GAM Run 07-09

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Groundwater Availability Modeling Section
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EXECUTIVE SUMMARY:

We ran the groundwater availability model for the northern part of the Trinity Aquifer for a 50-year predictive time period. Average recharge conditions were used for the first forty-seven years of the predictive portion of the simulation, followed by the three-year drought-of-record. Pumpage used in each year of the model run was specified by Groundwater Management Area 8.

Results of this model run indicated that water levels after 50 years of specified pumpage decreased in all of the aquifers of interest throughout the model area. Water level declines were less than 25 feet in the farthest updip portions of each aquifer and increased downdip. All aquifers showed maximum water level declines in excess of 300 feet over the 50-year predictive time period and also showed localized areas of higher water level declines around heavy pumping centers. Water level declines in these localized areas exceeded 700 feet for some aquifers.

REQUESTOR:

Ms. Cheryl Maxwell from the Clearwater Underground Water Conservation District (on behalf of Groundwater Management Area 8).

DESCRIPTION OF REQUEST:

Ms. Maxwell asked for a model run using the groundwater availability model for the northern part of the Trinity Aquifer. This baseline model run would be for a 50-year predictive time period. Average recharge conditions were used for the first forty-seven years of the predictive portion of the simulation, followed by the three-year drought-of-record. Pumpage used in each year of the model run was specified by Groundwater Management Area 8.

METHODS:

Average streamflows and evapotranspiration rates were used for each year of the predictive simulation. Average recharge was used for the first forty-seven years of the simulation, followed by a three-year drought-of-record. Resulting water levels and drawdowns were then evaluated and are described in the Results section below.

PARAMETERS AND ASSUMPTIONS:

The groundwater availability model for the northern part of the Trinity Aquifer was used for this model run. The parameters and assumptions for this model are described below:

- We are using version 1.01 of the groundwater availability model for the northern part of the Trinity Aquifer for this run. See Bené and others (2004) for assumptions and limitations of the model.

- The model includes seven layers, representing the Woodbine Aquifer (Layer 1), the Washita and Fredericksburg Series (Layer 2), the Paluxy Aquifer (Layer 3), the Glen Rose Formation (Layer 4), the Hensell Aquifer (Layer 5), the Pearsall/Cow Creek/Hammett/Sligo Formation (Layer 6), and the Hosston Aquifer (Layer 7). The Woodbine, Paluxy, Hensell, and Hosston layers are the main aquifers used in the region.

- The mean absolute error (a measure of the difference between simulated and actual water levels during model calibration) for the four main aquifers in the model (Woodbine, Paluxy, Hensell, and Hosston) for the calibration and verification time periods (1980 to 2000) ranged from approximately 37 to 75 feet. The root mean squared error was less than ten percent of the maximum change in water levels across the model (Bené and others, 2004).

- We used average annual recharge conditions based on climate data from 1980 to 1999 for the simulation. The last three years of the simulation used drought-of-record recharge conditions, which were defined as the years 1954-56.

- The model uses the MODFLOW stream-routing package to simulate the interaction between the aquifer(s) and major intermittent streams flowing in the region. Flow both from the stream to the aquifer and from the aquifer to the stream is allowed, and the direction of flow is determined by the water levels in the aquifer and stream during each stress period in the simulation.

Specified Pumpage

Each year of the predictive model run used pumpage specified by Groundwater Management Area 8. The following specifications on the pumpage were given by the groundwater management area for this model run:

- The simulation should maintain the existing model spatial pumping distribution.

- The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity Aquifer pumping within a county area) for layers 3, 4, 5, 6, and 7; except where specified otherwise.

- Pumping should be held constant for each area for which a pumping amount is specified, in other words, by county total for the Trinity Aquifer or by a layer specified within a county.

In addition to these general guidelines, specific pumpage totals for each county in the model were given by Groundwater Management Area 8. These totals are shown in Tables 1 through 4.

Table 1. Specified annual pumpage for the Woodbine Aquifer (layer 1) used in this model simulation. All pumpage is reported in acre-feet per year.

County	1999 pumpage	Specified pumpage	County	1999 pumpage	Specified pumpage
Collin	2,812	2,500	Lamar	122	3,658
Delta	0	16	Limestone	1	33
Fannin	2,054	3,300	Navarro	46	300
Grayson	10,924	12,100	Red River	2	170
Hunt	89	2,840	Rockwall	11	144
Kaufman	77	200			

Table 2. Specified annual pumpage for the Trinity Aquifer (layers 3, 4, 5, and 7) used in this model simulation. All pumpage is reported in acre-feet per year.

County	1999 pumpage	Specified pumpage	County	1999 pumpage	Specified pumpage
Brown	2,367	2,085	Kaufman	0	1,184
Callahan	1,193	3,787	Lamar	0.06	1,320
Collin	1,533	2,100	Lampasas	1,129	3,164
Comanche	18,675	25,000	Limestone	11	66
Coryell	2,203	1,791	Milam	3	321
Delta	0	364	Mills	780	2,400
Eastland	5,487	4,853	Montague	499	2,682
Erath	16,857	30,000	Navarro	1	1,873
Falls	65	161	Red River	165	528
Fannin	33	700	Rockwall	0.5	958
Grayson	5,063	9,400	Taylor	3	679
Hamilton	1,572	2,146	Travis	4,337	3,900
Hunt	2	551	Williamson	4,447	1,810

Table 3. Specified annual pumpage for the Woodbine and Trinity aquifers combined (layers 1, 3, 4, 5, and 7) used in this model simulation. All pumpage is reported in acre-feet per year.

County	1999 pumpage	Specified pumpage	County	1999 pumpage	Specified pumpage
Bosque	3,496	7,509	Johnson	10,527	17,767
Cooke	6,255	7,018	McLennan	12,307	15,234
Dallas	4,069	7,807	Parker	6,358	15,389
Denton	11,816	23,442	Somervell	1,320	2,485
Ellis	7,640	9,403	Tarrant	16,608	19,615
Hill	2,075	5,412	Wise	4,261	9,801
Hood	6,018	11,064			

Table 4. Specified annual pumpage by layer for Bell and Burnet counties used in this model simulation. All pumpage is reported in acre-feet per year.

Layer*	Bell County		Burnet County	
	1999 pumpage	Specified pumpage	1999 pumpage	Specified pumpage
Layer 3	48	112	3	200
Layer 4	479	880	13	200
Layer 5	603	1,100	287	700
Layer 6	0	0	0	0
Layer 7	1,830	5,000	270	2,500

*- Paluxy Aquifer (Layer 3), the Glen Rose Formation (Layer 4), the Hensell Aquifer (Layer 5), the Pearsall/Cow Creek/Hammett/Sligo Formation (Layer 6), and the Hosston Aquifer (Layer 7).

The latest year (1999) from the estimated historic pumpage from the calibrated groundwater availability model was used as the basis for the spatial distribution for the predictive pumpage dataset, and is also included in Tables 1 to 4 for reference. This pumpage was increased or decreased to the specified totals shown in Tables 1 to 4 using a factor based on the county pumpage in the 1999 pumpage data set and the desired total. This resulted in a predictive pumpage data set with the same spatial distribution as in the 1999 data set, as requested by the groundwater management area. The predictive pumpage was held constant throughout the 50-year predictive simulation. A summary of the historic pumpage used in the calibration-verification of the original groundwater availability model is provided in Appendix A.

Several changes to the original pumpage totals specified above were made. Delta County was specified to have 16 acre-feet per year of pumpage from the Woodbine Aquifer (layer 1) and 364 acre-feet per year of pumpage from the Trinity Aquifer (layers 3, 4, 5, and 7), and Kaufman County was specified to have 1,184 acre-feet per year of pumpage from the Trinity Aquifer (layers 3, 4, 5, and 7). However, no pumpage was present in the historic pumpage estimates for these counties from these aquifers. Therefore, because one of the baseline specifications for the predictive pumpage was to maintain the existing spatial distribution, no pumpage was included in these counties from the specified aquifers.

In addition, several counties and/or model layers were not specified in the original request. Counties with no specified pumpage are shown in Table 5. Neither layers 2 (Washita and Fredericksburg Series) nor 6 (Pearsall/Cow Creek/Hammett/Sligo Formation) were specified for counties in most of the model area. In all of these cases, the estimated historic pumpage for 1999 was used in the predictive model run.

Table 5. Annual pumpage used for non-specified counties/areas in the model simulation. These totals are based on historic pumpage totals from the 1999 groundwater availability model. All pumpage is reported in acre-feet per year.

County	Annual pumpage
Bastrop	4
Jack	11
Lee	5
Palo Pinto	12
Non-Texas	9,541

RESULTS:

Included in the results are estimates of the water budgets after running the model for 50 years. A groundwater budget summarizes how the model estimates water entering and leaving the aquifer. The components of the water budget are described below.

- Wells—water produced from wells in each aquifer. This component is always shown as “Outflow” from the water budget, because all wells included in the GAM produce (rather than inject) water. Wells are modeled using the MODFLOW Well package.

- Recharge—simulates areally distributed recharge due to precipitation falling on the outcrop areas of aquifers. Recharge is always shown as “Inflow” into the water budget. Recharge is modeled using the MODFLOW Recharge 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 using the MODFLOW Evapotranspiration package. In this model the Evapotranspiration package also represents groundwater discharge via small seeps and springs and larger spring discharge to streams not specifically modeled by the Stream package (Bené and others, 2004).

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

- 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 level declines). The storage component that is included in “Outflow” is water that is added back into storage in the aquifer (that is, water level increases). 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).

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

- Rivers and Streams—water that flows between perennial streams and rivers and an aquifer. The direction and amount of flow depends on the water level in the stream or river and the aquifer. In areas where water levels in the stream or river are above the water level in the aquifer, water flows into the aquifer and out of the stream 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 river, water flows out of the aquifer and into the stream and is shown as “Outflow” in the budget. Rivers and streams are modeled using the MODFLOW Streamflow-routing package.

- Reservoirs—water that flows between reservoirs and an aquifer. The direction and amount of flow depends on the water level in the reservoir and the aquifer. In areas where water levels in the reservoir are above the water level in the aquifer, water flows into the aquifer and out of the reservoir and is shown as “Inflow” in the budget. In areas where water levels in the aquifer are above the water level in the reservoir, water flows out of the aquifer and into the reservoir and is shown as “Outflow” in the budget. Reservoirs are modeled using the MODFLOW River package.

- Inter-aquifer Flow—The model uses general-head boundaries (GHBs) to simulate the movement of water between the Woodbine Aquifer and overlying wedge of younger deposits. The model also uses general-head boundaries to simulate the interaction of the aquifers with the Colorado River.

The results of the model run are described for the individual aquifers of interest; the Woodbine Aquifer (layer 1), the Paluxy Aquifer (layer 3), the Glen Rose Formation (layer 4), the Hensell Aquifer (layer 5), and the Hosston Aquifer (layer 7).

Water levels from the end of the transient calibration portion of the model run (the end of 1999/beginning of 2000) for layers 1, 3, 4, 5, and 7 are shown in Figures 1 to 5, respectively. These figures show the starting water levels for the 50-year predictive portion of the model run. These figures all show generally the same trend in initial water levels—higher water levels in the outcrop portions of the aquifers in the north and west, with water levels decreasing downdip (to the south and east). All of these figures also show the large cones of depression that have formed around large pumping centers, where decades of pumpage have significantly decreased water levels. These are especially noticeable in Ellis and Collin counties in the Woodbine Aquifer (layer 1; Figure 1), and the Dallas-Fort Worth and Waco areas in the Trinity Aquifer (layers 3, 4, 5, and 7; Figures 2 to 5).

Water levels at the end of the 50-year predictive portion of the simulation for layers 1, 3, 4, 5, and 7 are shown in Figures 6 to 10, respectively. Water levels at the end of the 50-year runs show similar trends to initial water levels (Figures 1 to 5); except that water levels in the heavily pumped areas are significantly lower than at the start of the model run. Because differences between initial water levels and water levels after 50 years of pumpage are sometimes difficult to quantify in these figures, maps of water level changes were made. A water level change map shows the difference between the water levels at the start and end of the 50-year predictive model run.

Water level changes over the 50-year predictive portion of the model simulation for layers 1, 3, 4, 5, and 7 are shown in Figures 11 to 15, respectively. Figure 11 indicates that water levels in the Woodbine Aquifer (layer 1) decrease over most of the model area over the 50-year predictive portion of the run. These changes range from less than 25 feet near the outcrop areas to over 700 feet in the large pumping centers over the 50-year predictive time period.

Figure 12 indicates that water levels are predicted to decrease throughout the model area in the Paluxy Aquifer (layer 3), with decreases generally less than 25 feet in the farthest updip extent of the aquifer, increasing to greater than 275 feet in the farthest downdip portions of the aquifer. Localized areas of even higher water level declines are found around the highest production areas of this aquifer, specifically on the Navarro-Ellis County line and in the northeast Dallas area in Rockwall County. Water levels have decreased more than 500 feet in these areas over the 50-year predictive time period.

Figure 13 indicates that water levels are also predicted to decrease throughout the model area in the Glen Rose Formation (layer 4), with decreases generally less than 25 feet in the farthest updip extent of the aquifer, increasing to greater than 300 feet in the farthest downdip portions of the aquifer. No localized areas of significantly higher water level declines are seen in this aquifer over the 50-year predictive time period.

Figure 14 indicates that water levels are also predicted to decrease throughout the model area in the Hensell Aquifer (layer 5), with decreases generally less than 25 feet in the farthest updip extent of the aquifer, increasing to greater than 300 feet in the farthest downdip portions of the aquifer. A large, localized area of higher water level declines are found in the Waco area in McLennan County. Water levels have decreased nearly 400 feet in this area over the 50-year predictive time period.

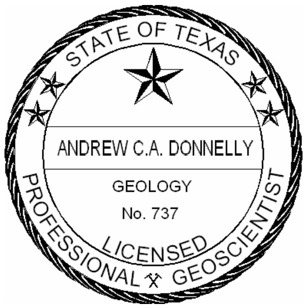
Figure 15 indicates that water levels are also predicted to decrease throughout the model area in the Hosston Aquifer (layer 7), with decreases generally less than 25 feet in the farthest updip extent of the aquifer, increasing to greater than 300 feet in the farthest downdip portions of the aquifer. A large, localized area of higher water level declines are found in the Waco area in McLennan County. Water levels have decreased more than 400 feet in this area over the 50-year predictive time period. Several other smaller localized areas of higher water level declines can be seen in Figure 15, including in Denton, Tarrant, Dallas, Johnson, Bosque, and Hill counties.

It is important to note that many of the aquifers of interest show larger water level declines in localized areas over the 50-year predictive time period. This may be in part due to the method used to increase pumpage to the levels specified in the original request. Because the original request specified that the original spatial distribution of pumpage be maintained, a factor was used to increase the 1999 estimated historic pumpage to the specified level in each county in the model area. This method is appropriate for smaller increases in pumpage, but may not be appropriate for larger increases in pumpage. In some cases the existing county pumpage was increased by a factor of 25 to 30, which may significantly exaggerate pumpage in local pumping centers. This may be the cause of large water level declines in the Woodbine Aquifer (Figure 11) in Hunt and Lamar counties, for example.

Because some of the desired future conditions for the groundwater management area may be based on discharge to springs or baseflow to rivers and streams, we also evaluated the water budgets for each of these components for each county in the model area. These budgets are provided in Appendix B. The components of the water budget are divided up into "In" and "Out", representing water that is coming into and leaving from the budget. As might be expected, water from wells is only in the "Out" column, representing water that is removed from the aquifer from wells. Likewise, recharge is only found in the "In" column. Streams and rivers, however, have values in both the "In" and "Out" columns. This is because some stream reaches lose water to the aquifer, and some gain water from the aquifer depending on the water levels in the aquifer. Also included in these budgets are values for vertical leakage to overlying and underlying formations as well as lateral inflow from adjacent counties. Future model runs can be compared to these budgets to determine the impact of additional pumpage compared to this baseline run. It should be noted that pumpage totals from the county budgets presented in Appendix B may be less than the specified pumpage given in Tables 1 to 4 due to the presence of dry cells. When a cell goes dry during the model run that cell is made inactive and therefore the pumpage from that cell is not included in the water budget.

REFERENCES:

Bené, J., Harden, B., O'Rourke, D., Donnelly, A., and Yelderman, J., 2004, Northern Trinity/Woodbine Groundwater Availability Model: contract report to the Texas Water Development Board by R.W. Harden and Associates, 391 p.



The seal appearing on this document was authorized by Andrew C.A. Donnelly, P.G. 737, on June 29, 2007.

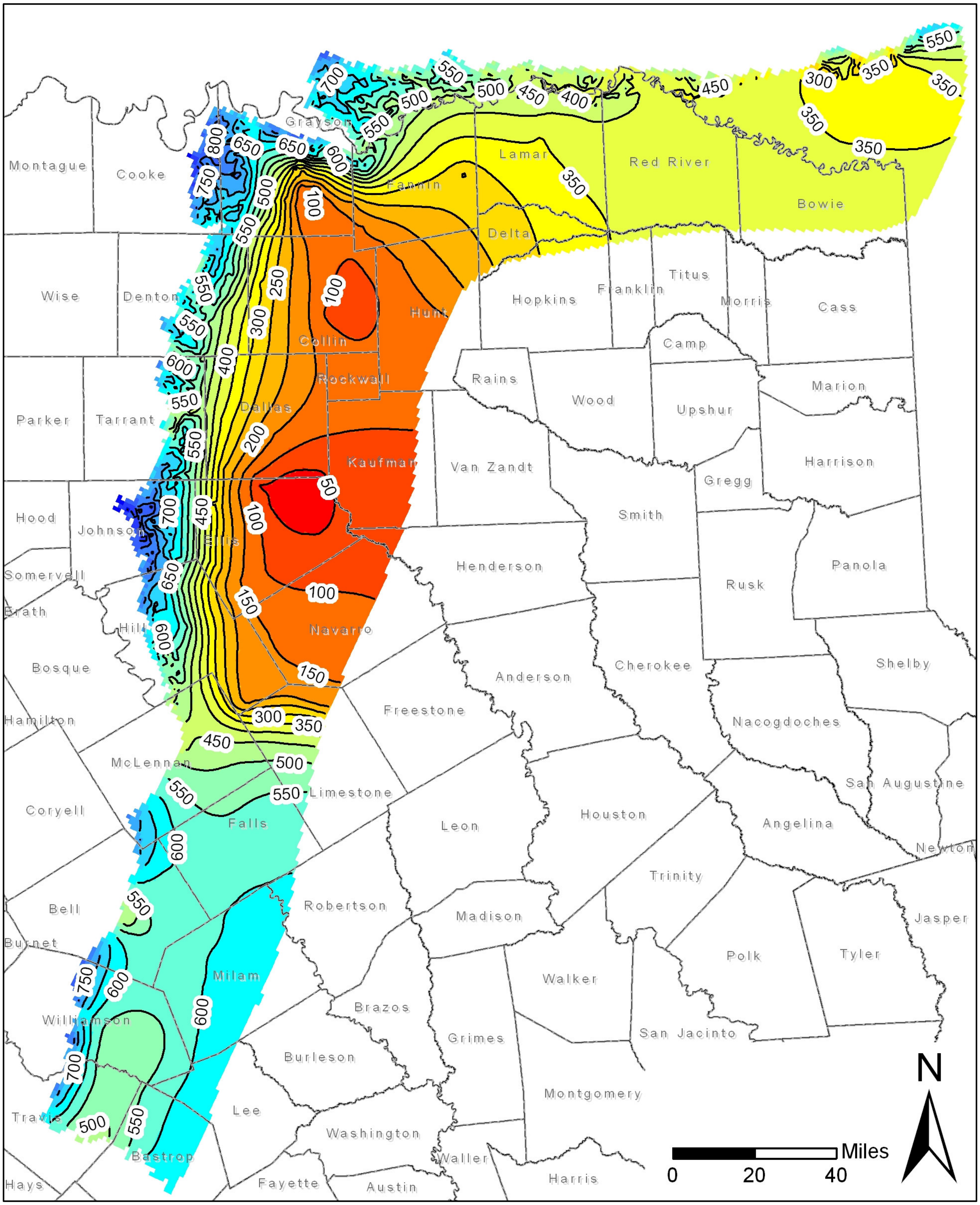


Figure 1. Initial water level elevations for the predictive model run in Layer 1 (Woodbine Aquifer) of the groundwater availability model for northern part of the Trinity Aquifer. Water level elevations are in feet above mean sea level. Contour interval is 50 feet.

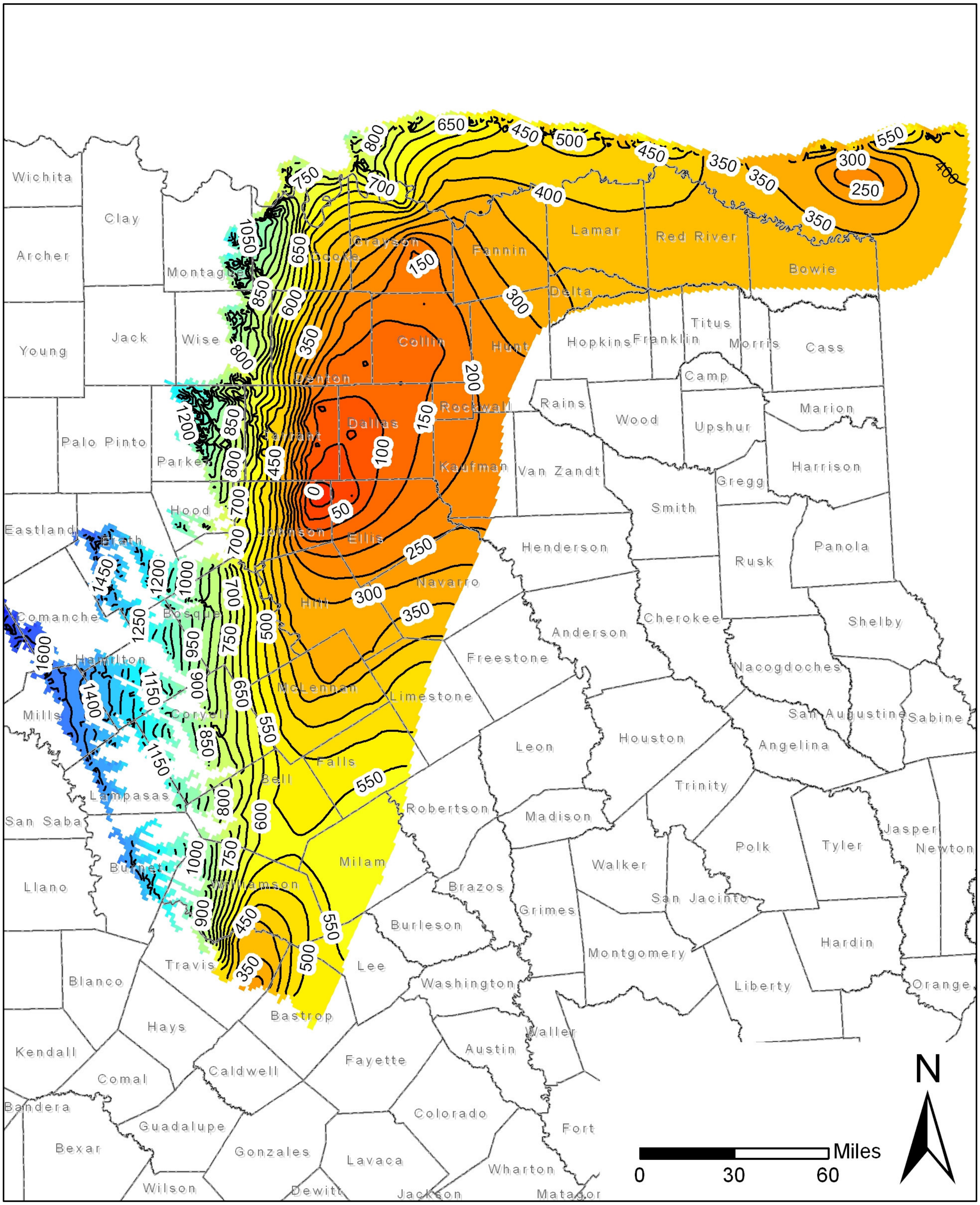


Figure 2. Initial water level elevations for the predictive model run in Layer 3 (Paluxy Aquifer) of the groundwater availability model for northern part of the Trinity Aquifer. Water level elevations are in feet above mean sea level. Contour interval is 50 feet.

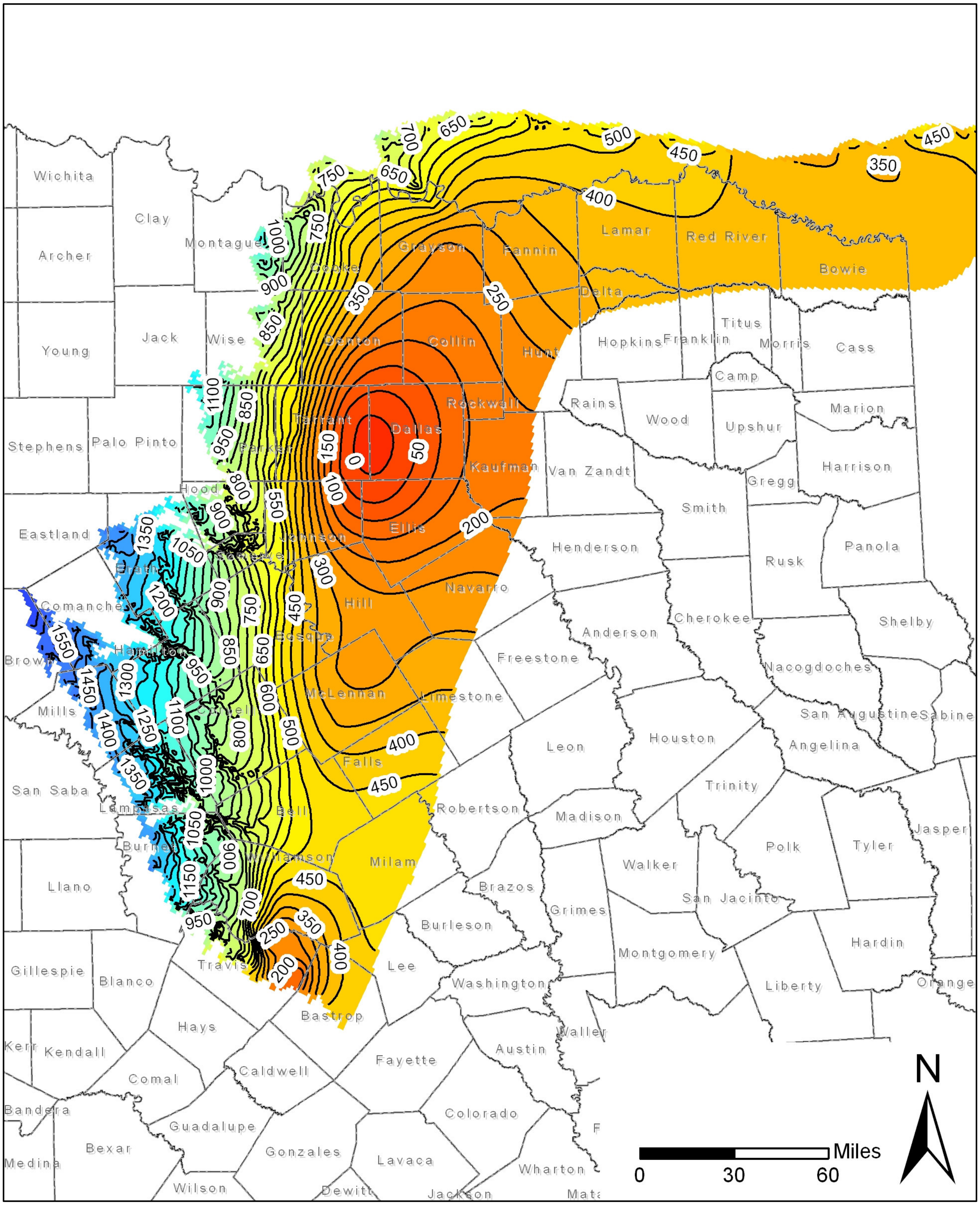


Figure 3. Initial water level elevations for the predictive model run in Layer 4 (Glen Rose Formation) of the groundwater availability model for northern part of the Trinity Aquifer. Water level elevations are in feet above mean sea level. Contour interval is 50 feet.

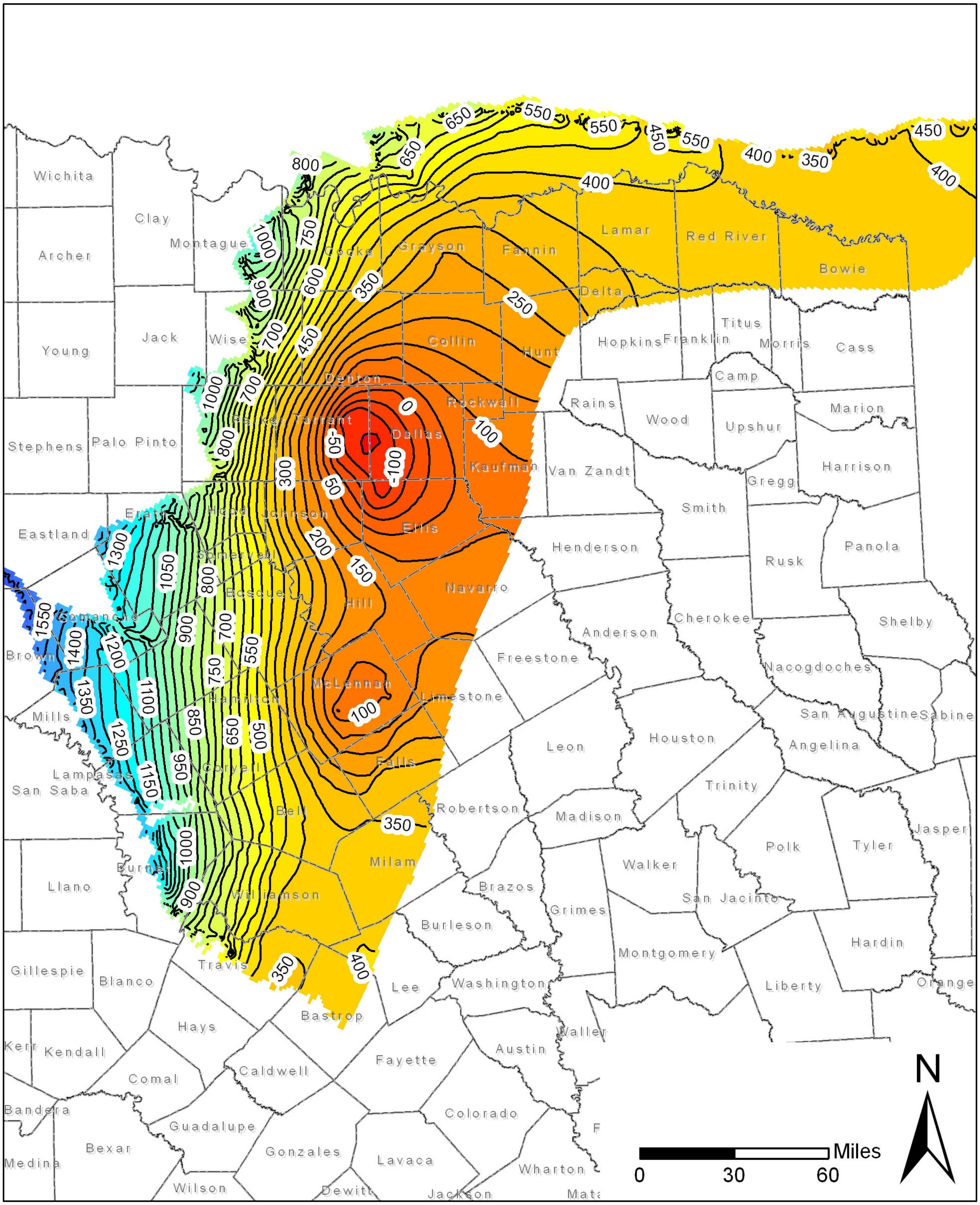


Figure 4. Initial water level elevations for the predictive model run in Layer 5 (Hensell Aquifer) of the groundwater availability model for northern part of the Trinity Aquifer. Water level elevations are in feet above mean sea level. Contour interval is 50 feet. Dry cells are shown in black.

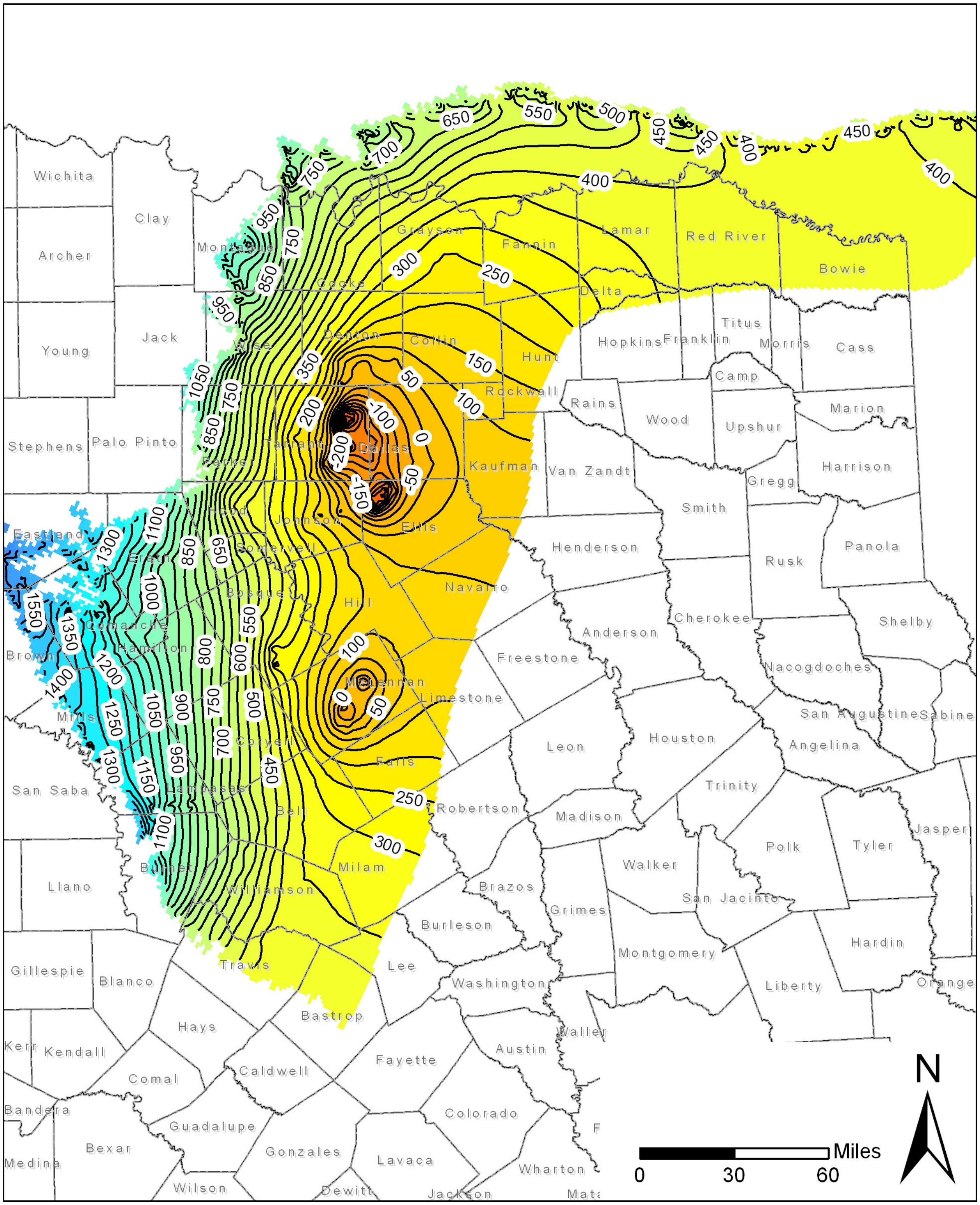


Figure 5. Initial water level elevations for the predictive model run in Layer 7 (Hosston Aquifer) of the groundwater availability model for northern part of the Trinity Aquifer. Water level elevations are in feet above mean sea level. Contour interval is 50 feet. Dry cells are shown in black.

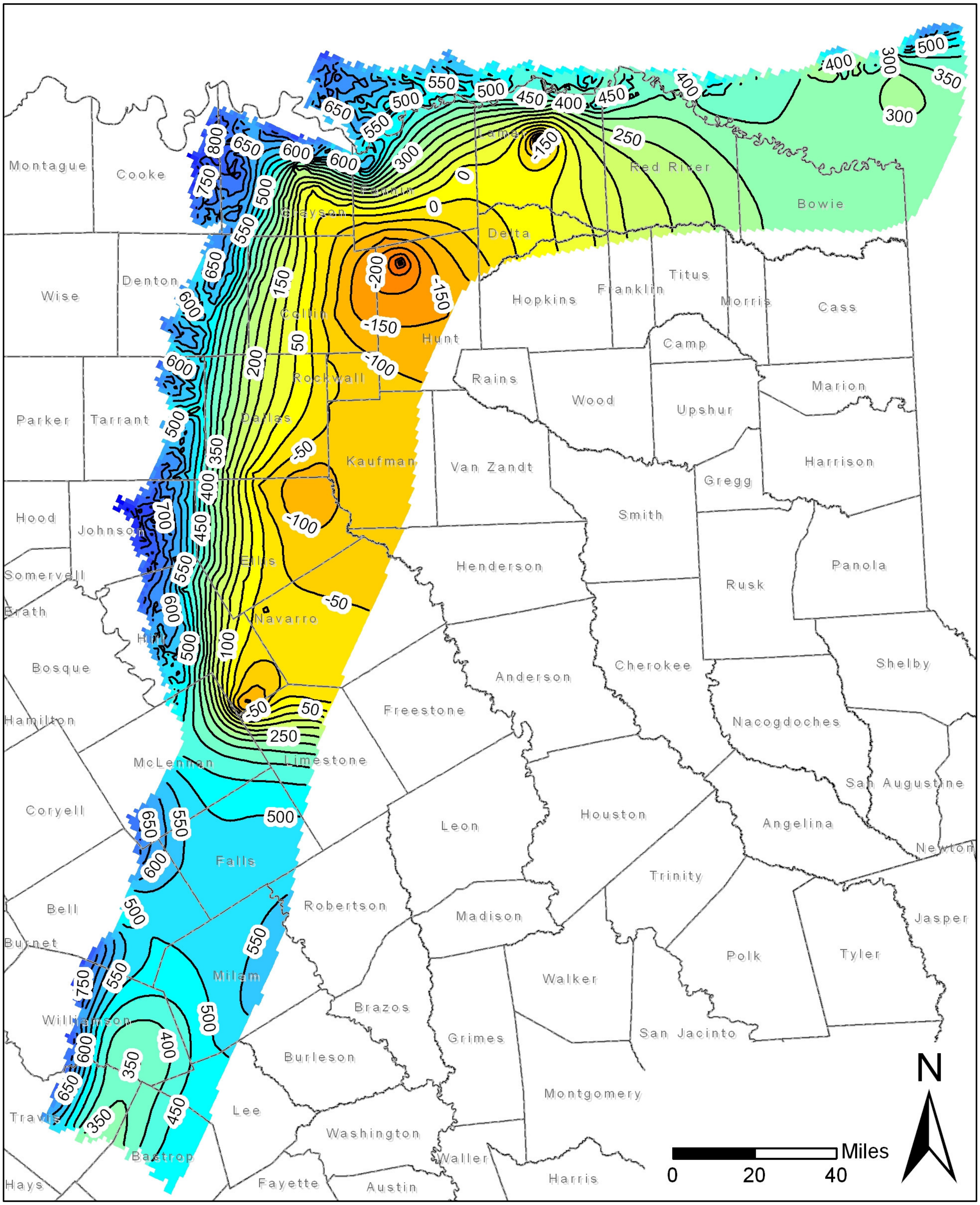


Figure 6. Water level elevations after 50 years using baseline pumpage in Layer 1 (Woodbine Aquifer). Water level elevations are in feet above mean sea level. Contour interval is 50 feet.

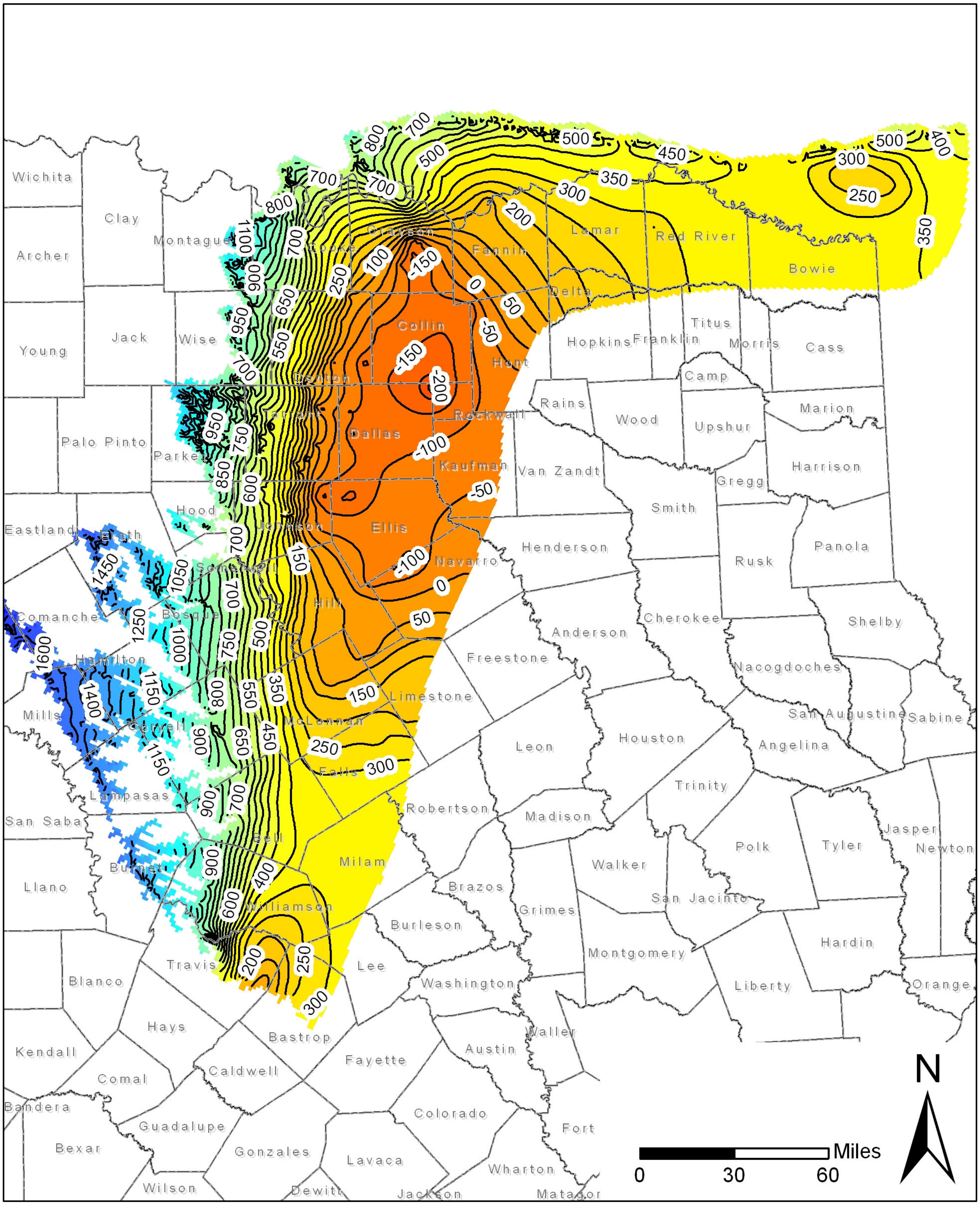


Figure 7. Water level elevations after 50 years using baseline pumpage in Layer 3 (Paluxy Aquifer). Water level elevations are in feet above mean sea level. Contour interval is 50 feet. Dry cells are shown in black.

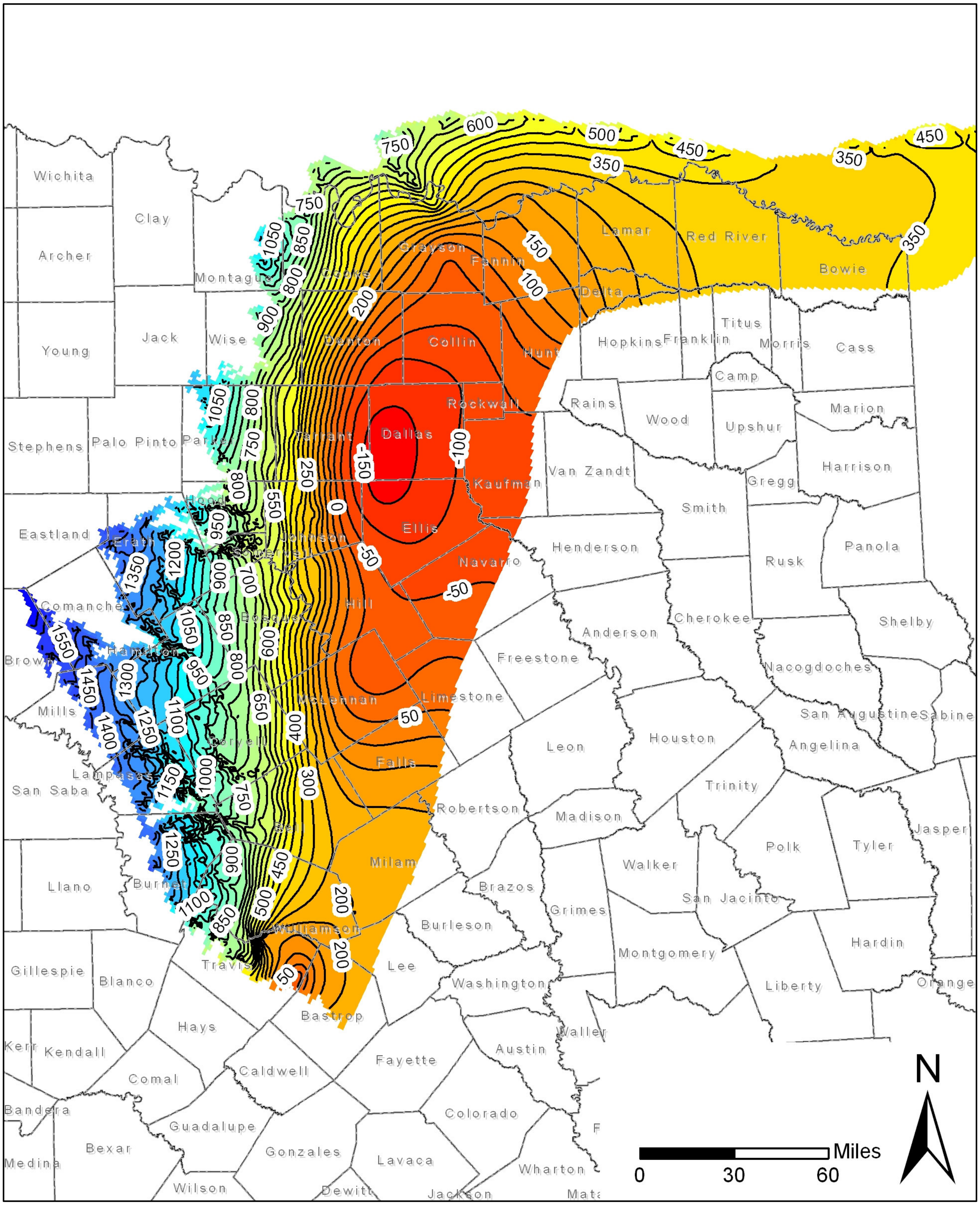


Figure 8. Water level elevations after 50 years using baseline pumpage in Layer 4 (Glen Rose Formation). Water level elevations are in feet above mean sea level. Contour interval is 50 feet. Dry cells are shown in black.

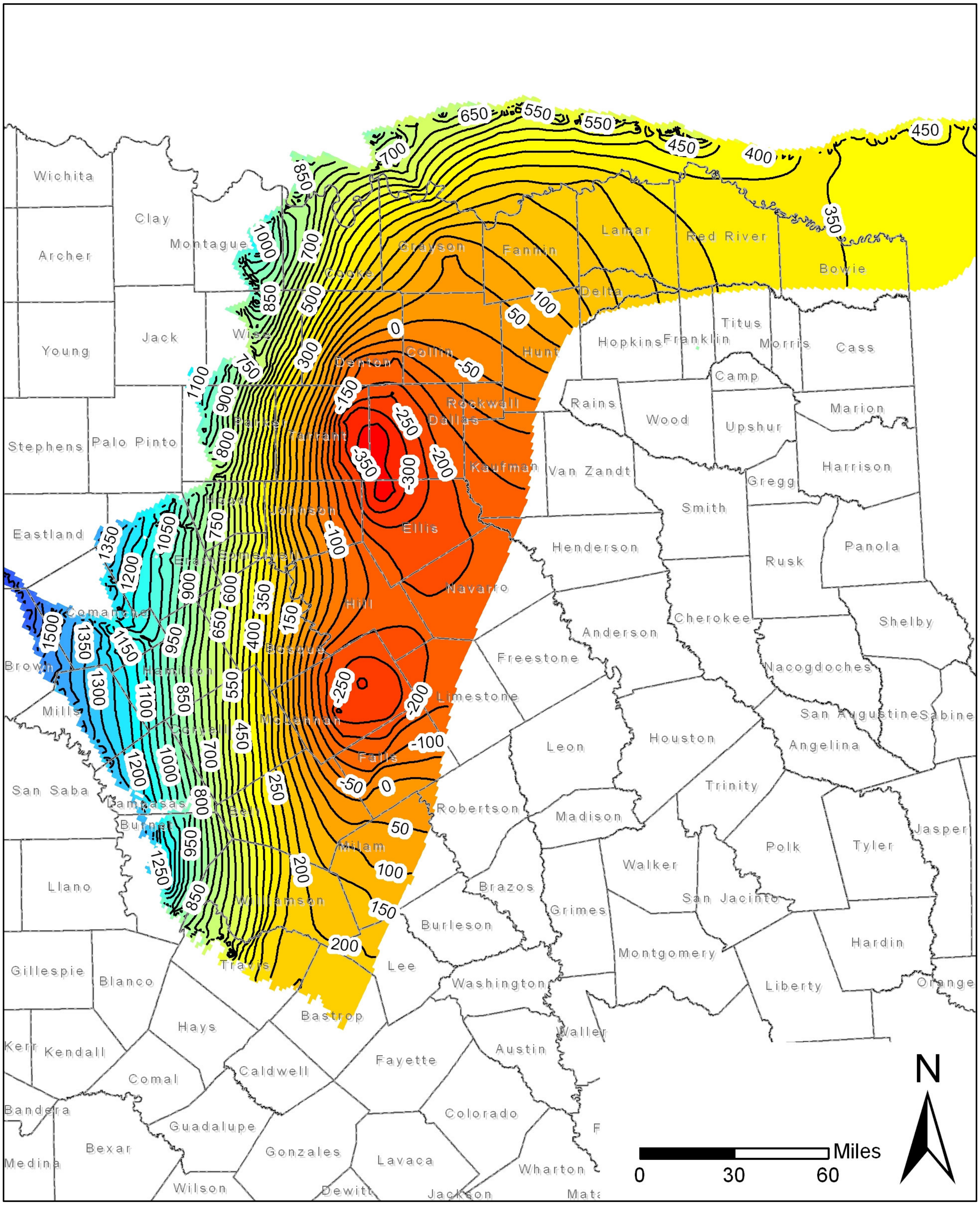


Figure 9. Water level elevations after 50 years using baseline pumpage in Layer 5 (Hensell Aquifer). Water level elevations are in feet above mean sea level. Contour interval is 50 feet. Dry cells are shown in black.

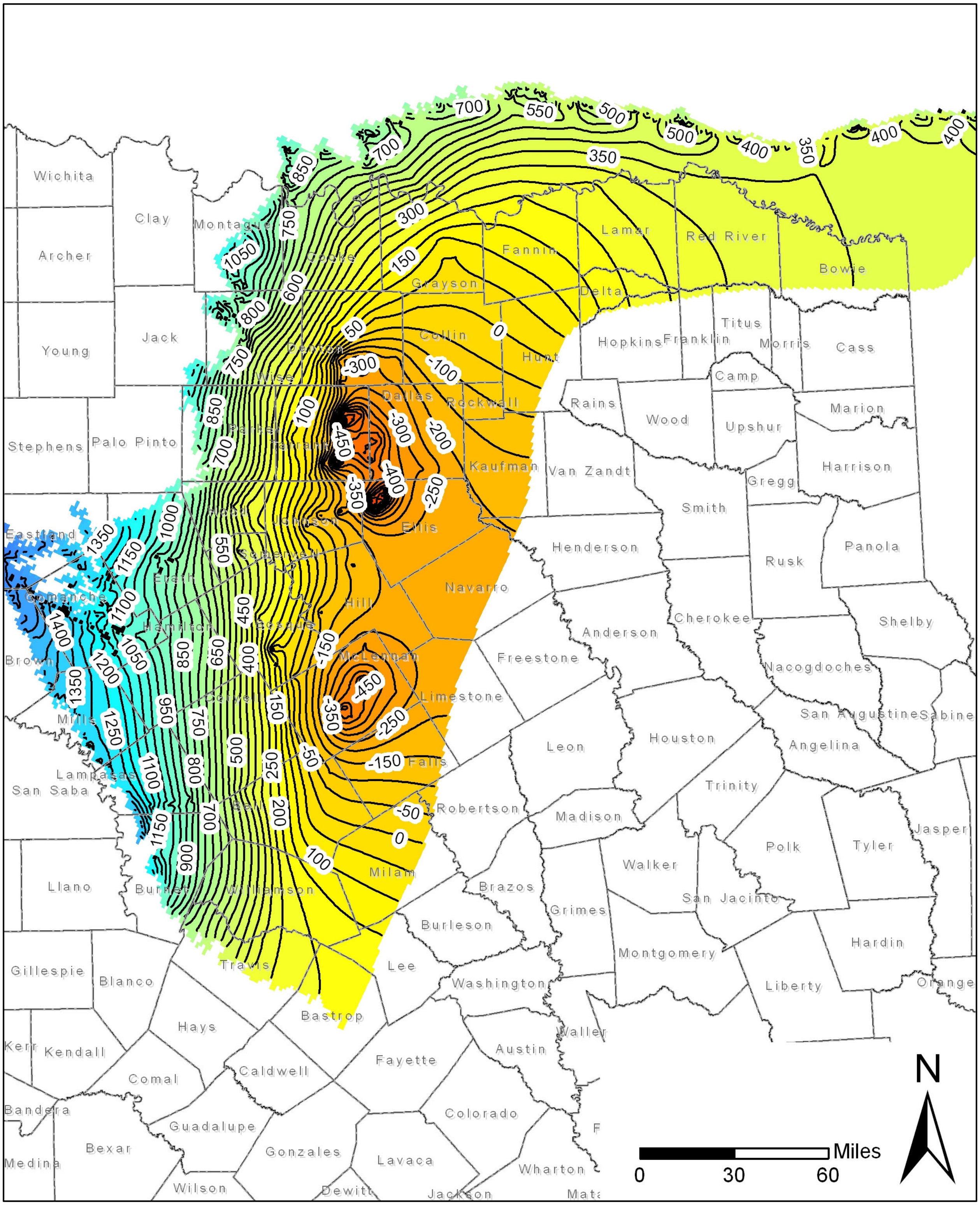


Figure 10. Water level elevations after 50 years using baseline pumpage in Layer 7 (Hosston Aquifer). Water level elevations are in feet above mean sea level. Contour interval is 50 feet. Dry cells are shown in black.

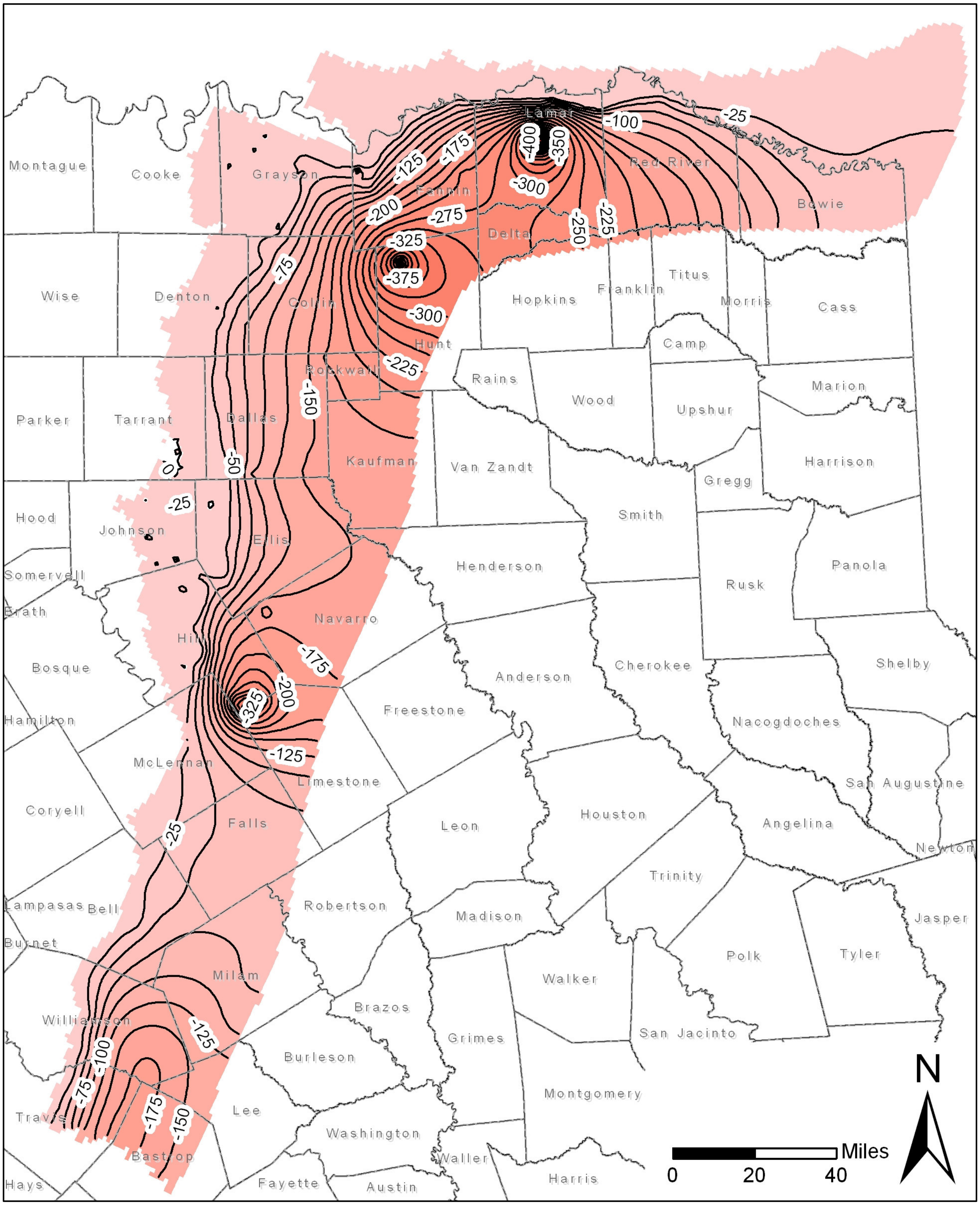


Figure 11. Changes in water levels after 50 years using baseline pumpage in Layer 1 (Woodbine Aquifer). Water level changes are in feet. Contour interval is 25 feet. Decreases in water levels (drawdowns) are shown in red.

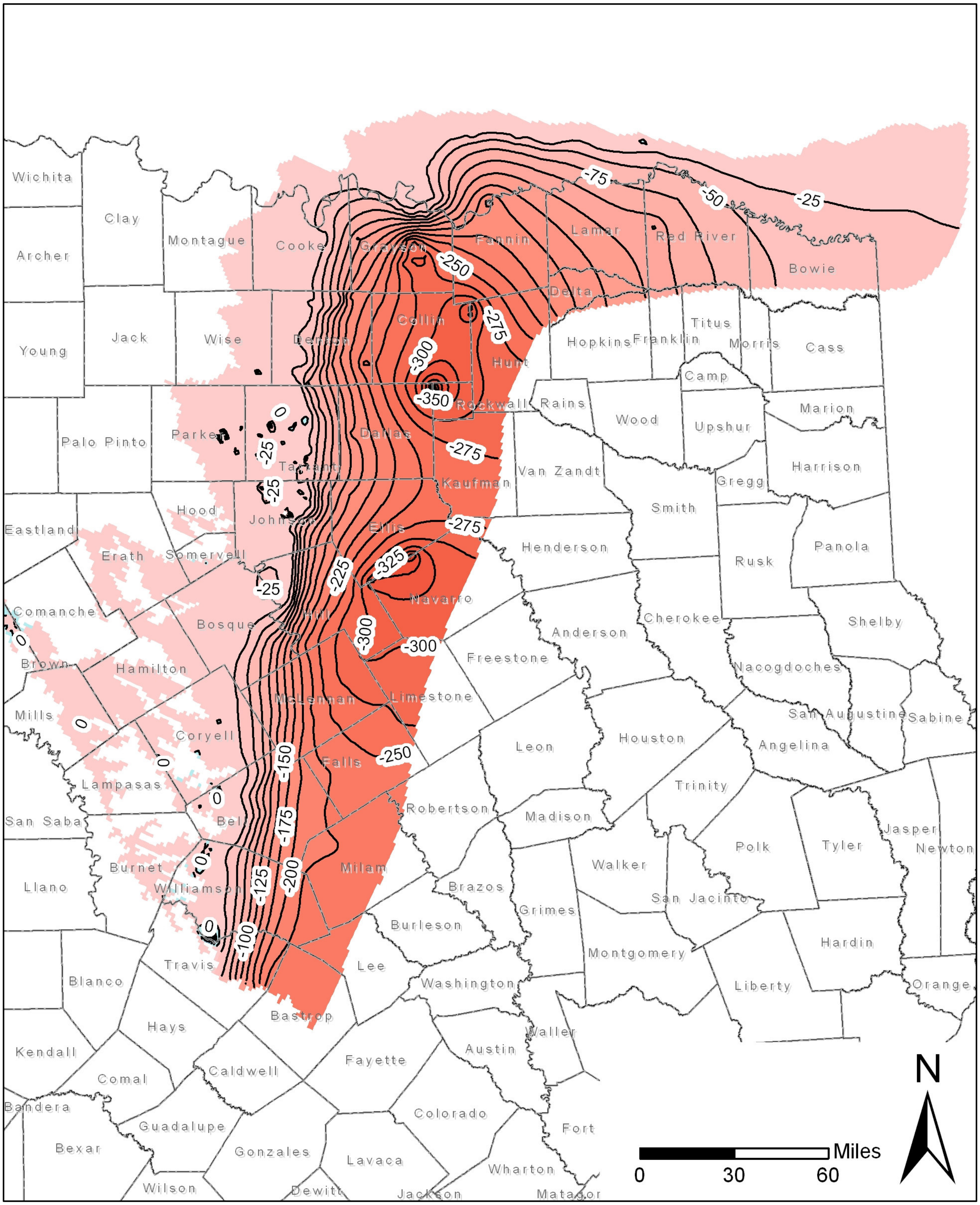


Figure 12. Changes in water levels after 50 years using baseline pumpage in layer 3 (Paluxy Aquifer). Water level changes are in feet. Contour interval is 25 feet. Decreases in water levels (drawdowns) are shown in red. Increases in water levels are shown in blue. Dry cells are shown in black.

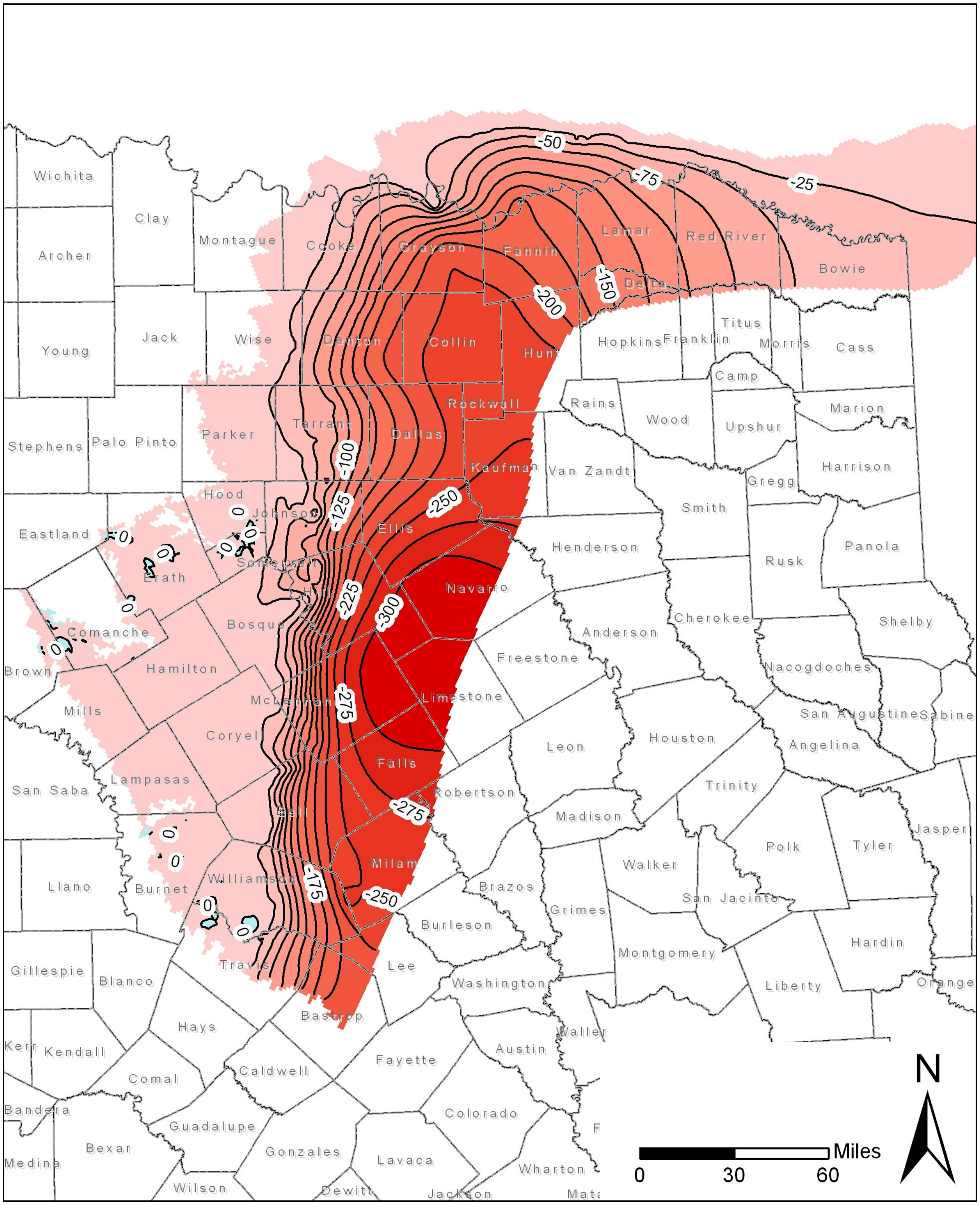


Figure 13. Changes in water levels after 50 years using baseline pumpage in layer 4 (Glen Rose Formation). Water level changes are in feet. Contour interval is 25 feet. Decreases in water levels (drawdowns) are shown in red. Increases in water levels are shown in blue. Dry cells are shown in black.

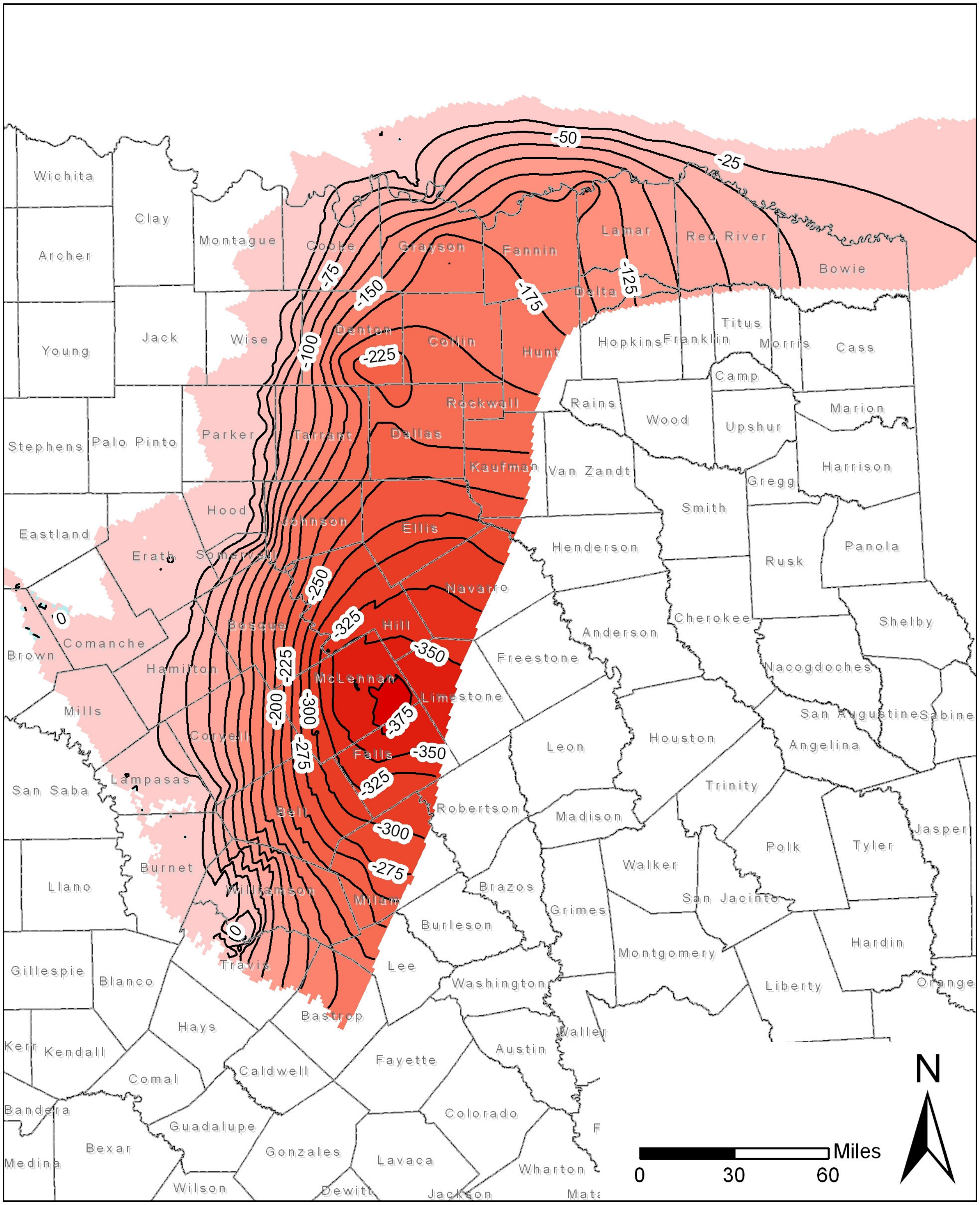


Figure 14. Changes in water levels after 50 years using baseline pumpage in layer 5 (Hensell Aquifer). Water level changes are in feet. Contour interval is 25 feet. Decreases in water levels (drawdowns) are shown in red. Increases in water levels are shown in blue. Dry cells are shown in black.

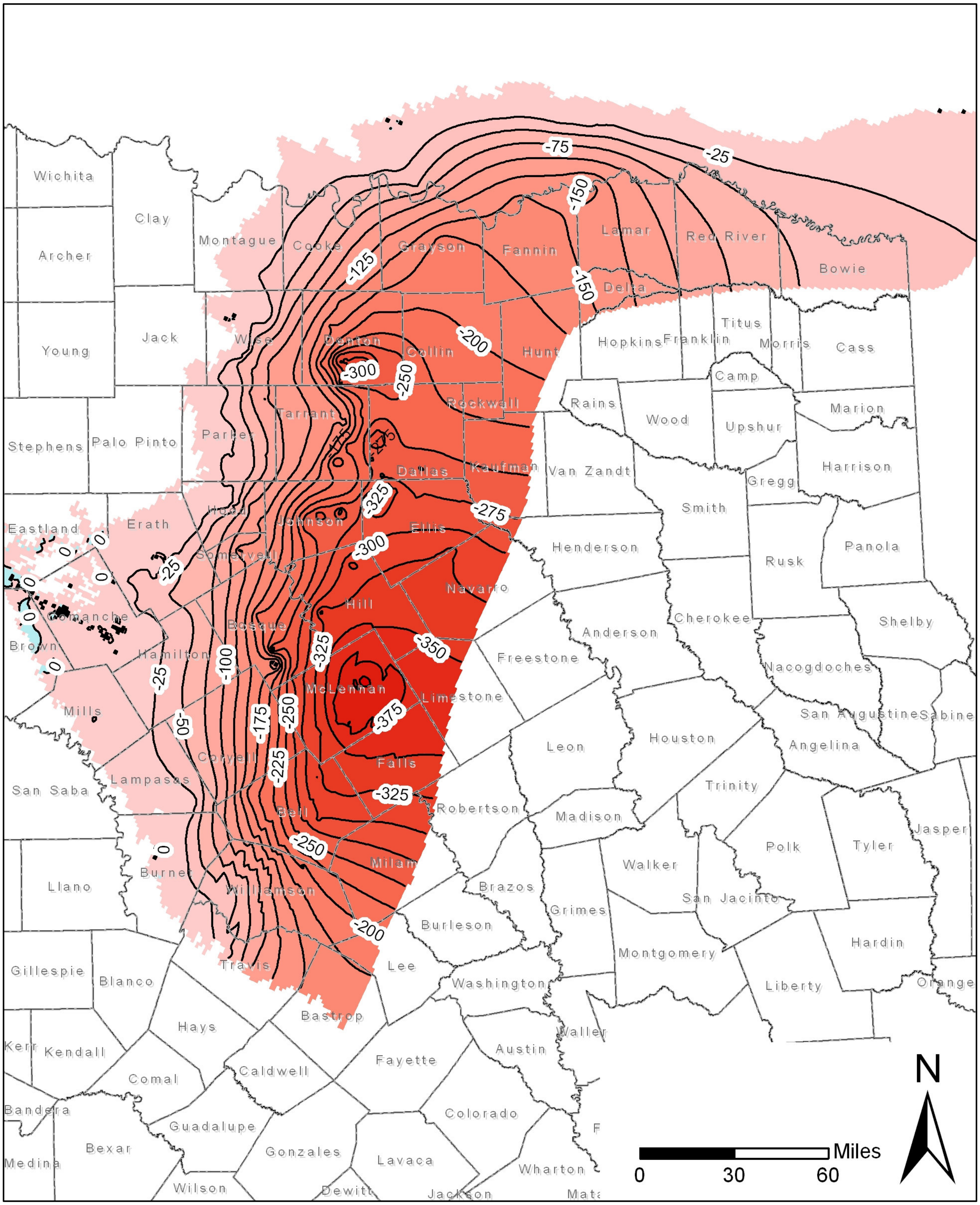


Figure 15. Changes in water levels after 50 years using baseline pumpage in layer 7 (Hosston Aquifer). Water level changes are in feet. Contour interval is 25 feet. Decreases in water levels (drawdowns) are shown in red. Increases in water levels are shown in blue. Dry cells are shown in black.

Appendix A

Summary of Historic Pumpage in the Groundwater Availability Model for the Northern Trinity Aquifer

Table A-1. Summary of estimated historic pumpage included in the groundwater availability model for the northern part of the Trinity Aquifer (in acre-feet per year).

Year	Total	Non-Texas	Bastrop	Bell	Bosque	Brown	Burnet	Callahan	Collin	Comanche
1980	186,462	8,239	0	4,121	2,819	911	499	1,402	3,219	11,252
1981	188,325	5,438	0	3,437	2,884	1,084	584	1,395	3,370	14,364
1982	193,350	6,900	0	3,573	2,860	1,249	655	1,329	3,681	17,441
1983	204,527	6,694	0	3,152	2,863	1,414	731	1,312	3,908	20,532
1984	218,127	7,351	0	3,105	3,526	1,584	814	1,226	4,184	23,623
1985	220,732	9,061	0	2,972	3,436	1,061	1,053	1,356	4,480	23,401
1986	206,914	7,214	0	2,972	3,506	1,974	839	1,274	4,345	22,769
1987	213,556	6,634	0	2,913	3,861	1,887	827	1,303	4,515	22,172
1988	211,115	7,837	0	2,923	3,398	1,738	849	1,164	5,212	20,880
1989	221,628	6,841	0	4,243	3,346	1,906	690	1,231	5,070	29,797
1990	210,811	7,380	1	4,485	3,679	1,123	706	1,176	4,421	26,430
1991	195,670	7,018	4	4,171	3,348	1,224	723	1,178	4,577	24,350
1992	207,892	6,225	4	4,439	3,402	1,210	704	1,723	3,865	33,254
1993	212,582	7,864	4	4,707	3,489	2,081	692	1,491	3,665	29,550
1994	209,899	6,668	5	4,637	3,670	1,972	678	1,326	3,913	28,739
1995	209,355	6,955	5	4,664	3,567	2,326	659	1,257	4,138	27,176
1996	206,666	8,925	5	4,786	3,968	2,164	640	1,197	4,331	19,114
1997	193,221	7,554	4	5,014	3,559	2,367	572	1,177	4,024	18,674
1998	200,581	8,790	4	5,092	3,597	2,367	572	1,194	4,214	18,675
1999	194,678	9,541	4	5,012	3,604	2,367	576	1,193	4,345	18,675

Table A-1. continued

Year	Cooke	Coryell	Dallas	Denton	Eastland	Ellis	Erath	Falls	Fannin	Grayson
1980	5,930	4,284	17,942	9,789	9,489	6,067	13,649	138	1,435	17,747
1981	5,598	4,753	18,915	9,265	9,469	6,212	13,958	141	1,556	16,475
1982	5,554	4,702	15,914	9,921	9,465	7,320	14,244	152	1,768	16,189
1983	5,871	4,610	19,556	10,934	9,539	7,630	14,788	86	2,145	15,638
1984	6,150	4,805	19,266	12,436	9,532	8,472	15,652	79	2,534	15,969
1985	6,130	4,754	20,033	11,004	11,837	9,364	12,032	84	2,799	18,854
1986	6,479	4,663	17,854	12,283	8,896	9,017	10,221	70	2,559	17,079
1987	5,796	4,610	20,486	12,787	11,518	9,470	10,112	70	2,488	16,937
1988	6,237	3,247	14,616	12,313	9,571	9,822	10,316	72	3,061	18,467
1989	5,620	2,102	11,960	13,269	9,559	10,139	14,363	72	1,910	19,209
1990	6,121	2,016	9,559	11,143	8,410	10,329	14,183	73	2,067	17,895
1991	6,224	1,904	7,904	10,319	8,971	7,833	11,132	71	1,868	17,289
1992	6,501	1,961	6,265	10,234	10,333	8,152	13,282	59	2,434	16,842
1993	6,914	2,106	6,573	11,331	3,694	8,504	22,987	66	4,384	14,926
1994	7,322	2,268	3,548	9,963	9,803	8,381	20,244	90	2,024	13,457
1995	6,977	2,308	3,848	11,434	9,206	7,421	20,195	72	2,136	15,520
1996	7,047	2,630	3,972	12,611	6,847	8,009	21,269	73	1,944	15,303
1997	6,918	2,259	3,407	11,515	5,476	7,672	16,550	67	2,048	16,062
1998	7,000	2,259	6,648	12,192	5,464	7,647	16,796	67	2,088	16,279
1999	6,255	2,259	4,069	11,816	5,487	7,640	16,857	67	2,086	15,987

Table A-1. continued

Year	Hamilton	Hill	Hood	Hunt	Jack	Johnson	Kaufman	Lamar	Lampasas	Lee
1980	2,617	2,745	2,711	82	7	6,864	118	197	965	1
1981	2,580	2,937	2,953	79	7	6,597	124	200	950	2
1982	2,555	3,255	3,095	70	8	6,806	127	194	938	2
1983	2,467	3,405	3,462	72	8	7,210	134	203	953	2
1984	2,544	2,389	3,926	84	9	7,877	139	266	971	2
1985	1,981	1,957	3,948	90	9	8,068	122	220	930	2
1986	1,429	1,868	4,064	90	9	7,953	135	200	948	2
1987	1,847	1,861	4,304	100	10	8,261	147	210	943	2
1988	1,841	1,829	4,497	105	10	8,399	128	218	902	2
1989	1,969	1,898	4,204	95	10	8,810	112	211	942	3
1990	2,107	1,979	4,215	108	10	9,035	97	204	983	3
1991	2,131	1,956	3,738	97	10	8,851	88	145	1,004	5
1992	2,047	1,874	3,848	98	9	9,228	84	144	1,141	5
1993	1,628	2,123	4,135	100	10	9,625	84	159	1,053	5
1994	1,614	2,160	4,017	102	10	9,912	103	164	1,058	6
1995	1,486	2,161	4,287	84	11	10,043	96	128	1,153	6
1996	1,625	2,216	4,583	85	11	10,679	122	133	1,171	6
1997	1,548	2,097	5,838	104	11	10,011	77	122	1,142	5
1998	1,547	1,975	5,957	93	11	10,187	77	122	1,142	5
1999	1,575	2,076	6,018	91	11	10,527	77	122	1,142	5

Table A-1. continued

Year	Limestone	McLennan	Milam	Mills	Montague	Navarro	Palo Pinto	Parker	Red River	Rockwall
1980	13	10,758	7	1,174	263	70	8	3,143	153	62
1981	15	10,397	7	1,059	276	66	8	3,315	141	74
1982	16	10,573	8	953	282	82	9	3,438	150	76
1983	17	10,723	8	837	286	91	9	3,721	152	88
1984	19	12,006	9	714	294	89	9	3,979	146	97
1985	17	11,587	9	683	286	67	7	4,561	158	102
1986	16	11,328	9	863	290	64	6	4,686	132	170
1987	16	10,971	9	889	288	69	6	4,885	129	172
1988	16	11,282	10	886	291	76	6	5,094	149	98
1989	15	10,408	12	736	284	73	9	5,241	141	89
1990	15	10,865	13	1,108	294	96	9	5,581	147	52
1991	15	9,895	9	1,147	297	84	7	5,730	150	9
1992	12	10,691	9	1,193	291	91	9	5,547	145	8
1993	14	11,268	10	827	316	85	15	5,883	148	10
1994	15	11,515	10	805	347	80	13	6,101	169	17
1995	14	11,373	10	851	487	81	13	6,216	177	20
1996	14	10,984	11	1,168	505	91	14	6,361	204	14
1997	13	11,084	9	785	499	90	12	6,179	159	11
1998	13	11,612	9	788	499	91	12	6,350	170	11
1999	13	12,308	9	780	499	46	12	6,358	166	11

Table A-1. continued

Year	Somervell	Tarrant	Taylor	Travis	Williamson	Wise
1980	1,057	20,278	12	4,580	6,985	2,979
1981	1,132	18,082	13	5,173	7,473	3,279
1982	1,344	18,433	13	5,395	8,186	3,398
1983	1,393	18,494	13	5,924	8,562	3,652
1984	1,562	20,194	14	6,648	9,409	3,841
1985	1,489	21,653	11	6,634	9,667	3,884
1986	1,388	16,825	11	5,587	10,171	3,926
1987	1,380	17,830	11	5,590	10,040	3,888
1988	1,368	21,646	12	6,139	10,592	3,679
1989	1,351	20,093	13	6,951	12,009	3,507
1990	1,139	18,313	14	6,692	12,126	3,831
1991	1,225	16,339	5	5,681	11,937	4,062
1992	1,388	15,867	7	5,594	12,202	3,728
1993	1,420	15,770	6	5,912	12,775	4,065
1994	1,361	16,970	6	5,849	13,187	4,295
1995	1,207	16,480	3	6,180	11,484	4,416
1996	1,624	17,787	3	6,442	12,234	4,685
1997	1,416	17,464	3	5,615	9,370	4,206
1998	1,232	19,307	3	5,604	9,336	4,282
1999	1,320	16,608	3	5,385	8,958	4,261

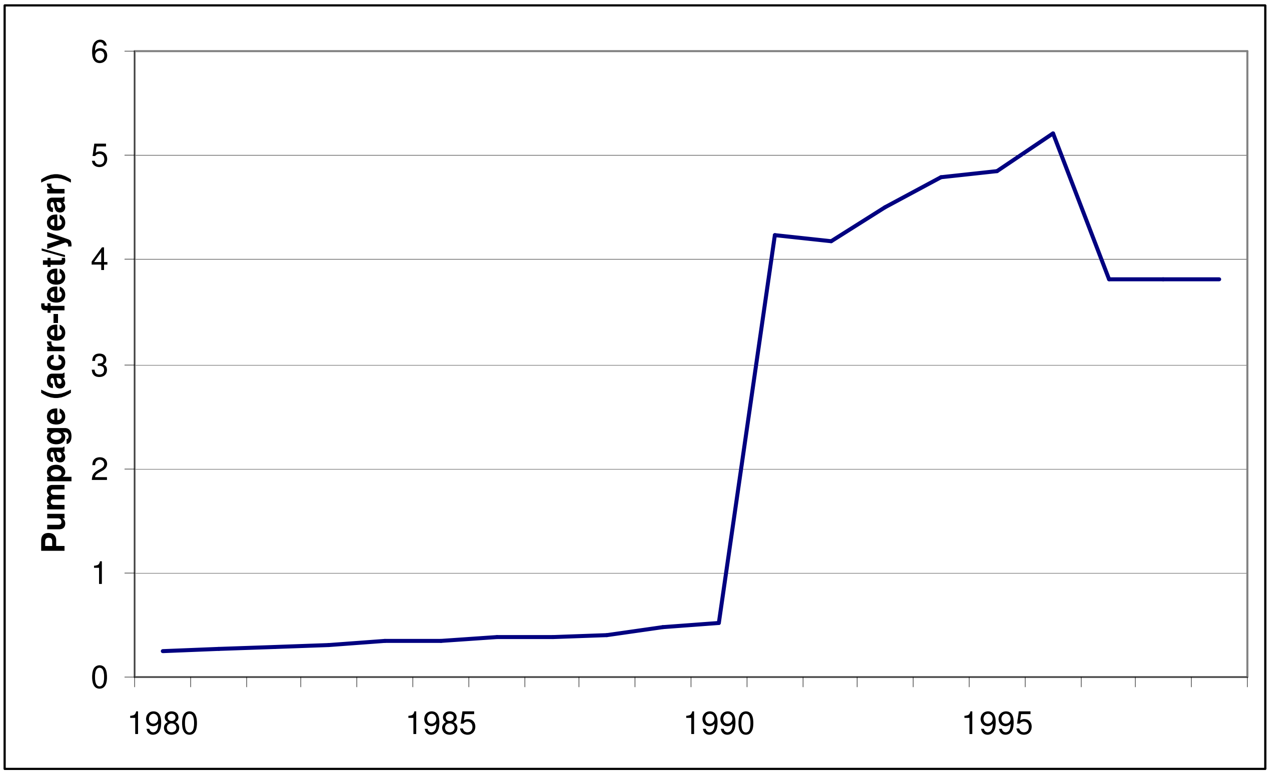


Figure A-1- Pumpage in Bastrop County included in the groundwater availability model for the northern part of the Trinity Aquifer.

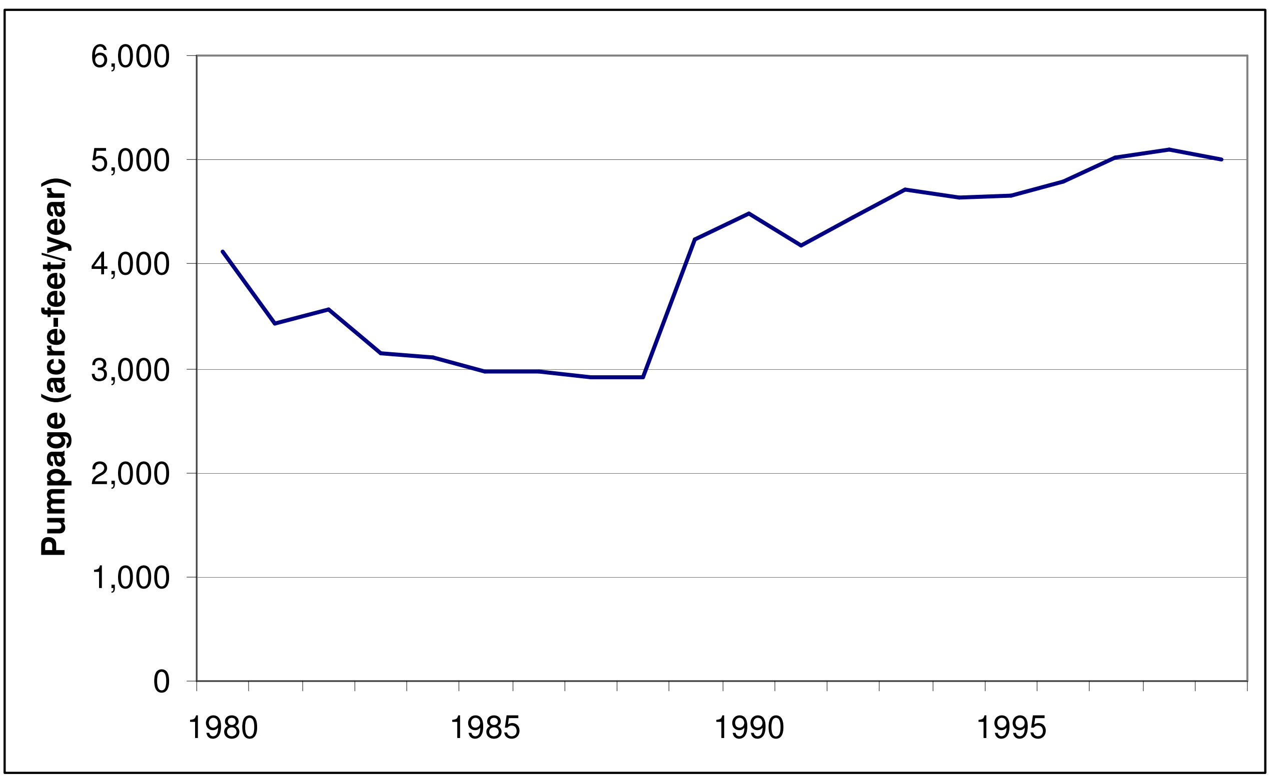


Figure A-2- Pumpage in Bell County included in groundwater availability model for the northern part of the Trinity Aquifer.

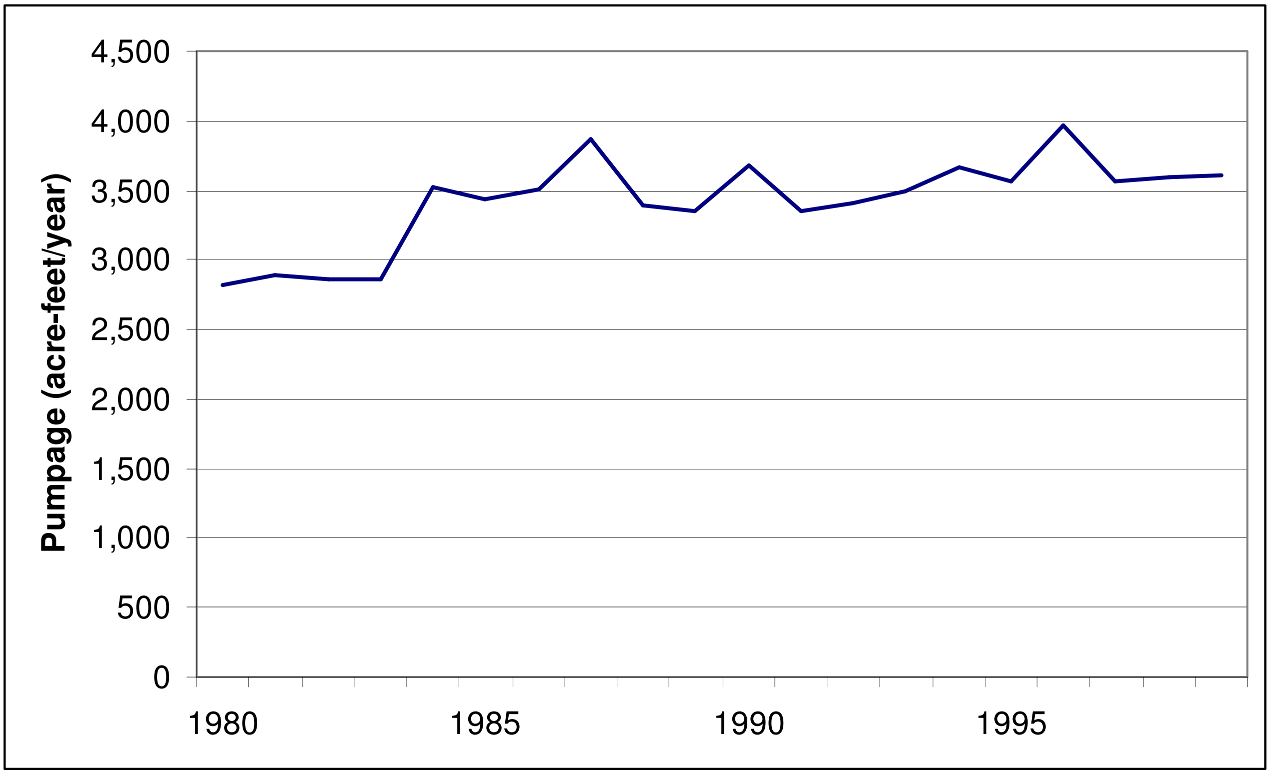


Figure A-3- Pumpage in Bosque County included in the groundwater availability model for the northern part of the Trinity Aquifer.

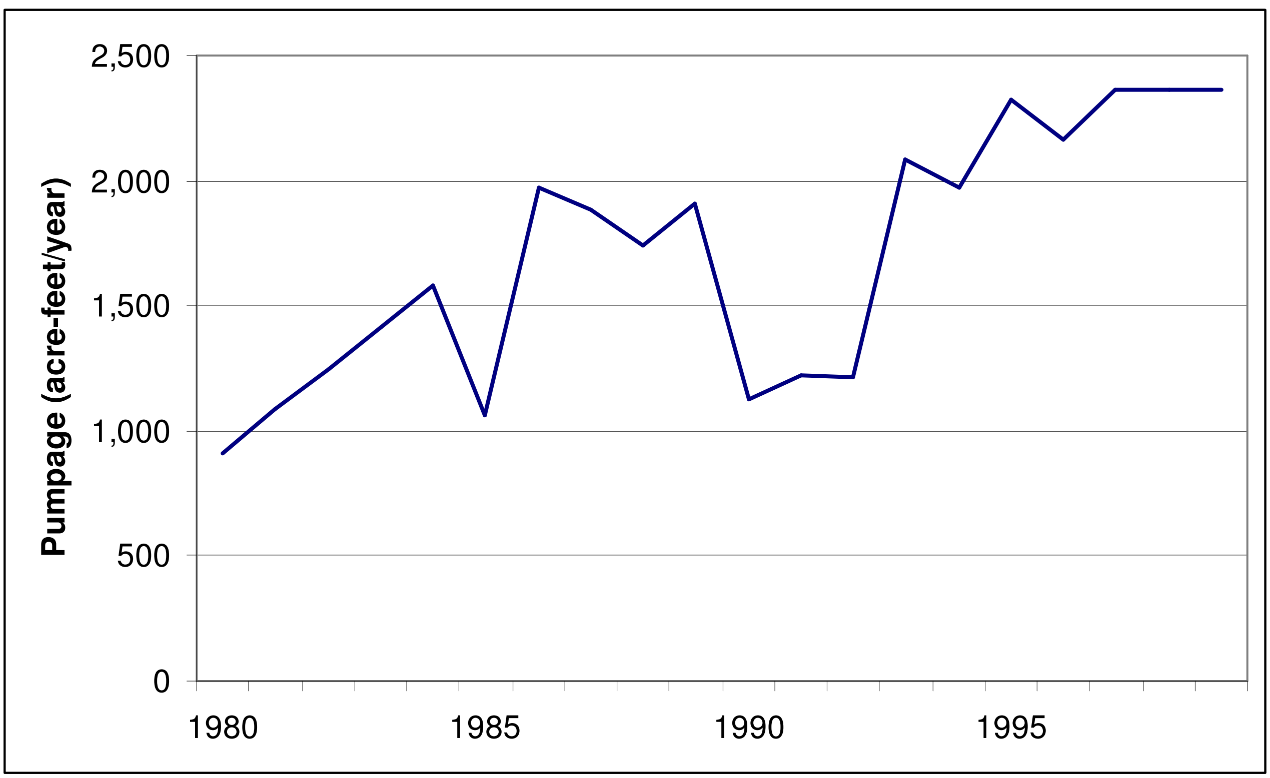


Figure A-4- Pumpage in Brown County included in the groundwater availability model for the northern part of the Trinity Aquifer.

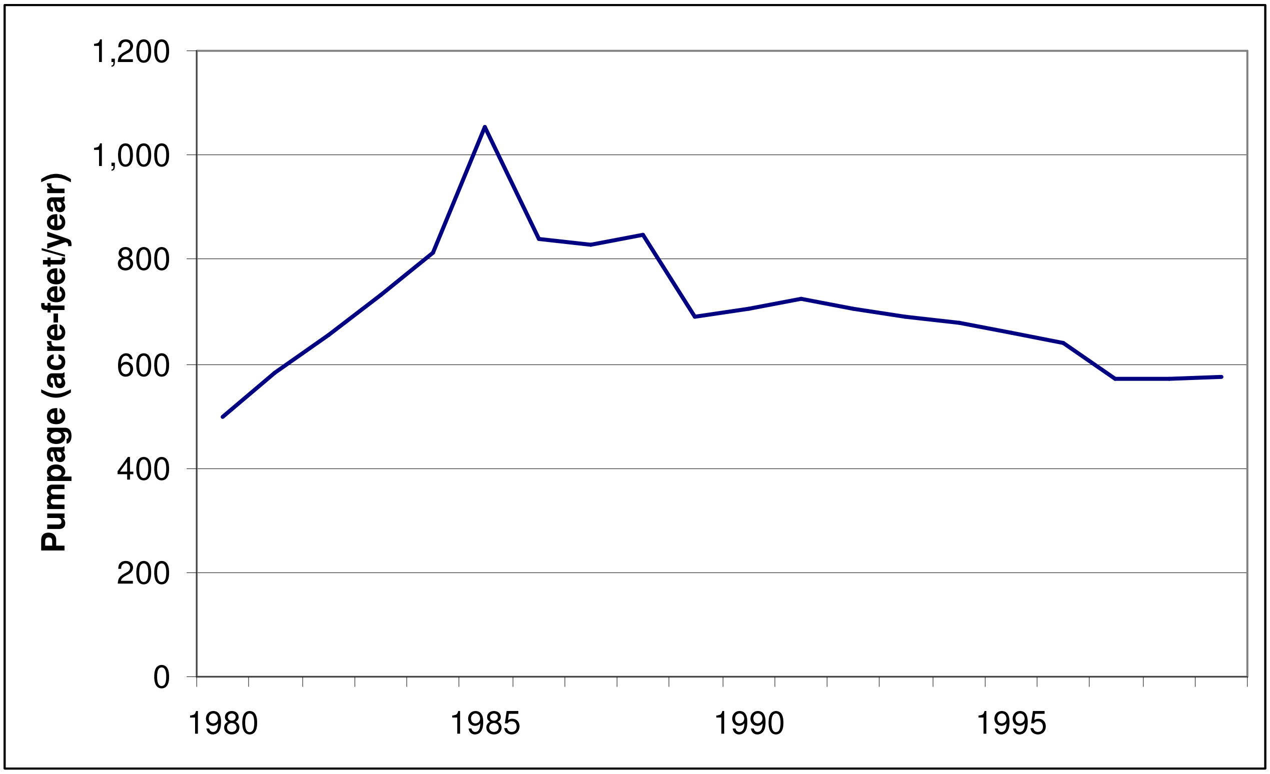


Figure A-5- Pumpage in Burnet County included in the groundwater availability model for the northern part of the Trinity Aquifer.

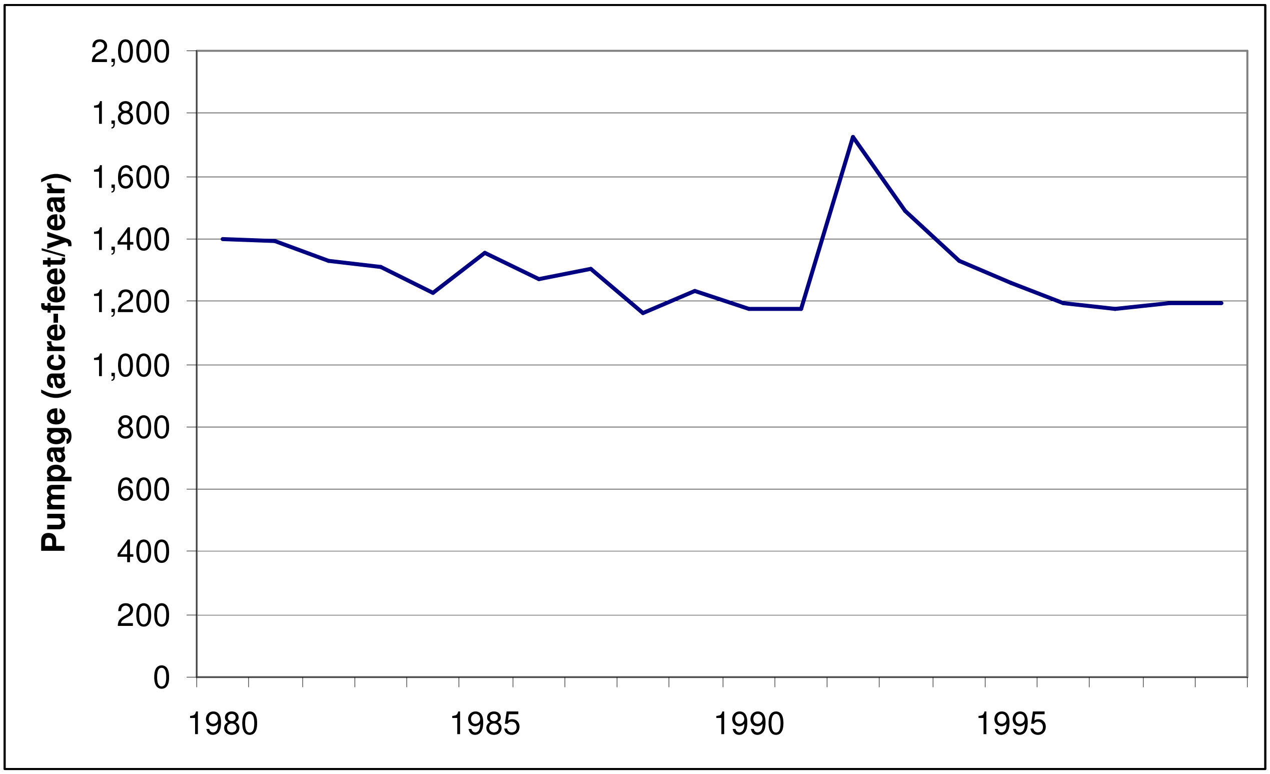


Figure A-6- Pumpage in Callahan County included in the groundwater availability model for the northern part of the Trinity Aquifer.

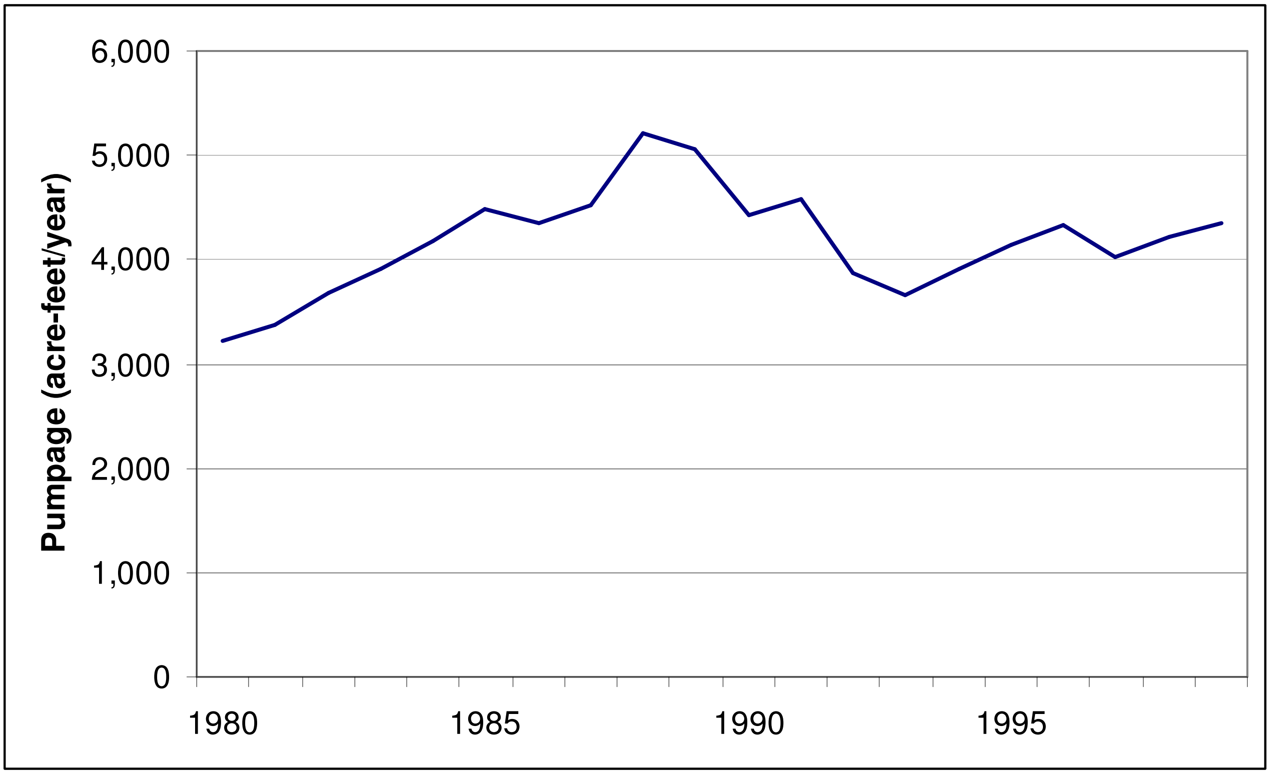


Figure A-7- Pumpage in Collin County included in the groundwater availability model for the northern part of the Trinity Aquifer.

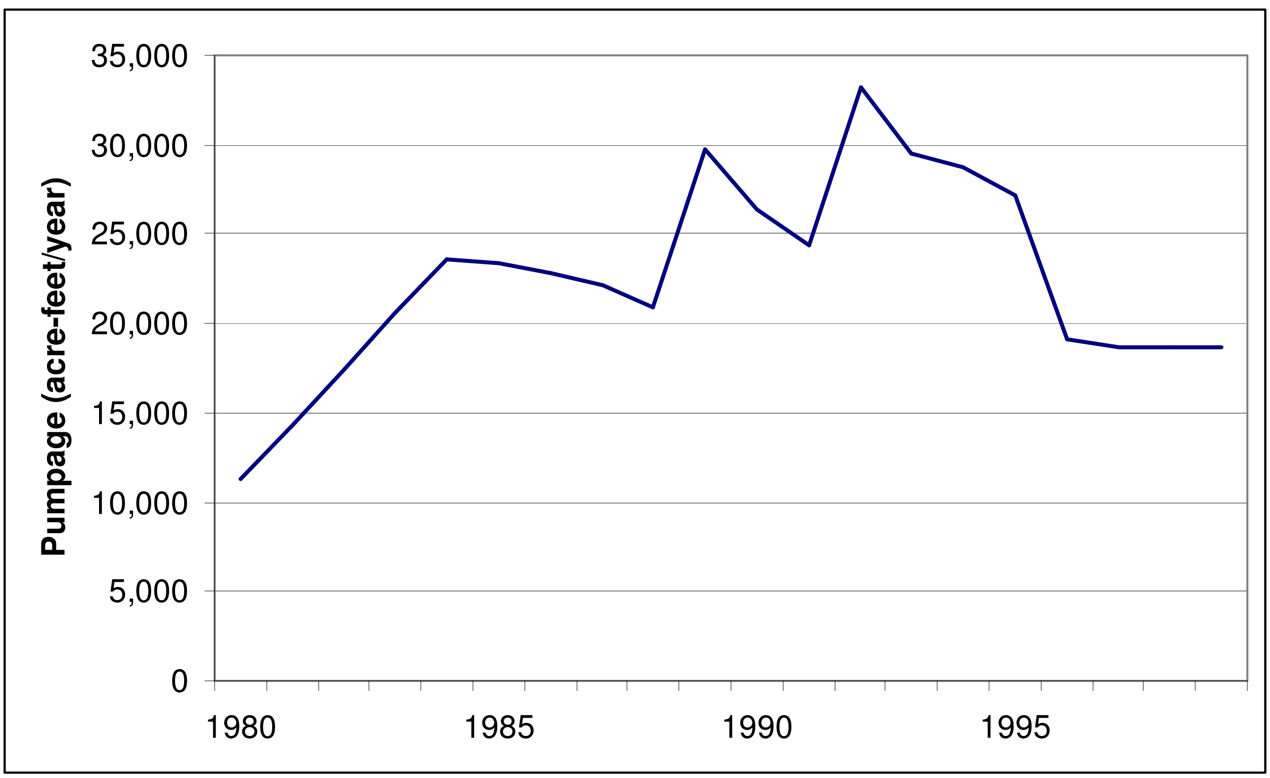


Figure A-8- Pumpage in Comanche County included in the groundwater availability model for the northern part of the Trinity Aquifer.

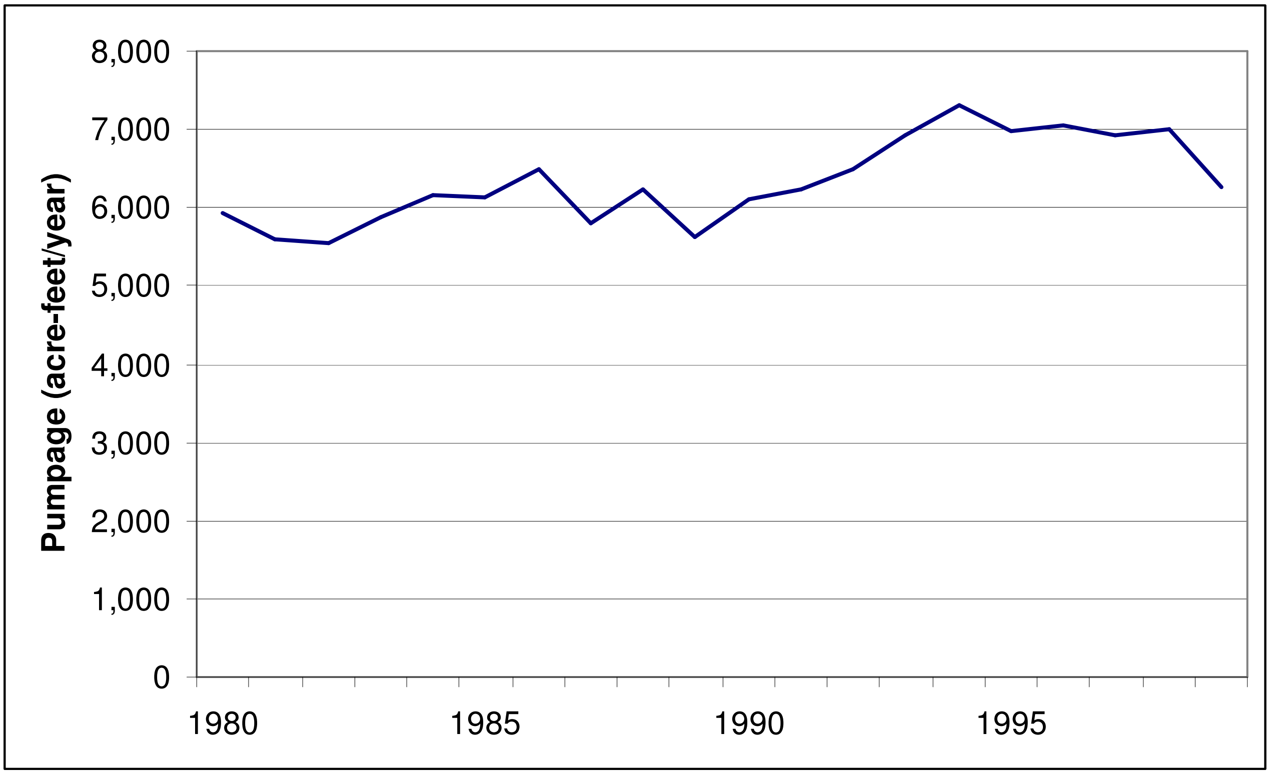


Figure A-9- Pumpage in Cooke County included in the groundwater availability model for the northern part of the Trinity Aquifer.

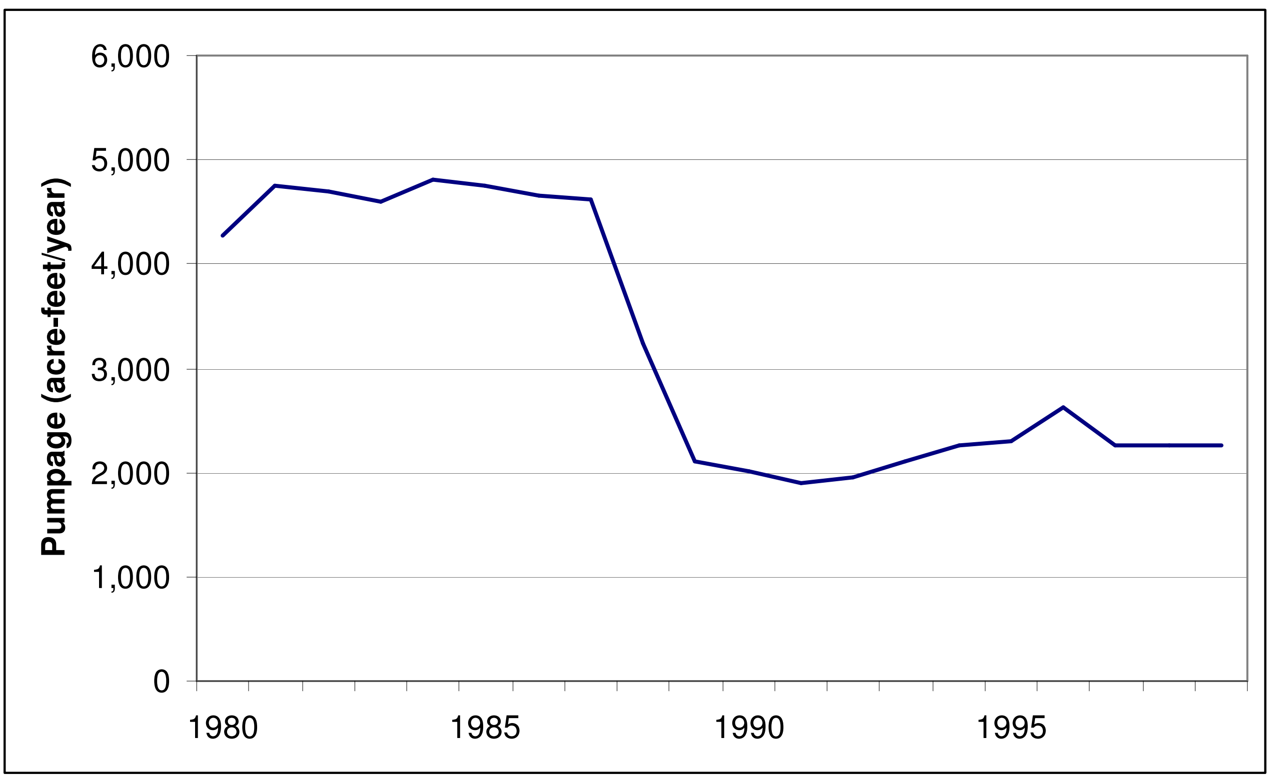


Figure A-10- Pumpage in Coryell County included in the groundwater availability model for the northern part of the Trinity Aquifer.

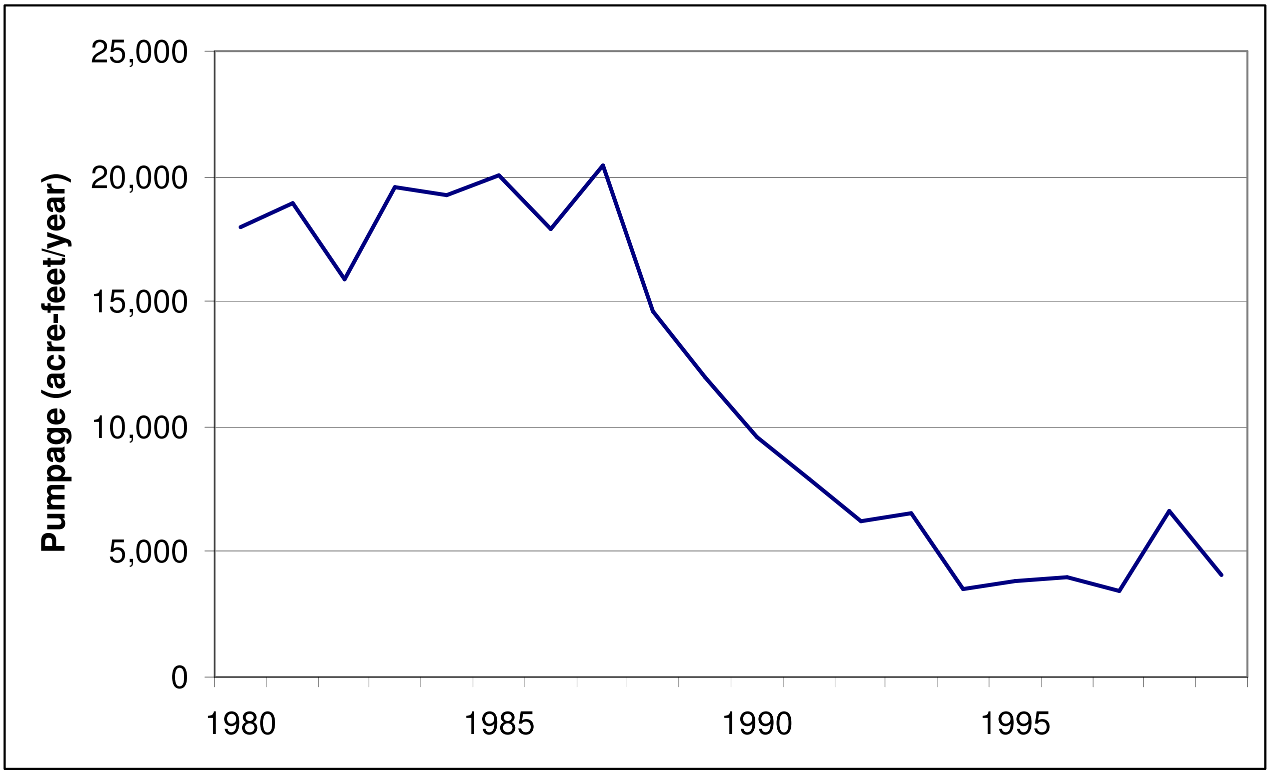


Figure A-11- Pumpage in Dallas County included in the groundwater availability model for the northern part of the Trinity Aquifer.

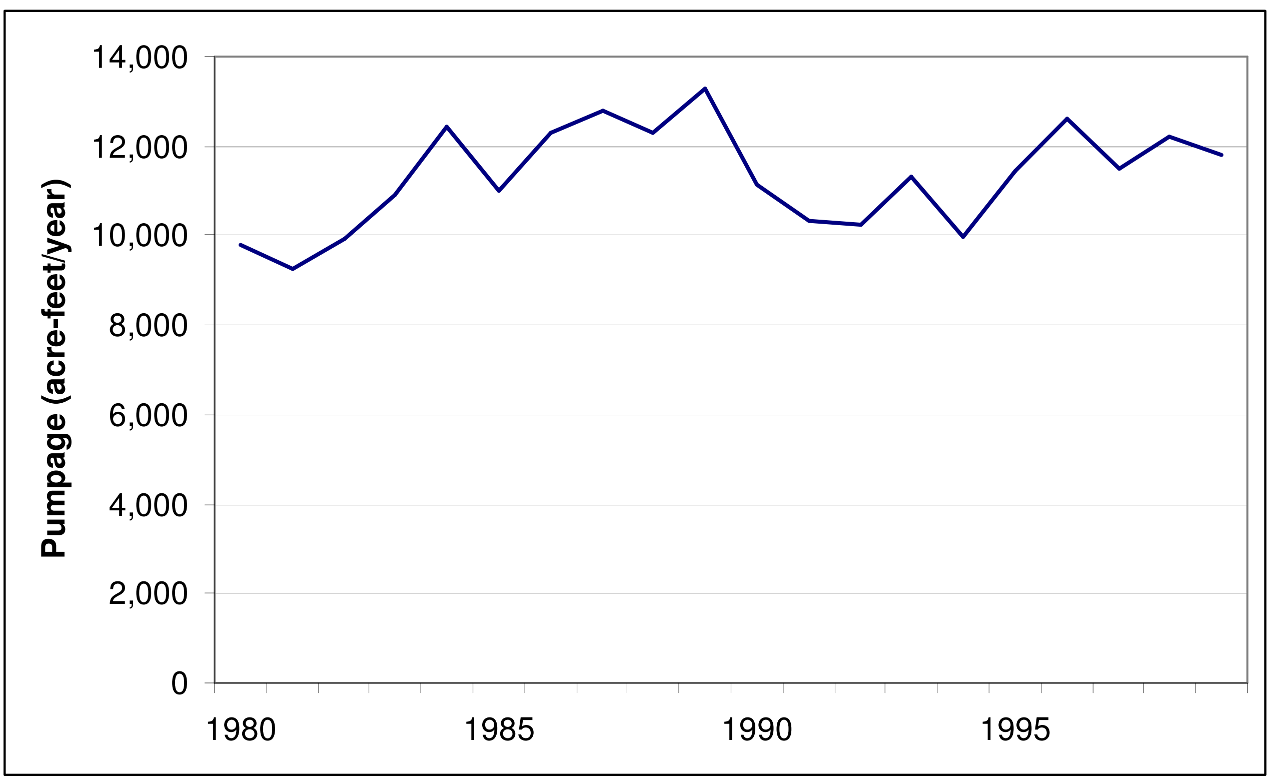


Figure A-12- Pumpage in Denton County included in the groundwater availability model for the northern part of the Trinity Aquifer.

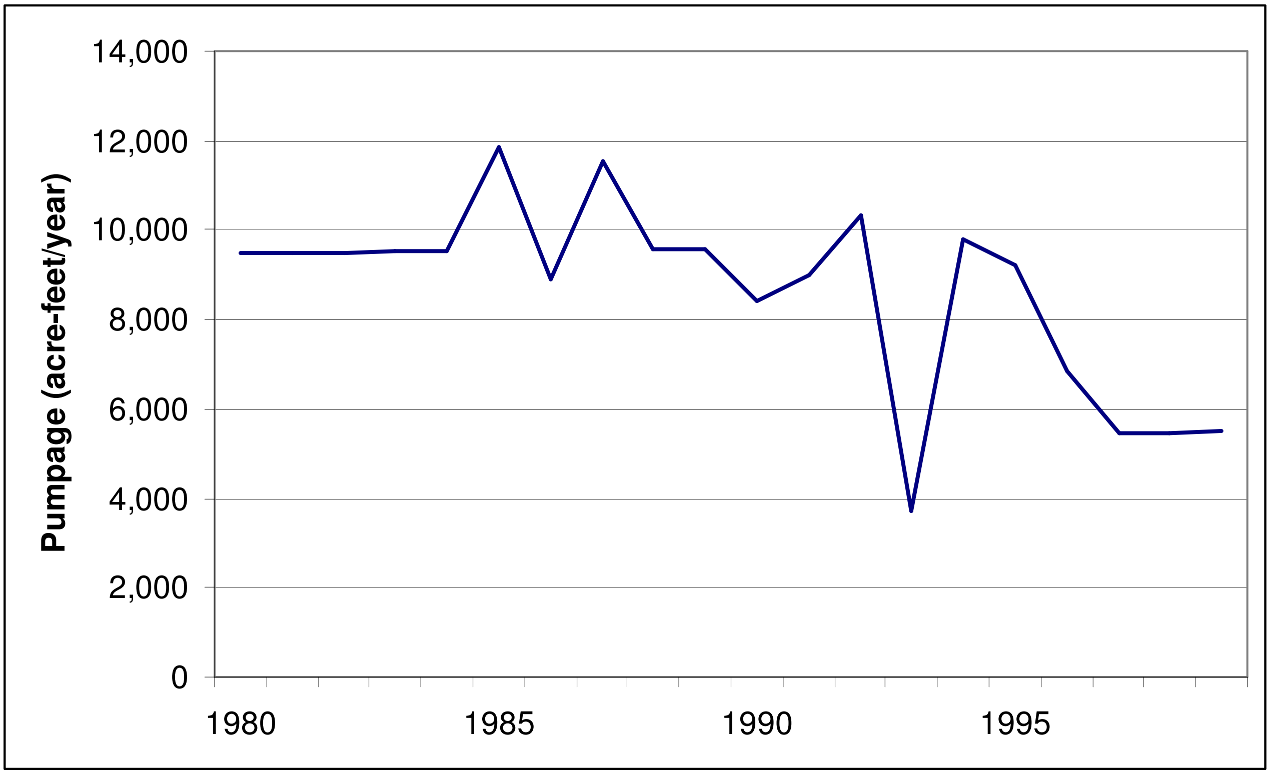


Figure A-13- Pumpage in Eastland County included in the groundwater availability model for the northern part of the Trinity Aquifer.

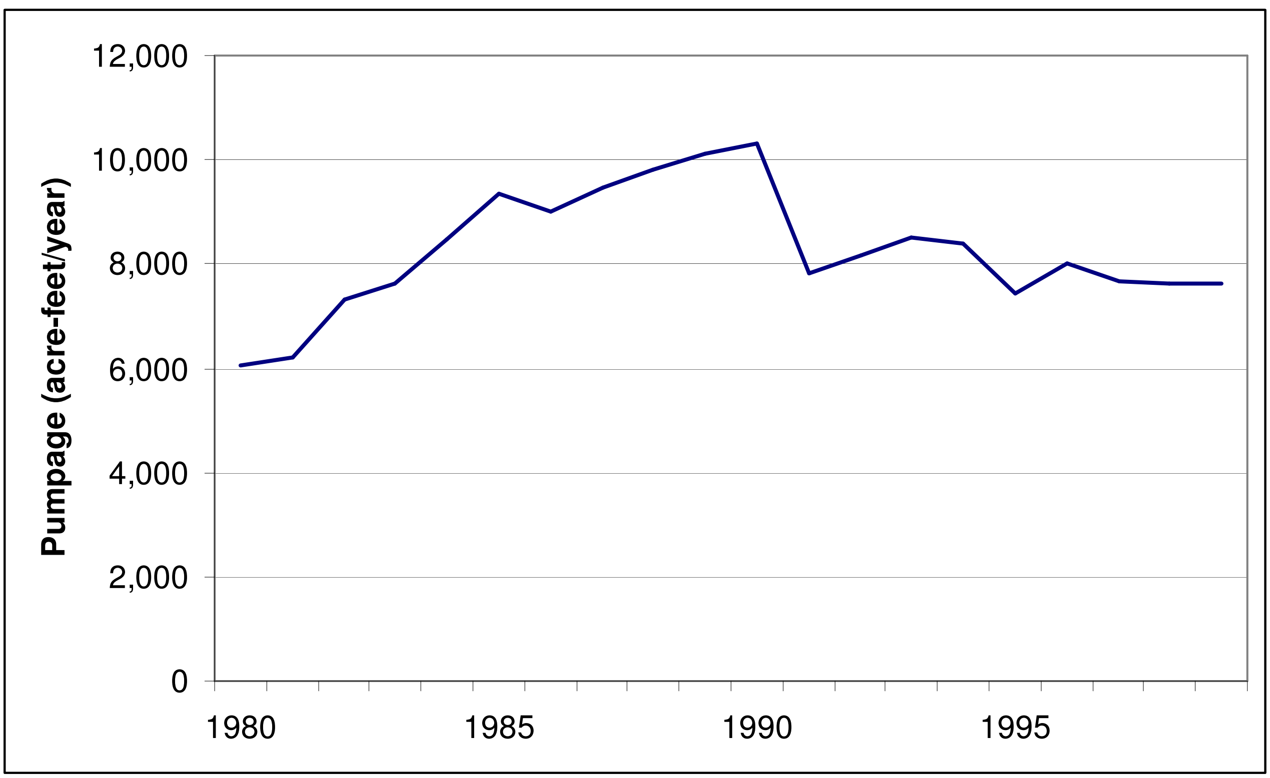


Figure A-14- Pumpage in Ellis County included in the groundwater availability model for the northern part of the Trinity Aquifer.

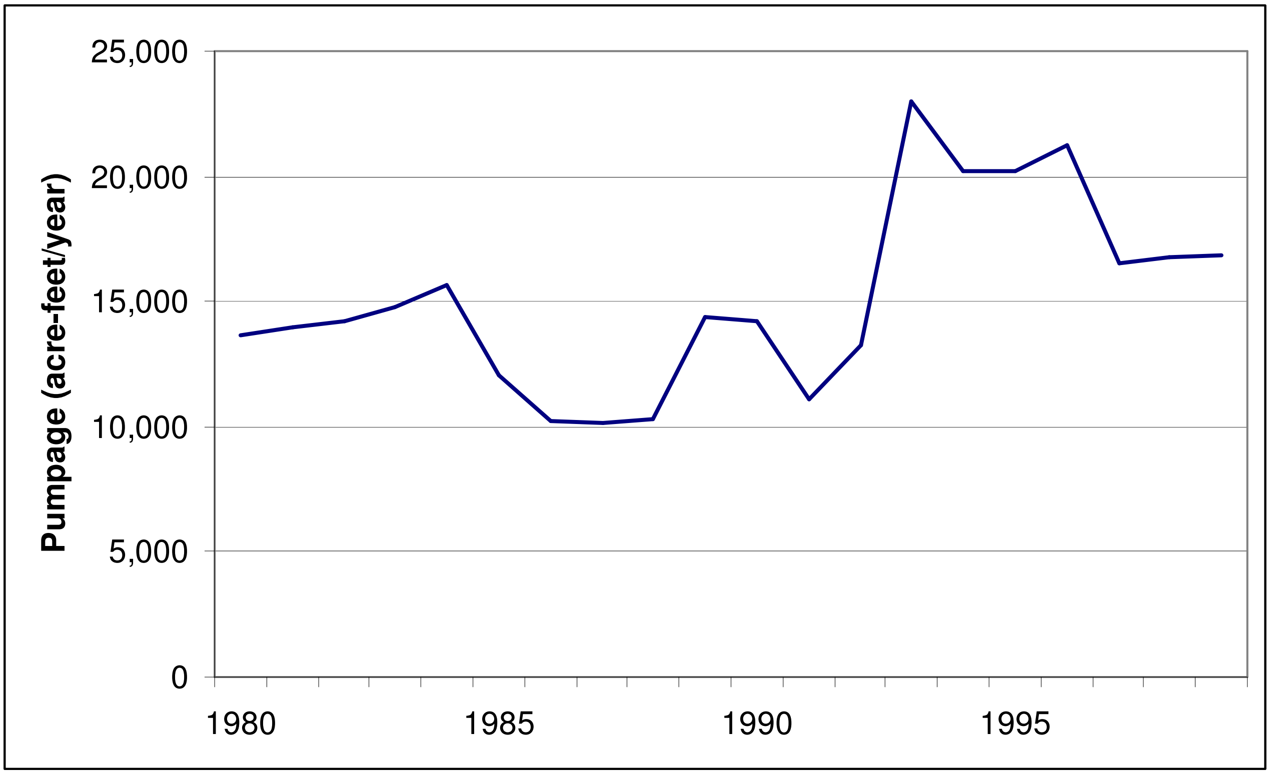


Figure A-15- Pumpage in Erath County included in the groundwater availability model for the northern part of the Trinity Aquifer.

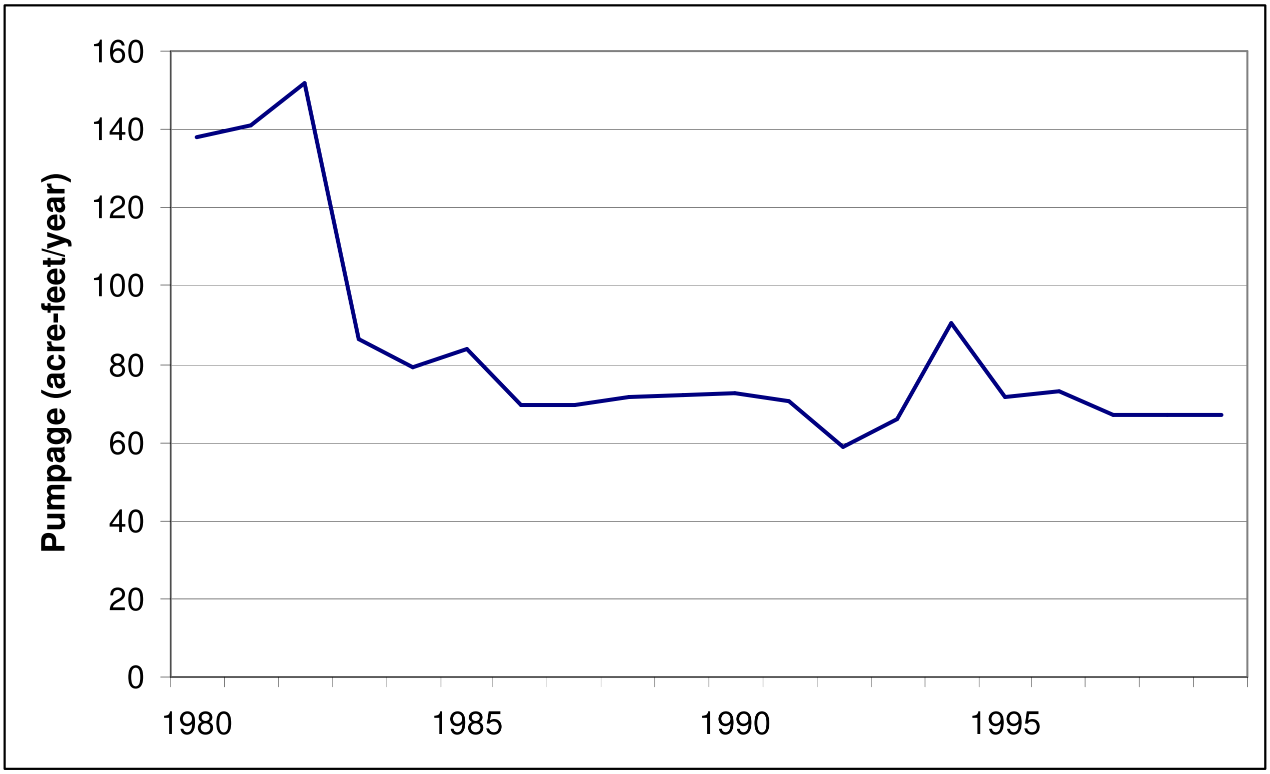


Figure A-16- Pumpage in Falls County included in the groundwater availability model for the northern part of the Trinity Aquifer.

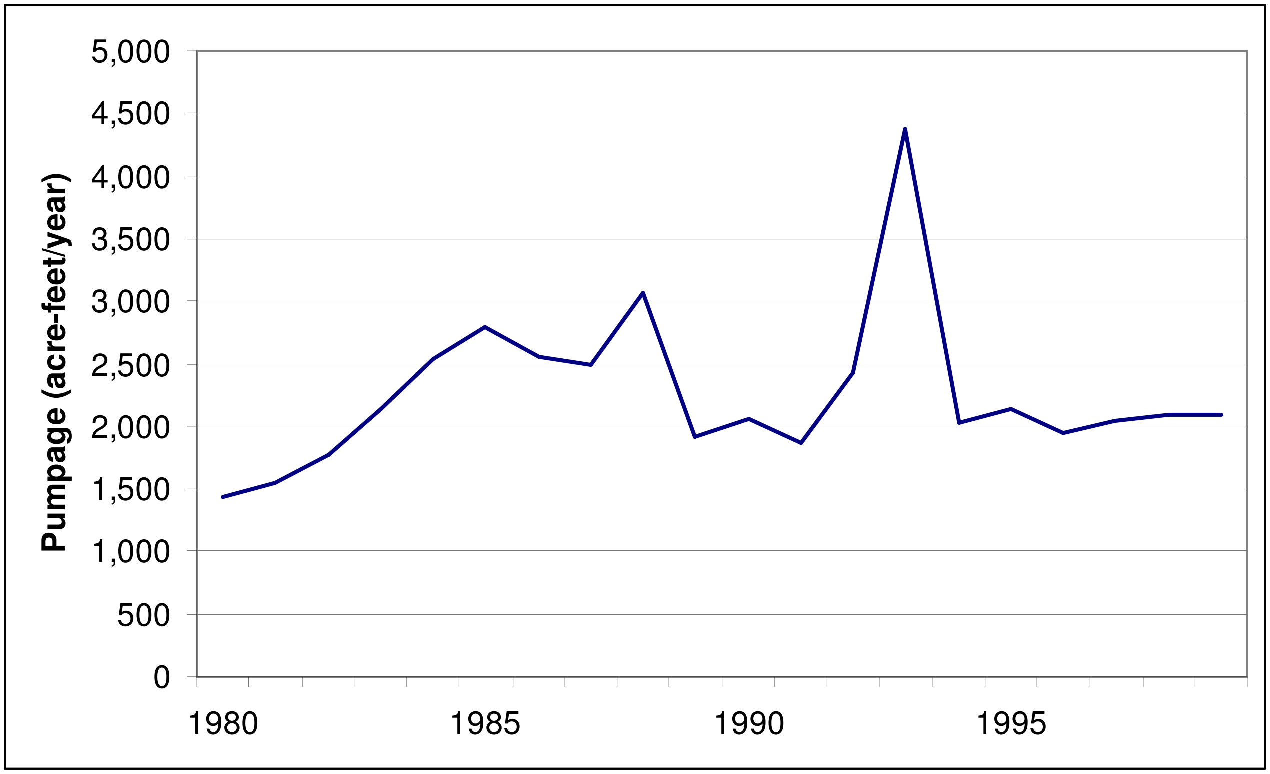


Figure A-17- Pumpage in Fannin County included in the groundwater availability model for the northern part of the Trinity Aquifer.

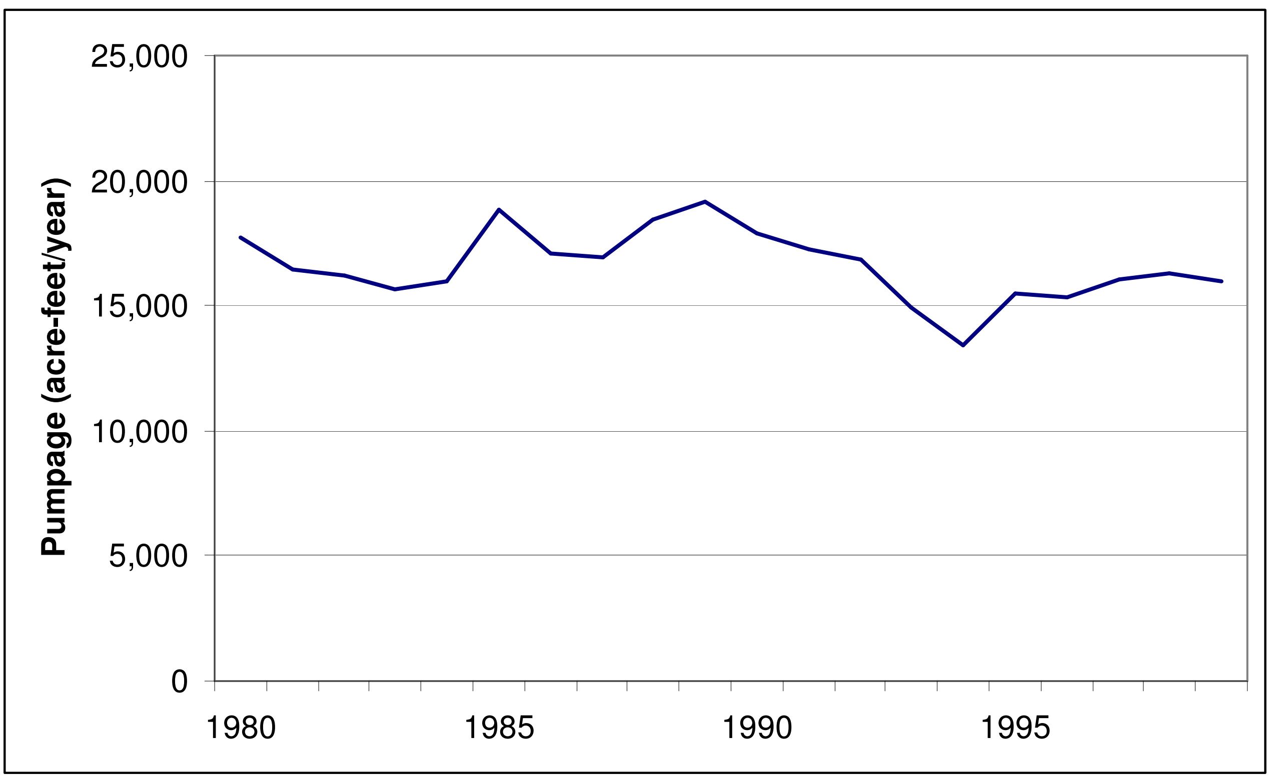


Figure A-18- Pumpage in Grayson County included in the groundwater availability model for the northern part of the Trinity Aquifer.

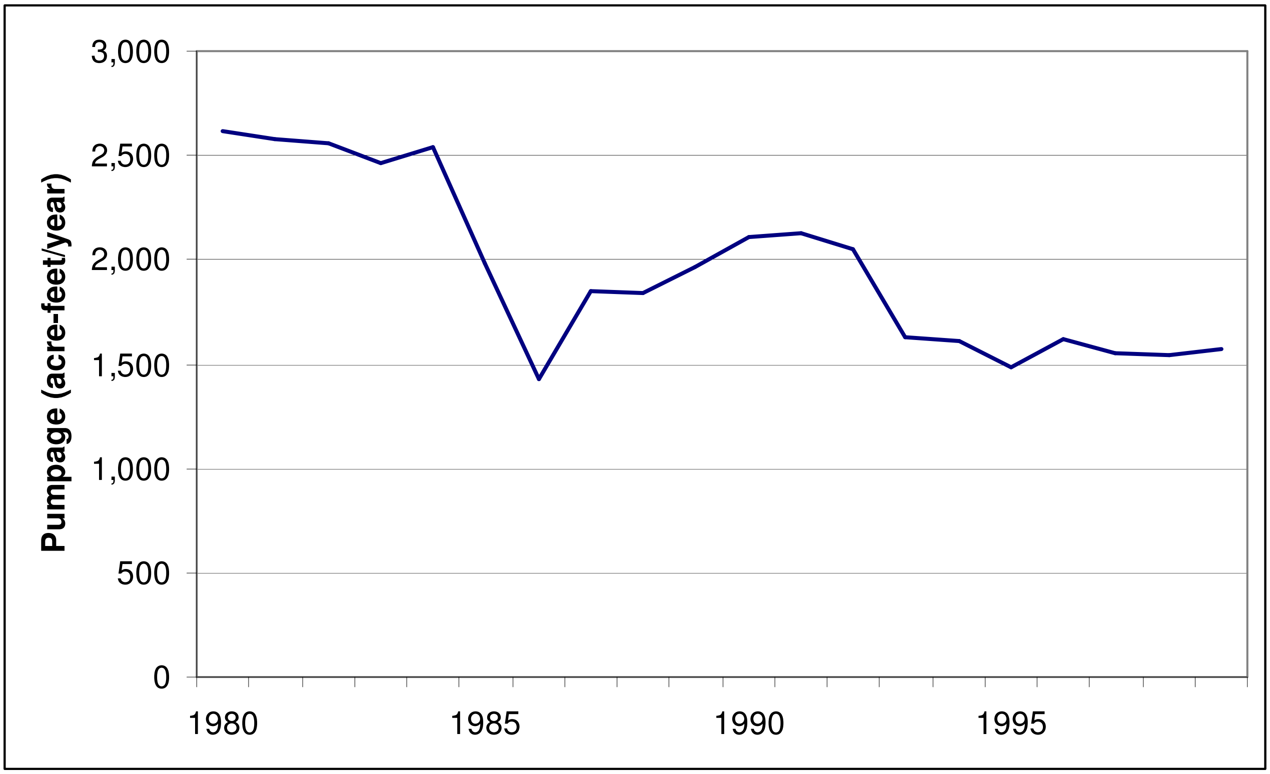


Figure A-19- Pumpage in Hamilton County included in the groundwater availability model for the northern part of the Trinity Aquifer.

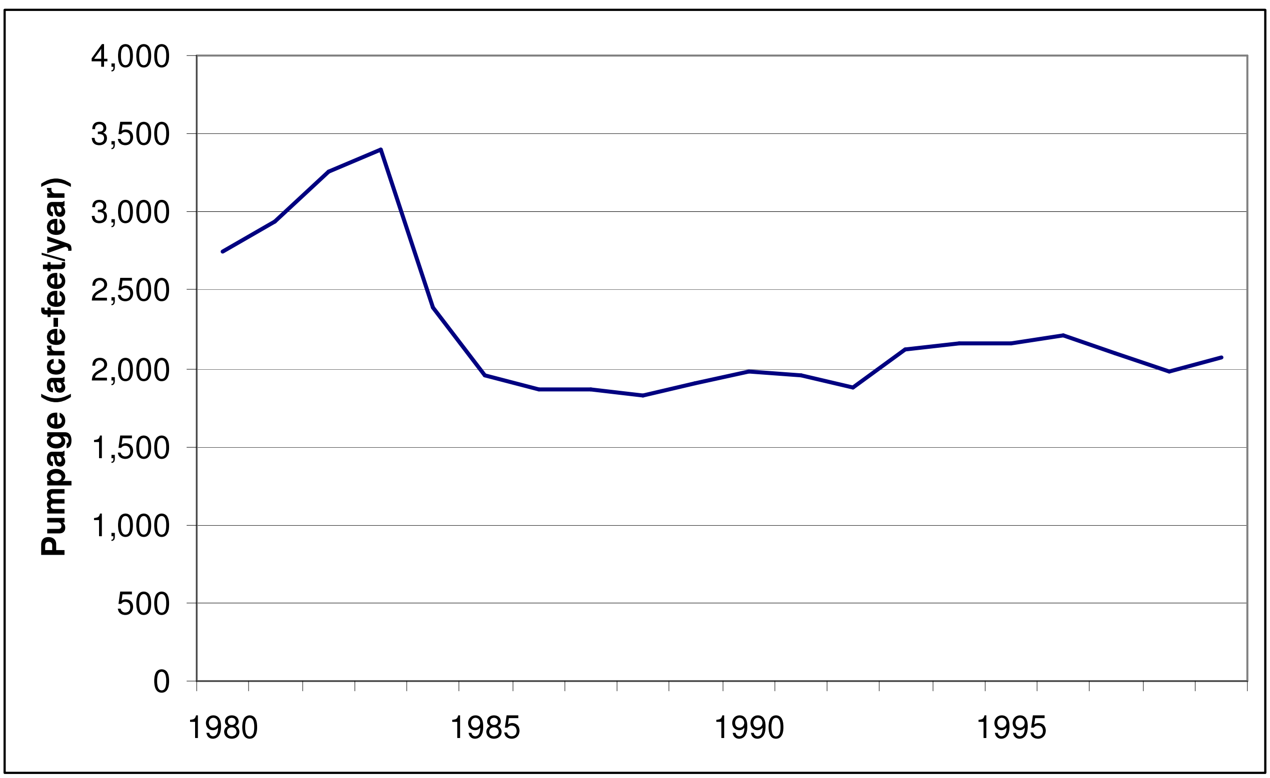


Figure A-20- Pumpage in Hill County included in the groundwater availability model for the northern part of the Trinity Aquifer.

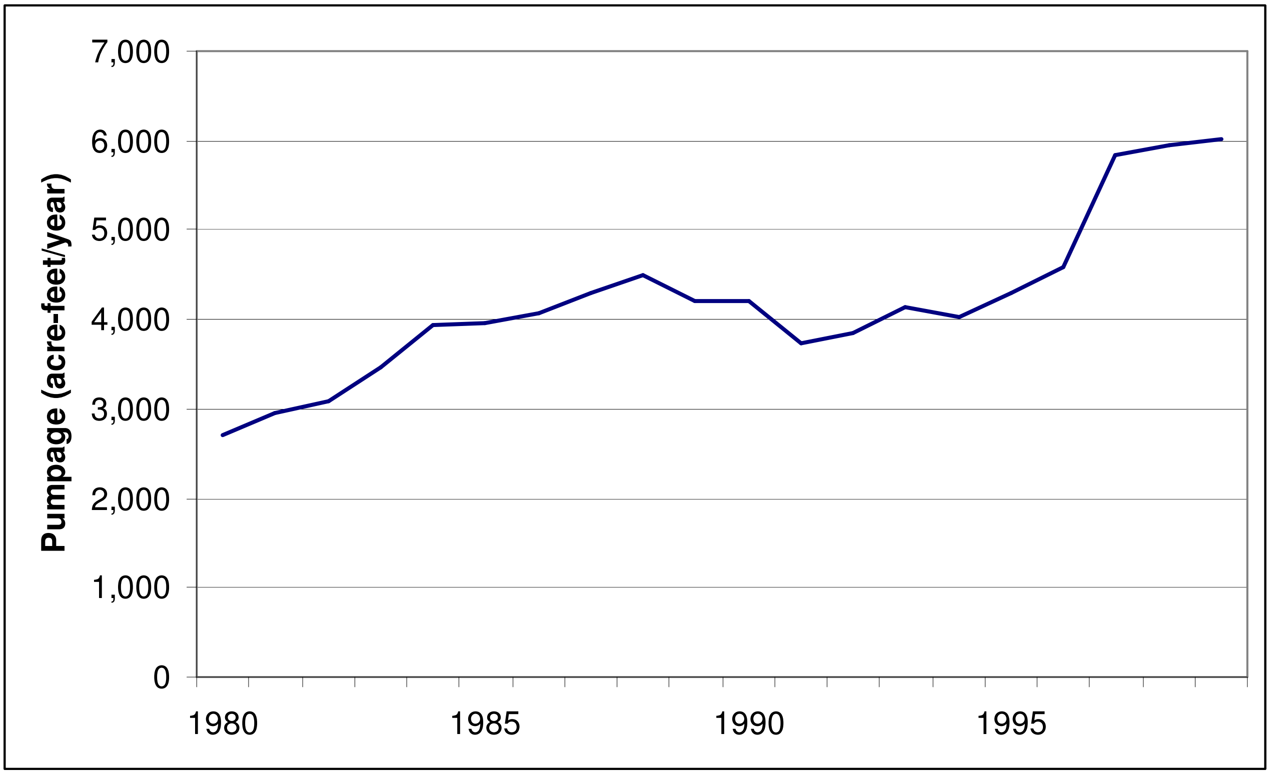


Figure A-21- Pumpage in Hood County included in the groundwater availability model for the northern part of the Trinity Aquifer.

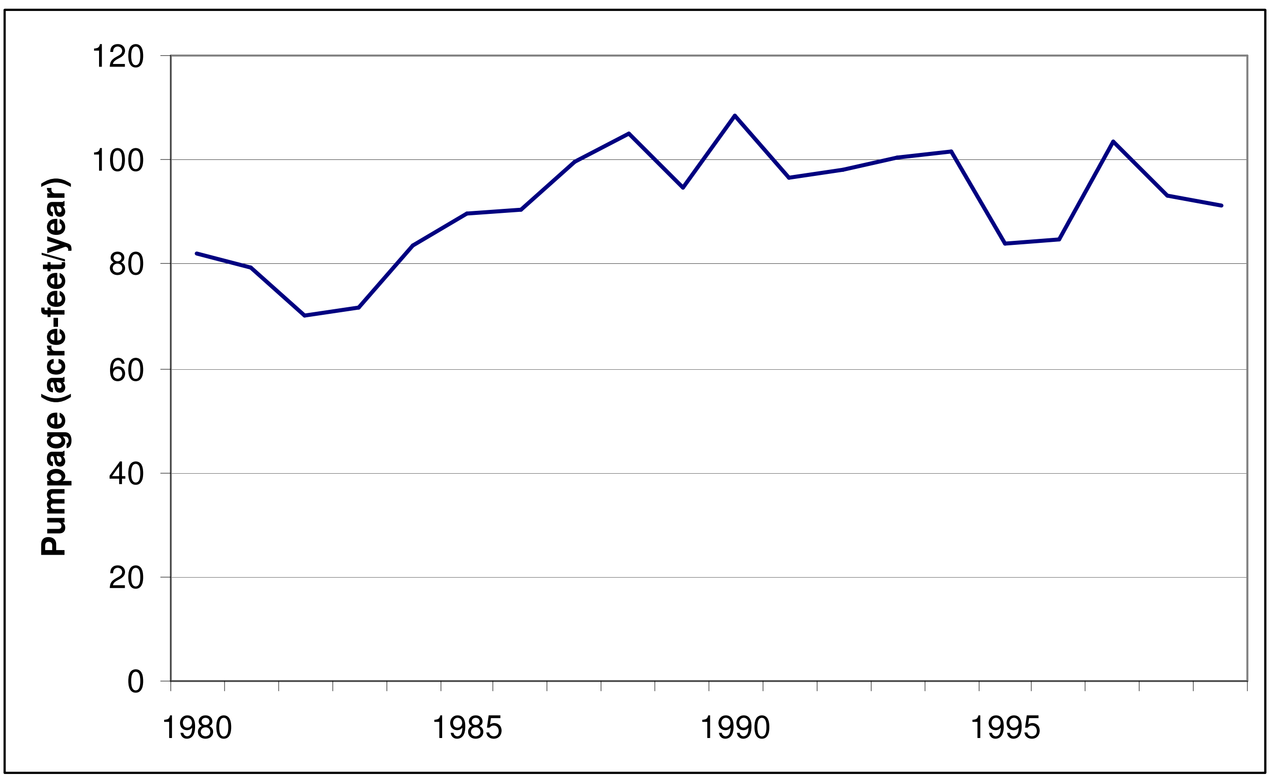


Figure A-22- Pumpage in Hunt County included in the groundwater availability model for the northern part of the Trinity Aquifer.

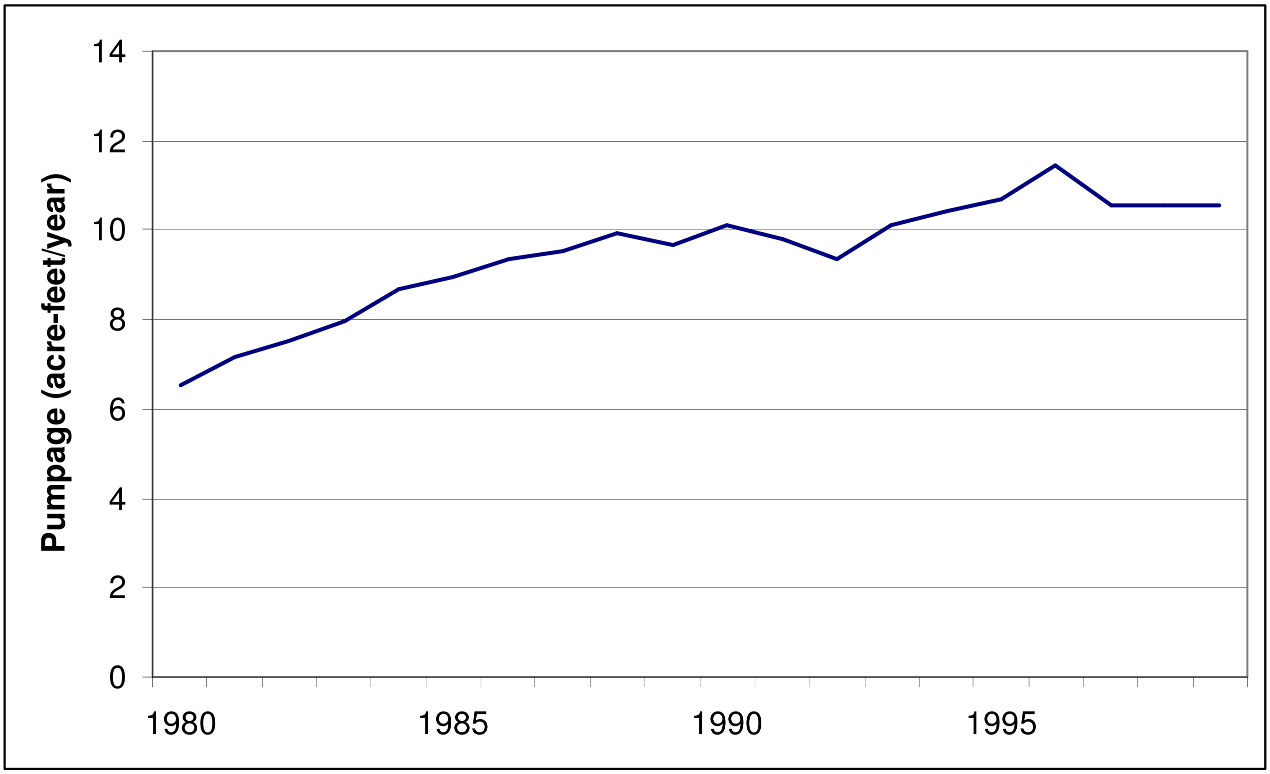


Figure A-23- Pumpage in Jack County included in the groundwater availability model for the northern part of the Trinity Aquifer.

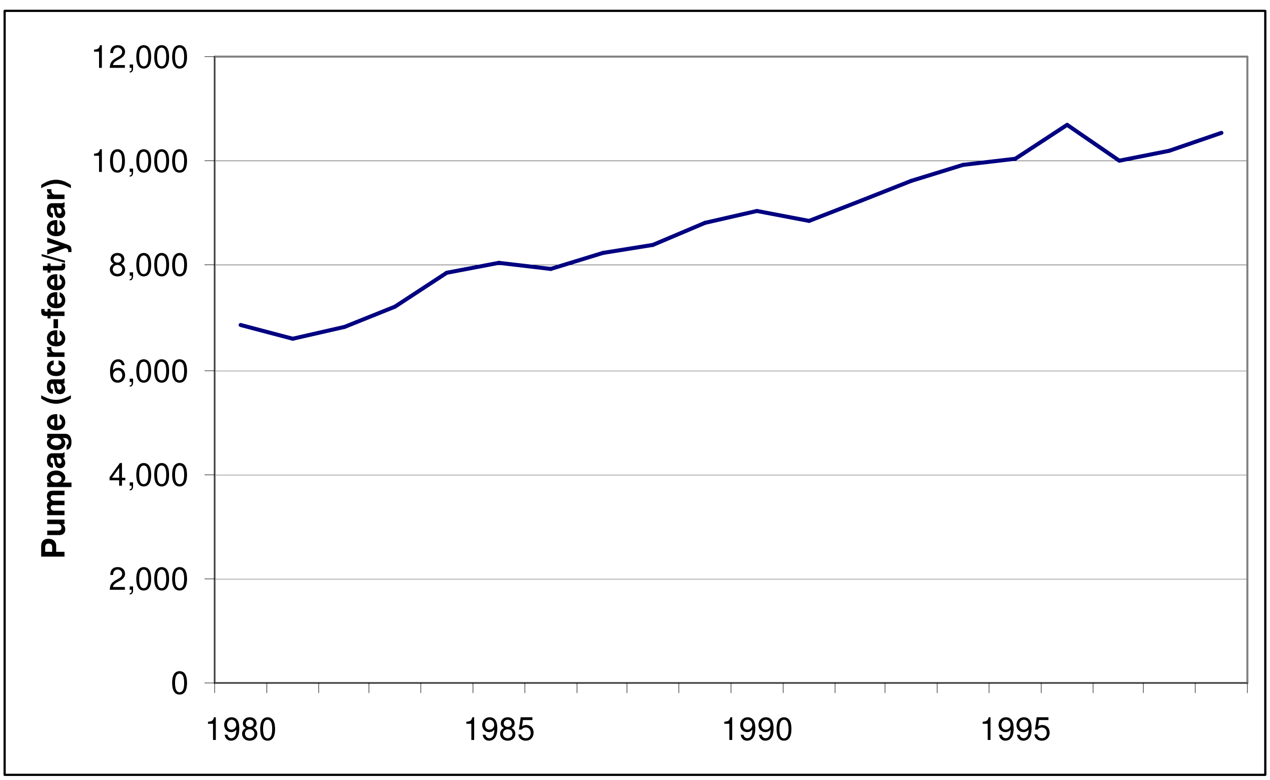


Figure A-24- Pumpage in Johnson County included in the groundwater availability model for the northern part of the Trinity Aquifer.

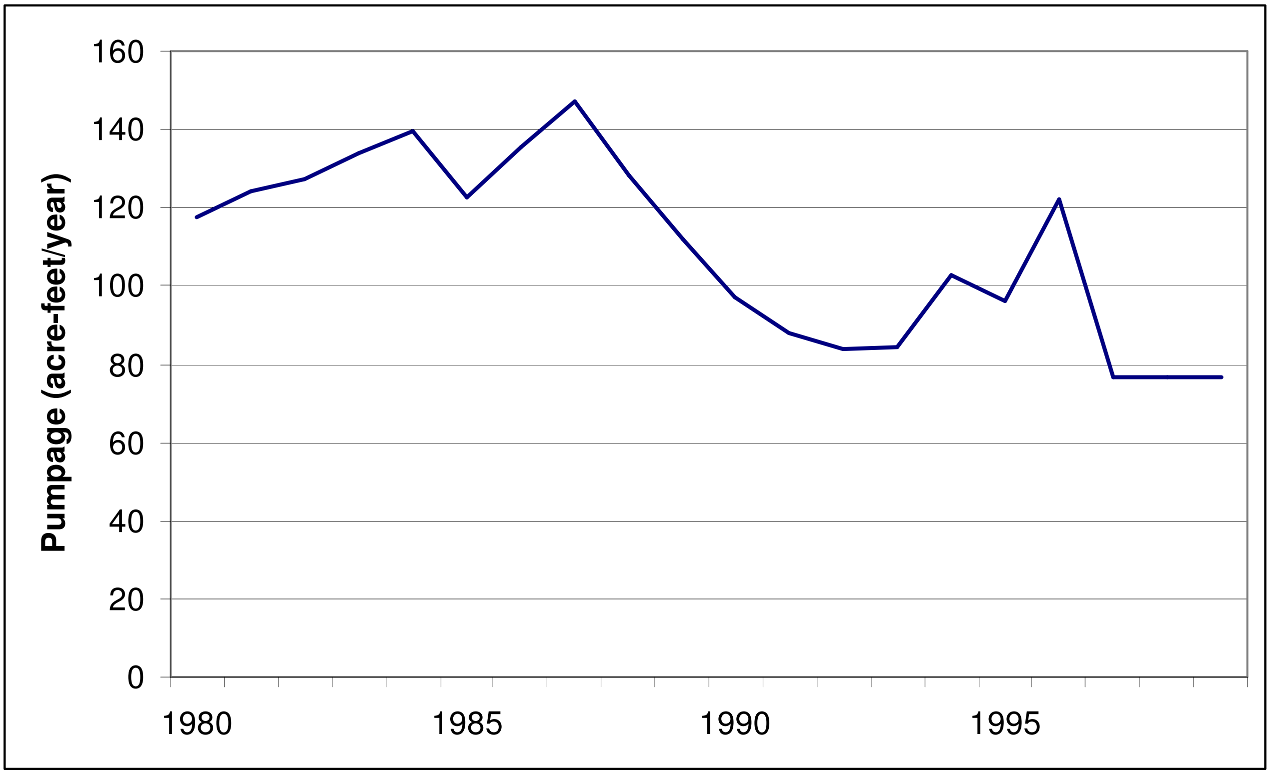


Figure A-25- Pumpage in Kaufman County included in the groundwater availability model for the northern part of the Trinity Aquifer.

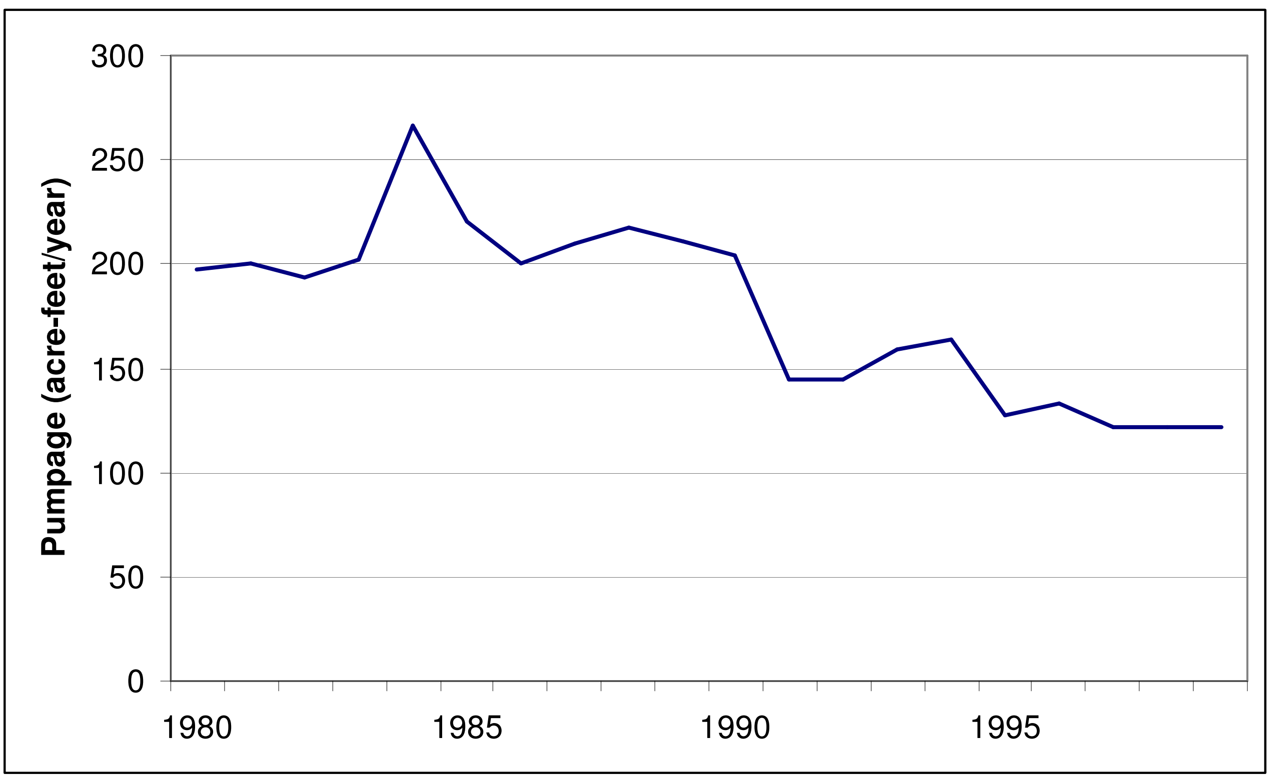


Figure A-26- Pumpage in Lamar County included in the groundwater availability model for the northern part of the Trinity Aquifer.

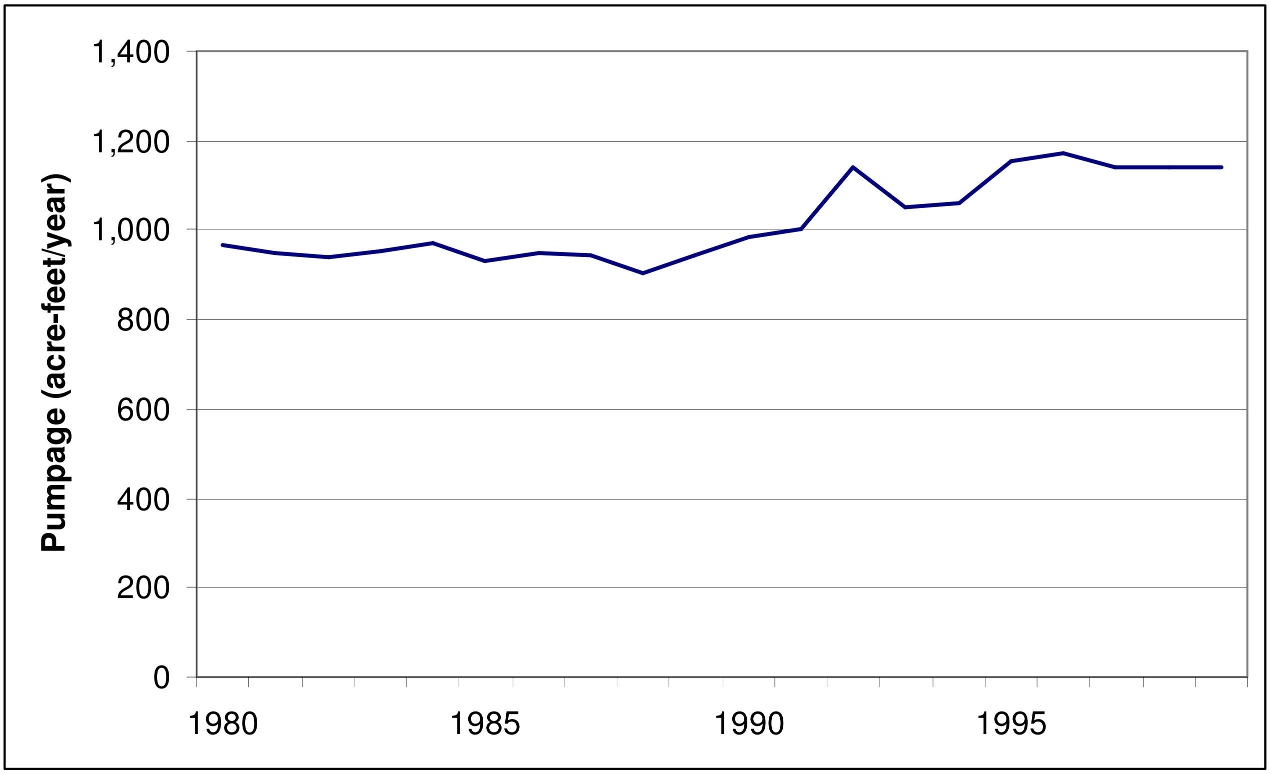


Figure A-27- Pumpage in Lampasas County included in the groundwater availability model for the northern part of the Trinity Aquifer.

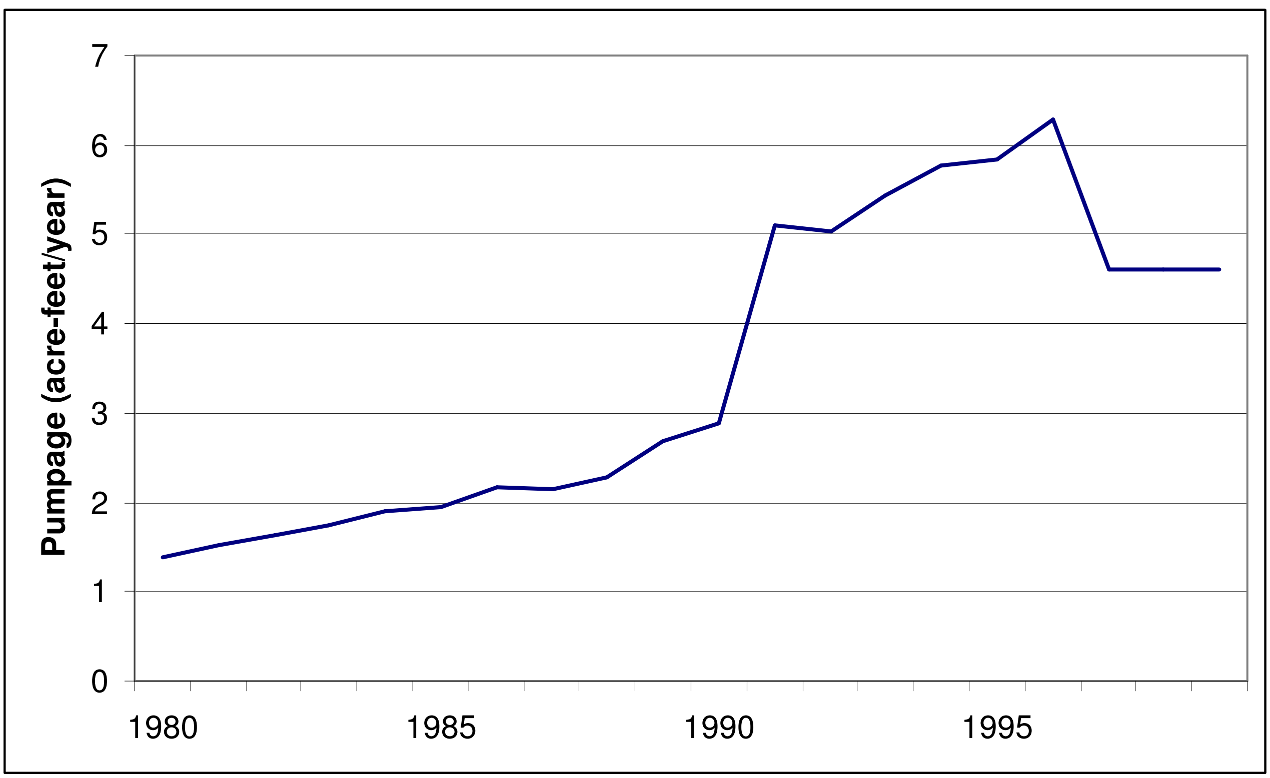


Figure A-28- Pumpage in Lee County included in the groundwater availability model for the northern part of the Trinity Aquifer.

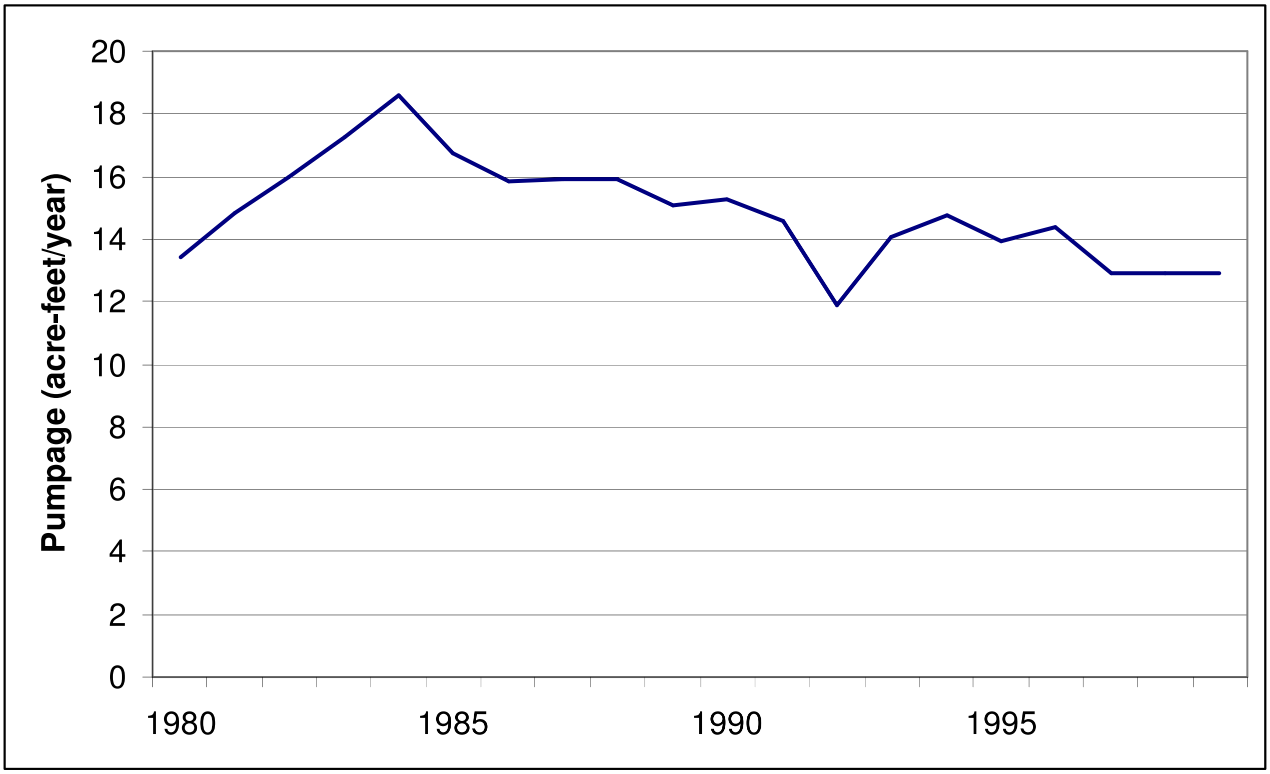


Figure A-29- Pumpage in Limestone County included in the groundwater availability model for the northern part of the Trinity Aquifer.

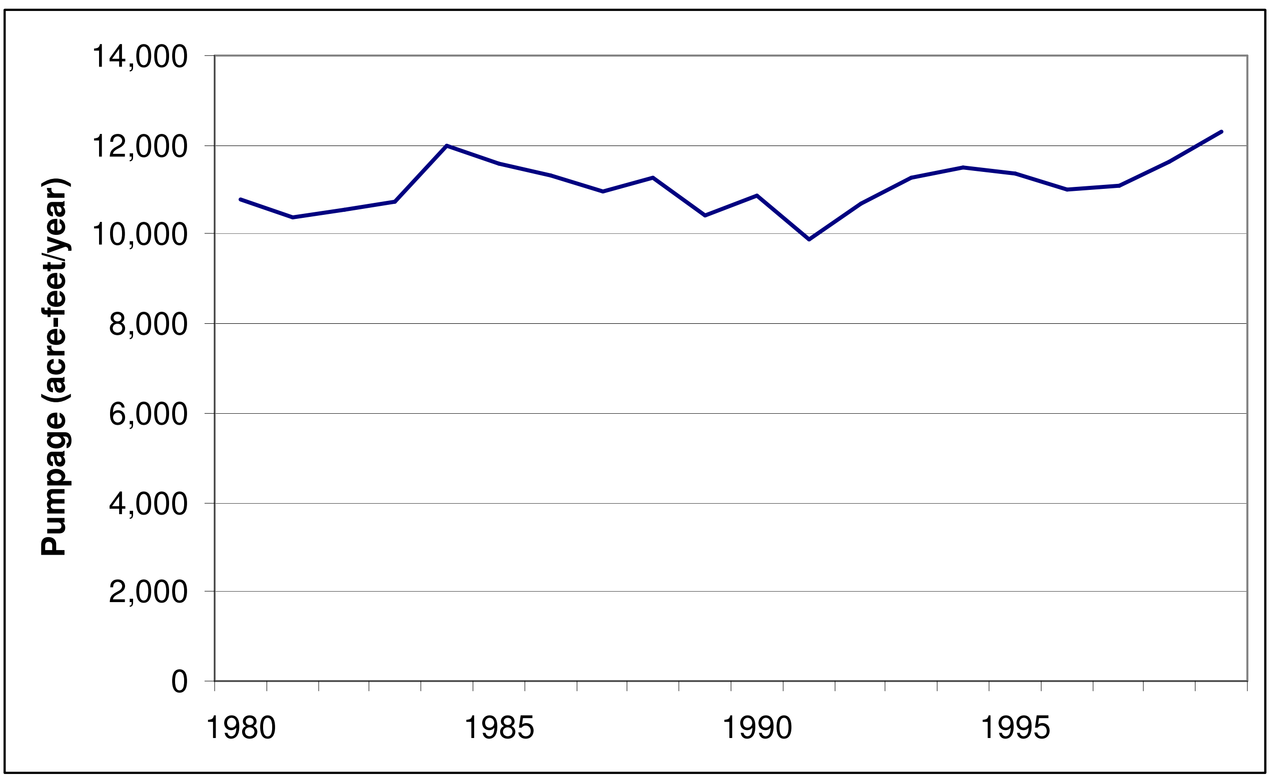


Figure A-30- Pumpage in McLennan County included in the groundwater availability model for the northern part of the Trinity Aquifer.

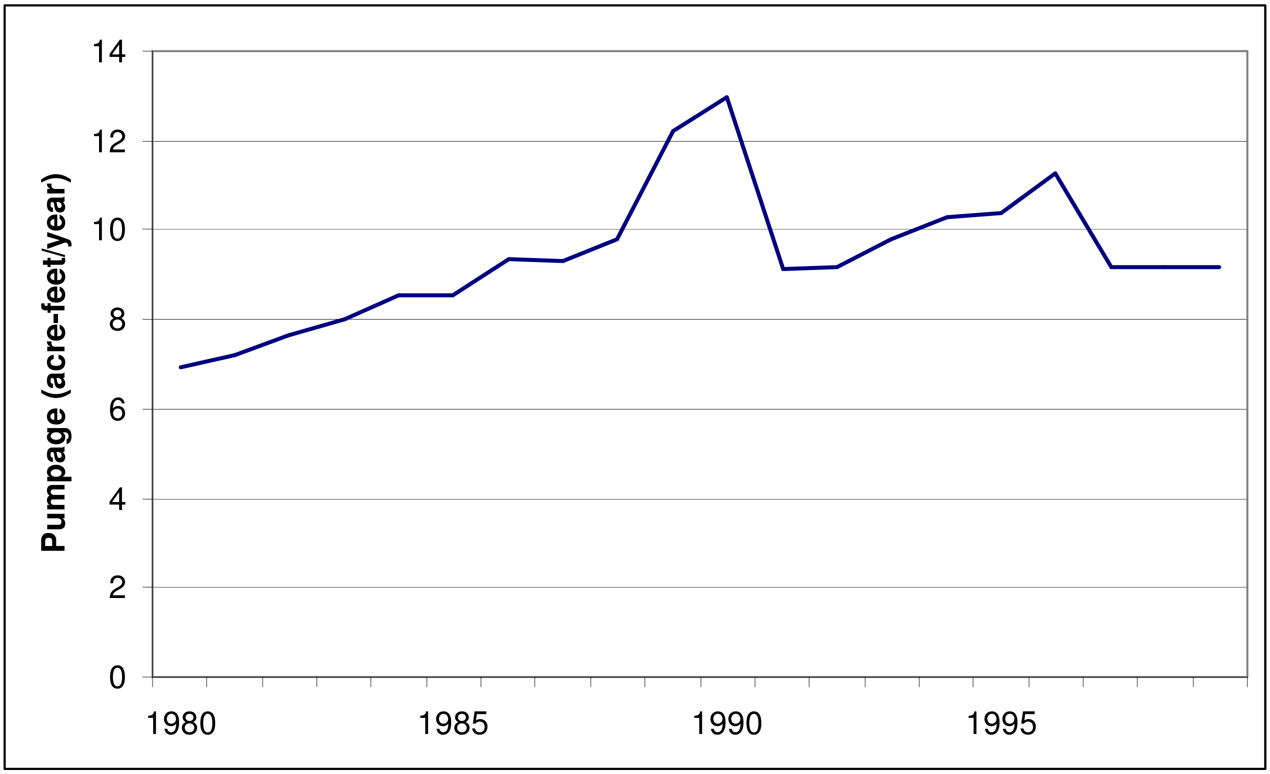


Figure A-31- Pumpage in Milam County included in the groundwater availability model for the northern part of the Trinity Aquifer.

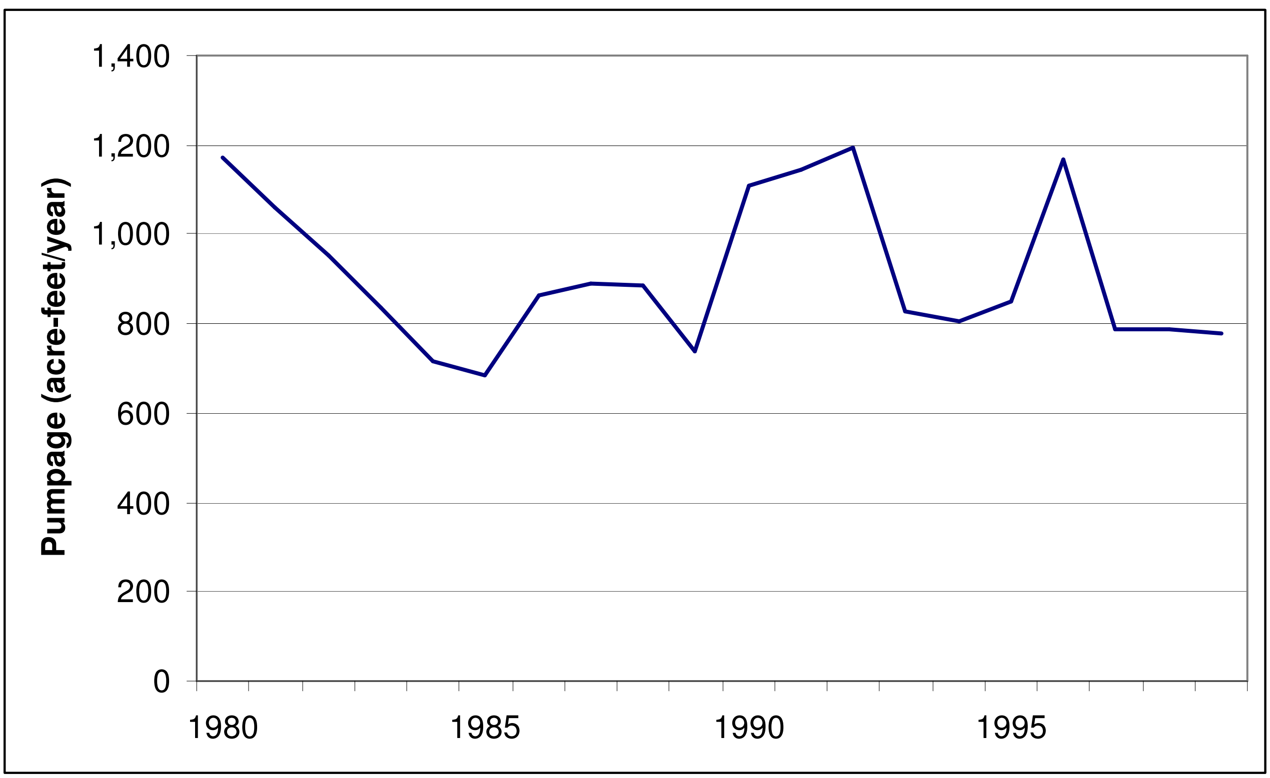


Figure A-32- Pumpage in Mills County included in the groundwater availability model for the northern part of the Trinity Aquifer.

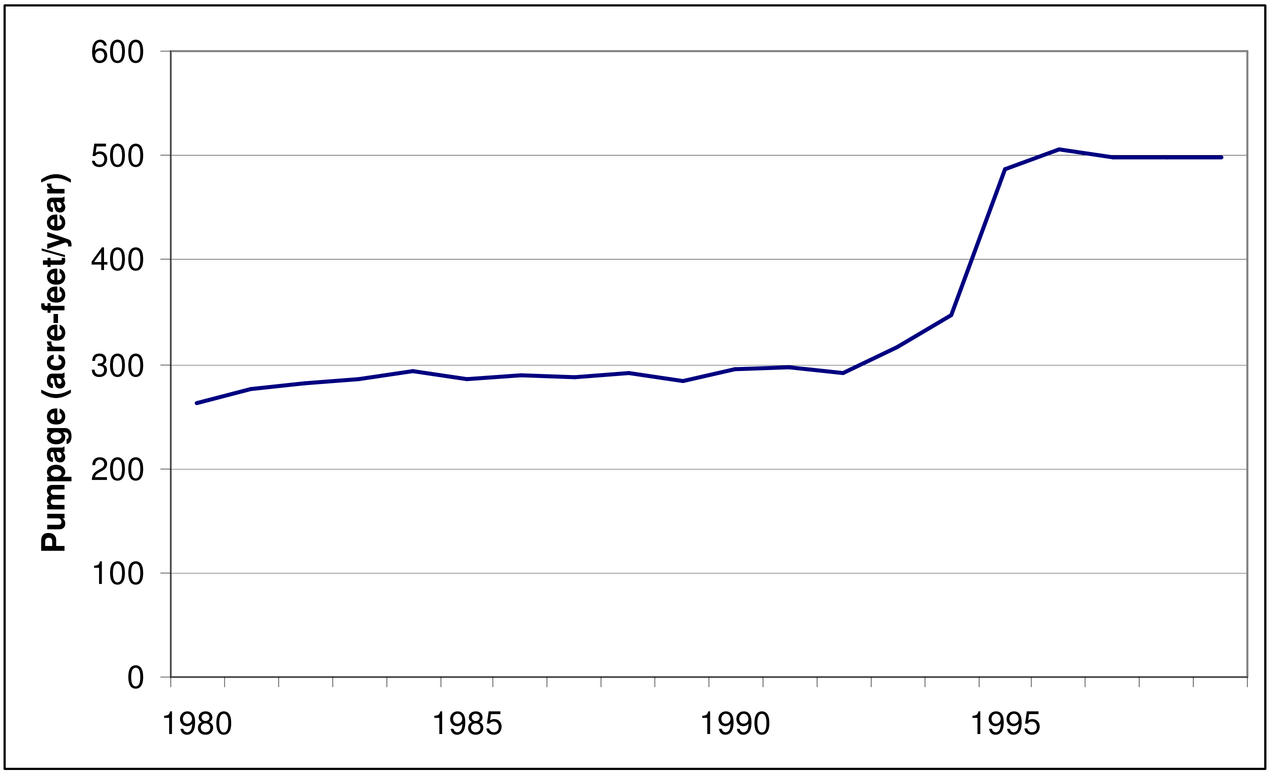


Figure A-33- Pumpage in Montague County included in the groundwater availability model for the northern part of the Trinity Aquifer.

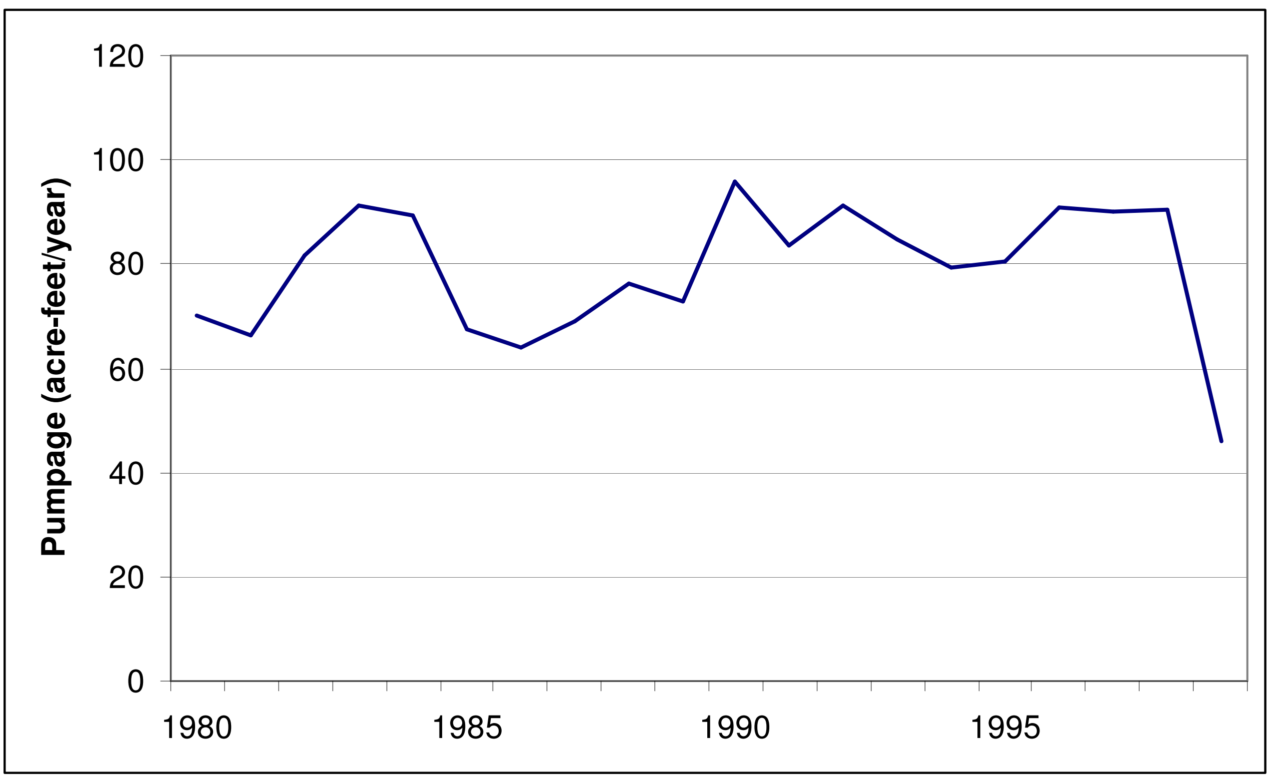


Figure A-34- Pumpage in Navarro County included in the groundwater availability model for the northern part of the Trinity Aquifer.

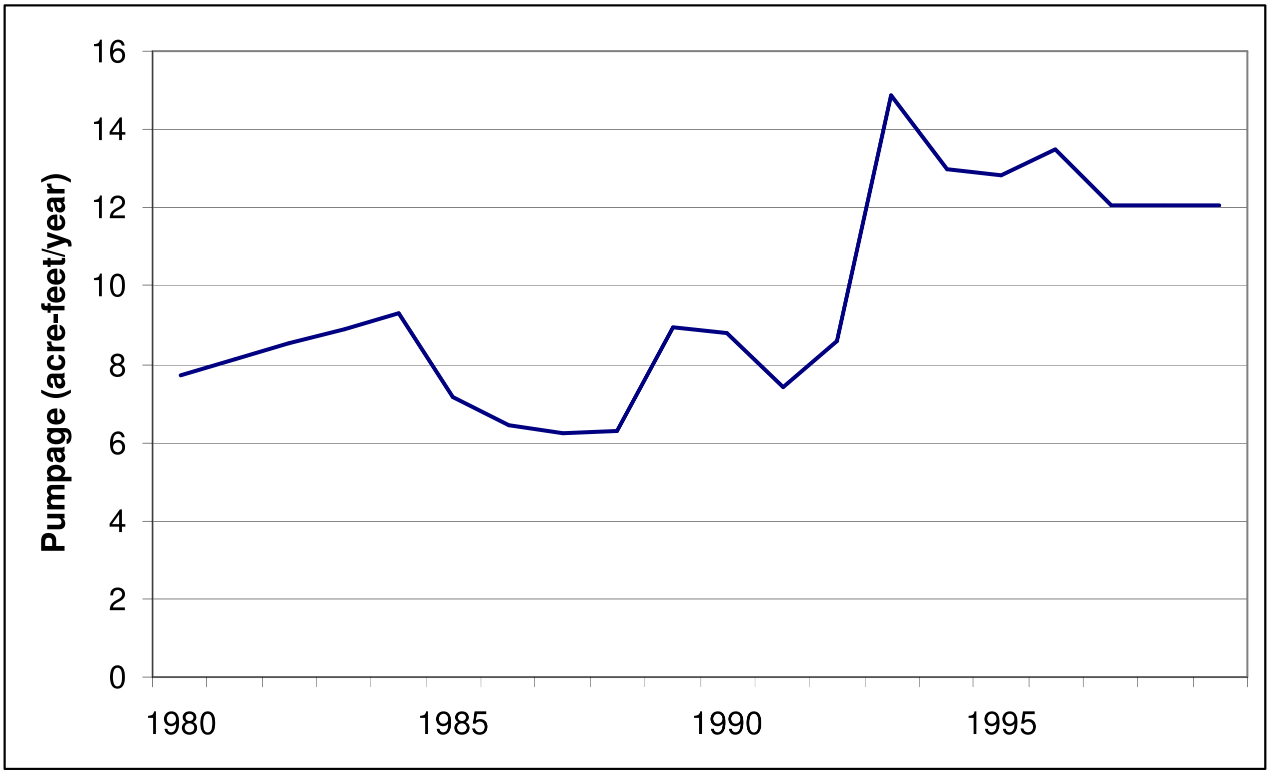


Figure A-35- Pumpage in Palo Pinto County included in the groundwater availability model for the northern part of the Trinity Aquifer.

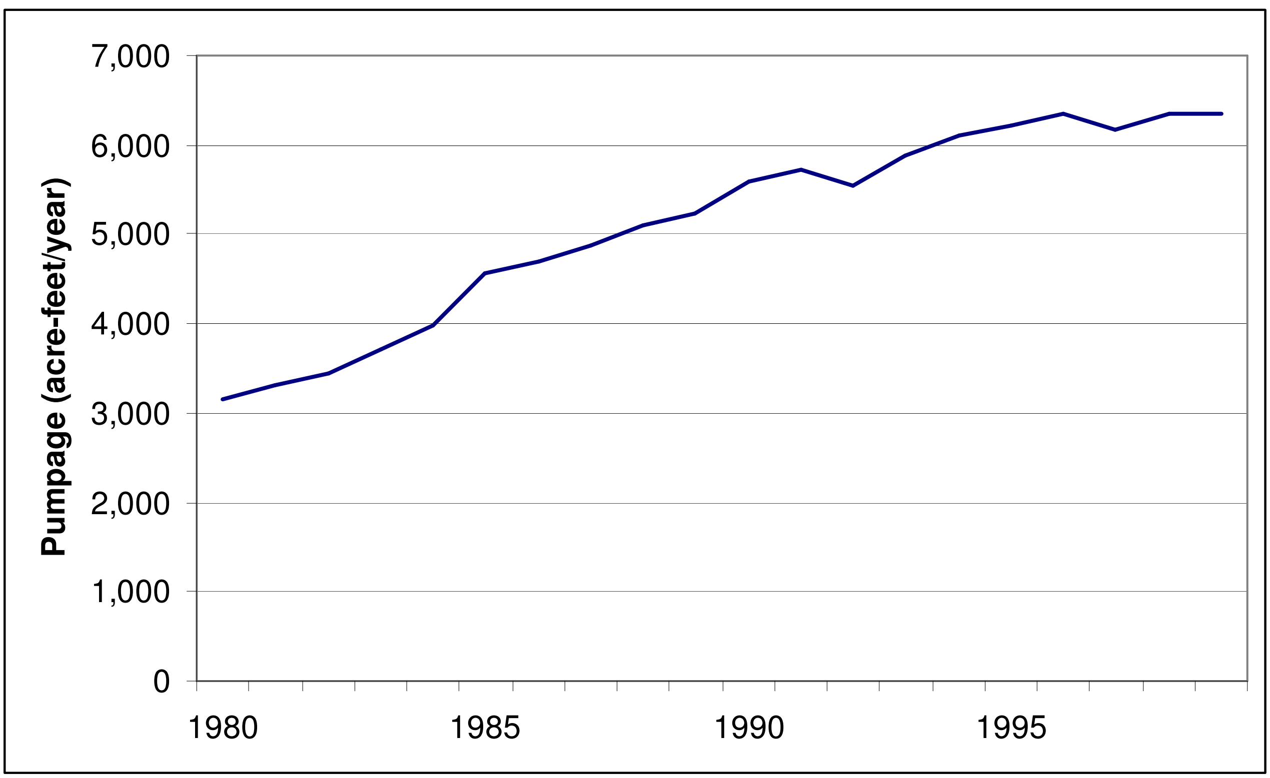


Figure A-36- Pumpage in Parker County included in the groundwater availability model for the northern part of the Trinity Aquifer.

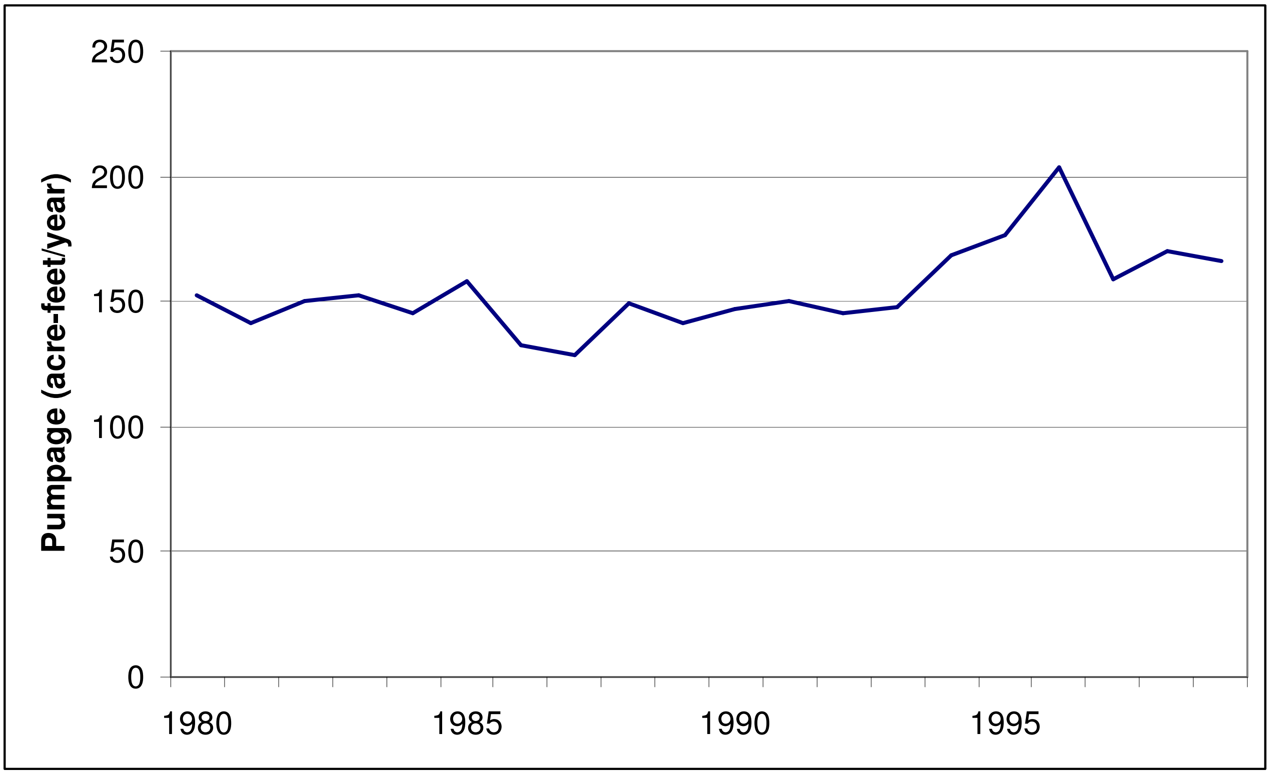


Figure A-37- Pumpage in Red River County included in the groundwater availability model for the northern part of the Trinity Aquifer.

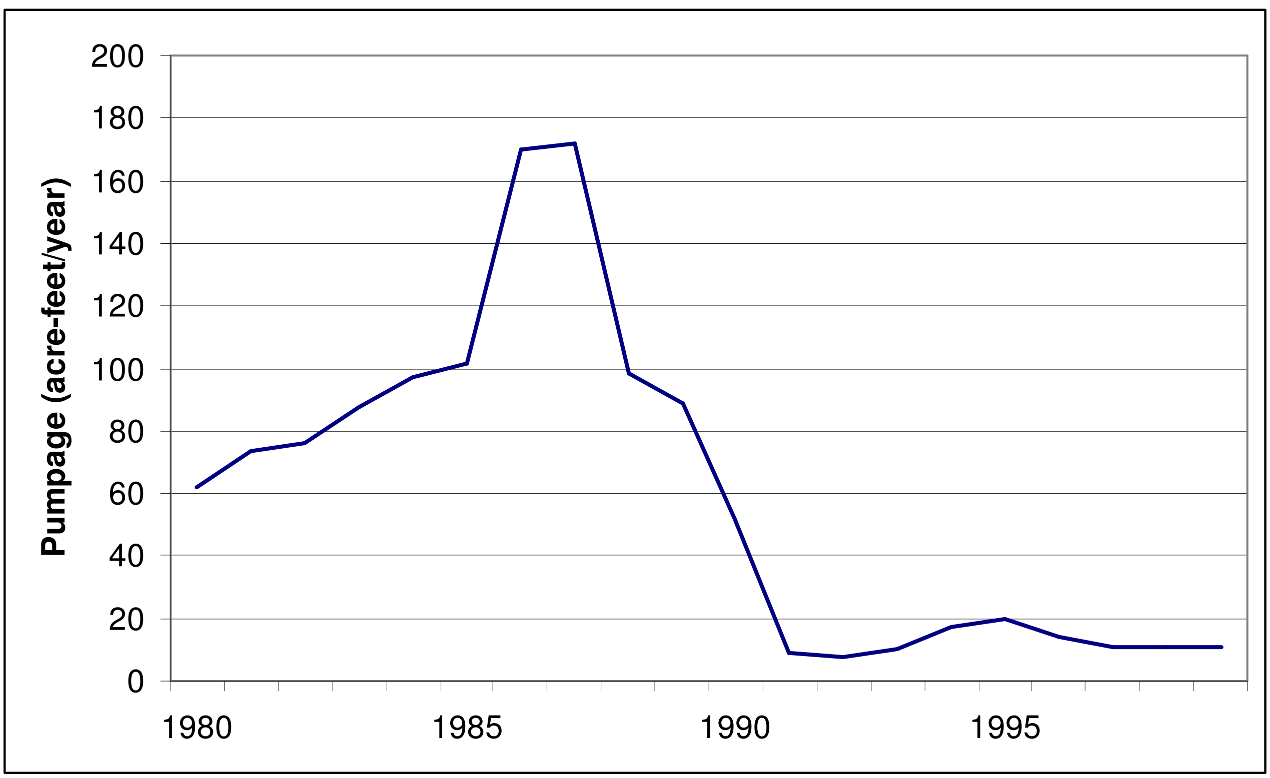


Figure A-38- Pumpage in Rockwall County included in the groundwater availability model for the northern part of the Trinity Aquifer.

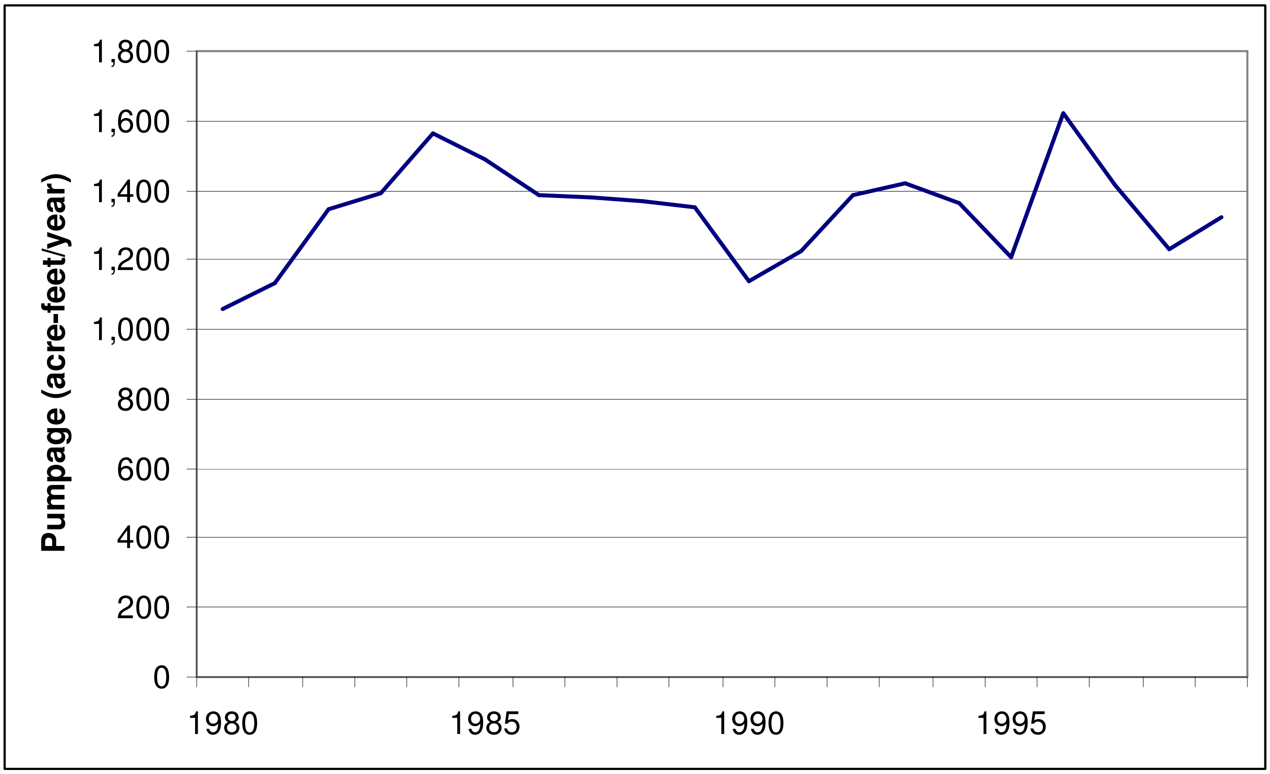


Figure A-39- Pumpage in Somervell County included in the groundwater availability model for the northern part of the Trinity Aquifer.

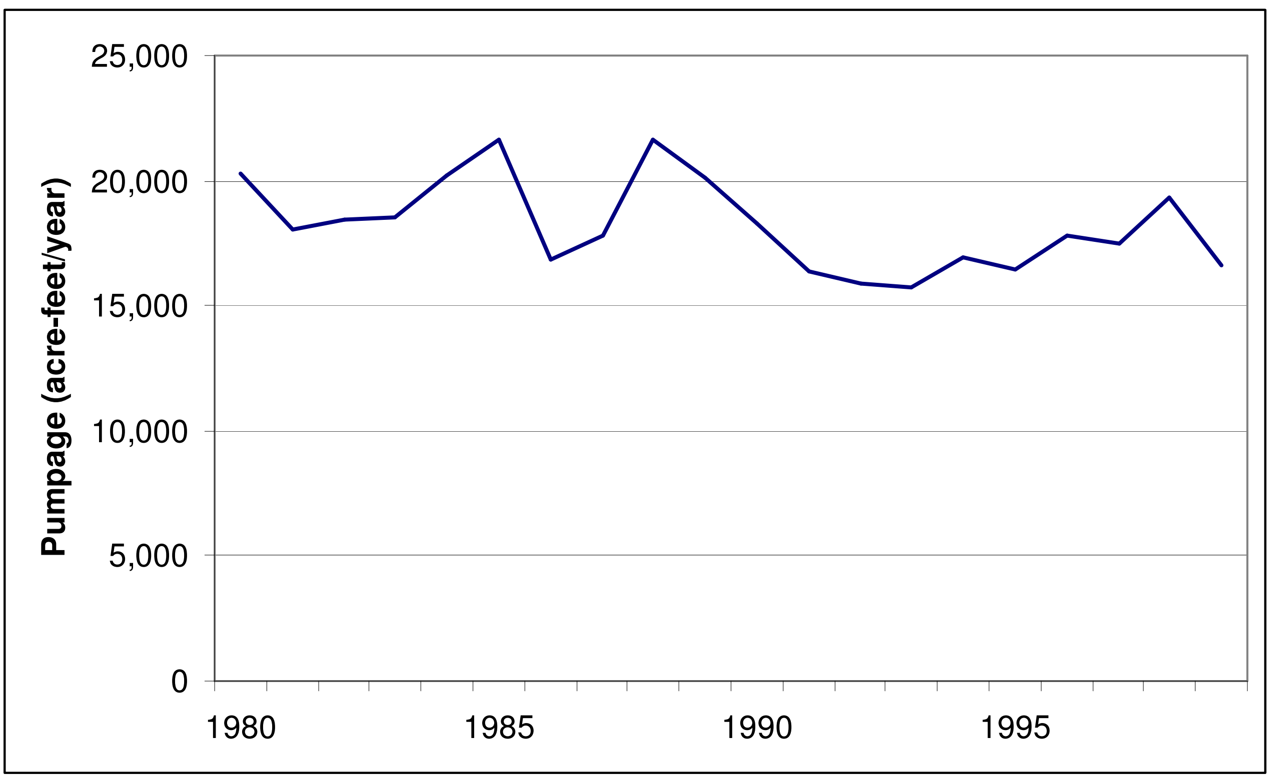


Figure A-40- Pumpage in Tarrant County included in the groundwater availability model for the northern part of the Trinity Aquifer.

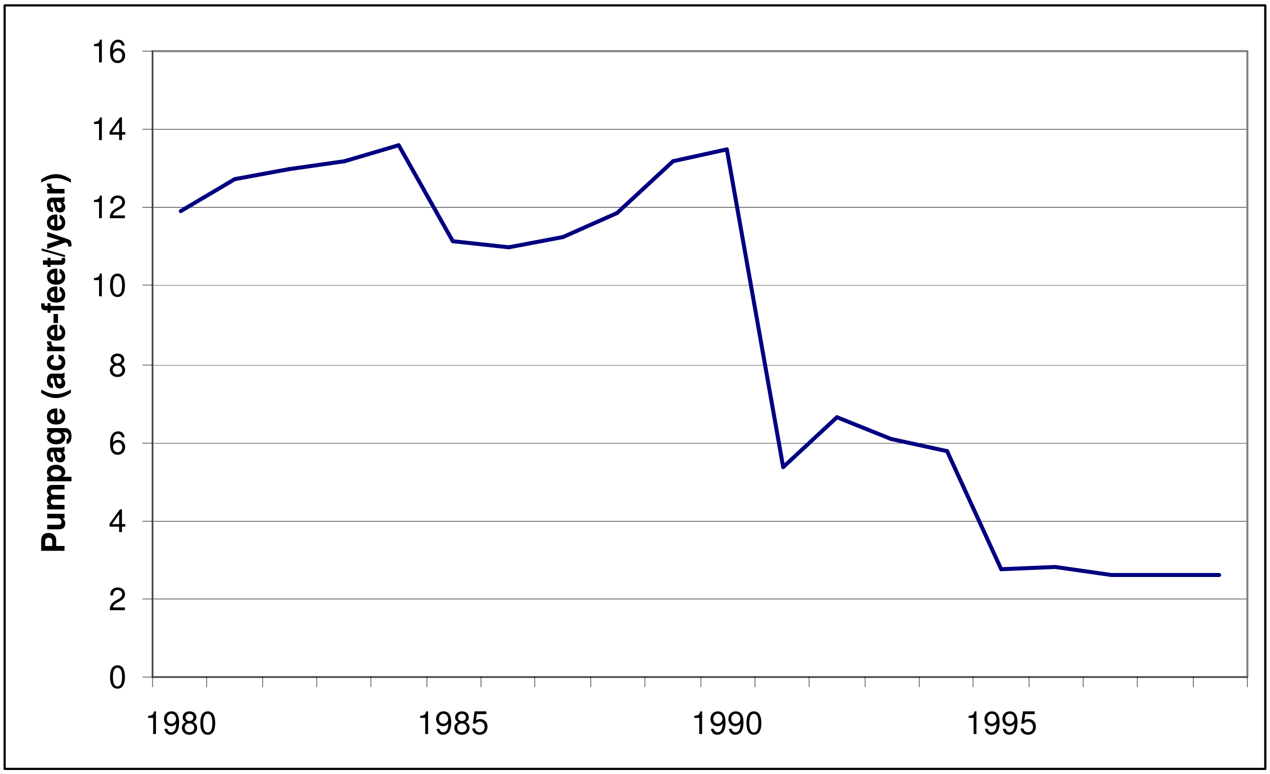


Figure A-41- Pumpage in Taylor County included in the groundwater availability model for the northern part of the Trinity Aquifer.

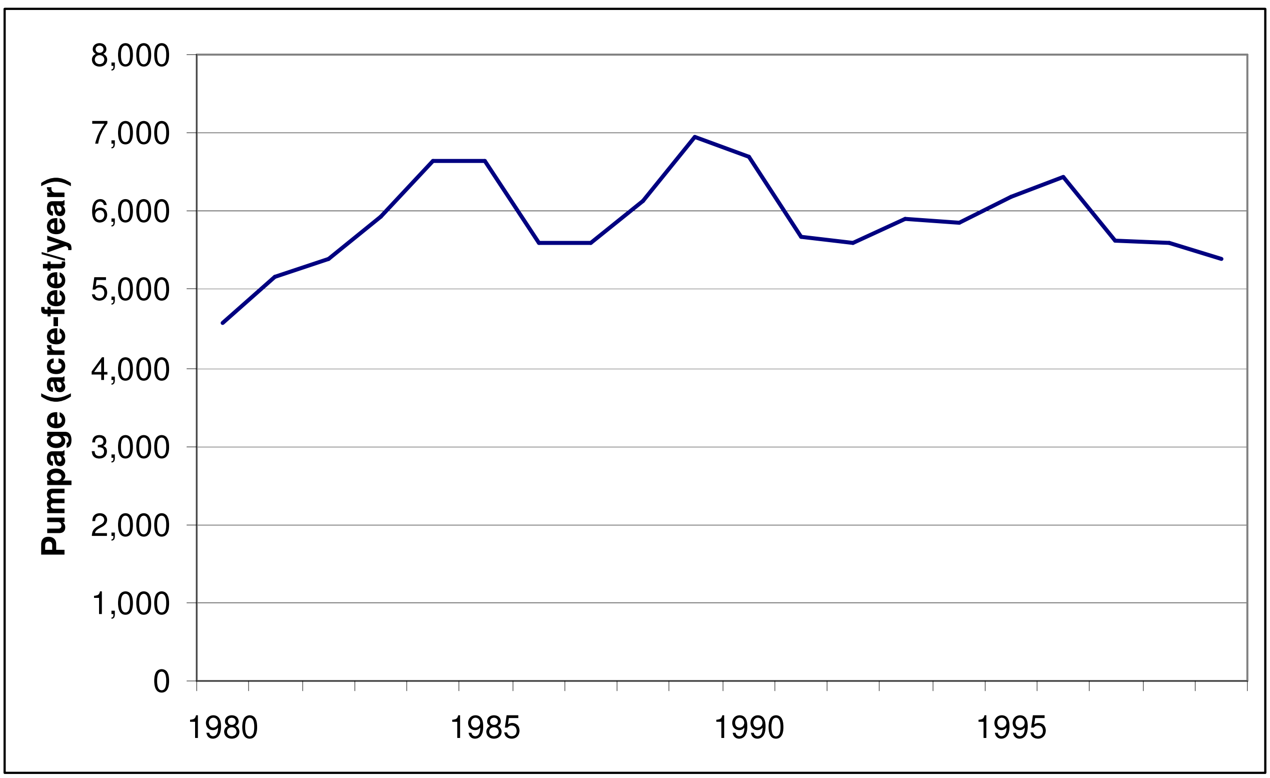


Figure A-42- Pumpage in Travis County included in the groundwater availability model for the northern part of the Trinity Aquifer.

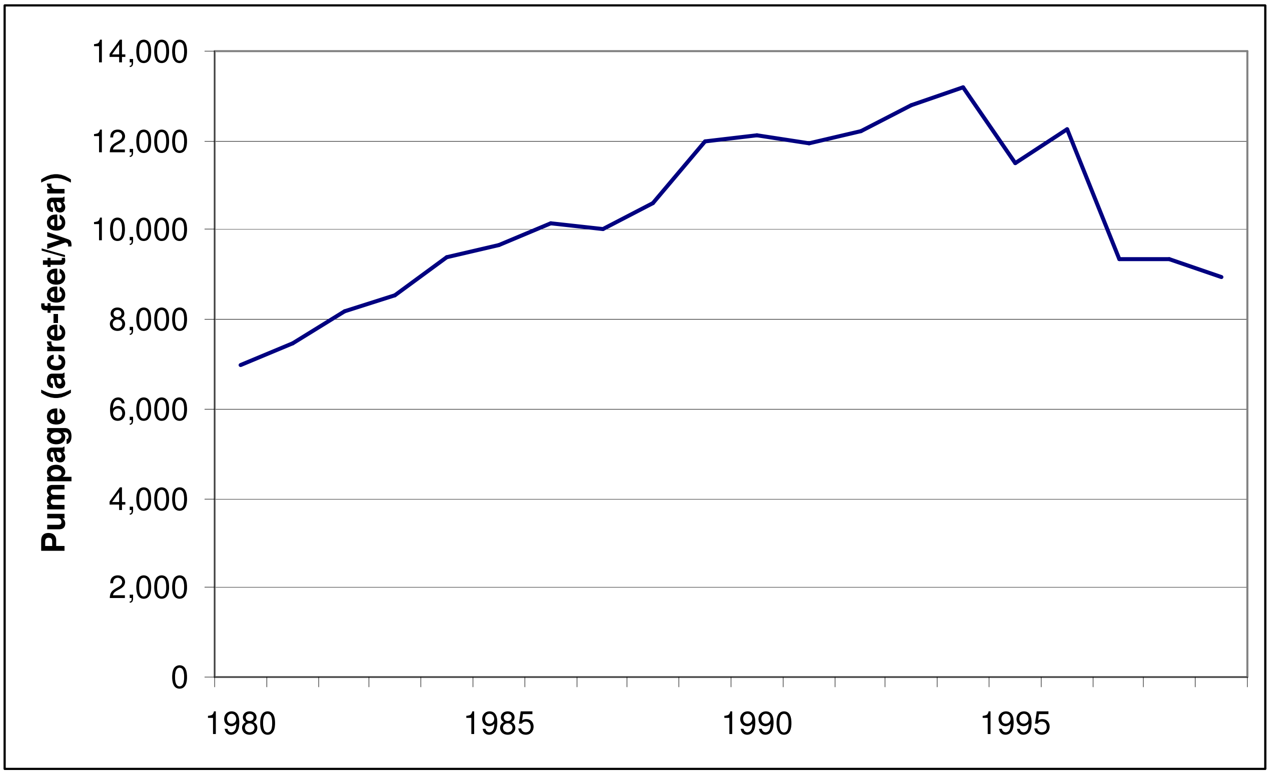


Figure A-43- Pumpage in Williamson County included in the groundwater availability model for the northern part of the Trinity Aquifer.

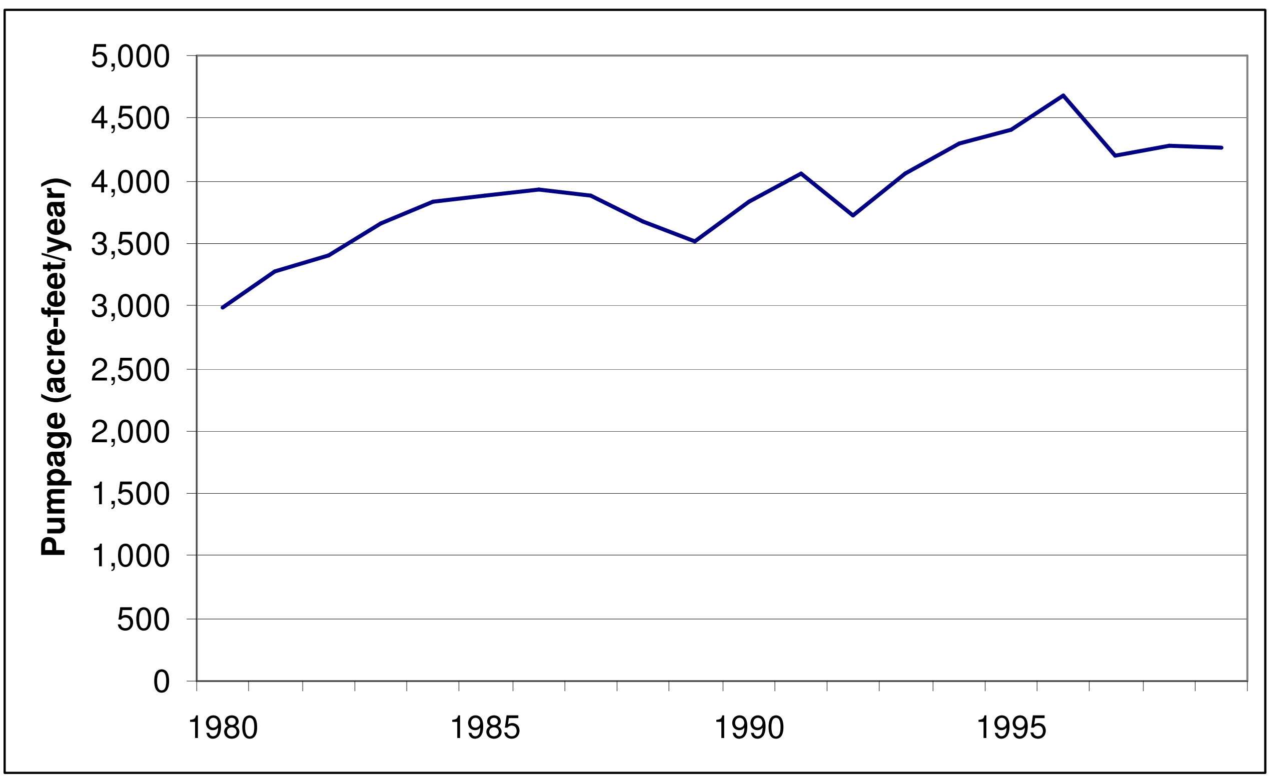


Figure A-44- Pumpage in Wise County included in the groundwater availability model for the northern part of the Trinity Aquifer.

Appendix B

Summary of Budgets After 50 Years

Table B-1. Annual water budgets for each county at the end of the 50-year predictive portion of the model run using the requested baseline pumpage in the groundwater availability model for the northern part of the Trinity Aquifer (in acre-feet per year).

	Non-Texas		Bastrop		Bell		Bosque		Bowie		Brown	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	13,183	0	55	0	28	0	--	--	37	0	--	--
Reservoirs (River Package)	0	0	0	0	0	0	--	--	0	0	--	--
Inter-aquifer Flow (GHB Package)	16	7	2	0	11	2	--	--	2	1	--	--
Wells	0	10	0	0	0	0	--	--	0	0	--	--
Rivers and Streams (Stream Package)	31	5,072	0	0	3	10	--	--	0	0	--	--
Recharge	63,981	0	0	0	0	0	--	--	0	0	--	--
Evapotranspiration	0	71,070	0	0	0	0	--	--	0	0	--	--
Lateral Inflow	658	1,429	0	2	2	5	--	--	9	50	--	--
Vertical Leakage Downward	17	294	0	55	2	28	--	--	8	4	--	--
Paluxy Aquifer (Layer 3)												
Storage	13,034	2	85	0	184	24	1,429	3	36	0	176	0
Reservoirs (River Package)	6	1	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	2	11	0	0	0	0	0	0	0	0	0	0
Wells	0	2,628	0	0	0	95	0	1,003	0	0	0	18
Rivers and Streams (Stream Package)	0	1,066	0	0	0	0	0	492	0	0	0	0
Recharge	44,478	0	0	0	61	0	3,699	0	0	0	3,805	0
Evapotranspiration	0	50,011	0	0	0	0	0	3,332	0	0	0	3,650
Vertical Leakage Upward	885	21	0	16	184	14	360	10	17	0	12	0
Lateral Inflow	1,465	4,027	1	3	49	22	474	625	23	92	22	107
Vertical Leakage Downward	540	2,642	0	67	0	323	0	496	15	0	2	242
Glen Rose Formation (Layer 4)												
Storage	401	0	60	0	2,491	0	1,653	0	28	0	120	0
Reservoirs (River Package)	0	0	0	0	15	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	1	0	880	0	258	0	0	0	0
Rivers and Streams (Stream Package)	0	0	0	0	275	995	64	323	0	0	0	0
Recharge	0	0	0	0	2,173	0	677	0	0	0	1,937	0
Evapotranspiration	0	0	0	0	0	2,907	0	403	0	0	0	1,909
Vertical Leakage Upward	2,642	540	67	0	323	0	496	0	0	15	242	2
Lateral Inflow	83	231	42	198	1,281	555	910	760	14	31	19	106
Vertical Leakage Downward	279	2,633	30	0	0	1,221	0	2,056	5	1	0	301

Table B-1. (continued)

	Non-Texas		Bastrop		Bell		Bosque		Bowie		Brown	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	13,709	0	68	0	148	0	154	0	33	0	855	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	3,007	0	0	0	1,100	0	1,742	0	0	0	79
Rivers and Streams (Stream Package)	0	339	0	0	0	0	0	0	0	0	0	0
Recharge	42,571	0	0	0	0	0	0	0	0	0	3,747	0
Evapotranspiration	0	49,641	0	0	0	0	0	0	0	0	0	3,131
Vertical Leakage Upward	2,633	279	0	30	1,221	0	2,056	0	1	5	301	0
Lateral Inflow	2,191	5,358	0	3	3,252	1,699	7,349	5,589	130	153	67	483
Vertical Leakage Downward	1,421	3,901	5	42	0	1,822	2	2,230	0	6	0	1,276
Pearsall/Cow Creek/Sligo (Layer)												
Storage	469	2	53	0	122	0	48	0	26	0	47	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0	0	0	0	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	0
Vertical Leakage Upward	3,901	1,421	42	5	1,822	0	2,230	2	6	0	1,276	0
Lateral Inflow	6	12	0	1	12	6	7	7	0	0	0	1
Vertical Leakage Downward	1,340	4,281	1	90	0	1,949	1	2,277	0	32	0	1,323
Hosston Aquifer (Layer 7)												
Storage	16,226	214	60	0	156	0	153	0	32	0	457	3
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	3,554	0	0	0	5,000	0	2,820	0	0	0	1,957
Rivers and Streams (Stream Package)	0	274	0	0	0	0	0	0	0	0	0	0
Recharge	47,088	0	0	0	0	0	0	0	0	0	3,457	0
Evapotranspiration	0	56,715	0	0	0	0	0	0	0	0	0	2,867
Vertical Leakage Upward	4,281	1,340	90	1	1,949	0	2,277	1	32	0	1,323	0
Lateral Inflow	2,444	7,943	586	735	6,106	3,212	4,078	3,688	481	545	164	572

Table B-1. (continued)

	Burnet		Callahan		Collin		Comanche		Cooke		Coryell	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	--	--	--	--	396	0	--	--	2,085	0	--	--
Reservoirs (River Package)	--	--	--	--	0	0	--	--	6	0	--	--
Inter-aquifer Flow (GHB Package)	--	--	--	--	124	0	--	--	0	0	--	--
Wells	--	--	--	--	0	2,500	--	--	0	154	--	--
Rivers and Streams (Stream Package)	--	--	--	--	0	0	--	--	0	0	--	--
Recharge	--	--	--	--	0	0	--	--	8,198	0	--	--
Evapotranspiration	--	--	--	--	0	0	--	--	0	9,830	--	--
Lateral Inflow	--	--	--	--	3,732	1,863	--	--	139	438	--	--
Vertical Leakage Downward	--	--	--	--	111	0	--	--	0	7	--	--
Paluxy Aquifer (Layer 3)												
Storage	446	0	--	--	118	0	201	0	6,608	0	626	7
Reservoirs (River Package)	0	0	--	--	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	--	--	0	0	0	0	0	0	0	0
Wells	0	182	--	--	0	1,758	0	12	0	3,532	0	143
Rivers and Streams (Stream Package)	0	31	--	--	0	0	0	0	84	842	0	267
Recharge	5,170	0	--	--	0	0	5,356	0	4,407	0	5,690	0
Evapotranspiration	0	5,306	--	--	0	0	0	5,420	0	3,981	0	5,804
Vertical Leakage Upward	31	4	--	--	226	0	23	0	307	3	220	9
Lateral Inflow	2	6	--	--	2,041	965	167	70	1,756	3,350	211	242
Vertical Leakage Downward	2	122	--	--	337	0	1	245	20	1,475	2	277
Glen Rose Formation (Layer 4)												
Storage	2,834	23	--	--	112	0	469	2	35	0	5,581	0
Reservoirs (River Package)	0	0	--	--	0	0	0	0	0	0	6	0
Inter-aquifer Flow (GHB Package)	0	0	--	--	0	0	0	0	0	0	0	0
Wells	0	200	--	--	0	0	0	0	0	0	0	372
Rivers and Streams (Stream Package)	167	735	--	--	0	0	0	5	0	0	398	739
Recharge	8,779	0	--	--	0	0	8,491	0	0	0	8,029	0
Evapotranspiration	0	8,985	--	--	0	0	0	8,568	0	0	0	10,859
Vertical Leakage Upward	122	2	--	--	0	337	245	1	1,475	20	277	2
Lateral Inflow	268	1,268	--	--	139	55	304	249	44	100	977	1,017
Vertical Leakage Downward	0	957	--	--	148	7	0	683	10	1,443	0	2,279

Table B-1. (continued)

	Burnet		Callahan		Collin		Comanche		Cooke		Coryell	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	3,505	1	119	0	130	0	4,429	0	4,022	0	664	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	686	0	124	0	102	0	273	0	1,616	0	836
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	241	139	177	0	0
Recharge	1,316	0	661	0	0	0	13,384	0	452	0	0	0
Evapotranspiration	0	1,565	0	503	0	0	0	13,031	0	508	0	0
Vertical Leakage Upward	957	0	--	--	7	148	683	0	1,443	10	2,279	0
Lateral Inflow	249	2,365	13	112	1,762	1,309	958	1,494	3,516	5,384	4,288	4,747
Vertical Leakage Downward	29	1,441	0	53	0	339	15	4,429	1	1,879	0	1,647
Pearsall/Cow Creek/Sligo (Layer)												
Storage	763	0	0	0	106	0	181	58	68	0	45	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0	0	0	0	0	8
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	0
Vertical Leakage Upward	1,441	29	53	0	339	0	4,429	15	1,879	1	1,647	0
Lateral Inflow	1	7	0	0	6	6	1	2	9	8	6	9
Vertical Leakage Downward	29	2,198	0	53	0	445	14	4,552	0	1,947	0	1,681
Hosston Aquifer (Layer 7)												
Storage	2,857	3	3,950	1	131	0	11,188	21	235	0	60	0
Reservoirs (River Package)	0	0	0	0	0	0	19	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	35	0	0	0	0	0	0	0	0	0	0
Wells	0	2,485	0	3,663	0	239	0	21,589	0	1,715	0	433
Rivers and Streams (Stream Package)	0	0	0	27	0	0	44	35	0	330	0	0
Recharge	1,010	0	9,425	0	0	0	10,209	0	280	0	0	0
Evapotranspiration	0	746	0	9,614	0	0	0	4,331	0	425	0	0
Vertical Leakage Upward	2,198	29	53	0	445	0	4,552	14	1,947	0	1,681	0
Lateral Inflow	639	3,406	336	458	3,548	3,885	1,059	1,080	5,034	5,024	3,802	5,110

Table B-1. (continued)

	Dallas		Delta		Denton		Eastland		Ellis		Erath	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	1,200	0	12	0	4,900	0	--	--	2,846	0	--	--
Reservoirs (River Package)	0	0	0	0	108	79	--	--	0	0	--	--
Inter-aquifer Flow (GHB Package)	126	0	12	0	32	0	--	--	150	0	--	--
Wells	0	2,316	0	0	0	4,132	--	--	0	5,444	--	--
Rivers and Streams (Stream Package)	5	0	0	0	22	351	--	--	0	0	--	--
Recharge	50	0	0	0	12,383	0	--	--	0	0	--	--
Evapotranspiration	0	0	0	0	0	11,121	--	--	0	0	--	--
Lateral Inflow	3,570	2,700	632	694	477	2,213	--	--	3,201	884	--	--
Vertical Leakage Downward	71	5	37	0	1	27	--	--	132	2	--	--
Paluxy Aquifer (Layer 3)												
Storage	138	0	35	0	7,884	0	35	0	193	0	4,207	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	467	0	0	0	9,804	0	4	0	400	0	3,981
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	239	0	0	0	12,377	0
Evapotranspiration	0	0	0	0	0	0	0	253	0	0	0	12,241
Vertical Leakage Upward	243	0	7	0	402	0	--	--	229	0	39	0
Lateral Inflow	1,262	1,078	636	694	3,894	1,505	7	18	423	350	54	79
Vertical Leakage Downward	34	131	16	0	56	927	0	5	2	98	0	375
Glen Rose Formation (Layer 4)												
Storage	136	0	30	0	46	0	63	0	179	0	3,334	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0	0	0	0	0	1
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	10	732
Recharge	0	0	0	0	0	0	246	0	0	0	10,850	0
Evapotranspiration	0	0	0	0	0	0	0	197	0	0	0	12,132
Vertical Leakage Upward	131	34	0	16	927	56	5	0	98	2	375	0
Lateral Inflow	184	15	114	116	157	76	23	114	216	30	548	618
Vertical Leakage Downward	1	402	0	12	28	1,025	0	26	0	460	1	1,636

Table B-1. (continued)

	Dallas		Delta		Denton		Eastland		Ellis		Erath	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	164	0	33	0	74	0	392	0	209	0	17,440	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	1,121	0	0	0	3,110	0	79	0	1,142	0	8,693
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	127	419
Recharge	0	0	0	0	0	0	2,574	0	0	0	4,189	0
Evapotranspiration	0	0	0	0	0	0	0	2,525	0	0	0	3,050
Vertical Leakage Upward	402	1	12	0	1,025	28	26	0	460	0	1,636	1
Lateral Inflow	1,992	605	672	676	5,422	1,583	160	126	1,887	398	1,099	4,179
Vertical Leakage Downward	0	831	0	41	0	1,800	6	427	0	1,016	0	8,150
Pearsall/Cow Creek/Sligo (Layer)												
Storage	133	0	26	0	63	0	9	7	170	0	193	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0	0	0	0	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	0
Vertical Leakage Upward	831	0	41	0	1,800	0	427	6	1,016	0	8,150	0
Lateral Inflow	8	5	3	4	13	5	0	0	10	2	1	3
Vertical Leakage Downward	0	968	0	67	0	1,871	6	429	0	1,193	0	8,341
Hosston Aquifer (Layer 7)												
Storage	165	0	31	0	81	0	2,597	48	209	0	7,600	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	3,903	0	0	0	6,395	0	4,630	0	2,417	0	15,015
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	13	0	0	0	0
Recharge	0	0	0	0	0	0	11,485	0	0	0	491	0
Evapotranspiration	0	0	0	0	0	0	0	9,853	0	0	0	244
Vertical Leakage Upward	968	0	67	0	1,871	0	429	6	1,193	0	8,341	0
Lateral Inflow	4,452	1,682	2,742	2,840	6,042	1,599	473	435	2,270	1,256	1,152	2,325

Table B-1. (continued)

	Falls		Fannin		Franklin		Grayson		Hamilton		Henderson	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	54	0	3,788	0	1	0	11,906	0	--	--	2	0
Reservoirs (River Package)	0	0	0	0	0	0	9	4	--	--	0	0
Inter-aquifer Flow (GHB Package)	0	11	115	0	0	0	118	0	--	--	2	0
Wells	0	0	0	3,300	0	0	0	12,100	--	--	0	0
Rivers and Streams (Stream Package)	0	0	285	477	0	0	0	0	--	--	0	0
Recharge	0	0	2,760	0	0	0	14,251	0	--	--	0	0
Evapotranspiration	0	0	0	1,703	0	0	0	14,198	--	--	0	0
Lateral Inflow	7	12	2,057	3,625	108	112	1,812	1,821	--	--	61	70
Vertical Leakage Downward	0	38	107	8	2	0	58	30	--	--	6	0
Paluxy Aquifer (Layer 3)												
Storage	217	0	104	0	3	0	1,937	0	1,048	5	13	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	288	0	0	0	4,709	0	291	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	353	0	0
Recharge	0	0	0	0	0	0	0	0	9,280	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	9,397	0	0
Vertical Leakage Upward	95	0	132	0	0	0	360	0	145	0	4	0
Lateral Inflow	3	7	1,281	1,351	59	62	3,571	1,340	104	231	17	31
Vertical Leakage Downward	0	309	124	3	1	0	341	159	0	300	0	3
Glen Rose Formation (Layer 4)												
Storage	165	0	92	0	2	0	156	0	3,626	7	11	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	2	0	0	0	0	0	0	0	46	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	286	1,089	0	0
Recharge	0	0	0	0	0	0	0	0	7,642	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	8,629	0	0
Vertical Leakage Upward	309	0	3	124	0	1	159	341	300	0	3	0
Lateral Inflow	134	143	119	118	20	21	151	73	569	1,010	5	9
Vertical Leakage Downward	0	463	46	18	0	0	164	216	0	1,644	0	10

Table B-1. (continued)

	Falls		Fannin		Franklin		Grayson		Hamilton		Henderson	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	180	0	104	0	2	0	471	0	2,778	0	12	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	21	0	203	0	0	0	2,345	0	1,110	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	6	0	0
Recharge	0	0	0	0	0	0	0	0	52	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	91	0	0
Vertical Leakage Upward	463	0	18	46	0	0	216	164	1,644	0	10	0
Lateral Inflow	476	454	1,258	1,063	84	84	4,107	2,018	3,348	4,599	76	85
Vertical Leakage Downward	0	644	24	92	0	3	49	316	16	2,032	0	13
Pearsall/Cow Creek/Sligo (Layer)												
Storage	141	0	84	0	2	0	67	0	7	0	9	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0	0	0	0	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	0
Vertical Leakage Upward	644	0	92	24	3	0	316	49	2,032	16	13	0
Lateral Inflow	5	7	4	4	0	0	5	3	3	4	0	1
Vertical Leakage Downward	0	782	9	161	0	4	25	360	16	2,037	0	22
Hosston Aquifer (Layer 7)												
Storage	160	0	103	0	2	0	86	0	10	0	11	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	138	0	209	0	0	0	2,346	0	699	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	0
Vertical Leakage Upward	782	0	161	9	4	0	360	25	2,037	16	22	0
Lateral Inflow	3,665	4,469	2,340	2,385	350	357	4,929	3,004	1,822	3,155	447	480

Table B-1. (continued)

	Hill		Hood		Hopkins		Hunt		Jack		Johnson	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	1,991	4	--	--	3	0	27	0	--	--	2,798	606
Reservoirs (River Package)	32	1	--	--	0	0	0	0	--	--	0	0
Inter-aquifer Flow (GHB Package)	105	0	--	--	2	0	53	0	--	--	18	0
Wells	0	2,263	--	--	0	0	0	2,840	--	--	0	4,735
Rivers and Streams (Stream Package)	0	272	--	--	0	0	0	0	--	--	0	10
Recharge	7,239	0	--	--	0	0	0	0	--	--	13,031	0
Evapotranspiration	0	6,777	--	--	0	0	0	0	--	--	0	9,247
Lateral Inflow	428	540	--	--	308	319	2,759	125	--	--	114	1,337
Vertical Leakage Downward	72	11	--	--	7	0	126	0	--	--	0	25
Paluxy Aquifer (Layer 3)												
Storage	970	0	732	2	7	0	118	0	26	0	8,769	1
Reservoirs (River Package)	0	0	1	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	1,254	0	933	0	0	0	551	0	3	0	9,493
Rivers and Streams (Stream Package)	0	0	2	501	0	0	0	0	0	0	0	94
Recharge	0	0	5,830	0	0	0	0	0	208	0	79	0
Evapotranspiration	0	0	0	4,819	0	0	0	0	0	241	0	1
Vertical Leakage Upward	324	0	18	0	1	0	71	0	--	--	329	1
Lateral Inflow	658	477	138	383	246	257	1,082	840	12	0	1,236	566
Vertical Leakage Downward	0	220	0	83	3	0	121	0	0	3	11	269
Glen Rose Formation (Layer 4)												
Storage	411	0	1,429	2	6	0	107	0	29	0	438	0
Reservoirs (River Package)	0	0	33	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	10	0	4	0	0	0	0	0	0	0	24
Rivers and Streams (Stream Package)	0	0	303	1,541	0	0	0	0	0	0	0	0
Recharge	0	0	10,680	0	0	0	0	0	467	0	0	0
Evapotranspiration	0	0	0	9,573	0	0	0	0	0	450	0	0
Vertical Leakage Upward	220	0	83	0	0	3	0	121	3	0	269	11
Lateral Inflow	408	272	311	893	52	54	103	108	10	28	726	321
Vertical Leakage Downward	0	757	1	827	0	2	22	3	0	32	0	1,078

Table B-1. (continued)

	Hill		Hood		Hopkins		Hunt		Jack		Johnson	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	174	0	6,986	0	7	0	114	0	202	0	284	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	933	0	3,568	0	0	0	0	0	1	0	1,064
Rivers and Streams (Stream Package)	0	0	107	440	0	0	0	0	0	0	0	0
Recharge	0	0	2,167	0	0	0	0	0	684	0	0	0
Evapotranspiration	0	0	0	1,117	0	0	0	0	0	806	0	0
Vertical Leakage Upward	757	0	827	1	2	0	3	22	32	0	1,078	0
Lateral Inflow	3,341	2,159	1,640	3,026	257	257	657	662	6	50	4,359	3,136
Vertical Leakage Downward	0	1,181	0	3,575	0	8	0	89	0	67	19	1,539
Pearsall/Cow Creek/Sligo (Layer)												
Storage	143	0	24	0	5	0	91	0	2	0	48	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0	0	0	0	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	0
Vertical Leakage Upward	1,181	0	--	--	8	0	89	0	67	0	1,539	19
Lateral Inflow	5	6	2	3	1	1	5	5	0	1	6	9
Vertical Leakage Downward	0	1,323	0	3,599	0	14	0	180	0	69	17	1,582
Hosston Aquifer (Layer 7)												
Storage	179	0	2,445	0	6	0	107	0	295	0	62	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	951	0	6,559	0	0	0	0	0	7	0	2,289
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	132	0	0	0	0	0	1,014	0	0	0
Evapotranspiration	0	0	0	149	0	0	0	0	0	1,310	0	0
Vertical Leakage Upward	1,323	0	3,599	0	14	0	180	0	69	0	1,582	17
Lateral Inflow	1,933	2,484	1,821	1,289	1,177	1,197	2,547	2,835	104	163	1,885	1,223

Table B-1. (continued)

	Kaufman		Lamar		Lampasas		Lee		Limestone		McLennan	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	24	0	3,320	0	--	--	21	0	42	0	98	0
Reservoirs (River Package)	0	0	0	0	--	--	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	31	0	104	0	--	--	0	0	16	0	31	3
Wells	0	200	0	3,658	--	--	0	0	0	33	0	4
Rivers and Streams (Stream Package)	0	0	8	1,064	--	--	0	0	0	0	0	29
Recharge	0	0	2,657	0	--	--	0	0	0	0	673	0
Evapotranspiration	0	0	0	2,158	--	--	0	0	0	0	0	697
Lateral Inflow	538	469	1,557	910	--	--	1	3	33	86	64	129
Vertical Leakage Downward	76	0	147	3	--	--	0	19	31	3	11	15
Paluxy Aquifer (Layer 3)												
Storage	152	0	91	0	975	0	37	0	136	0	180	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	13	0	0	0	0	0	170
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	4,434	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	5,185	0	0	0	0	0	0
Vertical Leakage Upward	74	0	34	0	26	1	0	6	40	0	293	0
Lateral Inflow	80	309	745	879	24	115	1	2	7	30	237	89
Vertical Leakage Downward	12	9	25	16	0	143	0	29	0	153	0	451
Glen Rose Formation (Layer 4)												
Storage	138	0	79	0	3,375	0	27	0	100	0	441	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	779	0	1	0	4	0	195
Rivers and Streams (Stream Package)	0	0	0	0	69	1,548	0	0	0	0	0	0
Recharge	0	0	0	0	9,528	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	9,692	0	0	0	0	0	0
Vertical Leakage Upward	9	12	16	25	143	0	29	0	153	0	451	0
Lateral Inflow	31	77	116	105	270	423	15	62	48	77	613	112
Vertical Leakage Downward	0	88	0	81	11	954	0	8	0	220	0	1,198

Table B-1. (continued)

	Kaufman		Lamar		Lampasas		Lee		Limestone		McLennan	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	147	0	88	0	2,546	1	30	0	104	0	194	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	660	0	889	0	0	0	14	0	3,085
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	471	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	474	0	0	0	0	0	0
Vertical Leakage Upward	88	0	81	0	954	11	8	0	220	0	1,198	0
Lateral Inflow	327	434	1,360	773	1,107	2,292	3	18	89	220	4,690	481
Vertical Leakage Downward	0	128	16	111	6	1,417	0	23	0	180	0	2,517
Pearsall/Cow Creek/Sligo (Layer)												
Storage	116	0	70	0	132	0	23	0	82	0	158	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	0	0	11	0	0	0	0	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	0
Vertical Leakage Upward	128	0	111	16	1,417	6	23	0	180	0	2,517	0
Lateral Inflow	3	3	3	3	2	4	1	1	1	3	16	1
Vertical Leakage Downward	0	244	8	174	6	1,536	0	45	0	261	0	2,690
Hosston Aquifer (Layer 7)												
Storage	134	0	86	0	1,157	0	25	0	94	0	197	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	0	0	660	0	1,454	0	0	0	48	0	11,780
Rivers and Streams (Stream Package)	0	0	0	0	114	0	0	0	0	0	0	0
Recharge	0	0	0	0	1,984	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	1,935	0	0	0	0	0	0
Vertical Leakage Upward	244	0	174	8	1,536	6	45	0	261	0	2,690	0
Lateral Inflow	1,886	2,264	2,632	2,225	907	2,304	764	835	837	1,144	9,535	641

Table B-1. (continued)

	Milam		Mills		Montague		Navarro		Palo Pinto		Parker	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	82	0	--	--	--	--	34	0	--	--	--	--
Reservoirs (River Package)	0	0	--	--	--	--	0	0	--	--	--	--
Inter-aquifer Flow (GHB Package)	0	8	--	--	--	--	48	0	--	--	--	--
Wells	0	0	--	--	--	--	0	300	--	--	--	--
Rivers and Streams (Stream Package)	0	0	--	--	--	--	0	0	--	--	--	--
Recharge	0	0	--	--	--	--	0	0	--	--	--	--
Evapotranspiration	0	0	--	--	--	--	0	0	--	--	--	--
Lateral Inflow	2	5	--	--	--	--	389	273	--	--	--	--
Vertical Leakage Downward	0	71	--	--	--	--	101	0	--	--	--	--
Paluxy Aquifer (Layer 3)												
Storage	226	0	773	0	1,798	0	225	0	--	--	7,447	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	--	--	6	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	--	--	0	0
Wells	0	0	0	6	0	508	0	413	--	--	0	9,866
Rivers and Streams (Stream Package)	0	0	0	8	0	498	0	0	--	--	164	164
Recharge	0	0	3,988	0	7,959	0	0	0	--	--	18,464	0
Evapotranspiration	0	0	0	4,517	0	7,985	0	0	--	--	0	14,216
Vertical Leakage Upward	27	4	93	1	13	0	86	0	--	--	86	0
Lateral Inflow	1	3	33	90	137	276	271	91	--	--	381	1,313
Vertical Leakage Downward	0	248	0	265	24	664	2	80	--	--	0	988
Glen Rose Formation (Layer 4)												
Storage	170	0	655	0	7	0	182	0	--	--	893	2
Reservoirs (River Package)	0	0	0	0	0	0	0	0	--	--	2	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	--	--	0	0
Wells	0	183	0	66	0	0	0	0	--	--	0	194
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	--	--	5	14
Recharge	0	0	2,827	0	0	0	0	0	--	--	3,942	0
Evapotranspiration	0	0	0	2,841	0	0	0	0	--	--	0	3,795
Vertical Leakage Upward	248	0	265	0	664	24	80	2	--	--	988	0
Lateral Inflow	131	75	76	286	2	14	48	62	--	--	306	593
Vertical Leakage Downward	0	291	0	629	15	651	0	245	--	--	0	1,538

Table B-1. (continued)

	Milam		Mills		Montague		Navarro		Palo Pinto		Parker	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	190	0	3,855	0	2,741	0	190	0	--	--	4,753	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	--	--	1	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	--	--	0	0
Wells	0	36	0	945	0	364	0	256	--	--	0	1,469
Rivers and Streams (Stream Package)	0	0	0	0	0	350	0	0	--	--	84	814
Recharge	0	0	2,588	0	6,389	0	0	0	--	--	2,893	0
Evapotranspiration	0	0	0	2,815	0	6,468	0	0	--	--	0	1,989
Vertical Leakage Upward	291	0	629	0	651	15	245	0	--	--	1,538	0
Lateral Inflow	128	207	464	1,800	59	1,583	221	120	--	--	973	2,637
Vertical Leakage Downward	0	367	33	2,009	65	1,125	0	281	--	--	0	3,331
Pearsall/Cow Creek/Sligo (Layer)												
Storage	147	0	4	0	93	0	150	0	--	--	575	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	--	--	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	--	--	0	0
Wells	0	0	0	0	0	0	0	0	--	--	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	--	--	0	0
Recharge	0	0	0	0	0	0	0	0	--	--	0	0
Evapotranspiration	0	0	0	0	0	0	0	0	--	--	0	0
Vertical Leakage Upward	367	0	2,009	33	1,125	65	281	0	--	--	3,331	0
Lateral Inflow	2	3	1	2	0	5	1	1	--	--	4	7
Vertical Leakage Downward	0	512	32	2,011	60	1,208	0	432	--	--	0	3,904
Hosston Aquifer (Layer 7)												
Storage	161	0	1,036	0	3,404	0	179	0	195	0	1,708	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	102	0	1,383	0	1,810	0	1,204	0	12	0	3,860
Rivers and Streams (Stream Package)	0	0	0	0	0	151	0	0	0	0	0	88
Recharge	0	0	2,383	0	8,566	0	0	0	533	0	3,160	0
Evapotranspiration	0	0	0	3,255	0	8,736	0	0	0	710	0	2,354
Vertical Leakage Upward	512	0	2,011	32	1,208	60	432	0	--	--	3,904	0
Lateral Inflow	2,699	3,270	300	1,060	249	2,671	1,029	436	55	61	709	3,179

Table B-1. (continued)

	Red River		Robertson		Rockwall		Somervell		Tarrant		Taylor	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)												
Storage	1,005	0	3	0	5	0	--	--	3,038	213	--	--
Reservoirs (River Package)	0	0	0	0	0	0	--	--	10	0	--	--
Inter-aquifer Flow (GHB Package)	37	0	0	1	10	0	--	--	11	0	--	--
Wells	0	170	0	0	0	144	--	--	0	633	--	--
Rivers and Streams (Stream Package)	2	876	0	0	0	0	--	--	67	468	--	--
Recharge	4,000	0	0	0	0	0	--	--	11,966	0	--	--
Evapotranspiration	0	3,585	0	0	0	0	--	--	0	11,573	--	--
Lateral Inflow	283	764	0	1	535	423	--	--	371	2,549	--	--
Vertical Leakage Downward	71	2	0	2	17	0	--	--	0	27	--	--
Paluxy Aquifer (Layer 3)												
Storage	71	0	12	0	28	0	100	37	11,024	26	--	--
Reservoirs (River Package)	0	0	0	0	0	0	0	0	8	0	--	--
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	--	--
Wells	0	471	0	0	0	958	0	120	0	10,446	--	--
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	213	21	16	--	--
Recharge	0	0	0	0	0	0	3,078	0	1,804	0	--	--
Evapotranspiration	0	0	0	0	0	0	0	2,626	0	1,502	--	--
Vertical Leakage Upward	19	0	2	0	25	0	16	1	363	1	--	--
Lateral Inflow	778	426	0	1	1,189	319	35	154	1,886	2,251	--	--
Vertical Leakage Downward	30	2	0	13	34	0	0	79	0	865	--	--
Glen Rose Formation (Layer 4)												
Storage	62	0	9	0	26	0	645	28	273	0	--	--
Reservoirs (River Package)	0	0	0	0	0	0	7	0	0	0	--	--
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	--	--
Wells	0	0	0	0	0	0	0	134	0	110	--	--
Rivers and Streams (Stream Package)	0	0	0	0	0	0	464	2,767	0	0	--	--
Recharge	0	0	0	0	0	0	5,470	0	0	0	--	--
Evapotranspiration	0	0	0	0	0	0	0	3,079	0	0	--	--
Vertical Leakage Upward	2	30	13	0	0	34	79	0	865	0	--	--
Lateral Inflow	78	86	17	24	48	37	578	620	628	159	--	--
Vertical Leakage Downward	0	26	0	15	1	4	0	615	0	1,497	--	--

Table B-1. (continued)

	Red River		Robertson		Rockwall		Somervell		Tarrant		Taylor	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)												
Storage	70	0	10	0	28	0	1,790	0	129	0	--	--
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	--	--
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	--	--
Wells	0	19	0	0	0	0	0	741	0	2,532	--	--
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	--	--
Recharge	0	0	0	0	0	0	0	0	0	0	--	--
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	--	--
Vertical Leakage Upward	26	0	15	0	4	1	615	0	1,497	0	--	--
Lateral Inflow	564	568	60	53	325	329	2,529	3,009	4,454	1,394	--	--
Vertical Leakage Downward	0	73	0	33	0	28	0	1,184	48	2,202	--	--
Pearsall/Cow Creek/Sligo (Layer)												
Storage	56	0	8	0	22	0	3	0	51	0	--	--
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	--	--
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	--	--
Wells	0	0	0	0	0	0	0	0	0	0	--	--
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	--	--
Recharge	0	0	0	0	0	0	0	0	0	0	--	--
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	--	--
Vertical Leakage Upward	73	0	33	0	28	0	1,184	0	2,202	48	--	--
Lateral Inflow	2	2	1	1	2	2	3	3	12	4	--	--
Vertical Leakage Downward	0	128	0	41	0	50	0	1,186	46	2,259	--	--
Hosston Aquifer (Layer 7)												
Storage	68	0	8	0	27	0	36	0	247	0	1,478	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0	0	0	0	0
Wells	0	38	0	0	0	0	0	1,490	0	5,549	0	431
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0	0	0	1,647	0
Evapotranspiration	0	0	0	0	0	0	0	0	0	0	0	2,443
Vertical Leakage Upward	128	0	41	0	50	0	1,186	0	2,259	46	--	--
Lateral Inflow	1,539	1,698	690	738	1,522	1,598	1,898	1,630	3,791	703	59	310

Table B-1. (continued)

	Titus		Travis		Williamson		Wise	
	In	Out	In	Out	In	Out	In	Out
Woodbine Aquifer (Layer 1)								
Storage	2	0	36	0	67	0	--	--
Reservoirs (River Package)	0	0	0	0	0	0	--	--
Inter-aquifer Flow (GHB Package)	0	0	16	0	31	0	--	--
Wells	0	0	0	0	0	0	--	--
Rivers and Streams (Stream Package)	0	0	0	0	2	1	--	--
Recharge	0	0	0	0	0	0	--	--
Evapotranspiration	0	0	0	0	0	0	--	--
Lateral Inflow	79	84	5	2	8	3	--	--
Vertical Leakage Downward	3	0	0	55	0	104	--	--
Paluxy Aquifer (Layer 3)								
Storage	3	0	53	3	151	0	5,230	0
Reservoirs (River Package)	0	0	0	0	0	0	1	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0
Wells	0	0	0	3	0	11	0	2,581
Rivers and Streams (Stream Package)	0	0	0	0	0	0	54	816
Recharge	0	0	0	0	13	0	11,503	0
Evapotranspiration	0	0	0	0	0	0	0	10,789
Vertical Leakage Upward	0	0	34	10	133	44	77	0
Lateral Inflow	42	45	21	5	16	27	326	1,898
Vertical Leakage Downward	1	0	1	88	0	231	2	1,111
Glen Rose Formation (Layer 4)								
Storage	2	0	3,727	0	1,786	0	208	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	327	0	0	0	0
Wells	0	0	0	2,627	0	770	0	5
Rivers and Streams (Stream Package)	0	0	0	0	58	257	0	21
Recharge	0	0	4,193	0	2,449	0	1,907	0
Evapotranspiration	0	0	0	5,493	0	2,706	0	1,786
Vertical Leakage Upward	0	1	88	1	231	0	1,111	2
Lateral Inflow	16	17	1,156	471	1,046	1,094	63	235
Vertical Leakage Downward	0	0	87	332	7	748	1	1,240

Table B-1. (continued)

	Titus		Travis		Williamson		Wise	
	In	Out	In	Out	In	Out	In	Out
Hensell Aquifer (Layer 5)								
Storage	2	0	907	0	421	0	5,838	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0
Wells	0	0	0	157	0	415	0	1,484
Rivers and Streams (Stream Package)	0	0	0	0	0	0	68	559
Recharge	0	0	799	0	0	0	9,032	0
Evapotranspiration	0	0	0	777	0	0	0	8,676
Vertical Leakage Upward	0	0	332	87	748	7	1,240	1
Lateral Inflow	67	68	259	456	1,907	879	534	3,558
Vertical Leakage Downward	0	2	38	858	0	1,776	27	2,459
Pearsall/Cow Creek/Sligo (Layer)								
Storage	2	0	170	0	115	0	874	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	0	0	0	0	0	0
Wells	0	0	0	6	0	1	0	0
Rivers and Streams (Stream Package)	0	0	0	0	0	0	0	0
Recharge	0	0	0	0	0	0	0	0
Evapotranspiration	0	0	0	0	0	0	0	0
Vertical Leakage Upward	2	0	858	38	1,776	0	2,459	27
Lateral Inflow	0	0	5	3	8	9	3	11
Vertical Leakage Downward	0	4	13	999	0	1,889	23	3,322
Hosston Aquifer (Layer 7)								
Storage	2	0	450	0	143	0	3,478	0
Reservoirs (River Package)	0	0	0	0	0	0	0	0
Inter-aquifer Flow (GHB Package)	0	0	50	168	0	0	0	0
Wells	0	0	0	1,114	0	614	0	5,246
Rivers and Streams (Stream Package)	0	0	0	0	0	0	13	177
Recharge	0	0	0	0	0	0	7,670	0
Evapotranspiration	0	0	0	0	0	0	0	6,734
Vertical Leakage Upward	4	0	999	13	1,889	0	3,322	23
Lateral Inflow	283	289	1,725	1,929	3,860	5,278	1,096	3,399