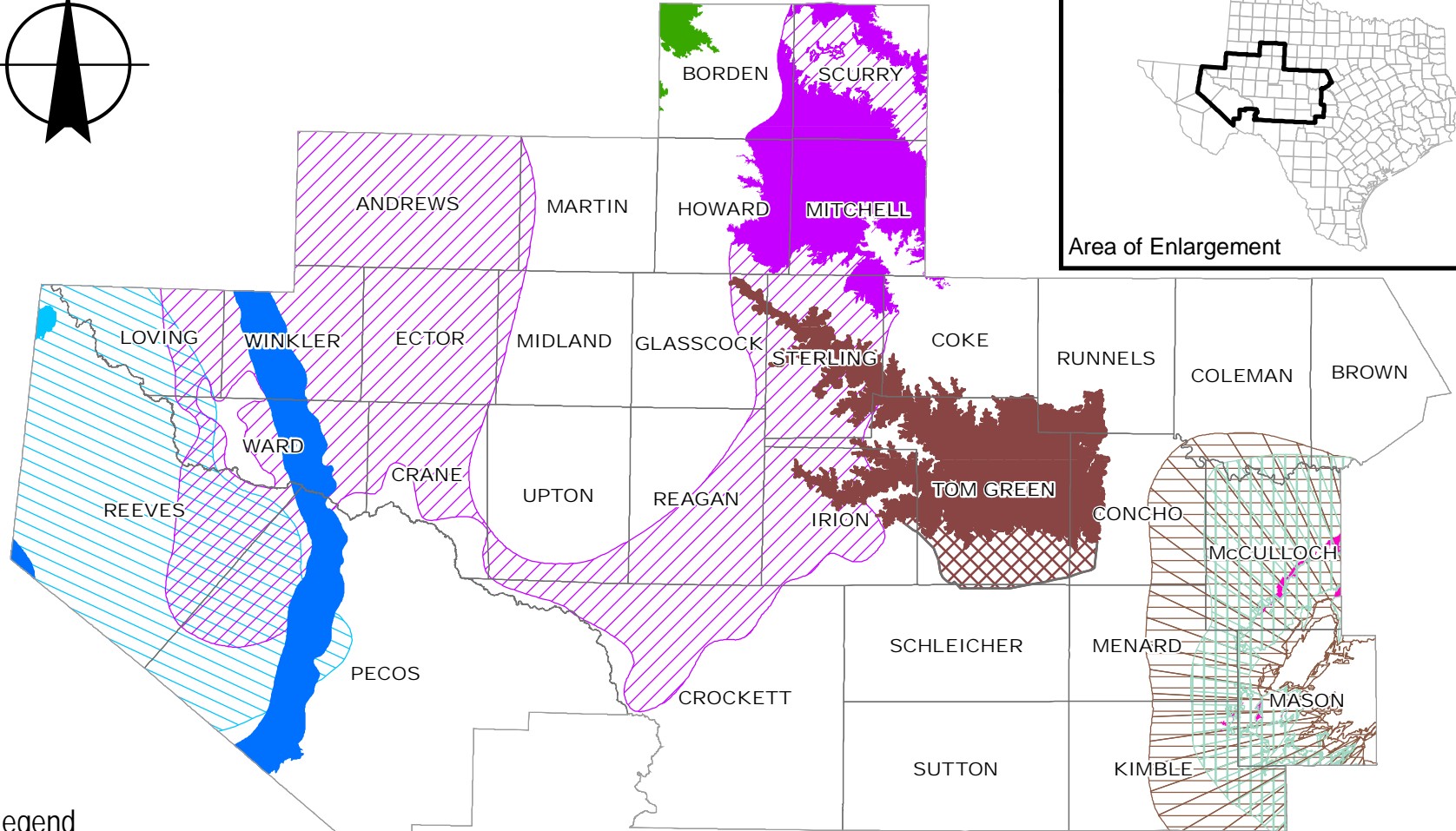


Area of Enlargement



Source: Texas Water Development Board

Legend

Minor Aquifers

- Dockum**
 Outcrop
 Downdip
- Hickory**
 Outcrop
 Downdip
- Ellenburger - San Saba**
 Outcrop
 Downdip

- Rustler**
 Outcrop
 Downdip
- Marble Falls**
- Lipan**
 Outcrop
 Downdip

- Captain Reef Complex**
 Outcrop
 Downdip

Minor Aquifer Map

Region F

FN JOB NO. GMD07215
 FILE RegionF_MinAquifers.mxd
 DATE January 4, 2010
 SCALE 1:2,420,500
 DESIGNED BME
 DRAFTED BME

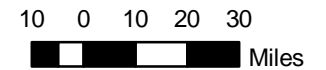


Table 1.2-1
Historical Total Water Use by County in Region F
(Values in acre-feet)

County	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Andrews	23,139	18,901	17,633	24,187	34,446	34,197	38,924	33,419	35,943	35,219
Borden	11,071	4,096	3,547	3,187	3,202	3,491	3,357	3,604	3,895	3,488
Brown	23,456	27,286	26,161	21,374	19,660	18,851	16,013	14,312	16,162	19,165
Coke	2,347	3,434	2,525	2,846	2,863	2,674	1,984	2,562	2,499	1,965
Coleman	4,262	4,222	4,278	2,894	2,571	2,421	2,957	3,389	3,305	3,458
Concho	3,553	5,473	7,331	3,813	3,245	4,888	3,779	4,162	4,853	8,879
Crane	4,346	3,947	3,823	3,523	3,013	4,738	6,349	6,591	6,634	6,622
Crockett	6,058	4,929	4,761	3,863	3,565	3,208	2,928	2,903	3,069	2,498
Ector	39,242	32,072	32,258	61,697	45,246	30,539	31,709	29,318	32,520	32,915
Glasscock	52,825	62,642	24,920	35,828	26,126	26,758	45,427	44,641	44,612	46,924
Howard	14,923	16,129	17,399	15,716	14,478	13,323	16,464	14,275	17,630	13,785
Irion	3,558	2,493	2,285	2,724	2,244	2,279	3,006	2,140	1,991	1,247
Kimble	2,712	3,051	3,146	2,750	2,157	2,099	4,022	3,541	3,812	4,422
Loving	667	651	638	412	379	258	50	50	97	111
Martin	16,232	22,214	21,074	16,107	17,862	17,904	14,435	16,230	7,118	17,193
Mason	10,919	10,716	10,767	11,952	11,122	11,435	11,094	11,320	17,645	8,932
McCulloch	6,201	6,444	6,036	7,420	5,429	5,387	7,599	7,072	10,203	9,577
Menard	4,642	4,456	5,045	3,908	4,573	4,507	2,734	2,163	2,313	3,271
Midland	63,214	70,267	78,372	62,945	60,854	61,852	52,117	49,543	47,502	54,747
Mitchell	6,202	7,206	8,610	18,153	7,945	9,693	9,770	13,254	13,349	8,919
Pecos	85,785	87,948	89,417	80,436	72,170	68,314	43,271	47,793	52,352	74,653
Reagan	49,463	67,271	23,456	18,769	14,452	17,559	12,858	13,277	15,689	21,966
Reeves	115,958	113,892	128,338	79,453	81,792	68,776	38,797	94,104	98,122	94,581
Runnels	9,200	7,975	5,957	3,497	5,592	6,514	5,851	4,692	4,673	5,726
Schleicher	2,971	3,869	4,405	3,473	2,476	2,469	1,992	1,814	1,842	2,071
Scurry	8,150	7,513	9,791	9,094	7,193	8,200	8,952	9,790	10,588	10,289
Sterling	1,918	1,966	1,939	1,886	1,994	1,969	1,121	1,011	975	1,135
Sutton	4,273	2,170	4,276	3,483	3,163	3,087	2,031	1,813	3,103	3,265
Tom Green	133,483	75,645	63,786	53,396	62,970	61,759	57,857	71,030	66,285	70,681
Upton	19,462	29,166	10,804	16,139	11,328	11,643	11,274	10,631	11,598	12,079
Ward	19,391	22,558	19,318	23,171	19,484	12,537	8,911	9,600	10,042	10,871
Winkler	3,651	3,868	3,411	5,523	5,412	6,016	6,539	6,310	6,169	7,360
<i>Total</i>	<i>753,274</i>	<i>734,470</i>	<i>645,507</i>	<i>603,619</i>	<i>559,006</i>	<i>529,345</i>	<i>474,172</i>	<i>536,354</i>	<i>556,590</i>	<i>598,014</i>

Note: Data are from the Texas Water Development Board.
Data for Reeves County after 2003 includes all water released from the Red Bluff Reservoir. Approximately 25% of this water is delivered to customers in Pecos, Reeves, Ward and Loving Counties. The remaining 75% of the water is lost to evaporation and stream losses.

Table 1.2-2
Historical Water Use by Category in Region F
(Values in acre-feet)

Year	Municipal	Manu- facturing	Irrigation	Steam- Electric	Mining ^a	Livestock	Total
1997	121,510	7,581	556,928	15,405	31,892	19,958	753,274
1998	134,656	6,661	534,735	13,995	27,985	16,438	734,470
1999	131,308	6,429	448,573	13,772	27,985	17,440	645,507
2000	153,415	8,364	378,187	17,516	28,683	17,454	603,619
2001	131,104	10,861	365,952	11,089	23,477	16,523	559,006
2002	119,678	8,065	348,932	10,935	26,048	15,687	529,345
2003	129,580	7,017	289,196	9,272	25,962	13,145	474,172
2004	131,205	9,213	346,540	9,581	26,566	13,249	536,354
2005	128,464	9,951	367,682	9,593	26,905	13,995	556,590
2006	121,620	11,914	418,636	3,732	26,905	15,207	598,014
State Total in 2000	4,047,661	1,559,912	10,228,528	561,394	278,624	300,441	16,976,560
% of State Total in Region F	3.17%	0.54%	3.86%	3.16%	10.54%	5.80%	3.51%

Note: Data are from the Texas Water Development Board (TWDB).

a. Mining use data are from 2005.

Figure 1.2-3
Historical Water Use by Category in Region F

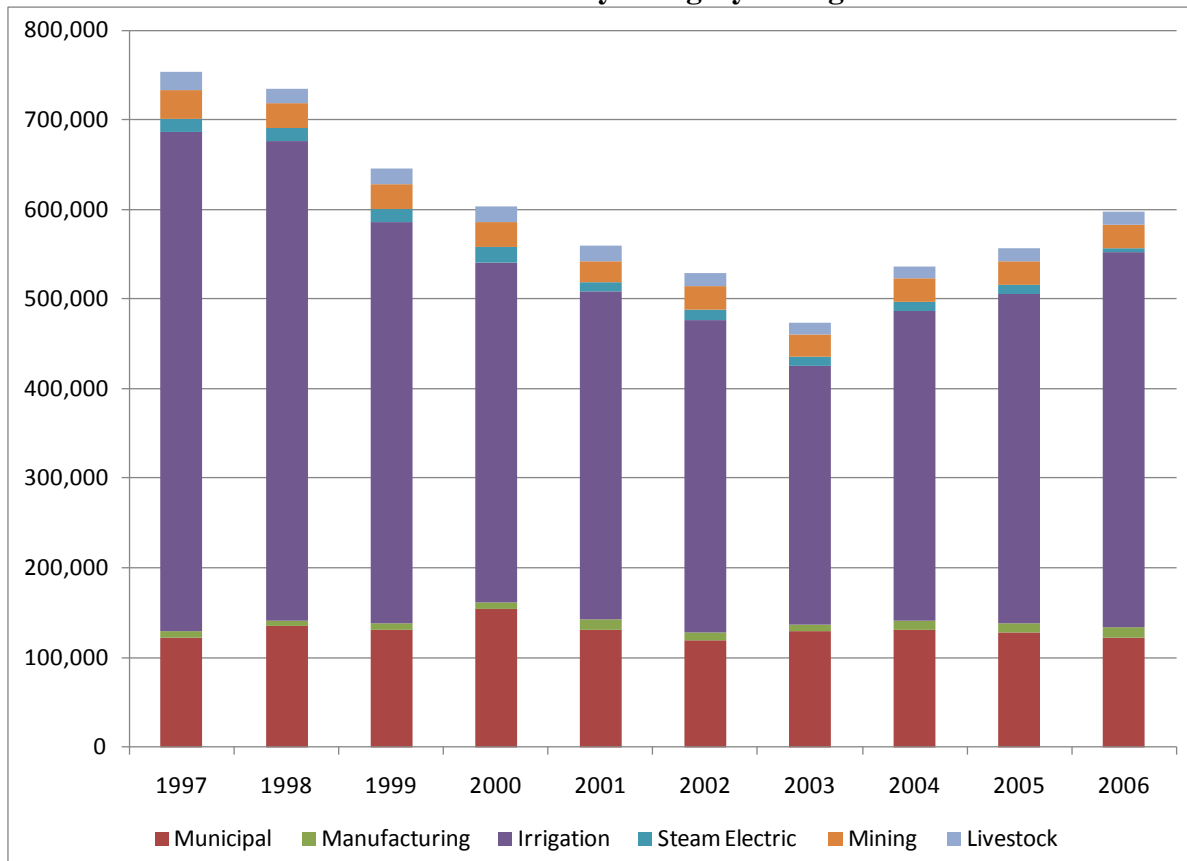
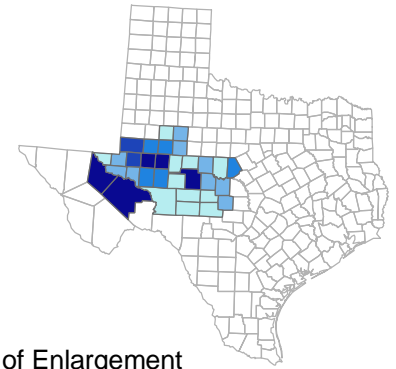
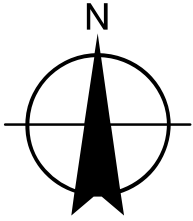


Table 1.2-3
Year 2006 Water Use by Category and County
(Values in acre-feet)

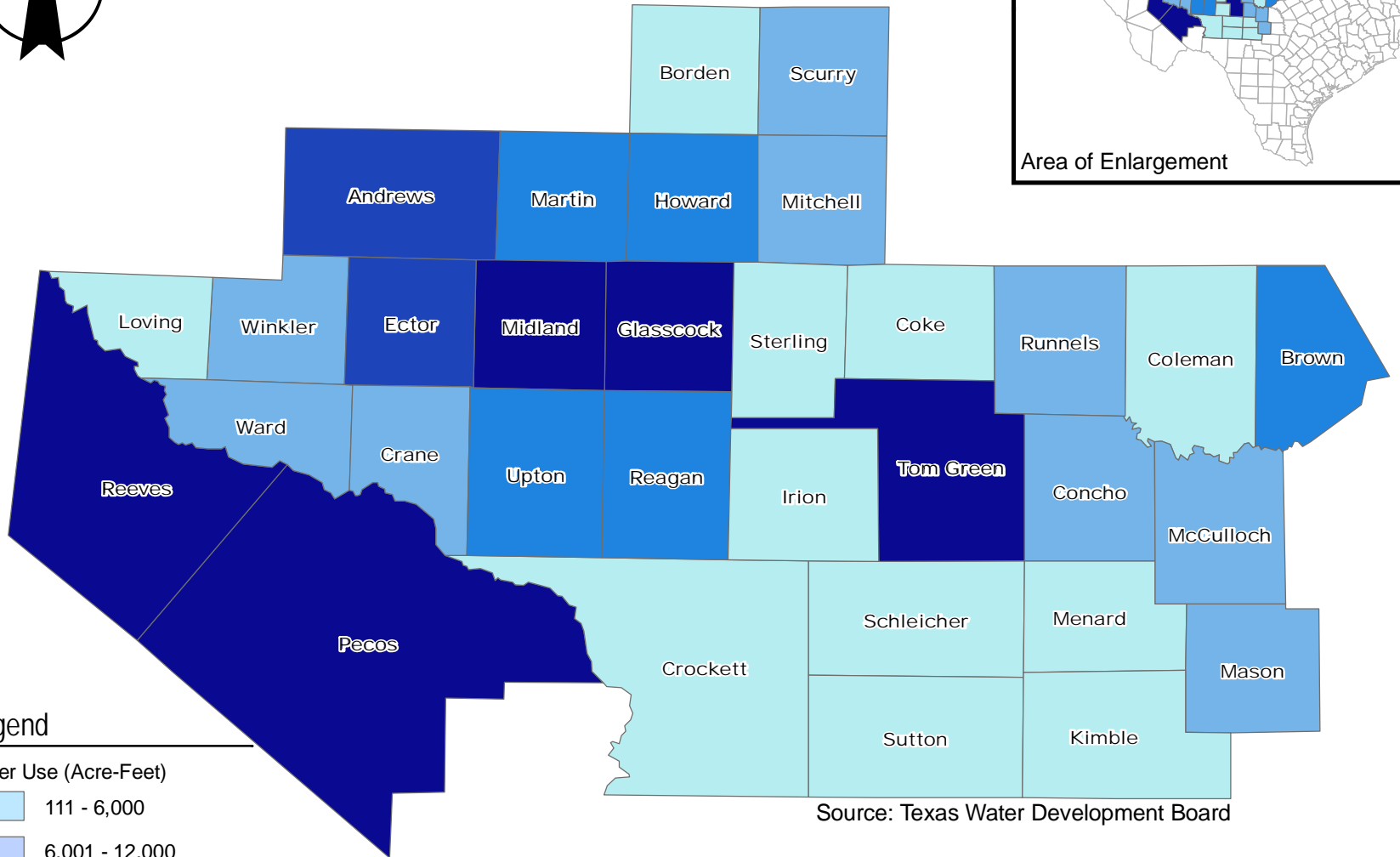
County	Municipal	Manu- facturing	Irrigation	Steam- Electric	Mining ^a	Livestock	Total
Andrews	2,736	47	30,459	0	1,702	275	35,219
Borden	144	0	2,322	0	806	216	3,488
Brown	6,747	422	9,467	0	1,227	1,302	19,165
Coke	389	0	965	0	293	318	1,965
Coleman	1,767	3	742	0	16	930	3,458
Concho	578	0	7,727	0	0	574	8,879
Crane	1,125	0	0	0	5,418	79	6,622
Crockett	1,267	41	485	0	24	681	2,498
Ector	24,749	2,185	1,450	0	4,283	248	32,915
Glasscock	145	0	46,579	0	7	193	46,924
Howard	5,785	2,233	3,155	604	1,793	215	13,785
Irion	198	0	700	0	125	224	1,247
Kimble	835	68	3,054	0	91	374	4,422
Loving	7	0	0	0	3	101	111
Martin	597	53	15,626	0	788	129	17,193
Mason	854	0	6,830	0	0	1,248	8,932
McCulloch	2,869	2,475	3,477	0	140	616	9,577
Menard	332	3	2,538	0	0	398	3,271
Midland	31,965	786	20,687	0	960	349	54,747
Mitchell	1,134	0	7,306	29	141	309	8,919
Pecos	4,220	88	69,056	0	356	933	74,653
Reagan	1,346	0	18,741	0	1,742	137	21,966
Reeves	3,264	1,433	88,925	0	97	862	94,581
Runnels	1,320	17	3,534	0	41	814	5,726
Schleicher	425	0	1,005	0	108	533	2,071
Scurry	1,918	8	5,707	0	2,152	504	10,289
Sterling	239	0	600	0	0	296	1,135
Sutton	1,110	0	1,677	0	108	370	3,265
Tom Green	17,853	1,940	49,140	0	59	1,689	70,681
Upton	770	4	7,301	0	3,885	119	12,079
Ward	3,042	0	4,469	3,099	189	72	10,871
Winkler	1,890	108	4,912	0	351	99	7,360
<i>Total</i>	<i>121,620</i>	<i>11,914</i>	<i>418,636</i>	<i>3,732</i>	<i>26,905</i>	<i>15,207</i>	<i>598,014</i>

Note: Data are from the Texas Water Development Board.

- a. Mining use data are from 2005.
- b. Data for Reeves County includes all water released from the Red Bluff Reservoir. In accordance with TCEQ reports, 62,691 ac-ft of water was released. from Red Bluff Reservoir. Of this amount, 660 ac-ft was delivered for use in Reeves County and 8,533 ac-ft was delivered to customers in Pecos, Ward and Loving Counties. The remaining water was lost to evaporation and stream losses.

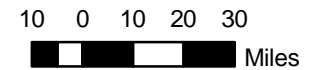
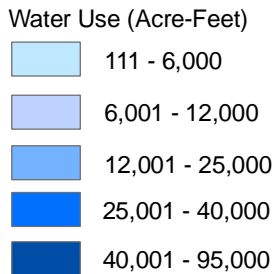


Area of Enlargement



Source: Texas Water Development Board

Legend



Region F
Water Use by County
(2006)

FN:JOBNO OMD07215
 FILE RegionFWaterUse.mxd
 DATE January 4, 2010
 SCALE 1:2,401,000
 DESIGNED BME
 DRAWN BME

FIGURE 1.2-4

- Most of the municipal water use occurred in Midland, Ector and Tom Green Counties, location of the cities of Midland, Odessa and San Angelo, respectively. In the year 2006 these counties accounted for almost 62 percent of the water use in this category. Other significant municipal demand centers include Brown County (Brownwood) and Howard County (Big Spring).
- Manufacturing water use is concentrated in Ector, Howard, Tom Green, McCulloch and Reeves Counties, accounting for 85 percent of the total use in this category.
- Reeves and Pecos Counties accounted for most of the reported irrigation water use in 2006, accounting for more than a third of the irrigation water use in the region. However, a large amount of the water reported for irrigation in Reeves County is associated with delivery losses from the Red Bluff Reservoir. The actual use of irrigation water in Reeves County is much less. Other significant demand centers for irrigation water include Glasscock, Andrews, Midland and Tom Green Counties.
- Steam-electric power generation water use occurred only in Ector, Howard, Mitchell, and Ward Counties. Facilities in other counties have temporarily or permanently ceased operations.
- Most of the water used for mining purposes occurred in Ector and Crane Counties, accounting for over 30 percent of the total use. Other significant areas of mining water use included Scurry, Upton, Brown, Andrews, Reagan, and Howard Counties. (Mining use data are from 2005. TWDB Data for 2006 are only self reported use which differs from previous estimates.)
- Most of the livestock water use occurred in Tom Green, Brown, and Mason Counties, accounting for slightly more than a quarter of the total use in this category in the year 2006.

In addition to the consumptive water uses discussed above, water-oriented recreation is important in Region F. Table 1.2-4 summarizes recreational opportunities at major reservoirs in the region. Smaller lakes and streams provide opportunities for fishing, boating, swimming, and other water-related recreational activities. Water in streams and lakes is also important to fish and wildlife in the region, providing a wide variety of habitats.

**Table 1.2-4
Recreational Use of Reservoirs in Region F**

Reservoir Name	County	Fishing	Boat Launch	Swimming Area	Marina	Picnic Area	Camping	Hiking Trails	Back-packing	Bicycle Trails	Equestrian Trails	Pavilion Area
Lake J. B. Thomas	Borden and Scurry	X	X			X	X					X
Lake Colorado City	Mitchell	X	X	X		X	X					
Champion Creek Reservoir	Mitchell											
Oak Creek Reservoir	Coke	X	X	X								
Lake Coleman	Coleman	X	X	X		X	X					
E. V. Spence Reservoir	Coke	X	X		X	X	X					X
Lake Winters/ New Lake Winters	Runnels	X	X	X	X	X	X	X				X
Lake Brownwood	Brown	X	X	X		X	X	X				
Hords Creek Lake	Coleman	X	X	X		X	X	X		X		
Lake Ballinger / Lake Moonen	Runnels	X	X	X		X	X		X			
O. H. Ivie Reservoir	Concho and Coleman	X	X		X	X	X	X				X
O. C. Fisher Lake	Tom Green	X	X	X		X	X	X		X	X	X
Twin Buttes Reservoir	Tom Green	X	X	X		X	X					
Lake Nasworthy	Tom Green	X	X	X	X	X	X			X		X
Brady Creek Reservoir	McCulloch	X	X	X	X	X	X	X	X		X	X
Mountain Creek	Coke											
Red Bluff Reservoir	Reeves and Loving											
Lake Balmorhea	Reeves			X		X	X					

Note: "X" indicates that the activity is available at the specified reservoir.

1.3 Current Sources of Water

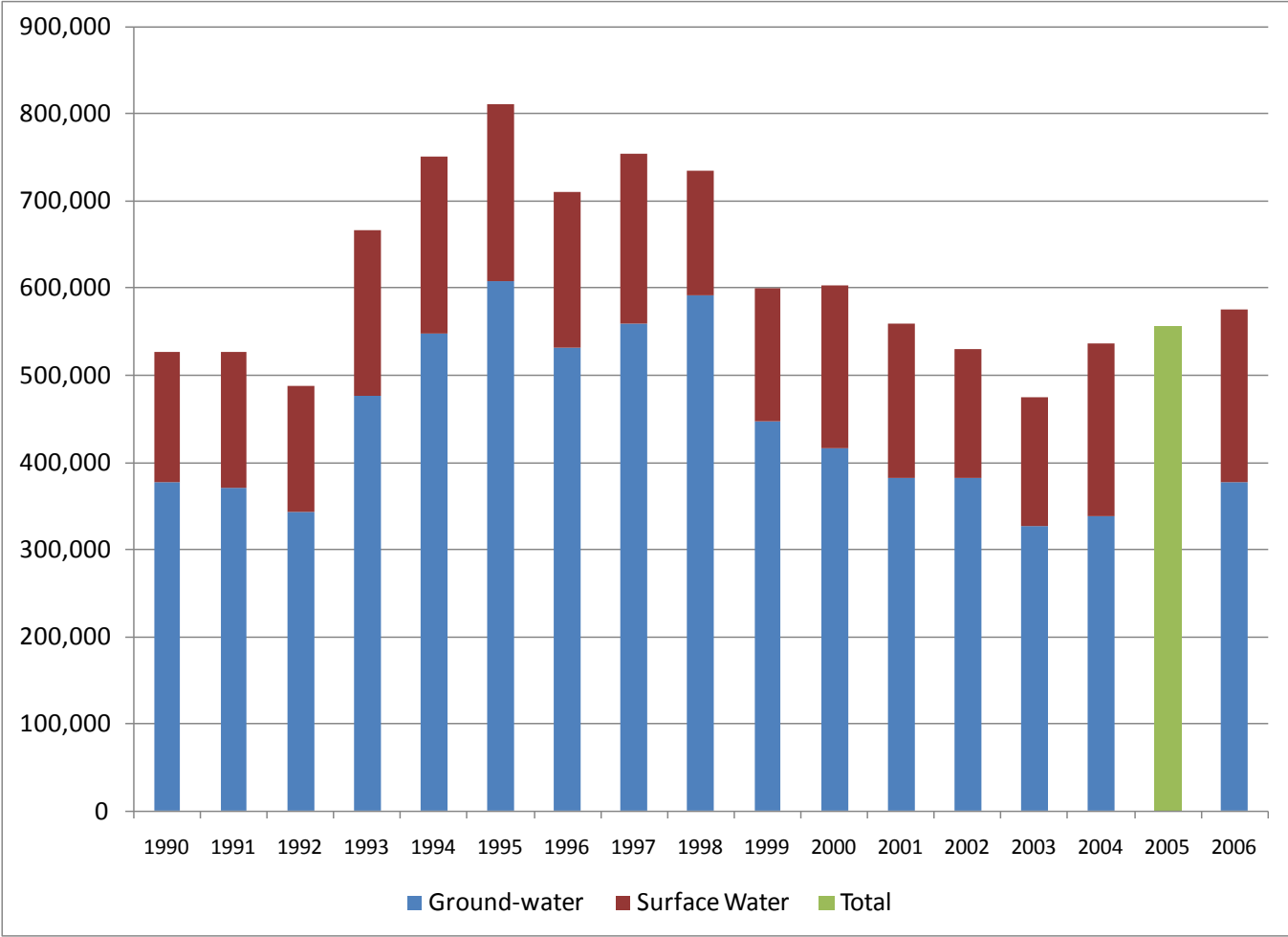
Table 1.3-1 summarizes the total surface water and groundwater use in Region F from 1990 through 2006, and Figure 1.3-1 graphically illustrates the same data. (2006 is the latest year for which the split between groundwater and surface water use is available.) Total historical water use peaked in 1995. Groundwater use has followed a similar trend ranging from 80 percent of total water use in 1998 to 66 percent in 2006. Total water use increased by 48,236 acre-feet (9.1 percent) between 1990 and 2006. Groundwater use increased by 1,162 acre feet (0.3 percent) and surface water use increased by 47,074 acre-feet (31.3 percent) over the same period. Total water use was significantly higher between 1993 and 1998 than the rest of the decade. The reduction in water use at the end of the decade was primarily due to unusually hot, dry weather associated with a significant drought, suppressing the amount of water available for irrigation. Table 1.3-2 shows the distribution of groundwater and surface water use by county and category for 2006, which is the most recent year for which data are available. Figure 1.3-2 shows the percentage of supply from groundwater for each county in the region in the same year.

**Table 1.3-1
Historical Groundwater and Surface Water Use in Region F**

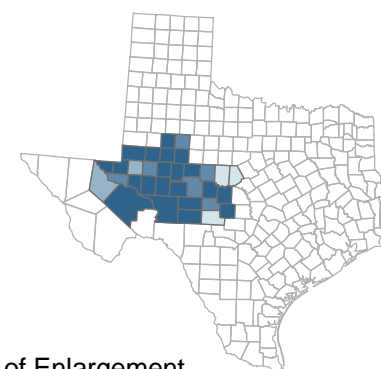
Year	Water Use in Acre-Feet		
	Ground-water	Surface Water	Total
1990	376,891	150,339	527,230
1991	371,311	154,848	526,159
1992	343,522	143,559	487,081
1993	476,492	190,465	666,957
1994	547,948	202,740	750,688
1995	607,802	203,160	810,962
1996	531,956	177,836	709,792
1997	559,393	193,881	753,274
1998	591,390	143,123	734,513
1999	447,738	151,241	598,979
2000	417,179	186,681	603,860
2001	382,724	176,282	559,006
2002	382,087	147,258	529,345
2003	326,588	147,584	474,172
2004	338,316	198,038	536,354
2005			556,590*
2006	394,127	203,887	598,014

Note: Data are from Texas Water Development Board. *2005 data were not broken by groundwater/surface water at the time of this plan.

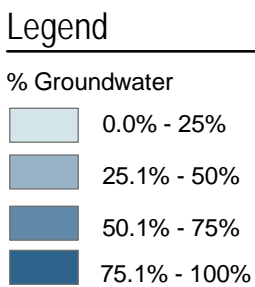
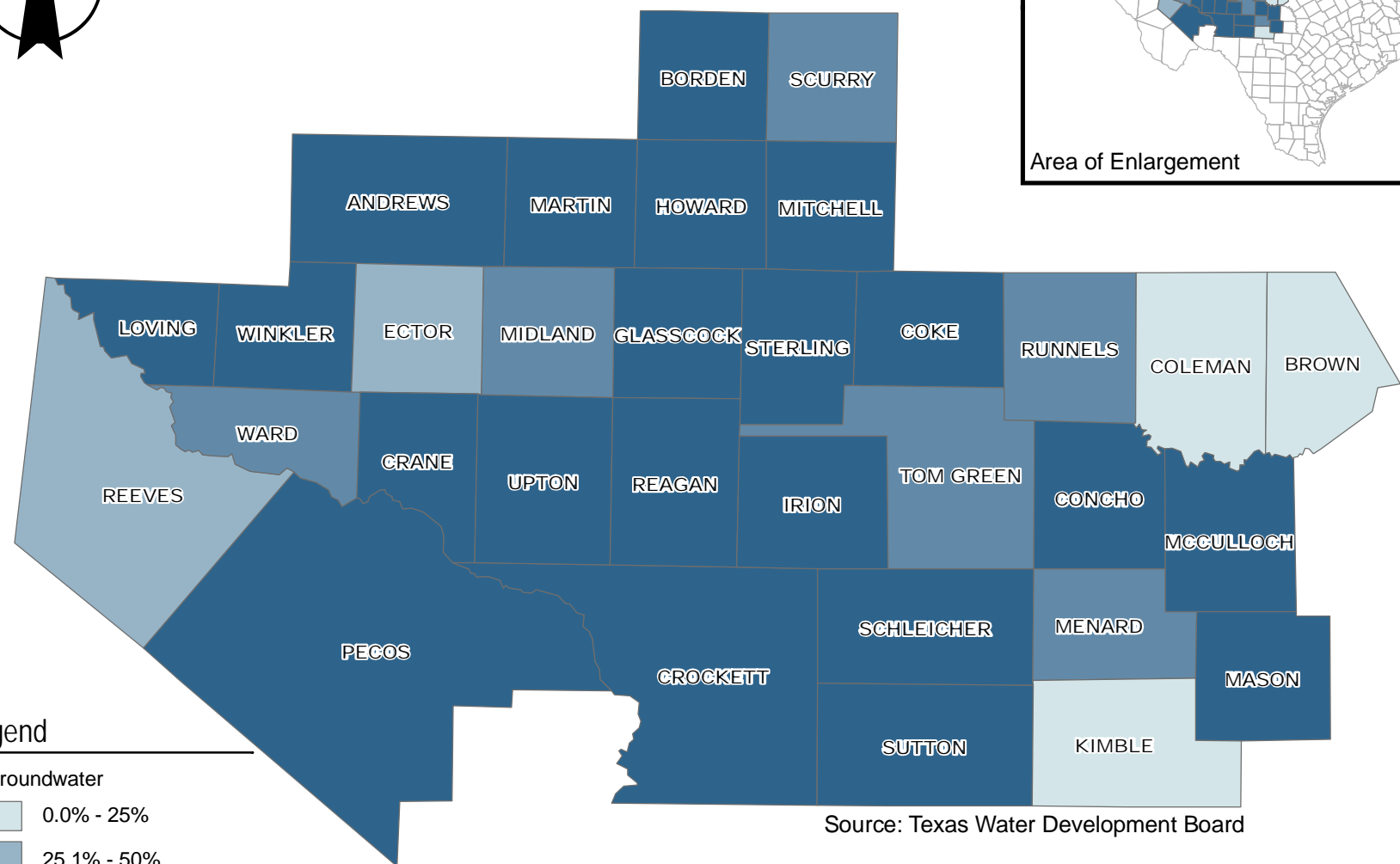
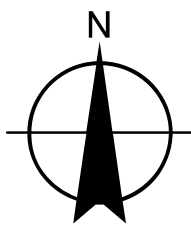
**Figure 1.3-1
Historical Groundwater and Surface Water Use in Region F**



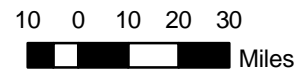
*2005 data were not broken by groundwater/surface water at the time of this plan.



Area of Enlargement



Source: Texas Water Development Board



Freese and Nichols
 4055 International Plaza, Suite 200
 Fort Worth, TX 76109-4895
 Phone - (817) 735-7300

Region F
Supplies from Groundwater by County
(2006)

FILE: RegionF_GWUse.mxd
 DATE: January 4, 2010
 SCALE: 1:2,420,500
 DESIGNED: BME
 DRAFTED: BME

Table 1.3-2
Source of Supply by County and Category in 2006 for Region F
(Values in Acre-Feet)

County	Source of Water	Municipal	Manu- facturing	Irrigation	Steam- Electric	Mining ^a	Livestock	Total
Andrews	Ground	2,736	47	30,459	0	1,702	275	35,219
	Surface	0	0	0	0	0	0	0
	<i>Total</i>	2,736	47	30,459	0	1,702	275	35,219
Borden	Ground	144	0	2,322	0	806	65	3,337
	Surface	0	0	0	0	0	151	151
	<i>Total</i>	144	0	2,322	0	806	216	3,488
Brown	Ground	106	0	45	0	72	195	418
	Surface	6,641	422	9,422	0	1,155	1,107	18,747
	<i>Total</i>	6,747	422	9,467	0	1,227	1,302	19,165
Coke	Ground	173	0	937	0	178	248	1,536
	Surface	216	0	28	0	115	70	429
	<i>Total</i>	389	0	965	0	293	318	1,965
Coleman	Ground	0	3	0	0	16	28	47
	Surface	1,767	0	742	0	0	902	3,411
	<i>Total</i>	1,767	3	742	0	16	930	3,458
Concho	Ground	574	0	7,632	0	0	287	8,493
	Surface	4	0	95	0	0	287	386
	<i>Total</i>	578	0	7,727	0	0	574	8,879
Crane	Ground	1,125	0	0	0	2,712	75	3,912
	Surface	0	0	0	0	2,706	4	2,710
	<i>Total</i>	1,125	0	0	0	5,418	79	6,622
Crockett	Ground	1,267	41	485	0	4	647	2,444
	Surface	0	0	0	0	20	34	54
	<i>Total</i>	1,267	41	485	0	24	681	2,498
Ector	Ground	4,019	2,179	25	0	3,533	223	9,979
	Surface	20,730	6	1,425	0	750	25	22,936
	<i>Total</i>	24,749	2,185	1,450	0	4,283	248	32,915
Glasscock	Ground	145	0	46,579	0	7	154	46,885
	Surface	0	0	0	0	0	39	39
	<i>Total</i>	145	0	46,579	0	7	193	46,924
Howard	Ground	5,483	590	3,155	0	189	183	9,600
	Surface	302	1,643	0	604	1,604	32	4,185
	<i>Total</i>	5,785	2,233	3,155	604	1,793	215	13,785
Irion	Ground	198	0	700	0	125	179	1,202
	Surface	0	0	0	0	0	45	45
	<i>Total</i>	198	0	700	0	125	224	1,247
Kimble	Ground	211	2	24	0	91	262	590
	Surface	624	66	3,030	0	0	112	3,832
	<i>Total</i>	835	68	3,054	0	91	374	4,422
Loving	Ground	7	0	0	0	3	99	109
	Surface	0	0	0	0	0	2	2
	<i>Total</i>	7	0	0	0	3	101	111

Table 1.3-2 (cont.): Source of Supply by County and Category in 2006 for Region F

County	Source of Water	Municipal	Manu- facturing	Irrigation	Steam- Electric	Mining ^a	Livestock	Total
Martin	Ground	303	53	15,626	0	788	90	16,860
	Surface	294	0	0	0	0	39	333
	<i>Total</i>	597	53	15,626	0	788	129	17,193
Mason	Ground	854	0	6,775	0	0	936	8,565
	Surface	0	0	55	0	0	312	367
	<i>Total</i>	854	0	6,830	0	0	1,248	8,932
McCulloch	Ground	2,553	2,475	2,943	0	140	493	8,604
	Surface	316	0	534	0	0	123	973
	<i>Total</i>	2,869	2,475	3,477	0	140	616	9,577
Menard	Ground	332	3	1,559	0	0	338	2,232
	Surface ^b	0	0	979	0	0	60	1,039
	<i>Total</i>	332	3	2,538	0	0	398	3,271
Midland	Ground	7,363	786	20,687	0	960	346	30,142
	Surface	24,602	0	0	0	0	3	24,605
	<i>Total</i>	31,965	786	20,687	0	960	349	54,747
Mitchell	Ground	1,108	0	7,306	17	0	77	8,508
	Surface	26	0	0	12	141	232	411
	<i>Total</i>	1,134	0	7,306	29	141	309	8,919
Pecos	Ground	4,220	88	61,906	0	356	886	67,456
	Surface	0	0	7,150	0	0	47	7,197
	<i>Total</i>	4,220	88	69,056	0	356	933	74,653
Reagan	Ground	1,346	0	18,741	0	1,742	123	21,952
	Surface	0	0	0	0	0	14	14
	<i>Total</i>	1,346	0	18,741	0	1,742	137	21,966
Reeves	Ground	3,230	1,433	18,925	0	97	862	24,547
	Surface ^c	34	0	70,000	0	0	0	70,034
	<i>Total</i>	3,264	1,433	88,925	0	97	862	94,581
Runnels	Ground	129	0	2,663	0	41	407	3,240
	Surface	1,191	17	871	0	0	407	2,486
	<i>Total</i>	1,320	17	3,534	0	41	814	5,726
Schleicher	Ground	425	0	1,005	0	108	506	2,044
	Surface	0	0	0	0	0	27	27
	<i>Total</i>	425	0	1,005	0	108	533	2,071
Scurry	Ground	227	0	5,623	0	2,150	126	8,126
	Surface	1,691	8	84	0	2	378	2,163
	<i>Total</i>	1,918	8	5,707	0	2,152	504	10,289
Sterling	Ground	239	0	600	0	0	266	1,105
	Surface	0	0	0	0	0	30	30
	<i>Total</i>	239	0	600	0	0	296	1,135
Sutton	Ground	1,110	0	1,677	0	108	363	3,258
	Surface	0	0	0	0	0	7	7
	<i>Total</i>	1,110	0	1,677	0	108	370	3,265

Table 1.3-2 (cont.): Source of Supply by County and Category in 2006 for Region F

County	Source of Water	Municipal	Manu- facturing	Irrigation	Steam- Electric	Mining ^a	Livestock	Total
Tom Green	Ground	2,085	332	33,086	0	59	1,351	36,913
	Surface	15,768	1,608	16,054	0	0	338	33,768
	<i>Total</i>	<i>17,853</i>	<i>1,940</i>	<i>49,140</i>	<i>0</i>	<i>59</i>	<i>1,689</i>	<i>70,681</i>
Upton	Ground	770	4	7,301	0	3,885	119	12,079
	Surface	0	0	0	0	0	0	0
	<i>Total</i>	<i>770</i>	<i>4</i>	<i>7,301</i>	<i>0</i>	<i>3,885</i>	<i>119</i>	<i>12,079</i>
Ward	Ground	3,042	0	969	3,099	189	68	7,367
	Surface	0	0	3,500	0	0	4	3,504
	<i>Total</i>	<i>3,042</i>	<i>0</i>	<i>4,469</i>	<i>3,099</i>	<i>189</i>	<i>72</i>	<i>10,871</i>
Winkler	Ground	1,890	108	4,912	0	351	97	7,358
	Surface	0	0	0	0	0	2	2
	<i>Total</i>	<i>1,890</i>	<i>108</i>	<i>4,912</i>	<i>0</i>	<i>351</i>	<i>99</i>	<i>7,360</i>
<i>Total</i>	<i>Ground</i>	<i>47,414</i>	<i>8,144</i>	<i>304,667</i>	<i>3,116</i>	<i>20,412</i>	<i>10,374</i>	<i>394,127</i>
	<i>Surface</i>	<i>74,206</i>	<i>3,770</i>	<i>113,969</i>	<i>616</i>	<i>6,493</i>	<i>4,833</i>	<i>203,887</i>
	<i>Total</i>	<i>121,620</i>	<i>11,914</i>	<i>418,636</i>	<i>3,732</i>	<i>26,905</i>	<i>15,207</i>	<i>598,014</i>

Source: Data are based on draft report of year 2006 usage from the Texas Water Development Board.

- a. Mining use shown is for 2005.
- b. The City of Menard's water supply comes from several wells on the banks of the San Saba River. Historically, the city's water supply has been classified as surface water.
- c. Reeves County surface water for irrigation includes all delivery losses associated with the Red Bluff Reservoir. Actual surface water use for irrigation is much less.

1.3.1 Surface Water Sources

Table 1.3-3 summarizes permitted surface water diversions by use category for each county in Region F. (These categories differ slightly from the demand categories used by TWDB for regional water planning.) Table 1.3-3 does not include non-consumptive use categories such as recreation. Figure 1.3-3 shows the distribution of permitted diversions by county. Most of the large surface water diversions in Region F are associated with major reservoirs. Table 1.1-4 in Section 1.1.2 lists the permitted diversions and the reported year 2006 water use from major water supply reservoirs in the region.

Region F does not import a significant amount of surface water from other regions. Region F exports a significant amount of water to two cities in Region G: Sweetwater and Abilene. The City of Sweetwater owns and operates Oak Creek Reservoir, a 30,000 acre-foot reservoir in Coke County. The City of Sweetwater used an average of 1,500 acre-feet per year from Oak Creek

Reservoir between 1980 and 2006. The West Central Texas Municipal Water District has a contract with the Colorado River Municipal Water District (CRMWD) for 15,000 acre-feet per year of water from O.H. Ivie Reservoir to supply the City of Abilene. Facilities to transfer water from Lake O.H. Ivie to Abilene became operational in September 2003. The pipeline has an initial peak capacity of 20 million gallons per day (MGD) with an ultimate capacity of 24 MGD. Currently Abilene is receiving an average of approximately 8 MGD (9,000 acre-feet per year) from O.H. Ivie. Small amounts of surface water are also supplied to the Cities of Lawn and Rotan, both of which are in Region G. Several rural water supply corporations also supply small amounts of surface water to neighboring regions.

Table 1.3-3
Surface Water Rights by County and Category

County	Permitted Surface Water Diversions (Acre-Feet per Year)					
	Municipal	Industrial	Irrigation	Mining	Other	Total
Borden	200	0	63	0	0	263
Brown	31,360	0	8,859	0	0	40,219
Coke	47,865	6,135	869	9,634 ^a	0	64,503
Coleman ^b	127,192	14,509	6,362	0	0	148,063
Concho	70	0	2,476	0	16	2,562
Ector	0	0	3,200	0	0	3,200
Howard	1,700	0	89	5,715	0	7,504
Irion	0	0	5,421	0	0	5,421
Kimble	1,000	2,466	8,486	60	0	12,012
Martin	0	2,500	0	0	0	2,500
Mason	0	0	356	0	0	356
McCulloch	3,500	0	2,152	0	0	5,652
Menard	1,016	0	10,597	3	0	11,616
Mitchell	8,200	4,050	123	0	0	12,373
Pecos	0	0	66,902	0	0	66,902
Reeves ^c	1,890	0	412,352	0	0	414,242
Runnels	2,919	0	7,024	70	0	10,013
Schleicher	0	0	38	3	0	41
Scurry ^d	30,050	0	503	0	0	30,553
Sterling	0	0	168	0	0	168
Sutton	0	0	99	3	0	102
Tom Green	138,434	15,002	41,019	0	0	194,462
Total	395,396	44,662	577,158	15,488	16	1,032,720

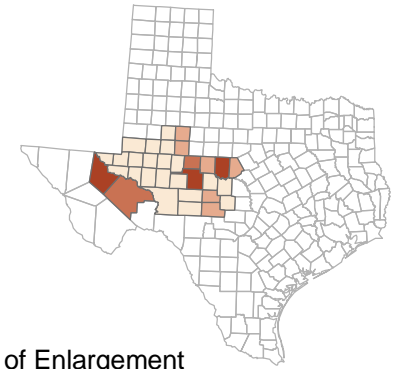
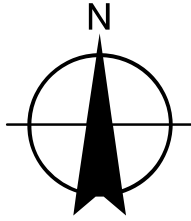
a Includes up to 6,000 acre-feet per year that can be diverted and used in Mitchell or Howard Counties

b Includes water rights for Ivie Reservoir, which is located in Coleman, Concho and Runnels Counties.

c Includes rights for Red Bluff Reservoir, which is located in Loving and Reeves Counties.

d Includes rights for Lake J.B. Thomas, which is located in Borden and Scurry Counties.

Note: Data are from TCEQ's active water rights list.¹⁰ Other counties have no permitted water rights on the TCEQ list. Does not include recreation rights.







Area of Enlargement

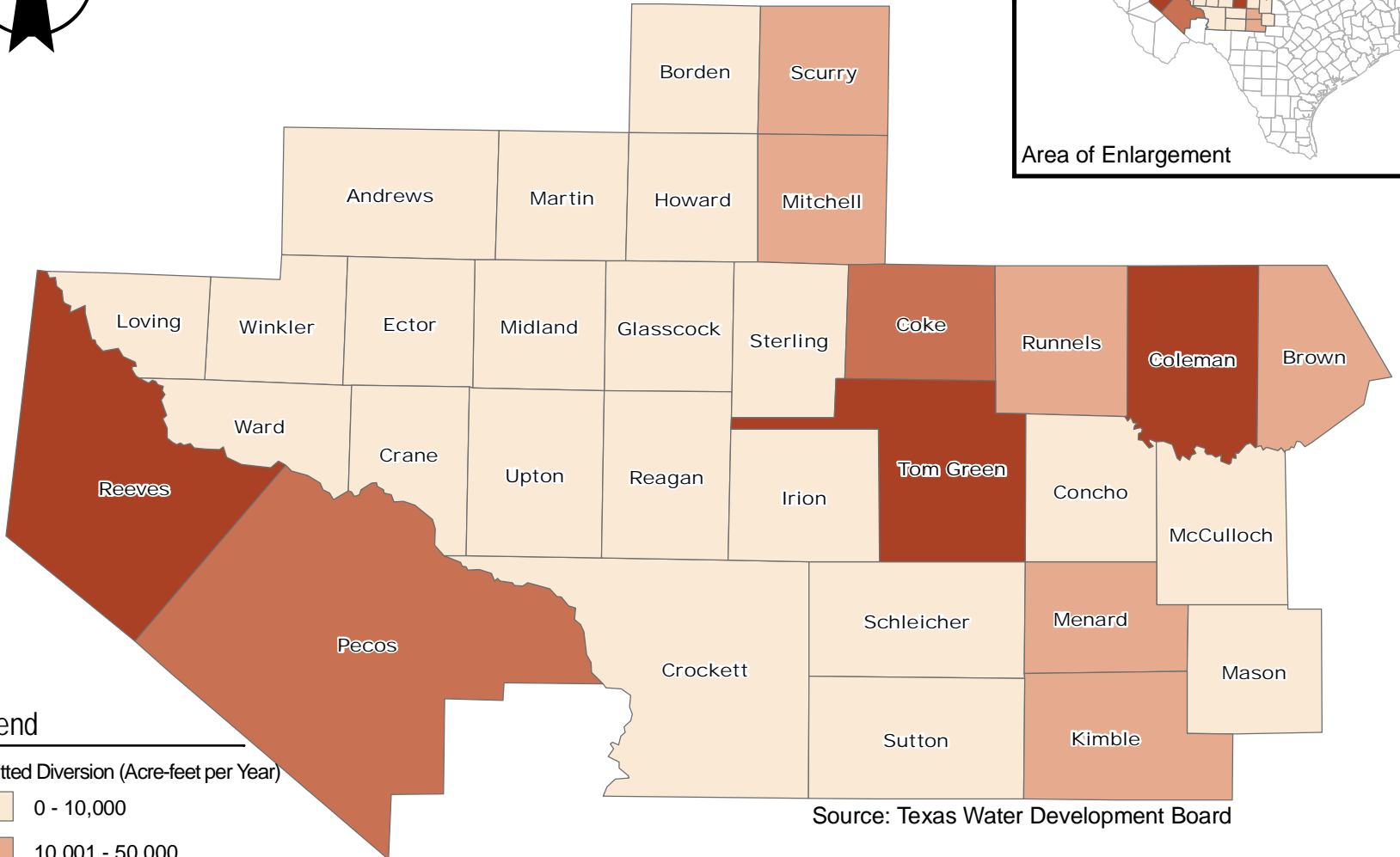
**Total Permitted Surface Water
 Diversion by County**

Region F

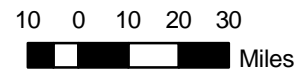
Legend

Permitted Diversion (Acre-feet per Year)

-  0 - 10,000
-  10,001 - 50,000
-  50,001 - 100,000
-  100,001 - 500,000



Source: Texas Water Development Board



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DATE	January 4, 2010
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DRAWN	EME

1.3.2 Groundwater Sources

There are eleven aquifers that supply water to the 32 counties of Region F: four major aquifers (Edwards-Trinity Plateau, Ogallala, Pecos Valley, and Trinity) and seven minor aquifers (Dockum, Hickory, Lipan, Ellenberger-San Saba, Marble Falls, Rustler and the Capitan Reef Complex). Figure 1.2-1 shows the major aquifers and Figure 1.2-2 shows the minor aquifers in Region F. The TWDB defines a major aquifer as an aquifer that supplies large quantities of water to large areas.¹¹ Minor aquifers supply large quantities of water to small areas, or relatively small quantities of water to large areas. The Trinity aquifer is considered a major aquifer by the TWDB because it supplies large quantities of water in other regions. However, the Trinity aquifer covers only a small portion of Region F in Brown County and supplies a relatively small amount of water in the region.

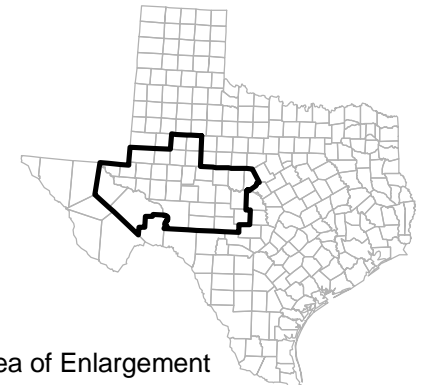
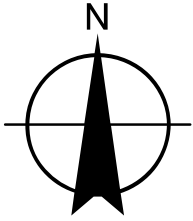
Table 1.3-4 shows the 2003 groundwater use by county and aquifer, the latest year for which these data are available. The Edwards-Trinity Plateau, Pecos Valley and Ogallala are the largest sources of groundwater in Region F, providing 36.0 percent, 24.7 percent and 16.7 percent of the total groundwater pumped in 2003, respectively. The Lipan aquifer provided almost 8 percent of the 2003 totals, with all remaining aquifers contributing 14.6 percent combined. Groundwater pumping is highest in Andrews, Reeves, Midland, Pecos, Glasscock, and Tom Green Counties. These six counties account for 63 percent of the region's total pumping.

Groundwater conservation districts are the preferred method for managing groundwater in the State of Texas. There are 15 Underground Water Conservation Districts (GCDs) in Region F. Figure 1.3-4 is a map of the jurisdictional boundaries of the Districts. These entities are required to develop and adopt comprehensive management plans, permit wells that are drilled, completed or equipped to produce more than 25,000 gallons per day, keep records of well completions, and make information available to state agencies. Other powers granted to GCDs are prevention of waste, conservation, recharge projects, research, distribution and sale of water, and making rules regarding transportation of groundwater outside of the district.¹²

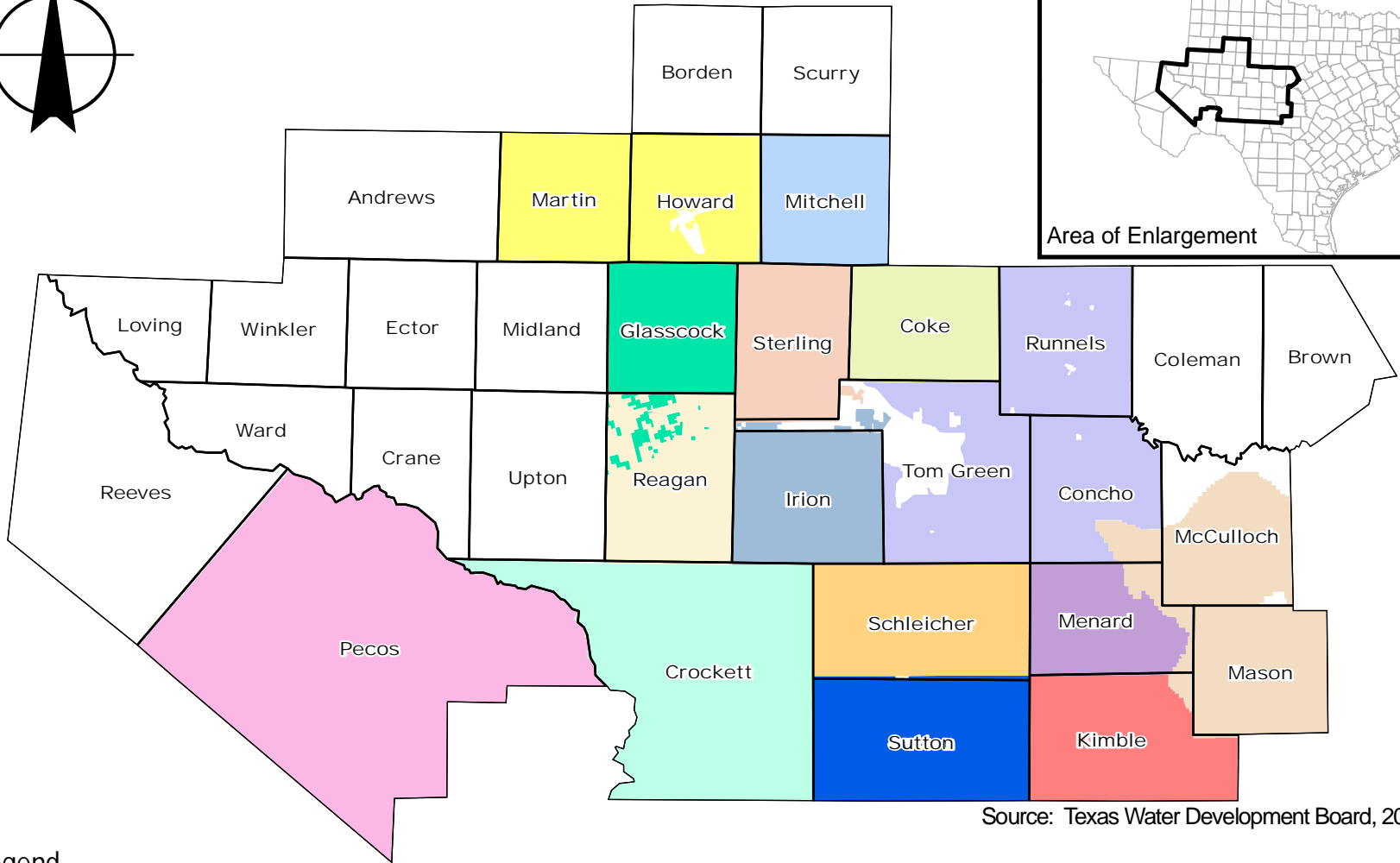
Table 1.3-4
2003 Groundwater Pumping by County and Aquifer
(Values in Acre-Feet)

County	Edwards -Trinity Plateau	Ogallala	Pecos Valley	Lipan	Hickory	Dockum	Trinity	Ellen- berger- San Saba	Marble Falls	Edwards -Trinity High Plains	Rustler	Other	Total
Andrews	23	39,096	155	0	0	4	0	0	0	0	0	0	39,278
Borden	0	2,227	0	0	0	0	0	0	0	8	0	861	3,096
Brown	0	0	0	0	0	0	2,123	0	0	0	0	143	2,266
Coke	51	0	0	0	0	0	0	0	0	0	0	664	715
Coleman	0	0	0	0	0	0	13	0	0	0	0	39	52
Concho	92	0	0	1,495	506	0	0	0	0	0	0	265	2,358
Crane	0	0	3,011	0	0	13	0	0	0	0	64	0	3,088
Crockett	2,169	0	0	0	0	0	0	0	0	0	0	0	2,169
Ector	5,554	917	36	0	0	403	0	0	0	0	0	0	6,910
Glasscock	38,943	6,392	0	0	0	0	0	0	0	0	0	0	45,335
Howard	770	3,134	0	0	0	98	0	0	0	0	0	0	4,002
Irion	435	0	0	0	0	0	0	0	0	0	0	360	795
Kimble	590	0	0	0	0	0	0	0	0	0	0	0	590
Loving	0	0	36	0	0	7	0	0	0	0	0	0	43
Martin	0	14,740	0	0	0	0	0	0	0	0	0	0	14,740
Mason	0	0	0	0	10,415	0	0	207	199	0	0	0	10,821
McCulloch	11	0	0	0	6,404	0	0	242	10	0	0	128	6,795
Menard	558	0	0	0	0	0	0	8	0	0	0	38	604
Midland	9,323	14,744	0	0	0	0	0	0	0	0	0	0	24,067
Mitchell	0	0	0	0	0	6,950	0	0	0	0	0	5	6,955
Pecos	28,710	0	13,981	0	0	0	0	0	0	0	684	3	43,378
Reagan	12,481	0	0	0	0	103	0	0	0	0	0	0	12,584
Reeves	252	0	23,944	0	0	1,061	0	0	0	0	26	0	25,283
Runnels	0	0	0	0	0	0	0	0	0	0	0	2,335	2,335
Schleicher	1,970	0	0	0	0	0	0	0	0	0	0	0	1,970
Scurry	0	0	0	0	0	4,807	0	0	0	0	0	304	5,111
Sterling	309	0	0	0	0	0	0	0	0	0	0	795	1,104
Sutton	1,987	0	0	0	0	0	0	0	0	0	0	0	1,987
Tom Green	1,572	0	0	23,896	0	0	0	0	0	0	0	3,973	29,441
Upton	12,570	0	0	0	0	12	0	0	0	0	0	0	12,582
Ward	0	0	13,263	0	0	1,367	0	0	0	0	0	0	14,630
Winkler	0	0	504	0	0	3,014	0	0	0	0	0	0	3,518
Total	118,370	81,250	54,930	25,391	17,325	17,839	2,136	457	209	8	774	9,913	328,602

Note: Data are from the Texas Water Development Board. 2003 is the most recent year data were available by aquifer.



Area of Enlargement

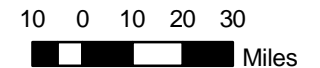


Source: Texas Water Development Board, 2009

Legend

UWC Districts

- | | | | |
|------------------|----------------|---------------------|---------------|
| Sutton County | Permian Basin | Crockett County GCD | Kimble County |
| Glasscock County | Lipan-Kickapoo | Coke County | Lone Wolf |
| Sterling | Irion County | Hickory | Middle Pecos |
| Santa Rita | Plateau UWC | Menard | |



Region F
Underground Water Conservation Districts

FN:JOB:BN
 OMD:07215
 FILE: RegionF_UWCD.mxd
 DATE: January 4, 2010
 SCALE: 1:2,421,500
 DESIGNED: BME
 DRAWN: BME

FIGURE 1.3-4

Ten of the GCDs in Region F form the West Texas Regional Groundwater Alliance, an organization that promotes the conservation, preservation and beneficial use of water and related resources in the region. Seven of the GCDs are also members of the West Texas Weather Modification Association, a group that performs rainfall enhancement activities in a seven county area.

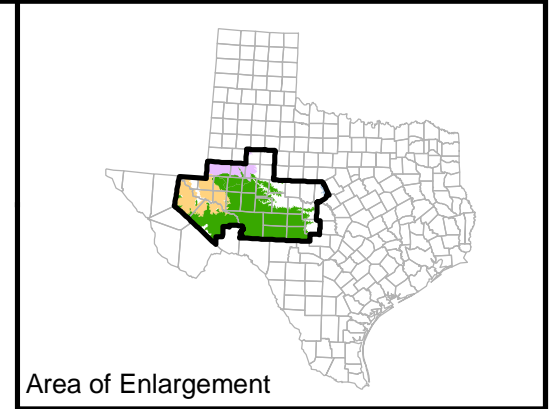
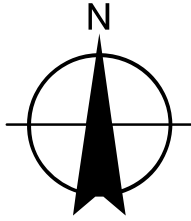
The GCDs also are participating in a joint planning initiative for groundwater through Groundwater Management Areas (GMAs). The State Legislature designated 16 GMAs to coincide with major aquifers in the State of Texas. Each GMA is tasked with determining Desired Future Conditions for the aquifers in the management area for planning purposes. There are four GMAs that include one or more counties in Region F: GMA-7, GMA-4, GMA-2, and GMA-8. The GMA coverage in Region F is shown in Figure 1.3-5. Additional information on the GMA process and groundwater availability is included in Chapter 3.

1.3.3 Springs in Region F

Springs in Region F have been important sources of water supply since prehistoric times and have had great influence on early transportation routes and patterns of settlement. However, groundwater development and the resulting water level declines have caused many springs to disappear over time and have greatly diminished the flow from many of those that remain. Even though springflows are declining throughout the region due to groundwater development, brush infestation, and climatic conditions, many still are important sources of water.

Several rivers in Region F have significant spring-fed flows, including tributary creeks to the Concho and the San Saba Rivers, which are directly or indirectly used for municipal and irrigation purposes in the region.

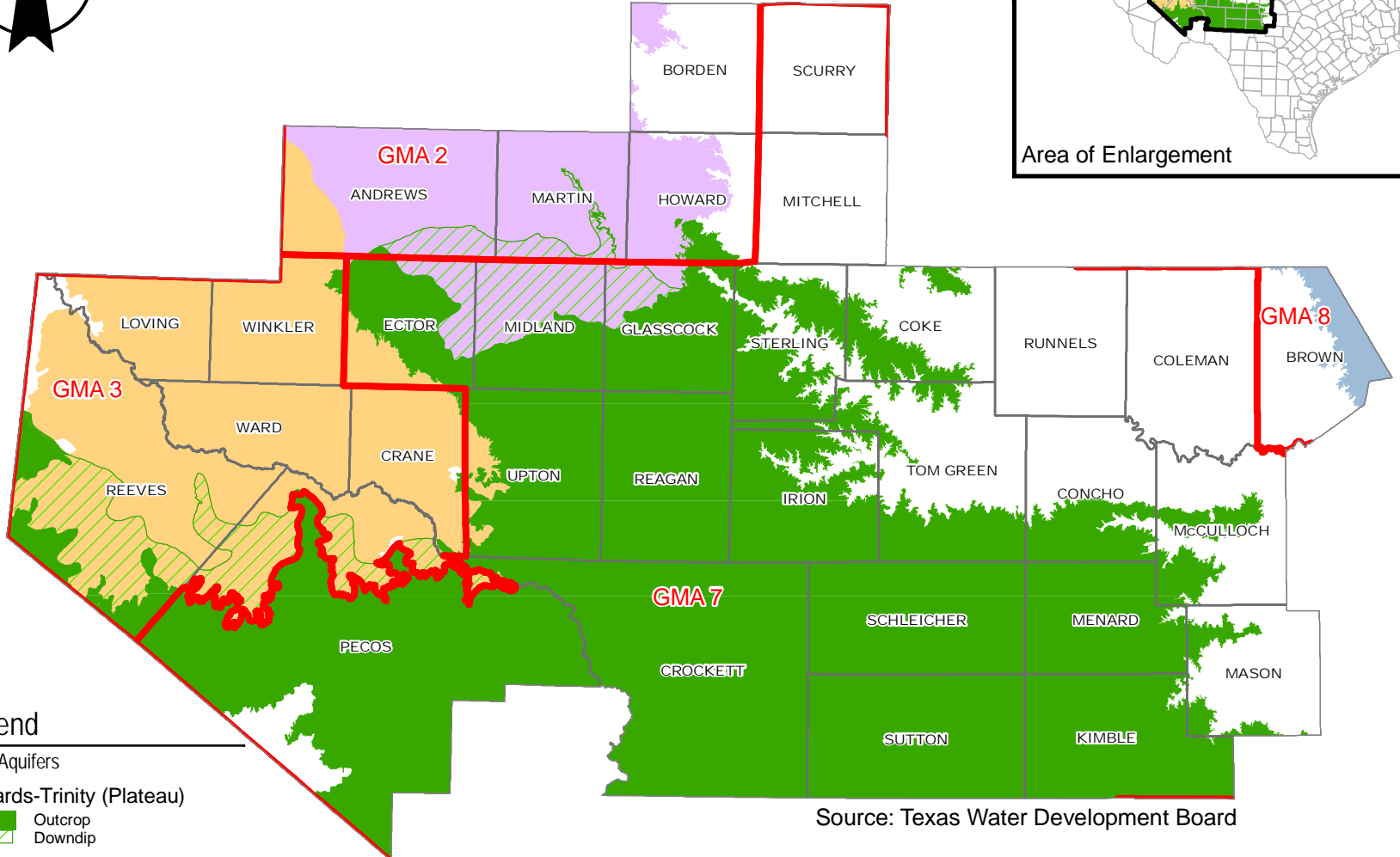
Many springs are also important to the region for natural resources purposes. The Diamond Y Springs in northern Pecos County and the Balmorhea spring complex in southern Reeves County flow continuously and are important habitat for endangered species. Also in Pecos County, the historically significant Comanche Springs flow occasionally during winter months when there is less stress on the underlying aquifer.



Area of Enlargement

GMA Boundaries with Major Aquifer

Region F

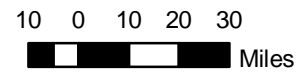


Source: Texas Water Development Board

Legend

Major Aquifers

- Edwards-Trinity (Plateau)
 - Outcrop
 - Downdip
- Pecos Valley
- Ogallala
- Trinity
- GMAs



FILE	RegionF_GMA.mxd
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PLOTTED	BME