

# GAM run 03-21

by **Richard Smith**

Texas Water Development Board  
Groundwater Availability Modeling Section  
(512) 936-0877  
November 3, 2003

## **REQUESTOR:**

Mr. Jason Coleman, General Manager, South Plains Underground WCD

## **DESCRIPTION OF REQUEST:**

Mr. Coleman requested the following information from the Southern Ogallala aquifer Groundwater Availability Model (GAM) for the South Plains Underground Water Conservation District (SPUWCD):

- Water table decline maps for the GAM run recently supplied to the SPUWCD with average recharge (2003-2014)
- Water table decline maps and flow budget for the years 2001-2014 substituting usage numbers supplied by SPUWCD.

## **METHODS:**

To address the request, we:

- Ran the Southern Ogallala aquifer Groundwater Availability Model (Blandford and others, 2003) for the projected period 2000-2050 with average recharge and queried the budget files in the South Plains UWCD for 2003-2014; and
- Changed the pumpage for 2001-2014 to reflect the numbers supplied by SPUWCD; ran the model and computed the water budget and heads for 2001-2014.

## **PARAMETERS AND ASSUMPTIONS:**

None: Data request.

## **RESULTS:**

### **Recharge and Water budget**

Table 1 shows the water budget for the Southern Ogallala GAM model in the South Plains UWCD for the years 2001-2014. Recharge values from the model are listed in the table. Figures 1-14 show the water table declines for each year 2001-2014 with RWPG pumpage and Figures 15-28 show the declines with SPUWCD usage numbers. Average recharge was used in both sets of pumping numbers.

## REFERENCES:

Blandford, T. N., Blazer, D. J., Calhoun, K. C., Dutton, A. R., Naing, T., Reedy, R. C., and Scanlon, B. R., 2003, Groundwater Availability of the Southern Ogallala Aquifer in Texas and New Mexico; Numerical Simulations Through 2050: Final Report prepared for the Texas Water Development Board.

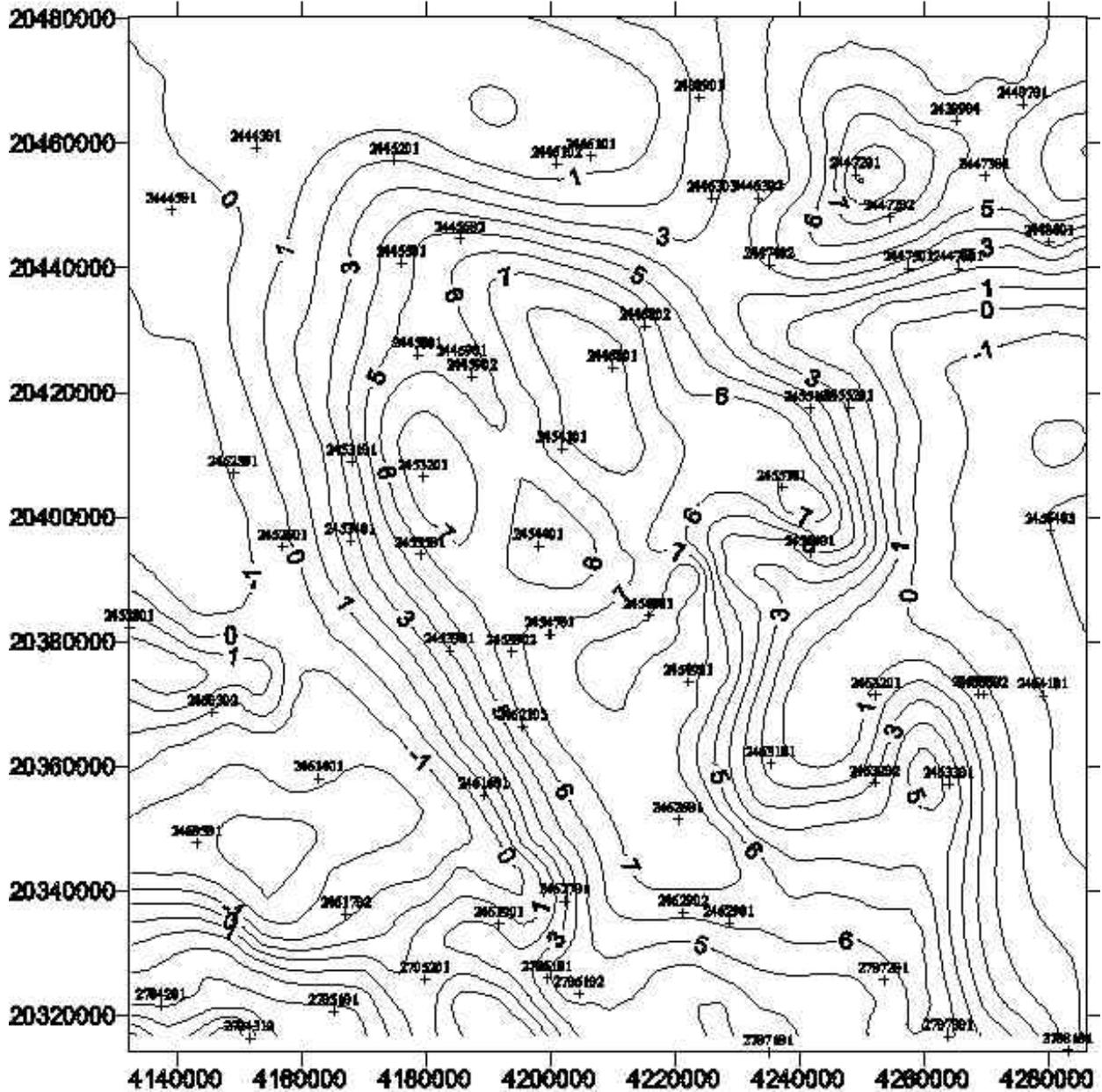
Table 1: Water Budget for SPUWCD using substituted pumpage – All units are acre-feet/year

Year	Water from Storage	In-to Storage	X-flow in	X-flow out	Wells	Springs and Seeps	Recharge	Total		% diff
								In	Out	
2001	70,133	4,790	1,970	3,601	133,641	814	70,748	142,850	142,846	0
2002	73,187	4,619	1,979	3,519	136,959	813	70,748	145,914	145,911	0
2003	68,231	4,557	1,987	3,436	132,158	811	70,748	140,966	140,962	0
2004	61,920	4,515	1,994	3,365	125,923	809	70,703	134,617	134,612	0
2005	61,073	4,432	2,002	3,284	125,253	806	70,703	133,778	133,775	0
2006	60,230	4,353	2,016	3,206	124,583	803	70,703	132,949	132,946	0
2007	59,370	4,281	2,030	3,106	123,912	801	70,703	132,103	132,100	0
2008	58,506	4,213	2,044	2,994	123,242	798	70,703	131,253	131,247	0
2009	57,665	4,152	2,058	2,906	122,570	794	70,703	130,426	130,423	0
2010	56,771	4,094	2,072	2,836	121,690	791	70,571	129,414	129,411	0
2011	56,128	4,037	2,085	2,782	121,173	788	70,571	128,785	128,781	0
2012	54,602	3,976	2,098	2,730	119,252	785	70,050	126,750	126,743	0.01
2013	53,410	3,920	2,110	2,670	117,808	782	69,663	125,183	125,180	0
2014	52,708	3,865	2,121	2,634	117,077	779	69,529	124,359	124,355	0

Notes:

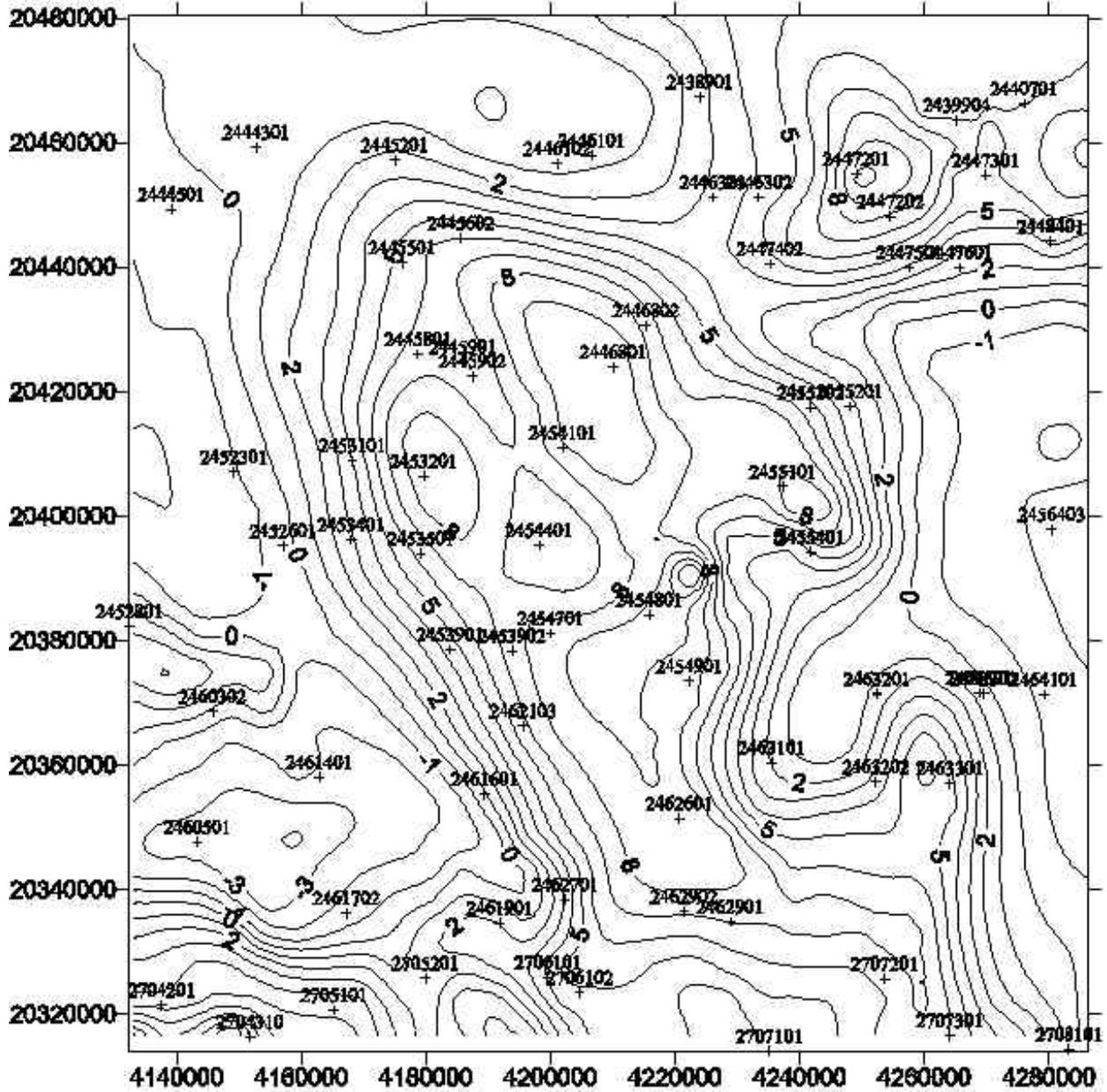
1. **In-to-storage** refers to water put into storage
2. **Water from storage** refers to water withdrawn from storage
3. **X-flow in** refers to lateral flow into the county.
4. **X-flow out** refers to lateral flow out of the county.
5. **Wells** is for pumping input.

Figure 1: 2001 Head declines in Terry County with average recharge



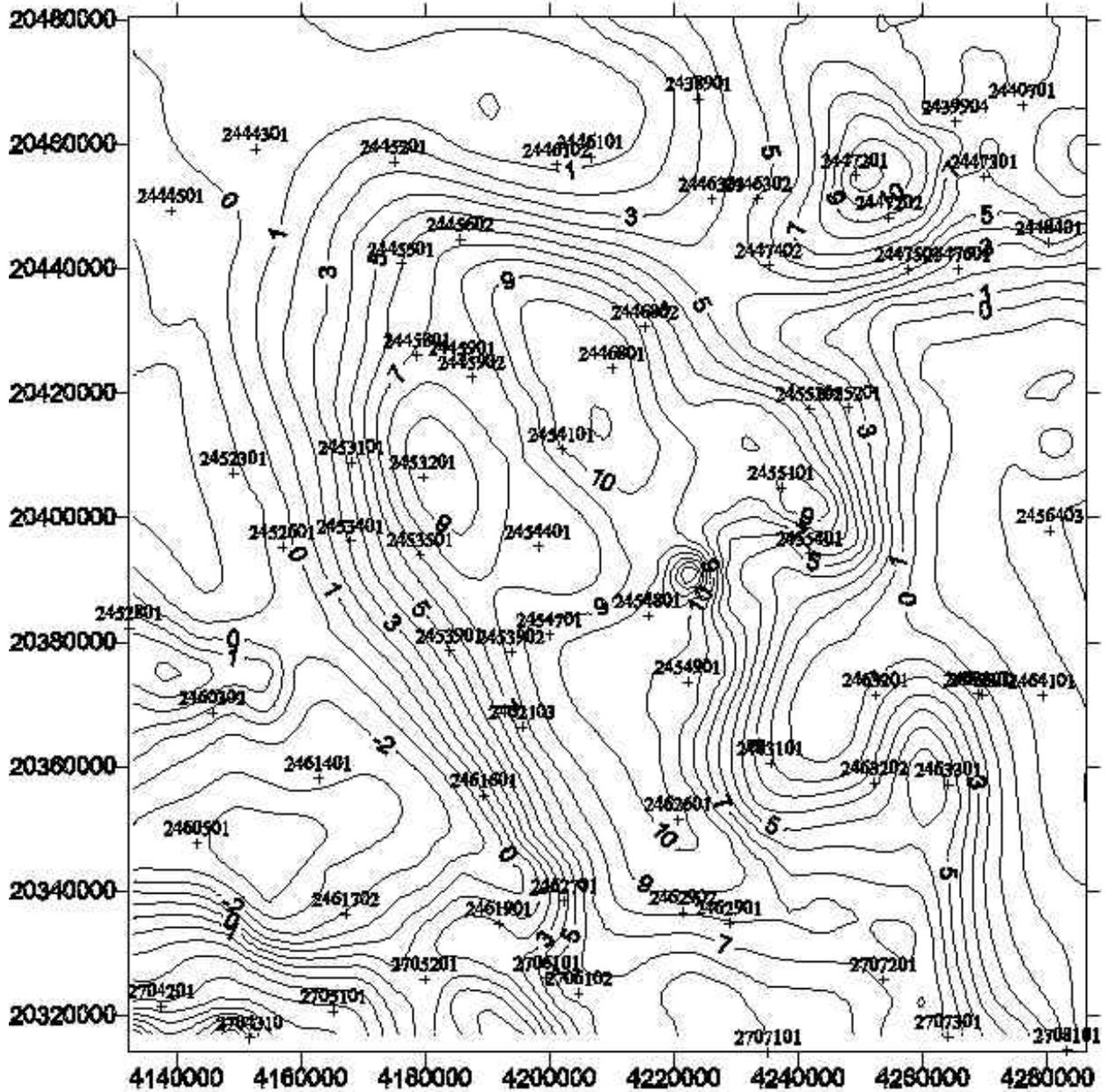
All contours are in feet. Pumping is consistent with R.WPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 2: 2002 Head declines in Terry County with average recharge



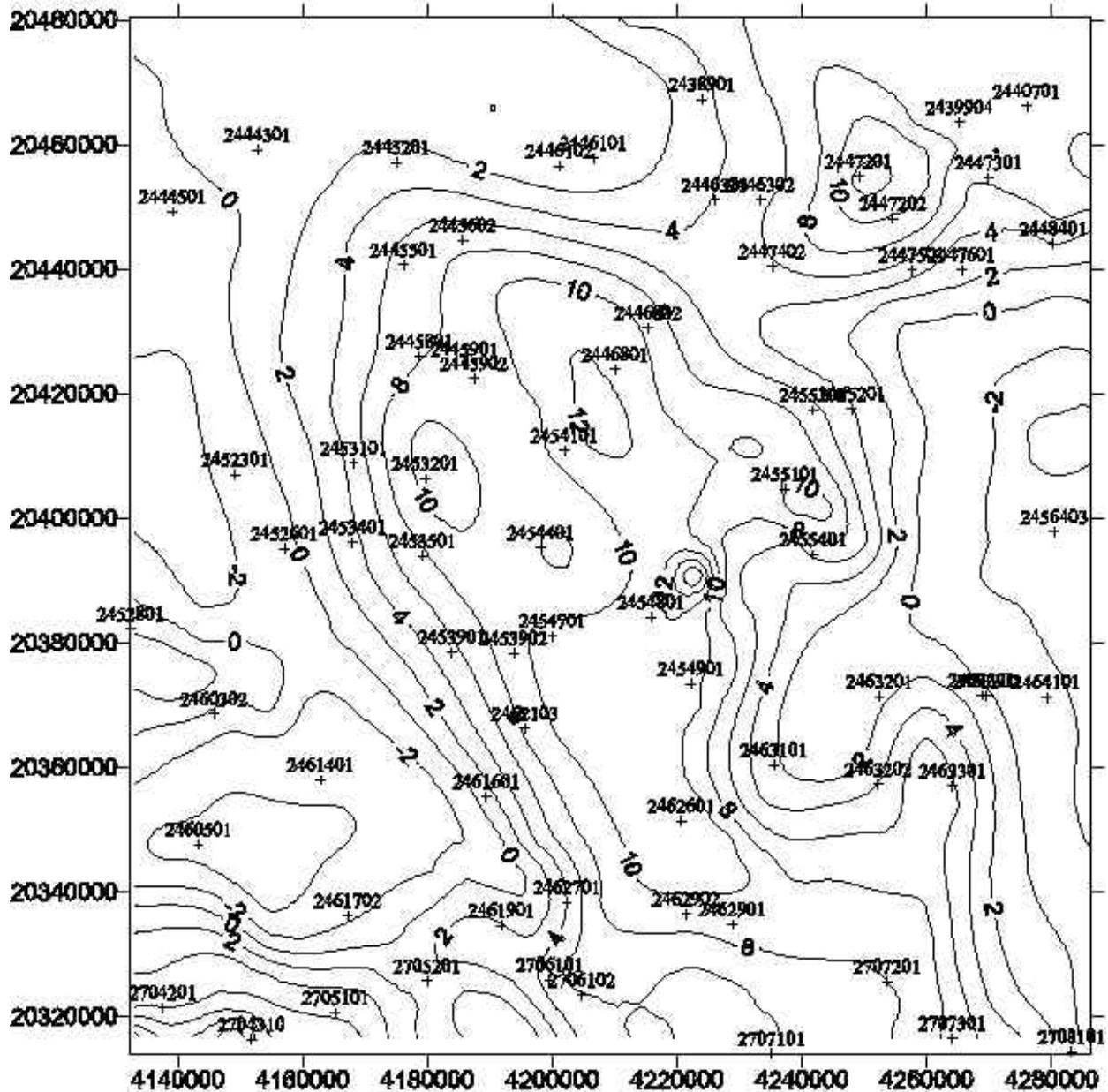
All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 3: 2003 Head declines in Terry County with average recharge



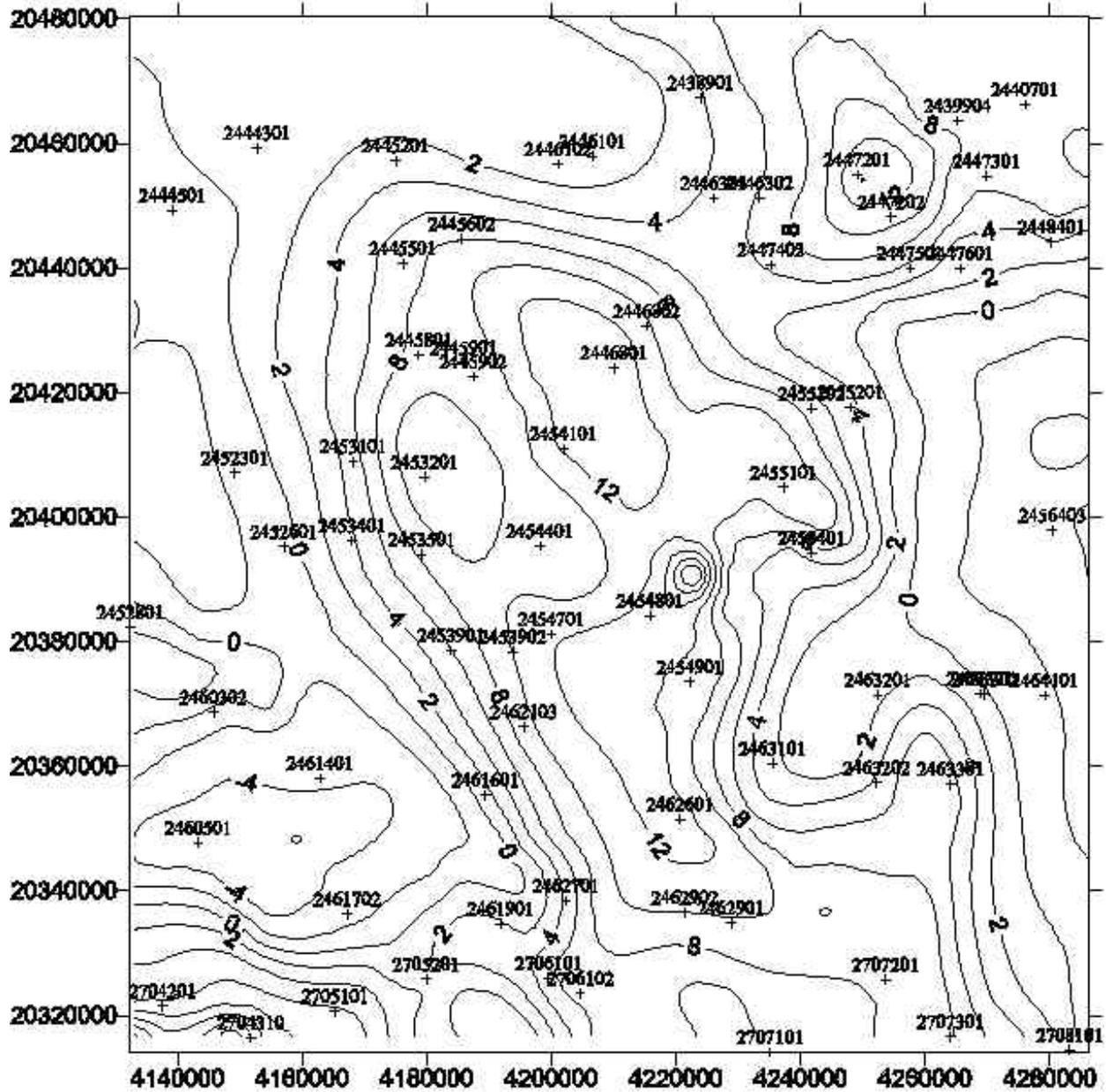
All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 4: 2004 Head declines in Terry County with average recharge



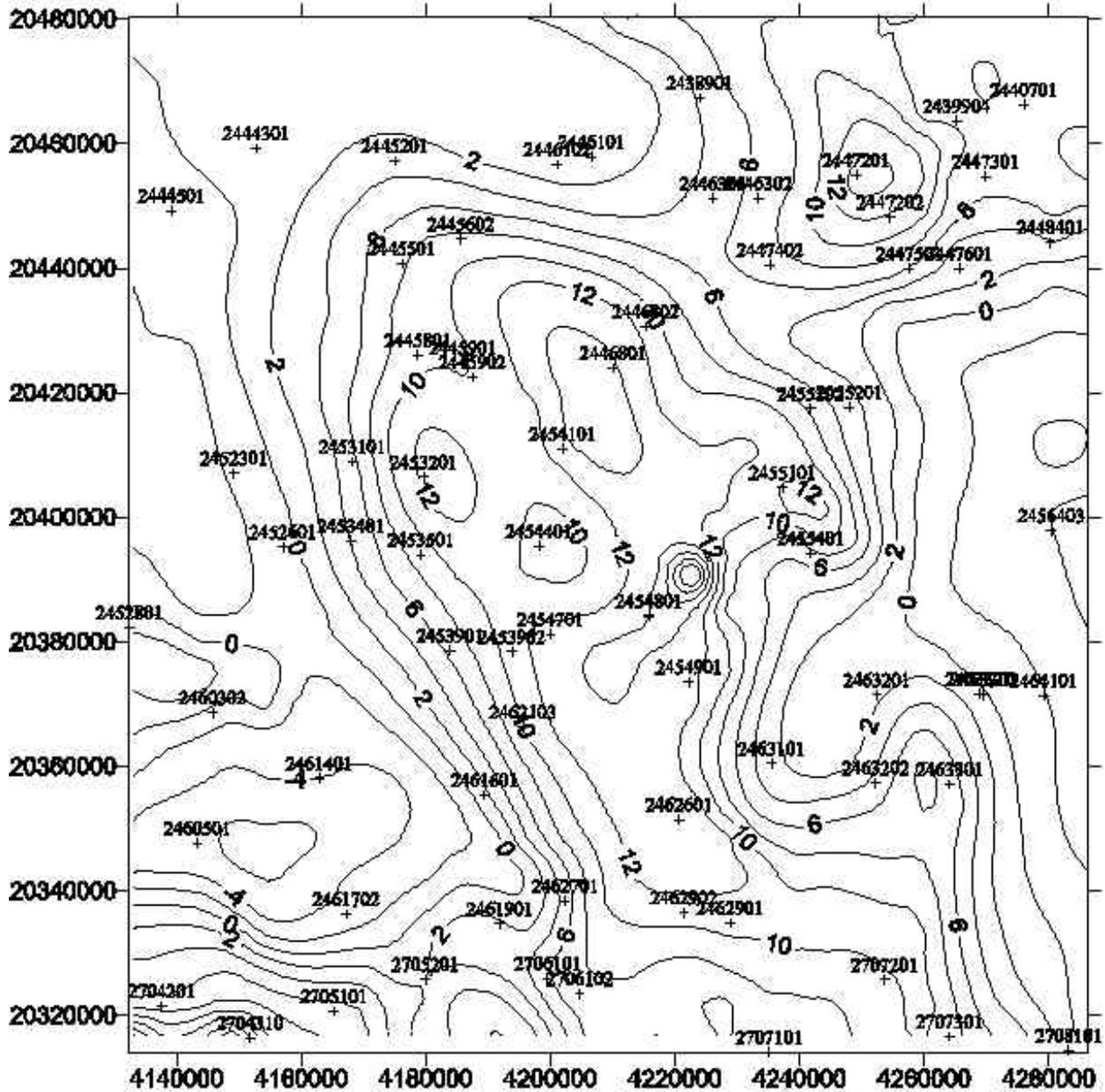
All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 5: 2005 Head declines in Terry County with average recharge



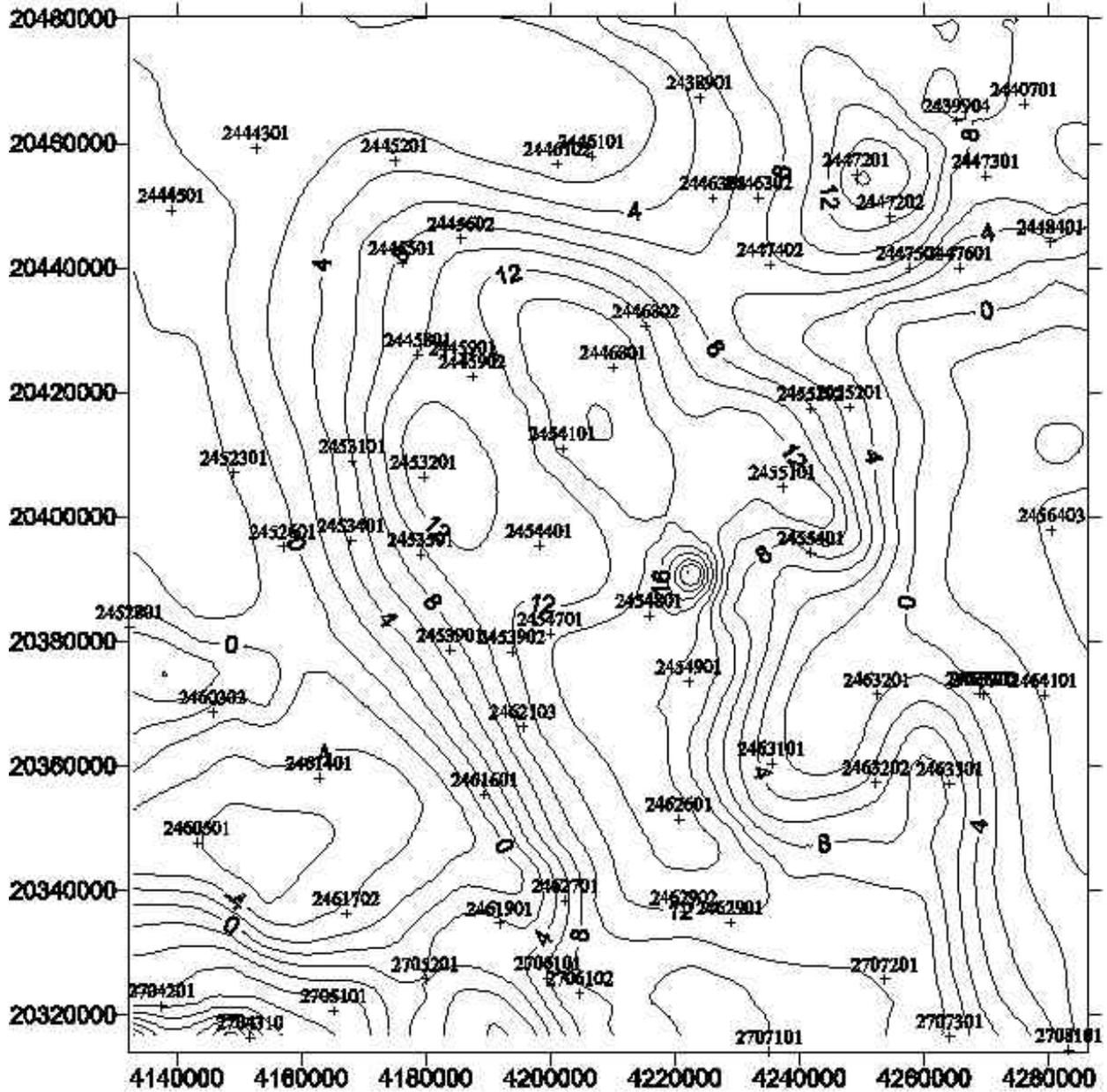
All contours are in feet. Pumping is consistent with RWPB projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 6: 2006 Head declines in Terry County with average recharge



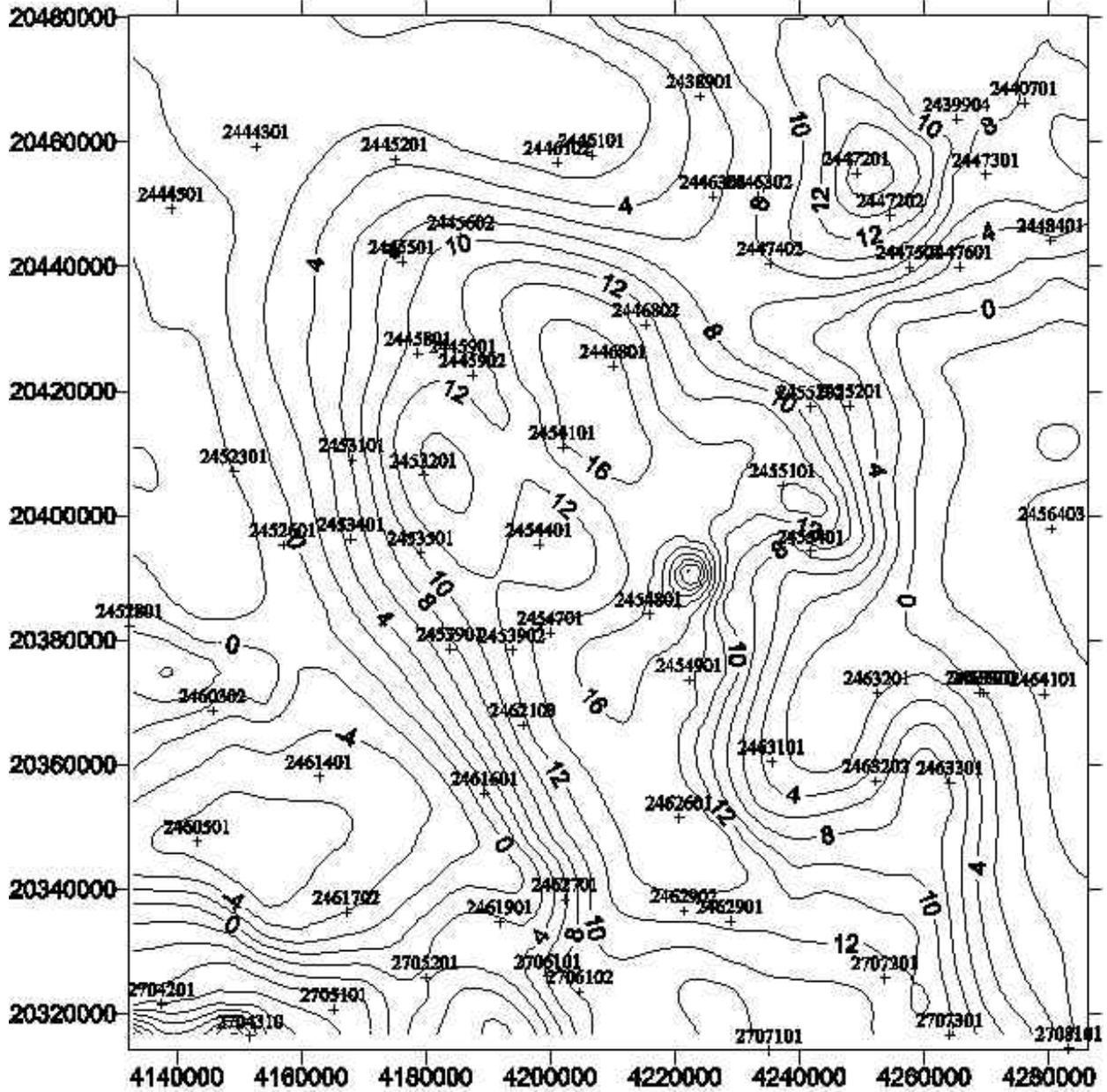
All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 7: 2007 Head declines in Terry County with average recharge



All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

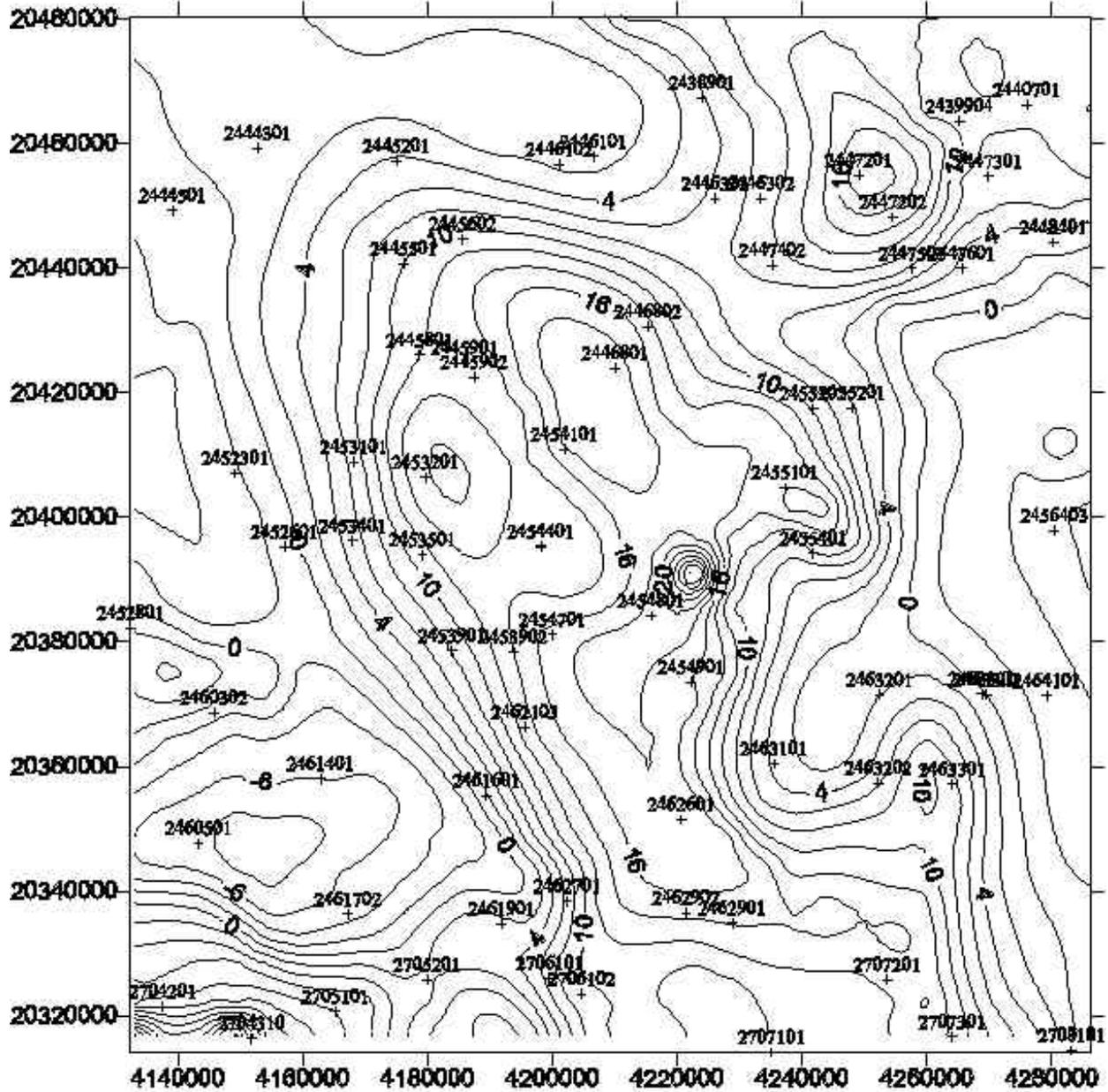
Figure 8: 2008 Head declines in Terry County with average recharge



All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds



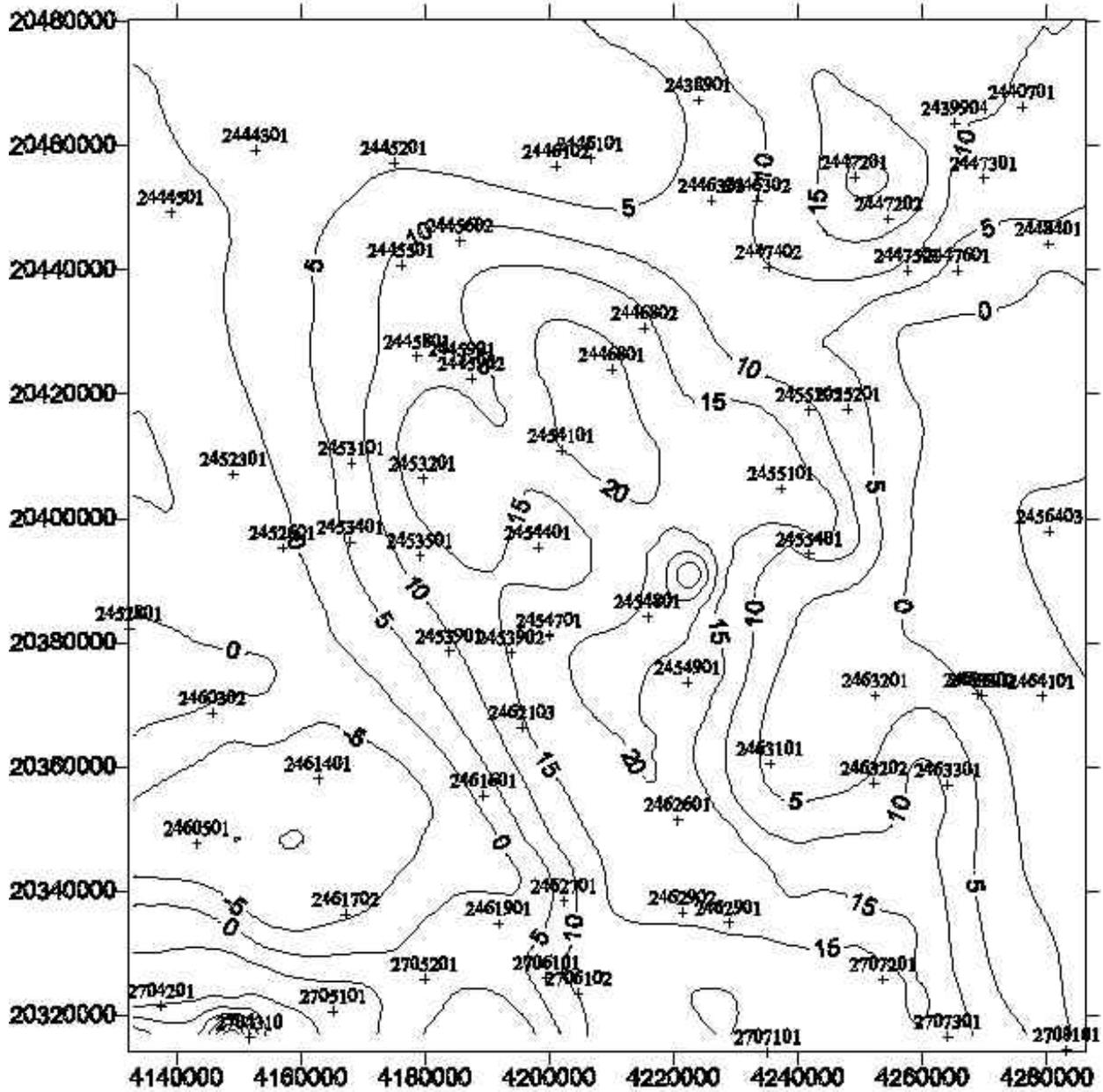
Figure 10: 2010 Head declines in Terry County with average recharge



All contours are in feet. Pumping is consistent with RWPG projected numbers  
The base year is 1996 and the boundary of the figure is the boundary of Terry County  
Positive numbers are head declines and negative numbers are head rebounds

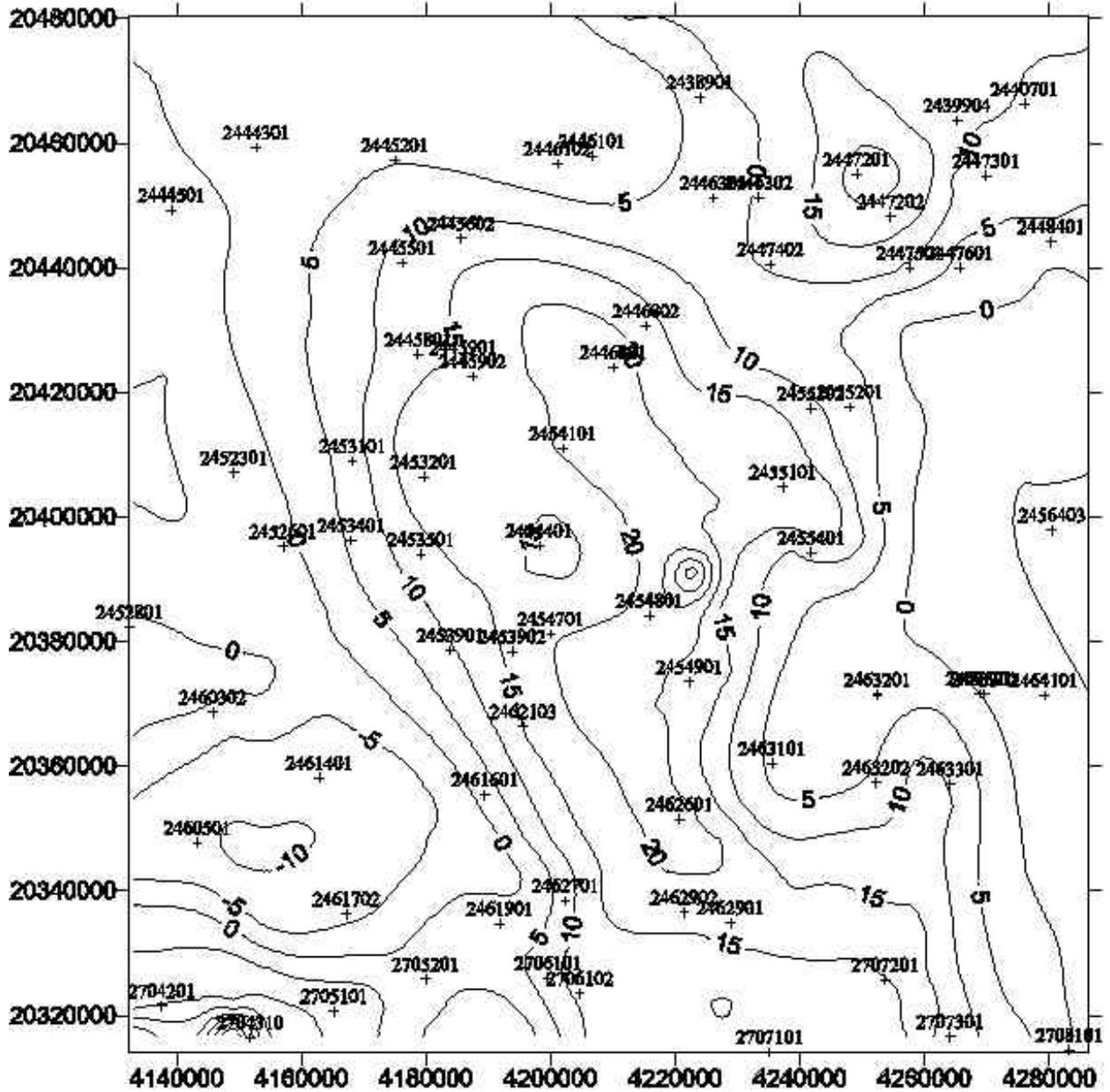


Figure 12: 2012 Head declines in Terry County with average recharge



All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

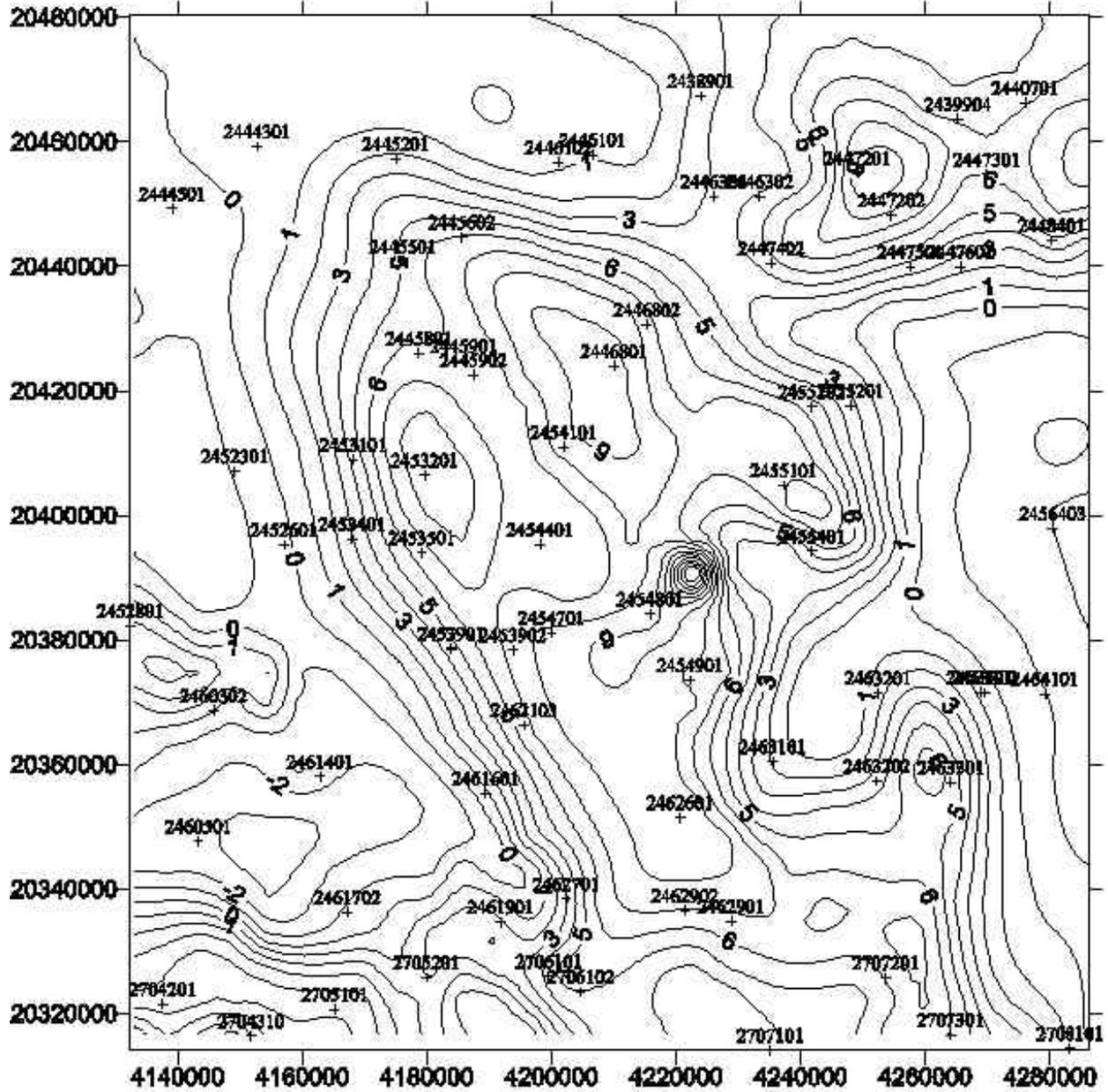
Figure 13: 2013 Head declines in Terry County with average recharge



All contours are in feet. Pumping is consistent with RWPG projected numbers  
 The base year is 1996 and the boundary of the figure is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

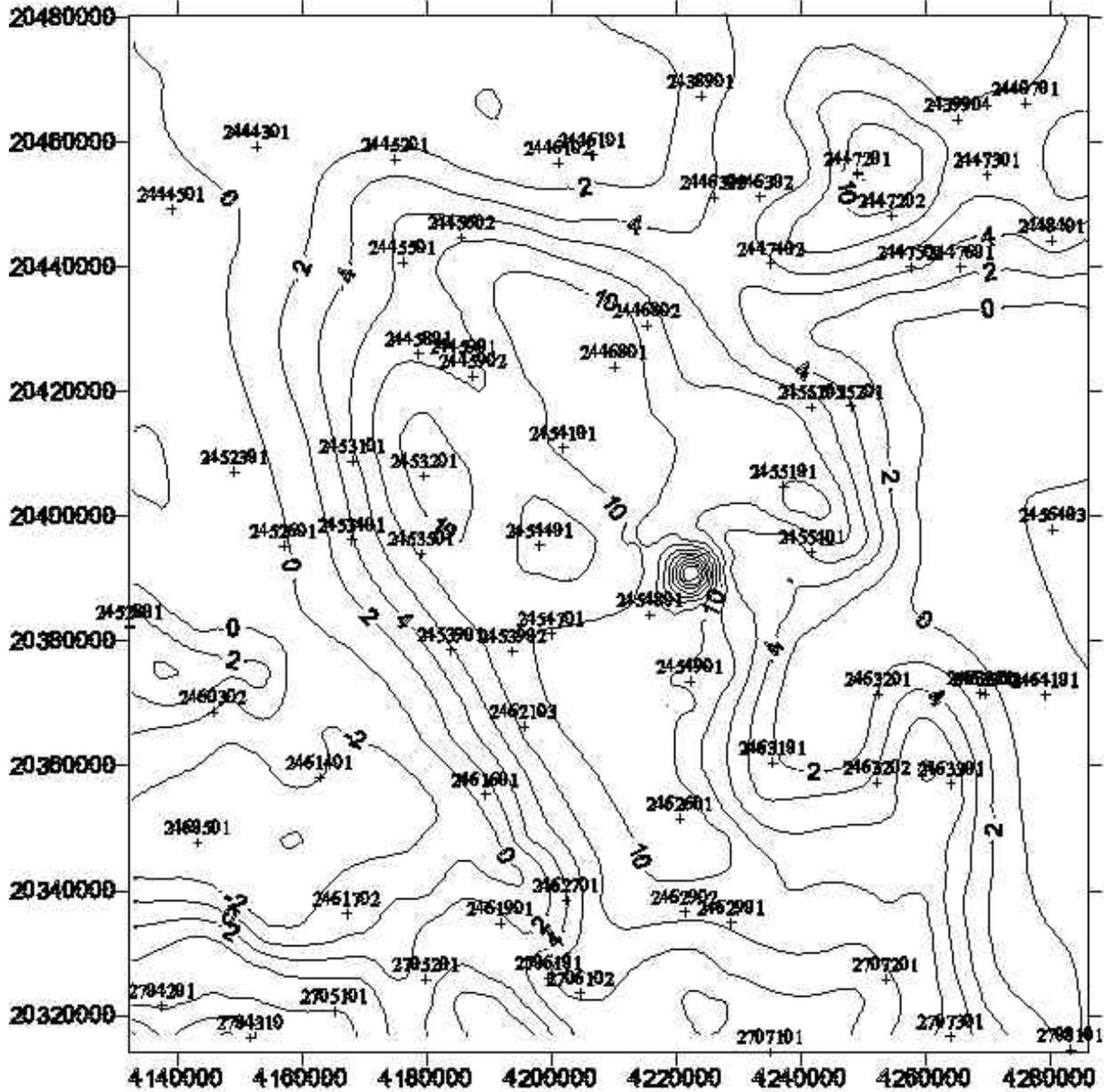


Figure 15: 2001 groundwater declines for Terry County with revised pumping



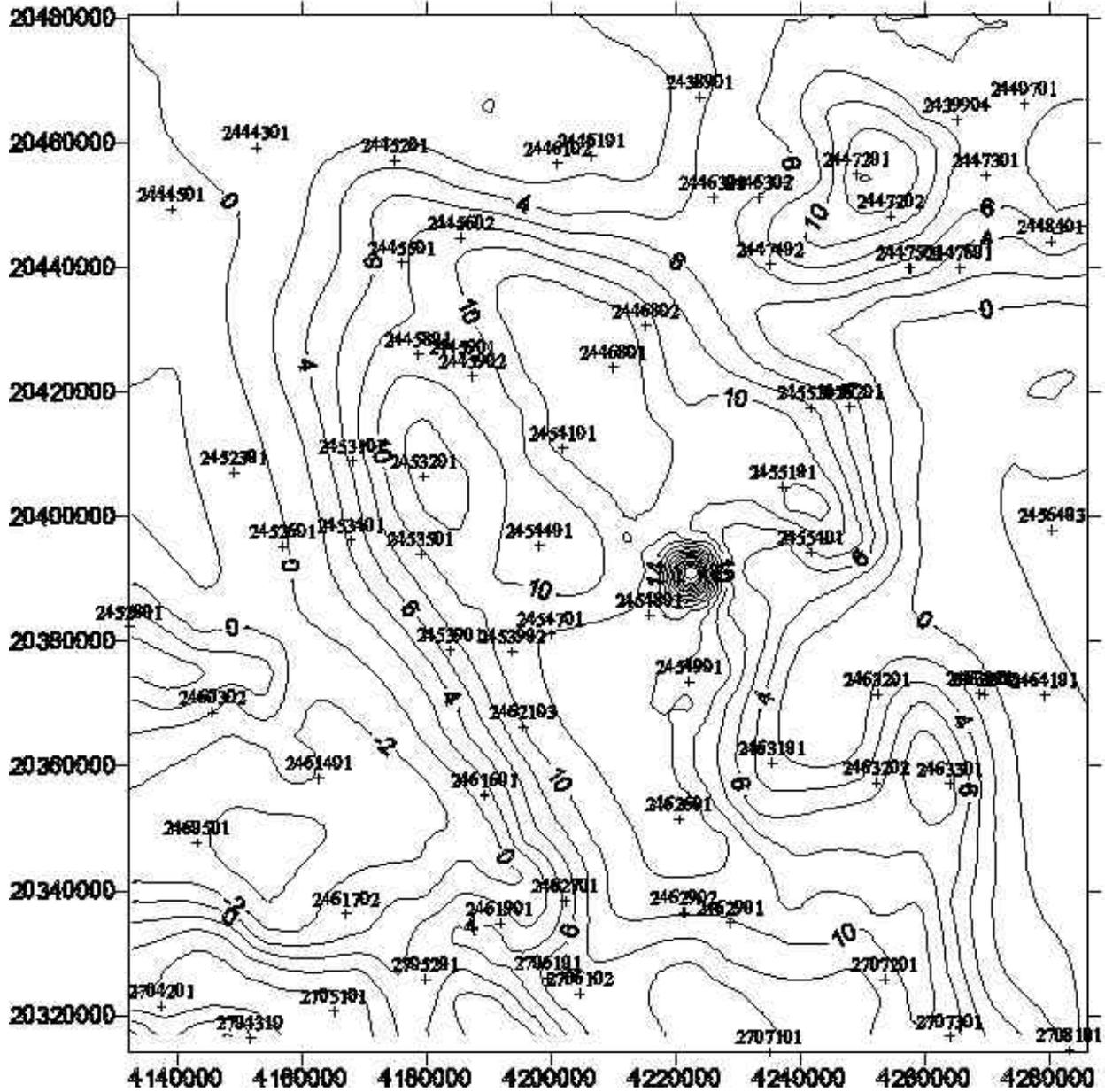
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 16: 2002 groundwater declines for Terry County with revised pumping



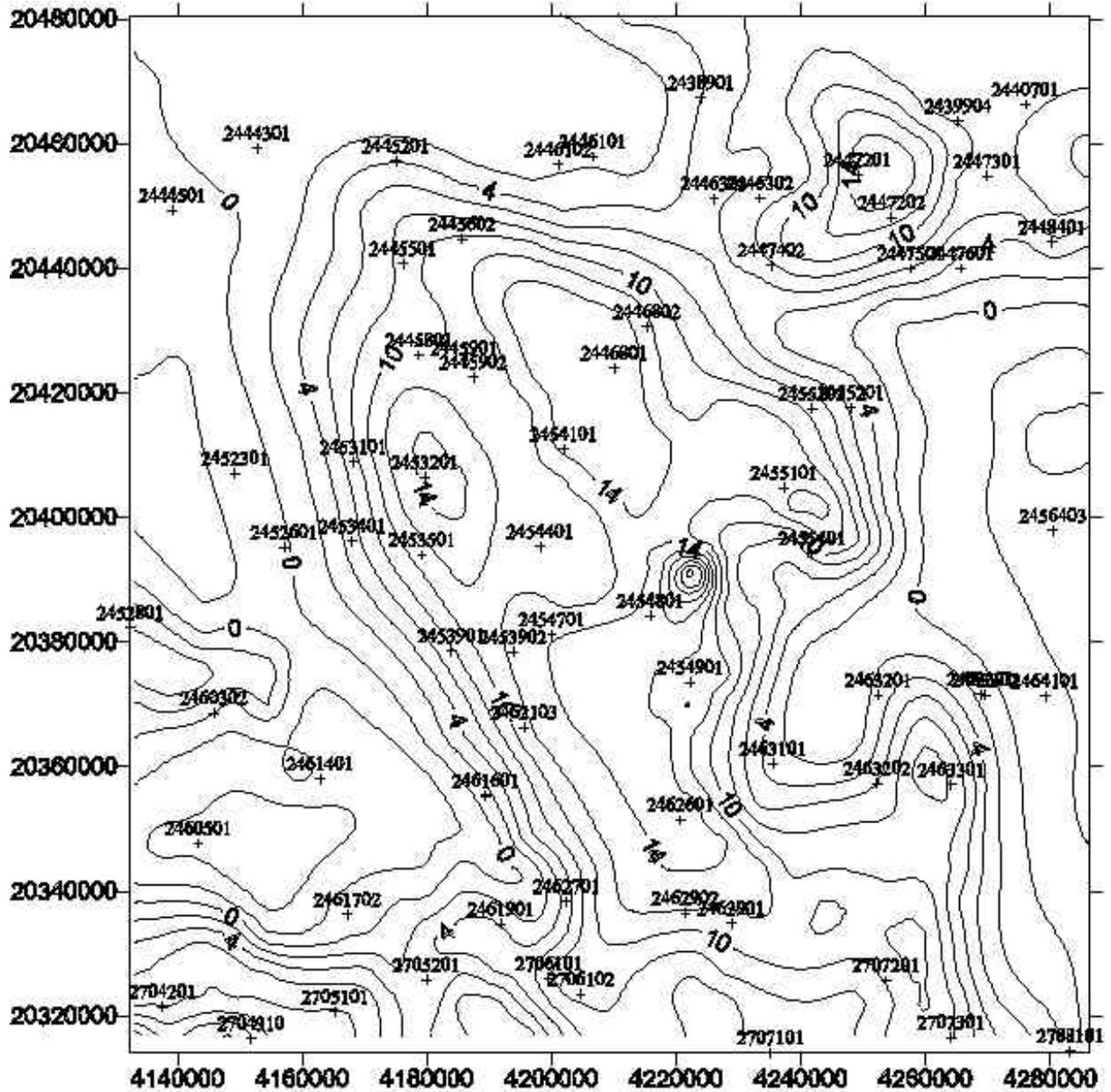
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 17: 2003 groundwater declines for Terry County with revised pumping



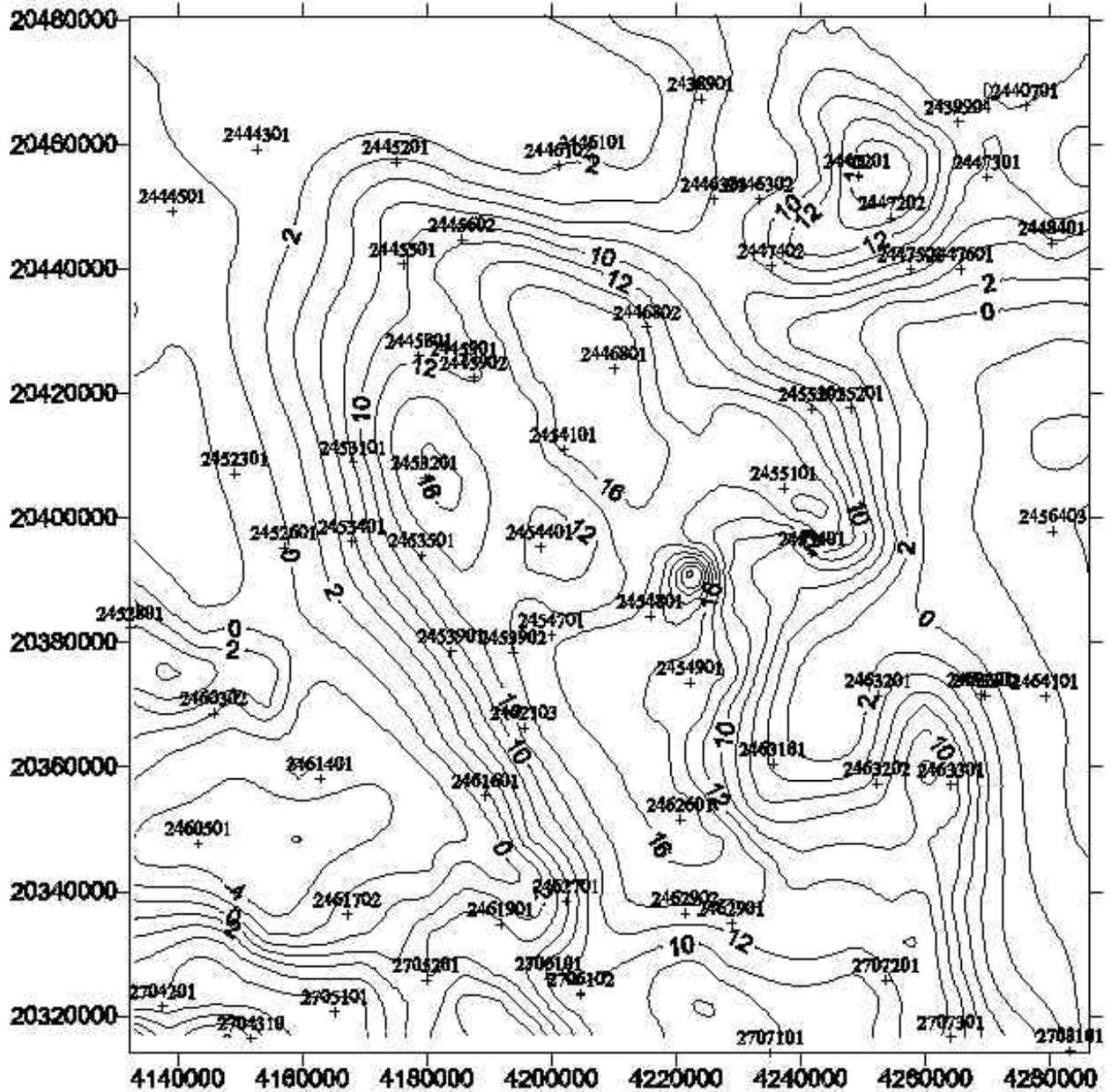
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 18: 2004 groundwater declines for Terry County with revised pumping



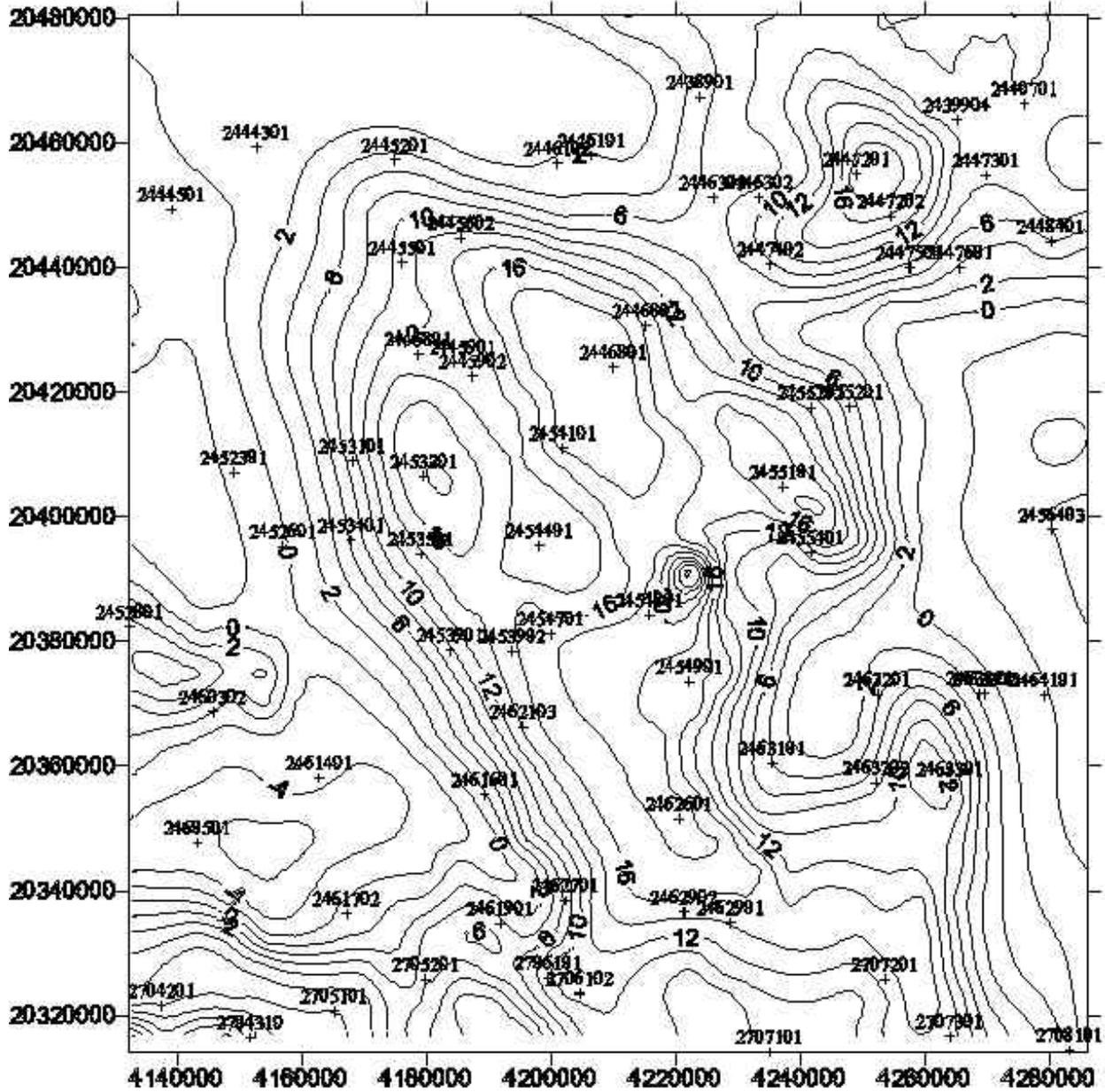
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 19: 2005 groundwater declines for Terry County with revised pumping



All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

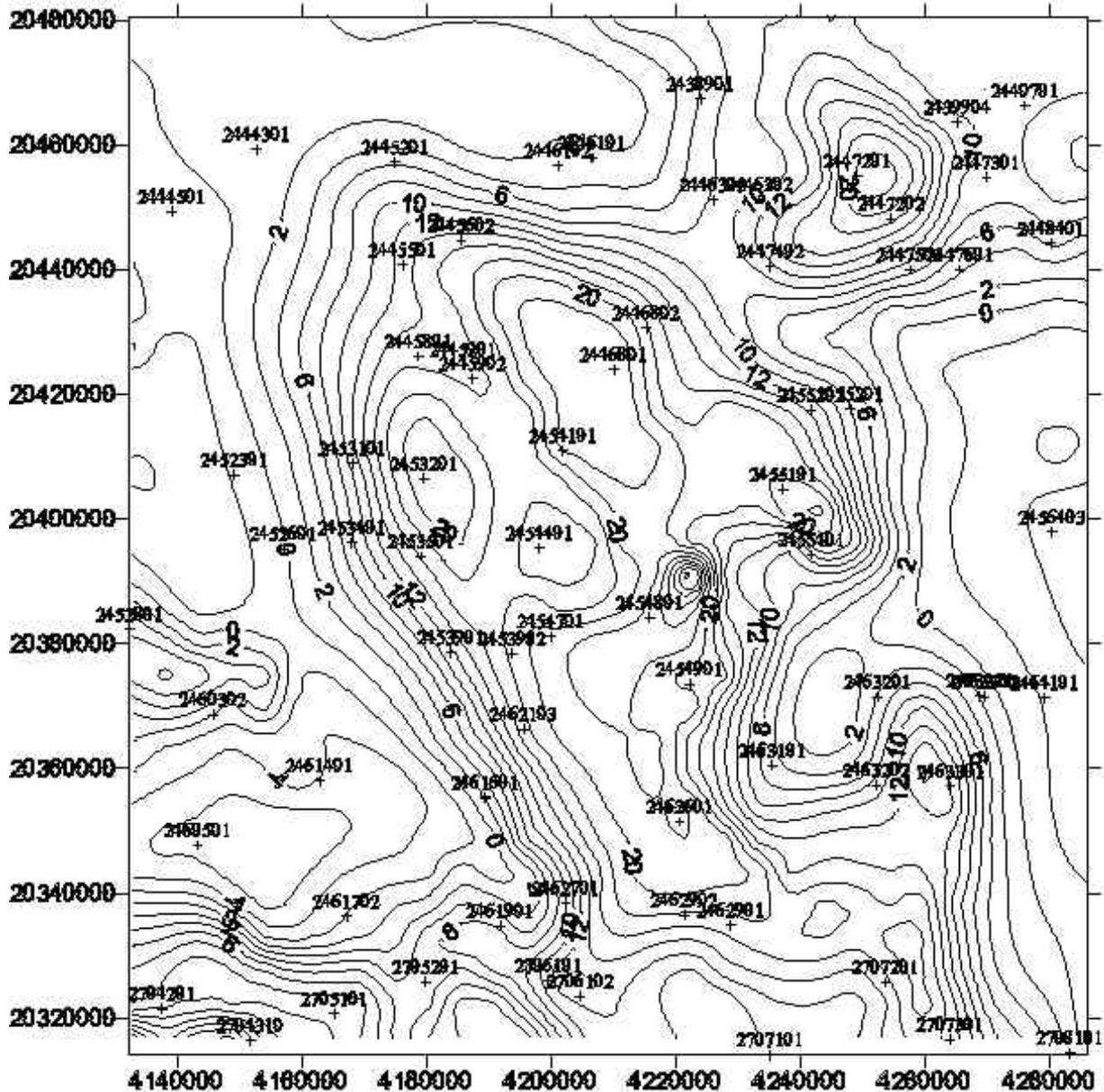
Figure 20: 2006 groundwater declines for Terry County with revised pumping



All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

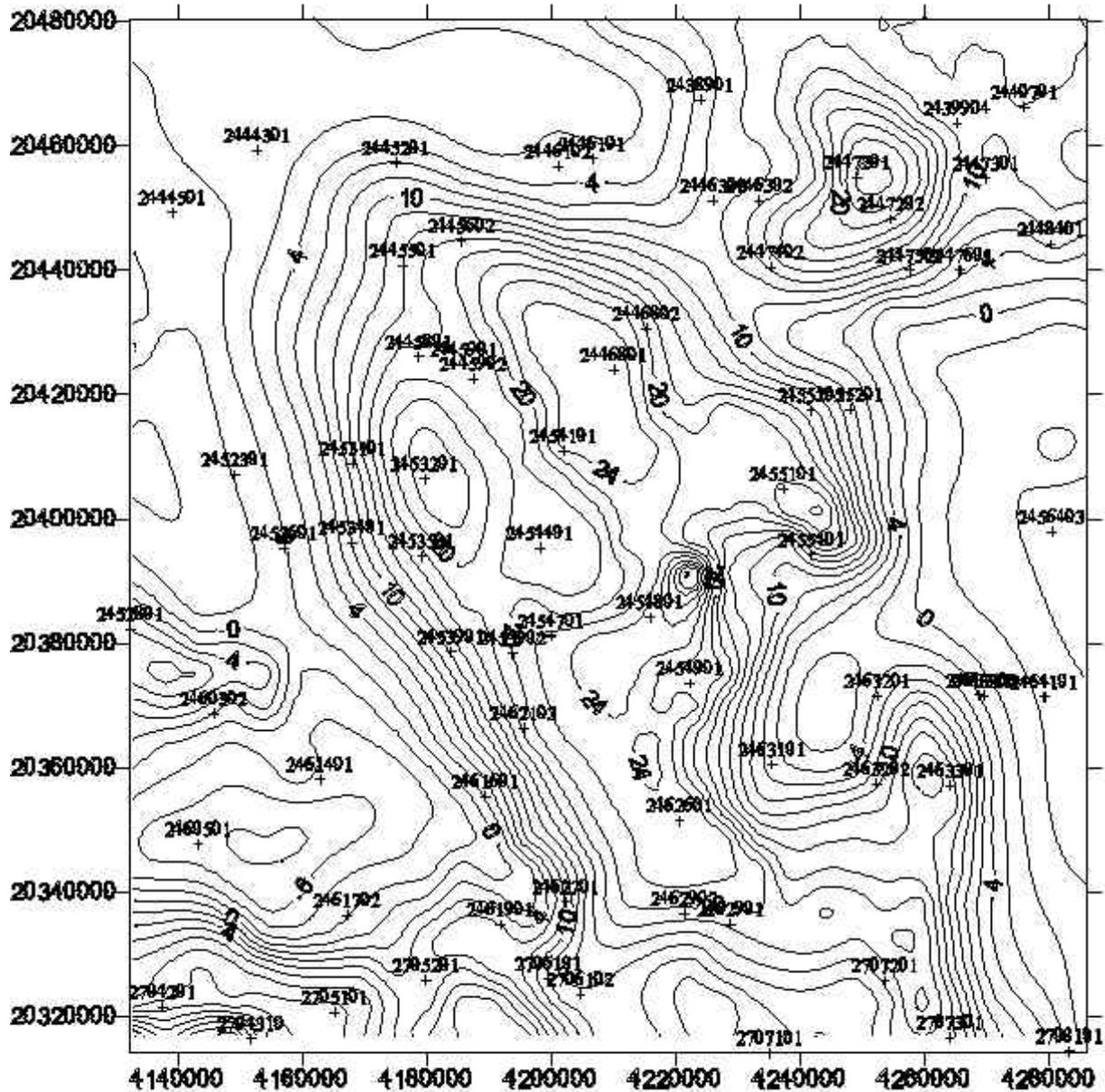


Figure 22: 2008 groundwater declines for Terry County with revised pumping



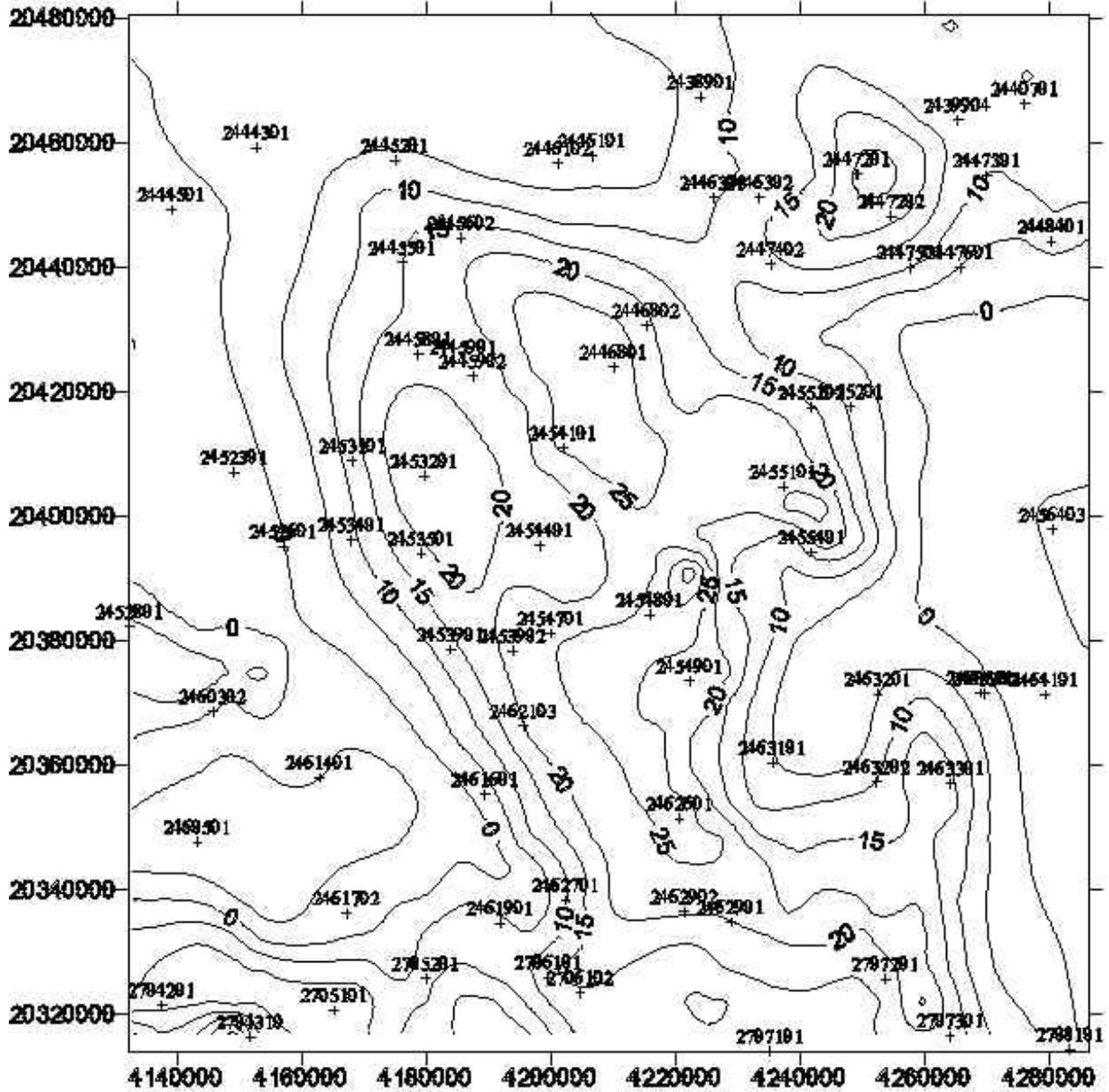
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 23: 2009 groundwater declines for Terry County with revised pumping



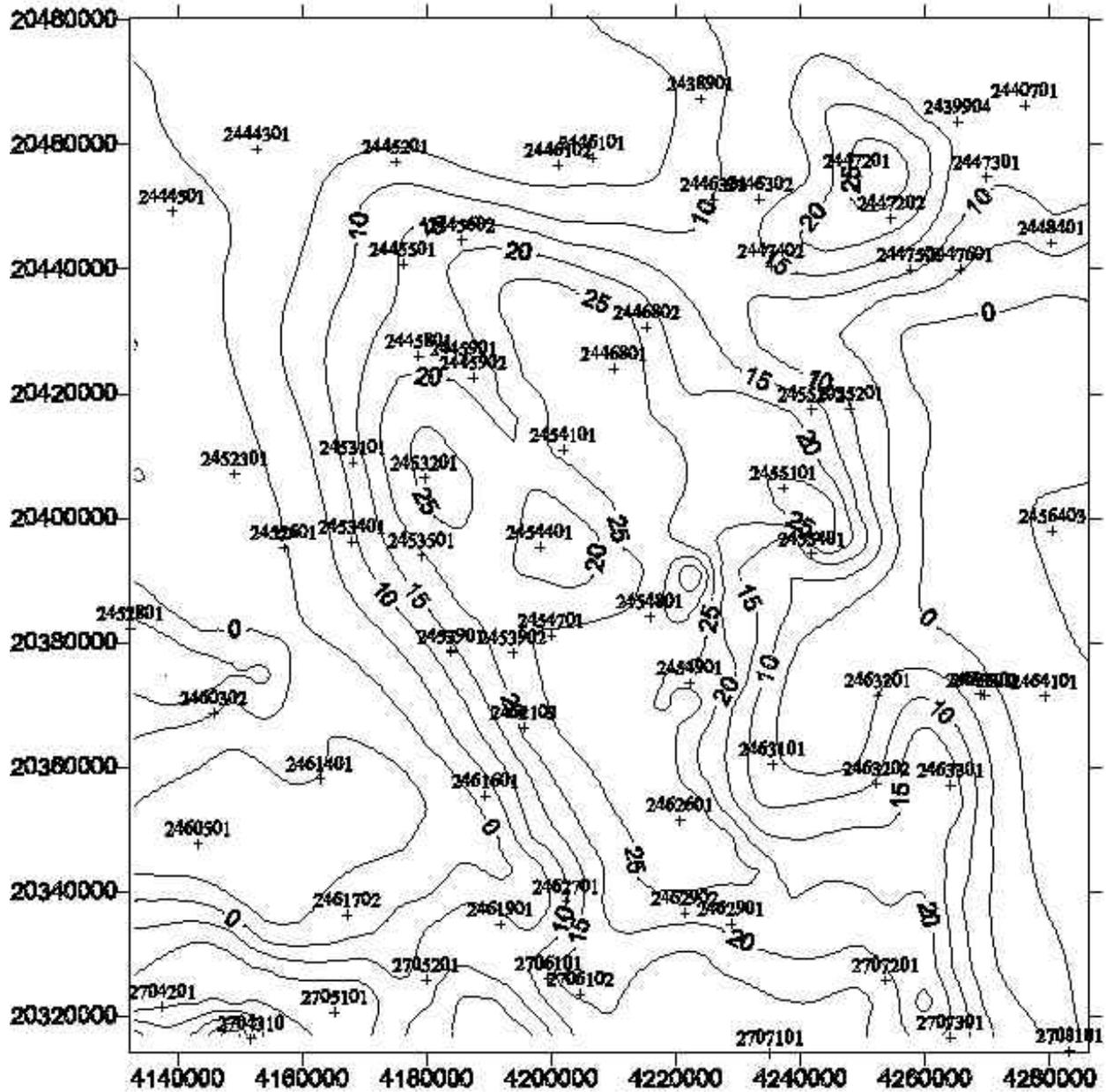
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 24: 2010 groundwater declines for Terry County with revised pumping



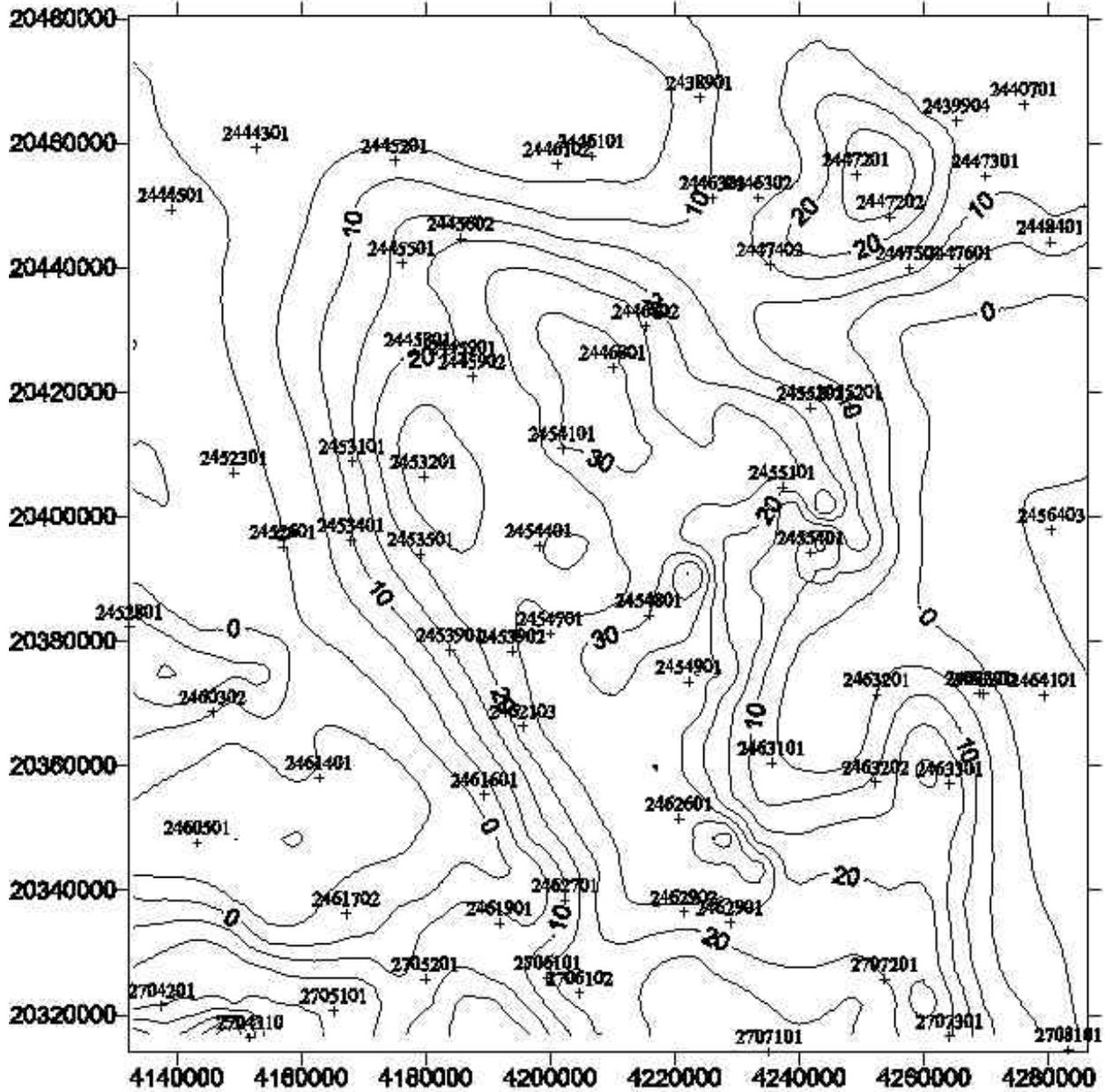
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 25: 2011 groundwater declines for Terry County with revised pumping



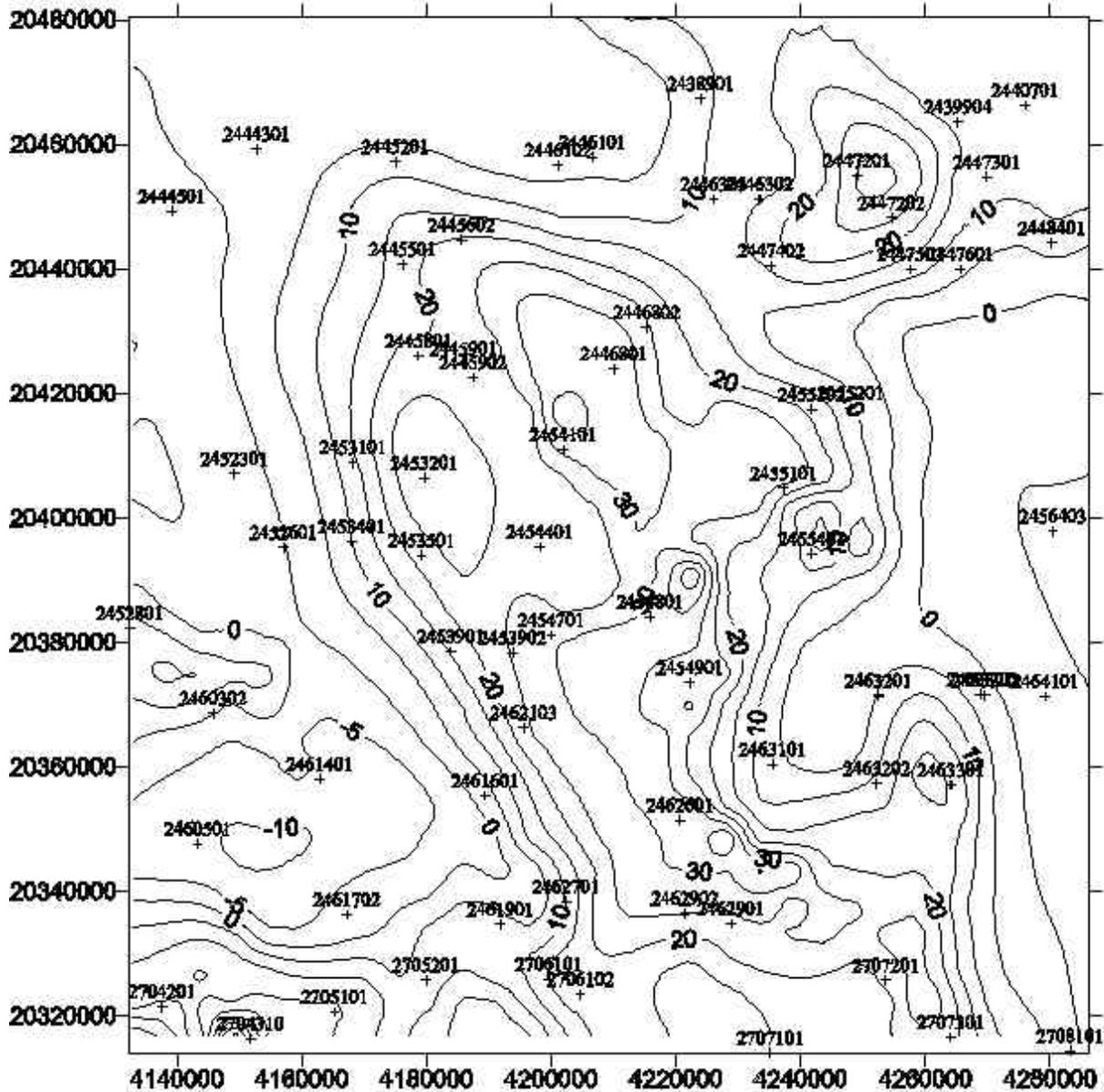
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 26: 2012 groundwater declines for Terry County with revised pumping



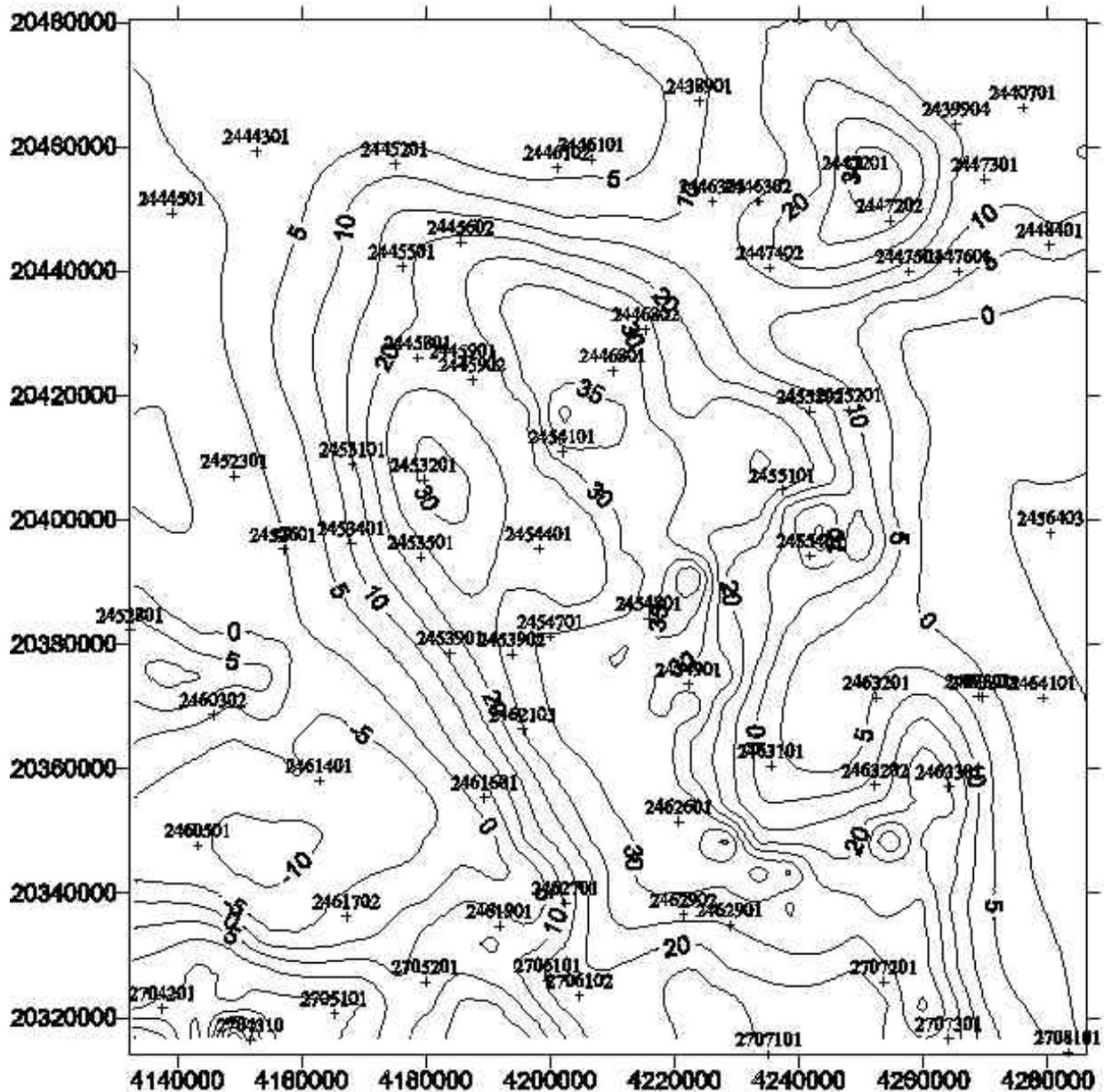
All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 27: 2013 groundwater declines for Terry County with revised pumping



All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds

Figure 28: 2014 groundwater declines for Terry County with revised pumping



All contours are in feet. Pumping is consistent with revised pumping numbers supplied by SPUWCD  
 The base year is 1996 and the boundary of the map is the boundary of Terry County  
 Positive numbers are head declines and negative numbers are head rebounds