

CIBOLO CREEK TRANSFER RULES
REGULATORY ASSESSMENT FOR PROPOSED
AMENDMENTS

Chapter 707 (Procedure before the Authority)
Subchapter F (Procedures for Contested Case Hearings)

Chapter 711 (Groundwater Withdrawals)
Subchapter L (Administration of Permits)



EDWARDS AQUIFER
A U T H O R I T Y

August 2009

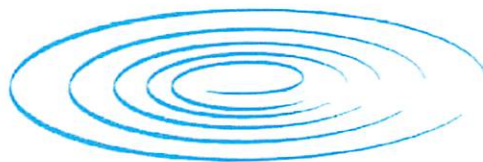
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Prepared for
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EDWARDS AQUIFER
A U T H O R I T Y

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August 2009

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1.0 INTRODUCTION

The Edwards Aquifer Authority (EAA) has promulgated rules that regulate the usage of groundwater within the Edwards Aquifer (Aquifer). These rules include the approach by which a water producer can acquire additional water rights by purchase or by lease from other water right holders. These water rights can be acquired in one geographic area of the Aquifer and transferred to another location for pumping. Chapter 711, Subchapter L of the Authority's Rules defines the transfer process and addresses the issue of water rights being transferred from withdrawal points located west of Cibolo Creek in Bexar, Medina, Uvalde, and Atascosa Counties to withdrawal points located east of Cibolo Creek in Comal, Hays, Guadalupe, and Caldwell Counties. Cibolo Creek represents the geographic feature between the east and west, and the existing rules that pertain to these transfers are referred to as the Cibolo Creek Transfer Rules or Cibolo Creek Rules. **Figure 1** shows the location of Cibolo Creek in relation to the Aquifer zones and the EAA jurisdictional boundaries.

The EAA is proposing amendments to the existing Cibolo Creek Rules that would modify the current administrative procedures for evaluating and processing groundwater rights transfer and, with limited exceptions, generally prohibit any future transfers of groundwater withdrawal rights from withdrawal points located west of Cibolo Creek to withdrawal points located east of Cibolo Creek. The proposed amendments would be contained in Chapters 707 and 711 of the EAA's rules dealing with procedures and groundwater withdrawals, respectively, as follows:

- Chapter 707 (Procedure Before the Authority), Subchapter F (Procedures for Contested Case Hearings)
- Chapter 711 (Groundwater Withdrawals), Subchapter L (Administration of Permits)

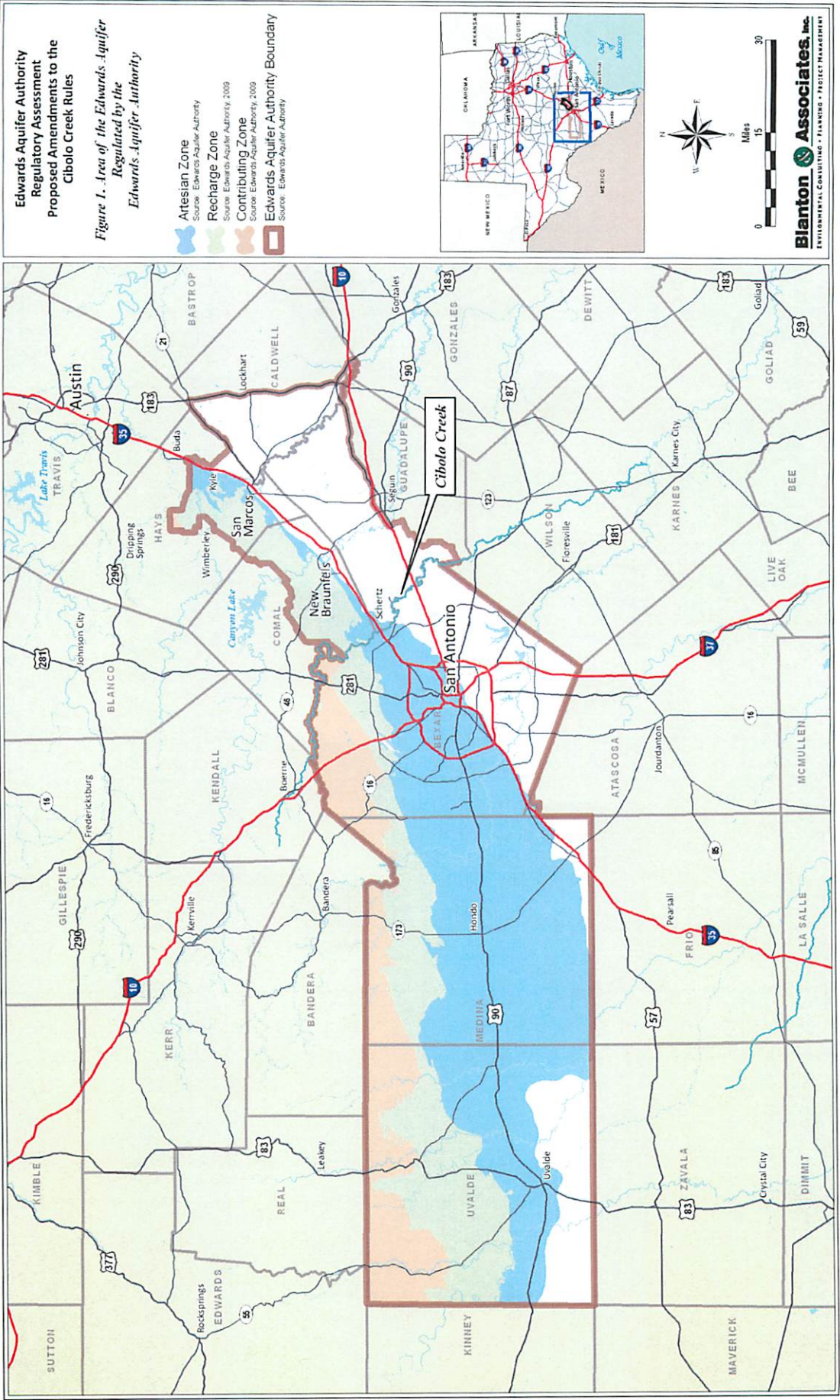
As noted above, the Cibolo Creek Transfer Rules are currently in place and the EAA is proposing that the existing rules be amended to address concerns associated with the locations of withdrawals (i.e., west to east of Cibolo Creek) and more effectively manage transfers that may impact the springflow at Comal and San Marcos Springs and the associated threatened and endangered species.

These proposed amendments are the focus of this Regulatory Assessment (RA) and the modified Cibolo Creek Transfer Rules will be referred to as the Proposed Rules (PRs) throughout this document. However, this RA is not intended to include an assessment of the entire Cibolo Creek Rules and will instead focus on the proposed amendments. The existing Cibolo Creek Rules will be considered the no-action alternative and will be considered to be the existing baseline conditions for comparison with the PRs.

The PRs can be found in **Appendix A** of this report.

1.1 Overview of EAA Authority and the Proposed Rules

The Edwards Aquifer Authority Act of 1993 vested the EAA and its Board of Directors with the power "to manage, conserve, preserve, and protect the Aquifer and to increase the recharge of, and prevent the waste or pollution of water in the Aquifer" (S.B. 1477, 73rd Legislature of the State of Texas, 1993).



EDWARDS AQUIFER AUTHORITY REGULATORY ASSESSMENT FOR PROPOSED AMENDMENTS TO THE EXISTING CIBOLO CREEK TRANSFER RULES

Pursuant to this mandate, the EAA's groundwater withdrawal rules are intended to manage groundwater quantity in the Aquifer.

1.1.1 Proposed Rules—General

PRs are rules that are under consideration and have been approved by the EAA Board for notice and public comment. PRs are not considered Final Rules and are not enforceable by the EAA. PRs are made available to the public for written or oral comments with the Authority. The EAA will formally respond in writing to all written comments received within the public comment period, but will not respond to oral comments.

Public hearings are conducted for the PRs in order to receive additional public comments. After the public comments have been reviewed and the EAA's responses have been prepared, the PRs are prepared as Final Rules and presented again to the EAA Board for adoption. The Final Rules may be the same as the PRs, or may contain revisions (<http://www.edwardsaquifer.org/> Accessed June 2009).

1.1.2 Proposed Amendments to the Cibolo Creek Rules

The proposed Cibolo Creek Rules amend the existing EAA rules – Ch. 707 (Procedure before the Authority) and Ch. 711 (Groundwater Withdrawals) – as they relate to regulating the transfer of Aquifer groundwater withdrawal rights from west to east across the Cibolo Creek. These proposed rules restrict the transfer of groundwater rights from withdrawal points located west of Cibolo Creek to withdrawal points located east of Cibolo Creek, except under certain scenarios for a specific period of time. These rules, as proposed, are based on the most recent scientific data available concerning the flow of groundwater and the impacts of increased pumping near the Comal and San Marcos springs.

These PRs are being considered as a result of the findings of the following studies and activities:

- 1) Evaluation of the Aquifer and Springflow Impacts Associated with the Cibolo Creek Transfer Rules (LBG-Guyton Associates, 2008)
- 2) “Simulated Impacts Associated with Cibolo Creek Transfers using MODFLOW-NR and Senate Bill 3 Assumptions” (LBG-Guyton Associates, 2008), referred to as the Cibolo Creek Study
- 3) “Memorandum: Model simulation and evaluation of transfer ratios of groundwater from west of Cibolo Creek to Comal and Hays counties and their impact on the minimum springflow at Comal and San Marcos Springs” (EAA, 2009a)

At the June 2008 EAA Board meeting, consultant LBG-Guyton Associates (groundwater and environmental services consultant) presented a report on the study titled “Simulated Impacts Associated with Cibolo Creek Transfers using MODFLOW-NR and Senate Bill 3 Assumptions” (LBG-Guyton Associates, 2008), referred to as the Cibolo Creek Study. This study used the EAA's groundwater model to assess the impact of transfers of groundwater rights from west of Cibolo Creek to east of the creek on Aquifer levels and springflow.

In short, the study noted that, due to the geologic structure and the position of the Aquifer freshwater/saline water interface, Cibolo Creek represents the area where the north-south extent of the fresh water portion of the Aquifer significantly narrows. Downgradient (downstream in the Aquifer) of this area, Aquifer flowpaths are limited in areal extent resulting in withdrawals from wells intercepting groundwater that would have exited from either Comal or San Marcos Springs. Considering these facts, Cibolo Creek was considered to be a reasonable and distinguishable surface feature for regulating groundwater withdrawal transfers.

Based on the conclusions of the Cibolo Creek Study, an immediate permanent prohibition on Cibolo Creek transfers was considered before development of the PRs. However, an immediate prohibition was not considered feasible at the time of the development of the PRs because:

- 1) Some well water users east of Cibolo Creek require access to groundwater rights west of Cibolo Creek to resolve compliance problems.
- 2) Additional time was necessary for the water market to adjust.

In light of the concerns, the proposed amendments to the Cibolo Creek Rules identified in **Appendix A** and addressed in this RA were developed.

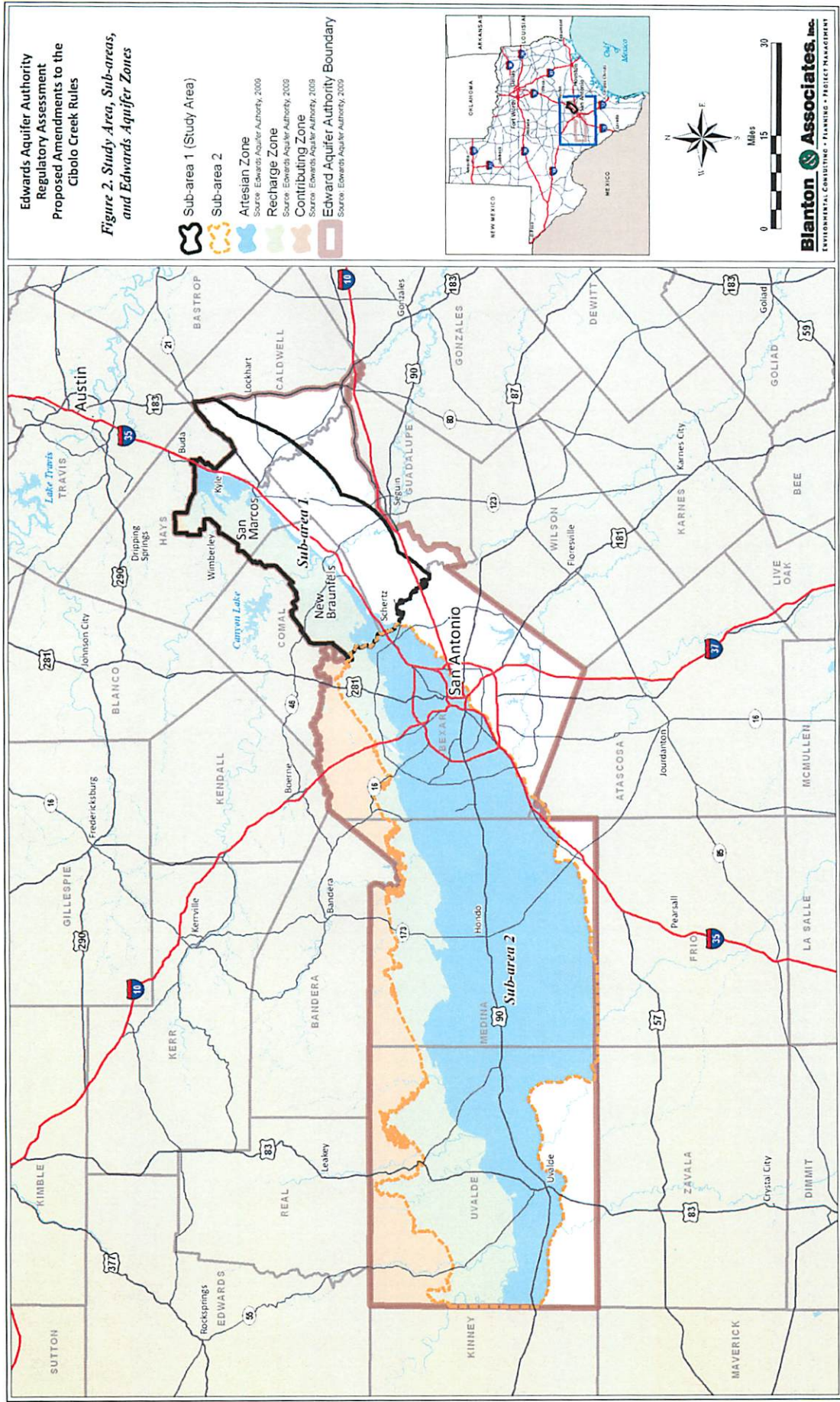
1.2 Study Area

As noted above, the area covered under the existing Cibolo Creek Rules and the PRs includes the portions of the Aquifer Recharge and Artesian Zones that are located within the EAA's jurisdictional boundary and within areas which withdrawal points may be located. The study area includes two distinct sub-areas.

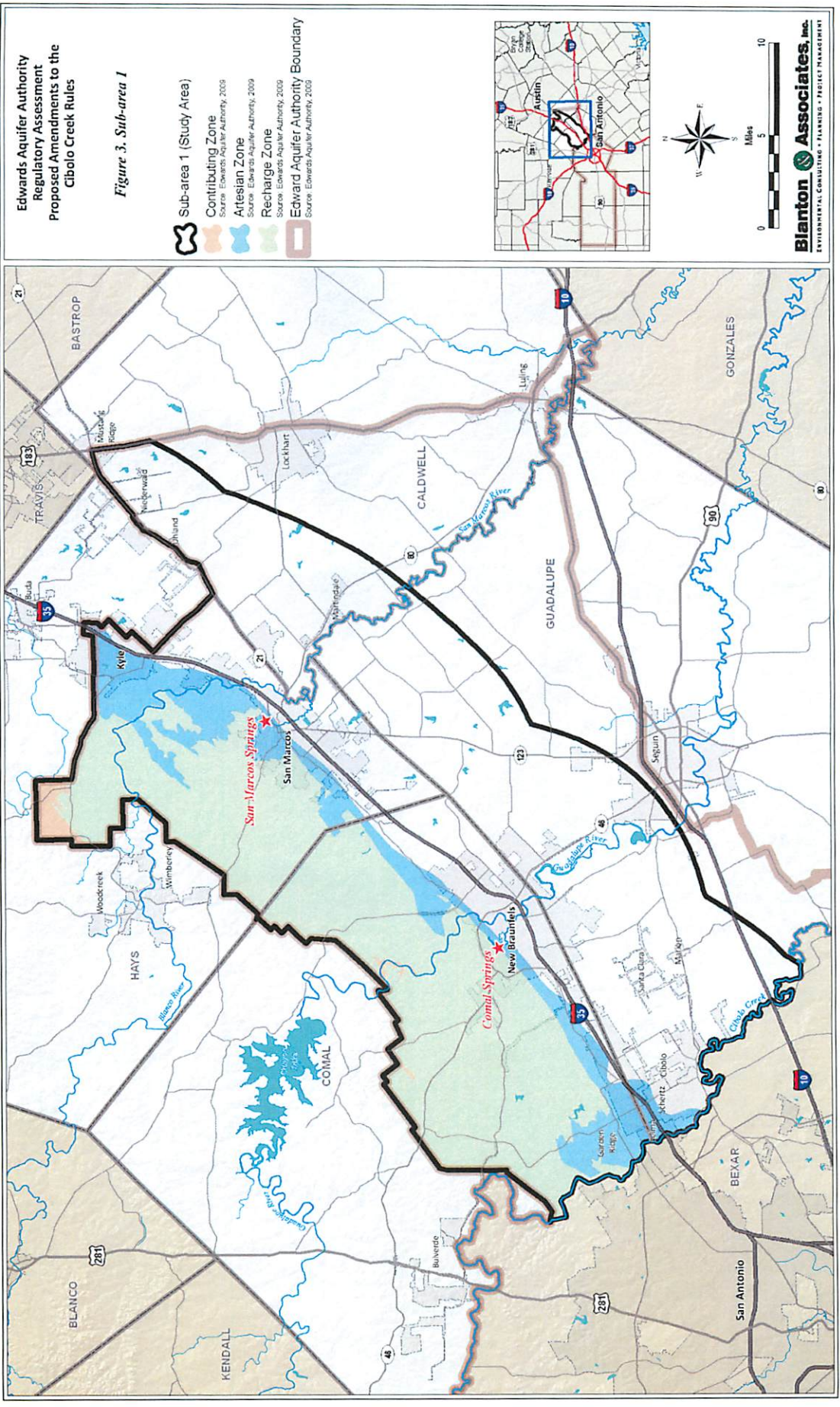
Sub-area 1—Sub-area 1 is the area located east of Cibolo Creek (within the EAA's jurisdictional boundaries) to which groundwater transfers have occurred under the existing Cibolo Creek Rules, including portions of Comal, Hays, Guadalupe, and Caldwell Counties.

Sub-area 2—Sub-area 2 is the area located west of Cibolo Creek (within the EAA's jurisdictional boundaries) from which groundwater transfers have occurred under the existing Cibolo Creek Rules, including portions of Bexar, Medina, Uvalde, and Atascosa Counties.

Sub-area 1 is the focus of this RA as it is the area that is expected to be directly impacted by the PRs. The Recharge and Artesian Zones represent the area where points of withdrawal could be expected to occur based on the hydrogeology of the Aquifer. The Recharge and Artesian Zones within Sub-area 1 cover approximately 244.8 and 75.4 square miles, respectively, in Comal, Hays, Guadalupe, and Caldwell Counties. The majority of the Artesian Zone in Sub-area 1 study area is located in Comal County (41.5 percent) and Hays County (51.4 percent); 7 percent is located in Guadalupe County, and less than 1 percent is located in Caldwell County. Sub-area 1 includes the entire Recharge and Artesian Zones within the EAA's jurisdictional boundaries in Comal and Hays Counties plus a 10-mile area southeast of the Artesian Zone that includes portions of Guadalupe and Caldwell Counties. **Figure 2** identifies Sub-areas 1 and 2 and the Recharge, and Artesian Zones within Sub-area 1. **Figure 3** identifies the boundaries and notable features located within Sub-area 1.



EDWARDS AQUIFER AUTHORITY REGULATORY ASSESSMENT FOR PROPOSED AMENDMENTS TO THE EXISTING CIBOLO CREEK TRANSFER RULES



A common understanding of the definition and boundaries of these zones of the Aquifer is valuable in the review of this document. The EAA defines the Contributing and Recharge Zones in Subchapter A, Definitions §713.1 as follows:

Contributing Zone—the area or watershed where runoff from precipitation flows down gradient to the Recharge Zone. The Artesian Zone is identified as that area delineated as such on the official maps located at the EAA.

Recharge Zone—that area where the stratigraphic units constituting the Aquifer crop out, including the outcrops of other geologic formations in proximity to the Aquifer, where caves, sinkholes, faults, fractures, or other permeable features would create a potential for recharge of surface waters into the Aquifer.

Note that in the Recharge Zone the Aquifer formation is unconfined (i.e., not confined by an impermeable upper layer such as the Del Rio clay) and is therefore exposed at the surface. Withdrawal points in the Recharge Zone are not artesian (i.e., they are unconfined) and tend to fluctuate in response to rainfall more than withdrawal points in the Artesian Zone (i.e., confined zone). Withdrawal points in the Aquifer formation are located within the Recharge Zone and the Artesian Zone, which is described below.

Artesian Zone—that area where the Edwards Limestone is down-faulted into the subsurface and its groundwater is confined between upper and lower less permeable formations (George Veni and Associates, August 2004). In the confined area, the Edwards Limestone lies between an upper and lower impermeable layer. Water will rise above the top of the Aquifer formation because of the pressure caused by water in the Artesian Zone. In the Artesian Zone, there is no water table, and the limestone is saturated.

It is important to note that portions of the Contributing, Recharge, and Artesian Zones extend beyond the EAA’s jurisdictional and ETJ boundaries, and these areas are not covered by the PRs nor addressed in the RA.

1.3 Aquifer Use East of Cibolo Creek

1.3.1 General

Table 1-1 identifies the estimated number of wells by zone and type of use within Sub-area 1. Note that approximately 69 percent of the wells are located in the unconfined Recharge Zone of the Aquifer with approximately 30 percent located in the confined Artesian Zone.

Table 1-1 Estimated Number of Wells (Permitted, Unpermitted, Exempt, Abandoned) by Zone and Type of Use within Sub-area 1*

Zone	Well Use	Count	Percent of total
Artesian	Municipal (CCN)	45	30.2%
	Municipal	5	
	Industrial	52	
	Irrigation	21	
	Domestic/Livestock	334	
	Exempt	84	

Table 1-1 Estimated Number of Wells (Permitted, Unpermitted, Exempt, Abandoned) by Zone and Type of Use within Sub-area 1*

Zone	Well Use	Count	Percent of total
	Compliance Issue	22	
	<i>Total</i>	<i>542</i>	
Recharge	Municipal (CCN)	16	69.1%
	Municipal	10	
	Industrial	53	
	Irrigation	10	
	Domestic/Livestock	1,030	
	Exempt	96	
	Compliance Issue	27	
	<i>Total</i>	<i>1,242</i>	
Contributing	Municipal (CCN)	0	0.7%
	Municipal	0	
	Industrial	0	
	Irrigation	0	
	Domestic/Livestock	12	
	Exempt	0	
	Compliance Issue	1	
	<i>Total</i>	<i>12</i>	
<i>Total All Zones</i>		<i>1,796</i>	<i>100%</i>

Source: EAA, 2009a

*Note the estimated number of wells does not equal the estimated number of permits as a single well may have multiple permits and vice versa.

Tables 1-2 and 1-3 summarize the total EAA-authorized permitted withdrawals from withdrawal points located east of Cibolo Creek in Comal, Hays, Guadalupe, and Caldwell Counties by type of use and county. As noted on Table 1-2, a total of 188 permits have been issued by the EAA for a total of 37,077.90 acre-feet per year for withdrawal points located east of Cibolo Creek. The majority of the authorized use is for municipal use (55.90%) by retail water suppliers that hold Certificates of Convenience and Necessity (CCN) followed by industrial use (39.97%) and irrigation (3.90%). The total authorized use east of Cibolo Creek represents 6.48% of the total volume of 572,000 acre-feet per year authorized by the EAA. The vast majority of the 37,077.90 acre-feet per year authorized east of Cibolo Creek is located in Comal (65.65%) and Hays (32.64%) Counties, with 1.71% in Guadalupe County and none in Caldwell County.

Table 1-2 Existing EAA Permits East of Cibolo Creek by Use and Authorized Volume

Use	Total Number of Permits	Authorized Use per Year (Acre-feet)	Percent of Total Use East of Cibolo Creek	Percent of EAA's Total Authorized Use (572,000 Acre-feet)
Municipal (CCN)	55	20,727.91	55.90%	3.62%
Municipal (Non-CCN)	19	86.00	0.23%	0.02%
Industrial	88	14,818.85	39.97%	2.59%
Irrigation	26	1,445.14	3.90%	0.25%
<i>Total All Uses</i>	<i>188</i>	<i>37,077.90</i>	<i>100.00%</i>	<i>6.48%</i>

Source: EAA, 2009a

Table 1-3 Existing EAA Permits East of Cibolo Creek by County, Type, and Authorized Volume

County	Type of Transfer	Total Number of Permits	Authorized Use per Year (Acre-feet)	Percent of Total Use East of Cibolo Creek	Percent of EAA's Total Authorized Use (572,000 Acre-feet)
Comal	Owens	95	22,752.21	61.36%	3.98%
	Pending Sale	1	1.00	0.00%	0.00%
	Lease	20	1,587.50	4.28%	0.28%
	<i>Total</i>	<i>116</i>	<i>24,340.71</i>	<i>65.65%</i>	<i>4.25%</i>
Hays	Owned	48	10,666.95	28.77%	1.86%
	Pending Sale	3	1,079.81	2.91%	0.19%
	Lease	10	356.19	0.96%	0.06%
	<i>Total</i>	<i>61</i>	<i>12,102.94</i>	<i>32.64%</i>	<i>2.12%</i>
Guadalupe	Owned	9	538.25	1.71%	0.11%
	Pending Sale	0	0.00	0.00%	0.00%
	Lease	2	96.00	0.00%	0.00%
	<i>Total</i>	<i>11</i>	<i>634.25</i>	<i>1.71%</i>	<i>0.11%</i>
Caldwell	Owned	0	0.00	0.00%	0.00%
	Pending Sale	0	0.00	0.00%	0.00%
	Lease	0	0.00	0.00%	0.00%
	<i>Total</i>	<i>0</i>	<i>0.00</i>	<i>0.00%</i>	<i>0.00%</i>
Total		188	37,077.90	100.00%	6.48%

Source: EAA, 2009a

1.3.2 Transfers

Tables 1-4 and 1-5 provide summaries of total Aquifer use east of Cibolo Creek relative to total transfers (Table 1-4) and type of transfer (Table 1-5). As noted in Table 1-4, transfers account for approximately 10.72% (3,937.96 acre-feet) of the total Aquifer use east of Cibolo Creek. As identified in Table 1-5, approximately 40.19% (1,597.15 acre-feet) of the 3,973.96 acre-feet of existing transfers is the result of permanent sales, with 32.61% (1,296.00 acre-feet) and 27.20% (1,080.81 acre-feet) resulting from leases and pending sales, respectively. Overall, the total Cibolo Creek transfers of 3,973.96 acre-feet represent 0.69% of the EAA's total authorized use of 572,000 acre-feet.

Table 1-4 Summary of Aquifer Use East of Cibolo Creek

	Total	Non-transfers	Transfers
Number of Permits	188	140	48
Quantity (Acre-feet)	37,077.90	33,103.94	3,973.96
Percent of Total* Aquifer Use East of Cibolo Creek	100%	89.28%	10.72%

*Excluding exempt wells

Table 1-5 Summary of Transfers by Type of Transfer

	Permanent Sales	Leases	Pending Sales	Total
Number of Permits	35	9	4	48
Quantity (Acre-feet)	1,597.15	1,296.00	1,080.81	3,973.96
Percent of Total Transfer Volume	40.19%	32.61%	27.20%	100.00%

Tables 1-6, 1-7, 1-8, and 1-9 provide a summary of the total EAA-authorized transfers from withdrawal points located west of Cibolo Creek to withdrawal points located east of Cibolo Creek. Table 1-6 identifies the permanent transfers that are currently owned by entities/individuals east of Cibolo Creek.

These transfers are the results of the sale of water rights that occurred before July 11, 2006, and are considered permanent and will not be affected by the PRs or discussed throughout this RA.

Table 1-6 Transfers—Permanent Sales within Sub-area 1

County Transferred to	Use	Total Number of Permanent Transfers	Transfer Amount (Acre-feet)	Percent of Total Amount of Transfers	Percent of Use East of Cibolo Creek (37,077.90 Acre-feet)	Percent of EAA's Total Authorized Use (572,000 Acre-feet)
Comal	Municipal (CCN)	12	454.92	28.48%	1.23%	0.08%
	Municipal (Non-CCN)	4	13.00	0.85%	0.04%	0.00%
	Industrial	8	955.00	59.79%	2.58%	0.17%
	Irrigation	0	0.00	0.00%	0.00%	0.00%
	Total	24	1,422.92	89.09%	3.845	0.25%
Hays	Municipal (CCN)	1	17.00	1.06%	0.0%	0.005
	Municipal (Non-CCN)	3	81.00	5.07%	0.22%	0.01%
	Industrial	0	0.00	0.00%	0.00%	0.00%
	Irrigation	3	15.00	0.94%	0.04%	0.00%
	Total	7	113.00	7.08%	0.30%	0.02%
Guadalupe	Municipal (CCN)	0	0.00	0.00%	0.00%	0.00%
	Municipal (Non-CCN)	0	0.00	0.00%	0.00%	0.00%
	Industrial	4	61.23	3.83%	0.17%	0.01%
	Irrigation	0	0.00	0.00%	0.00%	0.00%
	Total	4	61.23	3.83%	0.17%	0.01%
Caldwell	Municipal (CCN)	0	0.00	0.00%	0.00%	0.00%
	Municipal (Non-CCN)	0	0.00	0.00%	0.00%	0.00%
	Industrial	0	0.00	0.00%	0.00%	0.00%
	Irrigation	0	0.00	0.00%	0.00%	0.00%
	Total	0	0.00	0.00%	0.00%	0.00%
Total Municipal (CCN)		13	471.92	29.55%	1.27%	0.08%
Total Municipal (Non-CCN)		7	94.00	5.89%	0.25%	0.02%
Total Industrial		12	1,016.23	63.63%	2.74%	0.18%
Total Irrigation		3	15.00	0.94%	0.04%	0.00%
Total All Transfers		35	1,597.15	100.00%	4.31%	0.28%

Source: EAA, 2009a

Table 1-7 Transfers—Pending Sales and Leases within Sub-area 1

County Leased into	Use	Total Number of Leases	Total Number of Pending Sales	Authorized Use per Year (Acre-feet)	Percent of Total Amount of Transfers	Percent of Total Use East of Cibolo Creek (37,077.90 Acre-feet)	Percent of EAA's Total Authorized Use (572,000 Acre-feet)
Comal	Municipal (CCN)	7	0	1,200.00	50.49%	3.24%	0.21%
	Municipal (Non-CCN)	0	0	0.00	0.00%	0.00%	0.00%
	Industrial	0	1	1.00	0.04%	0.00%	0.00%
	Irrigation	0	0	0.00	0.00%	0.00%	0.00%
	Total	7	1	1,201.00	50.53%	3.24%	0.21%

Table 1-7 Transfers—Pending Sales and Leases within Sub-area 1

County Leased into	Use	Total Number of Leases	Total Number of Pending Sales	Authorized Use per Year (Acre-foot)	Percent of Total Amount of Transfers	Percent of Total Use East of Cibolo Creek (37,077.90 Acre-feet)	Percent of EAA's Total Authorized Use (572,000 Acre-feet)
Hays	Municipal (CCN)	0	3	1,079.81	45.43%	2.91%	0.19%
	Municipal (Non-CCN)	0	0	0.00	0.00%	0.00%	0.00%
	Industrial	0	0	0.00	0.00%	0.00%	0.00%
	Irrigation	0	0	0.00	0.00%	0.00%	0.00%
	<i>Total</i>	<i>0</i>	<i>3</i>	<i>1,079.81</i>	<i>45.43%</i>	<i>2.91%</i>	<i>0.19%</i>
Guadalupe	Municipal (CCN)	2	0	96.00	4.04%	0.00%	0.01%
	Municipal (Non-CCN)	0	0	0.00	0.00%	0.00%	0.00%
	Industrial	0	0	0.00	0.00%	0.00%	0.00%
	Irrigation	0	0	0.00	0.00%	0.00%	0.02%
	<i>Total</i>	<i>2</i>	<i>0</i>	<i>96.00</i>	<i>4.04%</i>	<i>0.26%</i>	<i>0.02%</i>
Caldwell	Municipal (CCN)	0	0	0.00	0.00%	0.00%	0.00%
	Municipal (Non-CCN)	0	0	0.00	0.00%	0.00%	0.00%
	Industrial	0	0	0.00	0.00%	0.00%	0.00%
	Irrigation	0	0	0.00	0.00%	0.00%	0.00%
	<i>Total</i>	<i>0</i>	<i>0</i>	<i>0.00</i>	<i>0.00%</i>	<i>0.00%</i>	<i>0.00%</i>
<i>Total Municipal (CCN)</i>		<i>9</i>	<i>3</i>	<i>2,375.81</i>	<i>99.96%</i>	<i>6.41%</i>	<i>0.42%</i>
<i>Total Municipal (Non-CCN)</i>		<i>0</i>	<i>0</i>	<i>0.00</i>	<i>0.00%</i>	<i>0.00%</i>	<i>0.00%</i>
<i>Total Industrial</i>		<i>0</i>	<i>1</i>	<i>1.00</i>	<i>0.04%</i>	<i>0.00%</i>	<i>0.00%</i>
<i>Total Irrigation</i>		<i>0</i>	<i>0</i>	<i>0.00</i>	<i>0.00%</i>	<i>0.00%</i>	<i>0.00%</i>
<i>Total All Transfers</i>		<i>9</i>	<i>4</i>	<i>2,376.81</i>	<i>100.00%</i>	<i>6.41%</i>	<i>0.41%</i>

Source: EAA, 2009a

Table 1-8 Pending Sales/Lease Transfers by Origin, Destination, Number, and Volume

County From	County To	Total Number of Leases	Total Number of Pending Sales	Authorized Amount of Transfers (Acre-foot per Year)	Percent of Total Transfers by County
Bexar	Comal	2	0	222.84	9.4%
	Hays	0	0	0.00	
	Guadalupe	0	0	0.00	
	Caldwell	0	0	0.00	
	<i>Total</i>	<i>2</i>	<i>0</i>	<i>222.84</i>	
Medina	Comal	4	0	671.56	35.2%
	Hays	0	1	115.21	
	Guadalupe	1	0	50.00	
	Caldwell	0	0	0.00	
	<i>Total</i>	<i>5</i>	<i>1</i>	<i>836.77</i>	
Uvalde	Comal	1	1	306.60	55.4%
	Hays	0	2	964.60	
	Guadalupe	1	0	46.00	
	Caldwell	0	0	0.00	
	<i>Total</i>	<i>2</i>	<i>3</i>	<i>1,317.20</i>	
<i>Total All Counties</i>		<i>9</i>	<i>4</i>	<i>2,376.81</i>	<i>100.0%</i>

Source: EAA, 2009a

Table 1-9 Summary of Pending Sales and Lease Transfers by County

	Total Number of Leases	Total Number of Pending Sales	Authorized Amount of Transfer (acre-feet per year)	Percent of Total
County From				
Bexar	2	0	222.84	9.4%
Medina	5	1	836.77	35.2%
Uvalde	2	3	1,317.20	55.4%
Total	9	4	2,376.81	100.0%
County To				
Comal	7	1	1,201.00	50.5%
Hays	0	3	1,079.81	45.4%
Guadalupe	2	0	96.00	4.0%
Caldwell	0	0	0.00	0.0%
Total	9	4	2,376.81	100.0%

Source: EAA, 2009a

As noted on Table 1-7, 13 transfers for a total of 2,376.81 acre-feet per year are currently authorized by the EAA and may be subject to the PRs. The transfers represent approximately 6.41% of the total authorized withdrawal (37,077.90 acre-feet per year) from withdrawal points located east of Cibolo Creek and 0.41% of the EAA's total authorized use of 572,000 acre-feet per year.

As indicated in Tables 1-8 and 1-9, the majority of the transfers originate in Uvalde (55.7%) and Medina (34.5%) Counties and are transferred to Comal (52.7%) and Hays (47.3%) Counties. Currently, there are no authorized Cibolo Creek transfers to Guadalupe or Caldwell Counties. Of the 13 transfers, nine are lease transfers for a total volume of 1,296 acre-feet per year and four are conditionally approved sales for a total volume of 1,080.806 acre-feet per year.

Table 1-10 provides a summary of Cibolo Creek transfer leases and the scheduled expiration date. Table 1-11 provides a similar summary of conditionally approved sales that are scheduled to revert to the west of Cibolo Creek if not approved on a permanent basis prior to the scheduled expiration date.

Table 1-10 Summary of Cibolo Creek Transfer Leases by County and by Expiration Date

County From	County To	Expiration Year	Total Number of Permits/Leases	Total Amount Leased (Acre-feet)
Medina	Comal	2013	3	500.000
		2017	1	171.560
		Total	4	671.560
Uvalde	Comal	2012	1	305.600
		Total	1	305.600
Bexar	Comal	2012	1	22.840
		2013	1	200.000
		Total	2	222.840
Medina	Hays	2010	0	0.000
		Total	0	0.000
Uvalde	Hays	2010	0	0.000
		Total	0	0.000
Medina	Guadalupe	2010	1	50.000
		Total	1	50.000
Uvalde	Guadalupe	2009	1	46.000
		Total	1	46.000
		2009	1	46.000
Total All Counties		2010	1	50.000

Table 1-10 Summary of Cibolo Creek Transfer Leases by County and by Expiration Date

County From	County To	Expiration Year	Total Number of Permits/Leases	Total Amount Leased (Acre-feet)
		2012	2	328.440
		2013	4	700.000
		2017	1	171.560
		Total	9	1,296.000

Source: EAA, 2009a

Table 1-11 Summary of Cibolo Creek Conditionally Approved (Pending) Sales by County and by Expiration Date

County From	County To	Expiration Year	Total Number of Pending Sales	Total Amount Pending Sales (Acre-feet)
Medina	Comal	Total	0	0.000
Uvalde	Comal	2010	1	1.000
		Total	1	1.000
Bexar	Comal	Total	0	0.000
Medina	Hays	2010	1	115.206
		Total	1	115.206
Uvalde	Hays	2010	2	964.600
		Total	2	964.600
Total All Counties		2010	4	979.806
		Total	4	1080.806

Source: EAA, 2009a

1.4 Purpose of the Regulatory Assessment

This RA provides an assessment of the PRs' effects on the regulated community, the Aquifer and Aquifer-related elements, and the EAA's regulatory programs. The EAA and its Board of Directors have determined that the assessment of potential impacts of these PRs would benefit the EAA, the regulated community, and the public. Accordingly, upon the General Manager's recommendation, the Board of Directors has directed the EAA's General Counsel to prepare a rules assessment to assist the Board and the public in evaluating and giving final approval to the PRs listed above.

For each of the PRs, the RA followed protocol approved by the General Manager and includes the following elements:

Impacts on the regulated community—What is the nature and extent of effects that would be directly experienced by persons or groups whose property or activities are addressed by the PRs?

Impacts on the Aquifer and Aquifer-related elements of the natural environment—To what extent are the PRs' effects on the regulated community balanced by the aggregate impacts of the rules' implementation on the quantity or quality of water in the Aquifer, springs, and other Aquifer-dependent natural resources?

Impacts on the EAA—How would implementation of the PRs affect the EAA with respect to staffing requirements, costs, recordkeeping and reporting, enforcement responsibilities, and other administrative and risk management issues?

Longer term or indirect social and economic effects—What secondary or cumulative effects may accrue to the regional economy, population, or institutions from implementation of the rules?

Further discussion on the organization and scope of this RA is provided in Sections 1.5 and 3.0, respectively.

1.5 Regulatory Assessment Organization

The organization of this RA is intended to provide the reader with the background information, data, and context to understand and evaluate the potential impacts of either implementing or not implementing the PRs. Sections 2.0 through 5.0 provide the necessary background information for such an evaluation, which includes:

Section 2.0 Overview of Proposed Rules and Comparison of Proposed Rules to Current Cibolo Creek Rules

Section 3.0 Scope of the Regulatory Assessment

Section 4.0 Baseline Data

Sections 5.0 and 6.0 focus on the analysis of the potential impacts of either implementing or not implementing (no-action alternative) the PRs. The no-action alternative is included in this analysis to provide the appropriate context for evaluating and comparing the impacts of either implementing or not implementing the PRs.

2.0 OVERVIEW OF EXISTING AND PROPOSED RULES

This section provides a summary of the current Cibolo Creek Rules followed by an overview of the proposed amendments to the existing Cibolo Creek Rules. A redlined version of the existing Cibolo Creek Rules with the proposed amendments (the PRs) is included in **Appendix A** of this RA.

2.1 Summary of Current Cibolo Creek Rules

The EAA has promulgated rules that regulate the usage of groundwater within the Aquifer. These include the approach by which a well owner can acquire water rights by transfer (i.e., purchase or by lease) from other water-right holders. These water rights can be acquired in one geographic area of the Aquifer and transferred to another location for pumping. Chapter 711, Subchapter L, of the Cibolo Creek Rules defines the transfer process and addresses the issue of whether water rights can be transferred from Bexar County and west to Comal and Hays Counties to the east. Cibolo Creek is the geographic feature between the two areas, and the process of transferring water rights from west to east is often referred to as a “Cibolo Creek Transfer.”

Currently, a request for a Cibolo Creek Transfer may be reduced or denied by the EAA if it is determined that a potential increase in production east of Cibolo Creek, with a subsequent equal reduction west of Cibolo Creek, either 1) does not protect aquatic and wildlife habitat, 2) does not protect threatened and endangered species in the springs, or 3) does not ensure continuous minimum spring flow at both springs to protect endangered and threatened species as required by federal law (PRs pp. 182-183) (LBG-Guyton Associates, 2008).

2.2 Proposed Rules—Chapter 707 (Procedure before the Authority): Subchapter F (Procedures for Contested Case Hearings)

The proposed amendments contained in Chapter 707, Subchapter F, of the PRs would eliminate the provision (707.601 (5)) that identifies the opportunity to request a contested case hearing in connection with the following type of application: “amendment applications to change the location of the point of withdrawal from a point west of Cibolo Creek to a point east of Cibolo Creek.” Under the PRs, applications for Cibolo Creek transfers will no longer be subject to contested case hearings.

2.3 Chapter 711 (Groundwater Withdrawals): Subchapter L (Administration of Permits)

This section includes a description of the PRs and a discussion of the purpose and applicability of the PRs followed by a more detailed overview of the specific amendment/modifications to the existing Cibolo Creek Rules.

2.3.1 Description of the Proposed Rules

The proposed Cibolo Creek Rules amend EAA rules – Ch. 711 (Groundwater Withdrawals) – as they relate to regulating the transfer of Aquifer groundwater withdrawal rights from west to east across the Cibolo Creek. These PRs restrict the transfer of groundwater rights from withdrawal points located west of Cibolo Creek to withdrawal points located east of Cibolo Creek, except under certain scenarios for a

specific period of time. These rules, as proposed, are based on the most recent scientific data available concerning the flow of groundwater and the impacts of increased pumping near the Comal and San Marcos Springs.

2.3.2 Purpose

These PRs are being considered as a result of the findings of the following studies:

- 1) Evaluation of the Aquifer and Springflow Impacts Associated with the Cibolo Creek Transfer Rules (LBG-Guyton Associates, 2008)
- 2) Simulated Impacts Associated with Cibolo Creek Transfers using MODFLOW-NR and Senate Bill 3 Assumptions” (LBG-Guyton Associates, 2008), referred to as the Cibolo Creek Study
- 3) Memorandum: Model simulation and evaluation of transfer ratios of groundwater from west of Cibolo Creek to Comal and Hays counties and their impact on the minimum springflow at Comal and San Marcos Springs” (EAA, 2009a)

In short, Study 2 above (referred to as the “Cibolo Creek Study) noted that, due to the geologic structure and the position of the Aquifer freshwater/saline water interface, Cibolo Creek represents the area where the north-south extent of the fresh water portion of the Aquifer significantly narrows. Downgradient (downstream in the Aquifer) of this area, Aquifer flowpaths are limited in areal extent resulting in withdrawals from wells intercepting groundwater that would have exited from either Comal or San Marcos Springs. Considering these facts, Cibolo Creek was considered to be a reasonable and distinguishable surface feature for regulating groundwater withdrawal transfers.

Based on the conclusions of the Cibolo Creek Study, an immediate permanent prohibition on Cibolo Creek transfers was considered before development of the PRs. However, an immediate prohibition was not considered feasible at the time of the development of the PRs because:

- 1) Some well water users east of Cibolo Creek require access to groundwater rights west of Cibolo Creek to resolve compliance problems.
- 2) Additional time was necessary for the water market to adjust.

In light of the concerns, the proposed amendments to the Cibolo Creek Rules identified in **Appendix A** and addressed in this RA were developed.

2.3.3 Applicability

As noted above, the area covered under the proposed PRs includes the portions of the Aquifer Artesian Zone that is located within the EAA’s jurisdictional boundary. The study area includes two distinct sub-areas.

Sub-area 1—the area located east of Cibolo Creek (within the EAA’s jurisdictional boundaries) to which groundwater transfers have occurred, including portions of Comal, Hays, Guadalupe, and Caldwell Counties.

Sub-area 2—the area located west of Cibolo Creek (within the EAA’s jurisdictional boundaries) from which groundwater transfers have occurred, including portions of Bexar, Medina, Uvalde, and Atascosa Counties

The PRs would apply to any and all individuals/entities involved in the transfers of groundwater rights within the EAA jurisdictional boundaries from withdrawal points located west of Cibolo Creek to withdrawal points located east of Cibolo Creek including but not limited to:

- 1) Political subdivisions of the state
- 2) Retail water providers including CCN and non-CCN water providers
- 3) Wholesale water providers
- 4) Individuals

In addition, the PRs would apply to the following purposes of use:

- 1) Irrigation users
- 2) Municipal users
- 3) Industrial users

2.3.4 Summary of Proposed Amendments/Modifications

This overview of these PRs focuses on the proposed amendments and modifications to the existing Cibolo Creek Rules and is not intended to be an exhaustive review of the entirety of the existing Cibolo Creek Rules. For the purposes of this overview, each of the proposed amendments/modifications is itemized and a brief discussion (summary as to the result and/or intent of the amendment/modification) is provided. As previously noted, a redlined version of the PRs with the proposed amendments/modifications is presented in **Appendix A**. Each of the proposed amendments is presented in **Table 2-1** exactly as it appears in the redlined version (**Appendix A**) along with a brief summary of the result/intent of the amendment.

Table 2-1. Summary of Proposed Amendments/Modifications to the Cibolo Creek Rules

Section	Proposed Amendment	Summary
§ 707.601 – Applicability		
§ 707.601	This subchapter applies to contested case hearings on application. Contested case hearings may be requested in connection with the following applications: (1) initial regular permits; (2) term permits; (3) Aquifer recharge and storage permits; <u>and</u> (4) recharge recovery permits.; (5) amendment applications to change the location of the point of withdrawal from a point west of Cibolo Creek to a point east of Cibolo Creek.	The proposed amendments contained in Chapter 707, Subchapter F, of the PRs would eliminate the provision (707.601 (5)) that identifies the opportunity to request a contested case hearing in connection with the following type of application: “amendment applications to change the location of the point of withdrawal from a point west of Cibolo Creek to a point east of Cibolo Creek.” Under the PRs, applications for Cibolo Creek transfers will no longer be subject to contested case hearings.
§ 711.328 – Basis for Granting Transfer Applications		
§ 711.328	The general manager, or for transfer applications subject to Subsection (12)(B) the Board, shall approve a transfer application if the following elements are established:	Approval of a Cibolo Creek Transfers transfer application by the EAA Board will no longer be required. The EAA General Manager will have the authority to approve such applications.

Table 2-1. Summary of Proposed Amendments/Modifications to the Cibolo Creek Rules

Section	Proposed Amendment	Summary
<p>§ 711.328 (a)(12)B(i), (ii), (iii)</p>	<p>(B) transferred from a point located west of Cibolo Creek to east of Cibolo Creek, and the transfer complied with the provisions in § 711.329. (i) — aquatic and wildlife habitat will be protected; (ii) — species that are designated as threatened or endangered under the applicable federal and state law will be protected; and (iii) — continuous minimum springflows of the Comal Springs and San Marcos Springs will be maintained to protect endangered and threatened species to the extent required by federal law; and</p>	<p>Cibolo Creek transfers are generally prohibited with limited exceptions as outlined in § 711.329 (see § 711.329 below). and Site-specific studies of the potential impacts of the proposed transfer on aquatic and wildlife habitat, federally listed threatened and endangered species, and springflow at Comal and San Marcos Springs, will no longer be required.</p>
<p>§ 711.329 – Cibolo Creek Transfers</p>		
<p>§ 711.329(a)</p>	<p><u>§ 711.329 Cibolo Creek Transfers</u> (a) A transfer of a point of withdrawal under a permit from west of Cibolo Creek to east of Cibolo Creek is prohibited unless:</p>	<p>This subsection identifies the conditions that must be met for leases or sales to be transferred after the adoption of the Final Rules. In general, this section notes that Cibolo Creek Transfers are prohibited unless specific terms and conditions are met.</p>
<p>§ 711.329(a)(1)</p>	<p>(1) the transfer is a lease; and (A) the right to withdraw groundwater is transferred to a well that existed before January 9, 2007; and (B) the term of the lease does not extend beyond December 31, 2014; and (C) the transferee places a portion of the lease amount into the groundwater trust for the term of the lease based on the following transfer ratios: (i) for transfers from Uvalde County to Comal, Hays, Guadalupe, or Caldwell County, a 5:1 transfer ratio is applied to the amount of the lease (i.e. in order to pump one acre-foot in Comal, Hays, Guadalupe, or Caldwell County, the transferee must lease 5 acre-feet and place 4 acre-feet into the groundwater trust); or (ii) for transfers from Medina, Atascosa, or Bexar County to Comal, Hays, Guadalupe, or Caldwell County, a 3:1 transfer ratio is applied to the amount of the lease (i.e. in order to pump one acre-foot in Comal, Hays, Guadalupe, or Caldwell County, the transferee must lease 3 acre-feet and place 2 acre-feet into the groundwater trust); and (D) once initially transferred across Cibolo Creek, the point of withdrawal is not subsequently amended or transferred; and (E) at the expiration of the lease, the right to withdraw groundwater under the permit reverts back to the transferor, including the place of use and the point of withdrawal; or</p>	<p>This section identifies limits on a Cibolo Creek Transfer that is a lease based on specific criteria and conditions, including: 1) date the well existed 2) deadline for lease expiration 3) transfer ratios 4) no further transfers once transferred across Cibolo Creek 5) automatic reversion to the transferor upon expiration</p>
<p>§ 711.329(a)(2)</p>	<p>(2) the transfer is a lease; and (A) the lease was approved by the Board before the effective date of this section; and (B) once initially transferred across Cibolo Creek, the point of withdrawal is not subsequently changed; and (C) at the expiration of the lease, the right to withdraw groundwater under the permit reverts back to the transferor, including the place of use and the point of withdrawal; or</p>	<p>This subsection refers to pre-existing leases that were approved prior to approval of the Final Rules. The lease will be allowed to expire under its terms, at which time the point of withdrawal will automatically revert to west of Cibolo Creek.</p>

Table 2-1. Summary of Proposed Amendments/Modifications to the Cibolo Creek Rules

Section	Proposed Amendment	Summary
§ 711.329(a)(3)	<p>(3) the transfer is a sale; and (A) the sale was originally approved by the Board on or before July 11, 2006; or (B) the sale is made to resolve a pending compliance matter relating to an unauthorized withdrawal at an unpermitted well that was installed or constructed on or before January 9, 2007, and is for no less than ¼ acre-foot per year and no more than 1 acre-foot per year; or (C) the sale was conditionally approved by the Board between July 12, 2006, and the effective date of this section. The order approving the application shall expire on December 31, 2014, at which time, the point of withdrawal under the permit reverts back to a point west of Cibolo Creek. The expiration shall not affect the ownership of the initial regular permit. (b) If a sale is made in accordance with § 711.329(a)(3)(B), the point of withdrawal under the permit may not be subsequently changed unless the owner's well has been plugged.</p>	<p>Under this section, sales that were approved prior to July 11, 2006, will not be affected.</p> <p>Additionally, small compliance transfers are also allowed. Under this section, owners of pre-January 9, 2007, wells may resolve issues through Cibolo Creek Transfers. Finally, any sales conditionally approved by the EAA Board between July 12, 2006, and the Final Rule will expire on December 31, 2014, and at that time the point of withdrawal will automatically revert to a point west of Cibolo Creek.</p>
§ 711.336 – Basis for Granting Amendment Applications		
§ 711.336(12)	<p>(12) the point of withdrawal is either: not transferred from a point located west of Cibolo Creek to east of Cibolo Creek. (A) not transferred from a point located west of Cibolo Creek to east of Cibolo Creek; or (B) transferred from a point located west of Cibolo Creek to east of Cibolo Creek, and (i) aquatic and wildlife habitat will be protected; (ii) species that are designated as threatened or endangered under applicable federal and state law will be protected; and (iii) continuous minimum springflows of the Comal Springs and San Marcos Springs will be maintained to protect endangered and threatened species to the extent required by federal law.</p>	<p>This subsection prohibits Cibolo Creek amendments.</p>

3.0 SCOPE OF THE REGULATORY ASSESSMENT

The scope and content of this RA were developed during two scoping meetings that were held on August 25, 2008, and February 17, 2009, at the EAA office in San Antonio. Attendees included representatives of the EAA, Kemp Smith LLC, and Blanton & Associates, Inc. (B&A). The focus of the scoping meetings was to determine the issues to include in the RA and the level to which each issue should be discussed.

The following reasons for preparing the proposed RA were identified:

1. Provides independent outside review of the PRs
2. Assists EAA staff in evaluating and making decisions about the PRs
3. Assists EAA Board in evaluating and making decisions about the PRs
4. Provides the public with information that will facilitate its review and comments on the PRs

Based on these reasons, the attendees determined that the RA should contain information that can be used to effectively assess the PRs, and the RA should be readable and understandable by the public. Furthermore, the attendees determined that the RA should be prepared using an interdisciplinary approach and should include analytical data, as appropriate.

The general content of the proposed RA, as determined by the EAA staff and B&A during the scoping meeting, is outlined below. The outline follows that provided in the EAA document titled *Rulemaking Regulatory Assessment Protocol* (protocol) (see **Appendix B**) and includes the following sections:

1. Impacts on the regulated community
2. Impacts on the Aquifer
3. Impacts on springflows from Comal and San Marcos Springs
4. Impacts on threatened and endangered species
5. Impacts on any other Aquifer-related elements of the natural environment
6. Impacts on the EAA's regulatory programs
7. Other secondary impacts

It was determined in the scoping meeting that all headings identified in the protocol would be included in the RA, although only minor discussion would be included for those headings that are not applicable to the PRs assessed.

For the purposes of this RA, the primary study area is defined as the portions of Comal, Hays, Guadalupe, and Caldwell Counties within the EAA's jurisdictional boundaries east of Cibolo Creek.

To assess the impacts of the PRs in each of the sections discussed below, B&A proposed to analyze, where appropriate, an action (implement the PRs) alternative and a no-action alternative (do not implement the PRs). This approach was intended to provide a baseline for comparing impacts of the PRs.

3.1 Impacts on the Regulated Community

During the meeting, it was decided that the initial step in preparing the RA would be to determine the regulated community: those entities that would be affected by the PRs. During the scoping meeting, it was determined that the primary regulated community for the PRs would be existing and potential future Aquifer water users within the EAA's jurisdictional boundaries and located east of Cibolo Creek, primarily in Comal and Hays Counties and to a lesser extent in Guadalupe and Caldwell Counties. The regulated community includes existing and potential future users and suppliers of groundwater from the Aquifer, including but not limited to exempt wells (domestic or livestock users), water retailers (i.e., municipal users, water supply corporations, municipal utility districts, etc.), cities, irrigators, industrial users, and water marketers for all possible uses.

The following methods for determining the primary regulated community were discussed:

- EAA will provide B&A a record of current permits within the study area
- EAA will provide B&A a record of current exempt wells within the study area
- Identification of existing and potential future users of the Aquifer in the study area, including:
 - Proposed land developments
 - Existing water suppliers
 - Potential future water suppliers
 - Entities who may use the Aquifer as a backup water supply source
 - Any planned or proposed 1) exempt domestic or livestock use, 2) irrigation, 3) industrial, or 4) municipal use
 - Projections of the aggregate of exempt wells based on population projections

Sources of this information include the counties, cities, and water suppliers as well as permitting and exempt-well records from the EAA. Projections of future uses will be based on planned projects (i.e., submitted plans to county, city, etc.) and Texas Water Development Board population projections for the study area. In addition, the South Central Texas (Region L) 2006 Regional Water Plan will be utilized to determine projected demands on the Aquifer and as a basis for evaluating alternative water supply sources.

During the meeting, the attendees agreed that the regulated community would be the primary focus of the RA as the PRs are a result of a series of studies including:

1. Evaluation of the Aquifer and Springflow Impacts Associated with the Cibolo Creek Transfer Rules (LBG-Guyton Associates, 2008)
2. Simulated Impacts Associated with the Cibolo Creek Transfers Using MODFLOW-NR and Senate Bill 3 Assumptions (LBG-Guyton Associates, 2008)
3. Memorandum: Model simulation and evaluation of transfer ratios of groundwater withdrawals from west of Cibolo Creek to Comal and Hays counties and their impact on the minimum springflow at Comal and San Marcos Springs (EAA, 2009a)

3.2 Impacts on the Aquifer

During the scoping meeting, it was determined that the three studies identified above would be summarized and discussed relative to the PRs in this section.

3.3 Impacts on Springflows from Comal and San Marcos Springs

During the scoping meeting, it was determined that the PRs are specifically intended to have a positive impact on springflows. Therefore, the RA would include only minor discussion in this section.

3.4 Impacts on Threatened and Endangered Species

As noted above, during the scoping meeting it was agreed that the PRs were specifically intended to protect the springflows at Comal and San Marcos Springs and ensure that potential impacts to threatened and endangered species dependent on these springflows are minimized. Therefore, the RA would include only minor discussion in this section.

3.5 Impacts on Other Aquatic-related Elements of the Natural Environment

During the scoping meeting it was determined that the three studies identified above would be summarized and discussed relative to the PRs in this section.

3.6 Impacts on the EAA's Regulatory Programs

During the scoping meeting it was determined that any assessment of impacts of the PRs on the EAA's regulatory programs would be conducted internally by EAA staff.

3.7 Other Secondary Impacts

During the meeting it was determined that the secondary impact categories identified below would be reviewed and, where appropriate, discussed and, if possible, the impacts would be quantified.

1. Cost to regulated communities of implementing programs required by the PRs
2. Economic impacts on local economies
3. Local employment impacts
4. Economic impact on small businesses
5. Public benefits and costs analysis
6. Operation of existing industries
7. Economic development

4.0 BASELINE DATA

This section identifies the baseline data that is necessary to evaluate the PRs. The baseline data collected and presented in this section is commensurate with the scope identified in Section 3.0 above. This section includes a description of the study area and, as appropriate, methods used to collect data. In combination with Sections 2.0 and 3.0, this section will provide the basis for assessing the potential impacts (Sections 5.0 and 6.0) of implementing the PRs.

The study area addressed in this section is identified in Section 1.2.

4.1 Identification of the Regulated Community

The EAA's Rulemaking Regulatory Assessment Protocol (see **Appendix B**) (Section 7 – Impacts on the Regulated Community) identifies nine categories of potential groundwater uses that may be impacted by PRs, including:

1. Irrigation users
2. Municipal users
3. Industrial users
4. Monitoring well users
5. Aquifer recharge and storage permit holders
6. Recharge recovery permit holders
7. Exempt well owners
8. Well construction permit holders
9. Any other entity engaging in an activity regulated by the PRs (this will normally apply to PRs not related to groundwater withdrawals, e.g. water quality rules)

The PRs are not designed nor intended to affect the potential groundwater uses identified in categories 4 through 9; therefore, this RA will focus on the regulated community in the following categories:

1. Irrigation users
2. Municipal users
3. Industrial users

The key steps to establish the regulated community included determining the geographic boundaries of the study area and identifying major water providers and their service areas. Many subsequent data sets were developed or collected based upon these two geographic data sets, and are supported by other spatial and tabular data sets collected for this assessment.

4.1.1 Geographic Boundaries

Study Area

A detailed discussion of the study area is provided in Section 1.2. As noted in Section 1.2, the primary focus of the PRs and this RA is Sub-area 1. Sub-area 1 represents the area located east of Cibolo Creek to which groundwater transfers have occurred under the existing Cibolo Creek Rules, including portions of

Comal, Hays, Guadalupe, and Caldwell Counties. **Figure 4** identifies the zones and boundaries of Sub-area 1.

Methods

Two shape files were provided by the EAA that included the known Artesian Zone boundary of the Aquifer and the EAA jurisdictional boundary (EAA, 2009b). The study area east of Cibolo Creek was extended a distance of 10 miles to determine the extent of the project study area outside the Artesian Zone and within the EAA jurisdictional boundary.

Source information for the aforementioned data sets and other supportive GIS data used in this assessment are located in **Appendix E**.

Results

The geographic boundaries of Sub-area 1 are identified on **Figures 2, 3, and 4**. The areal extent of the Artesian Zone for Sub-area 1 by county is presented in **Table 4-1**.

Table 4-1 Areal Extent of Sub-area 1 within and outside the Artesian Zone

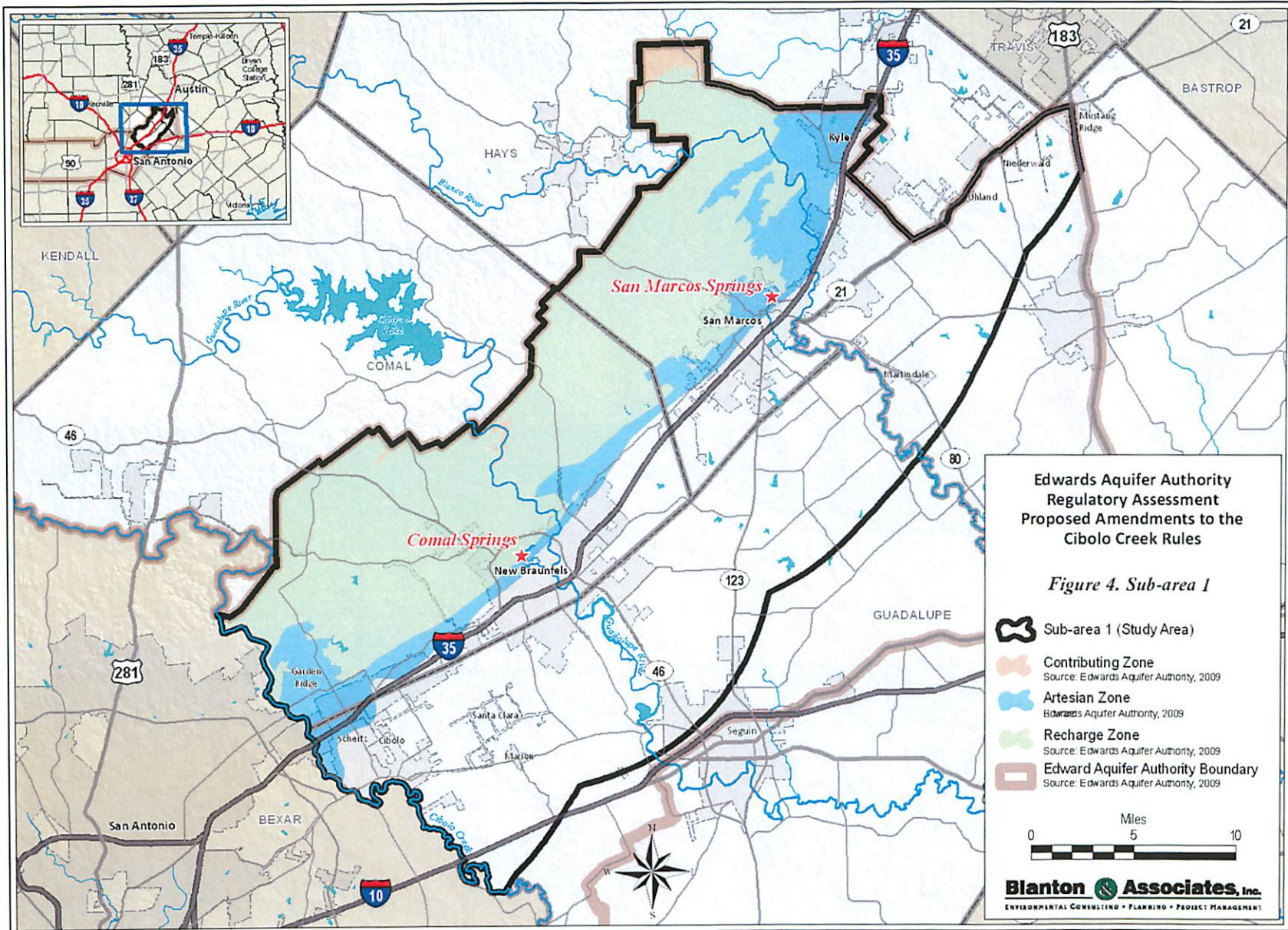
County	Zone	Area in square miles	Percent of total study area
Comal	Within Artesian Zone	31.33	4.1%
	Outside Artesian Zone	203.68	26.9%
Hays	Within Artesian Zone	38.77	5.2%
	Outside Artesian Zone	144.55	19.1%
Guadalupe	Within Artesian Zone	5.29	0.7%
	Outside Artesian Zone	244.32	32.3%
Caldwell	Within Artesian Zone	0.00	0.0%
	Outside Artesian Zone	87.56	11.7%
Total		755.49	100.0%

4.1.2 Retail Water Providers (CCN)

Methods

The regulated community includes major water suppliers and entities within the study area which may be impacted by the proposed rules. The service area boundaries and detailed information for major water suppliers with CCNs were obtained from the TCEQ (TCEQ 2009a). The GIS shape file, current as of December 11, 2008, was used to determine CCN boundaries within the study area. Some CCNs have changed names or ownership since December 2008, but were kept as originals from TCEQ for consistency. For those 41 CCNs in the study area, TCEQ Public Water System Data Sheets (TCEQ 2009b) provided detailed information for each CCN on contact person, known water sources, and average daily consumption for 2008.

To determine the impact of the proposed rules on major retail water suppliers with CCNs, the TCEQ CCN data was combined with the EAA CCN list to generate a comprehensive and thorough list of all retail water suppliers, their current authorized use by water source, and their 2008 annual use by water source. Of those CCNs with non-Aquifer water sources, each water supplier was contacted via phone, email, and/or website(s) to retrieve authorized or permitted amounts and 2008 annual use by water



source. With a few exceptions, this data was readily available from each water supplier. Some permitted amounts for surface water were retrieved from the TCEQ water rights database (TCEQ 2009c). When use data was unavailable for some water supplier water sources, average annual use amounts by water source were inferred from total TCEQ water use and subtracting any Aquifer use amounts.

To determine impacts on water supplier's future ability to withdraw Aquifer water, CCN boundaries were overlaid with the zones within Sub-area 1 to determine occurrence and amount of service area in each zone.

Results

Detailed data on each of the CCN holders are presented in **Appendix C**. Retail water providers located in Sub-area 1 and associated information regarding water sources and use are presented in **Table 4-2**. **Table 4-3** provides a summary of the retail water providers in Sub-area 1. The service areas of the CCN holders within Sub-area 1 are identified on **Figure 5**.

Table 4-2 Summary of CCNs by County and Water Source

County	Utility	Water Source	2008 Annual Use By Source EAA	Total Authorized Use (Acre-Feet)	2008 TCEQ Annual Use (Acre-feet) (All Sources)	Own/ Lease/ Sale	Expiration Year
Comal	3009 Water Company (PWS Seven Hills Ranch)	Trinity	0.000	No Permit	< 1	Own	N/A
Comal	4-D Water Company L.L.C.	Edwards Aquifer	49.151	11.764	49.151	Own	N/A
				26.000		Lease	2010
				4.000		Lease	2010
Comal	City of Bulverde	Trinity Aquifer	N/A	No Permit	N/A	N/A	N/A
		Canyon Lake	N/A	400.000		Own	N/A
		Guadalupe River		1,700.000		Own	N/A
Comal	City of Garden Ridge	Edwards Aquifer	492.629	62.000	492.629	Own	N/A
				2.000			
				441.451			
				1.301			
				3.895			
				2.000			
				4.000			
				2.000			
				2.000			
				14.000			
				1.760			
				2.000			
				0.660			
4.500							
		Trinity	910.620	No Permit	N/A	Own	N/A
Comal	City of Schertz	Edwards Aquifer	38.607	1,220.158	4327.543	Own	N/A
				47.918			
Comal	City of Selma	Carrizo	4,288.936	6,100.000	644.551	Own	N/A
		Edwards Aquifer	519.674	1,061.356			
		purchase from Schertz-Seguin	124.877	800.000		Own	N/A
Comal	Green Valley SUD	Edwards Aquifer	1,395.653	309.000	2834.015	Own	N/A
				200.000		Lease	2013

Table 4-2 Summary of CCNs by County and Water Source

County	Utility	Water Source	2008 Annual Use By Source EAA	Total Authorized Use (Acre-Feet)	2008 TCEQ Annual Use (Acre-feet) (All Sources)	Own/ Lease/ Sale	Expiration Year
				1,091.812		Own	N/A
				63.700		Lease	2013
Comal	Green Valley SUD	Edwards Aquifer	1,395.653	236.300	2834.015	Lease	2013
				22.840		Lease	2012
				305.600		Lease	2012
				171.560		Lease	2017
				200.000		Lease	2013
				87.500		Own	N/A
				45.000		Own	N/A
						Own	N/A
		Carrizo (ECWSC)	N/A	566.000		Own	N/A
		Guadalupe River at Lake Dunlap (NBU)	N/A	2,800.000		Own	N/A
Canyon Lake (CRWA)	N/A	1,800.000	Own	N/A			
Comal	KT Water Development LTD (Rockwall Ranch)	Trinity	N/A	No Permit	0.000	Own	N/A
Comal	New Braunfels Utilities (aka City of New Braunfels)	Edwards Aquifer	4,790.223	48.000	11495.803	Own	N/A
				5.028		Own	N/A
				30.684		Own	N/A
				7,127.233		Own	N/A
				23.271		Own	N/A
				35.769		Own	N/A
		Canyon Lake via Guadalupe River	N/A	6,720.000		Own	N/A
Comal River	N/A	300.000	Own	N/A			
Comal	River Road Community Coop	Glen Rose	N/A	N/A	<1	Own	N/A
Comal	San Antonio Water System	EA	204,630.376	243,700.000	193085.040	Own	N/A
		Canyon Lake (GBRA Western Canyon)	9,067.927	9,300.000		Own	N/A
		Trinity (Oliver Ranch & BSR)	3,518.381	3,500.000		Own	N/A
		Local Carrizo	383.132	6,400.000		Own	N/A
Comal	Siesta Village WSC	EA	< 1	0.000	0.000	Own	N/A
Comal	T Bar M Inc Water System	Unknown	N/A	No Permit	30.161	Own	N/A
Comal	Texas Country Water Inc	Glen Rose	13.045	No Permit	13.405	Own	N/A
Hays	Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc. CCN 11157	Edwards Aquifer	319.075	124.478	329.537	Own	N/A
				250.892		Lease	2010
	Glen Rose	10.462	No Permit	0.000	N/A	N/A	

Table 4-2 Summary of CCNs by County and Water Source

County	Utility	Water Source	2008 Annual Use By Source EAA	Total Authorized Use (Acre-Feet)	2008 TCEQ Annual Use (Acre-feet) (All Sources)	Own/ Lease/ Sale	Expiration Year
Hays	Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc., CCN 12902	Trinity	57.078	No Permit	0.000	N/A	N/A
Hays	Blanco River Ranch Homeowner's Association	Edwards Aquifer	10.054	17.000	10.054	Own	N/A
Hays	City of Kyle	Edwards Aquifer	975.000	432.072	2133.610	Own	N/A
		Guadalupe River (GBRA)	1,158.610	2,957.000		Own	N/A
Hays	City of San Marcos	Edwards Aquifer	1,912.000	5,433.423	7268.797	Own	N/A
		Guadalupe River	5,375.000	10,000.000		Own	N/A
		Carrizo	0.000	0.000		N/A	N/A
Hays	County Line WSC	Edwards Aquifer	117.016	76.212	525.025	Own	N/A
				100.000		Sale	2010
				115.206		Sale	2010
		San Marcos River (from CRWA)	408.009	2,278.830		Own	N/A
Hays	Crystal Clear WSC	Edwards Aquifer	1,029.675	875.060	1531.508		N/A
				864.600		Sale	2010
		Guadalupe River (NBU)	N/A	800.000		Own	N/A
		San Marcos River (CRWA Hays/Caldwell)	N/A	382.000		Own	N/A
		Carrizo-Wilcox (Springs-Hill)	N/A	250.000		Own	N/A
Hays	Goforth WSC	Edwards Aquifer (Barton Springs)	826.410	1,077.000	1045.581	Own	N/A
		Guadalupe River (GBRA)	219.171	1,050.000		Own	N/A
Hays	La Ventana Water Co LP	Trinity	51.385	78.000	51.385	Own	N/A
Hays	Maxwell Water Supply Corporation	Edwards Aquifer	7.346	278.527	481.459	Own	N/A
				7.000		Lease	2012
				5.400		Lease	2012
				5.000		Lease	2012
		2.600	Lease	2012			
Canyon Lake	474.113	350.000	Own	N/A			
Hays	Monarch Utilities I L P (Plum Creek)	Canyon Lake	637.489	560.000	637.849	Own	N/A
Hays	Rocket Water Company	Edwards Aquifer	65.097	18.300	65.097	Lease	2010
Guadalupe	City of Cibolo	Guadalupe River at Lake Dunlap	N/A	1,350.000	941.693	Own	N/A
		Carrizo-Wilcox Aquifer		700.000		Own	N/A

Table 4-2 Summary of CCNs by County and Water Source

County	Utility	Water Source	2008 Annual Use By Source EAA	Total Authorized Use (Acre-Feet)	2008 TCEQ Annual Use (Acre-feet) (All Sources)	Own/ Lease/ Sale	Expiration Year
Guadalupe	City of Marion	Edwards Aquifer	112.895	136.436	177.615	Own	N/A
				46.000		Lease	2010
				50.000		Lease	2011
				50.000		Own	N/A
		CRWA	64.720	155.000	Own	N/A	
Guadalupe	City of Seguin	Guadalupe River (GBRA)	0.000	100.000	N/A	Own	N/A
		Carrizo	4,338.643	6,100.000	6975.007	Own	N/A
Guadalupe	San Miguel Springs Water Co	Guadalupe	2,713.304	9,000.000		Own	N/A
		Alluvium and Leona	< 1	No Permit	0.000	Own	N/A
Guadalupe	Springs Hill WSC	Carrizo	N/A	1,500.000	2931.200	Own	N/A
		Canyon Lake	N/A	3,000.000		Own	N/A
		Seguin-Schertz	N/A	559.910		Own	N/A
		Guadalupe River (GBRA Lake Placid)	N/A	2,500.000		Own	N/A
Guadalupe	Staples Farmers Corp	Alluvium	N/A	No Permit	53.619	Own	N/A
Guadalupe	Water Services Inc. (Garden Oaks)	Green Valley SUD	N/A	N/A	0.000	Own	N/A
		Alluvium and Leona	0.000	Inactive		Own	N/A
Caldwell	Creedmoor MAHA Water Supply Corporation	Edwards Aquifer (Barton Springs)	681.415	721.000	681.415	Own	N/A
Caldwell	Martindale WSC	Recent Alluvium	282.650	300.000	229.000	Own	N/A
		San Marcos River	37.150	396.000		Own	N/A
		Lake Dunlap		50.000		Own	N/A
Caldwell	Polonia WSC	Carrizo-Wilcox	N/A	2,283.000	633.381	Own	N/A
Caldwell	Tri Community WSC	San Marcos River & possible alluvial GW under the influence	N/A	500.000	139.634	Own	N/A

Source: see Appendix E

Table 4-3 Total Annual Authorized Use for CCNs by Water Source

County	Utility	Water Source	Total Authorized Use (Acre-Feet)
Comal	3009 Water Company (PWS Seven Hills Ranch)	Trinity	No Permit
	4-D Water Company L.L.C.	Edwards Aquifer	41.764
	City of Bulverde	Trinity Aquifer	No Permit
		Canyon Lake	400.000
		Guadalupe River	1,700.000
	City of Garden Ridge	Edwards Aquifer	543.567
		Trinity	No Permit
	City of Schertz	Edwards Aquifer	1,268.076
		Carrizo	6,100.000
	City of Selma	Edwards Aquifer	1,061.356
purchase from Schertz-Seguin		800.000	
Green Valley SUD	Edwards Aquifer	2,733.312	

Table 4-3 Total Annual Authorized Use for CCNs by Water Source

County	Utility	Water Source	Total Authorized Use (Acre-Feet)	
		Carrizo (ECWSC)	566.000	
		Guadalupe River at Lake Dunlap (NBU)	2,800.000	
		Canyon Lake (CRWA)	1,800.000	
	KT Water Development LTD (Rockwall Ranch)	Trinity	No Permit	
	New Braunfels Utilities (aka City of New Braunfels)	Edwards Aquifer	7,269.985	
		Canyon Lake via Guadalupe River	6,720.000	
		Comal River	300.000	
	River Road Community Coop	Glen Rose	?	
	San Antonio Water System	Edwards Aquifer	243,700.000	
		Canyon Lake (GBRA Western Canyon)	9,300.000	
		Trinity (Oliver Ranch & BSR)	3,500.000	
		Local Carrizo	6,400.000	
	Siesta Village WSC	Edwards Aquifer	0.000	
	T Bar M Inc Water System	Unknown	No Permit	
	Texas Country Water Inc	Glen Rose	No Permit	
	Hays	Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc. CCN 11157	Edwards Aquifer	375.370
			Glen Rose	No Permit
Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc., CCN 12902		Trinity	No Permit	
Blanco River Ranch Homeowner's Association		Edwards Aquifer	17.000	
		Edwards Aquifer	432.072	
City of Kyle		Guadalupe River (GBRA)	2,957.000	
		Edwards Aquifer	5,433.423	
City of San Marcos		Guadalupe River	10,000.000	
		Carrizo	0.000	
		Edwards Aquifer	291.418	
County Line WSC		San Marcos River (from CRWA)	2,278.830	
		Edwards Aquifer	1,739.660	
Crystal Clear WSC		Guadalupe River (NBU)	800.000	
		San Marcos River (CRWA Hays/Caldwell)	382.000	
		Carrizo-Wilcox (Springs-Hill)	250.000	
		Edwards Aquifer (Barton Springs)	1,077.000	
Goforth WSC		Guadalupe River (GBRA)	1,050.000	
	Trinity	78.000		
La Ventana Water Co LP	Edwards Aquifer	298.527		
Maxwell Water Supply Corporation	Canyon Lake	350.000		
	Canyon Lake	560.000		
Monarch Utilities I L P (Plum Creek)	Edwards Aquifer	18.300		
Rocket Water Company	Edwards Aquifer	18.300		
Guadalupe	City of Cibolo	Guadalupe River at Lake Dunlap	1,350.000	
		Carrizo-Wilcox Aquifer	700.000	
	City of Marion	Edwards Aquifer	282.436	
		CRWA	155.000	
		Guadalupe River (GBRA)	100.000	
	City of Seguin	Carrizo	6,100.000	
		Guadalupe	9,000.000	
	San Miguel Springs Water Co	Alluvium and Leona	No Permit	
	Springs Hill WSC	Carrizo	1,500.000	
		Canyon Lake	3,000.000	
		Seguin-Schertz	559.910	
		Guadalupe River (GBRA Lake Placid)	2,500.000	
Staples Farmers Corp	Alluvium	No Permit		

Table 4-3 Total Annual Authorized Use for CCNs by Water Source

County	Utility	Water Source	Total Authorized Use (Acre-Feet)
	Water Services Inc. (Garden Oaks)	Green Valley SUD?	N/A
		Alluvium and Leona	Inactive
Caldwell	Creedmoor MAHA Water Supply Corporation	Edwards Aquifer (Barton Springs)	721.000
	Martindale WSC	Recent Alluvium	300.000
		San Marcos River	396.000
		Lake Dunlap	50.000
	Polonia WSC	Carrizo-Wilcox	2,283.000
Tri Community WSC	San Marcos River & possible alluvial GW under the influence	500.000	

Source: see Appendix E

4.1.3 Non-CCN Permit Holders

Methods

The EAA provided a complete list of permit holders east of Cibolo Creek that included water suppliers who possessed a CCN and others who did not. Non-CCN permit holders, which consisted of industrial, irrigation or smaller municipal users who served a population of fewer than 25 people, were separated into their own list. This list was used to determine the entity's location within Sub-area 1 to identify any significant impacts from the proposed rules.

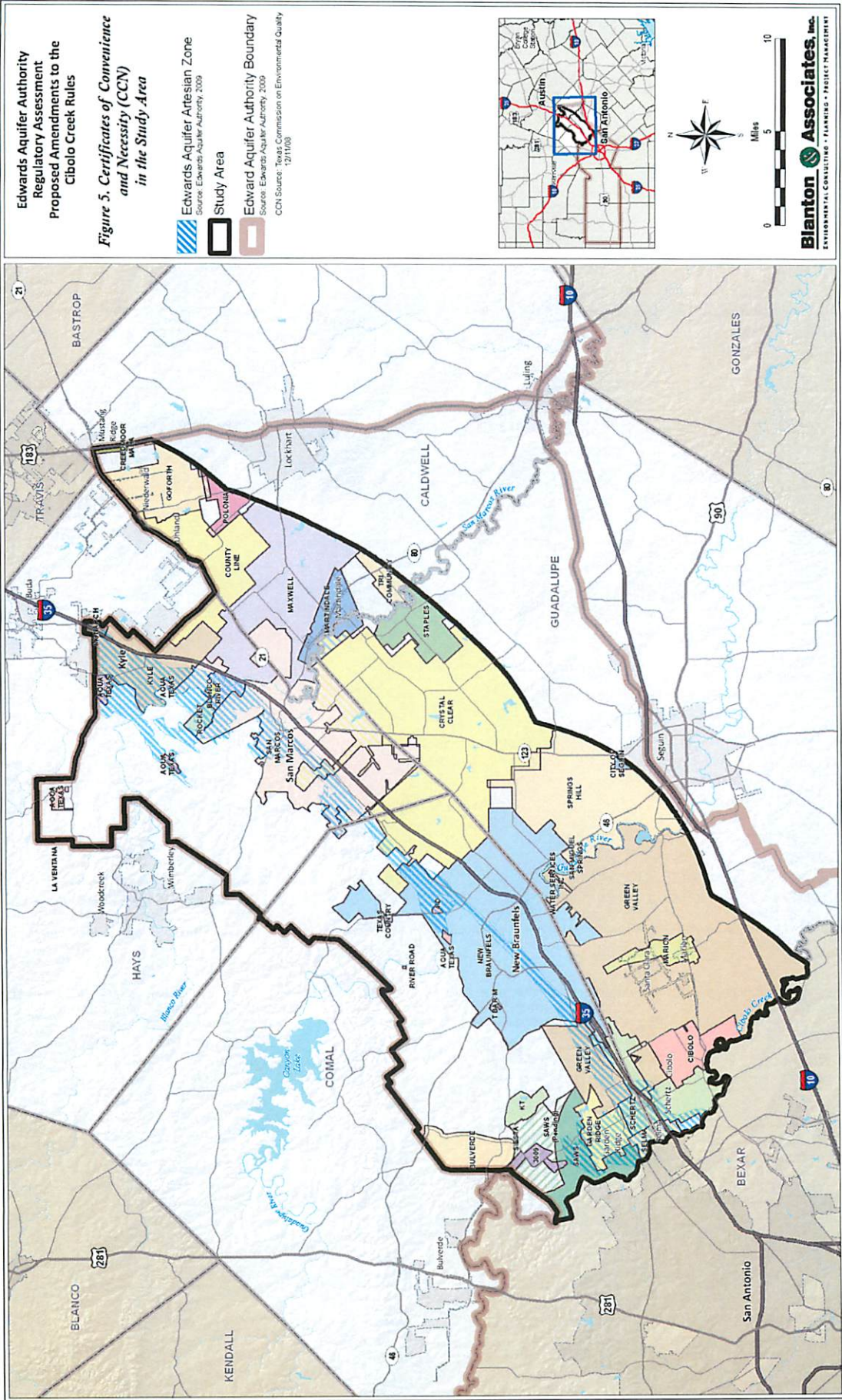
Results

Non-CCN water permit holders within Sub-area 1 are identified in Table 4-4. The majority (89.3 percent) of the total authorized water in this category is used for industrial purposes with irrigation accounting for a little over 10 percent and small municipal providers (serving populations of fewer than 25) accounting for less than 1 percent.

Table 4-4 Summary of Non-CCN Permit Holders within Sub-area 1

County	Use	Total Number of Permits	Total Authorized Use (Acre-feet)
Comal	Municipal	6	39.00
	Industrial	46	11,624.67
	Irrigation	17	820.34
<i>Total Comal County</i>	<i>All Uses</i>	<i>69</i>	<i>12,484.01</i>
Hays	Municipal	12	47.00
	Industrial	25	2,842.37
	Irrigation	9	624.80
<i>Total Hays County</i>	<i>All Uses</i>	<i>42</i>	<i>3,514.17</i>
Guadalupe County	Municipal	0	0.00
	Industrial	7	351.81
	Irrigation	0	0.00
<i>Total Guadalupe County</i>	<i>All Uses</i>	<i>7</i>	<i>351.81</i>
Caldwell County	Municipal	0	0.00
	Industrial	0	0.00
	Irrigation	0	0.00
<i>Total Caldwell County</i>	<i>All Uses</i>	<i>0</i>	<i>0.00</i>
All Counties	Municipal	0	84.00
	Industrial	0	14,527.85
	Irrigation	0	1,445.14
	<i>All Uses</i>	<i>0</i>	<i>16,349.99</i>

Source: EAA, 2009a



4.1.4 Exempt Wells

Methods

The EAA furnished a GIS shape file containing all known and permitted wells within its jurisdiction. For those permitted wells located east of Cibolo Creek, attributes were added for entity, primary use, county, and CCN ownership, where applicable, using the permit holder list provided by the EAA.

Many wells provided water for multiple users and some for multiple uses. In these instances, the primary user and/or use was linked to a particular well. Wells which could not be linked to any permit in the list provided by the EAA were categorized for this analysis as unpermitted domestic/livestock use. For a few wells, missing well data such as entity name were retrieved from the EAA website.

Results

Tables 4-5 and 4.6 provide an estimate of the number of exempt wells located within Sub-area 1. The majority of the wells (1,354 wells; 75.4 percent) are exempt wells that are used for domestic and livestock purposes. Domestic water use, based on an estimated daily use of 250 gallons (2.5 persons per household at 100 gallons per person per day) per well per day for these individual wells is estimated to be approximately 338,500 gallons per day or approximately 379 acre-feet annually. The distribution of wells within Sub-area 1 is identified on Figure 6. As this figure illustrates, a large percentage (69.2 percent) of the exempt Aquifer wells are located in the unconfined portion (i.e., the Recharge Zone) outside of the Artesian Zone.

Table 4-5 Approximate Number of Wells by County and Primary Use within Sub-area 1

County	Municipal (Non-CCN Owned)	Municipal (CCN Owned)	Industrial	Irrigation	Domestic/Livestock (Exempt)	Not in Use	Compliance Issue	Total
Comal	7	24	73	19	523	68	2	716
Hays	8	36	27	12	829	103	48	1,063
Guadalupe	0	1	5	0	2	9	0	17
Caldwell	0	0	0	0	0	0	0	0
Total	15	61	105	31	1,354	180	50	1,796

Source: EAA, 2009a

Table 4-6 Estimated Number of Wells by Aquifer Zone and Type of Use within Sub-area 1

Zone	Well Use	Count
Artesian	Municipal (CCN)	45
	Municipal (Non-CCN)	5
	Industrial	52
	Irrigation	21
	Domestic/Livestock	313
	Exempt	84
	Compliance Issue	22
	Total	542
Recharge	Municipal (CCN)	16
	Municipal (Non-CCN)	10
	Industrial	53
	Irrigation	10
	Domestic/Livestock	1,030
	Exempt	96
	Compliance Issue	27
Total	1,242	

Table 4-6 Estimated Number of Wells by Aquifer Zone and Type of Use within Sub-area 1

Zone	Well Use	Count
Contributing	Municipal (CCN)	0
	Municipal (Non-CCN)	0
	Industrial	0
	Irrigation	0
	Domestic/Livestock	12
	Exempt	0
	Compliance Issue	1
	<i>Total</i>	<i>12</i>
	<i>Total All Zones</i>	<i>1,796</i>

Source: EAA, 2009a

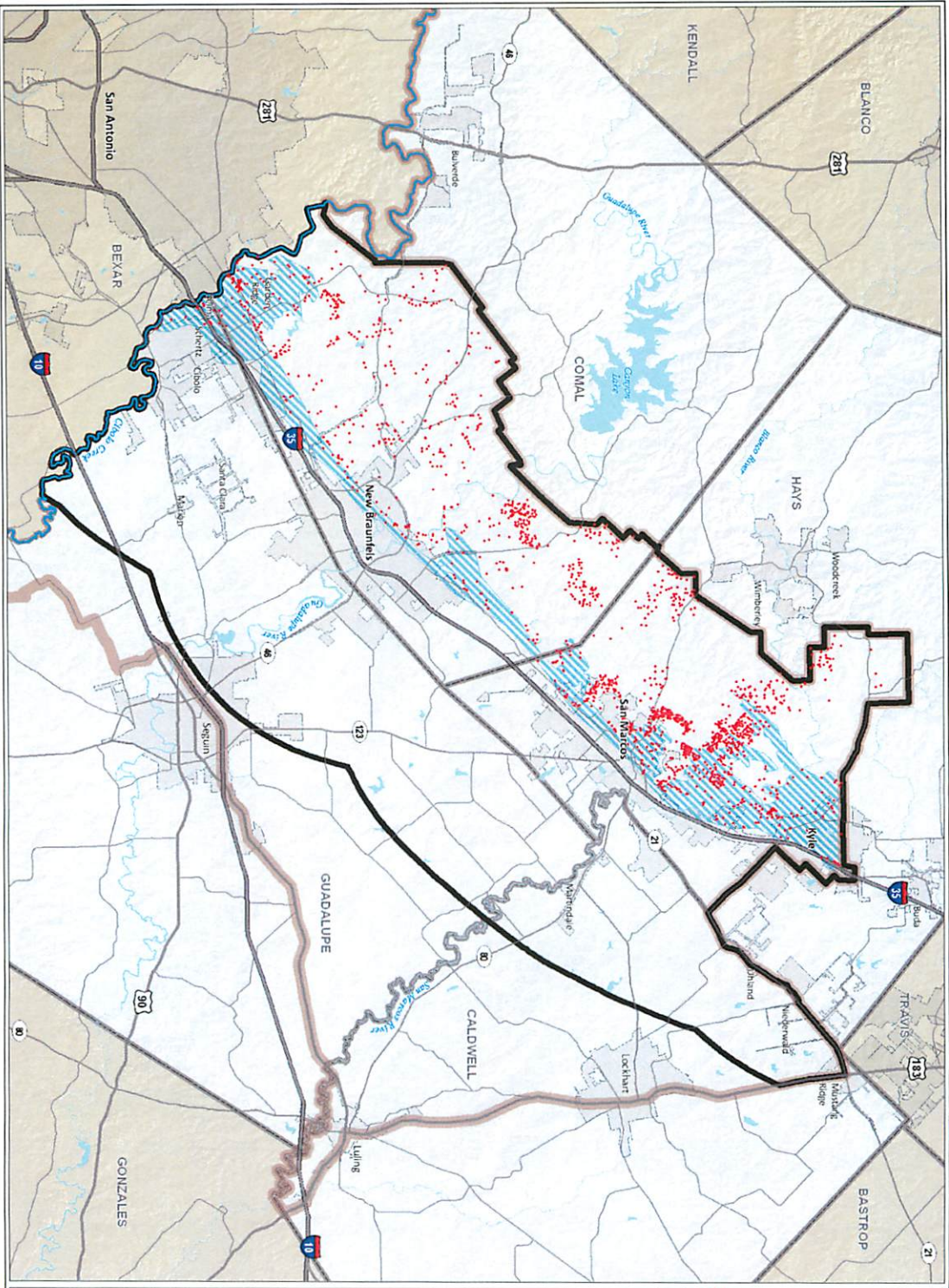
4.1.5 Wholesale Water Providers

Methods

Three large wholesale water providers service a majority of the study area: Guadalupe-Blanco River Authority (GBRA), Canyon Regional Water Authority (CRWA), and Schertz-Seguin Local Government Corporation (SSLGC). The service areas of each wholesale provider, by CCN, were obtained from the 2006 TWDB Region L Water Plan (TWDB 2006), mapped by CCN, and are illustrated in **Figure 7**. Significant overlap between all three providers demonstrates the ability for water suppliers to obtain water from a variety of possible sources.

Results

Wholesale water providers and the utilities that purchase raw and/or treated water from these entities are identified in **Table 4.7** and **Figure 7**. Wholesale water providers are included in the RA as they currently and may in the future supply water to the water supply entities (i.e., CCN holders) that may be impacted by the PRs. As **Table 4-7** illustrates, approximately 19 CCN holders within Sub-area 1 are located within the service area of the three wholesale water providers.



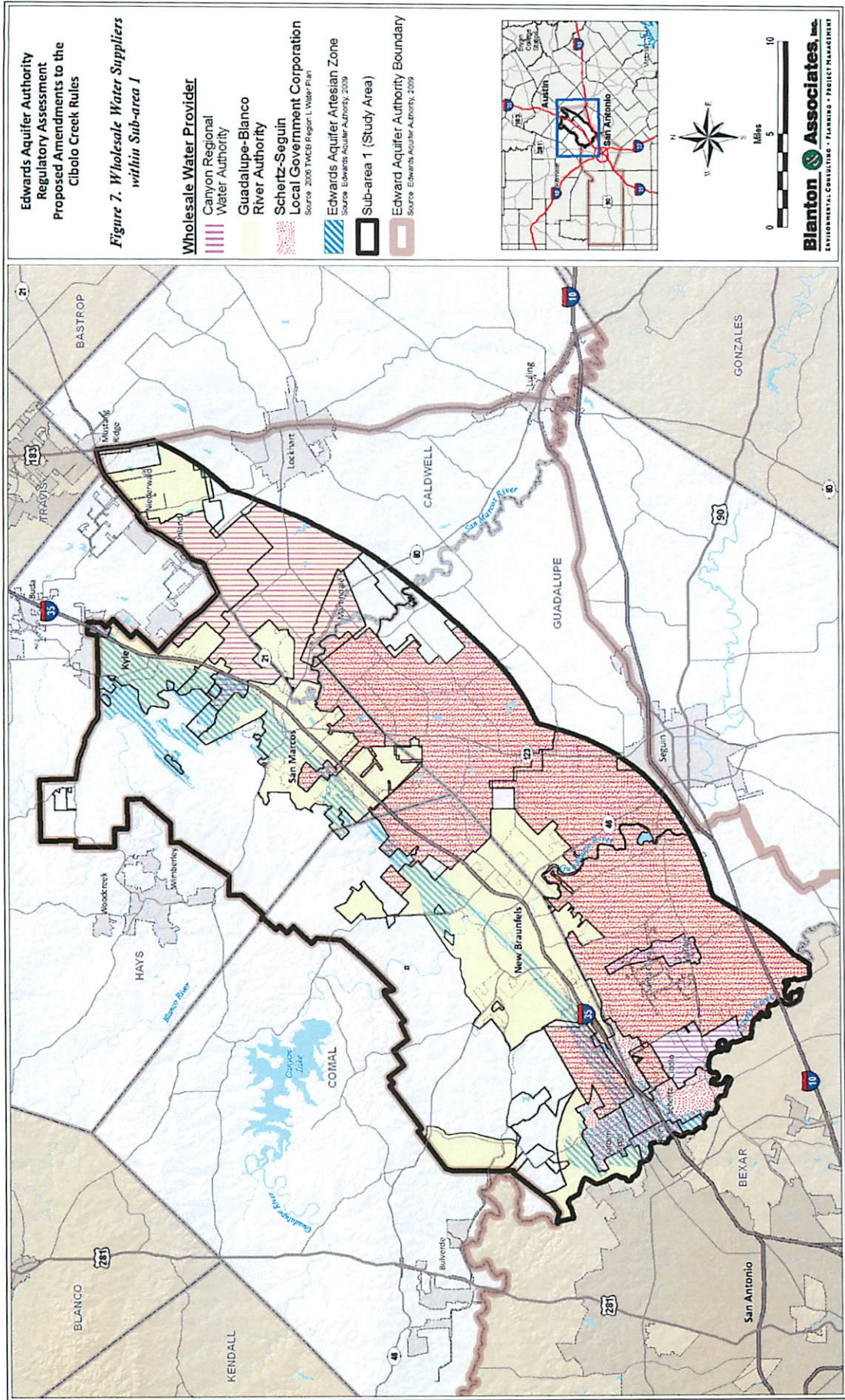
**Edwards Aquifer Authority
Regulatory Assessment
Proposed Amendments to the
Cibola Creek Rules**

**Figure 6. Distribution of
Known Exempt and Permitted Wells
within Sub-area 1**

- Well
Source: Edwards Aquifer Authority, 2009
- ▨ Edwards Aquifer Artesian Zone
Source: Edwards Aquifer Authority, 2009
- ▨ Sub-area 1 (Study Area)
- ▭ Edwards Aquifer Authority Boundary
Source: Edwards Aquifer Authority, 2009



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EDWARDS AQUIFER AUTHORITY REGULATORY ASSESSMENT FOR PROPOSED AMENDMENTS TO THE EXISTING CIBOLO CREEK TRANSFER RULES

Table 4-7 Wholesale Water Providers Service Areas (by CCN)

Wholesale Provider	CCNs Served
Canyon Regional Water Authority	City of Cibolo
	City of Marion
	County Line WSC
	Crystal Clear WSC
	Green Valley SUD
	Martindale WSC
	Maxwell WSC
	Springs Hill WSC
Guadalupe-Blanco River Authority	City of Bulverde
	City of Kyle
	City of San Marcos
	City of Seguin
	County Line WSC
	Crystal Clear WSC
	Goforth WSC
	Green Valley SUD
	Martindale WSC
	Maxwell WSC
	New Braunfels Utilities
	San Antonio Water System
	Springs Hill WSC
Schertz-Seguin Local Government Corporation	City of Garden Ridge
	City of Marion
	City of Schertz
	City of Seguin
	City of Selma
	Crystal Clear WSC
	Green Valley SUD
Springs Hill WSC	

Source: TWDB 2006 (Region L Water Plan)

4.1.6 Population and Water Use / Demand Projections

Methods

To determine possible future effects from the proposed rules on the regulated community, population projections and water use / demand projections were compiled from the 2006 TWDB Region L Water Plan for the years 2000 - 2060. Population and water usage numbers in the Region L Plan were originally listed by county and river basin, and these numbers were aggregated to CCN by county for consistency with other analyses. Some smaller entities not listed in the 2006 Region L Plan are not included in this data set.

Results

Population and water use projections developed by the Texas Water Development Board for each of the CCN holders within Sub-area 1 are presented in **Table 4-8** and **Figures 8** through **11**.

Table 4-8 Population and Water Use Projections for Major Utilities within Sub-area 1

County	Utility	Projected Population															Projected Water Use															Percent Annual Growth Rate																			
		2010					2020					2030					2040					2050					2060					2070					2080					2090					2100				
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100										
Caldwell	CALDWELL COUNTY (RURAL)	1,189	1,229	1,172	1,066	968	882	801	730	237	223	199	176	157	143	0.34	0.34	-0.46	-0.90	-0.92	-0.89	-0.89	0.30	-0.59	-1.08	-1.16	-1.08	-0.89	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100													
Caldwell	MARTINDALE WSC	1,058	1,735	2,078	2,397	2,802	3,093	3,415	119	189	217	242	273	298	329	6.40	1.98	1.54	1.69	1.04	1.04	5.88	1.48	1.15	1.28	0.92	1.04	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Caldwell	MAXWELL WSC	3,726	5,716	7,920	9,955	11,995	14,137	16,108	451	660	878	1,093	1,290	1,520	1,733	5.34	3.86	2.57	2.05	1.79	1.39	4.63	3.30	2.45	1.80	1.78	1.40	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Caldwell	CITY OF LOCKHART	11,615	16,328	21,083	25,111	29,154	33,216	37,148	1,795	2,451	3,094	3,629	4,180	4,725	5,285	4.06	2.91	1.91	1.61	1.39	1.18	3.65	2.62	1.73	1.52	1.30	1.19	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Caldwell	POLONIA WSC	4,737	7,275	10,019	12,451	14,891	17,340	19,710	462	668	886	1,074	1,268	1,457	1,656	5.36	3.77	2.43	1.96	1.64	1.37	4.46	3.26	2.12	1.81	1.49	1.37	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Caldwell	CITY OF LULING	5,080	6,309	7,301	7,998	8,700	9,407	10,092	888	1,067	1,210	1,299	1,384	1,486	1,594	2.42	1.57	0.95	0.88	0.81	0.73	2.02	1.34	0.74	0.65	0.74	0.73	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Caldwell	CREDMOOR MAHA WSC	1,540	2,311	3,136	3,866	4,600	5,341	6,053	170	244	316	382	448	514	583	5.01	3.57	2.33	1.90	1.61	1.33	4.35	2.95	2.09	1.73	1.47	1.34	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	COMAL COUNTY (RURAL)	19,981	21,691	23,995	26,603	29,257	32,018	34,996	2,596	2,721	2,930	3,159	3,376	3,658	3,995	0.86	1.06	1.09	1.00	0.94	0.93	0.48	0.77	0.78	0.69	0.84	0.92	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	WATER SERVICES INC	1,802	2,434	3,239	4,153	5,049	5,982	6,986	261	338	439	554	668	784	916	3.51	3.31	2.82	2.16	1.85	1.68	2.95	2.99	2.62	2.06	1.74	1.68	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	CITY OF SELMA	66	398	633	905	1,047	1,190	1,337	23	136	215	306	353	400	450	50.30	5.90	4.30	1.57	1.37	1.24	4.913	5.81	4.23	1.54	1.33	1.25	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	CANYON LAKE ESTATES WSC	9,741	19,509	32,010	46,244	60,182	74,628	90,163	1,495	2,928	4,769	6,838	8,898	11,034	13,331	10.03	6.41	4.45	3.01	2.40	2.08	9.59	6.29	4.34	3.01	2.40	2.08	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	CITY OF GARDEN RIDGE	1,882	2,380	3,017	3,743	4,454	5,191	5,923	458	565	703	860	1,018	1,181	1,360	2.65	2.68	2.41	1.90	1.65	1.53	2.34	2.44	2.23	1.84	1.60	1.52	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	CITY OF FAIR OAKS RANCH	246	248	250	252	254	256	258	58	58	58	58	58	58	58	59	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.17	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	CITY OF SCHERTZ	17,649	25,097	34,211	44,079	53,932	64,841	76,589	2,827	3,879	5,212	6,617	8,035	9,660	11,410	4.22	3.63	2.88	2.24	2.02	1.81	3.72	3.44	2.70	2.14	2.02	1.81	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	CITY OF NEW BRAUNFELS	36,494	46,909	60,186	75,239	90,002	105,592	121,944	8,359	10,509	13,213	16,350	19,457	22,667	26,226	2.85	2.83	2.50	1.96	1.71	1.57	2.60	2.37	2.37	1.90	1.65	1.57	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Comal	BEXAR METRO WATER DISTRICT	1,743	3,618	6,017	8,749	11,425	14,198	17,180	230	462	748	1,059	1,344	1,654	2,001	10.76	6.63	4.54	3.06	2.43	2.10	10.09	6.19	4.16	2.69	2.31	2.10	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	GUADALUPE COUNTY (RURAL)	2,644	2,186	1,779	1,335	850	494	116	332	270	214	156	96	54	13	-1.73	-1.86	-2.50	-3.63	-4.19	-7.65	-1.87	-2.07	-2.71	-3.85	-4.38	-7.59	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	CITY OF MARION	1,099	1,213	1,353	1,504	1,655	1,822	2,002	154	164	179	194	209	229	251	1.04	1.15	1.12	1.00	1.01	0.99	0.65	0.91	0.84	0.77	0.96	0.96	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	CITY OF CIBOLO	3,035	4,497	6,284	8,216	10,146	12,287	14,593	598	866	1,190	1,546	1,898	2,298	2,730	4.82	3.97	3.07	2.35	2.11	1.88	4.48	3.74	2.99	2.28	2.11	1.88	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	CRYSTAL CLEAR WSC	13,754	19,179	25,372	32,804	39,853	47,759	55,673	1,540	2,041	2,652	3,344	3,973	4,761	5,551	3.94	3.42	2.75	2.15	1.98	1.66	3.25	2.99	2.61	1.88	1.98	1.66	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	SPRINGS HILL WSC	10,773	12,485	14,579	16,842	19,103	21,611	24,312	2,076	2,349	2,679	3,056	3,424	3,849	4,330	1.59	1.68	1.55	1.34	1.31	1.25	1.32	1.40	1.41	1.20	1.24	1.25	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	GREEN VALLEY SUID	21,599	29,197	38,529	48,675	58,788	69,925	81,918	2,056	2,617	3,323	4,144	4,873	5,796	6,790	3.52	3.20	2.63	2.08	1.89	1.72	2.73	2.70	2.47	1.76	1.89	1.71	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	CITY OF SEGUIN	22,011	25,309	29,339	33,696	38,048	42,877	48,077	4,463	5,018	5,718	6,454	7,203	8,069	9,047	1.59	1.59	1.49	1.29	1.27	1.21	1.24	1.39	1.29	1.16	1.20	1.21	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Guadalupe	GONZALES COUNTY WSC	154	215	277	329	381	433	484	46	63	79	94	108	122	136	3.96	2.88	1.88	1.58	1.36	1.18	3.70	2.54	1.90	1.49	1.30	1.15	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	HAYS COUNTY (RURAL)	8,359	9,765	11,374	13,040	14,714	16,726	18,308	1,273	1,444	1,644	1,855	2,077	2,361	2,584	1.68	1.68	1.46	1.28	1.37	0.95	1.34	1.39	1.28	1.20	1.37	0.94	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	MOUNTAIN CITY OAKS WS	135	282	450	624	799	1,009	1,174	22	45	71	98	124	157	183	10.89	5.96	3.87	2.80	2.63	1.64	10.45	5.78	3.80	2.65	2.66	1.66	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	CITY OF DRIPPING SPRINGS	1,548	5,325	9,308	11,651	14,005	16,834	19,058	321	1,080	1,856	2,297	2,745	3,300	3,736	24.40	7.48	2.52	2.02	2.02	1.32	23.64	7.19	2.38	1.95	2.02	1.32	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	CITY OF KYLE	5,314	21,457	31,126	33,613	35,203	39,197	41,850	702	2,740	3,940	4,217	4,377	4,874	5,203	30.38	4.51	0.80	0.47	1.13	0.68	29.03	4.38	0.70	0.38	1.14	0.68	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	CIMARRON PARK WATER CO	1,896	2,417	3,013	3,631	4,232	4,998	5,584	327	403	489	582	676	789	882	2.75	2.47	2.05	1.71	1.75	1.17	2.32	2.13	1.90	1.62	1.67	1.18	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	COUNTY LINE WSC	2,193	7,132	14,509	17,249	18,449	20,479	23,448	366	1,151	2,307	2,724	2,894	3,212	3,677	22.52	10.34	1.89	0.70	1.10	1.45	21.45	10.04	1.81	0.62	1.10	1.45	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	WIMBERLY WSC	5,058	7,069	9,370	11,753	14,148	17,026	19,289	578	776	997	1,224	1,442	1,736	1,966	3.98	3.26	2.54	2.04	2.03	1.33	3.43	2.85	2.28	1.78	2.04	1.32	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	GOFORTH WSC	7,019	11,104	15,780	20,519	25,281	30,843	35,362	778	1,156	1,609	2,046	2,492	3,040	3,485	5.82	4.21	3.00	2.32	2.20	1.47	4.86	3.92	2.72	2.18	2.20	1.46	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100														
Hays	CITY OF BUDA	2,404	8,042	13,971	17,341	20,728	24,797	27,997																																											

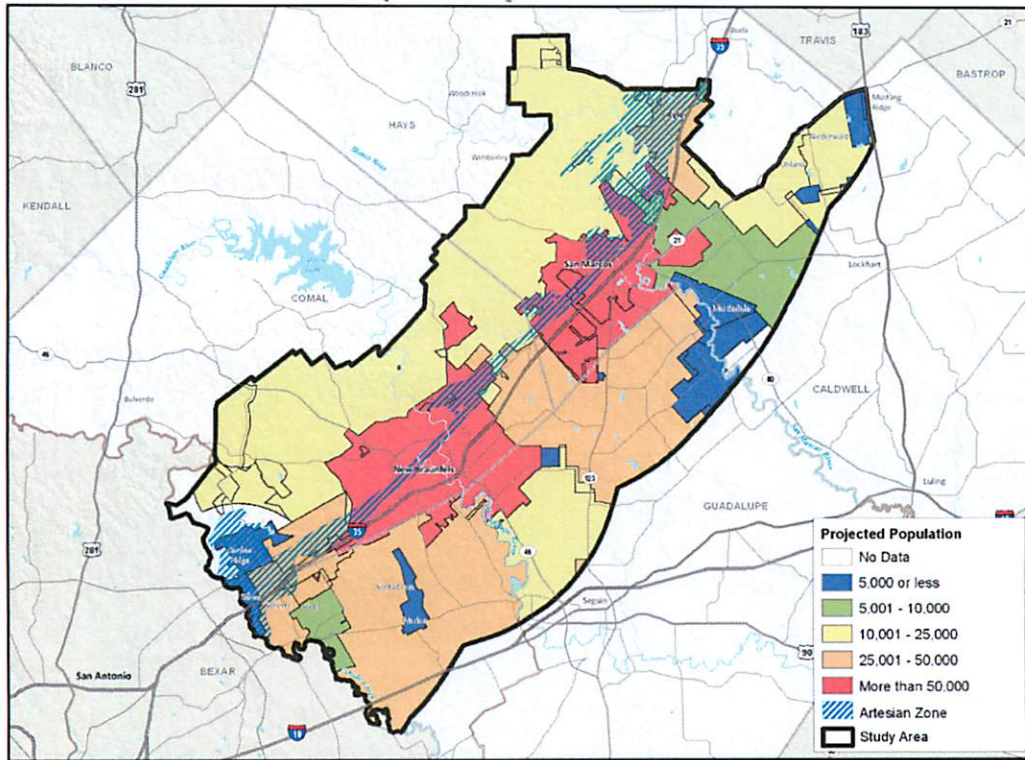


Figure 8 Sub-area 1 Projected Population 2020

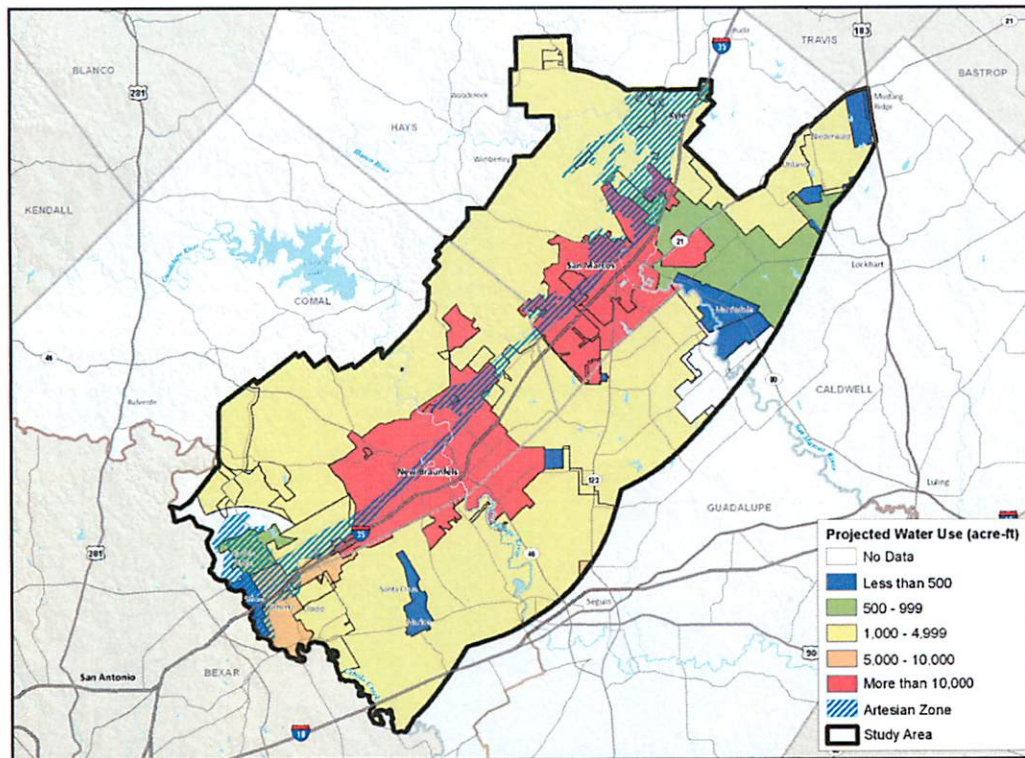


Figure 9 Sub-area 1 Projected Water Use 2020

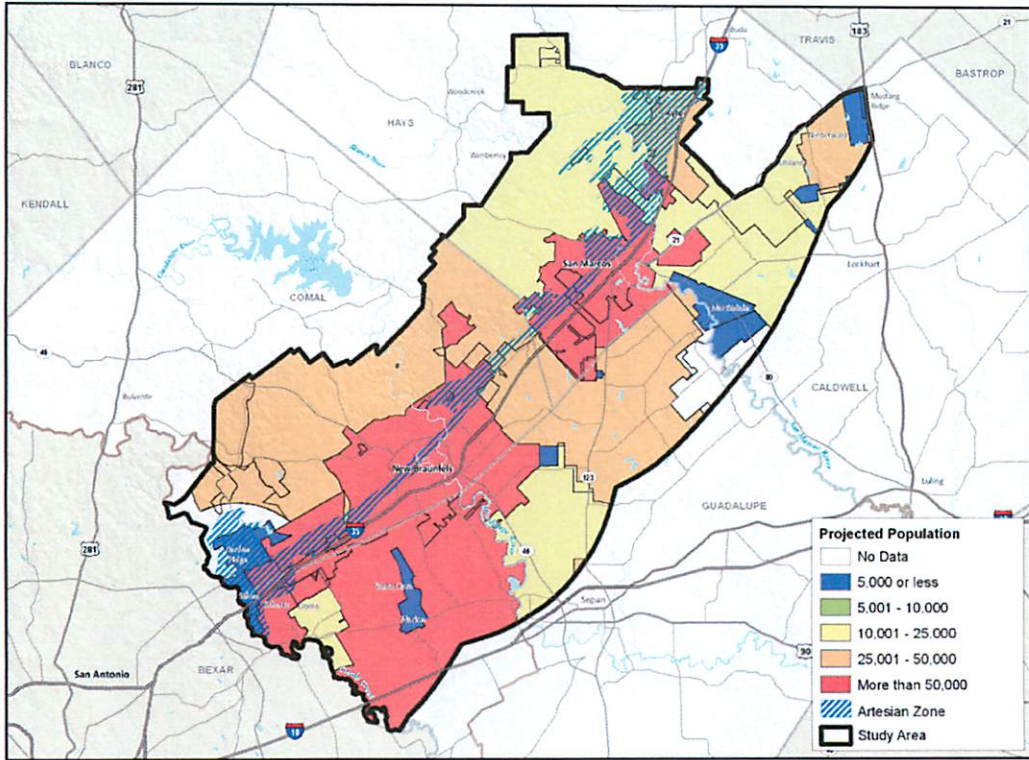


Figure 10 Sub-area 1 Projected Population 2040

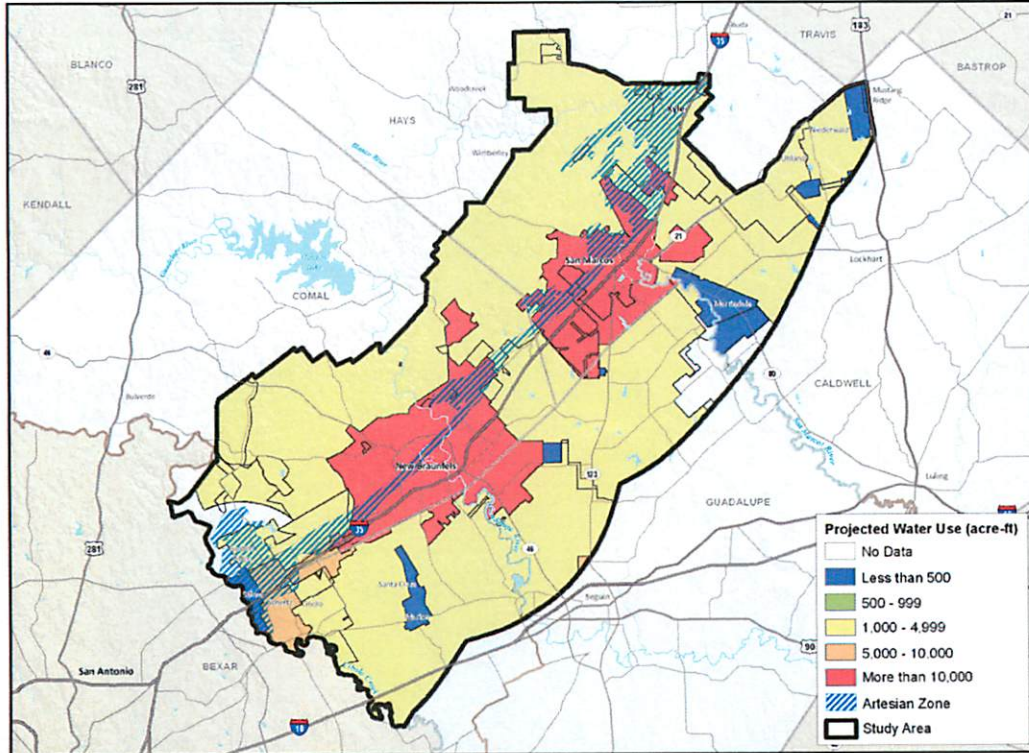


Figure 11 Sub-area 1 Projected Water Use 2040

4.1.7 Planned Developments

Methods

Planned developments were researched to provide an indication of future growth and possible water source needs. For the purposes of this project, planned developments were defined as platted but not yet approved or built site plans in Comal, Hays, Caldwell, or Guadalupe counties. A multitude of sources were contacted to provide this information, including County Engineering offices, planning department listings of received master plans, phone contacts, and city / county websites. This information was further researched online for any applicable articles or maps of planned developments. Information included here is dependent on the source and source date, and in some cases planned developments may have been abandoned or possibly further ahead in the building process. All gathered information was mapped using parcel boundaries for every county provided by Capital Area Council of Governments (CAPCOG, 2008) for Hays and Caldwell counties and the City of New Braunfels for Comal and Guadalupe counties (City of New Braunfels, 2009). Basic information on acreage, number of lots, and planned water source was attributed to each development.

Results

Planned developments within the study area are identified in **Table 4-9** and **Figure 12**. For the purposes of this RA, the growth in population and water demand associated with the planned developments is assumed to be incorporated in the projections derived from the 2006 TWDB Region L Water Plan.

Table 4-9 Summary of Planned Developments in Sub-area 1 by Potential Water Source

County	Potential Water Source	Planned Development Name	Estimated Acres	Estimated Number of Lots
Comal	Proposed wells	Ladera Canyon	185	31
	New Braunfels Utilities	The Preserve	206	151
	New Braunfels Utilities	Copper Ridge	850	595
	Canyon Lake WSC	Star Canyon	768	431
	Unknown	Crescent Hills	2750	5000
Total Comal County			4,759	6,208
Hays	City of San Marcos	Blanco River Village	42	0
	City of San Marcos	McCarty Commons	260	0
	City of San Marcos	Cottonwood Creek	471	2704
	City of San Marcos	Windemere Ranch	235	210
	Unknown	Purgatory Ranch	1449	0
	City of San Marcos	Blanco River Walk (mixed use)	239	Unk
	City of San Marcos	Blanco Vista	575	2000
	City of San Marcos	Paso Robles	1339	3427
Total Hays County			4,610	8,341
Guadalupe	New Braunfels Utilities	Pecan Crossing	73	311
	Green Valley SUD	River Valley	52	283
	Green Valley SUD	Zipp Meadows	54	203
	Green Valley SUD	Bandit Dunes	156	540
Total Guadalupe County			335	1,337
Caldwell	Tri-Community & Martindale WSC	Nolandale Estates	3600	2300
Total Caldwell County			3,600	2,300
Total All Counties			13,304	18,186

Source: Various—see Appendix E

4.1.8 Proposed Water Supply Projects

Methods

Based upon a review of proposed water supply projects from the 2006 TWDB Region L Water Plan, several water supply projects that may impact future water availability to major water suppliers within the study area were mapped. Projects adjacent to the study area were included. The 2006 TWDB Region L Water Plan identifies over 10 key water supply projects, some of which are already under construction. Many of these consist of transmission lines from water sources southeast of the study area, primarily from the Carrizo-Wilcox Aquifer. Other identified sources that were mapped include recycled water programs, a transfer from Canyon Lake to the Wimberley/Woodcreek area, and Lockhart Reservoir.

Results

Proposed water supply projects as identified in the 2006 Region L Water Plan Volume II are identified in Table 4-10 and Figure 13.

Table 4-10 Water Supply Projects within 10 Miles of Sub-area 1

Name of Project	Sponsor	Total Projected Supply (Acre-Feet)
Carrizo-Wilcox Aquifer	Polonia WSC	536
Carrizo-Wilcox Aquifer	Crystal Clear WSC	1,000
Carrizo-Wilcox Aquifer	City of Lockhart	1,612
CRWA Dunlap	CRWA	5,600
CRWA Siesta	CRWA	5,042
Hays / Caldwell - Carrizo	CRWA and Cities of Lockhart, San Marcos, and Kyle	15,000
Lockhart Reservoir	City of Lockhart and other area water user groups	5,627
Recycled Water Programs	San Antonio Water Supply	61,199
Recycled Water Programs	New Braunfels Utilities	N/A
Recycled Water Programs	City of San Marcos	N/A
Recycled Water Programs	City of Seguin	N/A
Schertz-Seguin LGC Expansion	Schertz-Seguin Local Government Corporation	12,800
Trinity Aquifer	County Line WSC	800
Wells Ranch / CRWA Dunlap	CRWA	3,400
Wimberley and Woodcreek	GBRA, Wimberley WSC and Woodcreek Utilities, Inc.	4,636

Source: TWDB 2006 (Region L Water Plan Vol. II)

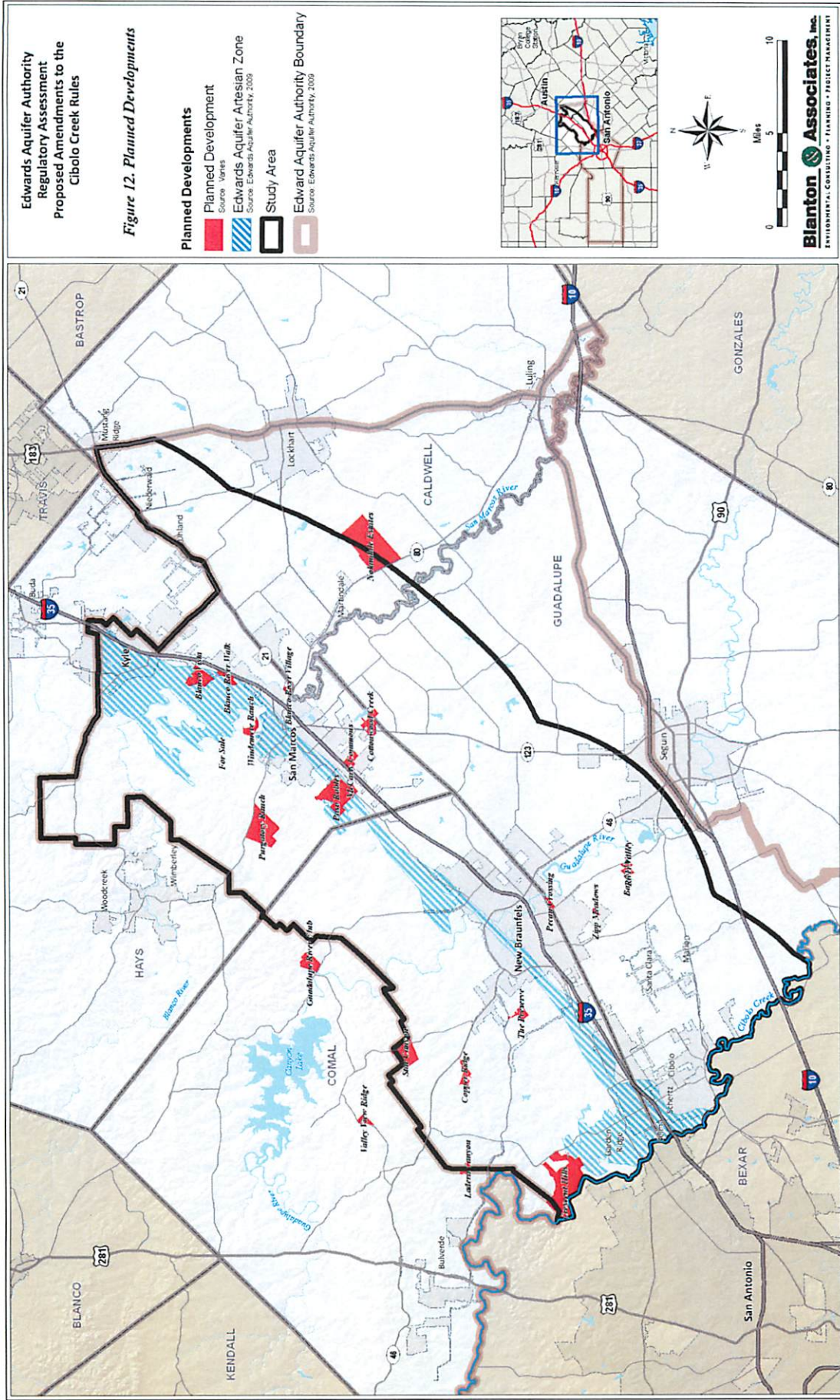
4.1.9 Leases/Conditionally Approved Sales

Methods

A list of leases and conditionally approved sales with their corresponding expiration dates was provided by the EAA (EAA, 2009c). Of primary importance were those leases and conditionally approved sales that, upon expiration, return to counties west of Cibolo Creek. This data was added to the CCN database to analyze water availability upon expiration of west-east transfers.

Results

Summaries of the EAA leases and conditionally approved sales are presented on Tables 4-11, 4-12, 4-13, and 4-14.



EDWARDS AQUIFER AUTHORITY REGULATORY ASSESSMENT FOR PROPOSED AMENDMENTS TO THE EXISTING CIBOLA CREEK TRANSFER RULES

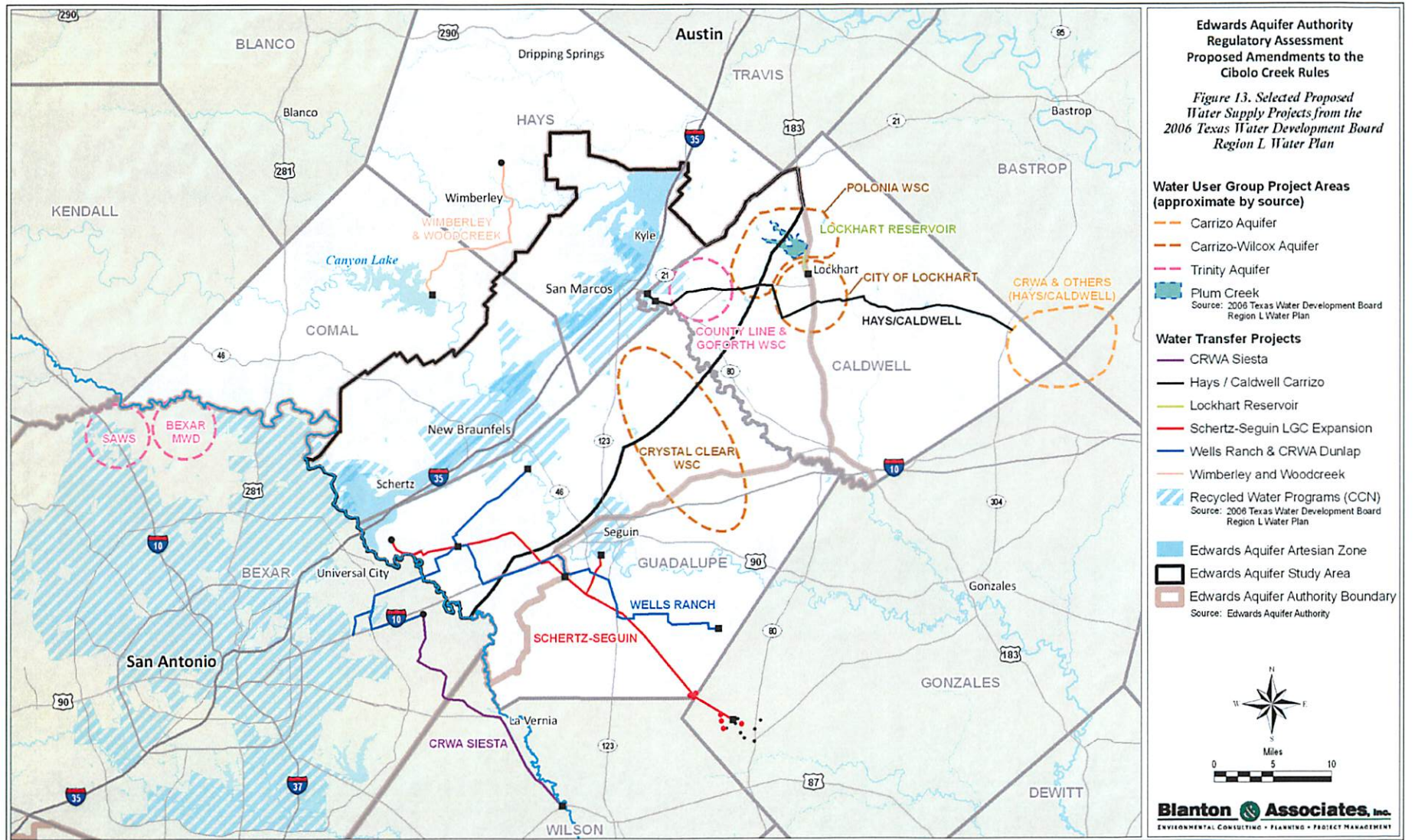


Table 4-11 Summary of Cibolo Creek Transfer Leases by County and Lease Expiration Date

County From	County To	Expiration Year	Total Number of Permits/Leases	Total Amount Leased (Acre-feet per year)
Medina	Comal	2013	3	500.000
		2017	1	171.560
		Total	4	671.560
Uvalde	Comal	2012	1	305.600
		Total	1	305.600
Bexar	Comal	2012	1	22.840
		2013	1	200.000
		Total	2	222.840
Medina	Hays	2010	0	0.000
		Total	0	0.000
Uvalde	Hays	2010	0	0.000
		Total	0	0.000
Medina	Guadalupe	2010	1	50.000
		Total	1	50.000
Uvalde	Guadalupe	2011	1	46.000
		Total	1	46.000
		2010	1	50.000
		2011	1	46.000
		2012	2	328.440
		2013	4	700.000
		2017	1	171.560
		Total	9	1,296.00

Source: EAA, 2009a

Table 4-12 Summary of Cibolo Creek Transfers Conditionally Approved Sales by County and Expiration Date

County From	County To	Expiration Year	Total Number of Pending Sales	Total Amount Pending Sales (Acre-feet)
Medina	Comal	Total	4	0.000
Uvalde	Comal	2010	1	1.000
		Total	1	1.000
Bexar	Comal	Total	0	0.000
Medina	Hays	2010	1	115.206
		Total	1	115.206
Uvalde	Hays	2010	2	964.600
		Total	2	964.600
Total All Counties		2010	4	979.806
		Total	4	1,080.806

Source: EAA, 2009a

Table 4-13 Summary Cibolo Creek Transfer Leases by CCN and Lease Expiration Date

County From	To CCN	Expiration Year	Total Number of Permits/Leases	Total Amount Leased (Acre-feet)
Bexar	Green Valley SUD	2012	1	22.840
		2013	1	200.000
		Total	2	222.840
Medina	Green Valley SUD	2013	3	500.000
		2017	1	171.560
		Total	4	671.560
	City of Marion	2010	1	50.000
		Total	1	50.000
Uvalde	Green Valley SUD	2012	1	305.600
		Total	1	305.600
	City of Marion	2011	1	46.000

Table 4-13 Summary Cibolo Creek Transfer Leases by CCN and Lease Expiration Date

County From	To CCN	Expiration Year	Total Number of Permits/Leases	Total Amount Leased (Acre-feet)
		Total	1	46.000
<i>Total All Counties</i>		2010	1	50.000
		2011	1	46.000
		2012	2	328.440
		2013	4	700.000
		2017	1	171.560
		Total	9	1,296.000

Source: EAA, 2009a

Table 4-14 Summary of Cibolo Creek Transfer Conditionally Approved (Pending) Sales by CCN and Expiration Date

County From	To CCN	Expiration Year	Total Number of Pending Sales	Total Amount Pending Sales (Acre-feet)
Uvalde	County Line WSC	2010	1	100.000
		Total	1	100.000
Uvalde	Crystal Clear WSC	2010	1	864.600
		Total	1	864.600
Uvalde	John Stuart Sitework	2010	1	1.000
		Total	1	1.000
Medina	County Line WSC	2010	1	115.206
		Total	1	115.206
<i>Total All Counties</i>		2010	4	1,080.806
		Total	4	1080.806

Source: EAA, 2009a

4.1.10 Existing Water Market

A telephone survey was conducted of the sellers and lessors identified on the EAA website to determine the existing market for groundwater rights in Sub-areas 1 and 2. As noted in **Table 4-15**, the groundwater rights in Sub-area 1 (east of Cibolo Creek) are limited in supply and notably more expensive than groundwater rights in Sub-area 2 (west of Cibolo Creek). The difference in price is assumed to be a function of supply and demand with 81 potential sales or leases available in Sub-area 2 compared with five available in Sub-area 1. The cost of groundwater rights west of Cibolo Creek is heavily influenced by the primary holder and assumed future purchaser of Aquifer water rights west of Cibolo Creek, i.e., the San Antonio Water System, which currently is paying \$5,500 per acre-foot to purchase water rights.

Table 4-15 Cost Range by Location and Type of Transfer

Location	Sales price range per acre-foot (one-time purchase)	Lease price range per acre-foot annually	Total number of listings
Sub-area 1—East of Cibolo Creek	\$12,500	\$400-\$800	5
Sub-area 2—West of Cibolo Creek	\$5,500-\$8,000	\$100-\$350	81

Source: see Appendix D

4.2 Edwards Aquifer

The Aquifer is an underground layer of porous, honeycombed, water-bearing rock that is between 300 and 700 feet thick. The San Antonio segment of the Aquifer extends 160 miles from Brackettville in the west to near Kyle in the northeast and is between 5 and 40 miles wide at the surface. The Aquifer is one of the most productive Aquifers of its type in the nation. It is the primary source of public water supply

for Bexar County, Texas, and is the primary source of drinking water for approximately 1.7 million people in south-central Texas (EAA 2007a). An estimated 800,000 acre-feet of water are discharged from the Aquifer to wells and springs every year.

The Aquifer system is divided into three main zones: the Contributing Zone, the Recharge Zone, and the Artesian Zone. The Contributing Zone consists of a 5,400-square-mile drainage area where rainfall runs off into streams or infiltrates into the water table and eventually reaches the Recharge Zone. The Recharge Zone is a 1,250-square-mile area where highly faulted and fractured Aquifer limestones outcrop at the land surface, allowing large quantities of water to flow into the Aquifer. The Artesian Zone is a 2,100-square-mile area that consists of a complex network of interconnecting spaces, varying from microscopic pores to open caverns, where water is forced to the surface and discharged through springs. Major natural discharge occurs at Comal Springs and San Marcos Springs in the northeast.

Most recharge to the Aquifer results from the percolation of stream flow losses and the infiltration of precipitation through porous parts of the out-cropping Recharge Zone. Major drainage basins that contribute to recharge and their respective contributions in the 10-year period between 1996 and 2005 are provided in **Table 4-16**. The Nueces River basin, the Frio-Sabinal River basins, and the Seco-Hondo Creek and Medina River basins supply about 70 percent of the total recharge to the Aquifer (EAA 2007a).

Table 4-16 Major Drainage Sub-basins Contributing to the Aquifer

River Basin	Sub-basin	Estimated Average Groundwater Recharge to the Aquifer from 1996 to 2005 (thousands of acre-feet)
Sabinal	Nueces/West Nueces River Basin	190.7
	Frio/Dry Frio River Basin	179.4
	Sabinal River Basin	53.9
	Area between Sabinal River and Medina River Basin	149.1
San Antonio	Medina River Basin	76.5
	Area between Medina River and Cibolo Creek/Dry Comal Creek Basin	97.1
	Cibolo Creek /Dry Comal Creek Basin	165.8
Guadalupe	Blanco River Basin	81.6

Source: EAA 1999-2005 (Hydrologic Data Report from 2005)

4.3 Springflows from Comal and San Marcos Springs

Comal and San Marcos Springs are the two largest groups of springs in Texas. Both are sustained by outflow from the Aquifer and discharge at an average rate of 100 cubic feet per second (cfs). These springs have been modified in the past for various reasons and have been largely surrounded by urban development. Springflows from Comal and San Marcos Springs support recreational activities and businesses, provide surface water to several thousand downstream users, and ensure the survival of a number of threatened and endangered species. **Table 4-17** provides average yearly flows for the period between 1999 and 2005, and **Table 4-18** provides monthly flows from Comal and San Marcos Springs as well as other large springs of the Aquifer in the year 2005. The following paragraphs describe the springs and the importance of springflows.

Table 4-17 Annual Spring Discharge from the Aquifer, 1999 to 2005 (acre-feet)

Year	Leona Springs and Leona River Underflow	San Pedro Springs	San Antonio Springs	Comal Springs	Hueco Springs	San Marcos Springs	Total Monthly Discharge from Springs
1999	33,137	4,485	12,898	247,702	27,561	130,312	456,095
2000	19,074	1,415	2,026	189,630	23,804	101,560	337,509
2001	15,520	6,400	22,985	247,280	69,383	167,880	529,448
2002	12,200	10,000	58,600	274,800	58,400	195,900	606,900
2003	35,888	10,581	75,637	282,710	47,679	169,040	621,535
2004	48,700	114,000	85,600	276,600	53,200	147,400	622,900
2005	51,566	10,340	79,930	288,000	47,910	169,400	647,146
<i>Average Annual Discharge</i>	<i>30,869</i>	<i>22,460</i>	<i>48,239</i>	<i>258,103</i>	<i>46,848</i>	<i>154,499</i>	<i>545,933</i>

Source: EAA 1999-2005 (Hydrologic Data Report from 1999 to 2005)

Table 4-18 Estimated Spring Discharge from the Aquifer, 2005 (acre-feet)

Month	Leona Springs and Leona River Underflow	San Pedro Springs	San Antonio Springs	Comal Springs	Hueco Springs	San Marcos Springs	Total Monthly Discharge from Springs
January	5,252	1,360	12,610	27,130	5,550	20,480	72,382
February	5,122	1,300	12,230	24,900	5,170	17,460	66,182
March	6,704	1,410	13,880	28,340	6,010	18,610	74,954
April	5,579	1,200	10,070	26,530	5,250	17,460	66,089
May	4,322	1,010	7,490	26,140	5,100	16,410	60,472
June	3,661	777	5,760	23,810	4,590	14,450	53,048
July	3,209	541	2,920	22,450	4,360	12,880	46,360
August	3,613	603	3,420	22,230	4,160	11,890	45,916
September	3,374	549	2,900	215,210	2,760	10,890	41,993
October	3,533	529	2,720	22,360	2,110	10,790	42,042
November	3,576	515	2,760	21,240	1,540	9,240	38,871
December	3,620	553	3,160	21,380	1,310	8,840	38,863
<i>Total</i>	<i>51,566</i>	<i>10,340</i>	<i>79,930</i>	<i>288,000</i>	<i>47,910</i>	<i>169,400</i>	<i>647,146</i>

Source: EAA 1999-2005 (Hydrologic Data Report from 2005)

Comal Springs are the largest spring group in Texas with a mean flow of 300 cfs. The springs are located in New Braunfels, Comal County, and release from four major orifices located along a 1,500-yard stretch of the Balcones Escarpment above Landa Lake. The springs give rise to the Comal River, which flows for two miles through Landa Park and New Braunfels before draining into the Guadalupe River. Landa Lake and the Comal River are presently used for recreation and the production of hydroelectric power. In addition, the springs serve as critical habitat for three endangered species.

Flows at Comal Springs become intermittent when the level of the J-17 index well in San Antonio drops below 620 feet, and springflows cease at 618 feet. The only time the springs have dried up in recorded history was from June to November of 1956, during the 1950s drought.

San Marcos Springs are the second largest spring group in Texas with a mean flow of 161 cfs. The springs, located in San Marcos, Hays County, are under approximately 40 feet of water in Spring Lake, which was originally created by damming the springs for hydroelectric power. Water releases from six major orifices along the base of the Balcones Escarpment, as well as from numerous smaller openings. The springs give rise to the San Marcos River, which flows approximately 4 miles through San Marcos to

its confluence with the Blanco River, then continuing on approximately 75 miles to the Guadalupe River. For years, San Marcos Springs and Spring Lake served as a tourist attraction known as Aquarena Springs but is now owned by Texas State University and used for educational purposes. The springs and San Marcos River immediately downstream serve as critical habitat for four endangered species.

San Marcos Springs have never ceased to flow in recorded history. The lowest recorded flow rate was 46 cfs in August of 1956, during the same time that Comal Springs dried up. San Marcos Springs would cease to flow with a water elevation of about 574 feet at the springs.

4.4 Threatened and Endangered Species

Nine federally listed threatened or endangered species are dependent on water in or directly discharged from the Aquifer system and are addressed in the EAA's draft Edwards Aquifer Habitat Conservation Plan. These include eight aquatic species that live in the Aquifer, its springs, and surface streams immediately downstream of the springs and the whooping crane (*Grus americana*), which is dependent on estuarine habitats that are fed by surface streams receiving springflows from the Aquifer. The federally listed species are identified in Table 4-19. The following paragraphs provide general descriptions of each group of species, their habitats (including designated critical habitat), imminent threats to their survival, and conservation measures.

Table 4-19 Federally Listed Threatened and Endangered Species Associated with the Aquifer

Species	Federal Listing Status (Date Listed) ¹	Habitat Description/Distribution	Critical Habitat Designated?
AQUATIC SPECIES			
San Marcos salamander (<i>Eurycea nana</i>)	T (7/14/1980)	Shallow alkaline springs carved out of limestone, with sand and gravel substrate; Restricted to San Marcos Springs, Spring Lake, and a few hundred feet of San Marcos River	Yes (7/14/1980)
Texas blind salamander (<i>Typhlomolge rathbuni</i>)	E (3/10/1967)	Endemic to underground limestone caverns in the Aquifer around San Marcos	No
Fountain darter (<i>Etheostoma fonticola</i>)	E (10/12/1970)	Clear, quiet backwater areas with dense bottom growth of aquatic plants and matted algae within Spring Lake, San Marcos River (to the confluence of the Blanco River), and Comal River	Yes (7/14/1980)
San Marcos gambusia (<i>Gambusia georgei</i>)	E (7/14/1980)	Likely extinct; Preferred clean, clear backwater areas with muddy bottom and stable temperature; Was restricted to a few kilometers of the San Marcos River below Spring Lake	Yes (7/14/1980)
Peck's cave amphipod (<i>Stygobromus pecki</i>)	E (12/18/1997)	Subterranean springs; restricted to Comal Springs and Hueco Springs in Comal County	Yes (7/17/2007)
Comal Springs dryopid beetle (<i>Stygoparnus comalensis</i>)	E (12/18/1997)	Flowing, uncontaminated waters within Comal Springs and Fern Bank Springs	Yes (7/17/2007)
Comal Springs riffle beetle (<i>Heterelmis comalensis</i>)	E (12/18/1997)	Gravel substrates and shallow riffles in spring runs; known from Comal Springs and from a single specimen in San Marcos Springs	Yes (7/17/2007)
Texas wild-rice (<i>Zizania texana</i>)	E (4/26/1978)	Gravel shallows in clear, flowing waters in the upper 4 miles of the San Marcos River	Yes (7/14/1980)

Table 4-19 Federally Listed Threatened and Endangered Species Associated with the Aquifer

Species	Federal Listing Status (Date Listed) ¹	Habitat Description/Distribution	Critical Habitat Designated?
OTHER SPECIES			
Whooping crane (<i>Grus americana</i>)	E (3/11/1967)	Winters in coastal marshes of Aransas, Calhoun, and Refugio Counties; during migration occasionally uses marshes, river bottoms, potholes, prairies, and croplands	Yes (5/15/1978)

¹E = Endangered; T = Threatened

Sources: USFWS 1997, 1980, 1978, 1967; EAA 2007b, c, d

4.4.1 Aquatic Species

The eight listed aquatic species include two salamanders, two fish, one crustacean, two insects, and one vascular plant. The species are known from Comal, San Marcos, and Fern Bank Springs and associated subterranean caverns, Spring Lake, and the Comal and San Marcos Rivers immediately downstream from the springs. Due to the different types of species, habitat requirements vary, but all species are endemic to clear, uncontaminated waters of the Aquifer.

As noted in Table 4-19, critical habitat has been designated for all but the Texas blind salamander (*Typhlomolge rathbuni*). General information regarding designated critical habitat for each species is provided in Table 4-20.

Table 4-20 Designated Critical Habitat Units for Listed Aquatic Species

Species	Critical Habitat Description	Area of Critical Habitat (acres)
San Marcos salamander (<i>Eurycea nana</i>)	Spring Lake and its outflow, the San Marcos River, downstream approximately 50 meters from the Spring Lake Dam	Unknown
Texas blind salamander (<i>Typhlomolge rathbuni</i>)	No designated critical habitat	NA
Fountain darter (<i>Etheostoma fonticola</i>)	Spring Lake and its outflow, the San Marcos River, downstream approximately 0.5 mile below the IH 35 bridge	Unknown
San Marcos gambusia (<i>Gambusia georgei</i>)	San Marcos River from the RM 12 bridge downstream to 0.5 mile below the IH 35 bridge	Unknown
Peck's cave amphipod (<i>Stygobromus pecki</i>)	Aquatic habitats and shorelines in Comal and Hueco Springs	38.5
Comal Springs dryopid beetle (<i>Stygoparnus comalensis</i>)	Aquatic habitats in Comal and Fern Bank Springs	39.5
Comal Springs riffle beetle (<i>Heterelmis comalensis</i>)	Aquatic habitats in Comal and San Marcos Springs	30.3
Texas wild-rice (<i>Zizania texana</i>)	Spring Lake and its outflow, the San Marcos River, downstream to its confluence with the Blanco River	Unknown

Common threats to listed aquatic species and the spring systems they inhabit include reduced springflows caused by increased water withdrawals; elimination of habitat through excavation/construction, degradation of water quality caused by urban expansion, hazardous materials spills, pesticide use, and storm water pollutants; and long-term water depletion of the Aquifer. Conservation efforts are focused on the protection of the occupied springs, lakes, and river segments and adjacent buffer zones.

4.4.2 Other Species

In addition to the aquatic species discussed above, the whooping crane is of concern to the EAA because surface streams carrying springflow from the Aquifer eventually reach the estuarine habitats that comprise this species' critical wintering habitat located in and around the Aransas National Wildlife Refuge. The whooping crane population that winters on the Texas coast represents the only self-sustaining population of the species and consists of 215 individuals (Canadian Wildlife Service and USFWS 2007). Current threats include limited genetics of the population, loss and degeneration of migration stopover habitat, construction of additional power lines, degradation of coastal ecosystems, and threat of chemical spills in Texas. Continuing conservation efforts include the protection of nesting, wintering, and migratory stopover habitats; captive breeding programs; monitoring of migrating flocks; and public education programs.

4.5 Other Aquifer Related Elements of the Natural Environment

Table 4-21 provides a list of the major streams that may be influenced by springflows, along with water quality information for various stream segments. Overall, water quality in the major stream segments in these basins is good.

Table 4-21 Water Quality in Surface Streams Receiving Springflows from the Aquifer

River/Stream	Segment ID	Segment Name	303(d) impairment
Nueces River	2112	Upper Nueces River	None
Frio River	2113	Upper Frio River	Impaired fish community
	2117	Frio River Above Choke Canyon Reservoir	Bacteria
Sabinal River	2110	Lower Sabinal River	None
	2111	Upper Sabinal River	None
Medina River	1903	Medina River Below Medina Diversion Dam	None
	1905	Medina River Above Medina Lake	None
	1909	Medina Diversion Lake	None
Cibolo Creek	1902	Lower Cibolo Creek	Bacteria
	1908	Upper Cibolo Creek	Bacteria
	1913	Mid Cibolo Creek	Bacteria
Guadalupe River	1804	Guadalupe River Below Comal River	None
	1806	Guadalupe River Above Canyon Lake	Bacteria
	1812	Guadalupe River Below Canyon Dam	None
Comal River	1811	Comal River	None
Blanco River	1809	Lower Blanco River	None
	1813	Upper Blanco River	None
San Marcos River	1808	Lower San Marcos River	None
	1814	Upper San Marcos River	None
Seco Creek	2115	Seco Creek	None
Leon Creek	1907	Upper Leon Creek	None
	1906	Lower Leon Creek	PCBs in fish tissue, depressed dissolved oxygen, bacteria
Hondo Creek	2114	Hondo Creek	None

Source: TCEQ 2008 (303(d) list, March 19, 2008)

4.6 Related EAA Regulatory Program

The impact of the PRs on existing EAA regulatory programs are addressed in Section 5.6, including the potential impacts on the following:

- Aquifer management fees
- Groundwater withdrawal and related programs such as well flow metering and critical period management
- Well registration
- Well construction and well plugging permits
- Storage tank regulations
- Comprehensive water management such as groundwater conservation planning and Aquifer management pool determinations
- Enforcement

5.0 ASSESSMENT OF THE POTENTIAL IMPACTS OF IMPLEMENTING PROPOSED AMENDMENTS TO CHAPTER 711 (GROUNDWATER WITHDRAWALS) SUBCHAPTER L (ADMINISTRATION OF PERMITS)

5.1 Regulated Community—General

This section describes the potential impacts of the proposed amendments to Chapter 11 Subchapter L (Administration of Permits). As previously noted, the PRs would eliminate, with limited exceptions, the transfer of groundwater rights from a withdrawal point located west of Cibolo Creek to a withdrawal point located east of Cibolo Creek.

5.1.1 No Action

If the proposed amendments to the Cibolo Creek Rules were not adopted and implemented, the regulated community as defined in Section 4.1 would be required to continue to comply with existing Cibolo Creek Rules and follow the current process used to evaluate and approve/deny transfer applications.

5.1.2 Action Alternative – Implement Proposed Amendments

Currently, under the existing Cibolo Creek Rules the EAA Board has the authority to approve, approve with modifications, or deny any application for transfer of groundwater rights from west to east of Cibolo Creek based on the EAA's assessment of whether or not the transfer complies with the following provisions:

- 1) aquatic and wildlife habitat will be protected;
- 2) species that are designated as threatened or endangered under applicable federal and state law will be protected; and
- 3) continuous minimum springflows of the Comal Springs and San Marcos Springs will be maintained to protect endangered and threatened species to the extent required by federal law.

The process as required by the existing Cibolo Creek Rules has the potential to be rigorous and costly (in terms of money and schedule) as each transfer application is expected to include documentation demonstrating that the transfer complies with the provisions identified above. In addition, the existing Cibolo Creek Rules require that EAA staff and Board evaluate the applicant's assessment and make a recommendation/decision based on the documentation submitted by the applicant.

The PRs would be expected to avoid and/or minimize the potential rigor and costliness associated with the current Cibolo Creek Rules by providing specific criteria and guidance that, while potentially limiting transfers, clarify when and how transfers applications would be expected to be approved.

The proposed amendments will:

- 1) clarify the administrative process (i.e., only general manager approval is required, not EAA Board)
- 2) eliminate the requirement that the applicant demonstrate that
 - a) aquatic and wildlife habitat will be protected

- b) federally protected and threatened and endangered species will be protected
 - c) continuous minimal springflow at Comal and San Marco Springs will be maintained to protect endangered and threatened species to the extent required by federal law
- 3) provide specific criteria for the following scenarios:
- a) transfer is a lease, and the right to withdraw groundwater is transferred to a well that existed before January 9, 2007, for a five-year period
 - b) the transfer is a lease, and the lease was approved by the EAA Board prior to the effective date of the Final Rules
 - c) the transfer is a pre-July 11, 2006, approved sale
 - d) the transfer is a sale, and the sale was originally approved by the EAA Board on or before July 11, 2006
 - e) the transfer is a sale, and the sale resolves a compliance issue for a pre-January 9, 2007, well
 - f) the sales was conditionally appraised between July 21, 2006, and the effective date of the Final Rules

A more detailed assessment of these proposed modifications/amendments is presented in Section 2.0. Potential impacts to the regulated community are identified below by the following headings:

- Retail Water Providers/CCN Holders
- Non-CCN Permit Holder
- Exempt Wells (Domestic/Livestock)
- Wholesale Water Providers
- Proposed Water Supply Projects
- Planned Developments
- EAA Leases/Conditionally Approved Sales
- Water Markets

5.1.2.1 Retail Water Providers—CCN Holders

Table 5-1 identifies the projected demand by year versus the existing water supply for the major CCN holders in Sub-area 1. Note that **Table 5-1** compares projected demand versus existing supply, which is based on the assumption that no additional water rights and/or supply sources will be acquired through the year 2060. This comparison is intended to demonstrate the worst-case scenario for each of the CCNs and is not expected to occur. As noted in Section 4.0, the Region L Water Plan identified 10 potential water supply projects located within 10 miles of Sub-area 1, some of which would be expected to be developed. As noted in **Table 5-1**, the county-wide totals for all major water suppliers combined is expected to be adequate for Comal and Hays Counties through the year 2030. However, several individual CCN holders are expected to experience shortage prior to the year 2030 as shown below.

Table 5-1 Projected Demand and Existing Supplies for Major Water Suppliers (CCNs)

County	Utility	Projected Water Demand (Acre-feet) ⁽¹⁾							Existing Supply (Acre-feet)	Amount Existing Supply Exceeds Projected Demand (by year)							Estimated Year Projected Demand Exceeds Existing Supply
		2000	2010	2020	2030	2040	2050	2060		2000	2010	2020	2030	2040	2050	2060	
Comal	City of Selma	23	136	215	306	353	400	450	1,861	1,838	1,725	1,646	1,555	1,508	1,461	1,411	2060+
	City of Garden Ridge ⁽¹⁾	458	565	703	860	1,018	1,181	1,360	1,454	996	889	751	594	436	273	94	2060+
	City of Schertz	2,827	3,879	5,212	6,617	8,035	9,660	11,410	7,368	4,541	3,489	2,156	751	-667	-2,292	-4,042	2036
	Green Valley SUD	2,056	2,617	3,323	4,144	4,873	5,796	6,790	7,899	5,843	5,282	4,576	3,755	3,026	2,103	1,109	2060+
	New Braunfels Utilities (aka City of New Braunfels)	8,339	10,509	13,213	16,350	19,457	22,667	26,226	14,290	5,951	3,781	1,077	-2,060	-5,167	-8,377	-11,936	2024
Comal Total		13,703	17,706	22,666	28,277	33,736	39,704	46,236	32,873	19,170	15,167	10,207	4,596	-863	-6,831	-13,363	
Hays	County Line WSC	366	1,151	2,307	2,724	2,894	3,212	3,677	2,570	2,204	1,419	263	-154	-324	-642	-1,107	2027
	City of Kyle	702	2,740	3,940	4,217	4,377	4,874	5,203	3,389	2,687	649	-551	-828	-988	-1,485	-1,814	2016
	City of San Marcos	5,914	8,038	11,198	14,371	17,824	21,559	24,439	15,433	9,519	7,395	4,235	1,062	-2,391	-6,126	-9,006	2034
	Crystal Clear WSC	1,540	2,041	2,652	3,344	3,973	4,761	5,551	3,177	1,632	1,131	520	-172	-801	-1,589	-2,379	2027
	Goforth WSC	778	1,156	1,609	2,046	2,492	3,040	3,485	2,127	1,349	971	518	81	-365	-913	-1,358	2032
	Maxwell Water Supply Corporation	451	660	878	1,093	1,290	1,520	1,733	649	198	-11	-229	-444	-641	-871	-1,084	2010
	Monarch Utilities I L P (Plum Creek)	392	566	762	963	1,168	1,427	1,630	560	168	-6	-202	-403	-608	-867	-1,070	2010

Table 5-1 Projected Demand and Existing Supplies for Major Water Suppliers (CCNs)

County	Utility	Projected Water Demand (Acre-feet) ⁽¹⁾								Existing Supply (Acre-feet)	Amount Existing Supply Exceeds Projected Demand (by year)						Estimated Year Projected Demand Exceeds Existing Supply
		2000	2010	2020	2030	2040	2050	2060	2000		2010	2020	2030	2040	2050	2060	
Hays Total		10,143	16,352	23,346	28,758	34,018	40,393	45,718	27,900	17,981	12,120	5,518	508	-4,342	-10,199	-15,118	
Guadalupe	City of Cibola	598	866	1,190	1,546	1,898	2,298	2,730	2,050	1,452	1,184	860	504	152	-248	-680	2044
	City of Manton	154	164	179	194	209	229	251	537	383	373	358	343	328	308	286	2060+
	City of Seguin	4,463	5,018	5,718	6,454	7,203	8,069	9,047	15,100	10,637	10,082	9,382	8,646	7,897	7,031	6,053	2060+
Guadalupe Total	Springs Hill WSC	2,076	2,349	2,679	3,056	3,424	3,849	4,330	7,560	5,484	5,211	4,881	4,504	4,136	3,711	3,230	2060+
		7,291	8,397	9,766	11,250	12,734	14,445	16,358	25,247	17,956	16,850	15,481	13,997	12,513	10,802	8,889	
Caldwell	Creedmoor MAHA Water Supply Corporation	170	244	316	382	448	514	583	721	551	477	405	339	273	207	138	2060+
	Martindale WSC	119	189	217	242	273	298	329	746	627	557	529	504	473	448	417	2060+
	Polonia WSC	462	668	886	1,074	1,268	1,457	1,656	2,283	1,821	1,615	1,397	1,209	1,015	826	627	2060+
Caldwell Total		751	1,101	1,419	1,698	1,989	2,269	2,568	3,750	2,999	2,649	2,331	2,052	1,761	1,481	1,182	

⁽¹⁾ Compiled from TWDB 2006 (Region L Water Plan)

⁽²⁾ 2008 Annual use substituted for unpermitted water source

CCN Holder	Estimated Year Projected Demands Exceeds Existing Supply
New Braunfels Utilities	2024
County Line WSC	2027
Crystal Clear WSC	2027
Maxwell WSC	2010
Monarch Utilities LP (Plum Creek)	2010
City of Kyle	2016

The projections for two of these entities, County Line WSC and Crystal Clear WSC, are dependent on conditional sales that are subject to the PRs. A detailed analysis of the impact of the PRs on these entities as well as the Green Valley SUD (which has a current Cibolo Creek lease transfer that has the potential to be impacted by the PRs) is presented below.

The three retail water providers listed below were identified as having the potential to be directly impacted by the PRs:

Retail Water Provider	Type of Transfer
Green Valley Special Utility District	Lease Transfer
Crystal Clear Water Supply Corporation	Conditional Sale
County Line Water Supply Corporation	Conditional Sale

Each of these water supply entities has existing transfer leases and/or conditional sales that have some potential to be impacted by the PRs, which in turn has the potential to impact their ability to meet their projected water demands.

Green Valley Special Utility District (SUD)

The Green Valley SUD currently holds three transfer leases totaling 1,200 acre-feet that were previously approved by the EAA Board which, under the PRs, would expire in accordance with the following schedule and could not be renewed.

Expiration Date	Amount expiring (acre-feet per year)
January 1, 2012	328.44
January 1, 2013	700.00
January 1, 2017	171.56
Total	1,200.00

As demonstrated on **Table 5-2**, the leases that will be schedule to expire represent approximately 15.2% of the Green Valley SUD total water supply. In spite of the expiration of these leases, the Green Valley SUD is projected to have ample water supply through at least 2050, even if they do not acquire the rights to any additional water during this period. Therefore, the expiration of this lease as a result of the PRs is not expected to have a measureable impact on the Green Valley SUD.

Table 5-2 Green Valley SUD - Lease Transfer - Potential Impact of PRs on Existing Cibolo Creek Leases/Transfers

Year	EAA Leased Authorized Use (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Leased EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Leased Water is of Total Water Supply	Estimated Projected Water Demand ⁽³⁾ (Acre-feet)	Estimated Total Excess Capacity / Shortage (Acre-feet)
2010	1200	0.00	1200.00	7899.31	15.19%	2617	5282
2011	0	0.00	1200.00	7899.31	15.19%	2688	5211
2012	0	328.44	871.56	7570.87	11.51%	2759	4811
2013	0	700.00	171.56	6870.87	2.49%	2830	4040
2014	0	0.00	171.56	6870.87	2.49%	2900	3969
2015	0	0.00	171.56	6870.87	2.49%	2972	3898
2016	0	0.00	171.56	6870.87	2.49%	3043	3827
2017	0	171.56	0.00	6693.31	0.00%	3114	3579
2018		0.00	0.00	6693.31	0.00%	3185	3508
2019		0.00	0.00	6693.31	0.00%	3256	3437
2020	0	0.00	0.00	6693.31	0.00%	3323	3370
Totals		1200.00					

⁽¹⁾ As of January 1 of the year noted

⁽²⁾ Includes all water sources including surface water, other groundwater sources, and current Aquifer water

⁽³⁾ TWDB 2006 (Region L Water Plan interpolated based on 2010 and 2020 projections)

Crystal Clear WSC

The Crystal Clear WSC currently has a single conditionally approved sale for 864.60 acre-feet that has some potential to be impacted by the PRs. Therefore, three scenarios were considered in determining the potential impact of the PRs on the Crystal Clear WSC.

Scenario 1: Conditionally approved sale approved under existing Cibolo Creek Rules

Scenario 2: Conditionally approved sale expires and EAA Board denies application under current rules

Scenario 3: Conditionally approved sale expires but not denied by EAA Board and conditionally approved sale is subject to PRs

Tables 5-3, 5-4, and 5-5, respectively, identify the above three scenarios that could occur with regard to the pending sale and the PRs:

Table 5-3 Crystal Clear WSC Scenario 1 - Conditionally approved sale approved under existing Cibolo Creek Rules

Year	EAA Pending Sales (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Transfer EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Pending Sale is of Total Water Supply ⁽³⁾	Estimated Projected Water Demand ⁽⁴⁾ (Acre-feet)	Estimated Total Excess Capacity/ Shortage (Acre-feet)
2010	864.6	0.00	864.6	3177.66	27.24%	2041	1130
2011	0	0.00	864.6	3177.66	27.24%	2102	1069
2012	0	0.00	864.6	3177.66	27.24%	2163	1008
2013	0	0.00	864.6	3177.66	27.24%	2224	947
2014	0	0.00	864.6	3177.66	27.24%	2285	886
2015	0	0.00	864.6	3177.66	27.24%	2346	832
2016	0	0.00	864.6	3177.66	27.24%	2407	764
2017	0	0.00	864.6	3177.66	27.24%	2468	703
2018	0	0.00	864.6	3177.66	27.24%	2529	649
2019	0	0.00	864.6	3177.66	27.24%	2591	587

Table 5-3 Crystal Clear WSC Scenario 1 - Conditionally approved sale approved under existing Cibolo Creek Rules

Year	EAA Pending Sales (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Transfer EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Pending Sale is of Total Water Supply ⁽³⁾	Estimated Projected Water Demand ⁽⁴⁾ (Acre-feet)	Estimated Total Excess Capacity/ Shortage (Acre-feet)
2020	0	0.00	864.6	3177.66	27.24%	2652	526

⁽¹⁾ As of January 1 of the year noted

⁽²⁾ Includes all water sources including surface water, other groundwater sources, and current Aquifer water

⁽³⁾ TWDB 2006 (Region L Water Plan interpolated based on 2010 and 2020 projections)

⁽⁴⁾ Based on a total water supply of 3171.660 acre-feet that includes the 864.60 acre-feet pending sale

Table 5-4 Crystal Clear WSC Scenario 2 – Conditionally approved sale expires and EAA Board denies application under current rules

Year	EAA Pending Sales (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Transfer EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Pending Sale is of Total Water Supply ⁽³⁾	Estimated Projected Water Demand ⁽⁴⁾ (Acre-feet)	Estimated Total Excess Capacity / Shortage (Acre-feet)
2010	864.6	864.60	0	2307.60	27.24%	2041	265
2011	0	0.00	0	2307.60	0.00%	2102	204
2012	0	0.00	0	2307.60	0.00%	2163	143
2013	0	0.00	0	2307.60	0.00%	2224	82
2014	0	0.00	0	2307.60	0.00%	2285	22
2015	0	0.00	0	2307.60	0.00%	2346	-38
2016	0	0.00	0	2307.60	0.00%	2407	-100
2017	0	0.00	0	2307.60	0.00%	2468	-161
2018	0	0.00	0	2307.60	0.00%	2529	-221
2019	0	0.00	0	2307.60	0.00%	2591	-283
2020	0	0.00	0	2307.60	0.00%	2652	-344

⁽¹⁾ As of January 1 of the year noted

⁽²⁾ Includes all water sources including surface water, other groundwater sources, and current Aquifer water

⁽³⁾ TWDB 2006 (Region L Water Plan interpolated based on 2010 and 2020 projections)

⁽⁴⁾ Based on a total water supply of 3171.660 acre-feet that includes the 864.60 acre-feet pending sale

Table 5-5 Crystal Clear WSC Scenario 3 - Conditionally approved sale expires but not denied by EAA Board and conditionally approved sale is subject to PRs

Year	EAA Pending Sales (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Transfer EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Pending Sale is of Total Water Supply ⁽³⁾	Estimated Projected Water Demand ⁽⁴⁾ (Acre-feet)	Estimated Total Excess Capacity/ Shortage (Acre-feet)
2010	864.6	0.00	864.60	3177.66	27.24%	2041	1130
2011	0	0.00	864.60	3177.66	27.24%	2102	1069
2012	0	0.00	864.60	3177.66	27.24%	2163	1008
2013	0	0.00	864.60	3177.66	27.24%	2224	947
2014	0	0.00	864.60	3177.66	0.00%	2285	892
2015	0	864.60	0.00	2307.60	0.00%	2346	-38
2016	0	0.00	0.00	2307.60	0.00%	2407	-100
2017	0	0.00	0.00	2307.60	0.00%	2468	-161
2018	0	0.00	0.00	2307.60	0.00%	2529	-221.00
2019	0	0.00	0.00	2307.60	0.00%	2591	-283.00
2020	0	0.00	0.00	2307.60	0.00%	2652	-344.00

⁽¹⁾ As of January 1 of the year noted

⁽²⁾ Includes all water sources including surface water, other groundwater sources, and current Aquifer water

⁽³⁾ TWDB 2006 (Region L Water Plan interpolated based on 2010 and 2020 projections)

⁽⁴⁾ Based on a total water supply of 3171.660 acre-feet that includes the 864.60 acre-feet pending sale

A discussion of each of the scenarios is presented below.

Scenario 1: Under this scenario the Crystal Clear WSC water supply would be expected to have an adequate water supply through the year 2029.

Scenario 2: Under this scenario, the Crystal Clear WSC existing water supply would be projected to have an excess capacity of 265 acre-feet in the year 2010 with an average increase in demand of approximately 61 acre-feet a year resulting in a projected shortage of approximately 38 acre-feet in the year 2015.

Scenario 3: Under this scenario, the Crystal Clear WSC would be projected to have an excess capacity of 1,130 acre-feet in the year 2010, which is significantly higher than the excess projected under Scenario 2. However, based on a lease expiration date of December 31, 2014 (per the PRs), the projected shortage of 38-acre feet for year 2015 would remain.

County Line WSC

County Line WSC currently has a single conditionally approved sale for 215.206 acre-feet that has the potential to be impacted by the PRs. Tables 5-6, 5-7, and 5-8 identify the following three scenarios that would occur in regard to the pending sale.

Scenario 1: Conditionally approved sale approved under existing Cibolo Creek Rules

Scenario 2: Conditionally approved sale expires and EAA Board denies application under current rules

Scenario 3: Conditionally approved sale expires but not denied by EAA Board and conditionally approved sale is subject to PRs

Table 5-6 County Line WSC Scenario 1 - Conditionally approved sale approved under existing Cibolo Creek Rules

Year	EAA Pending Sales (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Transfer EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Pending Sales of Total Water Supply ⁽³⁾	Estimated Projected Water Demand ⁽⁴⁾ (Acre-feet)	Estimated Total Excess Capacity / Shortage (Acre-feet)
2010	0	0.00	215.21	2570.25	9.14%	1151	1419
2011	0	0.00	215.21	2570.25	9.14%	1267	1303
2012	0	0.00	215.21	2570.25	9.14%	1382	1188
2013	0	0.00	215.21	2570.25	9.14%	1498	1072
2014	0	0.00	215.21	2570.25	9.14%	1613	957
2015	0	0.00	215.21	2570.25	9.14%	1729	841
2016	0	0.00	215.21	2570.25	9.14%	1845	725
2017	0	0.00	215.21	2570.25	9.14%	1960	610
2018	0	0.00	215.21	2570.25	9.14%	2076	494
2019	0	0.00	215.21	2570.25	9.14%	2191	379
2020	0	0.00	215.21	2570.25	9.14%	2307	263

⁽¹⁾ As of January 1 of the year noted

⁽²⁾ Includes all water sources including surface water, other groundwater sources, and current Aquifer water

⁽³⁾ TWDB 2006 (Region L Water Plan interpolated based on 2010 and 2020 projections

⁽⁴⁾ Based on a total water supply of 2355 acre-feet that includes the 215 acre-feet pending sale

Table 5-7 County Line WSC Scenario 2 - Conditionally approved sale expires and EAA Board denies application under current rules

Year	EAA Pending Sales (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Transfer EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Pending Sale is of Total Water Supply ⁽³⁾	Estimated Projected Water Demand ⁽⁴⁾ (Acre-feet)	Estimated Total Excess Capacity / Shortage (Acre-feet)
2010	215.206	215.21	0.00	2355.04	9.14%	1151	1204
2011	0	0.00	0.00	2355.04	0.00%	1267	1088
2012	0	0.00	0.00	2355.04	0.00%	1382	973
2013	0	0.00	0.00	2355.04	0.00%	1498	857
2014	0	0.00	0.00	2355.04	0.00%	1613	742
2015	0	0.00	0.00	2355.04	0.00%	1729	626
2016	0	0.00	0.00	2355.04	0.00%	1845	510
2017	0	0.00	0.00	2355.04	0.00%	1960	395
2018	0	0.00	0.00	2355.04	0.00%	2076	279
2019	0	0.00	0.00	2355.04	0.00%	2191	164
2020	0	0.00	0.00	2355.04	0.00%	2307	48

⁽¹⁾ As of January 1 of the year noted

⁽²⁾ Includes all water sources including surface water, other groundwater sources, and current Aquifer water

⁽³⁾ TWDB 2006 (Region L Water Plan interpolated based on 2010 and 2020 projections)

⁽⁴⁾ Based on a total water supply of 2355 acre-feet, which includes the 215 acre-feet pending sale

Table 5-8 County Line WSC Scenario 3 - Conditionally approved sale expires but not denied by EAA Board and conditionally approved sale is subject to PRs

Year	EAA Pending Sales (Acre-feet)	Total EAA Expiring ⁽¹⁾	Available Transfer EAA Water as of Jan 1	Total Available All Water Sources ⁽²⁾	Percent Pending Sales of Total Water Supply ⁽³⁾	Estimated Projected Water Demand ⁽⁴⁾ (Acre-feet)	Estimated Total Excess Capacity / Shortage (Acre-feet)
2010	215.21	0.00	215.21	2570.25	9.14%	1151	1419
2011	0	0.00	215.21	2570.25	9.14%	1267	1303
2012	0	0.00	215.21	2570.25	9.14%	1382	1188
2013	0	0.00	215.21	2570.25	9.14%	1498	1072
2014	0	0.00	215.21	2355.04	9.14%	1613	957
2015	0	215.21	0	2355.04	0.00%	1729	626
2016	0	0.00	0	2355.04	0.00%	1845	510
2017	0	0.00	0	2355.04	0.00%	1960	395
2018	0	0.00	0	2355.04	0.00%	2076	279
2019	0	0.00	0	2355.04	0.00%	2191	164
2020	0	0.00	0	2355.04	0.00%	2307	48

⁽¹⁾ As of January 1 of the year noted

⁽²⁾ Includes all water sources including surface water, other groundwater sources, and current Aquifer water

⁽³⁾ TWDB 2006 (Region L Water Plan interpolated based on 2010 and 2020 projections)

⁽⁴⁾ Based on a total water supply of 2355 acre-feet, which includes the 215 acre-feet pending sale

A discussion of the potential impacts of each of the scenarios identified above on the County Line WSC is presented below.

Scenario 1: Under this scenario, the County Line WSC would purchase and be able to withdraw the 215.21 acre-feet of water from a location east of Cibolo Creek for perpetuity. Under this scenario, the County Line WSC water supply would be expected to be adequate through the year 2022.

Scenario 2: Under this scenario, the County Line WSC would not acquire the permanent water rights to the 215.21 acre-feet which would represent approximately 9.14% of their total water

supply for the year 2010. However, the County Line WSC would be expected to still have an excess capacity of approximately 48 acre-feet in the year 2020 without this 215.21 acre-feet.

Scenario 3: Under this scenario, the County Line WSC would acquire the water rights for the years 2010 to 2014 with the water rights transferring to the original location west of Cibolo Creek in 2015. The projection of excess capacity for the year 2020 would be the same as in Scenario 2 (i.e., 48 acre-feet).

5.1.2.2 Non-CCN Permit Holders

As noted in **Table 4-4**, the majority (89.3%) of the total authorized water use for non-CCN permit holders is for industrial purposes. According to the Region L water plan, the primary demand for water in Sub-area 1 is expected to be for municipal uses. In addition, non-CCN permit holders make up less than 0.15% of the total unauthorized EAA water use in Sub-area 1 and none of the existing Cibolo Creek transfers. Finally, no non-CCN permit holders have existing leases and/or pending transfers.

5.1.2.3 Exempt Wells (Domestic/Livestock)

Individual wells used for exempt domestic/livestock purposes are not expected to be impacted by the PRs as Cibolo Creek transfers have not previously and are not expected to be used for exempt domestic/livestock individual wells.

5.1.2.4 Wholesale Water Providers

Wholesale water providers would be expected to experience some increase in demand from retail water suppliers as a result of the PRs. Currently, nine lease transfers are adopted and implemented and are subject to expiration in accordance with the PRs. In addition, four pending sales totaling 1,080.81 acre-feet are subject to the current Cibolo Creek Rules, but if these pending sales are not approved under the current rules and are denied by the EAA Board, the entities involved could also be impacted by the PRs. Additionally, six retail water providers are expected to experience shortages prior to the year 2030 based on existing supply versus projected demand. These entities will have to either purchase wholesale water from the identified providers and/or develop alternative supply sources to meet the projected demand. In short, reducing the potential supply of available water by removing the potential for Cibolo Creek Transfers via the PRs is expected to increase the demand for alternative water supply sources in Sub-area 1, and the wholesale water providers would be expected to have the potential to meet all or a portion of this projected demand. However, it is important to note that these wholesale water providers will be subject to the typical array of constraints associated with developing the necessary infrastructure to supply, treat, and distribute the water, including but not limited to the financial, engineering, legal, regulatory, institutional, and environmental constraints.

5.1.2.5 Proposed Water Supply Projects

A demand for the proposed water supply projects in the vicinity of Sub-area 1 currently exists. Any increase in demand that may occur as a result of the PRs would be expected to increase the support for the proposed water supply projects at a level commensurate with the proposed loss.

5.1.2.6 Planned Developments

The planned developments discussed in Section 4.1.7 are assumed to be incorporated into the water-supply and demand projections and analysis addressed in Section 5.1.2.1. In addition, all of the planned developments shown in **Table 4-9** are located within the boundaries of current CCN holders and would be expected to purchase water from these retail suppliers rather than develop their own water source.

5.1.2.7 Leases/Conditionally Approved Sales

See Section 5.1.2.1.

5.1.2.8 Water Markets

As noted in **Table 4-15**, currently, EAA water rights east of Cibolo Creek are more than twice as expensive to purchase and/or lease than water rights west of Cibolo Creek. This difference in cost is assumed to be a function of supply and demand (i.e., 81 sales/leases available west of Cibolo Creek versus five sales/leases available east of Cibolo Creek).

A summary of the current role of the Aquifer and specifically Cibolo Creek Transfers provides the context for evaluating the potential impact of the PRs on the overall water market as well as the impact on the market for permanently owned Aquifer water within Sub-area 1. **Table 5-9** identifies the transfers by type and use. Approximately 71.7% of the transfers that currently recorded are transfers for municipal use with approximately 25.6% for industrial uses and less than 1% for irrigation. As noted in **Table 5-10**, transfers represent approximately 10.7% of the total authorized Aquifer use east of Cibolo Creek.

As noted in **Table 5-11**, permitted Aquifer water represented approximately 25% of the TCEQ municipal water (CCN) use in Sub-area 1 in the year 2008. Cibolo Creek Transfers accounted for approximately 6% of the total TCEQ 2008 municipal (CCN) water use in Sub-area 1, and only 2.8% of the total water use for the year 2008 was the result of a Cibolo Creek Transfer of lease.

If the PRs were not adopted and implemented, Cibolo Creek Transfers would be expected to continue to represent similar percentages of the water supply as indicated on **Tables 5-9, 5-10, and 5-11** until transfers were no longer cost effective as compared to the cost of existing and future water supply alternatives and associated infrastructure (i.e., water treatment plants and distribution systems). If the PRs are adopted and implemented, the relative dependency on transfers is expected to decrease, and some increase in demand for alternative water supply sources is anticipated. However, as noted in the tables and above discussion, transfers (all types and uses) represent only about 10% of all Aquifer use east of Cibolo Creek and approximately 6% of municipal use, and less than 3% of the total water use for the year 2008 was the result of a Cibolo Creek Transfer of lease. In addition, approximately 43% (8,908 acre-feet) of authorized use east of Cibolo Creek was not utilized based on TCEQ use data for the year 2008.

The volume of water that could possibly be transferred from west to east under the current Cibolo Creek Rules is not quantified; however, the Cibolo Creek Study indicates that any additional transfers (based on location) have the potential to impact springflows and Comal and San Marcos Springs. In addition, as

Table 5-9 Transfers by Type and Use

	Permanent Sales (Acre-feet)	% of Total Permanent Sales	Pending Sales (Acre-feet)	% of Total Pending Sales	Leases (Acre-feet)	% of Total Leases	Total
Municipal (CCN)	471.92	29.55%	1,079.81	99.90%	1,296.00	100.00%	2,847.73
Municipal (Non-CCN)	94	5.89%	0		0	0.00%	94
Industrial	1,016.23	63.63%	1	0.10%	0	0.00%	1,017.23
Irrigation	15	0.94%	0	0.00%	0	0.00%	15
Totals	1,597.15	100.00%	1,080.81	100.00%	1,296.00	100.00%	3,973.96

Table 5-10 Total and Transfer Volumes by Use

	Total Authorized Volume East of Cibolo Creek (Including Transfers)	Percent of Total Authorized Volume	Total Transfers	Percent of Total Transfers	Percent of Total Transfers Are of Authorized Volume East of Cibolo Creek
Municipal CCN	20,727.91	55.90%	2,847.73	71.66%	13.74%
Municipal (Non-CCN)	86	0.23%	86	2.16%	100%
Industrial	14,818.85	39.97%	1,017.23	25.60%	6.86%
Irrigation	1,445.14	3.90%	15	0.37%	1.03%
Total	37,077.90	100%	3,973.96	100%	10.7%

Table 5-11 2008 Municipal (CCN) Use by Source

Number of CCN Holders	Estimated TCEQ 2008 Use (Acre-feet) for CCNs Whose Boundaries Extend into Sub-area 1* Except San Antonio Water System (SAWS)	Total Authorized Aquifer All Users	2008 Annual Aquifer Use (Acre-feet)	Percent of Total Water Use	Percent of Total Authorized Aquifer-Municipal (CCN) water	Authorized Aquifer Municipal CCN Holder Not Used in 2008	Percent of Authorized Water Not Used in 2008
36	46,718	20,727.91	11,819	25.30%	57%	8,908.91	43%

*This estimated includes all CCN holders except SAWS, whose boundaries extend into Sub-area 1, based on the assumption that any of these CCN holders would have the potential to pursue a Cibolo Creek Transfer and transport water to their customers.

noted in Section 4.1.5 Wholesale Water Providers and Section 4.1.8 Proposed Water Supply Projects, additional water supplies are available and/or planned within the region, which would be expected to compensate for any minimal impact on supply that may occur because of the PRs.

In short, the impact of the PRs on the overall water market east of Cibolo Creek is not expected to be significant because:

1. Cibolo Creek Transfers have historically played a relatively minimal role in the water supply for Sub-area 1.
2. Under the current Cibolo Creek rules, the EAA Board has the authority to approve, approve with modification, or deny an application for a transfer based on the EAA assessment of whether the transfer complies with certain provisions (see Section 5.1.2). Based on the results of the Cibolo Creek study, it would be expected that as demand on the aquifer increases, demonstration of compliance

with these provisions would become more difficult, which would have the potential to limit transfers in a manner similar to the PRs. In other words, based on the results of the Cibolo Creek study, over a 25- to 50-year planning horizon the quantity of water rights transferred under the current rules and PRs would not be expected to be substantially different.

In addition, the availability of existing and planned alternative water supply sources is expected to minimize the potential impacts to the water market. As noted in **Table 4-2**, a number of the CCN holders currently use non-regulated groundwater sources such as the Trinity, Carrizo, Carrizo–Wilcox, Glen Rose, and various alluvium aquifers and formations, and the quantity of groundwater available from these sources is unknown.

The impact of the PRs on the Edwards Aquifer water market is also not expected to be substantial. Aquifer water rights west of Cibolo Creek are heavily influenced by the activities of the primary water supplier located within Sub-area 2 (i.e., the San Antonio Water System), and Cibolo Creek Transfers represent a small fraction (less than 1%) of the total water rights (all surface water and groundwater) available in Sub-area 2. The projected demand for groundwater supplies in Sub-area 2 (i.e., area west of Cibolo Creek) is expected to result in a continuing demand for Aquifer water in the area west of Cibolo Creek, thereby reducing the need for an outside market (i.e., transfers) for the sale and/or lease of the water rights.

In the area east of Cibolo Creek (Sub-area 1), currently there are only five listings on the EAA website for water rights for sale or lease, and they total approximately 12 acre-feet. In addition, the asking price per acre-foot east of Cibolo Creek of \$12,500 per acre-foot is more than twice as much as the asking price west of Cibolo Creek, and this price is expected to be significantly higher than the cost of utilizing existing and proposed alternative water supply sources in the region; therefore, the impact of the PRs on the Aquifer water market east of Cibolo Creek is also expected to be minimal.

5.1.2.9 Future Users in the Regulated Community

Table 5-12 summarizes the potential effects of a lease transfer from west of Cibolo Creek to east of Cibolo Creek by condition. As **Table 5-12** indicates, the estimated cost of alternative water sources over a five-year period for leases subject to §711.329(a)(1)(c)(i)(ii) varies significantly depending on the county transferred from and the associated transfer ratio. Lease transfers from Uvalde County are expected to cost approximately \$200 per acre-foot per year (or \$1,000 per acre-foot over the five-year period allowed in the PRs) more than alternative water supply sources. The cost differential is due to the 5:1 transfer ratio required in the PRs for Cibolo Creek transfers from Uvalde County. In contrast, Cibolo Creek lease transfers from Medina, Atascosa, and Bexar Counties are expected to cost approximately \$40 per acre-foot less per year than alternative water supply sources due to the 3:1 transfer ratio required in the PRs for these counties.

Note that these estimates are based on an assumed average cost of water per acre-foot per year as of the date of this report; any fluctuation or refinement of this assumed average cost could impact this analysis. However, it is important to note that although the cost of transferred water rights and alternative water

Table 5-12 Summary of the Potential Effects of a Lease Transfer from West of Cibolo Creek to East of Cibolo Creek by Condition

Condition	Transfer from	Transfer to	Estimated cost of Aquifer lease transfer per acre-foot (west of Cibolo Creek)	Transfer ratio	Estimated cost of transfer per acre-foot ¹ per year	Maximum term of lease ²	Average cost of alternative water sources ³ per acre-foot per year	Estimated cost of transferred water per acre-foot over 5-year lease	Estimated cost of alternative water source per acre-foot over 5-year lease	Estimated average cost difference (per acre-foot) between transfer and other water source over 5-year lease	Limitations of the transfer
The right to withdraw groundwater is temporarily transferred for a 5-year period to a well that existed before January 9, 2007	Uvalde County	Comal, Hays, Guadalupe, Caldwell Counties	120	5:1	\$600	5 years	\$400	\$3,000	\$2,000	\$1,000	Once initially transferred from west to east of Cibolo Creek, the point of withdrawal cannot be amended or transferred, and at the expiration of the lease (no later than December 31, 2014) the right to withdraw groundwater reverts back to the transferor, including the place of use and point of withdrawal
The right to withdraw groundwater is temporarily transferred for a 5-year period to a well that existed before January 9, 2007	Medina, Atascosa, Bexar Counties	Comal, Hays, Guadalupe, Caldwell Counties	120	3:1	\$360	5 years	\$400	\$1,080	\$2,000	(\$920)	Once initially transferred from west to east of Cibolo Creek, the point of withdrawal cannot be amended or transferred, and at the expiration of the lease (no later than December 31, 2014) the right to withdraw groundwater reverts back to the transferor, including the place of use and point of withdrawal

¹ Based on an assumed average cost of \$120 per acre-foot (County Line WSC personal communication 2009)

² Based on the assumption that the PRs will become a Final Rule and effective on December 31, 2009

³ Based on an average cost for an alternative water source of \$400 per acre-foot annually for treated water. Alternative water sources include those sources identified in the Regional Water Plan

supply options appear to be significant, the price differential is within the range identified between west of Cibolo Creek and east of Cibolo Creek (see **Table 4-15**).

5.2 Edwards Aquifer

5.2.1 No Action

If the EAA's proposed amendments to Cibolo Creek transfer rules were not adopted and implemented, water rights could continue to be applied for from withdrawal points located west of Cibolo Creek and transferred to withdrawal points east of Cibolo Creek. However, a request for a Cibolo Creek Transfer may be modified or denied by the EAA if it is determined that a potential increase in production east of Cibolo Creek either does not protect threatened and endangered species or their habitat or does not maintain minimum springflow at both springs to protect threatened and endangered species as required by federal law.

5.2.2 Action Alternative – Implement Proposed Amendments

Implementation of the proposed amendments to Subchapter L §711.329 would prohibit water rights transfers under a permit from west of Cibolo Creek to east of Cibolo Creek with exceptions as described in Section 2.0.

The potential impacts of the EAA's proposed Cibolo Creek transfer rules on the Aquifer itself are expected to be beneficial and limited to springflows and threatened and endangered habitat associated with the Comal and San Marcos Springs. The transfer of water withdrawal permits from west to east of Cibolo Creek has the potential to impact discharge from Comal and San Marcos Springs and, as such, have a negative effect on springflow. Model simulations conducted by the EAA indicate that transfer ratios could be used to minimize the impact of Cibolo Creek Transfers. A minimum transfer ratio of 3:1 from Medina, Atascosa, and Bexar Counties and 5:1 from Uvalde County were required to have no adverse impact on the minimum discharge at the San Marcos Springs.

5.3 Springflows from Comal and San Marcos Springs

5.3.1 No Action

If the EAA's proposed Cibolo Creek transfer rules were not adopted and implemented, water rights would continue to be applied for in one geographic area of the Aquifer and transferred to another location for pumping. However, a request for a Cibolo Creek Transfer may be modified or denied by the EAA if it is determined that a potential increase in production east of Cibolo Creek either does not protect threatened and endangered species or does not maintain minimum springflow at both springs to protect threatened and endangered species, as required by federal law.

5.3.2 Action Alternative – Implement Proposed Amendments

Implementation of Subchapter L §711.329 would prohibit water rights transfers under a permit from west of Cibolo Creek to east of Cibolo Creek, with exceptions as described in detail in Section 2.0.

Based on the results of the 2008 LBG-Guyton Cibolo Creek Study, the transfer of water withdrawal permits from west to east of Cibolo Creek has the potential to impact discharge from Comal and San Marcos Springs and, as such, have a negative effect on springflow. The study concluded that permits transferred farther east have more impacts on San Marcos springflow while the average change in Comal springflow as a percent of the transfer volume ranges from -16 percent reduction to a 42 percent increase, depending on the “transfer to” location. Cibolo Creek transfers generally have a negative impact on San Marcos springflow because the San Marcos Springs are located at the end of the flow system and are generally affected by these “upgradient” withdrawals. Model simulations conducted by the EAA indicate that transfer ratios could be used to minimize the impact of Cibolo Creek transfers, meaning a portion of all transferred water rights east of Cibolo Creek would be placed in the EAA’s Groundwater Trust. A minimum transfer ratio of 3:1 from Medina, Atascosa, and Bexar Counties and 5:1 from Uvalde County were required to have no adverse impact on the minimum discharge at the San Marcos Springs. The use of these transfer ratios would require the transferor to obtain additional water rights to place in the Groundwater Trust, thereby mitigating the impact of Cibolo Creek transfers on springflows. The proposed rules would limit the term of a lease transfer to 2014, after which time the right to withdraw groundwater under the permit would revert to the original place of use and point of withdrawal. This five-year time line would attempt to ensure long-term stability in springflows and overall Aquifer levels and provide the user time to identify and utilize an alternative water supply source, after which, except for small compliance transfers, Cibolo Creek Transfers would be prohibited after December 3, 2014.

5.4 Threatened and Endangered Species

5.4.1 No Action

If the EAA’s proposed Cibolo Creek transfer rules were not adopted and implemented, threatened and endangered species dependent on the Aquifer would continue to be protected by existing groundwater withdrawal rules, as well as the Endangered Species Act.

5.4.2 Action Alternative – Implement Proposed Amendments

If the proposed Cibolo Creek transfer rules were implemented, threatened and endangered species dependent on the Aquifer would benefit from increased protection of springflow volumes and Aquifer levels. Existing EAA regulations and the Endangered Species Act would also continue to provide protection to threatened and endangered species with habitat within and adjacent to the Aquifer.

5.5 Other Aquifer-related Elements of the Natural Environment

5.5.1 No Action

If the EAA’s proposed Cibolo Creek transfer rules were not adopted and implemented, the Aquifer would continue to be protected by existing rules. Under the no-action alternative, withdrawal permit transfers can be limited or denied if it is determined that the transfer would negatively impact springflows and habitat for threatened or endangered species. Therefore, the Aquifer and related elements would continue to benefit from the requirements of existing regulations.

5.5.2 Action Alternative – Implement Proposed Amendments

Compared to the no-action alternative, implementing the proposed Cibolo Creek transfer rules would provide additional protection of the Aquifer by allowing the EAA to further limit withdrawals east of Cibolo Creek resulting in impacts to springflows and overall Aquifer levels. The proposed rules are not expected to have a measurable impact to surface water quality.

5.6 Related EAA-Regulatory Programs

5.6.1 No Action

If the PRs were not adopted and implemented, no changes to the EAA’s regulatory programs would occur as a result of the PRs, and no additional staff or resources would be required as a result of the proposed program.

5.6.2 Action Alternative – Implement Proposed Amendments

Table 5-13 Impacts of PRs on EAA Regulatory Programs

Existing Regulatory Program	Impact from Proposed Rules
Aquifer Management Fees	None
Groundwater Withdrawal and related programs such as well flow metering and critical period management	None
Well Registration	None
Well Construction and Well Plugging Permits	None
Storage Tank Regulations	None
Comprehensive Water Management such as Groundwater Conservation Planning and Aquifer management pool determinations	None
Enforcement	Compliance activities may decrease under the PRs. No additional Compliance and Enforcement staff and additional legal services are expected to be required.

In addition to the potential impact noted in Table 5-13, under the proposed amendments the EAA General Manager may approve a transfer application without involvement of the EAA Board. Under the existing Cibolo Creek Rules, transfer applications subject to subsection (12)(B)(define) require Board approval. The proposed amendments would eliminate the requirement for Board approval under any and all circumstances.

5.7 Secondary Impacts

5.7.1 No Action

If the EAA’s PRs were not adopted and implemented, the existing Cibolo Creek Rules could continue to apply for transfers from west to east of Cibolo Creek and no secondary impacts would be anticipated.

5.7.2 Action Alternative

As noted in section 5.1.2.8, the availability and price of water is expected to be minimally impacted by the PRs due to the minimal quantity currently and historically transferred under the existing Cibolo Creek Rules. Leases and pending sales currently represent about 5% of the total TCEQ water use in Sub-area 1

for the year 2008. In addition, the Region L Water Plan identifies a number of alternative water-supply sources that are intended to address the projected water demand without any consideration of transfers under the existing or proposed Cibolo Creek Rules. In short, the Cibolo Creek Transfers currently provide a relatively small portion (8.5%) of the water for Sub-area 1 based on TCEQ water use for the year 2008, and under the current rules or the PRs this percentage would not be expected to increase substantially due to the current planning and development efforts by water suppliers in the counties east of Cibolo Creek. Therefore, secondary impacts associated with adopting and implementing the PRs are expected to be minimal.

However, specific retail water providers (CCN holders) who are significantly more dependent on the Cibolo Creek Transfers than Sub-area 1 as a whole may be directly impacted by the PRs. Under the PRs, these entities would no longer have the opportunity to conduct their own independent investigations to determine if a proposed transfer would result in a negative impact to Comal and/or San Marcos Springs as generally indicated in the Cibolo Creek Study. The Cibolo Creek Study indicated that the impacts on the Comal and San Marcos Springs are highly dependent on well location and withdrawal amounts and further noted that the transfer of well locations from west to east of Cibolo Creek may result in an increase in springflows at Comal Springs under certain scenarios. The elimination of any opportunity for an applicant to analyze and present findings to the EAA staff and, if necessary, request a contested case hearing has the potential to directly impact those entities whose current and future plans include a high level of dependence on the transfer of water rights under the Cibolo Creek Rules. In contrast, the PRs are clear and minimize any potential for the EAA and the regulated community to be in conflict in the management and planning for current and future Aquifer use associated with Cibolo Creek Transfers. In short, approval of the PRs would be expected to provide the regulated community a clear understanding of the EAA's intent regarding Cibolo Creek Transfers and allow these entities to plan accordingly for future water-supply sources.

6.0 ASSESSMENT OF THE POTENTIAL IMPACTS OF IMPLEMENTING THE PROPOSED AMENDMENT TO CHAPTER 707 (PROCEDURES BEFORE THE AUTHORITY) SUBCHAPTER F (PROCEDURES FOR CONTESTED CASE HEARINGS)

As noted in Section 3.0, the proposed amendments to Chapter 707 Subchapter F (Procedures for Contested Case Hearings) would eliminate the possibility that a contested case hearing may be requested in connection with “amendment applications to change the location of the point of withdrawal from a point west of Cibolo Creek to a point east of Cibolo Creek.” In short, under the PRs, Cibolo Creek Transfers will no longer be subject to contested case hearings and will be evaluated based on compliance with the PRs. The elimination of the opportunity for a contested case hearing represents one of the several proposed amendments intended to modify the current administrative procedures for evaluating and processing groundwater rights transfers and, with limited exceptions, generally prohibit any future transfers of groundwater withdrawal rights from withdrawal points located west of Cibolo Creek to withdrawal points located east of Cibolo Creek. Therefore, the impacts to the assessment categories as listed in the Rulemaking Regulatory Assessment Protocol are expected to be similar to those identified in Section 5.0. As noted in Section 5.0, Cibolo Creek Transfers currently and historically have represented a relatively small percentage of:

1. total Aquifer use east of Cibolo Creek (currently 3,877.96 of 37,077.90 acre feet, or 10.4%)
2. percent of total authorized Aquifer use (currently 0.67% of 572,000 acre-feet)
3. total water use east of Cibolo Creek (currently approximately 8.5% of total 2008 water use as identified by the TCEQ)

Because of the limited role transfers have historically played in the region, eliminating the opportunity for contested case hearings would not be expected to result in any significant impact to water suppliers as a whole, the springflows at Comal or San Marcos Springs and associated threatened and endangered species, or any other individuals/entities located within Sub-area 1. However, as previously mentioned, specific retail water providers and potential industrial users may be directly impacted on a case-by-case basis. The lack of opportunity for a specific entity to request a contested case hearing to present evidence associated with their requested transfers may have some potential to limit an entity’s ability to provide a reliable and cost-effective solution to addressing its future water needs depending on the unique circumstances of the specific entity.

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APPENDIX A
Proposed Rules

**EDWARDS AQUIFER AUTHORITY
RULEMAKING**

Title: **EDWARDS AQUIFER AUTHORITY RULES**
Ch. 707 (Procedure Before The Authority)
Subchapter F (Procedures for Contested Case Hearings)
Ch. 711 (Groundwater Withdrawals)
Subchapter L (Administration of Permits)

Rule Type: **Proposed Rules (PRs)**

Prepared By: *MF* Marc Friberg, Public Policy Officer

Through: Darcy Alan Erownfelter, General Counsel

Approved By: Velma R. Danielson, General Manager *VR*

Date Prepared: February 25, 2009

Effective Date: _____, 200_
Board approves FRs: _____, 200_
Permits/Enforcement Committee approves FRs: _____, 200_
GM approves FRs: _____, 200_
Public Hearing on PRs: _____, 200_
GM determines: Assessment needed: February 17, 2009
Board approves PRs: February 10, 2009 (sent to GM for assessment and public comment)
Aquifer Management Committee approves PRs: February 3, 2009
GM approves PRs: February 3, 2009

CHAPTER 707. PROCEDURE BEFORE THE AUTHORITY
Subchapter F. Procedures for Contested Case Hearings

Section
707.601 Applicability
...

§ 707.601 Applicability

This subchapter applies to contested case hearings on applications. Contested case hearings may be requested in connection with the following applications:

- (1) initial regular permits;
- (2) term permits;
- | (3) Aquifer recharge and storage permits; and
- | (4) recharge recovery permits; ~~and~~
- | ~~(5) amendment applications to change the location of the point of withdrawal from a point west of Cibola Creek to a point east of Cibola Creek.~~

CHAPTER 711. GROUNDWATER WITHDRAWALS

Subchapter L. Administration of Permits

Section

...

711.328 Basis for Granting Transfer Applications

711.329 Cibolo Creek Transfers

...

711.336 Basis for Granting Amendment Applications

...

§ 711.328 Basis for Granting Transfer Applications

The general manager, ~~or for transfer applications subject to Subsection (12)(B) the Board,~~ shall approve a transfer application if the following elements are established:

(1) all applicable fees of the transferor or transferee have been paid, including current year fees for groundwater withdrawn by the transferor prior to the effective date of the transfer;

(2) it has been confirmed that, prior to the transfer, the transferor owned all or part of the initial regular permit sought to be transferred;

(3) it has been confirmed that, after the transfer, the transferee owns all or part of the initial regular permit sought to be transferred;

(4) the application complies with the Act and the Authority's rules; and

(5) the transferor and the transferee are in compliance with the Act, the Authority's rules, other permits, and orders of the Board;

(6) for transfers of part of the place of use of an initial regular permit for irrigation use:

(A) a survey has been prepared showing the following:

(i) the lands irrigated during the historical period which provided the basis for the issuance of the original initial regular permit and are identified as all or part of the place of use in the permit;

(ii) the portion of the historically irrigated lands conveyed to the transferee; and

(iii) the portion of the historically irrigated lands retained by the transferor; and

(iv) the boundaries of the place of use in the permit and the actual historically irrigated acres in relation to one another;

(B) the survey was certified by a registered professional surveyor, to be true and correct; and

(7) the total volume of groundwater withdrawal amount and rate of withdrawal for the permit is accurately quantified, and, if applicable, properly allocated between base irrigation and unrestricted irrigation groundwater;

(8) the application was timely filed relative to the year in which the transfer is sought to be effective;

(9) all applicable reports of the transferor and transferee have been filed;

(10) for transfers of the purpose of use, the proposed purpose is for a beneficial use;

(11) for transfers of the place of use, the new place of use is located inside the boundaries of the Authority;

(12) for transfers of the point of withdrawal, the point is:

(A) not transferred from a point located west of Cibolo Creek to east of Cibolo Creek; or

(B) transferred from a point located west of Cibolo Creek to east of Cibolo Creek, and the transfer complies with the provisions in § 711.329.

~~(i) aquatic and wildlife habitat will be protected;~~

~~(ii) species that are designated as threatened or endangered under applicable federal and state law will be protected; and~~

~~(iii) continuous minimum springflows of the Comal Springs and San Marcos Springs will be maintained to protect endangered and threatened species to the extent required by federal law; and~~

(13) for an application for an initial regular permit filed by a federal facility, the approval by the Authority of the transfer of ownership to another person occurred prior to September 1, 2003.

(14) a copy of the transfer agreement is filed, with all necessary supporting documentation demonstrating, among other things:

- (A) ownership;
 - (B) the date on which the transfer became effective; and
 - (C) the transfer term;
- (15) copies of all current leases encumbering the permit; and
- (16) a meter reading has been taken within one week of the date that the application was filed.

§ 711.329 Cibolo Creek Transfers

(a) A transfer of a point of withdrawal under a permit from west of Cibolo Creek to east of Cibolo Creek is prohibited unless:

(1) the transfer is a lease; and

(A) the right to withdraw groundwater is transferred to a well that existed before January 9, 2007; and

(B) the term of the lease does not extend beyond December 31, 2014; and

(C) the transferee places a portion of the lease amount into the groundwater trust for the term of the lease based on the following transfer ratios:

(i) for transfers from Uvalde County to Comal, Hays, Guadalupe, or Caldwell County, a 5:1 transfer ratio is applied to the amount of the lease (i.e. in order to pump one acre-foot in Comal, Hays, Guadalupe, or Caldwell County, the transferee must lease 5 acre-feet and place 4 acre-feet into the groundwater trust); or

(ii) for transfers from Medina, Atascosa, or Bexar County to Comal, Hays, Guadalupe, or Caldwell County, a 3:1 transfer ratio is applied to the amount of the lease (i.e. in order to pump one acre-foot in Comal, Hays, Guadalupe, or Caldwell County, the transferee must lease 3 acre-feet and place 2 acre-feet into the groundwater trust); and

(D) once initially transferred across Cibolo Creek, the point of withdrawal is not subsequently amended or transferred; and

(E) at the expiration of the lease, the right to withdraw groundwater under the permit reverts back to the transferor, including the place of use and the point of withdrawal; or

(2) the transfer is a lease; and

(A) the lease was approved by the Board before the effective date of this section; and

(B) once initially transferred across Cibolo Creek, the point of withdrawal is not subsequently changed; and

(C) at the expiration of the lease, the right to withdraw groundwater under the permit reverts back to the transferor, including the place of use and the point of withdrawal; or

(3) the transfer is a sale; and

(A) the sale was originally approved by the Board on or before July 11, 2006; or

(B) the sale is made to resolve a pending compliance matter relating to an unauthorized withdrawal at an unpermitted well that was installed or constructed on or before January 9, 2007, and is for no less than ¼ acre-foot per year and no more than 1 acre-foot per year; or

(C) the sale was conditionally approved by the Board between July 12, 2006, and the effective date of this section. The order approving the application shall expire on December 31, 2014, at which time, the point of withdrawal under the permit reverts back to a point west of Cibolo Creek. The expiration shall not affect the ownership of the initial regular permit.

(b) If a sale is made in accordance with § 711.329(a)(3)(B), the point of withdrawal under the permit may not be subsequently changed unless the owner's well has been plugged.

...

§ 711.336 Basis for Granting Amendment Applications

The general manager shall approve an amendment application if the following elements are established:

(1) all applicable fees of the applicant have been paid, including current year fees for groundwater withdrawn by the transferor prior to the effective date of the amendment;

(2) it has been confirmed that, prior to the amendment, the applicant owned all or part of the initial regular permit sought to be amended, if applicable;

(3) it has been confirmed that, after the amendment, the applicant owns all or part of the initial regular permit sought to be amended, if applicable;

(4) the application complies with the Act and the Authority's rules;

(5) the applicant is in compliance with the Act, the Authority's rules, other permits, and orders of the Board;

(6) for amendments to part of the place of use of an initial regular permit for irrigation use, a survey is provided that complies with § 711.328(6) or the designation made under § 711.332(e);

(7) the total volume of groundwater withdrawal amount and rate of withdrawal for the permit is accurately quantified, and, if applicable, properly allocated between base irrigation and unrestricted irrigation groundwater;

(8) the application was timely filed relative to the year in which the amendment is sought to be effective;

(9) all applicable reports of the applicant have been filed;

(10) for amendments to the place of use, the new place of use is located inside the boundaries of the Authority;

(11) for amendments to the purpose of use, the proposed purpose is for a beneficial use; and

(12) the point of withdrawal is either: not transferred from a point located west of Cibolo Creek to east of Cibolo Creek.

~~(A) not transferred from a point located west of Cibolo Creek to east of Cibolo Creek; or~~

~~(B) transferred from a point located west of Cibolo Creek to east of Cibolo Creek; and~~

~~(i) aquatic and wildlife habitat will be protected;~~

~~(ii) species that are designated as threatened or endangered under applicable federal and state law will be protected; and~~

~~(iii) continuous minimum springflows of the Comal Springs and San Marcos Springs will be maintained to protect endangered and threatened species to the extent required by federal law.~~

...

APPENDIX B

EAA Rulemaking Regulatory Assessment Protocol

EDWARDS AQUIFER AUTHORITY RULEMAKING REGULATORY ASSESSMENT PROTOCOL

1.0 INTRODUCTION

The purpose of this protocol is to establish an organizational framework for providing rulemaking support to the Edwards Aquifer Authority (Authority) relating to assessing certain impacts of proposed rules (PR) that the Authority may have under consideration. The conceptual framework outlined herein will provide the Authority an effective approach to evaluating the effects of PRs under consideration. The approach is based on accepted methodologies for analyzing intended and unintended consequences of the PRs. This protocol is intended as a conceptual starting point. In any particular regulatory assessment (RA), the concepts and approaches set out herein may be revised when appropriate for effective evaluation of the effects of Authority rulemaking. The remainder of this protocol describes the basic RA approach.

2.0 DISCRETIONARY NATURE OF REGULATORY ASSESSMENTS

Since September 1, 2001, Section 1.115 of the Edwards Aquifer Authority Act (Act)¹ provides the procedures to be used by the Authority when conducting its rulemaking. Prior to this date, the Authority was required to comply with the more rigorous rulemaking requirements of the Texas Administrative Procedures Act (APA).² Under the APA, there were numerous individual assessments of PRs that were required. However, under Section 1.115, no such assessments are required.³ Accordingly, the performance of RAs by the Authority is purely a discretionary function. However, because observers of the Authority are accustomed to the Authority having prepared RAs under the APA format, the Authority deems it to be in the public interest that some form of RA be continued to be performed even though current law may not so require. Generally, the Authority limits the performance of RAs to certain rule sets which are likely to have substantial impacts on stakeholders or Edwards Aquifer Authority-related resources potentially affected by the PRs.

¹ Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350; as amended by Act of May 16, 1995, 74th Leg., R.S., ch. 524, 1995 Tex. Gen. Laws 3280; Act of May 29, 1995, 74th Leg., R.S., ch. 261, 1995 Tex. Gen. Laws 2505; Act of May 6, 1999, 76th Leg., R.S., ch. 163, 1999 Tex. Gen. Laws 634; Act of May 28, 2001, 77th Leg., R.S., ch. 966, §§ 2.60–2.62 and 6.01–6.05, 2001 Tex. Gen. Laws 1991, 2021–22 and 2075–76; and Act of June 1, 2003, 78th Leg., R.S., ch. 1112, § 6.01(4), 2003 Tex. Gen. Laws 3188, 3193.

² The APA generally applies only to *state* agencies. *See e.g.*, TEX. GOV'T CODE ANN. §§ 2001.001, 2001.003, 2001.021, 2001.023, 2001.033 (Vernon 2000 & Supp. 2006). It does not apply to political subdivisions of the state, such as the Authority. However, the Act originally made the APA expressly applicable to the Authority. The Act formerly provided that “[t]he authority is subject to . . . the Administrative Procedure and Texas Register Act” (now codified as the APA). *See* Act § 1.11(h) (repealed by Act of May 28, 2001, 77th Leg., R.S., ch. 966, § 6.03 (eff. Sept. 1, 2001)).

³ Section 1.115(c) requires, among other things, that the order adopting a rule must “state the reasons and justifications for the rule.” The Authority does not interpret the “reasons and justifications” requirement to be an RA as envisioned by this protocol. Rather, the Authority sees this requirement similar to the duty to include in a final order adopting rules a “reasoned justification” for a rule that includes (1) a summary of the public comments received; (2) a summary of the factual basis for the rules; and (3) an articulation of the reasons why the agency may disagree with public comments. *See* TEX. GOV'T CODE ANN. § 2001.033(a)(1) (Vernon Supp. 2006).

3.0 NATURE OF REGULATORY ASSESSMENTS AND AVAILABLE DATA BASE

RAs are analytical in nature and designed to provide information on issues of interest to the Authority that are identified in the initial scoping meeting. Unless authorized by the General Manager, the information for the preparation of RAs will be based on existing data. Any need for the performance of additional supplemental studies or modeling should be identified at the initial scoping meeting. Additionally, the entity to perform any additional studies, as well as estimated costs, should be identified. No additional studies or modeling may be performed until all authorizations from the Authority have been obtained, including the execution of any appropriate contracts or subcontracts.

4.0 LEGAL ISSUES

RAs will not contain legal analysis. Assessments involving legal sufficiency or compliance will be performed by the General Counsel of the Authority in separate documents. In the event it becomes necessary to include discussion of legal issues, all such discussion will be drafted by General Counsel.

5.0 MANAGEMENT OF THE REGULATORY ASSESSMENT PROCESS

Whether or not an RA is performed for a certain set of PRs is solely within the discretion of the Board of Directors (Board) of the Authority, or its General Manager. If an RA is to be performed, the Authority's General Counsel will supervise its preparation in coordination with the Deputy General Manager of the Authority. The point of contact for the RA contractor will be the General Counsel. The General Counsel's point of contact will be the Deputy General Manager. The selected RA contractor will enter into a contract with the General Counsel. General Counsel will submit for payment, along with its monthly invoice, the invoice of the RA contractor. All contact between the RA contractor and the staff of the Authority, as well as requests for information or copies of Authority documents, must first be coordinated with the General Counsel and the Deputy General Manager.

A normal RA process will involve the following basic steps:

1. Board or General Manager authorizes an RA to be performed
2. General Counsel confirms budget availability with Deputy General Manager
3. General Counsel and RA contractor execute appropriate contracts
4. RA contractor executes appropriate subcontracts (if any)
5. General Counsel delivers PRs and concept memorandum to RA contractor
6. Initial scoping meeting with Authority staff
7. RA contractor develops scoping meeting memorandum and obtains Authority concurrence
8. RA contractor coordinates staff contact and information requests with General Counsel and the Deputy General Manager
9. RA contractor conducts staff interviews, as appropriate
10. RA contractor develops RA Draft-1
11. Staff and General Counsel review and comment on RA Draft-1
12. RA contractor develops RA Draft-2
13. Staff and General Counsel review and comment on RA Draft-2
14. RA contractor develops Final RA
15. RA contractor attends committee meeting and presents Final RA
16. RA contractor attends Board meeting and presents Final RA

6.0 CONTENTS OF REGULATORY ASSESSMENTS

Regulatory assessments of PRs will consider the following general areas for potential impacts:

1. Regulated community
2. Edwards Aquifer
3. Springflows from Comal Springs and San Marcos Springs
4. Threatened and endangered species
5. Other Aquifer-related elements of the natural environment
6. Authority's regulatory programs
7. Secondary impacts of interest, whether beneficial or detrimental

RAs will normally consider categories nos. 1-6 for nearly all rule sets. Studies indicated in the eighth category, however, would be reserved for rulemaking that has a relatively high probability to register system-wide impacts on communities within the geographic and demographic reach of the Authority. Initiation of such assessments would require a determination by the General Manager or the Board. The following sections describe in more detail potential issues for proposed assessment.

7.0 IMPACTS ON THE REGULATED COMMUNITY

The right to withdraw groundwater from the Aquifer is highly regulated under the Act and the Authority rules. Accordingly, PRs may, if appropriate, be evaluated with respect to potential impacts on groundwater users as to water availability, economic costs, and administrative requirements. The regulated community will consist of the following categories:

1. irrigation users
2. municipal users
3. industrial users
4. monitoring well users
5. aquifer recharge and storage permittees
6. recharge recovery permittees
7. exempt well owners
8. well construction permittees
9. any other entity engaging in an activity regulated by the PRs (this will normally apply to PRs not related to groundwater withdrawals, e.g. water quality rules)

8.0 IMPACTS ON THE EDWARDS AQUIFER

Although the Authority is not a supplier of raw water, it manages withdrawals from the Aquifer by adjudicating⁴ groundwater rights and conditioning the exercise of such rights in order to achieve the Authority's management objectives. Additionally, the Authority may regulate activities on the surface of the land which, among other things, could potentially impact the quality of the groundwater in the

⁴ The term "adjudicate" is used loosely. According to the Texas Supreme Court, the Authority's permit process is not "an adjudication of title to property." *Barshop v. Medina Underground Water Conservation Dist.*, 925 S.W.2d 618, 635 (Tex. 1996). Rather, the Court advises that the Authority's permit decisions are merely "fact findings" instead of determinations of controverted property rights.

Aquifer.⁵ Accordingly, PRs may, if appropriate, be evaluated with respect to potential impacts on the following:

1. Annual groundwater availability
2. Seasonal groundwater availability
3. Effects on Aquifer levels; interruptions
4. Beneficial use of Aquifer groundwater
5. Recharge and storage
6. Waste prevention
7. Water quality

9.0 IMPACTS ON SPRINGFLOWS FROM COMAL AND SAN MARCOS SPRINGS

The Authority is required to manage the Aquifer in order to ensure that springflows from Comal and San Marcos Springs occur in sufficient volumes at various times of the year for the benefit of threatened or endangered species as may be required by federal law under the Endangered Species Act.⁶ Accordingly, PRs may, if appropriate, be evaluated with respect to potential impacts on the following:

1. volume and timing of springflows emanating from Comal Springs
2. volume and timing of springflows emanating from San Marcos Springs
3. location of points of withdrawals in relation to the springs and impact of withdrawals on springflow
4. impact on the ability of the Authority to ensure continuous minimum springflow to protect endangered and threatened species to the extent required by federal law

10.0 IMPACTS ON THREATENED AND ENDANGERED SPECIES

The Authority is required to protect aquatic and wildlife habitat, and protect listed threatened and endangered species. In furtherance of these statutory missions, the Authority has filed a draft Habitat Conservation Plan (HCP) (Mar. 2005) with the U.S. Fish & Wildlife Service. The HCP calls for the Authority to manage the Aquifer for the benefit of the following species: (1) Fountain darter (*Etheostoma fonticola*) (listed as endangered); (2) San Marcos gambusia (*Gambusia georgei*) (listed as endangered); (3) San Marcos salamander (*Eurycea nana*) (listed as threatened); (4) Texas blind salamander (*Eurycea rathbuni*) (listed as endangered);⁷ (5) Comal Springs riffle beetle (*Heterelmis comalensis*) (listed as endangered); (6) Comal Springs dryopid beetle (*Stygoparnus comalensis*) (listed as endangered); (7) Pecks Cave amphipod (*Stygobromus pecki*) (listed as endangered); (8) Texas wild-rice (*Zizania texana*) (listed as endangered); (9) Whooping crane (*Grus americana*) (listed as endangered); and (10) Cagles' map turtle (*Graptemys caglei*) (unlisted species of interest).

The Fountain darter occurs in the spring-fed aquatic ecosystems of both Comal and San Marcos Springs. The San Marcos gambusia is endemic to the San Marcos Springs ecosystem. However, it has not

⁵ *Id.* § 1.08(c).

⁶ 16 U.S.C.A. §§ 1531-1544 (West 2006).

⁷ This is the Latin name used in the Authority's Draft Habitat Conservation Plan (HCP). However, after submission of the draft HCP to the USFWS, the name for this species was officially changed by the USFWS to *Typhlomolge rathbuni* and can be found on its website.

been observed since 1983 and may well be extinct. The San Marcos salamander occurs only in the aquatic ecosystems associated with San Marcos Springs. The Texas blind salamander is a subterranean species occurring in the Aquifer near San Marcos Springs. The Comal Springs riffle beetle occurs in the spring-fed aquatic ecosystems of both Comal and San Marcos Springs. Comal Springs dryopid beetle is known to occur in the Aquifer near Comal Springs and Fern Bank Springs. Peck's Cave amphipod is known to occur in the Aquifer near Comal Springs and Hueco Springs. Texas wild-rice occurs only in the aquatic ecosystems associated with San Marcos Springs. The whooping crane is dependent during winter upon marshes and wetlands in the Guadalupe River Estuary that are sustained in part by freshwater inflows from the Guadalupe and San Antonio Rivers. Flows of the Guadalupe River downstream of the confluence with the San Marcos River are partially dependent upon the discharge of the Aquifer through Comal Springs and San Marcos Springs. Cagle's map turtle is endemic to the Guadalupe River system of south-central Texas.

Accordingly, PRs may, if appropriate, be evaluated with respect to potential impacts on the following issues:

1. above-listed or candidate species
2. designated critical habitat, if any
3. ability of the Authority to comply with and implement its ESA obligations⁸

11.0 IMPACTS ON ANY OTHER AQUIFER-RELATED ELEMENTS OF THE NATURAL ENVIRONMENT

The Authority has also been charged with protecting certain other Aquifer-related natural resources. Accordingly, PRs may, if appropriate, be evaluated with respect to potential impacts on the following issues:

1. water quality of the surface streams to which the Aquifer provides springflow
2. instream flows for instream uses, bays, and estuaries

12.0 IMPACTS ON THE AUTHORITY'S REGULATORY PROGRAMS

The Authority has developed certain programs that provide the backbone for the Authority's management of the Aquifer. Accordingly, PRs may, if appropriate, be evaluated with respect to potential impacts on those programs identified in Exhibit A.

13.0 OTHER SECONDARY IMPACTS

As indicated above, some categories of PRs may require broader and more rigorous assessments of their effects on the natural and human environment. Assessments of these issues would be undertaken only on the recommendation of the Board or the General Manager. Secondary and/or cumulative effects of some PRs may be experienced by certain populations and institutions that are not directly affected by Authority rules. In such cases, the Authority may choose to evaluate the short, medium, or long term direct and indirect effects of its rulemaking on various sectors of the community and economy within its jurisdiction. The approach to performing these broader assessments would normally involve primary reliance on previous quantitative analyses upon which logical implications can be drawn on a qualitative

⁸ These obligations will be embodied in an incidental take permit, cooperative agreement, or other controlling legal document, if and when issued by the U.S. Fish & Wildlife Service.

basis. If requested by the General Manager quantitative interpretations of available modeling studies or statistical analyses may be performed, or new investigations may be performed to generate necessary data. Potential areas of secondary impacts that may arise due to the operation of the PRs include the following:⁹

1. Guadalupe river surface water rights holders
2. economic impacts on local economies
3. local employment impacts
4. economic impact on small businesses
5. fiscal impact on federal, state, and local governments
6. public benefits and costs analysis
7. social interests dependent on the aquifer for water supply
8. operation of existing industries
9. economic development

14.0 CONCLUSION

The RA process is designed to provide timely, useful information to the Board and the General Manager in order to assist them in the rulemaking decision-making process. Additionally, RAs are to be available to assist the public in formulating its public comment on PRs. By addressing the above-referenced issues, when relevant, it's believed such useful information will be developed.

⁹ This list is not intended to be exhaustive.

APPENDIX C

Water Use and Availability Summary by County, Study Area Zone, and CCN

County	Utility	Water Source	2008 Annual Use By Source	Total Authorized Use Acre-Feet (By Source)	TCEQ Annual Use Acre-feet (All Sources)	TCEQ Avg Daily Use (All Sources)	Own/Lease/Sale	Expiration Year	Edwards West-East Lease Transfers (Acre-feet)	Edwards Owned (Acre-feet)	% Edwards Lost to PR	Total Non-Edwards Water Sources (Acre-feet)	Total All Water Sources (Acre-feet)	% Decrease in Total Water on Expiration Date of Lease	Available Water upon Expiration of Edwards Lease (Acre-feet)	Expiration Year	% Total Authorized Use in 2008			
Comal	3009 Water Company (PWS Seven Hills Ranch)	Trinity	0.000	No Permit	< 1	0	Own	None	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	* N/A			
	4-D Water Company L.L.C.	Edwards Aquifer	49.151	11.764	49.151	0.044	Own	None	0.000	11.764	0.00%	0.000	41.764	0.00%	41.764	N/A	117.69%			
				26.000			Lease	2010												
				4.000			Lease	2010												
	City of Bulverde	Trinity Aquifer	Unavailable	No Permit	Unavailable	Unavailable	N/A	None	0.000	0.000	0.00%	2,100.000	2,100.000	0.00%	2,100.000	N/A	* N/A			
		Canyon Lake	Unavailable	400.000	Unavailable	Unavailable	Own	None									N/A			
		Guadalupe River	Unavailable	1,700.000	Unavailable	Unavailable	Own	None									N/A			
	City of Garden Ridge	Edwards Aquifer	492.629	62.000	492.629	0.441	Own	N/A	0.000	543.567	0.00%	0.000	1,454.187	0.00%	1,454.187	N/A	96.50%			
				2.000																
				441.451																
				1.301																
				3.895																
				2.000																
				4.000																
				2.000																
				2.000																
				14.000																
				1.760																
				2.000																
				0.660																
				4.500																
	Trinity	910.620	No Permit	N/A	N/A	Own	None	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	0	* N/A				
	City of Schertz	Edwards Aquifer	36.607	1,220.156	4,327.543	3.874	Own	None	0.000	1,268.076	0.00%	6,100.000	7,368.076	0.00%	7,368.076	N/A	58.73%			
47.918				Own														None		
City of Selma	Carizo	4,288.936	6,100.000	644.551	0.577	Own	None	0.000	1,061.356	0.00%	800.000	1,861.356	0.00%	1,861.356	N/A	34.63%				
	Edwards Aquifer	519.674	1,061.356														Own	N/A		
	purchase from Schertz-Saguin	124.877	800.000														Own	N/A		
Green Valley SUD	Edwards Aquifer	1,395.653	309.000	2,834.015	2.537	Own	None	1,200.000	1,533.312	43.90%	5,166.000	7,899.312	4.16%	7,570.872	2012	35.88%				
			200.000														Lease	2013		
			1,091.612										Own	None	13.02%	6,870.872	2013			
			63.700										Lease	2013						
			236.300										Lease	2013						
			22.840										Lease	2012						
			305.600										Lease	2012						
			171.560										Lease	2017						
			200.000										Lease	2013						
			87.500										Own	None				15.19%	6,699.312	2017
			45.000										Own	None						
			566.000										Own	None						
			Carizo (ECWSC)										Unavailable	566.000				Own	None	
Guadalupe River at Lake Dunlap (NBU)	Unavailable	2,800.000	Own	None																
Canyon Lake (CRWA)	Unavailable	1,800.000	Own	None																
KT Water Development LTD (PWS Rockwall Ranch)	Trinity	0.000	No Permit	0.000	0	Own	N/A	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	* N/A				
New Braunfels Utilities (aka City of New Braunfels)	Edwards Aquifer	4,790.223	48.000	11,495.803	10.291	Own	None	0.000	7,269.985	0.00%	7,020.000	14,289.985	0.00%	14,289.985	N/A	80.45%				
			5.028																	
			30.684																	
			7,127.233																	
			23.271																	
			35.769																	

County	Utility	Water Source	2008 Annual Use By Source	Total Authorized Use Acre-Feet (By Source)	TCEQ Annual Use Acre-Feet (All Sources)	TCEQ Avg Daily Use (All Sources)	Own/Lease/Sale	Expiration Year	Edwards West-East Lease Transfers (Acre-feet)	Edwards Owned (Acre-feet)	% Edwards Lost to PR	Total Non-Edwards Water Sources (Acre-feet)	Total All Water Sources (Acre-feet)	% Decrease in Total Water on Expiration Date of Lease	Available Water upon Expiration of Edwards Lease (Acre-feet)	Expiration Year	% Total Authorized Use in 2008
	River Road Community Coop	Canyon Lake via Guadalupe River	Unavailable	6,720.000			Own	None									
		Cornal River	Unavailable	300.000			Own	None									
	Glen Rose	0.000	No Permit	<1	0	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	* N/A
	Siesta Village WSC	Edwards Aquifer	0.000	0.000	0.000	0	Own	N/A	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	0.00%
	T Bar M Inc Water System	Unknown	30.161	No Permit	30.161	0.027	Own	N/A	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	* N/A
	Texas Country Water Inc	Glen Rose	13.405	No Permit	13.405	0.012	Own	N/A	0.000	0.000	0.00%	0.000	0.000	0.00%	13.405	N/A	* N/A
Hays	Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc., CCN 12902	Trinity	57.078	No Permit	0.000	0	N/A	None	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	* N/A
Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc. CCN 11157	Edwards Aquifer	319.075	124.478 250.892	329.537	0.295	Own	None	0.000	124.780	0.00%	0.000	385.832	0.00%	385.832	N/A	85.41%	
	Glen Rose	10.462	No Permit	0.000	0	N/A	None	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	* N/A	
Bianco River Ranch Homeowner's Association	Edwards Aquifer	10.054	17.000	10.054	0.009	Own	None	0.000	17.000	0.00%	0.000	17.000	0.00%	17.000	N/A	59.14%	
City of Kyle	Edwards Aquifer	975.000	432.072	2,133.610	1.91	Own	None	0.000	432.072	0.00%	2,957.000	3,389.072	0.00%	3,389.072	N/A	62.96%	
	Guadalupe River (GBRA)	1,158.610	2,957.000			Own	None										
City of San Marcos	Edwards Aquifer	1,912.000	5,433.423	7,268.797	6.507	Own	None	0.000	5,433.423	0.00%	10,000.000	15,433.423	0.00%	15,433.423	N/A	47.22%	
	Guadalupe River	5,375.000	10,000.000			Own	None										
	Camizo	0.000	0.000			N/A	N/A										
County Line WSC	Edwards Aquifer	117.016	78.212 100.000 115.206	525.025	0.47	Own	None	215.206	78.212	73.85%	2,278.830	2,570.248	8.37%	2,355.042	2010	20.43%	
	San Marcos River (from CRWA)	408.009	2,278.830			Own	None										
	Edwards Aquifer	1,029.675	875.060 884.600	1,531.508	1.371	Sale	2010	864.600	875.060	49.70%	1,432.000	3,171.660	27.26%	2,307.060	2010	48.29%	
	Guadalupe River (NBU)	Unavailable	800.000			Own	None										
Goforth WSC	San Marcos River (CRWA Hays/Caldwell)	Unavailable	382.000			Own	None										
	Camizo-Wilcox (Springs-Hill)	Unavailable	250.000			Own	None										
	Edwards Aquifer (Barton Springs)	826.410	1,077.000	1,045.581	0.936	Own	None	0.000	0.000	0.00%	2,127.000	2,127.000	0.00%	2,127.000	N/A	49.16%	
Guadalupe River (GBRA)	219.171	1,050.000			Own	None											
La Ventana Water Co LP	Trinity	51.385	78.000	51.385	0.046	Own	None	0.000	0.000	0.00%	78.000	78.000	0.00%	78.000	N/A	65.88%	
Maxwell Water Supply Corporation	Edwards Aquifer	7.346	278.527 7.000 5.400 5.000 2.600	481.459	0.431	Own	None	0.000	278.527	0.00%	350.000	648.527	0.00%	648.527	N/A	74.24%	
		Lease	2012														
		Lease	2012														
		Lease	2012														
		Lease	2012														
	Canyon Lake	474.113	350.000			Own	None	0.000	0.000	0.00%	560.000	560.000	0.00%	560.000	N/A	113.90%	
Monarch Utilities I LP (PWS Plum Creek)	Canyon Lake	637.489	560.000	637.849	0.571	Own	None	0.000	0.000	0.00%	560.000	560.000	0.00%	560.000	N/A	113.90%	

County	Utility	Water Source	2008 Annual Use By Source	Total Authorized Use (Acro-Feet (By Source))	TCEQ Annual Use (Acro-feet (All Sources))	TCEQ Avg Daily Use (All Sources)	Own/Lease/Sale	Expiration Year	Edwards West-East Lease Transfers (Acro-feet)	Edwards Owned (Acro-feet)	% Edwards Lost to PR	Total Non-Edwards Water Sources (Acro-feet)	Total All Water Sources (Acro-feet)	% Decrease in Total Water on Expiration Date of Lease	Available Water upon Expiration of Edwards Lease (Acro-feet)	Expiration Year	% Total Authorized Use in 2008	
	Rocket Water Company	Edwards Aquifer	65.097	18.300	65.097	0.059	Lease	2010	0.000	18.300	0.00%	0.000	18.300	0.00%	18.300	N/A	355.72%	
Guadalupe	City of C6bilo	Guadalupe River at Lake Durnlap	Unavailable	1,350.000	941.693	0.843	Own	None	0.000	0.000	0.00%	2,050.000	2,050.000	0.00%	2,050.000	N/A	45.94%	
		Camizo-Wilcox Aquifer	700.000	Own			None											
	City of Marion	Edwards Aquifer		112.895	136.436	177.815	0.159	Own	None	96.000	166.436	33.99%	255.000	537.436	8.56%	491.436	2010	33.05%
					46.000			Lease	2010									
					50.000			Lease	2011									
					50.000			Own	None									
					64.720			Own	None									
	CRWA	155.000	Own	None														
		Guadalupe River (GBRA)	0.000	100.000	N/A	N/A	Own	None						9.30%	441.436	2011		
	City of Seguin	Camizo	4,338.643	6,100.000	6,975.007	6.244	Own	None	0.000	0.000	0.00%	15,100.000	15,100.000	0.00%	15,100.000	N/A	46.70%	
		Guadalupe	2,713.304	9,000.000			Own	None	0.000	0.000								
	San Miguel Springs Water Co	Alluvium and Leona	0.000	No Permit	0.000	0	Own	None	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	* N/A	
	Springs Hill WSC	Camizo	Unavailable	1,500.000	2,931.200	2.624	Own	None	0.000	0.000	0.00%	7,559.910	7,559.910	0.00%	7,559.910	N/A	38.77%	
			Unavailable	3,000.000			Own	None										
Unavailable			559.910	Own			None											
Unavailable			2,500.000	Own			None											
Staples Farmers Corp	Alluvium	53.619	No Permit	53.619	0.048	Own	None	0.000	0.000	0.00%	0.000	0.000	0.00%	53.619	N/A	* N/A		
Water Services Inc. (PWS Garden Oaks)	Green Valley SUD	Unavailable	N/A	0.000	0	Own	None	0.000	0.000	0.00%	0.000	0.000	0.00%	0.000	N/A	0.00%		
	Alluvium and Leona	0.000	Inactive			Own	None											
Caldwell	Creedmoor MAHA Water Supply Corporation	Edwards Aquifer (Barton Springs)	681.415	721.000	681.415	0.61	Own	None	0.000	0.000	0.00%	721.000	721.000	0.00%	721.000	N/A	94.51%	
	Martindale WSC	Recent Alluvium	282.650	300.000	229.000	0.205	Own	None	0.000	0.000	0.00%	746.000	746.000	0.00%	746.000	N/A	42.87%	
		San Marcos River	37.150	396.000			Own	None										
		Lake Durnlap	50.000	50.000			Own	None										
	Polonia WSC	Camizo-Wilcox	633.381	2,283.000	633.381	0.587	Own	None	0.000	0.000	0.00%	2,283.000	2,283.000	0.00%	2,283.000	N/A	27.74%	
	Tri Community WSC	San Marcos River & possible alluvial GW under the influence	139.634	500.000	139.634	0.125	Own	None	0.000	0.000	0.00%	500.000	500.000	0.00%	500.000	N/A	27.93%	

* Assumes supply is equal to use, i.e., no excess, no shortage

APPENDIX D

Summary of Phone Survey

Summary of Price Survey for Transfers

Name	Estimated sales price per acre-foot	Estimated lease price
West of Cibolo Creek		
Lisa Guardiola (SAWS)	\$5,500	5 year lease - \$100 10 year lease First 5 years - \$115 Second 5 years - \$140
Jordan Boehme	\$5,500 to \$7,000 (asking \$6,500)	6 year lease - \$120
Mark Van Overberg	NA	\$125
Dan Eason (Edwardswater.com)	\$6,000 to \$8,000 depending on volume	\$350
Total Number of Listings West of Cibolo Creek: 81		
East of Cibolo Creek		
Paul Geiger	\$12,500	\$800
Dan Eason (Edwardswater.com)	\$12,500	\$400-\$450
Total Number of Listings East of Cibolo Creek: 5		

Source: EAA website

APPENDIX E

Additional Data Sources

WATER SUPPLIER SOURCES	
Water Supplier	Additional Sources
3009 Water Company (PWS Seven Hills Ranch)	David at 3009 Water Company (830) 660-4765
4-D Water Company L.L.C.	2008 Annual Use per EAA email 05/20/09
Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc.	Brent Reeh @ bcreeh@aquaaamerica.com
Aqua Source Utility, Inc. a.k.a. Aqua Utilities, Inc. d.b.a. Aqua Texas, Inc.	
Blanco River Ranch Homeowner's Association	N/A
City of Bulverde	City of Bulverde
	http://www.gbra.org/News/2008091201.aspx
	Bulverde Comprehensive Plan
City of Cibolo	Canyon Regional Water Authority http://www.crwa.com
	Wells Ranch Project from San Antonio News 08/20/08 http://www.mysanantonio.com/community/northeast/Cibolo_water_pact_goes_before_CRWA_board.html
City of Garden Ridge	Nancy Cain at City of Garden Ridge (05/13/09)
City of Kyle	Filed a lease later in 2008 for an additional 608 acre-feet for a total authorized amount of 1,040.072 acre-feet (Marc Friberg)
	2009 GBRA Conservation Plan, p. 13
City of Marion	2008 Annual Use per EAA email 05/20/09
	2009 GBRA Conservation Plan, p. 13
City of San Marcos	2008 Annual Use per EAA email 05/20/09
	2009 GBRA Conservation Plan, p. 13
	Bill Couch, Development Manager, San Marcos (05/06/09)
	http://www.ci.san-marcos.tx.us/departments/WWW/SurfaceWaterTreatmentPlant.htm
City of Schertz	2008 Annual Use per EAA email 05/20/09
	SSLCG Fact Sheet http://www.schertz.com/pdfs/SSLGCFactSheetElectronic.pdf
City of Seguin	2008 use from John Schraub, City of Seguin
City of Selma	called on 04/15/09; Larry Verna
	http://ci.selma.tx.us/pdf/water.pdf
County Line Water Supply Corporation	2008 Annual Use per EAA email 05/20/09
	TCEQ Investigation Report (Sean Ables) Email 05/19
Creedmoor MAHA Water Supply Corporation	Barton Springs/Edwards Aquifer Conservation District website http://www.bseacd.org/
Crystal Clear Water Supply Corporation	2008 Annual Use per EAA email 05/20/09
	http://www.crystalclearwsc.com/html/aboutus.html#contact
	2009 GBRA Conservation Plan, p. 13
Goforth WSC	2006 TWDB Region L Water Plan, pp.4A-24 to 25
	Mario Tobias 1-512-644-4640
	Avg Use from Guy @ Barton Springs Edwards Aquifer Conservation District 05/21/09
	GBRA Conservation Plan p.13
Green Valley Special Utility District	2008 Annual Use per EAA email 05/20/09
	TCEQ Investigation Report (Sean Ables) Email 05/19

WATER SUPPLIER SOURCES	
Water Supplier	Additional Sources
	Retrieved from 2009 GBRA Conservation Plan, p. 13 2006 TWDB Region L Water Plan, p.4A-22
KT Water Development LTD (Rockwall Ranch)	Email from Scott Knowlton on 04/21/09
La Ventana Water Co LP	Hays-Trinity GCD 04/20/09 phone
Martindale WSC	Steven Fonville@ Martindale WSC (512) 357-6951
Maxwell Water Supply Corporation	2008 Annual Use per EAA email 05/20/09
Monarch Utilities I L P (Plum Creek)	2009 GBRA Conservation Plan p.13
New Braunfels Utilities (aka City of New Braunfels)	2008 Annual Use per EAA email 05/20/09
New Braunfels Utilities (aka City of New Braunfels)	2009 GBRA Conservation Plan p.13
New Braunfels Utilities (aka City of New Braunfels)	http://www.nbutexas.com/AboutUS/generalinfo.php
Polonia WSC	Polonia Water Supply (512) 398-4757
River Road Community Coop	River Road Camp (830) 625-5004
Rocket Water Company	No additional sources
San Antonio Water System	SAWS 04/09 Draft Water Management Plan, pp. 20-21 http://www.saws.org/our_water/waterresources/2009wmp/download.shtml
	Annual use from Steven Bereyso SAWS
	Felipe Martinez at SAWS
San Miguel Springs Water Co	Carl J. Kolb via email 04/24/09
Siesta Village WSC	No additional sources
Springs Hill WSC	Keith Steffen at Springs Hill 04/16/09 http://springshill.org/WEB%20PAGE%20INFO/WaterCon_DroughtContPlan2005.pdf
	Peggy at Staples (512) 357-6472
Staples Farmers Corp	Peggy at Staples (512) 357-6472
T Bar M Inc Water System	T Bar M Inc Water System phone (830) 625-7738 on 04/15/09
Texas Country Water Inc	Bill Lowman phone (830) 708-5530 on 04/21/09
Tri Community WSC	Tommy Forester at Tri-Community (512) 738-0713 http://tri-communitywater.com/history.htm
	No additional sources
Water Services Inc. (Garden Oaks)	No additional sources

PLANNED DEVELOPMENT SOURCES		
County	Planned Development	Source
Comal	Copper Ridge	Betty Lien, Subdivision Coordinator, Comal County Engineering Office
	Crescent Hills	Betty Lien, Subdivision Coordinator, Comal County Engineering Office
	Ladera Canyon	Betty Lien, Subdivision Coordinator, Comal County Engineering Office
	The Preserve	Betty Lien, Subdivision Coordinator, Comal County Engineering Office
	Star Canyon	Betty Lien, Subdivision Coordinator, Comal County Engineering Office
Hays	Blanco River Village	San_Marcos_FutureDevelopment_Map_7_31_08
	Blanco River Walk	San_Marcos_FutureDevelopment_Map_7_31_08
	Blanco Vista	San_Marcos_FutureDevelopment_Map_7_31_08
	McCarty Commons	http://www.sanmarcosmercury.com/archives/3367
	Cottonwood Creek	http://www.cottonwoodcreektx.com/homes.htm
	Paso Robles	http://www.sanmarcosmercury.com/archives/6047
	Purgatory Ranch	conversation with Bill Couch, Development Manager, City of San Marcos
Windemere Ranch	www.naicip.com/Properties/WindemereRanch/Flyer.pdf	
Guadalupe	Bandit Dunes	New Braunfels - Master Plans & Unrecorded Plats; http://tx-newbraunfels.civicplus.com/documentcenterii.aspx
	Pecan Crossing	New Braunfels - Master Plans & Unrecorded Plats; http://tx-newbraunfels.civicplus.com/documentcenterii.aspx
	River Valley	New Braunfels - Master Plans & Unrecorded Plats; http://tx-newbraunfels.civicplus.com/documentcenterii.aspx
	Zipp Meadows	New Braunfels - Master Plans & Unrecorded Plats; http://tx-newbraunfels.civicplus.com/documentcenterii.aspx
Caldwell	Nolandale Estates	Kasi Miles, Subdivision Coordinator, Caldwell County; http://www.lockhart-tx.org/web98/citydepartments/economicdevelopment-news.asp?op=view&id=59

GIS DATA DICTIONARY									
Theme	Data Set	Description	Format	Geometry	Source	Source Details	Source Date	Download Date	Comments
Study Area	EAA_boundary	EAA jurisdictional boundary	GeoDB	Polygon	Edwards Aquifer Authority website	http://www.edwardsaquifer.org/pages/maps.htm	4/3/09	4/3/09	
	Study_Area_EAA	Study area	Shapefile	Polygon	Blanton & Associates, Inc.		4/3/09	4/6/09	
	Aquifer	Edwards Aquifer Artesian & Recharge Zones	Shapefile	Polygon	Edwards Aquifer Authority website	http://www.edwardsaquifer.org/pages/maps.htm	?	4/22/09	Official file for EAA maps
Water Suppliers	TCEQ_CCN_WATER	Water Certificates of Convenience & Necessity (CCN) Service Areas	Shapefile	Polygon	TCEQ website	http://www.tceq.state.tx.us/gis/boundary.html	12/11/08	3/30/09	
	CCN_TCEQ_SA	CCN Service Areas clipped to SA	Shapefile	Polygon	Blanton & Associates, Inc.		12/11/08	4/3/09	This data set is the basis of other many data sets
	CCN_SAWS_Pending	Pending CCD for San Antonio	GeoDB	Polygon	SAWS 2009 Water Plan (PDF); digitized by Blanton & Associates, Inc		4/14/09	5/1/09	Contain attribute information for projected demand, supply, and needs of wholesale providers within the study area
	GBRA	Wholesale Provider Guadalupe-Blanco River Authority service area by CCN	GeoDB	Polygon	Blanton & Associates, Inc., TCEQ CCN, and TWDB data		12/11/08	4/3/09	
	CRWA	Wholesale Provider Canyon Regional Water Authority service area by CCN	GeoDB	Polygon	Blanton & Associates, Inc., TCEQ CCN, and TWDB data		12/11/08	4/3/09	
	SSLGC	Wholesale Provider Seguin-Schertz Local Government Corp. service area by CCN	GeoDB	Polygon	Blanton & Associates, Inc., TCEQ CCN, and TWDB data		12/11/08	4/3/09	

GIS DATA DICTIONARY									
Theme	Data Set	Description	Format	Geometry	Source	Source Details	Source Date	Download Date	Comments
Water Supply Projects	H2O_Proj	Planned Water Supply Projects and Water Supply Projects Under Construction	GeoDB	Various	TWDB 2006 Region L Water Supply Plan Vol. II; B&A		N/A	N/A	
Wells	EAA_Wells_All	EAA Wells including all known individual and permitted wells	Shapefile	Point	Edwards Aquifer Authority email; file modified by Blanton & Associates, Inc.		4/16/09	5/1/09	
	TWDB_Springs	Known springs from TWDB	Shapefile	Point	TWDB; extracted from shapefile TWDB_well_locations_dd83	http://www.twdb.state.tx.us/mapping/gisdata.asp	3/9/09	4/17/09	Provided locations for Comal and San Marcos Springs
Parcels	hays	Hays county parcels	GeoDB	Polygon	CAPCOG	http://www.capcog.org/information-clearinghouse/geospatial-data/	12/29/08	4/2/09	These parcel data sets were used to generate planned developments
	caldwell	Caldwell county parcels	GeoDB	Polygon	CAPCOG	http://www.capcog.org/information-clearinghouse/geospatial-data/	12/29/08	4/2/09	
	comal_guadalupe	Comal & Guadalupe county parcels	GeoDB	Polygon	City of New Braunfels	http://maps.nbtexas.org/geocortex/essentials/Viewer.aspx?Site=NewBraunfels	4/7/09	4/7/09	
ETJs	Hays_Co_ETJs	ETJs for Hays County	Shapefile	Polygon	Hays County	http://www.ci.san-marcos.tx.us/departments/engineering/MapLibrary.html	4/8/09	4/8/09	These data sets were used to generate all ETJs
	NewBraunfels_ETJ	ETJ for New Braunfels and surrounding area	Shapefile	Polygon	City of New Braunfels	http://maps.nbtexas.org/geocortex/essentials/Viewer.aspx?Site=NewBraunfels	8/15/06	4/8/09	
	Martindale_ETJ	Martindale ETJ (& Caldwell County)	Shapefile	Polygon	Caldwell CAD	Matthew Allen at Caldwell County Appraisal District; email rec'd 04/23/09	5/8/08	4/23/09	

GIS DATA DICTIONARY									
Theme	Data Set	Description	Format	Geometry	Source	Source Details	Source Date	Download Date	Comments
	ETJs	All ETJs for cities in Study Area	GeoDB	Polygon	Hays County; City of New Braunfels and Caldwell CAD; edited and compiled by B&A	Compilation of above ETJs; others not available digitally were digitized from hardcopy maps	Varies	Varies	Some adjacent boundaries are disputed
Planning Data Sets	Plan_Developments	Planned Development w/in New Braunfels ETJ	GeoDB	Polygon	Various	See Planned Developments Source Table	N/A	N/A	
	CCN_TCEQ_Pop_Use	Population & H2O Projections 2000-2060	GeoDB	Polygon	TCEQ; TWDB Region L Water Supply Plan; compiled by Blanton & Associates, Inc.		N/A	N/A	
Background	Counties_of_Texas	Generalized county boundaries of Texas	GeoDB	Polygon	US Counties (ESRI)		6/11/05	3/27/09	
	Counties_of_Texas_24K	Detailed county boundaries of Texas	GeoDB	Polygon	TNRIS	www.tnris.state.tx.us/	Varies	Varies	
	City_Limits	City Limits for Study Area & surrounding area	GeoDB	Polygon	CAPCOG; City of San Antonio; City of New Braunfels; City of Garden Ridge; ESRI	Downloaded from: http://www.capcog.org/information-clearinghouse/geospatial-data/ http://www.ci.garden-ridge.tx.us/pdf_gr08/gr_city_limits_2008.pdf	Varies	Varies	
	Hydro_line	Streams & rivers	GeoDB	Polyline	USGS		N/A	N/A	
	Hydro_poly	Lakes	GeoDB	Polygon	USGS		N/A	N/A	