# REVISED MODEL OF THE TULAROSA BASIN

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# Revised Model of the Tularosa Basin

## INTRODUCTION

A numerical model of the Tularosa Basin (Morrison, 1989) has been used to predict drawdown and administer the basin. The 1989 model is still well calibrated in much of the basin but new information warrants an update of the model. The model has been redesigned to include observed and estimated pumping through June 2005. There is also new water level and aquifer test data available to constrain the calibration.

Other modifications have been added. The wet season from 1975 to 1995 altered the model assumptions on recharge. Recharge along the Mountain front has been modified to reflect increased recharge during higher precipitation periods. Also, head dependant model cells were added to relate surface elevation and water elevation to evaporation losses.

The statistical fit by every calibration measure has been improved with the 2005 model. The revised model can be used to project 40-year drawdown using a projected growth rate for the basin.

## BOUNDARIES AND MODEL STRUCTURE

The revised model is run in MODFLOW96 (Harbaugh and McDonald, 1996) in units of feet and days. Figure 1 shows the grid layout of the 2005 model. It is slightly larger than the 1989 model. The grids have the same eastern extent along the uplift of the Sacramento Mountains. The new grid extends ¼ mile further than the 1989 grid in the north, south and west directions. In the 2005 model, a cell size of 0.5 mile by 0.5 mile is universally applied.

As in the 1989 model, the grid orientation is rotated counterclockwise 15 degrees. The bottom-left corner of the revised grid is at

UTM X: 392,856 meters
UTM Y: 3,587,151 meters.

The Projected Coordinate System is NAD 1983, UTM Zone 13N.

The active portion of the model represents Basin Fill. As in the 1989 model, the east side of the active grid is along the Sacramento Mountain uplift. The Permian and Pennsylvanian through Precambrian rocks of the uplifted area are much less transmissive than in the Basin Fill as indicated by steeper water level gradients and wells with lower yields. From observation of water elevation contours and watershed delineation, most of the flow enters the active grid area along the eastern mountain front as runoff. Boundaries to the north, south and west of the grid were conceptualized as no-flow. These boundaries are also outside of the influence of most historical pumping. As distance from the mountain front increases, the Basin Fill is generally composed of finer grained, less permeable material.

As in the 1989 model, the Basin Fill is represented as an unconfined aquifer with a single transmissivity layer. In reality, the Basin Fill is of variable depth forming a trench thousands of feet deep and underlain by Permian rocks of unknown permeability. Most of the wells and available pump tests partially penetrate the Basin Fill. The water at depth, in general, is more saline, although a USBR (2003) borehole at Township 16S, Range 9E, Section 36 found a total dissolved solids inversion of 5200 ppm to 1100 ppm at depths from 645 to 1240 feet below ground surface. Information on how parameters for vertical and horizontal conductance, storage and salinity change with depth is limited. Selection of parameters for a multi-layer model would be largely guesswork with very little information to constrain it. For these reasons, a reasonable calibration was achieved with as simple of a model as possible.

## RECHARGE

No direct aerial recharge was simulated in the model. The basin precipitation of 12 inches/year is much less than the evaporation of 72 inches/year.

Simulated mountain front recharge was placed at the watershed / basin fill intersection cells as shown in figure 2. Watersheds with an area of greater than 4000 acres were delineated in the Sacramento Mountains. Precipitation falling in each watershed was estimated by using a linear relationship to correlate observed precipitation to surface elevation at nearby gages. Figure 3 shows the relationship in the area to be

Annual Precipitation (in/yr) = 0.0038 * Surface Elevation (ft msl) – 6.51

Initially, the total recharge rate from the 1989 model of 14,847 AFY was proportioned to watershed rainfall portion in each of the 22 watersheds. In the calibration of the 2005 model, watersheds 1 through 15 were the primary contributors of recharge. Watershed 16 contributed recharge only in high precipitation periods and recharge from watersheds 17 through 22 were deleted. This decreased the total recharge to 11,890 AFY.

The areas for watersheds 1 through 15 were multiplied by the precipitation at the centroid of the watershed to obtain the total volumetric rate of rainfall. This rate is 539,593 AFY. The watershed delineation and precipitation calculation differ from the 1989 model. The simulated mountain front recharge of 11,890 AFY is 2.2% of the available precipitation. This percentage differs from the 1989 model that delivered 2.7% of precipitation as mountain front recharge. Table 1 shows the recharge calculation.

The 1989 model is not well calibrated to some wells near Tularosa between 1975 and 1995. Figure 4 shows that this was a high precipitation period and that there was a corresponding buildup in water elevations that is not simulated in the 1989 model. In calibration of the revised model, the recharge was stepped up to 26,983 AFY for the high precipitation period then stepped back down to a rate of 11,890 AFY. Figure 5 shows the observed Rio Tularosa discharge near Bent and the simulated mountain front recharge. Proportionally, mountain front recharge approximates the increased rise in discharge on the Rio Tularosa. Additional mountain front recharge was applied to the model during this period along additional lengths of drainages. The locations of the additional recharge cells were shown in figure 2. Each additional recharge cell has a specified flux of 150,000 cfd (1258 AFY). The number of additional recharge cells along drainages was largely a factor of calibration to observed water level mounding rather than size or elevation of a source watershed.

## DISCHARGE

In the 1989 model evapotranspiration was represented in the model with specified fluxes. In the revised model, the rate of evaporative discharge is related to the simulated depth to water. This was done using the MODFLOW evaporation package. The land surface elevations from a 30-meter digital elevation model (DEM) were digitized to the centers of the model cells. A maximum evaporation rate of 72 inches a year and an extinction depth of 20 feet were used.

It was possible to calibrate the model with a range of evaporation extinction depths. With an extinction depth of 6 feet, calibrated transmissivity in the model increases by about 40%. Typically, an extinction depth of 6 feet would be selected for barren soil, while 20 feet would be selected in a phreatophyte-covered area. Much of the surface area on the active model grid has very little phyreatophyte activity. However, observed depths to water and LANDSAT imagery indicate that much of the evaporation occurs along phreatophyte-covered drainages.

John Shomaker and Associates, Inc. (2003) compiled historical pumping through 1999. The compilation was similar to the Morrison compilation to 1984 but JSAI added pumping outside of the administrative area, particularly north of Temporal Creek. The updated pumping compilation used municipal records for Alamogordo and Tularosa. It also contains the complete Holloman Air Force Base pumping that was initially compiled by JSAI for the water plan of the basin. JSAI updated the irrigation pumping with water rights files from the OSE office and cross-referenced this by doing a field survey. Reports by the USDA and NMASS and Wilson were also utilized. Because water elevation data was available after 1999, the simulation was extended through June 2005 with estimates of pumping based on projections of the 1999 pumping. Table 2 summarizes the pumping used in the model. No return flow was used in the revised OSE model.

## MODEL CALIBRATION

The model was started from a predevelopment steady state simulation at 1/1/1910. A transient simulation was calibrated from 1/1/1910 to 6/30/2005.

Steady state and transient simulations were examined in conjunction to find the best statistical and visual fit to water level observations.

Initially, the single transmissivity and single storage that fit calibration points the best was determined. A transmissivity of 900 $ft^2$/day and storage of 8% yielded the best calibration fit when a *single value* for transmissivity was used on the entire model grid. After the distribution of additional recharge cells in high recharge years was determined, only transmissivity zones were delineated and varied to improve upon the calibration. Transmissivity calibration was guided by observed values of transmissivity.

Figure 6 shows the calibrated transmissivity zones and aquifer test observation points. This calibrated and observed transmissivity information is also tabulated in table 3. The aquifer test points aided in the delineation of the model transmissivity zones. Being a regional model, site-specific information does not always match the simulated parameters. Transmissivity zones were also delineated along river drainages and conceptual geology. The transmissivity of the aquifer is highest along river drainages and decreases as the thickness of the basin fill pinches out to the west. Storage of 8% was universally applied in the model.

The average value of transmissivity, 900 $ft^2$/day, was used in areas of the model where the model could have been calibrated with a wide range of transmissivity and either no aquifer test was available or multiple aquifer test results were highly variable.

## STEADY STATE SIMULATION

In the steady state simulation, the only outflow of water in the model is at head dependant evaporation cells. Mountain front recharge enters the model at a rate of 11,890 AFY and exits via evaporation at a rate of 11,888 AFY. Model convergence error accounts for the other 2 AFY. The model iterates to determine the discharge and location of the model evaporation cells. The distribution of steady state evaporative outflow is shown in figure 7. The largest outflow model cells are along drainages. The simulated areas of outflow correspond with areas of observed shallow depth to groundwater.

A steady state water elevation set was constructed from wells with early measurement data and wells at a great distance from pumping effects. Water elevation contours for the steady state simulation and residuals for the steady state calibration wells are shown in figure 8. Observed and computed steady state water elevations and residuals are also summarized in table 4. In most areas of the model, residual errors are scattered in a non-systematic or random manner. The scatter is shown in figure 9 along with the idealized perfect fit line. Table 5 shows the steady state summary statistics for the 2005 model, the one-transmissivity model and the 1989 model. Steady state statistics have been improved with the 2005 model.

## TRANSIENT SIMULATION

Drawdown and buildup contours from steady state through June 2005 are shown in figure 10. Three Rivers and the area 9 miles north of Tularosa still show residual mounding due to the high recharge period from the years 1975 to 1995.

A set of 393 wells and 2073 observed data points of well water elevations from USGS hydrograph data and field measurements from JSAI and the OSE was used in the transient calibration. The water elevation data set spans from January 1911 to March 2004. A subset of 17 wells was selected to graphically compare observed to simulated water elevations throughout the model area.

Figure 10 also shows the locations of these 17 hydrographs dispersed about the model area. Figure 11 compares observed and simulated water elevations at these locations. The simulated water elevations are shown for the 1989 and 2005 models. Pumping was updated in the 1989 model. The 2005 model achieves a better calibration in the northern portion of the model. Observed rises in hydrographs, particularly in the Tularosa area, were due primarily to an increase in mountain front recharge. This increased recharge was not simulated in the 1989 model.

The budget at the end of the calibration period is shown in table 6. Evaporative outflow at June 2005 is 9905 AFY. Decline in the water table due to groundwater pumping from pre-development steady state through June 2005, salvages 1983 AFY of evaporation. Figure 12 shows the annual simulated water budget from 1910 to June 2005.

Transient statistics for the 2005 model, the one-transmissivity model and the 1989 model are summarized in table 7. The statistical fit by every measure has been improved with the 2005 model. The transient residual mean has less bias. Residual standard deviation has been reduced to 31 feet.

## References

Finch, S.T. and Shomaker, J.W., 2003, Predicted drawdown effects and evaluation of potential saline encroachment due to pumping under City of Alamogordo application nos. T-3825 through T-3825-S-9, approximately 10 miles north of Tularosa, Otera County, New Mexico. Unpublished consultants report.

Livingston Associates and John Shomaker & Associates, Inc., 2002, Tularosa Basin and Salt Basin regional water plan 2000-2040: South Central RD&C Council, Inc., Carrizozo, New Mexico.

Harbaugh, A.W., and McDonald, M.G., 1996, User's documentation for MODFLOW-96, an update to the U.S. Geological Survey modular finite-difference ground-water flow model: U.S. Geological Survey Open-File Report 96-485, 56 p.

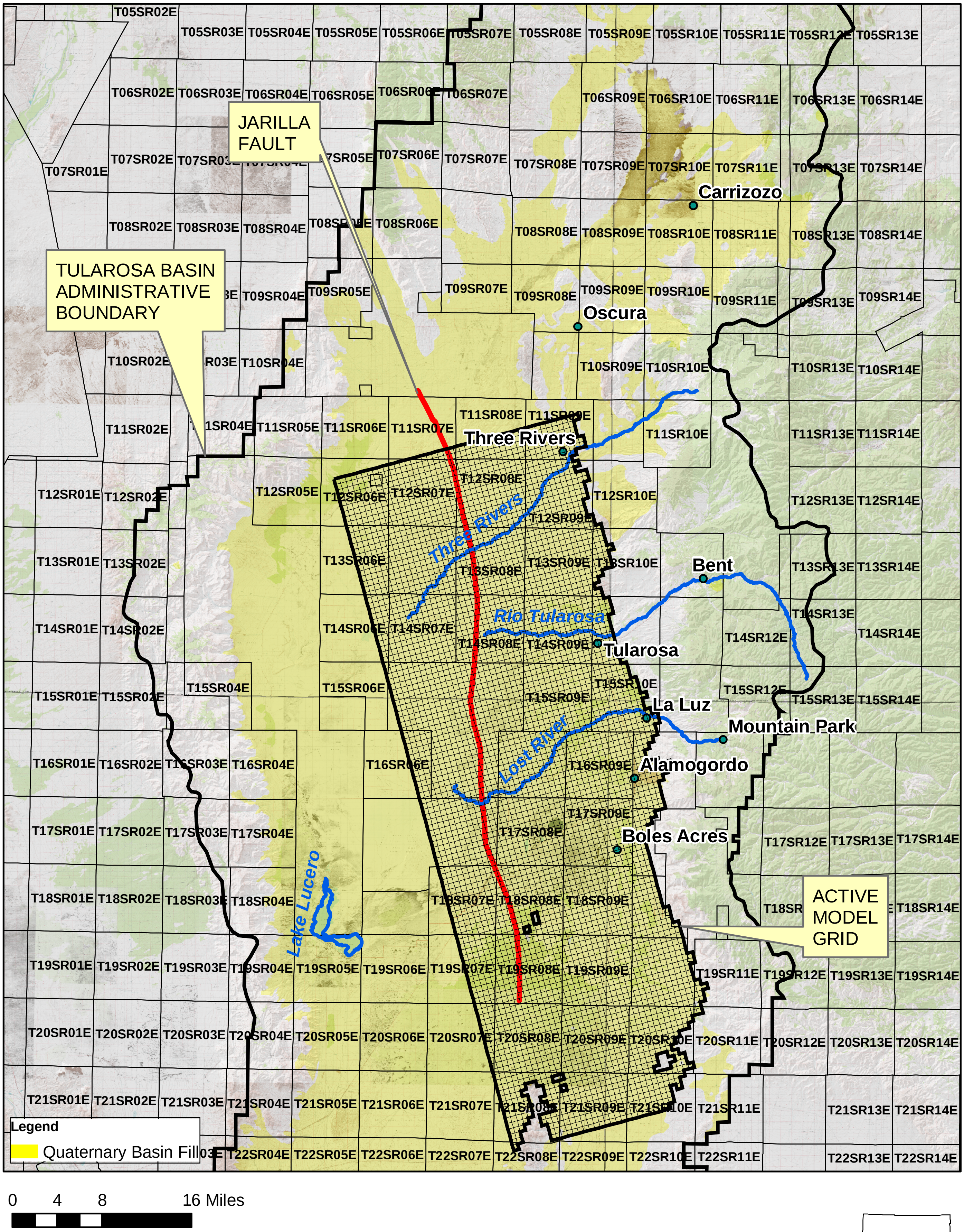
McLean, J. S., 1970, Saline ground-water resources of the Tularosa Basin, New Mexico: U.S. Geological Survey, OSW Report No. 561, 128 p.

Morrison, T. D., 1989, A regional model of the basin fill aquifer near Tularosa and Alamogordo, New Mexico: New Mexico State Engineer Office, Technical Division Hydrology Report 89-3.

New Mexico State Engineer Office, 1997, Tularosa underground water basin administrative criteria for the Alamogordo-Tularosa area: New Mexico State Engineer, May 1997.

U. S. Bureau of Reclamation Technical Memorandum, 2,092-foot borehole field activities, Source supply well USBR-WW-01, Tularosa Basin National Desalination Research Facility, November 14, 2003.

# FIGURES



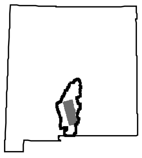


FIGURE 1
LOCATION MAP FOR THE ACTIVE MODEL GRID

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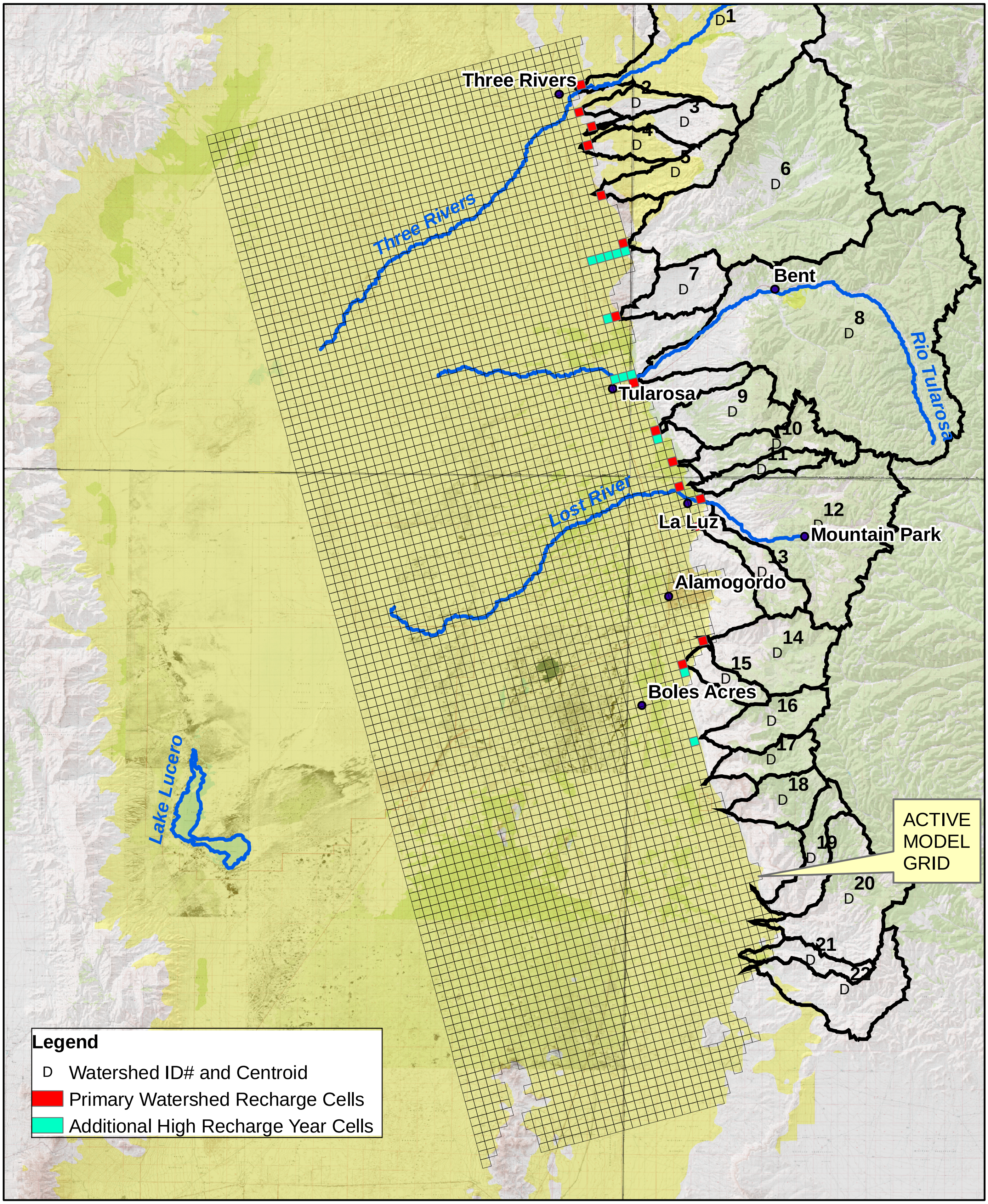
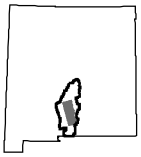


FIGURE 2
MOUNTAIN FRONT RECHARGE MODEL CELLS



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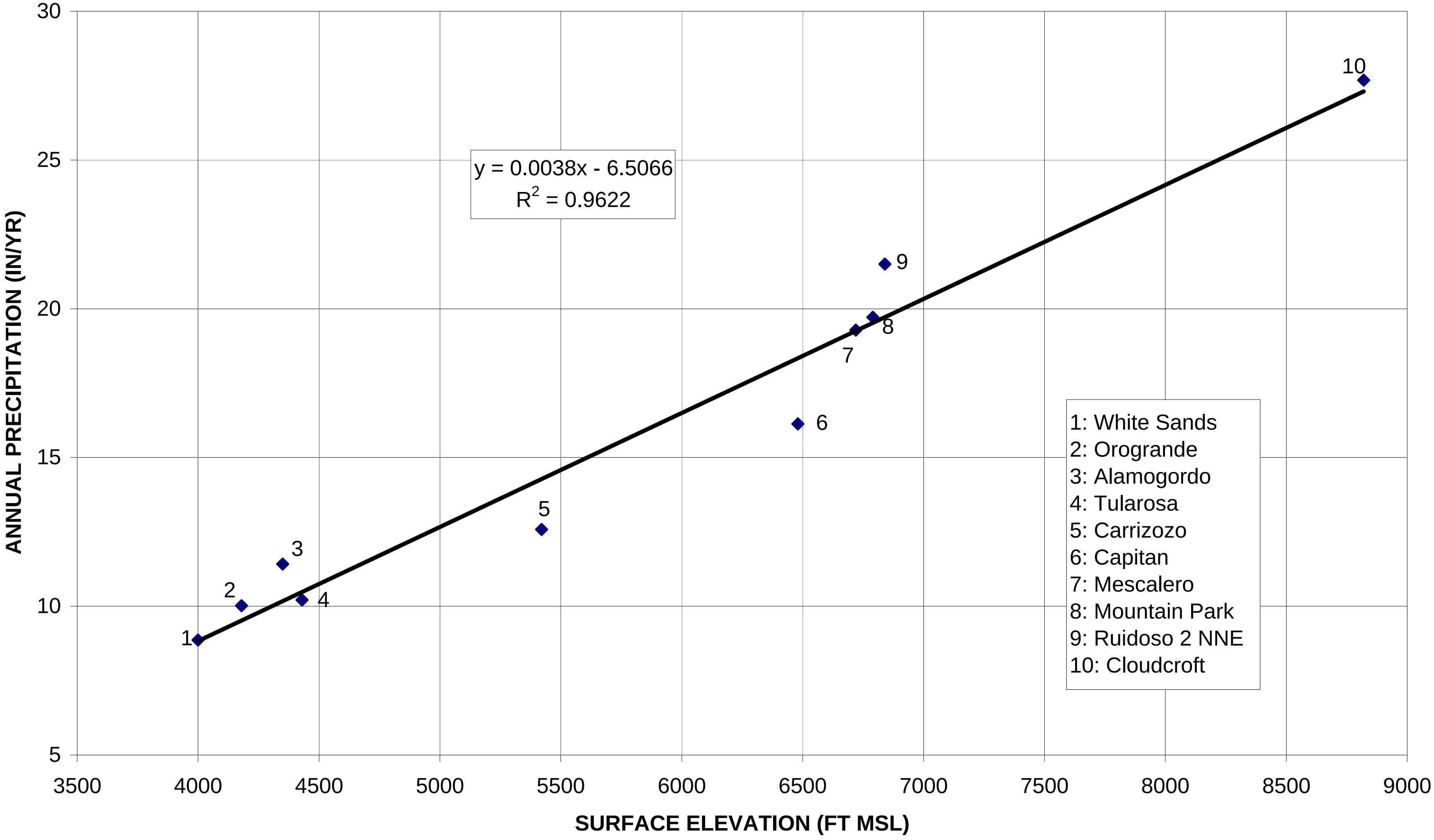
## FIGURE 3
## VARIATION OF PRECIPITATION WITH SURFACE ELEVATION AT GAGING STATIONS NEAR TULAROSA BASIN



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# FIGURE 4
## COMPARISON OF TULAROSA AREA DEPTH TO WATER AND MOVING AVERAGE OF TULAROSA PRECIPITATION

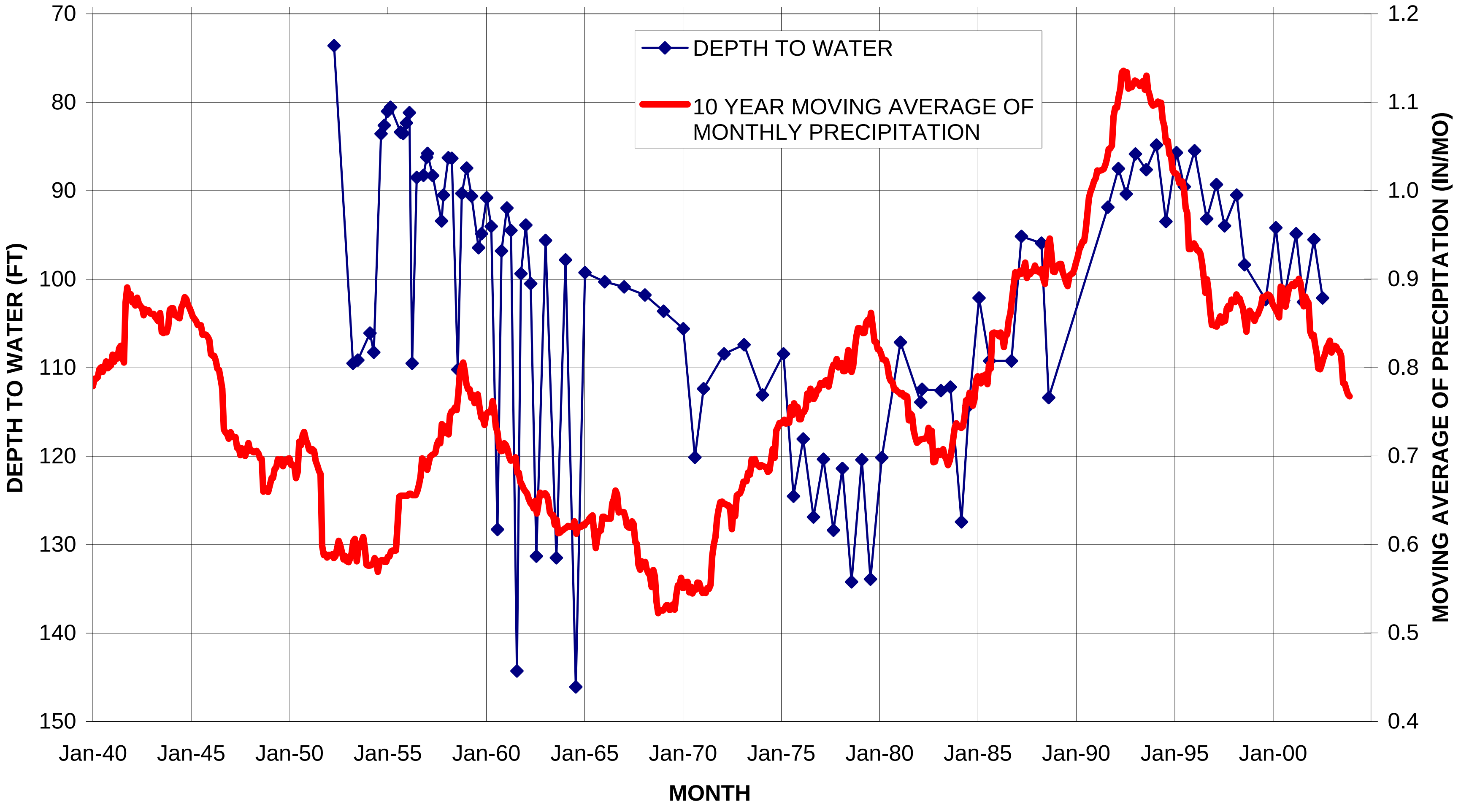

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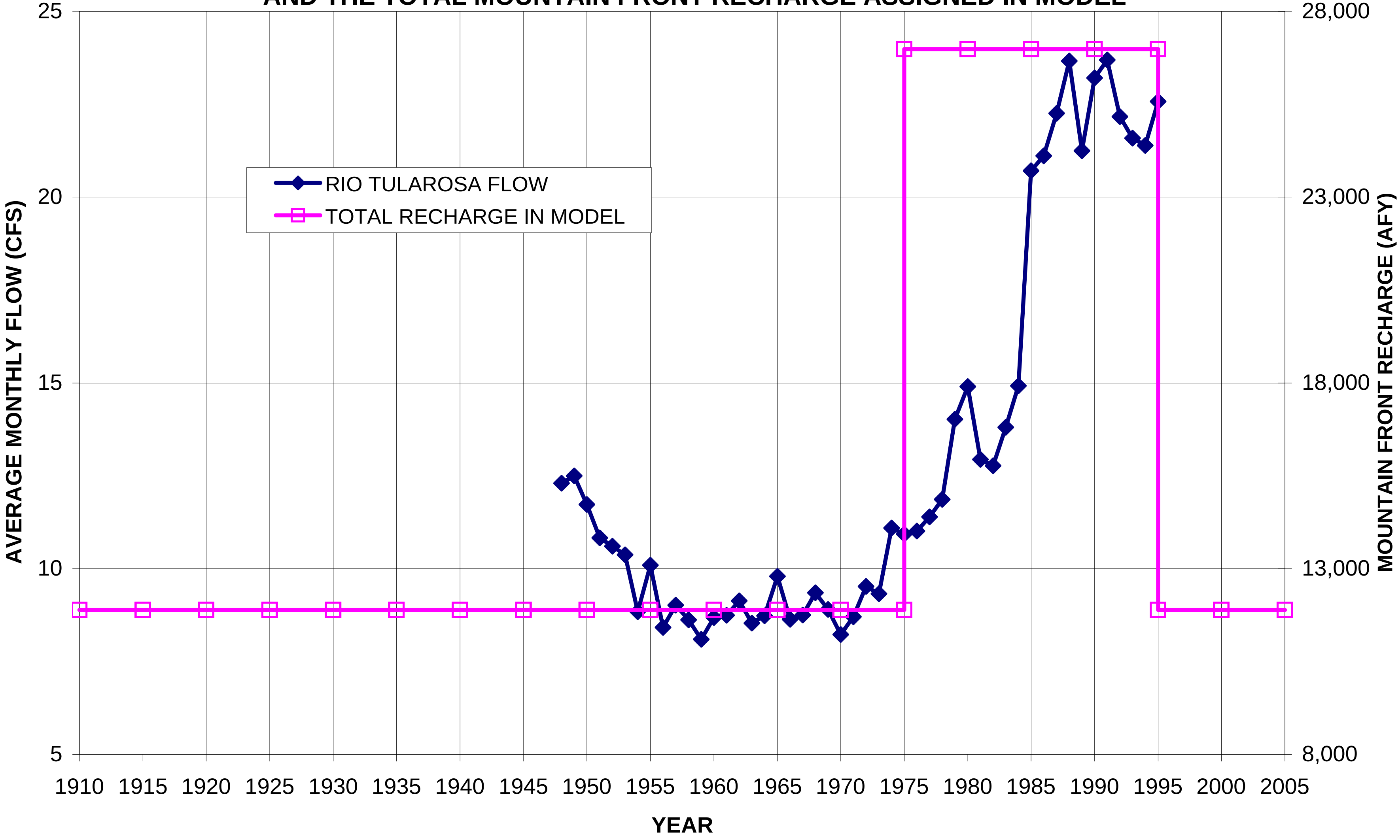
**FIGURE 5**
**AVERAGE MONTHLY FLOW AT THE RIO TULAROSA GAGE NEAR BENT**
**AND THE TOTAL MOUNTAIN FRONT RECHARGE ASSIGNED IN MODEL**



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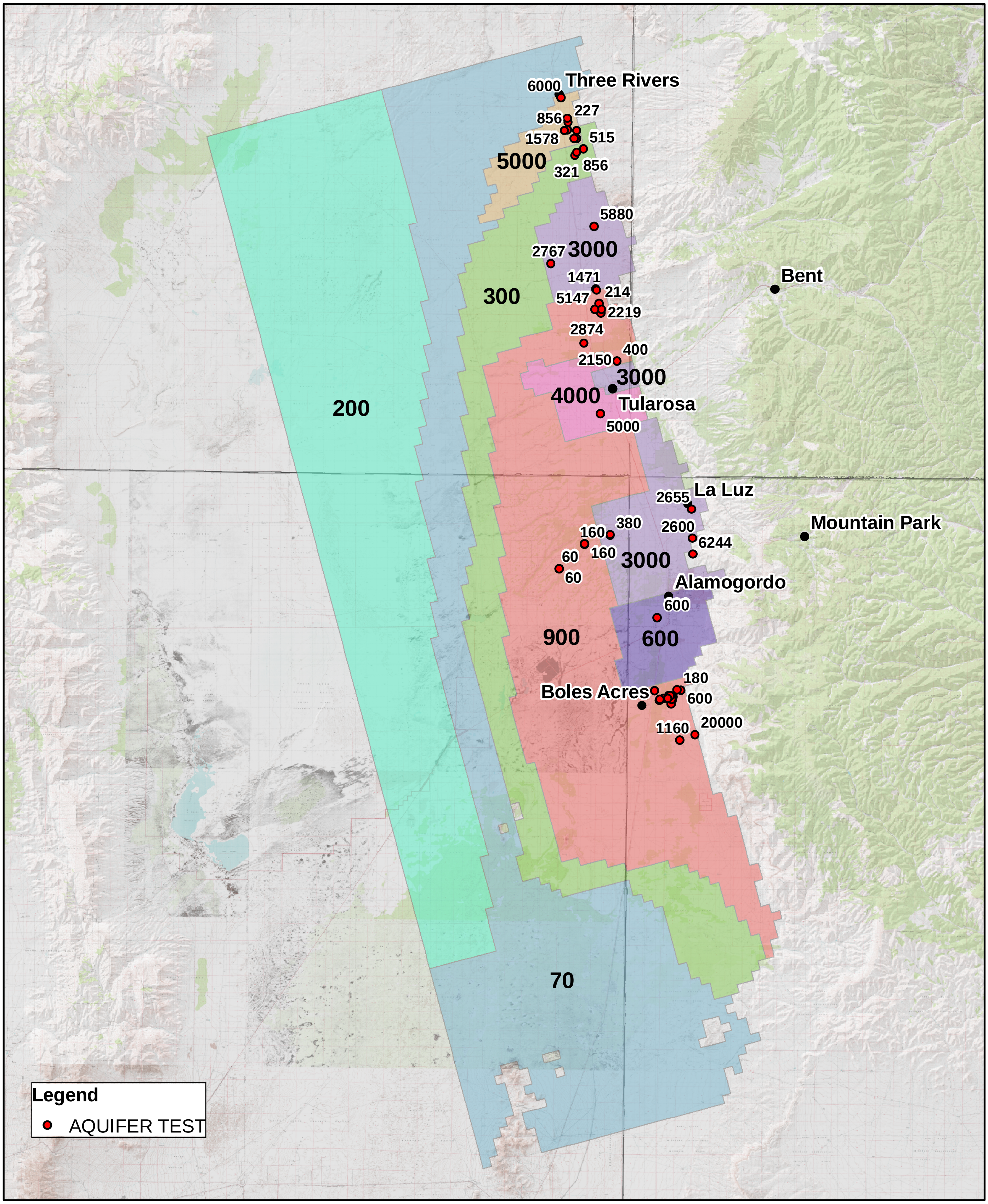

**TRANSMISSIVITY UNITS ARE IN FT$^2$/DAY**
**MODEL STORAGE IS UNIVERSALLY EQUAL TO 8%**

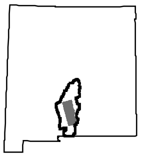

FIGURE 6
MODEL TRANSMISSIVITY
WITH AQUIFER TEST POINTS OF TRANSMISSIVITY

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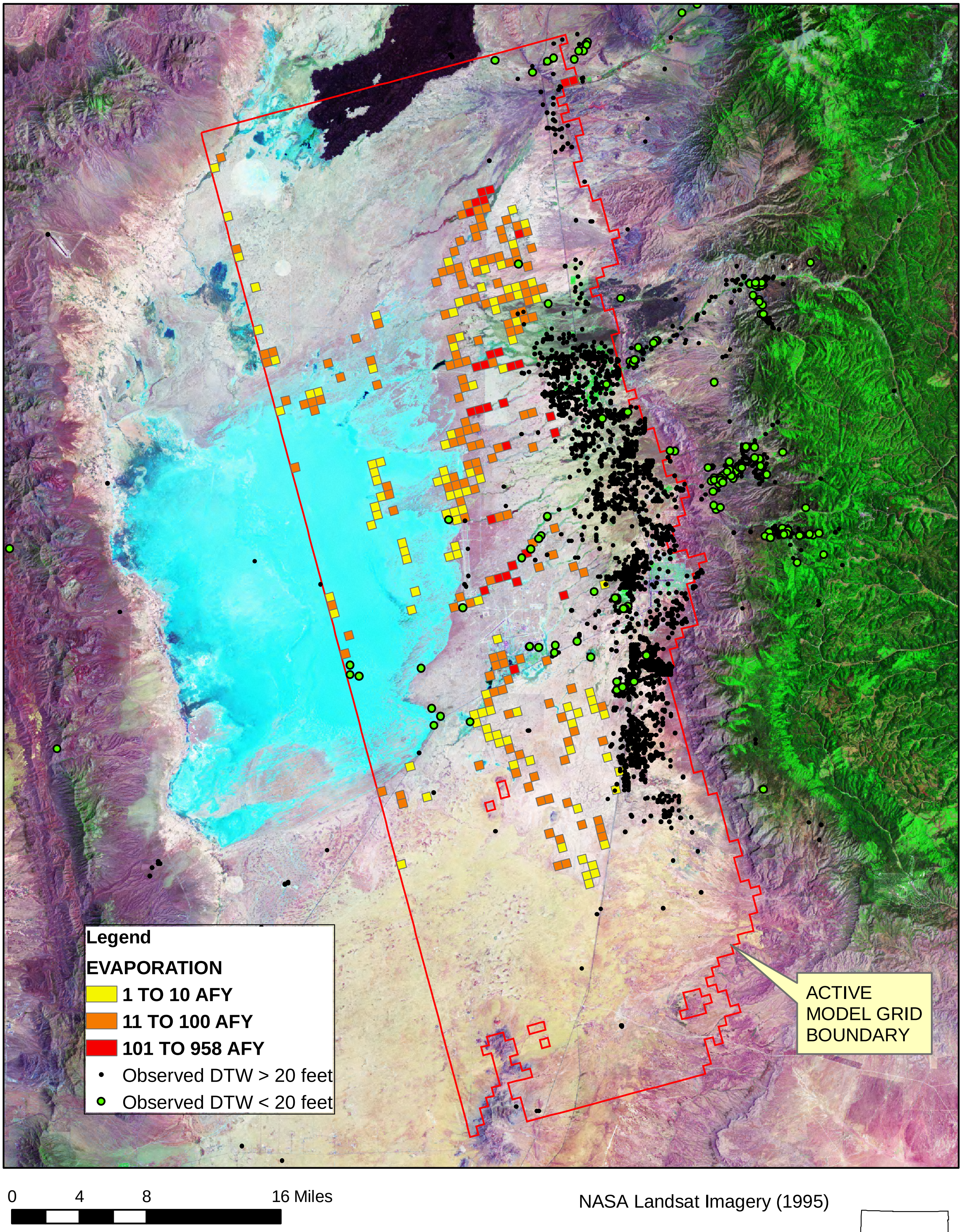
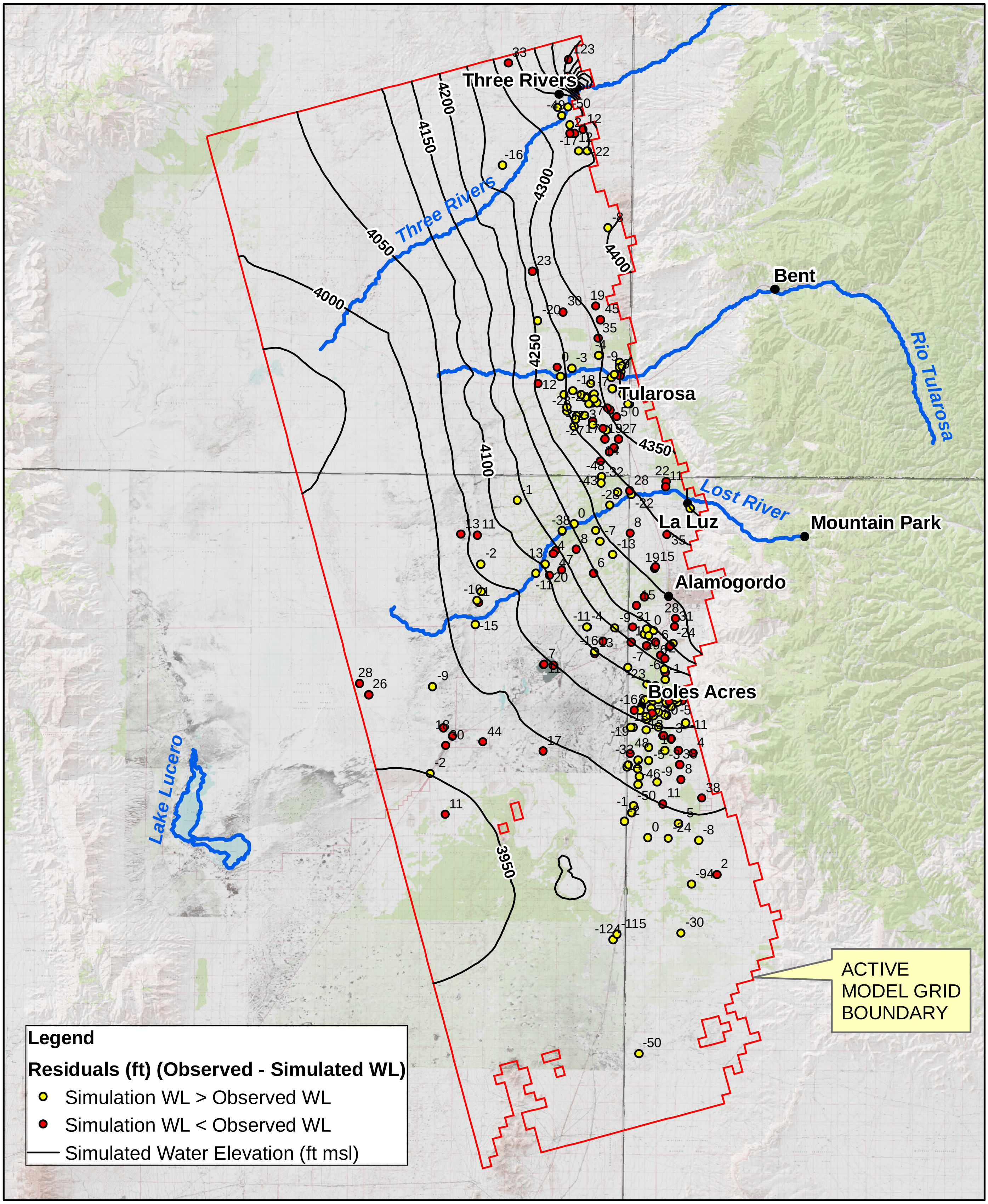


NASA Landsat Imagery (1995)

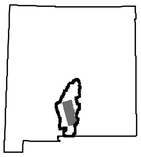
FIGURE 7
EVAPORATION LOCATIONS AND RATES
DETERMINED BY THE STEADY STATE MODEL

ss_dtw.mxd



0 4 8 16 Miles

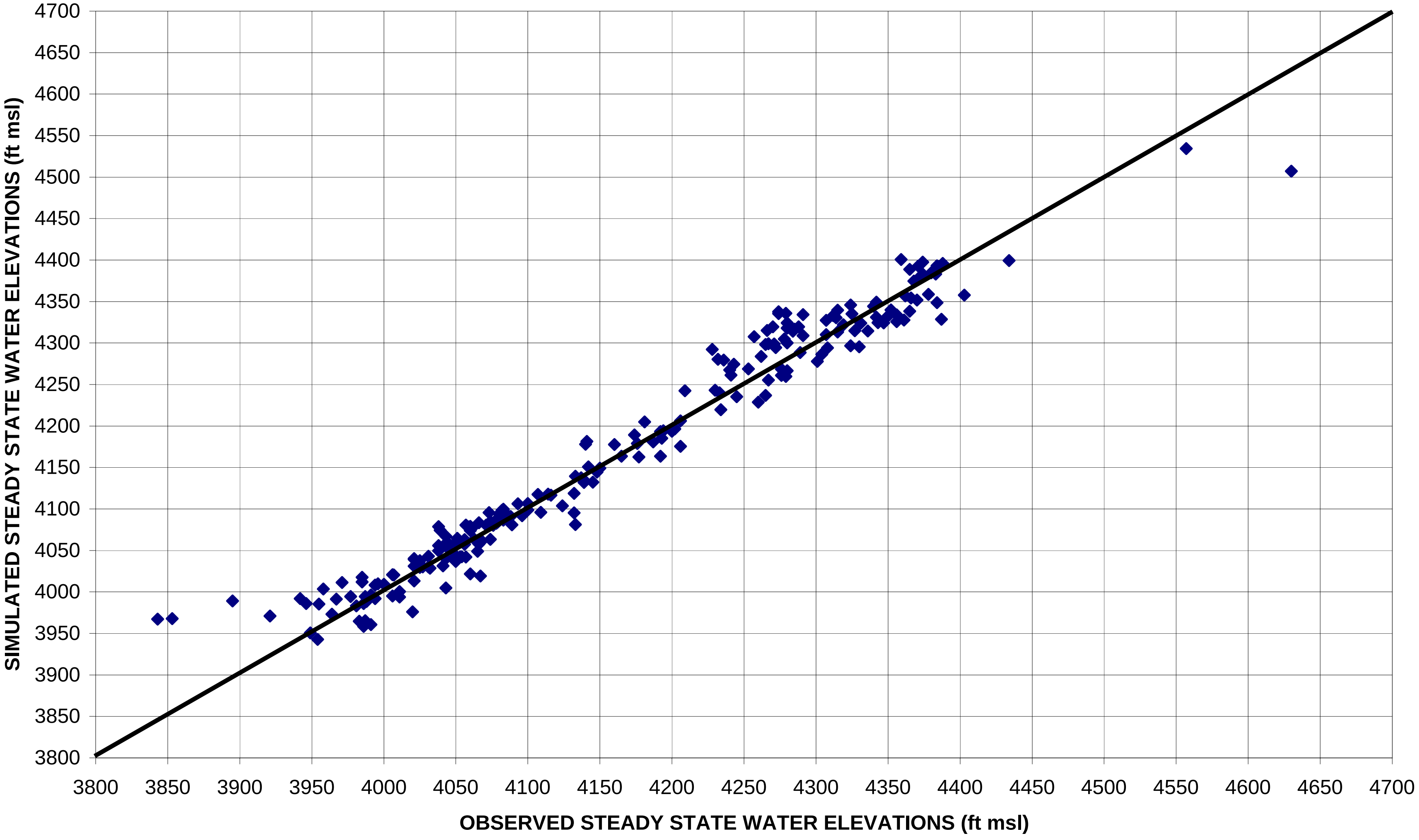
Contour Interval is 50-feet



# FIGURE 8
# OBSERVED - SIMULATED WATER ELEVATION RESIDUALS AND SIMULATED STEADY STATE WATER ELEVATIONS

ss_wl2.mxd

## FIGURE 9
## STEADY STATE COMPARISON OF OBSERVED WATER ELEVATIONS TO SIMULATED WATER ELEVATIONS



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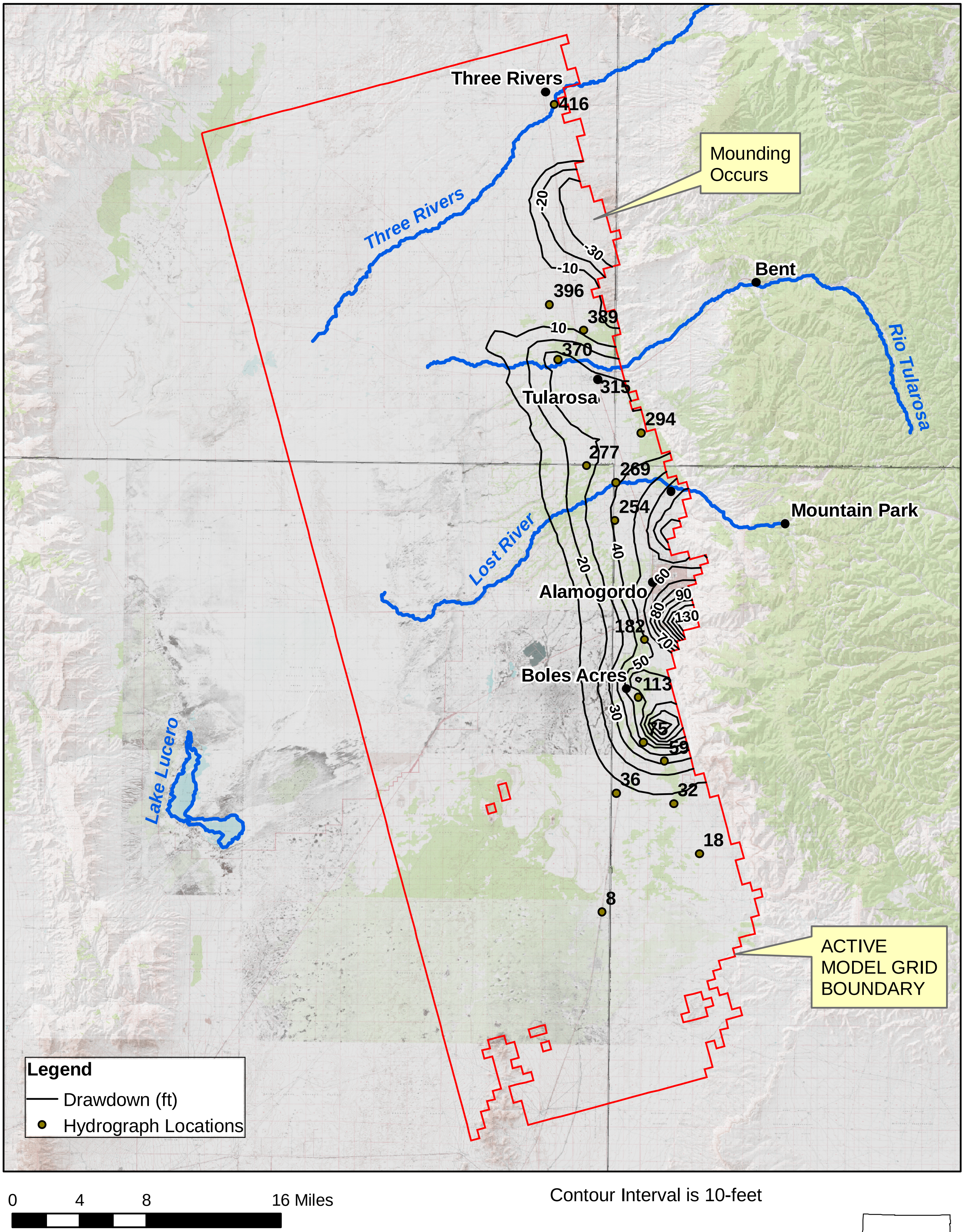

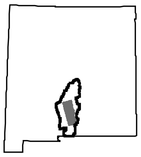

FIGURE 10
SIMULATED DRAWDOWN FROM STEADY STATE TO JUNE 2005
AND FIGURE 11 HYDROGRAPH LOCATIONS

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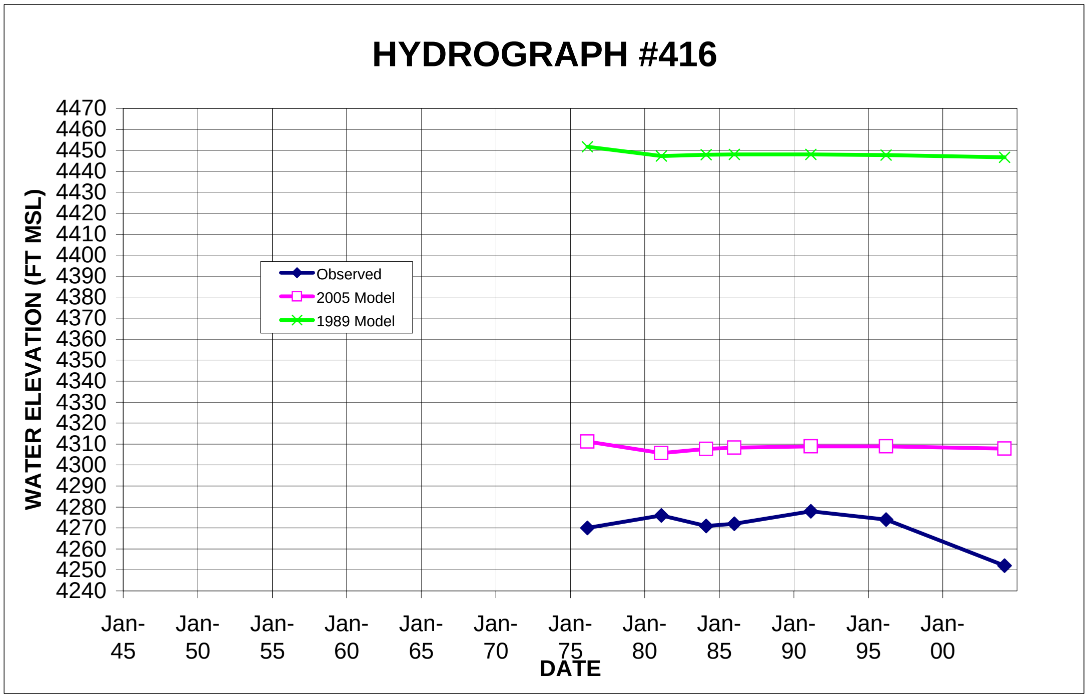
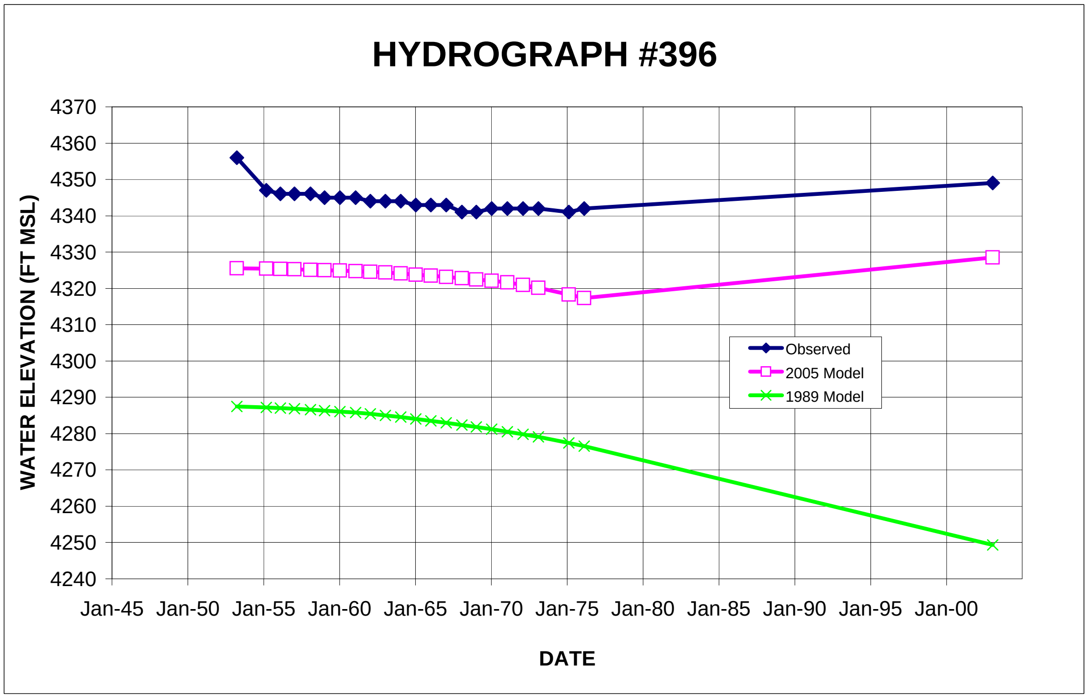
# FIGURE 11
# COMPARISON OF SIMULATED TO OBSERVED HYDROGRAPHS





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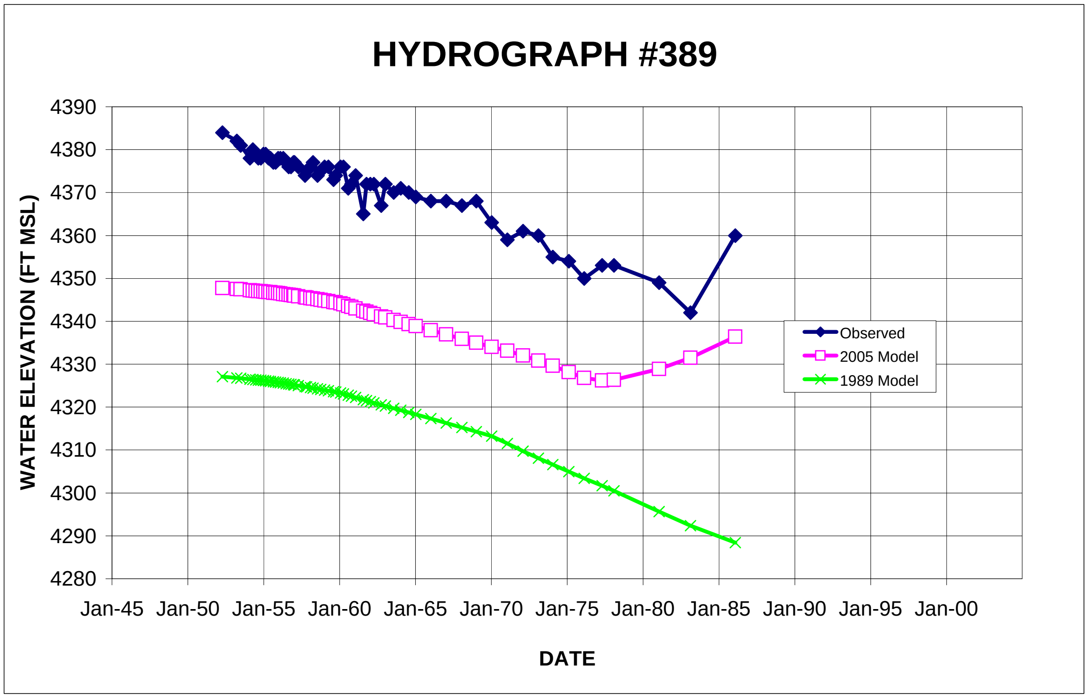

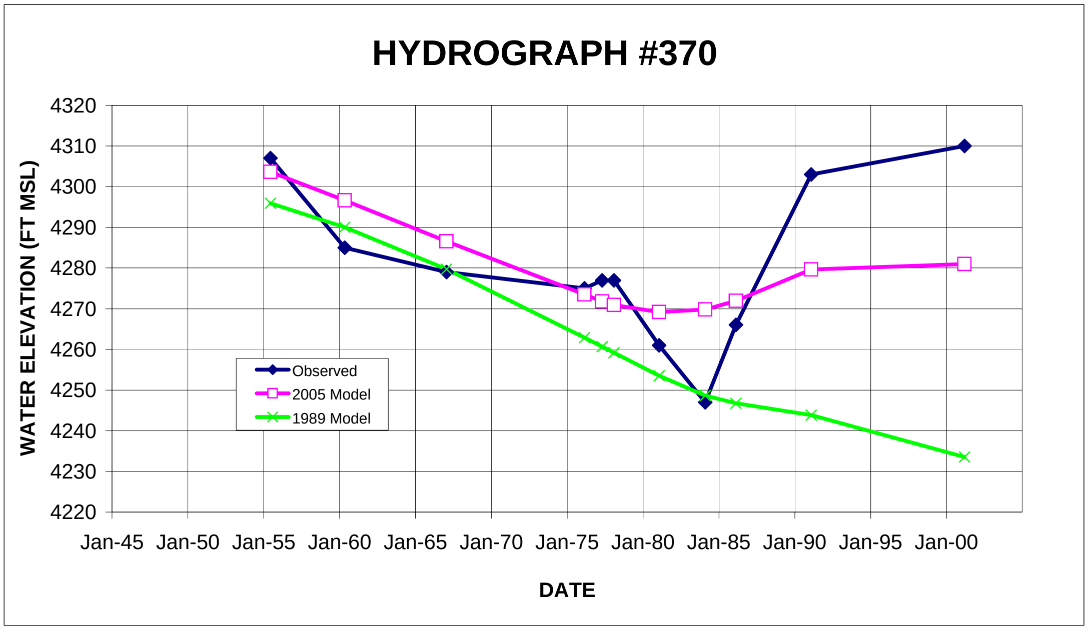

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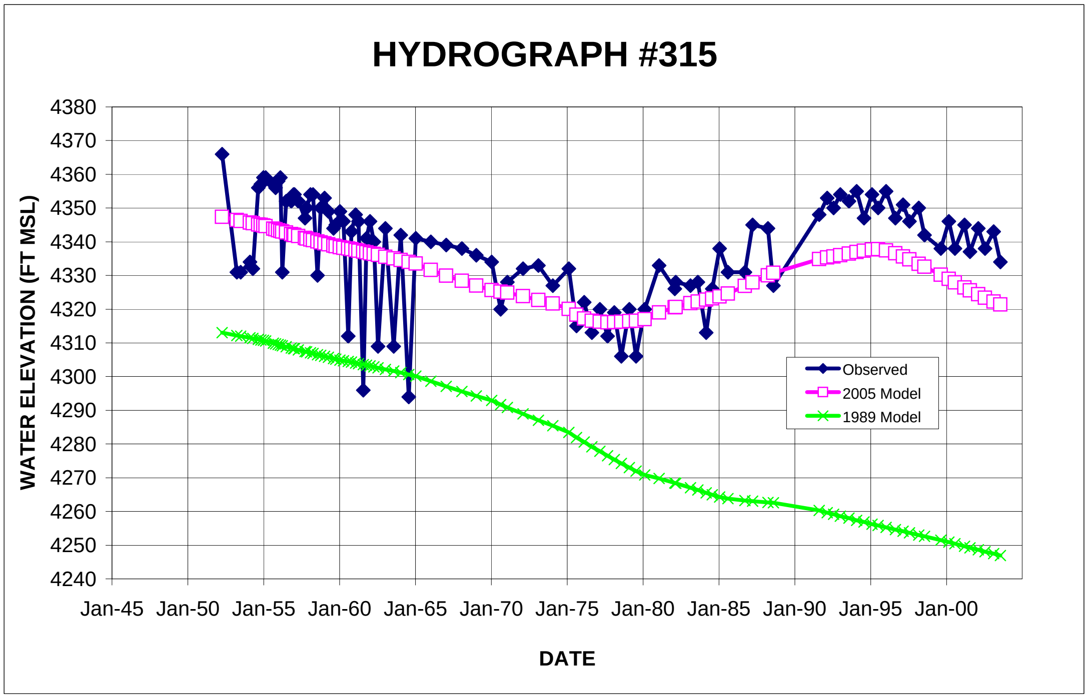

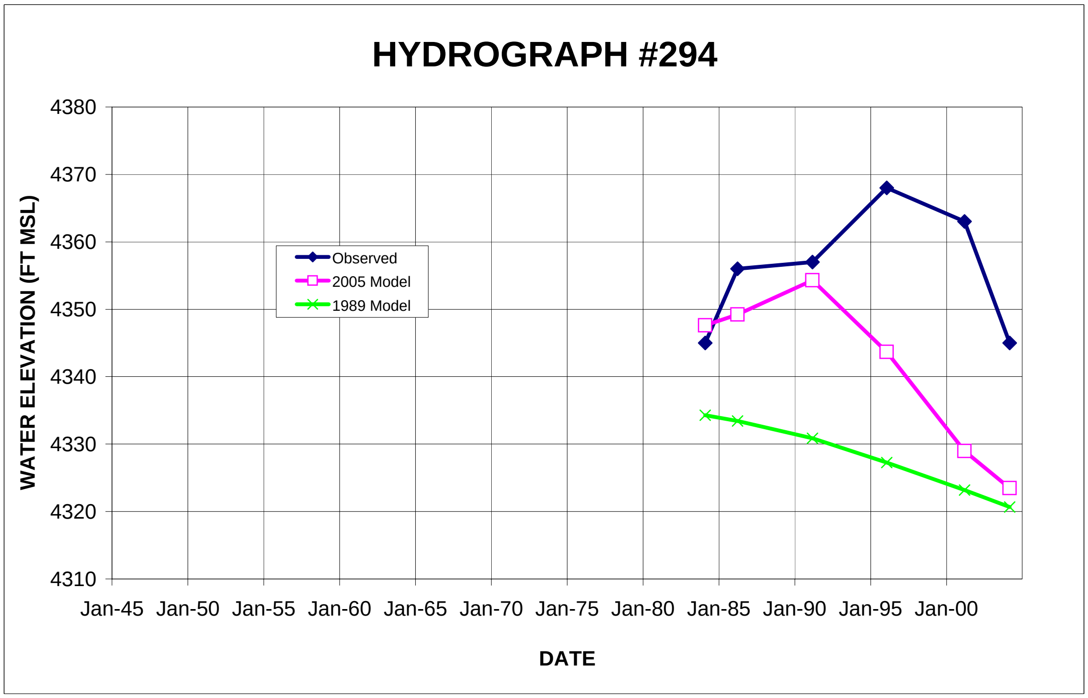

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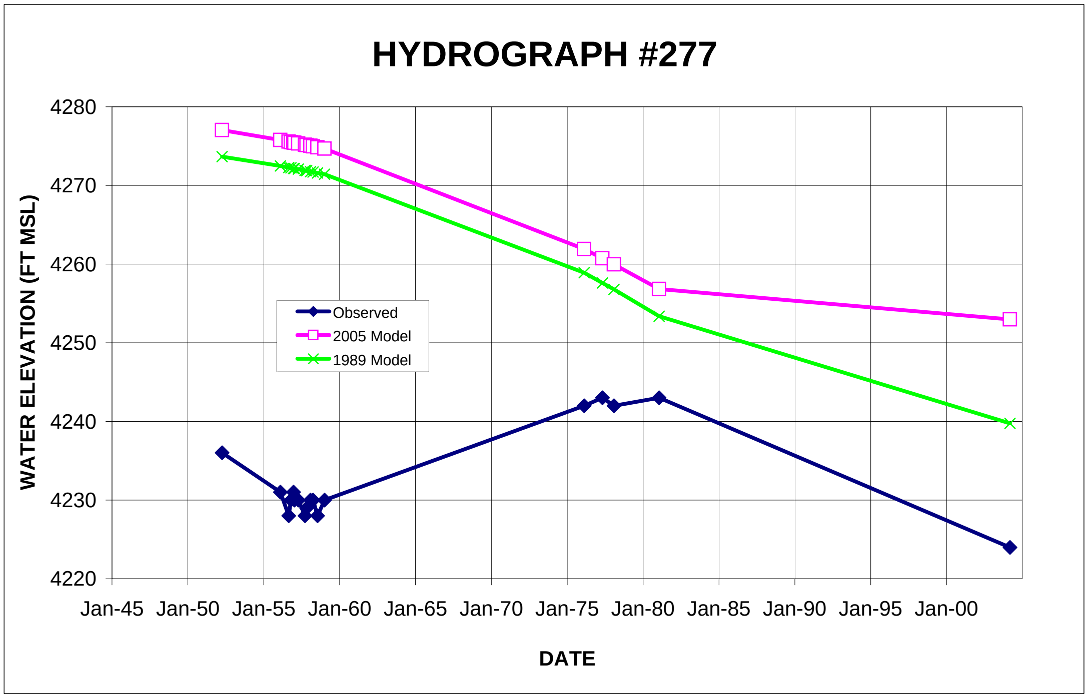

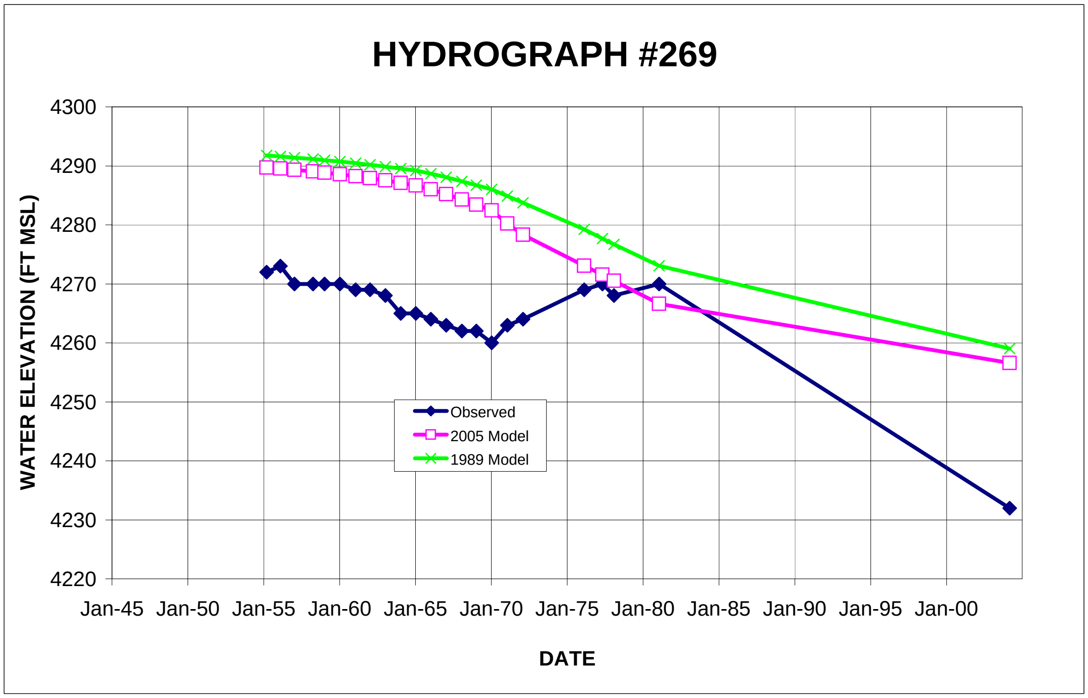

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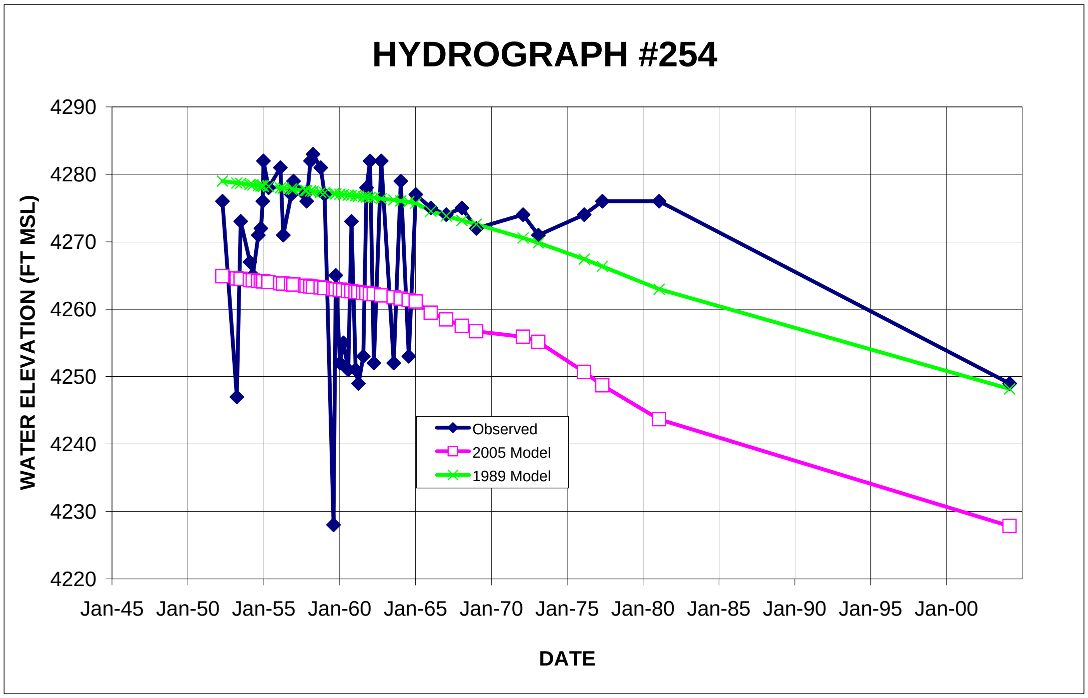

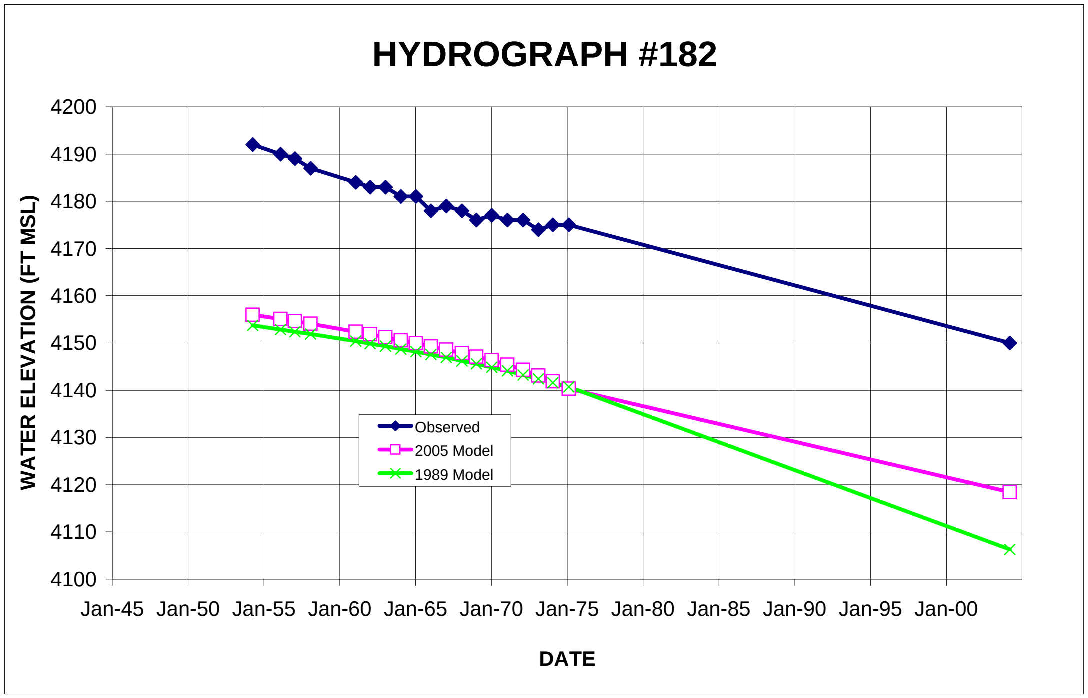

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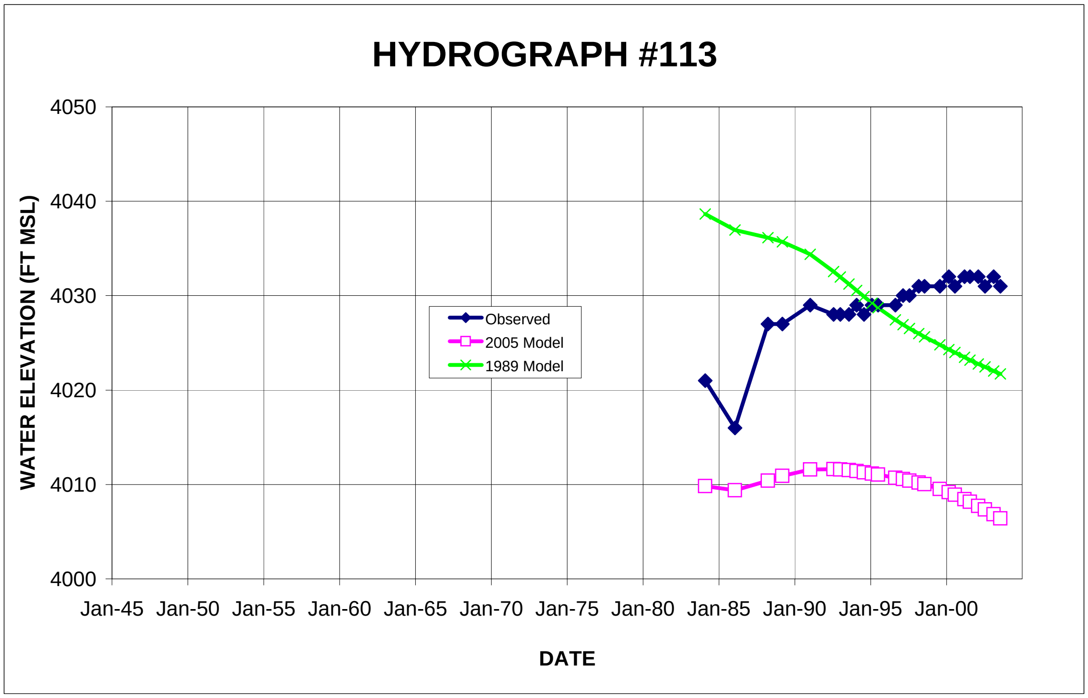

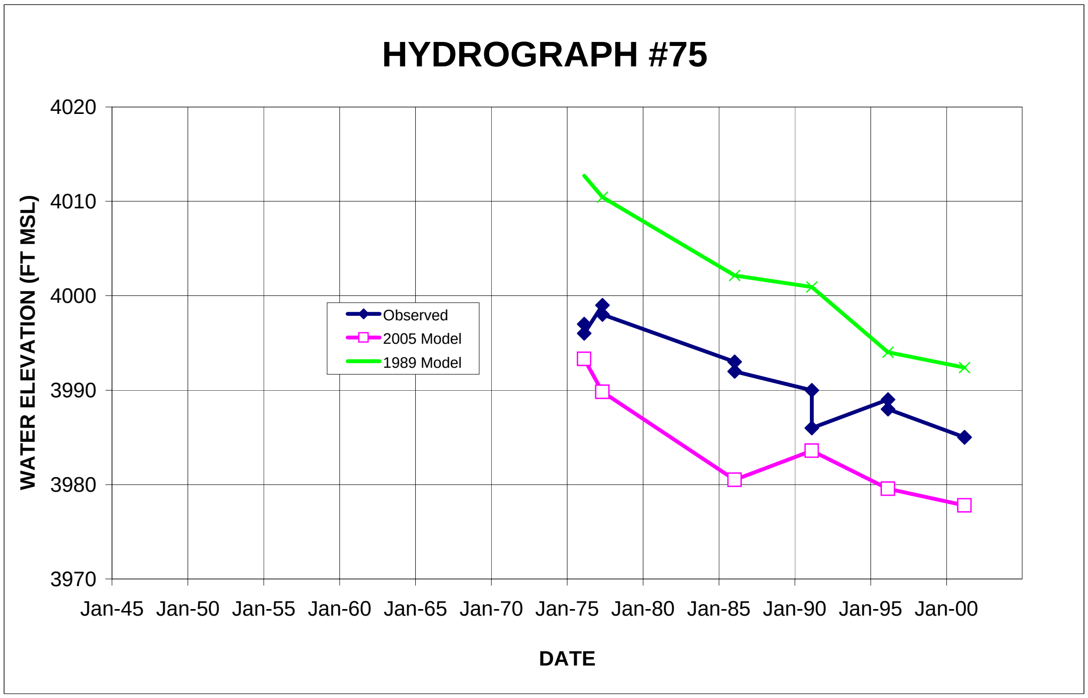

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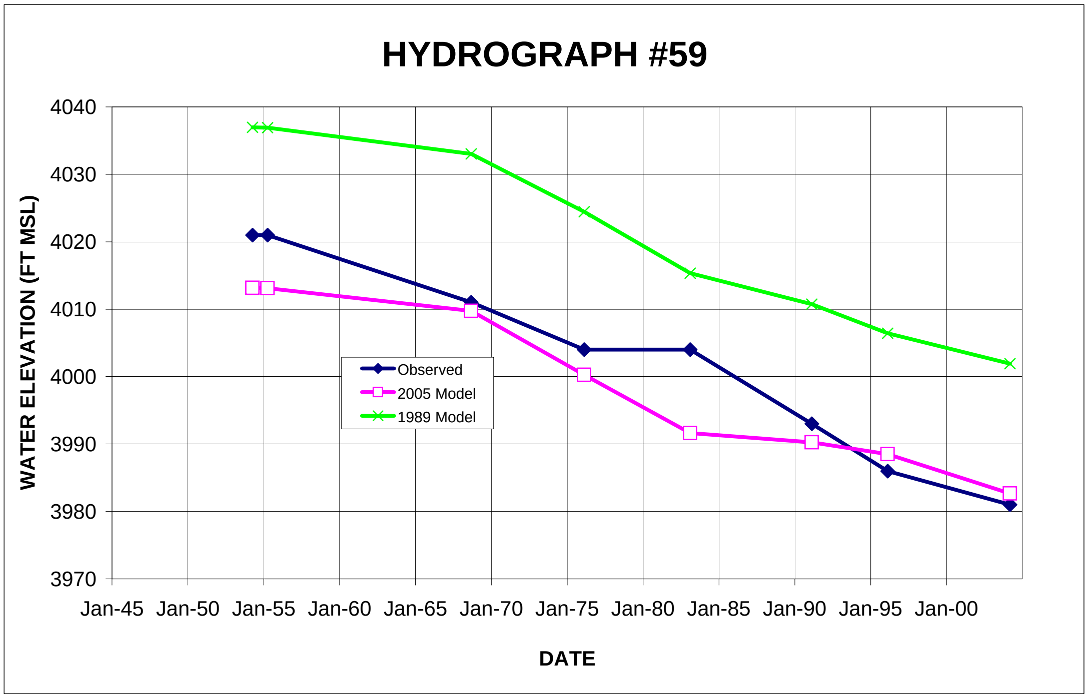

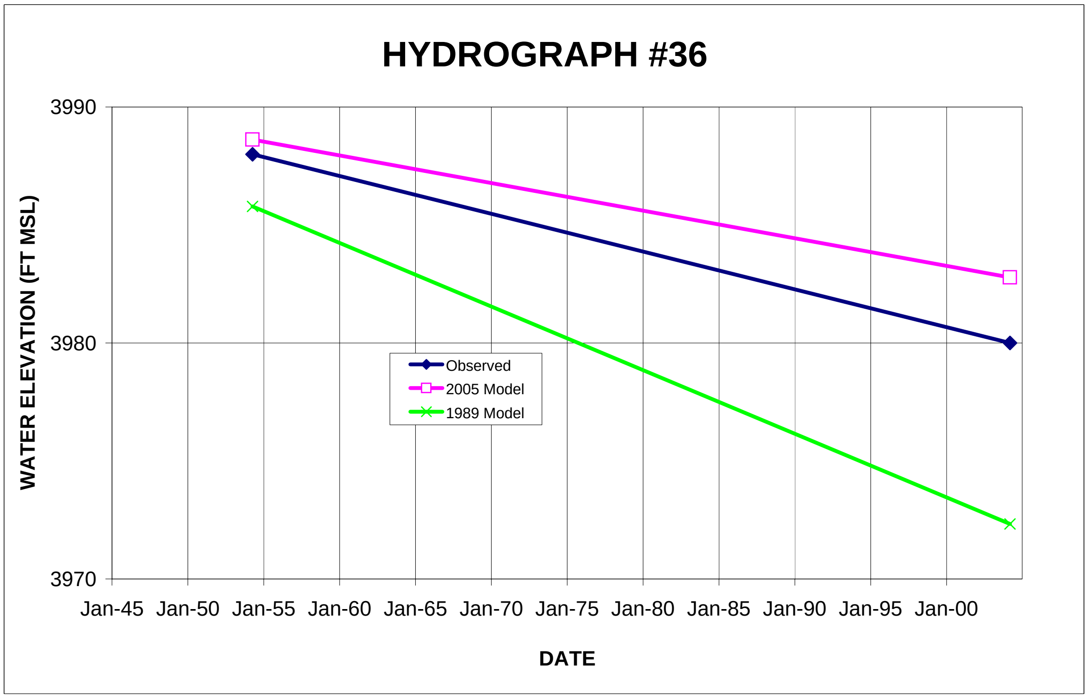

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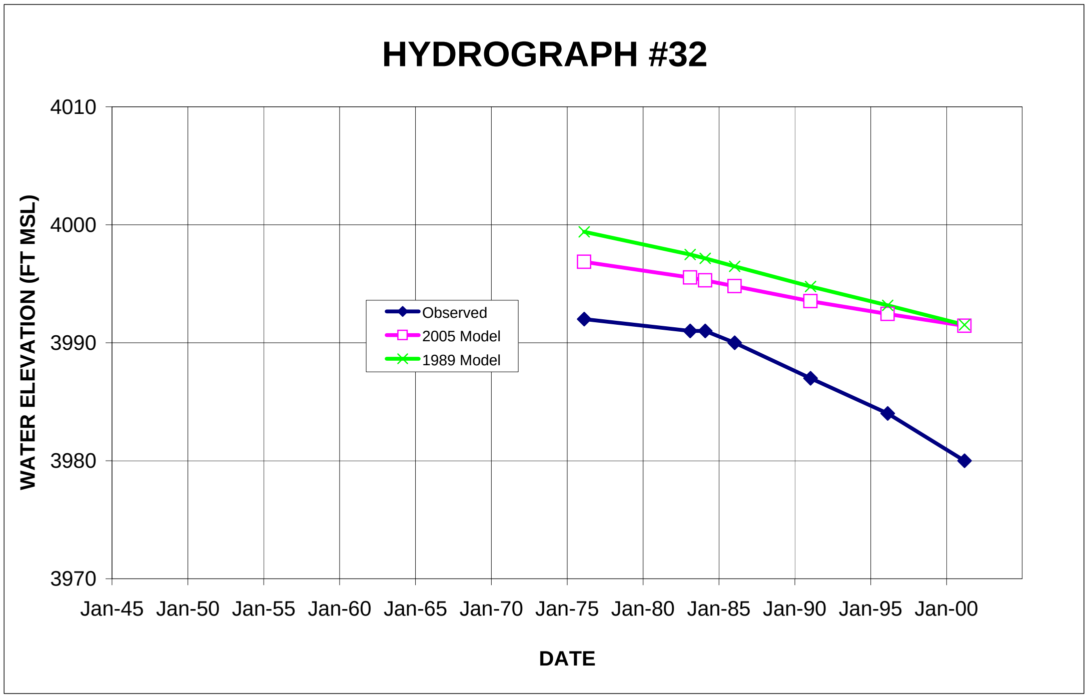

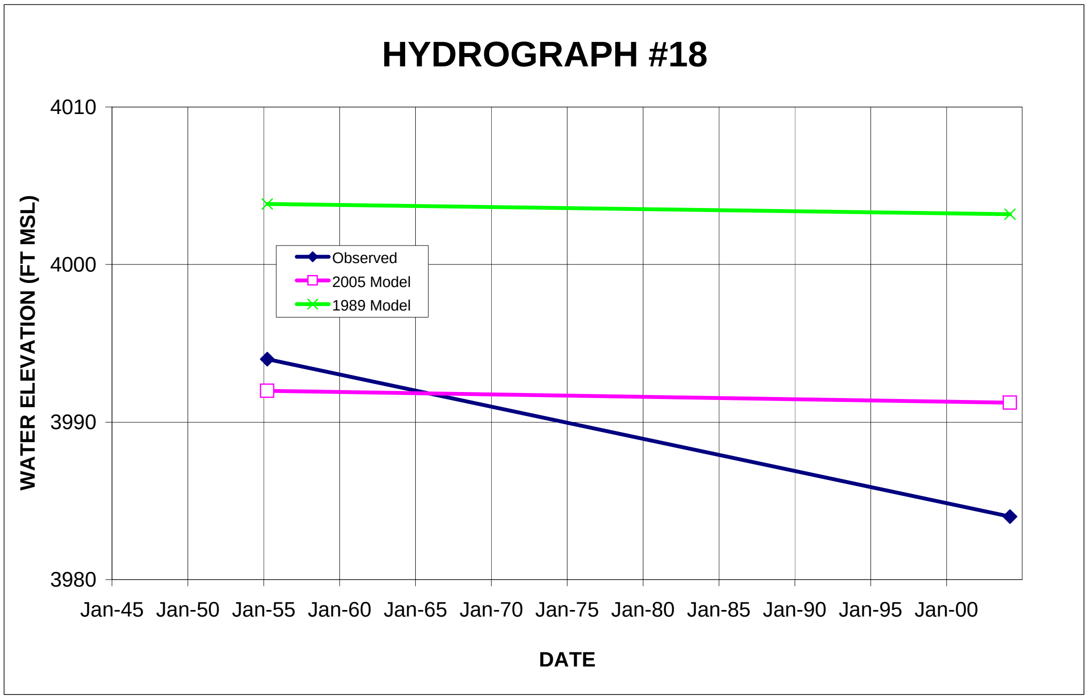

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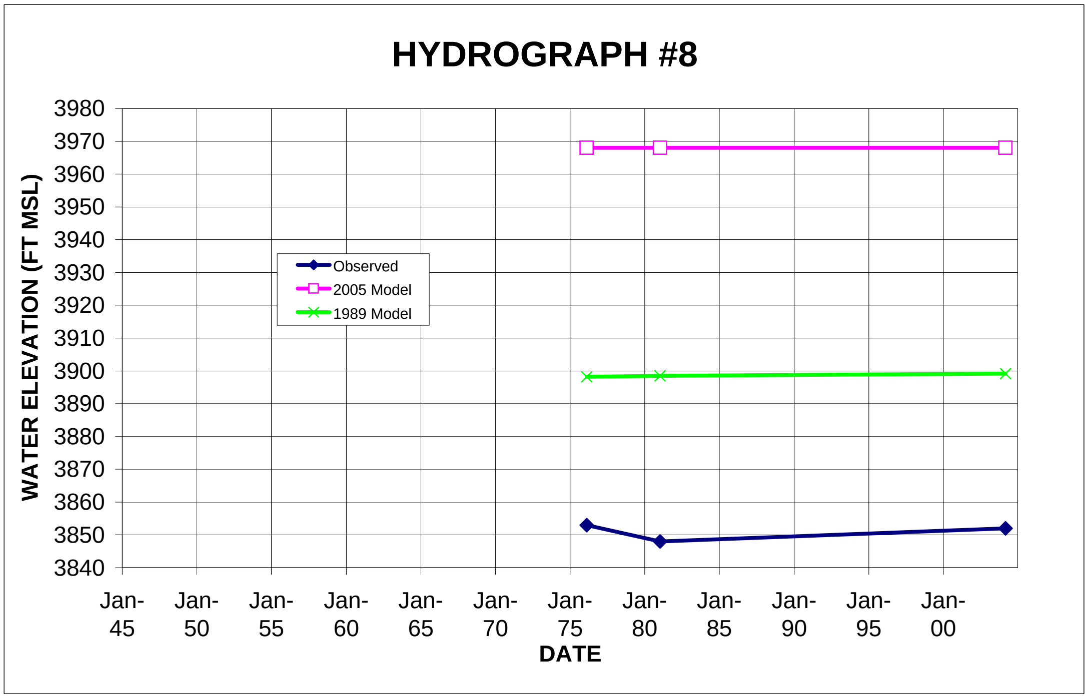
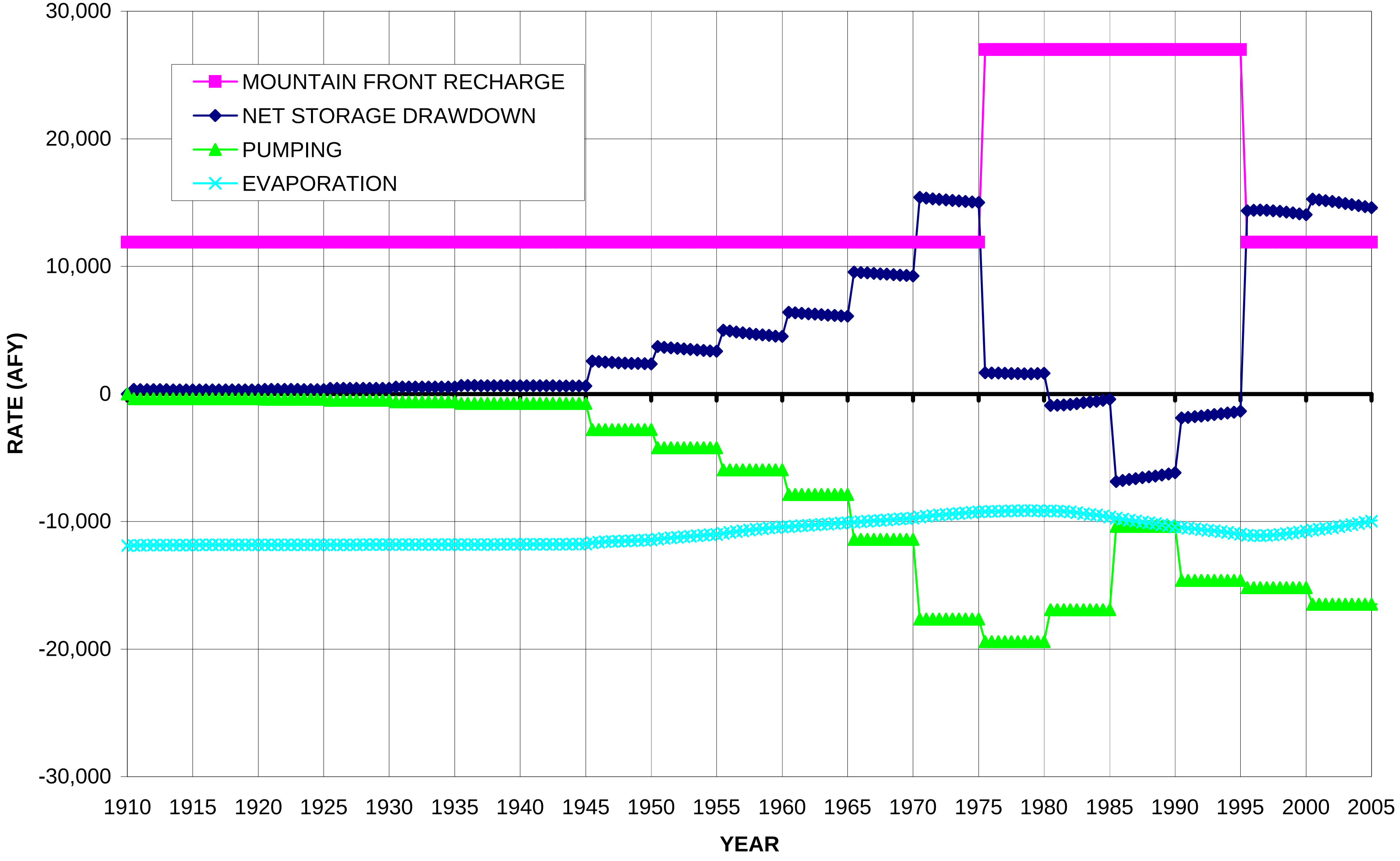


**FIGURE 12**
**SIMULATED WATER BUDGET COMPONENTS**



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# TABLES

# TABLE 1
# STEADY STATE MOUNTAIN FRONT RECHARGE

| ID# | MODEL GRID INTERSECTION ROW | COLUMN | WATERSHED AREA (acres) | WATERSHED CENTROID ELEV. (ft msl) | WATERSHED CENTROID PRECIP. (in/yr) | WATERSHED RAINFALL (AFY) | WATERSHED RAINFALL PORTION | SIMULATED RECHARGE (AFY) | SIMULATED RECHARGE (CFD) |
|---:|---:|---:|---:|---:|---:|---:|---:|---:|---:|
| 1 | 6 | 44 | 55,353 | 5749 | 15.3 | 70,755 | 13.11% | 1,559 | 185,937 |
| 2 | 9 | 43 | 4,045 | 5031 | 12.6 | 4,252 | 0.79% | 94 | 11,173 |
| 3 | 11 | 44 | 7,162 | 5590 | 14.7 | 8,794 | 1.63% | 194 | 23,110 |
| 4 | 13 | 43 | 5,340 | 5056 | 12.7 | 5,655 | 1.05% | 125 | 14,861 |
| 5 | 19 | 43 | 8,485 | 5535 | 14.5 | 10,271 | 1.90% | 226 | 26,992 |
| 6 | 25 | 44 | 63,347 | 6114 | 16.7 | 88,299 | 16.36% | 1,946 | 232,043 |
| 7 | 33 | 41 | 8,720 | 5082 | 12.8 | 9,307 | 1.72% | 205 | 24,457 |
| 8 | 41 | 41 | 97,057 | 8039 | 24.0 | 194,464 | 36.04% | 4,285 | 511,034 |
| 9 | 47 | 42 | 11,915 | 5574 | 14.7 | 14,572 | 2.70% | 321 | 38,294 |
| 10 | 51 | 43 | 10,505 | 6580 | 18.5 | 16,194 | 3.00% | 357 | 42,557 |
| 11 | 54 | 43 | 4,658 | 5750 | 15.3 | 5,955 | 1.10% | 131 | 15,648 |
| 12 | 56 | 45 | 40,356 | 6980 | 20.0 | 67,318 | 12.48% | 1,483 | 176,905 |
| 13 | 59 | 44 | 7,805 | 6367 | 17.7 | 11,505 | 2.13% | 254 | 30,234 |
| 14 | 72 | 41 | 15,782 | 7010 | 20.1 | 26,478 | 4.91% | 583 | 69,581 |
| 15 | 74 | 38 | 4,161 | 6095 | 16.7 | 5,775 | 1.07% | 127 | 15,176 |
|  |  |  |  |  | **TOTAL** | 539,593 | 100.00% | 11,890 | 1,418,001 |

# TABLE 2
# HISTORICAL SIMULATED PUMPING
# ADAPTED FROM FINCH AND SHOMAKER (MARCH 2003)

| | | | | | | STRESS PERIOD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | START DATE | 1/1/1910 | 1/1/1915 | 1/1/1920 | 1/1/1925 | 1/1/1930 | 1/1/1935 | 1/1/1940 | 1/1/1945 | 1/1/1950 | 1/1/1955 | 1/1/1960 |
| ID | NMOSE | COMMENT | LOCATION (T.R.S.QQQ) | MODEL ROW | MODEL COLUMN | END DATE | 12/31/1914 | 12/31/1919 | 12/31/1924 | 12/31/1929 | 12/31/1934 | 12/31/1939 | 12/31/1944 | 12/31/1949 | 12/31/1954 | 12/31/1959 | 12/31/1964 |
| 1 | Three Rivers Cattle T-442 et al (T-442) | | 11.09.34.4 | 8 | 42 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Three Rivers Cattle T-442 et al (T-442(2)) | subtracted from rch cell | | 6 | 44 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | Three Rivers Cattle T-442 et al | shifted from (7,45) | | 6 | 45 | ANNUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Three Rivers Cattle T-442 et al | | | 8 | 41 | PUMPING | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | Niccum (T-2014, T-2016, T-2018, T-2023, T-2024) | | 12.09.10.22 | 10 | 41 | RATE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Niccum (T-2019) | | 12.09.11.11 | 10 | 42 | (CFD) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | Niccum (T-2017,T-2020, T-2022, T-2026) | | 12.09.11.33 | 12 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | Niccum (T-2021) | | 12.09.14.22 | 13 | 43 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | HFR T-1797-S-8 | | | 29 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | HFR T-1797-S-6&7 | | 13.09.23.4 | 28 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | HFR T-1797-S-5 | | 13.09.24.2 | 27 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | HFR T-1797-S-4 | | | 29 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20,500 |
| 13 | HFR T-1797-S-3 | | 13.09.25.0 | 29 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,000 |
| 14 | HFR T-1797-S- | | | 31 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,005 | 5,005 | 5,005 |
| 15 | T-0028 HFR (T-1797) | | 13.09.36.23 | 31 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,005 | 5,005 | 5,005 |
| 16 | T-594, T-774 | | 14.09.10.31 | 34 | 33 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,100 |
| 17 | irr-w/gw 160 acres (same OSE cell as Hydrograph | | 14.09.01.3 | 34 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 |
| 18 | irr-w/gw 70 acres | | 14.09.16.0 | 36 | 32 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,000 |
| 19 | T-768 | | 14.09.11.44 | 36 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | irr-w/gw 355 acres (same OSE cell as Hyd. 7) T-0 | | 14.09.15.3 | 36 | 33 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,000 | 15,000 | 15,000 |
| 21 | T-0085, T-0070 (Hydrograph 8) | | 14.09.22.22 | 37 | 34 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 25,000 |
| 22 | T-0929 | | 14.09.13.32 | 37 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 15,000 | 20,000 |
| 23 | T-156, T-157 | | 14.10.18.0 | 34 | 28 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 5,000 | 10,000 |
| 24 | T-0656, T-0021 | | 14.09.23.23 | 38 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | T-0085-s (see Hyd. 9), T-0723 | | 14.09.24.12 | 38 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,000 | 25,000 |
| 26 | T-0022 | | 14.10.17.41 | 35 | 30 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 20,000 | 20,000 |
| 27 | T-0188 | | 14.10.20.44 | 38 | 30 | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 28 | T-0730 | | 14.09.27.23 | 40 | 33 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20,000 | 25,600 |
| 29 | T-14 | | 14.10.19.31 | 36 | 26 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 5,000 |
| 30 | T-104 | | 14.09.25.22 | 40 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,500 | 2,500 | 2,500 | 2,500 |
| 31 | T-0018 | | 14.10.19.14 | 36 | 27 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 10,000 | 15,000 | 20,000 |
| 32 | T-25 | | 14.10.19.23 | 36 | 27 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20,000 | 30,000 | 30,000 | 20,000 |
| 33 | T-0443, T-0057 (Hydrograph 17) | | 14.10.20.22 | 36 | 30 | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 34 | T-0057-A, T-589 | | 14.10.20.14 | 37 | 29 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 15,000 | 15,000 | 15,000 |
| 35 | T-0027, T-0158, T-0001, T-0004, T-0170, T-0169 | | 14.09.26.41 | 41 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 40,000 | 43,000 | 46,000 |
| 36 | T-61 | | 14.09.26.42 | 41 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 10,000 | 30,000 | 20,000 |
| 37 | T-0077 | | 14.10.20.42 | 37 | 30 | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 38 | T-1494 | | 14.09.35.11 | 42 | 33 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,000 | 10,000 |
| 39 | T-0046 (Hydrograph 10) | | 14.09.25.32 | 41 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 25,000 | 40,000 | 40,000 |
| 40 | T-0494, T-0013 | | 14.10.30.32 | 42 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,000 | 5,000 |
| 41 | | | 14.09.36.12 | 42 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,000 | 0 | 0 | 0 |
| 42 | T-0010, T-0076 (Hydrograph 18) | | 14.10.29.31 | 42 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,000 | 5,000 | 5,000 | 5,000 |
| 43 | | | 14.10.29.14 | 42 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,000 | 0 | 0 | 0 |
| 44 | T-216, T-1363. T-1359 (irr) | | 14.09.35.4 | 43 | 34 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 10,000 |
| 45 | T-467 | | 14.09.36.24 | 43 | 37 | | 0 | 0 | 0 | 0 | 0 | 10,000 | 10,000 | 15,000 | 15,000 | 25,000 | 15,000 |
| 46 | irr-w/gw 35 acres | | 14.10.32.1 | 43 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,000 | 2,000 | 2,000 |
| 47 | T-0879 | | 15.09.02.24 | 44 | 34 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 48 | T-0835 (Hydrograph 21) | | 15.09.01.12 | 44 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 25,000 | 25,000 | 25,000 |
| 49 | T-0019, T-1319 | | 15.10.06.11 | 45 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14,000 | 20,000 | 15,000 | 20,000 |
| 50 | T-0223, T-0686, T-0218, T-1003, T-428, T-960 | | 15.10.06.42 | 46 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 10,000 | 10,000 |
| 51 | | | 15.10.05.3 | 46 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52 | T-0164, T-1057 | | 15.10.04.13 | 46 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,000 |
| 53 | | | 15.09.12.41 | 47 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 15,000 |
| 54 | T-0178-S, T-0178 | | 15.10.07.31 | 47 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 5,000 | 5,000 |
| 55 | | | 15.10.07.24 | 47 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,000 | 15,000 | 15,000 | 10,000 |
| 56 | T-0846 | | 15.10.09.14 | 48 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 10,000 |
| 57 | T-107 | | 15.10.08.41 | 48 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,000 |
| 58 | | | 15.09.13.42 | 49 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 59 | T-0155, T-1628 | | 15.10.09.40 | 49 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7,000 |
| 60 | T-1247 | | 15.10.10.13 | 49 | 42 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61 | T-0190 | | 15.10.18.33 | 50 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 |
| 62 | irr-w/gw 32 acres; T-1068 | | 15.10.17.3 | 50 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 20,000 | 20,000 | 20,000 |
| 63 | T-0406, T-0405, T-1274, T-1306, T-1307, T-0980, | | 15.10.16.14 | 50 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 64 | T-0802 | | 15.10.19.31 | 52 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 65 | T-1204 | | 15.10.21.14 | 52 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66 | | | 15.10.21.42 | 53 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35,800 | 0 | 0 | 0 |
| 67 | | | 15.10.29.13 | 53 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 0 | 0 | 0 |
| 68 | irr-w/gw 32 acres see #43 (Hydrograph 27) | | 15.10.29.1 | 53 | 37 | | 0 | 0 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 69 | T-1626 | | 15.10.22.32 | 53 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 70 | | | 15.10.21.44 | 53 | 40 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,000 | 0 | 0 | 0 |
| 71 | irr-w/gw 24 acres | | 15.10.24.11 | 53 | 45 | | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 72 | T-1151, T-0572, T-0195, T-1312 | | 15.10.28.13 | 54 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 73 | irr-w/gw 36 acres | | 15.10.24 | 54 | 45 | | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 74 | irr-w/gw 3 acres | | 15.10.26 | 56 | 43 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 75 | irr-w/gw 1 acre | | 15.10.25.1 | 55 | 44 | | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 76 | T-0377, T-1288, T-1342 | | 15.10.32.34 | 57 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 77 | | | 16.09.03.2 | 57 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,000 | 15,000 | 15,000 |
| 78 | irr-w/gw 1 acre see #53 | | 15.10.25.4 | 57 | 45 | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 4,200 |
| 79 | T-0135 | | 15.10.33.33 | 57 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 80 | | | 15.10.34.4 | 57 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 81 | Alamagordo (T-0032-S-3, S-2, S-6) | | 15.10.36.11 | 57 | 44 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16,708 | 36,280 |
| 82 | | | 15.10.36.3 | 58 | 44 | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 83 | LaLuz MDWC (T-1056) | | 15.10.25.40 | 57 | 45 | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 84 | | | 16.09.09.42 | 59 | 34 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 500 | 0 | 0 | 0 |
| 85 | Alamagordo (T-0032-S-5) | | 16.10.05.20 | 59 | 43 | ANNUAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 86 | | | 16.10.05.2 | 59 | 43 | PUMPING | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |

# TABLE 2
# HISTORICAL SIMULATED PUMPING
# ADAPTED FROM FINCH AND SHOMAKER (MARCH 2003)

| ID | NMOSE | COMMENT | LOCATION (T.R.S.QQQ) | MODEL ROW | MODEL COLUMN | STRESS PERIOD START DATE END DATE | 1 1/1/1910 12/31/1914 | 2 1/1/1915 12/31/1919 | 3 1/1/1920 12/31/1924 | 4 1/1/1925 12/31/1929 | 5 1/1/1930 12/31/1934 | 6 1/1/1935 12/31/1939 | 7 1/1/1940 12/31/1944 | 8 1/1/1945 12/31/1949 | 9 1/1/1950 12/31/1954 | 10 1/1/1955 12/31/1959 | 11 1/1/1960 12/31/1964 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87 | T-0431 | | 16.10.05.14 | 60 | 42 | RATE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,000 | 2,000 |
| 88 | Alamagordo (T-0032-S-8, S-7) | shifted from (61,43) | 16.10.05.42 | 61 | 42 | (CFD) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,771 | 26,542 |
| 89 | irr-w/gw 16 acres | | 16.09.13.2 | 62 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 10,000 | 10,000 |
| 90 | T-0065 | | 16.10.05.33 | 62 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,000 | 1,000 | 1,000 |
| 91 | T-0176, T-0189 | | 16.09.23.24 | 64 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 92 | T-1351 | | 16.10.18.4 | 65 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 93 | | | 16.10.18.4 | 65 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,000 | 2,000 |
| 94 | | | 16.10.08.3 | 63 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,000 | 1,000 | 1,000 |
| 95 | T-0501 | | 16.10.18.23 | 64 | 39 | | 0 | 0 | 0 | 0 | 0 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| 96 | | | 16.10.17.2 | 64 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,000 | 1,000 | 1,000 |
| 97 | T-0779, T-0533, T-0172 | subtracted from rch cell | 16.09.27.21 | 72 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 98 | | subtracted from rch cell | 16.09.26.12 | 72 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 99 | T-1090, T-0031, T-0735, T-0639 | subtracted from rch cell | 16.09.25.12 | 72 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14,000 | 7,000 | 7,000 | 10,000 |
| 100 | | subtracted from rch cell | 16.09.24.4 | 59 | 44 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 101 | | | 16.10.16.2 | 65 | 43 | | 0 | 0 | 0 | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 2,000 | 2,000 | 2,000 |
| 102 | | | 16.10.21.1 | 67 | 42 | | 0 | 0 | 0 | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 3,000 | 3,000 | 3,000 |
| 103 | | | 16.09.34.2 | 67 | 33 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 104 | T-0051 | | 16.09.35.22 | 67 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20,000 | 15,000 | 15,000 | 15,000 |
| 105 | | | 16.10.30.21 | 68 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,000 | 0 | 0 | 0 |
| 106 | | | 16.10.20.4 | 67 | 41 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 107 | | | 16.10.21.3 | 67 | 43 | | 0 | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 3,000 | 3,000 | 3,000 |
| 108 | | | 16.10.28.1 | 69 | 41 | | 0 | 0 | 1,000 | 1,000 | 2,000 | 2,000 | 2,000 | 2,000 | 3,000 | 3,000 | 3,000 |
| 109 | | | 16.10.29.33 | 69 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 0 | 0 | 0 |
| 110 | | | 16.10.32.12 | 70 | 39 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 0 | 0 | 0 |
| 111 | | | 16.10.28.3 | 70 | 41 | | 3,000 | 3,000 | 3,000 | 4,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| 112 | | | 17.09.01.3 | 70 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 113 | | | 16.10.32.24 | 71 | 40 | | 4,000 | 4,000 | 4,000 | 5,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 8,000 |
| 114 | T-1493 | | 16.10.31.44 | 71 | 38 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,000 | 8,000 | 10,000 |
| 115 | | | 16.10.32.4 | 71 | 40 | | 5,000 | 5,000 | 5,000 | 8,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 12,000 |
| 116 | | | 16.10.33.3 | 72 | 41 | | 5,000 | 5,000 | 5,000 | 8,000 | 10,000 | 10,000 | 10,000 | 10,000 | 15,000 | 15,000 | 15,000 |
| 117 | | | 17.10.05.4 | 73 | 40 | | 5,000 | 5,000 | 5,000 | 8,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| 118 | | | 17.10.07.0 | 74 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 119 | | | 17.10.08.1 | 74 | 39 | | 0 | 0 | 0 | 0 | 2,000 | 2,000 | 2,000 | 2,000 | 3,000 | 3,000 | 3,000 |
| 120 | T-0111, T-0173, T-0114, T-0132-A. T-1041 | | 17.09.24.33 | 76 | 34 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 121 | T-0821 | | 17.09.24.31 | 76 | 34 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,431 | 4,702 | 7,323 |
| 122 | T-0115, T-1085-S-2 | | 17.09.26.32 | 77 | 32 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 123 | T-1140, T-1085-S-3 | | 17.09.26.22 | 77 | 33 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 500 | 3,000 |
| 124 | | | 17.09.24.43 | 77 | 34 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,773 | 14,106 | 21,968 |
| 125 | | | 17.09.24.44 | 77 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8,521 | 27,192 | 23,511 | 36,613 |
| 126 | | | 17.10.18.44 | 77 | 37 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,773 | 4,702 | 7,323 |
| 127 | | | 17.09.25.2 | 77 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 128 | | | 17.10.19.3 | 78 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,535 | 6,663 | 4,702 | 7,323 |
| 129 | T-2333 | | 17.10.30.31 | 80 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,000 | 15,500 | 15,500 | 10,000 |
| 130 | T-0032, T-0507 | | 17.09.35.24 | 79 | 32 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,710 | 4,379 | 4,379 |
| 131 | T-0032-S | | 17.09.35.44 | 80 | 32 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,710 | 4,379 | 4,379 |
| 132 | HAFB (T-0756-S) | | 17.10.32.11 | 81 | 36 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11,732 |
| 133 | HAFB (T-1255-S, S-3, S-4, S-5, T-0756-S-4) | | 17.10.31.40 | 83 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,560 |
| 134 | T-0079 | | 18.09.11.32 | 83 | 30 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,000 |
| 135 | HAFB (T-1255-S-2) | | 17.10.31.44 | 83 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11,930 |
| 136 | | | 18.10.06.2 | 83 | 35 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,209 |
| 137 | T-1058 | | 18.09.13.22 | 85 | 33 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | **SUM (CFD)** | 48,000 | 48,000 | 53,000 | 64,000 | 77,000 | 92,000 | 92,000 | 336,856 | 507,262 | 714,470 | 943,471 |
| | | | | | | **SUM (AFY)** | 402 | 402 | 444 | 537 | 646 | 771 | 771 | 2,825 | 4,253 | 5,991 | 7,911 |

# TABLE 2
## HISTORICAL SIMULATED PUMPING
## ADAPTED FROM FINCH AND SHOMAKER (MARCH 2003)

| ID | NMOSE | COMMENT | LOCATION (T.R.S.QQQ) | MODEL ROW | MODEL COLUMN | STRESS PERIOD START DATE END DATE | 12 1/1/1965 12/31/1969 | 13 1/1/1970 12/31/1974 | 14 1/1/1975 12/31/1979 | 15 1/1/1980 12/31/1984 | 16 1/1/1985 12/31/1989 | 17 1/1/1990 12/31/1994 | 18 1/1/1995 12/31/1999 | 19 1/1/2000 6/30/2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Three Rivers Cattle T-442 et al (T-442) | | 11.09.34.4 | 8 | 42 | | 0 | 20,500 | 3,908 | 3,908 | 3,908 | 3,908 | 3,908 | 3,908 |
| 2 | Three Rivers Cattle T-442 et al (T-442(2)) | subtracted from rch cell | | 6 | 44 | | 0 | 20,500 | 3,908 | 3,908 | 3,908 | 3,908 | 3,908 | 3,908 |
| 3 | Three Rivers Cattle T-442 et al | shifted from (7,45) | | 6 | 45 | ANNUAL | 0 | 9,000 | 0 | 7,616 | 7,816 | 7,816 | 7,816 | 7,816 |
| 4 | Three Rivers Cattle T-442 et al | | | 8 | 41 | PUMPING | 0 | 10,010 | 0 | 0 | 7,816 | 11,781 | 15,631 | 23,447 |
| 5 | Niccum (T-2014, T-2016, T-2018, T-2023, T-2024) | | 12.09.10.22 | 10 | 41 | RATE | 0 | 10,010 | 55,814 | 0 | 0 | 0 | 0 | 0 |
| 6 | Niccum (T-2019) | | 12.09.11.11 | 10 | 42 | (CFD) | 0 | 3,000 | 11,163 | 0 | 0 | 0 | 0 | 0 |
| 7 | Niccum (T-2017,T-2020, T-2022, T-2026) | | 12.09.11.33 | 12 | 41 | | 0 | 10,200 | 44,651 | 0 | 0 | 0 | 0 | 0 |
| 8 | Niccum (T-2021) | | 12.09.14.22 | 13 | 43 | | 0 | 25,000 | 11,163 | 0 | 0 | 0 | 0 | 0 |
| 9 | HFR T-1797-S-8 | | | 29 | 40 | | 0 | 50,000 | 0 | 0 | 0 | 21,271 | 32,975 | 42,908 |
| 10 | HFR T-1797-S-6&7 | | 13.09.23.4 | 28 | 38 | | 0 | 15,000 | 0 | 0 | 0 | 21,271 | 32,975 | 42,908 |
| 11 | HFR T-1797-S-5 | | 13.09.24.2 | 27 | 41 | | 0 | 45,000 | 20,500 | 20,500 | 29,815 | 21,271 | 32,975 | 42,908 |
| 12 | HFR T-1797-S-4 | | | 29 | 40 | | 20,500 | 23,000 | 23,678 | 48,510 | 29,815 | 21,271 | 32,975 | 42,908 |
| 13 | HFR T-1797-S-3 | | 13.09.25.0 | 29 | 40 | | 9,000 | 25,000 | 28,298 | 9,048 | 29,815 | 21,271 | 32,975 | 42,908 |
| 14 | HFR T-1797-S- | | | 31 | 39 | | 5,005 | 24,000 | 25,988 | 15,997 | 14,919 | 21,271 | 32,975 | 42,908 |
| 15 | T-0028 HFR (T-1797) | | 13.09.36.23 | 31 | 39 | | 5,005 | 30,000 | 25,988 | 15,997 | 14,919 | 21,271 | 32,975 | 42,908 |
| 16 | T-594, T-774 | | 14.09.10.31 | 34 | 33 | | 5,100 | 30,000 | 3,000 | 3,000 | 0 | 3,000 | 3,000 | 3,000 |
| 17 | irr-w/gw 160 acres (same OSE cell as Hydrograph | | 14.09.01.3 | 34 | 38 | | 10,200 | 3,000 | 10,200 | 10,200 | 10,200 | 11,503 | 11,503 | 12,806 |
| 18 | irr-w/gw 70 acres | | 14.09.16.0 | 36 | 32 | | 15,000 | 25,600 | 25,000 | 15,000 | 5,100 | 5,752 | 5,752 | 6,403 |
| 19 | T-768 | | 14.09.11.44 | 36 | 37 | | 0 | 10,000 | 50,000 | 50,000 | 0 | 5,000 | 5,000 | 0 |
| 20 | irr-w/gw 355 acres (same OSE cell as Hyd. 7) T-0 | | 14.09.15.3 | 36 | 33 | | 15,000 | 10,000 | 15,000 | 15,000 | 10,000 | 11,277 | 11,277 | 12,555 |
| 21 | T-0085, T-0070 (Hydrograph 8) | | 14.09.22.22 | 37 | 34 | | 25,000 | 25,000 | 50,000 | 61,400 | 61,400 | 69,244 | 69,244 | 77,087 |
| 22 | T-0929 | | 14.09.13.32 | 37 | 37 | | 23,000 | 30,000 | 9,000 | 13,400 | 13,400 | 15,112 | 15,112 | 16,824 |
| 23 | T-156, T-157 | | 14.10.18.0 | 34 | 28 | | 15,400 | 3,000 | 25,600 | 33,900 | 25,000 | 38,231 | 38,231 | 42,561 |
| 24 | T-0656, T-0021 | | 14.09.23.23 | 38 | 35 | | 18,000 | 20,000 | 24,000 | 20,000 | 11,500 | 12,969 | 12,969 | 14,438 |
| 25 | T-0085-s (see Hyd. 9), T-0723 | | 14.09.24.12 | 38 | 37 | | 28,200 | 51,000 | 28,200 | 20,000 | 11,500 | 12,969 | 12,969 | 14,438 |
| 26 | T-0022 | | 14.10.17.41 | 35 | 30 | | 20,000 | 30,000 | 30,000 | 30,000 | 11,500 | 12,969 | 12,969 | 14,438 |
| 27 | T-0188 | | 14.10.20.44 | 38 | 30 | | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 28 | T-0730 | | 14.09.27.23 | 40 | 33 | | 25,600 | 13,000 | 25,000 | 10,000 | 4,500 | 5,075 | 5,075 | 5,650 |
| 29 | T-14 | | 14.10.19.31 | 36 | 26 | | 5,000 | 40,000 | 20,000 | 20,000 | 0 | 10,000 | 10,000 | 0 |
| 30 | T-104 | | 14.09.25.22 | 40 | 37 | | 2,500 | 15,000 | 20,000 | 20,000 | 0 | 10,000 | 10,000 | 0 |
| 31 | T-0018 | | 14.10.19.14 | 36 | 27 | | 25,000 | 10,000 | 25,000 | 15,000 | 9,100 | 10,262 | 10,262 | 11,425 |
| 32 | T-25 | | 14.10.19.23 | 36 | 27 | | 20,000 | 18,000 | 30,000 | 30,000 | 0 | 10,000 | 10,000 | 0 |
| 33 | T-0443, T-0057 (Hydrograph 17) | | 14.10.20.22 | 36 | 30 | | 3,000 | 5,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 34 | T-0057-A, T-589 | | 14.10.20.14 | 37 | 29 | | 18,000 | 12,000 | 20,000 | 15,000 | 8,600 | 9,699 | 9,699 | 10,797 |
| 35 | T-0027, T-0158, T-0001, T-0004, T-0170, T-0169 | | 14.09.26.41 | 41 | 35 | | 48,600 | 30,000 | 55,000 | 49,000 | 30,000 | 55,260 | 55,260 | 61,519 |
| 36 | T-61 | | 14.09.26.42 | 41 | 35 | | 20,000 | 2,000 | 40,000 | 40,000 | 0 | 10,000 | 10,000 | 10,000 |
| 37 | T-0077 | | 14.10.20.42 | 37 | 30 | | 3,000 | 8,000 | 4,800 | 6,500 | 6,500 | 6,947 | 6,947 | 7,394 |
| 38 | T-1494 | | 14.09.35.11 | 42 | 33 | | 10,200 | 28,700 | 13,000 | 10,000 | 7,700 | 8,684 | 8,684 | 9,667 |
| 39 | T-0046 (Hydrograph 10) | | 14.09.25.32 | 41 | 36 | | 40,000 | 35,000 | 64,000 | 31,700 | 31,700 | 35,750 | 35,750 | 39,799 |
| 40 | T-0494, T-0013 | | 14.10.30.32 | 42 | 38 | | 13,400 | 10,000 | 33,000 | 33,000 | 33,000 | 37,216 | 37,216 | 41,431 |
| 41 | | | 14.09.36.12 | 42 | 36 | | 1,000 | 10,000 | 20,000 | 20,000 | 0 | 10,000 | 10,000 | 10,000 |
| 42 | T-0010, T-0076 (Hydrograph 18) | | 14.10.29.31 | 42 | 40 | | 10,000 | 5,000 | 20,500 | 23,000 | 10,000 | 25,938 | 25,938 | 28,876 |
| 43 | | | 14.10.29.14 | 42 | 40 | | 1,000 | 25,000 | 10,000 | 10,000 | 0 | 5,000 | 5,000 | 5,000 |
| 44 | T-216, T-1363. T-1359 (irr) | | 14.09.35.4 | 43 | 34 | | 12,000 | 10,000 | 12,000 | 8,300 | 8,300 | 9,360 | 9,360 | 10,421 |
| 45 | T-467 | | 14.09.36.24 | 43 | 37 | | 20,000 | 15,000 | 41,000 | 21,800 | 21,800 | 24,585 | 24,585 | 27,370 |
| 46 | irr-w/gw 35 acres | | 14.10.32.1 | 43 | 39 | | 2,000 | 10,000 | 2,000 | 1,900 | 1,900 | 2,143 | 2,143 | 2,385 |
| 47 | T-0879 | | 15.09.02.24 | 44 | 34 | | 2,600 | 1,000 | 12,000 | 7,680 | 7,680 | 8,661 | 8,661 | 9,642 |
| 48 | T-0835 (Hydrograph 21) | | 15.09.01.12 | 44 | 35 | | 25,000 | 5,000 | 32,400 | 46,078 | 46,078 | 51,964 | 51,964 | 57,850 |
| 49 | T-0019, T-1319 | | 15.10.06.11 | 45 | 37 | | 35,000 | 8,000 | 35,000 | 7,700 | 7,700 | 8,684 | 8,684 | 9,667 |
| 50 | T-0223, T-0686, T-0218, T-1003, T-428, T-960 | | 15.10.06.42 | 46 | 38 | | 10,000 | 10,000 | 20,000 | 8,960 | 8,690 | 10,105 | 10,105 | 11,249 |
| 51 | | | 15.10.05.3 | 46 | 38 | | 5,000 | 10,000 | 20,000 | 20,000 | 6,800 | 7,669 | 7,669 | 8,537 |
| 52 | T-0164, T-1057 | | 15.10.04.13 | 46 | 40 | | 5,000 | 20,000 | 10,000 | 10,000 | 0 | 5,000 | 5,000 | 5,000 |
| 53 | | | 15.09.12.41 | 47 | 35 | | 20,500 | 5,000 | 38,000 | 30,000 | 4,480 | 5,052 | 5,052 | 5,625 |
| 54 | T-0178-S, T-0178 | | 15.10.07.31 | 47 | 36 | | 10,000 | 0 | 5,000 | 2,560 | 2,560 | 2,887 | 2,887 | 3,214 |
| 55 | | | 15.10.07.24 | 47 | 38 | | 10,000 | 0 | 30,000 | 30,000 | 0 | 10,000 | 10,000 | 0 |
| 56 | T-0846 | | 15.10.09.14 | 48 | 40 | | 10,000 | 20,000 | 10,000 | 10,000 | 2,000 | 2,255 | 2,255 | 2,511 |
| 57 | T-107 | | 15.10.08.41 | 48 | 39 | | 1,000 | 10,000 | 1,000 | 1,300 | 1,300 | 1,466 | 1,466 | 1,632 |
| 58 | | | 15.09.13.42 | 49 | 35 | | 5,000 | 2,600 | 5,000 | 5,000 | 0 | 5,000 | 0 | 0 |
| 59 | T-0155, T-1628 | | 15.10.09.40 | 49 | 41 | | 7,000 | 20,000 | 8,000 | 7,680 | 7,860 | 8,661 | 8,661 | 9,642 |
| 60 | T-1247 | | 15.10.10.13 | 49 | 42 | | 0 | 10,000 | 10,000 | 10,000 | 1,640 | 1,850 | 1,850 | 2,059 |
| 61 | T-0190 | | 15.10.18.33 | 50 | 35 | | 10,000 | 2,000 | 10,000 | 10,000 | 0 | 5,000 | 0 | 0 |
| 62 | irr-w/gw 32 acres; T-1068 | | 15.10.17.3 | 50 | 37 | | 20,000 | 3,800 | 20,000 | 6,400 | 6,400 | 7,218 | 7,218 | 8,035 |
| 63 | T-0406, T-0405, T-1274, T-1306, T-1307, T-0980, | | 15.10.16.14 | 50 | 40 | | 0 | 2,000 | 5,000 | 5,760 | 5,760 | 6,496 | 6,496 | 7,232 |
| 64 | T-0802 | | 15.10.19.31 | 52 | 35 | | 0 | 12,000 | 0 | 1,300 | 1,300 | 1,466 | 1,466 | 1,632 |
| 65 | T-1204 | | 15.10.21.14 | 52 | 39 | | 0 | 2,000 | 2,300 | 2,300 | 0 | 0 | 0 | 0 |
| 66 | | | 15.10.21.42 | 53 | 40 | | 2,000 | 0 | 30,000 | 30,000 | 0 | 10,000 | 10,000 | 10,000 |
| 67 | | | 15.10.29.13 | 53 | 36 | | 2,000 | 40,000 | 20,000 | 20,000 | 0 | 10,000 | 10,000 | 10,000 |
| 68 | irr-w/gw 32 acres see #43 (Hydrograph 27) | | 15.10.29.1 | 53 | 37 | | 2,600 | 4,800 | 2,600 | 2,600 | 0 | 0 | 0 | 0 |
| 69 | T-1626 | | 15.10.22.32 | 53 | 41 | | 20,000 | 0 | 20,000 | 8,320 | 8,320 | 9,383 | 9,383 | 10,446 |
| 70 | | | 15.10.21.44 | 53 | 40 | | 5,000 | 0 | 20,000 | 20,000 | 0 | 10,000 | 0 | 0 |
| 71 | irr-w/gw 24 acres | | 15.10.24.11 | 53 | 45 | | 2,000 | 52,749 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 72 | T-1151, T-0572, T-0195, T-1312 | | 15.10.28.13 | 54 | 38 | | 0 | 3,000 | 3,800 | 3,800 | 3,840 | 4,331 | 4,331 | 4,821 |
| 73 | irr-w/gw 36 acres | | 15.10.24 | 54 | 45 | | 2,000 | 3,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 74 | irr-w/gw 3 acres | | 15.10.26 | 56 | 43 | | 10,000 | 10,000 | 12,000 | 12,000 | 0 | 10,000 | 10,000 | 10,000 |
| 75 | irr-w/gw 1 acre | | 15.10.25.1 | 55 | 44 | | 2,000 | 32,580 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 76 | T-0377, T-1288, T-1342 | | 15.10.32.34 | 57 | 36 | | 0 | 2,000 | 0 | 2,133 | 2,133 | 2,405 | 2,405 | 2,678 |
| 77 | | | 16.09.03.2 | 57 | 36 | | 38,400 | 3,100 | 40,000 | 30,000 | 17,919 | 20,208 | 20,208 | 22,497 |
| 78 | irr-w/gw 1 acre see #53 | | 15.10.25.4 | 57 | 45 | | 4,500 | 84,494 | 5,100 | 11,700 | 11,700 | 13,195 | 13,195 | 14,689 |
| 79 | T-0135 | | 15.10.33.33 | 57 | 37 | | 0 | 13,000 | 0 | 768 | 768 | 866 | 866 | 964 |
| 80 | | | 15.10.34.4 | 57 | 41 | | 0 | 1,000 | 0 | 3,200 | 3,200 | 3,609 | 3,609 | 4,018 |
| 81 | Alamagordo (T-0032-S-3, S-2, S-6) | | 15.10.36.11 | 57 | 44 | | 34,454 | 10,000 | 42,987 | 22,403 | 9,302 | 12,308 | 25,814 | 35,778 |
| 82 | | | 15.10.36.3 | 58 | 44 | | 3,000 | 3,100 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 83 | LaLuz MDWC (T-1056) | | 15.10.25.40 | 57 | 45 | | 3,000 | 2,600 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| 84 | | | 16.09.09.42 | 59 | 34 | | 5,000 | 1,000 | 20,000 | 20,000 | 0 | 10,000 | 10,000 | 0 |
| 85 | Alamagordo (T-0032-S-5) | | 16.10.05.20 | 59 | 43 | ANNUAL | 21,343 | 6,400 | 34,371 | 20,198 | 9,302 | 12,308 | 25,814 | 35,778 |
| 86 | | | 16.10.05.2 | 59 | 43 | PUMPING | 2,000 | 1,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |

# TABLE 2
# HISTORICAL SIMULATED PUMPING
## ADAPTED FROM FINCH AND SHOMAKER (MARCH 2003)

| ID | NMOSE | COMMENT | LOCATION (T.R.S.QQQ) | MODEL ROW | MODEL COLUMN | STRESS PERIOD START DATE END DATE | 12 1/1/1965 12/31/1969 | 13 1/1/1970 12/31/1974 | 14 1/1/1975 12/31/1979 | 15 1/1/1980 12/31/1984 | 16 1/1/1985 12/31/1989 | 17 1/1/1990 12/31/1994 | 18 1/1/1995 12/31/1999 | 19 1/1/2000 6/30/2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87 | T-0431 |  | 16.10.05.14 | 60 | 42 | **RATE** | 3,100 | 0 | 3,100 | 3,072 | 6,272 | 7,073 | 7,073 | 7,875 |
| 88 | Alamagordo (T-0032-S-8, S-7) | shifted from (61,43) | 16.10.05.42 | 61 | 42 | **(CFD)** | 53,871 | 32,000 | 88,743 | 95,476 | 43,410 | 57,436 | 120,465 | 166,965 |
| 89 | irr-w/gw 16 acres |  | 16.09.13.2 | 62 | 39 |  | 13,000 | 10,200 | 20,000 | 11,520 | 11,520 | 12,992 | 12,992 | 14,463 |
| 90 | T-0065 |  | 16.10.05.33 | 62 | 41 |  | 1,000 | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 91 | T-0176, T-0189 |  | 16.09.23.24 | 64 | 36 |  | 500 | 2,000 | 20,000 | 20,000 | 3,840 | 4,331 | 4,331 | 4,821 |
| 92 | T-1351 |  | 16.10.18.4 | 65 | 39 |  | 3,100 | 3,000 | 3,100 | 3,072 | 5,972 | 6,734 | 6,734 | 7,498 |
| 93 |  |  | 16.10.18.4 | 65 | 39 |  | 2,600 | 1,500 | 2,600 | 2,560 | 5,160 | 5,819 | 5,819 | 6,478 |
| 94 |  |  | 16.10.08.3 | 63 | 41 |  | 1,000 | 30,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 95 | T-0501 |  | 16.10.18.23 | 64 | 39 |  | 6,400 | 10,000 | 6,400 | 6,400 | 12,800 | 14,436 | 14,436 | 16,070 |
| 96 |  |  | 16.10.17.2 | 64 | 41 |  | 1,000 | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 97 | T-0779, T-0533, T-0172 | subtracted from rch cell | 16.09.27.21 | 72 | 41 |  | 0 | 2,000 | 0 | 1,024 | 1,024 | 1,155 | 1,155 | 1,286 |
| 98 |  | subtracted from rch cell | 16.09.26.12 | 72 | 41 |  | 32,000 | 2,000 | 40,000 | 30,000 | 17,279 | 19,486 | 19,486 | 21,694 |
| 99 | T-1090, T-0031, T-0735, T-0639 | subtracted from rch cell | 16.09.25.12 | 72 | 41 |  | 10,200 | 5,000 | 20,000 | 20,000 | 11,519 | 11,770 | 11,770 | 11,770 |
| 100 |  | subtracted from rch cell | 16.09.24.4 | 59 | 44 |  | 0 | 10,000 | 0 | 5,800 | 5,800 | 6,541 | 6,541 | 7,282 |
| 101 |  |  | 16.10.16.2 | 65 | 43 |  | 2,000 | 4,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 102 |  |  | 16.10.21.1 | 67 | 42 |  | 3,000 | 0 | 3,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| 103 |  |  | 16.09.34.2 | 67 | 33 |  | 1,500 | 8,000 | 1,500 | 1,279 | 1,279 | 1,442 | 1,442 | 1,606 |
| 104 | T-0051 |  | 16.09.35.22 | 67 | 36 |  | 30,700 | 10,000 | 40,000 | 30,000 | 19,839 | 22,373 | 22,373 | 24,908 |
| 105 |  |  | 16.10.30.21 | 68 | 39 |  | 5,000 | 12,000 | 20,000 | 20,000 | 0 | 10,000 | 10,000 | 0 |
| 106 |  |  | 16.10.20.4 | 67 | 41 |  | 0 | 20,000 | 0 | 3,800 | 7,640 | 8,616 | 8,616 | 9,592 |
| 107 |  |  | 16.10.21.3 | 67 | 43 |  | 3,000 | 10,000 | 3,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| 108 |  |  | 16.10.28.1 | 69 | 41 |  | 3,000 | 5,000 | 3,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| 109 |  |  | 16.10.29.33 | 69 | 39 |  | 5,000 | 3,000 | 5,000 | 10,000 | 0 | 10,000 | 10,000 | 10,000 |
| 110 |  |  | 16.10.32.12 | 70 | 39 |  | 5,000 | 17,000 | 20,000 | 20,000 | 0 | 10,000 | 10,000 | 10,000 |
| 111 |  |  | 16.10.28.3 | 70 | 41 |  | 5,000 | 7,693 | 5,000 | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 |
| 112 |  |  | 17.09.01.3 | 70 | 35 |  | 0 | 5,000 | 0 | 1,300 | 1,300 | 1,466 | 1,466 | 1,632 |
| 113 |  |  | 16.10.32.24 | 71 | 40 |  | 8,000 | 7,000 | 8,000 | 1,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| 114 | T-1493 |  | 16.10.31.44 | 71 | 38 |  | 10,000 | 17,371 | 28,295 | 28,295 | 28,295 | 31,910 | 31,910 | 35,524 |
| 115 |  |  | 16.10.32.4 | 71 | 40 |  | 12,000 | 13,840 | 12,000 | 12,000 | 15,512 | 15,577 | 15,577 | 15,643 |
| 116 |  |  | 16.10.33.3 | 72 | 41 |  | 20,000 | 8,031 | 20,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| 117 |  |  | 17.10.05.4 | 73 | 40 |  | 10,000 | 0 | 10,000 | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| 118 |  |  | 17.10.07.0 | 74 | 37 |  | 0 | 2,463 | 5,100 | 12,000 | 12,000 | 13,533 | 13,533 | 15,066 |
| 119 |  |  | 17.10.08.1 | 74 | 39 |  | 3,000 | 20,000 | 3,000 | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 |
| 120 | T-0111, T-0173, T-0114, T-0132-A. T-1041 |  | 17.09.24.33 | 76 | 34 |  | 15,000 | 4,379 | 17,000 | 16,639 | 16,639 | 18,765 | 18,765 | 20,890 |
| 121 | T-0821 |  | 17.09.24.31 | 76 | 34 |  | 7,028 | 4,379 | 7,794 | 7,681 | 7,681 | 8,662 | 8,662 | 9,643 |
| 122 | T-0115, T-1085-S-2 |  | 17.09.26.32 | 77 | 32 |  | 2,600 | 34,167 | 2,600 | 7,680 | 7,680 | 8,661 | 8,661 | 9,642 |
| 123 | T-1140, T-1085-S-3 |  | 17.09.26.22 | 77 | 33 |  | 5,000 | 67,286 | 7,600 | 17,600 | 17,600 | 19,848 | 19,848 | 22,097 |
| 124 |  |  | 17.09.24.43 | 77 | 34 |  | 17,371 | 7,000 | 17,837 | 24,092 | 24,092 | 27,170 | 27,170 | 30,247 |
| 125 |  |  | 17.09.24.44 | 77 | 35 |  | 18,235 | 155,813 | 12,745 | 15,957 | 15,957 | 17,995 | 17,995 | 20,034 |
| 126 |  |  | 17.10.18.44 | 77 | 37 |  | 11,833 | 7,693 | 11,732 | 14,861 | 14,861 | 16,759 | 16,759 | 18,658 |
| 127 |  |  | 17.09.25.2 | 77 | 35 |  | 0 | 20,000 | 0 | 600 | 600 | 677 | 677 | 753 |
| 128 |  |  | 17.10.19.3 | 78 | 35 |  | 3,302 | 2,463 | 1,322 | 2,069 | 2,069 | 2,333 | 2,333 | 2,598 |
| 129 | T-2333 |  | 17.10.30.31 | 80 | 35 |  | 10,000 | 20,000 | 40,000 | 40,000 | 0 | 10,000 | 10,000 | 0 |
| 130 | T-0032, T-0507 |  | 17.09.35.24 | 79 | 32 |  | 4,379 | 4,379 | 4,379 | 4,379 | 0 | 0 | 0 | 0 |
| 131 | T-0032-S |  | 17.09.35.44 | 80 | 32 |  | 4,379 | 4,379 | 4,379 | 4,379 | 0 | 0 | 0 | 0 |
| 132 | HAFB (T-0756-S) |  | 17.10.32.11 | 81 | 36 |  | 41,578 | 34,167 | 16,558 | 13,847 | 13,847 | 19,568 | 14,025 | 14,192 |
| 133 | HAFB (T-1255-S, S-3, S-4, S-5, T-0756-S-4) |  | 17.10.31.40 | 83 | 35 |  | 43,693 | 67,286 | 49,623 | 41,004 | 41,004 | 64,296 | 46,082 | 46,631 |
| 134 | T-0079 |  | 18.09.11.32 | 83 | 30 |  | 3,000 | 7,000 | 7,000 | 2,560 | 2,560 | 2,887 | 2,887 | 3,214 |
| 135 | HAFB (T-1255-S-2) |  | 17.10.31.44 | 83 | 35 |  | 58,913 | 155,813 | 139,330 | 124,621 | 115,573 | 195,683 | 140,251 | 141,920 |
| 136 |  |  | 18.10.06.2 | 83 | 35 |  | 10,176 | 7,693 | 23,006 | 23,006 | 0 | 15,000 | 15,000 | 0 |
| 137 | T-1058 |  | 18.09.13.22 | 85 | 33 |  | 20,000 | 20,000 | 40,000 | 40,000 | 0 | 10,000 | 0 | 0 |
|  |  |  |  |  |  | **SUM (CFD)** | 1,363,565 | 2,181,738 | 2,323,660 | 2,024,997 | 1,245,787 | 1,752,296 | 1,818,926 | 1,974,607 |
|  |  |  |  |  |  | **SUM (AFY)** | 11,434 | 18,294 | 19,484 | 16,980 | 10,446 | 14,693 | 15,252 | 16,557 |

# TABLE 3
# TULAROSA BASIN AQUIFER TEST INFORMATION

| id # | Location (T.R.S.QQQ) | Test Transmissivity (ft$^2$/day) | Calibrated Transmissivity (ft$^2$/day) | Source |
|---|---|---|---|---|
| 1 | 11S.9E.34 | 6000 | 5000 | Morrison (1989) |
| 2 | 13S.9E.1.341 | 5880 | 3000 | JSAI T-3825 pump test (2003) |
| 3 | 14S.10E.18.424 | 400 | 900 | Morrison (1989) |
| 4 | 14S.9E.11.422 | 2150 | 900 | Morrison (1989) |
| 5 | 14S.9E.36.422 | 5000 | 4000 | Morrison (1989) |
| 6 | 15S.10E.36.111 | 2655 | 3000 | JSAI (2003) |
| 7 | 16S.10E.5.244 | 2600 | 3000 | JSAI (2003) |
| 8 | 16S.10E.5.444 | 6244 | off grid | JSAI (2003) |
| 9 | 16S.8E.13.400 | 60 | 900 | Morrison (1989) |
| 10 | 16S.9E.4.400 | 380 | 3000 | Morrison (1989) |
| 11 | 16S.9E.8.100 | 160 | 900 | Morrison (1989) |
| 12 | 17S.10E.18.432 | 180 | 900 | Morrison (1989) |
| 13 | 17S.10E.18.442 | 600 | 900 | Morrison (1989) |
| 14 | 17S.10E.19.112 | 1330 | 900 | Morrison (1989) |
| 15 | 17S.10E.19.112 | 1370 | 900 | Morrison (1989) |
| 16 | 17S.10E.19.112 | 1590 | 900 | Morrison (1989) |
| 17 | 17S.10E.19.112 | 14400 | 900 | Morrison (1989) |
| 18 | 17S.10E.19.113 | 200 | 900 | Morrison (1989) |
| 19 | 17S.10E.19.121 | 600 | 900 | Morrison (1989) |
| 20 | 17S.10E.19.122 | 1600 | 900 | Morrison (1989) |
| 21 | 17S.10E.19.123 | 2130 | 900 | Morrison (1989) |
| 22 | 17S.10E.19.123 | 8528 | 900 | Morrison (1989) |
| 23 | 17S.10E.19.123 | 8020 | 900 | Morrison (1989) |
| 24 | 17S.10E.19.141 | 720 | 900 | Morrison (1989) |
| 25 | 17S.10E.19.142 | 1870 | 900 | Morrison (1989) |
| 26 | 17S.10E.19.142 | 1730 | 900 | Morrison (1989) |
| 27 | 17S.10E.19.144 | 2340 | 900 | Morrison (1989) |
| 28 | 17S.10E.19.321 | 1400 | 900 | Morrison (1989) |
| 29 | 17S.10E.31.424 | 1160 | 900 | Morrison (1989) |
| 30 | 17S.10E.32.234 | 20000 | 900 | Morrison (1989) |
| 31 | 17S.9E.24.342 | 2700 | 900 | Morrison (1989) |
| 32 | 17S.9E.25.212 | 1560 | 900 | Morrison (1989) |
| 33 | 17S.9E.25.213 | 2000 | 900 | Morrison (1989) |
| 34 | 17S.9E.25.222 | 2000 | 900 | Morrison (1989) |
| 35 | 16S.9E.36 | 600 | 600 | USBR (2003) |
| 36 | 13S.9E.36.214 | 214 | 900 | JSAI T-71 specific capacity |
| 37 | 13S.9E.36.442 | 2874 | 900 | JSAI T-564-s specific capacity |
| 38 | 12S.9E.3.444 | 227 | 5000 | JSAI T-2014 specific capacity |
| 39 | 12S.9E.10.244 | 856 | 5000 | JSAI T-2016 specific capacity |
| 40 | 12S.9E.14.331 | 321 | 300 | JSAI T-2017 specific capacity |
| 41 | 12S.9E.3.422 | 3369 | 5000 | JSAI T-2018 specific capacity |
| 42 | 12S.9E.11.144 | 842 | 5000 | JSAI T-2019 specific capacity |
| 43 | 12S.9E.11.344 | 1303 | 5000 | JSAI T-2020 specific capacity |
| 44 | 12S.9E.14.241 | 515 | 300 | JSAI T-2021 specific capacity |
| 45 | 12S.9E.14.324 | 856 | 300 | JSAI T-2022 specific capacity |
| 46 | 12S.9E.10.233 | 1578 | 5000 | JSAI T-2023 specific capacity |
| 47 | 12S.9E.11.331 | 1872 | 5000 | JSAI T-2026 specific capacity |
| 48 | 13S.9E.1.341 | 2767 | 3000 | JSAI T-3825 specific capacity |
| 49 | 13S.9E.36.424 | 2219 | 900 | JSAI T-1797 specific capacity |
| 50 | 13S.9E.36 | 5147 | 900 | JSAI T-1797-s specific capacity |
| 51 | 13S.9E.25 | 1471 | 3000 | JSAI T-1797-s-3 specific capacity |
| 52 | 13S.9E.25 | 8890 | 900 | JSAI T-1797-s-4 specific capacity |

## TABLE 4
## OBSERVED AND COMPUTED STEADY STATE WATER ELEVATIONS

| ID# | T.R.S | UTM X | UTM Y | Observed (ft msl) | Computed (ft msl) | Residual (ft) |
|---|---|---|---|---|---|---|
| 1 | T11S.R09E.27 | 400,863 | 3,689,118 | 4557 | 4534 | 23 |
| 2 | T11S.R09E.22 | 400,879 | 3,690,658 | 4630 | 4507 | 123 |
| 3 | T11S.R09E.19 | 395,241 | 3,690,347 | 4361 | 4328 | 33 |
| 4 | T11S.R09E.19 | 395,267 | 3,690,409 | 4387 | 4329 | 58 |
| 5 | T12S.R09E.3 | 399,851 | 3,686,202 | 4280 | 4318 | -38 |
| 6 | T12S.R09E.3 | 400,834 | 3,686,223 | 4270 | 4320 | -50 |
| 7 | T12S.R09E.3 | 400,231 | 3,685,427 | 4266 | 4315 | -49 |
| 8 | T12S.R09E.11 | 402,236 | 3,684,144 | 4352 | 4340 | 12 |
| 9 | T12S.R09E.11 | 401,430 | 3,683,752 | 4327 | 4315 | 12 |
| 10 | T12S.R09E.10 | 401,024 | 3,684,588 | 4284 | 4314 | -30 |
| 11 | T12S.R09E.10 | 401,016 | 3,683,787 | 4315 | 4313 | 2 |
| 12 | T12S.R09E.14 | 401,827 | 3,682,116 | 4314 | 4331 | -17 |
| 13 | T12S.R09E.14 | 402,604 | 3,682,139 | 4324 | 4346 | -22 |
| 14 | T12S.R09E.19 | 394,697 | 3,680,804 | 4253 | 4269 | -16 |
| 15 | T13S.R10E.6 | 404,551 | 3,674,943 | 4388 | 4396 | -8 |
| 16 | T13S.R09E.20 | 397,517 | 3,670,886 | 4301 | 4278 | 23 |
| 17 | T13S.R09E.36 | 403,417 | 3,667,654 | 4378 | 4359 | 19 |
| 18 | T13S.R09E.34 | 400,380 | 3,667,100 | 4356 | 4326 | 30 |
| 19 | T14S.R09E.4 | 398,014 | 3,666,293 | 4241 | 4261 | -20 |
| 20 | T14S.R09E.1 | 403,871 | 3,666,387 | 4403 | 4358 | 45 |
| 21 | T14S.R09E.12 | 403,646 | 3,664,634 | 4384 | 4349 | 35 |
| 22 | T14S.R09E.13 | 403,683 | 3,663,001 | 4340 | 4344 | -4 |
| 23 | T14S.R10E.18 | 405,647 | 3,662,365 | 4365 | 4389 | -24 |
| 24 | T14S.R09E.22 | 399,835 | 3,661,900 | 4289 | 4289 | 0 |
| 25 | T14S.R09E.22 | 399,705 | 3,661,932 | 4304 | 4286 | 18 |
| 26 | T14S.R10E.20 | 405,794 | 3,661,502 | 4359 | 4401 | -42 |
| 27 | T14S.R10E.18 | 405,642 | 3,661,934 | 4384 | 4393 | -9 |
| 28 | T14S.R10E.17 | 405,903 | 3,662,056 | 4374 | 4398 | -24 |
| 29 | T14S.R09E.23 | 401,182 | 3,661,825 | 4307 | 4310 | -3 |
| 30 | T14S.R09E.22 | 400,111 | 3,661,065 | 4228 | 4292 | -64 |
| 31 | T14S.R10E.19 | 405,686 | 3,661,133 | 4434 | 4399 | 35 |
| 32 | T14S.R10E.19 | 404,881 | 3,660,987 | 4370 | 4376 | -6 |
| 33 | T14S.R10E.19 | 405,143 | 3,661,232 | 4374 | 4383 | -9 |
| 34 | T14S.R09E.21 | 398,030 | 3,660,409 | 4267 | 4255 | 12 |
| 35 | T14S.R09E.24 | 402,957 | 3,660,390 | 4291 | 4334 | -43 |
| 36 | T14S.R10E.30 | 404,949 | 3,659,939 | 4368 | 4375 | -7 |
| 37 | T14S.R09E.26 | 401,264 | 3,659,730 | 4291 | 4309 | -18 |
| 38 | T14S.R09E.27 | 400,483 | 3,659,398 | 4265 | 4298 | -33 |
| 39 | T14S.R09E.25 | 403,154 | 3,659,341 | 4274 | 4336 | -62 |
| 40 | T14S.R09E.25 | 403,258 | 3,659,402 | 4274 | 4338 | -64 |
| 41 | T14S.R10E.29 | 405,955 | 3,659,436 | 4371 | 4393 | -22 |
| 42 | T14S.R09E.26 | 402,451 | 3,659,101 | 4280 | 4324 | -44 |
| 43 | T14S.R09E.26 | 402,065 | 3,659,382 | 4288 | 4320 | -32 |
| 44 | T14S.R10E.32 | 406,594 | 3,658,476 | 4380 | 4385 | -5 |
| 45 | T14S.R10E.32 | 406,413 | 3,658,508 | 4383 | 4383 | 0 |
| 46 | T14S.R09E.36 | 403,146 | 3,658,571 | 4312 | 4333 | -21 |
| 47 | T14S.R09E.36 | 403,561 | 3,658,598 | 4315 | 4339 | -24 |

## TABLE 4
## OBSERVED AND COMPUTED STEADY STATE WATER ELEVATIONS

| ID# | T.R.S | UTM X | UTM Y | Observed (ft msl) | Computed (ft msl) | Residual (ft) |
|---|---|---|---|---|---|---|
| 48 | T14S.R09E.25 | 403,254 | 3,658,970 | 4279 | 4336 | -57 |
| 49 | T14S.R09E.36 | 402,782 | 3,658,483 | 4307 | 4327 | -20 |
| 50 | T14S.R10E.31 | 404,800 | 3,657,938 | 4366 | 4354 | 12 |
| 51 | T14S.R10E.31 | 404,542 | 3,658,126 | 4370 | 4352 | 18 |
| 52 | T14S.R09E.34 | 400,727 | 3,657,795 | 4271 | 4299 | -28 |
| 53 | T14S.R09E.34 | 400,731 | 3,658,195 | 4280 | 4300 | -20 |
| 54 | T14S.R09E.35 | 402,357 | 3,657,439 | 4285 | 4317 | -32 |
| 55 | T14S.R10E.31 | 405,364 | 3,657,287 | 4362 | 4357 | 5 |
| 56 | T14S.R09E.35 | 401,656 | 3,657,385 | 4257 | 4308 | -51 |
| 57 | T14S.R09E.35 | 401,550 | 3,657,109 | 4278 | 4305 | -27 |
| 58 | T15S.R09E.1 | 403,129 | 3,656,877 | 4331 | 4324 | 7 |
| 59 | T15S.R10E.6 | 404,419 | 3,656,064 | 4325 | 4335 | -10 |
| 60 | T15S.R09E.2 | 401,413 | 3,656,402 | 4267 | 4299 | -32 |
| 61 | T15S.R10E.6 | 404,109 | 3,656,221 | 4350 | 4333 | 17 |
| 62 | T15S.R09E.1 | 403,126 | 3,656,539 | 4319 | 4322 | -3 |
| 63 | T15S.R10E.7 | 404,281 | 3,655,234 | 4343 | 4324 | 19 |
| 64 | T15S.R10E.7 | 405,526 | 3,655,222 | 4365 | 4338 | 27 |
| 65 | T15S.R10E.7 | 405,129 | 3,654,425 | 4347 | 4324 | 23 |
| 66 | T15S.R10E.7 | 404,709 | 3,653,998 | 4336 | 4314 | 22 |
| 67 | T15S.R09E.13 | 403,871 | 3,653,143 | 4308 | 4294 | 14 |
| 68 | T15S.R09E.24 | 403,935 | 3,651,665 | 4236 | 4279 | -43 |
| 69 | T15S.R09E.24 | 403,961 | 3,651,725 | 4232 | 4280 | -48 |
| 70 | T15S.R10E.22 | 410,004 | 3,651,237 | 4356 | 4334 | 22 |
| 71 | T15S.R09E.24 | 403,930 | 3,651,140 | 4243 | 4275 | -32 |
| 72 | T15S.R10E.22 | 409,947 | 3,650,776 | 4342 | 4331 | 11 |
| 73 | T15S.R10E.29 | 406,723 | 3,650,067 | 4272 | 4294 | -22 |
| 74 | T15S.R10E.29 | 406,622 | 3,650,407 | 4324 | 4297 | 28 |
| 75 | T15S.R10E.30 | 405,478 | 3,650,294 | 4262 | 4284 | -22 |
| 76 | T15S.R09E.29 | 396,100 | 3,649,496 | 4137 | 4138 | -1 |
| 77 | T15S.R10E.30 | 404,740 | 3,649,039 | 4240 | 4268 | -28 |
| 78 | T15S.R10E.36 | 412,239 | 3,648,753 | 4342 | 4349 | -7 |
| 79 | T16S.R09E.6 | 401,373 | 3,647,316 | 4206 | 4206 | 0 |
| 80 | T16S.R08E.1 | 400,276 | 3,646,649 | 4160 | 4178 | -18 |
| 81 | T16S.R08E.1 | 400,277 | 3,646,680 | 4140 | 4178 | -38 |
| 82 | T16S.R09E.5 | 403,444 | 3,646,680 | 4209 | 4242 | -33 |
| 83 | T16S.R08E.5 | 392,378 | 3,646,270 | 4074 | 4063 | 11 |
| 84 | T16S.R08E.6 | 390,820 | 3,646,318 | 4050 | 4037 | 13 |
| 85 | T16S.R10E.6 | 410,089 | 3,646,309 | 4330 | 4296 | 35 |
| 86 | T16S.R09E.3 | 406,479 | 3,646,342 | 4280 | 4267 | 13 |
| 87 | T16S.R09E.3 | 406,636 | 3,646,433 | 4276 | 4269 | 8 |
| 88 | T16S.R09E.9 | 403,824 | 3,645,659 | 4233 | 4240 | -7 |
| 89 | T16S.R08E.12 | 399,712 | 3,644,807 | 4148 | 4144 | 4 |
| 90 | T16S.R09E.7 | 401,609 | 3,644,942 | 4193 | 4185 | 8 |
| 91 | T16S.R08E.12 | 399,449 | 3,644,502 | 4139 | 4135 | 4 |
| 92 | T16S.R09E.9 | 405,007 | 3,644,416 | 4230 | 4243 | -13 |
| 93 | T16S.R08E.17 | 392,686 | 3,643,557 | 4056 | 4058 | -2 |
| 94 | T16S.R09E.13 | 408,916 | 3,643,178 | 4279 | 4260 | 19 |

## TABLE 4
## OBSERVED AND COMPUTED STEADY STATE WATER ELEVATIONS

| ID# | T.R.S | UTM X | UTM Y | Observed (ft msl) | Computed (ft msl) | Residual (ft) |
|---|---|---|---|---|---|---|
| 95 | T16S.R09E.13 | 409,021 | 3,643,269 | 4276 | 4261 | 15 |
| 96 | T16S.R08E.14 | 397,846 | 3,642,701 | 4074 | 4085 | -11 |
| 97 | T16S.R08E.14 | 398,686 | 3,643,555 | 4093 | 4106 | -13 |
| 98 | T16S.R09E.17 | 403,197 | 3,642,678 | 4200 | 4194 | 6 |
| 99 | T16S.R08E.13 | 400,265 | 3,642,985 | 4139 | 4132 | 7 |
| 100 | T16S.R08E.24 | 399,090 | 3,642,472 | 4124 | 4104 | 20 |
| 101 | T16S.R08E.29 | 392,710 | 3,640,939 | 4025 | 4038 | -13 |
| 102 | T16S.R09E.26 | 407,956 | 3,640,476 | 4245 | 4235 | 10 |
| 103 | T16S.R08E.29 | 392,491 | 3,639,955 | 4031 | 4030 | 1 |
| 104 | T16S.R08E.29 | 392,311 | 3,640,172 | 4021 | 4031 | -10 |
| 105 | T16S.R09E.26 | 407,247 | 3,639,683 | 4234 | 4220 | 15 |
| 106 | T16S.R10E.30 | 410,900 | 3,638,448 | 4265 | 4237 | 28 |
| 107 | T16S.R08E.31 | 392,183 | 3,637,926 | 4006 | 4021 | -15 |
| 108 | T17S.R09E.2 | 406,839 | 3,637,654 | 4206 | 4175 | 31 |
| 109 | T17S.R09E.1 | 408,811 | 3,637,296 | 4194 | 4194 | 0 |
| 110 | T17S.R09E.3 | 405,226 | 3,637,576 | 4142 | 4151 | -9 |
| 111 | T17S.R09E.5 | 402,602 | 3,637,664 | 4114 | 4118 | -4 |
| 112 | T17S.R09E.5 | 402,576 | 3,637,664 | 4107 | 4118 | -11 |
| 113 | T17S.R09E.2 | 407,976 | 3,637,027 | 4176 | 4179 | -3 |
| 114 | T17S.R09E.2 | 408,162 | 3,637,488 | 4174 | 4189 | -15 |
| 115 | T16S.R10E.31 | 410,815 | 3,637,678 | 4260 | 4229 | 31 |
| 116 | T17S.R09E.1 | 408,390 | 3,636,838 | 4141 | 4181 | -40 |
| 117 | T17S.R10E.6 | 410,619 | 3,636,140 | 4181 | 4205 | -24 |
| 118 | T17S.R09E.4 | 404,097 | 3,636,355 | 4132 | 4119 | 13 |
| 119 | T17S.R09E.2 | 406,722 | 3,636,269 | 4150 | 4149 | 1 |
| 120 | T17S.R09E.1 | 409,035 | 3,636,278 | 4187 | 4181 | 6 |
| 121 | T17S.R09E.11 | 408,174 | 3,635,916 | 4177 | 4163 | 15 |
| 122 | T17S.R10E.6 | 410,305 | 3,635,835 | 4192 | 4193 | -1 |
| 123 | T17S.R10E.6 | 410,383 | 3,635,927 | 4202 | 4197 | 6 |
| 124 | T17S.R09E.8 | 403,331 | 3,635,193 | 4109 | 4096 | 13 |
| 125 | T17S.R09E.8 | 403,333 | 3,635,377 | 4082 | 4098 | -16 |
| 126 | T17S.R09E.12 | 409,465 | 3,635,011 | 4192 | 4163 | 29 |
| 127 | WHITE SANDS | 381,382 | 3,632,413 | 3986 | 3959 | 28 |
| 128 | T17S.R09E.12 | 409,853 | 3,634,730 | 4165 | 4163 | 2 |
| 129 | T17S.R08E.13 | 399,447 | 3,634,092 | 4065 | 4049 | 16 |
| 130 | T17S.R08E.13 | 398,537 | 3,634,132 | 4053 | 4042 | 11 |
| 131 | T17S.R08E.13 | 398,616 | 3,634,192 | 4050 | 4044 | 7 |
| 132 | T17S.R09E.13 | 409,919 | 3,633,406 | 4145 | 4132 | 13 |
| 133 | T17S.R09E.13 | 409,817 | 3,633,715 | 4133 | 4139 | -6 |
| 134 | T17S.R09E.15 | 406,413 | 3,633,869 | 4100 | 4107 | -7 |
| 135 | WHITE SANDS | 382,202 | 3,631,356 | 3987 | 3961 | 26 |
| 136 | T17S.R09E.24 | 409,913 | 3,632,759 | 4116 | 4117 | -1 |
| 137 | T17S.R09E.23 | 408,193 | 3,632,313 | 4073 | 4096 | -23 |
| 138 | WHITE SANDS | 388,193 | 3,632,118 | 3964 | 3973 | -9 |
| 139 | T17S.R09E.24 | 409,070 | 3,631,596 | 4084 | 4090 | -6 |
| 140 | T17S.R09E.24 | 408,997 | 3,632,182 | 4100 | 4099 | 1 |
| 141 | T17S.R10E.18 | 411,097 | 3,631,455 | 4080 | 4094 | -14 |

# TABLE 4
# OBSERVED AND COMPUTED STEADY STATE WATER ELEVATIONS

| ID# | T.R.S | UTM X | UTM Y | Observed (ft msl) | Computed (ft msl) | Residual (ft) |
|---|---|---|---|---|---|---|
| 142 | T17S.R10E.18 | 410,994 | 3,631,518 | 4132 | 4095 | 37 |
| 143 | T17S.R10E.18 | 411,074 | 3,631,732 | 4083 | 4100 | -17 |
| 144 | T17S.R10E.19 | 410,706 | 3,631,335 | 4096 | 4092 | 4 |
| 145 | T17S.R10E.19 | 410,290 | 3,631,339 | 4088 | 4091 | -3 |
| 146 | T17S.R10E.19 | 410,368 | 3,631,399 | 4086 | 4092 | -6 |
| 147 | T17S.R09E.25 | 409,507 | 3,631,038 | 4066 | 4083 | -17 |
| 148 | T17S.R09E.25 | 409,846 | 3,631,158 | 4083 | 4087 | -4 |
| 149 | T17S.R10E.19 | 410,029 | 3,631,218 | 4079 | 4088 | -9 |
| 150 | T17S.R09E.25 | 408,750 | 3,630,768 | 4061 | 4076 | -15 |
| 151 | T17S.R09E.25 | 409,220 | 3,630,917 | 4057 | 4081 | -24 |
| 152 | T17S.R09E.25 | 408,675 | 3,631,108 | 4071 | 4081 | -10 |
| 153 | T17S.R09E.24 | 408,755 | 3,631,230 | 4078 | 4083 | -5 |
| 154 | T17S.R10E.19 | 411,507 | 3,630,743 | 4133 | 4081 | 52 |
| 155 | T17S.R10E.19 | 411,119 | 3,630,992 | 4080 | 4086 | -6 |
| 156 | T17S.R09E.26 | 407,997 | 3,630,898 | 4039 | 4074 | -35 |
| 157 | T17S.R10E.19 | 410,413 | 3,630,537 | 4059 | 4078 | -19 |
| 158 | T17S.R10E.19 | 411,038 | 3,630,655 | 4076 | 4080 | -4 |
| 159 | T17S.R10E.19 | 410,858 | 3,630,871 | 4079 | 4084 | -5 |
| 160 | T17S.R10E.19 | 410,312 | 3,630,969 | 4078 | 4085 | -7 |
| 161 | T17S.R10E.19 | 411,067 | 3,631,055 | 4078 | 4087 | -9 |
| 162 | T17S.R10E.19 | 410,462 | 3,630,229 | 4060 | 4074 | -14 |
| 163 | T17S.R10E.19 | 410,022 | 3,630,479 | 4060 | 4077 | -17 |
| 164 | T17S.R10E.19 | 410,023 | 3,630,602 | 4038 | 4079 | -41 |
| 165 | T17S.R10E.19 | 409,997 | 3,630,633 | 4060 | 4079 | -19 |
| 166 | T17S.R10E.19 | 410,285 | 3,630,722 | 4089 | 4081 | 8 |
| 167 | T17S.R09E.25 | 408,588 | 3,630,092 | 4043 | 4067 | -24 |
| 168 | T17S.R09E.26 | 407,546 | 3,629,886 | 4044 | 4060 | -16 |
| 169 | T17S.R10E.30 | 410,039 | 3,629,462 | 4063 | 4063 | 0 |
| 170 | T17S.R09E.36 | 409,856 | 3,629,464 | 4056 | 4063 | -7 |
| 171 | T17S.R09E.26 | 407,025 | 3,629,921 | 4066 | 4058 | 8 |
| 172 | T17S.R09E.25 | 409,286 | 3,629,685 | 4051 | 4065 | -14 |
| 173 | T17S.R09E.36 | 408,815 | 3,629,381 | 4050 | 4059 | -9 |
| 174 | T17S.R09E.25 | 408,661 | 3,629,599 | 4068 | 4062 | 7 |
| 175 | T17S.R09E.35 | 408,136 | 3,629,079 | 4044 | 4054 | -10 |
| 176 | T17S.R09E.35 | 408,112 | 3,629,296 | 4038 | 4056 | -18 |
| 177 | T17S.R10E.29 | 411,827 | 3,628,738 | 4044 | 4055 | -11 |
| 178 | T17S.R09E.36 | 409,274 | 3,628,360 | 4038 | 4050 | -12 |
| 179 | WHITE SANDS | 389,215 | 3,628,257 | 3987 | 3965 | 22 |
| 180 | T17S.R09E.35 | 408,127 | 3,628,033 | 4031 | 4043 | -12 |
| 181 | T17S.R09E.35 | 406,906 | 3,628,290 | 4021 | 4040 | -19 |
| 182 | T18S.R09E.1 | 409,683 | 3,627,525 | 4057 | 4042 | 15 |
| 183 | T18S.R09E.1 | 409,735 | 3,627,555 | 4054 | 4042 | 12 |
| 184 | T17S.R09E.35 | 406,698 | 3,628,292 | 4021 | 4039 | -18 |
| 185 | T18S.R07E.1 | 390,039 | 3,627,508 | 3983 | 3965 | 18 |
| 186 | T18S.R08E.5 | 392,895 | 3,626,923 | 4020 | 3976 | 44 |
| 187 | T17S.R10E.31 | 410,461 | 3,627,241 | 4043 | 4040 | 3 |
| 188 | T18S.R07E.1 | 389,405 | 3,626,592 | 3991 | 3961 | 30 |

## TABLE 4
## OBSERVED AND COMPUTED STEADY STATE WATER ELEVATIONS

| ID# | T.R.S | UTM X | UTM Y | Observed (ft msl) | Computed (ft msl) | Residual (ft) |
|---|---|---|---|---|---|---|
| 189 | T18S.R09E.1 | 408,398 | 3,626,428 | 4025 | 4030 | -5 |
| 190 | T18S.R10E.5 | 412,530 | 3,625,898 | 4032 | 4029 | 4 |
| 191 | T18S.R09E.1 | 409,852 | 3,626,137 | 4027 | 4030 | -3 |
| 192 | T18S.R08E.12 | 398,507 | 3,626,094 | 4011 | 3994 | 17 |
| 193 | T18S.R10E.6 | 411,154 | 3,626,157 | 4041 | 4031 | 10 |
| 194 | T18S.R09E.11 | 407,346 | 3,625,237 | 3985 | 4018 | -33 |
| 195 | T18S.R09E.10 | 406,649 | 3,625,829 | 4067 | 4019 | 48 |
| 196 | T18S.R10E.7 | 411,272 | 3,624,832 | 4060 | 4022 | 38 |
| 197 | T18S.R09E.12 | 408,386 | 3,625,227 | 4007 | 4021 | -14 |
| 198 | T18S.R09E.14 | 407,313 | 3,624,437 | 3985 | 4012 | -27 |
| 199 | T18S.R07E.14 | 387,971 | 3,623,990 | 3949 | 3951 | -2 |
| 200 | T18S.R09E.10 | 406,351 | 3,624,600 | 3996 | 4010 | -14 |
| 201 | T18S.R09E.10 | 406,457 | 3,624,783 | 3971 | 4011 | -40 |
| 202 | T18S.R09E.14 | 407,488 | 3,623,727 | 3994 | 4008 | -14 |
| 203 | T18S.R09E.13 | 409,123 | 3,623,188 | 4000 | 4009 | -9 |
| 204 | T18S.R10E.18 | 411,390 | 3,623,414 | 4021 | 4013 | 8 |
| 205 | T18S.R09E.14 | 407,351 | 3,622,958 | 3958 | 4004 | -46 |
| 206 | T18S.R10E.21 | 413,326 | 3,621,672 | 4043 | 4005 | 38 |
| 207 | T18S.R09E.25 | 409,703 | 3,621,150 | 4011 | 4000 | 11 |
| 208 | T18S.R09E.26 | 406,941 | 3,620,960 | 3942 | 3992 | -50 |
| 209 | T18S.R07E.25 | 389,359 | 3,620,155 | 3954 | 3943 | 11 |
| 210 | T18S.R09E.26 | 406,754 | 3,620,345 | 3988 | 3989 | -1 |
| 211 | T18S.R09E.34 | 406,096 | 3,619,551 | 3981 | 3983 | -2 |
| 212 | T18S.R10E.31 | 411,119 | 3,619,321 | 3991 | 3996 | -5 |
| 213 | T19S.R09E.1 | 408,294 | 3,617,990 | 3986 | 3986 | 0 |
| 214 | T19S.R10E.4 | 413,083 | 3,617,701 | 3977 | 3995 | -18 |
| 215 | T18S.R10E.32 | 413,031 | 3,617,733 | 3987 | 3995 | -8 |
| 216 | T18S.R10E.31 | 410,220 | 3,617,943 | 3967 | 3991 | -24 |
| 217 | T19S.R09E.1 | 408,371 | 3,617,898 | 3946 | 3986 | -40 |
| 218 | T18S.R10E.33 | 414,099 | 3,617,784 | 4006 | 3995 | 11 |
| 219 | T19S.R10E.10 | 414,723 | 3,614,546 | 3994 | 3992 | 2 |
| 220 | T19S.R10E.17 | 412,344 | 3,613,642 | 3895 | 3989 | -94 |
| 221 | T19S.R09E.34 | 405,053 | 3,608,474 | 3843 | 3967 | -124 |
| 222 | T19S.R09E.34 | 405,396 | 3,608,994 | 3853 | 3968 | -115 |
| 223 | T19S.R10E.32 | 411,392 | 3,609,093 | 3955 | 3985 | -30 |
| 224 | T21S.R09E.2 | 407,430 | 3,597,827 | 3921 | 3971 | -50 |

# TABLE 5
# STEADY STATE MODEL COMPARISON AND STATISTICAL INFORMATION

| STEADY STATE | 2005 MODEL | 1-T MODEL | 1989 MODEL |
|---|---|---|---|
| **Residual Mean** | -5.6 | -17.7 | -18.1 |
| **Res. Std. Dev.** | 27 | 45 | 39 |
| **Sum of Squares** | 1.7E+05 | 5.2E+05 | 3.9E+05 |
| **Abs. Res. Mean** | 20.1 | 32.8 | 30.8 |
| **Min. Residual** | -124 | -180 | -206 |
| **Max. Residual** | 123 | 123 | 84 |
| **Range** | 787 | 787 | 591 |
| **Std/Range** | 0.035 | 0.057 | 0.065 |

# TABLE 6
# SIMULATED WATER BALANCE
# FOR JUNE 2005

| IN: | AFY |
|---|---|
| MOUNTAIN FRONT RECHARGE | 11,890 |
| STORAGE (FROM DRAWDOWN) | 14,642 |
| SUM | 26,532 |
| | |
| OUT: | |
| EVAPORATION | 9,905 |
| STORAGE (FROM MOUNDING) | 135 |
| PUMPING | 16,491 |
| SUM | 26,532 |

# TABLE 7
# TRANSIENT MODEL COMPARISON AND STATISTICAL INFORMATION

| TRANSIENT | 2005 MODEL | 1-T MODEL | 1989 MODEL |
|---|---|---|---|
| **Residual Mean** | 5.4 | -9.9 | 10.0 |
| **Res. Std. Dev.** | 31 | 49 | 43 |
| **Sum of Squares** | 2.0E+06 | 5.3E+06 | 4.1E+06 |
| **Abs. Res. Mean** | 21.7 | 35.1 | 32.7 |
| **Min. Residual** | -228 | -289 | -247 |
| **Max. Residual** | 144 | 189 | 151 |
| **Range** | 795 | 795 | 636 |
| **Std/Range** | 0.038 | 0.062 | 0.068 |