



# Summary of Llano Estacado (O) Region

The Llano Estacado (Region O) Regional Water Planning Area encompasses 21 counties in the southern High Plains of Texas. From Garza County in the southeast to Deaf Smith County in the northwest, the region lies within the upstream parts of four major river basins (Canadian, Red, Brazos, and Colorado) (Figure O.1). Despite this fact, almost no surface water leaves the region, as more than 95 percent is captured by the region's estimated 14,000 playa basins. Groundwater from the Ogallala Aquifer is the region's primary source of water and is used at a rate that exceeds recharge. The largest economic sectors in the region are livestock operations and agricultural crops, with its cotton production equaling about 60 percent of the state's total crop. Major cities in the region include Lubbock, Plainview, Levelland, Lamesa, Hereford, and Brownfield. The members of the Llano Estacado Planning Group are listed on the last page of this summary.

## Population and Water Demands

By 2010, approximately 2 percent of the state's total population is projected to reside in the Llano Estacado Region. By the year 2060, the population is projected to increase 12 percent to 551,758 (Figure O.2). Its water demands, however, will decrease. By 2060, the total water demands for the region are projected to decrease 15 percent, from 4,388,459 acre-feet to 3,716,727 acre-feet because of declining irrigation water demands (Figure O.3). Irrigation demand is projected to decline 17 percent, from 4,186,018 acre-feet in 2010 to 3,474,163 acre-feet in 2060 due to declining well yields and increased irrigation efficiencies (Table O.1). Municipal water use, however, increases 7 percent, from 87,488 acre-feet to 93,935 acre-feet by 2060.

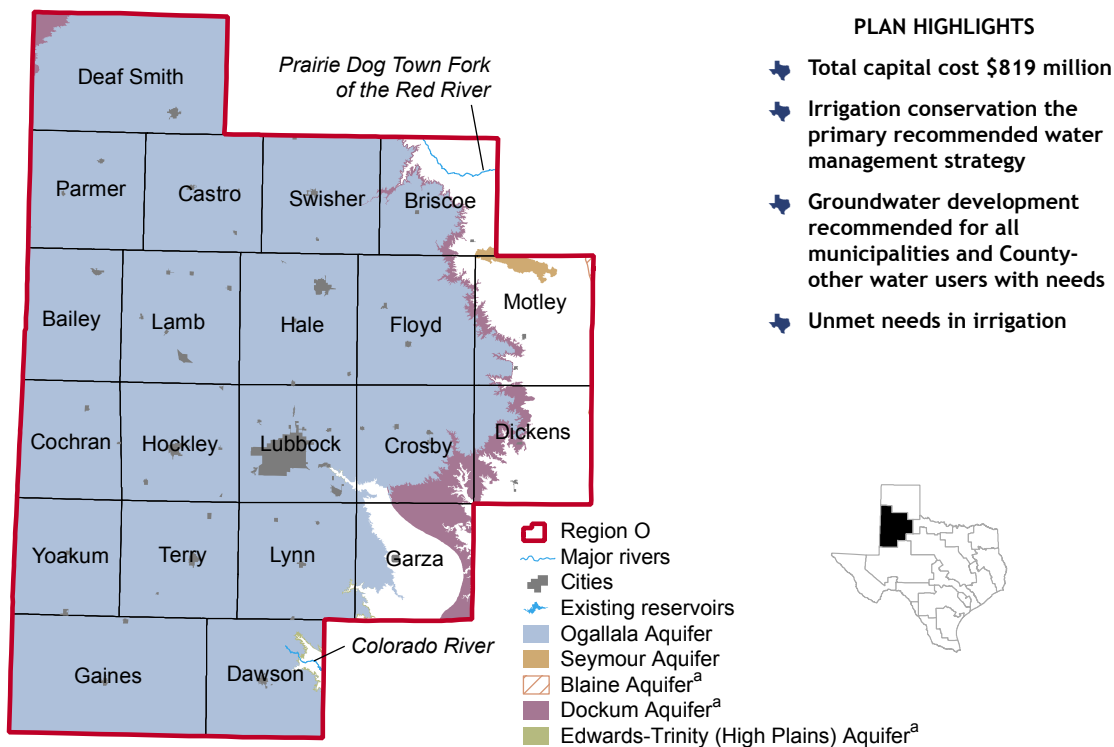


Figure O.1. Llano Estacado Region.

## Existing Water Supplies

The Llano Estacado Planning Region depends primarily upon groundwater from the Ogallala Aquifer, with 97 percent of the region’s supply in 2010 coming from this source. Approximately 95 percent of the water obtained from the aquifer is used for irrigation purposes. Other aquifers in the region (Seymour, Dockum, Edwards-Trinity [High Plains]) constitute less than 1 percent of the supply. Surface water is supplied by White River Lake and Lake Meredith. Of these reservoirs, Lake Meredith, operated by the Canadian River Municipal Water Authority in the Panhandle Region, is the largest contributor (33,445 acre-feet in 2060). By 2060, the total surface water and groundwater supply is projected to decline 55 percent, from 3,155,216 acre-feet in 2010 to approximately 1,421,987 acre-feet (Table O.2). This projected decline in water supply is due to the managed depletion of the Ogallala Aquifer.

## Needs

During times of drought, increased demands require pumping that exceeds the capacity of the Ogallala Aquifer, resulting in water needs occurring across the region as early as 2010. The needs for the Llano Estacado Region are projected to increase 85 percent from 1,266,820 acre-feet in 2010 to 2,349,124 acre-feet by 2060 (Figure O.4,

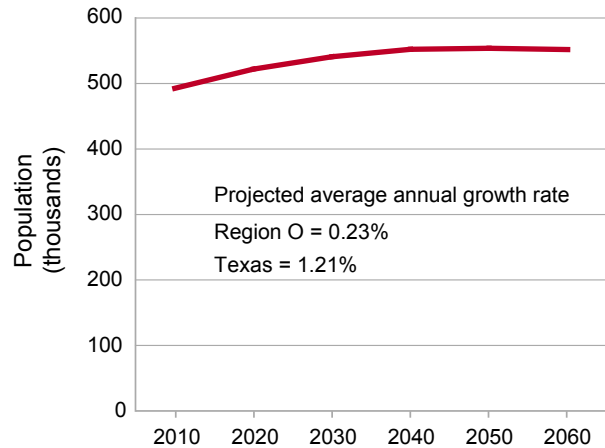


Figure O.2. Projected population for 2010-2060.

Table O.3). The plan identifies needs for irrigation of 1,261,453 acre-feet in 2010 and 2,322,544 acre-feet in 2060. Municipal needs also increase significantly, especially for Lubbock, which has needs of 13,614 acre-feet in 2060.

## Recommended Water Management Strategies and Cost

The Llano Estacado Planning Group recommended a variety of water management strategies, providing 441,511 acre-feet of additional water

Table O.1. Projected water demands for 2010-2060

Category	2010 (acre-feet)	2060 (acre-feet)	Percent change in demand 2010-2060	Percent of overall demand in 2010	Percent change in relative share of overall demand, 2010-2060
Municipal	87,488	93,935	+7	+2	+1
County-other	11,949	12,005	0	0	0
Manufacturing	11,778	15,999	+36	0	0
Mining	16,324	258	-98	0	0
Irrigation	4,186,018	3,474,163	-17	+95	-2
Steam-electric	25,645	49,910	+95	+1	+1
Livestock	49,257	70,457	+43	+1	+1
Region	4,388,459	3,716,727	-15		

Figure O.3. Projected total water demand and existing water supplies for 2010-2060.

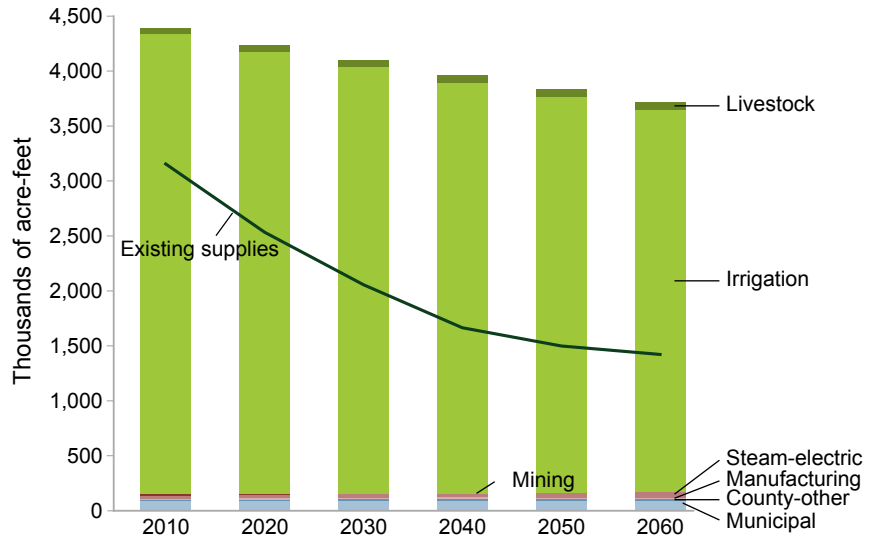


Figure O.4. Projected water needs for 2010-2060.

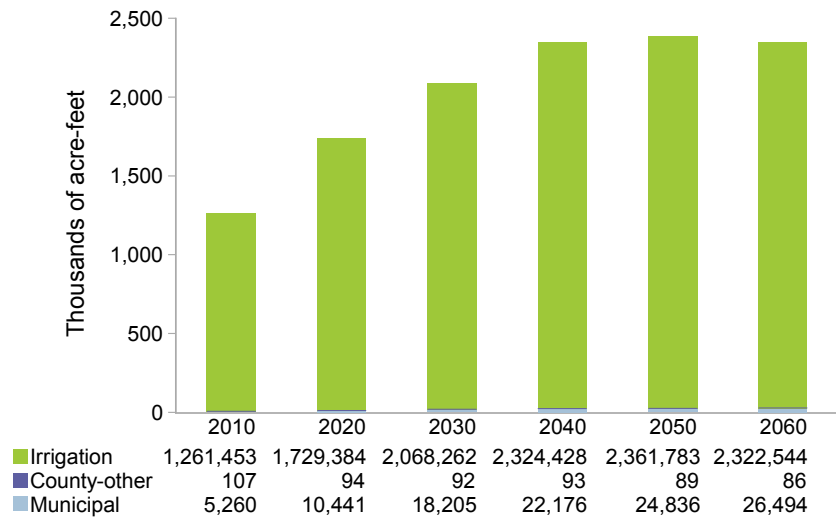


Figure O.5. Recommended water management strategy water supply volumes for 2010-2060.

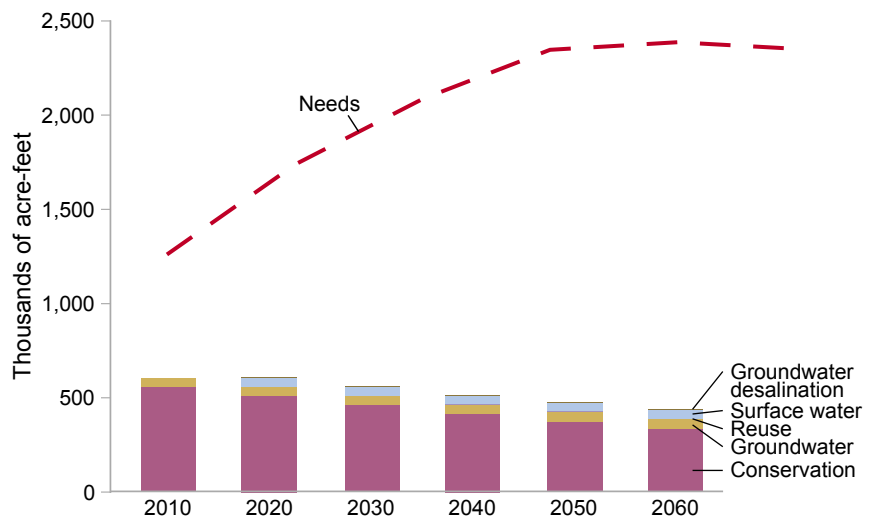


Table O.2. Existing water supplies for 2010 and 2060

Water supply source	2010 (acre-feet)	2060 (acre-feet)
<b>Surface water</b>		
Lake Meredith	33,445	33,445
Livestock local supply	10,658	12,837
Other surface water	1,999	8
<b>Surface water subtotal</b>	<b>46,102</b>	<b>46,290</b>
<b>Groundwater</b>		
Ogallala Aquifer	3,045,114	1,309,486
Other groundwater	12,486	14,622
<b>Groundwater subtotal</b>	<b>3,057,600</b>	<b>1,324,108</b>
<b>Reuse</b>		
Direct reuse	51,514	51,589
<b>Reuse subtotal</b>	<b>51,514</b>	<b>51,589</b>
<b>Region total</b>	<b>3,155,216</b>	<b>1,421,987</b>

Note: Water supply sources are listed individually if 10,000 acre-feet per year or greater in 2010. Only includes supplies that are physically and legally available to users during a drought record.

supply by the year 2060 (Figure O.5) at a total capital cost of \$818,630,071 (Appendix 2.1). The primary recommended water management strategy for the region is irrigation water conservation, which generates 74 percent of the volume of water from strategies in 2060. The planning group determined there were approximately 909,000 acres of irrigated crop land that did not have efficient irrigation systems. Because there were no economically feasible strategies identified to meet their needs, **19 counties in the region have unmet irrigation needs (2,027,680 acre-feet).**

### Conservation Recommendations

Conservation strategies represent 77 percent of the total volume of water associated with all recommended water management strategies. Water conservation was recommended for every municipal water user group that had both a need and a water use greater than 172 gallons per capita per day (the regional average). The planning group adopted a municipal water conservation goal of reducing per capita water use by 1 percent per year until 172 gallons per capita per day is achieved.

### Ongoing Issues

The Llano Estacado Planning Group is concerned about the methods chosen to estimate groundwater availability and agricultural demands in the region.

### Select Policy Recommendations

- Encourage legislative support for conservation programs
- Manage groundwater through groundwater conservation districts
- Support rule of capture as modified by rules of existing conservation districts
- Support vegetation control as a water conservation practice, particularly in the watersheds of Lakes Mackenzie, White River, and Alan Henry

Table O.3. Water needs (acre-feet per year) by county and type of use in years 2010 and 2060

County	Total		Municipal		County-other		Manufacturing		Steam-electric		Mining		Irrigation		Livestock	
	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060
Bailey	85,285	93,597	-	-	-	-	-	-	-	-	-	-	85,285	93,597	-	-
Briscoe	235	14,775	128	108	107	86	-	-	-	-	-	-	-	14,581	-	-
Castro	146,143	353,154	-	1,386	-	-	-	-	-	-	-	-	146,143	351,768	-	-
Cochran	39,909	73,140	-	496	-	-	-	-	-	-	-	-	39,909	72,644	-	-
Crosby	10,888	8,722	-	762	-	-	-	-	-	-	-	-	10,888	7,960	-	-
Dawson	95,781	73,240	-	-	-	-	-	-	-	-	-	-	95,781	73,240	-	-
Deaf Smith	168,813	240,650	-	-	-	-	-	-	-	-	-	-	168,813	240,650	-	-
Dickens	3,407	2,994	-	257	-	-	-	-	-	-	-	-	3,407	2,737	-	-
Floyd	90,731	100,285	-	212	-	-	-	-	-	-	-	-	90,731	100,073	-	-
Gaines	68,021	140,767	449	499	-	-	-	-	-	-	-	-	67,572	140,268	-	-
Garza	4,712	3,418	-	206	-	-	-	-	-	-	-	-	4,712	3,212	-	-
Hale	20,936	224,411	-	1,318	-	-	-	-	-	-	-	-	20,936	223,093	-	-
Hockley	62,664	81,286	263	702	-	-	-	-	-	-	-	-	62,401	80,584	-	-
Lamb	114,256	254,286	-	700	-	-	-	-	-	-	-	-	114,256	253,586	-	-
Lubbock	70,563	112,370	3,899	16,063	-	-	-	-	-	-	-	-	66,664	96,307	-	-
Lynn	550	457	-	55	-	-	-	-	-	-	-	-	550	402	-	-
Motley	1,332	1,025	-	-	-	-	-	-	-	-	-	-	1,332	1,025	-	-
Parmer	160,683	351,794	-	1,162	-	-	-	-	-	-	-	-	160,683	350,632	-	-
Swisher	23,276	108,065	521	513	-	-	-	-	-	-	-	-	22,755	107,552	-	-
Terry	74,856	90,605	-	457	-	-	-	-	-	-	-	-	74,856	90,148	-	-
Yoakum	23,779	20,083	-	1,598	-	-	-	-	-	-	-	-	23,779	18,485	-	-
Region	1,266,820	2,349,124	5,260	26,494	107	86	-	-	-	-	-	-	1,261,453	2,322,544	-	-

## SELECT MAJOR WATER MANAGEMENT STRATEGIES

*(Dollar amounts are rounded.*

*See Appendix 2.1 for all recommended strategies and actual costs.)*

- ✦ *Irrigation conservation strategy for most of region would provide 554,396 acre-feet in 2010, decreasing to 327,366 acre-feet by 2060—Implementation by: 2010; Capital Cost: \$354 million.*
- ✦ *Groundwater development, including expansion of Canadian River Municipal Water Authority supplies, would provide 50,421 acre-feet per year for municipal and rural water users—Implementation by: 2010; Capital Cost: \$44 million.*
- ✦ *Brackish groundwater desalination would produce 3,360 acre-feet per year to Lubbock—Implementation by: 2020; Capital Cost: \$10 million.*
- ✦ *Connecting infrastructure to Alan Henry Reservoir to provide 22,230 acre-feet per year to Lubbock—Implementation by: 2020; Capital Cost: \$175 million.*

## Llano Estacado Planning Group Members and Interests Represented

### Voting members during adoption of 2006 Regional Water Plan:

Harold P. “Bo” Brown (Chair), agriculture; Melanie Barnes, public; Delaine Baucum, agriculture; Bruce Blalack, municipalities; Dallas Brewer, counties; Jim Conkwright, water districts; Delmon Ellison, Jr., agriculture; Harvey Everheart, water districts; Bill Harbin, electric generating utilities; Doug Hutcheson, water utilities; Don James, agriculture; Bob Josserand, municipalities; Richard Leonard, agriculture; Terry Lopas, river authorities; Don McElroy, small business; Sukant Misra, agriculture; E.W. (Gene) Montgomery, industries; Ken Rainwater, public; Kent Satterwhite, river authorities; Jim Steiert, environmental

### Former voting members during 2001-2006 planning cycle:

Lloyd Urban, public; John Abernathy, agriculture; S.M.True, agriculture; Henry Rieff, water utilities; Jerry Webster, municipalities