Quick Facts

Even with significant population increase, water demand in Texas is projected to increase by only 22 percent, from about 18 million acre-feet per year in 2010 to about 22 million acre-feet per year in 2060. This smaller increase is primarily due to declining demand for irrigation water and increased emphasis on municipal conservation.

3 Population and Water Demand Projections

The population in Texas is expected to increase 82 percent between the years 2010 and 2060, growing from 25.4 million to 46.3 million people. Growth rates vary considerably across the state, with some planning areas more than doubling over the planning horizon and others growing only slightly or not at all.

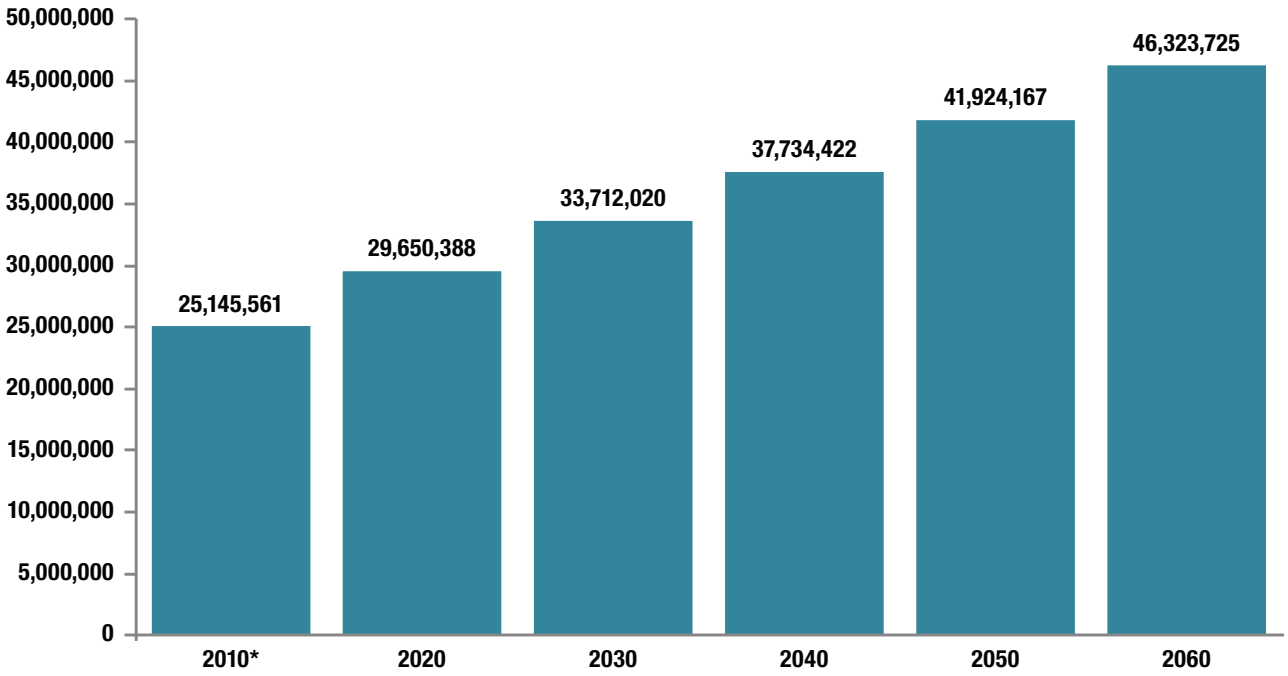
The first step in the regional water planning process is to quantify current and projected population and water demand over the 50-year planning horizon. Both the state and regional water plans incorporate projected population and water demand for cities, water utilities, and rural areas throughout the state. Water demand projections for wholesale water providers and for manufacturing, mining, steam-electric, livestock, and irrigation water use categories are also used in the planning process. TWDB developed projections in coordination with the Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, Texas Department of Agriculture, and the regional water planning groups for inclusion in the regional water plans and the state water plan. The final population and water demand projections are approved by TWDB's governing board.

3.1 POPULATION PROJECTIONS

As noted in every state water plan since the 1968 State Water Plan, Texas is a fast-growing state, and every new Texan requires water to use in the house, on the landscape, and in the food they consume and materials they buy.

Texas is not only the second most populated state in the nation, but also the state that grew the most between 2000 and 2010, increasing from 20.8 million residents to 25.1 million (Figure 3.1). However, such dramatic growth has not occurred evenly across the

FIGURE 3.1. TEXAS STATE POPULATION PROJECTED TO 2060.



*2010 population is the official population count from the U.S. Census Bureau; 2020–2060 represent projected population used in the 2012 State Water Plan.

state. Of 254 counties, 175 gained population and 79 lost population between the 2000 and 2010 censuses. The majority of the growing counties were located in the eastern portion of the state or along the Interstate Highway-35 corridor.

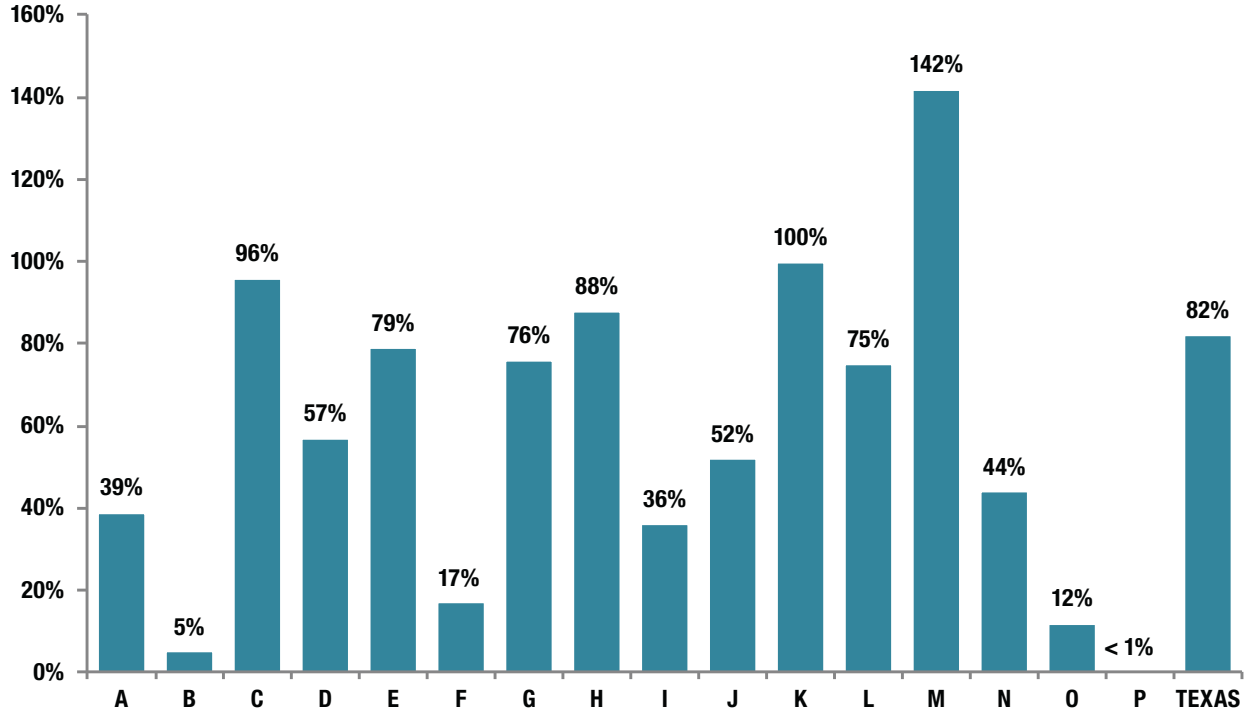
3.1.1 PROJECTION METHODOLOGY

As required in the water planning process, the population of counties, cities, and large non-city water utilities were projected for 50 years, from 2010 to 2060. During the development of the 2011 regional water plans, due to the lack of new census data, the population projections from the 2007 State Water Plan were used as a baseline and adjusted where more recent data was available from the Texas State Data Center.

The population projections for the 2006 regional water plans and the 2007 State Water Plan were created by a two-step process. The initial step used county projections from the Office of the State Demographer and the Texas State Data Center, the agencies charged with disseminating demographic and related socioeconomic data to the state of Texas. These projections were calculated using the cohort-component method: the county's population is projected one year at a time by applying historical growth rates, survival rates, and net migration rates to individual cohorts (age, sex, race, and ethnic groups). The Texas State Data Center projections are only done at the county level, requiring further analysis to develop projections for the sub-county areas.

Sub-county population projections were calculated for cities with a population greater than 500, non-city water utilities with an average daily use greater than 250,000 gallons, and "county-other." County-other is an aggregation of residential, commercial, and institutional water users in cities with less than 500 people or non-city utilities that provide less than an average of 250,000 gallons per day, as well as

FIGURE 3.2. PROJECTED POPULATION GROWTH FOR PLANNING REGIONS FOR 2010–2060.



unincorporated rural areas in a given county. With the county projections as a guide, projections for the municipal water user groups (cities and utilities) within each county were calculated. In general, the projections for these water user groups were based upon the individual city or utility's share of the county growth between 1990 and 2000. TWDB staff developed draft population projections with input from staff of the Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, and Texas Department of Agriculture. Following consultations with the regional water planning groups, these projections were then adopted by TWDB's governing board for use in the 2006 regional water plans.

For the 2011 regional water plans, the planning groups were able to request revisions to population projections for specific municipal water user groups, including cities and large non-city utilities. In certain regions, population estimates suggested that growth was taking place faster in some of the counties and cities than what was previously projected in the 2006 regional water plans. The planning groups could propose revisions, with the amount of upward population projection revision roughly limited to the amount of under-projections, as suggested by the Texas State Data Center's most recent population estimates. Population projections were revised, at least partially, for all changes requested by the planning groups: 352 municipal water user groups in 64 counties and 9 regions. This input from the cities and utilities through the regional water planning groups, combined with the long-range, demographically-driven methods, increases the accuracy of the population projections. The statewide total of the projections for 2010 that resulted from this process were slightly higher than the 2010 Census population.

TABLE 3.1. TEXAS STATE POPULATION PROJECTIONS FOR 2010–2060

Region	2010	2020	2030	2040	2050	2060
A	388,104	423,380	453,354	484,954	516,729	541,035
B	210,642	218,918	223,251	224,165	223,215	221,734
C	6,670,493	7,971,728	9,171,650	10,399,038	11,645,686	13,045,592
D	772,163	843,027	908,748	978,298	1,073,570	1,213,095
E	863,190	1,032,970	1,175,743	1,298,436	1,420,877	1,542,824
F	618,889	656,480	682,132	700,806	714,045	724,094
G	1,957,767	2,278,243	2,576,783	2,873,382	3,164,776	3,448,879
H	6,020,078	6,995,442	7,986,480	8,998,002	10,132,237	11,346,082
I	1,090,382	1,166,057	1,232,138	1,294,976	1,377,760	1,482,448
J	135,723	158,645	178,342	190,551	198,594	205,910
K	1,412,834	1,714,282	2,008,142	2,295,627	2,580,533	2,831,937
L	2,460,599	2,892,933	3,292,970	3,644,661	3,984,258	4,297,786
M	1,628,278	2,030,994	2,470,814	2,936,748	3,433,188	3,935,223
N	617,143	693,940	758,427	810,650	853,964	885,665
O	492,627	521,930	540,908	552,188	553,691	551,758
P	49,491	51,419	52,138	51,940	51,044	49,663
Texas	**25,388,403**	**29,650,388**	**33,712,020**	**37,734,422**	**41,924,167**	**46,323,725**

3.1.2 PROJECTIONS

Due to natural increase and a net in-migration, it is projected that Texas will continue to have robust growth. The state is projected to grow approximately 82 percent, from 25.4 million in 2010 to 46.3 million, by 2060 (Figure 3.2). As illustrated in the growth over the last decade, regional water planning areas that include the major metropolitan areas of Houston (Region H), the Dallas-Fort Worth area (C), Austin (K), San Antonio (L), and the Lower Rio Grande Valley (M) are anticipated to capture 82 percent of the state's growth by 2060 (Table 3.1).

Regions C, G, H, L, and M are expected to grow the most by 2060, while regions B, F, and P are expected to grow at the lowest rates. Individual counties are expected to grow at varying rates (Figure 3.3).

3.1.3 ACCURACY OF PROJECTIONS

At the state level, the 2010 population projections for the 2011 regional water plans were 1 percent greater than the 2010 census results: 25.39 million versus 25.15 million residents (Figure 3.4). Comparisons of 2010 projections and the 2010 census for the previous seven state water plans range from an over-projection of 7.4 percent in the 1968 State Water Plan to an under-projection by 11.3 percent in the "Low" series of the 1984 State Water Plan. The prior two state water plans developed through regional water planning, the 2002 State Water Plan and the 2007 State Water Plan, under-projected the 2010 population by only 2.6 and 1.0 percent, respectively. The 2060 population projection is projected to be slightly higher than what was projected in the 2007 State Water Plan: 46.3 million compared to 45.5 million. While shorter-range projections will always tend to be more accurate, the regional water planning process increases overall projection accuracy because of the use of better local information.

For geographic areas with smaller populations (regions, counties, and water user groups), the relative difference between projected population and actual growth can increase. At the regional water planning area level, 12 regions had populations that were over-projected, most notably Region N at 9.3 percent, Region J at 6.1 percent, and Region B at 5.7 percent

FIGURE 3.3. PROJECTED POPULATION GROWTH IN TEXAS COUNTIES.

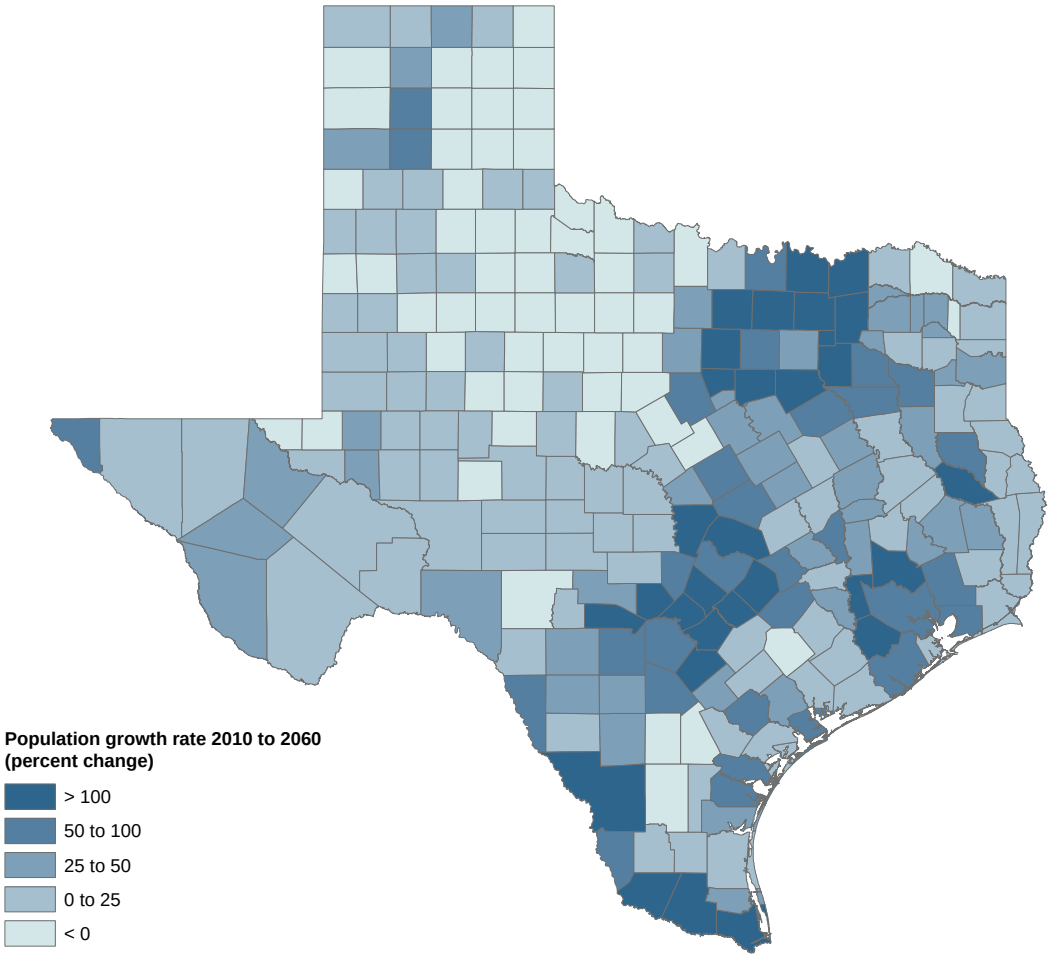
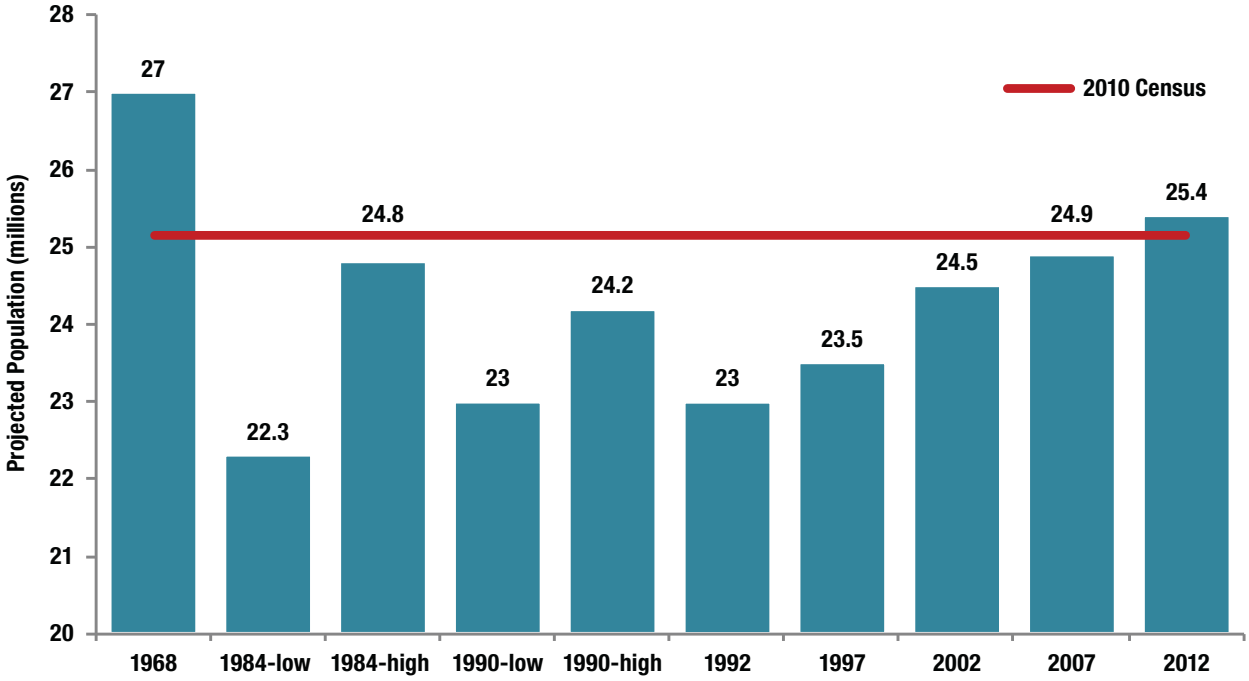


TABLE 3.2. COMPARISON BETWEEN 2010 POPULATION PROJECTIONS AND ACTUAL 2010 CENSUS POPULATION DATA

Region	2000 Census	2010 Census	2010 Projected Population, 2012 SWP	Projection Difference
A	355,832	380,733	388,104	1.9%
B	201,970	199,307	210,642	5.7%
C	5,254,748	6,455,167	6,670,493	3.3%
D	704,171	762,423	772,163	1.3%
E	705,399	826,897	863,190	4.4%
F	578,814	623,354	618,889	-0.7%
G	1,621,965	1,975,174	1,957,767	-0.9%
H	4,848,918	6,093,920	6,020,078	-1.2%
I	1,011,317	1,071,582	1,090,382	1.8%
J	114,742	127,898	135,723	6.1%
K	1,132,228	1,411,097	1,412,834	0.1%
L	2,042,221	2,526,374	2,460,599	-2.6%
M	1,236,246	1,587,971	1,628,278	2.5%
N	541,184	564,604	617,143	9.3%
O	453,997	489,926	492,627	0.6%
P	48,068	49,134	49,491	0.7%
Total	**20,851,820**	**25,145,561**	**25,388,403**	**1.0%**

FIGURE 3.4. COMPARISON OF STATE WATER PLAN POPULATION PROJECTIONS AND ACTUAL 2010 CENSUS POPULATION DATA.*



*In some of the past water plans, both a high and low projection series was analyzed.

(Table 3.2). Some of the larger and faster growing regions were under-projected, including Region L at 2.6 percent, Region H at 1.2 percent, and Region G at 0.9 percent.

At the county level, 23 counties were under-projected by 5 percent or more, the largest of which were Fort Bend, Bell, Smith, Galveston, Brazos, Midland, and Guadalupe (Figure 3.5). One hundred twenty-two counties were over-projected by at least 5 percent, the largest of which were Dallas, Hays, Johnson, Potter, Nueces, and Ellis. Apart from the larger counties in the state, many of the over-projected counties are in west Texas. A complete listing of all county population projections can be found in Appendix B (Projected Population of Texas Counties).

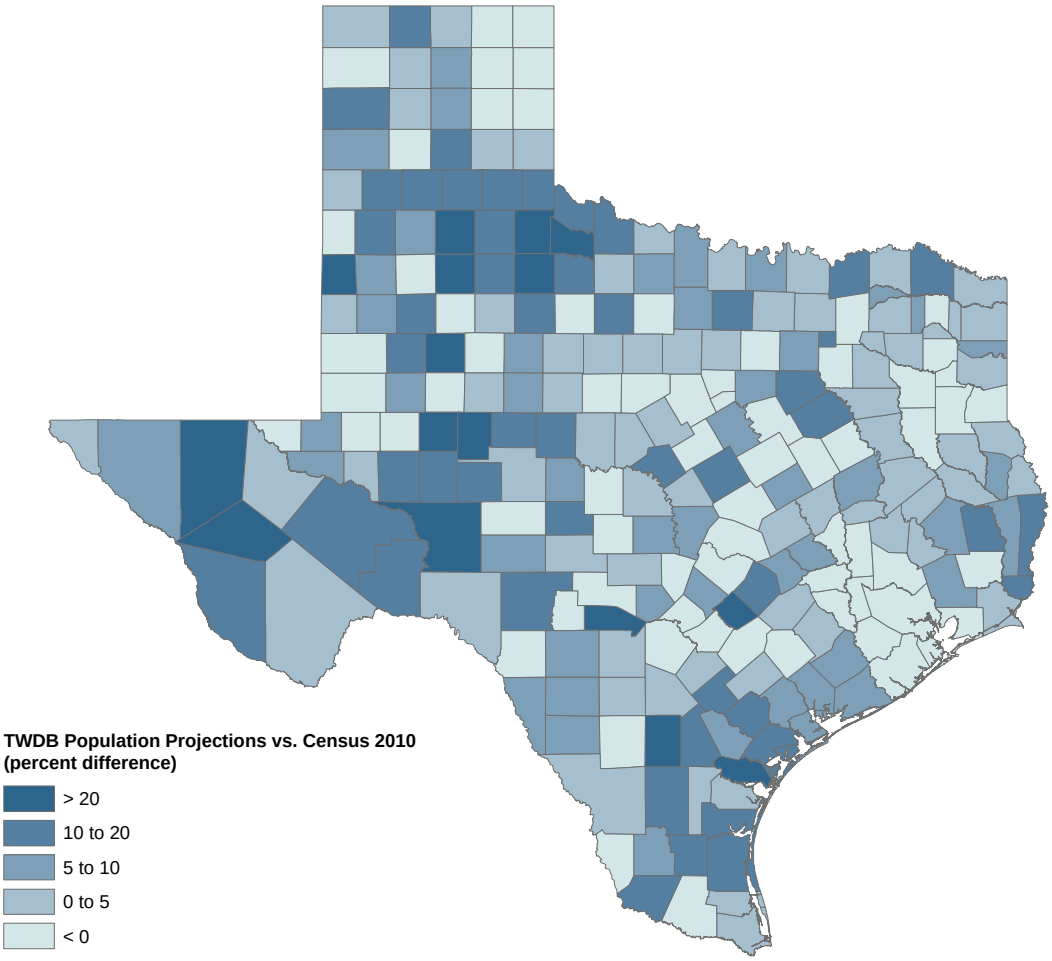
As part of the process for the 2016 regional water plans and the 2017 State Water Plan, population projections for cities, utilities, and counties will be developed anew with the methodology described above, with population and information derived from the 2010 census. As indicated by Figure 3.5, some counties are expected to have their population projections increase while others are expected to have more modest growth than in previous projections.

3.2 WATER DEMAND PROJECTIONS

Determining the amount of water needed in the future is one of the key building blocks of the regional and state water planning process. Projections of water demands are created for six categories, including

- **Municipal:** residential, commercial, and institutional water users in (a) cities with more than 500 residents, (b) non-city utilities that provide more than 280 acre-feet a year (equivalent to 250,000 gallons per day), and (c) a combined

FIGURE 3.5. PERCENT DIFFERENCE BETWEEN 2010 POPULATION PROJECTIONS AND 2010 CENSUS POPULATION DATA.



water user grouping of each county's remaining rural areas, referred to as county-other

- **Manufacturing:** industrial firms, such as food processors, paper mills, electronics manufacturers, aircraft assemblers, and petrochemical refineries
- **Mining:** key mining sectors in the state, such as coal, oil and gas, and aggregate producers
- **Steam-electric:** coal and natural gas-fired and nuclear power generation plants
- **Livestock:** feedlots, dairies, poultry farms, and other commercial animal operations
- **Irrigation:** commercial field crop production

Similar to population projections, the 2011 regional water plans generally used demand projections from the 2007 State Water Plan; revisions were made for the steam-electric water use category and other specific water user groups due to changed conditions or the results of region-specific studies. Water demand projections are based upon "dry-year" conditions and water usage under those conditions. For the 2007 State Water Plan, the year 2000 was selected to represent the statewide dry-year conditions for several reasons:

- For 7 of the 10 climatic regions in the state, the year 2000 included the most months of moderate

or worse drought between 1990 and 2000. For the remaining three regions, the year 2000 had the second-most months of moderate or worse drought in that period.

- During the summer months (May to September), when landscape and field crop irrigation is at its peak, the majority of the state was in moderate or worse drought during that entire period.

These water demand projections were developed to determine how much water would be needed during a drought. The regional water planning groups were able to request revisions to the designated dry-year for an area or for the resulting water demand projections if a different year was more representative of dry-year conditions for that particular area.

While the state's population is projected to grow 82 percent between 2010 and 2060, the amount of water needed is anticipated to grow by only 22 percent. (Table 3.3, Figure 3.6). This moderate total increase is due to the anticipated decline in irrigation water use as well as a slight decrease in the per capita water use in the municipal category (though the total municipal category increases significantly due to population growth).

3.2.1 MUNICIPAL WATER DEMAND

Municipal water demand consists of water to be used for residential (single family and multi-family), commercial (including some manufacturing firms that do not use water in their production process), and institutional purposes (establishments dedicated to public service). The water user groups included in this category include cities, large non-city water utilities, and rural county-other. Large-scale industrial facilities, whether supplied by a utility or self-supplied, that use significant amounts of water are included in the manufacturing, mining, or steam-electric power categories. Correlated with a slightly higher 2060 population projection than in the 2007 State Water Plan, the 2060 municipal water demands for the state are projected to be 8.4 million acre-feet compared to 8.2 million acre-feet in the 2007 State Water Plan.

Municipal water demand projections are calculated using the projected populations for cities, non-city water utilities, and county-other and multiplying the projected population by the total per capita water use. Per capita water use, measured in "gallons per capita per day," is intended to capture all residential, commercial, and institutional uses, including systems loss. Gallons per capita per day is calculated for each water user group by dividing total water use (intake minus sales to industry and other systems) by the population served. Total water use is derived from responses to TWDB's Water Use Survey, an annual survey of ground and surface water use by municipal and industrial entities within the state of Texas.

In general, total per capita water use was assumed to decrease over the planning horizon due to the installation of water-efficient plumbing fixtures (shower heads, toilets, and faucets) as required in the Texas Water Saving Performance Standards for Plumbing Fixtures Act of 1991. These fixtures are assumed to be installed as older ones require replacement. Although developed too late to be incorporated into the 2011 regional water plans, additional water-saving requirements have been mandated for dishwashers and clothes washing machines. Such savings will be included in the next regional water plan demand projections.

3.2.2 MANUFACTURING WATER DEMANDS

Manufacturing water demands consist of the future water necessary for large facilities, including those that process chemicals, oil and gas refining, food,

PROJECTED WATER DEMAND CALCULATION, 2010–2060

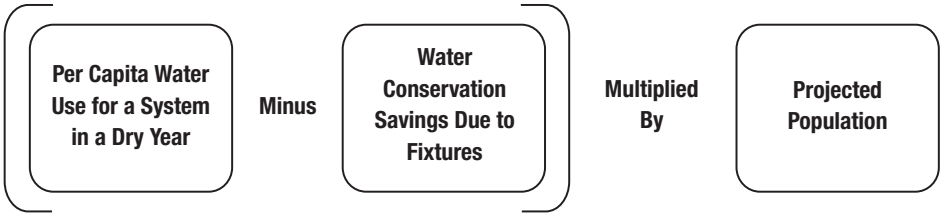
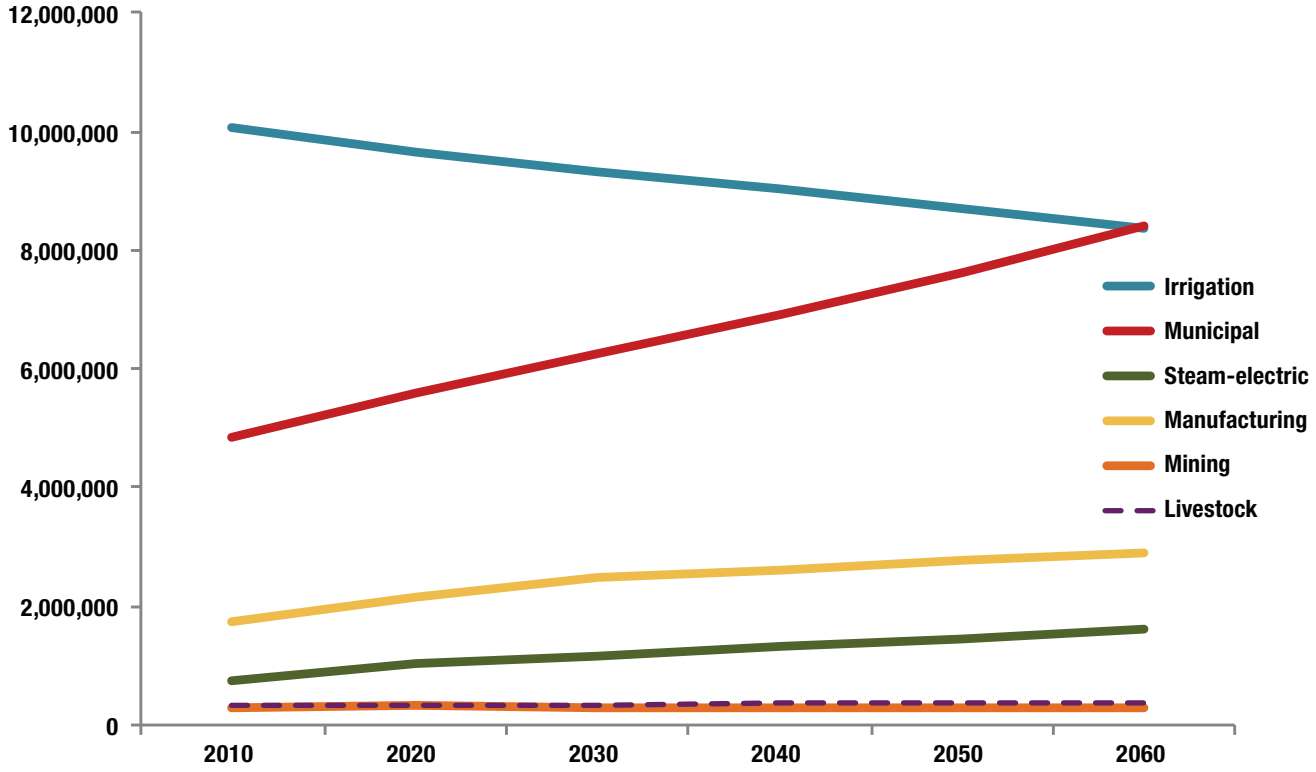


TABLE 3.3. SUMMARY OF WATER DEMAND PROJECTIONS BY USE CATEGORY FOR 2010–2060 (ACRE-FEET PER YEAR)

Category	2010	2020	2030	2040	2050	2060	Percent of 2060 Demand
Municipal	4,851,201	5,580,979	6,254,784	6,917,722	7,630,808	8,414,492	38.3%
Manufacturing	1,727,808	2,153,551	2,465,789	2,621,183	2,755,335	2,882,524	13.1%
Mining	296,230	313,327	296,472	285,002	284,640	292,294	1.3%
Steam-electric	733,179	1,010,555	1,160,401	1,316,577	1,460,483	1,620,411	7.4%
Livestock	322,966	336,634	344,242	352,536	361,701	371,923	1.7%
Irrigation	10,079,215	9,643,908	9,299,464	9,024,866	8,697,560	8,370,554	38.1%
Texas	**18,010,599**	**19,038,954**	**19,821,152**	**20,517,886**	**21,190,527**	**21,952,198**	

FIGURE 3.6. WATER DEMAND PROJECTIONS BY USE CATEGORY (ACRE-FEET PER YEAR).*



*Water demand projections for the livestock and mining water use categories are similar enough to be indistinguishable at this scale.

TABLE 3.4. PER CAPITA WATER USE FOR THE 40 LARGEST CITIES IN TEXAS FOR 2008–2060 (GALLONS PER CAPITA PER DAY)

City or Place Name	2008 Per Capita Use	2008 Residential Per Capita Use	2020 Per Capita Use	2040 Per Capita Use	2060 Per Capita Use
Frisco	254	158	289	289	283
Midland	235	159	254	248	247
Plano	223	113	253	250	249
Richardson	216	128	278	274	272
Dallas	213	95	252	247	246
Beaumont	206	140	209	203	201
McAllen	202	114	197	193	193
College Station	193	92	217	213	212
Irving	193	104	249	246	246
Waco	193	72	183	183	183
Fort Worth	192	75	207	203	202
Longview	190	75	120	115	115
Amarillo	188	108	201	201	201
McKinney	183	122	240	240	240
Tyler	177	103	255	249	248
Austin	171	102	173	171	169
Carrollton	162	102	188	184	183
Odessa	160	108	202	195	194
Arlington	157	100	179	175	174
Sugar Land	155	94	214	211	211
Corpus Christi	154	80	171	166	165
Laredo	154	88	192	189	188
Round Rock	154	96	194	191	191
Grand Prairie	152	89	152	148	148
Denton	150	60	179	176	176
Garland	150	90	160	156	155
San Antonio	149	92	139	135	134
Lewisville	143	75	173	171	170
Lubbock	141	93	202	196	195
Abilene	139	73	161	155	154
Wichita Falls	138	88	172	170	168
El Paso	137	98	130	130	130
Brownsville	134	63	221	217	217
Houston	134	65	152	147	146
Mesquite	134	90	164	168	168
San Angelo	131	91	193	187	186
Killeen	127	82	179	174	167
Pearland	112	105	127	124	124
Pasadena	109	67	110	105	104
Missouri City	86	68	167	167	169

TABLE 3.5. COMPARISON OF 2009 WATER USE ESTIMATES WITH PROJECTED 2010 WATER USE (ACRE-FEET PER YEAR)

Category	2009 Estimated Water Use[1]	2010 Projected Water Use	Estimated Difference from Projection
Municipal	4,261,585	4,851,201	-12.2%
Manufacturing	1,793,911	1,727,808	3.8%
Mining[2]	168,273	296,230	-43.2%
Steam-Electric Power	454,122	733,179	-38.1%
Livestock	297,047	322,966	-8.0%
Irrigation	9,256,426	10,079,215	-8.2%
Total	**16,231,364**	**18,010,599**	**-9.9%**

[1] Annual water use estimates are based upon returned water use surveys and other estimation techniques. These estimates may be updated when more accurate information becomes available.

[2] The 2009 mining use estimates represent an interpolation of estimated 2008 and 2010 volumes (UT Bureau of Economic Geology, 2011)

COMPARING PER CAPITA WATER USE

Since the 2007 State Water Plan, there has been an increasing amount of interest in comparing how much water is used by various cities (Table 3.4). Unfortunately, this measure can often be inappropriate and misleading. There are a number of valid reasons that cities would have differing per capita water use values, including

- climatic conditions;
- amount of commercial and institutional customers;
- construction activities;
- price of water;
- income of the customers;
- number of daily or seasonal residents; and
- age of infrastructure.

Per capita water use tends to be higher in cities with more arid climates; more non-residential businesses; high-growth areas requiring more new building construction; lower cost of water; higher-income residents; more commuters or other part-time residents who are not counted in the official population estimates; and with more aging infrastructure, which can result in greater rates of water loss.

Because of the variations between water providers, the total municipal per capita water use as described earlier is not a valid tool for comparison. As a start to providing more detailed and useful information, the annual residential per capita water use of cities in the state water plan has been calculated since 2007, in addition to the more comprehensive total municipal per capita use. Residential per capita use is calculated using the volume sold directly to single- and multi-family residences. As more water utilities are encouraged to track their sales volumes by these categories, a more complete picture of residential per capita water use across the state will be available in the years to come. Two bills passed in the recent 82nd Texas Legislature in 2011 address this type of water use information: Senate Bill 181 and Senate Bill 660, both of which require standardization of water use and conservation calculations for specific sectors of water use.

paper, and other materials. Demands in the 2012 State Water Plan were based on those from the 2007 State Water Plan. Demand projections were drafted as part of a contracted study (Waterstone Environmental Hydrology and Engineering, Inc. and The Perryman Group, 2003) that analyzed historical water use and trends and projected industrial activity. The projections incorporated economic projections for the various manufacturing sectors, general economic output-water use coefficients, and efficiency improvements of new technology. Future growth in water demand was assumed to be located in the same counties in which such facilities currently exist unless input from the regional water planning group identified new or decommissioned facilities.

Some regions requested increases to the 2007 State Water Plan projections due to changed conditions. Manufacturing demands are projected to grow 67 percent from 1.7 million acre-feet to 2.9 million acre feet. This 2060 projection of 2.9 million acre-feet is an increase of roughly 12 percent over the 2.6 million acre-feet projected in the 2007 State Water Plan.

3.2.3 MINING WATER DEMANDS

Mining water demands consist of water used in the exploration, development, and extraction processes of oil, gas, coal, aggregates, and other materials. The mining category is the smallest of the water user categories and is expected to decline 1 percent from 296,230 acre-feet to 292,294 acre-feet between 2010 and 2060. In comparison, the 2007 State Water Plan mining water demands ranged from 270,845 acre-feet to 285,573 acre-feet from 2010 and 2060. Mining demands increased in a number of counties reflecting initial estimates of increased water use in hydraulic fracturing operations in the Barnett Shale area.

Similar to manufacturing demand projections, the current projections were generated as part of the 2007 State Water Plan and used a similar methodology: analyzing known water use estimates and economic projections. The mining category has been particularly difficult to analyze and project due to the isolated and dispersed nature of oil and gas facilities, the transient and temporary nature of water used, and the lack of reported data for the oil and gas industry.

Due to the increased activity that had occurred in oil and gas production by hydraulic fracturing, in 2009 TWDB contracted with the University of Texas Bureau of Economic Geology (2011) to conduct an extensive study to re-evaluate the water used in mining operations and to project such uses for the next round of water planning. Initial results from the study indicate that, while fracturing and total mining water use continues to represent a small portion (less than 1 percent) of statewide water use, percentages can be significantly larger in some localized areas. In particular, the use of water for hydraulic fracturing operations is expected to increase significantly through 2020. The results of this study will form the basis for mining water demand projections for the 2016 regional water plans. Future trends in these types of water use will be monitored closely in the upcoming planning process.

3.2.4 STEAM-ELECTRIC POWER GENERATION WATER DEMANDS

The steam-electric power generation category consists of water used for the purposes of producing power. Where a generation facility diverts surface water, uses it for cooling purposes, and then returns a large portion of the water to the water body, the water use for the facility is only the volume consumed in the cooling process and not returned. For the 2011 regional water plans, the University of Texas Bureau of Economic

Geology (2008) completed a TWDB-funded study of steam-electric power generation water use and projected water demands. Regional water planning groups reviewed the projections developed in this study and were encouraged to request revisions where better local information was available.

A challenge for the projection of such water use is the very mobile nature of electricity across the state grid. While the demand may occur where Texans build houses, the power and water use for its production can be in nearly any part of the state. Beyond the specific future generation facilities on file with the Public Utility Commission of Texas, the increased demand for power generation and the accompanying use of water was assumed to be located in the counties that currently have power generation capabilities. Steam-electric water use is expected to increase by 121 percent over the planning horizon, from 0.7 million acre-feet in 2010 to 1.6 million acre-feet in 2060. This 2060 projection remains consistent with the projection of 1.5 million acre-feet in the 2007 State Water Plan.

3.2.5 IRRIGATION WATER DEMANDS

Irrigated agriculture uses over half of the water in Texas, much of the irrigation taking place in Regions A, O, and M and in the rice producing areas along the coast. Projections in the current regional water plans were based on those from the 2006 regional plans, with revisions to select counties based upon better information. Region A conducted a study to develop revised projections on a region-wide basis. Irrigation projections have been continually adjusted at the beginning of each planning cycle, with the previous projections being used as a base to be adjusted by factors and trends including

- changes in the amount of acreage under irrigation;
- increases in irrigation application efficiency;
- changes in canal losses for surface water diversions; and
- changes in cropping patterns.

Irrigation demand is expected to decline over the planning horizon by 17 percent, from 10 million acre-feet in 2010 to 8.3 million acre-feet in 2060, largely due to anticipated natural improvements in irrigation efficiency, the loss of irrigated farm land to urban development in some regions, and the economics of pumping water from increasingly greater depths. The projections are slightly reduced from the 2007 State Water Plan, which included a statewide 2010 projection of 10.3 million acre-feet and 8.6 million acre-feet in 2060.

3.2.6 LIVESTOCK WATER DEMANDS

Livestock water demand includes water used in the production of various types of livestock including cattle (beef and dairy), hogs, poultry, horses, sheep, and goats. Projections for livestock water demand are based upon the water use estimates for the base "dry year" and then generally held constant into the future. Some adjustments have been made to account for shifts of confined animal feeding operations into or out of a county. The volume of water needed for livestock is projected to remain fairly constant over the planning period, increasing only by 15 percent over 50 years, from 322,966 acre-feet in 2010 to 371,923 acre-feet in 2060. The livestock use projections from the 2007 State Water Plan ranged from 344,495 acre-feet in 2010 to 404,397 acre-feet in 2060.

3.2.7 COMPARISON OF WATER DEMAND PROJECTIONS AND WATER USE ESTIMATES

Water demand projections for the 2012 State Water Plan and 2011 regional water plans were developed early in the five-year planning cycle and for this reason include projected water demands for the year 2010. To

provide a benchmark of the relative accuracy of the projections, the projected 2010 volumes are compared with preliminary TWDB water use estimates from the most recent year available, 2009, an appropriate year for comparison as it was generally considered the second driest year of the last decade statewide, and the projected water demands are intended to be in dry-year conditions.

Overall, the statewide 2009 water use estimates are 10 percent less than the 2010 projections (Table 3.5). Projected water use can in general be expected to represent an upper bound to actual water use. One reason is that, even when a relatively dry year is experienced, not all parts of the state will experience the most severe drought, while the projections are calculated under the assumption that all water users are in drought conditions. Projections also are intended to reflect the water use that would take place if there were no supply restrictions. In practice, especially for municipal water users, water conservation and drought management measures to reduce water demand are implemented. In the context of water planning, such reductions are not automatically assumed to occur and thus reduce projected water use, but are more properly accounted for as water management strategies expected to be implemented in times of drought.

In each of the agricultural categories, estimated water use was 8 percent less than projected. Large differences occurred in the industrial categories of mining and steam-electric power. More recent research has indicated that the mining use projected for 2010 in this plan is overstated, and will be adjusted for the next planning cycle. Some of the difference in electric generation may be explained by increased efficiencies, but incomplete data returns for the 2009 estimates may also be a factor. The 2009 water use estimate for the municipal category is 12 percent less than the projected volume.

While 2009 was a relatively dry year, it did not approach the severity of drought conditions being experienced by most of Texas in the current year, 2011. Water use estimates for 2011 will provide a more representative comparison with 2010 projections, and will be incorporated into water demand projections for the next planning cycle, when they become available.

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