A Desired Future Condition and Aquifer Slivers in Groundwater Management Areas

Analysis Paper -
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Purpose of paper

The majority of groundwater management areas have small areas, or slivers, of aquifers that exist within their boundaries. Because of their size these slivers may not currently be used either as a supply that is permitted by a groundwater district or have exempt wells withdrawing groundwater. The purpose of this paper is to identify these areas and to recommend how groundwater conservation districts in groundwater management areas may consider desired future conditions in these areas.

Methods of Analysis

Maps showing groundwater management areas overlaid with the major and minor aquifers maps helped to identify the slivers. The Texas Water Development Board (TWDB) water well database was used to show how many wells for a specific aquifer occur within the sliver. This database does not necessarily include all water wells for a particular area. The number of wells in the TWDB database is a fraction of the number of water wells in the state. Usage data from the Water Resources Planning Division of the TWDB and existing groundwater availability numbers from the 2007 State Water Plan were evaluated to see if the planning groups defined groundwater availability for the slivers.

General Recommendation

We recommend that the groundwater conservation districts define a desired future condition for all slivers in their respective groundwater management areas. If a sliver is small with little to no use, we recommend that the groundwater conservation district in a groundwater management area adopt desired future conditions that are the same or similar to the aquifer in the adjacent groundwater management area. If a sliver does have use, we recommend considering the desired future condition in the adjacent groundwater management area and adjusting as necessary.

Results

Groundwater Management Area 1

Blaine Aquifer—The Blaine Aquifer extends into Groundwater Management Area 1 in southern Wheeler County (Figure 1). The TWDB water well database shows two wells designated Blaine Gypsum, and about 70 wells labeled Dog Creek Shale and Blaine Gypsum. Historical use for the aquifer in Wheeler County was at 1,429 acre feet in 1980 and has declined since then (Table 1). Total groundwater availability increases from 14,241 acre feet in 2000 to 32,500 acre feet in 2010.

Recommendation—Based on the number of wells, and the fact that historical use and availability numbers exist, we recommend that the groundwater conservation districts in Groundwater Management Area 1 define desired future conditions for this area by considering those of the Blaine Aquifer in Groundwater Management Area 6.

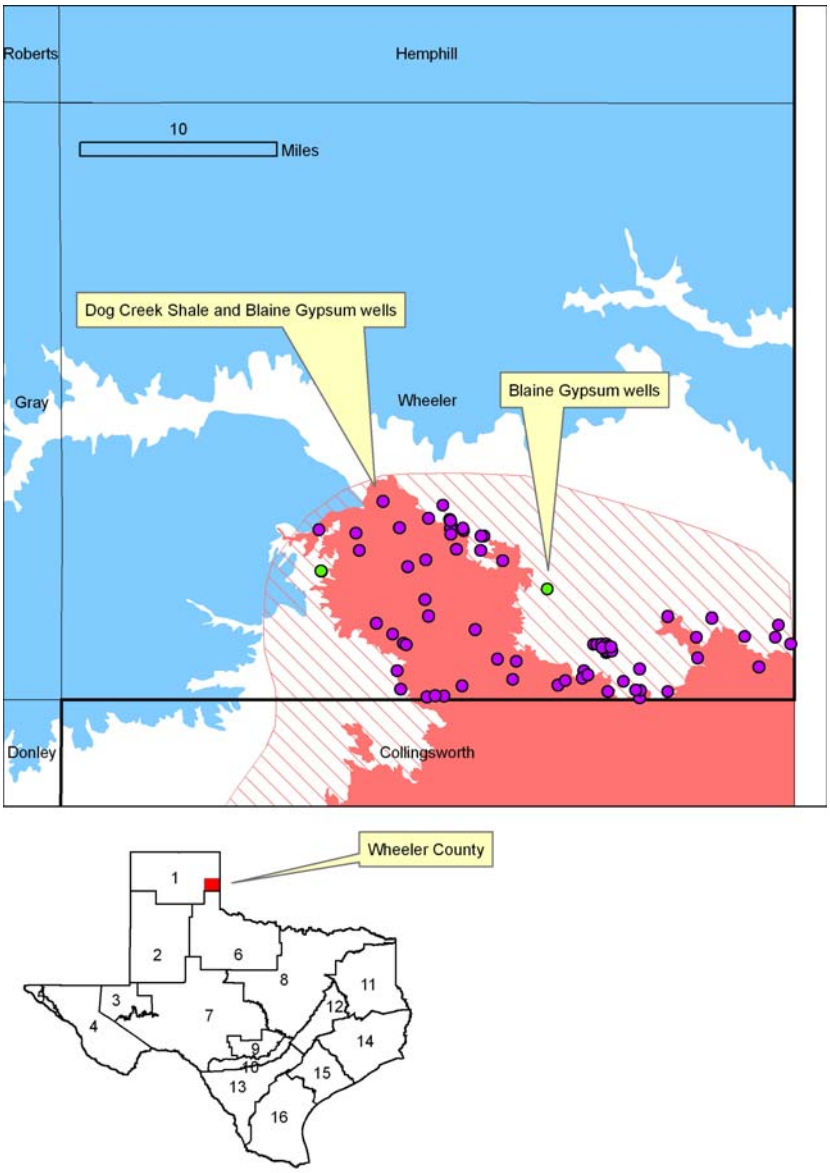


Figure 1. Wheeler County in southeastern Groundwater Management Area 1, showing wells from the Blaine Aquifer.

Table 1. Groundwater data from the 2007 State Water Plan and the Water Resources Planning Division of the TWDB for Groundwater Management Areas 1 through 6.

GMA	COUNTY	AQUIFER	HISTORICAL USE	AVAILABILITY (acre-feeet)			Methodology	Notes
			(acre-feet)	2000	2010	2020		
1	WHEELER	Blaine	max 1,429 in 1980; declines	14,241	32,500	31,250	GAM	
2	BRISCOE	Seymour		4,063	4,063	4,063	TWDB estimate	goes to 1,821 in year 2030
2	ANDREWS	Pecos Valley	2,000 in '84; all others <200	1,504	1,189	1,189	Recharge and 75% of recoverable storage depletion	no wells in TWDB database
							over 50 years	
2	ANDREWS	Edwards-Trinity Plateau	<500 through '88; ≤25 after	1,221	4,640	4,640	Recharge and 75% of recoverable storage depletion	
							over 50 years	
2	MARTIN	Edwards-Trinity Plateau		8,263	3,398	3,398	Recharge and 75% of recoverable storage depletion	
							over 50 years	
2	HOWARD	Edwards-Trinity Plateau	505-922	1,667	1,700	1,700	Recharge and 75% of recoverable storage depletion	
							over 50 years	
3	REEVES	Igneous						have wells but boundary change added aquifer to county
3	WINKLER	Ogallala						no wells in TWDB database
4	CULBERSON	Pecos Valley						no wells in TWDB database
4	JEFF DAVIS	Pecos Valley						no wells in TWDB database
6	JACK	Trinity	≤5	848	100	100	GAM	
6	PALO PINTO	Trinity		286	286	286	2001 Brazos G Plan	

Groundwater Management Area 2

There are three aquifers with slivers present in Groundwater Management Area 2: the Seymour, Pecos Valley, and Edwards-Trinity (Plateau) aquifers (Figure 2).

Seymour Aquifer—The Seymour Aquifer is present in Groundwater Management Area 2 in southeastern Briscoe County. The TWDB has no record of any wells in the area. The Llano Estacado (Region O) Water Planning Group estimated total groundwater availability at 4,063 acre feet decreasing to 1,821 acre feet in 2030 (Table 1).

Recommendation—The area of this sliver is small, but the estimated groundwater availability is relatively large. We recommend that the groundwater conservation districts in Groundwater Management Area 2 define desired future conditions for this area by considering those of the Seymour Aquifer in Groundwater Management Area 6.

Pecos Valley Aquifer—A large part of Andrews County includes the Pecos Valley Aquifer (formerly the Cenozoic Pecos Alluvium Aquifer). The size of this area increased with the aquifer boundary changes in the 2007 State Water Plan. Historical use has been generally less than 200 acre feet per year. Estimates for groundwater availability range from 1,504 acre feet to 1,189 acre feet.

Recommendation—Given the relatively large area of aquifer coverage and the presence of availability estimates in the regional water plan, we recommend that the groundwater conservation districts in Groundwater Management Area 2 define desired future conditions for this area by considering those of the Pecos Valley Aquifer in Groundwater Management Area 3.

Edwards-Trinity (Plateau) Aquifer—The Edwards-Trinity (Plateau) Aquifer occurs in Andrews, Martin, and Howard counties. Numerous wells tap into the aquifer (Figure 3), and estimates of groundwater availability are relatively large (Table 1).

Recommendation—Based on the amount of use from the aquifer within Groundwater Management Area 2, we recommend that the groundwater conservation districts in this area define desired future conditions by considering those of the Edwards-Trinity (Plateau) Aquifer in Groundwater Management Area 7.

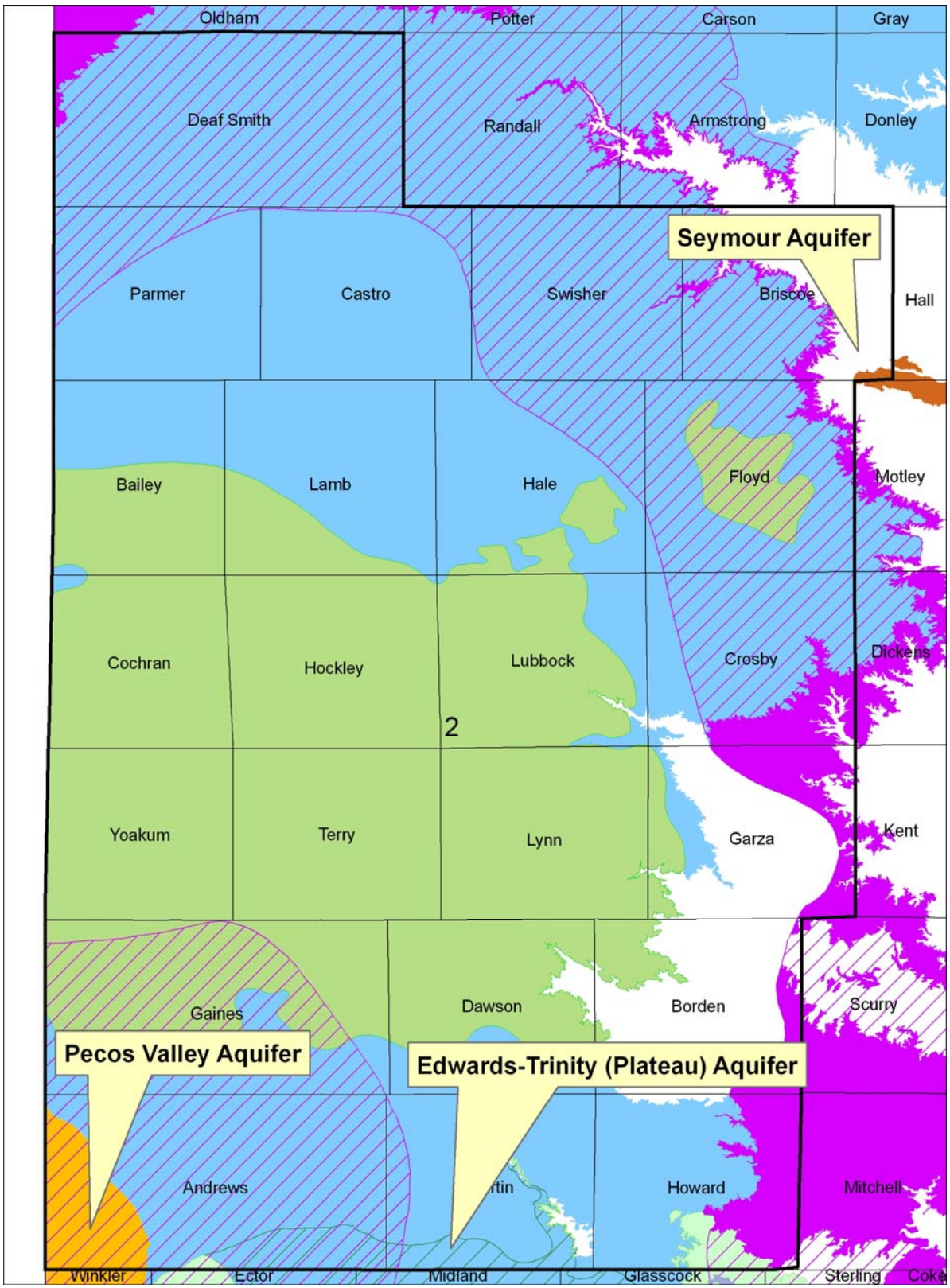


Figure 2. Three slivers in Groundwater Management Area 2.

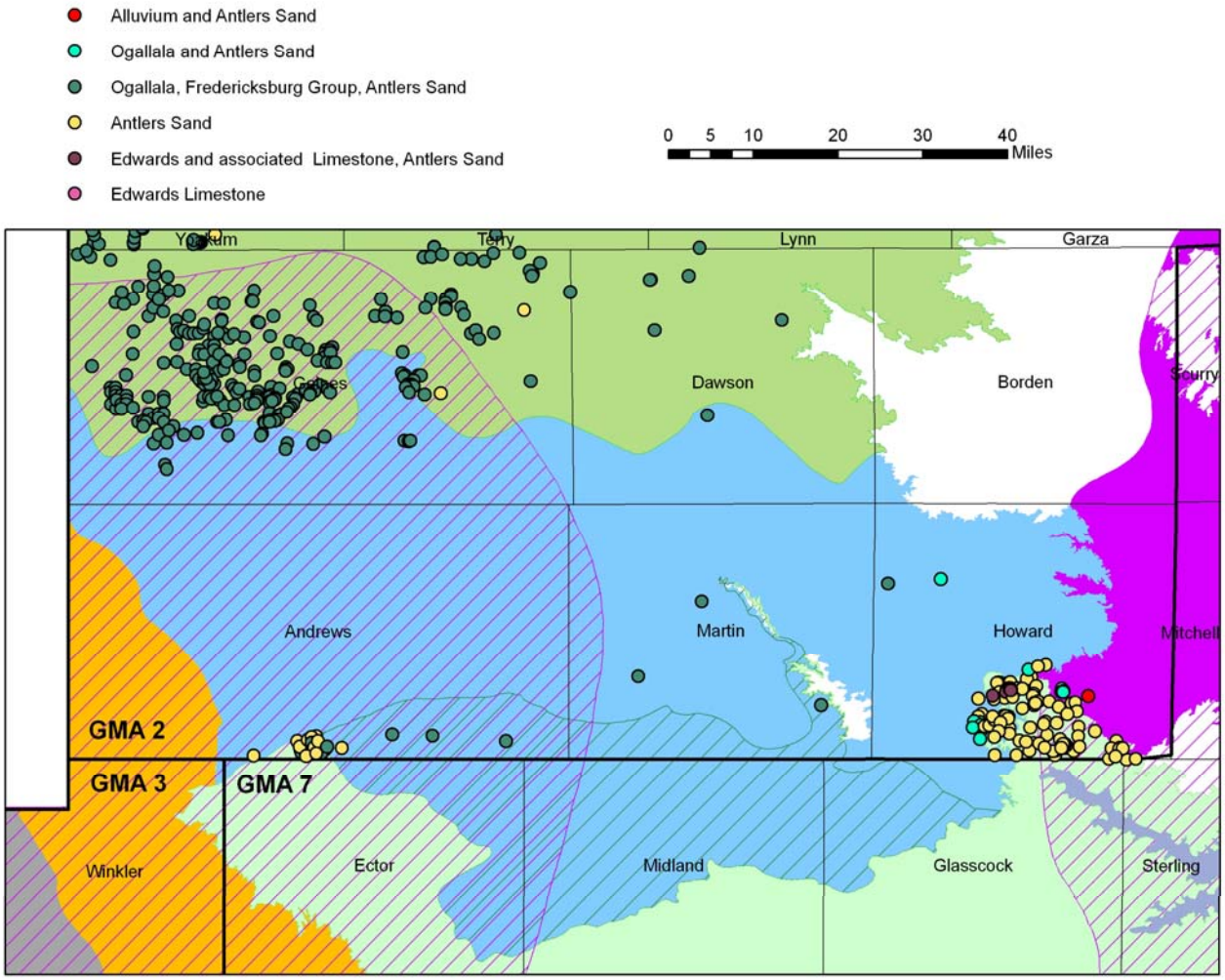


Figure 3. Wells of the Edwards-Trinity (Plateau) Aquifer, which includes the Antlers Sand, in the southern part of Groundwater Management Area 2.

Groundwater Management Area 3

Ogallala Aquifer—The Ogallala Aquifer occurs in a small area of northeastern Winkler County. There are no wells there and no data on usage or availability (Table 1).

Recommendation—Because the size of the sliver is small and has little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 3 adopt the desired future conditions that are the same or similar to those in the Ogallala Aquifer in Groundwater Management Area 2.

Igneous Aquifer—-The Igneous Aquifer boundary has been changed significantly in the 2007 State Water Plan (Figure 4). Groundwater Management Area 3 now has a relatively large area of the aquifer in southern Reeves County, where there are 15 wells in the TWDB water well database in volcanic rocks.

Recommendation—Given the size of the aquifer area and the wells in the county, we recommend that the groundwater conservation districts in Groundwater Management Area 3 define desired future conditions for this area by considering those of the Igneous Aquifer in Groundwater Management Area 4.

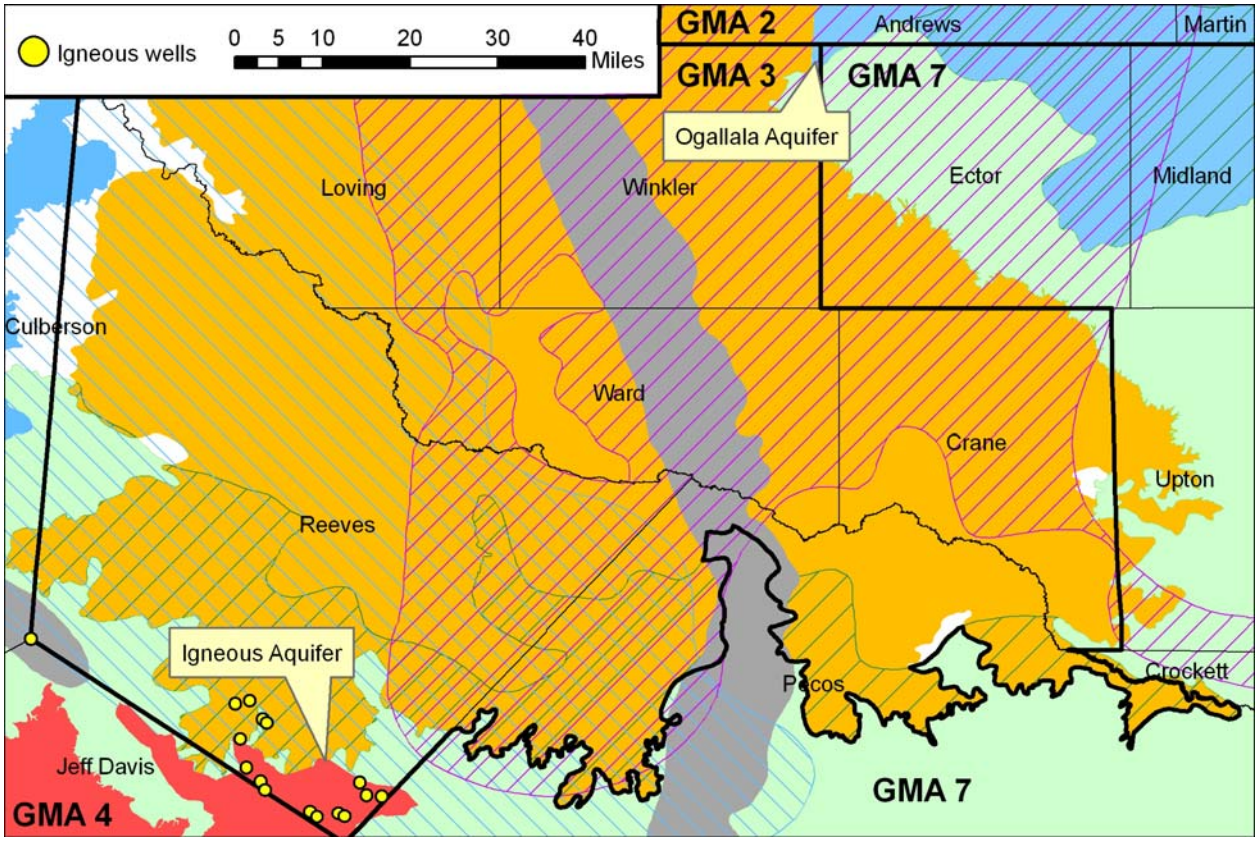
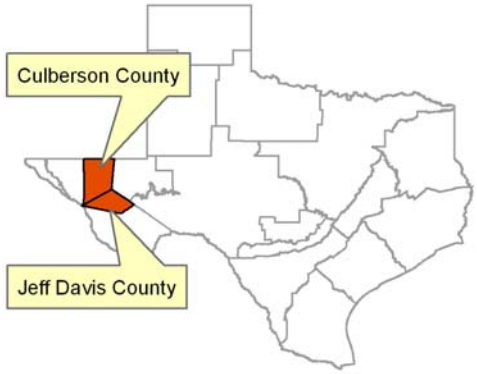


Figure 4. Groundwater Management Area 3 slivers and wells in the Igneous Aquifer.

Groundwater Management Area 4

Pecos Valley Aquifer—The only slivers in Groundwater Management Area 4 are those of the Pecos Valley Aquifer (Figure 5). There are no Pecos Valley Aquifer wells in the TWDB database for Groundwater Management Area 4, although there are some wells labeled alluvium. The 2007 State Water Plan contains no availability estimates for these areas (Table 1).

Recommendation— Because the sizes of the slivers are small and have little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 4 adopt the desired future conditions that are the same or similar to those in the Pecos Valley Aquifer in Groundwater Management Area 3.



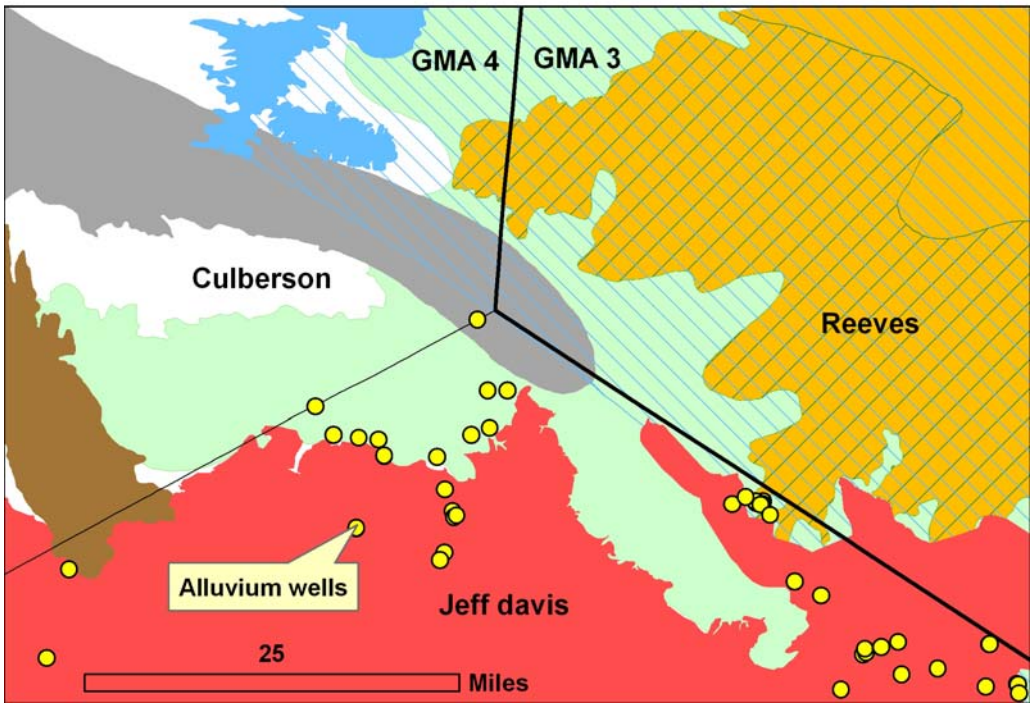


Figure 5. Slivers of Pecos Valley Aquifer in Groundwater Management Area 4.

Groundwater Management Area 5

Groundwater Management Area 5 has no slivers and only one named aquifer, the Hueco-Mesilla Bolsons Aquifer.

Groundwater Management Area 6

Trinity Aquifer—Small areas of the Trinity Aquifer occur in Jack and Palo Pinto counties. Both areas have wells, and their combined groundwater availability estimates decrease from 1,134 acre feet in 2000 to 386 in 2020 (Figure 6 and Table 1).

Recommendation—Given the occurrence of wells and groundwater availability numbers in the 2007 State Water Plan, we recommend that the groundwater conservation districts in Groundwater Management Area 6 define desired future conditions for these areas by considering those of the Trinity Aquifer in Groundwater Management Area 8.

Ogallala and Dockum aquifers—Areas including the Ogallala and Dockum Aquifers in western Groundwater Management Area 6 are sufficiently large not to be considered slivers. We recommend that the groundwater conservation districts in Groundwater Management Area 6 work with those districts in Groundwater Management Area 2 when defining their desired future conditions.

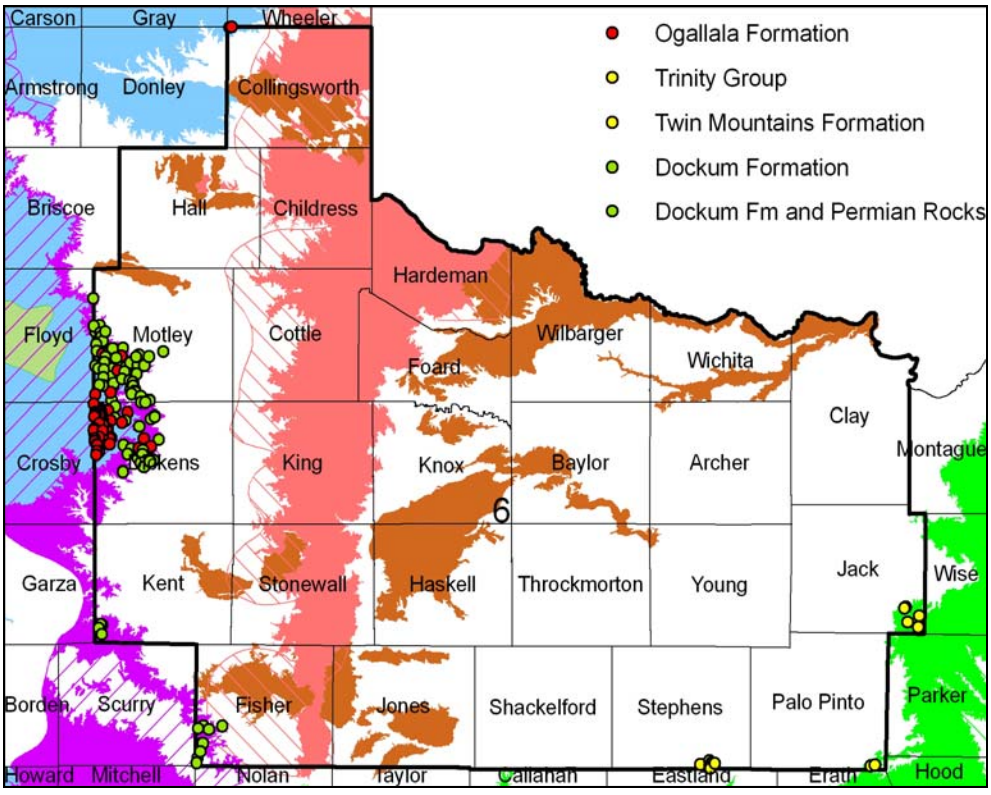


Figure 6. Slivers of the Trinity Aquifer in eastern Groundwater Management Area 6.

Groundwater Management Area 7

Trinity Aquifer—There are small areas of the Trinity Aquifer in Real and Uvalde counties (Figure 7). The Trinity Aquifer also occurs over a large area in Gillespie County.

Recommendation—Given the size of the area in Gillespie County, as well as groundwater availability estimates from the 2007 State Water Plan (Table 2), we recommend that the groundwater conservation districts in Groundwater Management Area 7 define desired future conditions for these areas by considering those of the Trinity Aquifer in Groundwater Management Area 9..

Seymour Aquifer—A sliver of the Seymour Aquifer crosses over into Groundwater Management Area 7 in Scurry County. There are no Seymour Aquifer wells in the TWDB water well database in Scurry County and no numbers on groundwater availability or use.

Recommendation—Because the size of the sliver is small and has little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 7 adopt the desired future conditions that are the same or similar to those in the Seymour Aquifer in Groundwater Management Area 3.

Blaine Aquifer—One area of the Blaine Aquifer occurs in Nolan County, where the aquifer was extended farther south in the 2007 State Water Plan. There are no wells there in the TWDB water well database, nor is there information on use and availability.

Recommendation—Because the size of the sliver is small and has little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 7 adopt the desired future conditions that are the same or similar to those in the Blaine Aquifer in Groundwater Management Area 3.

Igneous Aquifer- A sliver of the Igneous Aquifer occurs in western Pecos County. However, there are no wells there in the TWDB water well database and no data on groundwater use or availability.

Recommendation—Because the size of the sliver is small and has little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 7 adopt the desired future conditions that are the same or similar to those in the Igneous Aquifer in Groundwater Management Area 4.

Pecos Valley Aquifer—Small slivers of the Pecos Valley Aquifer occur in Groundwater Management Area 7 in Crockett and Pecos counties, and larger areas of the aquifer extend into Ector and Upton counties. There appear to be very few Pecos Valley Aquifer wells in these slivers according to the TWDB water well database (Figure 7).

Recommendation—Because of the size of the areas in Ector and Upton counties, along with groundwater availability and use figures, we recommend that the groundwater conservation districts in Groundwater Management Area 7 define desired future conditions for these areas by considering those of the Pecos Valley Aquifer in Groundwater Management Area 3.

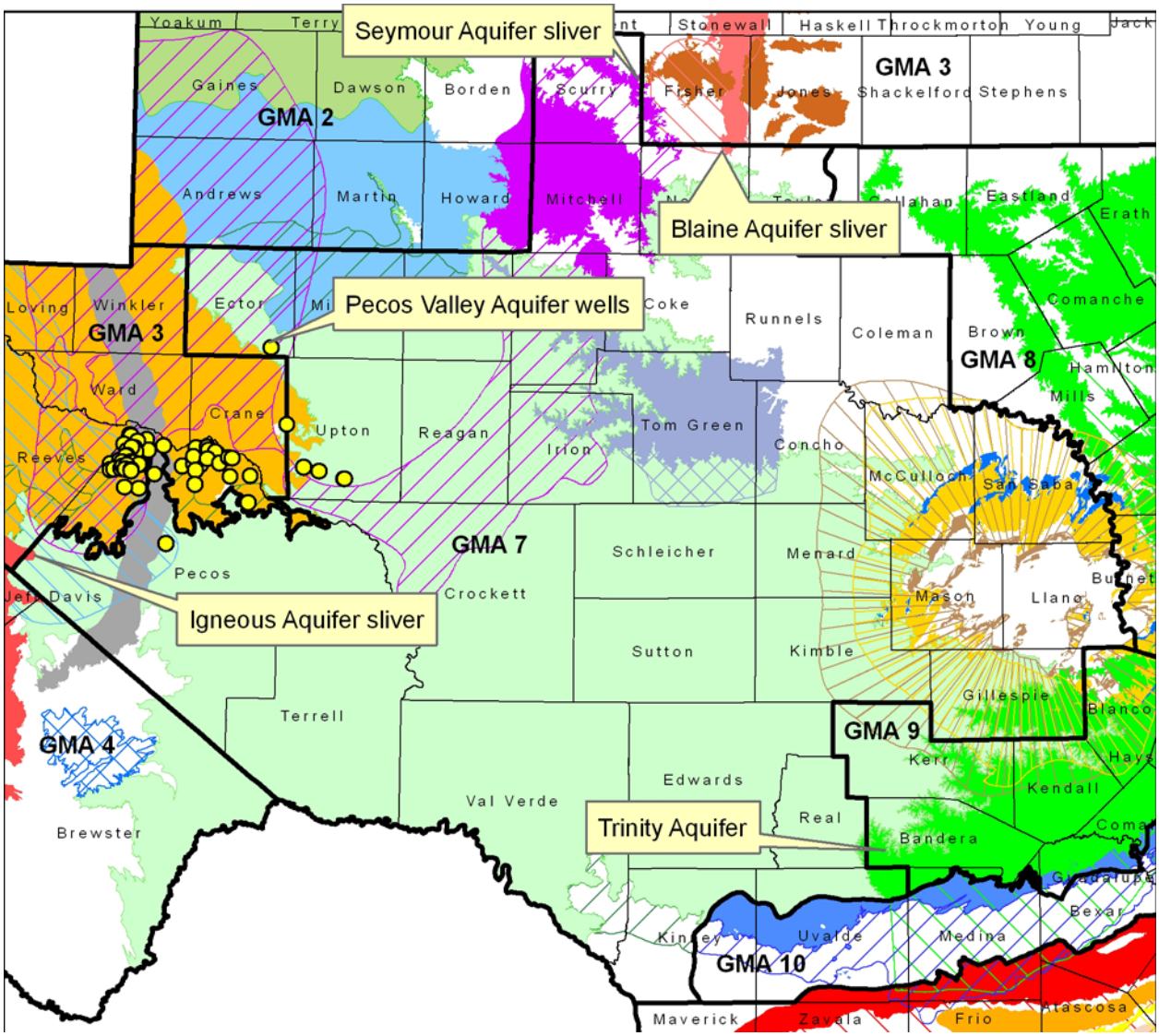


Figure 7. Slivers and water wells in Groundwater Management Area 7.

Table 2. Groundwater data from the 2007 State Water Plan and the Water Resources Planning Division of the TWDB for groundwater management areas 7 through 12.

GMA	COUNTY	AQUIFER	HISTORICAL USE	AVAILABILITY (acre-feet)			METHODOLOGY	NOTES
			(acre-feet)	2000	2010	2020		
7	REAL	Trinity		214	380	380	Trinity-Hill Country Aquifer GAM	
7	ULVALDE	Trinity						can't break out cty data based on GMA, there are Trinity wells
7	GILLESPIE	Trinity	~1,500-3,500	3,400	3,400	3,400	Based on HCUWCD Data	
7	NOLAN	Blaine						have wells, boundary change added aquifer to the county
7	SCURRY	Seymour						no data available, no wells
7	PECOS	Igneous						no wells, boundary change added aquifer to the county
7	PECOS	Pecos Valley						can't break out county data based on GMA
								there are Pecos Valley wells
7	CROCKETT	Pecos Valley						no data available
7	UPTON	Pecos Valley		275	1,078	1,078	Recharge and 75% of recoverable	
							storage depletion over 100 years.	
7	ECTOR	Pecos Valley	max 578; most <80	2,645	3,143	3,143	50% of recharge and 75% of recoverable	
							storage depletion over 50 years.	
8	LAMPASAS	Marble Falls		4,183	4,183	4,183	TWDB estimate	
8	BURNET	Marble Falls		5,625	5,625	5,625	based on % of area	sum of two numbers
8	LAMPASAS	Ellenburger-San Saba		551	551	551	TWDB estimate	
8	BURNET	Ellenburger-San Saba		3,148	3,148	3,148	based on % of area	sum of two numbers
8	BURNET	Hickory Aquifer		5,411	5,411	5,411	based on % of area	sum of two numbers
9	BLANCO	Marble Falls		300	300	300	GWbyBasin file 9/24/99	
9	BLANCO	Hickory aquifer		912	912	912	based on % of area	sum of two numbers
9	BLANCO	Ellenburger-San Saba		3,874	3,874	3,874	based on % of area	sum of two numbers
9	BEXAR	Edwards -BFZ						can't break out county data based on GMA
9	COMAL	Edwards -BFZ						can't break out county data based on GMA
9	HAYS	Edwards -BFZ						can't break out county data based on GMA
9	TRAVIS	Edwards -BFZ						can't break out county data based on GMA
10								no slivers
11	HENDERSON	Nacatoch		10	10	10	historical use	
11	BOWIE	Nacatoch						can't break out county data based on GMA
11	TRINITY	Gulf Coast	max 85; all other <53	4,973	3,814	3,814	Available Information	
11	SABINE	Gulf Coast		1,093	1,100	1,100	Available Information	sum of two numbers
12	BASTROP	Trinity		12	12	12		
12	LEE	Trinity						can't break out county data based on GMA
12	WILLIAMSON	Trinity						

Groundwater Management Area 8

Marble Falls, Ellenberger-San Saba, and Hickory aquifers—In Lampasas County there are slivers of the Marble Falls and Ellenberger-San Saba aquifers. Corresponding water wells are shown in purple and red (Figure 8). Groundwater availability numbers are 4,183 acre feet and 551 acre feet, respectively (Table 2). In Burnet County there are wells from the Marble Falls, Ellenberger-San Saba, and Hickory aquifers.

Recommendation—Based on pumpage and groundwater availability numbers in Burnet and Lampasas counties, we recommend that the groundwater conservation districts in Groundwater Management Area 8 define desired future conditions for these area by considering those of the Marble Falls and Ellenberger-San Saba aquifers in Groundwater Management Area 3.

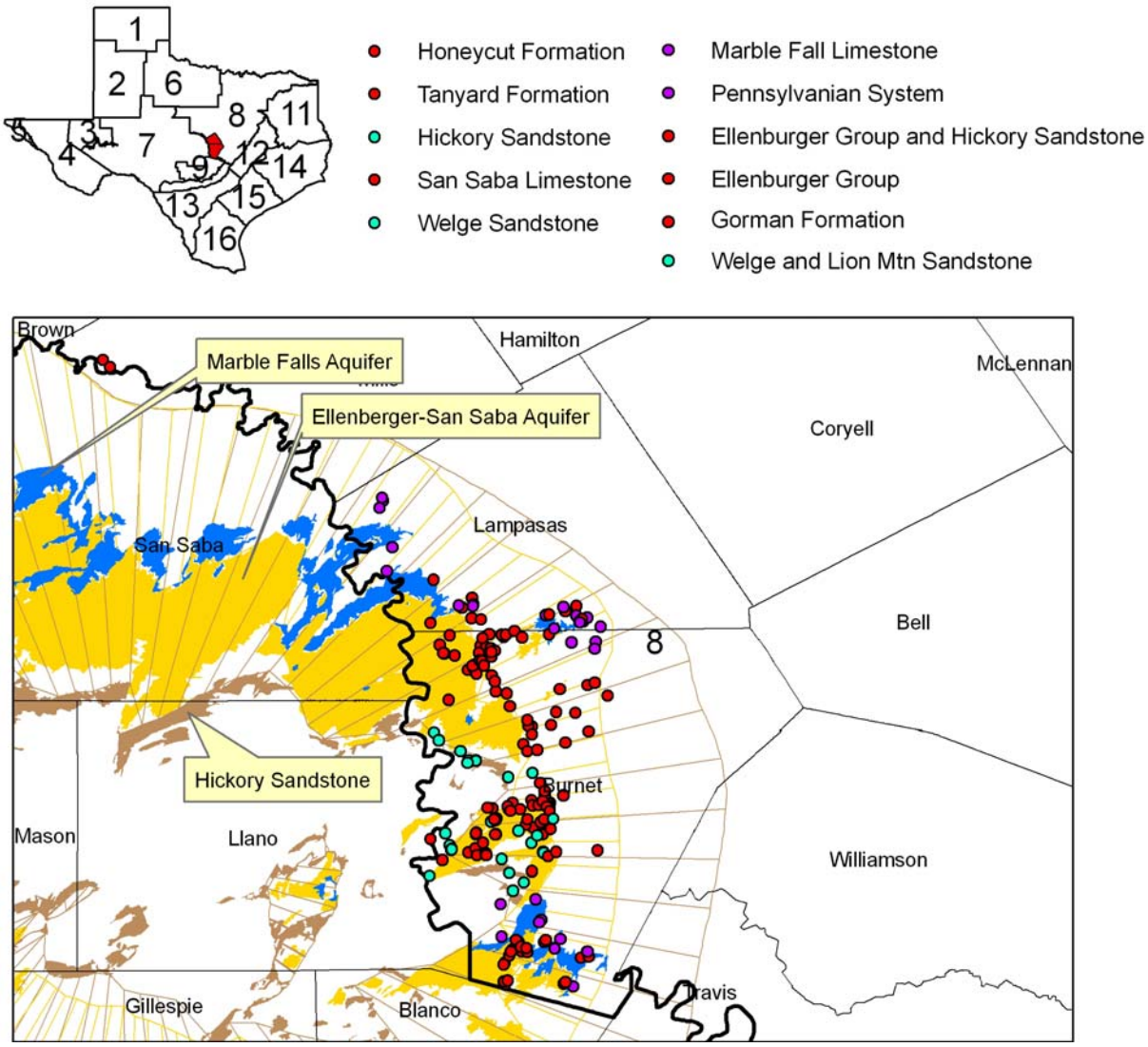


Figure 8. Slivers of aquifers in the southern part of Groundwater Management Area 8. Lampasas and Burnet Counties are indexed in red.

Groundwater Management Area 9

Marble Falls, Ellenberger-San Saba, and Hickory aquifers—In Groundwater Management Area 9 there are small areas of the Marble Falls and Hickory aquifers in Blanco County (Figure 9). The Ellenberger-San Saba and Edwards (Balcones Fault Zone) aquifers are somewhat larger in terms of area covered. All the aquifers have associated wells in Groundwater Management Area 9 (Figure 10). In Blanco County there are groundwater availability and use numbers for the Marble Falls, Hickory, and Ellenberger-San Saba aquifers (Table 2)

RecommendationWe recommend that the groundwater conservation districts in Groundwater Management Area 9 define desired future conditions for these areas by considering those of the Marble Falls, Ellenberger-San Saba, and Hickory aquifers in Groundwater Management Area 7 and Groundwater Management Area 8.

Edwards (Balcones Fault Zone) Aquifer—The Edwards (Balcones Fault Zone) Aquifer occurs in Groundwater Management Area 9 in Bexar, Comal, Hays, and Travis counties. There are groundwater availability and use data for the Edwards (Balcones Fault Zone) Aquifer on a county basis, but that data can not be broken out with respect to the groundwater management area as yet (Table 2).

Recommendation— We recommend that the groundwater conservation districts define a desired future condition for these areas, in close coordination with the Edwards Aquifer Authority.

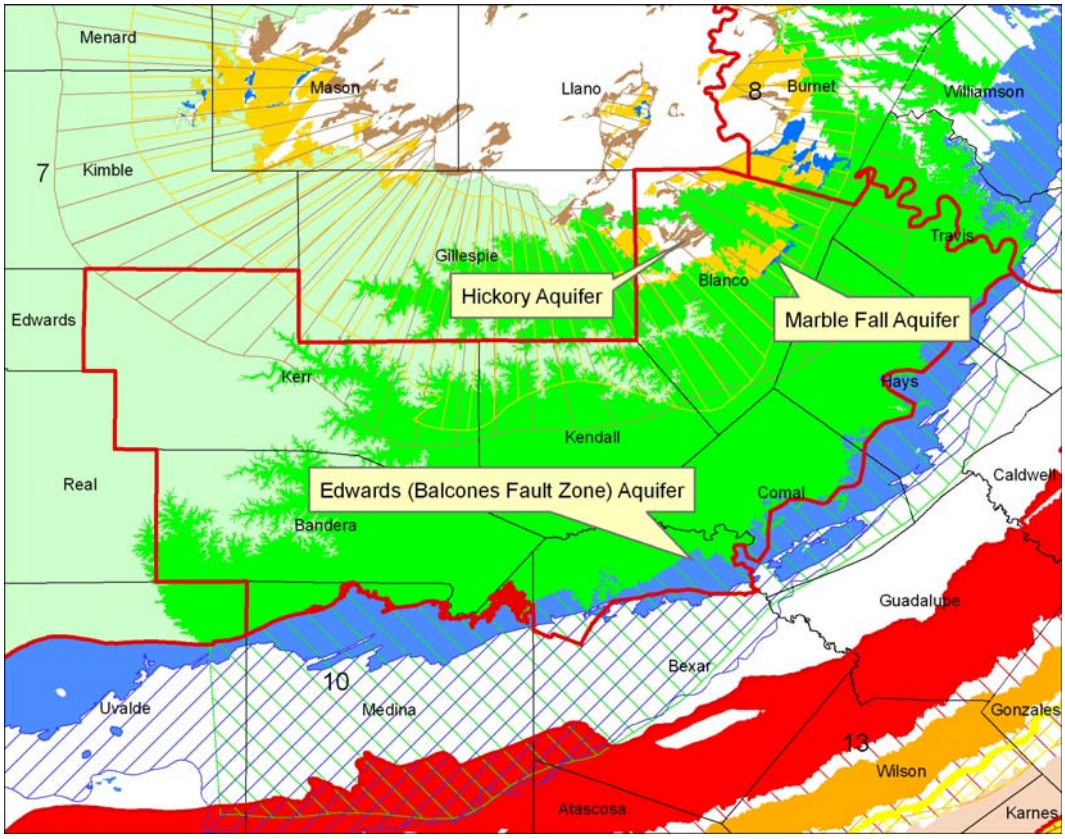


Figure 9. Slivers in Groundwater Management Area 9.The Trinity Aquifer is bright green and the Ellenberger-San Saba Aquifer is orange.

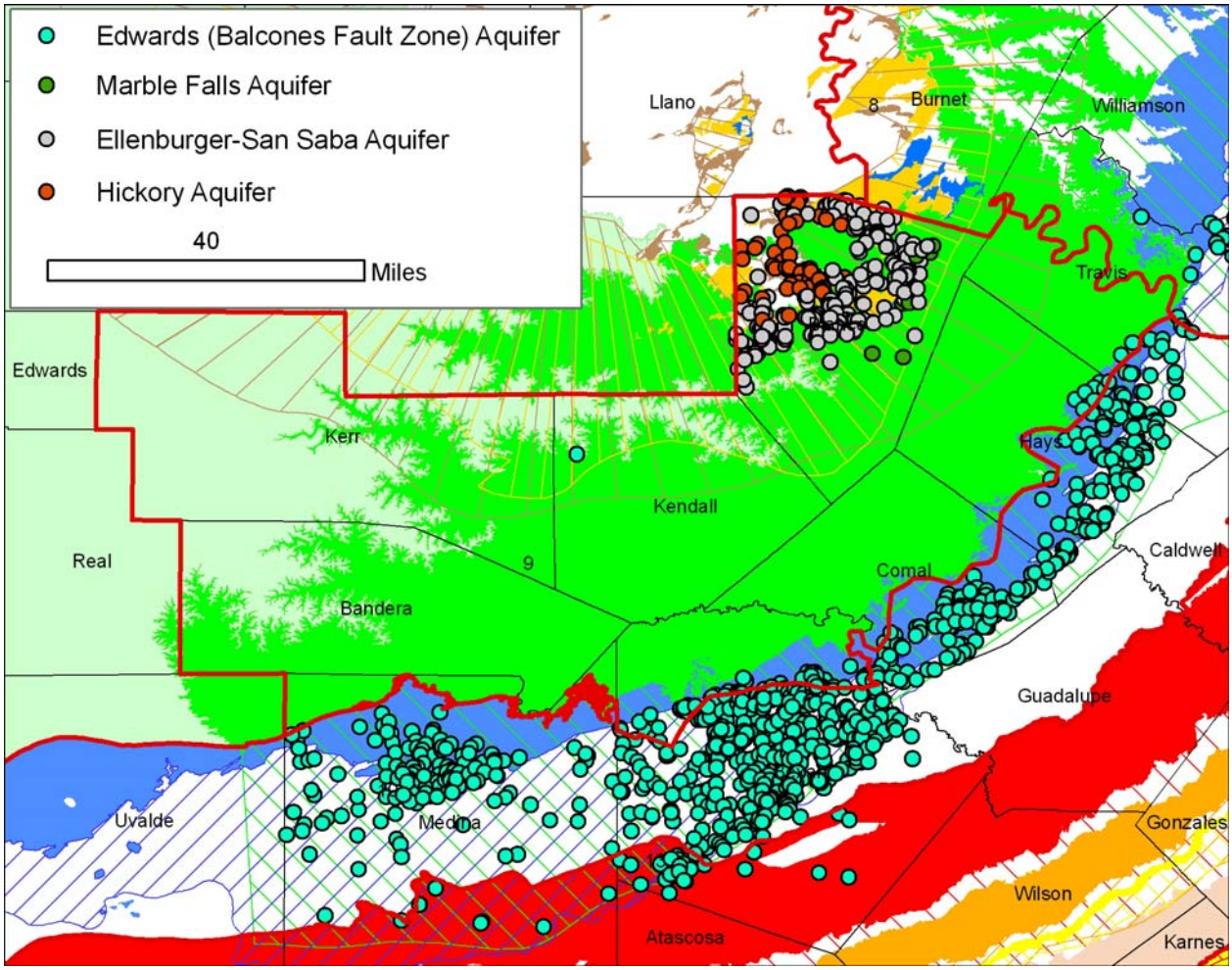


Figure 10. Water wells in slivers in Groundwater Management Area 9. The wells are grouped by color and aquifer.

Groundwater Management Area 10

There are no slivers of major or minor aquifers in Groundwater Management Area 10.

Groundwater Management Area 11

Nacatoch Aquifer—There are slivers of the Nacatoch Aquifer in westernmost Henderson County and southern Bowie County (Figure 11). However, there are a small number of wells in the Nacatoch Aquifer and little existing information on groundwater availability and use (Table 2).

Recommendation—We recommend that the groundwater conservation districts in Groundwater Management Area 11 define desired future conditions for these areas by considering those of the Nacatoch Aquifer in Groundwater Management Area 8..

Gulf Coast Aquifer—In the south the Gulf Coast Aquifer, specifically the Catahoula Formation, crosses into Groundwater Management Area 11 in Trinity and Sabine counties. Although there

are a limited number of wells in those counties, previous availability estimates range from about 1,000 to 5,000 acre feet.

Recommendation— We recommend that the groundwater conservation districts in Groundwater Management Area11 define desired future conditions for these areas by considering those of the Gulf Coast Aquifer in Groundwater Management Area 14..

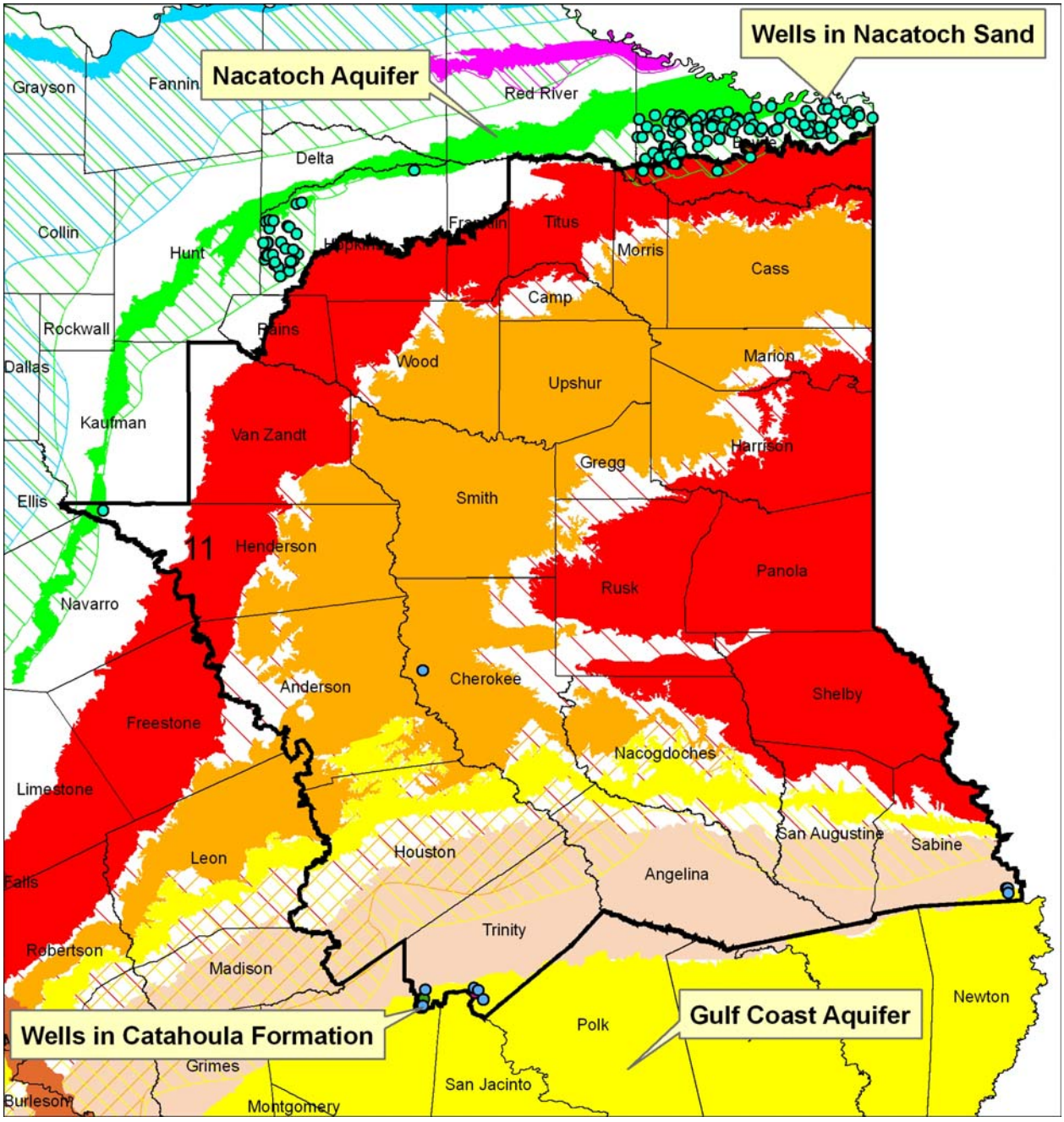


Figure 11. Aquifers and selected water wells of the Catahoula Formation, part of the Gulf Coast Aquifer, inGroundwater Management Area 11.

Groundwater Management Area 12

Trinity Aquifer—There is a sliver of the Trinity Aquifer in Bastrop, Lee, and Williamson counties, but no wells exist in the TWDB water well database for this area (Figure 12). Groundwater availability and use numbers are also limited (Table 2).

Recommendation—We recommend that the groundwater conservation districts in Groundwater Management Area 12 define desired future conditions for this area by considering those of the Trinity Aquifer in Groundwater Management Area 8.

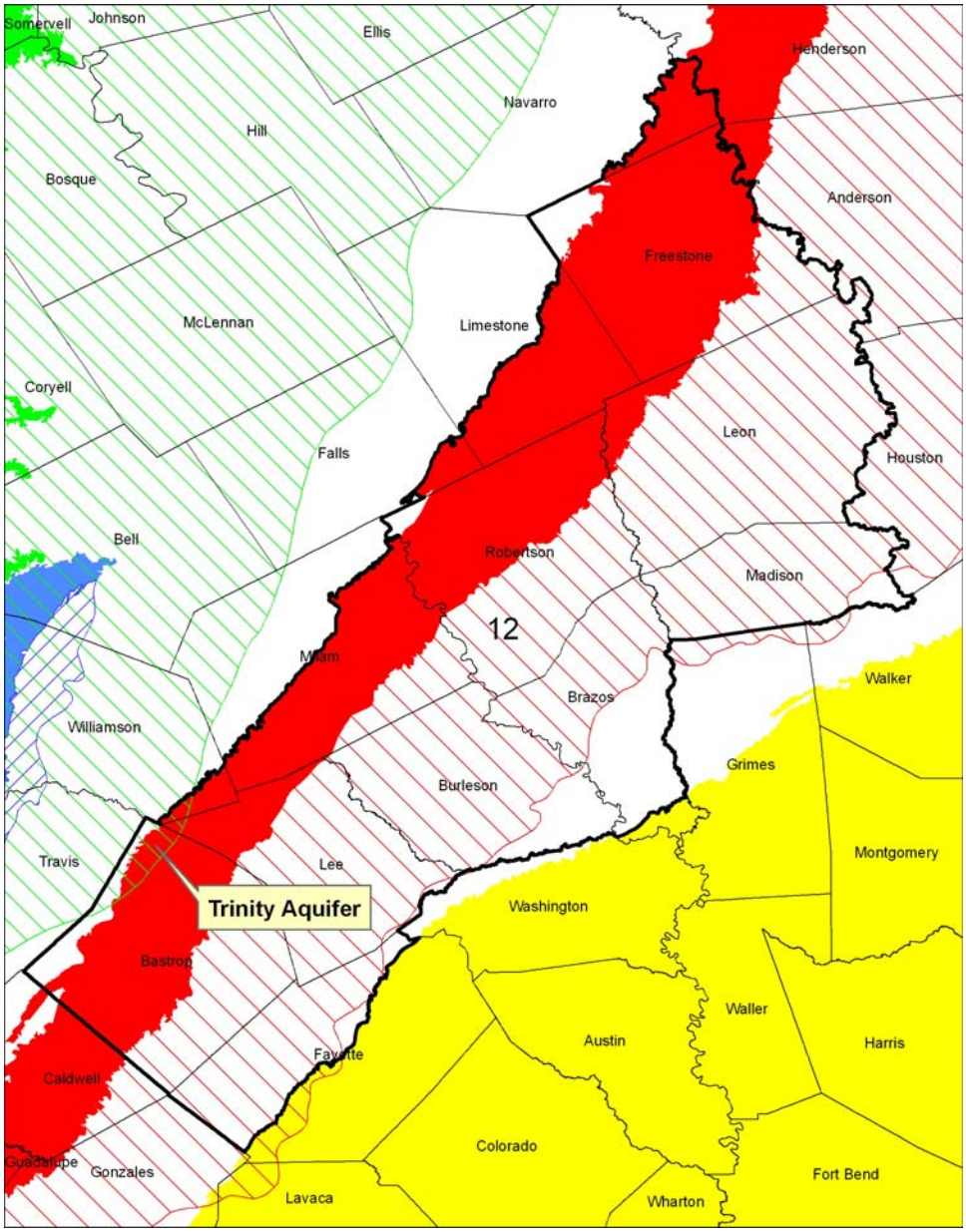


Figure 12. Major aquifers in Groundwater Management Area 12.

Groundwater Management Area 13

Gulf Coast Aquifer- There are two slivers of the Gulf Coast Aquifer in Groundwater Management Area 13, one in Zapata County and the other in Gonzales County. The latter has some wells and associated groundwater availability numbers from the 2007 State Water Plan (Figure 12 and Table 3).

Recommendation—We recommend that the groundwater conservation districts in Groundwater Management Area 13 define desired future conditions for these areas by considering those of the Gulf Coast Aquifer in Groundwater Management Area 16..

Trinity Aquifer- The Trinity Aquifer occurs in the subsurface in Uvalde, Medina, and Bexar counties. However, there are no wells in these areas and no data on availability or use in the 2007 State Water Plan and the TWDB water well database.

Recommendation— Because of the lack of well data and little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 13 adopt the desired future conditions that are the same or similar to those in the Trinity Aquifer in Groundwater Management Area 10.

Edwards (Balcones Fault Zone) Aquifer—There are a number of Edwards (Balcones Fault Zone) Aquifer wells in Groundwater Management Area 13 (Figure 13).

Recommendation—We recommend that the groundwater conservation districts define a desired future condition for this area, in close coordination with the Edwards Aquifer Authority.

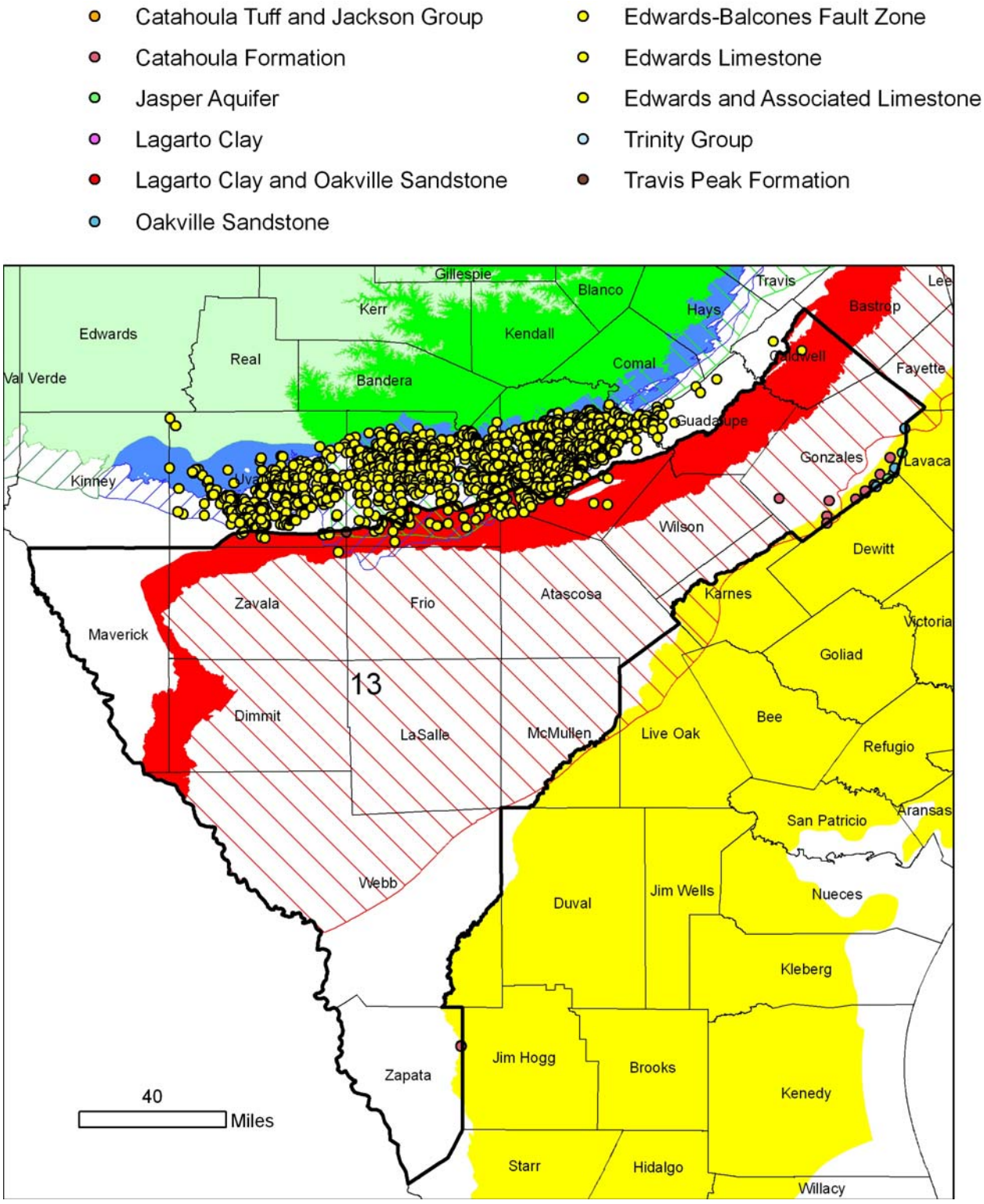


Figure 13. Selected wells in Groundwater Management Area 13.

Table 3. Groundwater data from the 2007 State Water Plan and the Water Resources Planning Division of the TWDB for Groundwater Management Areas 13 through 16.

GMA	COUNTY	AQUIFER	AVAILABILITY (acre-feet)			METHODOLOGY	NOTES
13	GONZALES	Gulf Coast	2,083	2,083	2,083	Prior planning value	sum of two numbers, from two basins
13	ZAPATA	Gulf Coast	11,224	500	500	GAM	
13	UVALDE	Edwards					no availability data, GMA and county boundaries differ*
13	MEDINA	Edwards					no availability data, GMA and county boundaries differ*
13	BEXAR	Edwards					no availability data, GMA and county boundaries differ*
13	ATASCOSA	Edwards	2,309	1,715	1,715	Availability based on permit locations	sum of two numbers, from two basins
13	FRIO	Edwards					no DB07 data
13	ZAVALA	Edwards					no DB07 data
13	BEXAR	Trinity					can't find any wells in GMA
13	MEDINA	Trinity					can't find any wells in GMA
13	ULVALDE	Trinity					can't find any wells in GMA
14	GRIMES	Carrizo-Wilcox	6,789	5,000	5,000	Carrizo GAM	sum of three numbers, from three basins
14	WALKER	Carrizo-Wilcox					no data available
14	NEWTON	Yegua-Jackson					no data available
14	JASPER	Yegua-Jackson					no data available
14	TYLER	Yegua-Jackson	180	180	180	Available Information	
14	TYLER	Yegua-Jackson	360	360	360	Available Information	
14	WALKER	Yegua-Jackson	6,400	6,400	6,400	Bulletin 5003 & Bluebonnet GCD	sum of two numbers, from two basins
14	WASHINGTON	Yegua-Jackson	?	?	?		no data available, but there seem to be Yegua-Jackson wells
14	GRIMES	Yegua-Jackson	?	?	?		no data available, but there seem to be Yegua-Jackson wells
14	WASHINGTON	Sparta					no data available
14	GRIMES	Sparta	2,044	2,044	2,044	TWDB estimate	
14	WALKER	Sparta	1,760	1,760	1,760	Previous report	
14	WALKER	Queen City					no data available
14	GRIMES	Queen City	462	462	462	TWDB Estimate	

Table 3. Continued							
15	LAVACA	Carrizo-Wilcox					no data available
15	FAYETTE	Carrizo-Wilcox					no availability data, GMA and county boundaries differ*
							don't see any Carrizo-Wilcox wells in GMA
15	DEWITT	Carrizo-Wilcox					no data available
15	LAVACA	Yegua-Jackson					no data available
15	FAYETTE	Yegua-Jackson	?	?	?		no data available, but there seem to be Yegua-Jackson wells
15	FAYETTE	Sparta					no data available, don't see any Sparta wells
15	FAYETTE	Queen City					no data available, don't see any Queen City wells
16	LIVE OAK	Carrizo-Wilcox	2,399	2,399	2,399	TWDB Estimate	
16	MCMULLEN	Carrizo-Wilcox					no availability data, GMA and county boundaries differ*
							don't see any Carrizo-Wilcox wells in GMA
16	KARNES	Carrizo-Wilcox					no availability data, GMA and county boundaries differ*
							but there are Carrizo-Wilcox wells in GMA
16	KARNES	Yegua-Jackson					no availability data, GMA and county boundaries differ*
							but there are Yegua-Jackson wells in GMA
16	LIVE OAK	Yegua-Jackson	?	?	?		no data available, but there seem to be Yegua-Jackson wells
16	DUVALL	Yegua-Jackson	?	?	?		no data available, but there seem to be Yegua-Jackson wells
16	WEBB	Yegua-Jackson	0	5,000	5,000	TWDB well records	
16	JIM HOGG	Yegua-Jackson	0	100	100	TWDB well records	
16	STARR	Yegua-Jackson	0	2,000	2,000	TWDB well records	
*Aquifer groundwater availability data can only be determined for individual counties in the current TWDB database. If a GMA boundary doesn't follow the county boundaries availability numbers can't be determined for the GMA area.							

Groundwater Management Area 14

Carrizo-Wilcox Aquifer—There are slivers of Carrizo-Wilcox Aquifer in Grimes and Walker counties. There are no associated wells in the TWDB water well database, but there are some groundwater availability numbers based on the groundwater availability model for the Carrizo-Wilcox Aquifer (Figure 14, Table 3).

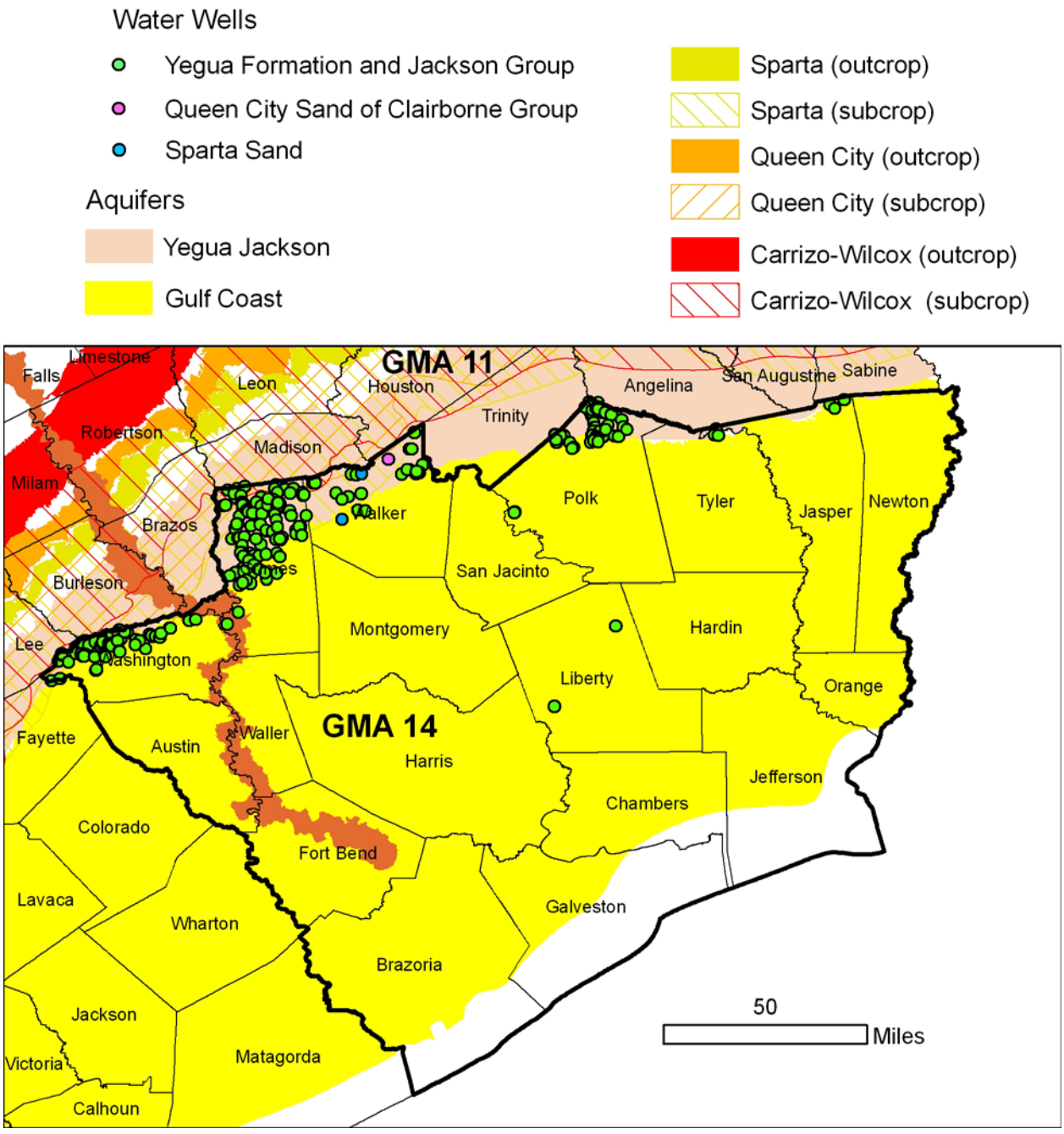
Recommendation**—**We recommend that the groundwater conservation districts in Groundwater Management Area 14 define desired future conditions for these areas by considering those of the Carrizo-Wilcox Aquifer in Groundwater Management Area 11..

Yequa-Jackson Aquifer—There are a number of wells in the northern part of Groundwater Management Area 14, and some information on groundwater availability in Table 3.

Recommendation**—**We recommend that the groundwater conservation districts in Groundwater Management Area 14 define desired future conditions for these areas by considering those of the Yequa-Jackson Aquifer in Groundwater Management Area 11..

Queen City and Sparta aquifers—Like the Carrizo-Wilcox Aquifer, there are not many Queen City or Sparta Aquifer wells in Groundwater Management Area 14 (Figure 14, Table 3).

Recommendation**—**Because of the lack of well data and little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 14 adopt the desired future conditions that are the same or similar to those of the Queen City and Sparta aquifers in Groundwater Management Area 11.



Figue 14. Wells in aquifers in Groundwater Management Area 14

Groundwater Management Area 15

Carrizo-Wilcox Aquifer—There are slivers of the Carrizo-Wilcox Aquifer in Lavaca, Fayette, and Dewitt counties (Figure 15). However, there are no wells in the TWDB water well database or groundwater availability and use data (Table 3).

Recommendation—Because of the lack of well data and little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 15 adopt the desired future conditions that are the same or similar to those of the Carrizo-Wilcox Aquifer in Groundwater Management Area 12 and Groundwater Management Area 13.

Sparta and Queen City Aquifers—There are slivers of the Sparta and Queen City aquifers in Groundwater Management Area 15 (Figure 15). However, there are no wells in the TWDB water well database or groundwater availability and use data (Table 3).

Recommendation—Because of the lack of well data and little to no use, we recommend that the groundwater conservation districts in Groundwater Management Area 15 adopt the desired future conditions that are the same or similar to those of the Sparta and Queen City aquifers in Groundwater Management Area 12 and Groundwater Management Area 13.

Yegua-Jackson Aquifer—There are wells of the Yegua-Jackson Aquifer in slivers in Groundwater Management Area 15 (Lavaca and Fayette counties). However, there are no current groundwater availability and use data.

Recommendation—Because of the lack of current groundwater availability and use data, we recommend that the groundwater conservation districts in Groundwater Management Area 15 adopt the desired future conditions that are the same or similar to those of the Yegua-Jackson Aquifer in Groundwater Management Area 12 and Groundwater Management Area 13.

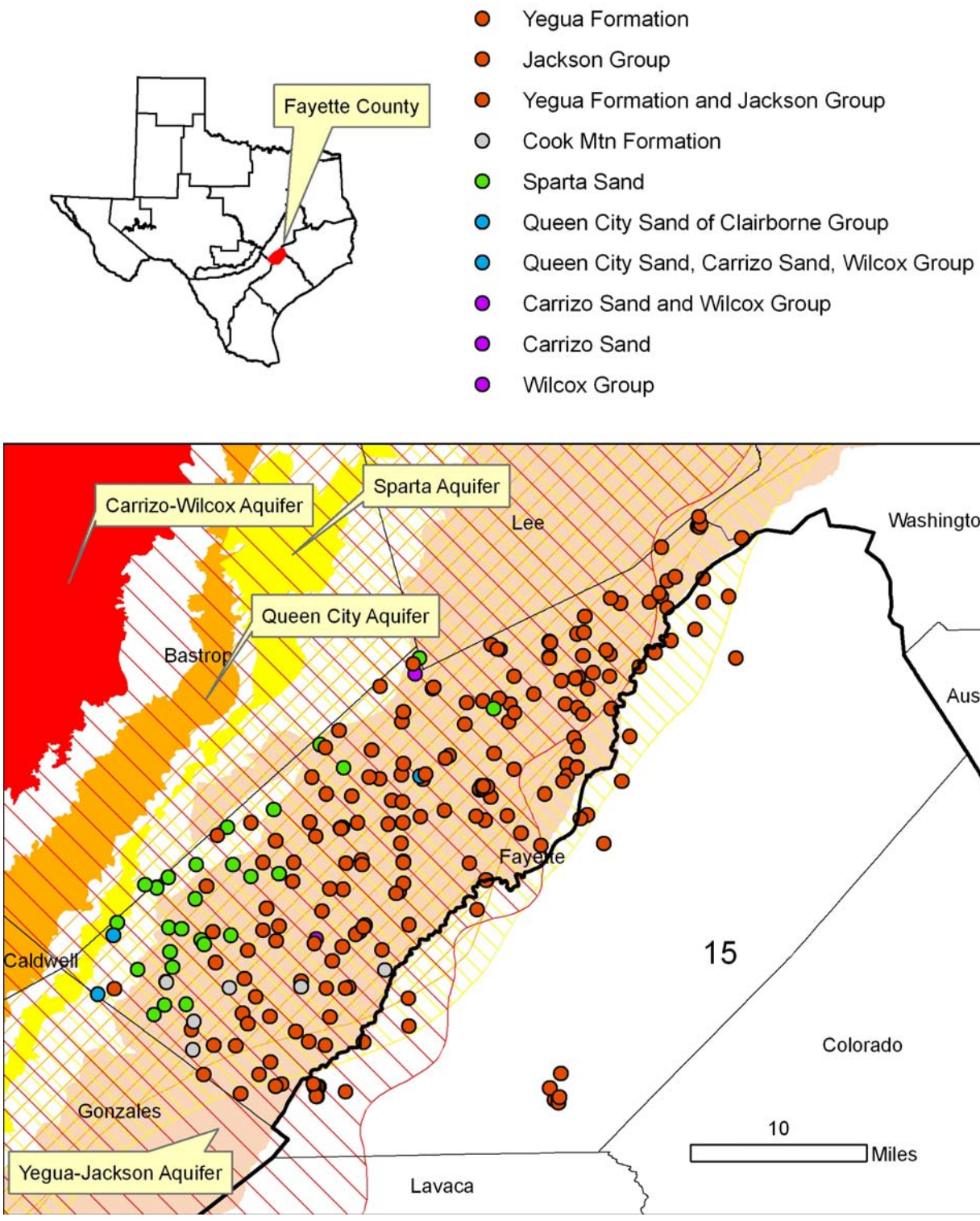


Figure 15. Part of Groundwater Management Area 15 showing aquifers and selected wells.

Groundwater Management Area 16

Carrizo-Wilcox Aquifer—There are small areas of the Carrizo-Wilcox Aquifer in Live Oak, McMullen, and Karnes counties (Figure 16). Based on information from the 2007 State Water Plan, groundwater availability is about 2,400 acre feet in Live Oak County (Table 3).

Recommendation—We recommend that the groundwater conservation districts in Groundwater Management Area 16 define desired future conditions for these areas by considering those of the Carrizo-Wilcox Aquifer in Groundwater Management Area 13.

Yegua-Jackson Aquifer—There are wells in the Yegua-Jackson Aquifer in the same general area where the aquifer is in the subsurface but not yet mapped. There are also a number of wells in the southwest part of the groundwater management area, where estimates of groundwater availability are from 2,000 to 5,000 acre feet.

Recommendation— We recommend that the groundwater conservation districts in Groundwater Management Area 16 define desired future conditions for these areas by considering those of the Yegua-Jackson Aquifer in Groundwater Management Area 13.

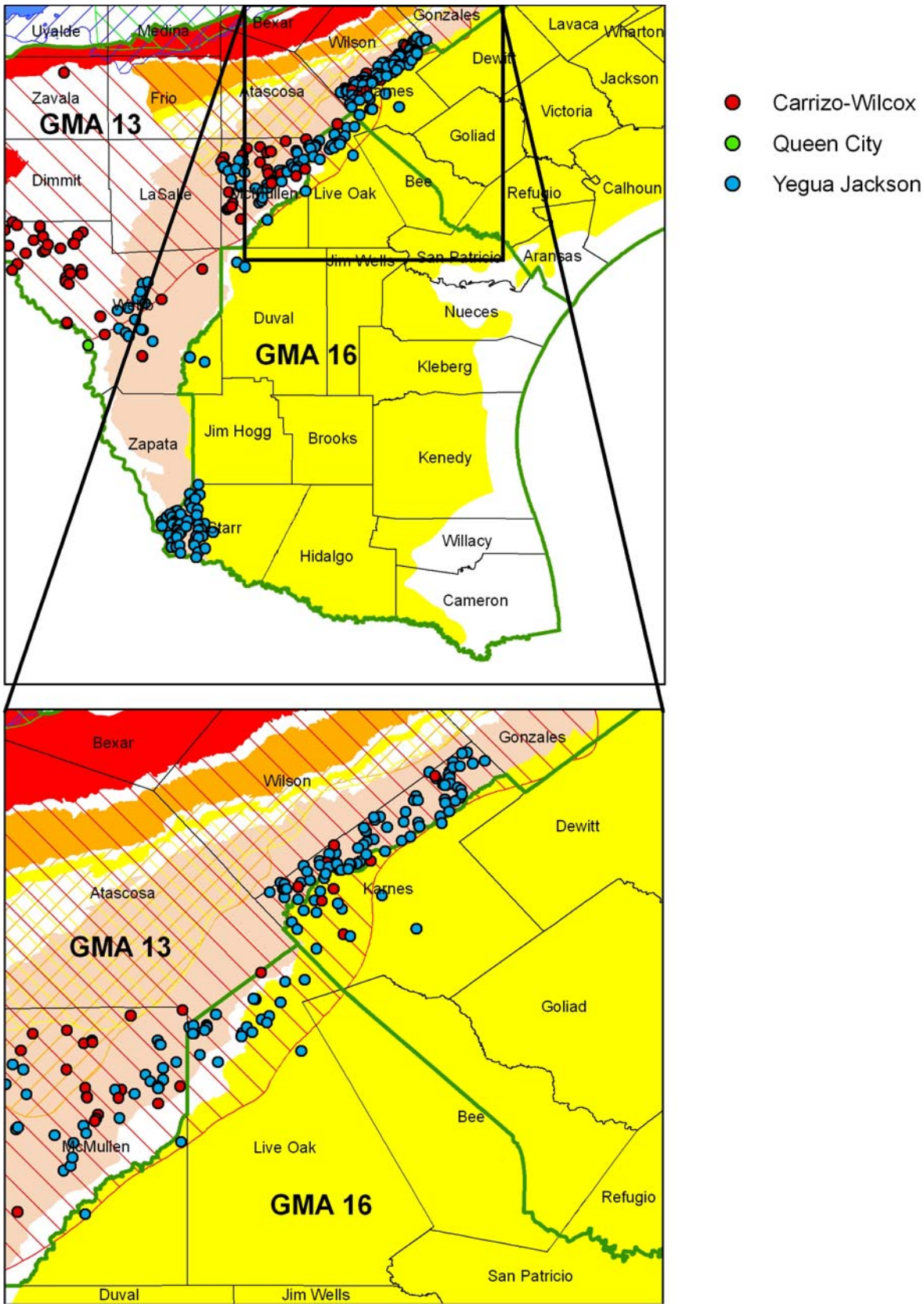


Figure 16. Water wells and aquifers in Groundwater Management Area 16.

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