500
F	Manufacturing	<500	<500	<500	<500	<500	<500
F	Mining	6,000	6,000	3,000	2,000	1,000	1,000
F	Municipal	<500	1,000	1,000	1,000	2,000	3,000
F	Steam-electric	11,000	11,000	11,000	11,000	11,000	11,000
G	Irrigation	61,000	61,000	52,000	51,000	51,000	54,000
G	Manufacturing	<500	0	0	0	0	0
G	Mining	16,000	16,000	16,000	16,000	17,000	19,000
G	Municipal	17,000	0	0	0	0	0
G	Steam-electric	72,000	71,000	71,000	71,000	71,000	72,000
H	Irrigation	47,000	47,000	47,000	47,000	47,000	47,000
H	Livestock	1,000	1,000	1,000	1,000	1,000	1,000
I	Irrigation	1,000	0	0	0	0	0
I	Livestock	8,000	0	0	0	0	0
I	Manufacturing	101,000	0	0	0	0	0

Table 6-5. Projected annual unmet water needs by region and water use category (acre-feet) – continued

Region	Water use category	2020	2030	2040	2050	2060	2070
I	Mining	8,000	0	0	0	0	0
I	Municipal	<500	0	0	0	0	0
I	Steam-electric	3,000	0	0	0	0	0
J	Livestock	<500	<500	<500	<500	<500	<500
J	Municipal	<500	<500	<500	<500	<500	1,000
K	Irrigation	76,000	84,000	70,000	63,000	54,000	44,000
K	Mining	<500	4,000	5,000	3,000	0	0
K	Steam-electric	5,000	5,000	5,000	5,000	5,000	5,000
L	Irrigation	137,000	138,000	140,000	142,000	151,000	155,000
L	Manufacturing	8,000	0	0	0	0	0
L	Mining	10,000	10,000	8,000	5,000	2,000	<500
L	Steam-electric	19,000	0	0	0	0	0
M	Irrigation	839,000	791,000	761,000	723,000	682,000	644,000
M	Manufacturing	<500	1,000	1,000	1,000	1,000	1,000
M	Mining	5,000	4,000	4,000	4,000	4,000	5,000
M	Steam-electric	3,000	<500	<500	<500	<500	<500
O	Irrigation	634,000	1,302,000	1,268,000	1,279,000	1,288,000	1,293,000
O	Livestock	<500	<500	1,000	2,000	4,000	5,000
Texas[a]	**All**	**2,227,000**	**2,867,000**	**2,652,000**	**2,557,000**	**2,508,000**	**2,475,000**

[a] *Statewide totals may vary between tables due to rounding.*

The exceptions are Region G, with 4 percent of municipal demands unmet in 2020 under drought of record conditions, and Regions F and J, with about 2 percent of municipal demands unmet in 2070.

Regions with unmet municipal needs provided the following explanations as to how affected water user groups will ensure protection of public health, safety, and welfare in the event of a repeat of the drought of record:

- Developing additional groundwater supplies, as legally allowable, to meet needs
- Coordinating with groundwater conservation districts to temporarily develop groundwater supplies above the modeled available groundwater volume
- Implementing drought management measures as outlined in individual drought contingency plans to prolong supply and reduce impacts to communities by limiting water use to only essential water uses
- Implementing strategies planned for the 2030 decade early to address 2020 needs
- Expanding utility service areas to incorporate county-other communities with needs

An unmet need in a regional plan does not prevent an associated entity from developing additional water supplies. In some instances, portions of an underlying, projected increase in demand that is the cause of an unmet need in the plan may simply not occur where anticipated, instead arising in a less water-scarce geographic location. An example would be when power generators change locations of future power production facilities from where they are currently anticipated to be built.

A pump station as part of a TWDB-funded water supply project

6.7 Comparison to the 2017 State Water Plan

This water plan estimates annual statewide water needs of 3.1 million acre-feet in 2020 and 6.9 million acre-feet in 2070. These amounts are less than the 2017 State Water Plan estimates of 4.8 million acre-feet and 8.9 million acre-feet for the same decades. The differences are primarily due to revised methodologies for estimating manufacturing, irrigation, and steam-electric power generation water demands, resulting in more credible and often lower projections.

When the planning data is aggregated at the state level, it masks the variable geographic and categorical mismatches between water needs and sources that can be significant at the local level. Many factors can affect the water need calculations, making it difficult to draw broad conclusions about why there are changes from the previous state water plan. Notable changes to the projected water needs from the 2017 State Water Plan are summarized below:

- Statewide unmet needs are approximately 24 percent lower in 2020 and 19 percent lower in 2070 than the 2017 plan. The net change in unmet needs is due to a variety of interrelated factors that vary geographically and can have both positive and negative effects, including lower-than-anticipated water supplies due to more severe drought conditions, changes in demand projections, and changes in groundwater management policies.
- Statewide, annual municipal water needs in 2020 are projected to be almost 300,000 acre-feet less than those from the previous plan, primarily due to lower water demand projections. Municipal needs in Region N, however, are significantly higher for each decade of the 50-year planning period. Municipal needs in Regions I and J are also significantly higher in several decades in the planning period. In general, these changes are due to a varying mix of increased demands driven by population growth and a reduced volume of water supplies available during drought.
- Comparisons with the 2017 plan show that manufacturing needs decreased by more than half for each decade of the planning horizon due to revising the manufacturing demand methodology that ties projections of demands more closely to reported historical use.
- The projected socioeconomic impacts of not meeting water needs are higher than the previous plan. This is due to many factors, including inflation, updates of the relevant water use volumes and economic output values, refinements to socioeconomic impact assessment methodology, and underlying changes in the economy.
- A variety of conservation and other projects have been implemented since 2017, which results in increasing the existing volume of water on the existing supply side of the planning equation, thereby reducing the resulting water need calculation.

6.8 Uncertainty of future water needs

Water needs during drought of record conditions are difficult to predict due to the uncertainties that already affect both water demand (Section 4.4) and water supply (Section 5.9). For example,

Hurst Creek Arm of Lake Travis, Lakeway, Texas

higher-than-projected per capita water demand combined with lower-than-anticipated water supply could result in a much greater water need than either factor could have caused independently.

Ultimately, future water need projections will continue to be updated as a result of numerous unpredictable forces including shifts in social values, legal changes, climate variability, economic trends, improvements in water use efficiency, energy costs, and advances in technology. In an attempt to address shifts behind Texas' overall water needs over time, the regional and state water planning process incorporates the emerging impacts of all these complex changes as a whole into the regional and state water plans during each five-year planning cycle through historic data and other newly available information.

References

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