GAM Run 11-007: Groundwater Management Area 13 Model Runs to Estimate Drawdowns under Assumed Future Pumping for Queen City, Sparta, and Carrizo-Wilcox Aquifers

by Shirley Wade, Ph.D., P.G.
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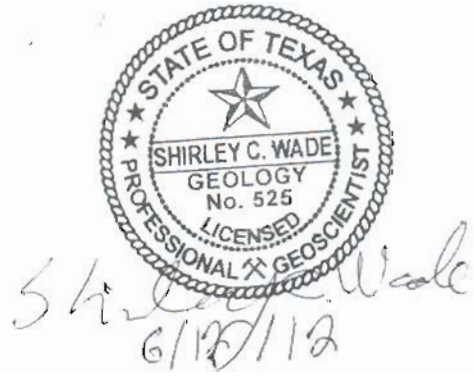
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
June 12, 2012



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GAM RUN 11-007: GROUNDWATER MANAGEMENT AREA 13 MODEL RUNS TO ESTIMATE DRAWDOWNS UNDER ASSUMED FUTURE PUMPING FOR QUEEN CITY, SPARTA, AND CARRIZO-WILCOX AQUIFERS

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EXECUTIVE SUMMARY:

Groundwater Management Area 13 requested a model run to estimate drawdowns with pumping added to scenario 4 from GAM Run 09-034. Two pumping scenarios (5a and 5b) for Groundwater Management Area 13 (GMA 13) were run using the groundwater availability model for the southern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers. Scenario 5a includes 35,000 acre-feet per year additional pumping at new locations in a downdip portion of the Carrizo Aquifer in eastern Gonzales County and scenario 5b includes 35,000 acre feet per year additional pumping at new locations in the updip part of the Carrizo Aquifer in eastern Caldwell County. Additional pumping of 4,600 acre-feet per year in the Carrizo Aquifer in western Gonzales and Guadalupe counties at existing and new locations was included in both scenarios. Both scenarios 5a and 5b result in a GMA wide average drawdown of 25 feet compared to 23 feet from scenario 4 in GAM Run 09-034.

REQUESTOR:

Mr. Mike Mahoney from the Evergreen Underground Water Conservation District acting on behalf of Groundwater Management Area 13.

DESCRIPTION OF REQUEST:

Mr. Mahoney requested a model run to estimate drawdowns using the groundwater availability model for the southern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers. This model run is a 61-year simulation using initial water levels from the end of the historic calibration period and average recharge conditions. Each year of the model run includes pumping specified by the members of Groundwater Management Area 13. The pumping included for this request consists of the same pumping included in scenario 4 of GAM Run 09-034 (Wade and Jigmond, 2010) plus 4,600 acre-feet per year additional pumping in the Carrizo Aquifer at new and existing locations in Guadalupe and western Gonzales counties and up to 35,000 acre-feet per year additional pumping in the Carrizo Aquifer at new locations in Caldwell County or Gonzales County.

PARAMETERS AND ASSUMPTIONS:

- Version 2.01 of the groundwater availability model for the southern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers was used for this analysis. See Deeds and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the southern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.
- This groundwater availability model includes eight layers, which generally correspond to (from top to bottom):
    1. the Sparta Aquifer,
    2. the Weches Confining Unit,
    3. the Queen City Aquifer,
    4. the Reklaw Confining Unit,
    5. the Carrizo Aquifer,
    6. the Upper Wilcox Aquifer,
    7. the Middle Wilcox Aquifer, and
    8. the Lower Wilcox Aquifer.

- The root mean square error (a measure of the difference between simulated and actual water levels during model calibration) in the groundwater availability model is 23 feet for the Sparta Aquifer, 18 feet for the Queen City Aquifer, and 33 feet for the Carrizo Aquifer for the calibration period (1980 to 1990) and 19, 22, and 48 feet for the same aquifers, respectively, in the verification period (1991 to 1999) (Kelley and others, 2004). These root mean square errors are between seven and ten percent of the range of measured water levels (Kelley and others, 2004).

- Groundwater in the Carrizo-Wilcox, Queen City, and Sparta aquifers ranges from fresh to brackish in composition (Kelley and others, 2004). Groundwater with total dissolved solids of less than 1,000 milligrams per liter are considered fresh and total dissolved solids of 1,000 to 10,000 milligrams per liter are considered brackish.

METHODS AND RESULTS:

Groundwater Management Area 13, located in south central Texas, includes the southern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers (Figure 1). For the simulation we used average recharge and evapotranspiration rates and initial streamflows based on the historic calibration-verification runs, representing 1981 to 1999. These averages were then used for each year of the 61-year predictive simulations along with the specified pumping.

Pumping amounts and locations are the same as those used for GAM Run 09-034 (Wade and Jigmond, 2010) with the addition of 39,600 acre-feet per year of pumping in Caldwell, Guadalupe, and Gonzales counties (Tables 1 through 6). Two pumping scenarios were modeled for this analysis, scenario 5a (Figure 2) with 35,000 acre-feet per year additional pumping in a downdip portion of the Carrizo Aquifer in eastern Gonzales County and scenario 5b (Figure 3) with 35,000 acre feet per year additional pumping in the updip part of the Carrizo Aquifer in eastern Caldwell County. Additional pumping of 4,600 acre-feet per year in the Carrizo Aquifer in western Gonzales and Guadalupe counties was included in both scenarios 5a and 5b. The amount of pumping used in the model is less than the requested pumping in some counties due to model cells going dry. Dry cells significantly reduce pumping in Uvalde County and to a lesser degree in Caldwell, Guadalupe, Medina, and Zavala counties. Scenario 5b had one additional dry cell in the Carrizo Aquifer in Caldwell County besides those that occurred in Scenarios 4 and 5a. The dry cell reduced pumping by 1,752 acre-feet per year.

Average drawdowns were summarized for each county and each groundwater conservation district (Tables 7 through 12). An overall Wilcox Aquifer average drawdown was calculated for model layers 6, 7, and 8 because in some locations the model layers do not necessarily exclusively represent the individual Upper, Middle, and Lower Wilcox aquifers. For example, in Gonzales County the Upper Wilcox is missing and Layer 6 represents the upper portion of the Middle Wilcox (Deeds and others, 2003). The overall average drawdown for Groundwater Management Area 13 for both scenarios 5a and scenario 5b is 25 feet.

The model water budgets for Groundwater Management Area 13 list the balance of water inflows to and outflows from the aquifers. Water budgets for each groundwater conservation district or county are listed in Appendices A (scenario 5a) and B (scenario 5b). The components of the water budget are described below:

- Recharge — simulates areally distributed recharge due to precipitation falling on the outcrop (where the aquifer is exposed at land surface) areas of aquifers. Recharge is always shown as "Inflow" into the water budget.

- Reservoirs and Streams — water that flows between streams and reservoirs and an aquifer. The direction and amount of flow depends on the water level in the stream or reservoir and the aquifer. In areas where water levels in the stream or reservoir are above the water level in the aquifer, water flows into the aquifer and is shown as "Inflow" in the budget. In areas where water levels in the aquifer are above the water level in the stream or reservoir, water flows out of the aquifer and into the stream and is shown as "Outflow" in the budget. Reservoir and streams are modeled in the model using the MODFLOW Stream and River packages.

- Vertical leakage — describes the vertical flow, or leakage, between two layers (aquifers or confining units) in the model. This flow is controlled by the water levels in each of the layers and aquifer properties of each layer that define the amount of leakage that can occur. "Inflow" to an aquifer from an overlying or underlying layer will always equal the "Outflow" from the other layer.

- Lateral flow — describes lateral flow within an aquifer between a county and adjacent counties.

- Wells — water produced from wells in each aquifer. In the model this component is always shown as "Outflow" from the water budget, because all wells included in the model produce (rather than inject) water. Wells are simulated in the model using the MODFLOW Well (WEL) package.

- Springs — water that naturally discharges from an aquifer when water levels rise above the elevation of the spring. This component is always shown as "Outflow", or discharge, from the water budget. Spring flows are simulated in the model using the MODFLOW Drain (DRN) package.

- Evapotranspiration — water that flows out of an aquifer due to direct evaporation and plant transpiration. This component of the budget will always be shown as "Outflow". Evapotranspiration is modeled in the model using the MODFLOW Evapotranspiration (EVT) package.

- Storage—water stored in the aquifer. The storage component that is included in "Inflow" is water that is removed from storage in the aquifer (that is, water levels decline). The storage component that is included in "Outflow" is water that is added back into storage in the aquifer (that is, water levels increase). This component of the budget is often seen as water both going into and out of the aquifer because this is a regional budget, and water levels will decline in some areas (water is being removed from storage) and will rise in others (water is being added to storage).

- General-Head Boundary (GHB)—The model uses general head boundaries to simulate groundwater flow across the northeastern lateral aquifer boundaries and vertical movement of groundwater between the Sparta Aquifer (layer 1) and younger sediments that overlie the Sparta Aquifer in the downdip portions (areas where the layer is confined or covered by other aquifers or geologic formations) are simulated using general head boundaries.

LIMITATIONS:

The groundwater model used in completing this analysis is the best available scientific tool that can be used to meet the stated objective(s). To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> "Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects

> for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."

A key aspect of using the groundwater model to evaluate historic groundwater flow conditions includes the assumptions about the location in the aquifer where historic pumping was placed. Understanding the amount and location of historic pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and streamflow are specific to a particular historic time period.

Because the application of the groundwater model was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historic precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

REFERENCES:

Deeds, N., Kelley, V., Fryar, D., Jones, T., Whallon, A. J., and Dean, K. E., 2003, Groundwater Availability Model for the Southern Carrizo-Wilcox Aquifer: contract report to the Texas Water Development Board, 452 p.

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National Research Council, 2007. Models in Environmental Regulatory Decision Making. Committee on Models in the Regulatory Decision Process, National Academies Press, Washington D.C., 287 p.

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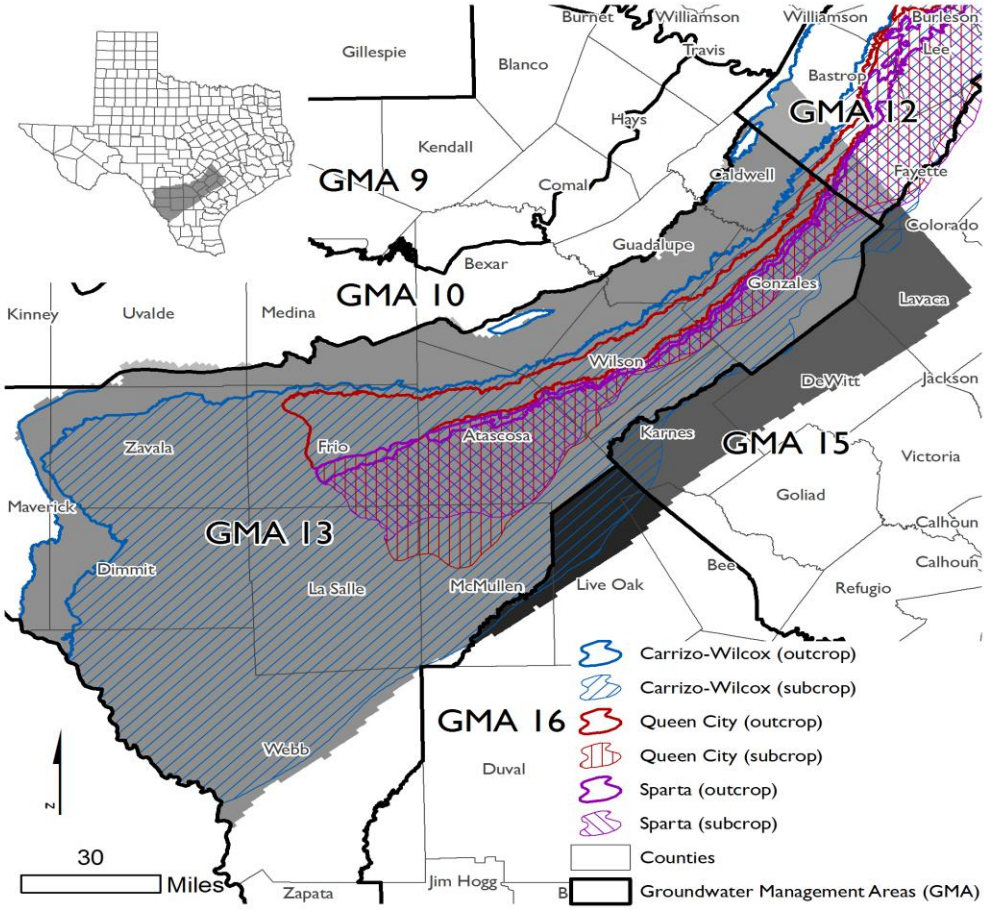

FIGURE 1: LOCATION MAP SHOWING GROUNDWATER MANAGEMENT AREA 13 AND THE ACTIVE AREA OF THE SOUTHERN PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS GROUNDWATER AVAILABILITY MODEL.

TABLE 1: 2060 PUMPING BY COUNTY INCLUDED IN SCENARIO 5A.PUMPING IS REPORTED IN ACRE-FEET PER YEAR. NA INDICATES THE LAYER IS NOT APPLICABLE.

County	*Sparta*	*Queen City*	*Carrizo*	*Layer 6*	*Layer 7*	*Layer 8*	*County Total*
ATASCOSA	994	4,202	58,308	250	250	17,000	81,003
BEXAR	NA	NA	9,107	0	0	17,000	26,107
CALDWELL	NA	307	22,809	0	7,371	13,380	43,867
DIMMIT	0	0	2,188	991	142	38	3,359
FRIO	601	3,983	70,030	0	0	0	74,614
GONZALES	3,552	5,065	89,520	0	9,577	16,271	123,986
GUADALUPE	NA	0	9,700	0	2,994	1,549	14,243
KARNES	0	0	1,280	0	0	0	1,280
LA SALLE	987	1	4,263	1,952	189	50	7,442
MAVERICK	NA	NA	143	136	259	992	1,531
MCMULLEN	90	136	1,819	0	0	0	2,045
MEDINA	NA	NA	400	0	1,248	886	2,534
UVALDE	NA	NA	828	0	0	0	828
WEBB	0	0	896	13	6	1	916
WILSON	140	845	27,549	125	121	17,000	45,780
ZAVALA	0	0	24,649	6,316	3,676	328	34,968
LAYER TOTAL	6,364	14,539	323,488	9,782	25,834	84,495	464,503

TABLE 2: 2060 PUMPING BY COUNTY INCLUDED IN SCENARIO 5B. PUMPING IS REPORTED IN ACRE-FEET PER YEAR. NA INDICATES THE LAYER IS NOT APPLICABLE.

County	*Sparta*	*Queen City*	*Carrizo*	*Layer 6*	*Layer 7*	*Layer 8*	*County Total*
ATASCOSA	994	4,202	58,308	250	250	17,000	81,003
BEXAR	NA	NA	9,107	0	0	17,000	26,107
CALDWELL	NA	307	50,807	0	7,371	13,380	71,865
DIMMIT	0	0	2,188	991	142	38	3,359
FRIO	601	3,983	70,030	0	0	0	74,614
GONZALES	3,552	5,065	59,770	0	9,577	16,271	94,236
GUADALUPE	NA	0	9,700	0	2,994	1,549	14,243
KARNES	0	0	1,280	0	0	0	1,280
LA SALLE	987	1	4,263	1,952	189	50	7,442
MAVERICK	NA	NA	143	136	259	992	1,531
MCMULLEN	90	136	1,819	0	0	0	2,045
MEDINA	NA	NA	400	0	1,248	886	2,534
UVALDE	NA	NA	828	0	0	0	828
WEBB	0	0	896	13	6	1	916
WILSON	140	845	27,549	125	121	17,000	45,780
ZAVALA	0	0	24,649	6,316	3,676	328	34,968
LAYER TOTAL	6,364	14,539	321,737	9,782	25,834	84,495	462,751

TABLE 3: 2060 PUMPING BY GROUNDWATER CONSERVATION DISTRICT INCLUDED IN SCENARIO 5A. PUMPING IS REPORTED IN ACRE-FEET PER YEAR. NA INDICATES THE LAYER IS NOT APPLICABLE.

Groundwater Conservation District	*Sparta*	*Queen City*	*Carrizo*	*Layer 6*	*Layer 7*	*Layer 8*	*Groundwater Conservation District Total*
No District	0	0	10,208	148	763	18,417	29,536
EVERGREEN	1,735	9,030	157,166	375	371	34,000	202,677
GONZALES COUNTY *	3,552	5,315	107,161	0	11,986	19,638	147,652
GUADALUPE COUNTY	NA	0	9,700	0	2,994	1,547	14,241
MCMULLEN	90	136	1,819	0	0	0	2,045
MEDINA COUNTY	NA	NA	400	0	1,248	886	2,534
PLUM CREEK	NA	NA	0	0	4,158	9,141	13,299
PLUM CREEK / GONZALES COUNTY OVERLAP	NA	57	5,107	0	308	448	5,920
UVALDE COUNTY	NA	NA	828	0	0	0	828
WINTERGARDEN	987	1	31,099	9,259	4,007	416	45,769
LAYER TOTAL	6,364	14,539	323,488	9,782	25,834	84,493	464,501

*Note the pumping total for Gonzales County Underground Water Conservation District includes pumping in southeast Caldwell County that is not in Plum Creek Conservation District overlap.

TABLE 4: 2060 PUMPING BY GROUNDWATER CONSERVATION DISTRICT INCLUDED IN SCENARIO 5B. PUMPING IS REPORTED IN ACRE-FEET PER YEAR. NA INDICATES THE LAYER IS NOT APPLICABLE.

Groundwater Conservation District	*Sparta*	*Queen City*	*Carrizo*	*Layer 6*	*Layer 7*	*Layer 8*	*Groundwater Conservation District Total*
No District	0	0	10,207	148	763	18,417	29,535
EVERGREEN	1,735	9,030	157,166	375	371	34,000	202,677
GONZALES COUNTY *	3,552	5,315	105,408	0	11,986	19,638	145,899
GUADALUPE COUNTY	NA	0	9,700	0	2,994	1,547	14,241
MCMULLEN	90	136	1,819	0	0	0	2,045
MEDINA COUNTY	NA	NA	400	0	1,248	886	2,534
PLUM CREEK	NA	NA	0	0	4,158	9,141	13,299
PLUM CREEK / GONZALES COUNTY OVERLAP	NA	57	5,110	0	308	448	5,923
UVALDE COUNTY	NA	NA	828	0	0	0	828
WINTERGARDEN	987	1	31,099	9,259	4,007	416	45,769
LAYER TOTAL	6,364	14,539	321,737	9,782	25,834	84,493	462,750

*Note the pumping total for Gonzales County Underground Water Conservation District includes pumping in southeast Caldwell County that is not in Plum Creek Conservation District overlap.

TABLE 5: COMPARISON OF 2060 PUMPING BY COUNTY FOR SCENARIOS 4, 5A, AND 5B. PUMPING IS REPORTED IN ACRE-FEET PER YEAR. NA INDICATES THE LAYER IS NOT APPLICABLE.

County	Scenario 4	Scenario 5a	Scenario 5b
ATASCOSA	81,003	81,003	81,003
BEXAR	26,107	26,107	26,107
CALDWELL	43,867	43,867	71,865
DIMMIT	3,359	3,359	3,359
FRIO	74,614	74,614	74,614
GONZALES	84,586	123,986	94,236
GUADALUPE	14,041	14,243	14,243
KARNES	1,280	1,280	1,280
LA SALLE	7,442	7,442	7,442
MAVERICK	1,531	1,531	1,531
MCMULLEN	2,045	2,045	2,045
MEDINA	2,534	2,534	2,534
UVALDE	828	828	828
WEBB	916	916	916
WILSON	45,780	45,780	45,780
ZAVALA	34,968	34,968	34,968
LAYER TOTAL	424,901	464,503	462,751

TABLE 6: COMPARISON OF 2060 PUMPING BY GROUNDWATER CONSERVATION DISTRICT FOR SCENARIOS 4, 5A, AND 5B. PUMPING IS REPORTED IN ACRE-FEET PER YEAR. NA INDICATES THE LAYER IS NOT APPLICABLE.

Groundwater Conservation District	Scenario 4	Scenario 5a	Scenario 5b
No District	29,536	29,536	29,535
EVERGREEN	202,677	202,677	202,677
GONZALES COUNTY *	108,254	147,652	145,899
GUADALUPE COUNTY	14,041	14,241	14,241
MCMULLEN	2,045	2,045	2,045
MEDINA COUNTY	2,534	2,534	2,534
PLUM CREEK	13,299	13,299	13,299
PLUM CREEK / GONZALES COUNTY OVERLAP	5,920	5,920	5,923
UVALDE COUNTY	828	828	828
WINTERGARDEN	45,769	45,769	45,769
LAYER TOTAL	424,903	464,501	462,750

*Note the pumping total for Gonzales County Underground Water Conservation District includes pumping in southeast Caldwell County that is not in Plum Creek Conservation District overlap.

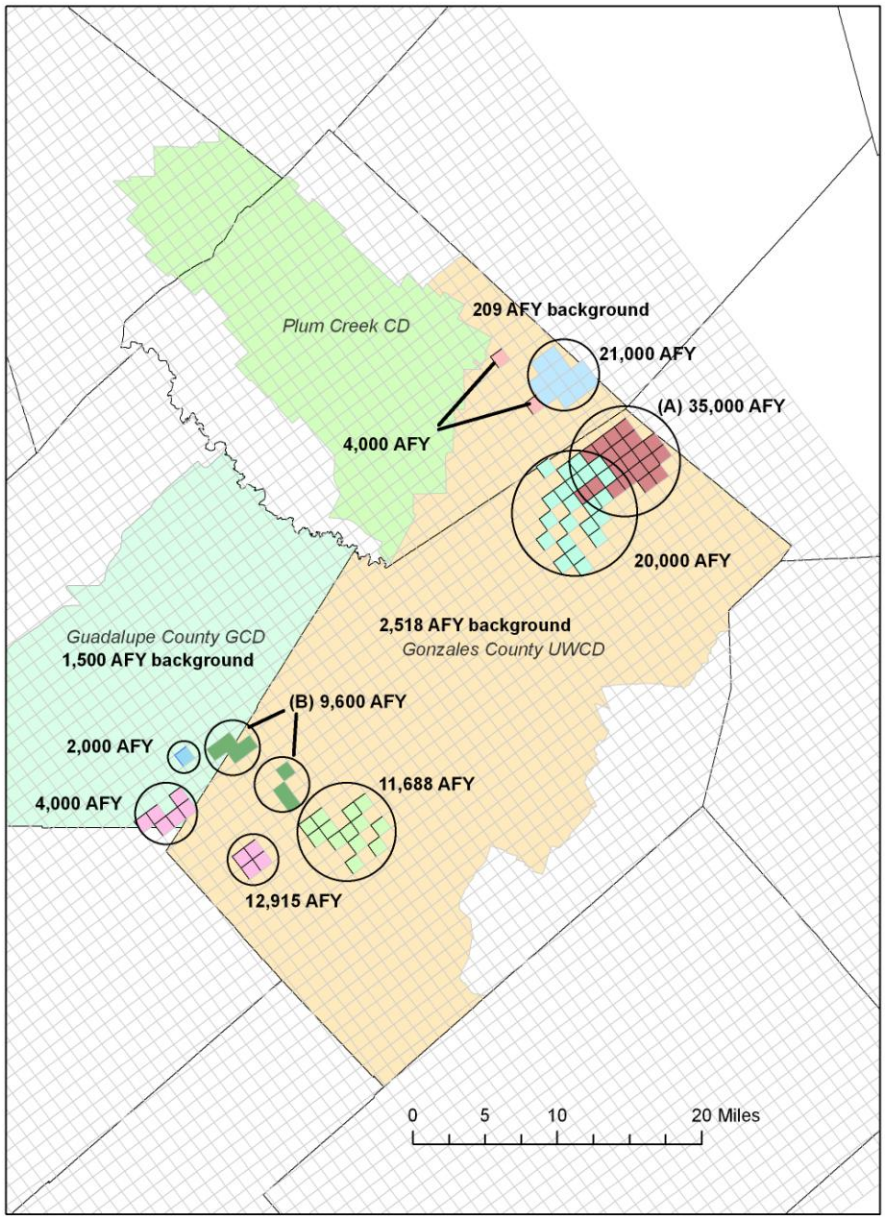

FIGURE 2: PUMPING AMOUNTS AND MAJOR WELLFIELD LOCATIONS IN CALDWELL, GONZALES, AND GUADALUPE COUNTIES FOR SCENARIO 5A. ALL PUMPING IS REPORTED IN ACRE-FEET PER YEAR (AFY). (A) NEW WELLFIELD (B) ORIGINAL RATE 5,000 ACRE-FEET PER YEAR INCREASED TO 9,600 ACRE-FEET PER YEAR.

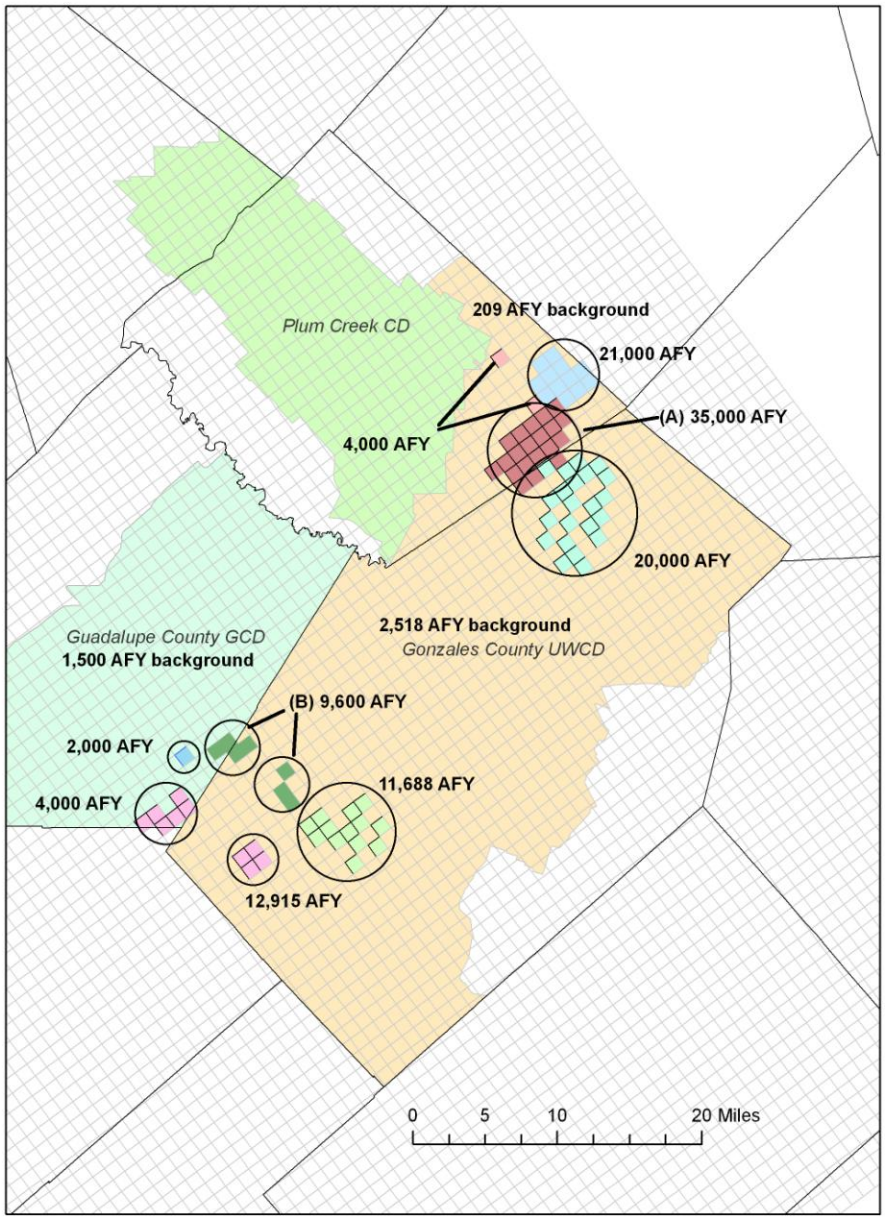

FIGURE 3: PUMPING AMOUNTS AND MAJOR WELLFIELD LOCATIONS IN CALDWELL, GONZALES, AND GUADALUPE COUNTIES FOR SCENARIO 5B. ALL PUMPING IS REPORTED IN ACRE-FEET PER YEAR (AFY). (A) NEW WELLFIELD (B) ORIGINAL RATE 5,000 ACRE-FEET PER YEAR INCREASED TO 9,600 ACRE-FEET PER YEAR.

TABLE 7. COUNTY AVERAGE WATER LEVEL DRAWDOWNS FROM 2000 TO 2060 IN FEET FOR SCENARIO 5A. NEGATIVE VALUES INDICATE A RISE IN WATER ELEVATIONS.

County	*Sparta*	*Weches*	*Queen City*	*Reklaw*	*Carrizo*	*Wilcox*	*County Overall*
ATASCOSA	10	13	15	43	75	102	63
BEXAR	0	0	0	8	64	94	90
CALDWELL	0	0	7	26	140	72	75
DIMMIT	-2	3	-4	-14	-17	-19	-15
FRIO	4	3	-3	19	39	35	24
GONZALES	26	33	41	83	132	103	82
GUADALUPE	0	0	-11	6	59	31	33
KARNES	18	28	36	65	92	81	60
LA SALLE	7	8	9	11	12	1	6
MAVERICK	0	0	0	1	-8	-7	-7
MCMULLEN	25	29	32	39	46	22	30
MEDINA	0	0	0	-1	29	28	28
UVALDE	0	0	0	0	1	22	19
WEBB	-7	-4	-9	-5	-4	-2	-4
WILSON	8	14	14	45	80	104	70
ZAVALA	-7	-5	-13	-14	2	-3	-5
OVERALL	9	12	8	20	36	33	25

TABLE 8. COUNTY AVERAGE WATER LEVEL DRAWDOWNS FROM 2000 TO 2060 IN FEET FOR SCENARIO 5B. NEGATIVE VALUES INDICATE A RISE IN WATER ELEVATIONS.

County	*Sparta*	*Weches*	*Queen City*	*Reklaw*	*Carrizo*	*Wilcox*	*County Overall*
ATASCOSA	10	13	15	43	75	102	63
BEXAR	0	0	0	8	64	94	90
CALDWELL	0	0	7	27	167	76	81
DIMMIT	-2	3	-4	-14	-17	-19	-15
FRIO	4	3	-3	19	39	35	24
GONZALES	25	32	39	80	130	102	80
GUADALUPE	0	0	-11	6	59	31	33
KARNES	18	28	36	65	92	81	60
LA SALLE	7	8	9	11	12	1	6
MAVERICK	0	0	0	1	-8	-7	-7
MCMULLEN	25	29	32	39	46	22	30
MEDINA	0	0	0	-1	29	28	28
UVALDE	0	0	0	0	1	22	19
WEBB	-7	-4	-9	-5	-4	-2	-4
WILSON	8	14	14	45	79	104	70
ZAVALA	-7	-5	-13	-14	2	-3	-5
OVERALL	9	12	7	19	36	33	25

TABLE 9: GROUNDWATER CONSERVATION DISTRICT AVERAGE WATER LEVEL DRAWDOWNS IN FEET FROM 2000 TO 2060 FOR SCENARIO 5A. NEGATIVE VALUES INDICATE A RISE IN WATER ELEVATIONS.

Groundwater Conservation District	*Sparta*	*Weches*	*Queen City*	*Reklaw*	*Carrizo*	*Wilcox*	*Groundwater Conservation District Overall*
No District	-2	1	-4	2	7	11	6
EVERGREEN	9	12	9	36	65	78	51
GONZALES COUNTY *	25	31	37	78	137	106	85
GUADALUPE COUNTY	0	0	-11	6	59	31	33
MCMULLEN	25	29	32	39	46	22	30
MEDINA COUNTY	0	0	0	-1	29	28	28
PLUM CREEK *	0	0	8	51	142	62	64
UVALDE COUNTY	0	0	0	0	1	22	19
WINTERGARDEN	5	6	0	-4	0	-7	-3
OVERALL	9	12	8	20	36	33	25

*Note both Gonzales County Underground Water Conservation District and Plum Creek Conservation District include overlap cells in their average.

TABLE 10: GROUNDWATER CONSERVATION DISTRICT AVERAGE WATER LEVEL DRAWDOWNS IN FEET FROM 2000 TO 2060 FOR SCENARIO 5B. NEGATIVE VALUES INDICATE A RISE IN WATER ELEVATIONS.

Groundwater Conservation District	*Sparta*	*Weches*	*Queen City*	*Reklaw*	*Carrizo*	*Wilcox*	*Groundwater Conservation District Overall*
No District	-2	1	-4	2	6	11	5
EVERGREEN	9	12	9	36	65	78	51
GONZALES COUNTY *	24	30	36	76	137	106	84
GUADALUPE COUNTY	0	0	-11	6	59	31	33
MCMULLEN	25	29	32	39	46	22	30
MEDINA COUNTY	0	0	0	-1	29	28	28
PLUM CREEK *	0	0	8	51	152	62	65
UVALDE COUNTY	0	0	0	0	1	22	19
WINTERGARDEN	5	6	0	-4	0	-7	-3
OVERALL	9	12	7	19	36	33	25

*Note both Gonzales County Underground Water Conservation District and Plum Creek Conservation District include overlap cells in their average.

TABLE 11. COMPARISON OF COUNTY AVERAGE WATER LEVEL DRAWDOWNS IN FEET FROM 2000 TO 2060 FOR SCENARIOS 4, 5A, AND 5B. NEGATIVE VALUES INDICATE A RISE IN WATER ELEVATIONS.

County	*Scenario 4*	*Scenario 5A*	*Scenario 5B*
ATASCOSA	62	63	63
BEXAR	90	90	90
CALDWELL	63	75	81
DIMMIT	-15	-15	-15
FRIO	24	24	24
GONZALES	65	82	80
GUADALUPE	32	33	33
KARNES	57	60	60
LA SALLE	6	6	6
MAVERICK	-7	-7	-7
MCMULLEN	29	30	30
MEDINA	28	28	28
UVALDE	19	19	19
WEBB	-4	-4	-4
WILSON	68	70	70
ZAVALA	-5	-5	-5
OVERALL	23	25	25

TABLE 12: COMPARISON OF GROUNDWATER CONSERVATION DISTRICT AVERAGE WATER LEVEL DRAWDOWNS IN FEET FROM 2000 TO 2060 FOR SCENARIOS 4, 5A, AND 5B. NEGATIVE VALUES INDICATE A RISE IN WATER ELEVATIONS.

Groundwater Conservation District	*Scenario 4*	*Scenario 5A*	*Scenario 5B*
No District	4	6	5
EVERGREEN	51	51	51
GONZALES COUNTY *	68	85	84
GUADALUPE COUNTY	32	33	33
MCMULLEN	29	30	30
MEDINA COUNTY	28	28	28
PLUM CREEK *	59	64	65
UVALDE COUNTY	19	19	19
WINTERGARDEN	-3	-3	-3
OVERALL	23	25	25

*Note both Gonzales County Underground Water Conservation District and Plum Creek Conservation District include overlap cells in their averages.

Appendix A: Water Budgets for Scenario 5A by Groundwater Conservation District or County

TABLE A.1. WATER BUDGET FOR BEXAR COUNTY FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	**Sparta**	**Weches**	**Queen City**	**Reklaw**	**Carrizo**	**Layer 6**	**Layer 7**	**Layer 8**
Inflow								
Recharge	-	-	-	96	4,277	434	2,989	5,284
River Leakage	-	-	-	0	0	0	1,802	0
Net Stream Leakage	-	-	-	50	1,239	0	3,863	3,543
Net Vertical Leakage Upper	-	-	-	0	131	-	292	9,489
Net Vertical Leakage Lower	-	-	-	-	24	-	-	-
Net Lateral Flow From Medina	-	-	-	-	-	-	-	18
Net Lateral Flow From Wilson	-	-	-	-	1,224	-	-	-
Total Inflow	-	-	-	146	6,895	434	8,946	18,334
Outflow								
Wells	-	-	-	0	9,107	0	0	17,000
Drains	-	-	-	0	0	0	62	135
Et	-	-	-	0	0	0	9	371
Net Vertical Leakage Upper	-	-	-	-	-	24	-	-
Net Vertical Leakage Lower	-	-	-	131	-	292	9,489	-

Flow term	**Sparta**	**Weches**	**Queen City**	**Reklaw**	**Carrizo**	**Layer 6**	**Layer 7**	**Layer 8**
Net Lateral Flow To Atascosa	-	-	-	26	2,687	55	798	2,244
Net Lateral Flow To Guadalupe	-	-	-	-	-	-	-	69
Net Lateral Flow To Medina	-	-	-	-	-	-	2	-
Net Lateral Flow To Wilson	-	-	-	62	-	35	1,210	6,864
Total Outflow	-	-	-	219	11,794	406	11,570	26,683
Storage Change	-	-	-	-73	-4,899	27	-2,623	-8,347
Model Error	-	-	-	0	0	1	-1	-2
Model Error (percent)	-	-	-	0	0	0	0	0

TABLE A.2 WATER BUDGET FOR CALDWELL COUNTY FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	**Sparta**	**Weches**	**Queen City**	**Reklaw**	**Carrizo**	**Layer 6**	**Layer 7**	**Layer 8**
Inflow								
Recharge	-	-	1,145	904	5,271	149	4,358	4,657
Net Stream Leakage	-	-	322	1,407	75	0	189	2,204
Net Vertical Leakage Upper	-	-	0	365	2,496	-	-	2,650
Net Vertical Leakage Lower	-	-	-	-	396	240	-	-
Net Lateral Flow From Bastrop	-	-	-	-	14,585	-	773	2,479
Net Lateral Flow From Guadalupe	-	-	-	-	-	-	1,402	349
Total Inflow	-	-	1,467	2,676	22,823	389	6,722	12,339
Outflow								
Wells	-	-	307	0	22,809	0	7,371	13,441
Drains	-	-	0	0	0	0	0	208
Et	-	-	0	0	0	0	0	383
Net Vertical Leakage Upper	-	-	-	-	-	396	240	-
Net Vertical Leakage Lower	-	-	365	2,496	-	-	2,650	-
Net Lateral Flow To Bastrop	-	-	106	49	-	11	-	-

Flow term	**Sparta**	**Weches**	**Queen City**	**Reklaw**	**Carrizo**	**Layer 6**	**Layer 7**	**Layer 8**
Net Lateral Flow To Gonzales	-	-	1,050	473	8,453	6	432	1,513
Total Outflow	-	-	1,828	3,018	31,262	413	10,693	15,545
Inflow - Outflow	-	-	-361	-342	-8,439	-24	-3,971	-3,206
Storage Change	-	-	-361	-342	-8,439	-22	-3,972	-3,205
Model Error	-	-	0	0	0	-2	1	-1
Model Error (percent)	-	-	0	0	0	0	0	0

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TABLE A.3 WATER BUDGET FOR EVERGREEN UNDERGROUND WATER CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	8,986	1,592	26,431	2,081	18,690	0	1,560	69
Net Stream Leakage	-	514	8,335	1,496	14,068	0	1,095	207
Net Head Dep Bounds	5,024	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	11,982	14,358	36,447	45,647	-	-	4,222
Net Vertical Leakage Lower	-	-	-	-	11,540	8,923	-	-
Net Lateral Flow From Bee GCD	-	-	-	-	-	-	6	157
Net Lateral Flow From Guadalupe County GCD	-	-	8	35	1,723	55	1,014	3,334
Net Lateral Flow From Live Oak UWCD	-	-	-	-	1,117	83	44	1,145
Net Lateral Flow From Mcmullen GCD	-	-	-	-	3,796	462	74	1,262
Net Lateral Flow From Medina County GCD	-	-	-	3	12,750	380	1,830	5,378

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow From Pecan Valley GCD	-	25	6	7	396	17	55	332
Net Lateral Flow From Wintergarden GCD	-	-	-	104	18,531	1,086	404	1,374
Net Lateral Inflow From Other Areas	-	-	-	88	1,464	91	2,007	9,107
Total Inflow	14,010	14,113	49,138	40,261	129,722	11,097	8,089	26,587
Outflow								
Wells	1,735	0	9,030	0	157,767	375	371	34,000
Drains	137	46	0	0	0	0	0	0
Et	81	16	0	0	0	0	0	0
Net Stream Leakage	393	-	-	-	-	-	-	-
Net Vertical Leakage Upper	-	-	-	-	-	11,540	8,923	-
Net Vertical Leakage Lower	11,982	14,358	36,447	45,647	-	-	4,222	-
Net Lateral Flow To Bee GCD	-	2	1	21	20	1	-	-
Net Lateral Flow To Gonzales County UWCD	212	78	1,006	115	14,256	13	443	823

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Live Oak UWCD	19	39	16	35	-	-	-	-
Net Lateral Flow To Mcmullen GCD	169	20	632	46	-	-	-	-
Net Lateral Flow To Pecan Valley GCD	1	-	-	-	-	-	-	-
Net Lateral Flow To Wintergarden GCD	1,332	67	1,577	-	-	-	-	-
Total Outflow	16,061	14,626	48,709	45,864	172,043	11,929	13,959	34,823
Inflow - Outflow	-2,051	-513	429	-5,603	-42,321	-832	-5,870	-8,236
Storage Change	-2,049	-511	432	-5,602	-42,323	-832	-5,870	-8,236
Model Error	-2	-2	-3	-1	2	0	0	0
Model Error (percent)	-	-	-	0	0	0	0	0

TABLE A.4 WATER BUDGET FOR GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	3,082	803	7,239	2,139	6,670	149	972	0
Net Stream Leakage	-	-	-	2,112	3,035	0	678	0
Net Vertical Leakage Upper	-	-	326	7,597	14,582	-	-	-
Net Vertical Leakage Lower	910	-	-	-	1,925	1,495	267	-
Net Lateral Flow From Evergreen UWCD	212	78	1,006	115	14,256	13	443	823
Net Lateral Flow From Fayette County GCD	239	45	788	165	23,406	36	2,119	4,379
Net Lateral Flow From Guadalupe County GCD	-	-	8	113	5,738	48	2,508	5,121
Net Lateral Flow From Lost Pines GCD	-	-	-	-	14,585	-	775	2,378
Net Lateral Flow From Pecan Valley GCD	20	38	30	36	412	15	112	337
Net Lateral Flow From Plum Creek CD	-	-	-	-	107	23	1,882	1,561

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Inflow From Other Areas	172	71	142	142	8,942	33	659	4,454
Total Inflow	4,635	1,035	9,539	12,419	93,658	1,812	10,415	19,053
Outflow								
Wells	3,552	0	5,372	0	112,268	0	12,294	20,086
Drains	8	9	0	0	0	0	0	0
Et	1	48	13	0	0	0	0	0
Net Stream Leakage	831	69	160	-	-	-	-	-
Net Head Dep Bounds	1,049	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	910	-	-	-	1,925	1,495	267
Net Vertical Leakage Lower	-	326	7,597	14,582	-	-	-	-
Net Lateral Flow To Lost Pines GCD	-	-	106	49	-	11	-	-
Total Outflow	5,441	1,362	13,248	14,631	112,268	1,936	13,789	20,353
Inflow - Outflow	-806	-327	-3,709	-2,212	-18,610	-124	-3,374	-1,300
Storage Change	-805	-328	-3,711	-2,212	-18,608	-124	-3,373	-1,300
Model Error	-1	1	2	0	-2	0	-1	0

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Model Error (percent)	0	0	0	0	0	0	0	0

NOTE: THESE FLOWS INCLUDE THE PLUM CREEK/GONZALES OVERLAP

TABLE A.5 WATER BUDGET FOR GUADALUPE COUNTY GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	78	454	7,210	0	5,607	4,546
Net Stream Leakage	-	-	0	175	556	0	3,029	1,443
Net Vertical Leakage Upper	-	-	0	39	664	85	-	2,848
Net Vertical Leakage Lower	-	-	-	-	-	13	-	-
Total Inflow	-	-	78	668	8,430	98	8,636	8,837
Outflow								
Wells	-	-	0	0	9,700	0	2,994	1,549
Drains	-	-	0	0	0	0	0	41
Et	-	-	0	0	0	0	0	67
Net Vertical Leakage Upper	-	-	-	-	-	-	13	-
Net Vertical Leakage Lower	-	-	39	664	85	-	2,848	-
Net Lateral Flow To Evergreen UWCD	-	-	8	35	1,723	55	1,014	3,334
Net Lateral Flow To Gonzales County UWCD	-	-	8	113	5,738	48	2,508	5,121

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Outflow To Other Areas	-	-	-	-	-	-	1,402	279
Total Outflow	-	-	55	812	17,246	103	10,779	10,391
Inflow - Outflow	-	-	23	-144	-8,816	-5	-2,143	-1,554
Storage Change	-	-	24	-143	-8,816	-4	-2,142	-1,554
Model Error	-	-	-1	-1	0	-1	-1	0
Model Error (percent)	-	-	0	0	0	0	0	0

TABLE A.6 WATER BUDGET FOR MAVERICK COUNTY FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	49	2,069	85	591	1,353
Net Stream Leakage	-	-	-	6	337	17	878	324
Net Vertical Leakage Upper	-	-	-	0	46	776	549	1,300
Net Lateral Flow From Webb	-	-	-	-	-	-	21	-
Total Inflow	-	-	-	55	2,452	878	2,039	2,977
Outflow								
Wells	-	-	-	0	143	136	259	992
Et	-	-	-	0	0	0	0	195
Net Vertical Leakage Lower	-	-	-	46	776	549	1,300	-
Net Lateral Flow To Dimmit	-	-	-	-	-	52	352	850
Net Lateral Flow To Webb	-	-	-	-	-	-	-	218
Net Lateral Flow To Zavala	-	-	-	11	760	28	60	609
Total Outflow	-	-	-	57	1,679	765	1,971	2,864
Inflow - Outflow	-	-	-	-2	773	113	68	113

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Storage Change	-	-	-	-2	772	114	67	110
Model Error	-	-	-	0	1	-1	1	3
Model Error (percent)	-	-	-	0	0	0	0	0

TABLE A.7 WATER BUDGET FOR MCMULLEN GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Net Vertical Leakage Upper	-	124	253	2,113	2,481	-	-	-
Net Vertical Leakage Lower	-	-	-	-	1,498	640	175	-
Net Lateral Flow From Evergreen UWCD	169	20	632	46	-	-	-	-
Net Lateral Flow From Live Oak UWCD	-	-	6	17	315	94	8	40
Net Lateral Flow From Wintergarden GCD	217	62	526	110	958	399	26	388
Net Lateral Inflow From Other Areas	1	2	5	10	38	20	2	19
Total Inflow	387	208	1,422	2,296	5,290	1,153	211	447
Outflow								
Wells	100	0	150	0	2,000	0	0	0
Net Head Dep Bounds	363	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	-	-	-	-	1,498	640	175
Net Vertical Leakage Lower	124	253	2,113	2,481	-	-	-	-

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Evergreen UWCD	-	-	-	-	3,796	462	74	1,262
Net Lateral Flow To Live Oak UWCD	7	8	-	-	-	-	-	-
Total Outflow	594	261	2,263	2,481	5,796	1,960	714	1,437
Inflow - Outflow	-207	-53	-841	-185	-506	-807	-503	-990
Storage Change	-207	-53	-841	-187	-504	-808	-504	-991
Model Error	0	0	0	2	-2	1	1	1
Model Error (percent)	0	0	0	0	0	0	0	0

TABLE A.8 WATER BUDGET FOR MEDINA COUNTY GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	22	8,790	0	2,638	2,091
Net Stream Leakage	-	-	-	0	1,432	0	900	-
Net Vertical Leakage Upper	-	-	-	0	17	453	118	3,246
Net Lateral Flow From Uvalde County UWCD	-	-	-	-	19	-	22	106
Net Lateral Inflow From Other Areas	-	-	-	-	-	-	2	-
Total Inflow	-	-	-	22	10,258	453	3,680	5,443
Outflow								
Wells	-	-	-	0	400	0	1,248	886
Et	-	-	-	0	0	0	0	354
Net Stream Leakage	-	-	-	-	-	-	-	128
Net Vertical Leakage Lower	-	-	-	17	453	118	3,246	-
Net Lateral Flow To Evergreen UWCD	-	-	-	3	12,750	380	1,830	5,378

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Wintergarden GCD	-	-	-	-	66	9	32	32
Net Lateral Outflow To Other Areas	-	-	-	-	-	-	-	18
Total Outflow	-	-	-	20	13,669	507	6,356	6,796
Inflow - Outflow	-	-	-	2	-3,411	-54	-2,676	-1,353
Storage Change	-	-	-	1	-3,411	-52	-2,678	-1,353
Model Error	-	-	-	1	0	-2	2	0
Model Error (percent)	-	-	-	0	0	0	0	0

TABLE A.9 WATER BUDGET FOR PLUM CREEK CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	-	118	0	2,976	2,750
Net Stream Leakage	-	-	-	-	0	0	1,340	1,159
Vertical Leakage Upper	-	-	-	-	0	10	1	1,975
Net Lateral Inflow From Other Areas	-	-	-	-	-	-	1,381	2,334
Total Inflow	-	-	-	-	118	10	5,698	8,218
Outflow								
Wells	-	-	-	-	0	0	4,158	9,202
Et	-	-	-	-	0	0	0	213
Vertical Leakage Lower	-	-	-	-	10	1	1,975	-
Net Lateral Flow To Gonzales County UWCD	-	-	-	-	107	23	1,882	1,561
Total Outflow	-	-	-	-	117	24	8,015	10,976
Inflow - Outflow	-	-	-	-	1	-14	-2,317	-2,758
Storage Change	-	-	-	-	1	-14	-2,316	-2,758

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Model Error	-	-	-	-	0	0	-1	0
Model Error (percent)	-	-	-	-	0	0	0	0

NOTE: THESE FLOWS DO NOT INCLUDE AMOUNTS IN THE PLUM CREEK GONZALES OVERLAP AREA

TABLE A.10 WATER BUDGET FOR UVALDE COUNTY UNDERGROUND WATER CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	-	1,370	-	1,188	1,205
Net Stream Leakage	-	-	-	-	658	-	293	335
Vertical Leakage Upper	-	-	-	-	0	-	0	1,445
Total Inflow	-	-	-	-	2,028	-	1,481	2,985
Outflow								
Wells	-	-	-	-	828	-	0	0
Et	-	-	-	-	0	-	0	6
Vertical Leakage Lower	-	-	-	-	0	-	1,445	-
Net Lateral Flow To Medina County GCD	-	-	-	-	19	-	22	106
Net Lateral Flow To Wintergarden GCD	-	-	-	-	1,178	-	946	4,341
Total Outflow	-	-	-	-	2,025	-	2,413	4,453
Inflow - Outflow	-	-	-	-	3	-	-932	-1,468
Storage Change	-	-	-	-	2	-	-934	-1,464

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Model Error	-	-	-	-	1	-	2	-4
Model Error (percent)	-	-	-	-	0	-	0	0

TABLE A.11 WATER BUDGET FOR WEBB COUNTY FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	3,201	382	10,802	283	529	82	82	15
Net Stream Leakage	1,776	913	13,614	1,983	53	-	175	-
Net Head Dep Bounds	4,316	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	2,726	3,442	4,696	4,532	2,559	538	563
Net Lateral Flow From Dimmit	7	-	-	-	-	-	114	316
Net Lateral Flow From Maverick	-	-	-	-	-	-	-	218
Net Lateral Inflow From Other Areas	-	-	-	-	-	13	-	2
Total Inflow	9,300	4,021	27,858	6,962	5,114	2,654	909	1,114
Outflow								
Wells	0	0	0	0	896	13	6	1
Et	2,203	145	1,527	1,624	124	69	150	42
Net Stream Leakage	-	-	-	-	-	190	-	135
Net Vertical Leakage Lower	2,726	3,442	4,696	4,532	2,559	538	563	-

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Dimmit	-	1	582	78	178	230	-	-
Net Lateral Flow To La Salle	523	85	1,229	386	1,172	1,482	142	755
Net Lateral Flow To Maverick	-	-	-	-	-	-	21	-
Net Lateral Flow To Mcmullen	1	2	5	10	38	20	2	19
Net Lateral Outflow To Other Areas	-	-	-	-	3	-	-	-
Total Outflow	5,453	3,675	8,039	6,630	4,970	2,542	884	952
Inflow - Outflow	3,847	346	19,819	332	144	112	25	162
Storage Change	3,848	346	19,824	335	145	113	27	162
Model Error	-1	0	-5	-3	-1	-1	-2	0
Model Error (percent)	0	0	0	0	0	0	0	0

TABLE A.12 WATER BUDGET FOR WINTERGARDEN GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5A. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	9,587	691	21,854	1,069	11,967	649	1,678	804
Net Stream Leakage	-	91	18,749	1,559	3,484	-	1,683	895
Net Head Dep Bounds	1,864	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	10,821	10,749	28,999	29,607	148	-	-
Net Vertical Leakage Lower	-	-	-	-	-	7,995	6,101	-
Net Lateral Flow From Evergreen UWCD	1,332	67	1,577	-	-	-	-	-
Net Lateral Flow From Medina County GCD	-	-	-	-	66	9	32	32
Net Lateral Flow From Uvalde County UWCD	-	-	-	-	1,178	-	946	4,341
Net Lateral Inflow From Other Areas	515	86	1,811	474	2,110	1,792	441	1,898
Total Inflow	13,298	11,756	54,740	32,101	48,412	10,593	10,881	7,970
Outflow								
Wells	987	0	1	0	31,099	9,259	4,007	416

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Et	582	78	0	0	0	0	0	0
Net Stream Leakage	2,111	-	-	-	-	31	-	-
Net Vertical Leakage Upper	-	-	-	-	-	-	7,995	6,101
Net Vertical Leakage Lower	10,821	10,749	28,999	29,607	148	-	-	-
Net Lateral Flow To Evergreen UWCD	-	-	-	104	18,531	1,086	404	1,374
Net Lateral Flow To Mcmullen GCD	217	62	526	110	958	399	26	388
Total Outflow	14,718	10,889	29,526	29,821	50,736	10,775	12,432	8,279
Inflow - Outflow	-1,420	867	25,214	2,280	-2,324	-182	-1,551	-309
Storage Change	-1,418	867	25,213	2,281	-2,324	-180	-1,549	-311
Model Error	-2	0	1	-1	0	-2	-2	2
Model Error (percent)	0	0	0	0	0	0	0	0

Appendix B: Water Budgets for Scenario 5B by Groundwater Conservation District or County

TABLE B.1. WATER BUDGET FOR BEXAR COUNTY FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	96	4,277	434	2,989	5,284
River Leakage	-	-	-	0	0	0	1,802	0
Net Stream Leakage	-	-	-	50	1,239	0	3,863	3,543
Net Vertical Leakage Upper	-	-	-	0	131	-	293	9,489
Net Vertical Leakage Lower	-	-	-	-	24	-	-	-
Net Lateral Flow From Medina	-	-	-	-	-	-	-	18
Net Lateral Flow From Wilson	-	-	-	-	1,227	-	-	-
Total Inflow	-	-	-	146	6,898	434	8,947	18,334
Outflow								
Wells	-	-	-	0	9,107	0	0	17,000
Drains	-	-	-	0	0	0	62	135
Et	-	-	-	0	0	0	9	371
Net Vertical Leakage Upper	-	-	-	-	-	24	-	-
Net Vertical Leakage Lower	-	-	-	131	-	293	9,489	-

Flow term	**Sparta**	**Weches**	**Queen City**	**Reklaw**	**Carrizo**	**Layer 6**	**Layer 7**	**Layer 8**
Net Lateral Flow To Atascosa	-	-	-	26	2,688	55	798	2,244
Net Lateral Flow To Guadalupe	-	-	-	-	-	-	-	69
Net Lateral Flow To Medina	-	-	-	-	-	-	2	-
Net Lateral Flow To Wilson	-	-	-	62	-	35	1,210	6,864
Total Outflow	-	-	-	219	11,795	407	11,570	26,683
Storage Change	-	-	-	-73	-4,897	27	-2,623	-8,349
Model Error	-	-	-	-73	-4,896	27	-2,623	-8,347
Model Error (percent)	-	-	-	0	-1	0	0	-2

TABLE B.2 WATER BUDGET FOR CALDWELL COUNTY FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	**Sparta**	**Weches**	**Queen City**	**Reklaw**	**Carrizo**	**Layer 6**	**Layer 7**	**Layer 8**
Inflow	-	-	1,145	904	5,271	149	4,358	4,657
Recharge	-	-	304	1,460	75	0	201	2,204
Net Stream Leakage	-	-	0	376	2,412	-	-	2,640
Net Vertical Leakage Upper	-	-	-	-	582	381	-	-
Net Vertical Leakage Lower	-	-	-	-	17,699	-	790	2,480
Net Lateral Flow From Bastrop	-	-	-	-	14,519	33	-	-
Net Lateral Flow From Guadalupe	-	-	-	-	-	-	1,402	349
Total Inflow	-	-	1,449	2,740	40,558	563	6,751	12,330
Outflow								
Wells	-	-	307	0	50,807	0	7,371	13,441
Drains	-	-	0	0	0	0	0	208
Et	-	-	0	0	0	0	0	383
Net Vertical Leakage Upper	-	-	-	-	-	582	381	-
Net Vertical Leakage Lower	-	-	376	2,412	-	-	2,640	-
Net Lateral Flow To Bastrop	-	-	98	41	-	7	-	-

Flow term	**Sparta**	**Weches**	**Queen City**	**Reklaw**	**Carrizo**	**Layer 6**	**Layer 7**	**Layer 8**
Net Lateral Flow To Gonzales	-	-	1,017	444	-	-	390	1,506
Total Outflow	-	-	1,798	2,897	50,807	589	10,782	15,538
Inflow - Outflow	-	-	-349	-157	-10,249	-26	-4,031	-3,208
Storage Change	-	-	-349	-158	-10,250	-26	-4,030	-3,208
Model Error	-	-	0	1	1	0	-1	0
Model Error (percent)	-	-	0	0	0	0	0	0

TABLE B.3 WATER BUDGET FOR EVERGREEN UNDERGROUND WATER CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	8,986	1,592	26,431	2,081	18,690	0	1,560	69
Net Stream Leakage	-	513	8,334	1,495	14,067	0	1,095	207
Net Head Dep Bounds	5,020	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	11,977	14,351	36,440	45,639	-	-	4,223
Net Vertical Leakage Lower	-	-	-	-	11,539	8,921	-	-
Net Lateral Flow From Bee GCD	-	-	-	-	-	-	6	157
Net Lateral Flow From Guadalupe County GCD	-	-	8	35	1,724	55	1,013	3,333
Net Lateral Flow From Live Oak UWCD	-	-	-	-	1,116	83	44	1,145
Net Lateral Flow From Mcmullen GCD	-	-	-	-	3,795	462	74	1,262
Net Lateral Flow From Medina County GCD	-	-	-	3	12,746	380	1,831	5,379

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow From Pecan Valley GCD	-	25	6	7	399	17	54	332
Net Lateral Flow From Wintergarden GCD	-	-	-	104	18,538	1,086	404	1,375
Net Lateral Inflow From Other Areas	-	-	-	88	1,461	91	2,007	9,107
Total Inflow	14,006	14,107	49,130	40,253	129,714	11,095	8,088	26,589
Outflow								
Wells	1,735	0	9,030	0	157,767	375	371	34,000
Drains	137	46	0	0	0	0	0	0
Et	81	16	0	0	0	0	0	0
Net Stream Leakage	393	-	-	-	-	-	-	-
Net Vertical Leakage Upper	-	-	-	-	-	11,539	8,921	-
Net Vertical Leakage Lower	11,977	14,351	36,440	45,639	-	-	4,223	-
Net Lateral Flow To Bee GCD	-	2	1	21	21	1	-	-
Net Lateral Flow To Gonzales County UWCD	212	78	1,005	115	14,225	13	442	822

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Live Oak UWCD	19	39	16	34	-	-	-	-
Net Lateral Flow To Mcmullen GCD	169	20	632	46	-	-	-	-
Net Lateral Flow To Pecan Valley GCD	1	-	-	-	-	-	-	-
Net Lateral Flow To Wintergarden GCD	1,332	67	1,577	-	-	-	-	-
Total Outflow	16,056	14,619	48,701	45,855	172,013	11,928	13,957	34,822
Inflow - Outflow	-2,050	-512	429	-5,602	-42,299	-833	-5,869	-8,233
Storage Change	-2,047	-511	433	-5,602	-42,299	-833	-5,867	-8,233
Model Error	-3	-1	-4	0	0	0	-2	0
Model Error (percent)	0	0	0	0	0	0	0	0

TABLE B.4 WATER BUDGET FOR GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	3,082	803	7,239	2,139	6,670	149	972	0
Net Stream Leakage	-	-	-	2,195	3,035	0	679	0
Net Vertical Leakage Upper	-	-	186	7,366	14,308	-	-	-
Net Vertical Leakage Lower	1,042	-	-	-	2,016	1,577	260	-
Net Lateral Flow From Evergreen UWCD	212	78	1,005	115	14,225	13	442	822
Net Lateral Flow From Fayette County GCD	241	44	787	149	16,782	28	2,092	4,375
Net Lateral Flow From Guadalupe County GCD	-	-	8	113	5,747	48	2,505	5,120
Net Lateral Flow From Lost Pines GCD	-	-	-	-	17,699	-	793	2,379
Net Lateral Flow From Pecan Valley GCD	20	39	30	36	416	15	112	337
Net Lateral Flow From Plum Creek CD	-	-	-	-	105	23	1,929	1,561

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Inflow From Other Areas	177	72	146	138	8,238	34	647	4,452
Total Inflow	4,774	1,036	9,401	12,251	89,241	1,887	10,431	19,046
Outflow								
Wells	3,552	0	5,372	0	110,518	0	12,294	20,086
Drains	8	10	0	0	0	0	0	0
Et	1	48	14	0	0	0	0	0
Net Stream Leakage	852	72	247	-	-	-	-	-
Net Head Dep Bounds	1,141	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	1,042	-	-	-	2,016	1,577	260
Net Vertical Leakage Lower	-	186	7,366	14,308	-	-	-	-
Net Lateral Flow To Lost Pines GCD	-	-	98	41	-	7	-	-
Total Outflow	5,554	1,358	13,097	14,349	110,518	2,023	13,871	20,346
Inflow - Outflow	-780	-322	-3,696	-2,098	-21,277	-136	-3,440	-1,300
Storage Change	-780	-321	-3,696	-2,098	-21,278	-137	-3,439	-1,301
Model Error	0	-1	0	0	1	1	-1	1

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Model Error (percent)	0	0	0	0	0	0	0	0

NOTE: THESE FLOWS INCLUDE THE PLUM CREEK/GONZALES OVERLAP

TABLE B.5 WATER BUDGET FOR GUADALUPE COUNTY GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	78	454	7,210	0	5,607	4,546
Net Stream Leakage	-	-	0	175	553	0	3,027	1,443
Net Vertical Leakage Upper	-	-	0	39	664	87	-	2,848
Net Vertical Leakage Lower	-	-	-	-	-	13	-	-
Total Inflow	-	-	78	668	8,427	100	8,634	8,837
Outflow								
Wells	-	-	0	0	9,700	0	2,994	1,549
Drains	-	-	0	0	0	0	0	41
Et	-	-	0	0	0	0	0	67
Net Vertical Leakage Upper	-	-	-	-	-	-	13	-
Net Vertical Leakage Lower	-	-	39	664	87	-	2,848	-
Net Lateral Flow To Evergreen UWCD	-	-	8	35	1,724	55	1,013	3,333
Net Lateral Flow To Gonzales County UWCD	-	-	8	113	5,747	48	2,505	5,120

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Outflow To Other Areas	-	-	-	-	-	-	1,402	280
Total Outflow	-	-	55	812	17,258	103	10,775	10,390
Inflow - Outflow	-	-	23	-144	-8,831	-3	-2,141	-1,553
Storage Change	-	-	24	-143	-8,830	-4	-2,140	-1,554
Model Error	-	-	-1	-1	-1	1	-1	1
Model Error (percent)	-	-	0	0	0	0	0	0

TABLE B.6 WATER BUDGET FOR MAVERICK COUNTY FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	49	2,069	85	591	1,353
Net Stream Leakage	-	-	-	6	337	17	878	324
Net Vertical Leakage Upper	-	-	-	0	46	777	549	1,300
Net Lateral Flow From Webb	-	-	-	-	-	-	21	-
Total Inflow	-	-	-	55	2,452	879	2,039	2,977
Outflow								
Wells	-	-	-	0	143	136	259	992
Et	-	-	-	0	0	0	0	195
Net Vertical Leakage Lower	-	-	-	46	777	549	1,300	-
Net Lateral Flow To Dimmit	-	-	-	-	-	52	352	850
Net Lateral Flow To Webb	-	-	-	-	-	-	-	218
Net Lateral Flow To Zavala	-	-	-	11	760	28	60	609
Total Outflow	-	-	-	57	1,680	765	1,971	2,864
Inflow - Outflow	-	-	-	-2	772	114	68	113

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Storage Change	-	-	-	-2	772	114	67	110
Model Error	-	-	-	0	0	0	1	3
Model Error (percent)	-	-	-	0	0	0	0	0

TABLE B.7 WATER BUDGET FOR MCMULLEN GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Net Vertical Leakage Upper	-	125	253	2,113	2,481	-	-	-
Net Vertical Leakage Lower	-	-	-	-	1,498	640	175	-
Net Lateral Flow From Evergreen UWCD	169	20	632	46	-	-	-	-
Net Lateral Flow From Live Oak UWCD	-	-	6	17	317	94	8	40
Net Lateral Flow From Wintergarden GCD	217	62	526	110	957	399	26	388
Net Lateral Inflow From Other Areas	1	2	5	10	38	20	2	19
Total Inflow	387	209	1,422	2,296	5,291	1,153	211	447
Outflow								
Wells	100	0	150	0	2,000	0	0	0
Net Head Dep Bounds	362	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	-	-	-	-	1,498	640	175
Net Vertical Leakage Lower	125	253	2,113	2,481	-	-	-	-

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Evergreen UWCD	-	-	-	-	3,795	462	74	1,262
Net Lateral Flow To Live Oak UWCD	7	8	-	-	-	-	-	-
Total Outflow	594	261	2,263	2,481	5,795	1,960	714	1,437
Inflow - Outflow	-207	-52	-841	-185	-504	-807	-503	-990
Storage Change	-207	-53	-840	-187	-504	-808	-504	-991
Model Error	0	1	-1	2	0	1	1	1
Model Error (percent)	0	0	0	0	0	0	0	0

TABLE B.8 WATER BUDGET FOR MEDINA COUNTY GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	22	8,790	0	2,638	2,091
Net Stream Leakage	-	-	-	0	1,432	0	900	-
Net Vertical Leakage Upper	-	-	-	0	17	454	118	3,246
Net Lateral Flow From Uvalde County UWCD	-	-	-	-	19	-	22	106
Net Lateral Inflow From Other Areas	-	-	-	-	-	-	2	-
Total Inflow	-	-	-	22	10,258	454	3,680	5,443
Outflow								
Wells	-	-	-	0	400	0	1,248	886
Et	-	-	-	0	0	0	0	354
Net Stream Leakage	-	-	-	-	-	-	-	128
Net Vertical Leakage Lower	-	-	-	17	454	118	3,246	-
Net Lateral Flow To Evergreen UWCD	-	-	-	3	12,746	380	1,831	5,379

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Wintergarden GCD	-	-	-	-	66	9	32	32
Net Lateral Outflow To Other Areas	-	-	-	-	-	-	-	18
Total Outflow	-	-	-	20	13,666	507	6,357	6,797
Inflow - Outflow	-	-	-	2	-3,408	-53	-2,677	-1,354
Storage Change	-	-	-	1	-3,407	-52	-2,679	-1,354
Model Error	-	-	-	1	-1	-1	2	0
Model Error (percent)	-	-	-	0	0	0	0	0

TABLE B.9 WATER BUDGET FOR PLUM CREEK CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	-	118	0	2,976	2,750
Net Stream Leakage	-	-	-	-	0	0	1,350	1,159
Vertical Leakage Upper	-	-	-	-	0	11	1	1,971
Net Lateral Inflow From Other Areas	-	-	-	-	-	-	1,387	2,335
Total Inflow	-	-	-	-	118	11	5,714	8,215
Outflow								
Wells	-	-	-	-	0	0	4,158	9,202
Et	-	-	-	-	0	0	0	213
Vertical Leakage Lower	-	-	-	-	11	1	1,971	-
Net Lateral Flow To Gonzales County UWCD	-	-	-	-	105	23	1,929	1,561
Total Outflow	-	-	-	-	116	24	8,058	10,976
Inflow - Outflow	-	-	-	-	2	-13	-2,344	-2,761
Storage Change	-	-	-	-	2	-13	-2,344	-2,760

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Model Error	-	-	-	-	0	0	0	-1
Model Error (percent)	-	-	-	-	0	0	0	0

NOTE: THESE FLOWS DO NOT INCLUDE AMOUNTS IN THE PLUM CREEK GONZALES OVERLAP AREA

TABLE B.10 WATER BUDGET FOR UVALDE COUNTY UNDERGROUND WATER CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	-	-	-	-	1,370	-	1,188	1,205
Net Stream Leakage	-	-	-	-	658	-	293	335
Vertical Leakage Upper	-	-	-	-	0	-	0	1,445
Total Inflow	-	-	-	-	2,028	-	1,481	2,985
Outflow								
Wells	-	-	-	-	828	-	0	0
Et	-	-	-	-	0	-	0	6
Vertical Leakage Lower	-	-	-	-	0	-	1,445	-
Net Lateral Flow To Medina County GCD	-	-	-	-	19	-	22	106
Net Lateral Flow To Wintergarden GCD	-	-	-	-	1,178	-	947	4,340
Total Outflow	-	-	-	-	2,025	-	2,414	4,452
Inflow - Outflow	-	-	-	-	3	-	-933	-1,467
Storage Change	-	-	-	-	3	-	-934	-1,465

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Model Error	-	-	-	-	0	-	1	-2
Model Error (percent)	-	-	-	-	0	-	0	0

TABLE B.11 WATER BUDGET FOR WEBB COUNTY FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	3,201	382	10,802	283	529	82	82	15
Net Stream Leakage	1,776	913	13,614	1,983	53	-	175	-
Net Head Dep Bounds	4,316	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	2,726	3,442	4,696	4,532	2,559	538	563
Net Lateral Flow From Dimmit	7	-	-	-	-	-	114	315
Net Lateral Flow From Maverick	-	-	-	-	-	-	-	218
Net Lateral Inflow From Other Areas	-	-	-	-	-	13	-	2
Total Inflow	9,300	4,021	27,858	6,962	5,114	2,654	909	1,113
Outflow								
Wells	0	0	0	0	896	13	6	1
Et	2,203	145	1,527	1,624	124	69	150	42
Net Stream Leakage	-	-	-	-	-	190	-	135
Net Vertical Leakage Lower	2,726	3,442	4,696	4,532	2,559	538	563	-

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Net Lateral Flow To Dimmit	-	1	582	78	178	230	-	-
Net Lateral Flow To La Salle	523	85	1,229	386	1,172	1,482	142	755
Net Lateral Flow To Maverick	-	-	-	-	-	-	21	-
Net Lateral Flow To Mcmullen	1	2	5	10	38	20	2	19
Net Lateral Outflow To Other Areas	-	-	-	-	3	-	-	-
Total Outflow	5,453	3,675	8,039	6,630	4,970	2,542	884	952
Inflow - Outflow	3,847	346	19,819	332	144	112	25	161
Storage Change	3,848	346	19,824	335	144	113	27	162
Model Error	-1	0	-5	-3	0	-1	-2	-1
Model Error (percent)	0	0	0	0	0	0	0	0

TABLE B.12 WATER BUDGET FOR WINTERGARDEN GROUNDWATER CONSERVATION DISTRICT FOR SCENARIO 5B. FLOW RATES ARE IN ACRE-FEET PER YEAR.

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Inflow								
Recharge	9,587	691	21,854	1,069	11,967	649	1,678	804
Net Stream Leakage	-	91	18,749	1,559	3,484	-	1,683	895
Net Head Dep Bounds	1,866	0	0	0	0	0	0	0
Net Vertical Leakage Upper	-	10,823	10,751	29,006	29,615	148	-	-
Net Vertical Leakage Lower	-	-	-	-	-	7,996	6,102	-
Net Lateral Flow From Evergreen UWCD	1,332	67	1,577	-	-	-	-	-
Net Lateral Flow From Medina County GCD	-	-	-	-	66	9	32	32
Net Lateral Flow From Uvalde County UWCD	-	-	-	-	1,178	-	947	4,340
Net Lateral Inflow From Other Areas	515	86	1,811	474	2,110	1,792	441	1,898
Total Inflow	13,300	11,758	54,742	32,108	48,420	10,594	10,883	7,969
Outflow								
Wells	987	0	1	0	31,099	9,259	4,007	416

Flow term	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8
Et	582	78	0	0	0	0	0	0
Net Stream Leakage	2,111	-	-	-	-	31	-	-
Net Vertical Leakage Upper	-	-	-	-	-	-	7,996	6,102
Net Vertical Leakage Lower	10,823	10,751	29,006	29,615	148	-	-	-
Net Lateral Flow To Evergreen UWCD	-	-	-	104	18,538	1,086	404	1,375
Net Lateral Flow To Mcmullen GCD	217	62	526	110	957	399	26	388
Total Outflow	14,720	10,891	29,533	29,829	50,742	10,775	12,433	8,281
Inflow - Outflow	-1,420	867	25,209	2,279	-2,322	-181	-1,550	-312
Storage Change	-1,419	866	25,210	2,280	-2,323	-179	-1,549	-311
Model Error	-1	1	-1	-1	1	-2	-1	-1
Model Error (percent)	0	0	0	0	0	0	0	0