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## Chapter 2 Current and Projected Population and Water Demand

### 2.1 Introduction

In October 2013, the Texas Water Development Board (TWDB) approved population and water demand projections for the Panhandle Water Planning Area (PWPA) for use in the 2016 regional water plan. As part of this regional water planning update, these projections were reviewed by the region and revised as needed. Modifications were made to projected populations and municipal use in Carson, Dallam, Hansford, Hutchinson, Moore, Ochiltree and Randall Counties based on local input. Changes were also made for the agricultural and industrial water demands. Due to the continuing changes in the agricultural sector in the region, a detailed study of the current and projected agricultural water use was conducted for this plan. Steam electric power water demands for Moore County were modified as the result of the expected closure of the facility in this county.

The TWDB distributes its population and demand projections by Water User Groups. A Water User Group is defined as one of the following:

- Cities with population of 500 or more,
- Individual utilities providing more than 0.25 million gallons per day (MGD) for municipal use,
- Rural/unincorporated areas of municipal water use, known as County Other (aggregated on a county/basin basis),
- Manufacturing (aggregated on a county/basin basis),
- Steam electric power (aggregated on a county/basin basis),
- Mining (aggregated on a county/basin basis),
- Irrigation (aggregated on a county/basin basis), or
- Livestock (aggregated on a county/basin basis).

Each Water User Group has an associated water demand. Only municipal Water User Groups have population projections.

To simplify the presentation of these data all projections in this chapter are aggregated by county where the water is used. Projections divided by Water User Group, county and basin may be found in the tables at the end of this chapter. The projections were developed by decade and cover the period from 2020 to 2070.

Projected demands on water sources are addressed in Chapter 3. Specifically, expected demands on the Ogallala aquifer by county are included in Table 3-16. Demands on other sources are accounted for through the allocation of water supplies to users and recommended water management strategies.

This chapter documents historical and projected estimates of population and water demands of cities and counties in the PWPA, as well as the demands on designated wholesale water providers. Revisions to population and water demand projections discussed in this chapter have been approved by the TWDB.

## 2.2 Population

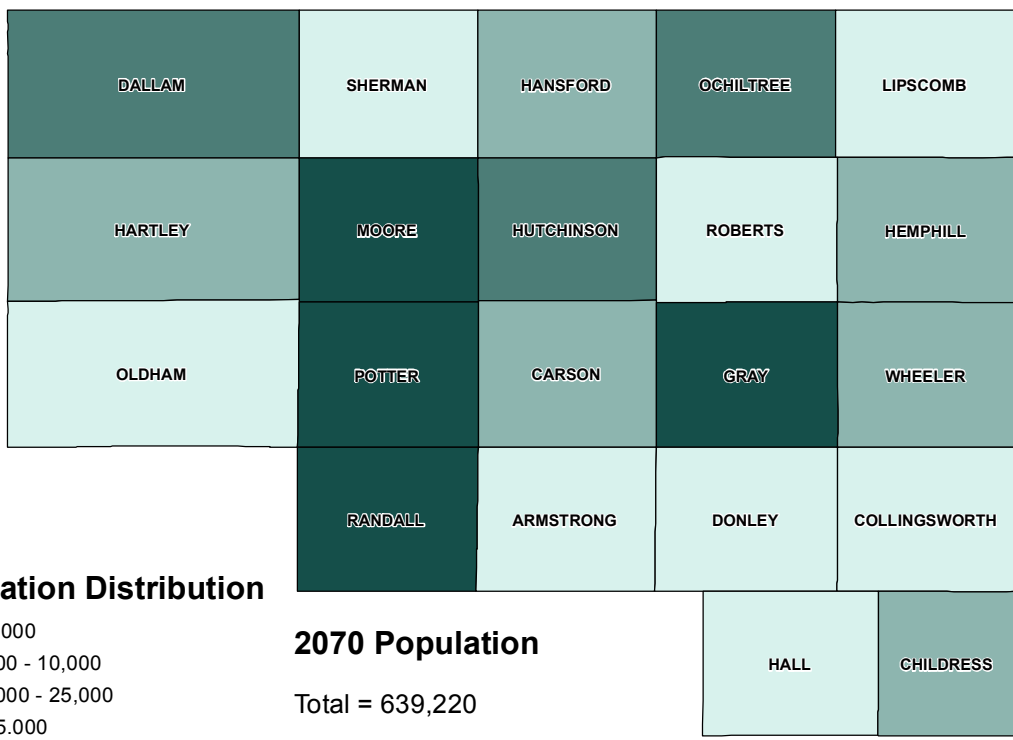
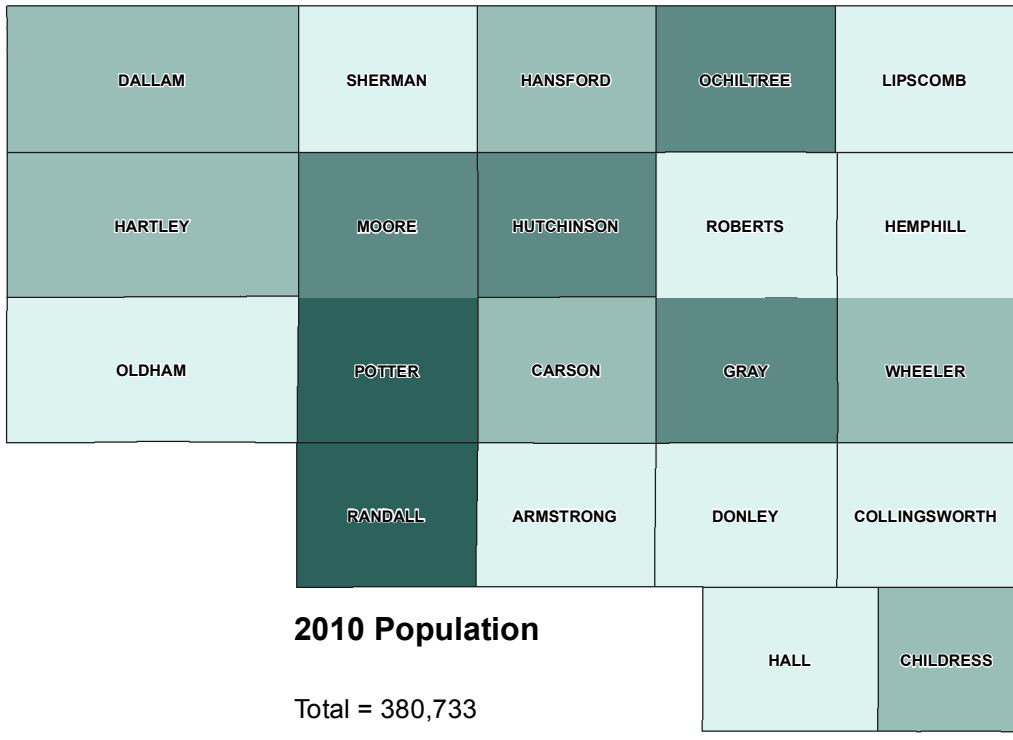
In 2010, the population of the State of Texas was approximately 25.1 million people. The population of the PWPA in 2010 was estimated to be 380,733. This represents approximately 1.5 percent of the state's population. Most of the region's population is located in Potter and Randall Counties, which contains Amarillo and surrounding areas. The remaining population in the PWPA is distributed among the other 19 counties, ranging from populations of 929 in Roberts County to 22,535 in Gray County.

Population projections for the PWPA are based on the 2010 U.S. Census. The projections use a standard methodology known as the cohort-component method. This method is based upon historical birth and survival rates of the region's population. It also accounts for the migration of people into and out of a community. For many communities, the migration rate can significantly affect the projected populations. For several counties in the Panhandle Region the TWDB assumed higher migration rates than historically recorded due to anticipated oil and gas development in the area. Surveys were sent to the municipalities to seek input on the projections. Based on the results of these surveys, several cities responded that significant long-term growth as estimated by the TWDB was not expected. These communities included Spearman, Perryton, Groom, Lake Tanglewood and Ochiltree County-Other. Two cities requested increases in population due to higher recent growth rates (Cactus) or new development (White Deer). Based on these responses, modifications to the draft TWDB projections were made for Carson, Hansford, Moore, Ochiltree and Randall Counties.

The population for the PWPA is projected to increase from the 380,733 in 2010 to 639,220 in 2070, or an average annual growth rate of 0.87 percent. As shown on Table 2-1, approximately 74 percent of the region's growth is expected to occur in Randall and Potter Counties, with much of this growth occurring outside of the city limits of Amarillo. Other counties showing increases in population include Dallam, Gray, Moore, and Ochiltree counties. The 2010 population and 2070 population projections by county are shown in Figure 2-1.

**Table 2-1: PWPA Population by County from 2010 to 2070**

County Name	2010	2020	2030	2040	2050	2060	2070
Armstrong	1,901	1,911	1,911	1,911	1,911	1,911	1,911
Carson	6,182	6,354	6,520	6,632	6,632	6,632	6,632
Childress	7,041	7,269	7,546	7,776	8,001	8,225	8,443
Collingsworth	3,057	3,236	3,408	3,522	3,653	3,755	3,844
Dallam	6,703	7,744	8,720	9,747	10,759	11,733	12,671
Donley	3,677	3,788	3,788	3,788	3,788	3,788	3,788
Gray	22,535	24,439	27,046	30,168	34,186	37,388	40,730
Hall	3,353	3,393	3,487	3,487	3,487	3,487	3,487
Hansford	5,613	5,959	6,368	6,710	7,017	7,330	7,634
Hartley	6,062	6,281	6,631	6,817	6,950	7,069	7,164
Hemphill	3,807	4,209	4,609	4,948	5,297	5,609	5,895
Hutchinson	22,150	22,957	23,779	23,990	23,990	23,990	23,990
Lipscomb	3,302	3,599	3,858	4,011	4,211	4,350	4,465
Moore	21,904	25,768	29,372	33,210	37,106	41,170	45,330
Ochiltree	10,223	11,305	12,158	13,075	14,061	15,122	16,264
Oldham	2,052	2,230	2,376	2,376	2,376	2,376	2,376
Potter	121,073	134,031	148,960	164,757	180,486	197,638	215,701
Randall	120,725	134,269	150,044	165,835	182,010	199,219	217,095
Roberts	929	1,003	1,047	1,047	1,047	1,047	1,047
Sherman	3,034	3,294	3,571	3,720	3,853	3,949	4,020
Wheeler	5,410	5,587	5,809	6,019	6,239	6,478	6,733
<b>Total</b>	<b>380,733</b>	<b>418,626</b>	<b>461,008</b>	<b>503,546</b>	<b>547,060</b>	<b>592,266</b>	<b>639,220</b>



**Population Distribution**

- < 5,000
- 5,000 - 10,000
- 10,000 - 25,000
- > 25,000

0 10 20 40 Miles

DATE: MARCH 2013

SCALE: 1:2,534,400

DATUM & COORDINATE SYSTEM: GCS NORTH AMERICAN 1983

PREPARED BY: JJR

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**PANHANDLE WATER PLANNING AREA**

**POPULATION PROJECTIONS FOR COUNTIES IN THE PWPA**

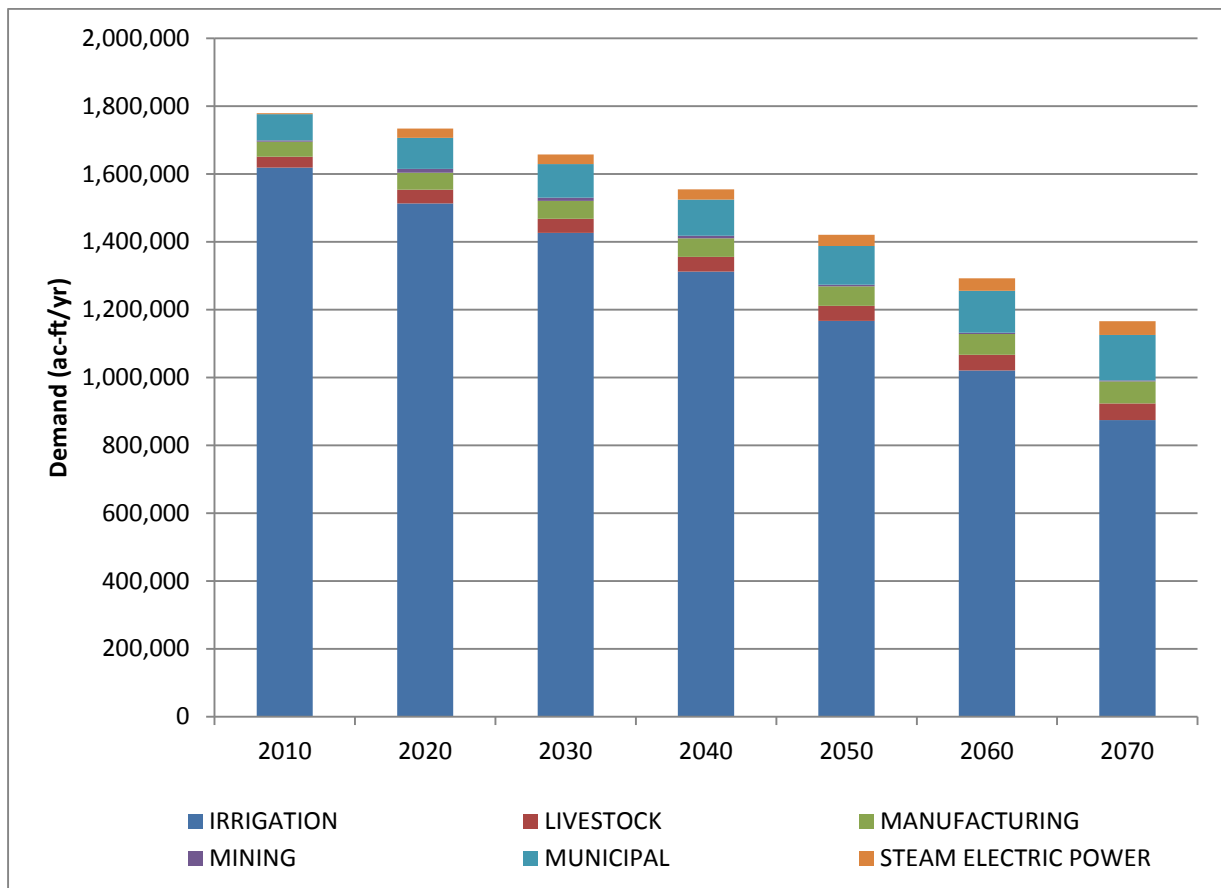


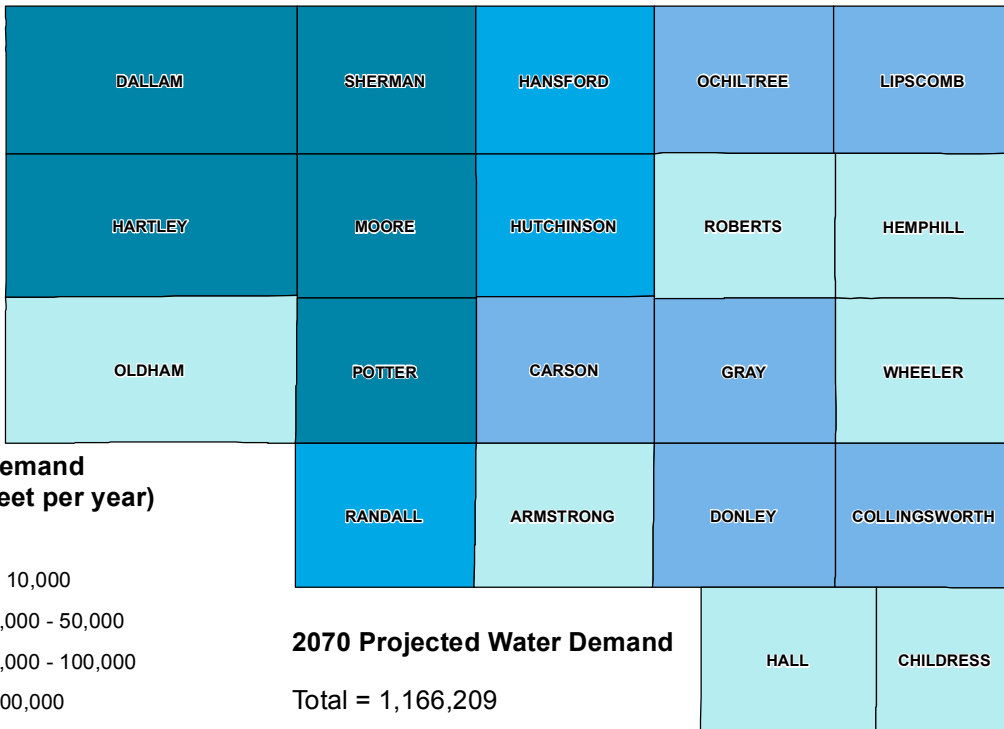
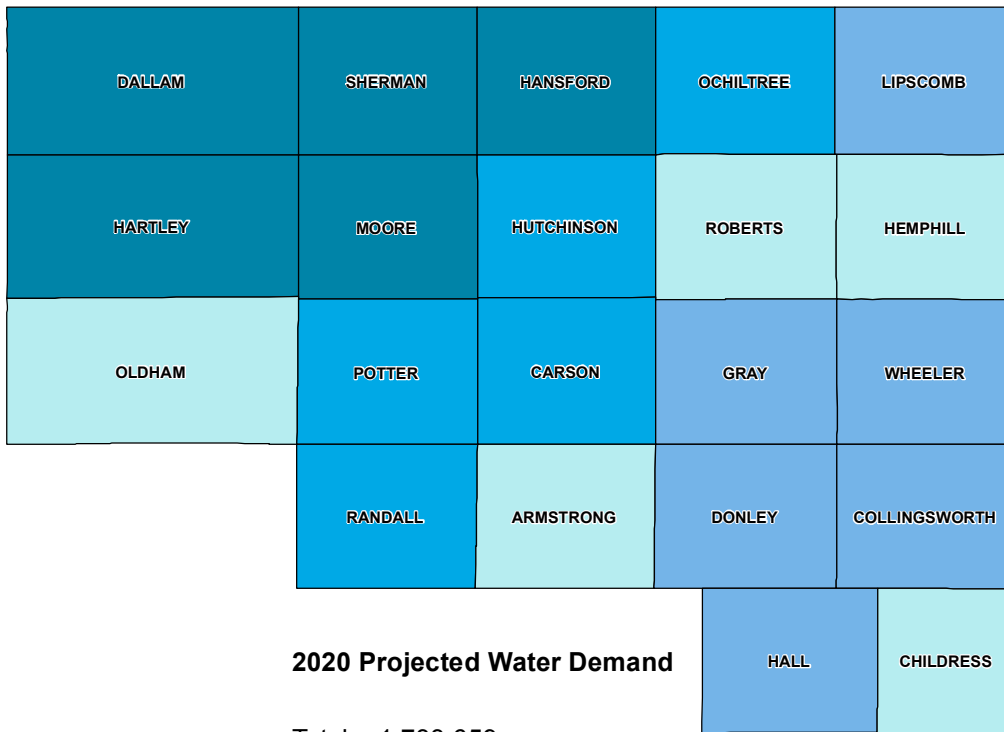
**FIGURE 2-1**

### 2.3 Historical Water Use and Projected Water Demand

Water use in the PWPA during 2010 totaled over 1.78 million acre-feet, or approximately 13 percent of the state total. Three counties in the PWPA, Dallam, Hartley and Sherman, reported water use of over 200,000 acre-feet with a combined water use of more than 0.95 million acre-feet in 2010. Water use by these three counties represents approximately 54 percent of the total water use in the PWPA during 2010. Water use of the remaining 18 counties totaled nearly 820,000 acre-feet and ranged from 5,243 acre-feet in Armstrong County to 178,277 acre-feet in Moore County. Projections for water demand indicate that total water usage in the PWPA will decrease from 1,733,659 acre-feet in 2020 to 1,166,209 acre-feet in 2070. (Figure 2-2) due to reductions in agricultural use. Most of the water use will continue to be used in the three counties noted above. Figure 2-3 shows the distribution of total water demands by county.

**Figure 2-2: Total Water Use for PWPA from 2010 to 2070**





**Total Demand  
(Acre-feet per year)**

- 0 - 10,000
- 10,000 - 50,000
- 50,000 - 100,000
- >100,000

0 10 20 40  
Miles

DATE: JULY 2014

SCALE: 1:2,534,400

DATUM & COORDINATE SYSTEM: GCS NORTH AMERICAN 1983

PREPARED BY: JLA

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**PANHANDLE WATER PLANNING AREA**

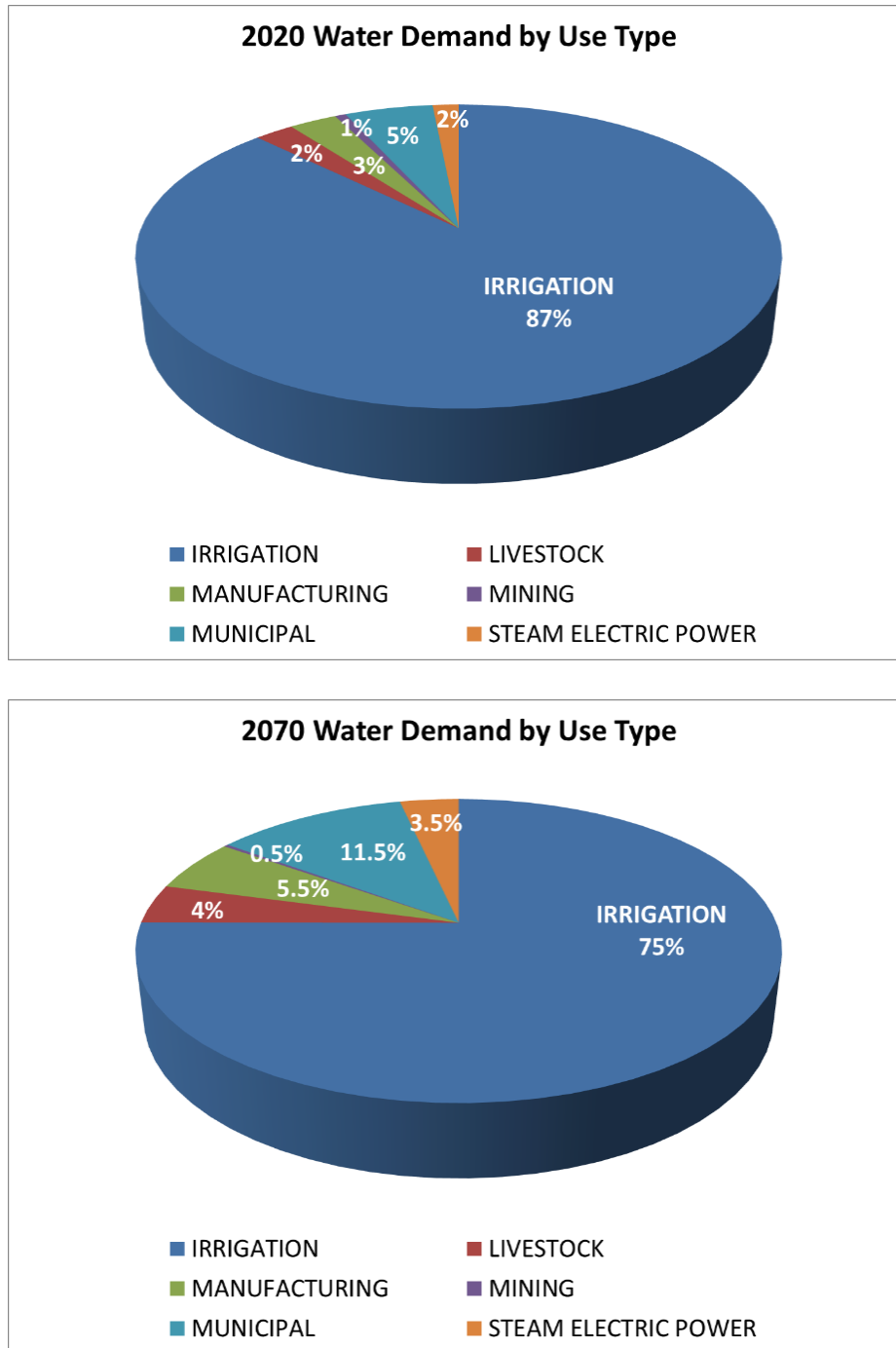
**TOTAL WATER DEMAND PROJECTIONS FOR COUNTIES IN THE PWPA**



**FIGURE 2-3**

The largest water use in the PWPA is for agricultural purposes, followed by municipal water use. Figure 2-4 shows the distribution of water demand by use type. Tables at the end of this chapter contain detailed information on projected water use by municipal, agricultural, steam-electric, and industrial water users.

Figure 2-4: Water Demand by Use Type

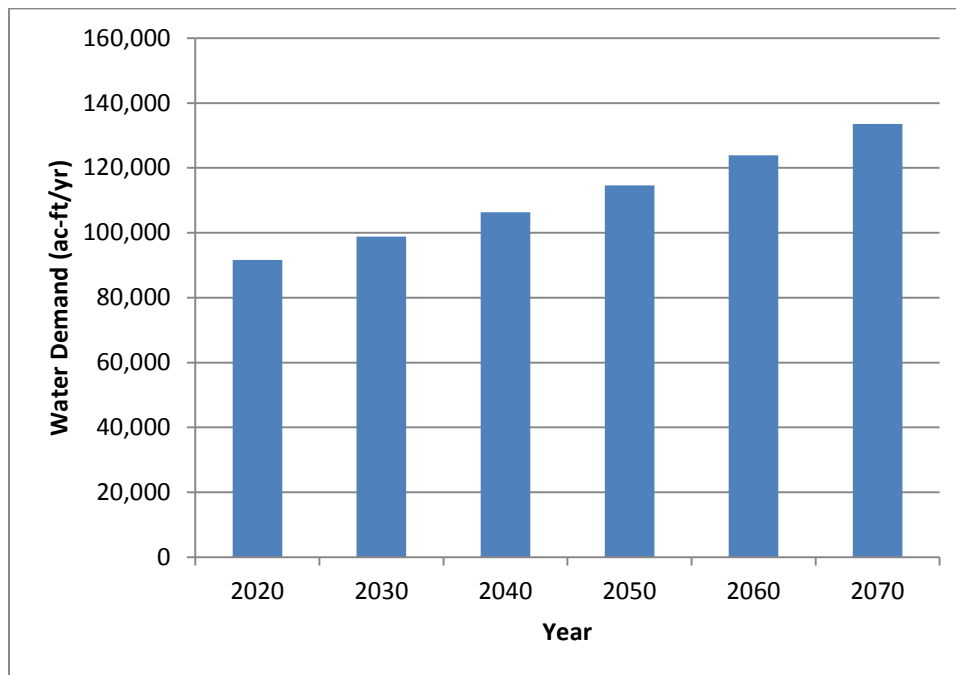


## 2.4 Municipal Water Demands

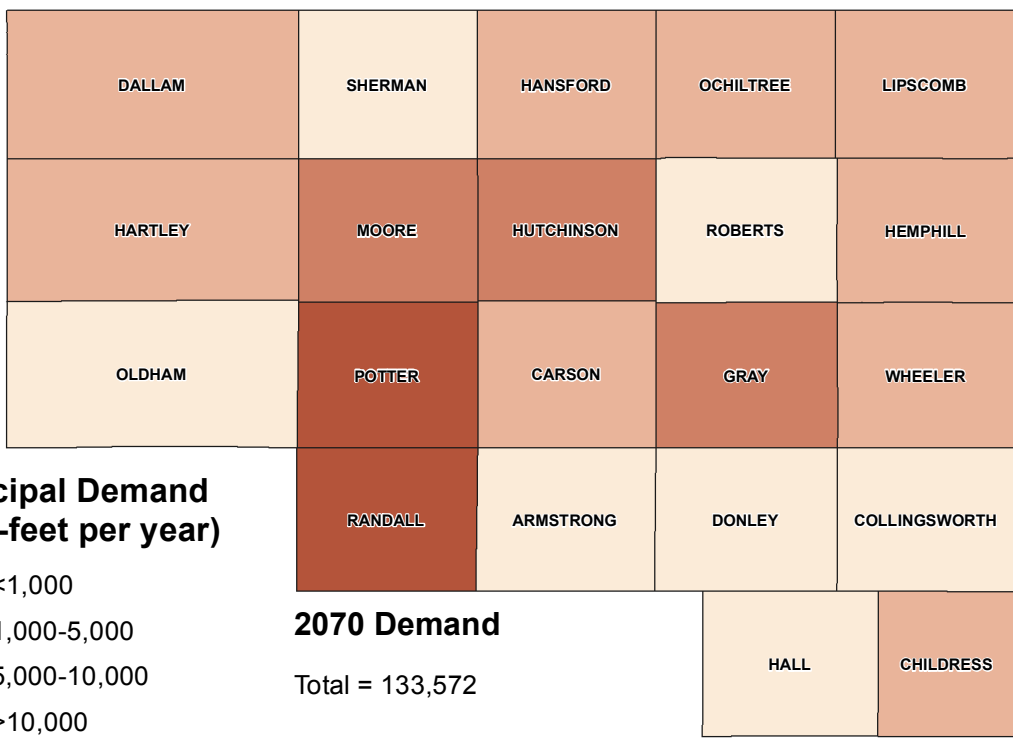
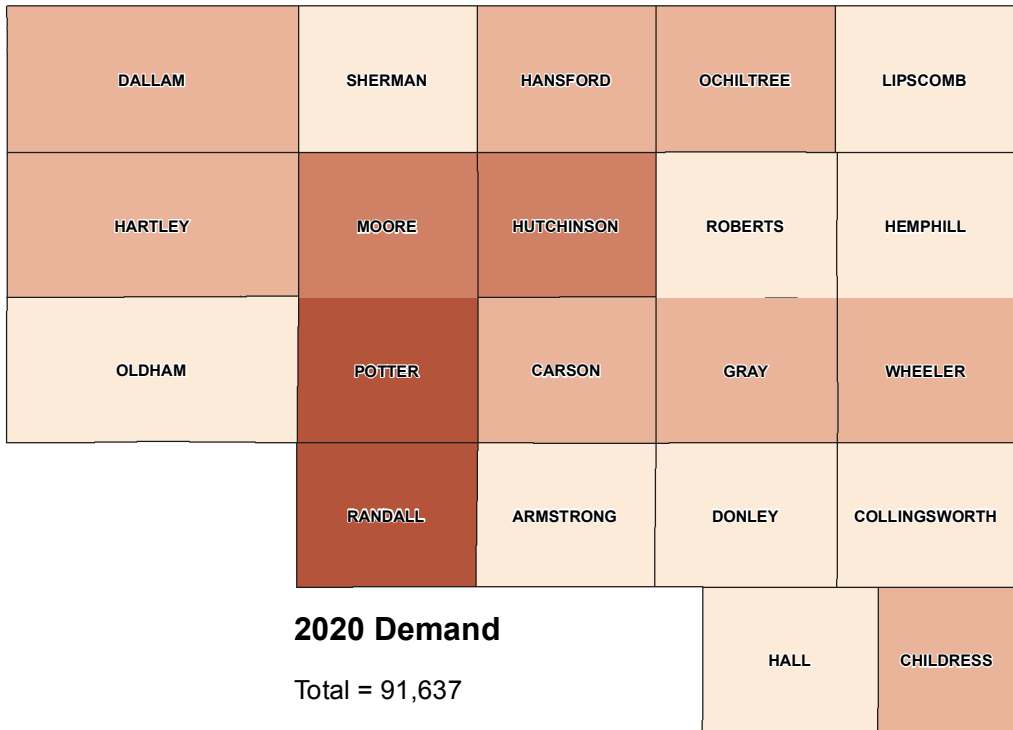
The distribution of municipal water use in the PWPA corresponds closely to the distribution of population centers in the PWPA. Projections of municipal water demands are calculated based on estimated changes in populations for cities and rural areas and on estimates of daily per capita water use. For this plan, year 2011 was used as the basis for per capita water use. Through implementation of the Plumbing Code Fixture Act, per capita water use is estimated to decrease for each decade of the planning period under the assumption that water efficient appliances and plumbing fixtures will be installed and result in lower water use. These conservation savings will be further explored and discussed in the subsequent chapter highlighting conservation efforts in the region.

Municipal water use in the PWPA accounts for approximately 5 percent of total water use in the PWPA in 2020. With the projected population growth, the municipal water demand for the PWPA is projected to increase from 91,637 acre-feet in 2020 to 133,572 acre-feet in 2070. This is approximately a 46 percent increase in water demand. Potter and Randall Counties represent most of the municipal water use increase over the planning period. In these counties the populations and municipal water demands in the County-Other municipal water user group are growing at nearly twice the rate of the population within the city of Amarillo. Since most of these users are not supplied by municipal water supply systems but domestic wells, water user needs in these areas are occurring now and need to be carefully considered. Figure 2-5 shows the increasing trend in projected municipal water demand for users in the PWPA through 2070. Figure 2-6 shows the municipal use by county.

**Figure 2-5: Projected Municipal Water Demand in the PWPA**







**Municipal Demand (Acre-feet per year)**

- <1,000
- 1,000-5,000
- 5,000-10,000
- >10,000

0 10 20 40 Miles

DATE: MARCH 2013

SCALE: 1:2,534,400

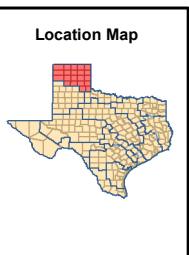
DATUM & COORDINATE SYSTEM: GCS NORTH AMERICAN 1983

PREPARED BY: JJR

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**PANHANDLE WATER PLANNING AREA**

**PROJECTED MUNICIPAL PWPA WATER DEMAND BY COUNTY**



**FIGURE 2-6**

## 2.5 Industrial Water Demands

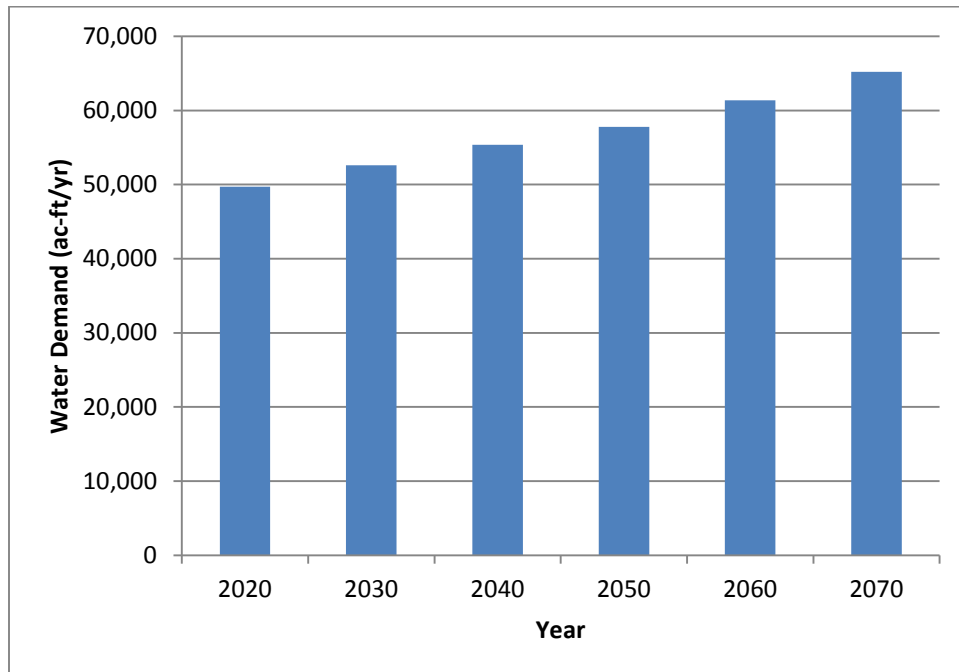
The TWDB defines industrial water use as water required in the production process of manufactured products, including water used by employees for drinking and sanitation purposes. The industrial use category includes manufacturing, steam power generation, and mining. Each of these categories is discussed below. Figure 2-7 (on the following page) shows the total industrial water demand in the PWPA by county for years 2020 and 2070.

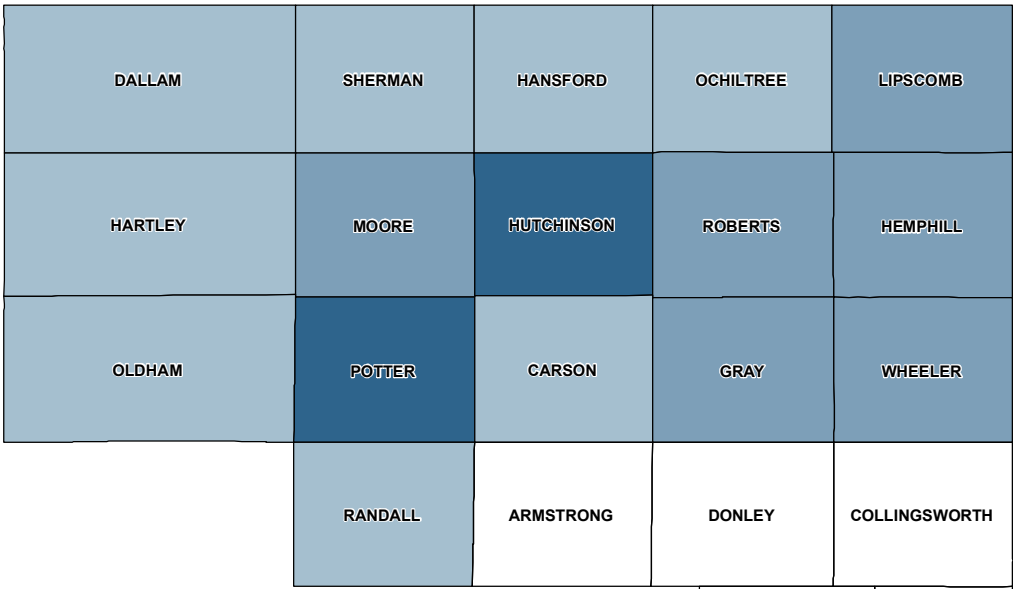
### 2.5.1 Manufacturing

Most of the manufacturing industries in the PWPA are associated with agribusiness or energy production (oil and gas). There are eleven counties in the region with manufacturing water use. The larger users are located in Hutchinson, Moore and Potter Counties. Manufacturing demands are estimated by the TWDB based on historical reported use from 2004 to 2008, employment data and the historical rate of change.

Figure 2-8 shows the total projected water demand of manufacturing users in the PWPA through 2070. Total manufacturing water demand for the PWPA is projected to increase from 49,695 acre-feet in 2020 to 65,194 acre-feet by 2070. Manufacturing water use represents 3 to 5 percent of the total water use in the PWPA over the planning period.

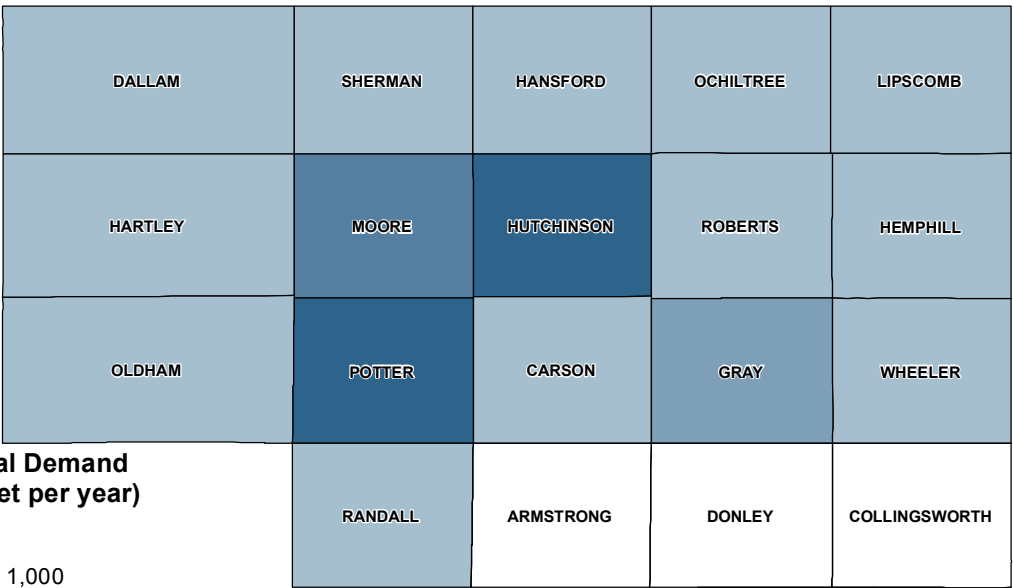
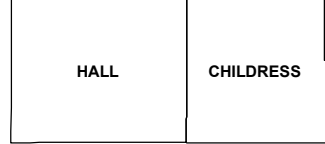
**Figure 2-8: Projected Manufacturing Water Use in the PWPA**



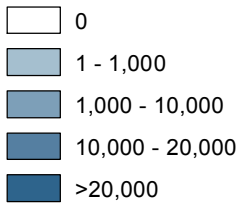


**2020 Projected Water Demand**

Total = 88,021

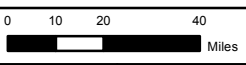
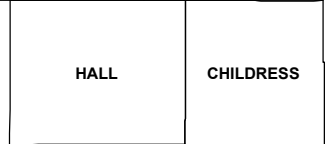


**Industrial Demand (Acre-feet per year)**

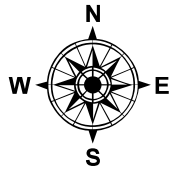


**2070 Projected Water Demand**

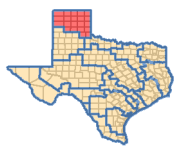
Total = 109,151



DATE: JULY 2014  
 SCALE: 1:2,534,400  
 DATUM & COORDINATE SYSTEM: GCS NORTH AMERICAN 1983  
 PREPARED BY: JLA  
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**PANHANDLE WATER PLANNING AREA**  
 INDUSTRIAL WATER DEMAND PROJECTIONS FOR COUNTIES IN THE PWPA



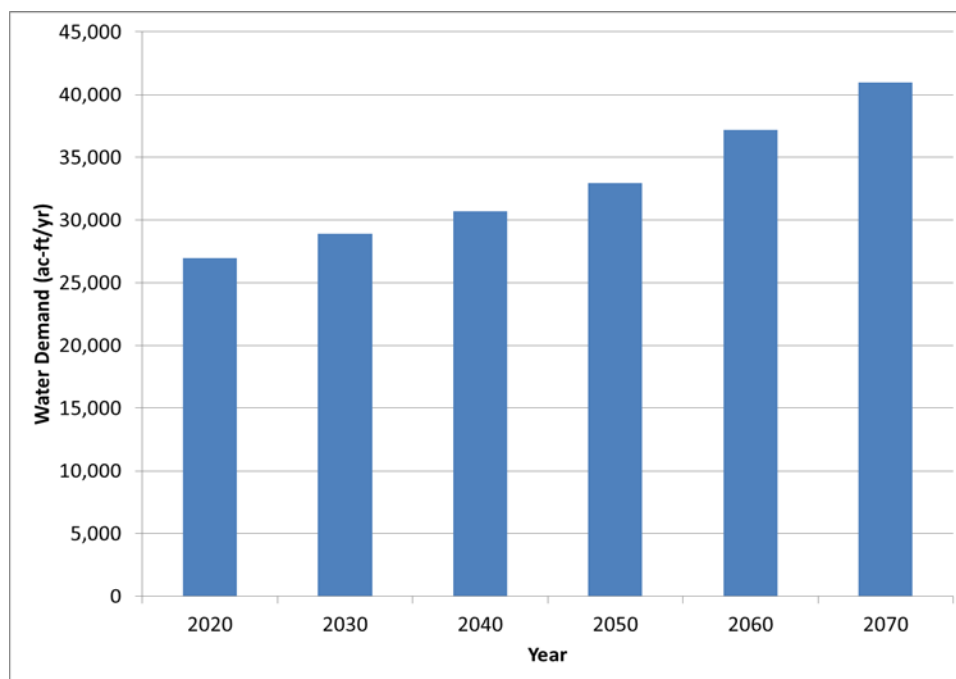
**FIGURE 2-7**

### 2.5.2 Steam Electric Power

Xcel Energy has power generation plants located in Moore and Potter counties that account for nearly all of the current water use by power generators in the PWPA. During this round of planning the amount projected water use by Xcel Energy in Moore County was set to zero (0) after 2020. In addition to the Xcel Energy facilities there is a proposed new coal plant in Gray County that is planned to support wind generation in the Panhandle. Water demands for this facility were developed by the Bureau of Economic Geology (BEG) as part of a study contracted by the TWDB <sup>(1)</sup>. These demands are included in this planning update.

Considering existing and proposed facilities, water demand for power generation in the PWPA is projected to increase from 26,996 acre-feet in 2020 to 40,989 acre-feet by 2070. This represents between 2 to 3 percent of the total water use in the PWPA over the planning period. Figure 2-9 illustrates the projected water demands of steam power generators in the PWPA.

**Figure 2-9: Projected Steam Power Water Use in the PWPA**



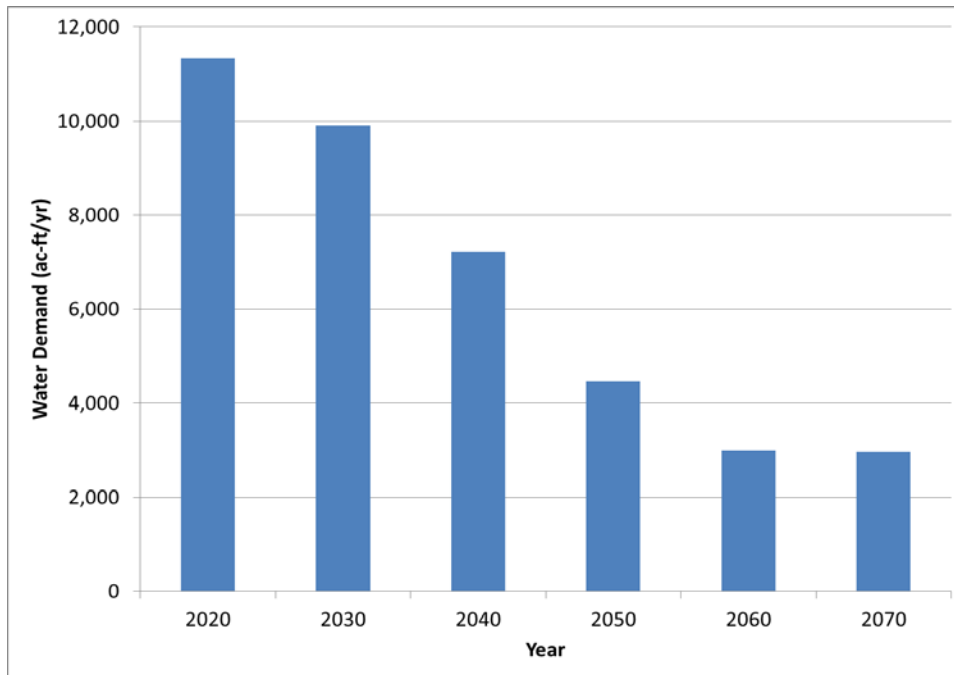
### 2.5.3 Mining

Mining activities in the PWPA consist primarily of oil and gas extraction and removal of industrial minerals such as sand, gravel, and gypsum. Technological advancements in natural gas development have increased mining activities in the Woodford Shale Formation in the Panhandle Region. This has resulted in increased mining water use in several northeastern counties in the region. These activities are expected to continue over the next 10 to 20 years, and then decrease over time. Water use for other oil and gas activities has seen recent fluctuation with the volatility of the energy market. In response to these

changes, the TWDB sponsored a study of long-term mining use associated with the oil and gas industry across the State titled “Current and Projected Water Use in the Texas Mining and Oil and Gas Industry”<sup>(2)</sup>. Mining demands for the 2016 regional plan are based on an additional study titled “Oil and Gas Water Use: Update to the 2011 Mining Water Use Report” by the Bureau of Economic Geology (BEG)<sup>(3)</sup>.

Mining water use is projected for 14 counties in the PWPA, totaling 11,330 acre-feet in 2020 and reducing to 2,968 acre-feet by 2070. Mining water use represents a small fraction of the total water use in the region (less than 1 percent). Figure 2-10 shows the projected water demands for mining in the PWPA.

**Figure 2-10: Projected Mining Water Use in the PWPA**



## 2.6 Agricultural Water Demands

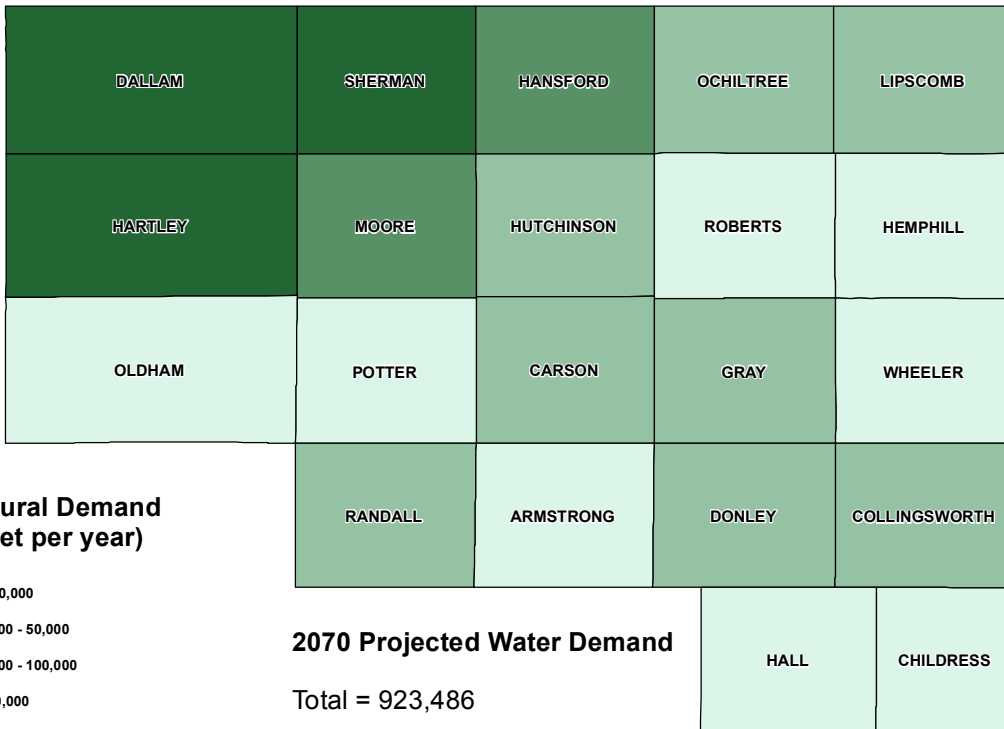
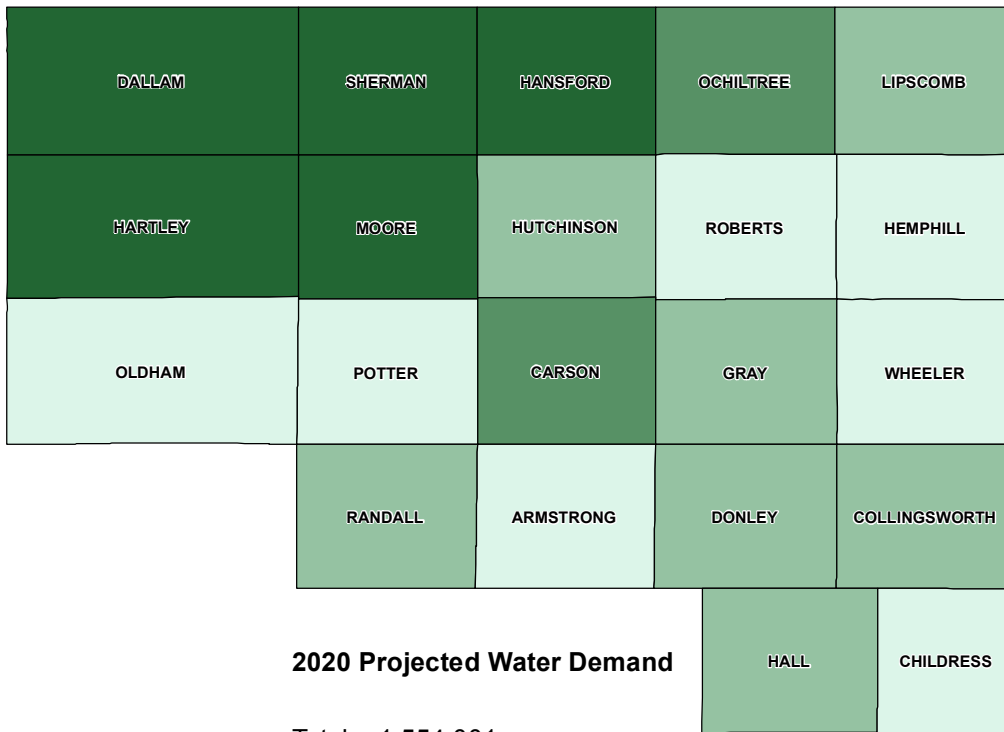
Agricultural water demands include water used for irrigation purposes and water for livestock production. It does not include water for processing agricultural or livestock products. This demand is included under manufacturing.

Agricultural water use accounts for approximately than 90 percent of the total water demand in the PWPA. Figure 2-11 shows the agricultural water use by county in the region. The largest agricultural water users are in Dallam, Hartley, Moore and Sherman Counties.

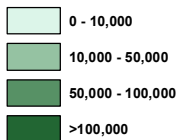
### 2.6.1 Irrigation Water Demands

Irrigation water use accounts for the majority of the water used in the PWPA. The PWPG contracted with Texas A&M AgriLife Research and Extension Center at Amarillo (Texas A&M Agrilife) to develop updated agricultural water demands, including irrigated agriculture and livestock water demands. The 2016 RWP irrigation estimates were developed using the Texas A&M AgriLife model. The model is effectively a water balance model using the parameters of irrigation water pumped, crop ET, effective rainfall and soil profile water used within the respective crop growing seasons. The irrigation model is computed on a per crop per county basis and then summed over the regional counties (21) for the irrigation demand total. Based on local information of irrigated farms and property transfers, the total regional irrigated acreage of 1,218,664 for 2020 in the 2011 Water Plan increased to 1,350,942 acres for this plan (a 10.9% increase). The agricultural demand report is provided in Appendix B.

Considering the current irrigated acreages by crop type, irrigation equipment, energy prices for irrigation wells, and the shifts in crop demands, the irrigation water demands for 2020 in the PWPA are projected to be 1.51 million acre-feet per year. This is an increase of about 200,000 acre-feet from the 2011 water plan. However, it is less than the historical use in 2011. This is because the adopted irrigation water demands consider an average water use over the historic period from 2006 to 2010. Since the primary source of water for irrigation is the Ogallala Aquifer, an average water demand for irrigation is recommended for long-term planning to better assess the impacts on the water source. 2011 was an extremely dry year with higher than average irrigation water use. As with the 2011 plan, irrigated water needs are projected to decline over time due to increases in conservation and conversion of acreages to other uses. By 2070, the updated irrigation water demands are projected to be 874,922 acre-feet per year. Figure 2-12 shows the total projected irrigation water demand in the PWPA.



**Agricultural Demand  
(Acre-feet per year)**

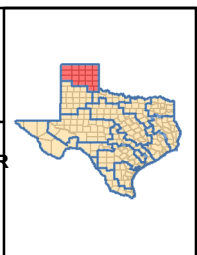


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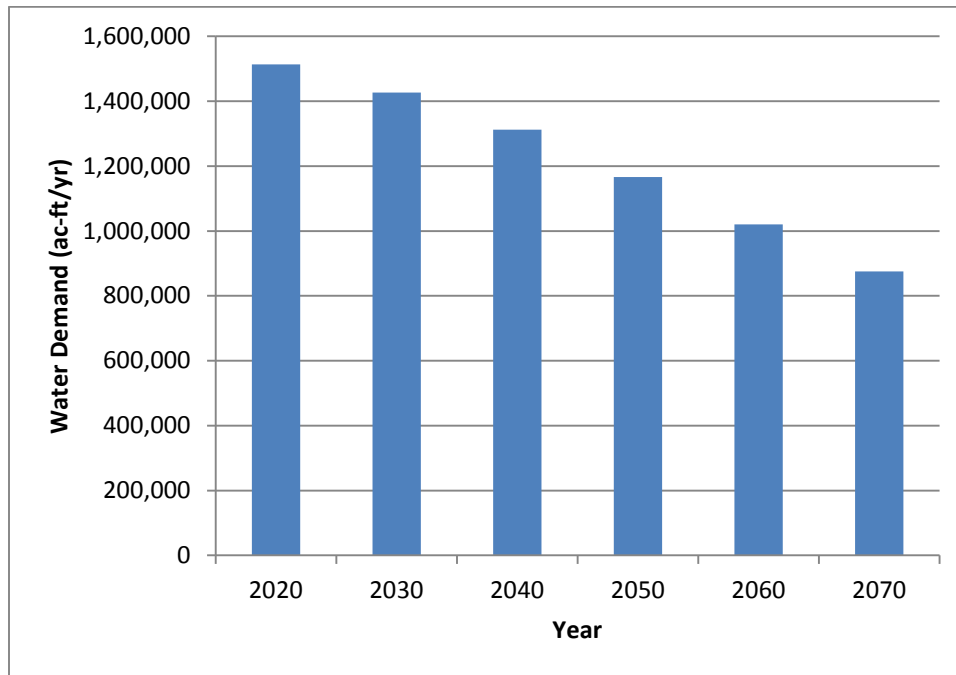
**PANHANDLE WATER  
PLANNING AREA**

**AGRICULTURAL WATER DEMAND PROJECTIONS FOR  
COUNTIES IN THE PWPA**



**FIGURE  
2-11**

**Figure 2-12: Projected Water Use for Irrigation in the PWPA**



### 2.6.2 Livestock Water Demands

Livestock water use is part of the total agricultural demand in the PWPA. While comprising only about 2 percent of the region’s current water use, livestock production is an important component of the overall economy of the PWPA. Changes to types of livestock production impact not only this demand sector but also associated agribusinesses. Due to recent trends in future livestock production, the demands for livestock water use were reviewed and updated by Texas A&M AgriLife. The report is included in Appendix B.

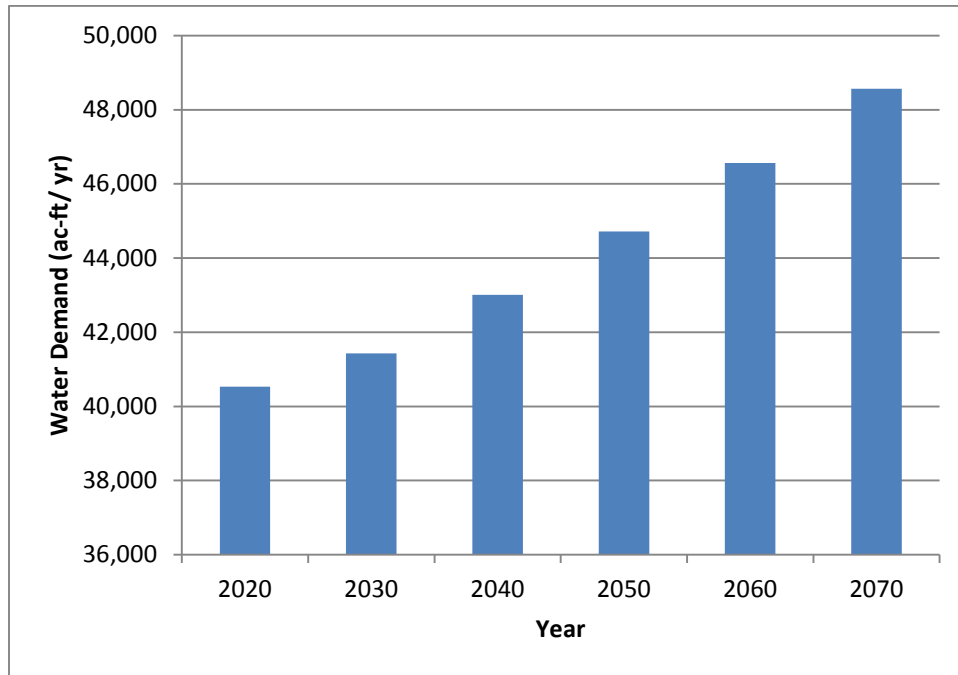
New projections developed by Texas A&M AgriLife included the most recent inventories of various livestock species for each county, estimates of annual industry growth rates, and updated regional species-level water use estimates. Future trends were developed with input from the PWPG Agricultural Committee.

Inventories of current livestock production, along with estimates of water use by species, result in an estimated livestock use of 40,532 acre-feet in 2020 and increasing to 48,564 acre-feet per year by 2070. The largest livestock water use group is the fed cattle industry with an annual usage of about 22,290 acre-feet per year by 2070. The forecasted expansion of the dairy industry results in a water usage estimate by 2070 of just over 12,000 acre-feet per year. These two user groups account for 71 percent of projected livestock water use in 2070. Overall, water use in the PWPA livestock sector is predicted to increase 20 percent from 2020 to 2070.



Figure 2-13 shows the projected livestock demand in the PWPA. Figure 2-14 illustrates the water demand by major livestock category for the planning period. Detailed livestock population and water demand data is contained in the Texas A&M AgriLife report in Appendix B.

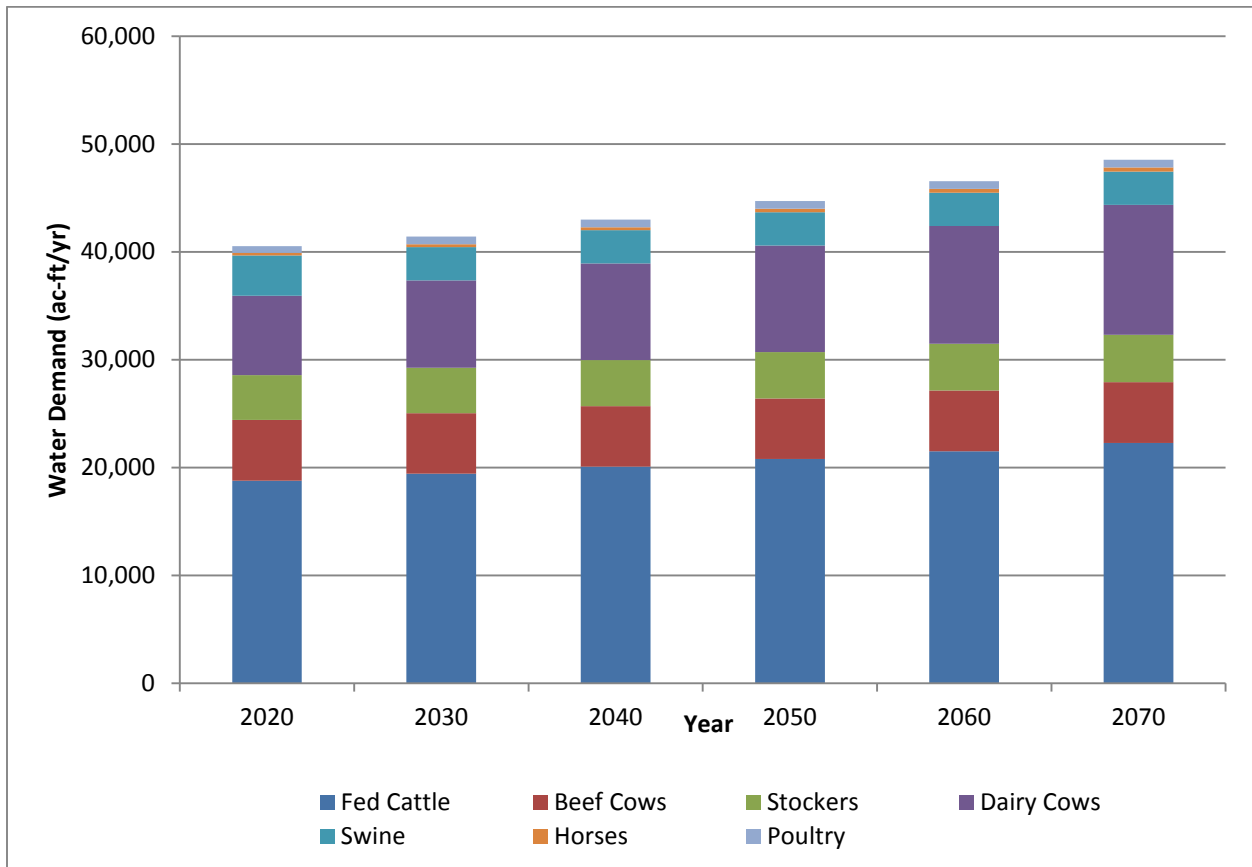
**Figure 2-13: Projected Livestock Water Demands for PWPA**



### 2.6.3 Uncertainty in Agricultural Demand Projections

The methodology used to develop the agricultural water demands is based on estimates of current production and expected trends in the agricultural sectors. These trends are contingent upon many factors, including changing market conditions, government subsidies, and availability of resources. Commodity and fuel prices also play important roles in agricultural water demands. These economic factors are often the driving force in the types of crops planted, irrigated acreage and ultimately the amount of water needed. These trends can result in both location and quantity changes to demands on the region's water sources and will need to be monitored and updated for subsequent planning efforts.

**Figure 2-14: Projected Livestock Water Demands by Animal Category**



## 2.7 Wholesale Water Providers

The category of Wholesale Water Provider (WWP) was created to include major providers of water for municipal and industrial use in the regional planning process. The PWPG has designated six WWPs in the region. These include the Canadian River Municipal Water Authority (CRMWA), cities of Amarillo, Borger, and Cactus, Greenbelt Municipal and Industrial Water Authority (Greenbelt MIWA) and Palo Duro River Authority (PDRA). Descriptions of each of these wholesale water providers are provided in Section 1.4 of this plan.

Of the six wholesale water providers, PDRA is not currently providing water to customers but each of these entities expect to provide wholesale water during the planning period. CRMWA and Greenbelt MIWA provide water to customers in the PWPA and adjoining regions. CRMWA provides water to customer cities in the Llano Estacado Water Planning Region (Region O) and Greenbelt MIWA provides water to customers in Region B.

### 2.7.1 City of Amarillo

In 2020, the City of Amarillo is projected to provide 81,492 acre-feet of water to the City of Amarillo, the City of Canyon, Texas Parks and Wildlife Department (Palo Duro State Park), and industrial use by ASARCO,

Tyson, and Xcel Energy. All of the water from Amarillo to Xcel Energy in 2020 is assumed to be treated wastewater. By 2070, Amarillo is expected to provide approximately 121,518 acre-feet per year to existing customers. Most of the increase in projected demand on Amarillo is associated with growth of the city and local manufacturing needs. As the surrounding County-Other in Potter and Randall Counties continue to grow, additional demands may be placed on Amarillo.

**Table 2-2: Projected Water Demands for the City of Amarillo**

Customers	Demands (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
City of Amarillo	47,731	52,110	56,810	61,860	67,631	73,739
Manufacturing - Potter	6,799	7,323	7,834	8,276	8,884	9,535
City of Canyon	1,000	1,000	1,000	1,000	0	0
Manufacturing - Randall	550	550	550	550	550	550
Palo Duro State Park	25	25	25	25	25	25
Steam Electric Power	25,387	26,804	28,408	30,011	34,115	37,669
<b>Total</b>	<b>81,492</b>	<b>87,812</b>	<b>94,627</b>	<b>101,722</b>	<b>111,205</b>	<b>121,518</b>

### 2.7.2 Greenbelt Municipal and Industrial Water Authority (Greenbelt MIWA)

Greenbelt MIWA provides water to four cities in the PWPA, three cities in Region B, and to the Red River Authority (RRA) for subsequent sales in both regions. Approximately 60 percent of the current demand on Greenbelt MIWA is to the cities of Childress, Clarendon, Hedley, and Memphis, and to the RRA for sales in the PWPA. The remaining sales are to the cities of Chillicothe, Crowell, and Quanah, and to the RRA in Region B. Demand projections for Greenbelt MIWA were developed based on each recipient’s projected water demand and the percentage of the historical water demands that the Greenbelt MIWA had supplied. The demand on Greenbelt MIWA is expected to remain about the same through the planning period.

**Table 2-3: Projected Water Demands for Greenbelt MIWA**

Customers	Demands (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
City of Childress	1,624	1,658	1,686	1,722	1,768	1,814
City of Chillicothe	65	63	60	61	62	62
City of Clarendon	378	369	361	356	356	356
City of Crowell	138	134	132	131	131	131
City of Memphis	100	100	100	100	100	100
Childress County-Other	178	184	189	194	200	204
Donley County-Other	95	95	95	95	95	95
Foard County-Other	50	50	50	50	50	50
Hall County-Other	92	92	92	92	92	92

Customers	Demands (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
Hardeman County-Other	60	60	60	60	60	60
Hardeman County Manufacturing	276	294	313	332	332	332
City of Quanah	397	391	388	394	397	400
<b>Total</b>	<b>3,453</b>	<b>3,490</b>	<b>3,526</b>	<b>3,587</b>	<b>3,643</b>	<b>3,696</b>

### 2.7.3 Canadian River Municipal Water Authority (CRMWA)

CRMWA is the largest wholesale water provider in the PWPA. In 2020 CRMWA is projected to supply nearly 100,000 acre-feet of water to customers in the PWPA and Llano Estacado Region. CRMWA delivers water to Amarillo, Borger, and Pampa in the PWPA and to eight cities in the Llano Estacado Region, including Lubbock. Projected water demands on CRMWA through the planning period are anticipated to increase to approximately 120,000 acre-feet per year.

**Table 2-4: Projected Water Demands for CRMWA**

Customers	Demands (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
<i>PWPA:</i>						
City of Pampa	1,818	1,827	1,836	4,680	4,680	4,680
City of Borger	7,054	7,091	7,072	7,068	7,064	7,063
City of Amarillo	46,000	50,000	50,000	50,000	50,000	50,000
<i>Llano Estacado Region:</i>						
City of Lamesa	1,534	1,950	2,300	2,750	2,750	2,750
City of O'Donnell	137	139	142	146	150	153
City of Plainview	2,761	3,000	3,250	3,500	3,500	3,500
City of Levelland	2,301	2,400	2,500	2,588	2,671	2,743
City of Lubbock	35,600	39,000	43,500	47,000	47,000	47,000
City of Slaton	1,405	1,430	1,455	1,479	1,477	1,477
City of Tahoka	460	477	483	496	507	517
City of Brownfield	1,380	1,500	1,600	1,750	1,750	1,750
<b>Total</b>	<b>100,450</b>	<b>108,814</b>	<b>114,138</b>	<b>121,457</b>	<b>121,549</b>	<b>121,633</b>

### 2.7.4 City of Borger

The City of Borger provides wholesale water to industrial customers in Hutchinson and Carson Counties and retail services to its city customers and Hutchinson County-Other. Currently, the industrial demands on Borger total about 6 MGD, which accounts for about 25 percent of the manufacturing demand in Hutchinson County (assuming a peaking factor of 1.25). It is expected that Borger will continue to provide water for 25 percent of the projected manufacturing demands. The City also provides water to a carbon

plant in Carson County. Borger has a contract to supply water to TCW Supply. This contract is met through a complex agreement of trading water supplies with several of its industrial customers such that the net demand on the City of Borger is zero.

**Table 2-5: Projected Water Demands for the City of Borger**

Customers	Demands (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
Borger	3,215	3,254	3,234	3,229	3,225	3,224
Manufacturing - Hutchinson Co.	6,337	6,707	7,062	7,371	7,885	8,435
Manufacturing Carson Co.	450	450	450	450	450	450
Hutchinson County-Other	56	57	57	55	52	49
TCW Supply	0	0	0	0	0	0
<b>Total</b>	<b>10,058</b>	<b>10,468</b>	<b>10,803</b>	<b>11,105</b>	<b>11,612</b>	<b>12,158</b>

### 2.7.5 City of Cactus

The City of Cactus provides wholesale water to manufacturers in Moore County and retail water to its municipal customers. The City has a contract for 3.2 MGD with a meat packing plant in Moore County and also provides water to the Etter Community outside the city limits.

**Table 2-6: Projected Water Demands for the City of Cactus**

Customers	Demands (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
City of Cactus	985	1,108	1,242	1,382	1,532	1,686
Moore County-Other	98	108	119	132	146	160
Moore County Manufacturing	3,168	3,342	3,513	3,664	3,913	4,178
<b>Total</b>	<b>4,251</b>	<b>4,558</b>	<b>4,874</b>	<b>5,178</b>	<b>5,591</b>	<b>6,024</b>

**List of References**

- (1) Bureau of Economic Geology, *Water Demand Projections for Power Generation in Texas*, prepared for the Texas Water Development Board, August 2008.
- (2) Bureau of Economic Geology, *Current and Projected Water Use in the Texas Mining and Oil and Gas Industry*, prepared for the Texas Water Development Board, June 2011.
- (3) Bureau of Economic Geology, *Oil and Gas Water Use in Texas: Update to the 2011 Mining Water Use Report*, prepared from the Texas Oil and Gas Association, September 2012.