

Managing Water in Texas

March 27, 2024



Top Line

1. Demand for water in Texas is projected to grow over the next 50 years, from 17.7 million acre-feet in 2020 to 19.2 million in 2070.
2. However, existing supplies are forecast to decline, from 16.8 million acre-feet in 2020 to 13.8 million in 2070.
3. The result is a rapidly growing gap between supply and demand, from .9 million acre-feet in 2020 to 5.4 million in 2070. This creates enormous risks to our communities and our economy.
4. Texas needs to address this gap quickly. That will require a combination of policies, including:
 - a. Continuing effective planning through the Texas Water Development Board
 - b. Conservation
 - c. Desalination
 - d. Aquifer storage and recovery
 - e. Investing in new reservoirs

Texas faces a significant and growing water shortage. We need leaders who will support effective planning and investment.

Backup

1. Demand for water in Texas is projected to grow over the next 50 years, from 17.7 million acre-feet in 2020 to 19.2 million in 2070.
 - a. Projected population growth is the main driver of this increase.
 - The Texas Water Development Board, which produces detailed projections of Texas water demand and supply, projects that our

population will grow from 29.7 million in 2020 to 51.5 million in 2070, an increase of more than 70% (1).

- This growth results in a 63% increase in water needed for Municipal purposes, reflecting some offset from conservation.

b. Other uses, especially demand for irrigation, are expected to decline over time.

- In part, this decline is due to water conservation from more efficient irrigation systems.
- However, it also comes from reduced groundwater supplies, which means that water will simply not be available for some irrigation purposes. In addition, the increased cost of pumping water from increasing depths makes it economically difficult. (2)

c. Demand by use category is shown below.

Demand for Water in Texas

(in acre-feet)

	2020	2030	2040	2050	2060	2070	%Growth 2020 - 2070
Irrigation	9,448,000	9,383,000	8,703,000	8,154,000	7,737,000	7,594,000	-19.6%
Livestock	332,000	343,000	353,000	363,000	374,000	382,000	15.1%
Manufacturing	1,339,000	1,531,000	1,531,000	1,531,000	1,531,000	1,531,000	14.3%
Mining	407,000	409,000	365,000	323,000	287,000	281,000	-31.0%
Municipal	5,223,000	5,826,000	6,440,000	7,089,000	7,783,000	8,507,000	62.9%
Steam-electric	931,000	935,000	935,000	935,000	935,000	935,000	0.4%
Texas Total	17,680,000	18,427,000	18,327,000	18,395,000	18,647,000	19,230,000	8.8%

Source: Texas Water Development Board 2022 State Water Plan, file:///C:/Users/tdove/Downloads/SWP22-Water-For-Texas%20(4).pdf, page 53

d. Because growing population is expected to increase demand, while at the same time demand for irrigation is projected to decline, the rate of growth in demand is very uneven across the state.

- Urban counties’ demand is expected to grow rapidly.
- The fastest growth rates are in some of the counties adjacent to the large population centers, such as Collin County and Denton County near Dallas, and Williamson County near Austin, as shown in the table below.

Water Demand Projections for Selected Counties

(In Acre-Feet)

County	2020	2070	Increase	% Increase
Bexar	344,503	471,297	126,794	36.8%
Collin	242,505	468,710	226,205	93.3%
Dallas	563,223	761,162	197,939	35.1%
Denton	183,755	393,966	210,211	114.4%
El Paso	307,830	387,190	79,360	25.8%
Fort Bend	271,795	423,542	151,747	55.8%
Harris	1,172,537	1,455,963	283,426	24.2%
Tarrant	427,050	637,649	210,599	49.3%
Travis	267,501	430,760	163,259	61.0%
Williamson	116,950	283,860	166,910	142.7%
All Other Counties	13,782,351	13,515,901	(266,450)	-1.9%
Texas Total	17,680,000	19,230,000	1,550,000	8.8%

Source: Texas Water Development Board, Demand projections by County,

https://www3.twdb.texas.gov/apps/reports/Projections/2022%20Reports/demand_county

- e. Demand by county for all Texas counties can be found at https://www3.twdb.texas.gov/apps/reports/Projections/2022%20Reports/demand_county.

2. As demand for water grows, existing supplies are forecast to decline, from 16.8 million acre-feet in 2020 to 13.8 million in 2070.

- a. When discussing water, experts use two terms: **Availability and Supply**. They have very specific meanings. (3)
- i. **Availability** – this refers to the maximum volume of raw water that can be withdrawn annually from each source (such as a reservoir or aquifer) during a repeat of the drought of record. Availability does not account for whether the supply is connected to or legally authorized for use.
 - ii. **Supply** - the subset of that total water availability volume that is already connected to water user groups. This subset is defined as the existing

supply. Existing water supplies are determined by legal access to the water as well as existing infrastructure (such as pipelines and treatment plant capacity) to treat and deliver the water to the “doorstep” of a water user group.

- b. Almost all the existing water supply in Texas comes from two sources – Surface water and Groundwater.
 - i. **Surface water** is water in reservoirs and rivers, and accounts for about 43% of existing supply. Surface water is expected to remain fairly steady over the next 50 years. Adding new reservoirs is one way to increase surface water supply.
 - ii. **Groundwater** is water in aquifers, and accounts for about 53% of current supply.

Texas annual existing water supply

(in Acre-feet)

Source	2020	2030	2040	2050	2060	2070	% Change 2020 - 2070
Surface water	7,232,000	7,184,000	7,153,000	7,126,000	7,107,000	7,080,000	-2.1%
Groundwater	8,912,000	7,638,000	6,869,000	6,407,000	6,092,000	6,023,000	-32.4%
Reuse	620,000	640,000	661,000	676,000	704,000	714,000	15.2%
Texas Total	16,764,000	15,462,000	14,683,000	14,209,000	13,903,000	13,817,000	-17.6%

Source: Texas Water Development Board 2022 State Water Plan, file:///C:/Users/tdove/Downloads/SWP22-Water-For-Texas%20(4).pdf, page 77

3. The result is a rapidly growing gap between supply and demand, creating enormous risks for our communities and our economy.

- a. The combination of increasing demand and falling supply creates a large and growing gap – from .9 million acre-feet in 2020 to 5.4 million in 2070.

Texas Water Gap, 2020 - 2070

(in millions of acre-feet)

	2020	2030	2040	2050	2060	2070
Demand	17.7	18.4	18.3	18.4	18.6	19.2
Supply	16.8	15.5	14.7	14.2	13.9	13.8
Gap	-0.9	-2.9	-3.6	-4.2	-4.7	-5.4

Source: Texas Water Development Board, Texas Comptroller

<https://comptroller.texas.gov/economy/fiscal-notes/archive/2023/sep/water.php>

- b. The current gap is causing Texas to deplete our groundwater supplies faster than they can be replenished.** (4) This creates a growing risk to supply, especially for rural areas that depend on groundwater for irrigation.
- c. Climate change may even accelerate this shortfall.** Rising temperatures increase demand for water, and at the same time accelerate evaporation in reservoirs according to Texas state climatologist John Nielsen-Gammon. (5) Currently, Texas water plans and projections do not take climate change into account. (4)
- d. The growing water shortfall creates a wide range of serious risks,** including:
 - i. Reduced water resources for agriculture, harming rural communities.
 - ii. The Rio Grande Valley is especially vulnerable. Water shortages could impact the important crops in that area. (6)
 - iii. Inadequate water supplies could impair municipal growth.
 - iv. Companies that depend on water for their operations may choose not to relocate to Texas. Chip fabrication is a very large user of water to clean the silicon wafers and to cool machinery. Attracting these high-tech employers will require a reliable and adequate supply of water. (8)
 - v. The shortage of water reduces our reserve stocks needed to survive drought conditions, which are expected to become more common as climate change intensifies.

4. Effective policies to address the shortfall in future water supply include:

a. Continuing effective planning through the Texas Water Development Board

- i. The Texas Water Development Board has established 16 regional water planning groups, each charged with planning for drought conditions, evaluating future water demands and developing water management plans for its area. (1)
- ii. In 2002 the TWDB developed the first State Water Plan. This is updated periodically, and the most recent one is dated 2022 (1)
- iii. The long-term water plan recognizes that Texas faces a significant water shortage, and that shortage will grow over time. The plan includes strategies to increase supply, and to decrease use through conservation.
- iv. The Legislature should continue to support fact-based, long-term water planning and investment that fully confronts the reality of Texas' water challenges.

b. Conservation

- i. The Texas Water Development Board estimates that conservation efforts can reduce water demand in 2070 by 2.2 million-acre feet, significantly reducing the gap between supply and demand. (1, page 101)
- ii. Conservation measures outlined in the Texas Water Development Board 2022 Plan include (1, p. 118):
 1. Municipal – comprehensive metering, loss reduction (identifying and addressing leaks in water infrastructure), encouraging adoption of appliances that are more water efficient, and public information to encourage efficient water use.
 2. Agricultural - changes to irrigation methods, equipment, and crops.
- iii. The Texas Water Development Board points out that achieving these conservation goals will require significant investment by the state.

- c. **Desalination of brackish groundwater and seawater**
 - i. Desalination is the process of removing dissolved solids from seawater or brackish groundwater, often by forcing the source water through membranes under high pressure.
 - ii. According to water experts, “Texas has many brackish water aquifers across parts of the state. Brackish water is not as salty as the sea, but it’s still too salty to drink. Desalination takes existing brackish water and treats it, so it’s safe drink and be used again. This under-tapped, abundant source can create an additional water supply.” (7)
 - iii. The State Water Development Board projects that desalination could add 350,000 acre-feet to our water supply by 2070, if appropriate investments are made. (1, p. 107)

- d. **Aquifer Storage and Recovery** - Aquifer storage and recovery refers to the practice of injecting water, when available, into an aquifer where it is stored for later use (1, page 103). This available water can come from surface water sources when excess water is available, and from reuse sources such as municipal wastewater and water from industrial uses such as cooling.

- e. **Investing in new reservoirs**, to increase availability for municipal growth, and to reduce the demand for groundwater from aquifers which are being rapidly depleted.
 - i. The 2022 State Water Plan calls for fourteen new major reservoirs to be online and providing water supply by 2030, and an additional eight new major reservoirs are planned to be online by 2050. (1, page 105)
 - ii. These reservoirs will increase surface water capability and reduce the risk of over-pumping groundwater aquifers.

More Information

1. Texas Water Development Board 2022 State Water Plan, <https://www.twdb.texas.gov/waterplanning/swp/2022/index.asp> – provides detailed information on demand and supply, and how Texas manages its water resources. Detailed policy recommendations are outlined beginning on page 96.
2. Water demand by county for all Texas counties can be found at https://www3.twdb.texas.gov/apps/reports/Projections/2022%20Reports/demand_county

Sources

1. Texas Water Development Board 2022 State Water Plan, <https://www.twdb.texas.gov/waterplanning/swp/2022/index.asp>, page 47.
2. Texas Water Development Board 2022 State Water Plan, <https://www.twdb.texas.gov/waterplanning/swp/2022/index.asp>, page 56.
3. Texas Water Development Board 2022 State Water Plan, <https://www.twdb.texas.gov/waterplanning/swp/2022/index.asp>, page 65.
4. Texas Tribune, 10/31/22, <https://www.texastribune.org/2022/10/31/texas-water-plan-reservoirs-climate-change/>
5. The Hill, 9/1/22, <https://thehill.com/policy/equilibrium-sustainability/3621118-dried-up-texas-cities-in-fear-of-running-out-of-water/>
6. Wired, 1/27/24, <https://www.wired.com/story/texas-water-drought-winter-weather-shortage/>
7. AECOM, “Water in Texas – Top 5 Issues We Need to Solve Now”, <https://aecom.com/without-limits/article/water-in-texas-top-5-issues-we-need-to-solve-now/>
8. Wired, 7/19/23, <https://www.wired.com/story/want-to-win-a-chip-war-youre-gonna-need-a-lot-of-water/>