Groundwater Management Area 16
Groundwater Flow Model

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PROFESSIONAL SEALS

The contents of this report (including tables and figures) document the work of the following licensed professionals:

William R. Hutchison, Ph.D., P.E. No. 96287, P.G. No. 286

Dr. Hutchison was the project manager responsible for oversight of the modeling project, including overall guidance for the modeling approach and review of model calibration. Dr. Hutchison also wrote in FORTRAN the lpf.exe, stpf.exe, rech.exe, riv.exe, and ghb.exe preprocessors, as well as the gethead.exe postprocessor.

Melissa E. Hill, Ph.D., P.G. No. 1316

Dr. Hill was the lead groundwater flow modeler responsible for compiling and reviewing the various data sets into a numerical model including data compiled by non-licensed personnel, selecting targets, writing pre- and post-processors using Statistical Analysis Software language (*Targets_Example.sas*; *Calibrated Model_Example.sas*) and the *getheadtargmod3.exe* postprocessor written in FORTRAN, as well as model calibration, and writing the model report.

PROFESSIONAL SEALS CONTINUED

Roberto Anaya, P.G. No. 480

Mr. Anaya developed the model framework and the *makepmp2.pl* program written in PERL for extracting pumping from the existing groundwater availability models.

Mohammad M. Hassan, P.E. No. 95699

Mr. Hassan developed FORTRAN programs for compiling the well package (*wel.exe*) and the drain preprocessor (*drn.exe*).

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Dr. Wade was responsible for the initial river and stream data compilation.

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EXECUTIVE SUMMARY

ES 1.0 Introduction and Purpose for Groundwater Flow Model

In support of the joint groundwater conservation district planning process for groundwater resources, a groundwater flow model that encompasses the footprint for Groundwater Management Area 16 and its underlying aquifer systems was developed by staff of the Texas Water Development Board. The Groundwater Management Area 16 model includes portions of the underlying Gulf Coast, Yegua-Jackson, Queen City, Sparta, and Carrizo-Wilcox aquifer systems. The model was developed in an effort to provide results useful to Groundwater Management Area 16, because the existing groundwater availability models for the central portion of the Gulf Coast Aquifer (Chowdhury and others, 2004) and the southern portion of the Gulf Coast Aquifer (Chowdhury and Mace, 2007) do not individually encompass the footprint for Groundwater Management Area 16, nor do they include the Yegua-Jackson, Queen City, Sparta, or Carrizo-Wilcox aquifer systems. The purpose of this model, therefore, was focused on use as a tool in developing desired future conditions.

ES 2.0 Model Overview

MODFLOW-96 (Harbaugh and McDonald, 1996) packages used by Chowdhury and others (2004) and Chowdhury and Mace (2007) were converted for use in MODFLOW-2000 (Harbaugh and others, 2000). The MODFLOW-2000 groundwater flow simulator was used with the Geometric Multigrid (GMG) solver (Wilson and Naff, 2004). MODFLOW packages used in this effort include the Basic, Discretization, Layer-Property Flow, Well, Drain, Recharge, General-Head Boundary, and River packages for model calibration. The Groundwater Management Area 16 model consists of six layers. Layers 1 through 4 represent the Gulf Coast Aquifer System that is comprised of the Chicot Aquifer, Evangeline Aquifer, Burkeville Confining System, and Jasper Aquifer in descending order. Layer 5 is an aggregate representation of the Yegua-Jackson Aquifer System including parts of the Catahoula Formation and layer 6 is an aggregate representation of the Queen-City, Sparta, and Carrizo-Wilcox Aquifer System.

ES 3.0 Model Calibration and Results

The model was calibrated using a combination of trial and error and automated adjustments using Parameter Estimation (PEST) developed by Watermark Numerical Computing (2004), an industry-standard inverse modeling software package. Calibration was accomplished by adjusting various parameters until simulated groundwater elevations were in reasonable agreement with measured groundwater elevations. The calibration period was 1963 through 1999 (37 annual stress periods), with a steady-state stress period (stress period 1) preceding the transient simulation for a total of 38 stress periods.

The model was calibrated with 966 target wells from the Texas Water Development Board's groundwater database. These target wells had at least one groundwater elevation measurement during the calibration period. The total number of groundwater elevation measurements was 3,885. The average residual for the 966 target wells is 14.7 feet and the standard deviation of residuals is 40.7, while the range in measured groundwater elevations is 1,034 feet. The standard deviation of the residuals divided by the range in measured groundwater elevations (0.039) are within acceptable limits (less than 10 to 15 percent or 0.10 to 0.15; Rumbaugh, 2004).

ES 4.0 Model Limitations

Numerical groundwater flow models are approximate representations of aquifer systems (Anderson and Woessner, 2002), and as such have limitations. These limitations are usually associated with (1) the purpose for the groundwater flow model, (2) the extent of the understanding of the aquifer(s), (3) the quantity and quality of data used to constrain parameters in the groundwater flow model, and (4) assumptions made during model development. Models are best viewed as tools to help form decisions rather than as machines to generate truth or make decisions. The National Research Council (2007) concluded that scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or be able to prove that a given model is correct in all respects for a particular application.

The nature of regional groundwater flow models affects the scale of application of the model. This model is most accurate in assessing larger regional-scale groundwater issues, such as predicting aquifer-wide water level changes and trends over the next 50 years that may result from different proposed water management strategies. Accuracy and applicability of the model decreases when using it to address more local-scale issues because of limitations of the information used in model construction and the model cell size that determines spatial resolution of the model. Consequently, this model is not likely to accurately predict water level declines associated with a single well or spring because (1) these water level declines depend on site-specific hydrologic properties not included in detail in regional-scale models, and (2) the cell size used in the model is too large to resolve changes in water levels that occur over relatively short distances. Addressing local-scale issues requires a more detailed model, with local estimates of hydrologic properties, or an analytical model. This model is more useful in determining the impacts of groups of wells distributed over many square miles. The model predicts changes in ambient water levels rather than actual water level changes at specific locations, such as an individual well.

1.0 INTRODUCTION AND PURPOSE FOR GROUNDWATER FLOW MODEL

In support of the joint groundwater conservation district planning process for groundwater resources, a new groundwater flow model that encompasses the footprint for Groundwater Management Area 16 and its underlying aquifer systems was developed by the staff of the Texas Water Development Board. The Groundwater Management Area 16 model includes portions of the underlying Gulf Coast, Yegua-Jackson, Queen City,Sparta, and Carrizo-Wilcox aquifer systems. The model was developed in an effort to provide results more useful for joint planning purposes in Groundwater Management Area 16, because the existing central portion of the Gulf Coast Aquifer (Chowdhury and others, 2004) and the southern portion of the Gulf Coast Aquifer (Chowdhury and Mace, 2007) groundwater availability models do not individually encompass the footprint for Groundwater Management Area 16 and do not include the Yegua-Jackson or the Queen City-Sparta, Carrizo-Wilcox aquifer systems. The purpose of this model, therefore, was focused on use as a tool in developing desired future conditions on a regional scale.

The existing groundwater availability models for the central and southern portions of the Gulf Coast Aquifer (Chowdhury and others, 2004; Chowdhury and Mace, 2007) consist of four layers that comprise the Chicot Aquifer, Evangeline Aquifer, Burkeville Confining System, and the Jasper Aquifer. The Groundwater Management Area 16 groundwater flow model consists of six layers. Layers 1 through 4 represent the Gulf Coast Aquifer System which is comprised of the Chicot Aquifer, Evangeline Aquifer, Burkeville Confining System, and Jasper Aquifer in descending order. Layer 5 is an aggregate representation of the Yegua-Jackson Aquifer System including parts of the Catahoula Formation and layer 6 is an aggregate representation of the Queen City, Sparta, and Carrizo-Wilcox Aquifer System.

2.0 MODEL OVERVIEW

MODFLOW-96 (Harbaugh and McDonald, 1996) packages used by Chowdhury and others (2004) and Chowdhury and Mace (2007) were converted to MODFLOW-2000 (Harbaugh and others, 2000). MODFLOW packages used in this effort included the Basic, Discretization, Layer-Property Flow, Well, Drain, Recharge, General-Head Boundary, and River packages. The Geometric Multigrid (GMG) solver (Wilson and Naff, 2004) option was also used.

2.1 Model Packages

The MODFLOW-2000 packages used to calibrate the model and their input filenames are listed in Table 1. MODFLOW output files and their names are listed in Table 2.

Table 1. Summary of model input packages and filenames.

MODFLOW-2000 Package	Input Filename
Basic (BAS)	GMA16.bas
Name (NAM)	GMA16.nam
Discretization (DIS)	GMA16.dis
Layer-Property FLOW (LPF)	GMA16.lpf
Well (WEL)	GMA16.wel
Drain (DRN)	GMA16.drn
Recharge (RCH)	GMA16.rch
General-Head Boundary (GHB)	GMA16.ghb
River (RIV)	GMA16.riv
Output Control (OC)	GMA16.oc
Geometric Multigrid Solver (GMG)	GMA16.gmg
Starting Heads	oGMA16.hds

Table 2. Summary of model output files and their names.

MODFLOW-2000 Output	Output Filename
Global output	GMA16.glo
List output	GMA16.lst
Cell-by-cell output	GMA16.cbb
Head output	GMA16.hds
Drawdown output	GMA16.ddn

2.11 Basic Package

The Basic Package specifies the status of each cell (active or inactive), the assigned head for inactive cells (9999), and specifications of starting heads. The Basic Package also reads the name file which contains the input and output files that will be invoked during a simulation using MODFLOW-2000 (Harbaugh and others, 2000).

The active model domain and general-head boundaries for each layer in the Groundwater Management Area 16 model are shown in Figure 1. In general, model cells with thicknesses less than or equal to 20 feet were deactivated to maintain numerical stability.

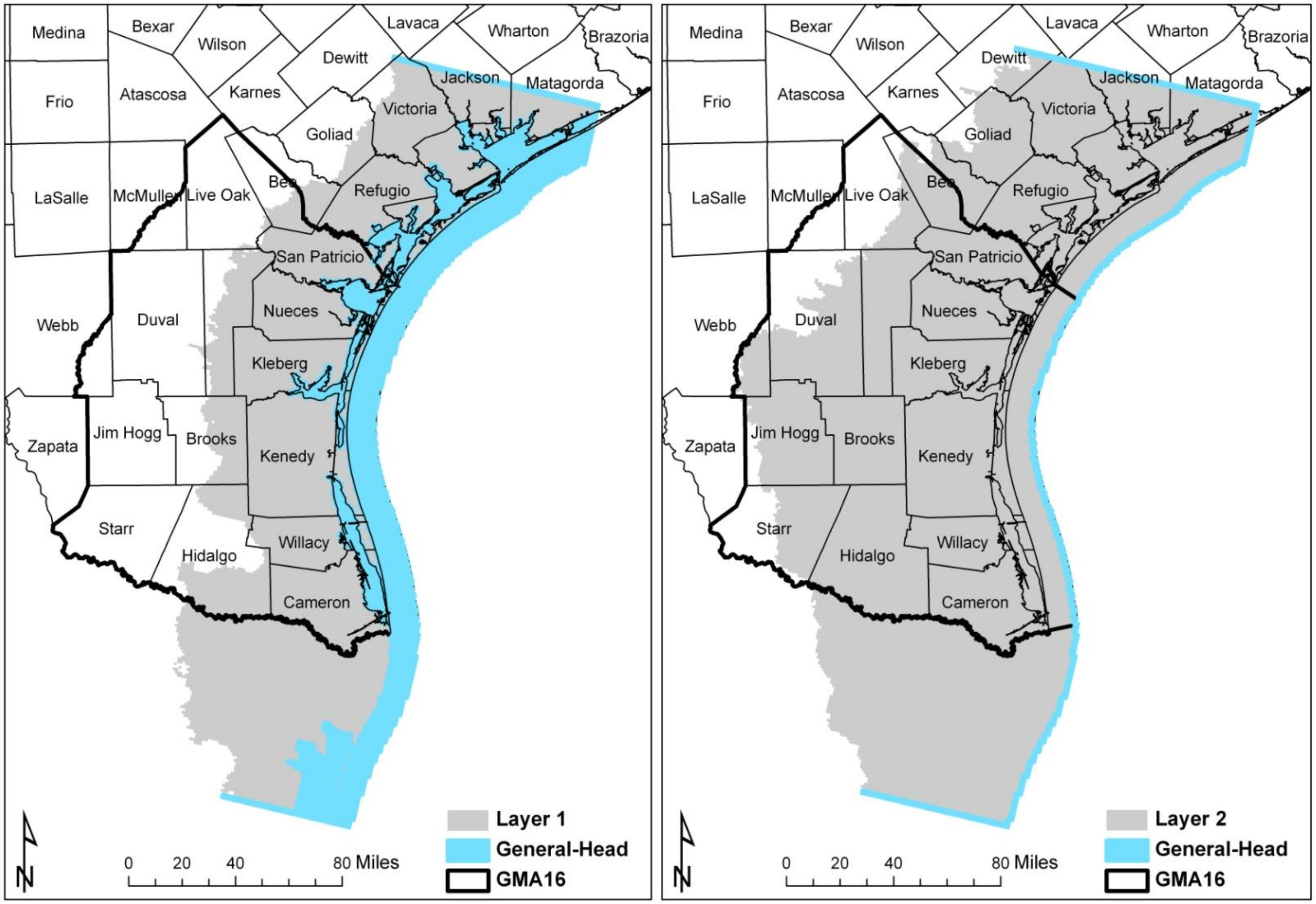


Figure 1. Active model cells for the Chicot Aquifer (layer 1) and Evangeline Aquifer (layer 2) with the location of general-head boundaries in the Groundwater Management Area 16 model.

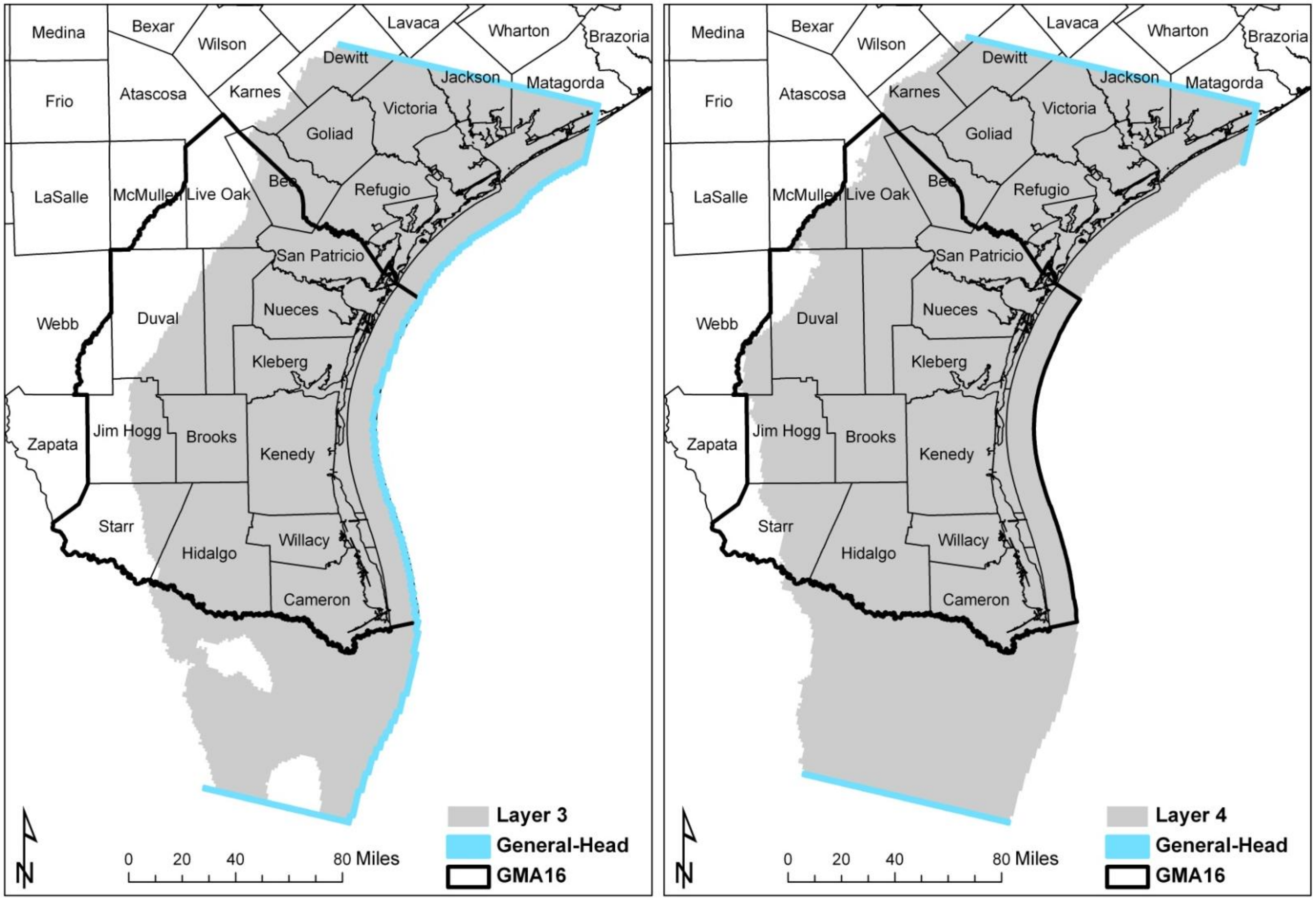


Figure 1 continued. Active model cells for the Burkeville Confining System (layer 3) and Jasper Aquifer (layer 4) with the location of general-head boundaries in the Groundwater Management Area 16 model.

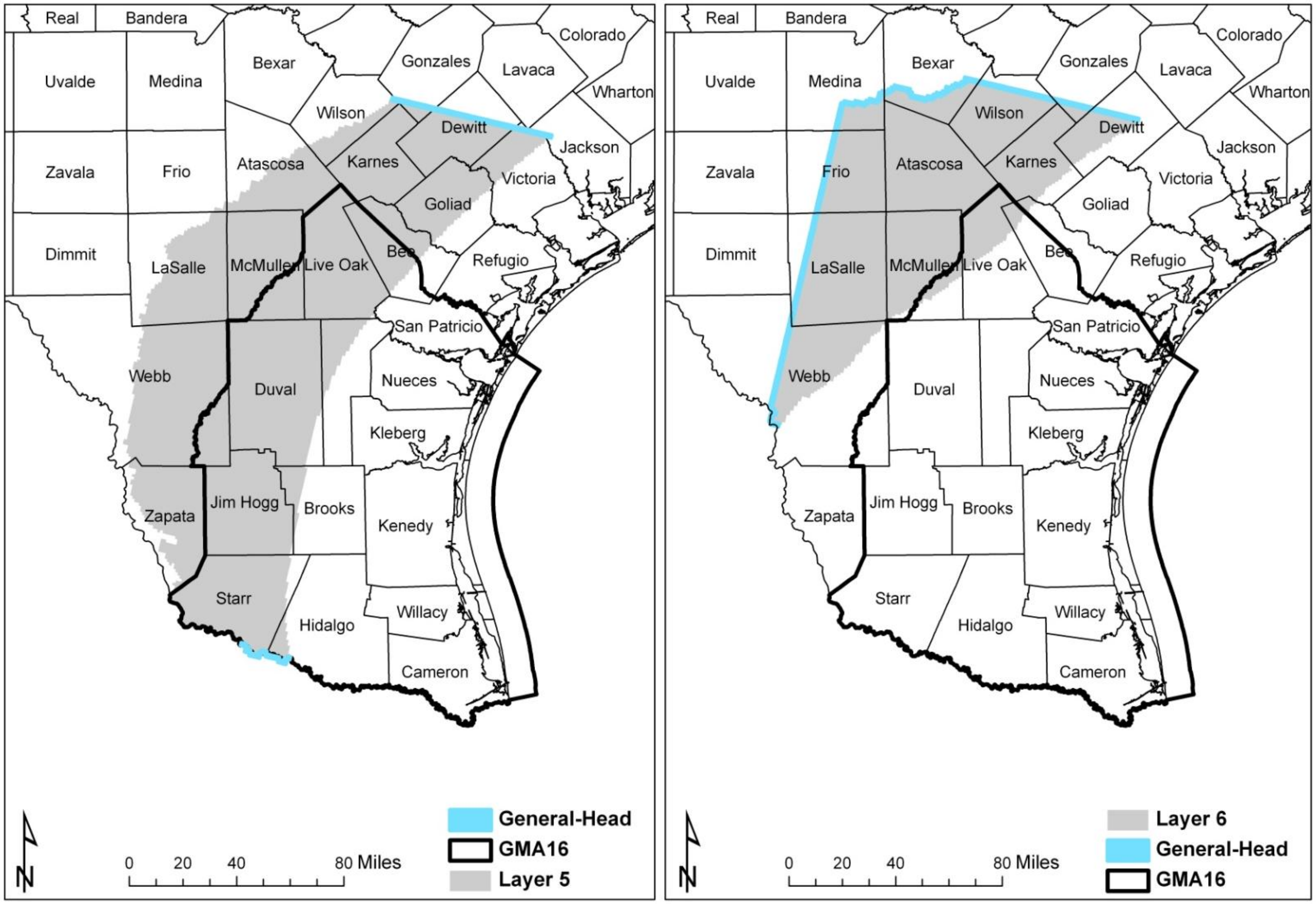


Figure 1 continued. Active model cells for the aggregate Yegua-Jackson Aquifer System (layer 5) and the aggregate Queen City, Sparta, Carrizo-Wilcox Aquifer System (layer 6) with the location of general-head boundaries in the Groundwater Management Area 16 model.

2.12 Discretization Package

The Discretization Package specifies the spatial and temporal discretization of the model. The model consists of six layers with 284 rows and 201 columns. The cell length and width are 5,280 feet (one mile by one mile). The time unit for the model is days, and the distance unit for the model is feet. The combined steady-state/transient model defines 38 stress periods. The first stress period is specified as steady-state and was used to provide a stable head distribution at the start of the transient calibration period; it is not intended to represent true "pre-development" conditions. The next 37 stress periods are transient, each with a length of 365 days (1 year). The transient stress periods represent 1963 through 1999.

The model framework (top and bottom elevations of the aquifers) are specified in the discretization package as follows: 1) the original bottom elevations from the model files for the existing Gulf Coast Aquifer groundwater availability models (Chowdhury and others, 2004; Chowdhury and Mace, 2007); 2) interpolated raster data for the base of the Yegua-Jackson Aquifer System as delineated in conceptual model deliverables provided by Deeds and others (2009); 3) the original bottom elevations from the model files for the groundwater availability model for the southern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers (Kelley and others, 2004); and 4) a 90-meter resolution digital elevation model (Jarvis and others, 2008).

The digital elevation model was used to constrain top and bottom elevations relative to approximate land surface elevations. The 90-meter digital elevation model was sampled with the new Groundwater Management Area 16 model grid shape file using the zonal statistics tool available with ESRI Geographical Information System (ArcGIS). The digital elevation model mean statistic was used to represent the top elevations of all aquifer outcrop model cells. For active non-outcrop model cells, the bottom elevation of the overlying model layer was used as the top elevation of the underlying model layer.

The model grid cell polygons for the central and southern portions of the Gulf Coast and Queen City, Sparta, Carrizo-Wilcox aquifers groundwater availability models were attributed with bottom elevations from the model files of the respective models. The spatial join tool in ArcGIS was then used to transfer these bottom elevations to the Groundwater Management Area16 model cell centroids point shape file. The ArcGIS buffer tool was then used to remove bottom elevation data points from the outcrop area of layers 2, 3, and 4 in order to remove legacy elevations with the potential to corrupt new digital elevation model data derived from the previous digital elevation model step used to constrain top and bottom elevations to approximate land surface elevations. In addition, the ArcGIS buffer tool was used to remove bottom elevation data points from the overlap area between the central and southern portions of the Gulf Coast Aquifer groundwater availability models.

Outcrop control points were then added by converting arc line vertices of the up-dip limits of layers 1, 2, 3, and 4, respectively to points using the "features to points" ArcGIS tool and then extracting digital elevation model values for each of those points to represent known bottom elevations at land surface. An image of the surface geology of

Mexico at a scale of 1:2,000,000 was georeferenced in ArcGIS and evaluated to determine the approximate location of the up-dip limits of the Chicot Aquifer, Evangeline Aquifer, and Jasper Aquifer. Outcrop control points were then added to extend the known bottom elevations at land surface across the Rio Grande into Mexico. This image can be found at: http://www.igeograf.unam.mx/instituto/publicaciones/atlas/iv-1-1.jpg

Because the Burkeville Confining System (layer 3) is presumed to pinch out in the subsurface, the up-dip extent of layer 3 was extrapolated southward into Mexico from north of the Rio Grande.

Control points were also extrapolated down-dip into the Gulf of Mexico, up-dip beyond the Gulf Coast Aquifer outcrop, and south across the Rio Grande into Mexico. The extrapolated control points up-dip and down-dip were grossly generalized to maintain the regional shape of the layer bottom surfaces. These generalized control points were necessary to mitigate spurious interpolations when kriging the surfaces in ArcGIS.

The bottom elevation surface used for the Yegua-Jackson Aquifer System was taken directly from the Yegua-Jackson Aquifer System conceptual model study deliverable files as a raster data set (Deeds and others, 2009). A sliver of sediments (mostly from the Catahoula Group) in the southern portion of the Groundwater Management Area 16 model domain were lumped into the Yegua-Jackson Aquifer System (layer 5).

The raster surfaces were then sampled using the zonal statistics tool in ArcGIS to attribute the mean model grid cell bottom elevations for model layers 1, 2, 3, 4, and 5 to the Groundwater Management Area 16 model grid shapefile. The bottom elevations used in the Queen City, Sparta, Carrizo-Wilcox Groundwater Availability Model were used after transferring the values to the Groundwater Management Area 16 model grid using the ArcGIS spatial join tool.

Quality control and quality assurance procedures were manually performed using the query tools in ArcGIS to assure that negative model layer thicknesses were removed from each model layer in areas where the aquifer units did not exist or were assumed inactive and to cross-check that each calculated model cell top elevation had a value greater than the respective model cell bottom elevation.

Because we used lumped, or bulk representations of units for layers 4 and 5, and because we declared model cells with thicknesses less than twenty feet as inactive, the outcrop areas for layers in the Groundwater Management Area 16 model do not necessarily coincide with the outcrop areas from the existing groundwater availability models.

Top and bottom elevation ranges for each layer are shown in Figure 2.

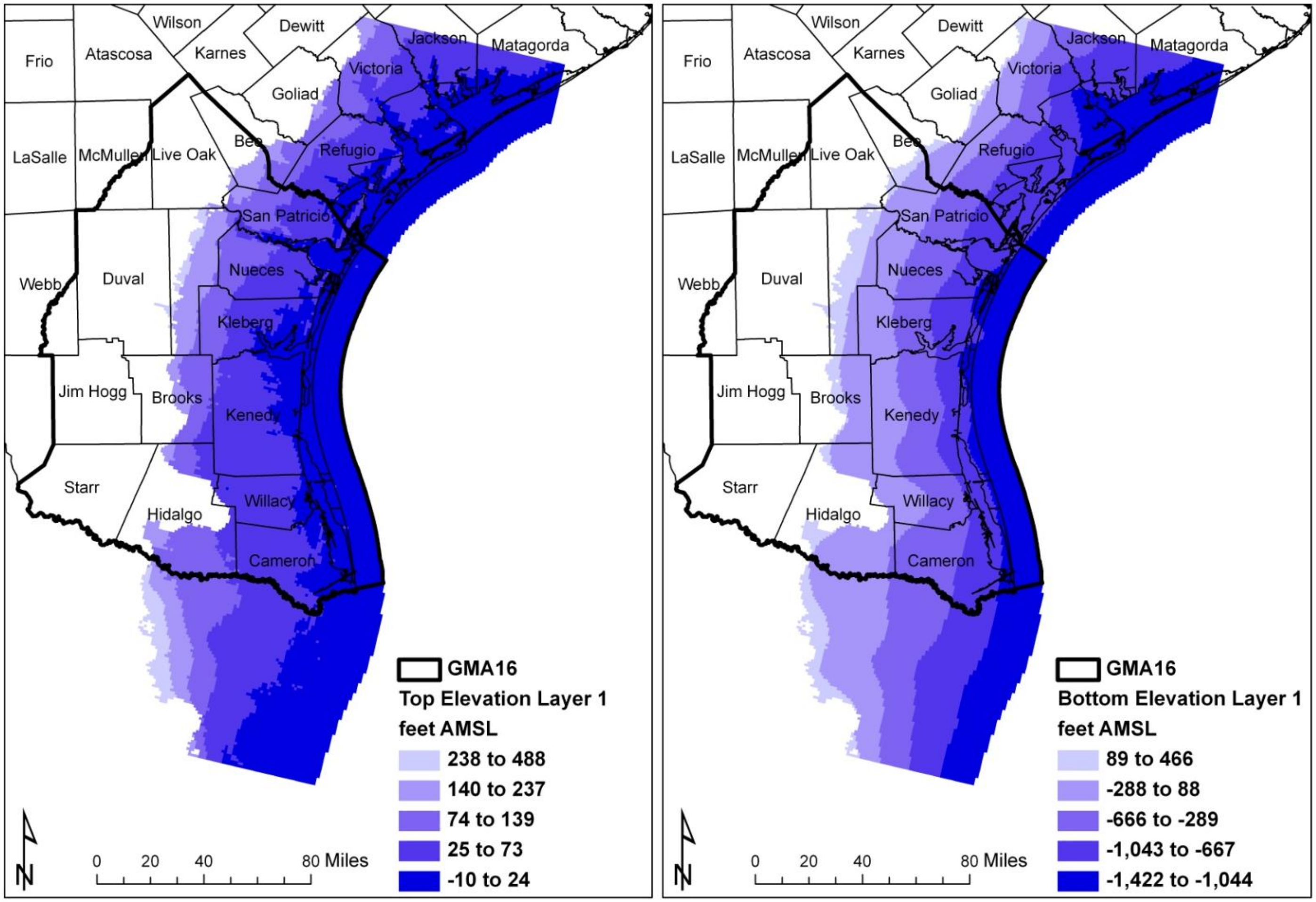


Figure 2. Top and bottom elevations for layer 1 (Chicot Aquifer) in the Groundwater Management Area (GMA) 16 model reported in elevations above mean sea level (AMSL).

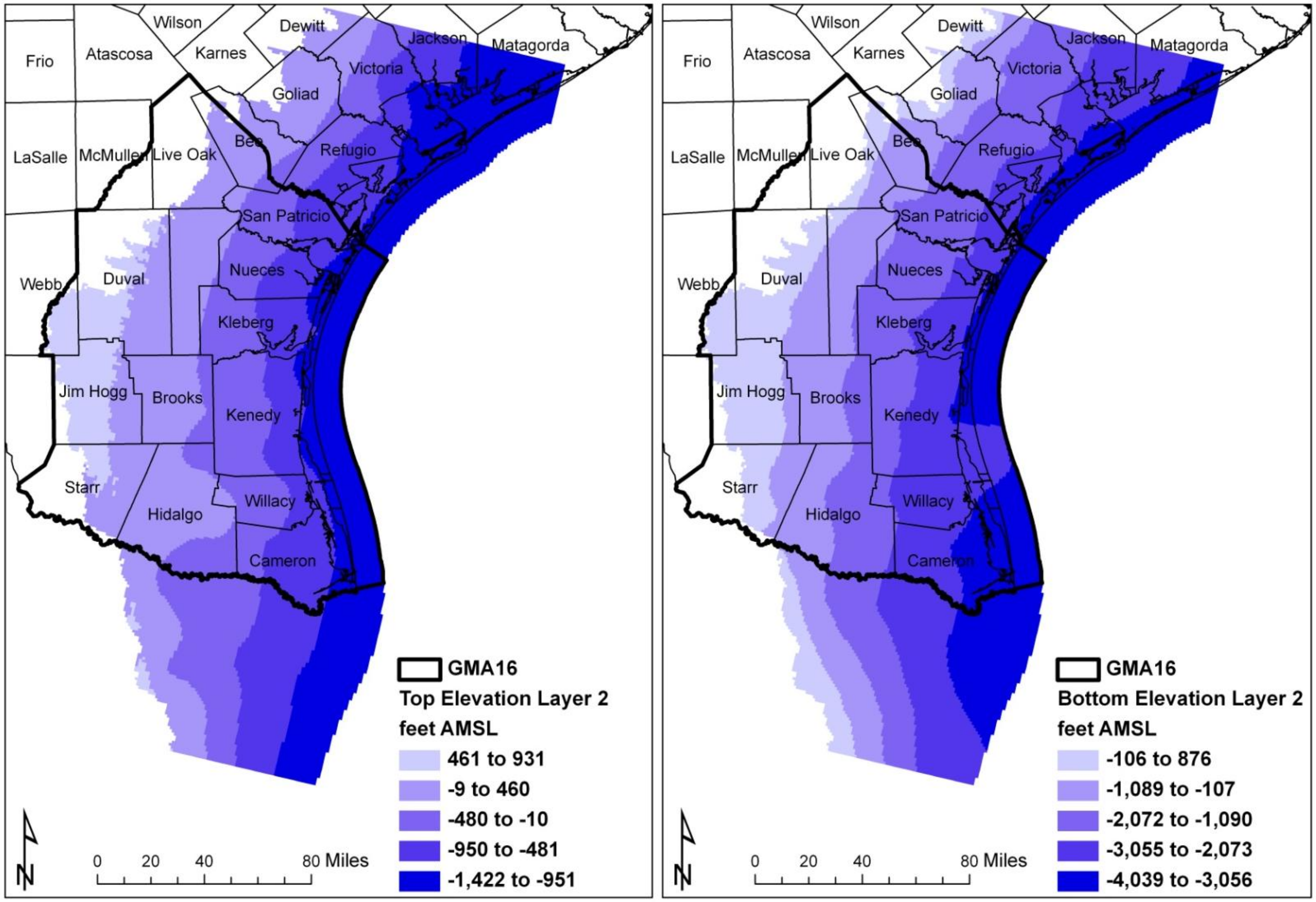


Figure 2 continued. Top and bottom elevations for layer 2 (Evangeline Aquifer) in the Groundwater Management Area (GMA) 16 model reported in elevations above mean sea level (AMSL).

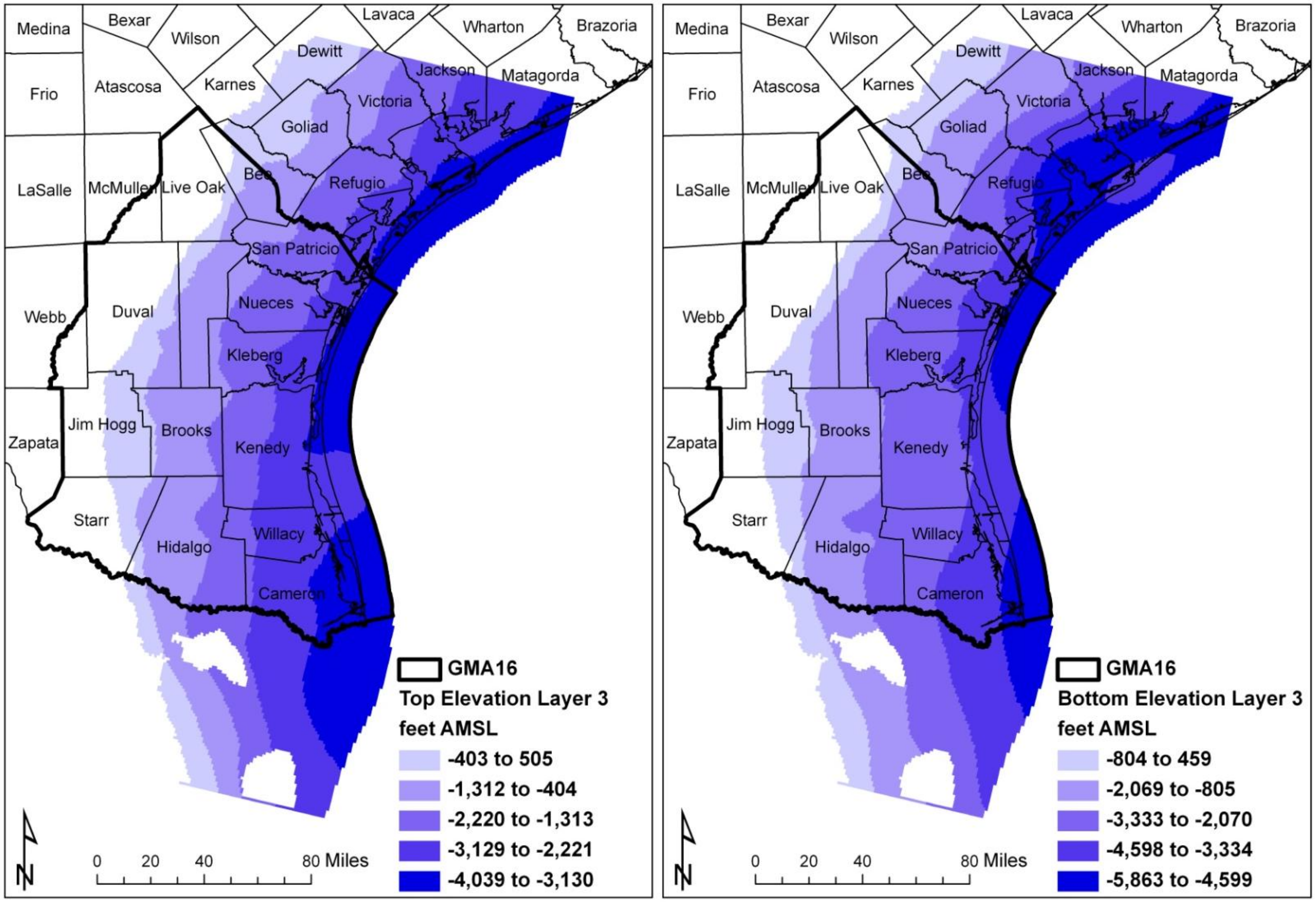


Figure 2 continued. Top and bottom elevations for layer 3 (Burkeville Confining System) in the Groundwater Management Area (GMA) 16 model reported in elevations above mean sea level (AMSL).

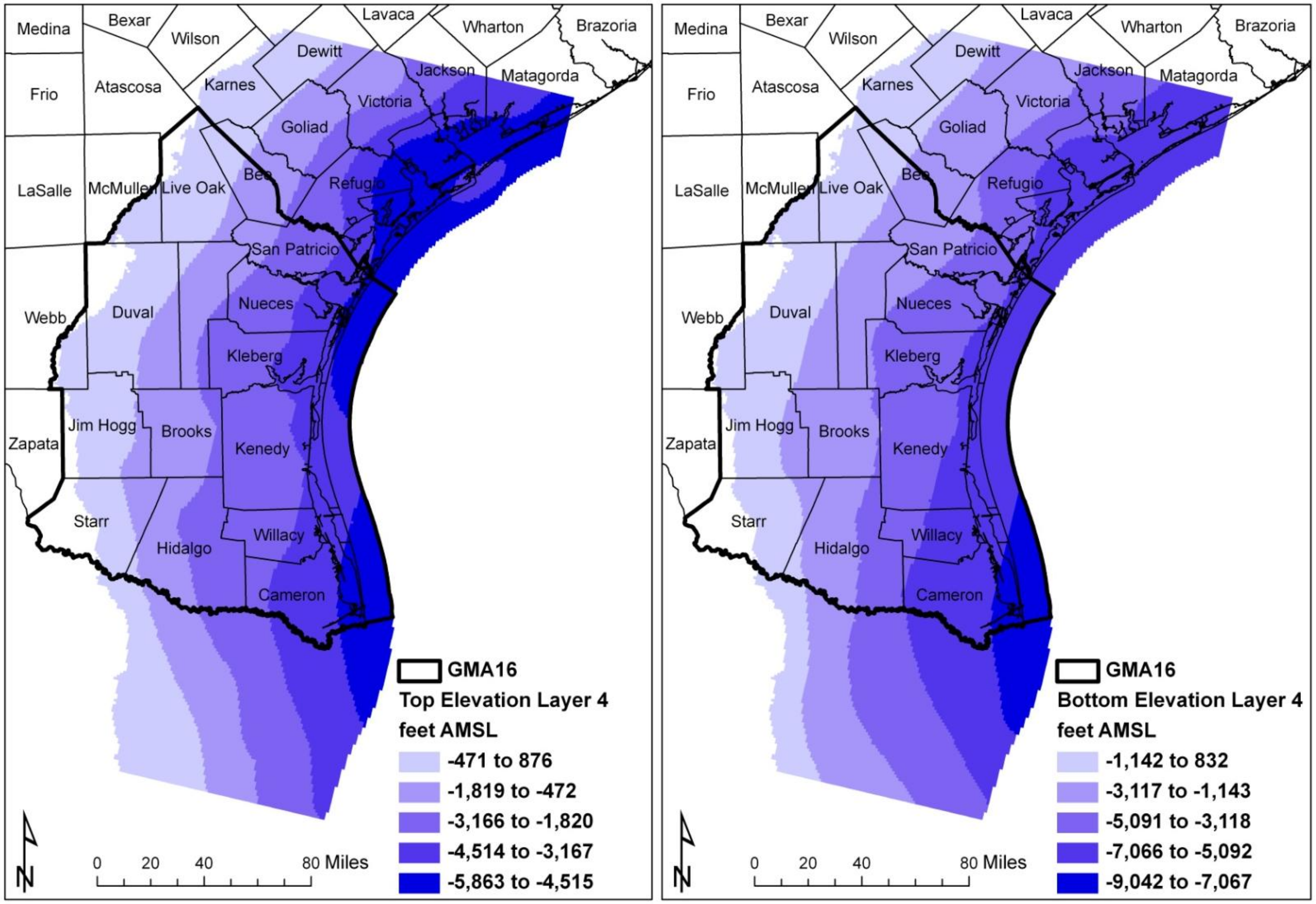


Figure 2 continued. Top and bottom elevations for layer 4 (Jasper Aquifer) in the Groundwater Management Area (GMA) 16 model reported in elevations above mean sea level (AMSL).

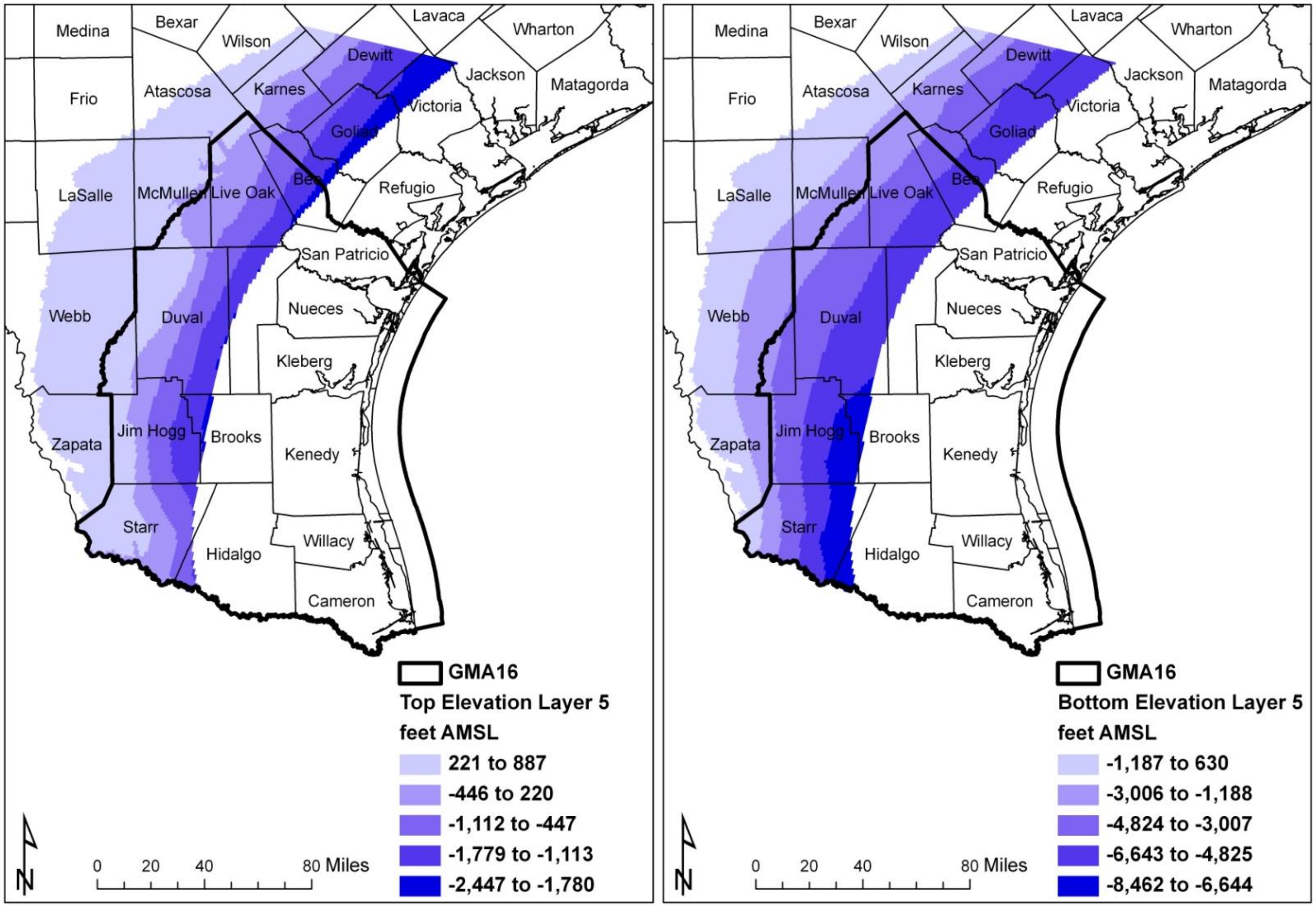


Figure 2 continued. Top and bottom elevations for layer 5 (Yegua-Jackson Aquifer System) in the Groundwater Management Area (GMA) 16 model reported in elevations above mean sea level (AMSL).

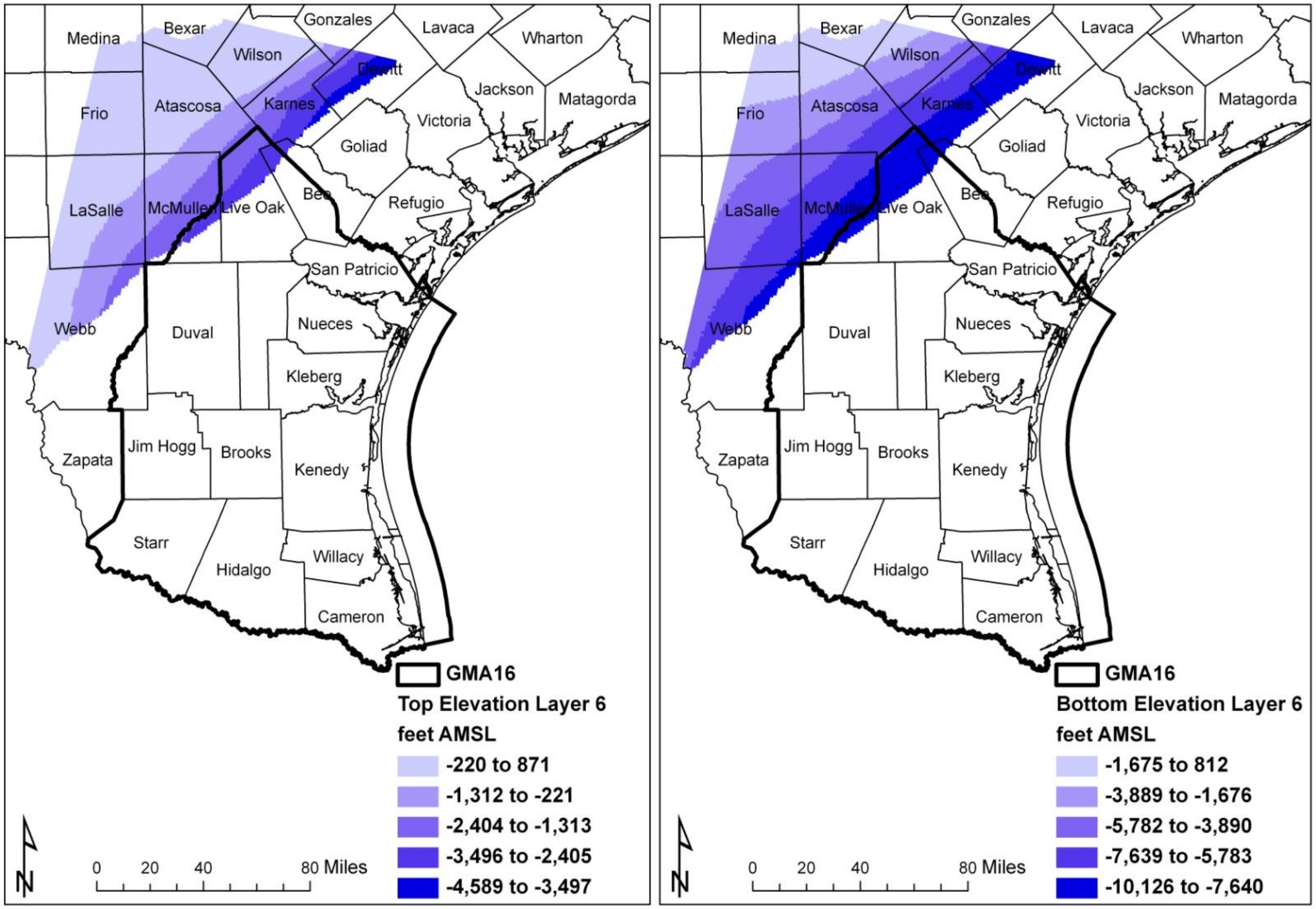


Figure 2 continued. Top and bottom elevations for layer 6 (Queen City, Sparta, Carrizo-Wilcox Aquifer System) in the Groundwater Management Area (GMA) 16 model reported in elevations above mean sea level (AMSL).

2.13 Layer-Property Flow Package

The Layer-Property Flow Package specifies the hydraulic conductivity and the storativity values for each cell in the model domain (Harbaugh and others, 2000). LAYTYP was set equal to zero, which assumes a confined or constant transmissivity. By assuming a confined or constant transmissivity, (LAYTYP=0) the occurrence of cells converting to dry during the simulation was eliminated. LAYAVG was set equal to zero (interblock transmissivity is based on a harmonic mean) and CHANI was set equal to -1, which means that horizontal anisotropy is assigned on a cell-by-cell basis. Hydraulic conductivity is read and multiplied by the aquifer thickness to estimate aquifer transmissivity. LAYVKA was set equal to 0, which means that vertical hydraulic conductivities are read, and LAYWET was set equal to 0, which inactivates wetting.

In order to facilitate calibration, the Layer-Property Flow Package was written using a pre-processor program (*lpf.exe*) written in FORTRAN. In summary, the *lpf.exe* pre-processor reads a file of aquifer parameter zone numbers (*kszone.dat*) and two database files, one for hydraulic conductivity (*kdb.dat*) and one for storativity (*sdb.dat*), and writes a new Layer-Property Flow data file that can be read by MODFLOW-2000.

The hydraulic conductivity file (*kdb.dat*) contains estimates for hydraulic conductivity in the x-, y- and z-directions. The hydraulic conductivity in the x-direction is used for the MODFLOW-2000 variable HK (hydraulic conductivity in the x-direction). The hydraulic conductivity in the y-direction is used in the pre-processor to calculate the MODFLOW-2000 variable HANI (ratio of hydraulic conductivity along columns to hydraulic conductivity along rows). The hydraulic conductivity in the z-direction is used for the MODFLOW-2000 variable VKA (hydraulic conductivity in the z-direction).

Thirty hydraulic conductivity zones in the Groundwater Management Area 16 model were defined as shown in Figure 3. Zone definition was based on a combination of aquifer thickness and measured groundwater elevations. Hydraulic conductivity values are summarized in Table 3. A bar graph with hydraulic conductivity values in the x-, y-, and z-directions for each of the thirty zones in the Groundwater Management Area 16 model is provided in Figure 4.

The pre-processor program also uses the aquifer parameter zonation file (*kszone.dat*) with the storativity database file (*sdb.dat*) to write specific storage values for each cell. The storativity database file (*sdb.dat*) contains estimates of both specific yield and storativity for model cells that are located in outcrop areas. Outcrop areas were defined the same as recharge zones (see Figure 11; *section 2.16 Recharge Package*), and were assigned specific yield values, whereas model cells in the subcrop portions were assigned storativity values as shown in Table 4. All storativity and specific yield values were converted to specific storage values. The resulting specific storage values were then written to the Layer Property Flow Package.

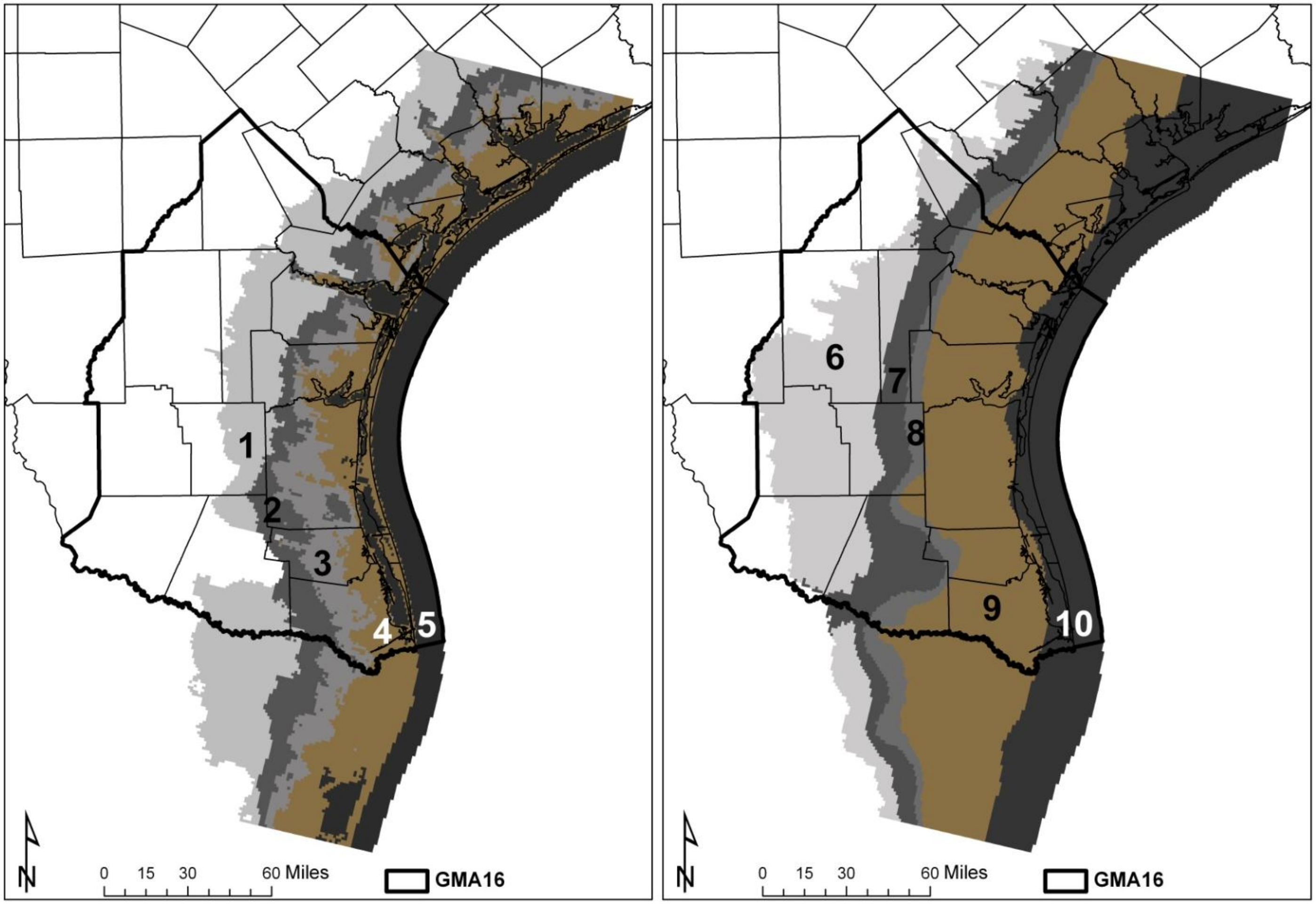


Figure 3. Hydraulic conductivity zones (1 through 5) for layer 1 (Chicot Aquifer) and layer 2, zones 6 through 10 (Evangeline Aquifer).

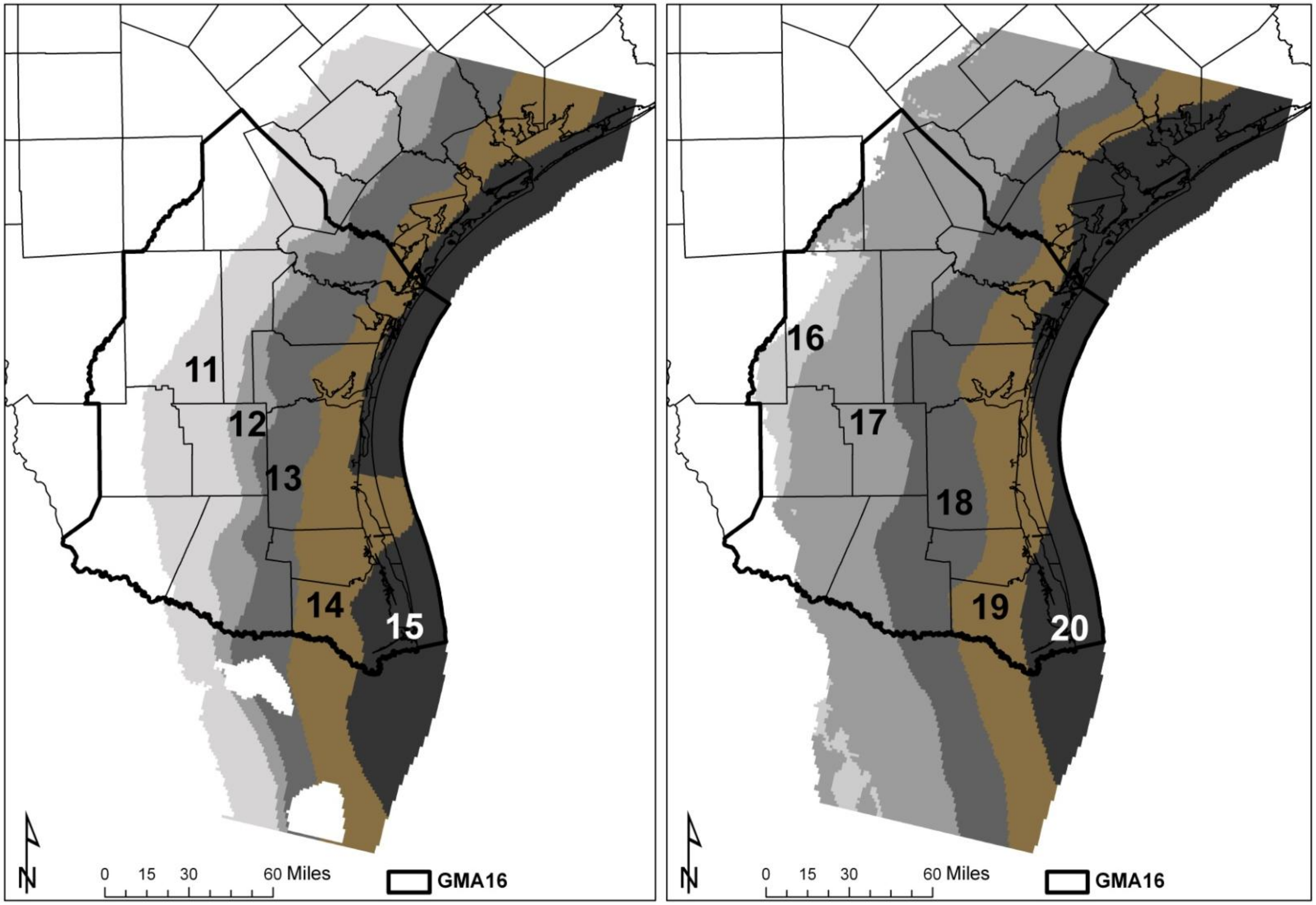


Figure 3 continued. Hydraulic conductivity zones 11 through 15 for layer 3 (Burkeville Confining System) and layer 4, zones 16 through 20 (Jasper Aquifer).

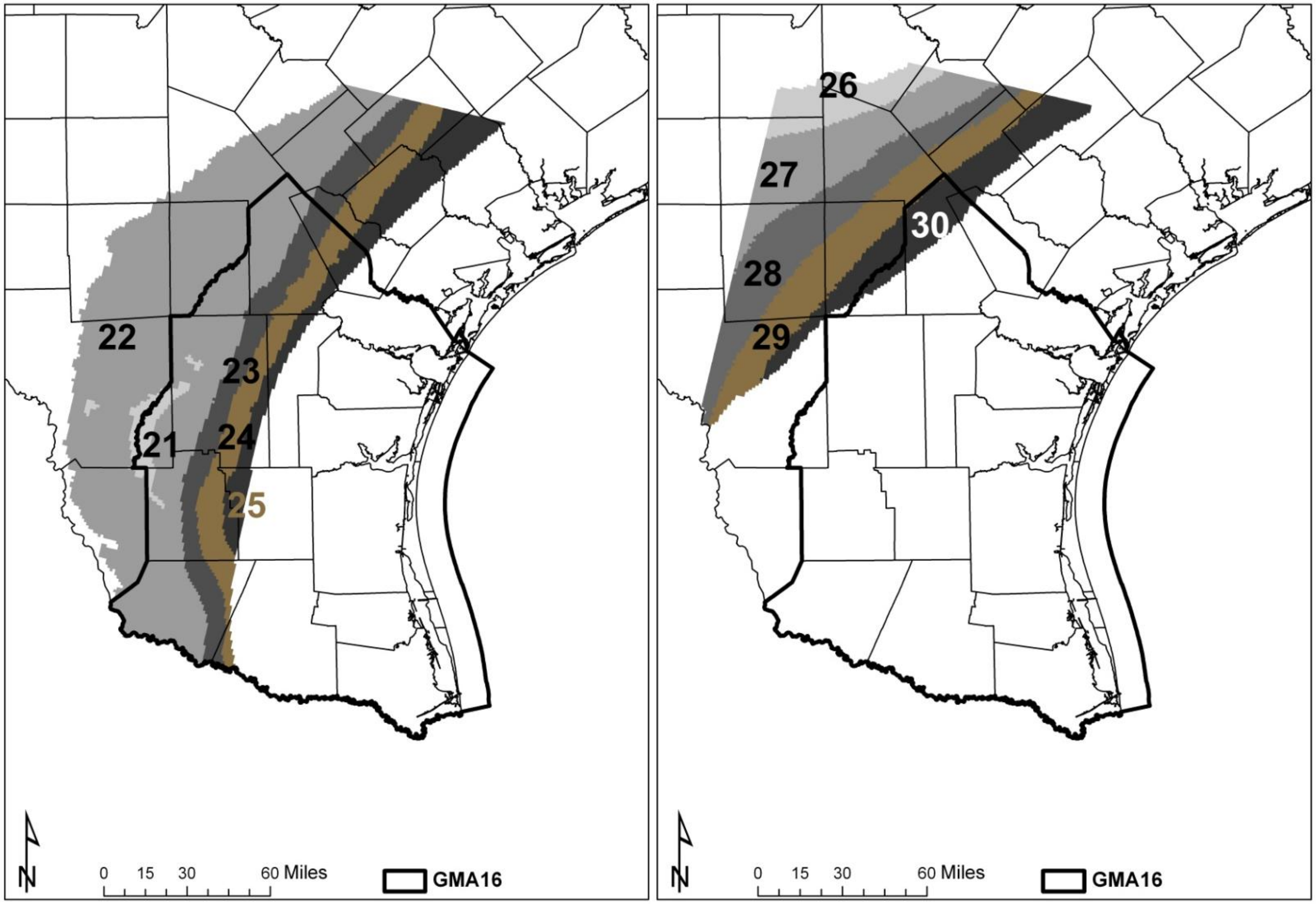


Figure 3 continued. Hydraulic conductivity zones 21 through 25 for layer 5 (aggregate Yegua-Jackson Aquifer System) and layer 6, zones 26 through 30 (aggregate Queen City, Sparta, Carrizo-Wilcox Aquifer System).

Table 3. Hydraulic conductivity values and ratios per zone from the Groundwater Management Area 16 model.

Zone	Kx (feet/day)	Ky (feet/day)	Ratio Kx/Ky (dimensionless)	Kz (feet/day)	Ratio average (Kx+Ky)/Kz (dimensionless)
1	67.14	69.78	0.96	2.0089	34
2	30.84	33.48	0.92	0.0659	488
3	17.90	14.21	1.26	0.1107	145
4	2.55	1.10	2.32	0.0010	1,838
5	2.08	0.18	11.56	0.3932	3
6	1.94	7.00	0.28	0.0971	46
7	0.65	0.65	1.00	0.0045	146
8	0.60	0.60	0.92	0.0001	6,024
9	0.55	0.60	1.00	0.0001	5,773
10	0.50	0.30	1.67	0.0996	4
11	3.50	2.50	1.40	0.0034	882
12	1.36	1.00	1.36	0.1951	6
13	1.03	0.50	7.80	0.0928	8
14	0.62	0.10	0.49	0.3619	1
15	0.39	0.05	6.20	0.1428	2
16	0.40	0.40	7.80	0.1000	4
17	0.40	0.20	1.00	0.1000	3
18	0.10	0.10	2.00	0.1000	1
19	0.10	0.10	1.00	0.1000	1
20	0.10	0.10	1.00	0.0100	10
21	1.00	1.00	1.00	0.5000	2
22	0.80	0.80	1.00	0.5000	2
23	0.40	0.80	0.50	0.5000	1
24	0.40	0.40	1.00	0.0995	4
25	0.40	0.30	1.33	0.0771	5
26	50.00	44.00	1.14	1.6598	28
27	10.00	12.00	0.83	1.5704	7
28	8.00	7.00	1.14	1.1045	7
29	6.00	3.00	2.00	0.9007	5
30	3.00	2.00	1.50	0.3693	7

Table 4. Storage values for the Groundwater Management Area 16 model. Storage values were converted to specific storage using the *lpf .exe* preprocessor and then written to the Layer Property Flow Package.

Zone	Storativity (dimensionless)	Specific Yield (dimensionless)
1	7.90E-05	0.0039
2	6.04E-04	0.0053
3	3.11E-04	0.0265
4	4.25E-03	0.0780
5	2.22E-03	0.0989
6	2.03E-03	0.0027
7	2.07E-04	0.0384
8	1.29E-02	0.1000
9	3.28E-04	0.0295
10	5.48E-03	0.0802
11	7.90E-05	0.0075
12	3.41E-04	0.0554
13	1.69E-04	0.0619
14	5.33E-04	0.0201
15	1.61E-03	0.0700
16	2.72E-04	0.0190
17	5.14E-04	0.1000
18	2.00E-02	0.0309
19	1.66E-04	0.0923
20	6.17E-04	0.0797
21	3.21E-04	0.0013
22	7.92E-04	0.0260
23	1.30E-05	0.0989
24	2.06E-04	0.0308
25	8.97E-04	0.0722
26	2.04E-04	0.0668
27	6.64E-04	0.1000
28	1.83E-04	0.0742
29	8.41E-04	0.0937
30	4.85E-04	0.0489

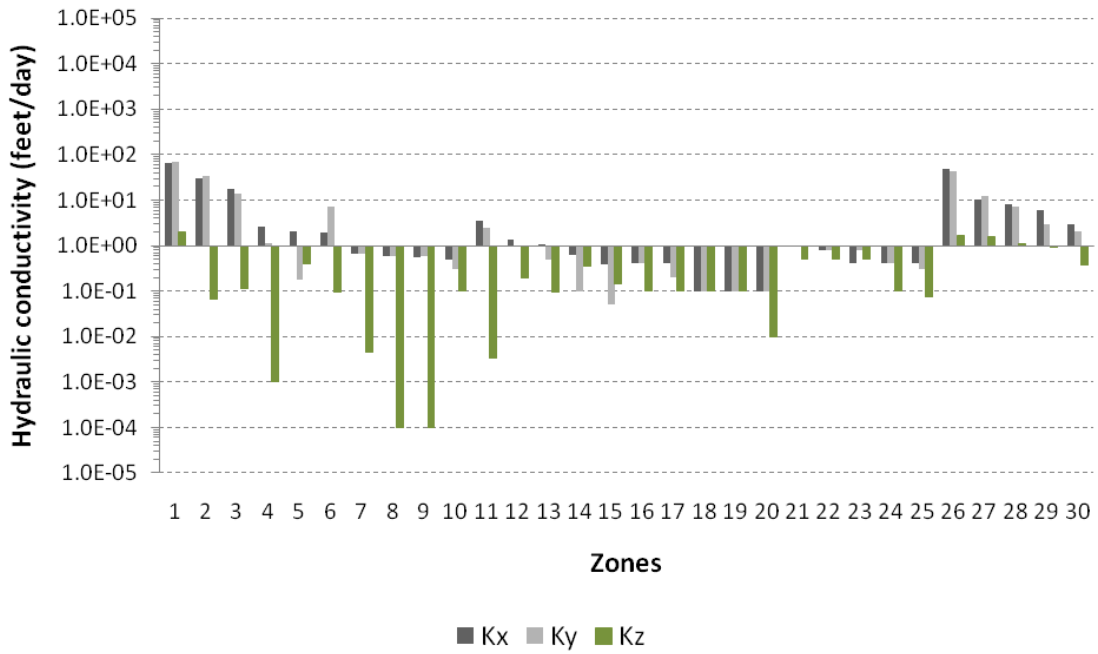


Figure 4. Bar graph of hydraulic conductivity values in the -x, -y, and -z directions for the Groundwater Management Area 16 model.

2.14 Well Package

The Well Package was used to simulate pumping or groundwater withdrawals. Initially, groundwater pumping quantities from 1981 through 1999 for the Texas portion of the model area were extracted from the well files from the existing central and southern portion of the Gulf Coast Aquifer groundwater availability models (Chowdhury and others, 2004; Chowdhury and Mace, 2007) using a script (*makepmp2.pl*) written in PERL. The script reads county-model cell identification files in addition to the well files from the existing central and southern portion of the Gulf Coast Aquifer groundwater availability models, and the southern part of the Queen City, Sparta, Carrizo-Wilcox aquifers groundwater availability model (Kelley and others, 2004). County-cell identifications files with domestic and livestock quantities summarized in Deeds and others (2009) were also included for the Yegua-Jackson Aquifer System. The script then reads a lookup table for the Groundwater Management Area 16 model grid (*gma16_grid_point_lookup.txt*) and estimates the pumping for the model cells. Pumping quantities were summed to annual totals for models with monthly stress periods. Additionally, an adjustment ratio was used to prevent double accounting in areas where the Gulf Coast Aquifer groundwater availability models overlap. The script writes a new well file (*gma16.wel*) which contains annual pumping quantities for 1981 through 1999. Output files with annual pumping per layer, county, and cell identification were also written for quality assurance.

A regression model, shown in Figure 5, was developed using Parameter-elevation Regressions on Independent Slopes Model (PRISM) annual precipitation rasters (PRISM Climate Group, 2009; see section 2.16 Recharge Package) and pumping from the existing groundwater availability flow models for the years 1982 to 1986 (Chowdhury and others, 2004; Chowdhury and Mace, 2007; Deeds and others 2009; and Kelley and others, 2004). The regression model was used to extrapolate pumping quantities backwards (1963 to 1980) as shown in Figure 6. Pumping during the steady-state stress period was assumed to be comparable to pumping in 1963. Groundwater withdrawals from 1963 to 1986 were distributed using the 1981well distributions. Pumping quantities were then scaled upward or downward for the 1981 well distributions as appropriate to match the quantities based on the regression model (see Figure 7). Groundwater pumping quantities in Mexico were assumed to be relatively low as they rely heavily on surface water supplies (Navar, 2004). Domestic pumping quantities were distributed in Mexico, with relatively lower quantities occurring: 1) in the vicinity of Matamoros and Reynosa and 2) with increasing distance from the Rio Grande/Rio Bravo, Figure 8. Pumping in Mexico was applied to layers one (Chicot Aquifer) and two (Evangeline Aquifer). The zone distribution for pumping in Mexico is shown in Figure 8, for both layers 1 and 2.

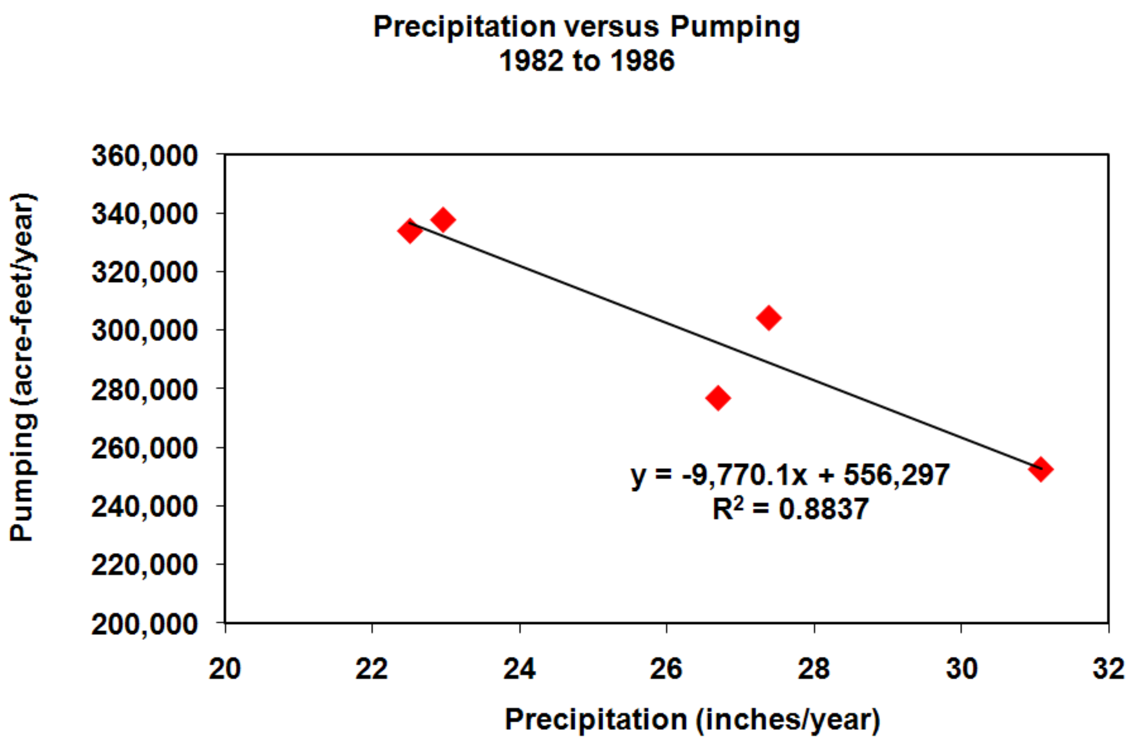


Figure 5. Regression model developed using average precipitation (PRISM data; PRISM Climate Group, 2009) and pumping in the existing groundwater availability models (Chowdhury and others, 2004; Chowdhury and Mace, 2007; Deeds and others 2009; and Kelley and others, 2004) for the years 1982 to 1986.

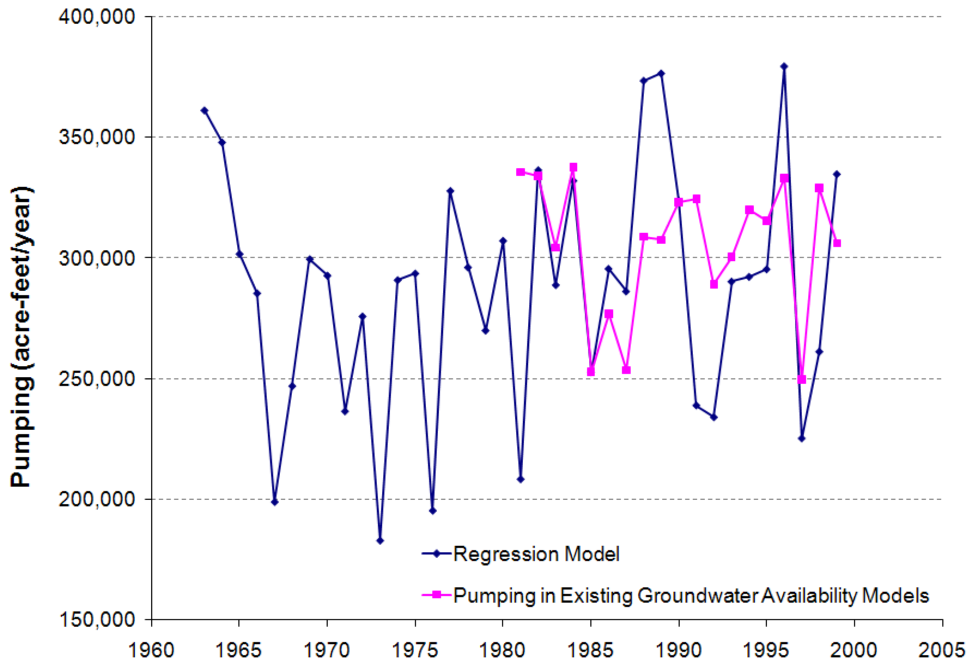


Figure 6. Pumping in the existing groundwater availability models (Chowdhury and others, 2004; Chowdhury and Mace, 2007; Deeds and others 2009; and Kelley and others, 2004) versus estimated pumping quantities based on the regression model.

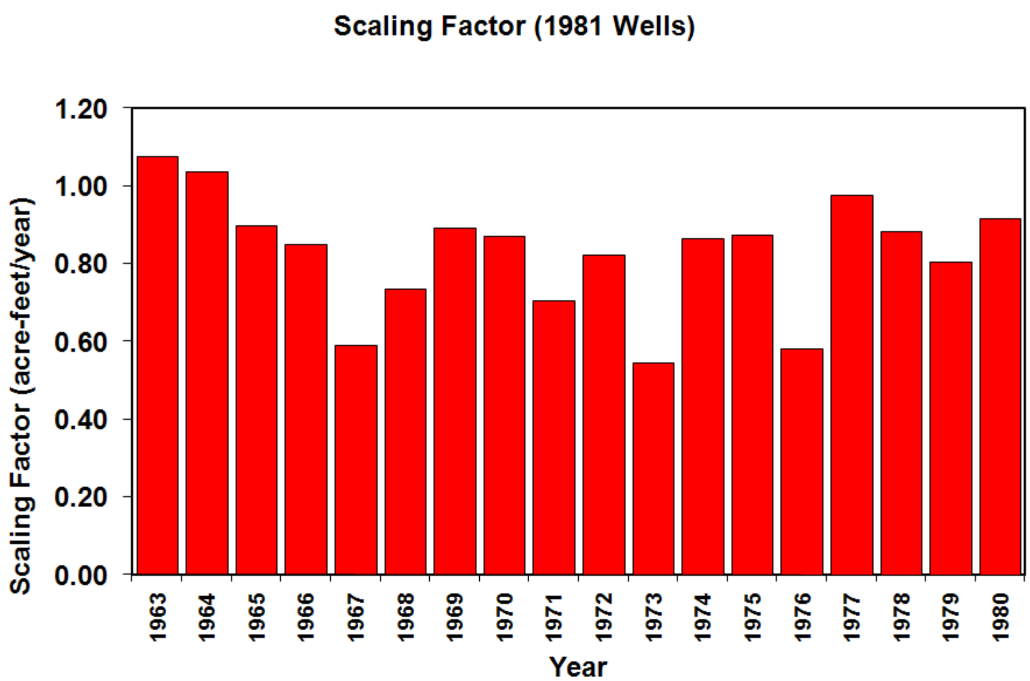


Figure 7. Graphical summary of scaling factors applied to 1981 well data set to obtain pumping quantities for 1963 through 1980.

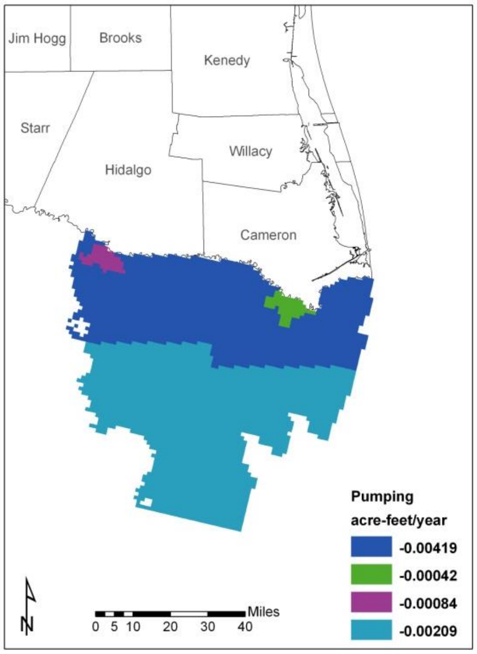


Figure 8. Distribution and pumping quantities for layer 1 (Chicot Aquifer) within Mexico in the Groundwater Management Area 16 model. Note that the quantities are relatively lower in urban areas, such as Matamoros and Reynosa, and also are relatively lower with increasing distance from the Rio Grande/Rio Bravo. The same zonation and quantities were used for the active model cells in layer two (Evangeline Aquifer).

The well package for pumping in Mexico was generated using a program (*wel.exe*) written in FORTRAN. Initially, the program reads a database file (ib.dat) that contains the ibound values for each model cell. The program then reads a matrix file (usmexicozone.dat) and a separate database file (mxyld.dat) that contains the pumping quantities for each zone in Mexico. Pumping in Mexico is uniformly distributed over each zone. The program then writes a well package for pumping in Mexico only (*mxpump8199.wel*). The program then reads the well package *pump8199.wel* that was previously generated (gma16.wel renamed) and a database file (scale_factor.dat) that contains the scaling factors for 1962 through 1980 that are shown in Figure 7. The program then applies these scaling factors to the 1981 pumping distributions in both well packages (*mxpump8199.wel* and *pump8199.wel*) and merges the two well packages into a single file (*OGMA16.wel*).

In an effort to improve the match between measured and simulated groundwater elevations for five target wells located within the Evangeline Aquifer in Kleberg County, near Kingsville, Texas where drawdown and recovery has been observed, a preprocessor (*stpf.exe*) was generated. The preprocessor reads a database file (*stpf.dat*) which contains the layer, row, and column for each of the five target wells. Additionally, the database file contains factors for each of the five wells and for each of the 38 stress periods. All pumping assigned to the model cells that the five target wells are located within were varied by the pumping factors located in *stpf.dat*.

Additional differences between pumping in the existing groundwater availability models and the Groundwater Management Area 16 model are attributable to the rotation in the model grids, and/or the calibrated time frames, which differs among the existing groundwater availability models. Additionally, we made two corrections to the Groundwater Management Area 16 well package. One change was a transfer of the pumpage that was previously allocated to the Chicot Aquifer for both Brooks and Kenedy counties in the central portion of the Gulf Coast Aquifer Groundwater Availability Model (Chowdhury and others, 2004). These quantities were transferred to layer 2 (Evangeline Aquifer) as they were identified as being attributed to the incorrect aquifer in the existing groundwater availability model (Donnelly, 2006). This change is illustrated in Figure 9. The second change was an increase of pumpage quantities by a factor of 1.7 for 1ayer 2 (Evangeline Aquifer) in Kenedy County. We increased the pumping quantities in 1ayer 2 as the livestock components had been previously underestimated for Kenedy County (Ridgeway, 2006).

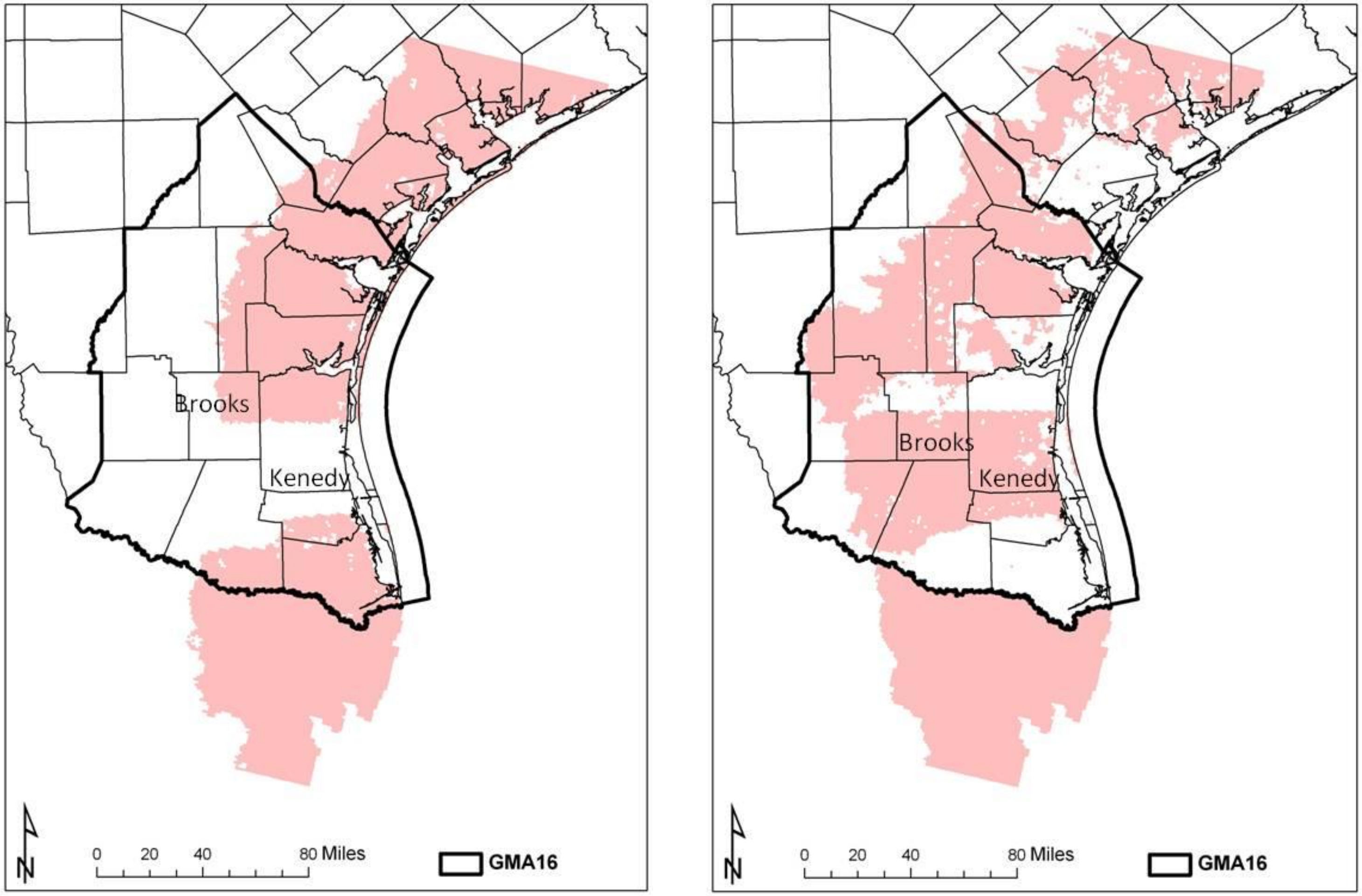


Figure 9. Distribution of pumping in layer 1 (left) and layer 2 (right) extracted from the existing groundwater availability models for the central and southern portions of the Gulf Coast Aquifer with the pumping in Mexico from the Groundwater Management Area (GMA) 16 model. Note the pumping allocated to layer 1 in Brooks and Kenedy counties and the absence of pumping in layer 2 in the northern portion of those counties.

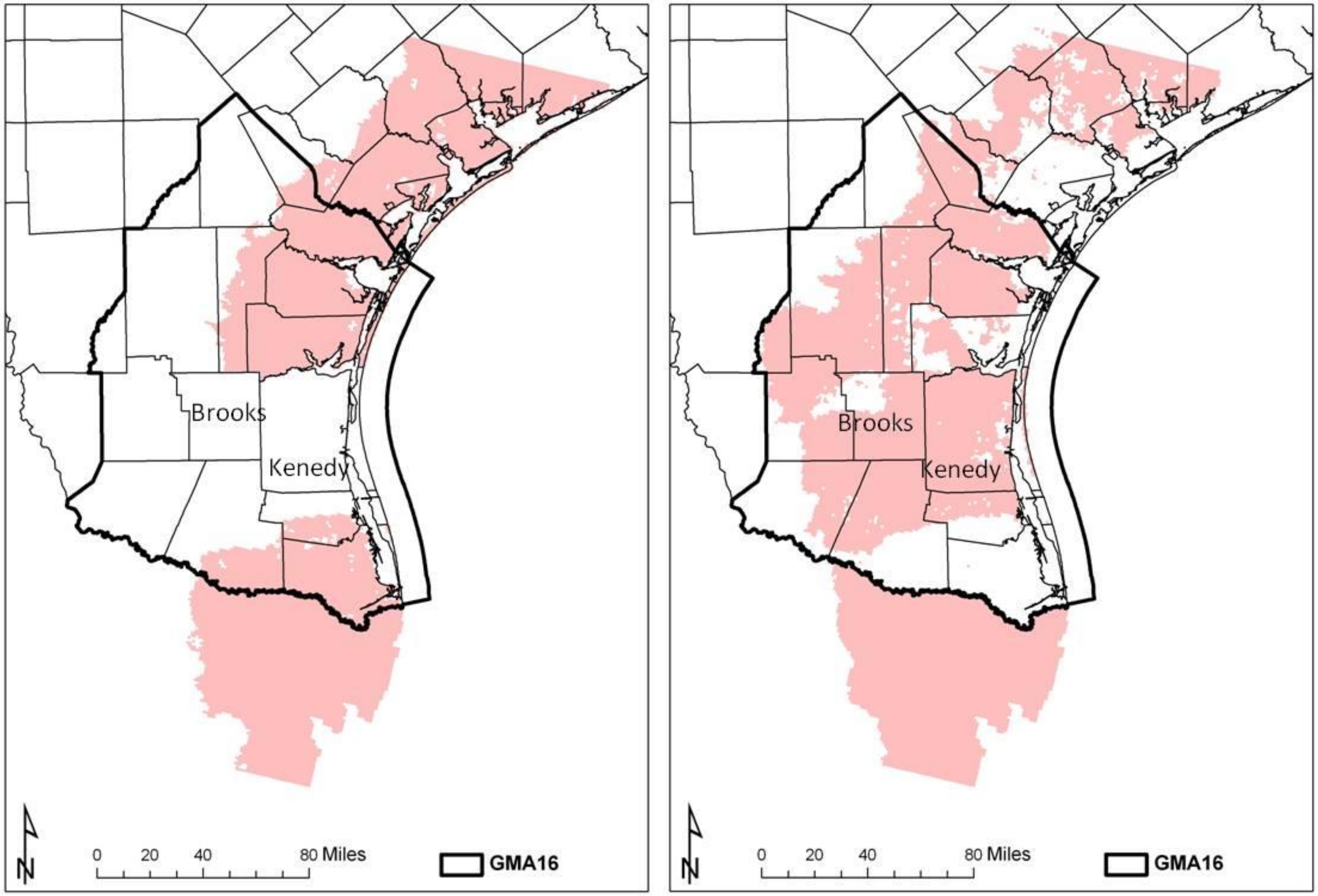


Figure 9 continued. Distribution of pumping in layer 1 (left) and layer 2 (right) in the Groundwater Management Area (GMA) 16 model. Note the transfer of pumping from layer 1 in Brooks and Kenedy counties to layer 2 for those two counties.

2.15 Drain Package

The Drain Package was used to simulate discharge from wetlands and springs. Drain elevations were set to the calculated minimum elevation value for a given grid cell using the digital elevation model and zonal statistics in ARCGIS. However, an exception occurs for drain cells lying near the coast in layer 1 where the calculated minimum elevation value was at or below mean sea level. These estimates arose due to the vertical accuracy limitations associated with the use of a digital elevation model (U.S. Geological Survey, 1995) coupled with the use of zonal statistics, which is affected by the model cell size in the calculations. Drain elevations having a calculated minimum elevation value originally at or below mean sea level were set to three feet above mean sea level. Additionally, drain boundaries do not overlap river boundaries. Therefore, drain locations in the Groundwater Management Area 16 model do not coincide with drain locations in existing groundwater availability models (Chowdhury and others, 2004; Deeds and others 2009; and Kelley and others, 2004).

A pre-processor (*drn.exe*) was written in FORTRAN to facilitate calibration. The program reads a matrix file with the zone numbers (*drainmatrix.dat*), the original drain package (*OGMA16.drn*) and a database file with the conductance values for each zone. The program then writes a new drain package (*gma16.drn*) using the conductance values determined during calibration. Drain zone numbers and locations are shown in Figure 10.

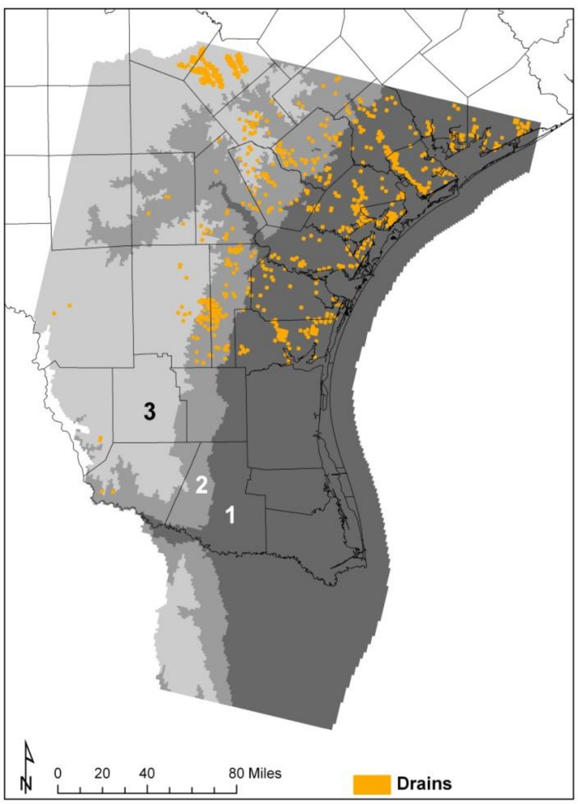


Figure 10. Drain zone numbers and locations for layers 1 through 6. Note only the active areas of the model domain are shown.

2.16 Recharge Package

Six recharge zones were used that correlated to the outcrop areas exposed to land surface for each layer. These zones represent distributed rainfall falling on the outcrop areas (Figure 11).

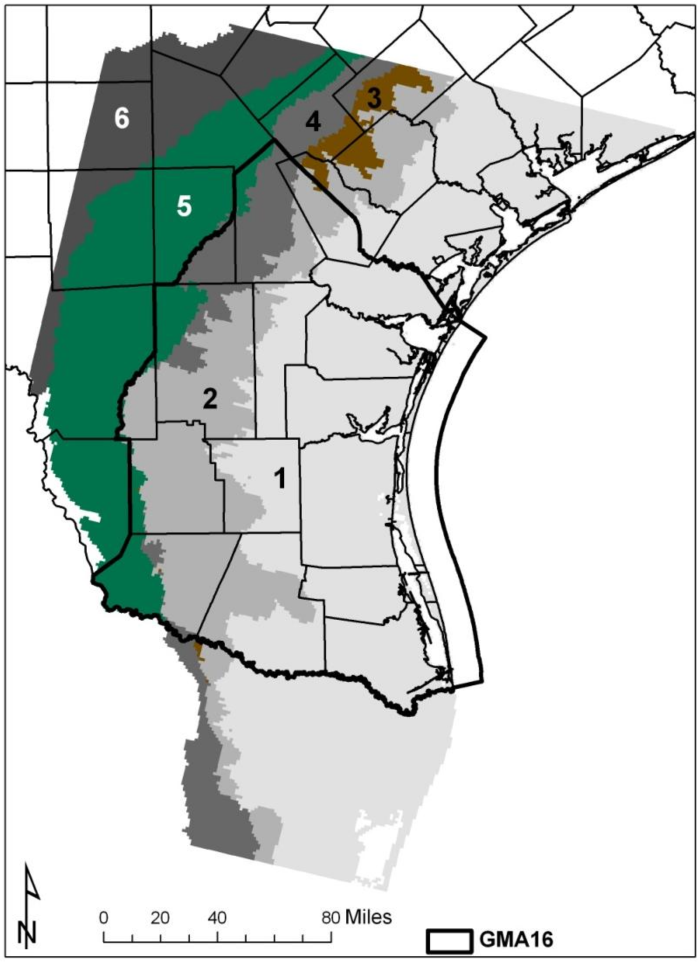


Figure 11. Recharge zones in the Groundwater Management Area (GMA) 16 model. The six-recharge zones correlate to the outcrop areas exposed to land surface for each of the six layers. Note only the active areas of the model domain are shown.

Recharge was estimated using Parameter-elevation Regressions on Independent Slopes Model (PRISM) annual precipitation rasters, (PRISM Climate Group, 2009) which were re-sampled, re-projected, and summarized for the Groundwater Management Area 16 model grid using zonal statistics in ArcGIS. The annual precipitation information for Mexico was generated by: 1) averaging the 1950 through 2000 annual precipitation for Texas, 2) extrapolating the contours (using 5 inches per year intervals) into the Mexico portion of the model grid, 3) interpolating the contours to a raster, 4) projecting the raster precipitation values for Mexico onto the Groundwater Management Area 16 model grid, and 5) extracting out only those values for active cells that intersected Mexico (using a shapefile from ESRI geographic information systems software) but excluded the active cells in Mexico that are in bays or the Gulf of Mexico.

In order to facilitate calibration, the Recharge Package was written using a pre-processor program (*rech.exe*) written in FORTRAN. In summary, the *rech.exe* pre-processor reads three input files. One input file contains the processed PRISM data (*pcp2.dat*), the second contains the annual precipitation rates and the percentage of rainfall for a given year relative to the average percentage from 1963 through 1999 (*avgannpcp.dat*; Table 5), and the third file contains the recharge factors that were adjusted per zone during model calibration (*rechparam.dat*). The pre-processor then writes a new recharge file that can be read by MODFLOW-2000. Please note that the first three years of the calibration period are relatively dry, and that the final three years of the calibration period are generally wet.

Table 5. Summary of annual average precipitation with annual precipitation factors.

Year	Average Precipitation (inches)	Annual Precipitation Factors
1963	19.96	0.73
1964	21.32	0.77
1965	26.06	0.95
1966	27.73	1.01
1967	36.59	1.33
1968	31.67	1.15
1969	26.28	0.96
1970	26.98	0.98
1971	32.74	1.19
1972	28.71	1.04
1973	38.23	1.39
1974	27.17	0.99
1975	26.89	0.98
1976	36.96	1.34
1977	23.38	0.85
1978	26.63	0.97
1979	29.31	1.07
1980	25.50	0.93
1981	35.62	1.29
1982	22.50	0.82

Year	Average Precipitation (inches)	Annual Precipitation Factors
1983	27.38	0.99
1984	22.95	0.83
1985	31.08	1.13
1986	26.69	0.97
1987	27.65	1.00
1988	18.70	0.68
1989	18.39	0.67
1990	23.79	0.86
1991	32.49	1.18
1992	32.99	1.20
1993	27.23	0.99
1994	27.03	0.98
1995	26.71	0.97
1996	18.09	0.66
1997	33.89	1.23
1998	30.21	1.10
1999	22.67	0.82
Average	27.52	1.00

2.17 General-Head Package

The General-Head Package is used to simulate flow into or out of cells where flow from or to external sources exists (Harbaugh and others, 2000). General-head boundaries were used to simulate lateral flow in the Groundwater Management Area 16 model along model boundaries where flow into or out of active model cells in the Gulf Coast Aquifer System, Yegua-Jackson Aquifer System, and the Queen City, Sparta, Carrizo-Wilcox Aquifer System was conceptualized. Maps of general-head boundaries for each layer were previously shown in Figure 1.

Along the northernmost boundary of the Gulf Coast Aquifer System (layers 1 through 4) groundwater elevation values for target wells along general-head boundaries were used to estimate general-head values when available. These values were updated for the transient model when measured groundwater elevations were available. Groundwater elevation values from target wells along general-head boundaries were also used to estimate general-head values for the Yegua-Jackson Aquifer System and the Queen City, Sparta, Carrizo-Wilcox Aquifer System. The average value for measured groundwater elevations for target wells with multiple measurements in these aquifer systems were used as an estimate for the general-head values during the transient stress periods in the original general-head package (*ogma16.ghb*). A pre-processer (*ghb.exe*) was developed to facilitate model calibration. The pre-processor reads the original general-head package (*ogma16.ghb*) and a file with the zone numbers (*ghbzone.dat*) and conductance values that were estimated during calibration (*ghbparam.dat*). The zonation used for the general-head boundaries matches those used for hydraulic conductivities shown in Figure 3. The program also reads the discretization file (*gma16.dis*) and a file (*topshed.dat*) where the top elevation for layer 6 is set equal to the bottom of layer 5. The program then sets the head elevation values for the general-head boundaries in layer 6 (zone 26 only) shown in red (Figure 12) to the elevation value for the top of layer 6. This was done because the general-head boundaries in zone 26 were added during calibration (*addedghb.dat*). The pre-processer then writes a new general-head package (*gma16.ghb*).

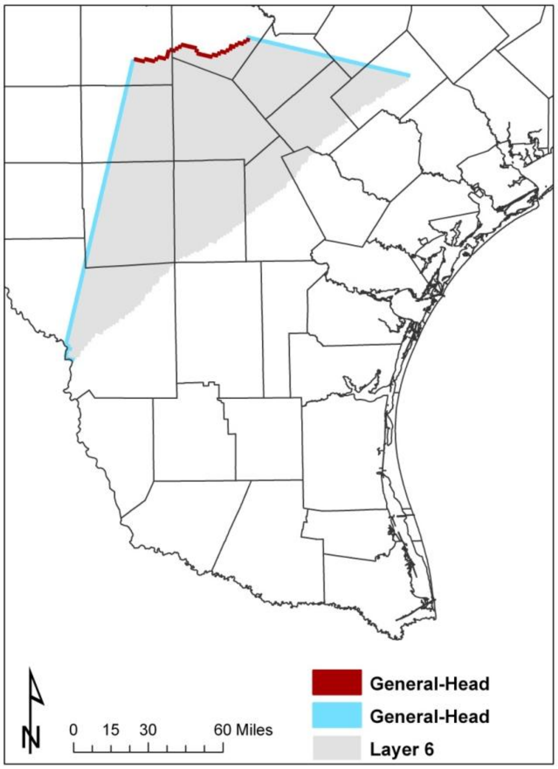


Figure 12. Location of general-head boundaries located in layer 6 that were set to the top elevation for layer 6 (shown in red).

2.18 River Package

The River Package simulates the effects of flow to or from surface water features and the underlying groundwater system (Harbaugh and others, 2000). In the Groundwater Management Area 16 model, the River Package simulated the effects of flow between rivers, reservoirs, streams, creeks, and the underlying aquifer systems. River stages were originally set to the calculated minimum elevation value for a given grid cell using the digital elevation model and zonal statistics in ARCGIS as an initial estimate. However, these stage values were adjusted during calibration. A FORTRAN pre-processor (*riv.exe*) was developed that reads two database files (*gm16rivers.dat* and *rivfac.dat*), and writes a new River Package that can be read by MODFLOW-2000. Annual precipitation factors were used as the basis to vary river stages for each stress period in the transient groundwater flow model. Both river stages and conductances were varied during model calibration. The locations of river cells in the Groundwater Management Area 16 model are shown in Figure 13.

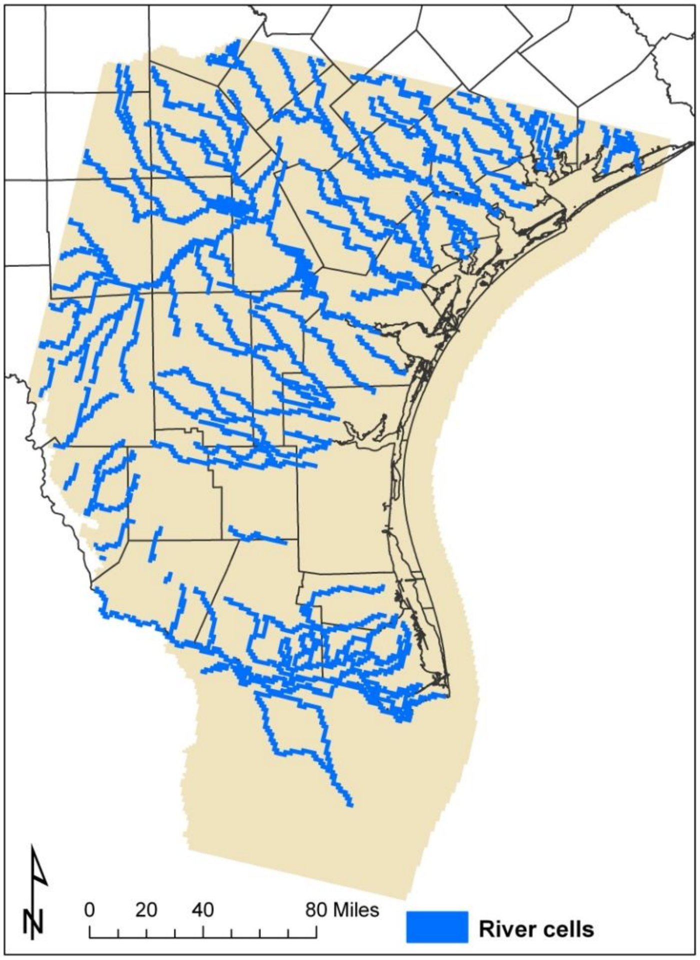


Figure 13. Location of river cells for active areas in layers 1 through 6. Note river cells were used to simulate the effects of flow between rivers, reservoirs, streams, creeks, and the underlying aquifer systems.

2.19 Output Control Package

The Output Control Package contains specifications for how output is written. This particular version of the file specifies saving heads, drawdown, and cell-by-cell flows for each stress period.

2.20 Geometric Multigrid Solver

The Geometric Multigrid Solver (Wilson and Naff, 2004) contains specifications for the chosen solver package. Note that in this particular implementation the head closure criterion is 10, and the residual closure criterion is 100.

3.0 MODEL CALIBRATION AND RESULTS

The model was calibrated using a combination of trial and error and automated adjustments using Parameter Estimation (PEST) an industry-standard inverse modeling software package developed by Watermark Numerical Computing (2004). Calibration of the model was evaluated based on the match between simulated and measured groundwater elevations. Calibration was accomplished by adjusting various parameters until simulated groundwater elevations were in reasonable agreement with measured groundwater elevations. Parameter adjustments generally focused on hydraulic conductivity values, recharge factors, general-head conductance values, drain conductance values, and river stages and conductance values.

The calibration period was 1963 through 1999 (37 annual stress periods), with a steady-state stress period (stress period 1) preceding the transient simulation for a total of 38 stress periods. The steady-state stress period was useful in that it provided an initial head solution that was used to initialize the transient simulation.

The model was calibrated with 966 target wells from the Texas Water Development Board's groundwater database. These target wells had a visit mark of "publishable" and at least one groundwater elevation measurement during the calibration period, and 349 of the 966 wells had 5 or more measurements. A program written using Statistical Analysis Software (SAS) language (*Targets_Example.sas*) was developed to assist with selecting targets for estimating annual groundwater elevations. The program estimates annual measurements as follows: first, the groundwater elevations were averaged if more than one measurement was reported during a single month, secondly, measurements collected during December were selected, however, if no measurements were available for December, measurements available for November were selected, and if there were no December or November measurements, then measurements performed during January were selected for the annual groundwater elevation measurement. The exception to this was the five wells in Kleberg County where drawdown and recovery has occurred (*see Section 3.1 Measured Groundwater Elevations versus Model Simulated Groundwater Elevations*). For these five wells, measurements were selected regardless of the month collected to avoid apparent gaps in data for years when no measurements were recorded for the months of December, November, or January. The code then generates hydrographs for the measured groundwater elevations which were evaluated for quality assurance. The locations for the 966 wells that were used in the calibration are shown in Figure 14. Target wells were assigned to model layers based on calculated elevations for the well depths. Vertical distribution of the target wells were as follows: Layer 1 – 193 wells, Layer 2 – 416 wells, Layer 3 – 33 wells, Layer 4 – 60 wells, Layer 5 – 33 wells, and Layer 6 – 231 wells.

The total number of groundwater elevation measurements was 3,885. Table A-1 of Appendix A summarizes the number of groundwater elevation measurements; the highest and lowest measured groundwater elevations; and the years for the earliest and latest measurements.

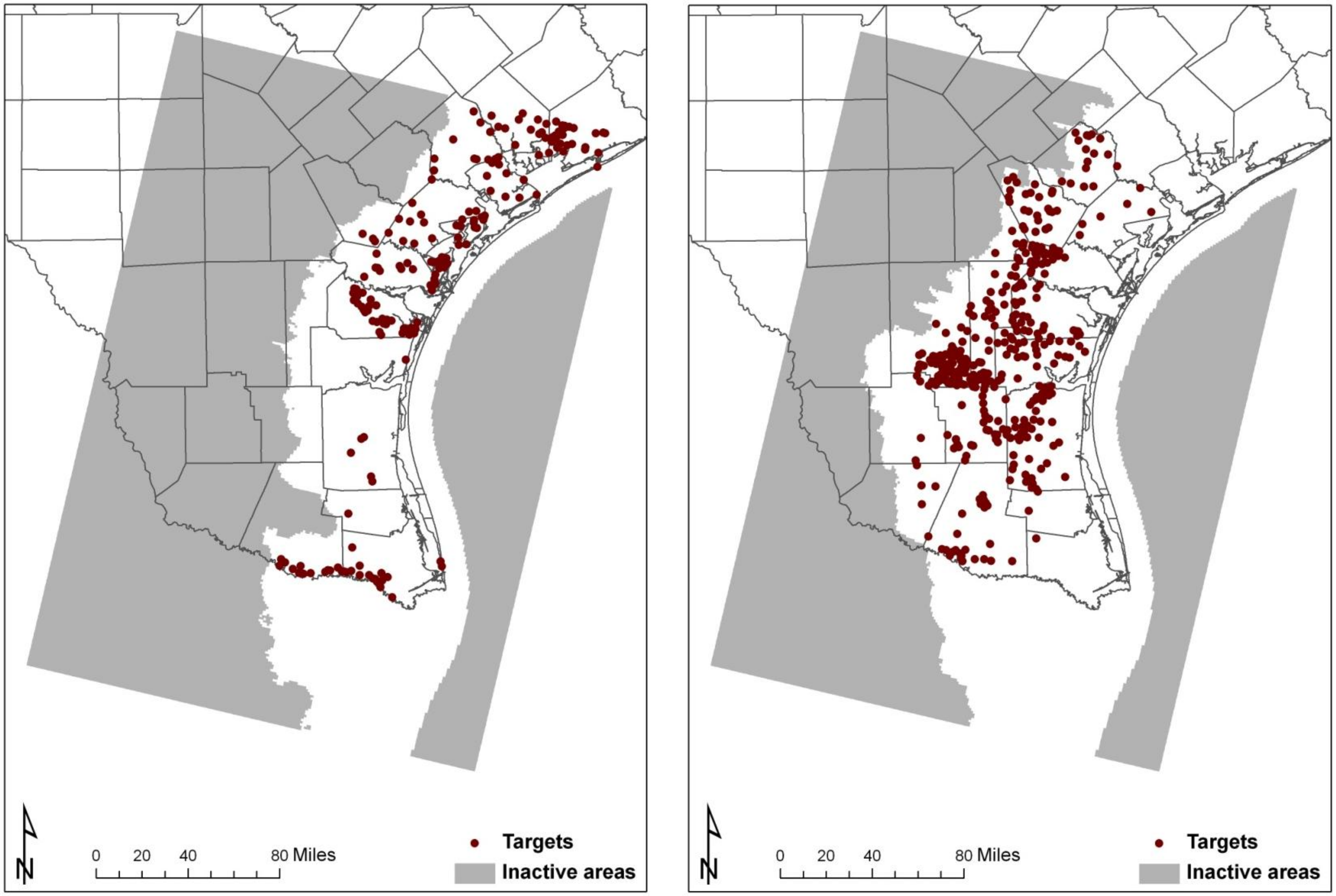
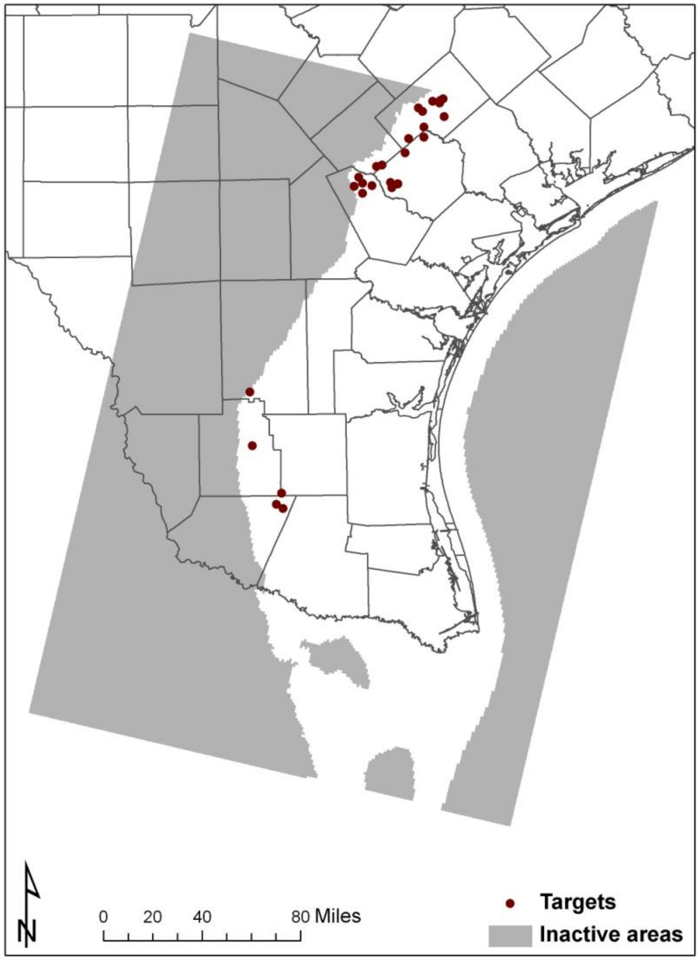


Figure 14. Locations for 193 target wells in the Chicot Aquifer (left) and 416 target wells in the Evangeline Aquifer (right) used to calibrate the groundwater flow model.



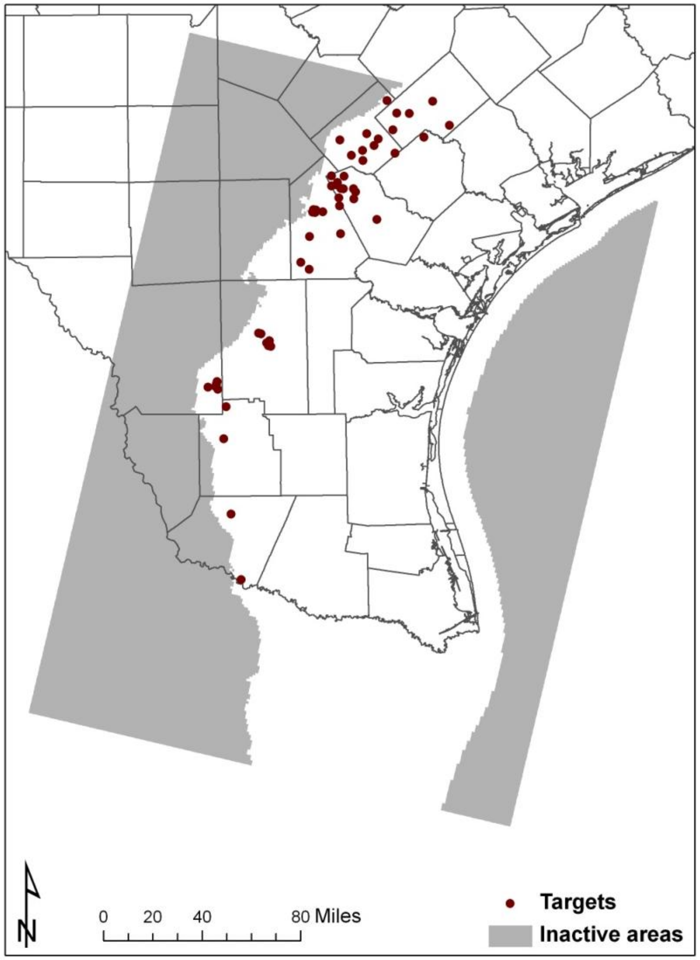


Figure 14 continued. Location for 33 target wells in the Burkeville Confining System (left) and 60 target wells in the Jasper Aquifer (right) used to calibrate the groundwater flow model.

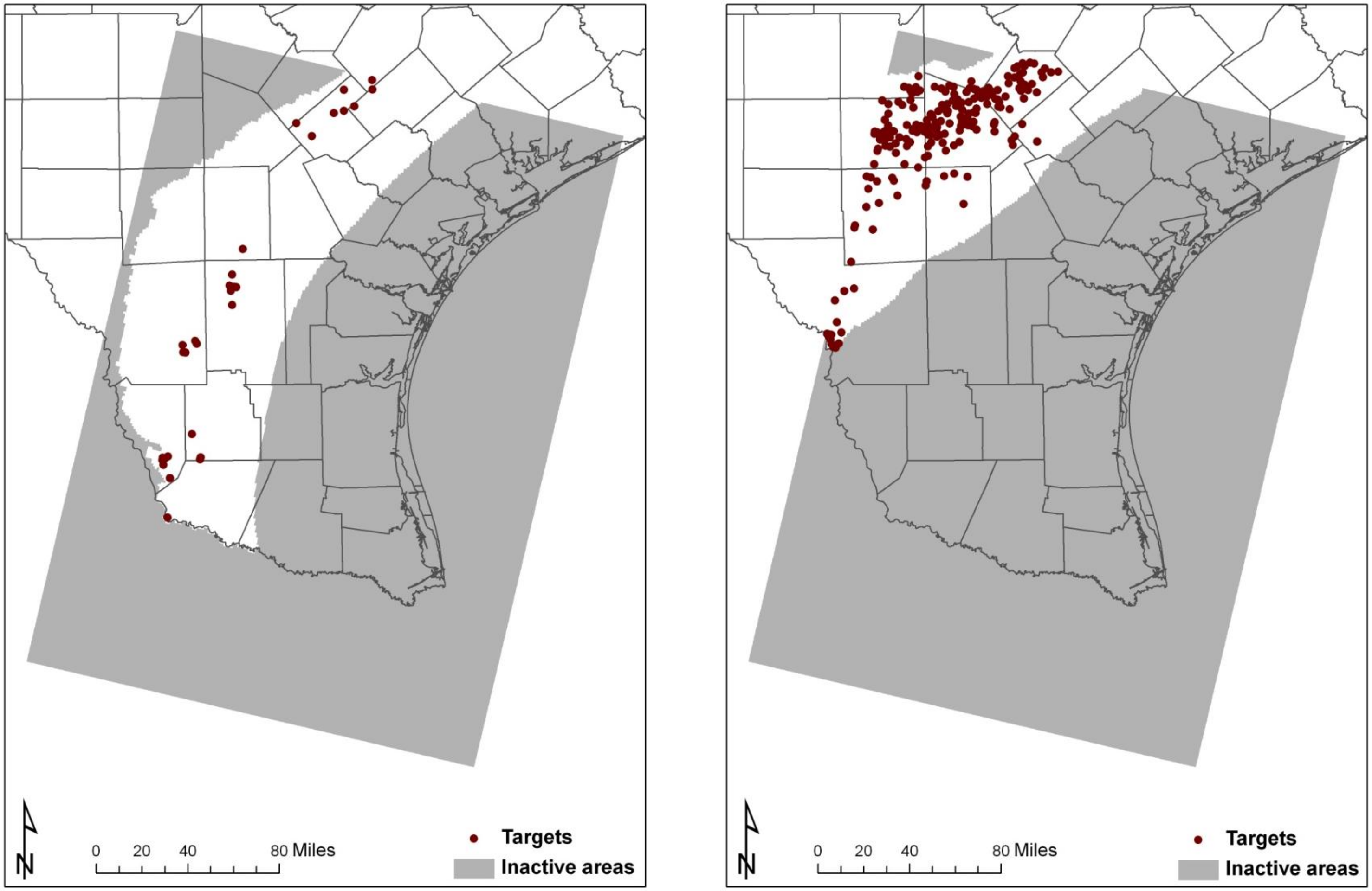


Figure 14 continued. Location for 33 target wells in the Yegua-Jackson Aquifer System (left) and 231 target wells in the Queen City, Sparta, Carrizo-Wilcox Aquifer System used to calibrate the groundwater flow model.

3.1 Measured Groundwater Elevations versus Model Simulated Groundwater Elevations

Calibration of the model was primarily evaluated based on the match between measured and simulated groundwater elevations. Particular emphasis was placed on the match between measured and simulated groundwater elevations for five target wells located in an area discussed in Chowdhury and others (2004) where drawdown and recovery has been observed. The wells are located within the Evangeline Aquifer in Kleberg County, near Kingsville, Texas. Their locations and state well numbers are shown in Figure 15.

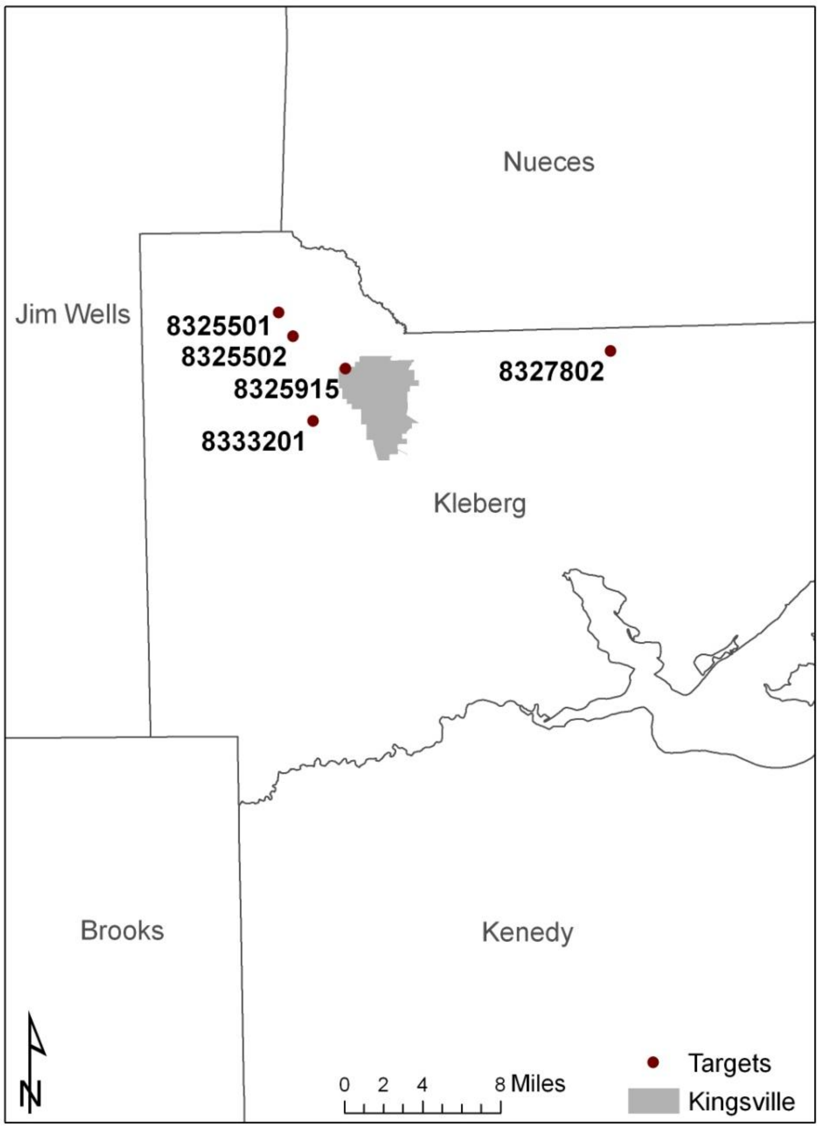


Figure 15. Location for five target wells within the Evangeline Aquifer in Kleberg County, near Kingsville, Texas.

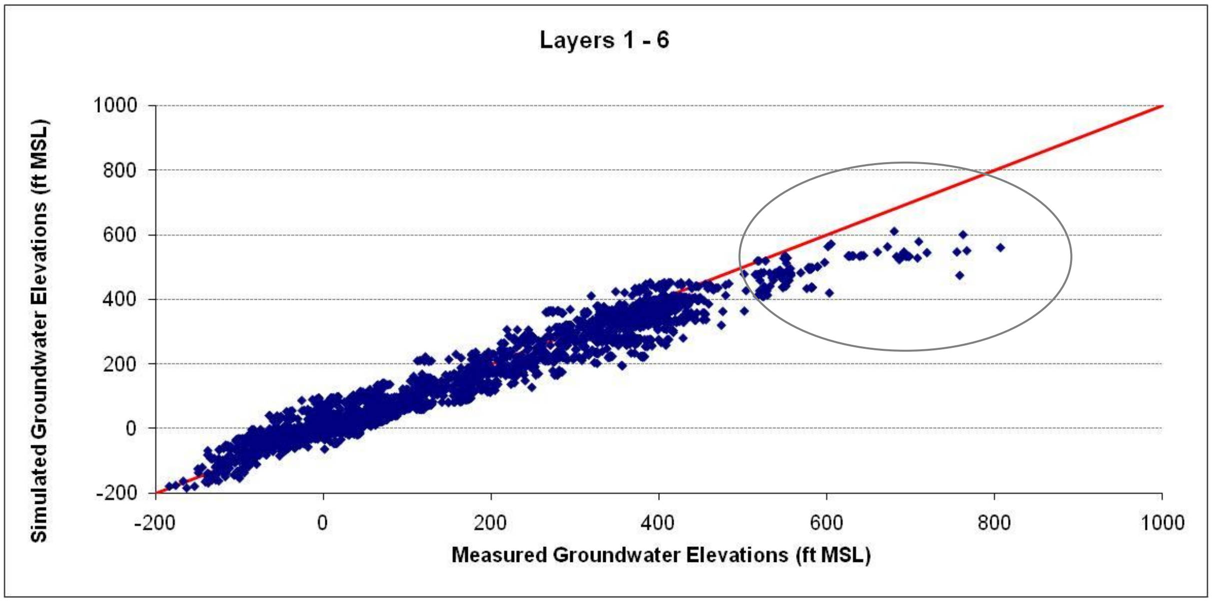
Post-processors (*gethead.exe* and *getheadtargmod3.exe*), written in FORTRAN, were used to expedite processing of model results. The programs read the binary head file (*gma16.hds*) and target head files (*targethead.prn* and *targethead3.prn*, respectively), and write output files (*headcompare.dat* and *headcompare3.dat*, respectively) which contain the measured and simulated groundwater elevations for each target well.

A statistical summary of the minimum residual, maximum residual, and the absolute residual mean are presented in Table 6. The residual is the difference between measured groundwater elevations and simulated groundwater elevations. If the residual is positive, the measured groundwater elevation is higher than the simulated groundwater elevation. If the residual is negative, the measured groundwater elevation is lower than the simulated groundwater elevation. The standard deviation of the residuals and the range of measured groundwater elevations are also provided in Table 6. A common statistical test to examine calibration is the standard deviation of the residuals (the difference between measured and simulated values) divided by the range of measured values. Rumbaugh (2004) suggests that a good calibration yields a value less than 10 to 15 percent or (0.10 to 0.15). The standard deviation of the residuals divided by the range of measured groundwater elevations for the new model is 0.039.

The summary also includes the value of the sum of squared residuals, which was used as the objective function during parameter estimation. Finally, the summary includes the frequency of residuals within 10, 25, and 50 feet. A graphical summary showing the match between measured and simulated groundwater elevations and a histogram of the residuals are shown in Figures 16 and 17. Twenty-six percent of the simulated groundwater elevations are within ± 10 feet of the measured groundwater elevations, 52 percent are within ± 25 feet, while 80 percent are within ± 50 feet.

Table 6. Statistical summary of simulated groundwater elevations in the new model.

Calibration Statistic	**Calibrated Model Value**
Minimum Residual (feet)	-110.9
Maximum Residual (feet)	285.9
Absolute Residual Mean (feet)	31.7
Average Residual (feet)	14.7
Standard Deviation of Residuals	40.7
Range of Measured Groundwater Elevations (feet)	1,034
Standard Deviation/Range	0.039
Absolute Residual Mean/Range*100	3
Sum of Squared Residuals	7.27E+06
Percent of residuals within:	
± 10 ft	26
± 25 ft	52
± 50 ft	80



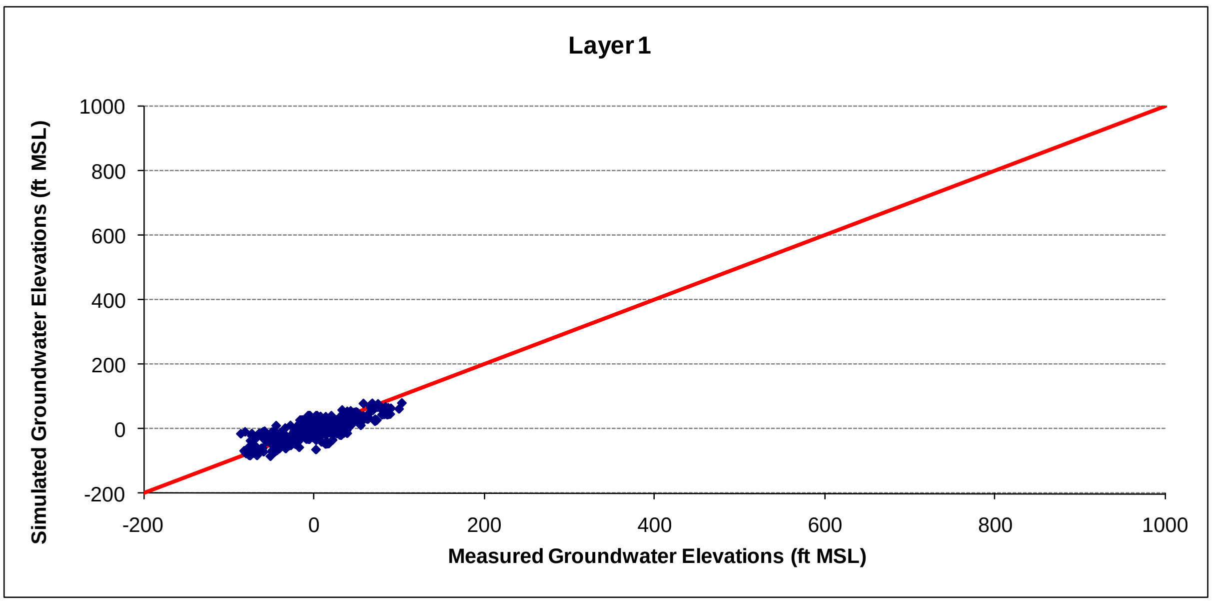
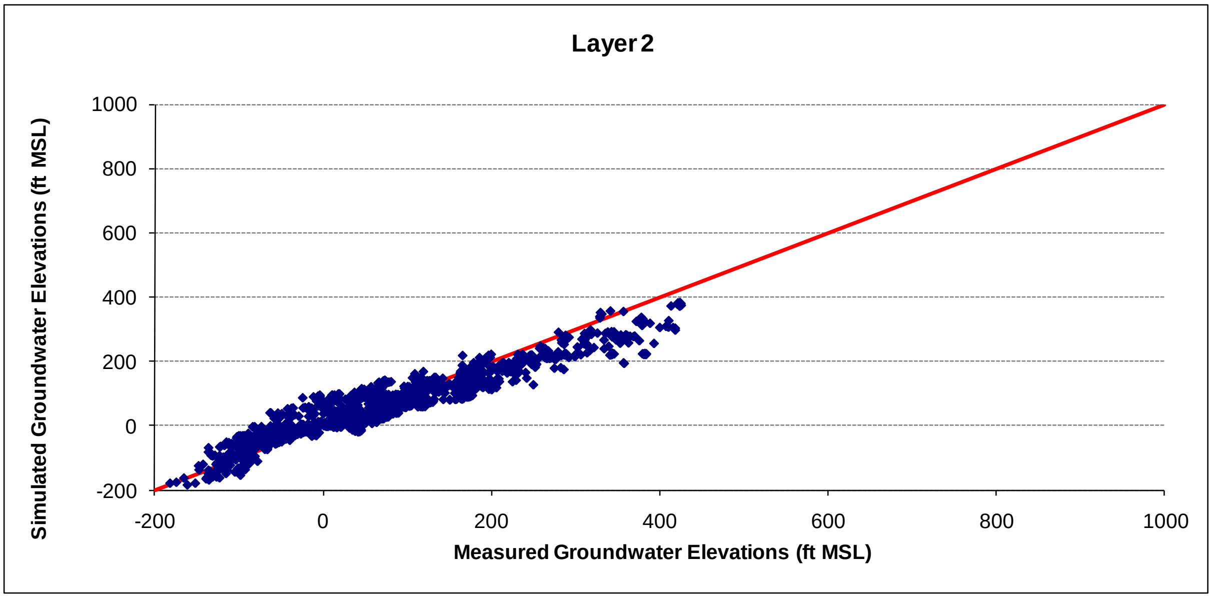


Figure 16. Graphical summary of the measured groundwater elevations versus simulated groundwater elevations for layers 1 through 6 of the Groundwater Management Area 16 model (top) and a graphical summary of the measured versus simulated groundwater elevations for layer 1-Chicot Aquifer (bottom).



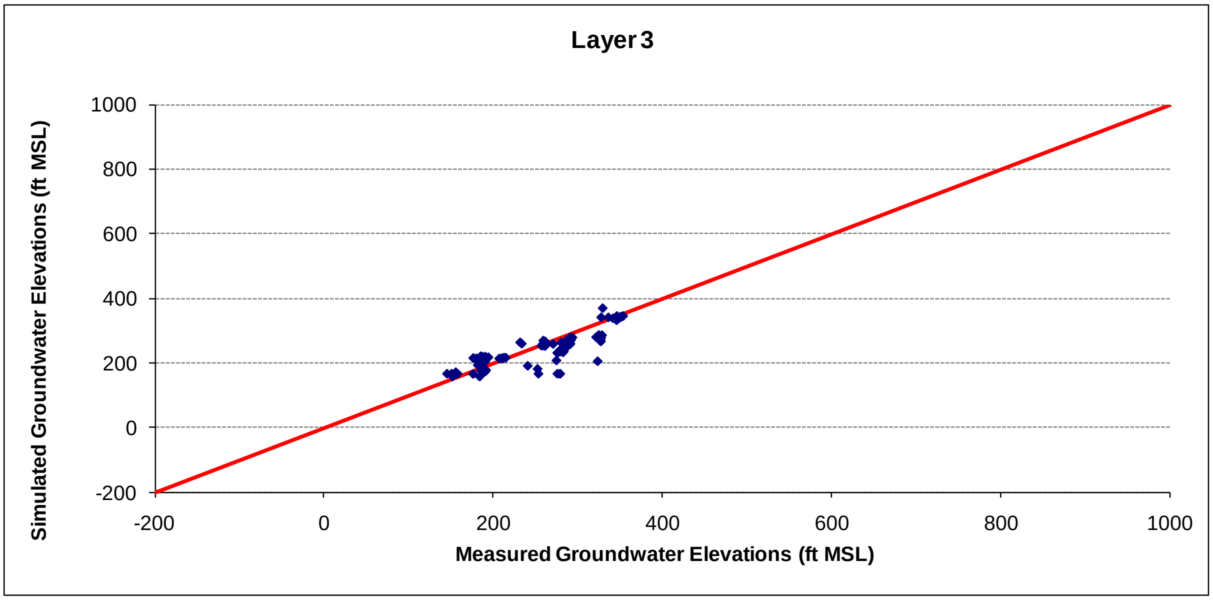
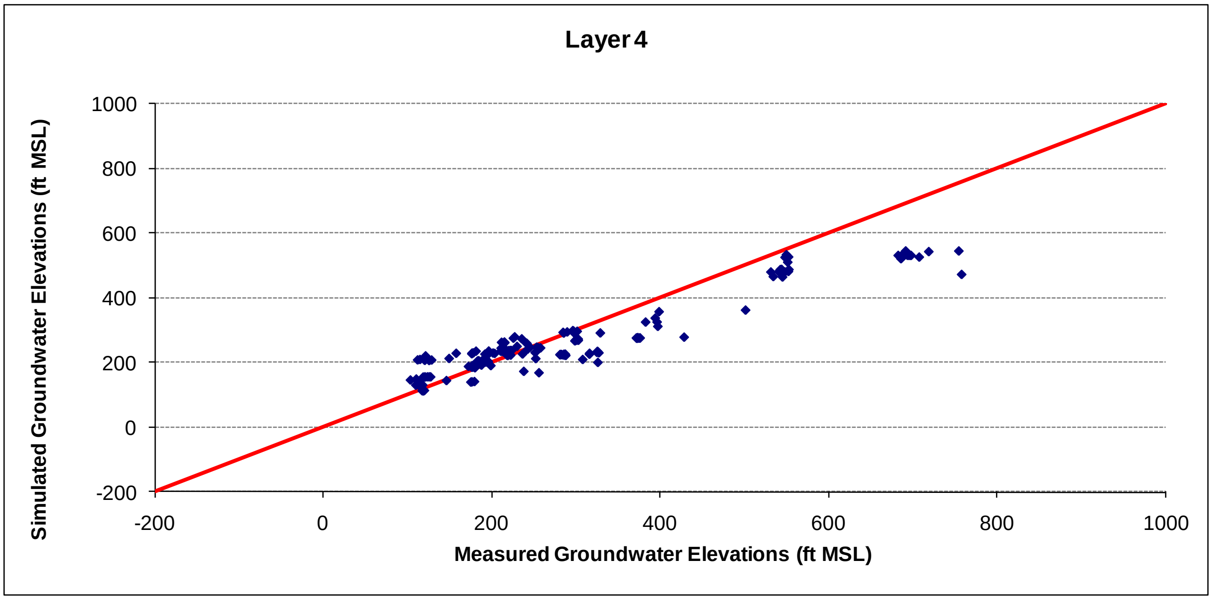


Figure 16 continued. Graphical summary of the measured versus simulated groundwater elevations for layer 2-Evangeline Aquifer (top) and layer 3-Burkeville Confining System (bottom) of the Groundwater Management Area 16 model.



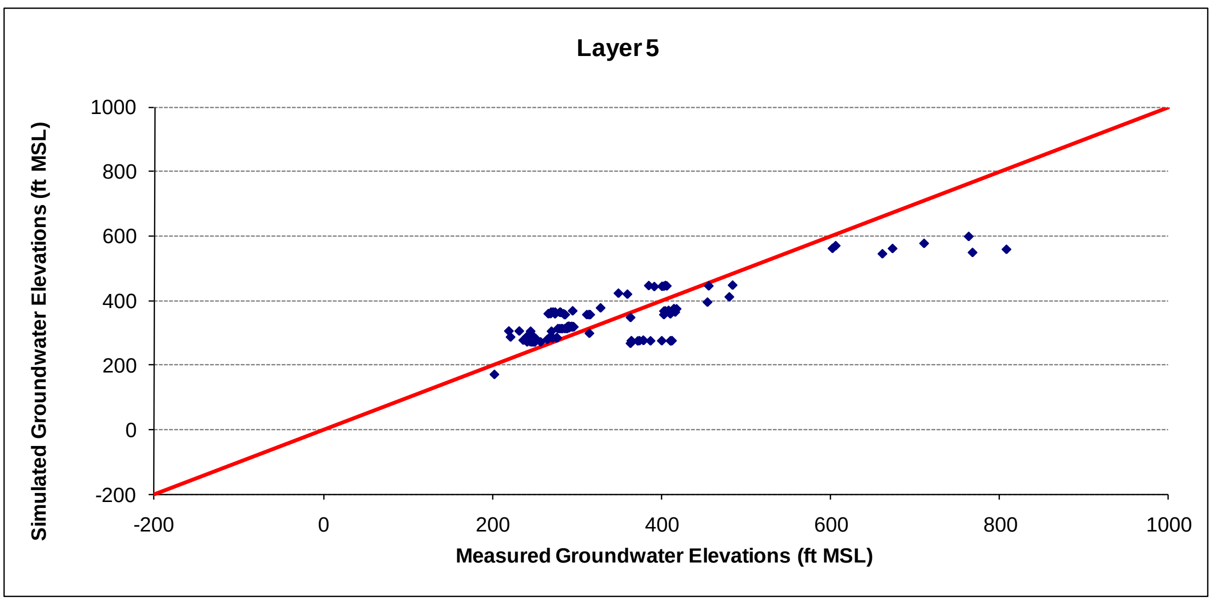


Figure 16 continued. Graphical summary of the measured versus simulated groundwater elevations for layer 4-Jasper Aquifer (top) and layer 5-Yegua-Jackson Aquifer System (bottom) of the Groundwater Management Area 16 model.

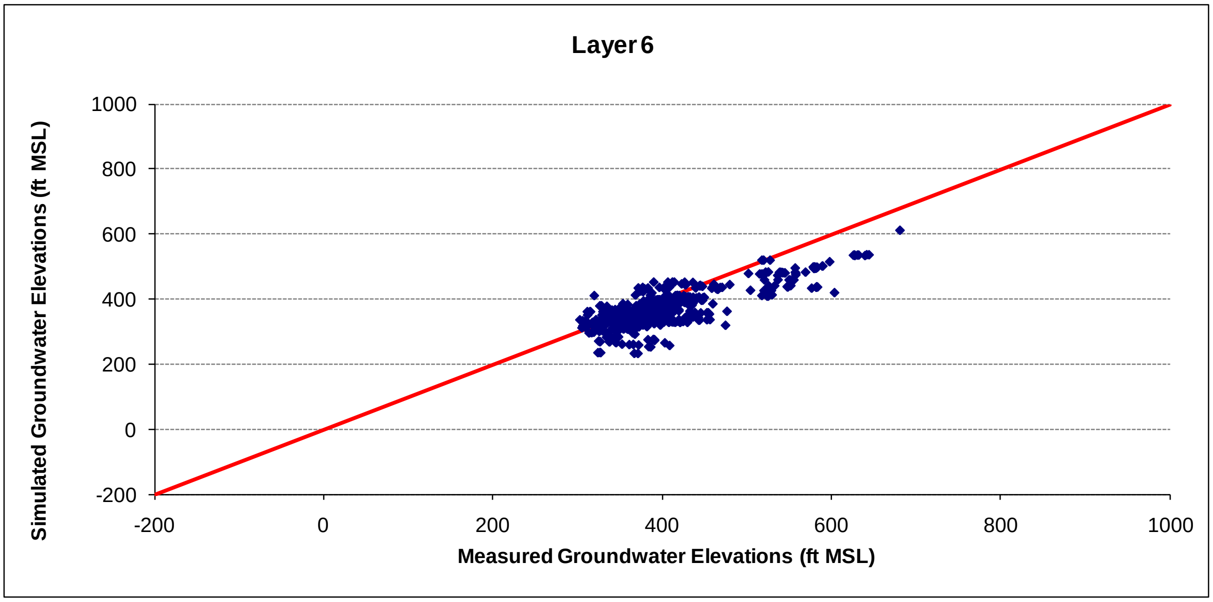


Figure 16 continued. Graphical summary of measured versus simulated groundwater elevations for layer 6-Queen City, Sparta, Carrizo-Wilcox Aquifer System of the Groundwater Management Area 16 model.

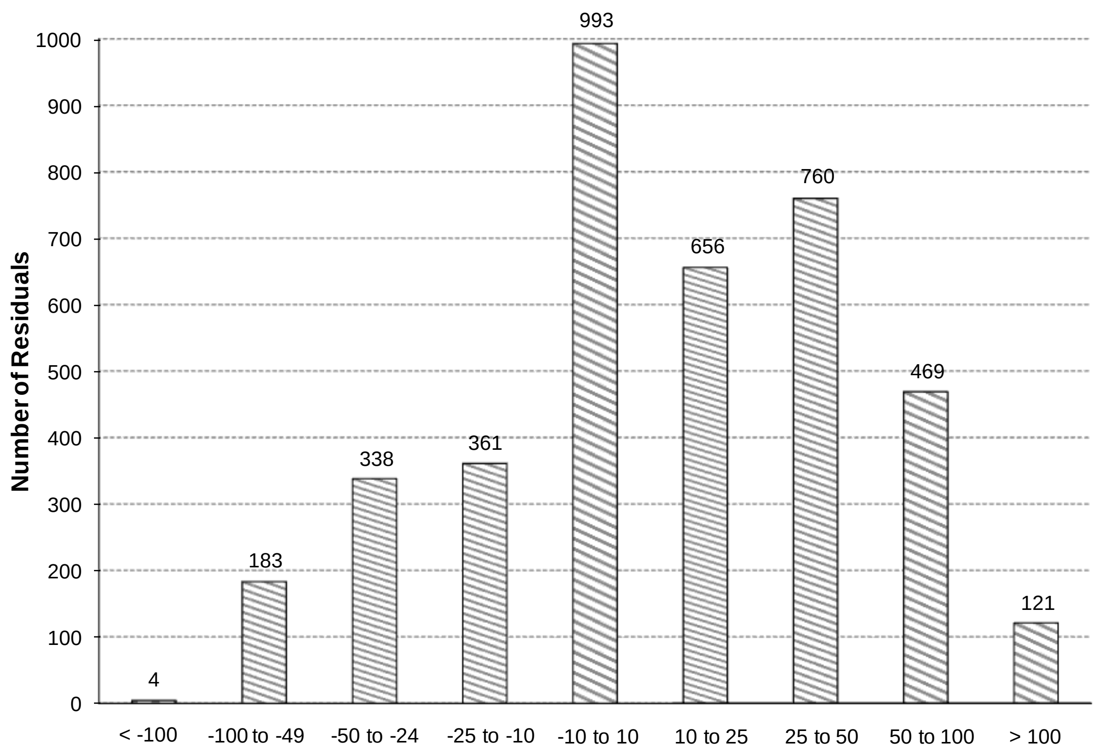


Figure 17. Histogram of residuals (difference between measured and simulated groundwater elevations) within each bin.

Figure 16 shows that for the most part, simulated groundwater elevations favorably match measured groundwater elevations. A departure in the match between simulated and measured groundwater elevations however is visible (circled area in Figure 16). The locations for these wells with a relatively poor match between simulated and measured groundwater elevations are shown in Figure 18. These wells occur within layers 2 through 6 as shown in Figure 18. Simulated groundwater elevations are generally underestimated at these locations. Many, but not all, of these wells lie within or adjacent to the outcrop areas where the saturated thickness is relatively thin compared to downdip areas. For layers 2, 3, and 4 these wells lie in the updip area of the strata, whereas for layers 5 and 6 most, but not all, of these wells are located along potentiometric highs. A minimum of 3 wells, (state well numbers 6760703, 7828601, and 7836902) display a poor match between measured and simulated groundwater elevations due to approximations in the land surface elevations based on the digital elevation model, model cell sizes, and\or uncertainties in well data as some measured groundwater elevations are above approximate land surface elevation (see the hydrograph for state well number 7836902 in Appendix B).

Additionally, there are areas in the groundwater flow model where simulated groundwater elevations are higher than approximate land surface elevation. For example, simulated groundwater elevations are above land surface at two percent of the target well locations. These target wells are located in layers 2, 4, and 6 (see Figure 19). Moreover, there are model cells in the Groundwater Management Area 16 model that do not contain targets but have simulated groundwater elevations above approximate land surface elevations.

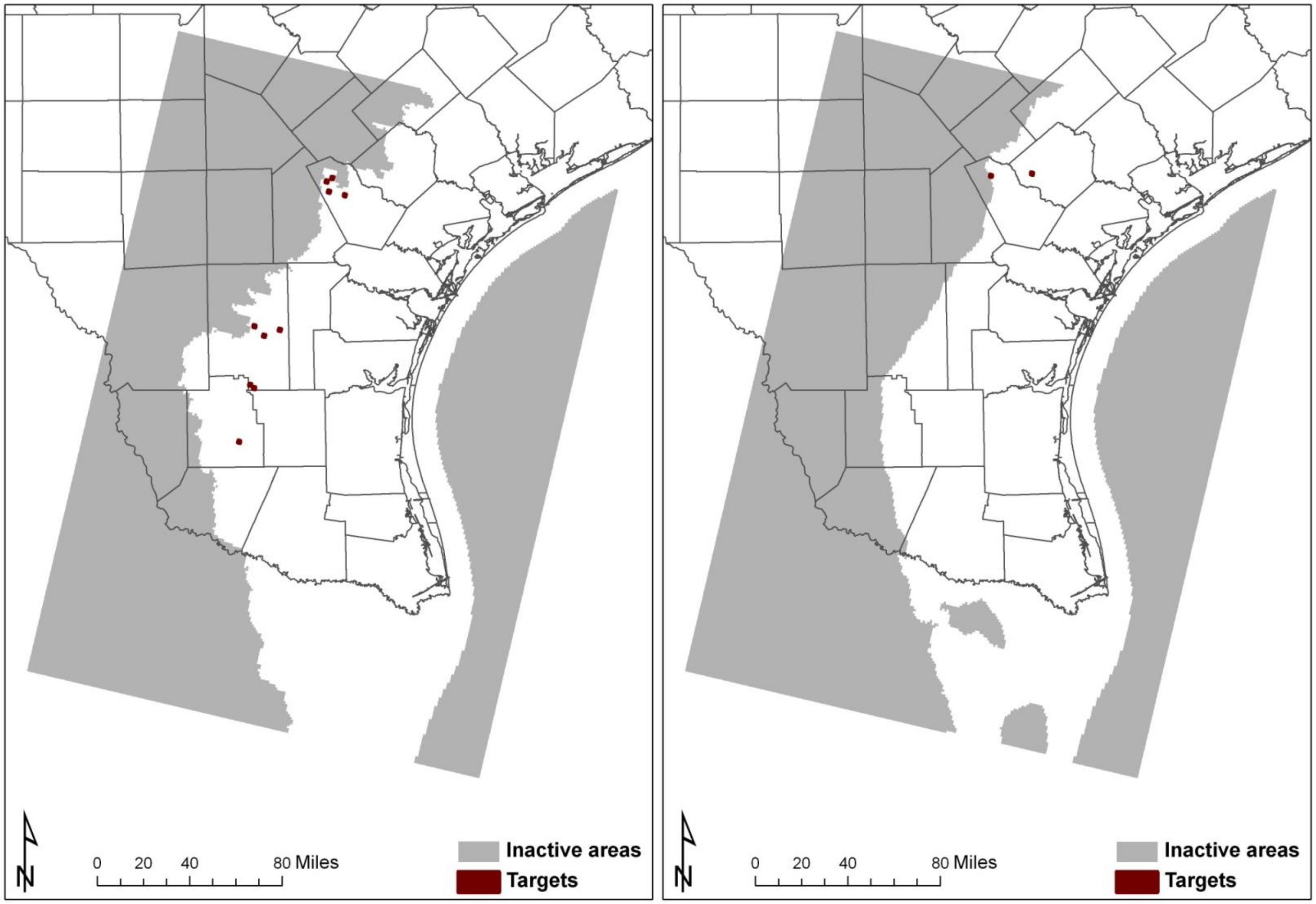


Figure 18. Location of wells where simulated groundwater levels in layer 2-Evangeline Aquifer (left) and layer 3-Burkeville Confining System (right) are underestimated.

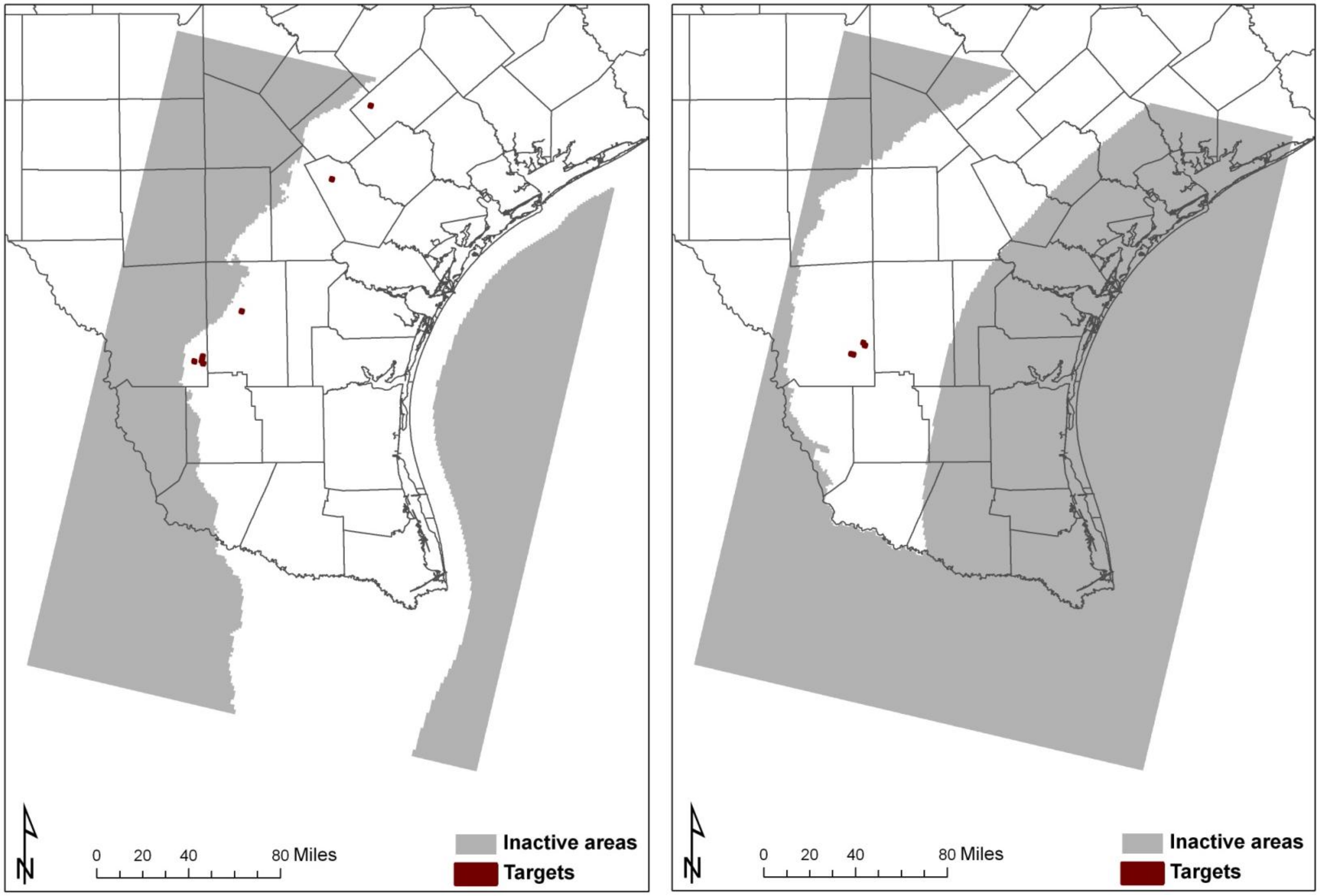


Figure 18 continued. Location of wells where simulated groundwater elevations in layer 4-Jasper Aquifer (left) and layer 5-Yegua-Jackson Aquifer System (right) are underestimated.

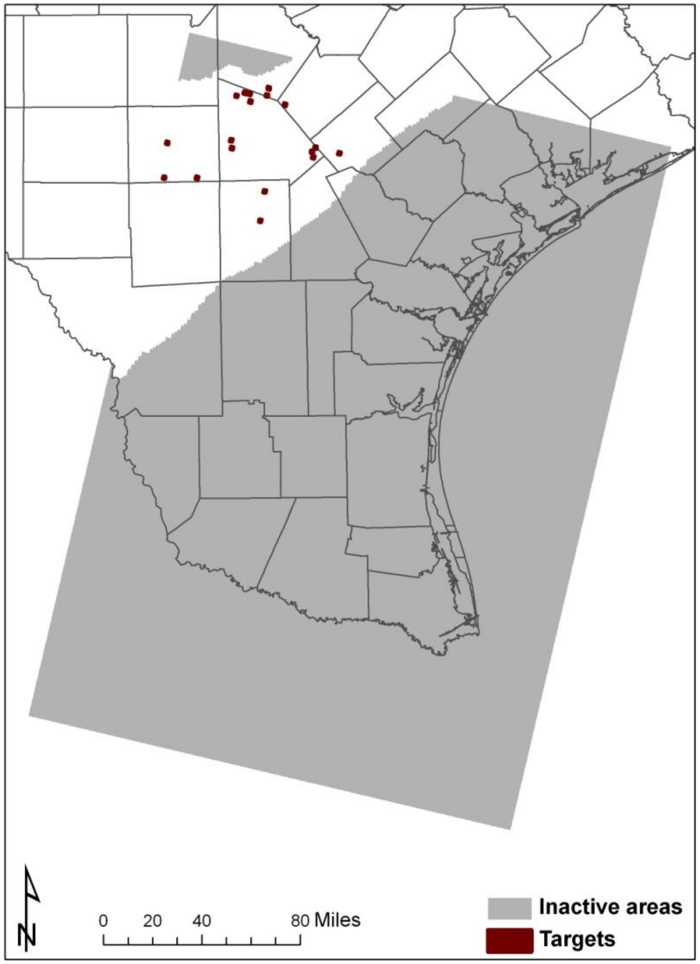


Figure 18 continued. Location of wells where simulated groundwater elevations in layer 6-Queen City, Sparta, Carrizo-Wilcox Aquifer System are underestimated.

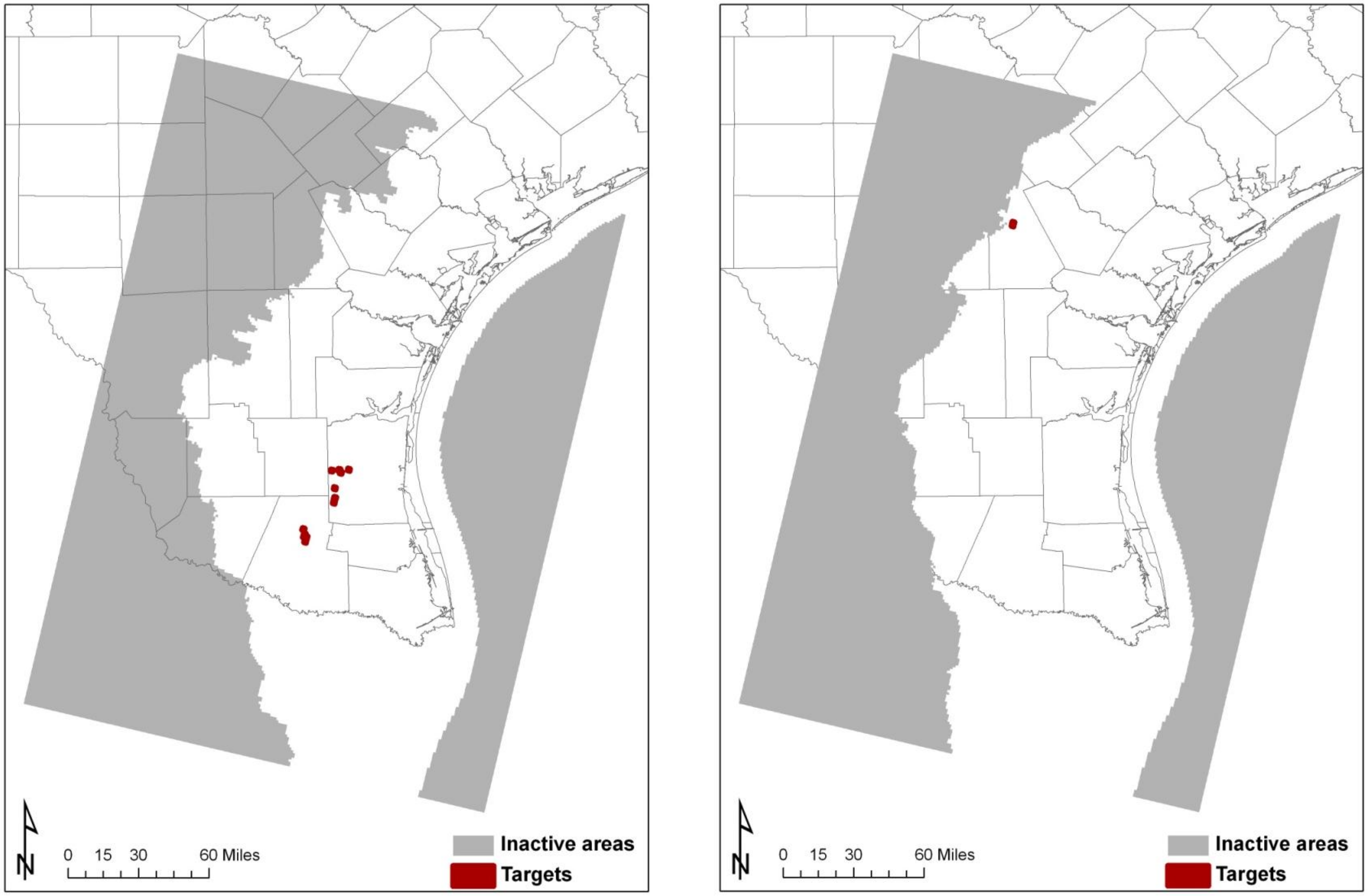


Figure 19. Location of target wells where simulated groundwater levels exceed approximate land surface elevations in layers 2-Evangeline Aquifer (left) and 4-Jasper Aquifer (right).

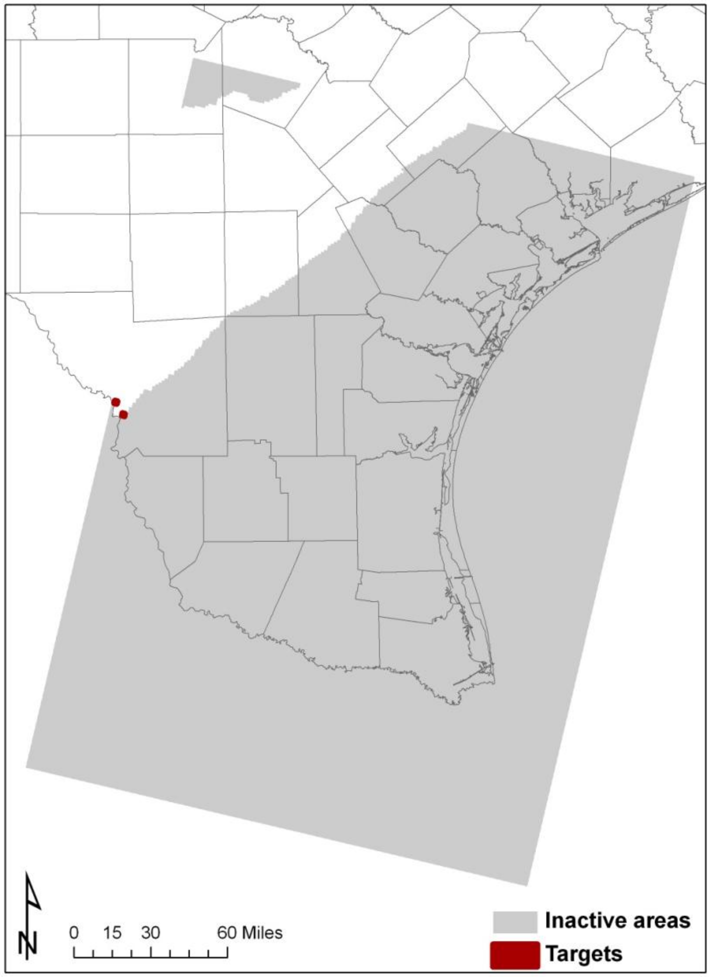


Figure 19 continued. Location of target wells where simulated groundwater levels exceed approximate land surface elevations in layer 6- Queen City, Sparta, Carrizo-Wilcox Aquifer System.

Figure 20 is a plot of model estimated groundwater elevations versus residuals for the Groundwater Management Area 16 model. Hill and Tiedeman (2007) noted that ideally in this type of plot the residuals should be scattered evenly about the zero residual line for the entire range of values on the horizontal axis.

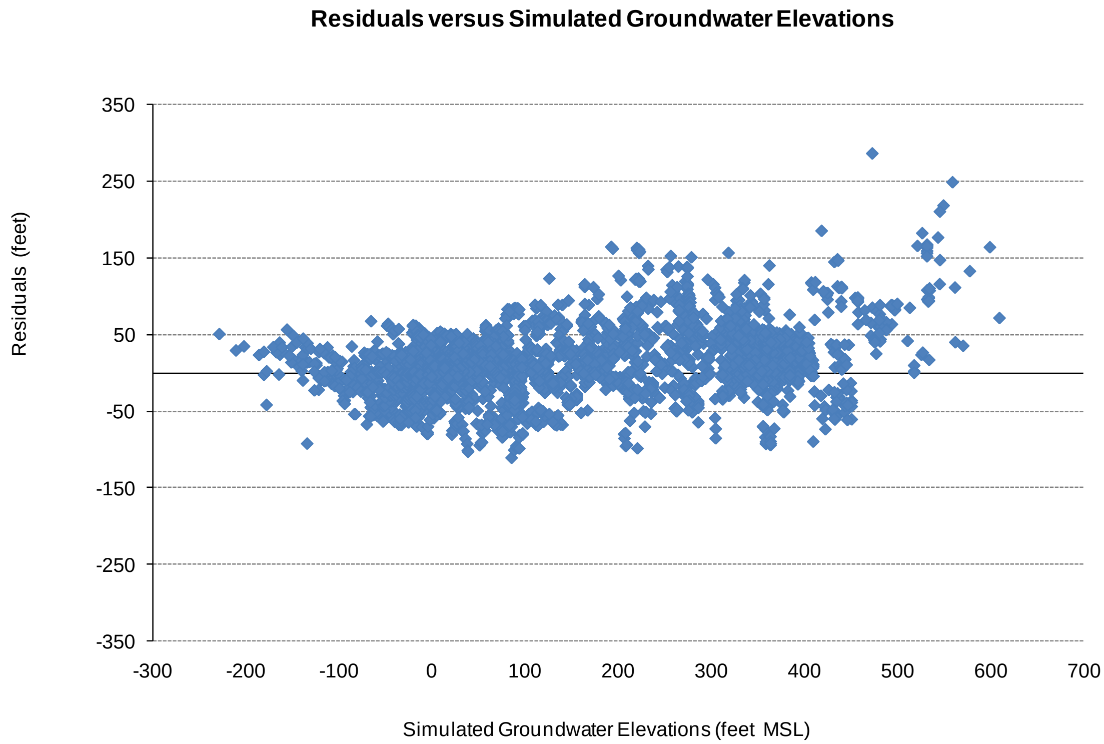


Figure 20. Plot of model estimated groundwater elevations versus residuals for the Groundwater Management Area 16 model.

The calibration fit was also evaluated both spatially and temporally. Figure 21 shows plots of the residuals for the simulated groundwater elevations versus the model rows and columns. These plots permit inspection of potential spatial trends in residuals northwest (low model row number) to the southwest (high model row number) as well as northwest (low column number) to the northeast (high column number).

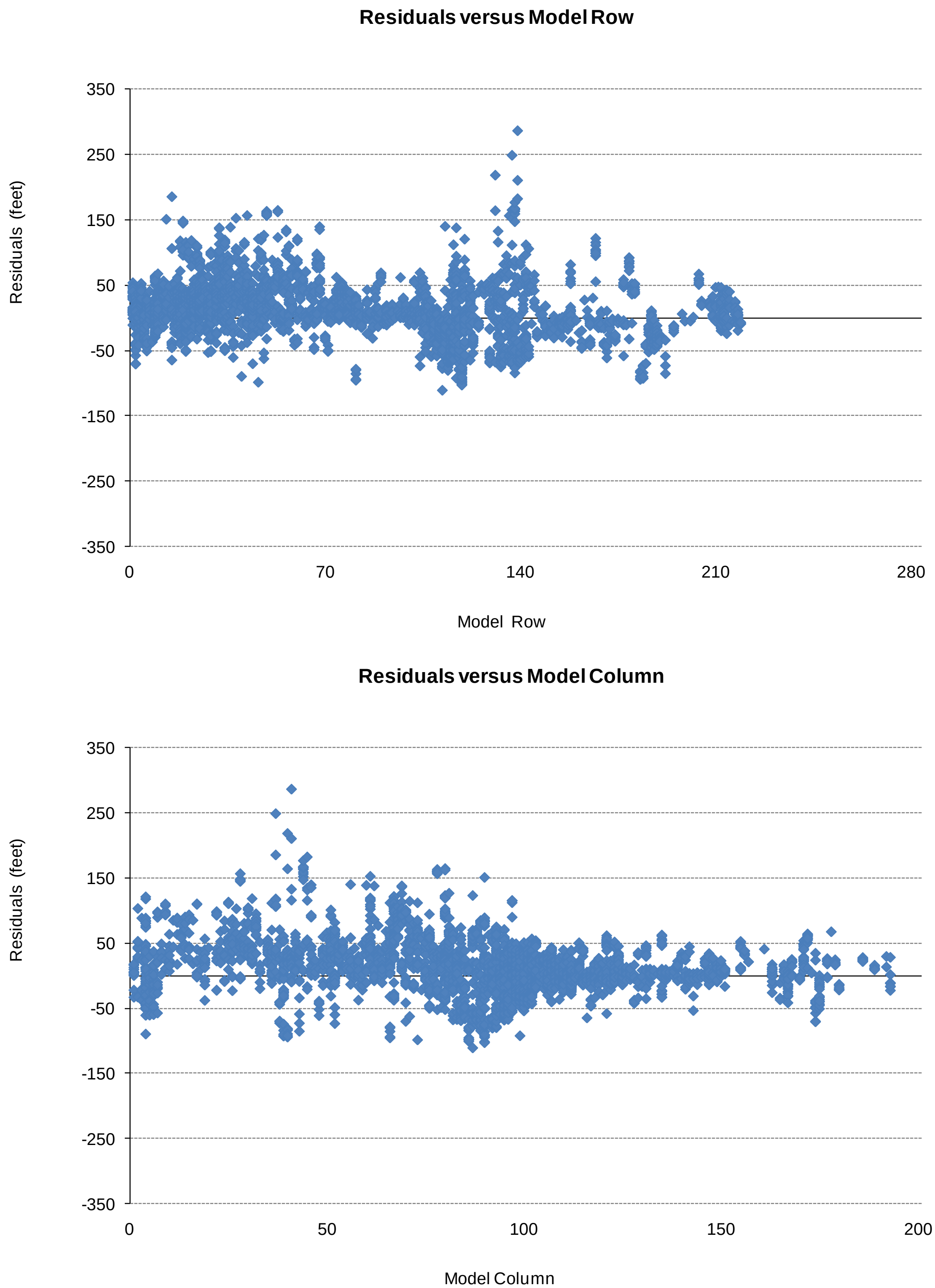


Figure 21. Model row versus the residuals for the 3,885 groundwater elevation measurements (top) and model column versus residuals for the 3,885 groundwater elevation measurements (bottom).

The temporal calibration fit is shown in Figure 22, which presents a plot of year versus residual. This plot is useful for identifying any obvious bias in specific years relative to other years.

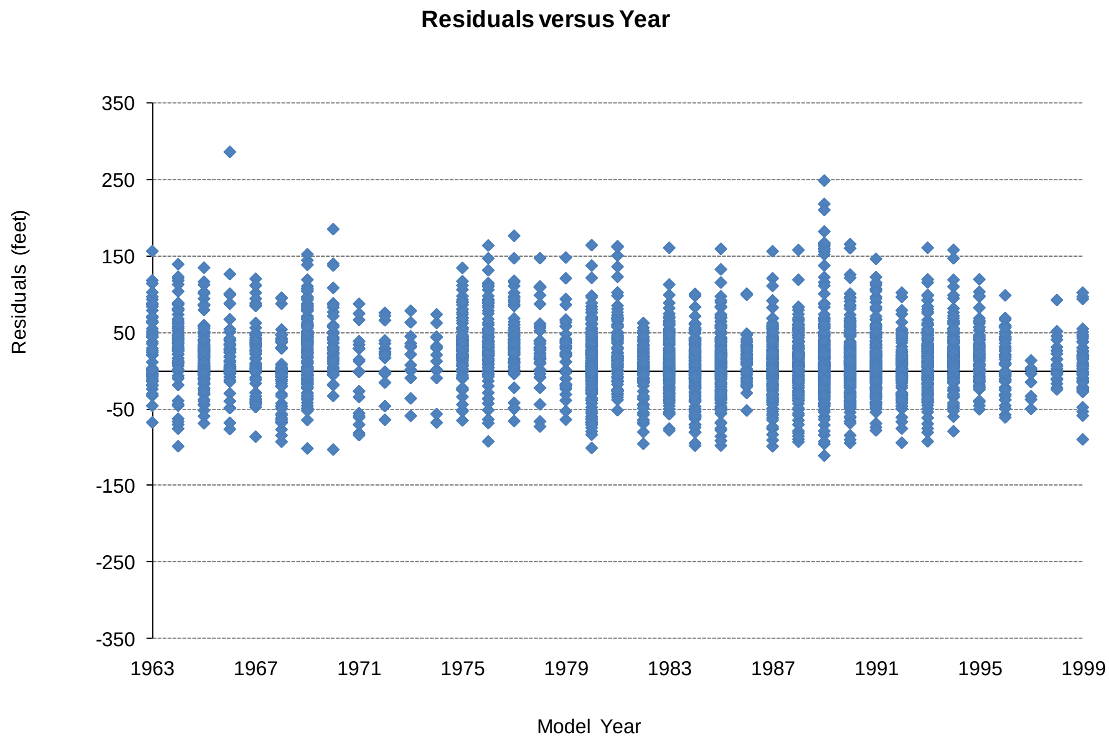
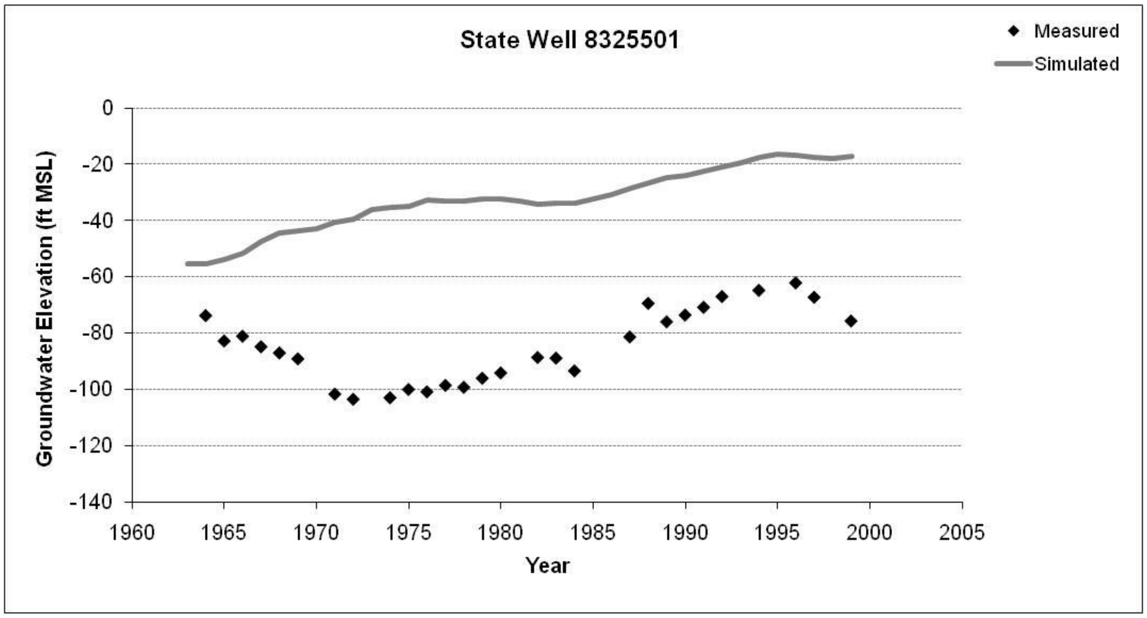


Figure 22. Temporal distribution of residuals for 3,885 groundwater elevation measurements used to calibrate the Groundwater Management Area 16 groundwater flow model. Positive residuals indicate that the measured groundwater elevation is higher than the simulated groundwater elevation. Negative residuals indicate that the measured groundwater elevation is lower than the simulated groundwater elevation.

Hydrographs showing the match between measured and simulated groundwater elevations for 349 target wells are provided in Appendix B. These 349 wells have 5 or more groundwater elevation measurements that were used to calibrate the groundwater flow model. The hydrographs shown in Appendix B were generated using a post-processor (*Calibrated Model_Example.sas*) written in SAS. The program reads the processed output files (*headcompare.dat* and *headcompare3.dat*), joins them into a single file based on the state well number, and then creates the hydrographs shown in Appendix B.

Hydrographs for the five target wells located within the Evangeline Aquifer in Kleberg County, near Kingsville, Texas where drawdown and recovery has been observed are also provided below (Figure 23). Although the model does a fairly good job of simulating the observed recovery trend, it does not do as well of a job simulating the drawdown that preceded recovery.



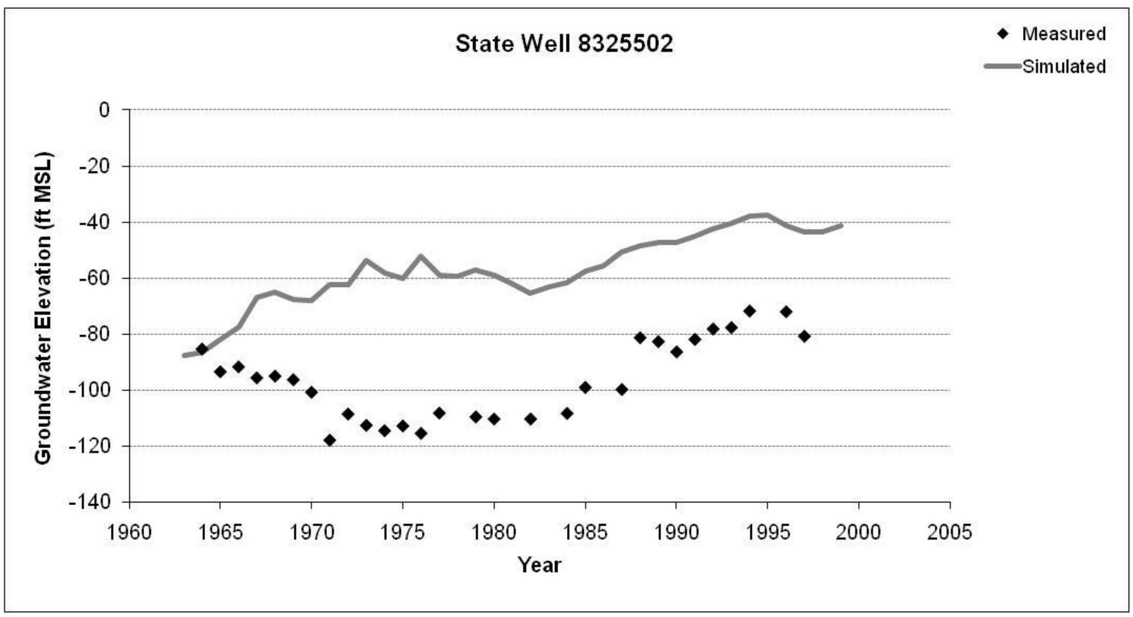
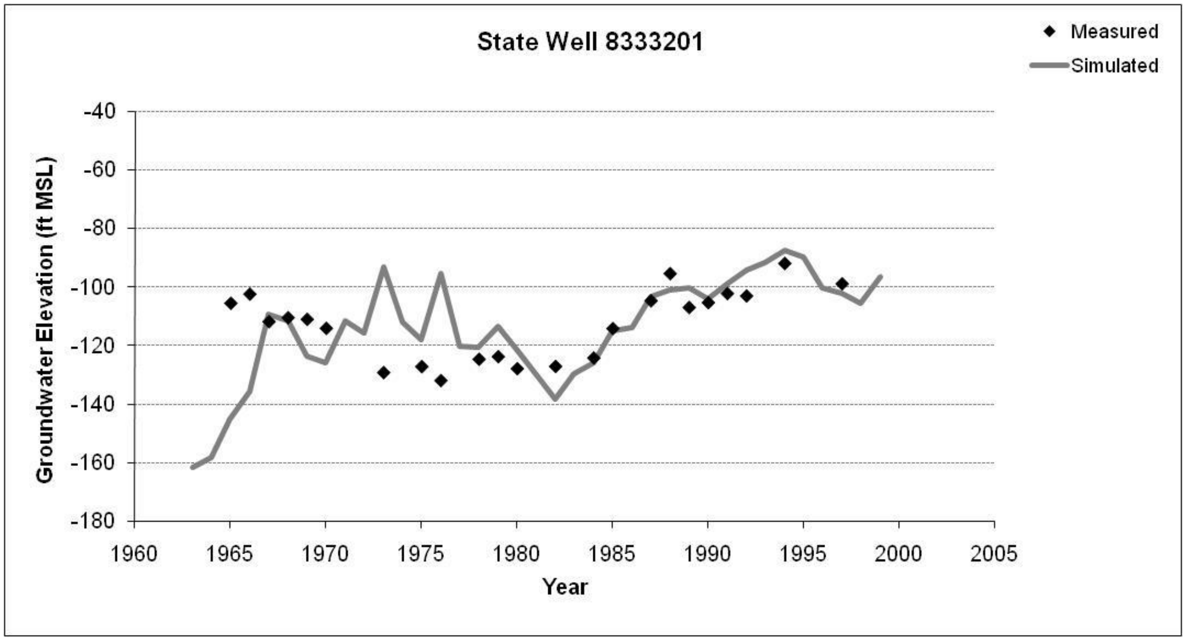


Figure 23. Plots of measured versus simulated groundwater elevations for target wells located within the Evangeline Aquifer in Kleberg County, near Kingsville, Texas where drawdown and recovery has been observed.



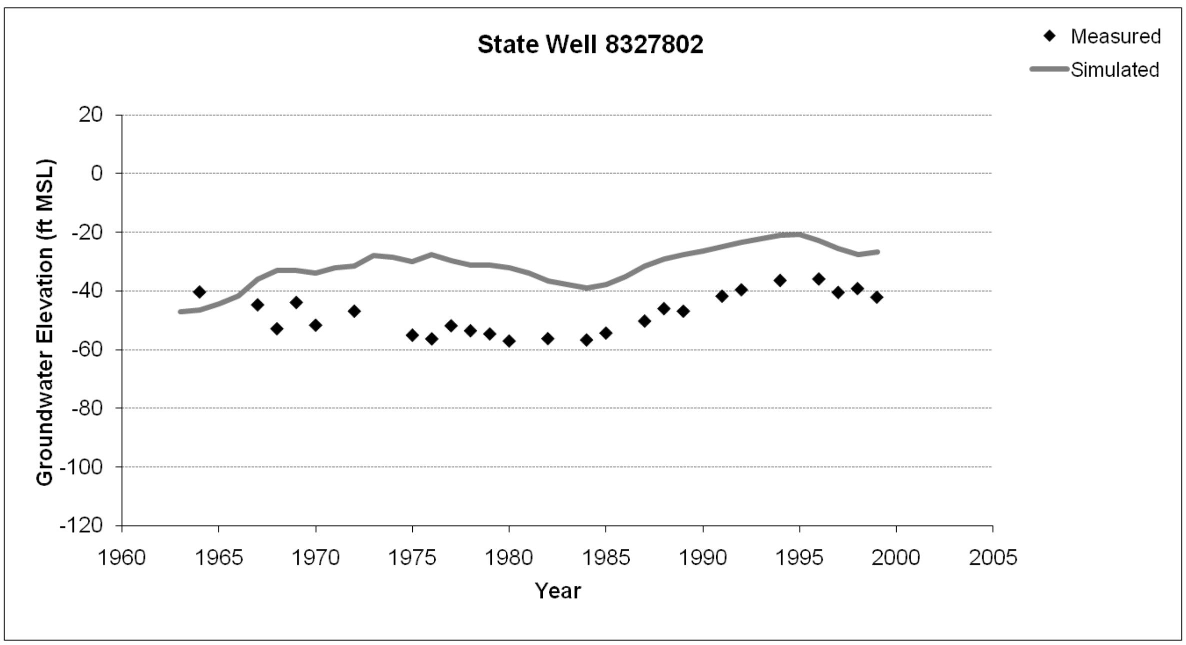


Figure 23 continued. Plots of measured versus simulated groundwater elevations for target wells located within the Evangeline Aquifer in Kleberg County, near Kingsville, Texas where drawdown and recovery has been observed.

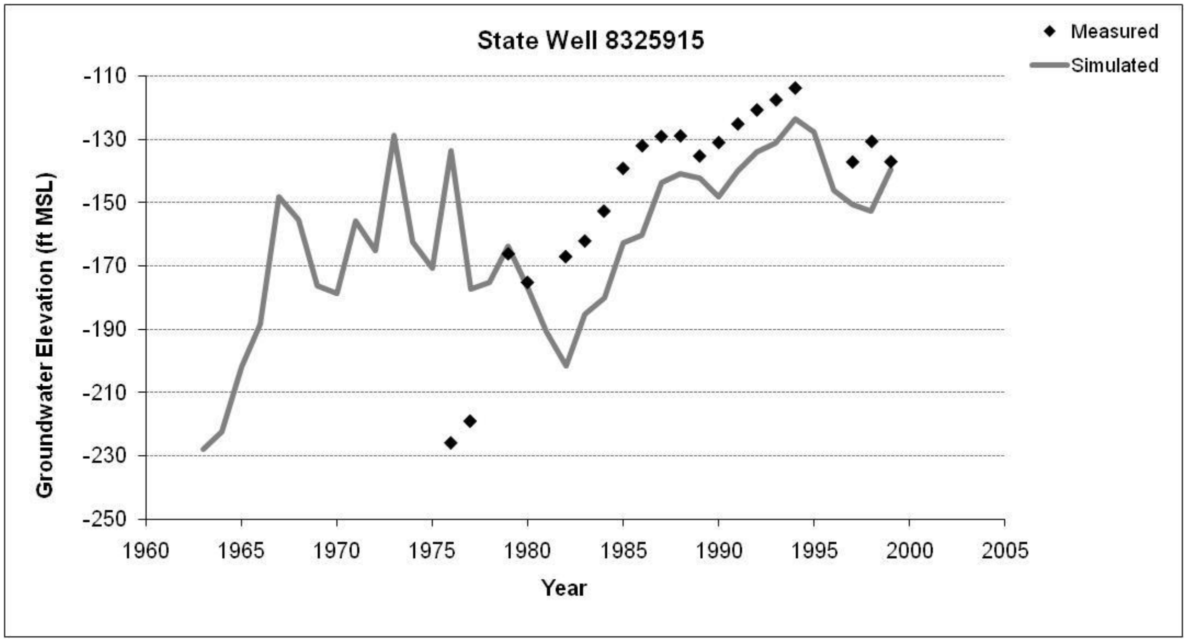


Figure 23 continued. Plots of measured versus simulated groundwater elevations for target wells located within the Evangeline Aquifer in Kleberg County, near Kingsville, Texas where drawdown and recovery has been observed.

3.2 Historic Groundwater Budget

Groundwater budgets or groundwater inventories are developed by quantifying all inflows to a system, all outflows from a system, and the storage change of the system over a specified period of time. Literature on the development of groundwater budgets dates back to at least the 1930s with the work of Meinzer (1932). Tolman (1937) noted that, at the time, methods to develop groundwater budgets had not reached the accuracy necessary to be accepted by all investigators. This was largely due to extensive data collection requirements and the lengthy time needed to observe the range of hydraulic conditions.

Bredehoeft (2002) reviewed the evolution of analysis of groundwater systems. The earliest methods in the 1940s and 1950s revolved around the analysis of flow to a single well. Understanding groundwater flow on an aquifer or basin scale became possible with the analog model in the 1950s. Improvements in computer technology in the 1960s and 1970s led to the development of digital computer models or numerical models of groundwater flow. By 1980, Bredehoeft (2002) reported that numerical models had replaced analog models in the investigations of aquifer dynamics. The principle objective of such models is to understand the impacts of pumping on the system.

A groundwater system in near steady-state (or near equilibrium) prior to development (prior to groundwater pumping for irrigation or other human use) is shown in Figure 24.

In this condition, groundwater inflow equals groundwater outflow and no change in storage occurs over time. For the Groundwater Management Area 16 model, inflows include recharge, inflows from river leakage, and lateral inflows along the general-head boundaries. Outflows include discharge from pumping, lateral outflows along general-head boundaries, discharge to rivers, and natural discharge from wetlands and springs.

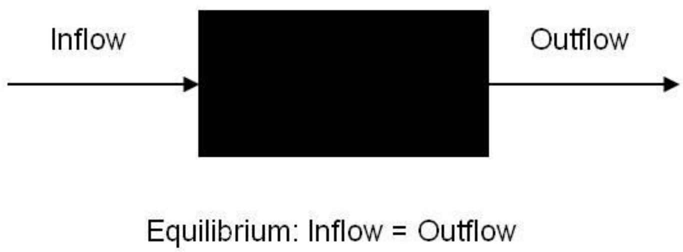


Figure 24. Groundwater system prior to development (after Alley and others, 1999).

Development of groundwater resources (i.e. pumping of wells) results in three “impacts” to the system that is in “near steady-state”: 1) storage decline (manifested in the form of lowered groundwater levels), 2) induced flow (generally manifested by increased surface water recharge, and 3) captured natural outflow (generally manifested in decreased springflows).

The initial response to pumping is a lowering of the groundwater level or a “cone of depression” around the well, which results in a decline in storage. The cone of depression deepens and extends radially with time. As the cone of depression expands, it causes groundwater to move toward the well thereby increasing the inflow to the area around the well.

The cone of depression can also cause a decrease of natural groundwater outflow from the area adjacent to the well and acts to “capture” this natural outflow. If the cone of depression causes water levels to decline in an area of shallow groundwater, evapotranspiration is reduced and the pumping is said to capture the evapotranspiration. At some point, the induced inflow and captured outflow (collectively the capture of the well) can cause the cone of depression to stabilize or equilibrate.

Figure 25 illustrates the case of a groundwater system after pumping begins. Note that the groundwater storage is decreased, inflow is increased, and outflow is decreased in response to the pumping. The inflow does not equal the total outflow (natural outflow plus pumping). The system is not in equilibrium and groundwater storage is decreasing.

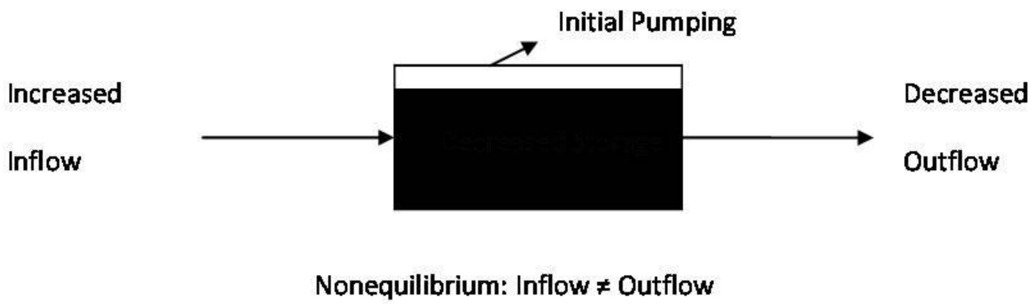


Figure 25. Groundwater system after initial pumping (after Alley and others, 1999).

If the hydraulic conductivity is sufficiently large and the initial pumping rate is relatively constant, the inflow and natural outflow will adjust to a new near steady-state condition in response to the pumping. Groundwater storage is decreased from the predevelopment level. This reduction in storage is the result of the new near steady-state condition of the system because the location and the nature of the outflow have changed (i.e. pumping wells). Figure 26 presents a diagram of this new near steady-state or new equilibrium condition.

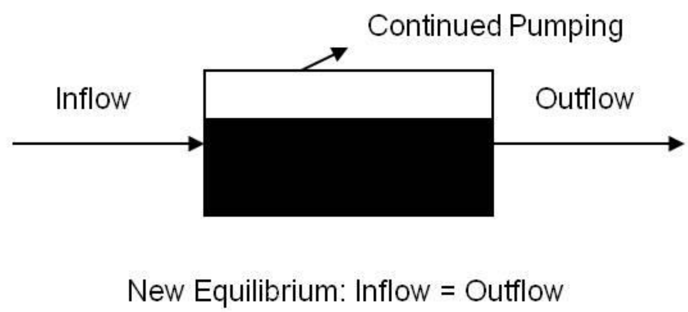


Figure 26. Groundwater system under continued pumping-new equilibrium condition (after Alley and others, 1999).

If pumping were to increase after this new near steady-state condition was established, the system inflow increases again, the natural outflow decreases again, and groundwater storage is further decreased. Figure 27 depicts this condition.

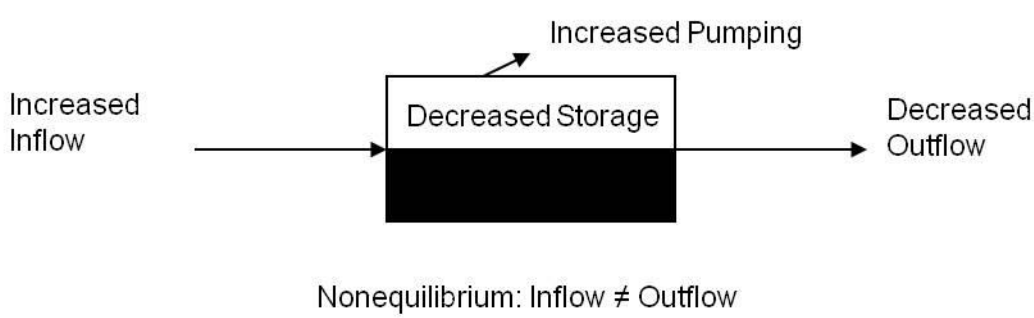


Figure 27. Groundwater system under additional increment of increased pumping (after Alley and others, 1999).

In response to this new increase in pumping, inflow would continue to increase, outflow would continue to decrease, and storage would continue to decrease as the system is equilibrating. If the pumping is relatively constant, it is possible for a groundwater basin to exhibit stable groundwater levels at a lower level than had been previously observed. Stable groundwater levels are an indication that a new near steady-state condition has been reached.

Pumping can increase to the point where no new near steady-state condition is possible. In this condition, inflow can be induced no further and/or natural outflow can be decreased no further. From an outflow perspective, this condition would be reached once all springs have ceased to flow (no more springflow to "capture") or the water table has declined to the point that shallow groundwater evapotranspiration has ceased.

In summary, groundwater pumping dynamically alters the direction and magnitude of hydraulic gradients, induces inflow, decreases natural discharge from the system (e.g springflows, evapotranspiration) and affects fluxes between hydraulically connected aquifer systems. Bredehoeft (2002) noted that understanding the dynamic response of a groundwater system under pumping stress distills down to understanding the rate and nature of "capture" attributable to pumping, which is the sum of the change in recharge and the change in discharge caused by pumping. A calibrated numerical groundwater model of a region is an ideal tool in meeting the objective of understanding capture. Output from the model includes estimates of the various components of the water budget.

The components of inflow to the Gulf Coast Aquifer in Groundwater Management Area 16 are: recharge from precipitation, net recharge from stream flow, net inflow from underlying units (the Yegua-Jackson and Carrizo-Wilcox aquifers), net lateral inflow from Groundwater Management Areas 13 and 15, and net lateral flow from Mexico. The components of outflow from the Gulf Coast Aquifer in Groundwater Management Area 16 are: pumping, spring flow, and net lateral outflow to the Gulf of Mexico.

Average annual groundwater budgets for the Gulf Coast Aquifer in Groundwater Management Area 16 are summarized in Table 7. Please note that the groundwater budget for the 1960s, 1970s, 1980s, and 1990s are summarized, as well as a groundwater budget for the entire calibration period (1963 to 1999). Note that the overall groundwater budget shows a net storage increase from 1963 to 1999 of about 65,000 acre-feet per year. The area of Groundwater Management Area 16 is about 15,500 square miles. The range of groundwater rise over the 37 year calibration period is less than 3 feet. Please recall that the first three years were relatively dry and the final three years were relatively wet, which would partially explain the overall rise in groundwater levels during this period of time.

Annual groundwater budgets are provided in Appendix C for the Gulf Coast Aquifer for all of Groundwater Management Area 16 as well as annual groundwater budgets for each of the county-district splits within Groundwater Management Area 16.

Table 7. Averaged groundwater budgets for the Gulf Coast Aquifer (layers 1-4) in Groundwater Management Area 16 for various periods of time between 1963 and 1999. All values are in acre-feet per year except as noted.

	1963-1970	1971-1980	1981-1990	1991-1999	1963-1999
Inflow					
Recharge from Precipitation	50,604	55,731	46,508	51,518	51,105
Net Recharge from Stream Flow	68,546	73,573	27,025	60,483	56,721
Net Inflow from Underlying Units	13,040	4,862	3,116	812	5,173
Net Lateral Inflow From GMA13	7	6	3	2	4
Net Lateral Inflow From GMA15	4,242	4,712	3,988	3,637	4,153
Net Lateral Inflow From Mexico	7,358	7,886	9,195	10,688	8,807
Total Inflow	143,797	146,770	89,835	127,139	125,964
Outflow					
Wells	43,385	39,696	51,490	57,094	47,913
Springs	3,522	5,002	4,704	5,059	4,615
Net Lateral Outflow To Gulf	7,764	8,540	8,476	8,735	8,402
Total Outflow	54,671	53,238	64,670	70,889	60,931
Inflow - Outflow	89,126	93,532	25,165	56,251	65,033
Storage Change	89,218	93,550	25,167	56,283	65,066
Model Error	-92	-18	-2	-32	-33
Model Error (percent)	2.90E-04	7.75E-05	1.30E-05	1.34E-04	1.20E-04

4.0 MODEL LIMITATIONS

Numerical groundwater flow models are approximate representations of aquifer systems (Anderson and Woessner, 2002), and as such have limitations. These limitations are usually associated with (1) the purpose for the groundwater flow model, (2) the extent of the understanding of the aquifer(s), (3) the quantity and quality of data used to constrain parameters in the groundwater flow model, and (4) assumptions made during model development. Models are best viewed as tools to help form decisions rather than as machines to generate truth or make decisions. The National Research Council (2007) concluded that scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or be able to prove that a given model is correct in all respects for a particular application.

Several input parameter data sets for the model are based on limited information. These include geologic framework, recharge, water level and streamflow data, hydraulic conductivity, specific storage, and specific yield. There is limited information on the geologic framework of the model area along the coast and in Mexico. Consequently, the elevations of the aquifer tops and bottoms in these areas of the model are less reliable than the geologic framework information in the other parts of the model.

There is model uncertainty associated with using annual stress periods in the model. The use of annual stress periods results in the model not simulating seasonal effects of recharge and pumping. However, attempting to simulate seasonal effects would be impractical due to the paucity of wells and frequent water level measurements needed for calibration and the fact that seasonal fluctuations may be too small to simulate with certainty at the regional scale. This limitation is amplified due to the relatively low pumping that has historically occurred in the region as evidenced by the relatively constant groundwater elevations through most of the model domain.

There is uncertainty with simulating base flow and spring discharge at the spatial and temporal scale of this model. Actual discharge to streams occurs within small areas averaging 50 feet wide, compared to the 1 square mile of the model cells, and base flow is more variable within the annual time steps of the model. Therefore, uncertainty occurs because modeled discharge to streams is averaged over a 1-year stress period and 1 square-mile cell.

Available transmissivity and hydraulic conductivity data are derived primarily from specific-capacity data obtained from wells scattered throughout the model area. However, these data are not located close enough to indicate more localized heterogeneity within the zones used in the model. The same is true in the assignment of storativity and specific yield values for the model. The scarcity of measured storativity and specific yield values is addressed by calibrating the model based on observed water level responses to wells with time series measurements of annual water levels. Again, due to the lack of change in groundwater levels in specific wells, it is difficult to place a great deal of confidence in these calibrated storativity and specific yield estimates.

Recharge generally takes the form of diffuse infiltration from precipitation through aquifer material exposed at land surface. This recharge differs from direct recharge, such as streamflow losses from rivers and reservoirs or along other specific discrete recharge features. However, these alternative mechanisms are simulated in MODFLOW using the River package.

Because transmissivity in the model is fixed and not allowed to change with changes in water levels, it is important to note that model cells will not go dry when simulated water levels fall below the base of the aquifer, consequently, saturated thickness must be carefully monitored to determine where the model cells may go dry. Although this is not a significant limitation during the calibration period of the model due to relatively small changes in groundwater elevations, it must be considered under predictive scenarios that significantly increase pumping. It should be noted that the assumption of fixed transmissivity values is not valid in cases of extreme drawdown. Saturated thickness data from this model must be used carefully where saturated thickness is less than the root mean square error of the model. This often results in negative calculated saturated thickness because the simulated water levels lie below the base of the aquifer.

The limitations described earlier and the nature of regional groundwater flow models affects the scale of application of the model. This model is most accurate in assessing larger regional-scale groundwater issues, such as predicting aquifer-wide water level changes and trends over the next

50 years that may result from different proposed water management strategies. Accuracy and applicability of the model decreases when using it to address more local-scale issues because of limitations of the information used in model construction and the model cell size that determines spatial resolution of the model. Consequently, this model is not likely to accurately predict water level declines associated with a single well or spring because (1) these water level declines depend on site-specific hydrologic properties not included in detail in regional-scale models, and (2) the cell size used in the model is too large to resolve changes in water levels that occur over relatively short distances. Addressing local-scale issues requires a more detailed model, with local estimates of hydrologic properties, or an analytical model. This model is more useful in determining the impacts of groups of wells distributed over many square miles. The model predicts changes in ambient water levels rather than actual water level changes at specific locations, such as an individual well.

5.0 SUMMARY AND CONCLUSIONS

A regional groundwater flow model that encompasses the footprint for Groundwater Management Area 16 and its underlying aquifer systems was developed and calibrated with groundwater elevation data from 1963 to 1999. The purpose for this model was to provide a regional groundwater flow model useful for joint planning in Groundwater Management Area 16. Previous groundwater availability models of the area that covered the central and southern portions of the Gulf Coast Aquifer (Chowdhury and others, 2004; Chowdhury and Mace, 2007), did not individually encompass the footprint for Groundwater Management Area 16 and did not include the Yegua-Jackson or the Queen City, Sparta, Carrizo-Wilcox aquifer systems.

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APPENDICES

APPENDIX A:
Wells Used for Measured Groundwater Elevations

Table C-1. State well numbers, model layer, model row, model column, number of measurements, highest measured groundwater elevation, lowest measured groundwater elevation, year of earliest measurement, and year of latest measurement for the 966 target wells used to calibrate the groundwater flow model.

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8325502	2	116	96	29	-71.88	-118.02	1964	1997
8325501	2	115	95	28	-62.30	-103.52	1964	1999
8327802	2	113	112	25	-35.86	-57.15	1964	1999
8333201	2	120	98	23	-91.99	-132.05	1965	1997
6862902	6	23	51	20	387.05	339.87	1964	1999
8325915	2	117	99	20	-113.70	-225.95	1976	1999
6856902	6	10	63	18	390.52	370.79	1965	1994
7946601	2	55	121	17	44.40	36.76	1964	1994
8424104	2	106	83	17	123.48	29.68	1963	1992
6849902	6	25	12	16	583.46	578.60	1963	1994
6860401	6	25	31	16	433.41	411.75	1963	1979
6860610	6	25	35	15	420.02	391.13	1963	1979
7803601	6	35	32	15	424.90	373.23	1965	1991
6848507	6	2	57	14	408.89	403.36	1970	1994
6848812	6	3	58	14	397.63	393.05	1971	1999
8432501	2	119	90	14	-17.59	-63.82	1963	1993
6856101	6	6	58	13	409.97	396.10	1964	1999
6863101	6	18	53	13	397.40	369.37	1964	1999
7913901	2	28	108	13	177.70	164.06	1963	1995
7934811	2	60	88	13	193.74	186.78	1980	1995
7942702	2	67	89	13	176.52	164.53	1980	1995
7964813	1	72	139	13	13.44	5.60	1967	1994
6750101	6	2	73	12	379.55	370.78	1975	1999
6855202	6	9	52	12	395.89	378.20	1970	1996
6856804	6	12	60	12	407.55	392.71	1975	1999
6861310	6	19	41	12	409.68	391.09	1965	1979
6862503	6	20	49	12	391.20	371.52	1975	1999
7905801	3	20	103	12	191.15	183.62	1963	1995
7905802	4	20	103	12	196.84	188.70	1963	1995
7926102	3	44	83	12	294.02	289.45	1980	1994
7934202	2	53	87	12	232.40	222.25	1980	1995
7945601	1	58	114	12	54.16	48.60	1980	1994
7952405	1	69	105	12	58.67	55.09	1980	1995
7954803	1	67	123	12	18.24	13.76	1980	1994
8014405	1	9	168	12	-16.40	-65.07	1965	1995

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8019802	1	25	151	12	1.17	-45.00	1968	1994
8307601	1	78	135	12	8.74	-4.60	1980	1994
8334401	2	122	102	12	-83.12	-105.25	1980	1994
6749201	6	4	66	11	402.70	371.00	1975	1999
6857307	6	26	13	11	545.36	522.40	1971	1994
7816606	5	32	69	11	412.36	363.31	1963	1999
7918702	3	42	81	11	328.94	321.93	1980	1994
7922201	2	29	112	11	125.92	114.25	1963	1994
7925103	4	48	76	11	288.80	281.95	1980	1995
7933501	2	58	81	11	239.91	224.37	1964	1995
7935101	2	53	93	11	208.76	195.30	1980	1994
7950909	2	75	97	11	88.70	44.60	1965	1994
7952406	1	70	106	11	54.97	47.39	1980	1994
7958201	2	78	93	11	89.55	56.94	1965	1994
7958302	2	77	97	11	74.65	42.68	1965	1994
7959402	2	79	98	11	68.40	34.05	1965	1994
8018601	1	24	146	11	14.85	3.90	1980	1995
8019503	1	23	149	11	7.34	-8.94	1980	1994
8028901	1	29	163	11	-0.84	-11.57	1980	1994
8307301	1	75	136	11	7.08	-5.45	1980	1994
8307919	1	82	136	11	5.86	2.34	1967	1994
8310301	2	92	101	11	34.33	25.89	1980	1993
8322801	1	100	132	11	3.05	-8.70	1965	1994
8334302	2	120	108	11	-49.95	-69.95	1980	1994
8336401	2	118	117	11	-17.90	-31.31	1980	1994
8422801	2	116	73	11	291.35	282.30	1967	1996
8437301	2	129	69	11	291.50	285.88	1980	1996
8438902	2	132	79	11	206.90	197.70	1980	1996
6750903	5	9	78	10	296.30	288.92	1963	1999
6854901	6	16	49	10	409.70	353.10	1964	1999
6863802	6	23	56	10	377.72	310.40	1964	1999
6864401	6	17	61	10	391.25	356.08	1964	1993
7863101	4	83	70	10	181.02	173.30	1980	1995
7864301	2	81	80	10	114.76	110.80	1980	1995
7903702	4	25	85	10	224.23	215.80	1963	1999
7913202	2	22	102	10	246.78	229.33	1980	1995
7914403	2	22	108	10	168.89	160.40	1963	1991
7927301	3	43	95	10	192.27	186.46	1980	1995
7931501	1	38	124	10	64.36	54.93	1963	1995
7940701	2	47	131	10	43.21	34.59	1980	1993
7943102	2	61	94	10	117.73	106.98	1980	1995

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7949905	2	75	88	10	80.06	74.04	1980	1995
7953602	1	67	118	10	17.68	11.65	1980	1994
7957602	2	81	90	10	89.95	76.59	1964	1984
7959103	2	76	100	10	75.85	42.00	1965	1994
7959304	2	76	103	10	68.50	40.48	1965	1994
7960802	1	81	110	10	37.93	29.79	1980	1994
7964701	1	72	136	10	-2.40	-10.91	1980	1994
8014801	1	10	171	10	-21.90	-47.50	1980	1995
8015102	1	2	174	10	-46.87	-86.16	1980	1995
8023401	1	13	177	10	-42.60	-68.30	1980	1995
8024201	1	10	186	10	5.70	-6.58	1966	1995
8033102	2	39	135	10	42.57	33.94	1980	1994
8049702	1	63	142	10	3.70	-13.77	1980	1994
8301605	2	89	91	10	74.20	64.20	1980	1994
8302306	2	85	97	10	33.18	7.62	1980	1994
8303506	1	86	105	10	29.37	26.08	1980	1994
8317901	2	110	96	10	-37.47	-72.65	1980	1993
8320904	1	104	118	10	25.95	13.99	1965	1994
8325701	2	118	93	10	-43.78	-84.35	1980	1994
8333402	2	123	95	10	-47.05	-67.60	1980	1993
8416701	2	105	84	10	161.87	63.31	1964	1984
8424208	2	106	86	10	103.95	97.61	1980	1994
8429306	2	120	67	10	354.54	341.50	1967	1994
8431102	2	117	76	10	252.00	241.26	1967	1996
8431502	2	119	80	10	184.00	163.03	1967	1993
8432401	2	119	86	10	18.78	-12.18	1980	1994
8454806	2	149	81	10	213.78	185.70	1982	1993
8460402	3	158	64	10	353.80	327.90	1980	1996
8731503	2	187	98	10	74.23	54.20	1967	1994
8731804	2	189	99	10	82.08	53.16	1967	1994
8731907	2	189	101	10	59.01	42.66	1967	1994
6762102	4	5	103	9	193.38	184.04	1963	1986
6861602	6	21	43	9	402.40	381.36	1975	1999
7816601	6	34	71	9	372.40	325.20	1963	1999
7818206	6	52	25	9	386.26	369.80	1976	1999
7901701	4	29	70	9	377.11	372.78	1980	1999
7902101	5	20	76	9	257.10	241.26	1980	1999
7913501	2	25	104	9	211.78	175.80	1980	1995
7918301	3	36	87	9	284.17	275.22	1963	1999
7925303	2	47	80	9	345.02	340.13	1981	1995
7925504	2	49	78	9	383.38	378.84	1981	1994

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7935305	2	50	98	9	185.55	157.50	1980	1993
7943903	2	65	100	9	88.58	83.13	1983	1994
7946602	1	54	123	9	24.84	15.47	1964	1987
7946803	1	58	119	9	51.63	38.47	1980	1994
7951202	1	68	100	9	89.51	79.99	1980	1991
7960401	2	76	107	9	49.60	39.96	1980	1994
7961901	1	78	119	9	26.70	22.90	1980	1994
8002102	1	5	135	9	6.05	-16.73	1980	1993
8006703	1	3	167	9	-23.50	-57.34	1981	1995
8006903	1	1	171	9	38.91	31.70	1980	1995
8011201	1	9	147	9	2.50	-22.55	1981	1995
8014102	1	7	166	9	-11.06	-37.79	1981	1995
8014901	1	9	172	9	21.77	8.80	1980	1995
8015301	1	2	179	9	10.00	4.80	1980	1995
8018401	1	25	140	9	22.90	15.37	1980	1995
8021601	1	17	167	9	-60.52	-82.29	1981	1995
8027602	1	28	155	9	-3.40	-9.80	1983	1994
8305301	1	79	120	9	30.89	25.18	1980	1993
8309703	2	102	89	9	130.40	124.22	1980	1992
8311101	1	92	103	9	29.30	17.00	1964	1993
8318802	2	107	102	9	-38.91	-68.73	1983	1993
8325801	2	120	96	9	-81.70	-136.90	1982	1993
8326106	2	111	100	9	-60.98	-91.10	1983	1993
8326203	2	111	102	9	-55.18	-110.32	1983	1994
8333301	2	120	98	9	-101.22	-148.73	1980	1993
8415705	2	106	75	9	233.40	176.17	1980	1993
8416407	2	102	81	9	150.10	135.00	1980	1994
8439701	2	131	82	9	173.30	72.60	1980	1993
8444402	2	143	61	9	424.82	412.80	1985	1996
8444601	2	142	66	9	387.83	371.50	1967	1994
8704402	2	167	67	9	417.80	399.40	1980	1996
8731917	2	188	100	9	68.78	40.00	1966	1994
8738201	2	195	92	9	126.00	118.00	1980	1994
8744501	2	208	80	9	190.60	183.90	1980	1993
8802103	2	154	110	9	24.60	20.19	1968	1991
8819602	1	170	128	9	-11.52	-16.55	1980	1993
8849701	2	210	118	9	65.10	61.00	1980	1994
8857301	1	212	123	9	50.20	47.38	1980	1994
8858502	1	213	127	9	51.20	45.18	1980	1994
6749202	6	4	66	8	401.98	391.84	1975	1999
6848601	6	1	60	8	405.96	383.37	1964	1999
6860912	6	28	36	8	361.80	341.10	1992	1999
6862405	6	23	46	8	378.25	348.45	1965	1999

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7802709	6	40	19	8	411.46	373.70	1975	1999
7805116	6	29	39	8	371.10	333.80	1975	1999
7805717	6	34	40	8	354.53	342.35	1975	1999
7909801	4	34	76	8	242.72	212.60	1963	1999
7910601	4	28	84	8	221.30	182.30	1980	1999
7917701	4	43	75	8	258.89	246.32	1964	1990
7922701	2	36	110	8	116.64	97.77	1981	1995
7925608	4	47	80	8	328.20	309.00	1966	1995
7929701	2	44	105	8	154.10	141.20	1980	1995
7930701	2	43	115	8	97.75	85.66	1983	1994
7947702	1	57	125	8	21.95	5.01	1981	1990
7951102	2	68	95	8	118.16	111.97	1980	1990
7957903	2	85	90	8	103.85	84.50	1980	1994
8004908	1	4	155	8	36.77	26.80	1981	1995
8011301	1	9	150	8	4.47	-2.96	1981	1995
8015402	1	6	175	8	-51.50	-73.30	1982	1995
8019502	1	22	150	8	-2.10	-10.40	1981	1991
8301509	2	89	89	8	79.25	53.10	1980	1994
8326701	2	116	101	8	-115.08	-180.91	1982	1994
8326901	2	116	106	8	-78.29	-123.81	1980	1994
8329401	2	108	123	8	20.30	-10.60	1965	1994
8329702	2	112	125	8	-6.47	-17.39	1980	1993
8334902	2	125	109	8	-37.22	-53.77	1983	1994
8423204	2	110	77	8	180.50	169.40	1980	1992
8437901	2	133	71	8	286.66	282.40	1980	1996
8439601	2	129	85	8	56.94	36.50	1980	1990
8446701	2	141	77	8	247.28	230.50	1980	1994
8447701	2	140	84	8	80.07	65.80	1980	1993
8463602	2	151	92	8	75.91	68.86	1964	1993
8711601	2	177	67	8	345.78	279.00	1987	1996
8712701	2	179	68	8	369.50	353.10	1985	1994
8713503	3	174	80	8	191.30	177.22	1983	1994
8731903	2	187	100	8	64.30	44.20	1967	1993
8739301	2	190	101	8	63.29	53.20	1980	1993
8743813	4	212	72	8	118.90	111.04	1980	1994
8746401	2	204	92	8	181.25	164.10	1980	1993
8748702	2	205	107	8	86.20	81.40	1980	1994
8756701	2	212	109	8	81.80	72.20	1985	1994
8763601	1	218	109	8	70.30	67.00	1980	1994
8801101	2	155	103	8	42.16	36.80	1969	1994
8801302	2	155	109	8	30.15	27.60	1969	1993
8802403	2	156	112	8	24.61	22.50	1980	1993
8820501	2	169	132	8	23.40	20.09	1980	1993

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8834102	2	187	120	8	38.84	38.33	1980	1994
8858101	1	213	126	8	51.00	47.20	1980	1992
8858402	1	213	126	8	51.20	42.00	1980	1992
6741801	6	2	67	7	406.92	398.79	1975	1990
6759702	5	15	84	7	249.28	221.60	1981	1995
6761802	3	10	100	7	261.89	257.60	1981	1989
6847903	6	5	54	7	420.58	415.77	1970	1990
6849808	6	24	9	7	644.50	626.07	1975	1994
6851701	6	21	22	7	555.75	550.10	1975	1999
6851801	6	21	25	7	552.07	547.84	1964	1978
6859804	6	31	26	7	416.10	359.50	1975	1999
6861805	6	26	42	7	377.52	353.50	1975	1999
7708806	6	44	6	7	383.00	350.35	1976	1999
7708808	6	44	6	7	383.70	337.20	1975	1999
7731501	6	66	4	7	409.20	311.81	1963	1969
7731703	6	71	4	7	390.92	326.55	1964	1996
7803302	6	31	30	7	431.33	388.30	1965	1979
7804204	6	31	36	7	404.59	355.31	1969	1993
7911901	4	29	93	7	204.40	177.26	1984	1999
7923601	1	29	123	7	73.77	71.58	1986	1995
7928501	2	44	101	7	179.93	162.83	1980	1994
7944103	2	57	102	7	119.30	83.40	1981	1995
7963801	1	73	133	7	8.16	5.60	1985	1994
8004601	1	1	156	7	31.23	22.33	1983	1995
8011101	1	12	144	7	-1.28	-21.58	1980	1991
8109401	1	2	189	7	5.56	-2.80	1980	1991
8125101	1	16	193	7	1.61	-22.00	1965	1993
8301901	2	94	92	7	67.95	61.49	1982	1993
8302706	2	92	95	7	36.02	17.00	1965	1993
8311401	1	97	103	7	35.40	30.42	1980	1990
8311801	1	99	107	7	44.60	16.65	1965	1989
8325101	2	114	92	7	-38.75	-58.81	1984	1992
8327101	2	109	108	7	-25.70	-52.77	1980	1992
8329201	2	107	124	7	21.00	7.03	1966	1993
8333602	2	123	100	7	-78.68	-137.00	1982	1993
8350601	2	138	112	7	1.30	-11.09	1968	1994
8416808	2	103	83	7	110.48	106.40	1980	1994
8444901	2	144	65	7	379.10	375.78	1988	1996
8447313	2	133	88	7	8.80	-4.06	1980	1993
8447501	2	137	85	7	120.65	61.22	1980	1990
8458301	4	158	52	7	553.30	532.48	1985	1996
8463901	2	154	92	7	93.54	85.43	1983	1991
8701601	5	171	48	7	455.80	384.95	1985	1996

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8707302	2	157	94	7	85.12	78.24	1982	1991
8710702	5	181	54	7	410.50	402.80	1980	1994
8718604	4	187	62	7	302.41	285.70	1985	1993
8720905	2	186	78	7	197.80	165.02	1980	1994
8754502	2	213	96	7	101.86	95.03	1964	1970
8764405	1	217	112	7	71.00	58.75	1965	1992
8810303	1	162	117	7	20.29	-6.97	1982	1994
8811701	2	165	123	7	11.89	7.38	1980	1993
6760903	4	12	95	6	303.71	299.72	1981	1995
6848907	6	1	62	6	404.47	387.20	1975	1999
6851602	6	19	28	6	583.65	576.75	1969	1991
6855601	6	9	55	6	406.12	389.58	1964	1986
6858101	6	25	15	6	536.64	502.10	1964	1991
6862205	6	18	47	6	388.93	365.33	1975	1990
7708201	6	37	5	6	436.50	390.20	1969	1992
7747802	6	88	10	6	402.20	365.82	1964	1996
7802303	6	33	23	6	418.80	401.16	1975	1991
7802702	6	42	19	6	381.18	312.15	1975	1999
7803509	6	35	28	6	386.39	347.85	1969	1991
7804812	6	37	37	6	364.86	329.40	1975	1991
7805409	6	31	39	6	349.20	306.20	1975	1999
7810303	6	42	24	6	371.48	332.10	1975	1994
7826502	6	62	28	6	369.60	367.86	1975	1996
7922402	2	33	110	6	134.23	125.55	1981	1989
7941401	4	66	79	6	120.90	118.35	1983	1995
7943401	2	61	94	6	140.41	107.83	1980	1994
7953504	2	65	114	6	32.90	27.52	1982	1994
7957605	2	81	90	6	91.33	84.19	1987	1994
7960104	2	74	107	6	49.77	29.55	1965	1987
8018402	1	25	141	6	24.52	19.21	1985	1995
8023101	1	10	175	6	-67.70	-77.24	1980	1991
8023301	1	9	180	6	-51.10	-57.60	1982	1995
8036501	1	37	163	6	4.30	-5.94	1981	1991
8037601	1	34	170	6	-4.89	-10.40	1983	1994
8327801	2	115	110	6	-44.90	-78.42	1980	1990
8334305	2	118	107	6	-81.59	-133.80	1984	1993
8349401	2	142	99	6	15.02	7.23	1980	1992
8408301	2	90	82	6	179.37	170.05	1980	1994
8424101	2	109	82	6	101.72	95.41	1980	1988
8424802	2	112	87	6	15.64	-25.00	1980	1989
8438701	2	132	73	6	266.98	250.89	1967	1990
8442601	4	145	50	6	553.90	545.30	1985	1996
8445304	2	138	71	6	310.35	305.52	1967	1989

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8506802	6	115	8	6	466.50	458.80	1975	1994
8513303	6	117	4	6	471.06	439.80	1975	1994
8513402	6	122	1	6	461.42	423.20	1975	1994
8616501	5	183	40	6	281.02	269.50	1971	1993
8616705	5	187	39	6	288.30	277.53	1971	1993
8707704	2	165	89	6	111.53	105.50	1982	1990
8731601	2	187	99	6	69.01	43.42	1967	1990
8731911	2	189	102	6	51.88	40.24	1964	1969
8754810	2	215	97	6	100.55	98.00	1967	1990
8859102	1	209	132	6	36.00	31.75	1980	1992
6761402	3	9	98	5	288.10	280.86	1981	1989
6852705	6	19	30	5	529.18	520.43	1965	1969
6856401	6	10	58	5	393.39	386.60	1970	1978
6859621	6	27	29	5	437.17	432.55	1969	1979
6860303	6	20	36	5	440.52	427.87	1969	1979
6860913	6	28	36	5	382.48	366.97	1969	1979
6862906	6	23	52	5	367.40	359.75	1994	1999
7715903	6	53	4	5	413.35	402.10	1975	1993
7715907	6	54	4	5	339.70	309.78	1975	1992
7739601	6	76	10	5	382.92	378.00	1964	1977
7739709	6	79	5	5	386.78	376.81	1975	1996
7762401	6	104	4	5	449.88	436.80	1975	1996
7805501	6	32	42	5	377.55	329.40	1965	1991
7805802	6	34	42	5	357.30	324.95	1975	1999
7806507	6	31	51	5	348.00	325.90	1977	1994
7811204	6	41	29	5	412.65	396.75	1975	1991
7811903	6	47	33	5	327.22	306.50	1969	1979
7815301	6	34	61	5	391.23	383.46	1969	1978
7836902	6	68	46	5	371.60	324.36	1964	1977
7854901	4	81	66	5	129.50	112.90	1984	1992
7902301	5	18	80	5	250.74	236.67	1980	1990
7905502	3	16	102	5	213.26	207.80	1981	1995
7925607	2	49	82	5	272.12	264.80	1980	1989
7942704	2	68	90	5	165.73	156.31	1980	1988
7945808	2	60	114	5	76.79	66.55	1980	1987
8005901	1	2	163	5	-25.72	-40.20	1982	1989
8019506	1	22	150	5	3.56	-3.40	1989	1994
8041701	1	55	141	5	10.73	-16.88	1966	1985
8301706	2	94	88	5	99.00	94.56	1984	1994
8309902	2	101	94	5	36.10	25.60	1980	1990
8319801	2	107	108	5	-5.45	-14.08	1980	1987
8328702	2	112	116	5	-24.28	-32.09	1983	1989
8328902	2	111	121	5	-10.38	-11.93	1980	1987

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8334413	2	122	103	5	-83.20	-98.46	1982	1989
8336501	2	118	120	5	-14.19	-24.67	1980	1991
8337601	1	117	131	5	10.80	-33.99	1980	1989
8351402	2	137	115	5	9.16	-0.33	1968	1985
8424506	2	109	85	5	108.40	37.50	1980	1988
8455901	2	146	90	5	71.30	64.16	1983	1993
8463301	2	149	91	5	82.10	64.99	1983	1990
8537208	6	142	6	5	382.58	372.25	1975	1994
8616403	5	184	39	5	284.30	266.22	1971	1990
8710402	5	180	54	5	417.80	402.90	1985	1996
8754514	2	214	96	5	105.39	96.92	1965	1969
8755601	2	212	106	5	87.50	74.90	1980	1989
8802603	2	155	117	5	19.08	10.36	1980	1989
8818701	2	175	116	5	32.98	28.51	1983	1990
8818803	2	175	119	5	25.84	23.42	1982	1993
8858103	1	213	125	5	48.83	46.35	1980	1989
8860701	1	213	143	5	28.00	23.60	1989	1994
6757101	6	13	66	4	351.85	345.20	1975	1978
6760202	5	6	90	4	276.60	271.50	1981	1988
6853805	6	18	39	4	428.16	414.32	1970	1979
6854802	6	17	46	4	380.56	374.54	1975	1978
6861401	6	24	38	4	412.43	389.14	1964	1976
6861501	6	22	40	4	405.61	404.51	1975	1979
6862607	6	21	51	4	443.01	433.48	1975	1990
7708409	6	40	4	4	405.45	320.00	1970	1999
7708812	6	42	6	4	389.90	353.86	1975	1999
7716201	6	46	7	4	369.94	335.11	1965	1979
7732501	6	64	13	4	380.57	378.50	1975	1994
7732601	6	65	14	4	387.83	384.87	1975	1994
7802402	6	39	18	4	400.95	375.81	1970	1978
7811501	6	44	31	4	353.56	343.84	1969	1977
7812701	6	44	36	4	347.18	341.98	1975	1979
7815805	6	38	61	4	409.00	352.85	1969	1993
7818305	6	51	26	4	382.49	376.28	1975	1991
7826802	6	64	28	4	312.45	305.47	1969	1977
7828101	6	56	39	4	343.62	334.48	1975	1978
7847502	4	70	67	4	128.30	121.61	1980	1989
7852908	5	87	51	4	276.65	251.00	1992	1996
7910402	4	31	80	4	219.73	197.36	1963	1999
7912304	3	22	97	4	271.27	232.40	1983	1989
7916607	1	19	129	4	43.10	41.05	1991	1994
7925106	4	48	75	4	223.49	219.13	1980	1985
7942201	2	60	90	4	205.27	196.25	1980	1989

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7949301	2	70	85	4	116.97	105.35	1967	1985
7957606	2	81	90	4	84.21	78.57	1989	1994
7958407	2	82	91	4	77.43	72.55	1989	1994
7958602	2	81	96	4	57.12	52.15	1989	1994
7958603	2	81	98	4	55.62	51.50	1989	1994
7958812	2	82	96	4	49.52	44.39	1989	1994
7960503	2	76	110	4	33.27	20.54	1965	1989
8022501	1	15	171	4	-59.30	-76.39	1982	1995
8026601	1	31	147	4	13.76	8.98	1982	1988
8308101	1	74	138	4	7.35	-3.51	1980	1984
8325301	2	112	97	4	-90.64	-100.10	1980	1985
8327402	2	113	107	4	-75.60	-104.57	1980	1989
8335903	2	122	116	4	-30.38	-89.63	1982	1991
8337201	2	114	128	4	14.98	-6.26	1980	1993
8341601	2	132	102	4	-24.35	-27.23	1985	1991
8416202	2	98	82	4	143.70	140.62	1983	1990
8447601	2	136	87	4	43.60	32.31	1980	1987
8447905	2	137	89	4	18.93	10.97	1980	1985
8455602	2	143	89	4	37.79	15.53	1982	1987
8616402	5	185	38	4	315.70	311.78	1987	1993
8754104	2	212	92	4	116.72	103.98	1985	1989
8763503	1	218	107	4	76.20	74.10	1980	1989
8809802	2	169	109	4	34.68	28.04	1969	1987
8818504	2	173	118	4	28.14	26.06	1983	1989
8819101	2	168	121	4	15.80	8.00	1980	1992
8826203	2	177	119	4	22.80	21.01	1984	1990
8826301	2	177	121	4	25.25	-29.67	1983	1989
8859502	1	212	137	4	37.18	34.83	1980	1988
8904902	1	219	149	4	10.95	7.35	1973	1976
6853404	6	15	37	3	603.71	526.32	1970	1976
6853701	6	18	37	3	525.30	517.95	1964	1970
6862102	6	19	46	3	408.28	407.55	1975	1977
6864402	6	17	61	3	357.70	356.20	1993	1999
7715304	6	47	3	3	434.00	329.15	1963	1979
7731101	6	66	2	3	415.15	395.94	1969	1976
7731604	6	67	7	3	454.73	445.80	1975	1977
7746804	6	89	2	3	448.03	446.70	1975	1977
7802602	6	36	22	3	405.90	393.20	1975	1978
7805104	6	31	39	3	349.75	338.35	1994	1996
7805212	6	28	41	3	350.80	328.20	1994	1999
7806503	6	30	51	3	359.51	354.53	1976	1979
7809602	6	47	17	3	360.46	343.21	1970	1978
7814203	6	34	52	3	348.63	347.58	1975	1977

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7827303	6	58	35	3	319.39	313.89	1975	1977
7903602	4	20	90	3	236.60	226.63	1981	1983
7906605	4	13	112	3	180.38	176.16	1981	1989
7914102	2	22	107	3	172.29	166.95	1993	1995
7953103	1	65	111	3	37.75	36.33	1980	1994
8013603	1	8	165	3	-41.55	-74.78	1981	1988
8019702	1	25	148	3	-1.08	-4.60	1969	1980
8041301	1	48	143	3	9.20	-44.59	1980	1990
8302710	2	91	94	3	36.68	35.92	1980	1983
8306201	1	78	125	3	19.86	18.83	1980	1984
8315201	1	85	135	3	5.67	5.13	1967	1980
8336601	2	118	122	3	-22.37	-33.30	1984	1991
8434404	4	138	44	3	692.60	687.00	1989	1994
8447303	2	134	88	3	-14.34	-18.22	1964	1966
8448302	2	132	95	3	-12.54	-13.87	1985	1990
8624503	5	192	43	3	270.00	219.60	1971	1988
8707703	2	165	90	3	134.37	133.12	1983	1985
8810502	2	165	115	3	30.05	27.15	1992	1994
8818403	2	172	115	3	27.13	18.71	1983	1989
8819901	1	172	129	3	18.72	-8.90	1985	1990
8859401	1	213	133	3	43.57	41.72	1980	1989
6749301	6	3	70	2	399.10	395.20	1964	1965
6850702	6	23	14	2	589.86	589.26	1976	1977
6852701	6	19	30	2	527.25	524.96	1964	1965
6853902	6	18	43	2	373.10	369.50	1994	1999
6854701	6	16	45	2	435.45	431.79	1964	1965
6862104	6	18	44	2	384.20	382.35	1994	1995
6862108	6	18	45	2	354.25	349.70	1998	1999
6964501	6	33	4	2	569.52	557.44	1975	1976
7723802	6	60	4	2	456.70	453.10	1977	1979
7740305	6	71	17	2	335.00	334.07	1994	1996
7746801	6	88	2	2	427.07	424.56	1969	1975
7802701	6	40	19	2	375.49	347.70	1976	1978
7802815	6	39	22	2	331.15	330.20	1998	1999
7803401	6	36	26	2	427.84	427.09	1964	1965
7804612	6	33	38	2	328.75	324.35	1994	1999
7804803	6	35	37	2	357.00	349.70	1994	1995
7805803	6	35	44	2	354.61	346.53	1967	1968
7810603	6	45	26	2	398.00	390.83	1964	1969
7817502	6	57	17	2	444.21	443.46	1976	1978
7826504	6	62	28	2	355.20	353.60	1995	1996
7828601	6	56	45	2	386.64	384.33	1975	1976
7925801	2	53	80	2	357.06	356.30	1980	1981

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7929902	2	44	111	2	112.71	110.73	1980	1981
7929903	2	44	111	2	107.24	106.95	1993	1994
7933202	2	56	80	2	281.75	274.12	1980	1981
7943406	2	63	95	2	149.91	149.64	1981	1983
7951105	2	68	95	2	117.20	114.80	1993	1994
7955504	1	63	130	2	12.35	2.75	1987	1993
8012801	1	15	156	2	2.51	2.34	1981	1982
8034301	1	37	150	2	-3.02	-3.88	1980	1981
8035601	1	38	157	2	-1.58	-1.71	1989	1990
8041202	2	48	142	2	43.60	35.40	1980	1984
8307506	1	80	135	2	-0.39	-0.99	1980	1984
8309103	2	97	87	2	142.08	100.55	1980	1984
8312701	1	97	113	2	24.49	23.07	1980	1982
8320401	1	104	113	2	28.25	23.38	1980	1983
8358503	2	148	113	2	20.63	19.02	1968	1980
8404807	5	104	52	2	359.70	349.10	1989	1991
8426401	5	131	40	2	767.50	763.00	1976	1989
8426702	5	132	41	2	710.25	661.00	1985	1989
8433601	4	139	41	2	759.00	755.70	1966	1989
8439801	2	129	84	2	45.08	44.40	1980	1982
8447712	2	139	83	2	65.70	64.60	1968	1969
8528601	6	138	2	2	403.55	402.62	1991	1996
8529203	6	135	7	2	427.80	409.00	1981	1996
8529706	6	141	4	2	388.00	383.50	1965	1996
8616701	5	185	38	2	286.19	285.50	1971	1980
8754501	1	214	98	2	103.22	99.89	1967	1980
8809501	2	165	108	2	34.79	34.55	1969	1984
8826303	2	178	122	2	19.80	18.80	1989	1994
6749503	6	6	67	1	384.00	384.00	1975	1975
6752502	5	2	89	1	265.00	265.00	1963	1963
6759201	4	9	85	1	329.89	329.89	1963	1963
6760703	4	13	90	1	429.45	429.45	1981	1981
6762104	3	5	103	1	186.60	186.60	1963	1963
6762211	3	4	106	1	157.80	157.80	1963	1963
6762212	3	4	106	1	158.80	158.80	1963	1963
6762213	3	4	106	1	146.30	146.30	1963	1963
6762214	3	5	106	1	152.80	152.80	1963	1963
6762215	3	4	106	1	151.70	151.70	1963	1963
6762216	3	3	107	1	156.60	156.60	1963	1963
6847901	6	4	55	1	425.64	425.64	1964	1964
6848803	6	3	58	1	394.72	394.72	1970	1970
6848810	6	3	58	1	396.80	396.80	1970	1970
6848811	6	3	58	1	400.80	400.80	1970	1970

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
6849801	6	24	11	1	598.00	598.00	1969	1969
6849805	6	24	9	1	627.69	627.69	1969	1969
6849806	6	24	9	1	639.74	639.74	1969	1969
6849912	6	25	12	1	581.26	581.26	1969	1969
6849913	6	25	12	1	557.33	557.33	1969	1969
6850101	6	18	14	1	681.00	681.00	1969	1969
6850703	6	24	16	1	558.00	558.00	1967	1967
6851904	6	22	27	1	504.47	504.47	1969	1969
6853809	6	18	40	1	405.00	405.00	1969	1969
6855504	6	12	53	1	390.00	390.00	1966	1966
6856106	6	7	57	1	396.00	396.00	1965	1965
6856408	6	10	58	1	366.00	366.00	1974	1974
6856702	6	13	58	1	360.00	360.00	1967	1967
6856703	6	14	59	1	395.00	395.00	1969	1969
6856803	6	13	62	1	342.00	342.00	1968	1968
6856806	6	11	60	1	385.00	385.00	1965	1965
6857302	6	25	14	1	558.00	558.00	1964	1964
6857404	6	32	10	1	521.00	521.00	1963	1963
6857407	6	31	8	1	520.00	520.00	1963	1963
6857613	6	29	13	1	537.00	537.00	1963	1963
6857904	6	32	15	1	533.00	533.00	1963	1963
6857908	6	32	15	1	526.00	526.00	1963	1963
6859508	6	28	27	1	431.00	431.00	1968	1968
6859914	6	30	30	1	439.00	439.00	1964	1964
6860103	6	22	31	1	530.00	530.00	1963	1963
6860312	6	20	36	1	409.37	409.37	1991	1991
6860424	6	25	32	1	460.00	460.00	1972	1972
6860426	6	24	32	1	426.00	426.00	1971	1971
6860510	6	24	33	1	434.00	434.00	1963	1963
6860850	6	27	33	1	351.00	351.00	1995	1995
6860925	6	27	35	1	395.82	395.82	1970	1970
6861311	6	19	41	1	374.00	374.00	1964	1964
6862101	6	20	45	1	476.80	476.80	1993	1993
6862604	6	20	50	1	378.00	378.00	1964	1964
6864102	6	14	59	1	377.00	377.00	1967	1967
6964401	6	32	1	1	520.00	520.00	1963	1963
6964402	6	32	1	1	527.62	527.62	1964	1964
6964403	6	32	1	1	518.00	518.00	1963	1963
7707903	6	46	2	1	456.00	456.00	1965	1965
7707904	6	46	1	1	371.00	371.00	1964	1964
7708903	6	44	9	1	371.00	371.00	1964	1964
7708909	6	44	8	1	363.00	363.00	1963	1963
7715314	6	47	1	1	365.00	365.00	1974	1974

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7715605	6	49	4	1	303.00	303.00	1963	1963
7716101	6	45	5	1	386.00	386.00	1963	1963
7716103	6	47	4	1	335.15	335.15	1969	1969
7716111	6	48	6	1	377.00	377.00	1964	1964
7716203	6	47	6	1	380.00	380.00	1963	1963
7716205	6	45	7	1	384.00	384.00	1964	1964
7716206	6	47	8	1	393.00	393.00	1963	1963
7716404	6	49	6	1	322.00	322.00	1963	1963
7716602	6	49	11	1	380.00	380.00	1963	1963
7716703	6	51	7	1	350.00	350.00	1963	1963
7716803	6	51	9	1	355.00	355.00	1963	1963
7724301	6	53	12	1	348.85	348.85	1969	1969
7746803	6	88	2	1	438.13	438.13	1964	1964
7801805	6	40	14	1	397.00	397.00	1964	1964
7801904	6	41	17	1	393.00	393.00	1965	1965
7801906	6	42	17	1	373.00	373.00	1972	1972
7802301	6	34	24	1	433.00	433.00	1963	1963
7802707	6	39	20	1	392.00	392.00	1964	1964
7802902	6	39	24	1	420.00	420.00	1963	1963
7802904	6	38	23	1	396.00	396.00	1964	1964
7802908	6	39	23	1	380.00	380.00	1968	1968
7803306	6	30	29	1	420.00	420.00	1965	1965
7803705	6	38	27	1	395.00	395.00	1963	1963
7803706	6	39	27	1	430.00	430.00	1963	1963
7804613	6	33	37	1	365.00	365.00	1995	1995
7805201	6	28	42	1	390.60	390.60	1964	1964
7807604	5	28	61	1	314.75	314.75	1972	1972
7808701	6	28	63	1	368.00	368.00	1970	1970
7809102	6	46	12	1	409.00	409.00	1963	1963
7809504	6	46	15	1	367.00	367.00	1963	1963
7809803	6	49	16	1	353.00	353.00	1970	1970
7810103	6	42	19	1	373.55	373.55	1975	1975
7810201	6	41	22	1	360.71	360.71	1969	1969
7810302	6	42	25	1	354.09	354.09	1969	1969
7810902	6	47	25	1	332.88	332.88	1969	1969
7811103	6	42	28	1	475.00	475.00	1963	1963
7811305	6	40	31	1	400.19	400.19	1975	1975
7812501	6	42	38	1	365.50	365.50	1963	1963
7815505	6	36	60	1	403.40	403.40	1969	1969
7818702	6	57	23	1	382.20	382.20	1964	1964
7824801	4	44	70	1	158.73	158.73	1964	1964
7832201	4	48	71	1	150.30	150.30	1964	1964
7832302	4	46	73	1	122.37	122.37	1964	1964

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7832304	4	47	73	1	237.54	237.54	1980	1980
7832901	4	52	75	1	199.83	199.83	1964	1964
7839203	4	59	66	1	118.11	118.11	1992	1992
7839204	4	59	67	1	121.72	121.72	1992	1992
7839501	4	60	66	1	112.57	112.57	1992	1992
7839502	4	60	66	1	147.15	147.15	1992	1992
7839510	4	60	67	1	111.33	111.33	1992	1992
7839601	4	59	67	1	119.50	119.50	1992	1992
7840302	4	55	76	1	239.00	239.00	1979	1979
7840403	4	59	70	1	104.40	104.40	1992	1992
7902801	4	24	80	1	212.10	212.10	1963	1963
7906202	3	10	109	1	177.00	177.00	1981	1981
7912503	3	28	97	1	215.52	215.52	1963	1963
7914101	2	21	109	1	141.44	141.44	1963	1963
7914602	2	22	113	1	119.20	119.20	1963	1963
7918101	4	35	81	1	243.50	243.50	1963	1963
7919101	3	35	89	1	195.10	195.10	1985	1985
7923103	2	28	118	1	21.00	21.00	1975	1975
7923901	2	32	123	1	57.38	57.38	1980	1980
7925101	4	48	75	1	253.21	253.21	1964	1964
7925301	3	46	80	1	323.76	323.76	1964	1964
7925609	4	48	81	1	327.00	327.00	1966	1966
7925901	4	51	81	1	257.03	257.03	1964	1964
7926301	3	44	87	1	241.37	241.37	1964	1964
7926401	3	48	84	1	252.95	252.95	1964	1964
7927302	3	41	94	1	184.68	184.68	1963	1963
7927704	2	48	90	1	228.60	228.60	1964	1964
7928103	3	41	97	1	276.30	276.30	1991	1991
7928104	3	41	97	1	279.34	279.34	1991	1991
7928105	3	41	97	1	279.19	279.19	1991	1991
7928106	3	41	97	1	279.68	279.68	1991	1991
7928107	3	41	97	1	254.00	254.00	1991	1991
7931302	1	34	124	1	53.00	53.00	1999	1999
7934201	2	53	87	1	249.15	249.15	1964	1964
7934301	2	52	89	1	203.30	203.30	1964	1964
7934903	4	57	92	1	110.90	110.90	1992	1992
7935301	2	49	98	1	160.58	160.58	1964	1964
7935901	2	57	98	1	93.29	93.29	1963	1963
7938805	1	50	118	1	57.00	57.00	1979	1979
7943309	2	57	98	1	95.00	95.00	1973	1973
7943311	2	58	99	1	85.00	85.00	1971	1971
7943331	2	58	100	1	116.00	116.00	1974	1974
7943811	2	66	99	1	53.74	53.74	1993	1993

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
7943814	2	66	99	1	82.00	82.00	1972	1972
7943815	2	66	99	1	86.00	86.00	1972	1972
7950402	2	74	91	1	120.28	120.28	1980	1980
7950704	2	76	91	1	70.30	70.30	1965	1965
7950706	2	75	91	1	74.80	74.80	1965	1965
7950903	2	74	95	1	63.83	63.83	1965	1965
7950906	2	75	95	1	60.00	60.00	1965	1965
7950907	2	75	96	1	52.10	52.10	1965	1965
7951704	2	74	97	1	53.95	53.95	1965	1965
7951705	2	74	99	1	52.40	52.40	1965	1965
7951906	2	73	104	1	39.10	39.10	1964	1964
7958903	2	82	98	1	36.20	36.20	1965	1965
7959101	2	76	98	1	44.10	44.10	1965	1965
7959102	2	76	98	1	48.90	48.90	1965	1965
7959202	2	77	101	1	40.30	40.30	1965	1965
7959205	2	76	101	1	37.00	37.00	1964	1964
7959306	2	75	104	1	34.00	34.00	1965	1965
7959501	2	80	103	1	28.50	28.50	1965	1965
7959504	2	80	102	1	27.90	27.90	1965	1965
7959603	2	78	105	1	27.40	27.40	1965	1965
7959701	2	81	101	1	27.00	27.00	1965	1965
7960103	2	74	105	1	35.40	35.40	1965	1965
7960202	1	75	108	1	31.40	31.40	1965	1965
7962701	1	76	122	1	32.13	32.13	1980	1980
7963802	1	73	132	1	3.20	3.20	1967	1967
7963902	1	72	135	1	0.30	0.30	1967	1967
7964401	1	70	138	1	-0.90	-0.90	1967	1967
7964402	1	70	136	1	2.40	2.40	1967	1967
8002804	1	9	139	1	33.00	33.00	1995	1995
8003403	1	5	143	1	-17.59	-17.59	1981	1981
8013201	1	7	161	1	-17.50	-17.50	1964	1964
8014605	1	7	172	1	-38.47	-38.47	1966	1966
8014606	1	7	173	1	-43.76	-43.76	1966	1966
8014608	1	8	171	1	-47.09	-47.09	1966	1966
8015101	1	2	174	1	-5.02	-5.02	1966	1966
8015106	1	3	175	1	-32.44	-32.44	1966	1966
8015201	1	2	175	1	-32.83	-32.83	1966	1966
8015202	1	2	177	1	-30.93	-30.93	1966	1966
8015401	1	5	173	1	-37.50	-37.50	1966	1966
8022302	1	12	174	1	-51.36	-51.36	1966	1966
8023201	1	10	178	1	2.24	2.24	1966	1966
8024202	1	9	186	1	-8.95	-8.95	1966	1966
8041702	1	55	139	1	3.60	3.60	1966	1966

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8041801	1	52	141	1	-3.00	-3.00	1966	1966
8041901	1	52	146	1	-0.84	-0.84	1966	1966
8042106	1	47	146	1	4.00	4.00	1989	1989
8042403	1	51	146	1	5.50	5.50	1966	1966
8042502	1	49	150	1	4.00	4.00	1966	1966
8042505	1	48	150	1	-0.90	-0.90	1966	1966
8042506	1	49	149	1	12.40	12.40	1966	1966
8042704	1	51	146	1	3.30	3.30	1966	1966
8042803	1	50	150	1	6.20	6.20	1966	1966
8049401	1	60	141	1	-1.30	-1.30	1966	1966
8049801	1	62	145	1	3.90	3.90	1966	1966
8050101	1	54	148	1	6.70	6.70	1966	1966
8050102	1	54	148	1	1.90	1.90	1965	1965
8050103	1	54	147	1	7.60	7.60	1966	1966
8109505	1	1	192	1	8.58	8.58	1965	1965
8109601	1	1	193	1	8.30	8.30	1966	1966
8117403	1	10	192	1	3.74	3.74	1966	1966
8301902	2	93	93	1	30.10	30.10	1965	1965
8302203	2	86	97	1	20.91	20.91	1964	1964
8303201	2	85	103	1	16.58	16.58	1965	1965
8303702	2	90	102	1	17.20	17.20	1965	1965
8304201	1	81	109	1	17.43	17.43	1965	1965
8304203	1	82	111	1	16.74	16.74	1965	1965
8307808	1	83	134	1	3.26	3.26	1967	1967
8309501	2	100	93	1	36.20	36.20	1965	1965
8309602	2	100	94	1	12.00	12.00	1965	1965
8310304	1	94	102	1	13.70	13.70	1965	1965
8310401	2	99	96	1	25.10	25.10	1965	1965
8310604	2	96	102	1	14.90	14.90	1965	1965
8311102	1	92	102	1	14.30	14.30	1965	1965
8311204	1	93	106	1	18.70	18.70	1965	1965
8311402	1	95	104	1	16.50	16.50	1965	1965
8311602	1	95	110	1	12.80	12.80	1965	1965
8311702	1	98	105	1	19.40	19.40	1965	1965
8311901	1	98	110	1	14.00	14.00	1965	1965
8317303	2	105	95	1	-18.60	-18.60	1965	1965
8317503	2	108	94	1	-56.80	-56.80	1965	1965
8317504	2	106	94	1	-42.30	-42.30	1965	1965
8318401	2	105	98	1	-29.70	-29.70	1965	1965
8318403	2	108	98	1	-34.40	-34.40	1965	1965
8318501	2	105	100	1	-45.00	-45.00	1965	1965
8319204	1	100	108	1	16.20	16.20	1965	1965
8319205	1	101	109	1	21.50	21.50	1965	1965

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8319301	1	100	110	1	17.50	17.50	1965	1965
8320501	1	102	117	1	15.20	15.20	1965	1965
8320602	1	102	119	1	14.60	14.60	1965	1965
8320801	1	104	115	1	7.20	7.20	1965	1965
8320902	1	104	119	1	15.10	15.10	1965	1965
8321701	1	102	121	1	-2.50	-2.50	1965	1965
8325902	2	117	99	1	-182.66	-182.66	1984	1984
8326303	2	111	106	1	-93.50	-93.50	1965	1965
8327603	2	111	112	1	-47.20	-47.20	1965	1965
8328201	1	108	117	1	-27.80	-27.80	1965	1965
8328202	1	108	117	1	11.00	11.00	1965	1965
8328302	2	106	121	1	15.70	15.70	1965	1965
8328501	1	109	118	1	-1.20	-1.20	1965	1965
8329101	2	106	123	1	14.00	14.00	1965	1965
8329102	2	106	122	1	11.70	11.70	1965	1965
8329202	2	107	124	1	14.40	14.40	1966	1966
8329301	1	106	127	1	5.50	5.50	1965	1965
8329303	1	104	127	1	-1.30	-1.30	1965	1965
8330101	1	104	129	1	-2.70	-2.70	1965	1965
8330102	1	104	130	1	0.10	0.10	1965	1965
8330103	1	103	130	1	-0.70	-0.70	1965	1965
8330201	1	105	132	1	7.30	7.30	1965	1965
8330202	1	103	132	1	1.50	1.50	1965	1965
8330203	1	103	131	1	12.20	12.20	1965	1965
8330401	1	106	130	1	-14.30	-14.30	1965	1965
8343703	2	133	112	1	-6.30	-6.30	1968	1968
8343901	2	132	117	1	-6.50	-6.50	1968	1968
8350602	2	139	112	1	7.60	7.60	1968	1968
8350801	2	142	110	1	6.70	6.70	1968	1968
8350802	2	140	111	1	17.80	17.80	1968	1968
8351101	2	134	115	1	2.10	2.10	1968	1968
8351102	2	136	114	1	1.50	1.50	1968	1968
8351201	2	133	115	1	-16.20	-16.20	1968	1968
8351301	2	135	118	1	9.50	9.50	1968	1968
8351401	2	139	115	1	6.10	6.10	1968	1968
8351501	2	136	117	1	12.20	12.20	1968	1968
8357501	2	150	105	1	19.50	19.50	1968	1968
8357801	2	153	106	1	32.40	32.40	1968	1968
8358301	2	144	113	1	10.42	10.42	1980	1980
8358701	2	152	109	1	28.20	28.20	1968	1968
8358702	2	151	111	1	19.50	19.50	1968	1968
8358703	2	149	109	1	16.60	16.60	1968	1968
8358801	2	152	111	1	31.70	31.70	1968	1968

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8359701	2	148	116	1	24.40	24.40	1969	1969
8359901	2	147	121	1	23.30	23.30	1969	1969
8359902	2	147	121	1	18.20	18.20	1969	1969
8403902	5	104	49	1	454.30	454.30	1970	1970
8404102	5	99	49	1	363.40	363.40	1970	1970
8404707	5	104	51	1	480.10	480.10	1980	1980
8412106	5	106	50	1	484.00	484.00	1994	1994
8412703	5	112	52	1	328.00	328.00	1969	1969
8420202	4	113	56	1	502.40	502.40	1970	1970
8420303	4	113	57	1	399.70	399.70	1970	1970
8421402	4	116	60	1	395.10	395.10	1970	1970
8421403	4	115	61	1	383.70	383.70	1970	1970
8421701	4	117	61	1	397.30	397.30	1970	1970
8421702	2	117	62	1	392.50	392.50	1970	1970
8421703	4	117	62	1	398.20	398.20	1970	1970
8423105	2	109	75	1	195.00	195.00	1987	1987
8425702	5	134	35	1	605.80	605.80	1989	1989
8430603	2	122	75	1	162.80	162.80	1970	1970
8430701	2	125	71	1	245.70	245.70	1969	1969
8430702	2	126	72	1	249.50	249.50	1969	1969
8433201	5	137	36	1	673.00	673.00	1989	1989
8433202	5	137	37	1	807.60	807.60	1989	1989
8433204	5	137	37	1	602.00	602.00	1995	1995
8434401	4	138	44	1	694.80	694.80	1989	1989
8434405	4	138	44	1	698.15	698.15	1989	1989
8434406	4	138	44	1	699.00	699.00	1989	1989
8434407	4	138	44	1	720.00	720.00	1977	1977
8434410	4	136	44	1	687.80	687.80	1989	1989
8434411	4	137	44	1	696.70	696.70	1989	1989
8434501	4	137	44	1	683.70	683.70	1989	1989
8434802	4	139	45	1	708.70	708.70	1989	1989
8436101	2	132	58	1	330.50	330.50	1969	1969
8436201	2	131	59	1	328.30	328.30	1969	1969
8436602	2	133	64	1	310.00	310.00	1969	1969
8436603	2	133	63	1	317.00	317.00	1969	1969
8436604	2	134	64	1	325.30	325.30	1969	1969
8436701	2	138	59	1	356.20	356.20	1969	1969
8436702	3	137	58	1	329.70	329.70	1969	1969
8436703	2	136	59	1	328.90	328.90	1969	1969
8436801	2	136	60	1	328.10	328.10	1969	1969
8436802	2	136	61	1	410.00	410.00	1969	1969
8437104	2	131	64	1	318.00	318.00	1969	1969
8437206	2	130	67	1	311.60	311.60	1969	1969

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8437303	2	127	71	1	255.50	255.50	1969	1969
8437304	2	128	71	1	262.80	262.80	1969	1969
8437305	2	129	70	1	260.00	260.00	1969	1969
8437306	2	129	70	1	269.20	269.20	1969	1969
8437403	2	131	65	1	311.50	311.50	1969	1969
8437404	2	133	65	1	343.00	343.00	1969	1969
8437502	2	132	68	1	301.40	301.40	1969	1969
8437503	2	132	67	1	309.50	309.50	1969	1969
8437504	2	131	68	1	302.00	302.00	1969	1969
8437505	2	131	67	1	312.10	312.10	1969	1969
8437703	2	134	66	1	347.50	347.50	1969	1969
8437706	2	134	66	1	333.10	333.10	1969	1969
8437802	2	135	69	1	333.30	333.30	1969	1969
8437902	2	135	71	1	299.60	299.60	1969	1969
8437903	2	135	72	1	273.70	273.70	1969	1969
8437904	2	135	73	1	275.80	275.80	1969	1969
8438101	2	127	71	1	245.30	245.30	1969	1969
8438102	2	127	73	1	236.00	236.00	1969	1969
8438103	2	129	73	1	219.90	219.90	1969	1969
8438105	2	128	72	1	249.60	249.60	1969	1969
8438201	2	128	75	1	226.10	226.10	1969	1969
8438202	2	126	75	1	216.80	216.80	1969	1969
8438403	2	130	72	1	252.60	252.60	1969	1969
8438501	2	130	76	1	170.40	170.40	1969	1969
8438502	2	129	76	1	212.20	212.20	1969	1969
8438602	2	130	79	1	183.90	183.90	1969	1969
8438603	2	129	78	1	131.40	131.40	1969	1969
8438604	2	129	78	1	133.10	133.10	1969	1969
8438802	2	134	77	1	164.40	164.40	1969	1969
8438804	2	133	77	1	206.40	206.40	1969	1969
8438807	2	131	77	1	162.30	162.30	1969	1969
8438904	2	133	79	1	115.80	115.80	1969	1969
8438910	2	132	79	1	187.80	187.80	1969	1969
8440103	2	123	87	1	54.30	54.30	1980	1980
8444103	2	141	59	1	340.70	340.70	1969	1969
8445106	2	139	68	1	312.80	312.80	1969	1969
8445201	2	138	69	1	321.10	321.10	1969	1969
8445202	2	137	70	1	316.00	316.00	1969	1969
8445309	2	138	71	1	313.00	313.00	1969	1969
8445310	2	136	73	1	273.90	273.90	1969	1969
8445403	2	141	68	1	312.30	312.30	1969	1969
8445404	2	142	68	1	352.30	352.30	1969	1969
8445504	2	141	69	1	338.70	338.70	1969	1969

State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8445505	2	140	71	1	278.60	278.60	1969	1969
8445601	2	140	73	1	298.50	298.50	1969	1969
8445602	2	140	72	1	301.20	301.20	1969	1969
8445703	2	143	68	1	362.20	362.20	1969	1969
8445903	2	141	73	1	274.50	274.50	1969	1969
8445905	2	141	74	1	268.40	268.40	1969	1969
8446202	2	135	76	1	174.50	174.50	1969	1969
8446301	2	135	79	1	166.20	166.20	1969	1969
8446304	2	135	78	1	196.00	196.00	1969	1969
8446401	2	138	75	1	178.20	178.20	1969	1969
8446402	2	138	75	1	252.96	252.96	1967	1967
8446405	2	138	75	1	245.80	245.80	1969	1969
8446407	2	138	76	1	164.70	164.70	1969	1969
8446504	2	138	77	1	223.60	223.60	1969	1969
8446703	2	141	74	1	265.50	265.50	1969	1969
8446803	2	140	79	1	118.40	118.40	1969	1969
8446903	2	140	80	1	108.30	108.30	1969	1969
8447105	2	135	83	1	56.30	56.30	1968	1968
8447308	2	133	87	1	6.00	6.00	1968	1968
8447309	2	133	87	1	5.50	5.50	1968	1968
8447403	2	136	83	1	65.30	65.30	1968	1968
8447405	2	136	82	1	68.90	68.90	1968	1968
8447406	2	137	82	1	76.20	76.20	1968	1968
8447610	2	134	88	1	3.70	3.70	1968	1968
8447611	2	134	86	1	18.50	18.50	1968	1968
8447803	2	140	85	1	48.10	48.10	1968	1968
8447906	2	138	89	1	-8.50	-8.50	1968	1968
8447907	2	138	89	1	-0.70	-0.70	1968	1968
8448107	2	133	89	1	-0.70	-0.70	1980	1980
8448601	2	135	94	1	-10.50	-10.50	1968	1968
8448602	2	134	95	1	-17.90	-17.90	1968	1968
8448709	2	136	91	1	-7.60	-7.60	1968	1968
8448803	2	138	93	1	-0.20	-0.20	1968	1968
8455304	2	140	89	1	20.00	20.00	1965	1965
8464401	2	152	94	1	57.20	57.20	1965	1965
8464602	2	152	98	1	29.80	29.80	1965	1965
8521801	6	131	4	1	480.00	480.00	1989	1989
8528301	6	137	2	1	406.30	406.30	1996	1996
8528302	6	137	1	1	404.20	404.20	1997	1997
8529401	6	139	3	1	396.90	396.90	1996	1996
8529402	6	137	3	1	404.00	404.00	1975	1975
8529708	6	142	5	1	407.08	407.08	1996	1996
8529709	6	141	4	1	372.00	372.00	1996	1996

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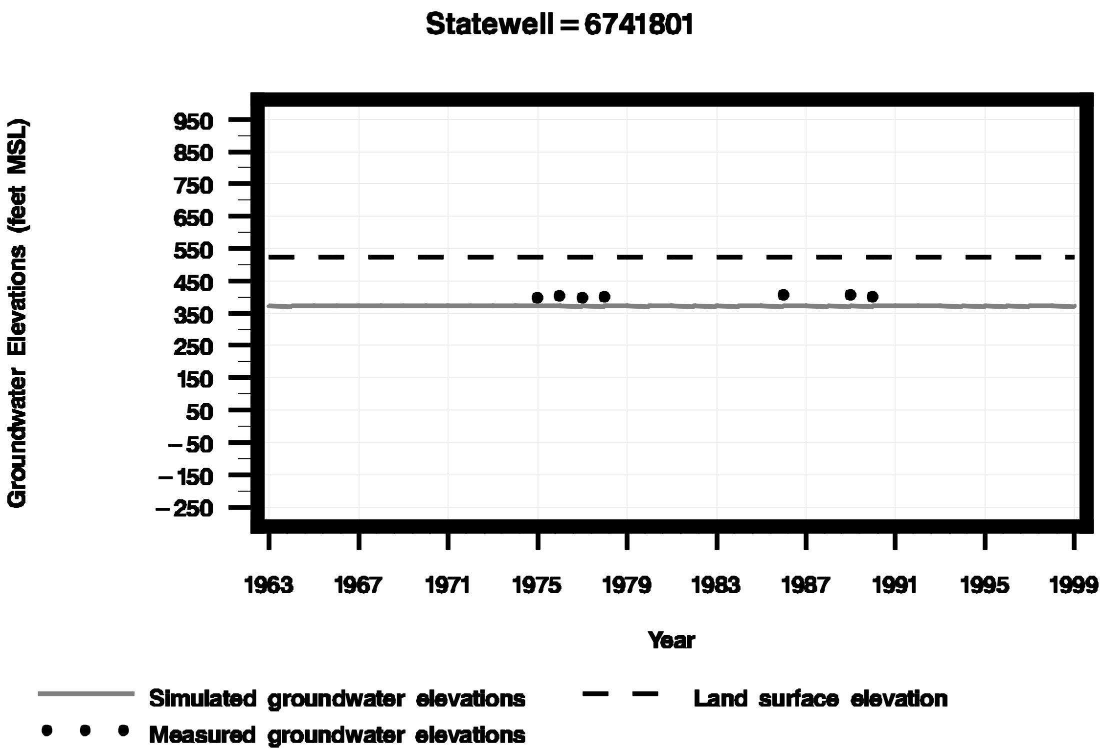
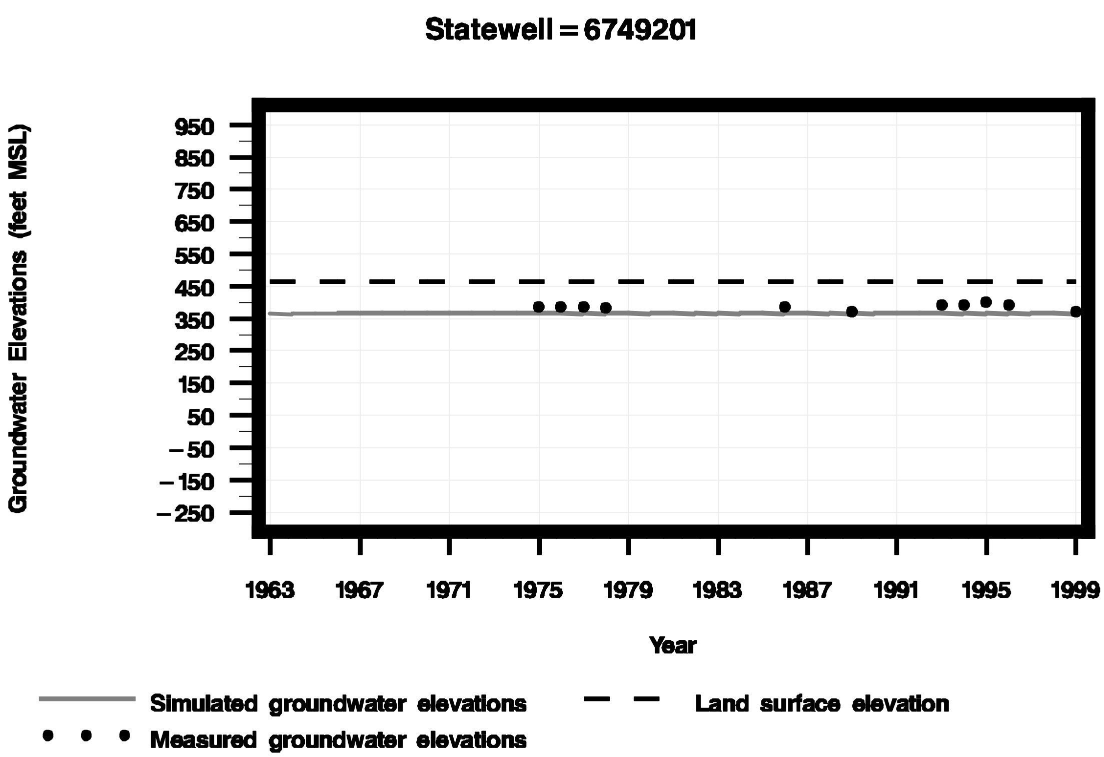
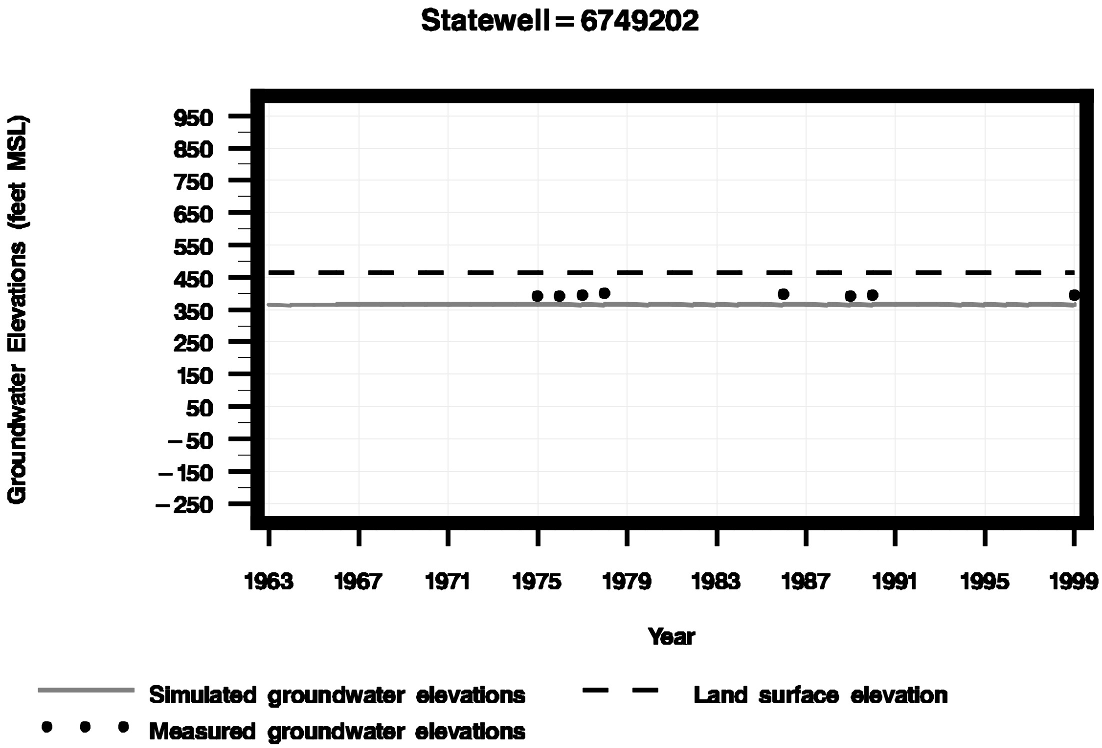
8529804	6	140	7	1	377.20	377.20	1996	1996
8616404	5	184	38	1	295.00	295.00	1978	1978
8624502	5	192	43	1	245.30	245.30	1971	1971
8640502	5	209	46	1	202.52	202.52	1967	1967
8705301	2	163	78	1	228.90	228.90	1965	1965
8706401	2	164	82	1	186.20	186.20	1965	1965
8706402	2	164	82	1	175.50	175.50	1965	1965
8706701	2	166	83	1	199.20	199.20	1965	1965
8706802	2	167	84	1	218.00	218.00	1965	1965
8707702	2	165	90	1	118.08	118.08	1967	1967
8708103	2	157	95	1	83.90	83.90	1965	1965
8708202	2	158	98	1	71.80	71.80	1965	1965
8708203	2	158	99	1	59.80	59.80	1965	1965
8708302	2	155	101	1	37.40	37.40	1965	1965
8708501	2	160	99	1	62.00	62.00	1965	1965
8708801	2	161	100	1	40.40	40.40	1965	1965
8714101	2	168	82	1	173.30	173.30	1965	1965
8714602	2	170	88	1	122.80	122.80	1965	1965
8714603	2	172	88	1	109.10	109.10	1965	1965
8720703	2	187	72	1	257.29	257.29	1994	1994
8721211	3	179	79	1	186.00	186.00	1987	1987
8721304	3	180	82	1	182.54	182.54	1980	1980
8728705	2	195	74	1	199.00	199.00	1995	1995
8731501	2	185	99	1	50.28	50.28	1967	1967
8731801	2	188	99	1	53.45	53.45	1967	1967
8731904	2	188	100	1	45.98	45.98	1967	1967
8731906	2	188	101	1	49.78	49.78	1967	1967
8753204	2	212	89	1	144.02	144.02	1967	1967
8753205	2	212	87	1	105.00	105.00	1995	1995
8753302	2	213	91	1	90.50	90.50	1998	1998
8753606	2	213	91	1	99.00	99.00	1998	1998
8753608	2	213	91	1	88.60	88.60	1998	1998
8753610	2	214	91	1	92.90	92.90	1999	1999
8754101	2	211	93	1	124.02	124.02	1967	1967
8754201	2	212	95	1	114.51	114.51	1967	1967
8754301	2	210	97	1	113.02	113.02	1967	1967
8754820	1	217	98	1	83.96	83.96	1967	1967
8754921	1	215	100	1	90.40	90.40	1967	1967
8755405	2	213	102	1	84.00	84.00	1999	1999
8763102	1	217	104	1	87.22	87.22	1967	1967
8763301	1	215	107	1	77.92	77.92	1967	1967
8763604	1	218	108	1	58.00	58.00	1979	1979
8801401	2	158	105	1	40.10	40.10	1969	1969

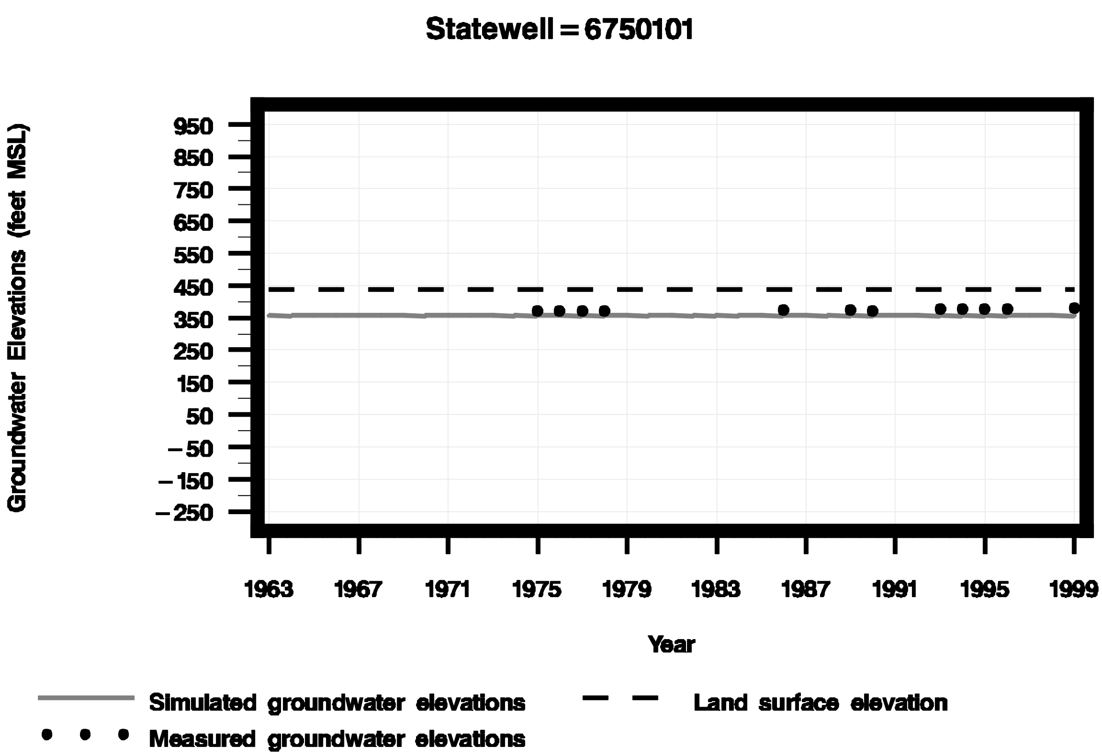
State Well Number	Model Layer	Model Row	Model Column	Number of Measurements	Highest Groundwater Elevation (feet MSL)	Lowest Groundwater Elevation (feet MSL)	Year of Earliest Measurement	Year of Latest Measurement
8801403	2	157	103	1	33.30	33.30	1969	1969
8801601	2	158	109	1	-0.30	-0.30	1969	1969
8801602	2	157	108	1	26.50	26.50	1969	1969
8802102	2	154	110	1	24.50	24.50	1968	1968
8802202	2	152	113	1	22.40	22.40	1968	1968
8802402	2	156	111	1	28.78	28.78	1983	1983
8803402	1	155	120	1	7.60	7.60	1969	1969
8803501	1	154	121	1	13.70	13.70	1969	1969
8803901	2	157	124	1	13.60	13.60	1969	1969
8804701	2	155	126	1	13.80	13.80	1969	1969
8817201	2	171	109	1	39.00	39.00	1969	1969
8817401	2	176	109	1	42.90	42.90	1969	1969
8834502	1	188	122	1	30.00	30.00	1997	1997
8842601	2	198	126	1	38.10	38.10	1980	1980
8850301	1	202	127	1	36.52	36.52	1980	1980
8855801	1	199	166	1	-5.00	-5.00	1996	1996
8855802	1	199	166	1	-5.00	-5.00	1996	1996
8857102	1	214	119	1	39.00	39.00	1980	1980
8857110	1	215	118	1	43.00	43.00	1986	1986
8857112	1	214	119	1	33.00	33.00	1998	1998
8857206	1	214	120	1	35.00	35.00	1990	1990
8857304	1	212	123	1	36.00	36.00	1996	1996
8858206	1	212	129	1	33.00	33.00	1998	1998
8858404	1	213	127	1	46.00	46.00	1969	1969
8859902	1	213	140	1	23.00	23.00	1970	1970
8859909	1	214	141	1	28.00	28.00	1969	1969
8859917	1	213	139	1	20.00	20.00	1984	1984
8860407	1	210	142	1	20.00	20.00	1996	1996
8860408	1	210	142	1	20.00	20.00	1999	1999
8860811	1	211	145	1	20.00	20.00	1998	1998
8863301	1	201	167	1	-5.00	-5.00	1996	1996
8904107	1	216	143	1	23.00	23.00	1968	1968

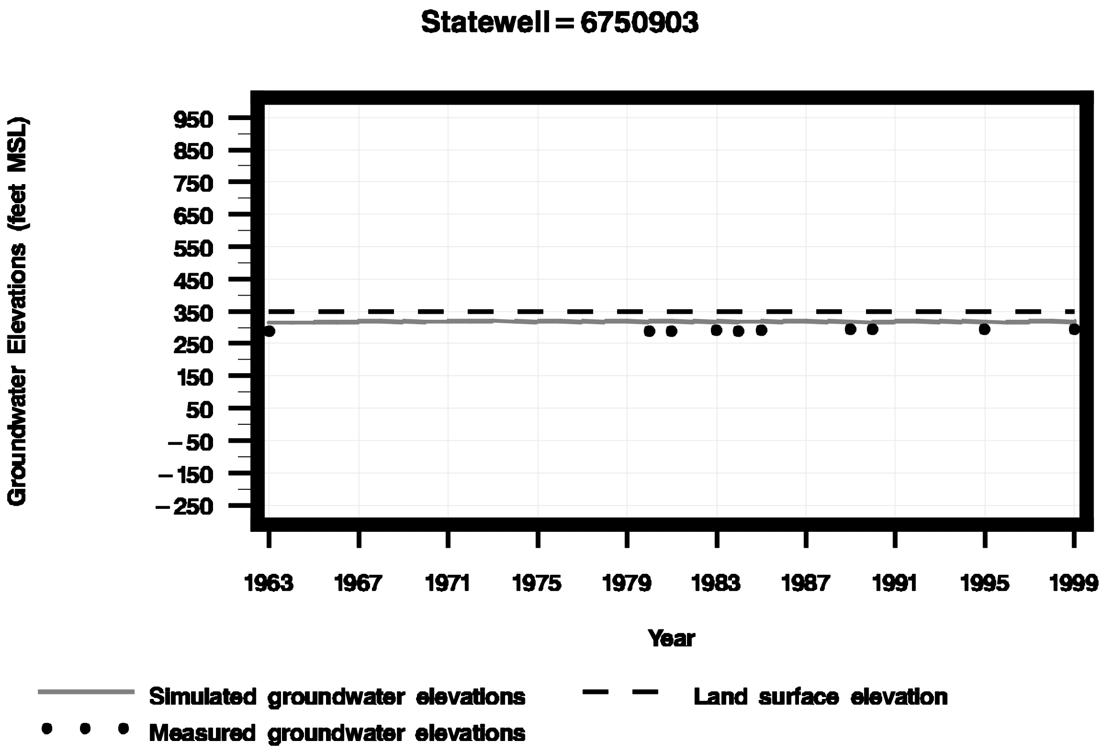
APPENDIX B: Hydrographs for Target Wells (with 5 or more measurements)

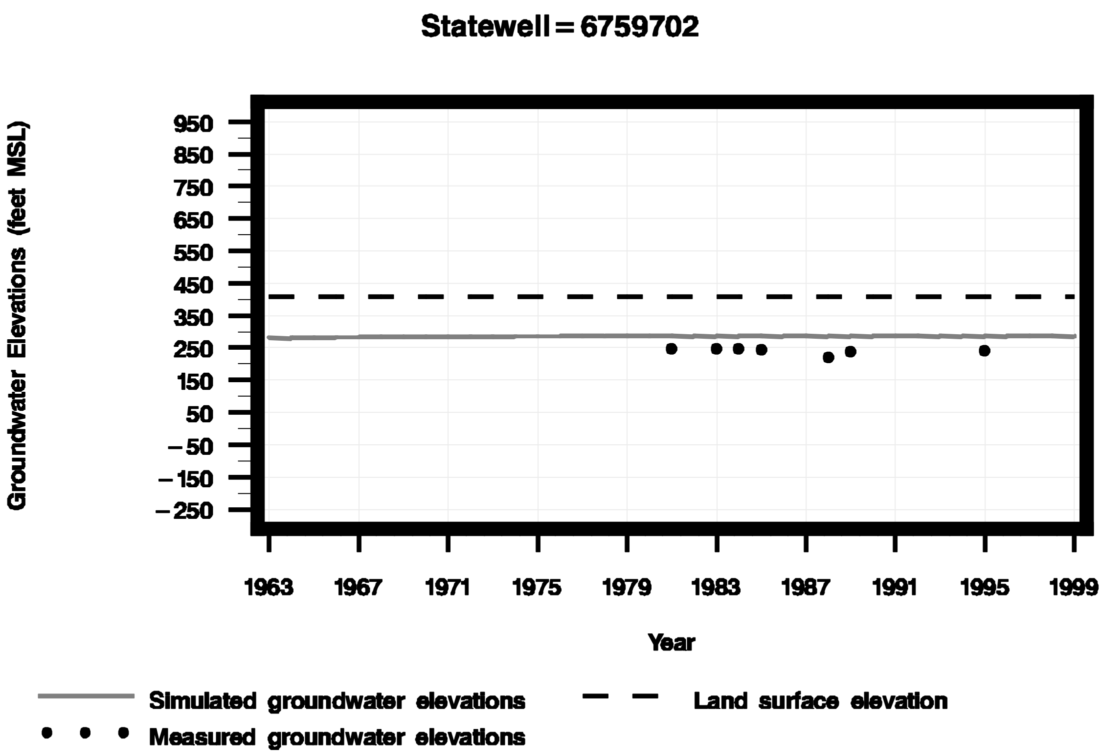

Statewell = 6741801
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6749201
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

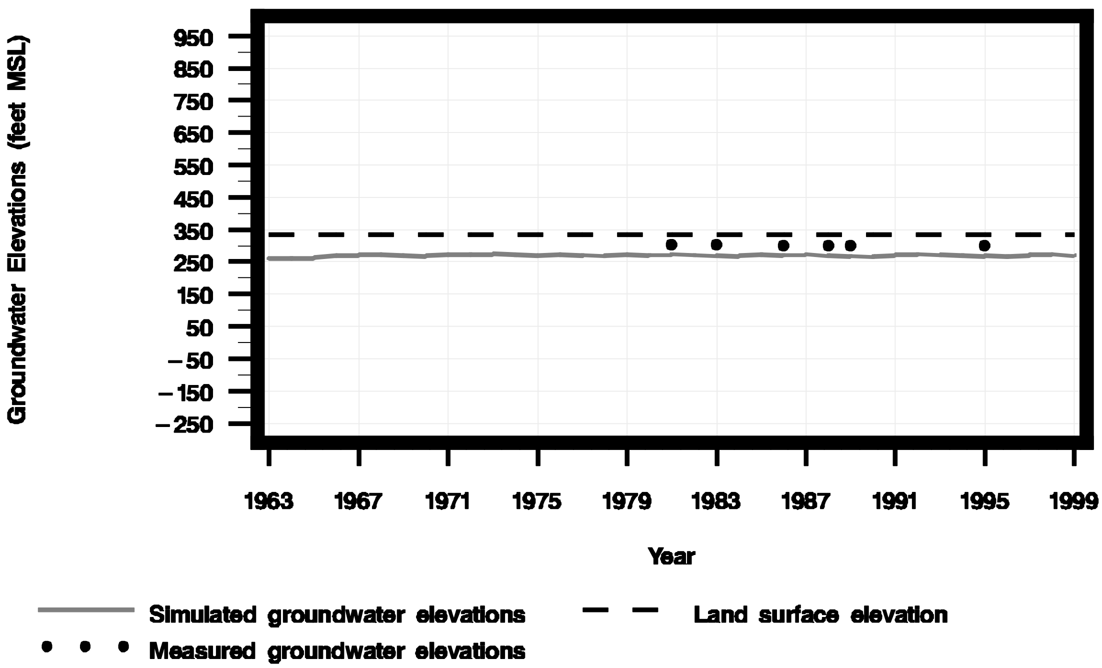

Statewell = 6749202
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6750101
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

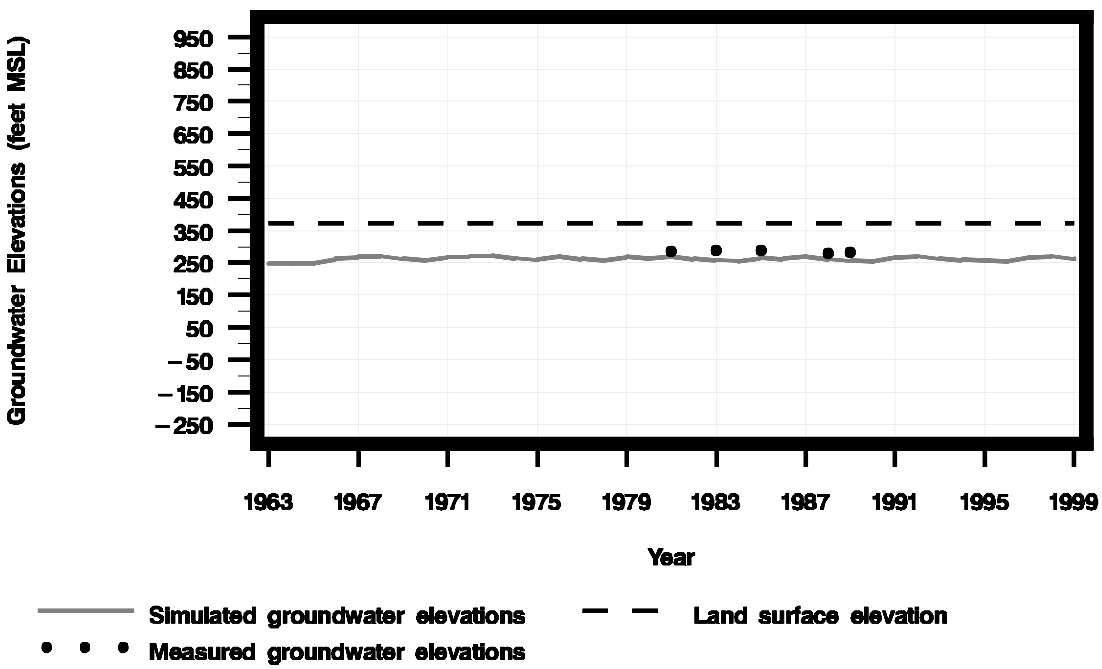

Statewell = 6750903
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

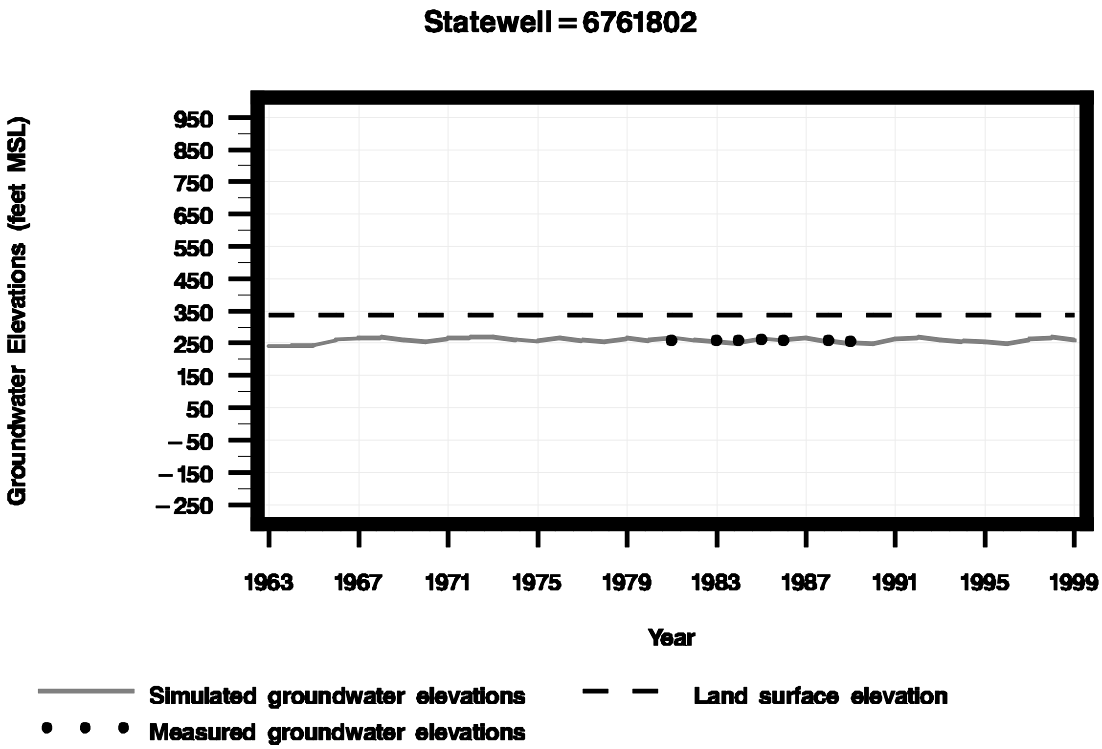

Statewell = 6759702
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

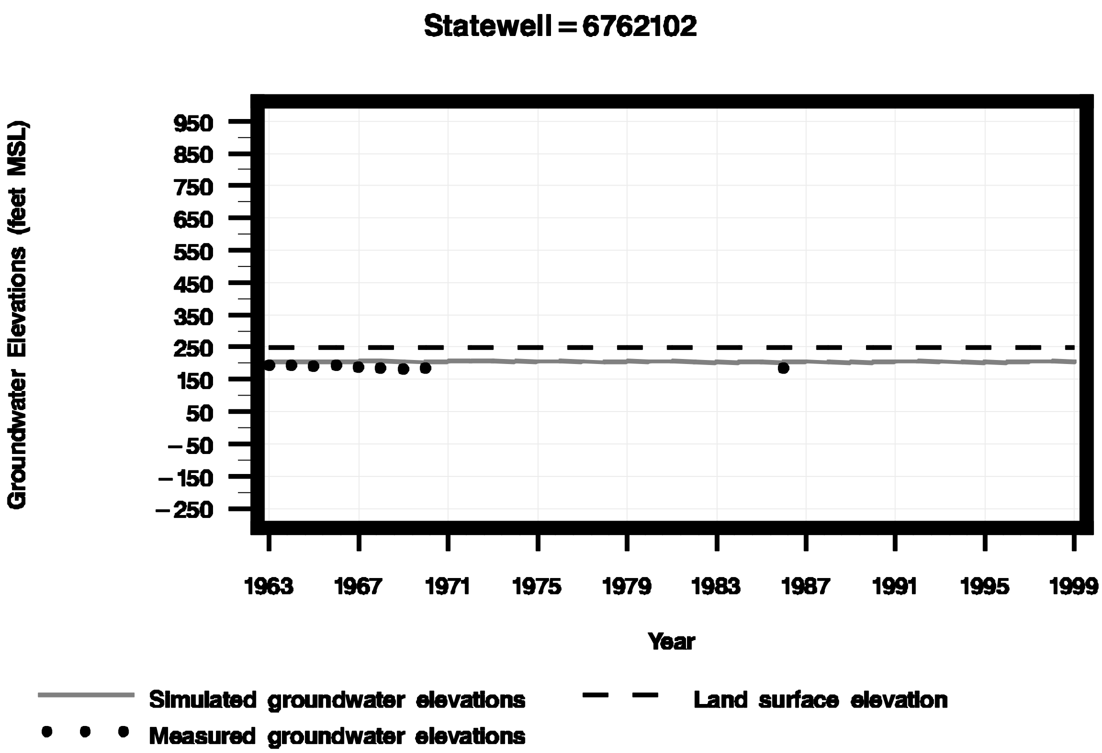
Statewell = 6760903

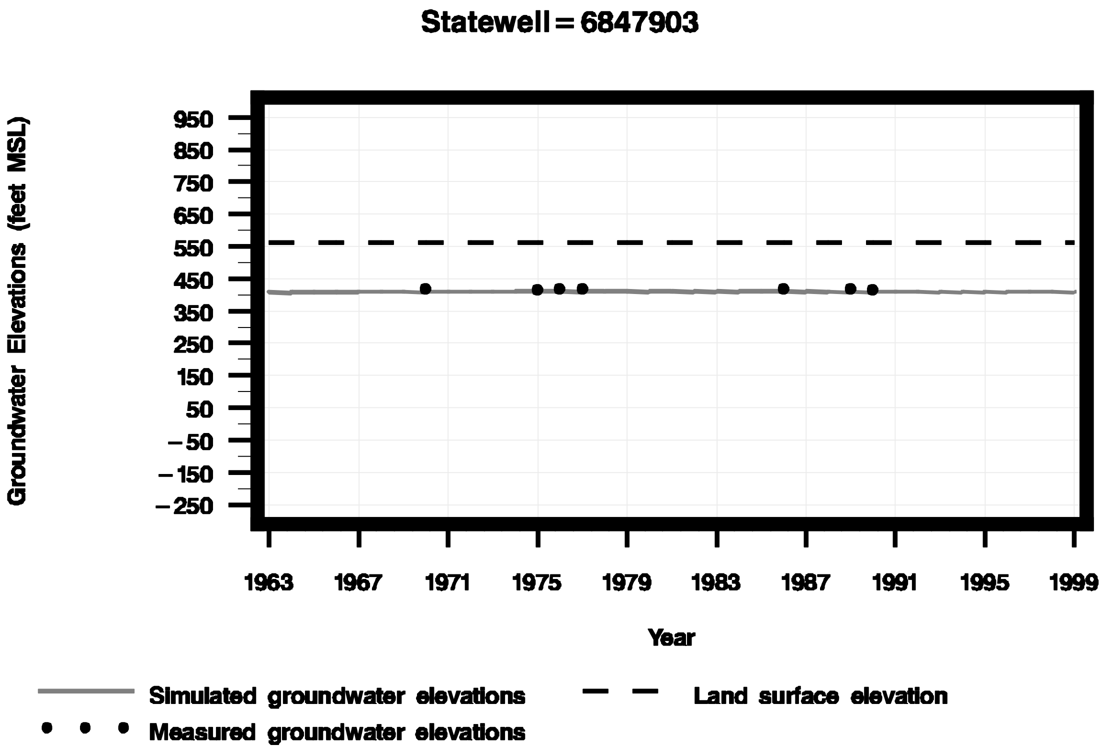


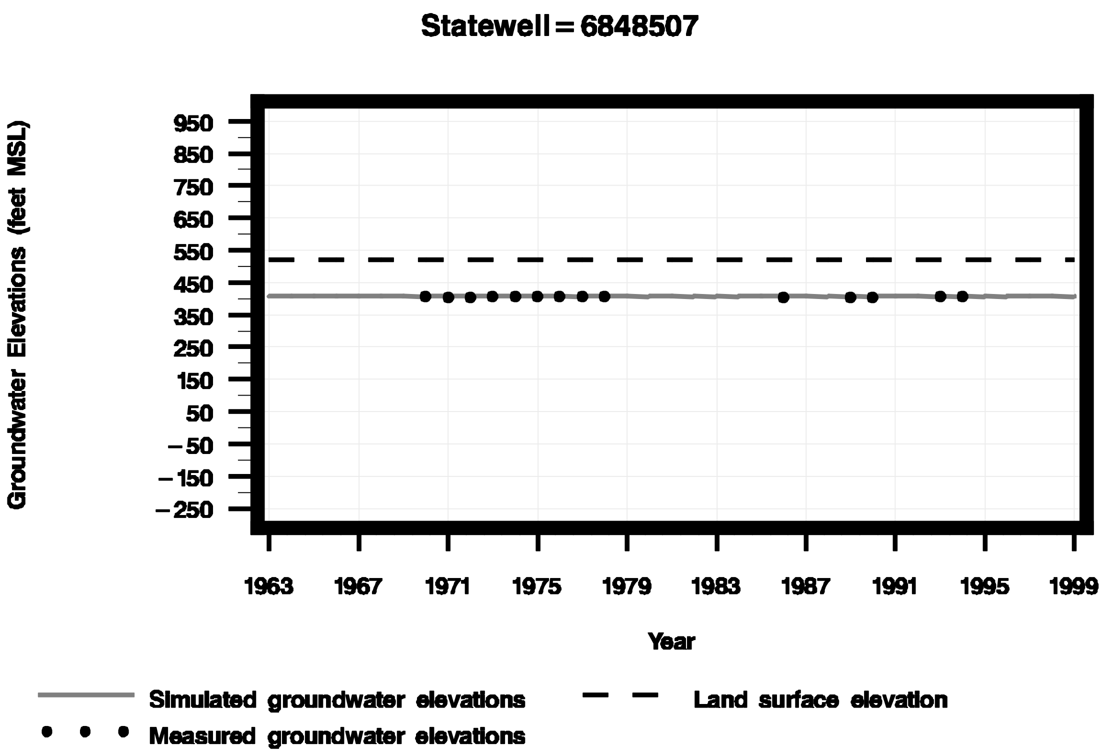
Statewell = 6761402




Statewell = 6761802
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6762102
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6847903
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6848507
Groundwater Elevations (feet MSL)
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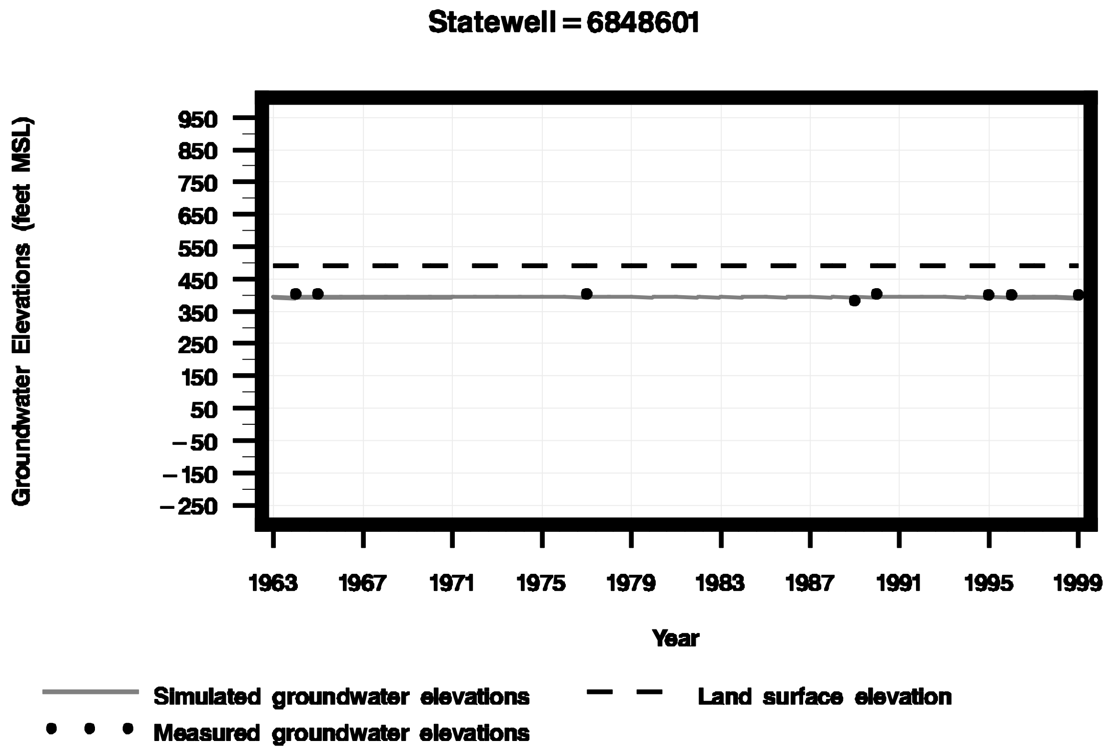
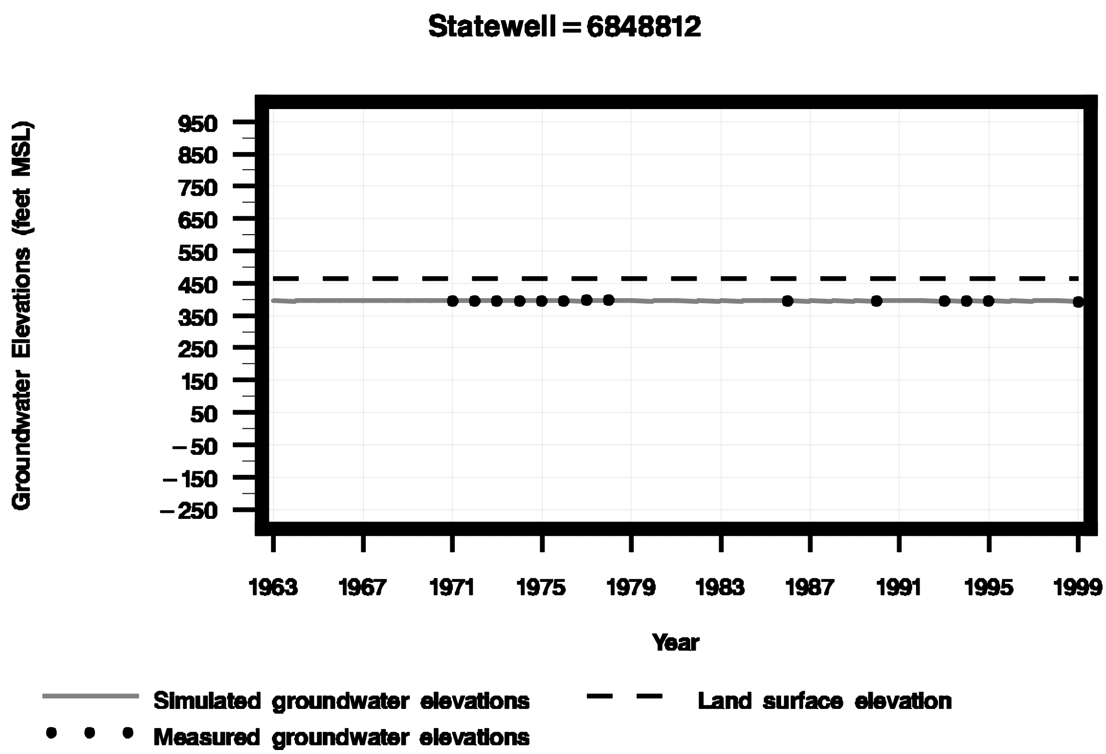
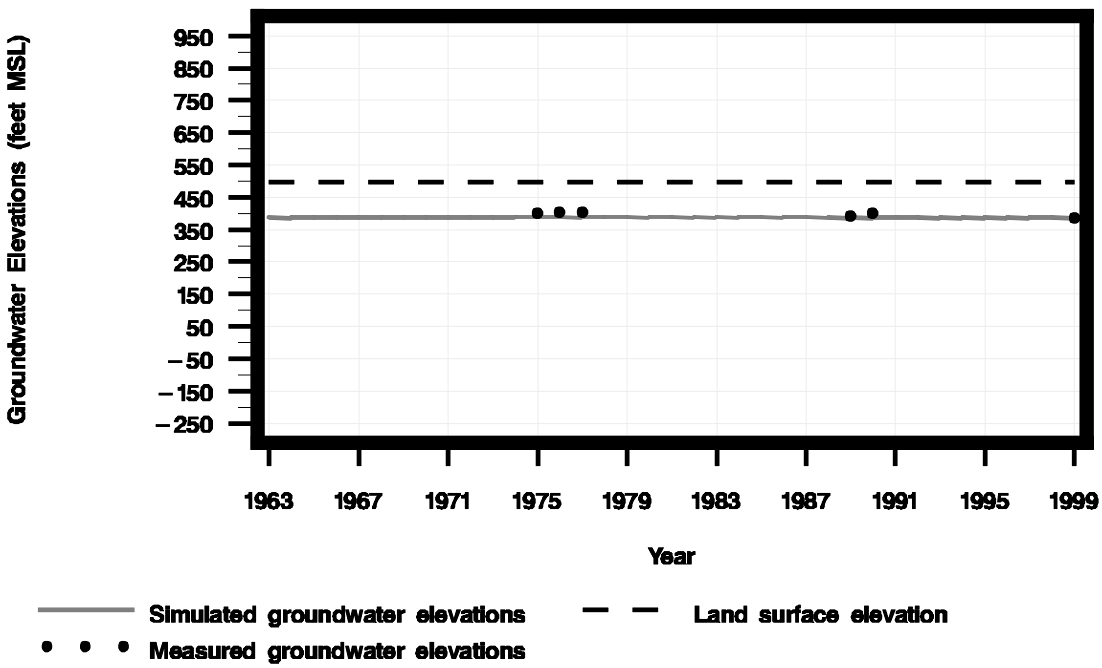
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

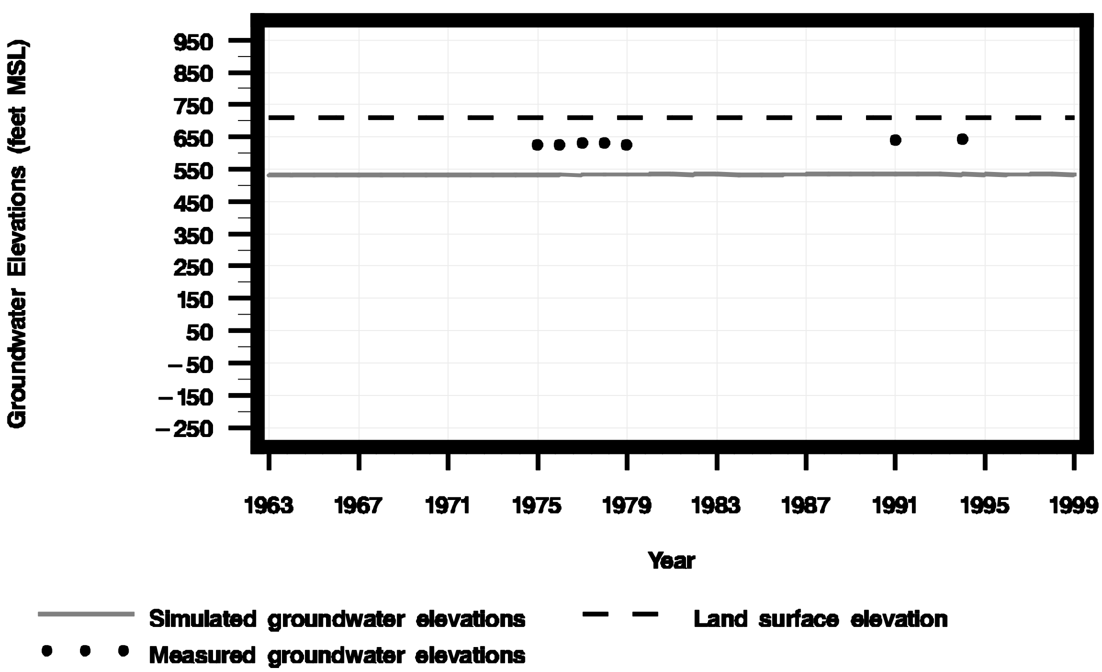

Statewell = 6848601
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

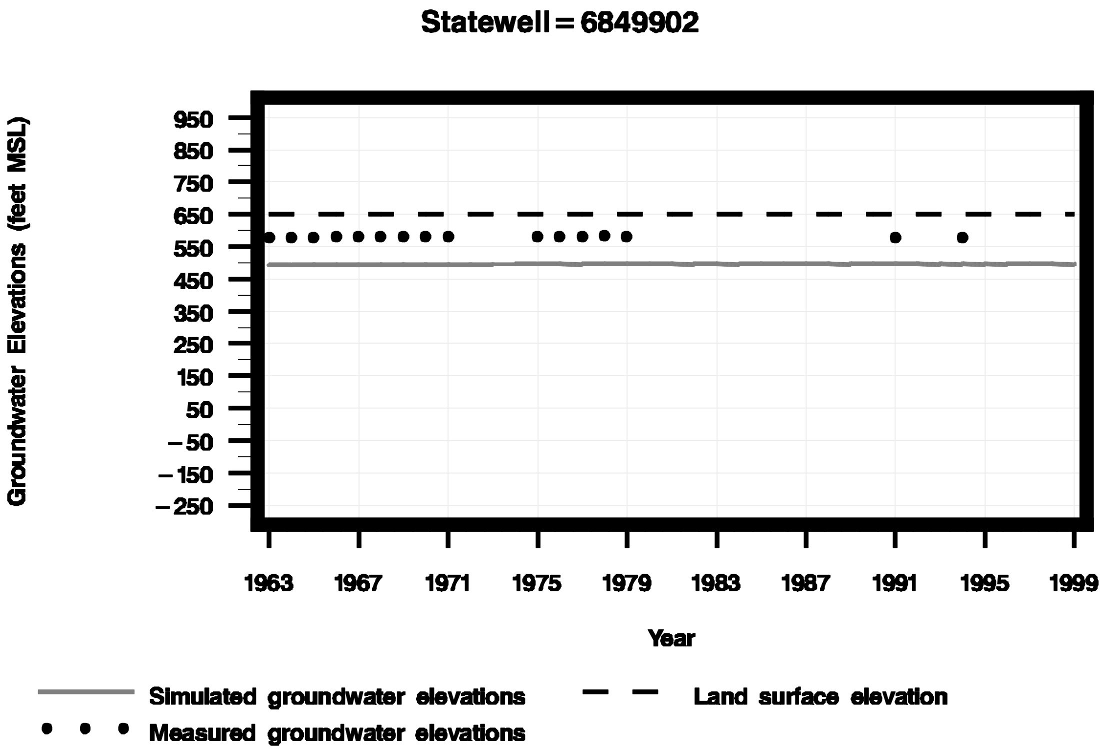

Statewell = 6848812
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

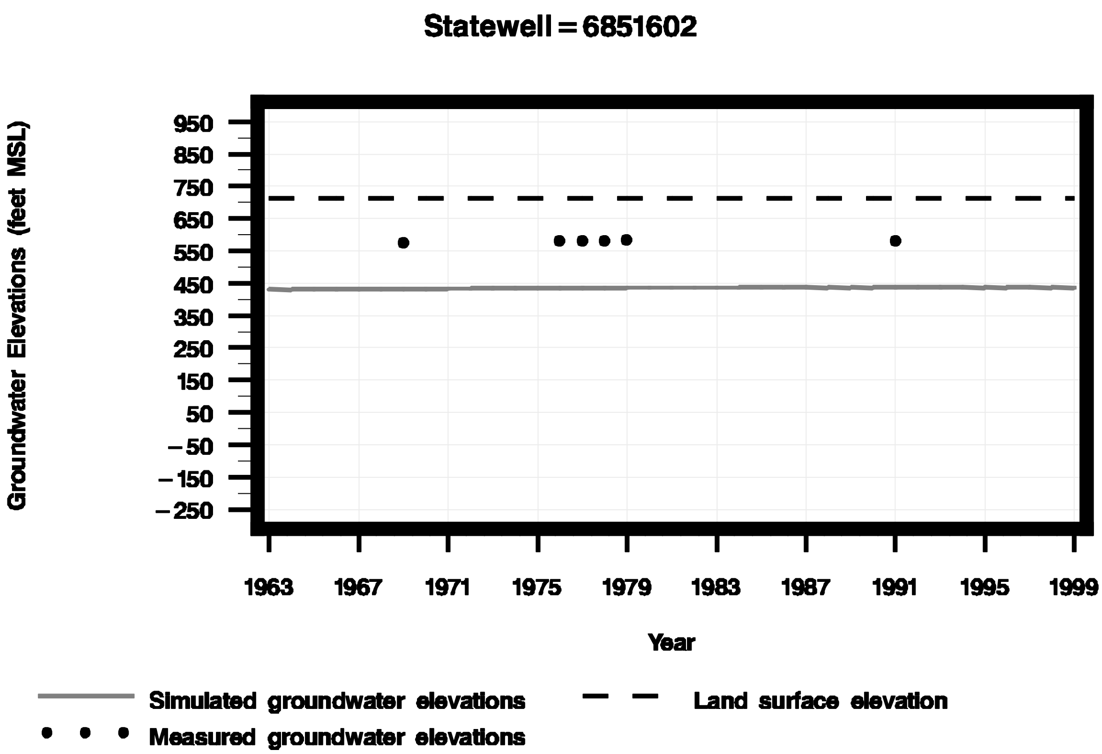
Statewell = 6848907



Statewell = 6849808




Statewell = 6849902
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6851602
Groundwater Elevations (feet MSL)
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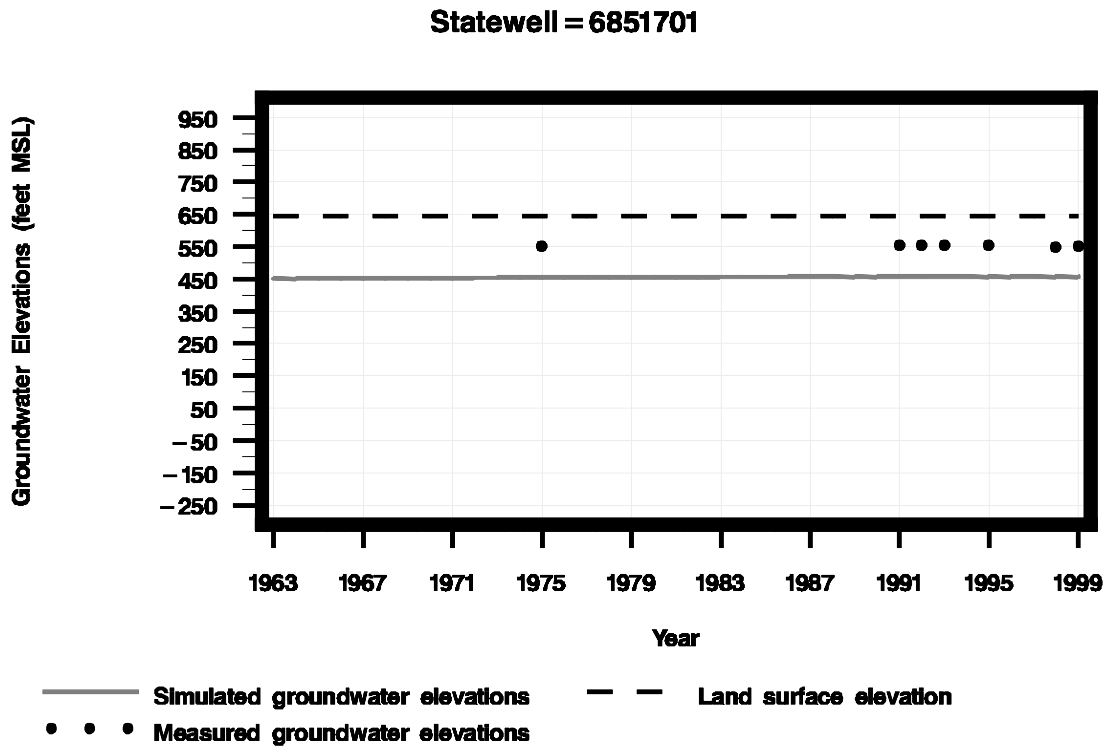
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6851701
Groundwater Elevations (feet MSL)
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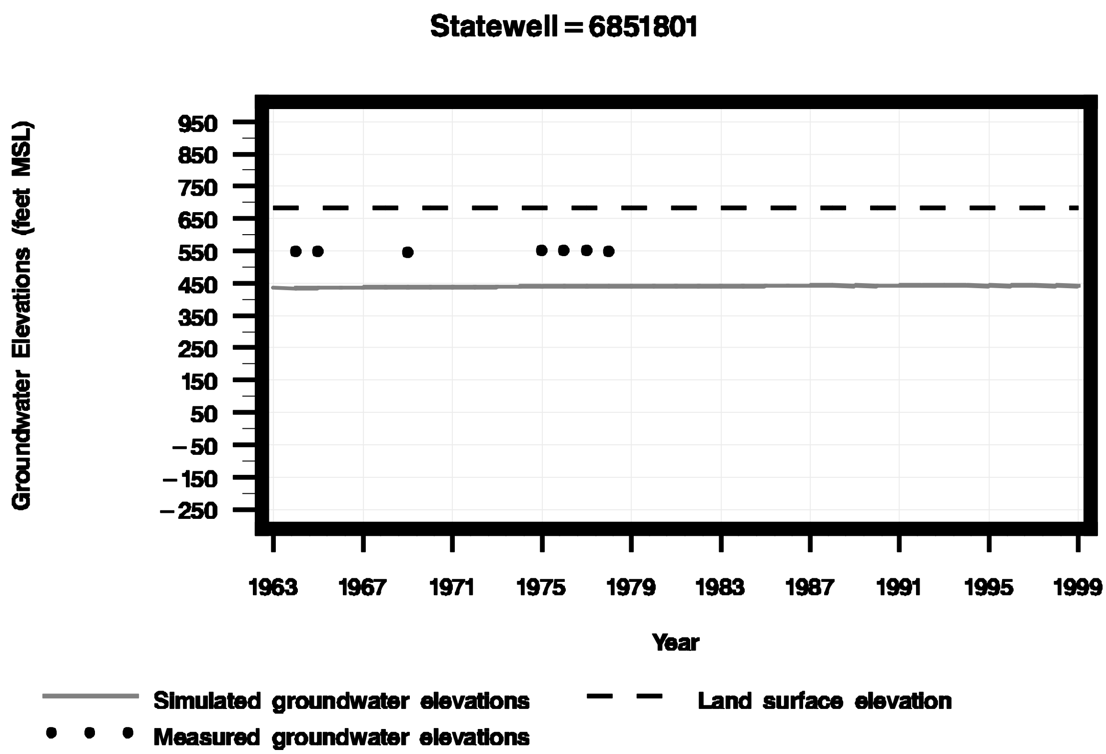
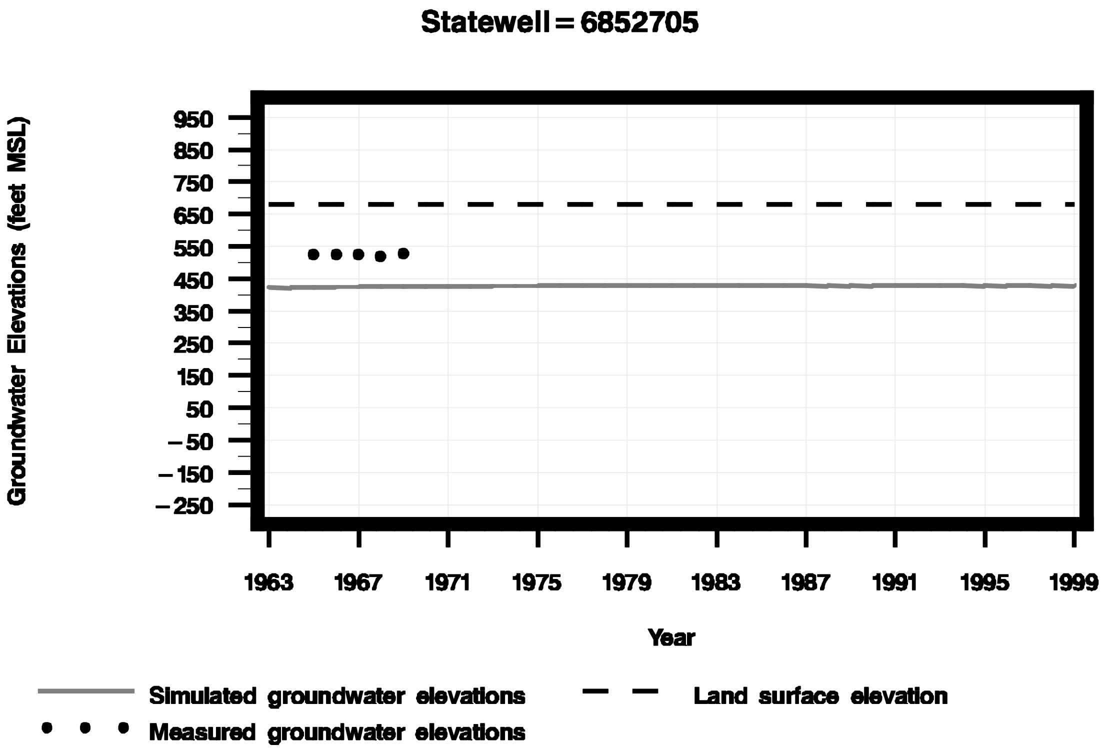
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6851801
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6852705
Groundwater Elevations (feet MSL)
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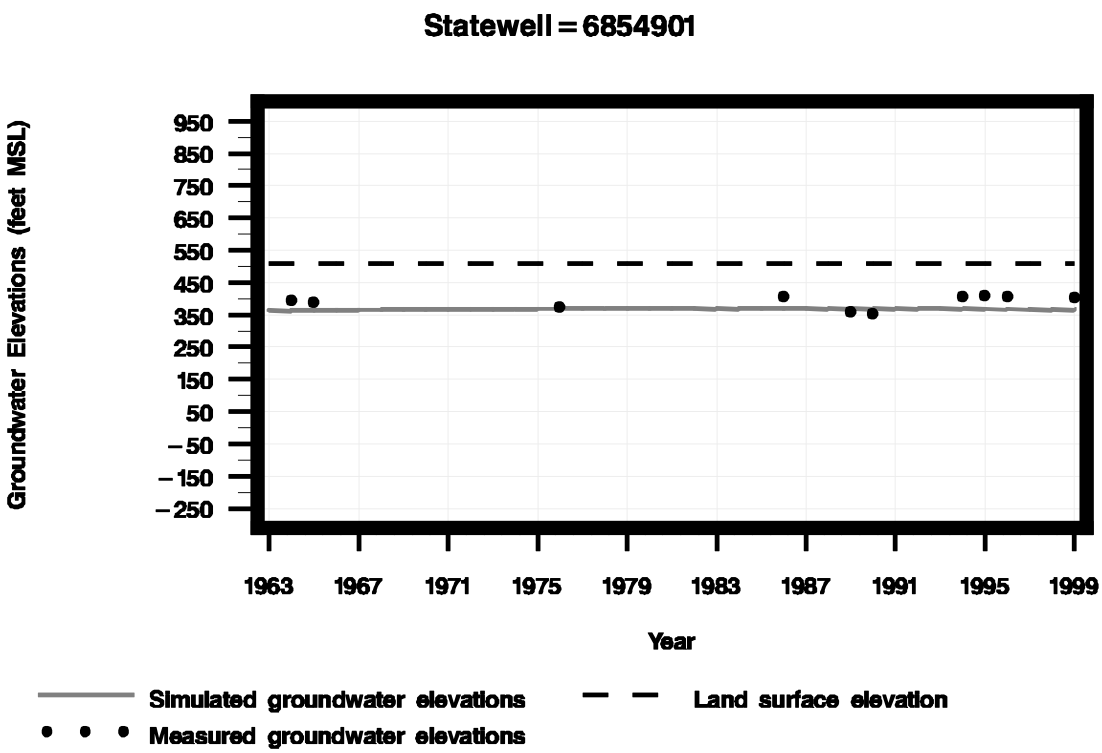
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6854901
Groundwater Elevations (feet MSL)
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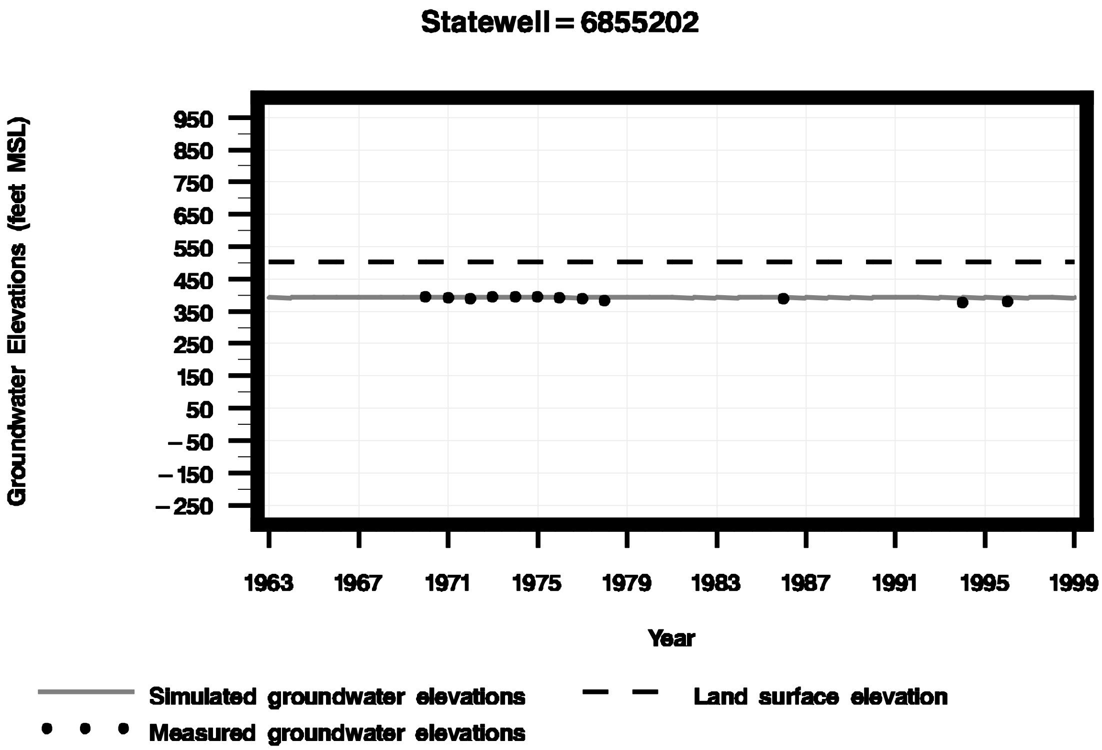
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6855202
Groundwater Elevations (feet MSL)
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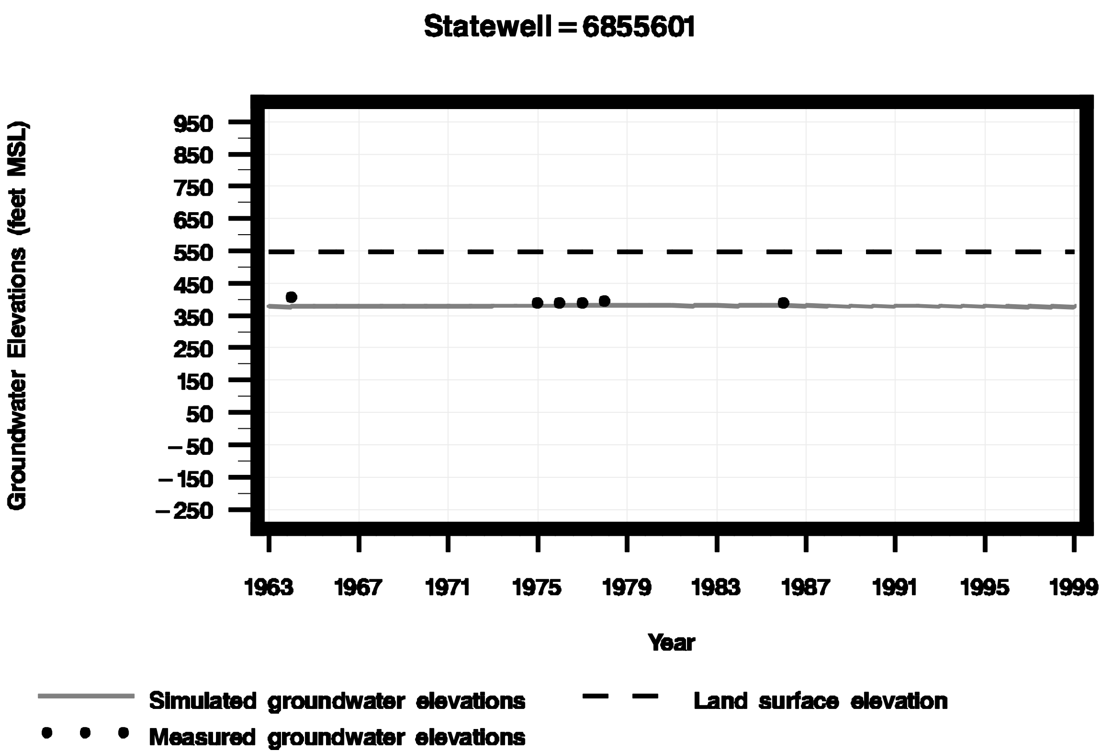
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6855601
Groundwater Elevations (feet MSL)
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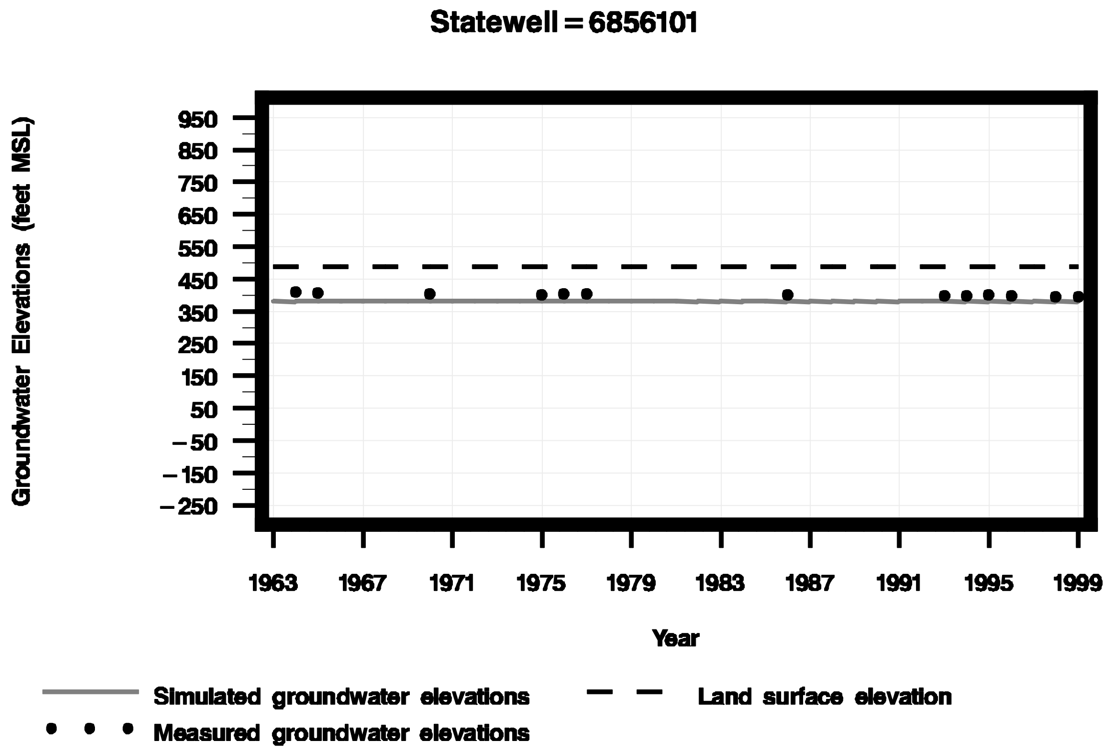
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6856101
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
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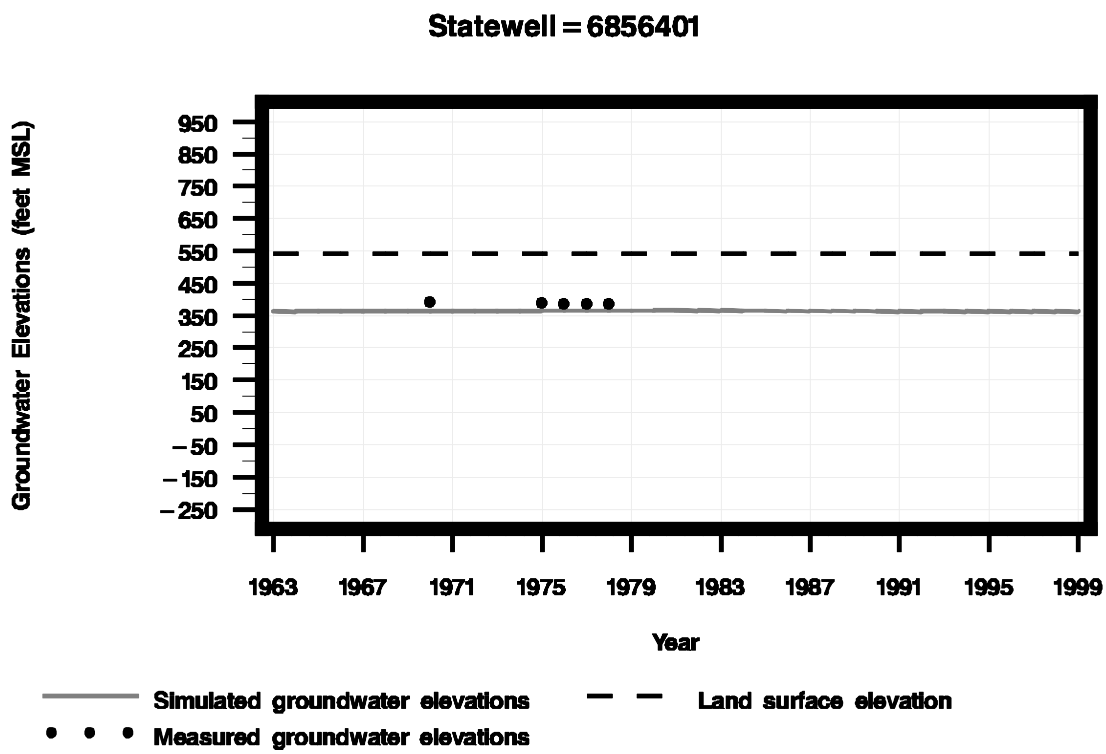
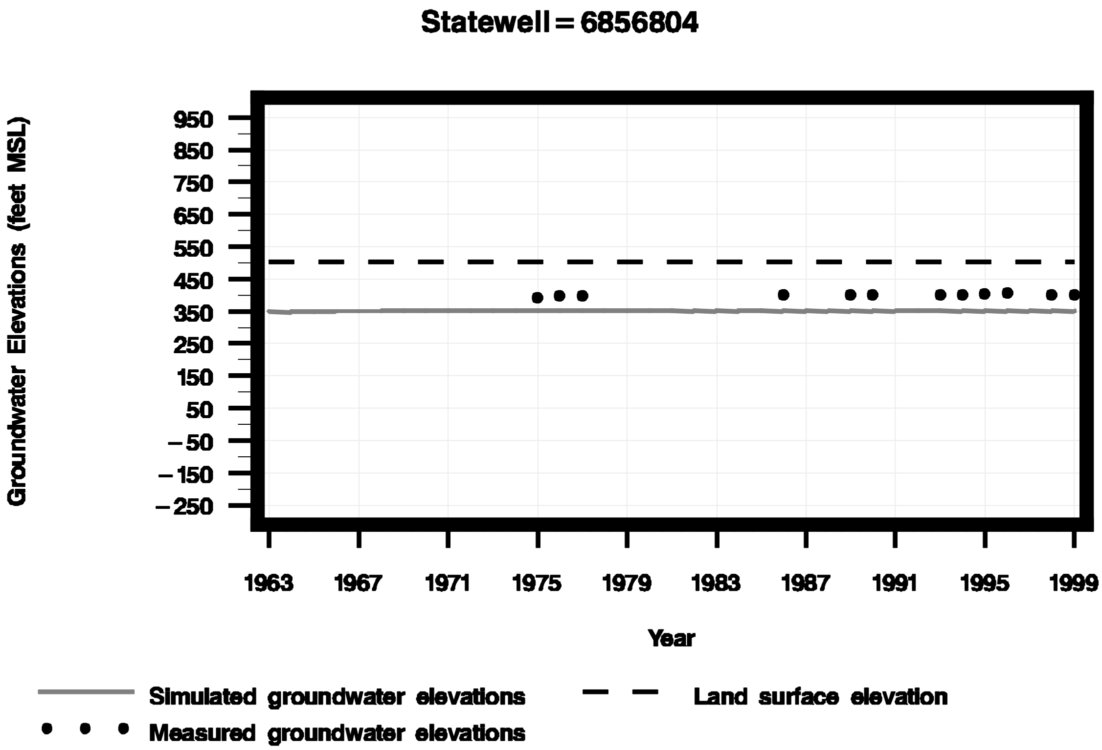
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6856401
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 6856804
Groundwater Elevations (feet MSL)
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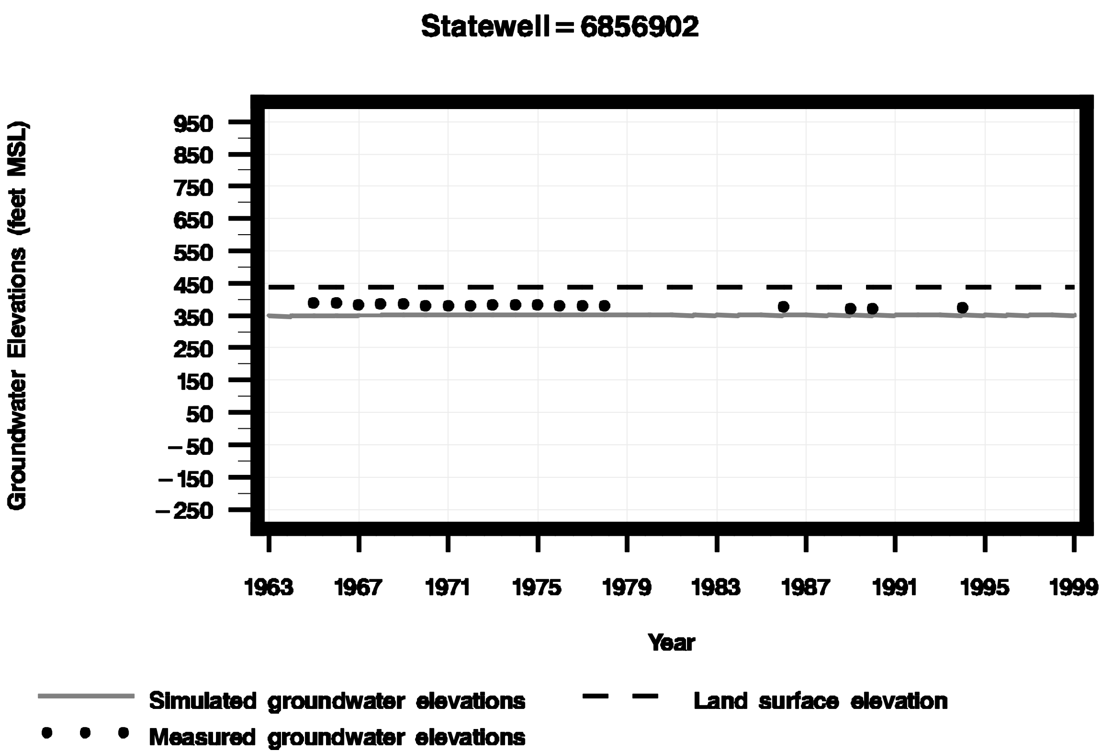
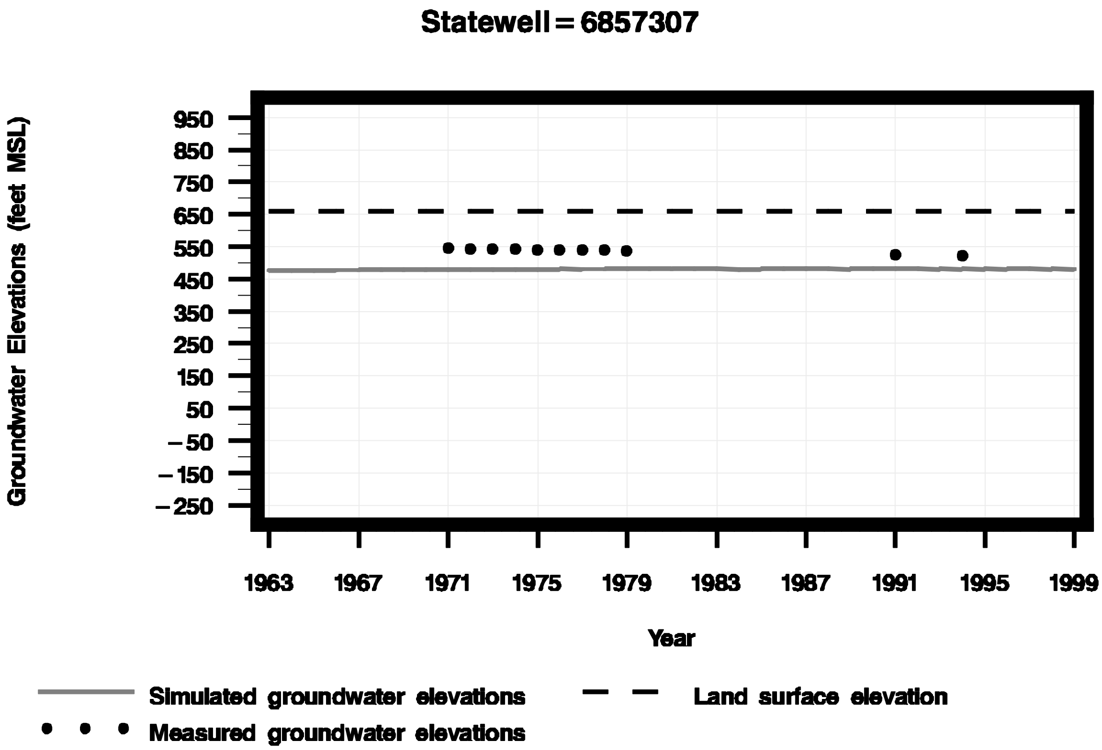
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 6856902
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6857307
Groundwater Elevations (feet MSL)
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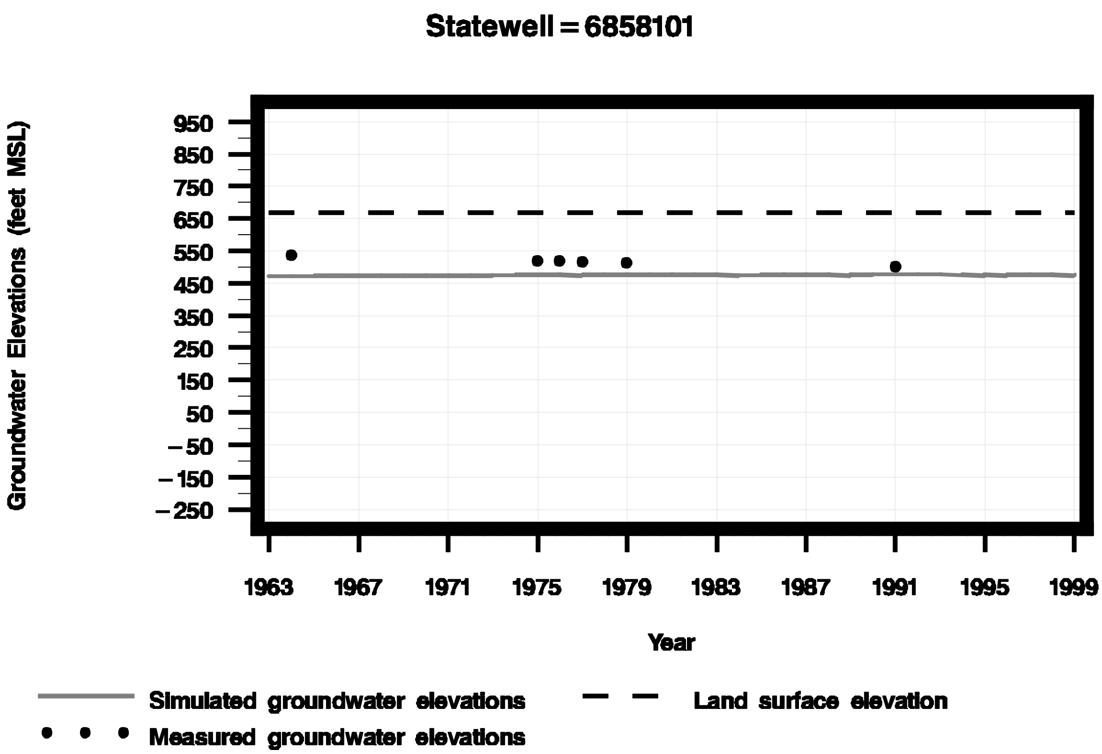
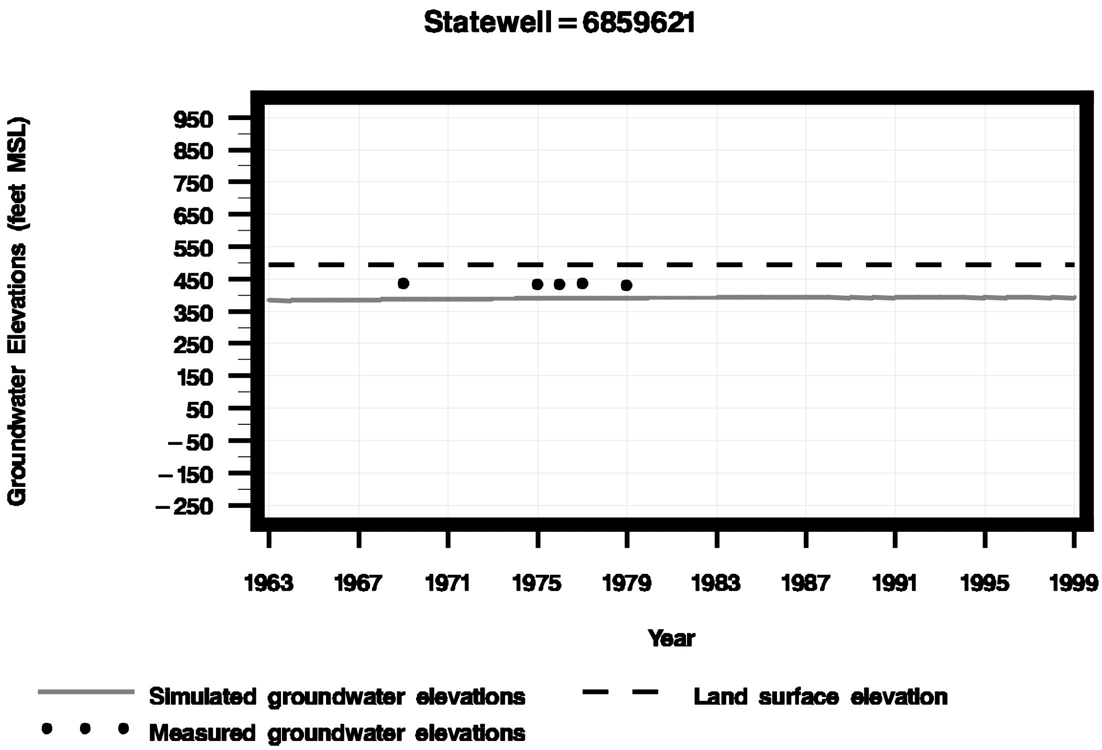
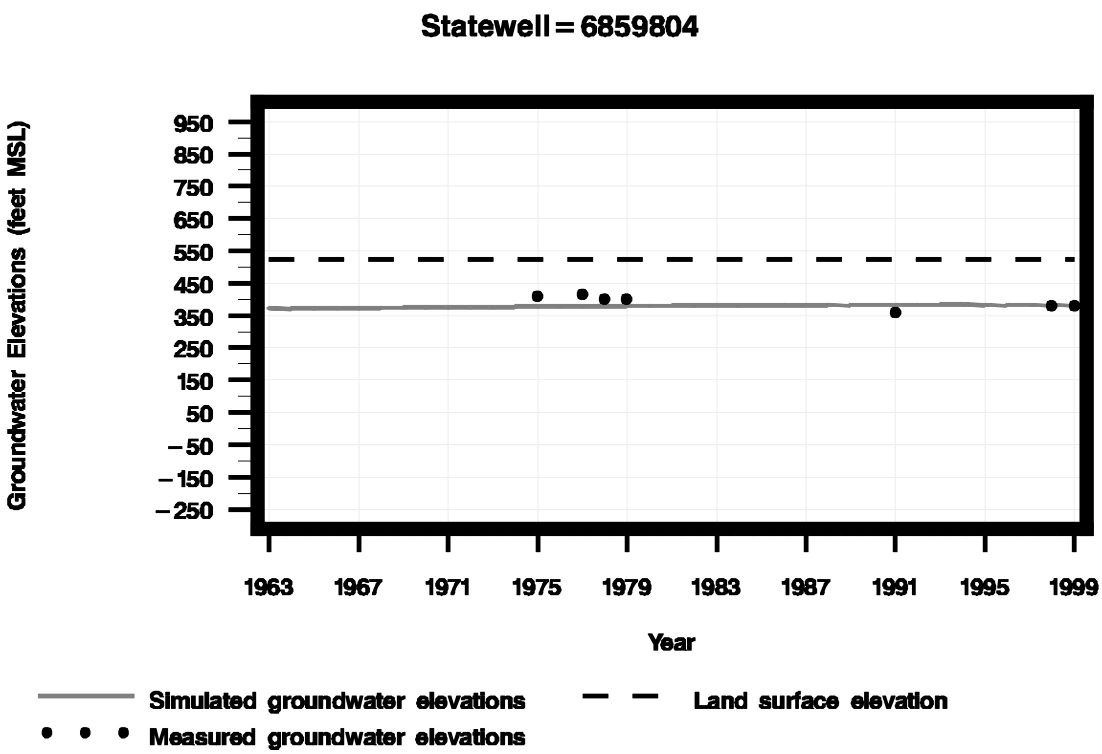
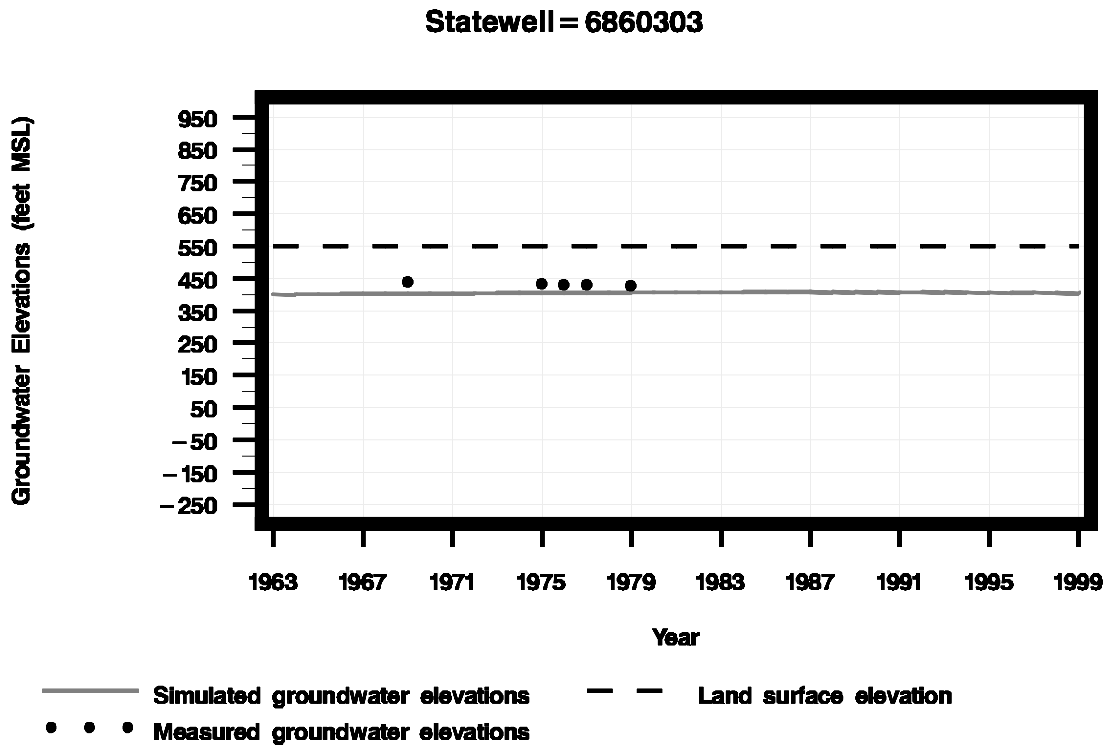
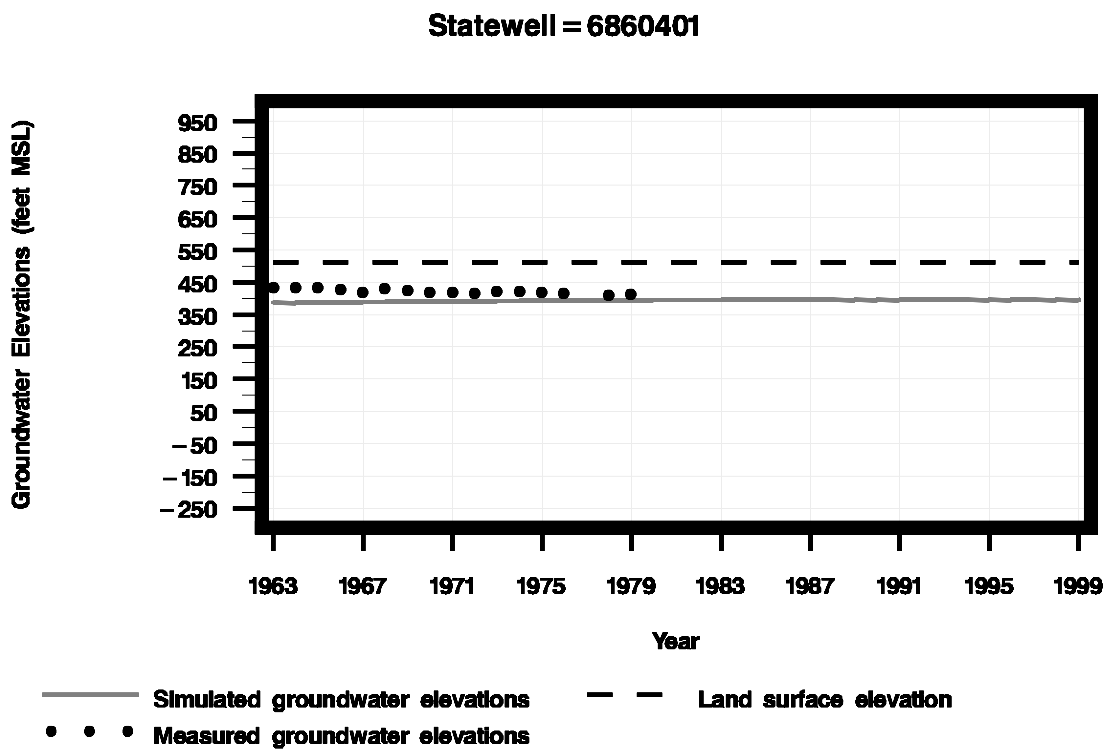
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6858101
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6859621
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6859804
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6860303
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6860401
Groundwater Elevations (feet MSL)
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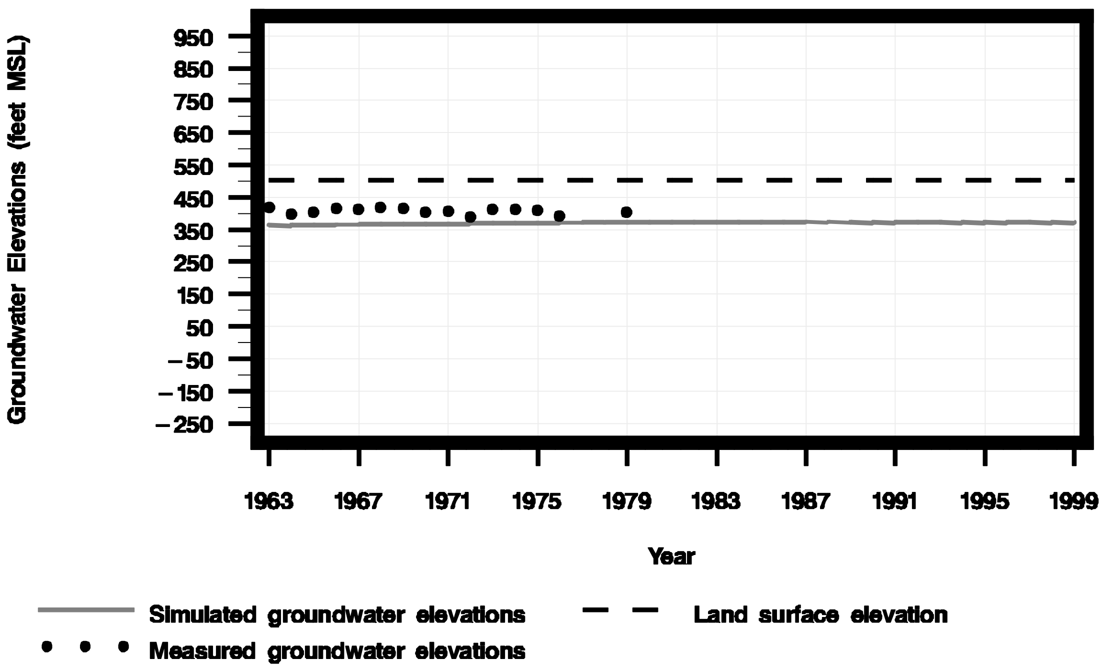
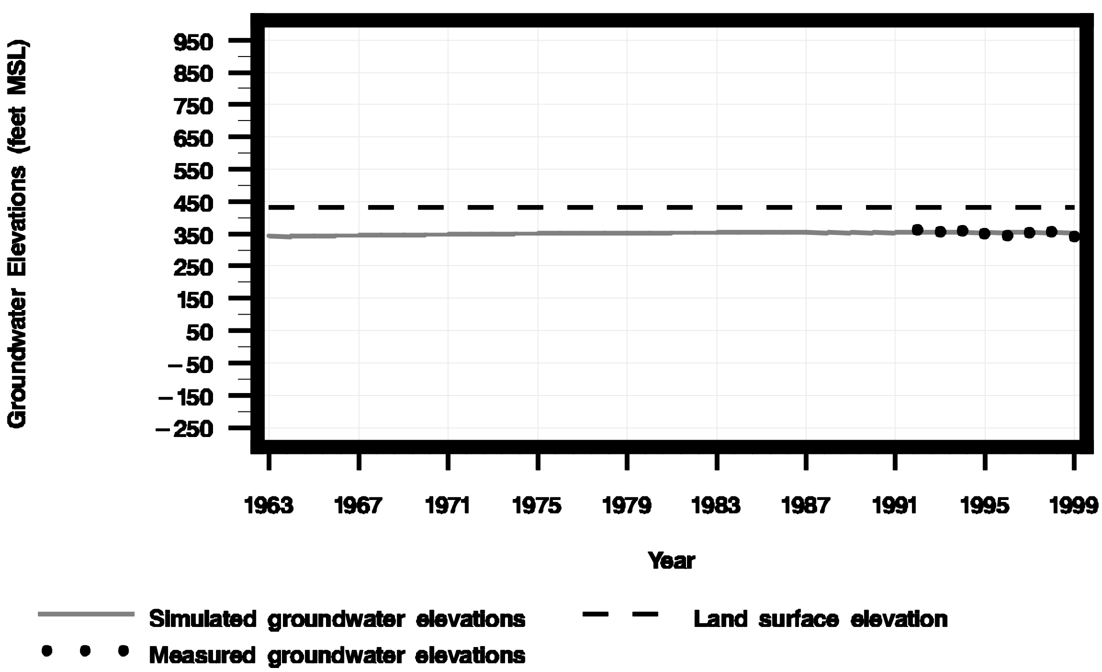
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

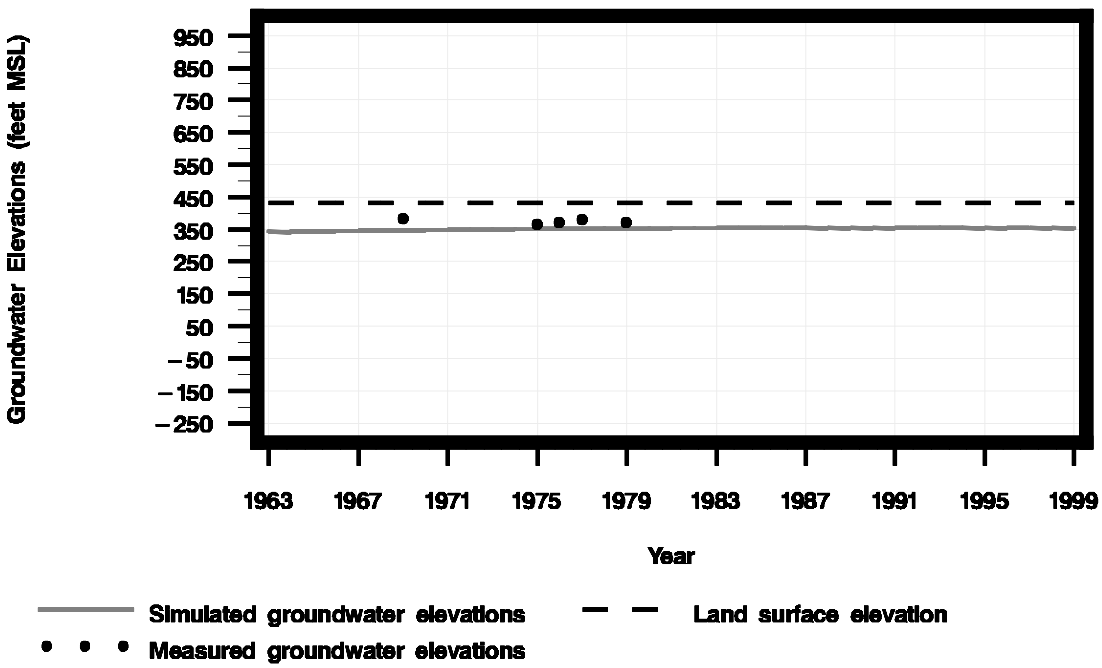
Statewell = 6860610



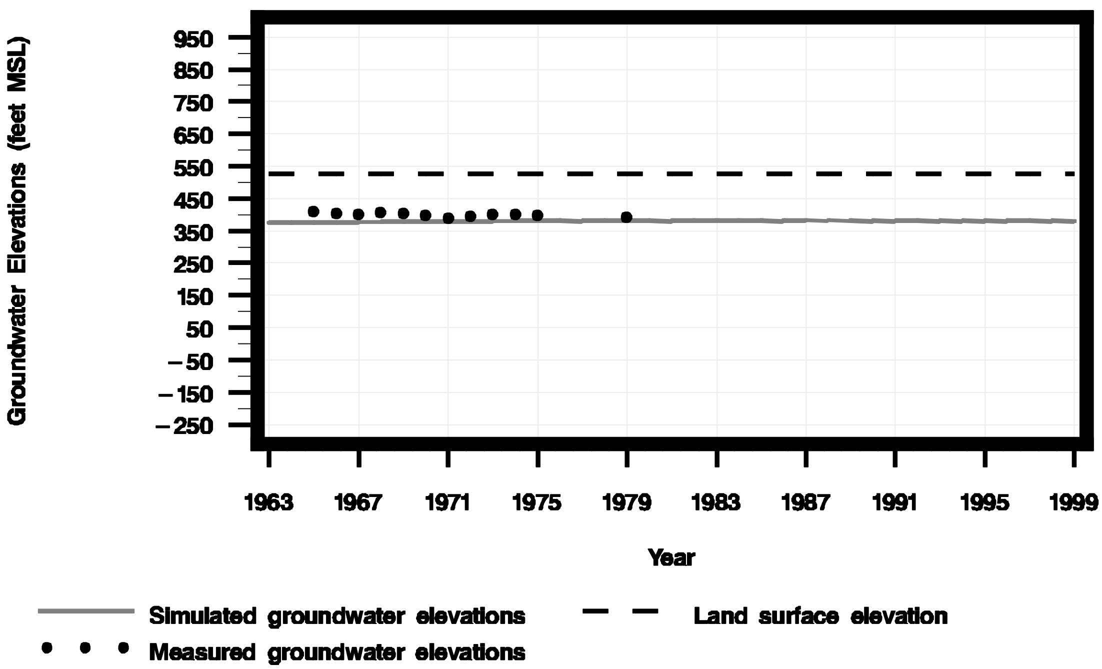
Statewell = 6860912

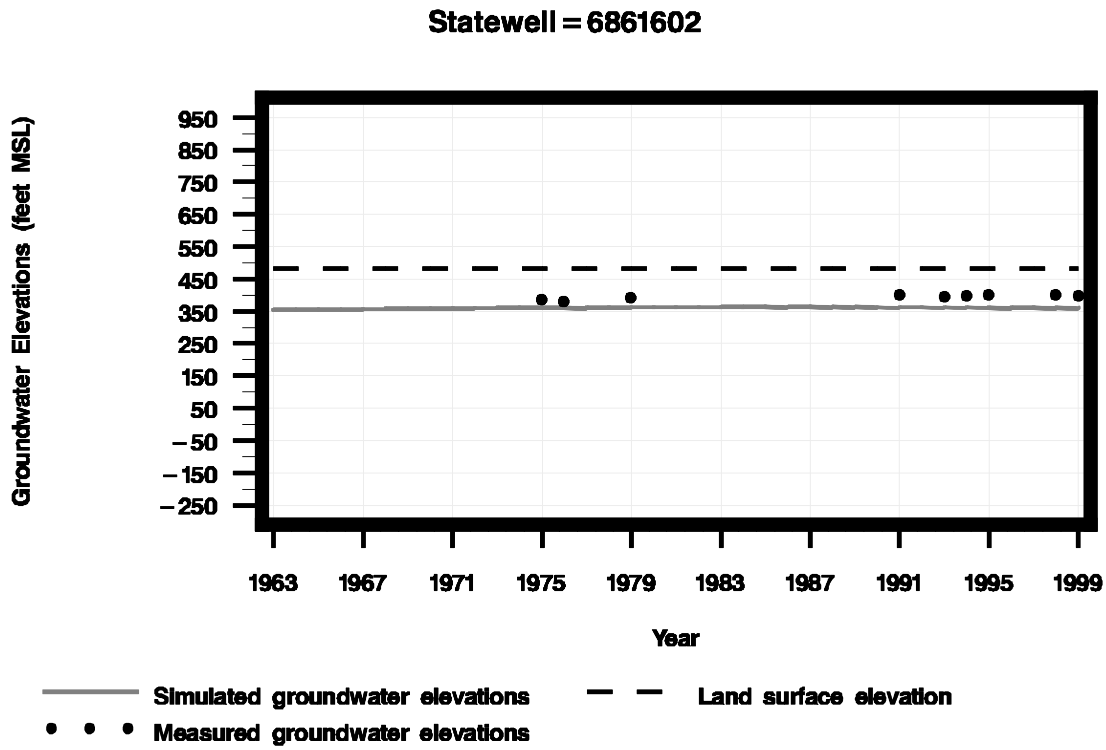


Statewell = 6860913



Statewell = 6861310




Statewell = 6861602
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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250
150
50
−50
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1971
1975
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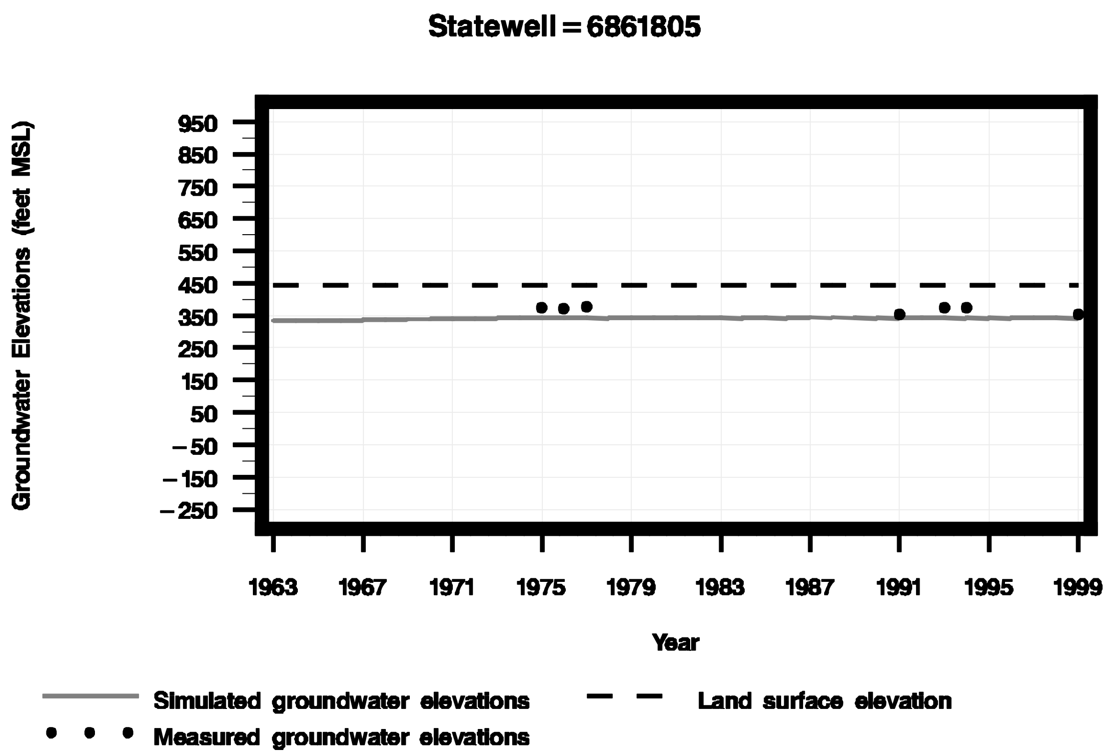
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6861805
Groundwater Elevations (feet MSL)
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850
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650
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450
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50
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1967
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1975
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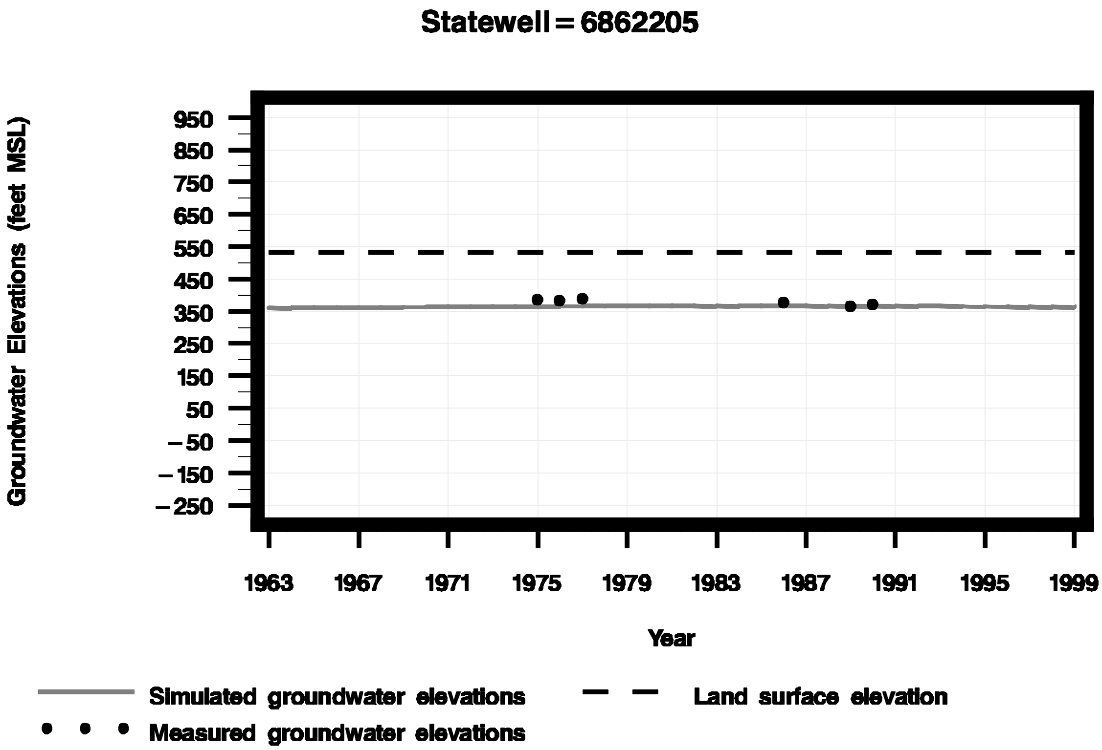
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6862205
Groundwater Elevations (feet MSL)
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450
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1967
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1975
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1983
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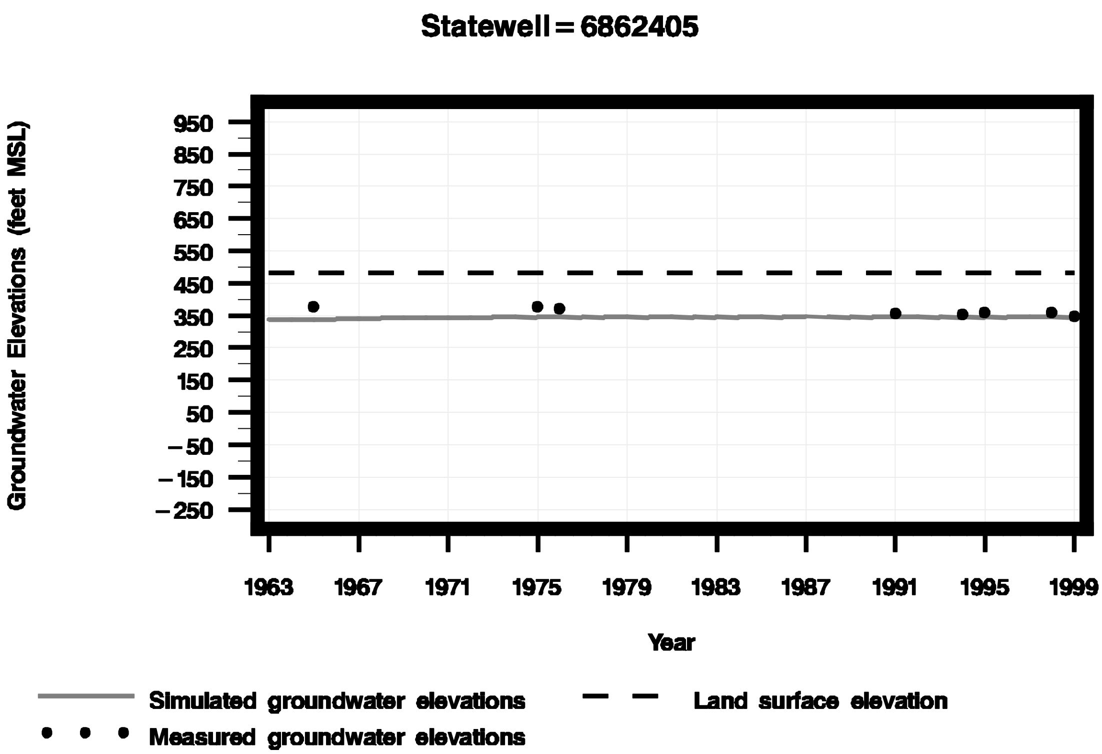
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6862405
Groundwater Elevations (feet MSL)
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850
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450
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1967
1971
1975
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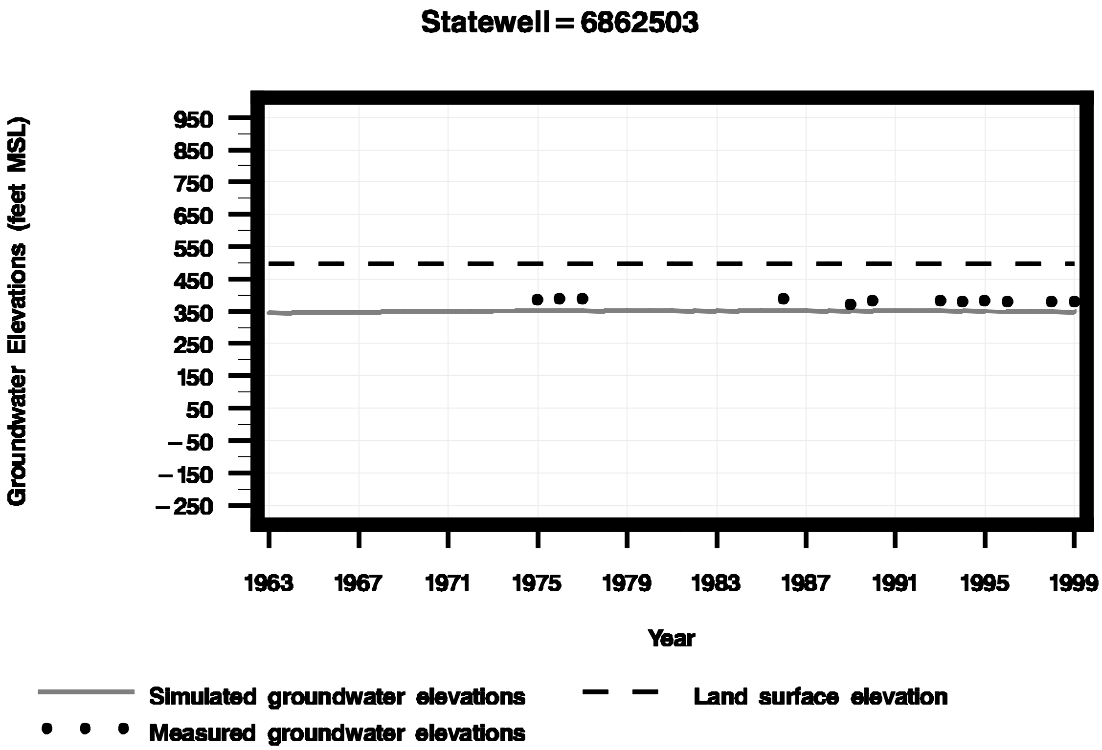
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6862503
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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150
50
−50
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1967
1971
1975
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1983
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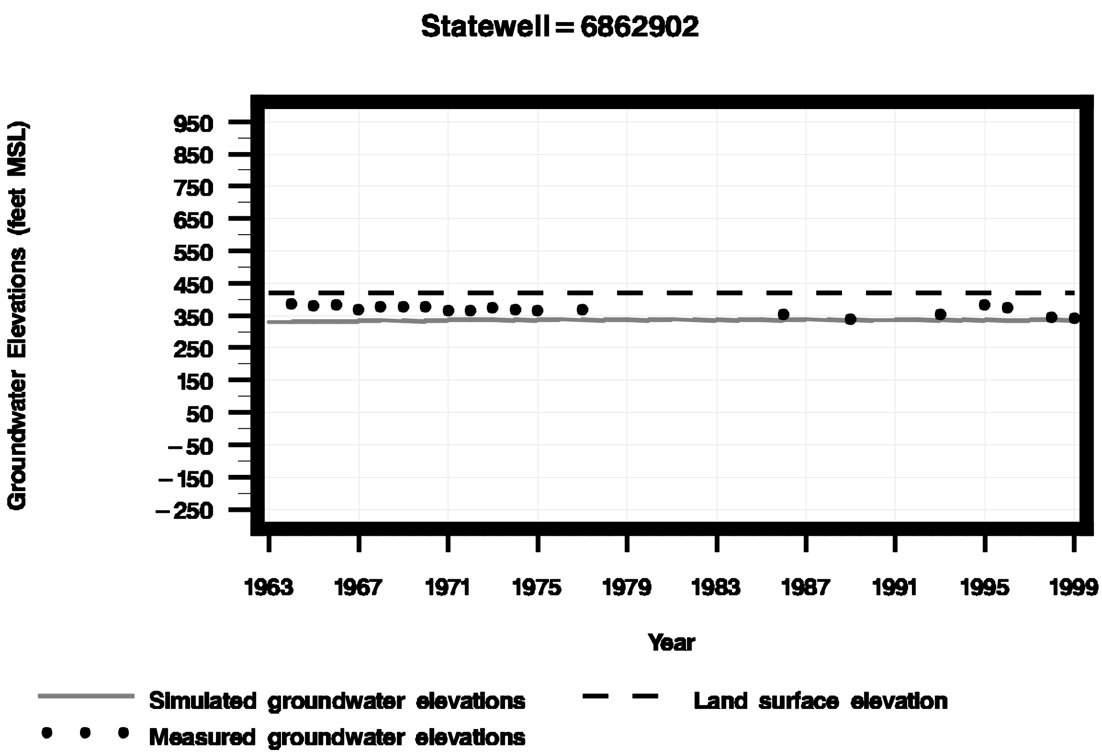
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6862902
Groundwater Elevations (feet MSL)
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850
750
650
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450
350
250
150
50
−50
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−250
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1967
1971
1975
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1983
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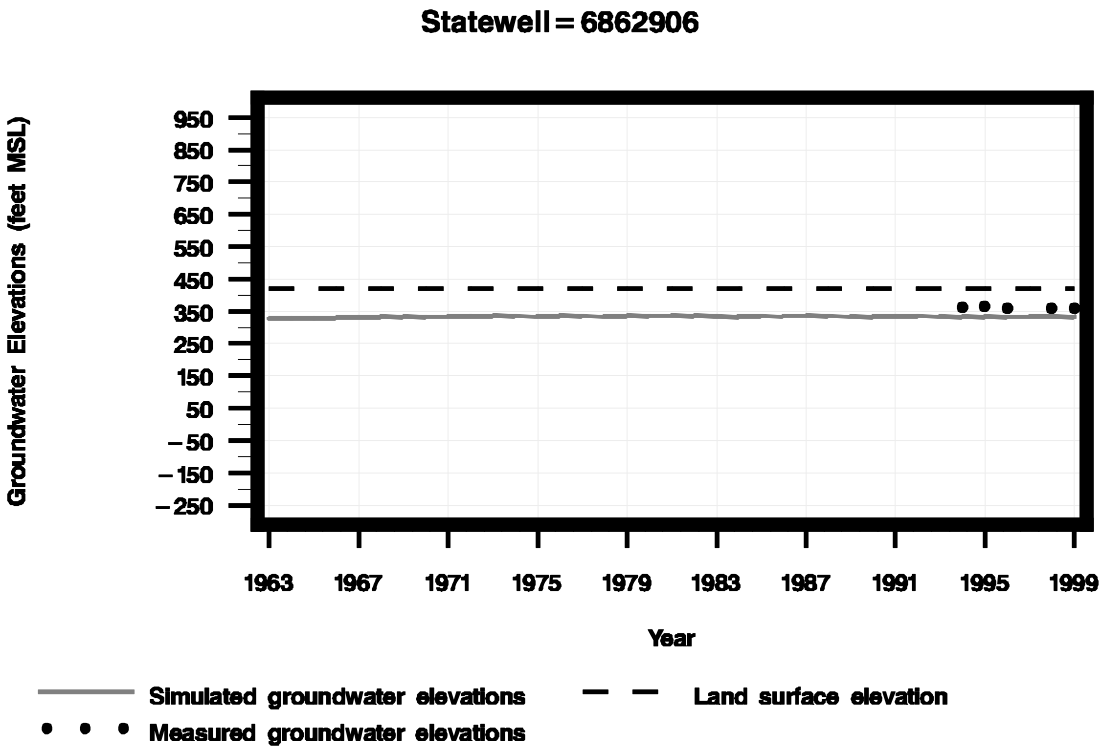
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6862906
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1967
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1975
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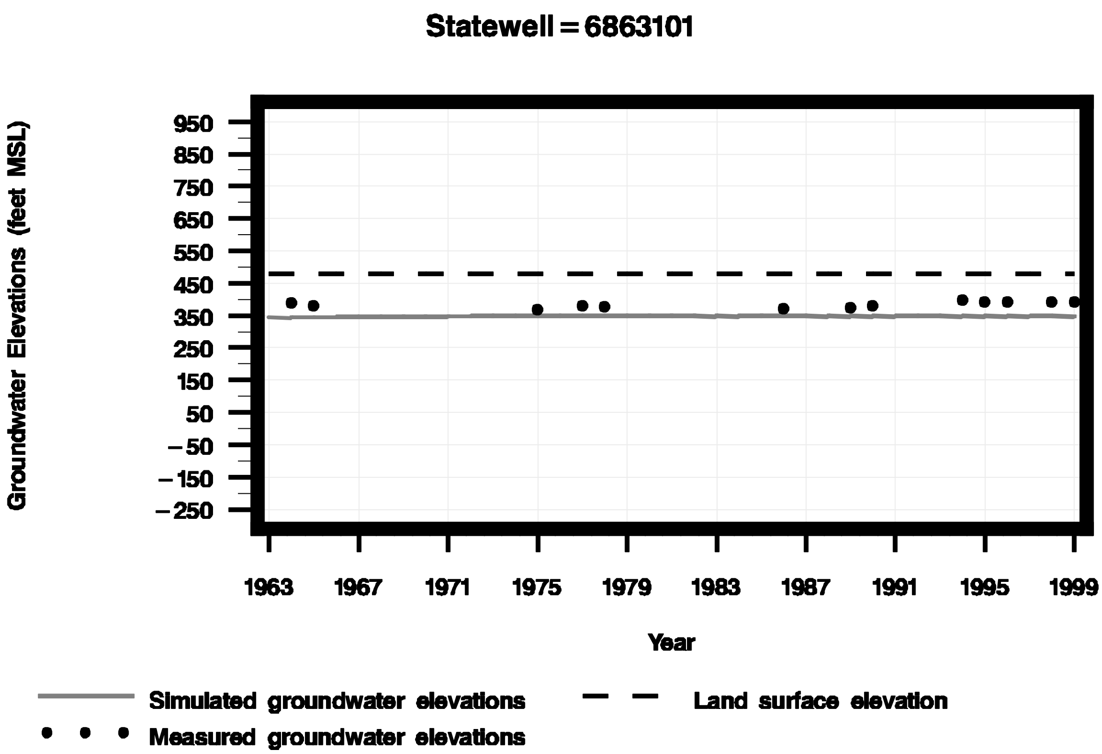
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6863101
Groundwater Elevations (feet MSL)
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850
750
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450
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150
50
−50
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1967
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1975
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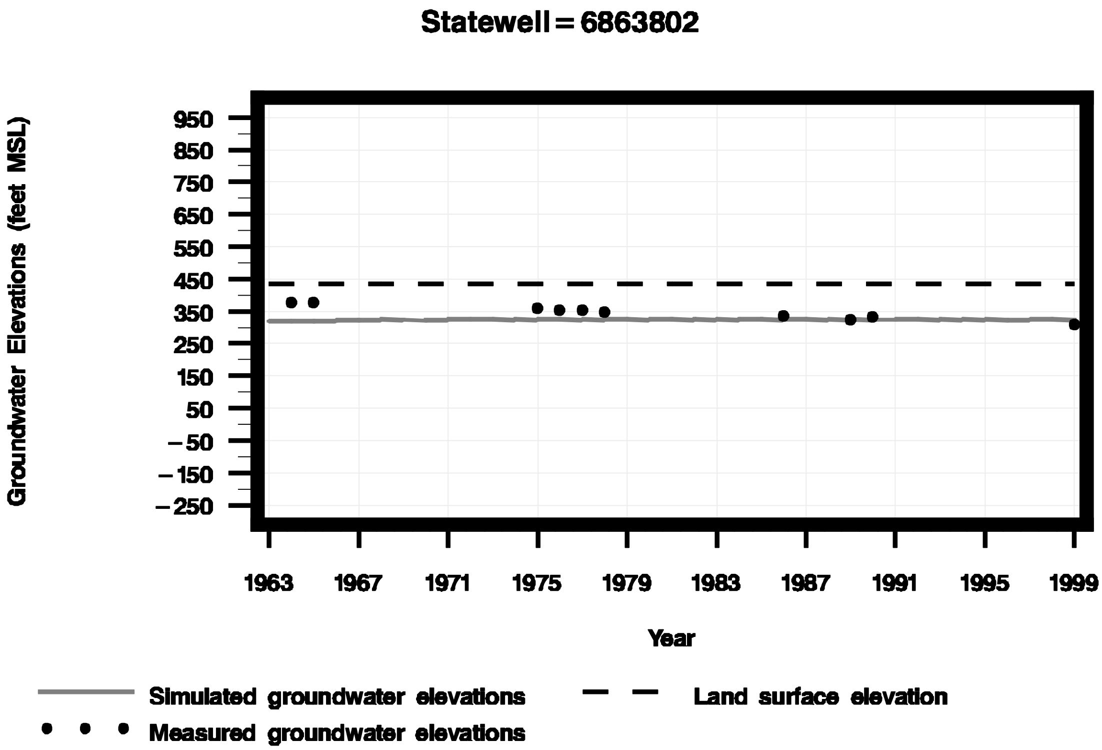
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6863802
Groundwater Elevations (feet MSL)
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750
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450
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50
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1967
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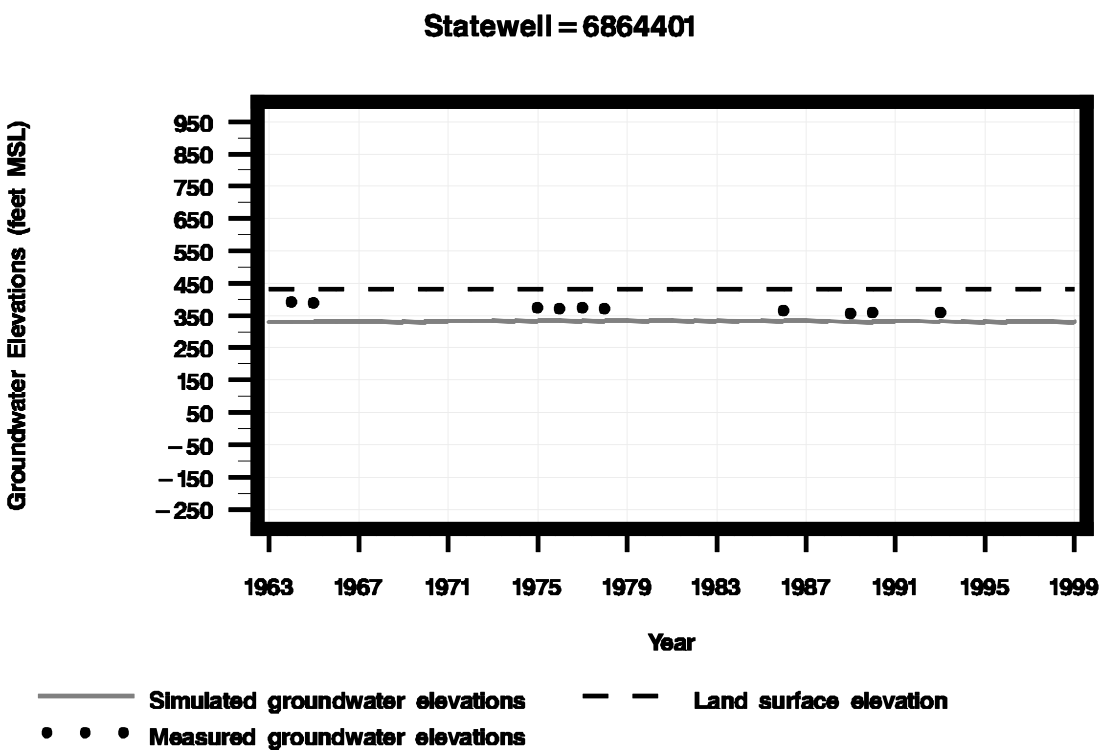
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 6864401
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1971
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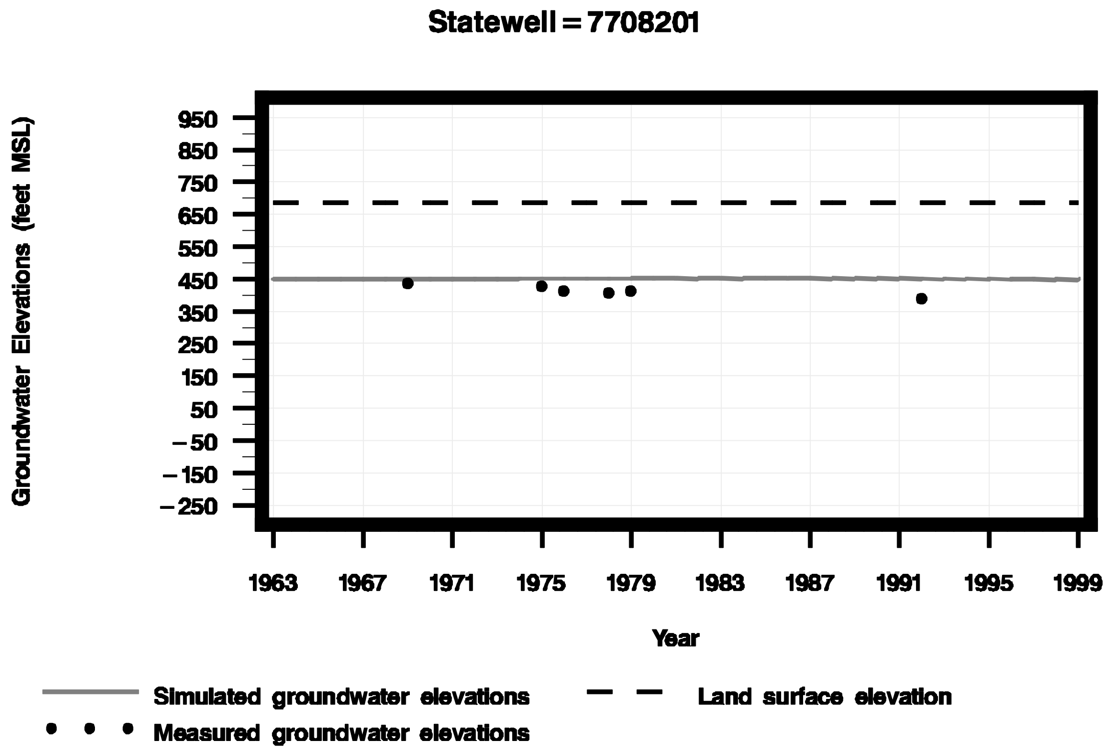
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7708201
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1967
1971
1975
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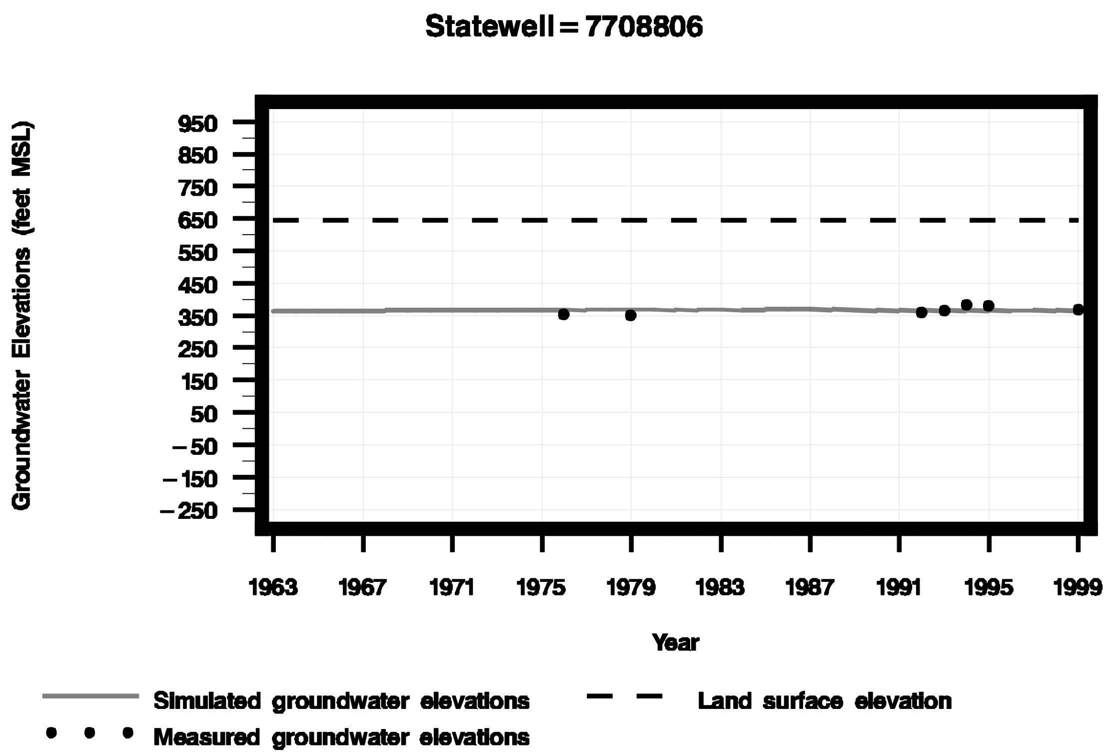
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7708806
Groundwater Elevations (feet MSL)
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550
450
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50
−50
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1967
1971
1975
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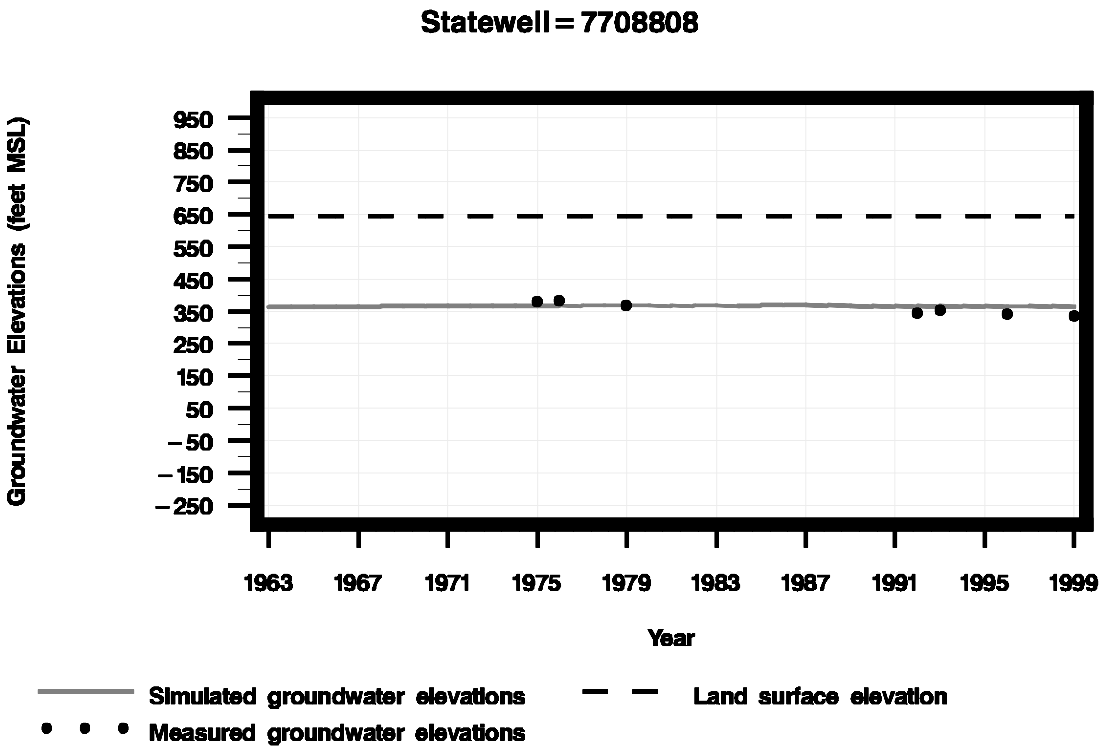
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7708808
Groundwater Elevations (feet MSL)
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750
650
550
450
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250
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50
−50
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−250
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1967
1971
1975
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1983
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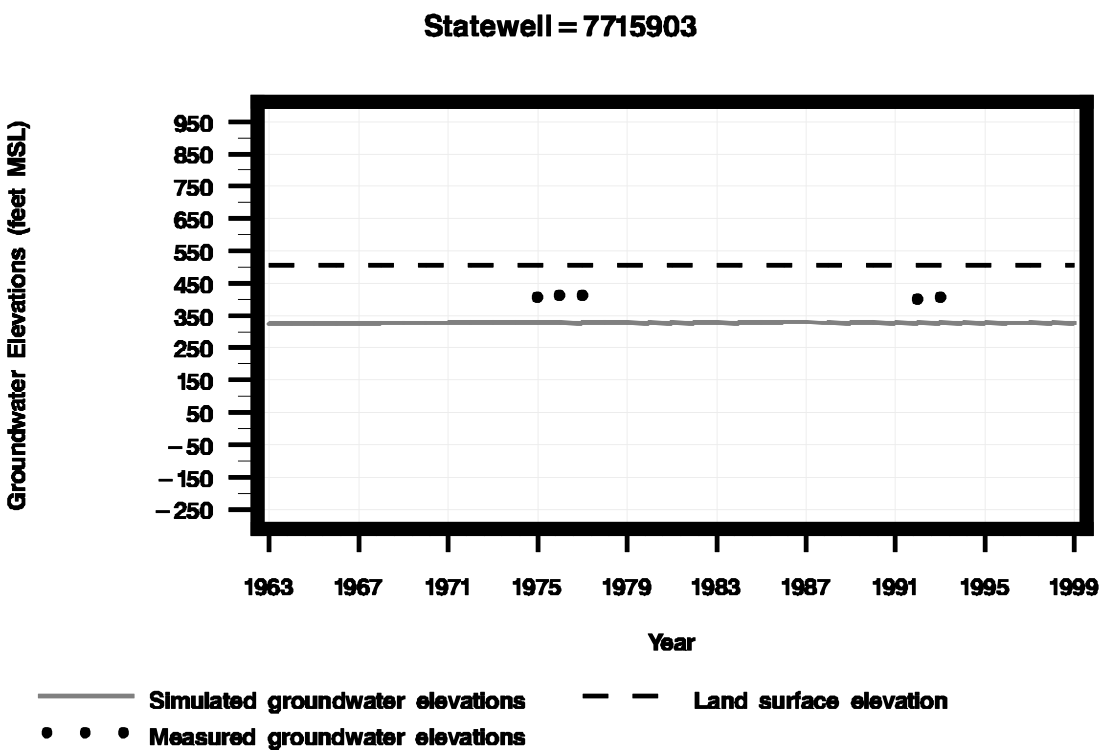
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7715903
Groundwater Elevations (feet MSL)
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750
650
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450
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50
−50
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−250
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1967
1971
1975
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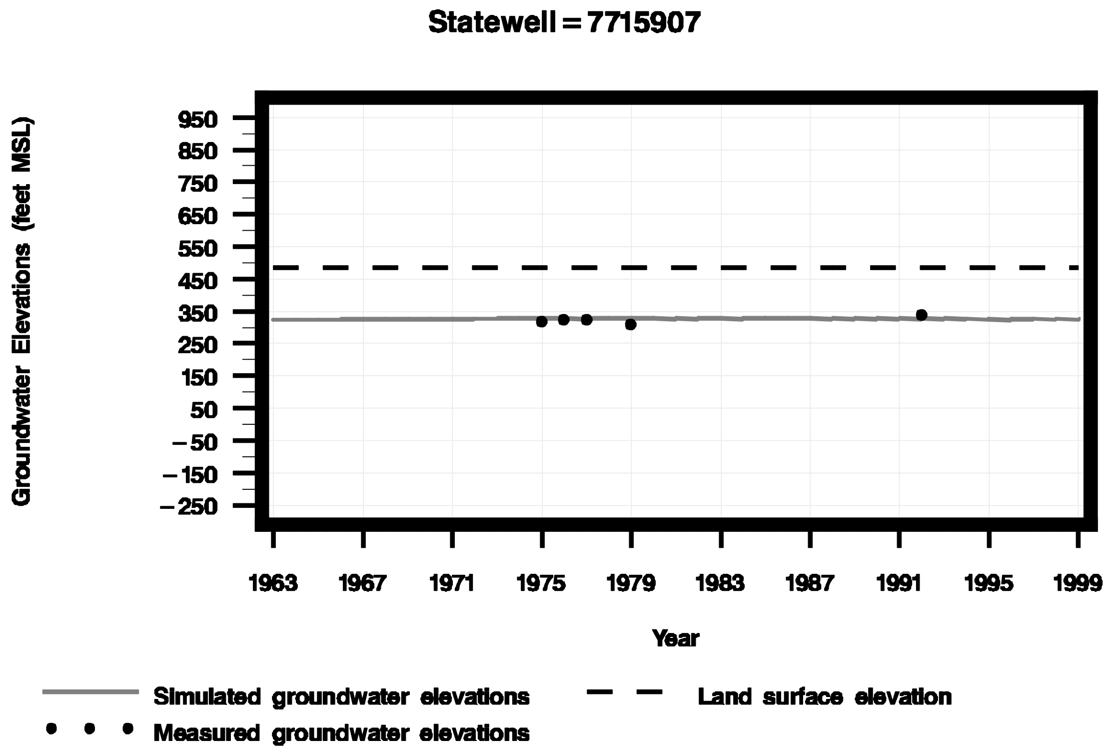
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7715907
Groundwater Elevations (feet MSL)
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650
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450
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50
−50
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−250
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1967
1971
1975
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1983
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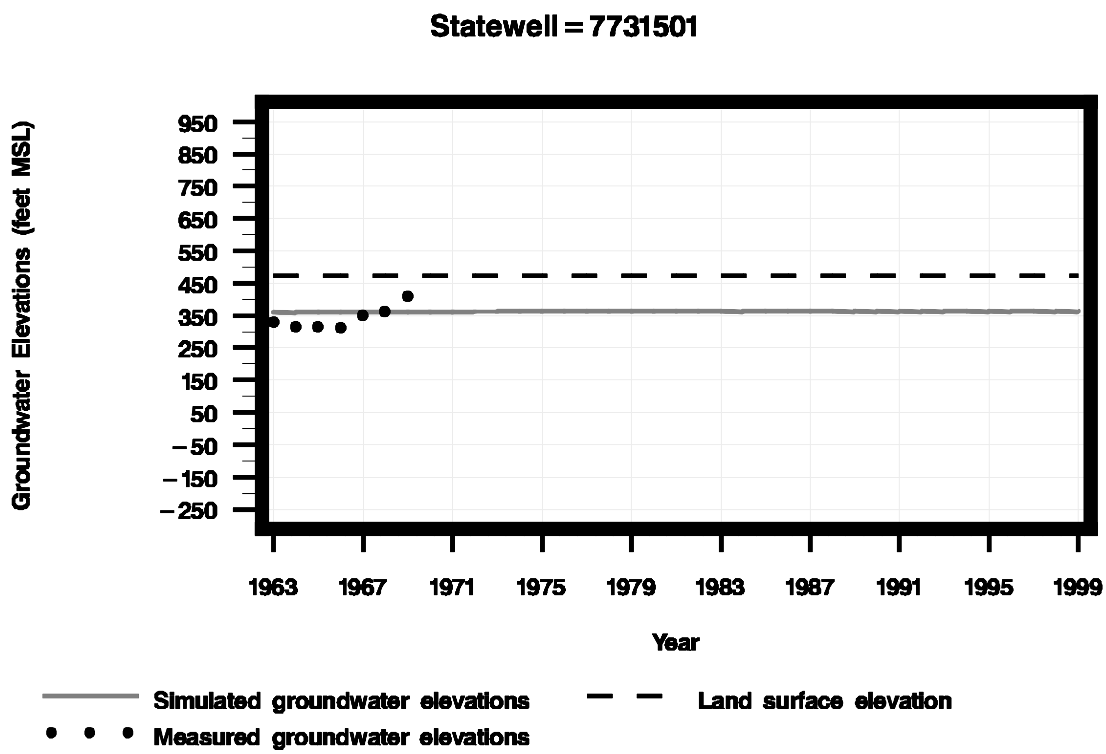
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7731501
Groundwater Elevations (feet MSL)
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650
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450
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50
−50
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−250
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1967
1971
1975
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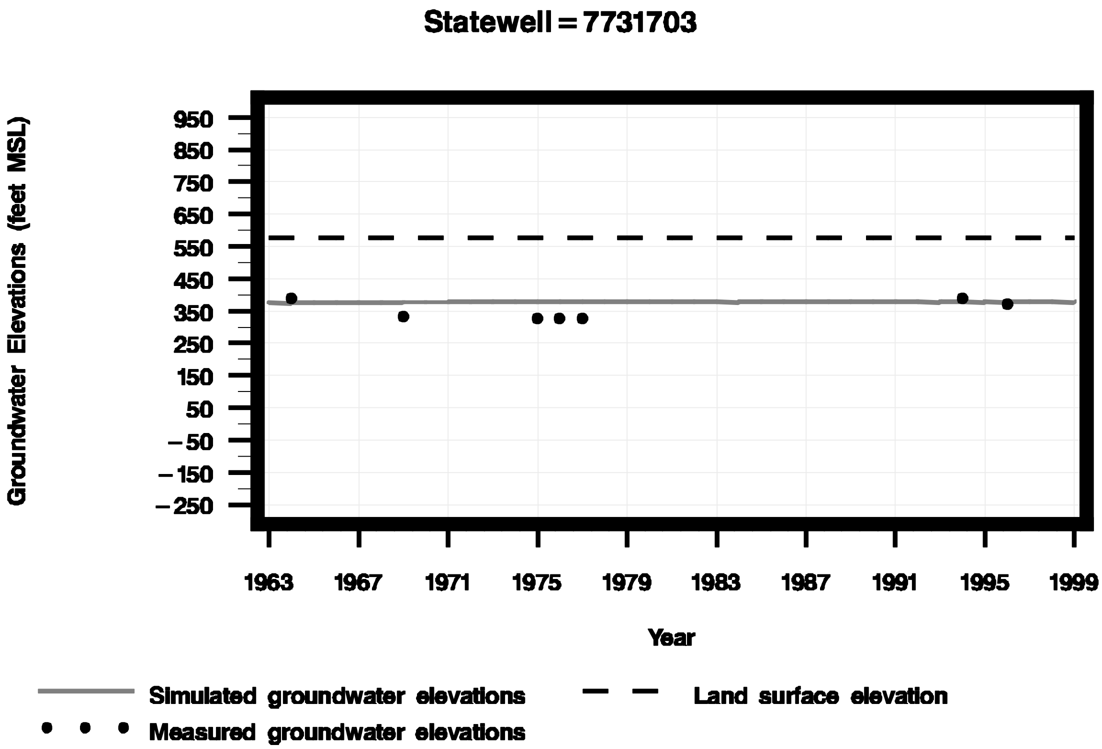
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7731703
Groundwater Elevations (feet MSL)
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750
650
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450
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50
−50
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1967
1971
1975
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1983
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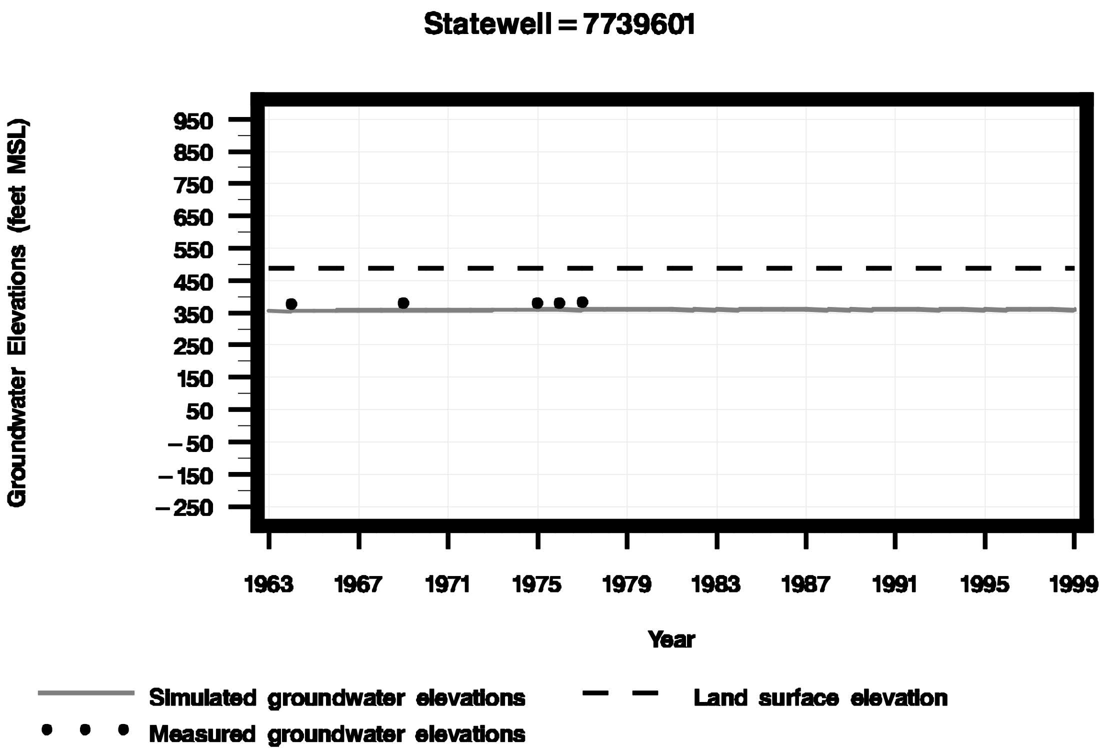
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7739601
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1967
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1975
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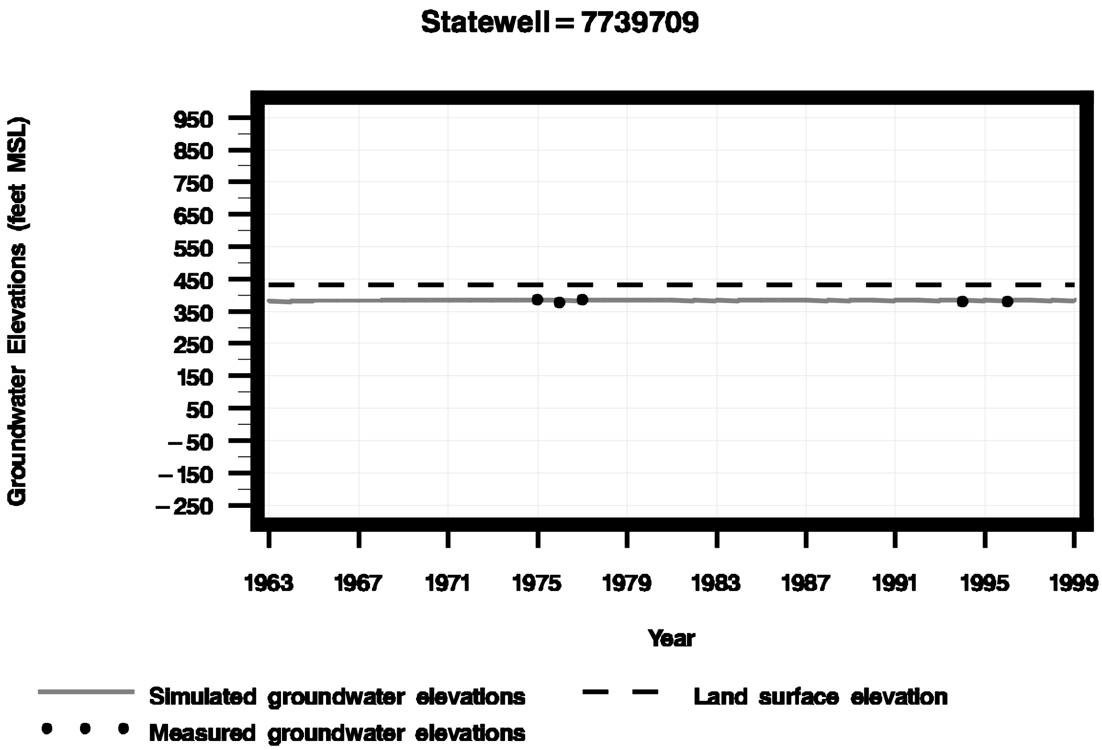
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7739709
Groundwater Elevations (feet MSL)
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450
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−50
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1967
1971
1975
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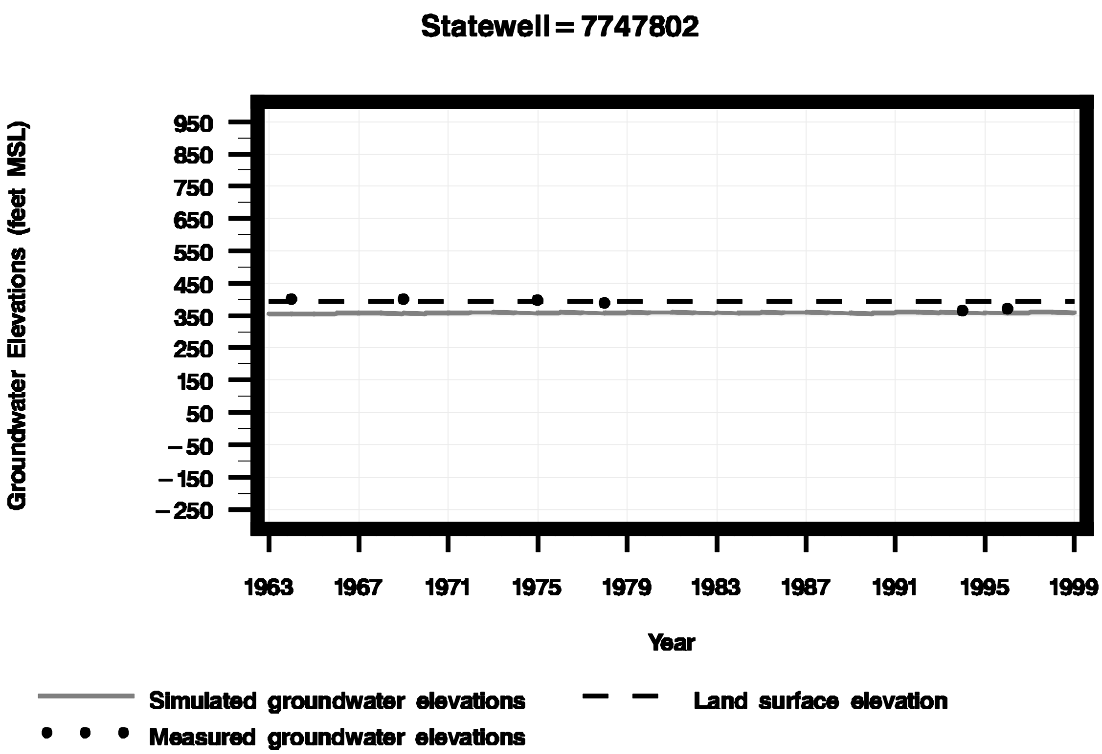
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7747802
Groundwater Elevations (feet MSL)
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450
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50
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1967
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1975
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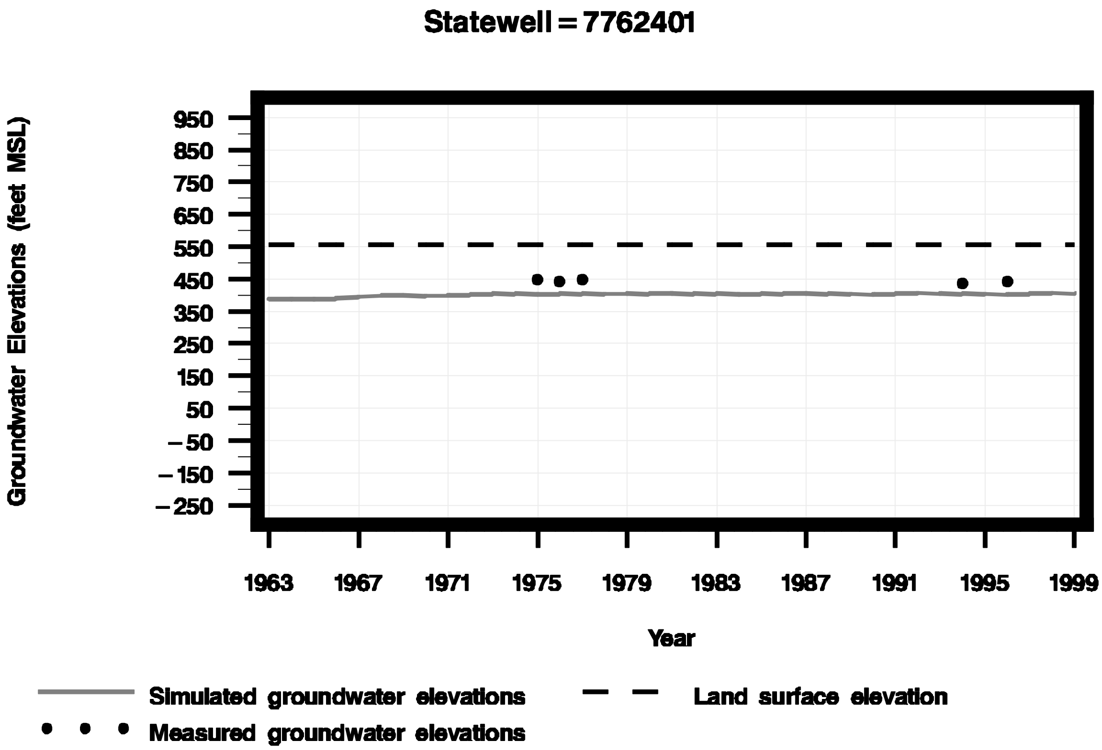
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7762401
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450
350
250
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50
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−150
−250
Groundwater Elevations (feet MSL)
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1967
1971
1975
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1983
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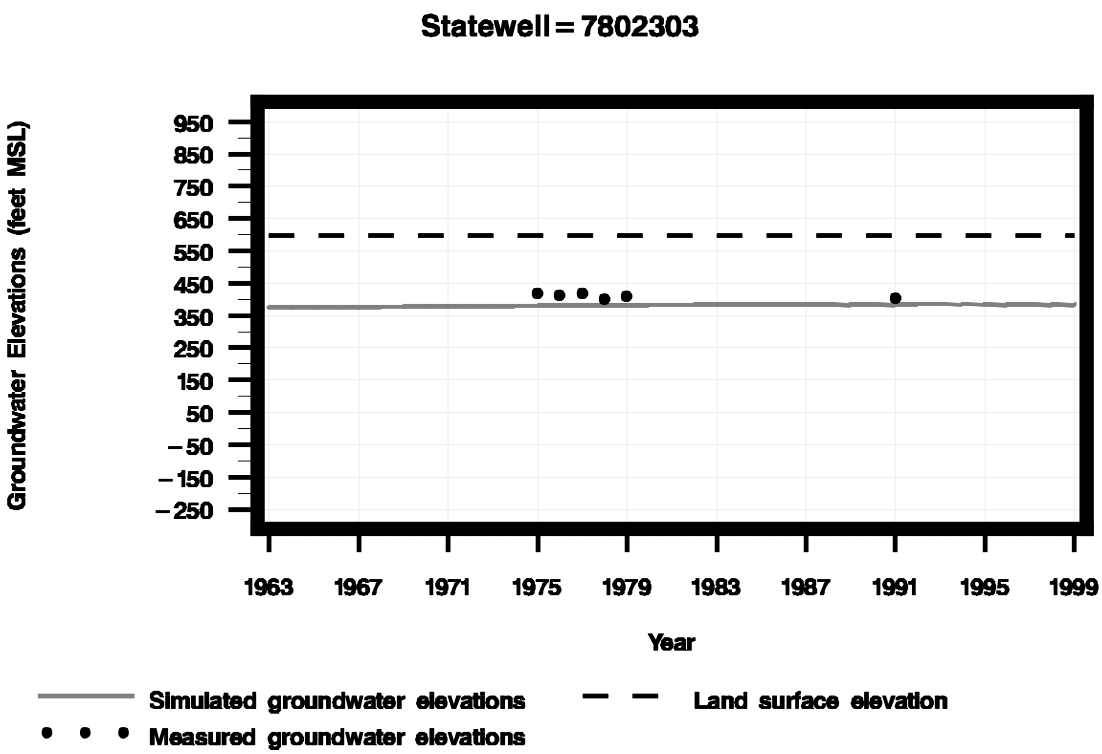
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7802303
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−250
Groundwater Elevations (feet MSL)
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1975
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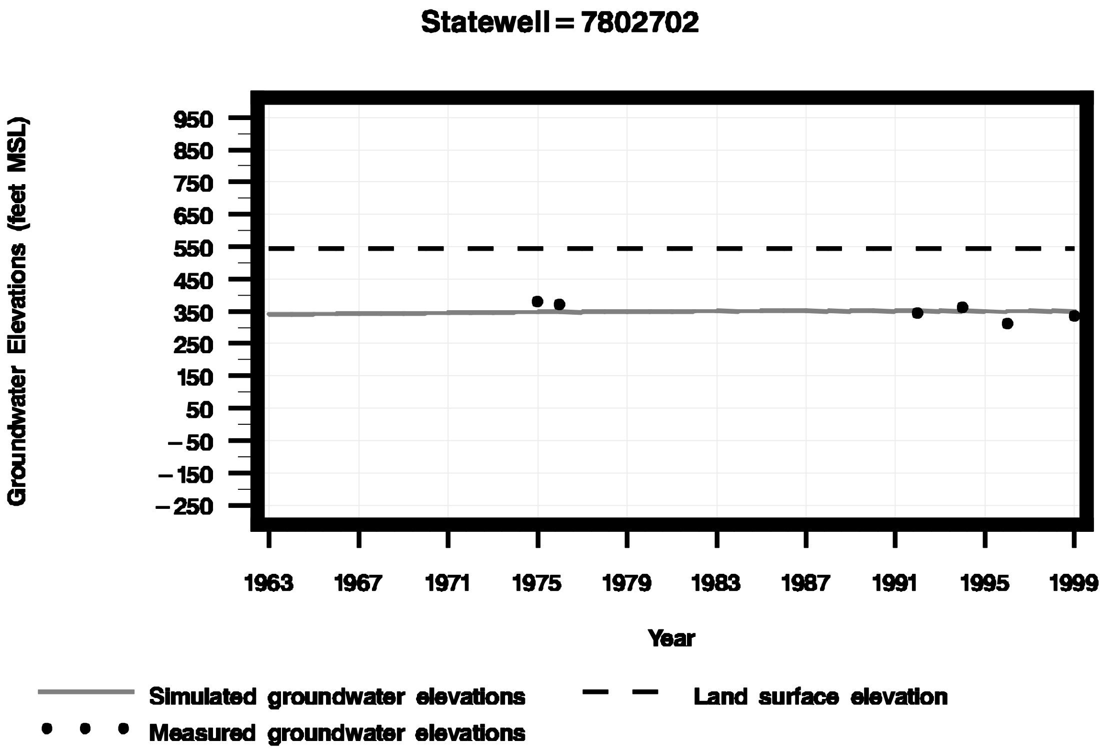
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7802702
Groundwater Elevations (feet MSL)
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550
450
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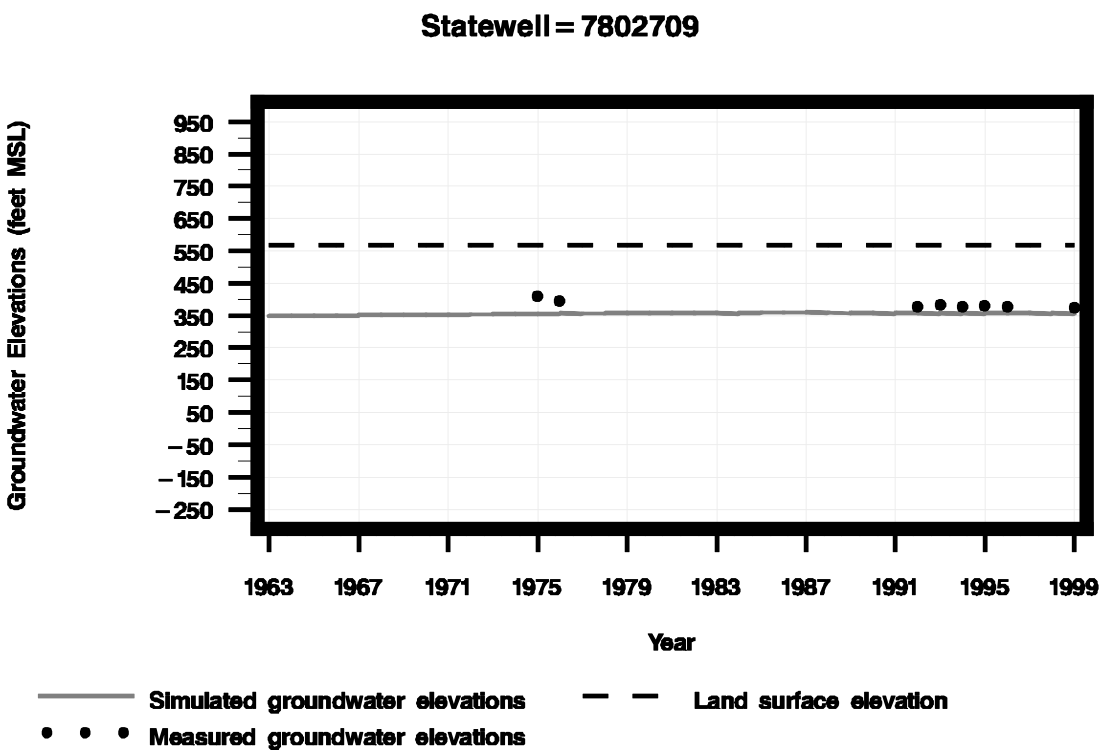
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7802709
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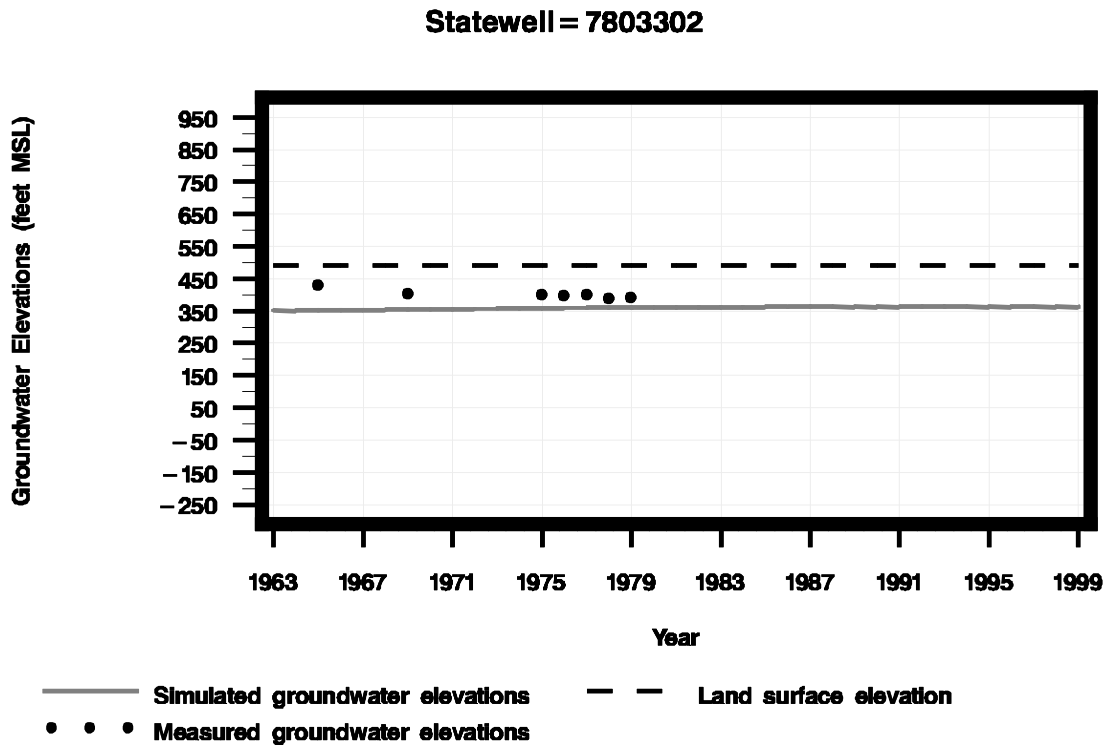
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7803302
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Groundwater Elevations (feet MSL)
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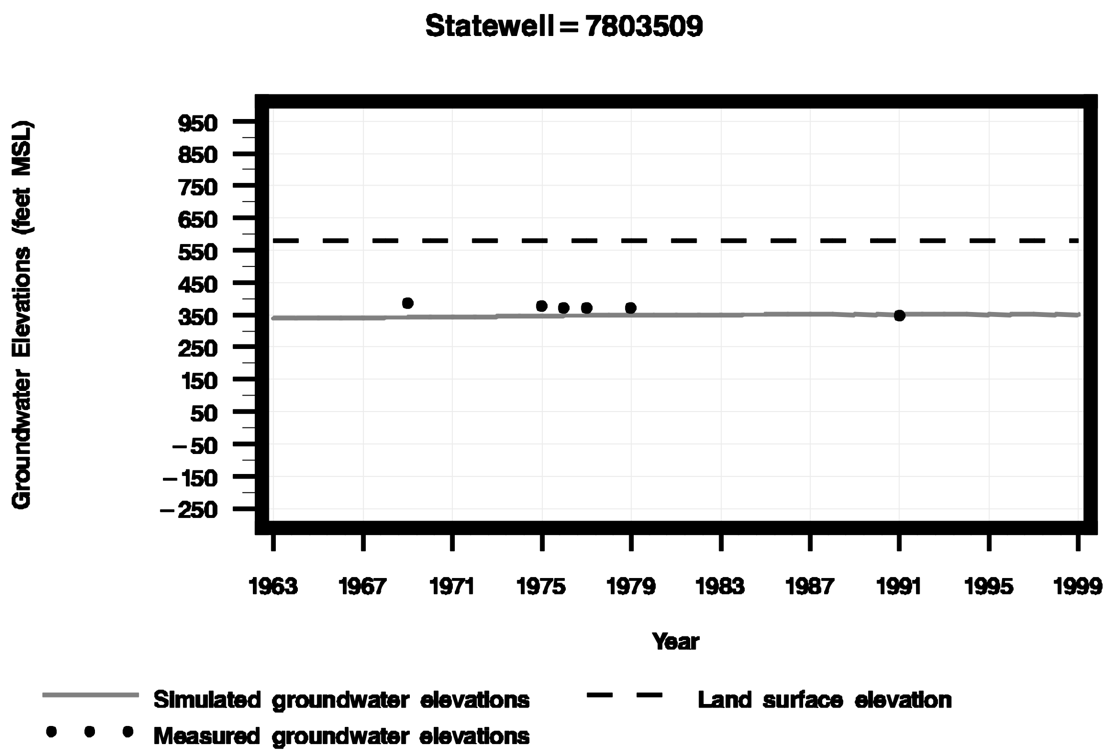
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7803509
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Groundwater Elevations (feet MSL)
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1991
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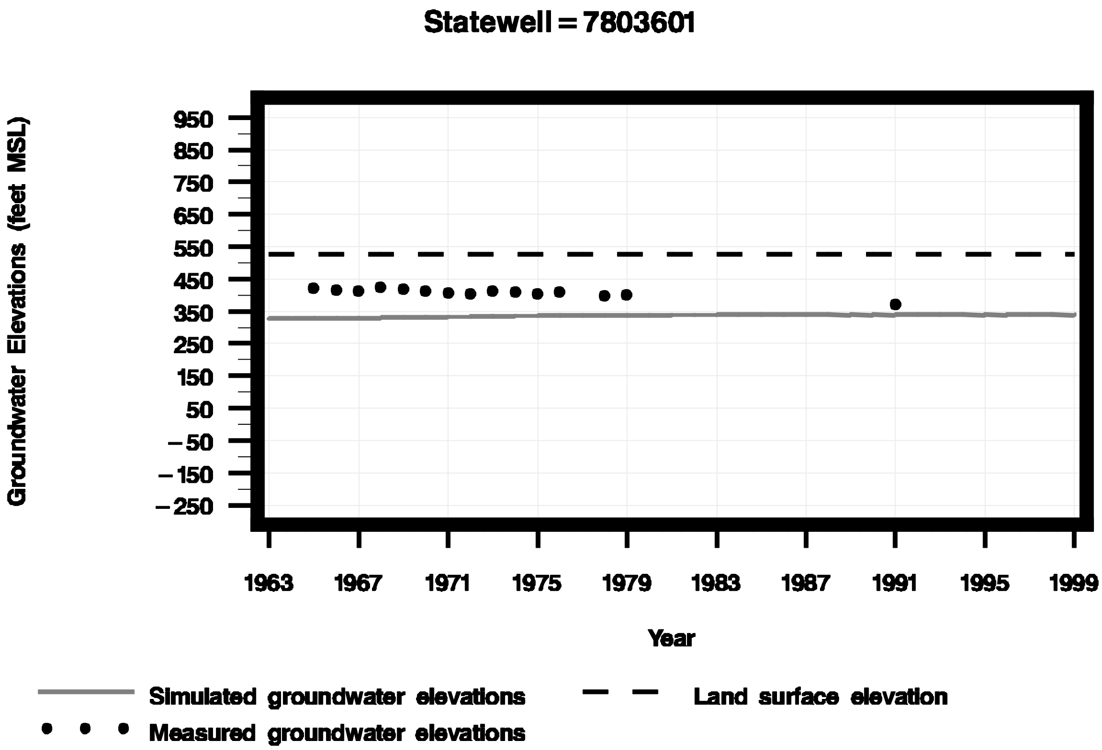
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7803601
Groundwater Elevations (feet MSL)
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1967
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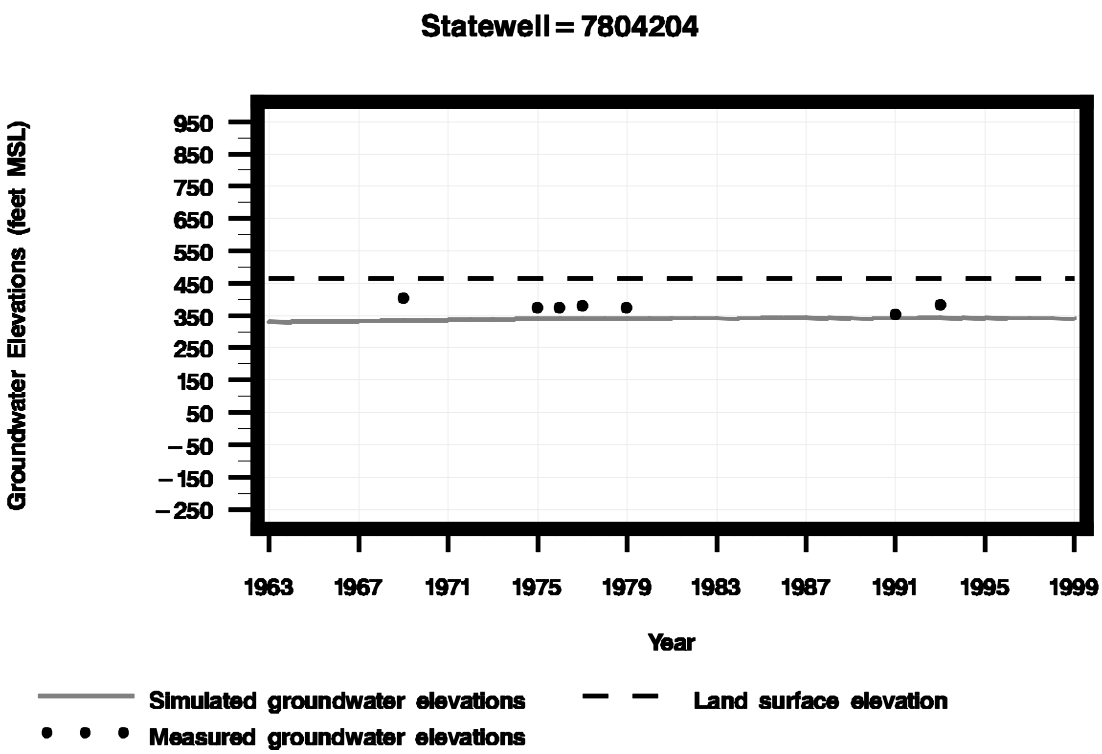
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7804204
Groundwater Elevations (feet MSL)
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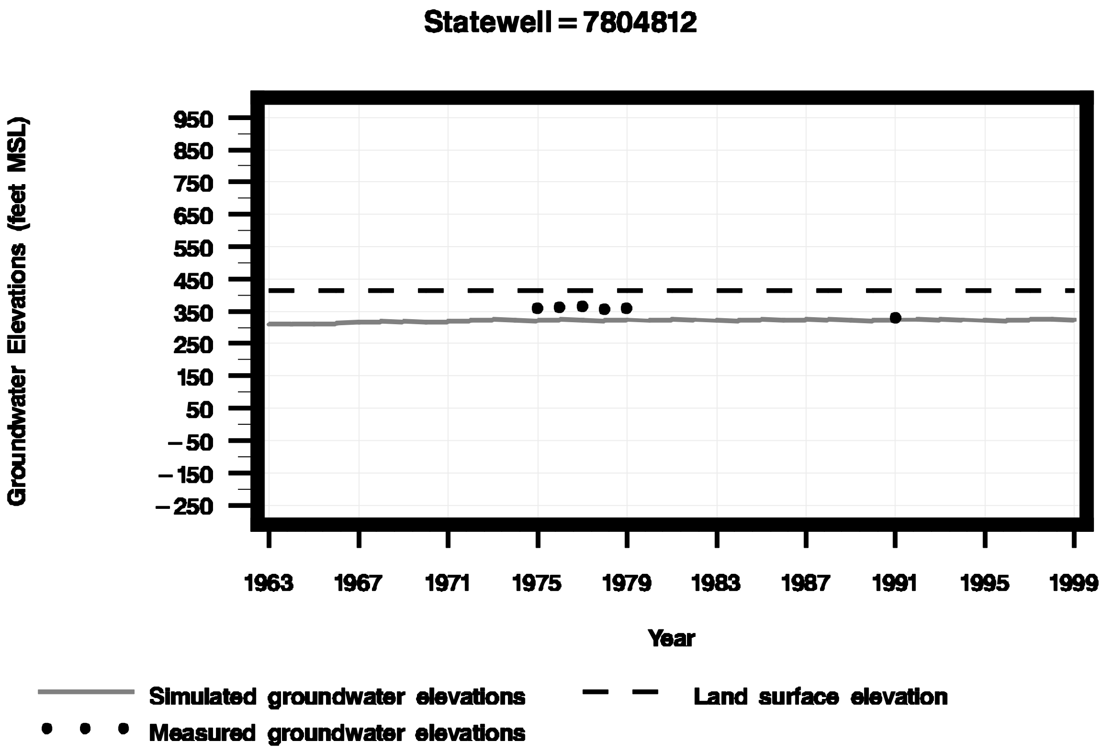
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7804812
Groundwater Elevations (feet MSL)
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450
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50
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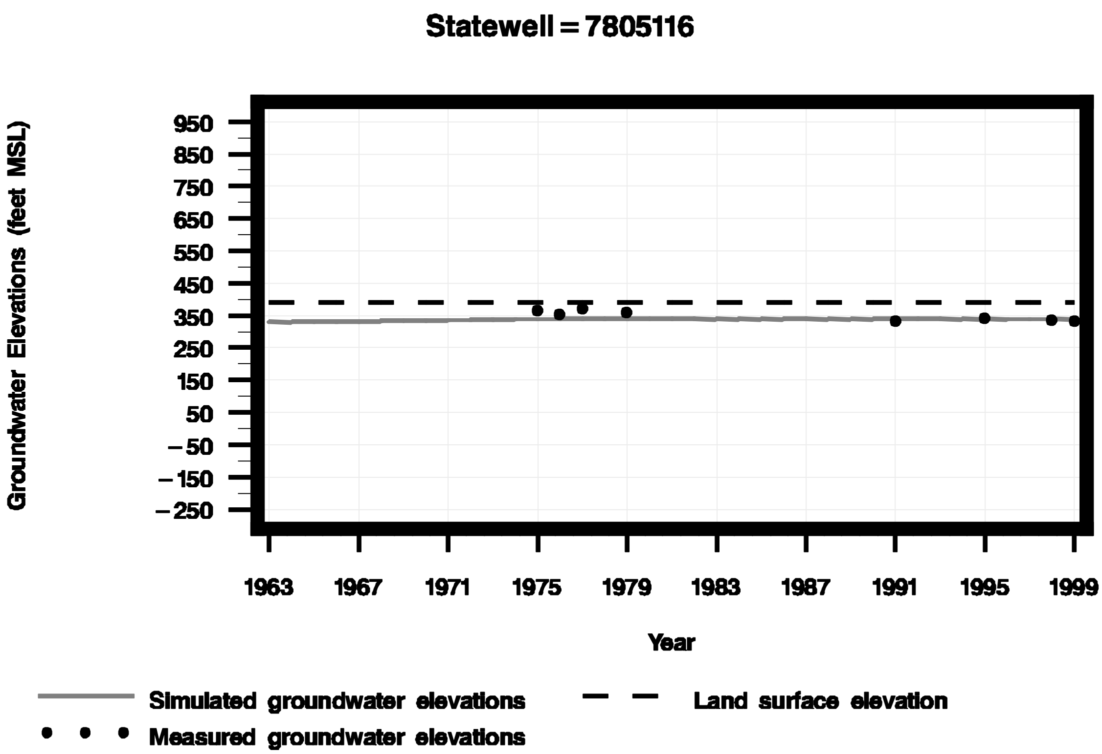
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7805116
Groundwater Elevations (feet MSL)
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1963
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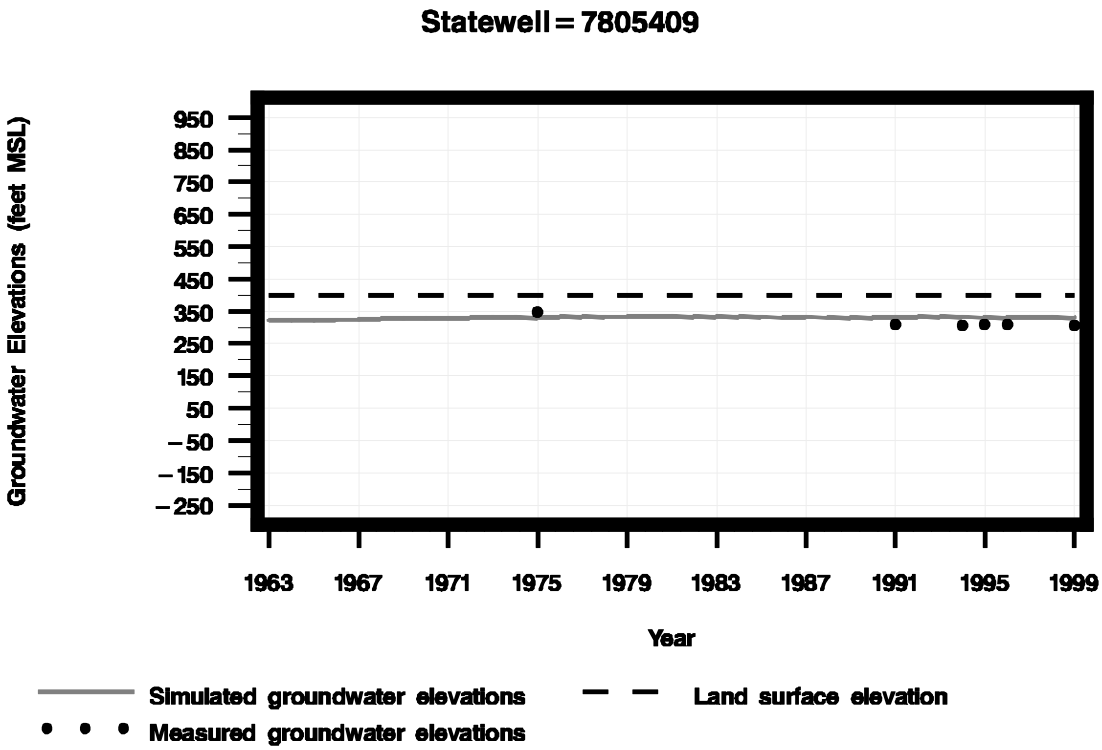
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7805409
Groundwater Elevations (feet MSL)
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450
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50
−50
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1963
1967
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1983
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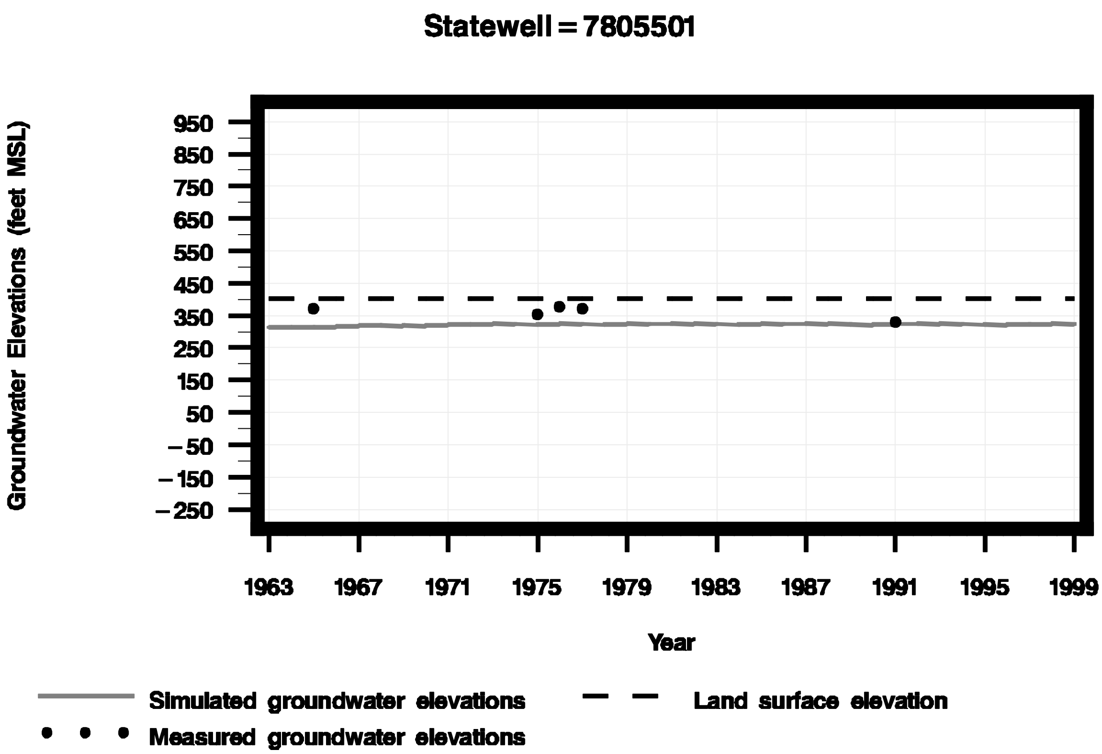
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7805501
Groundwater Elevations (feet MSL)
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650
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450
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250
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50
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1983
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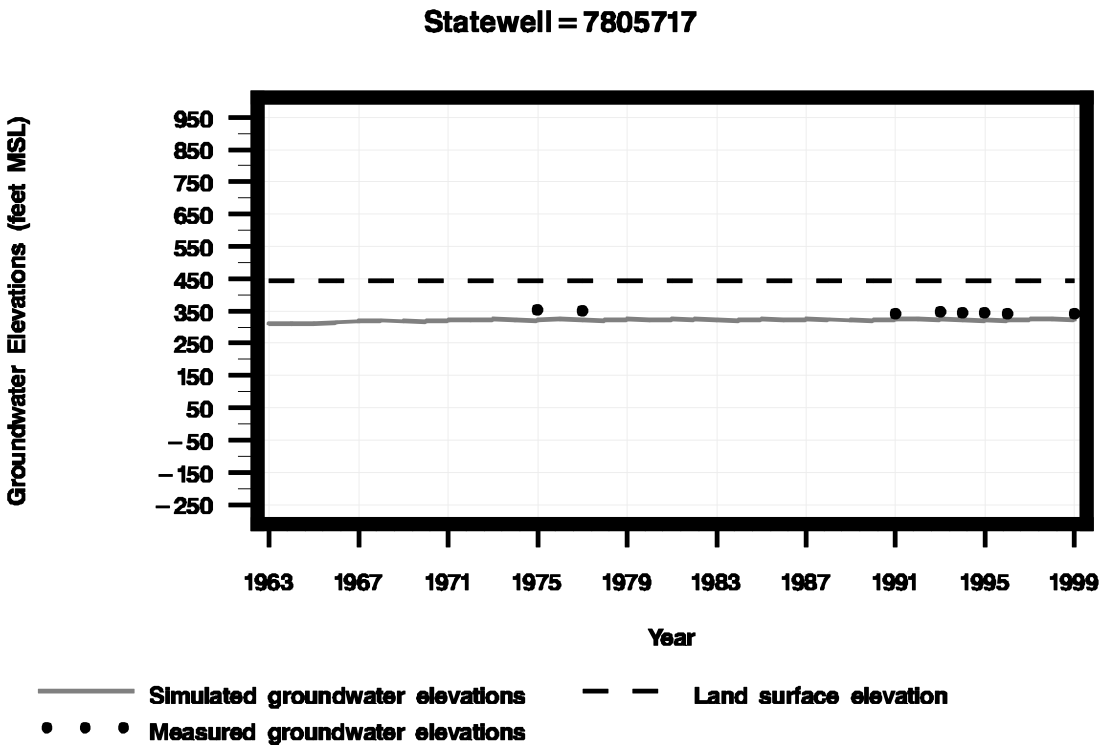
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7805717
Groundwater Elevations (feet MSL)
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50
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1967
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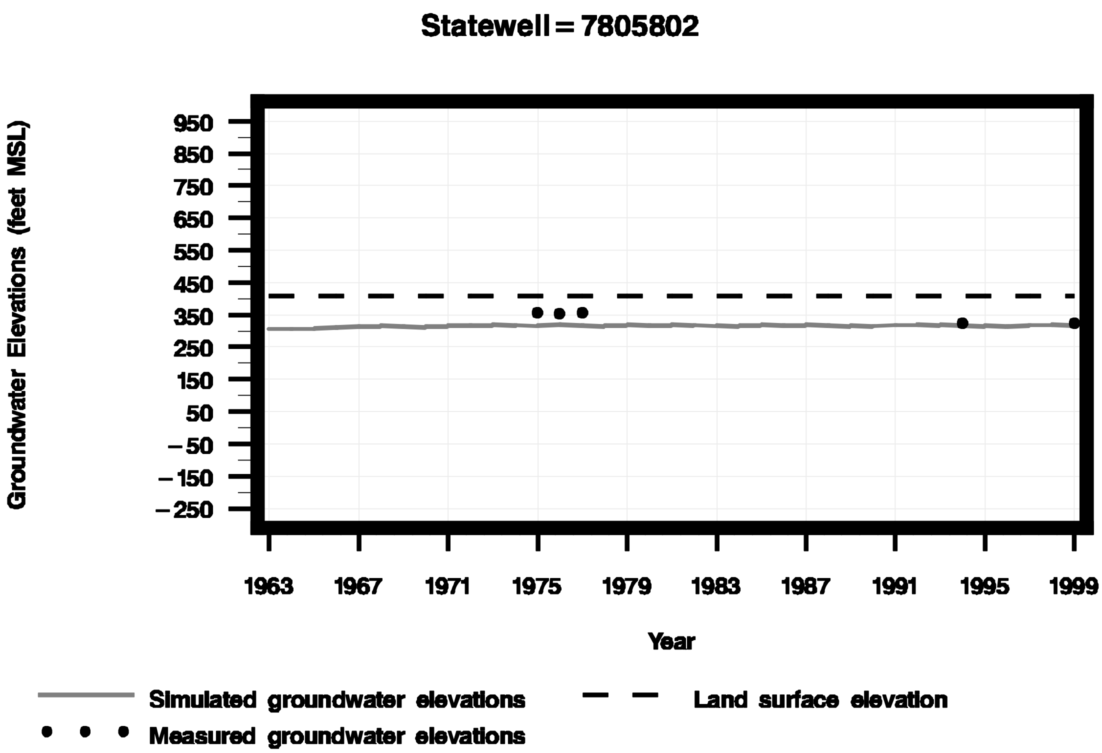
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7805802
Groundwater Elevations (feet MSL)
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450
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50
−50
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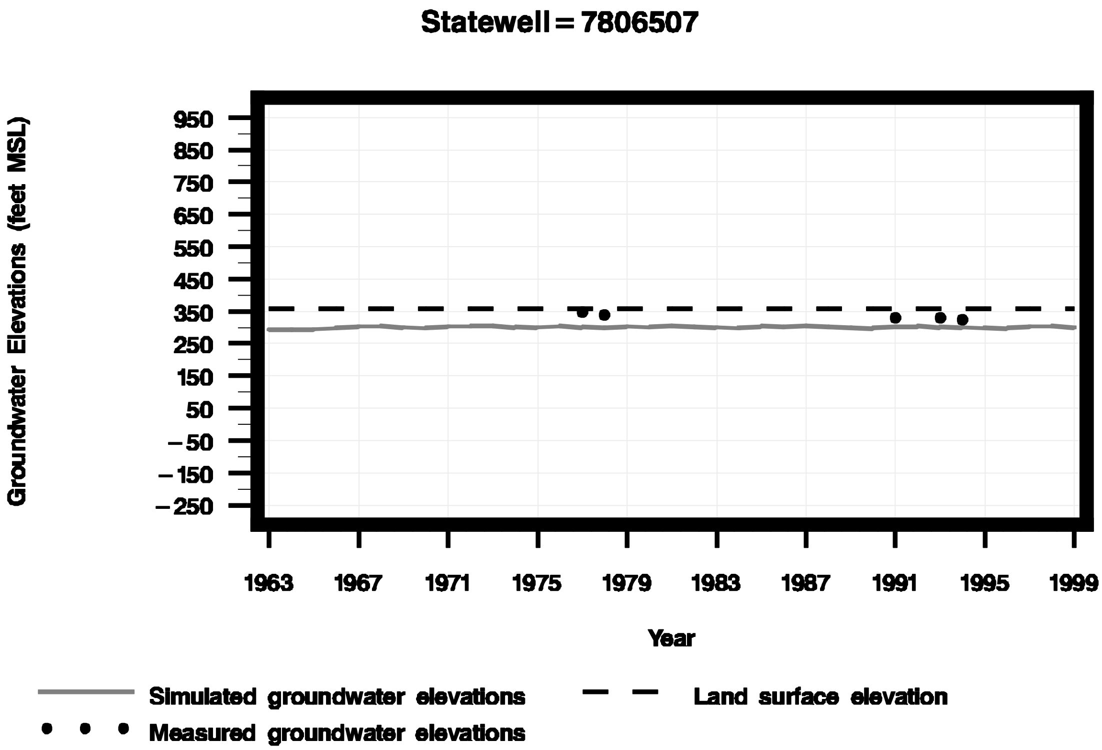
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7806507
Groundwater Elevations (feet MSL)
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450
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−50
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1967
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1983
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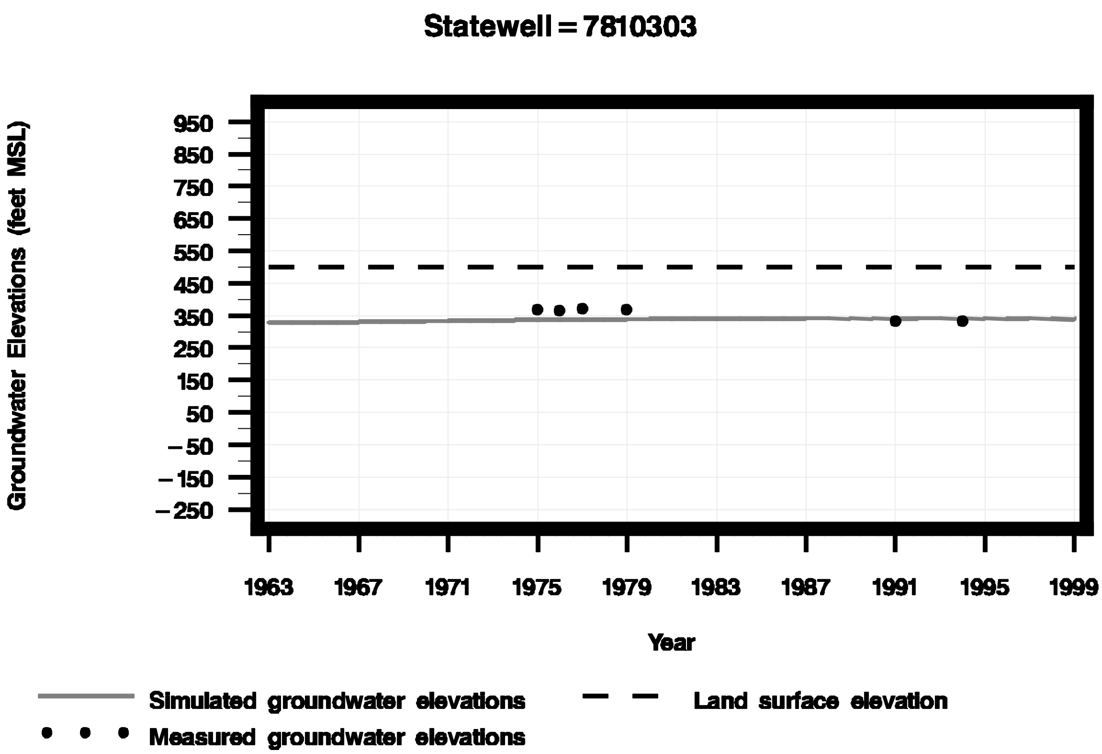
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7810303
Groundwater Elevations (feet MSL)
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750
650
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450
350
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50
−50
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1963
1967
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1983
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1991
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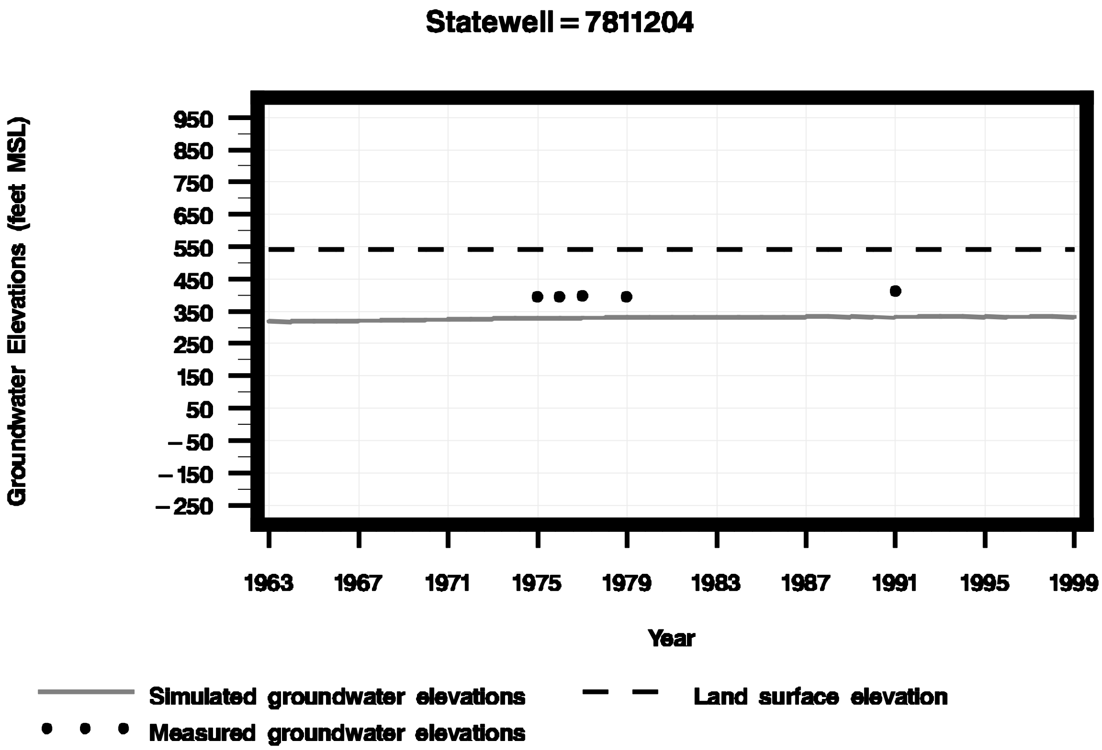
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7811204
Groundwater Elevations (feet MSL)
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650
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450
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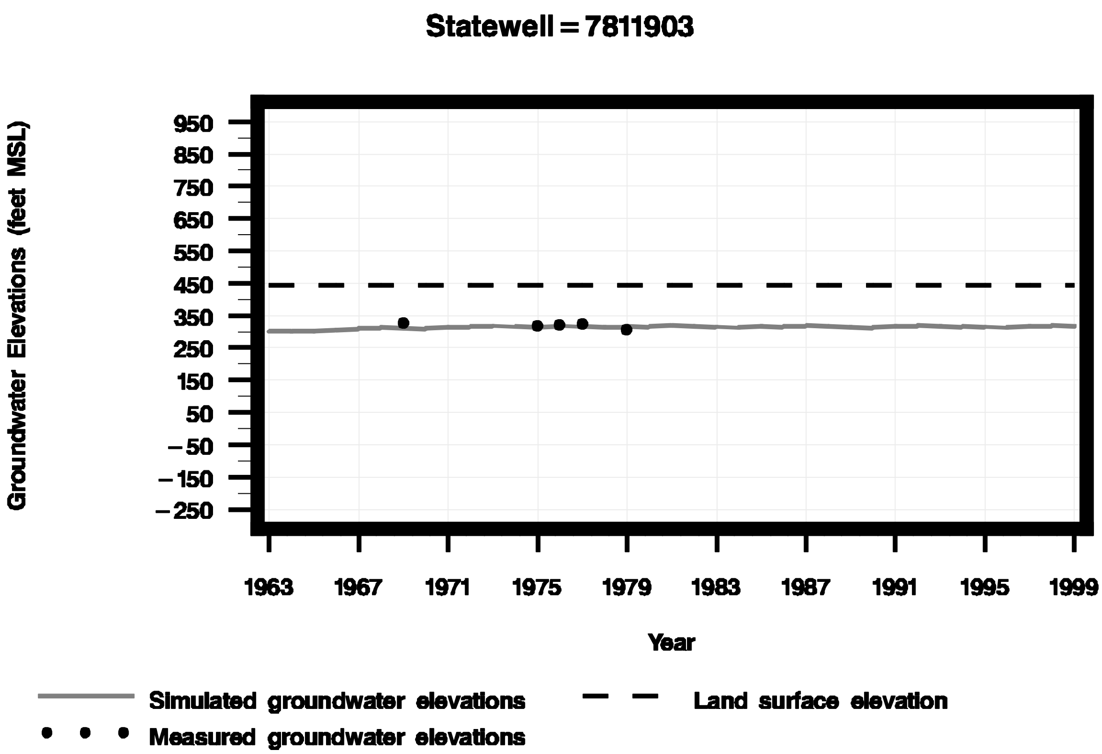
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7811903
Groundwater Elevations (feet MSL)
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850
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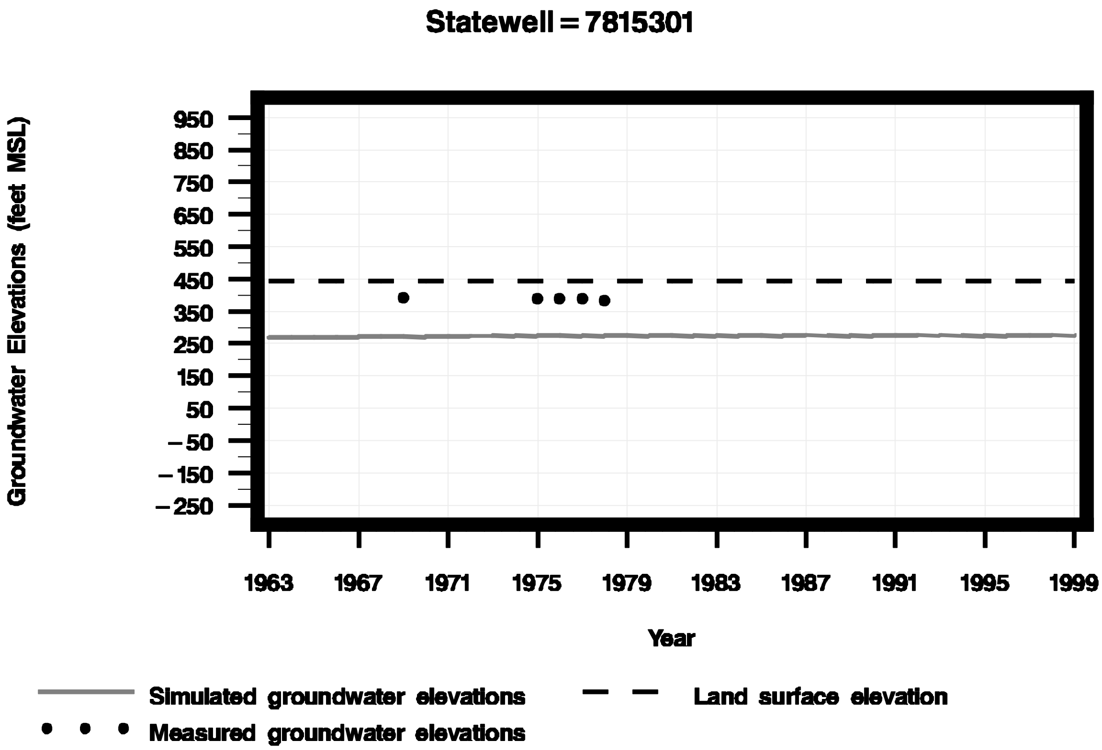
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7815301
Groundwater Elevations (feet MSL)
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450
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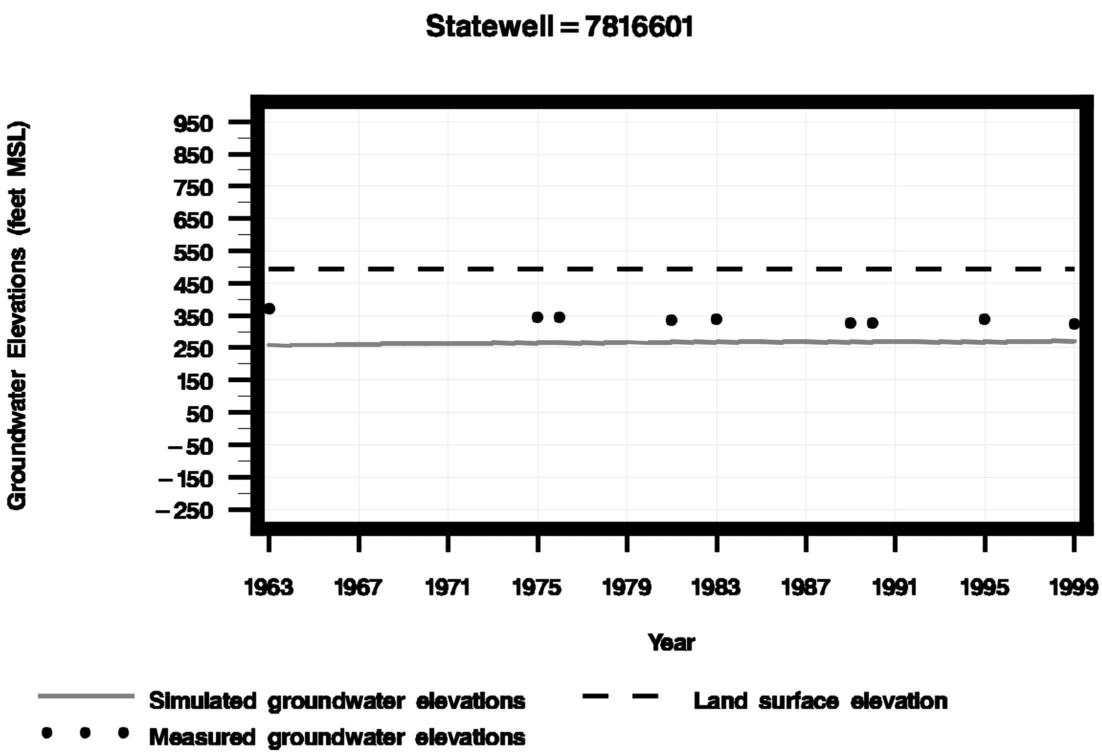
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7816601
Groundwater Elevations (feet MSL)
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450
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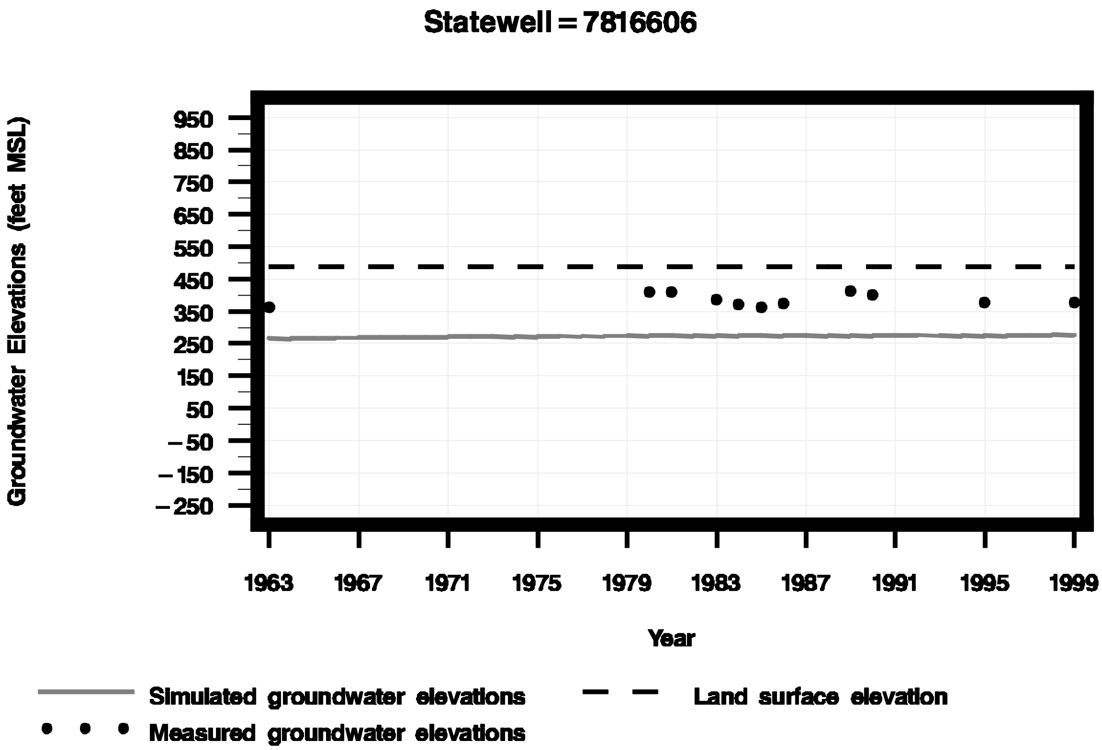
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7816606
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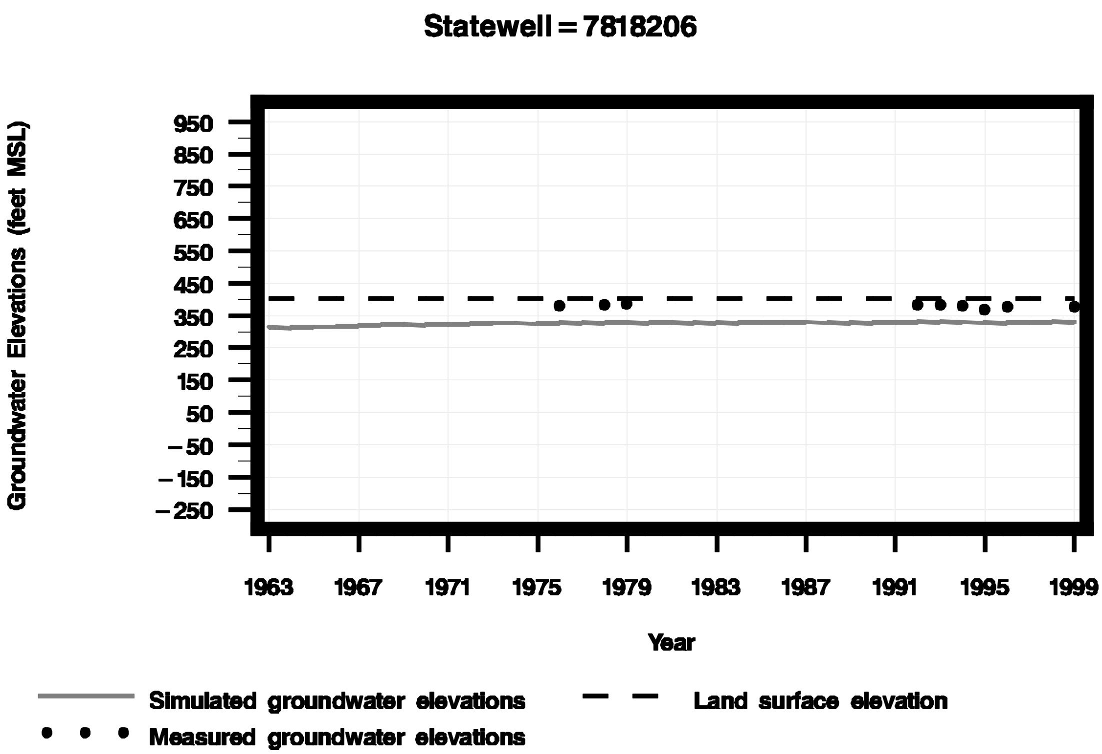
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 7818206
Groundwater Elevations (feet MSL)
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450
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−50
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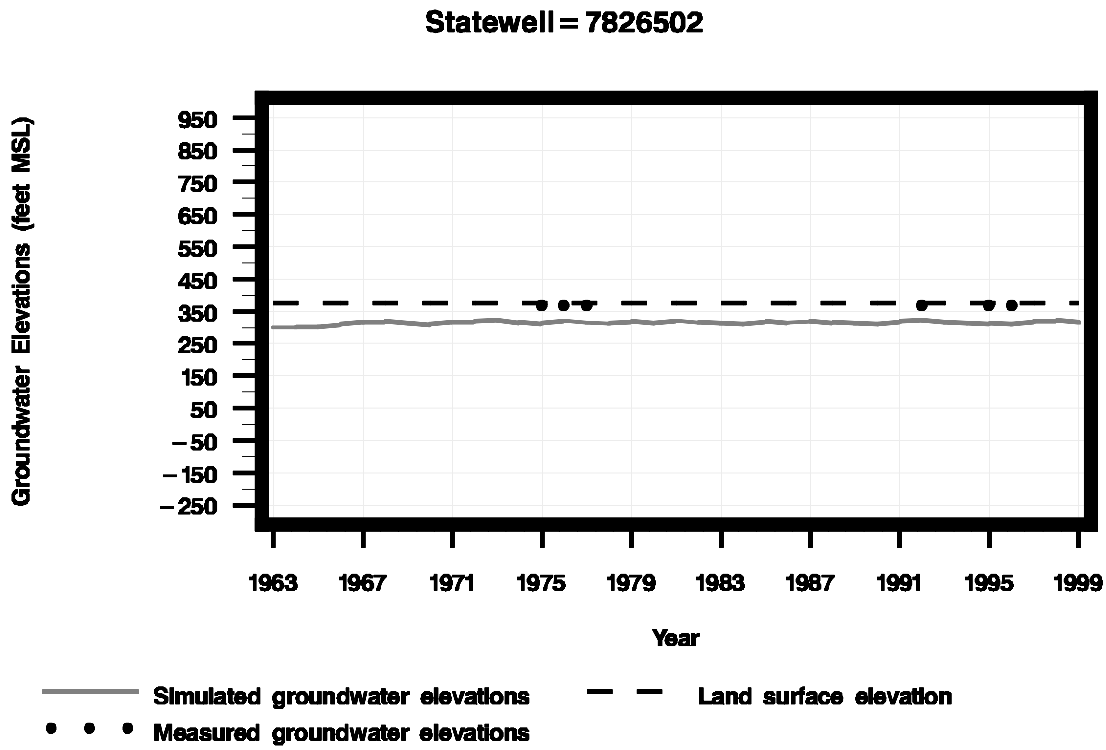
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 7826502
Groundwater Elevations (feet MSL)
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1991
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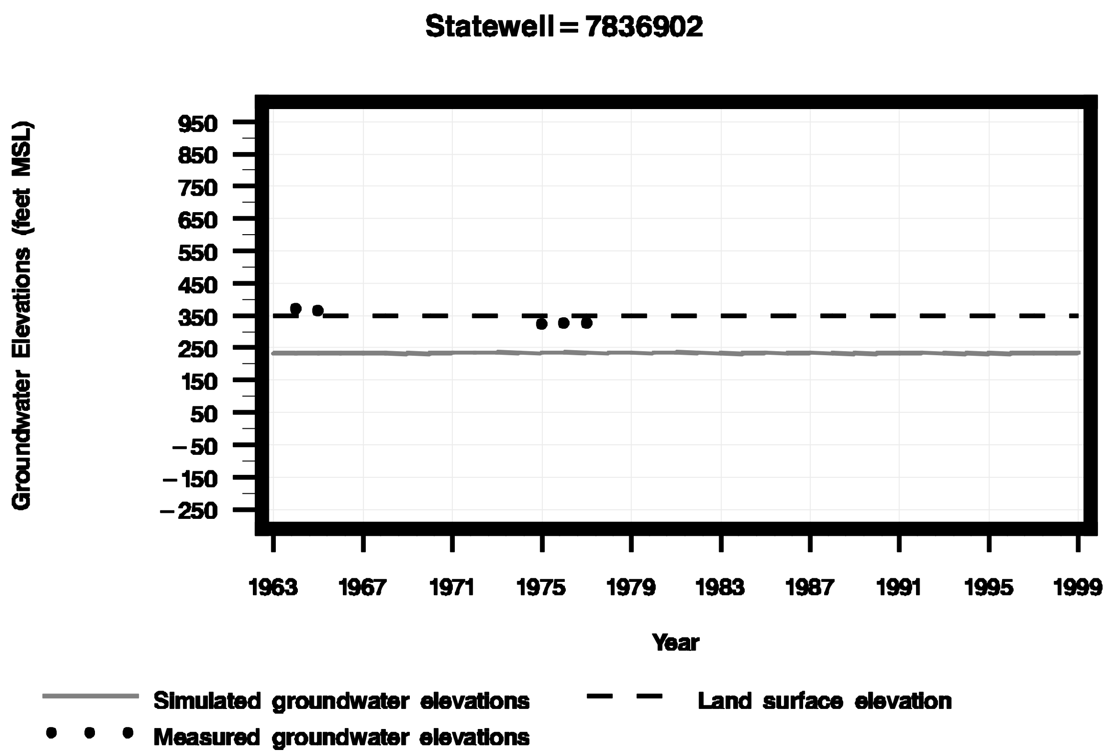
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7836902
Groundwater Elevations (feet MSL)
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750
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550
450
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−50
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1967
1971
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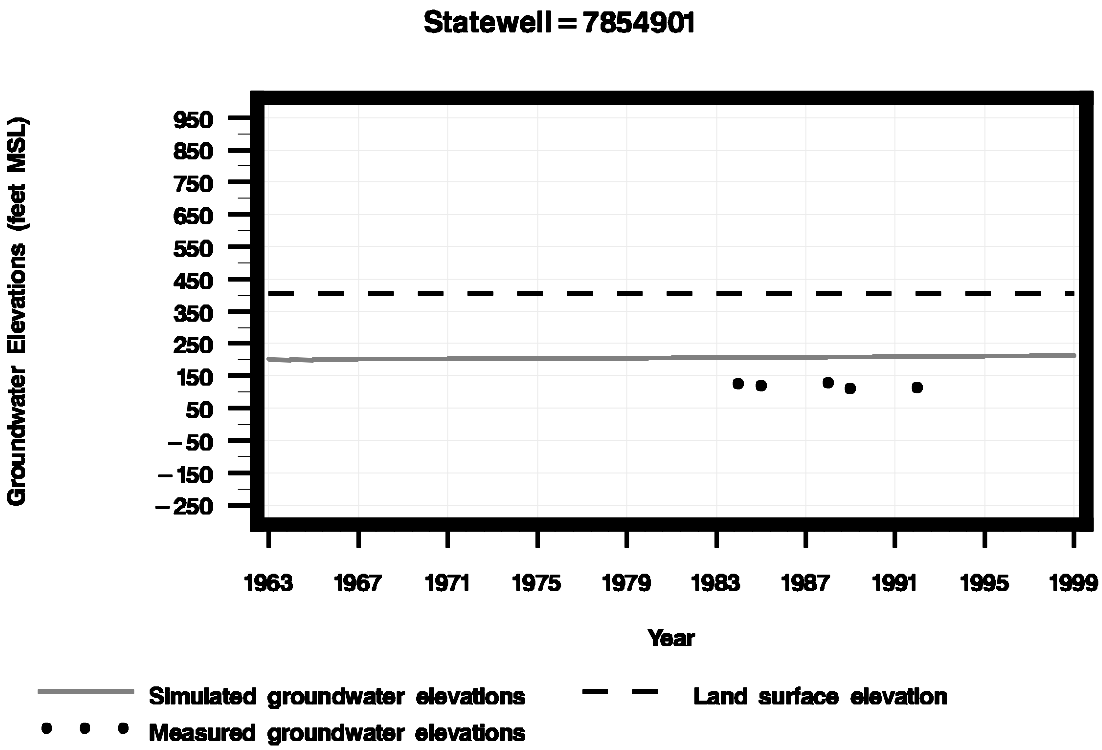
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7854901
Groundwater Elevations (feet MSL)
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450
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−50
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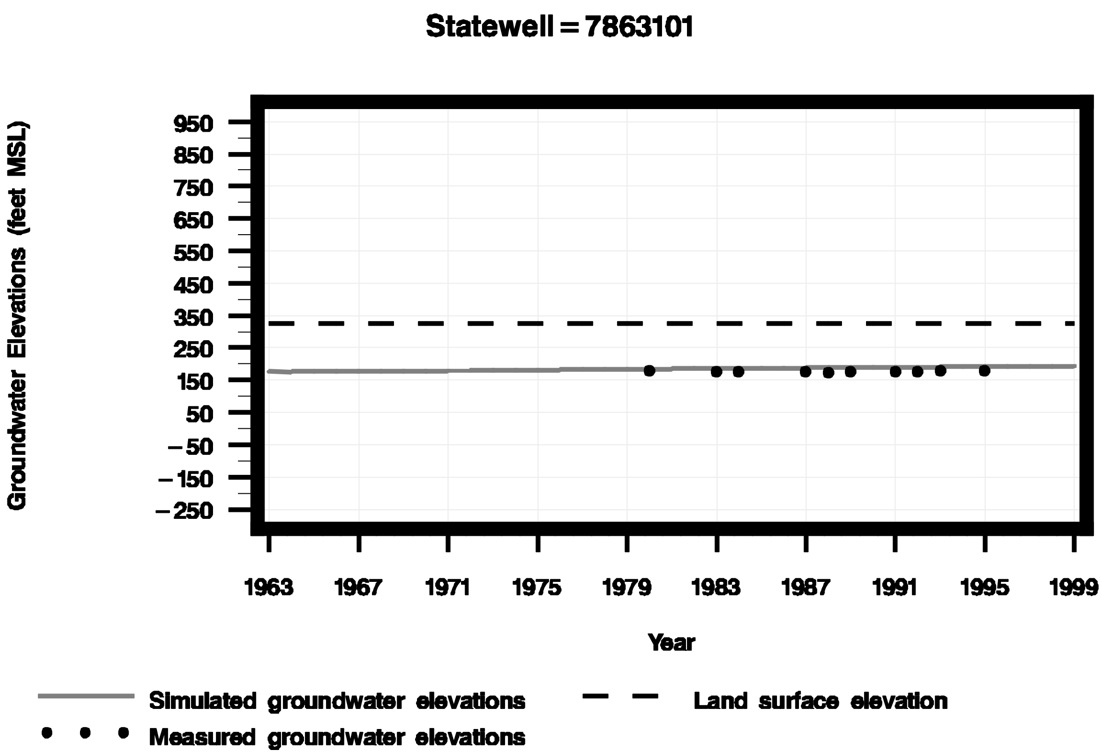
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7863101
Groundwater Elevations (feet MSL)
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450
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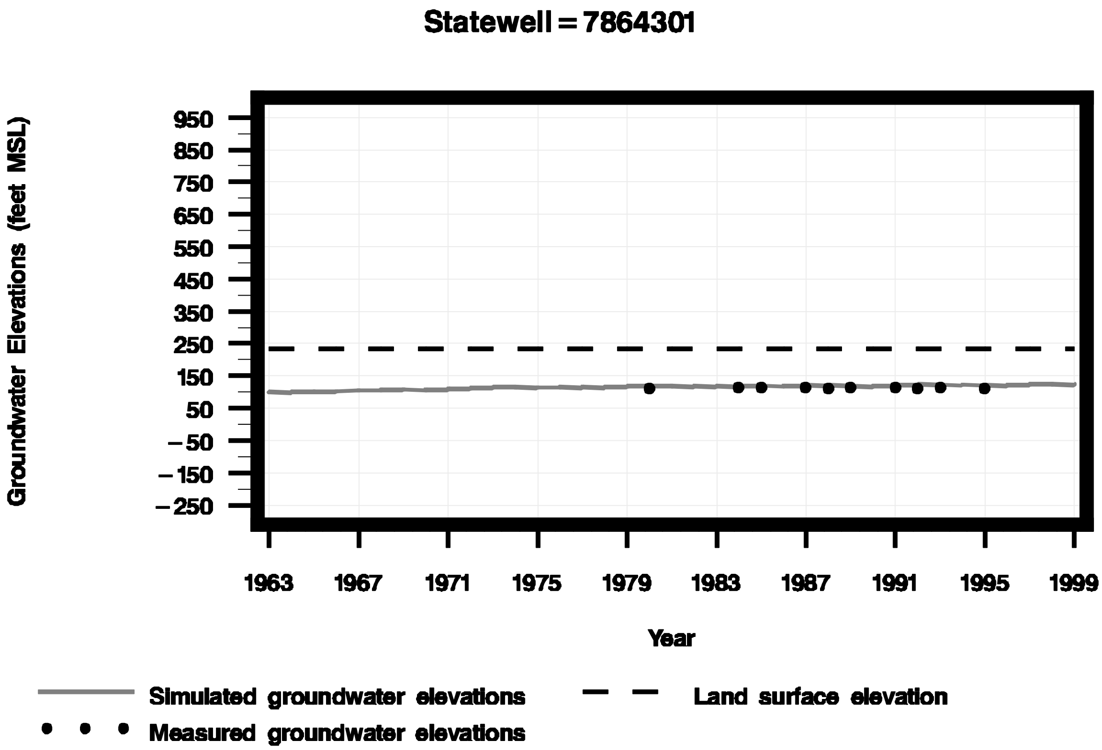
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7864301
Groundwater Elevations (feet MSL)
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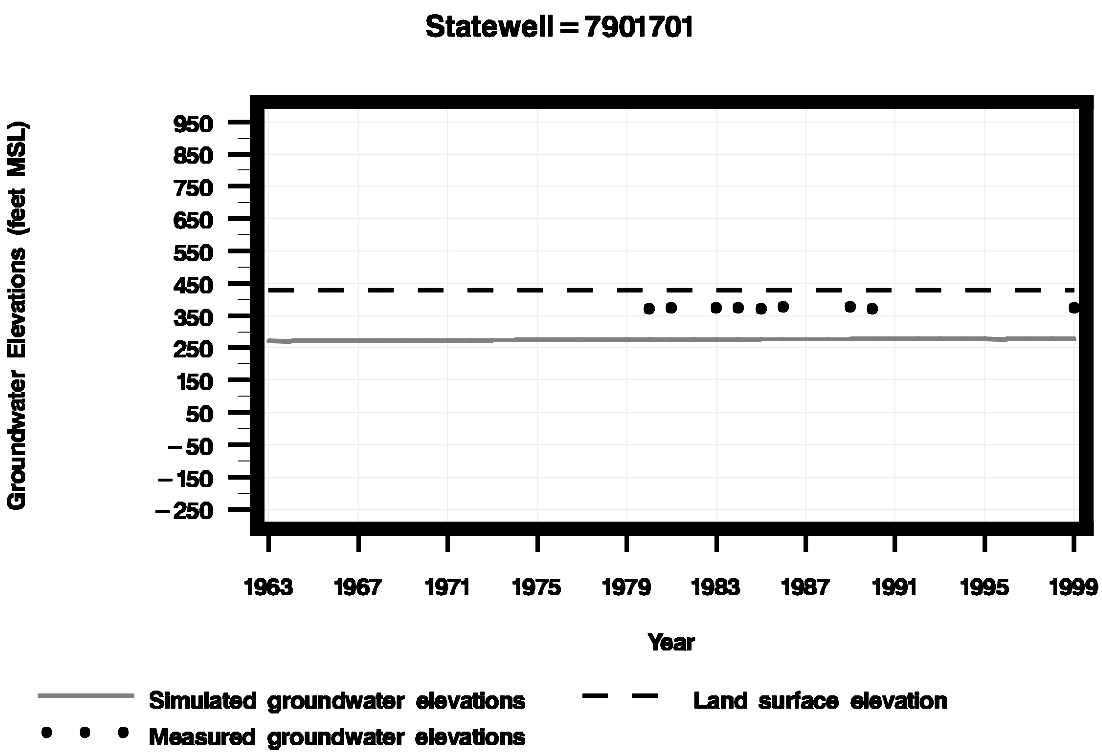
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7901701
Groundwater Elevations (feet MSL)
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750
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450
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50
−50
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−250
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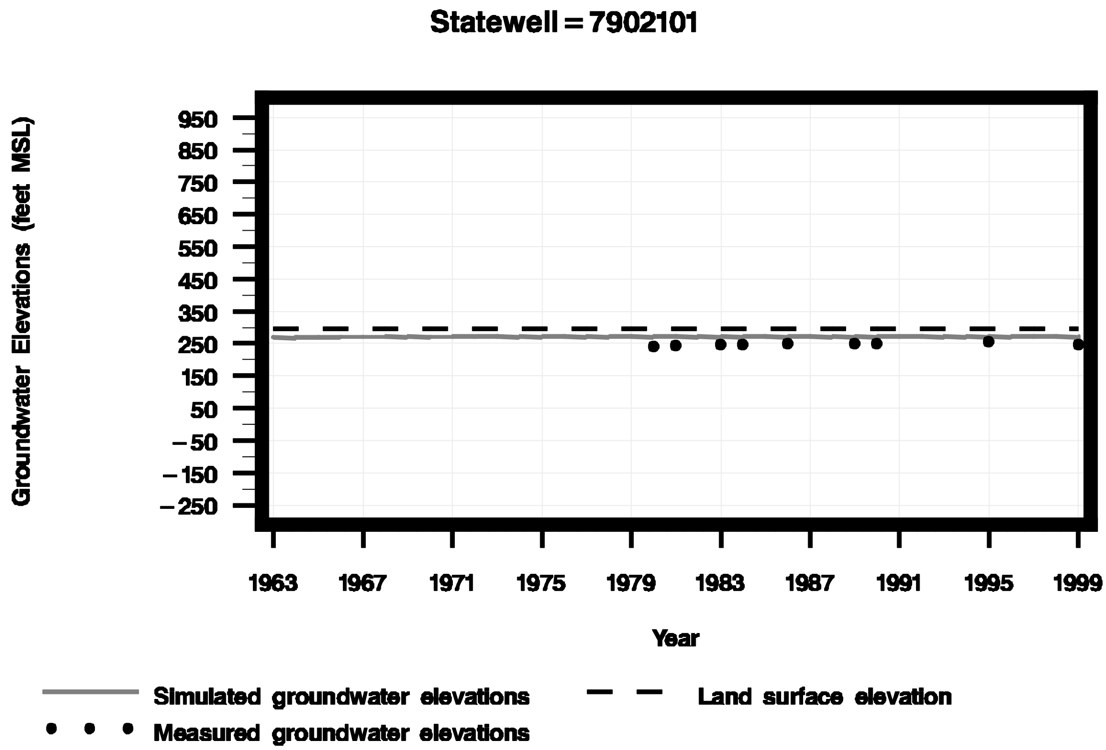
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7902101
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
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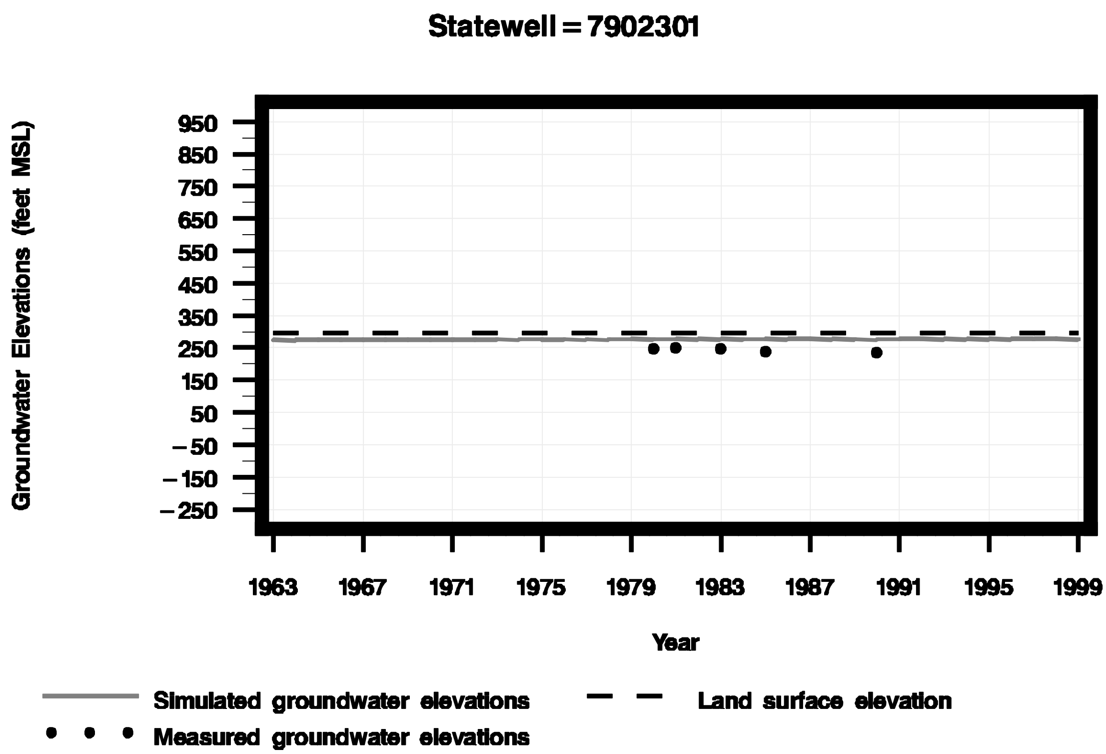
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7902301
Groundwater Elevations (feet MSL)
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750
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550
450
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150
50
−50
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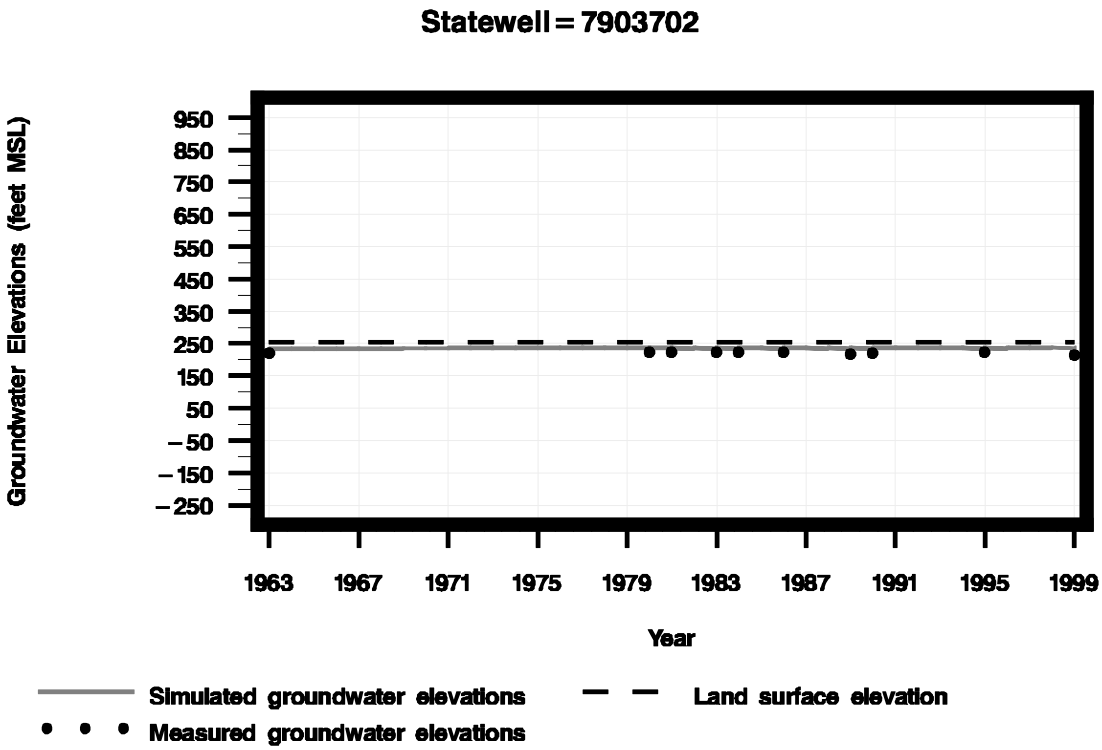
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7903702
Groundwater Elevations (feet MSL)
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450
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150
50
−50
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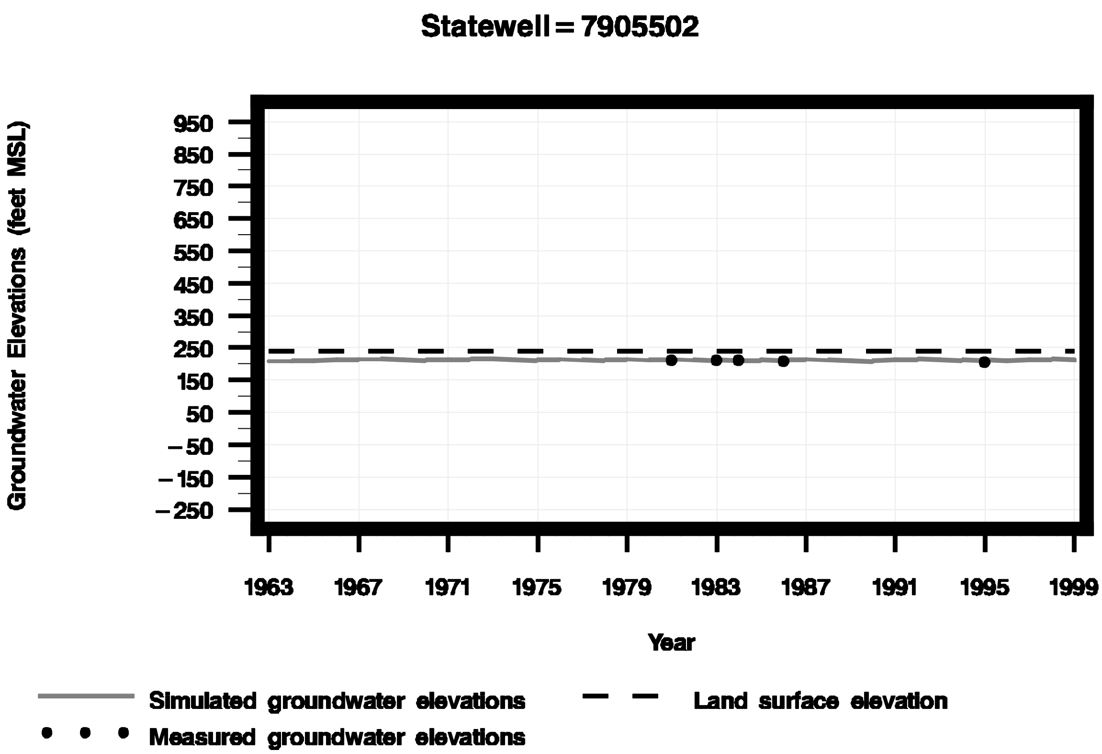
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7905502
Groundwater Elevations (feet MSL)
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50
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1967
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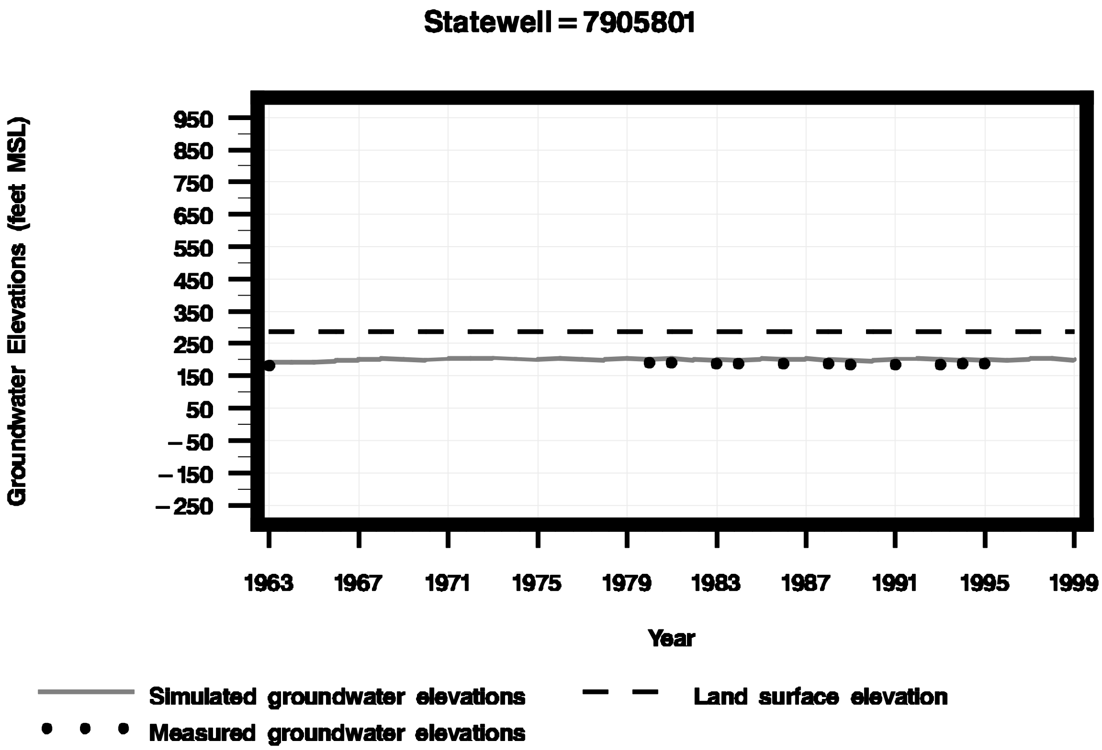
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7905801
Groundwater Elevations (feet MSL)
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450
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50
−50
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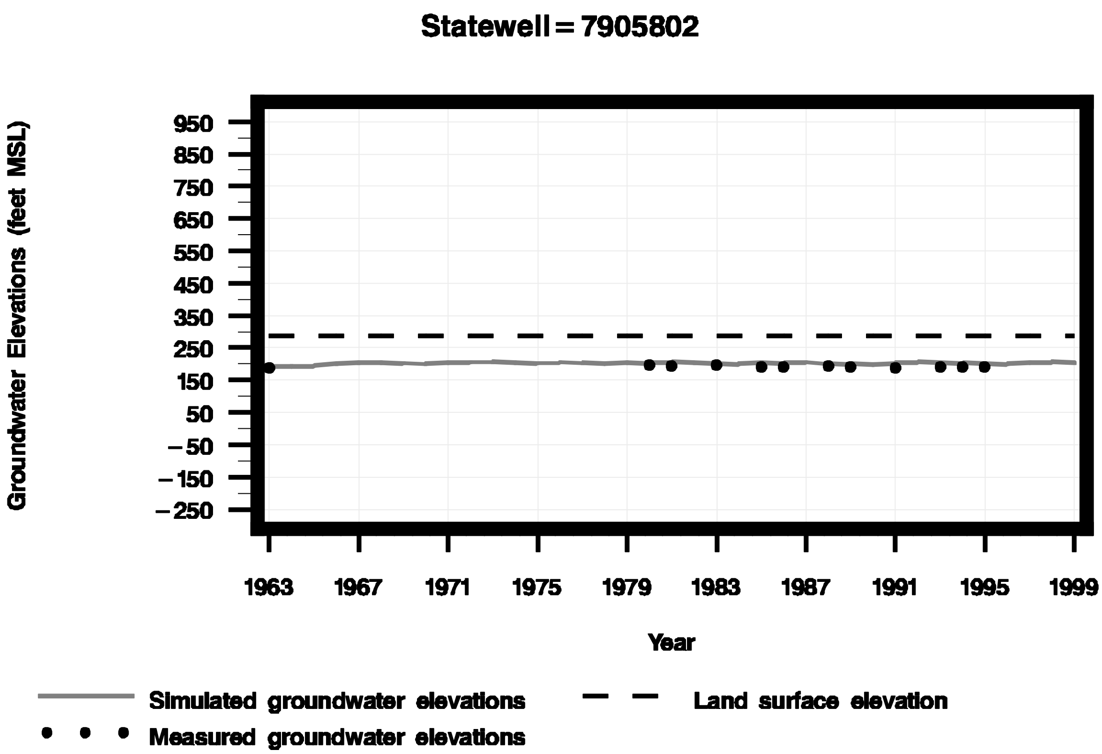
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 7905802
Groundwater Elevations (feet MSL)
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450
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50
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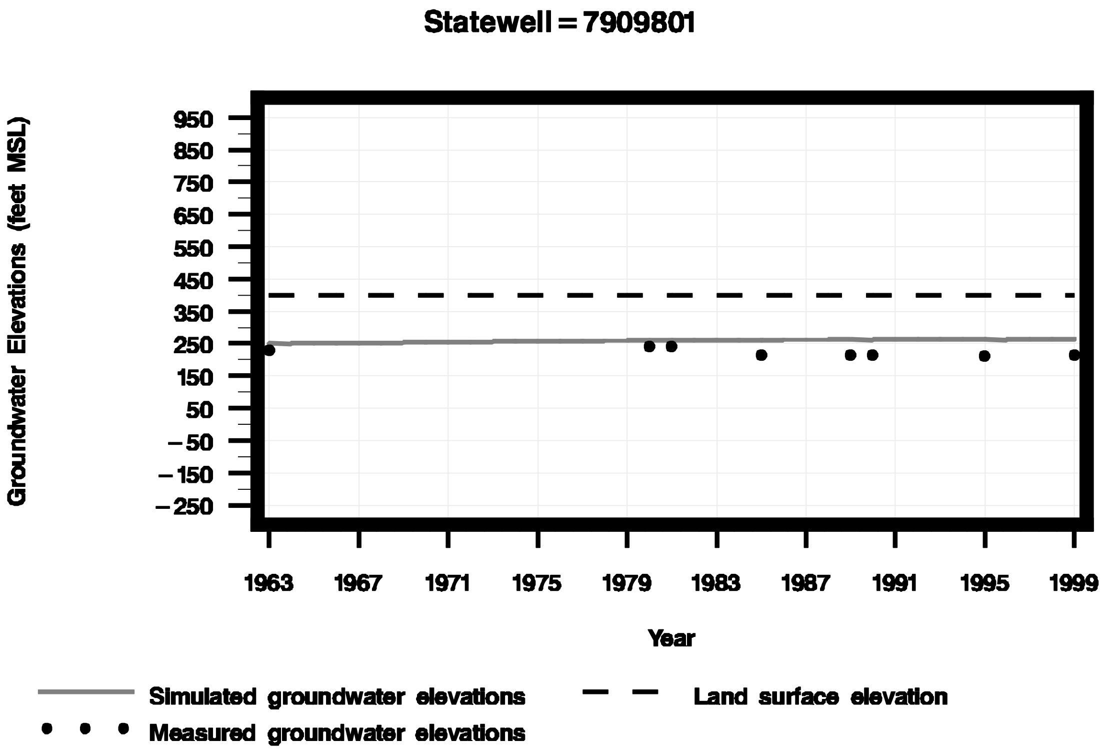
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 7909801
Groundwater Elevations (feet MSL)
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450
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150
50
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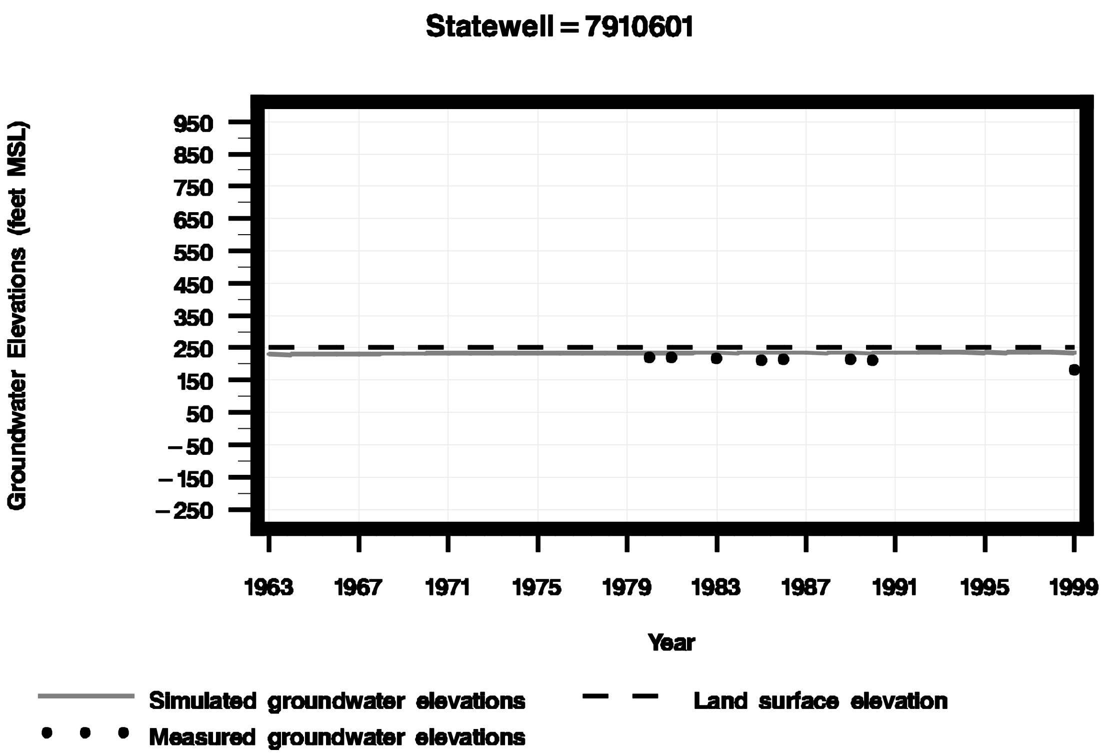
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7910601
Groundwater Elevations (feet MSL)
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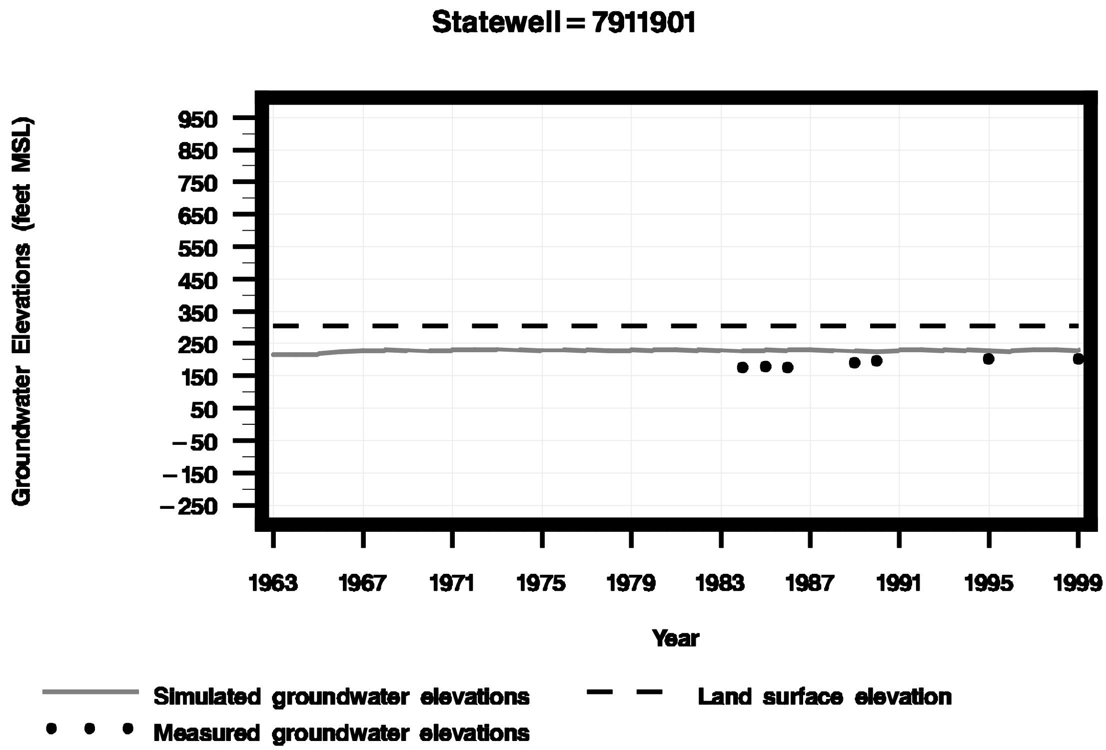
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7911901
Groundwater Elevations (feet MSL)
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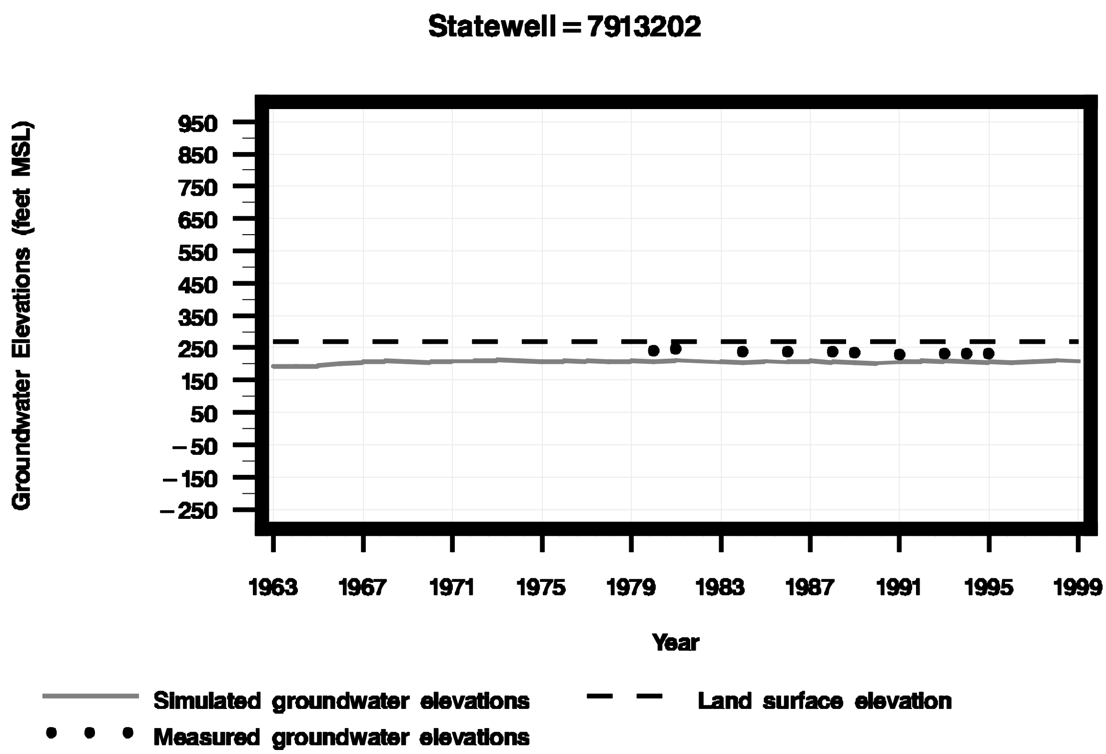
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7913202
Groundwater Elevations (feet MSL)
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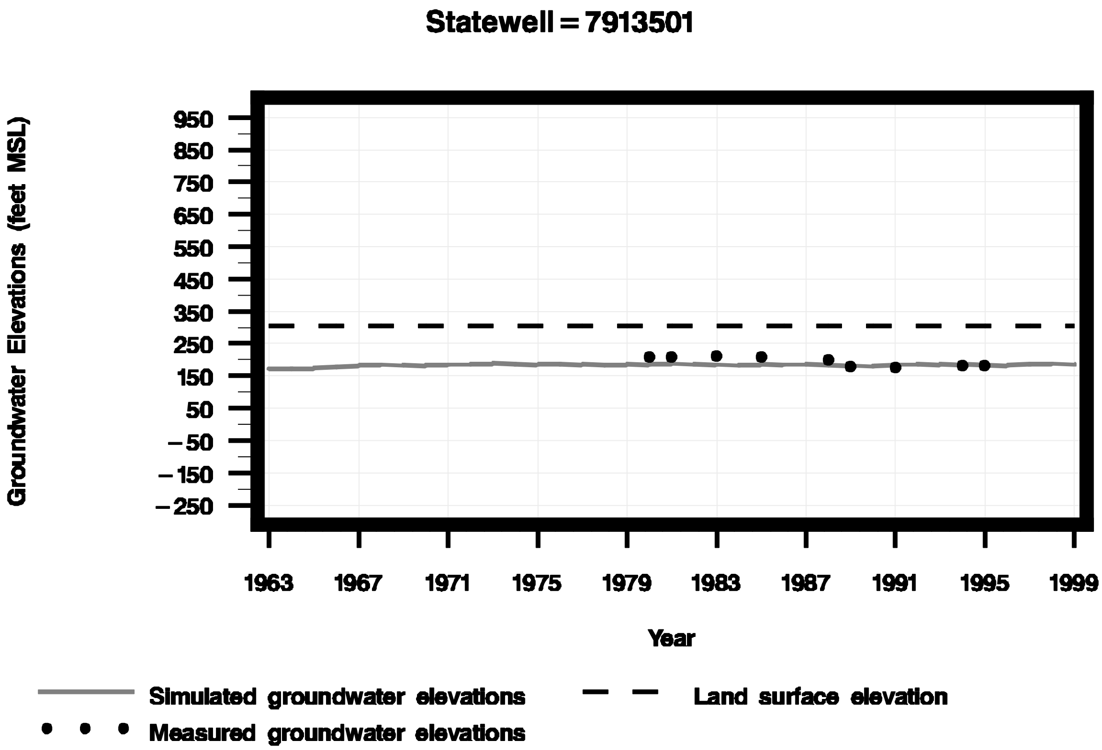
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7913501
Groundwater Elevations (feet MSL)
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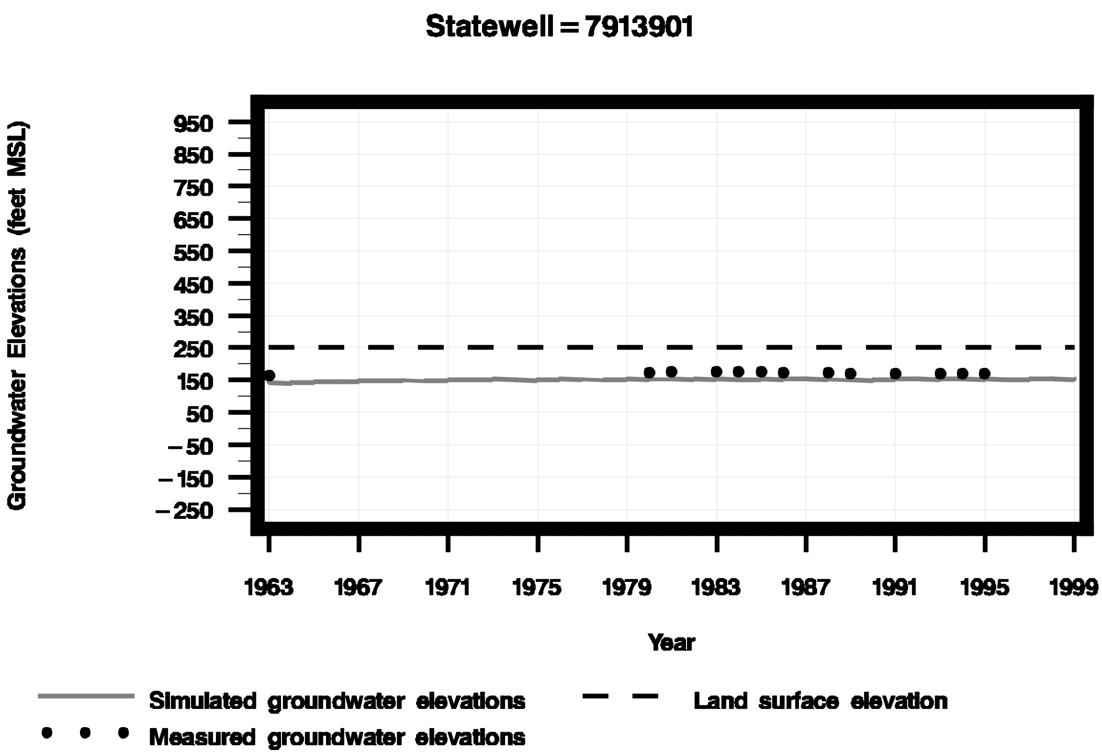
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7913901
Groundwater Elevations (feet MSL)
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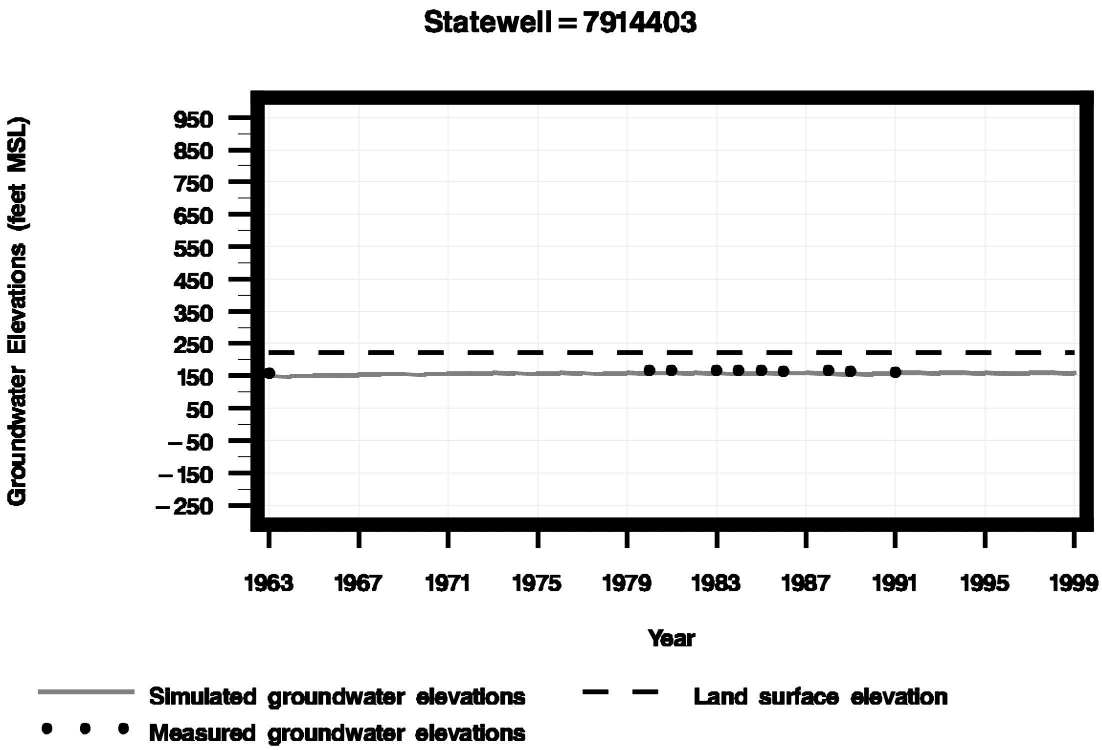
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7914403
Groundwater Elevations (feet MSL)
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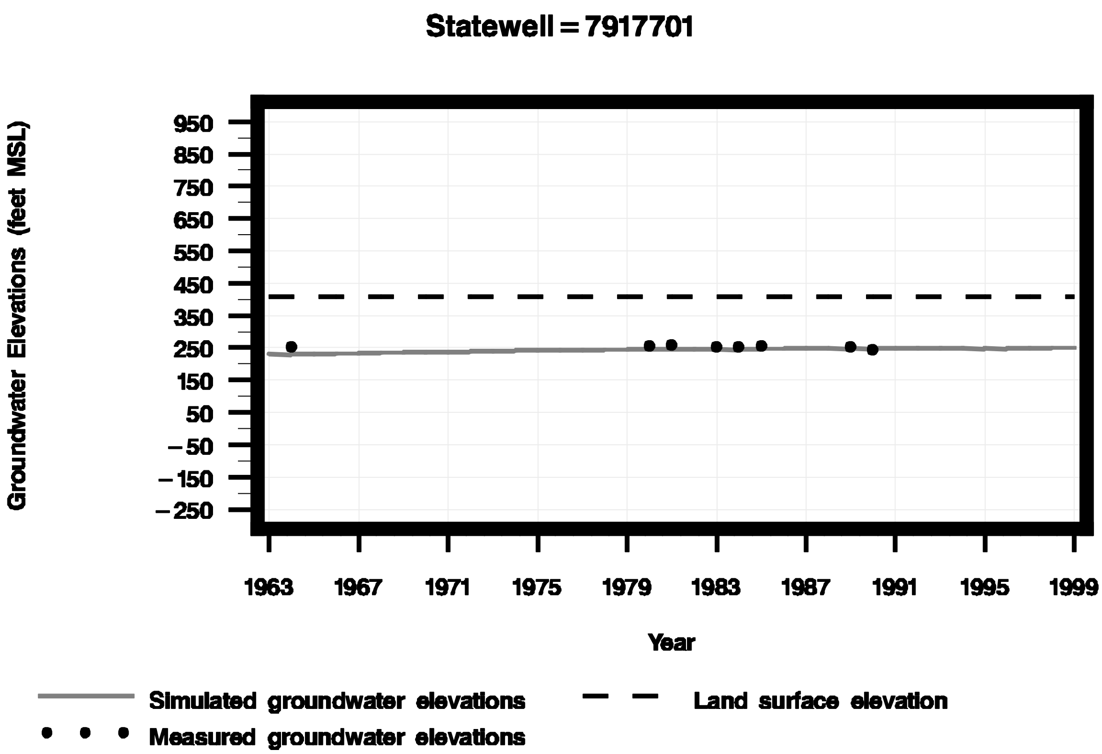
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7917701
Groundwater Elevations (feet MSL)
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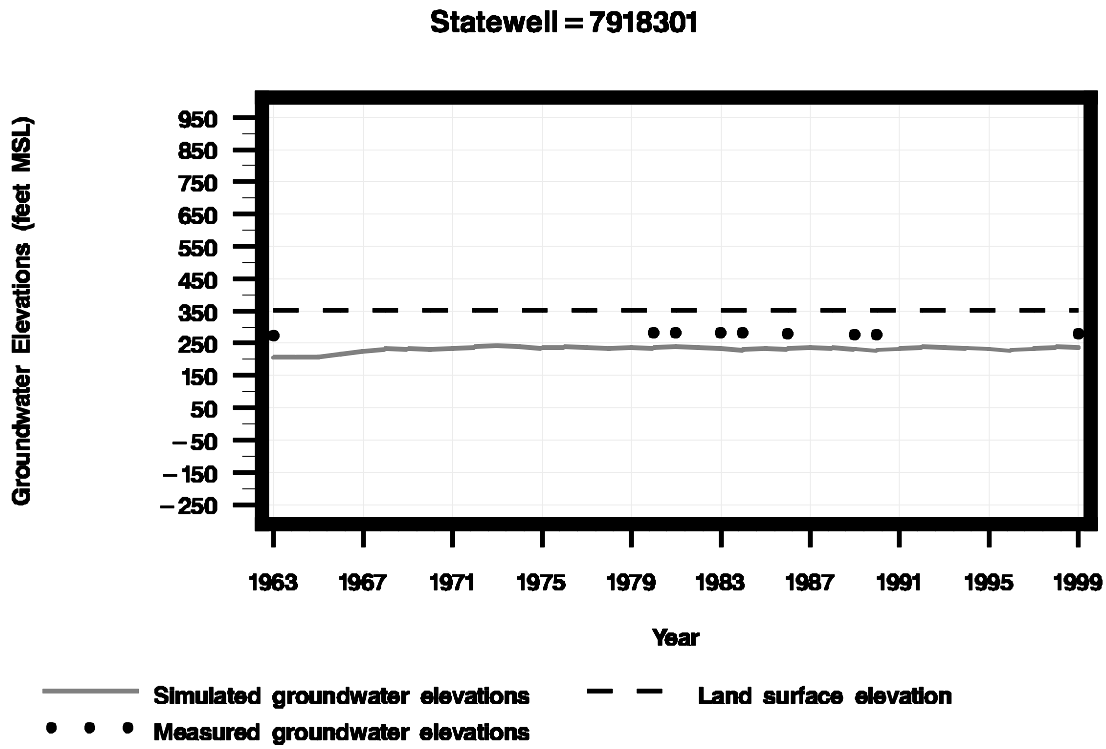
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7918301
Groundwater Elevations (feet MSL)
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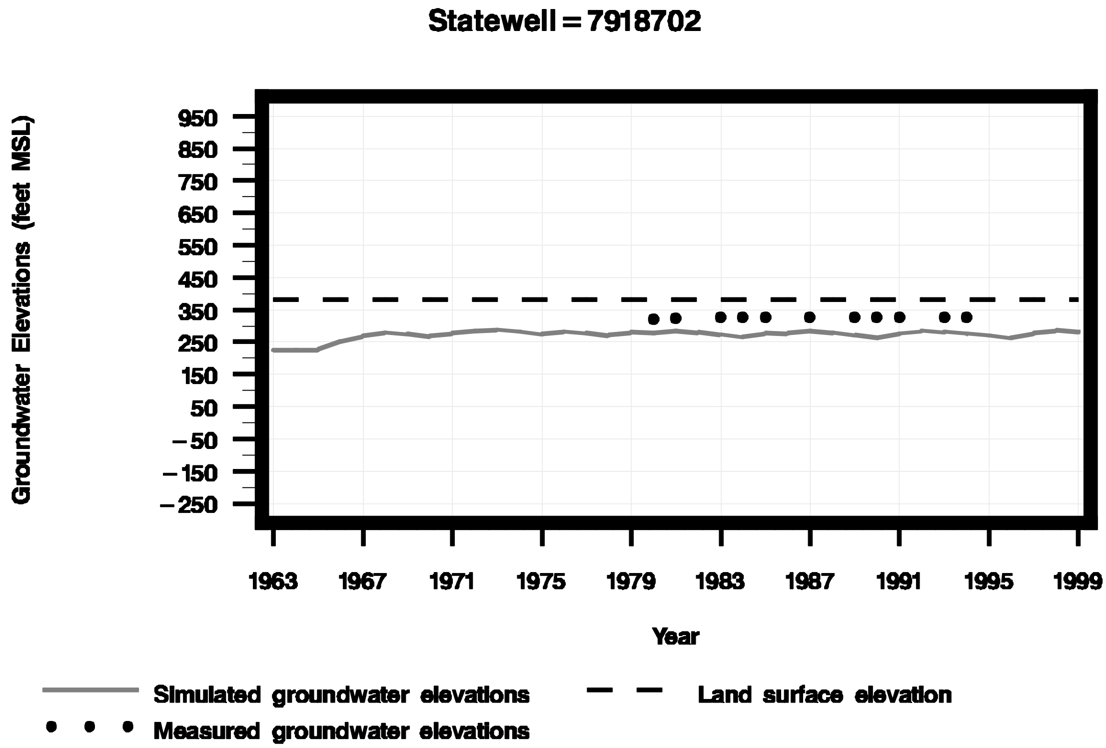
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7918702
Groundwater Elevations (feet MSL)
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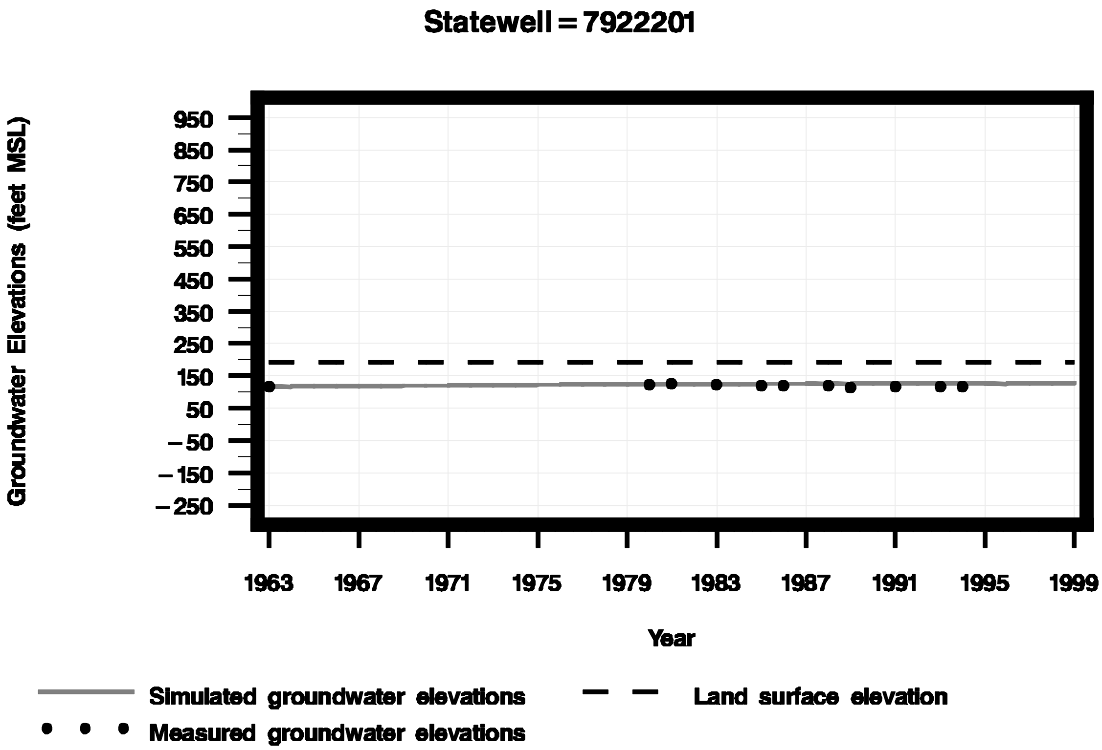
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7922201
Groundwater Elevations (feet MSL)
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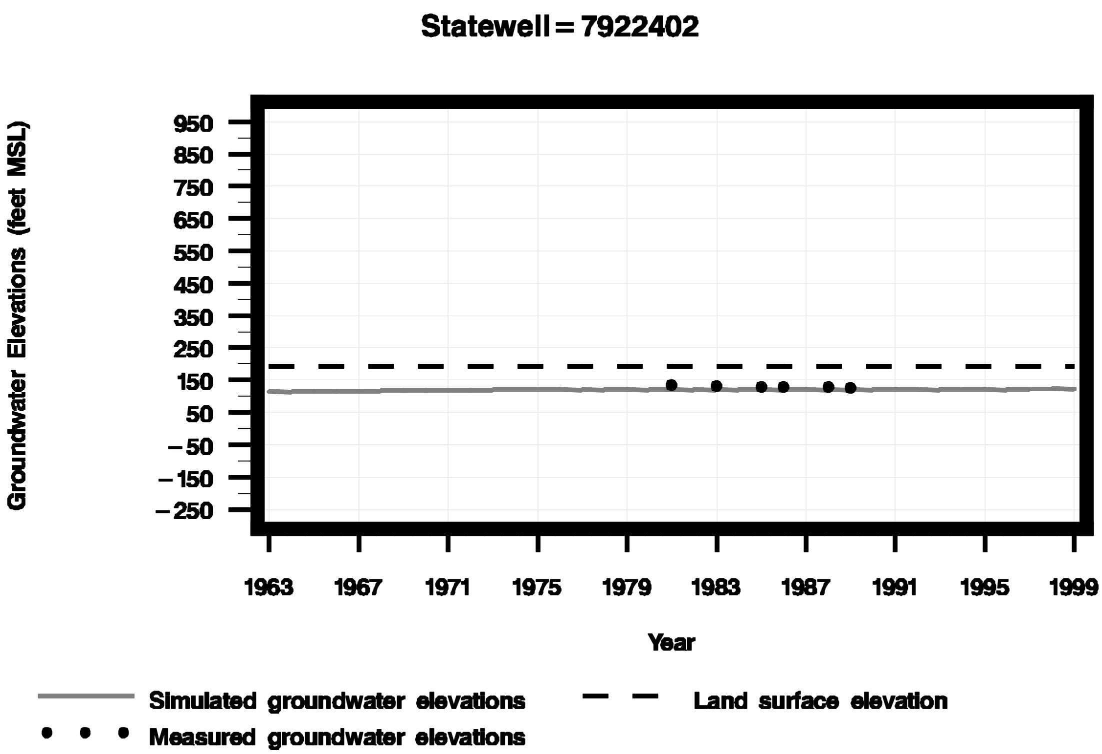
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7922402
Groundwater Elevations (feet MSL)
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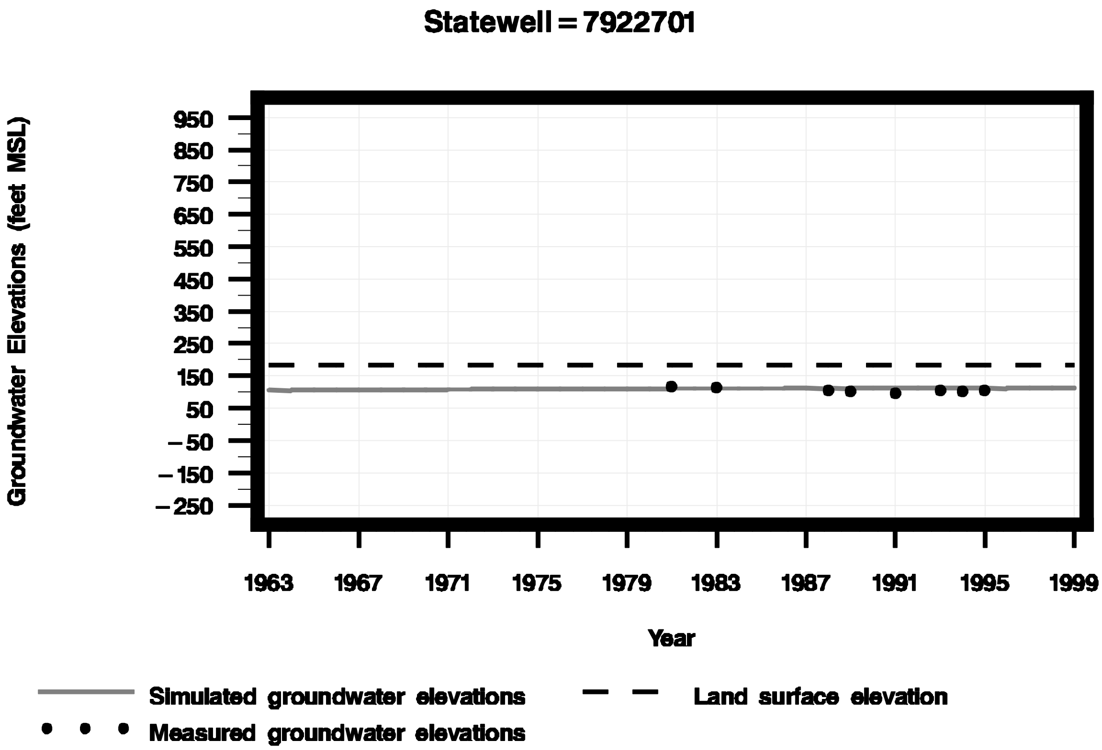
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7922701
Groundwater Elevations (feet MSL)
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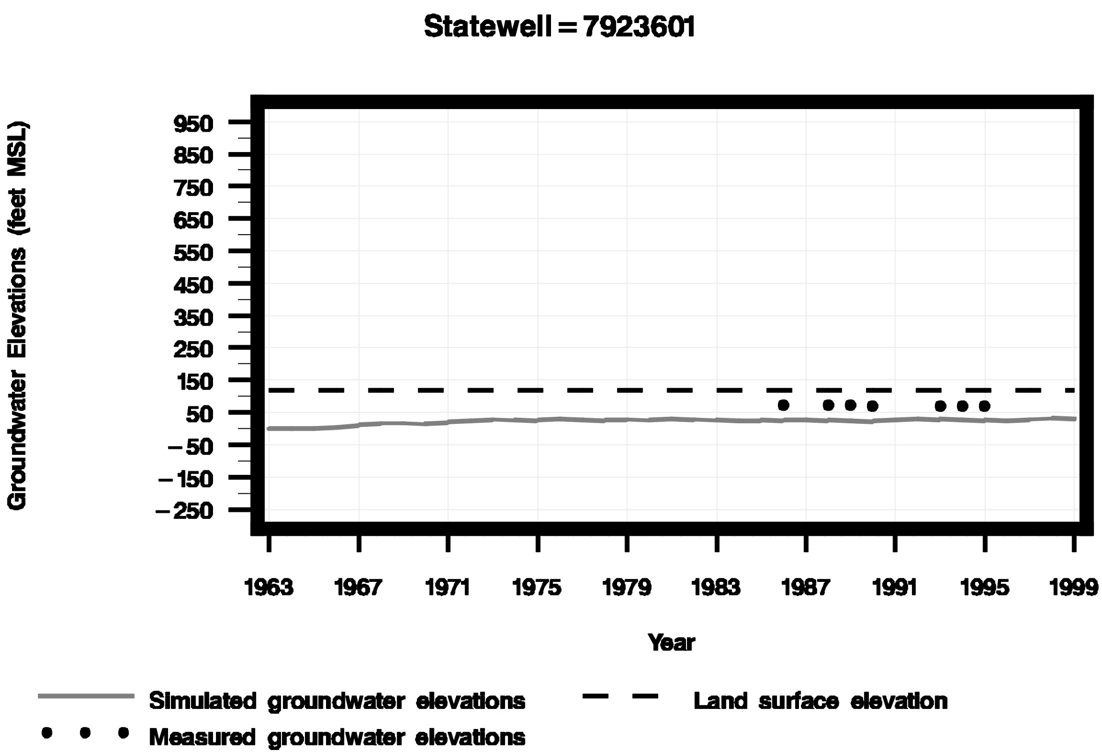
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7923601
Groundwater Elevations (feet MSL)
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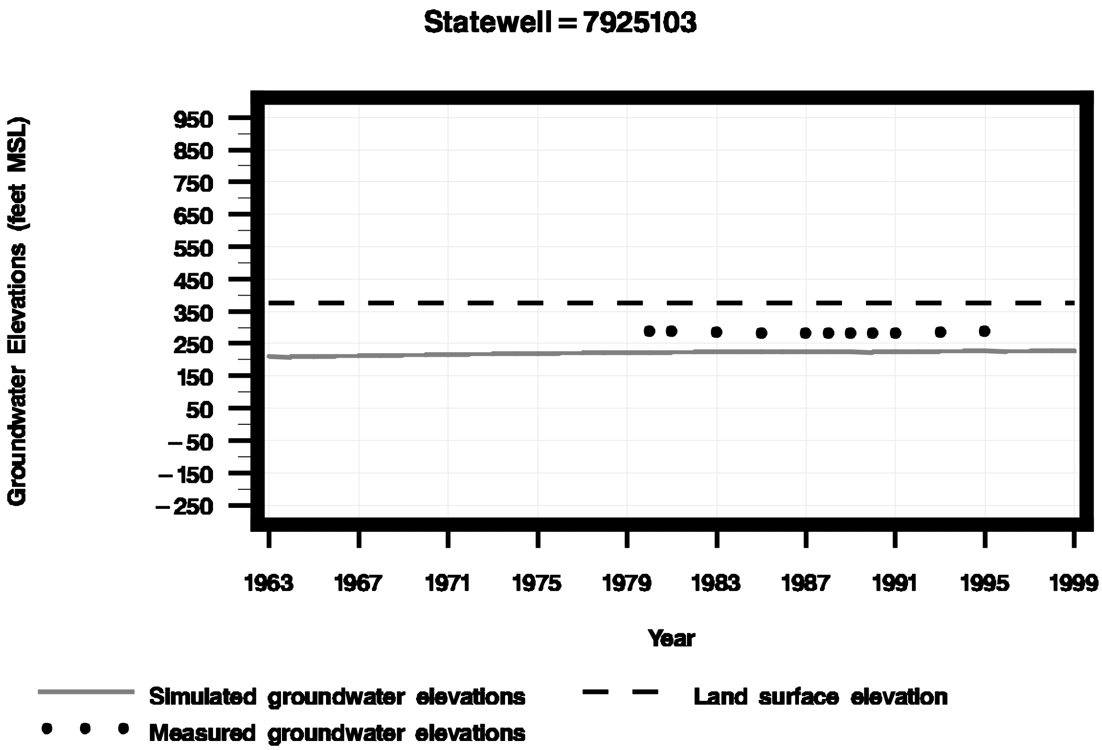
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7925103
Groundwater Elevations (feet MSL)
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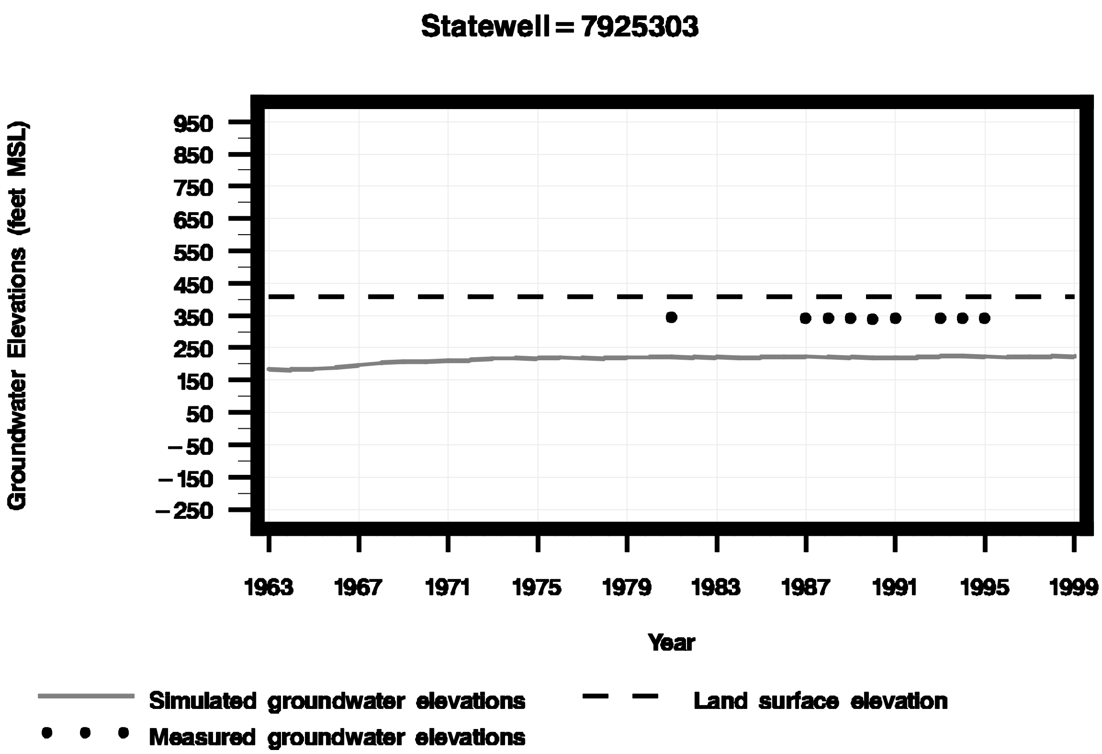
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7925303
Groundwater Elevations (feet MSL)
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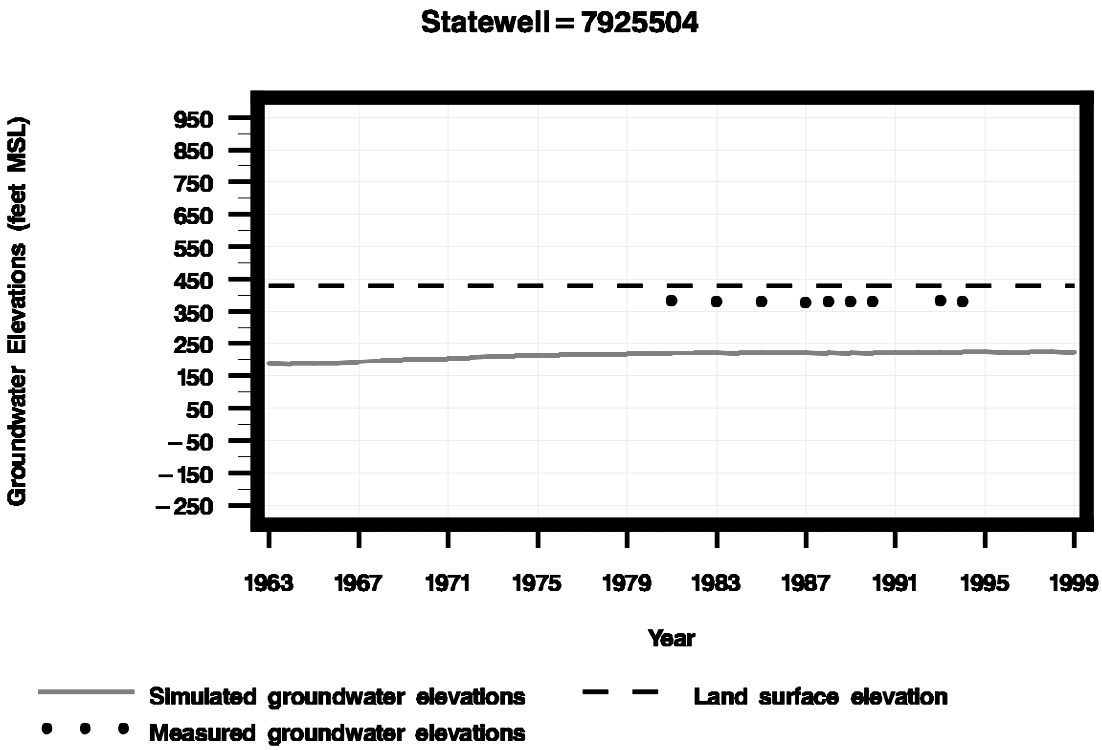
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7925504
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Groundwater Elevations (feet MSL)
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1991
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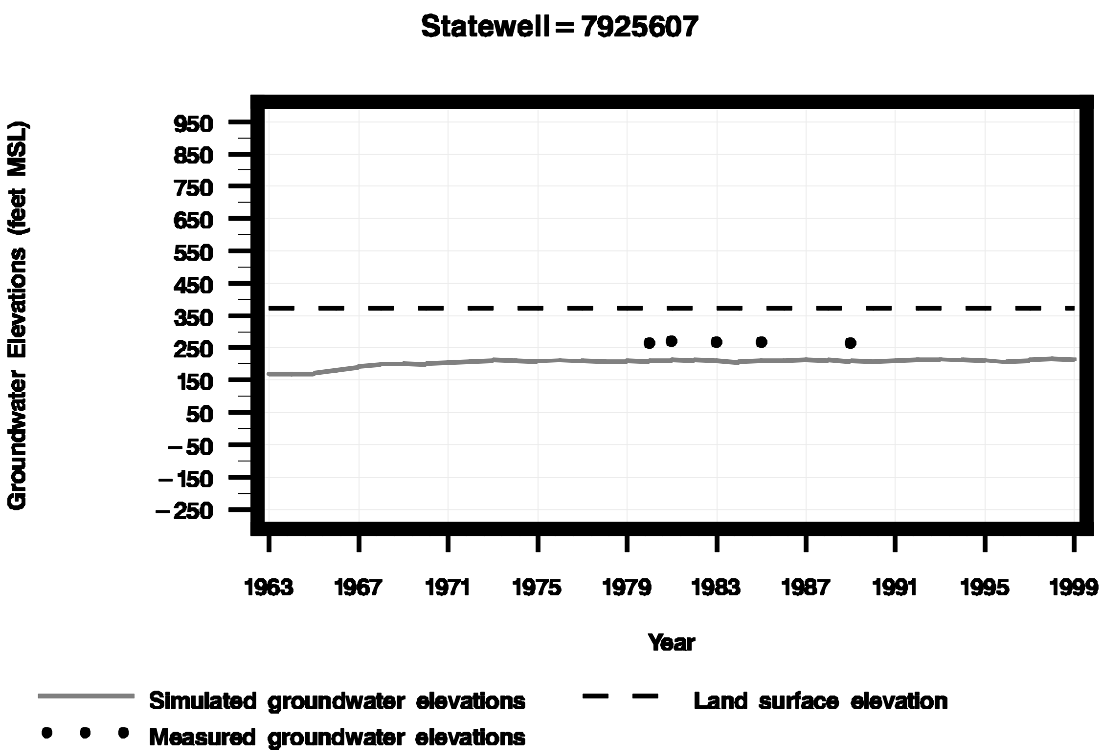
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7925607
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Groundwater Elevations (feet MSL)
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1967
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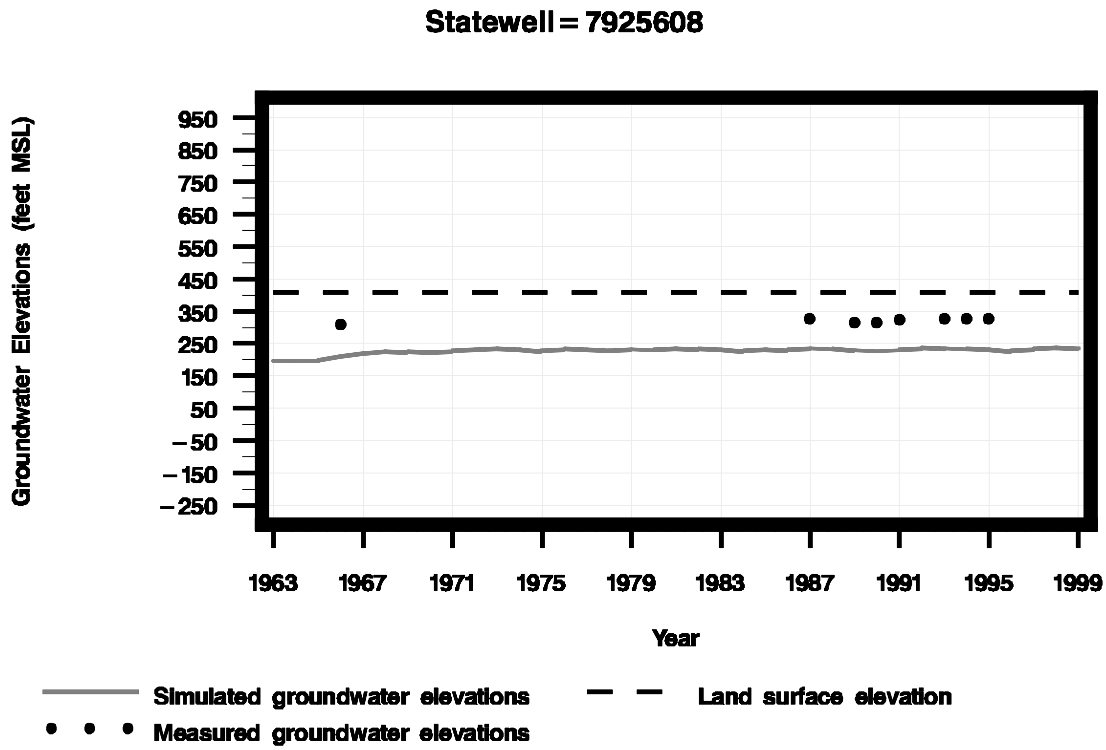
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7925608
Groundwater Elevations (feet MSL)
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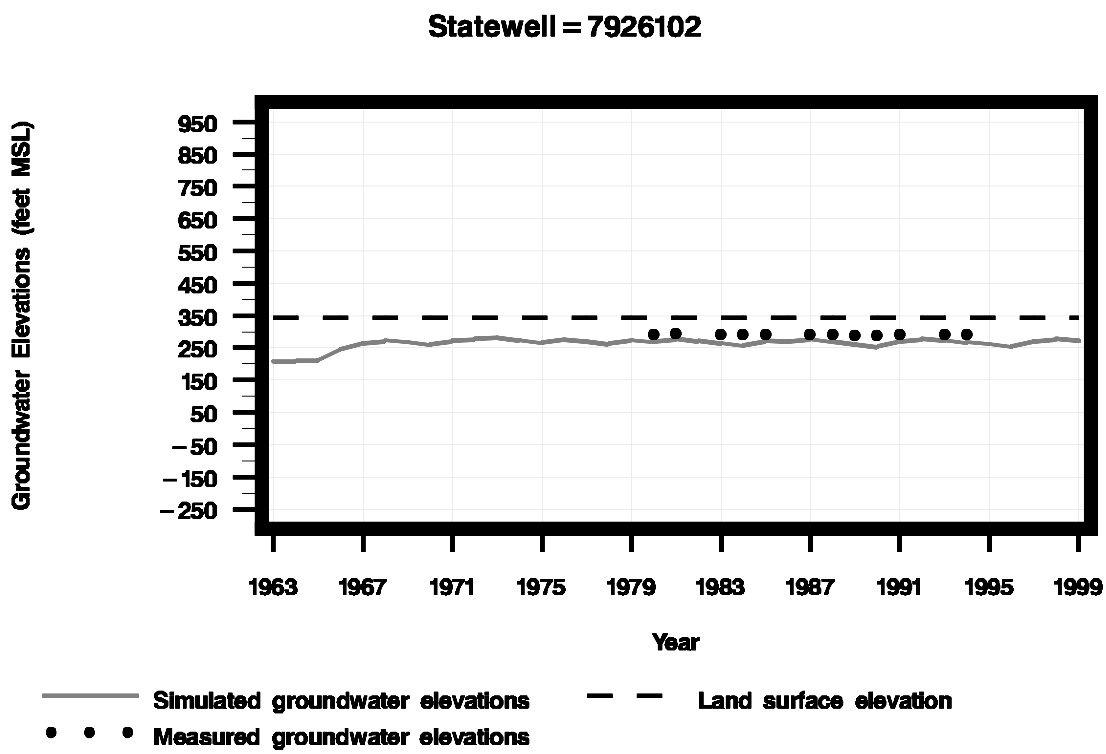
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7926102
Groundwater Elevations (feet MSL)
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1963
1967
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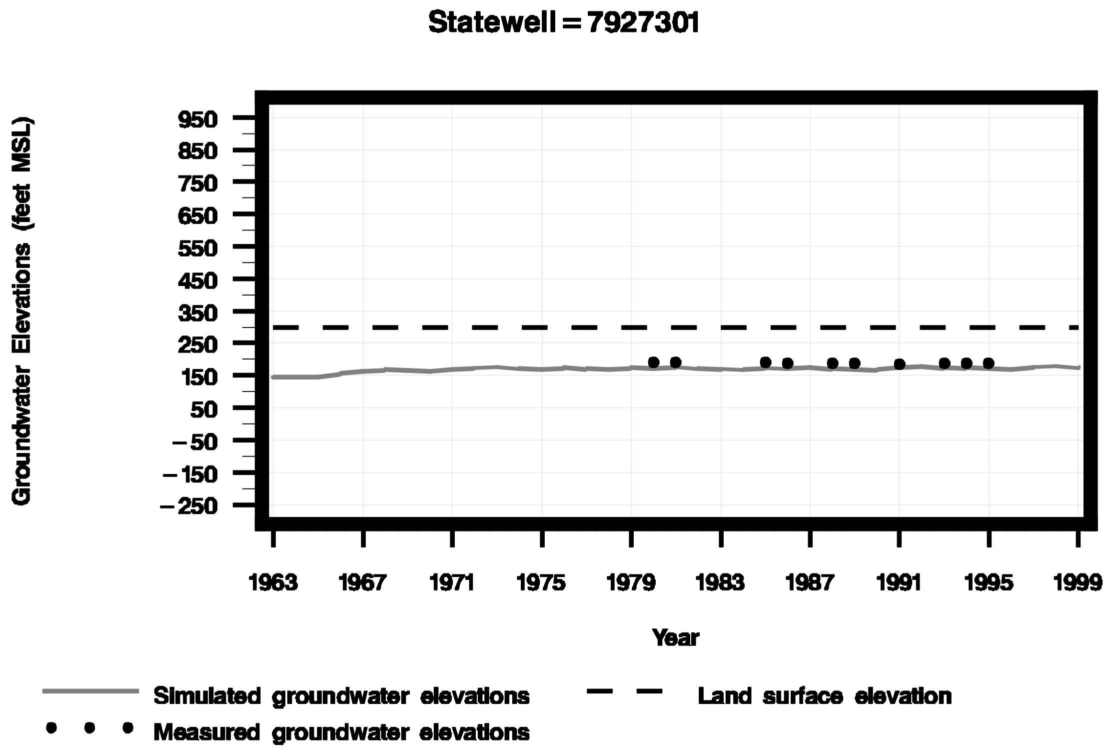
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7927301
Groundwater Elevations (feet MSL)
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850
750
650
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450
350
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150
50
−50
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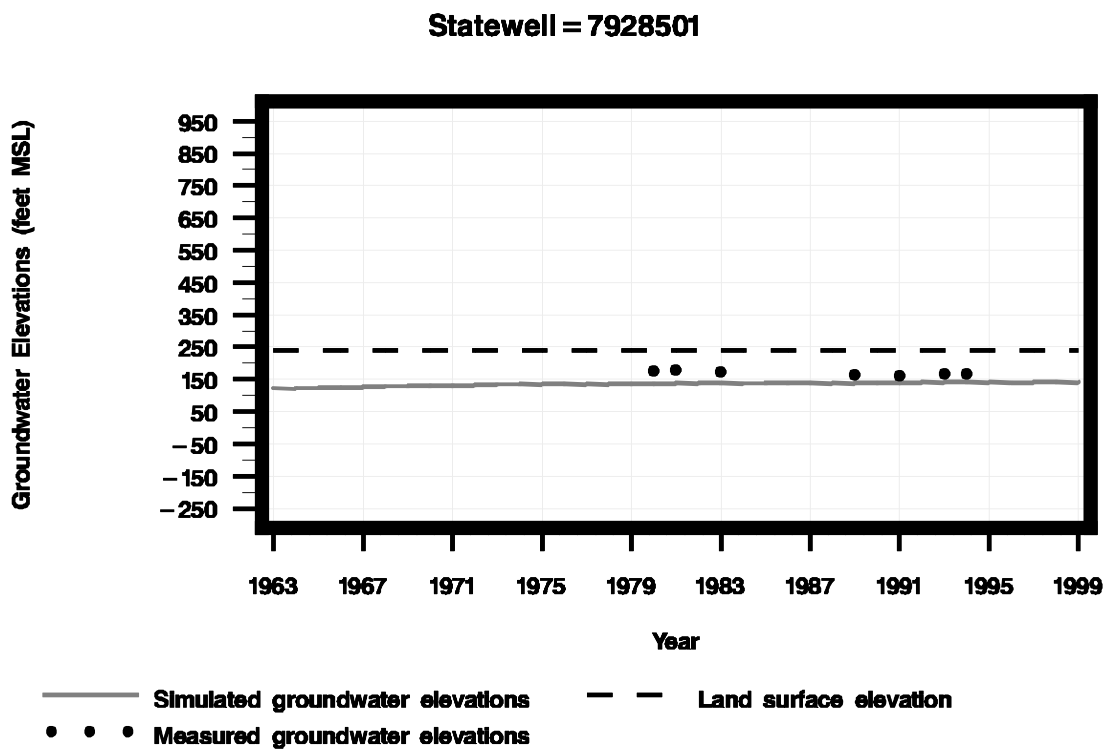
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7928501
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
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50
−50
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−250
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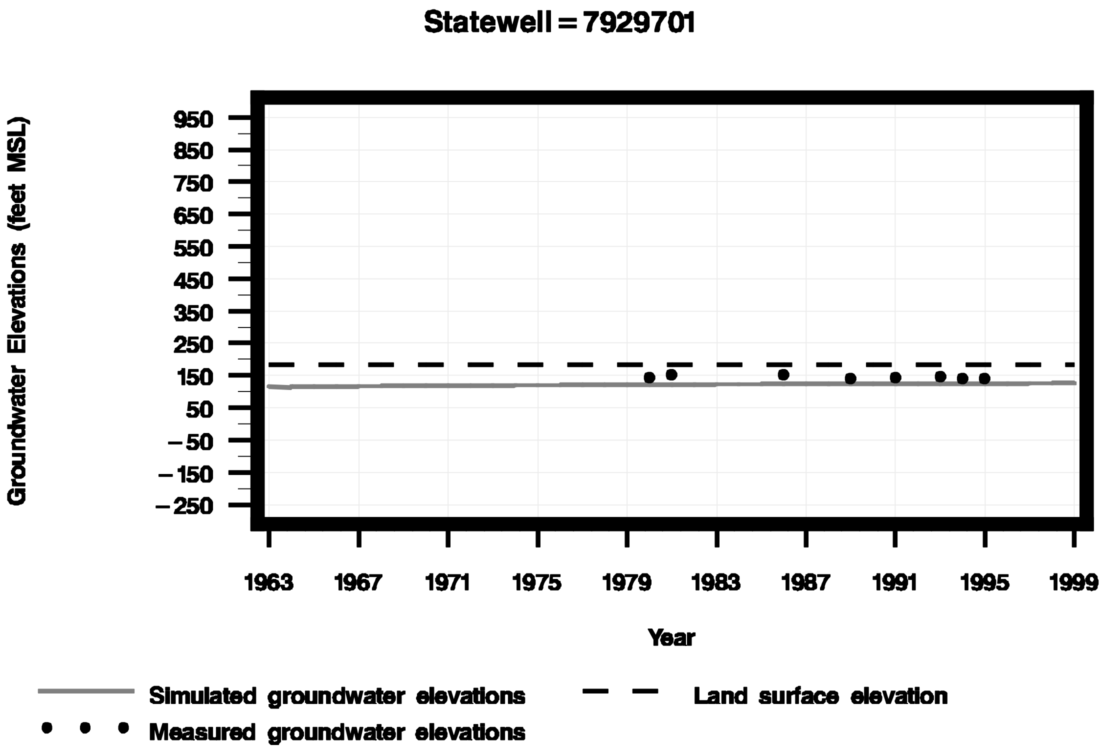
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7929701
Groundwater Elevations (feet MSL)
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850
750
650
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450
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−50
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−250
1963
1967
1971
1975
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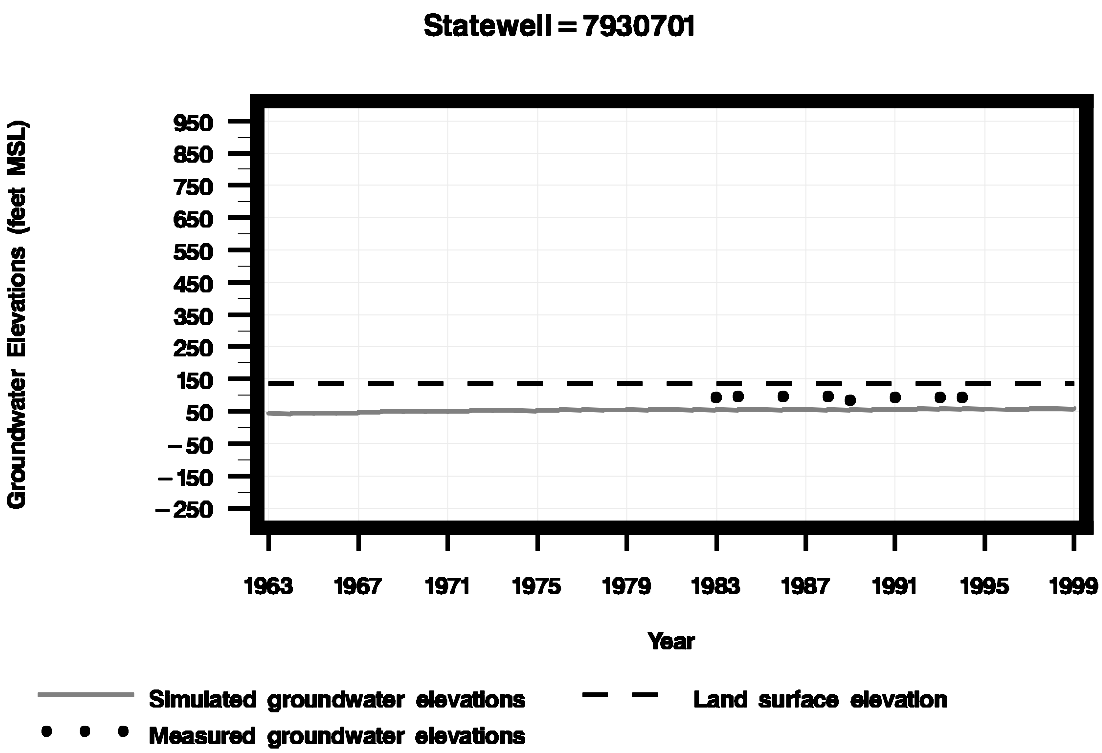
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7930701
Groundwater Elevations (feet MSL)
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850
750
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450
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−50
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−250
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1967
1971
1975
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1983
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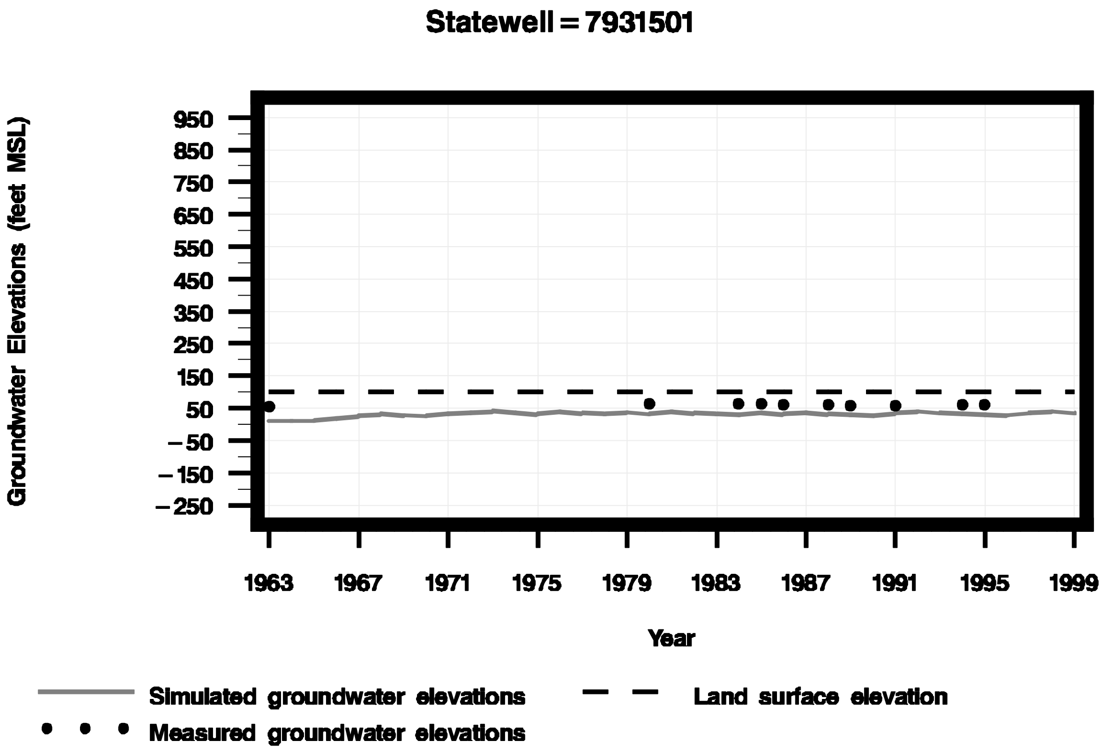
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7931501
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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50
−50
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−250
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1967
1971
1975
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1983
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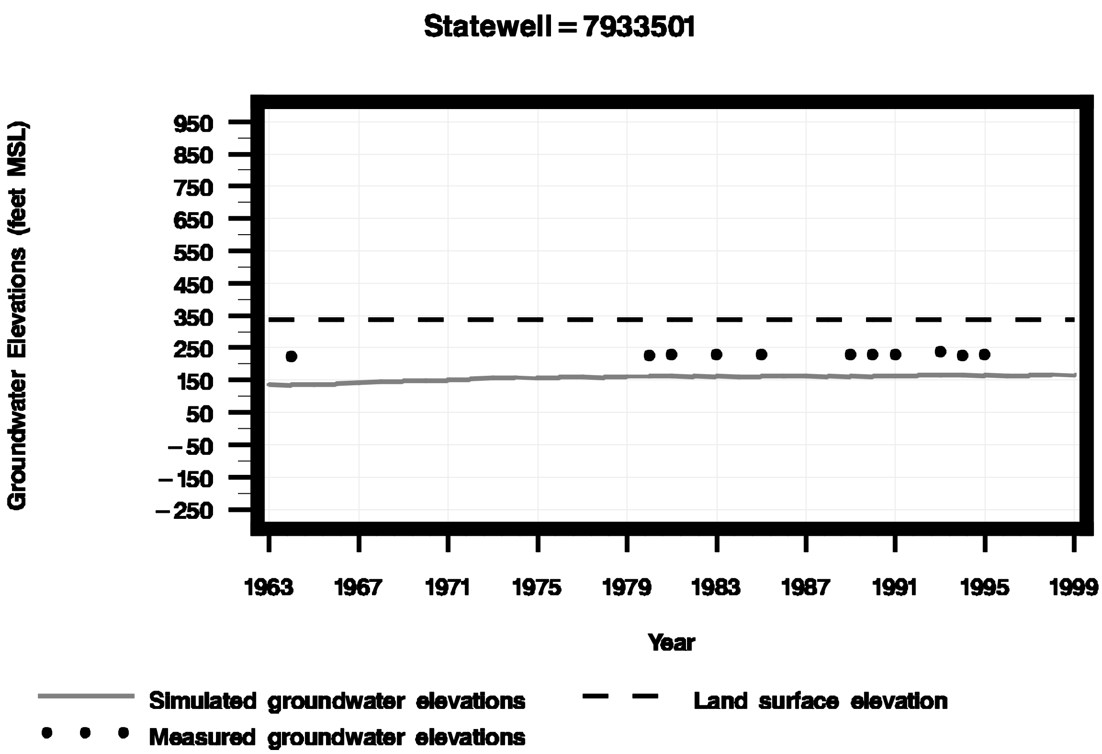
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7933501
Groundwater Elevations (feet MSL)
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850
750
650
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450
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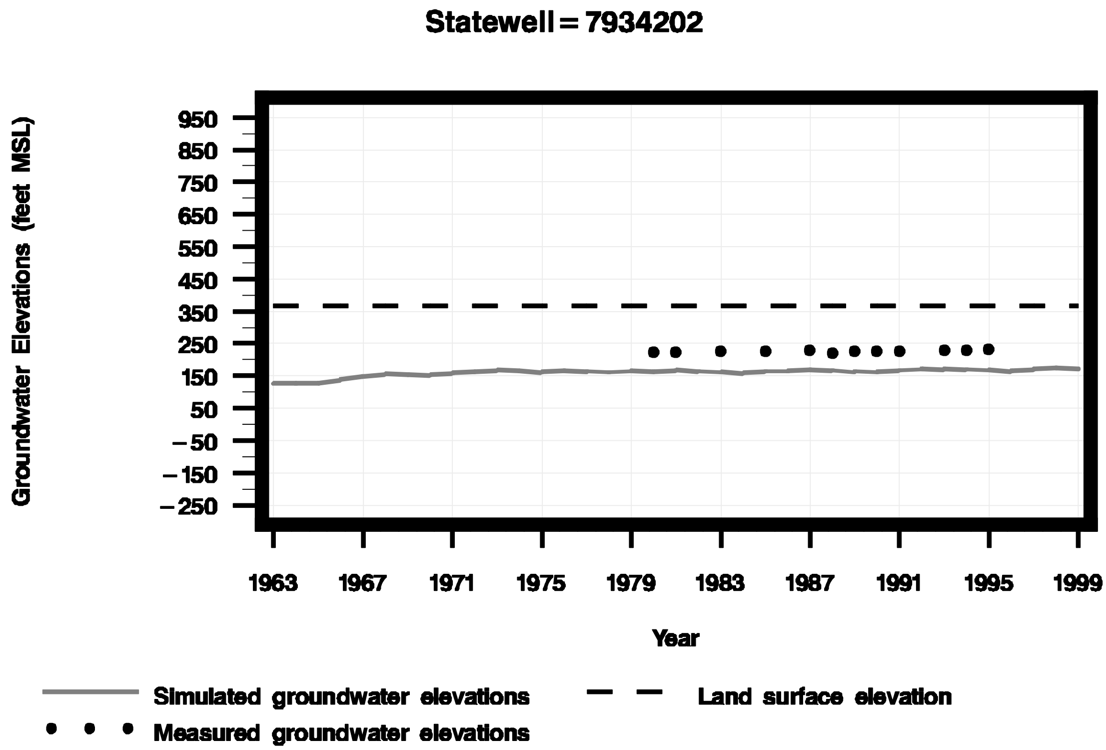
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7934202
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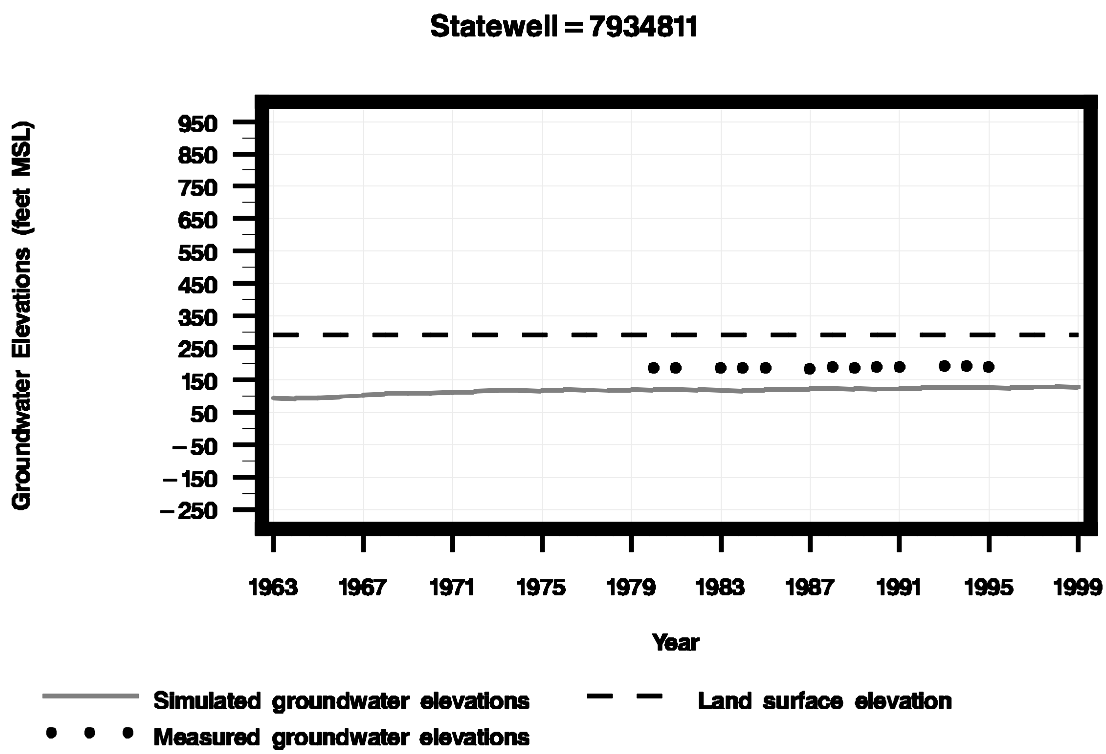
850
750
650
550
450
350
250
150
50
−50
−150
−250
Groundwater Elevations (feet MSL)
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7934811
950
850
750
650
550
450
350
250
150
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−50
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−250
Groundwater Elevations (feet MSL)
1963
1967
1971
1975
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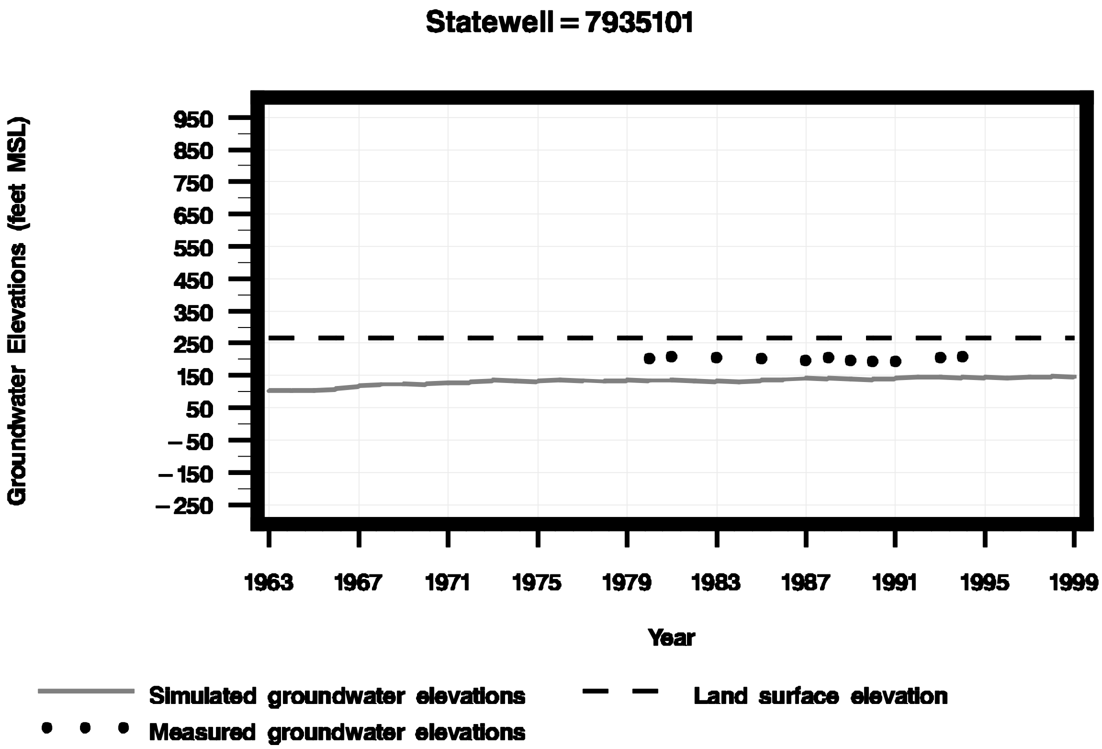
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7935101
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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50
−50
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1967
1971
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1983
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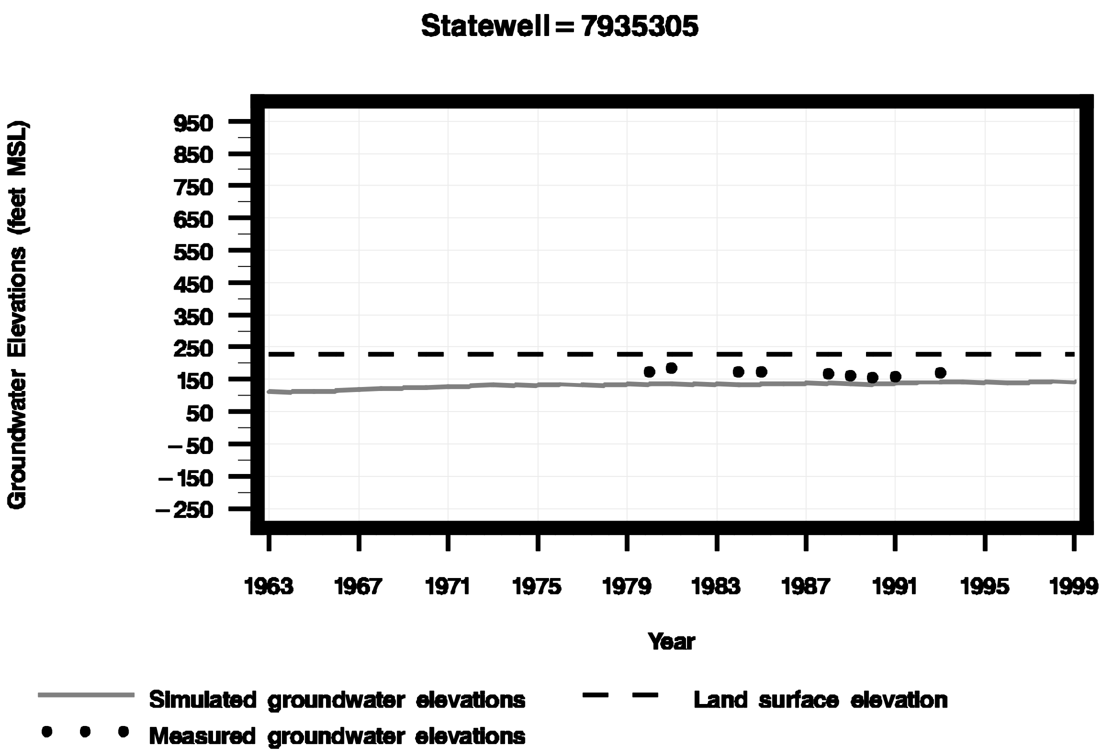
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7935305
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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250
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50
−50
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−250
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1967
1971
1975
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1983
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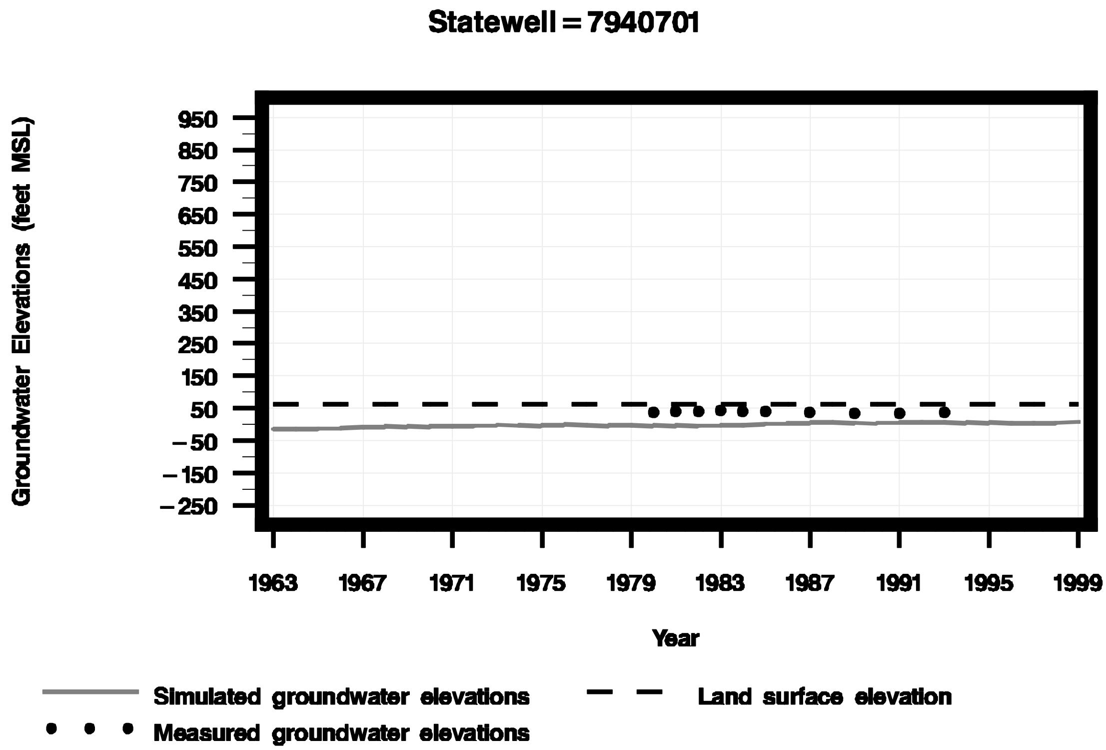
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7940701
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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250
150
50
−50
−150
−250
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1967
1971
1975
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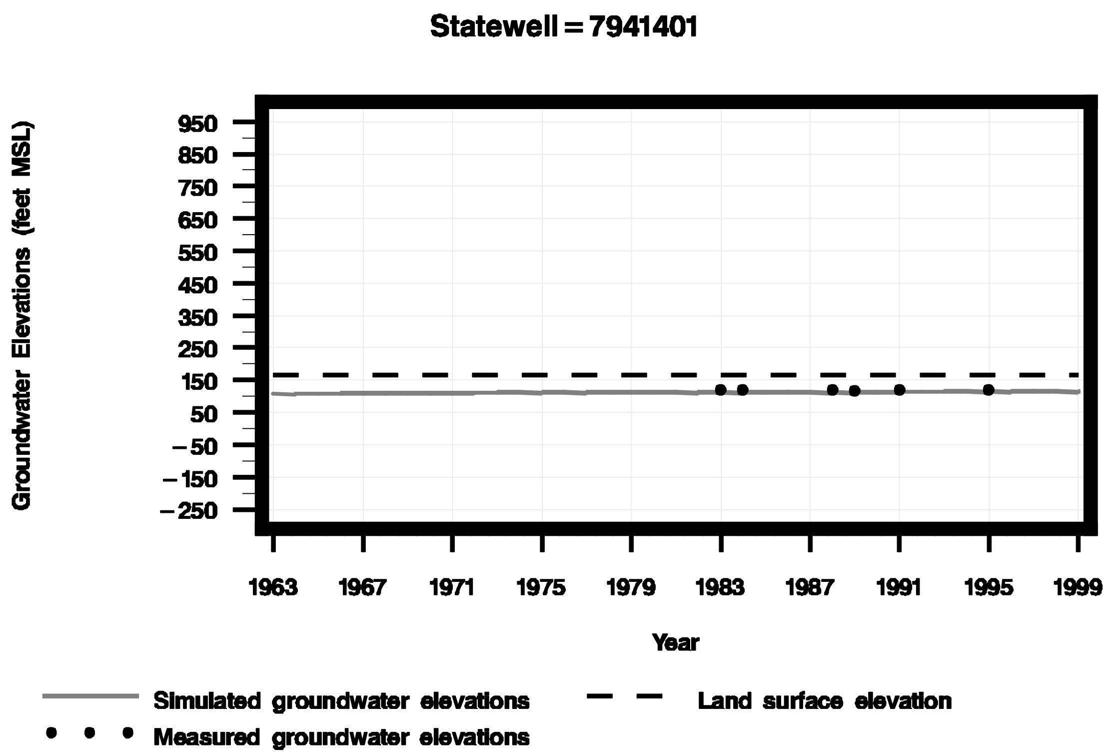
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7941401
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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150
50
−50
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−250
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1967
1971
1975
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1983
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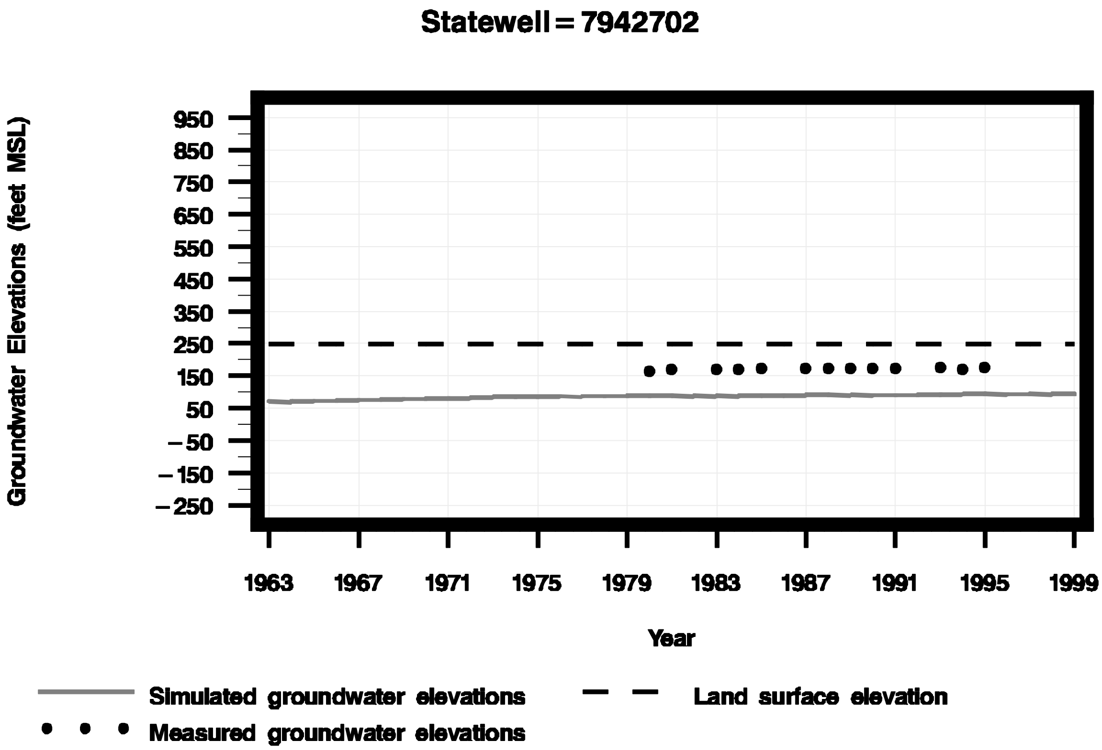
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7942702
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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50
−50
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−250
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1967
1971
1975
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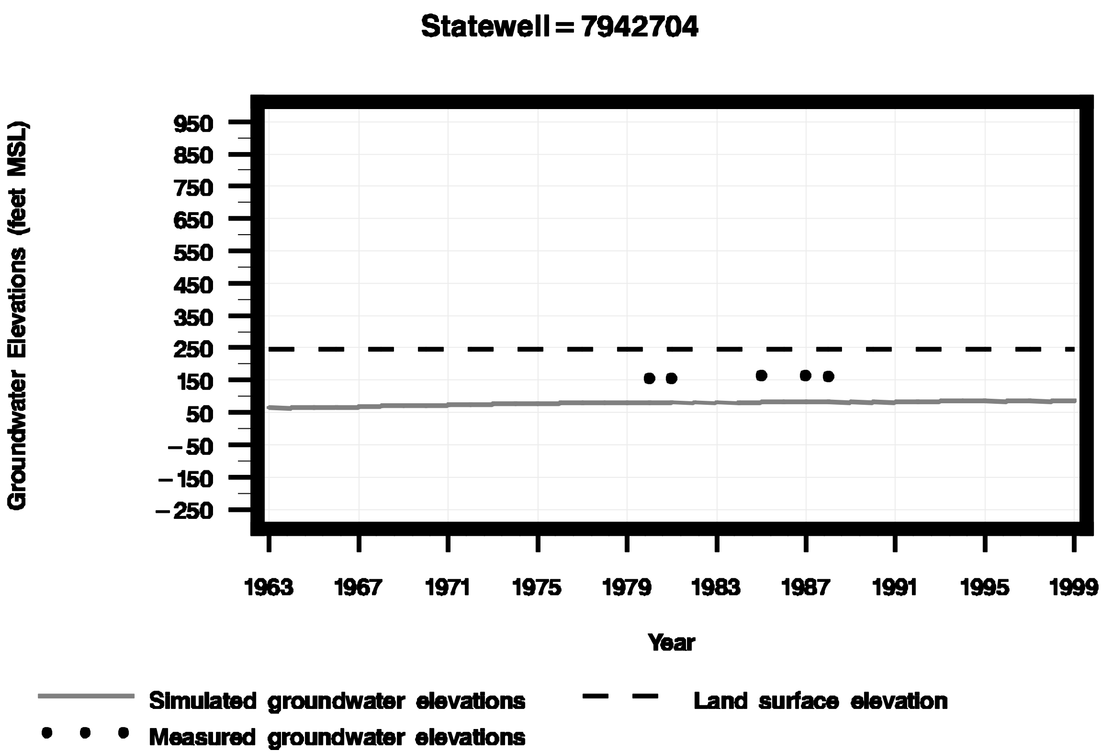
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7942704
Groundwater Elevations (feet MSL)
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450
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150
50
−50
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−250
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1967
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1975
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1991
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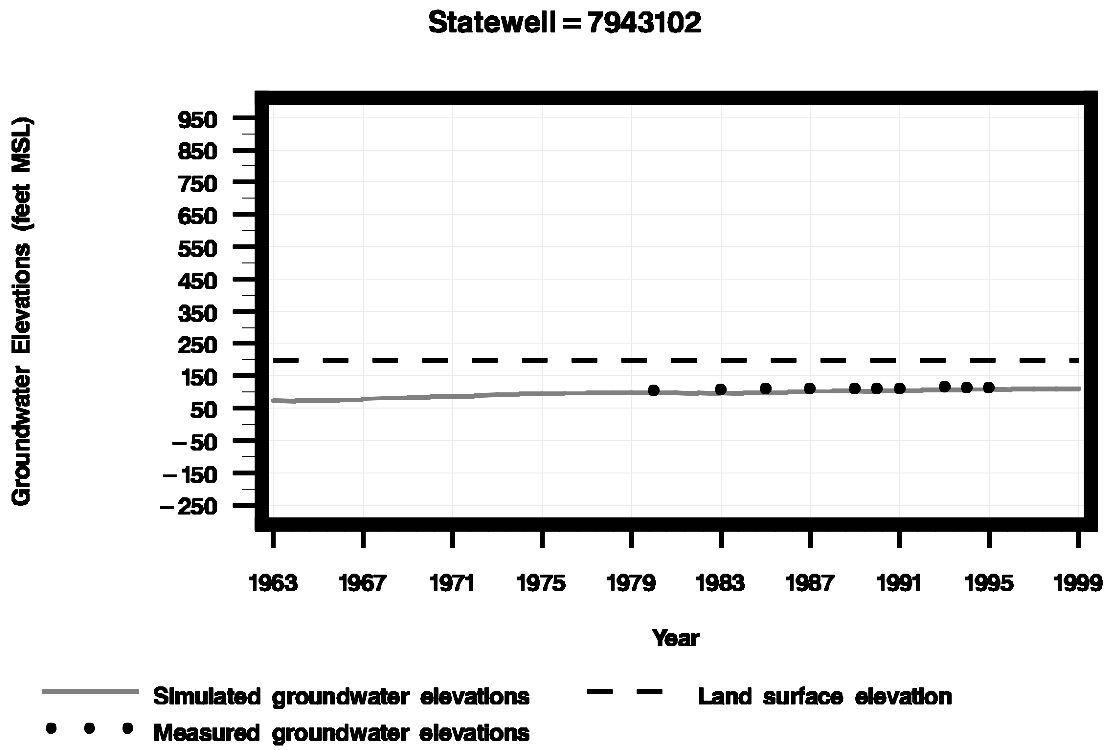
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7943102
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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−250
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1967
1971
1975
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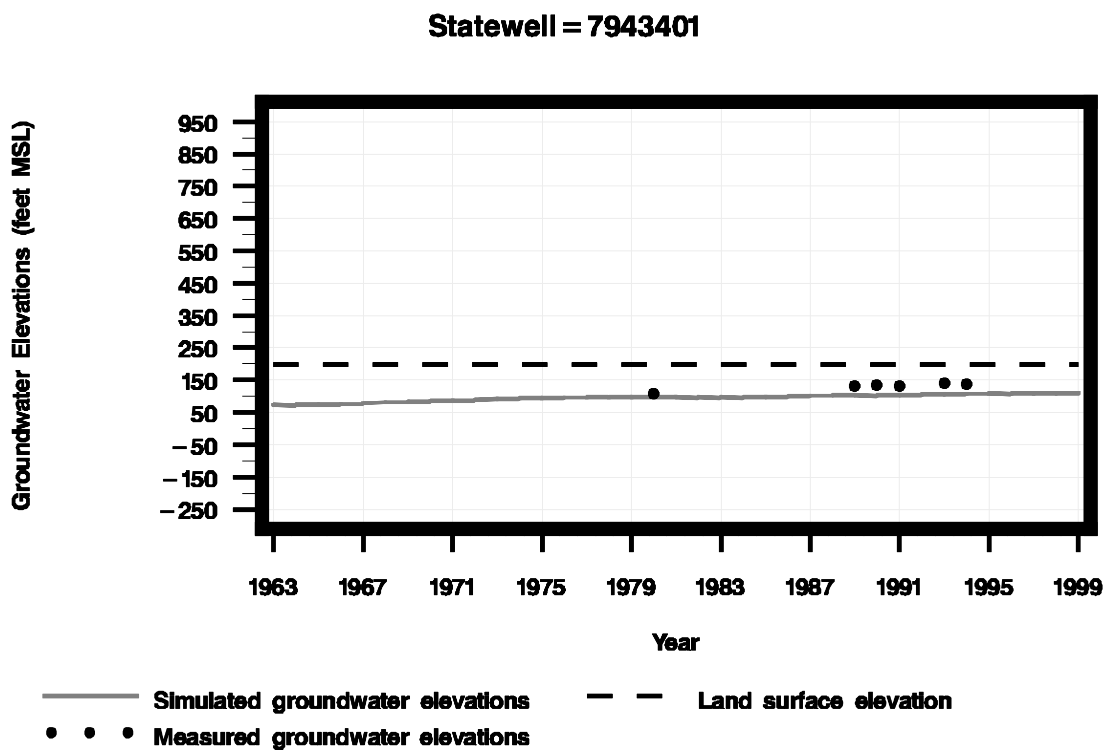
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7943401
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1967
1971
1975
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1983
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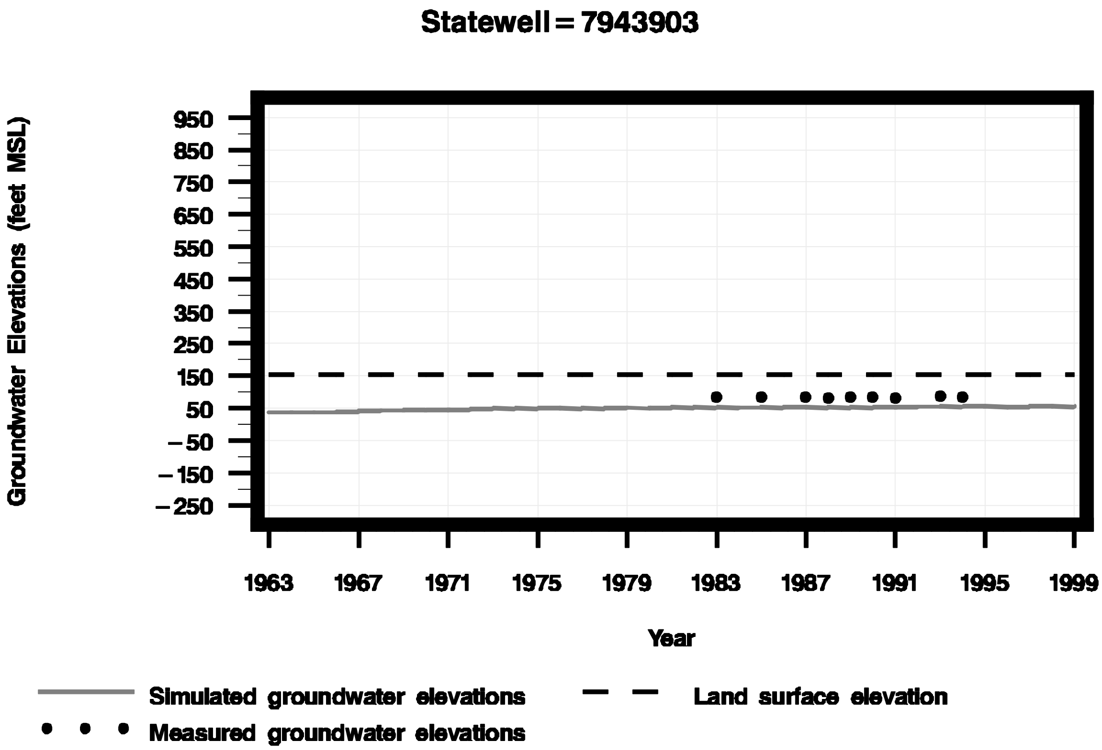
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7943903
Groundwater Elevations (feet MSL)
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850
750
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450
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50
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1967
1971
1975
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1983
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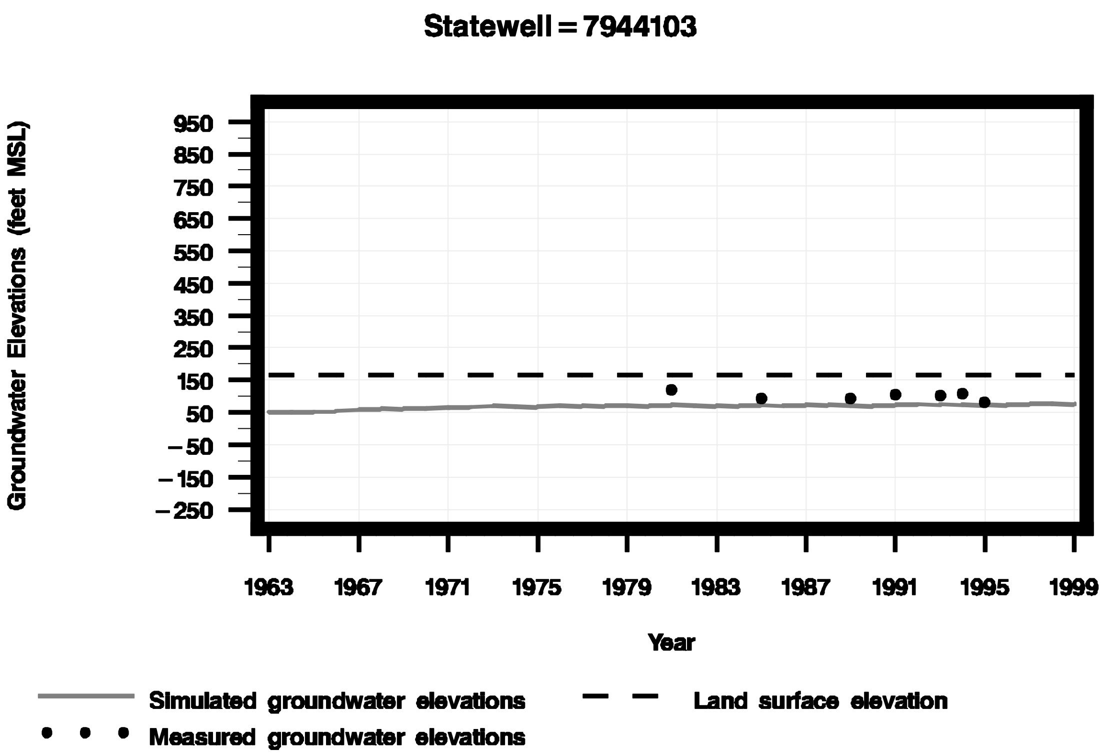
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7944103
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
1971
1975
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1991
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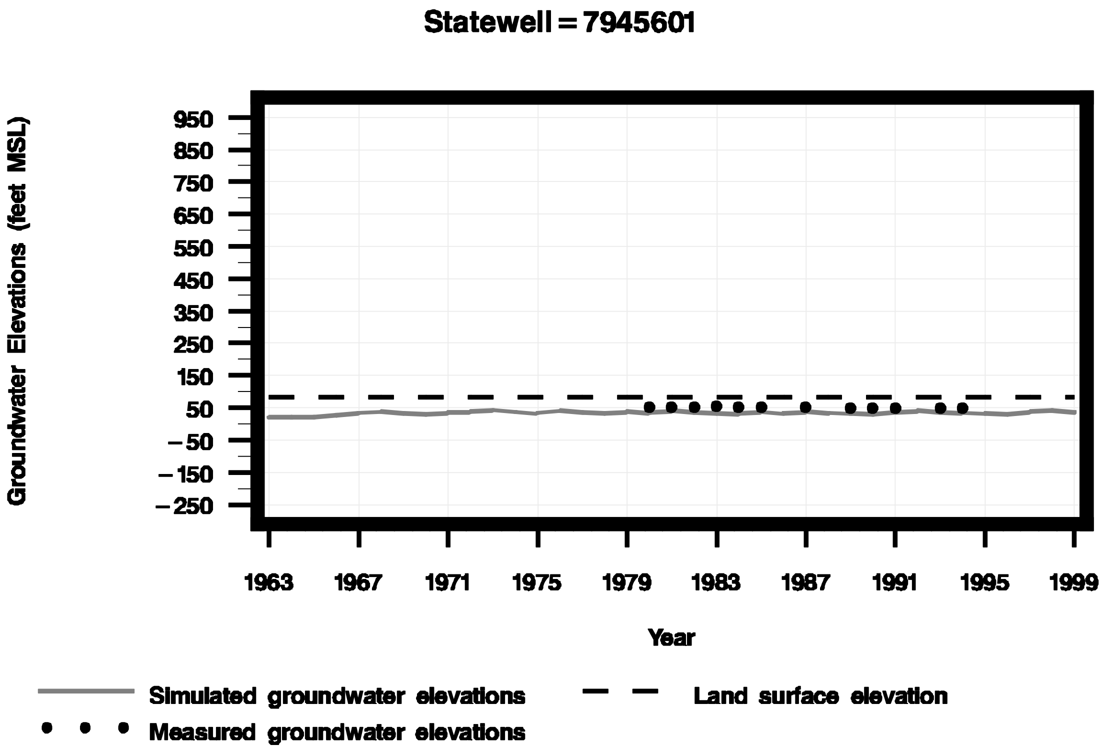
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7945601
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−250
Groundwater Elevations (feet MSL)
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1967
1971
1975
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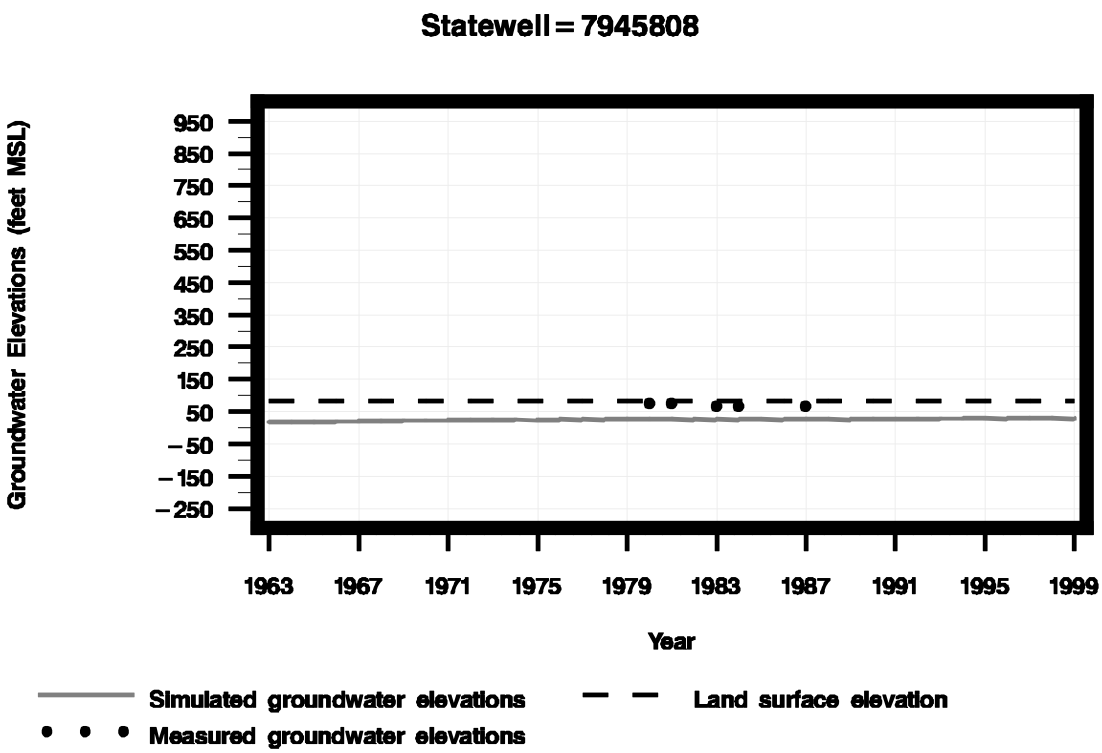
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7945808
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Groundwater Elevations (feet MSL)
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1967
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1991
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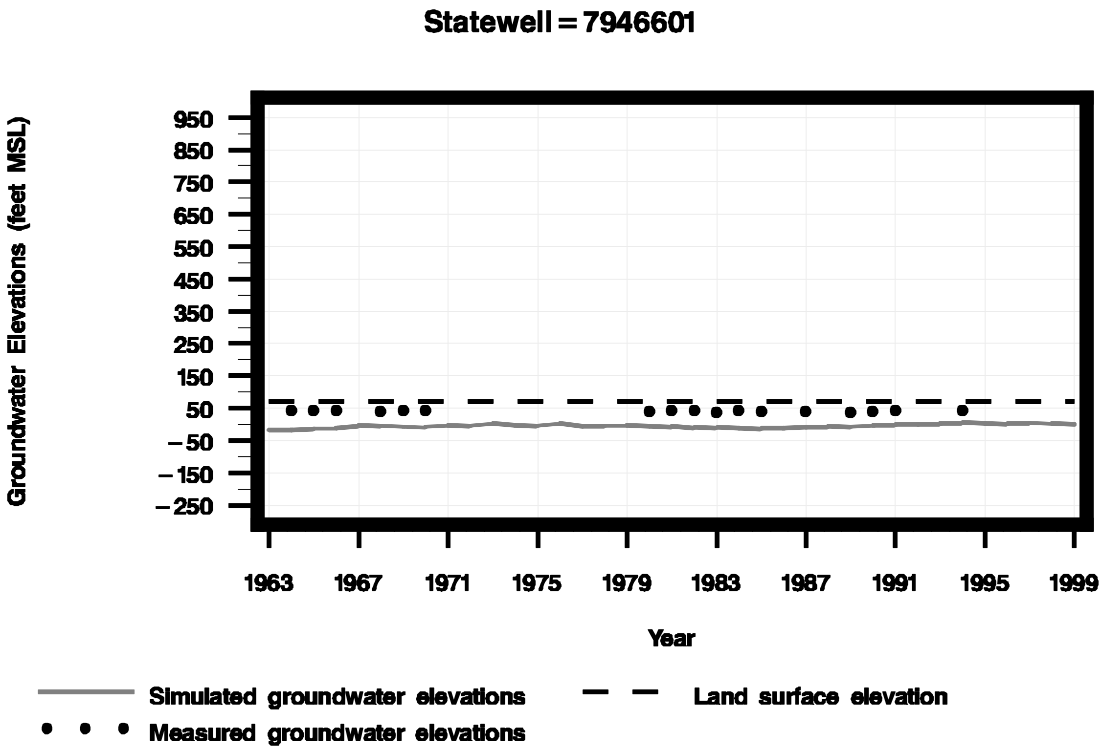
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7946601
Groundwater Elevations (feet MSL)
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450
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50
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1975
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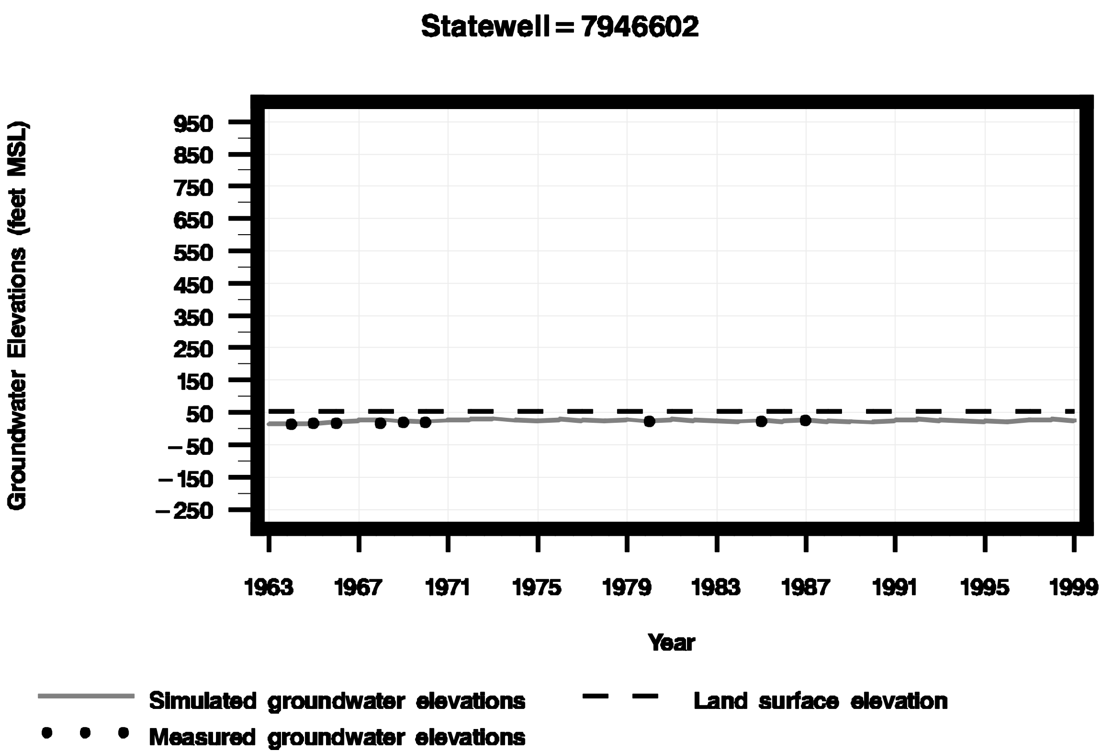
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7946602
Groundwater Elevations (feet MSL)
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50
−50
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1975
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1991
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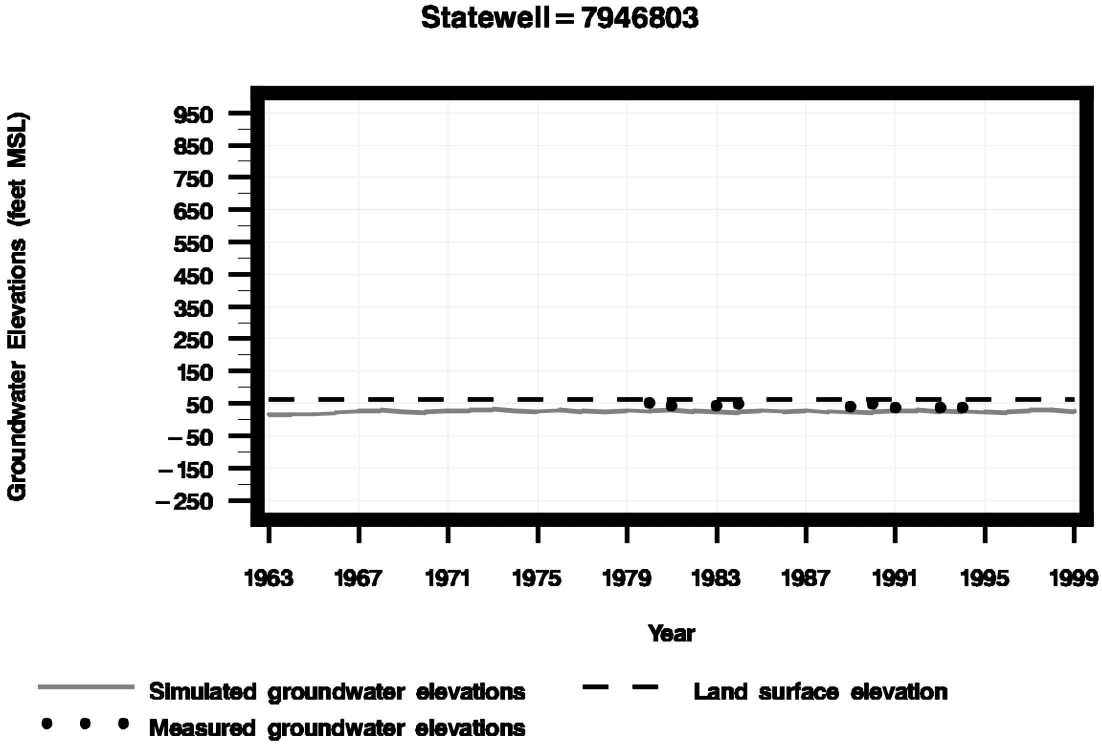
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7946803
Groundwater Elevations (feet MSL)
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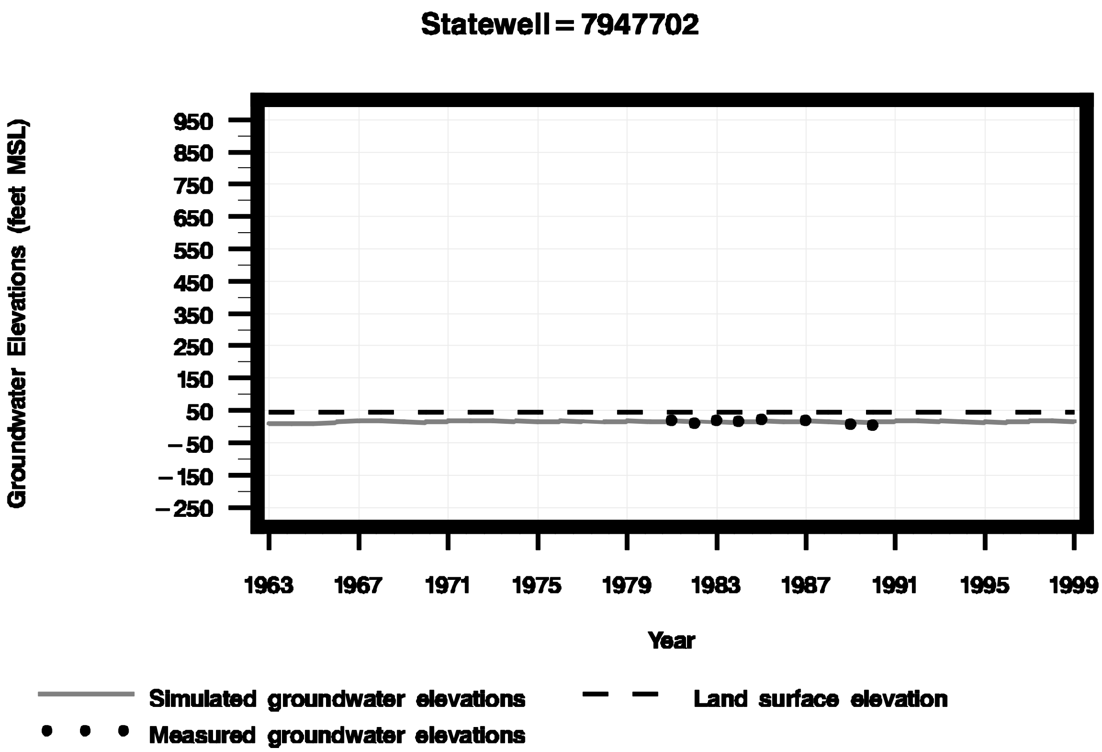
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7947702
Groundwater Elevations (feet MSL)
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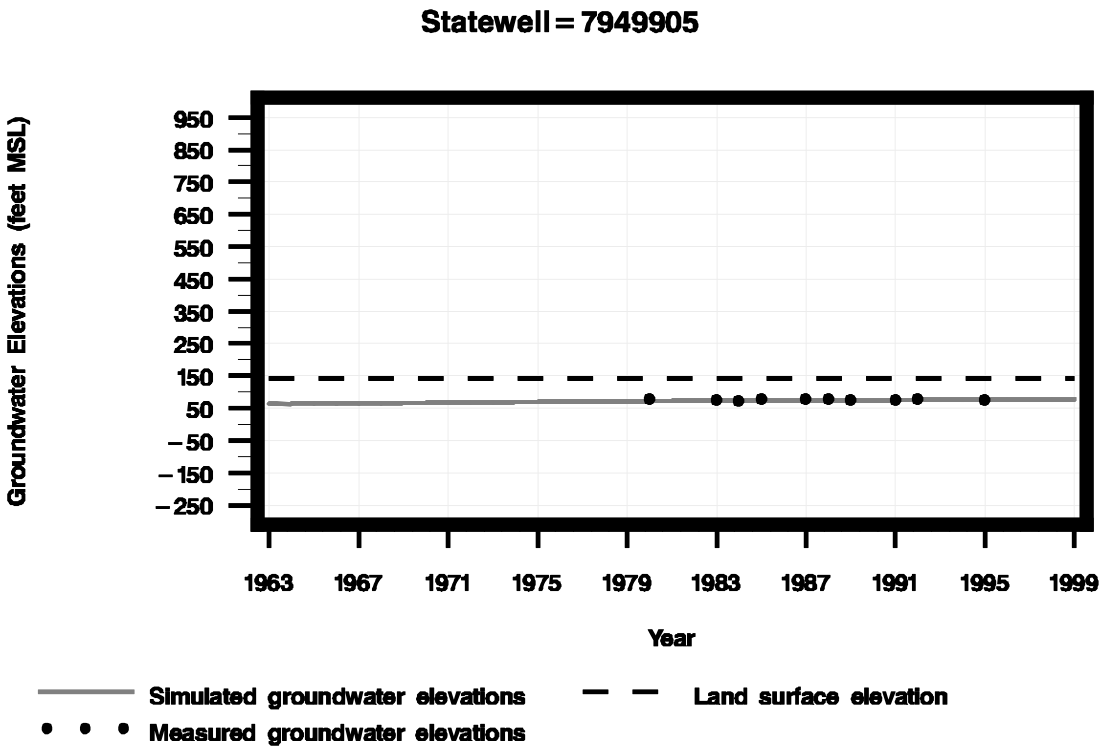
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7949905
Groundwater Elevations (feet MSL)
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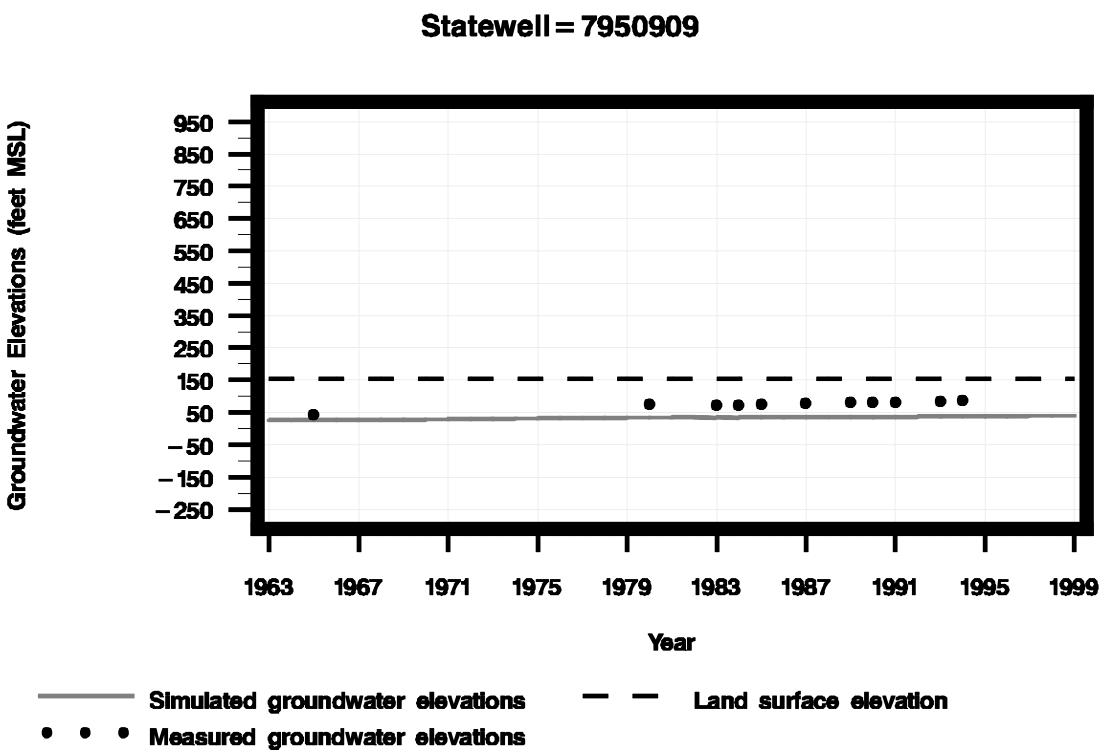
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 7950909
Groundwater Elevations (feet MSL)
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450
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50
−50
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1983
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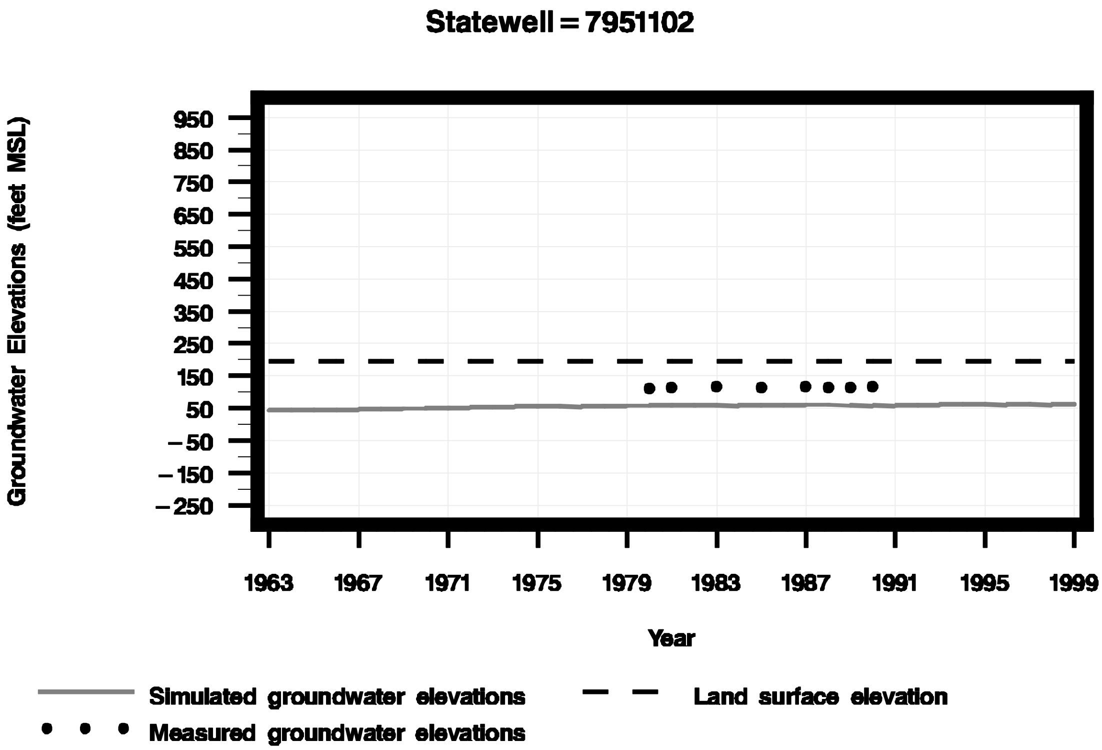
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7951102
Groundwater Elevations (feet MSL)
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450
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1967
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1983
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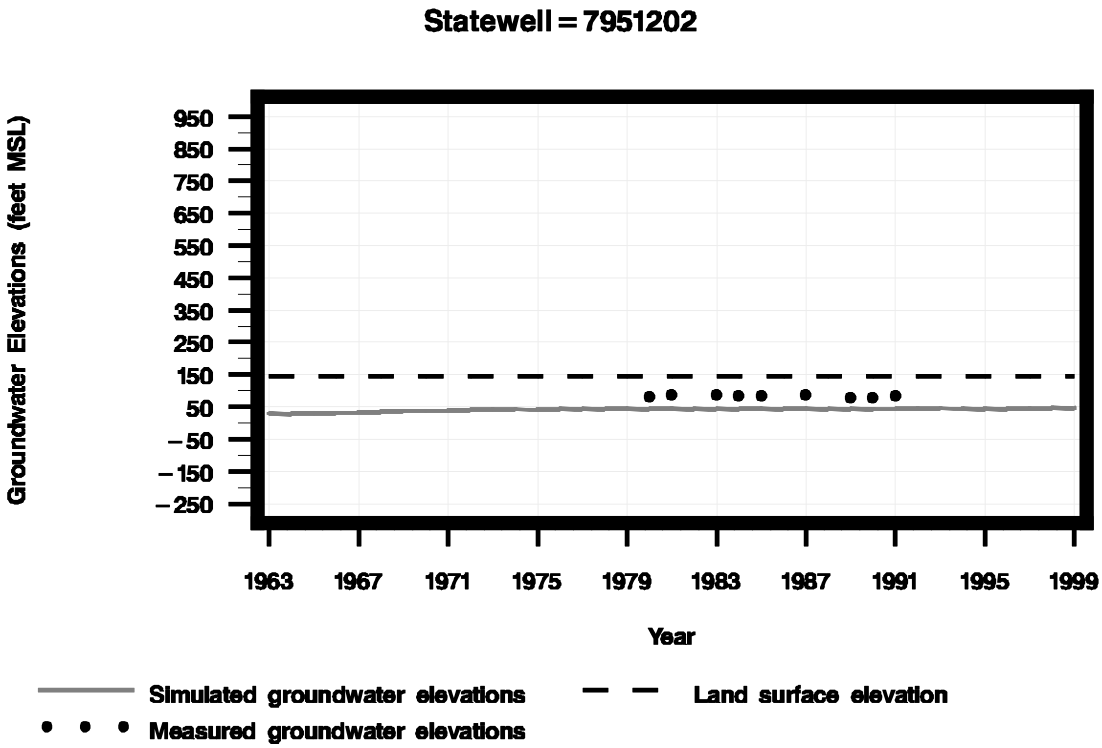
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7951202
Groundwater Elevations (feet MSL)
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450
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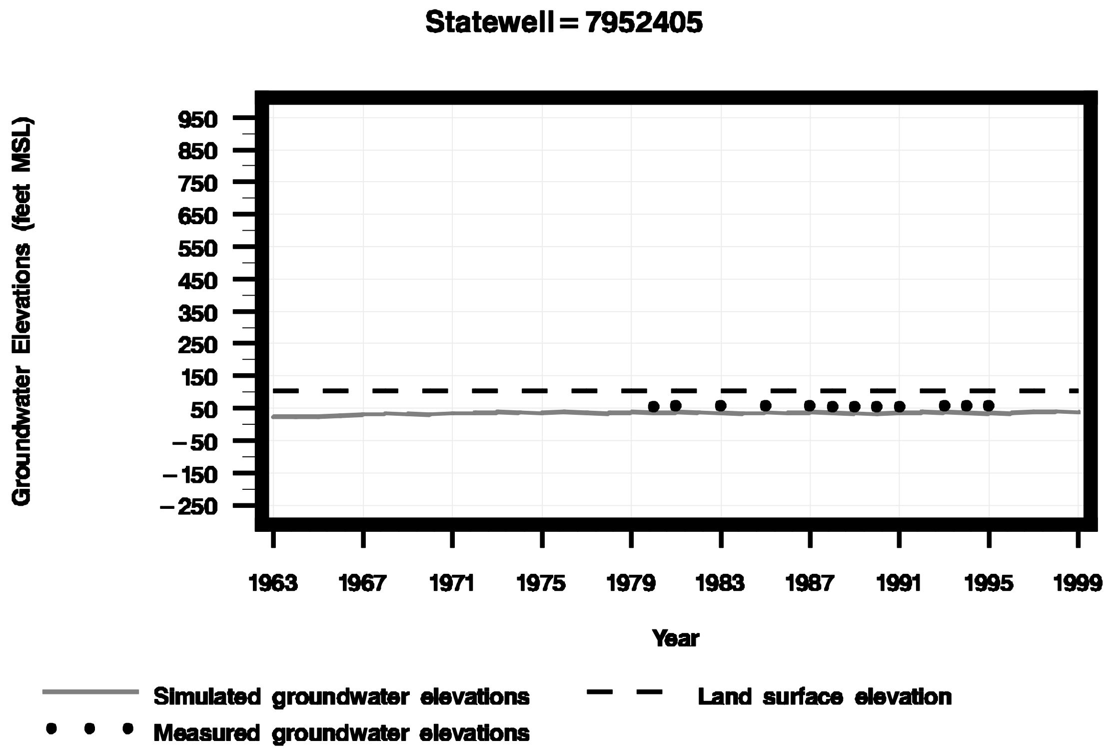
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7952405
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
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1983
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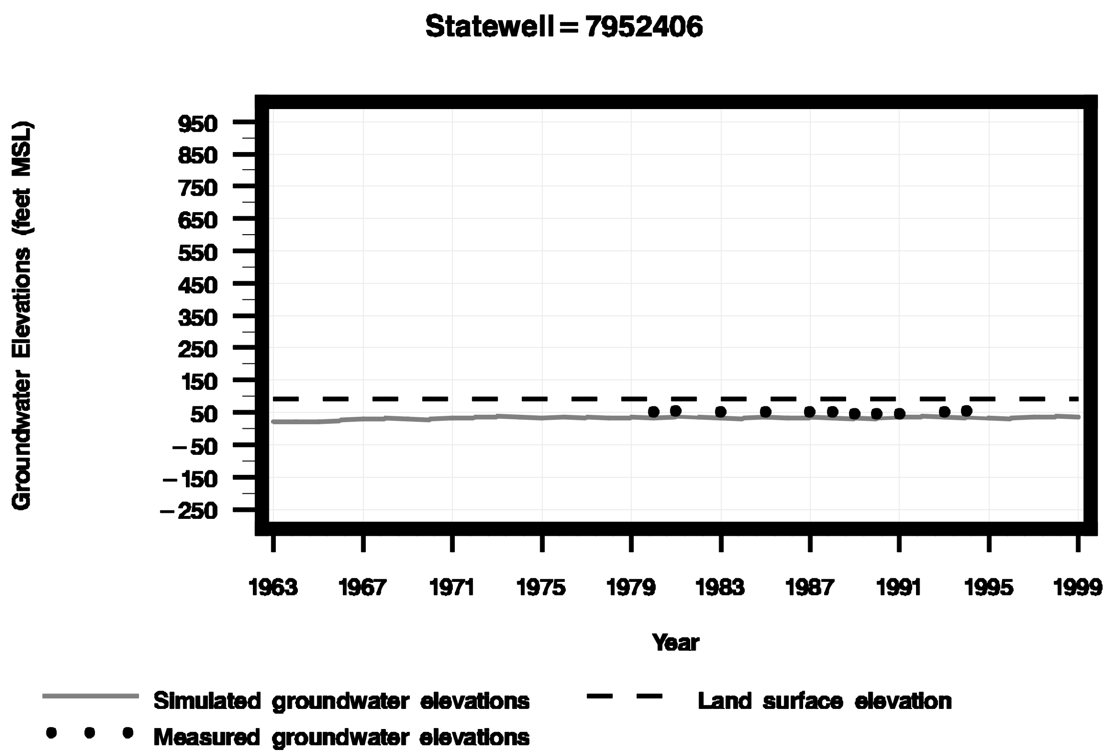
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7952406
Groundwater Elevations (feet MSL)
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450
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50
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1983
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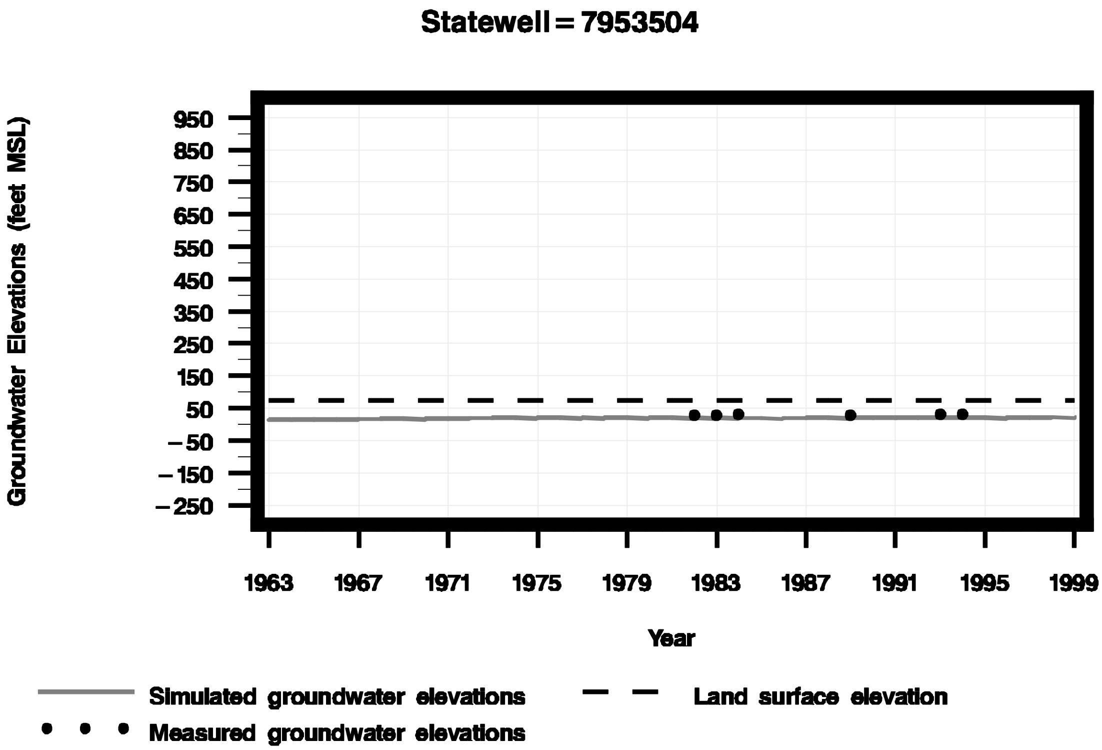
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7953504
Groundwater Elevations (feet MSL)
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450
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50
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1983
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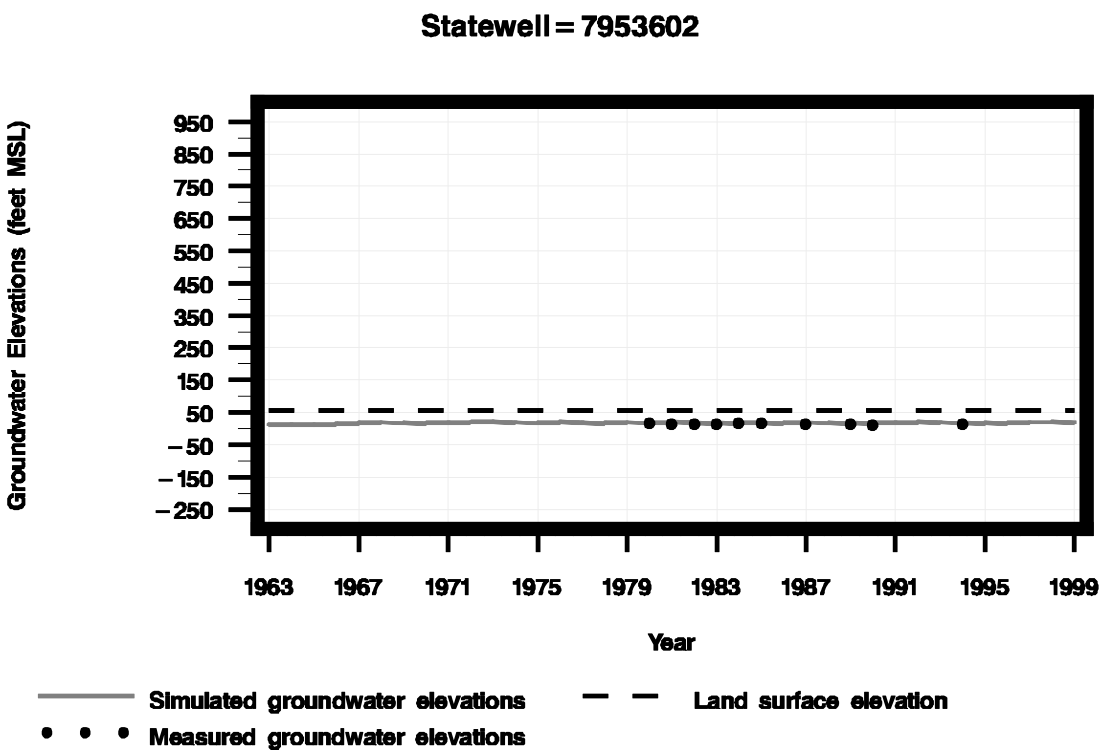
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7953602
Groundwater Elevations (feet MSL)
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50
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1967
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1975
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1983
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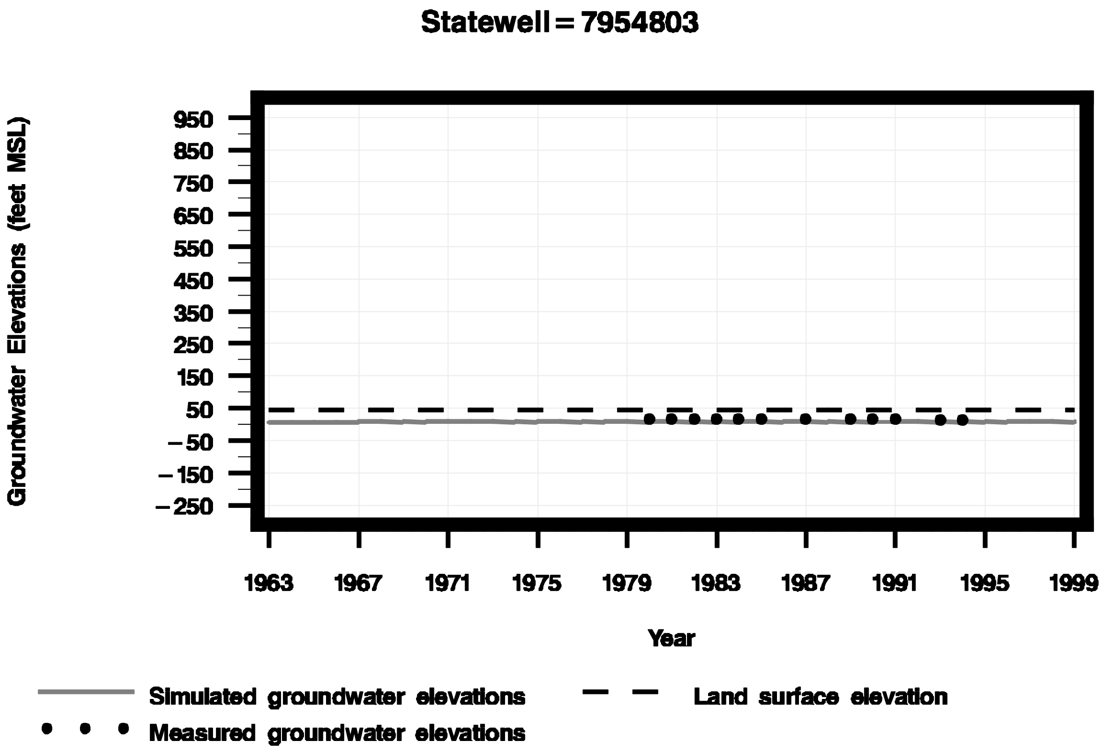
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7954803
Groundwater Elevations (feet MSL)
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450
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1963
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1983
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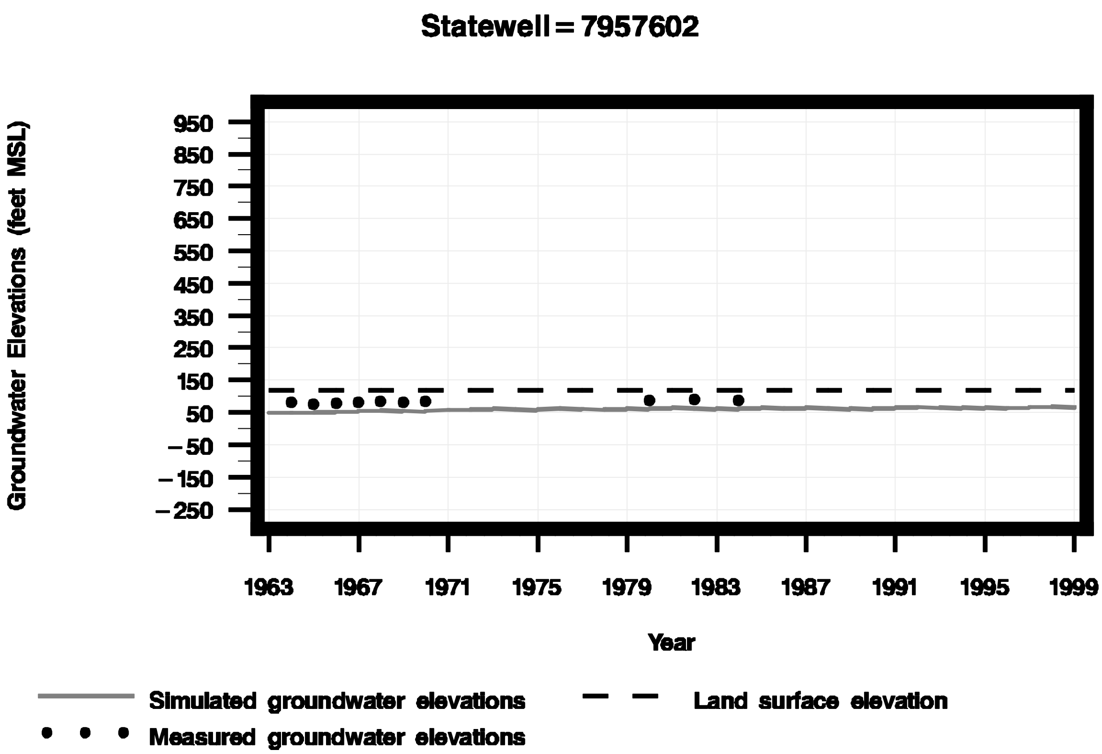
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7957602
Groundwater Elevations (feet MSL)
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450
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−50
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1963
1967
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1975
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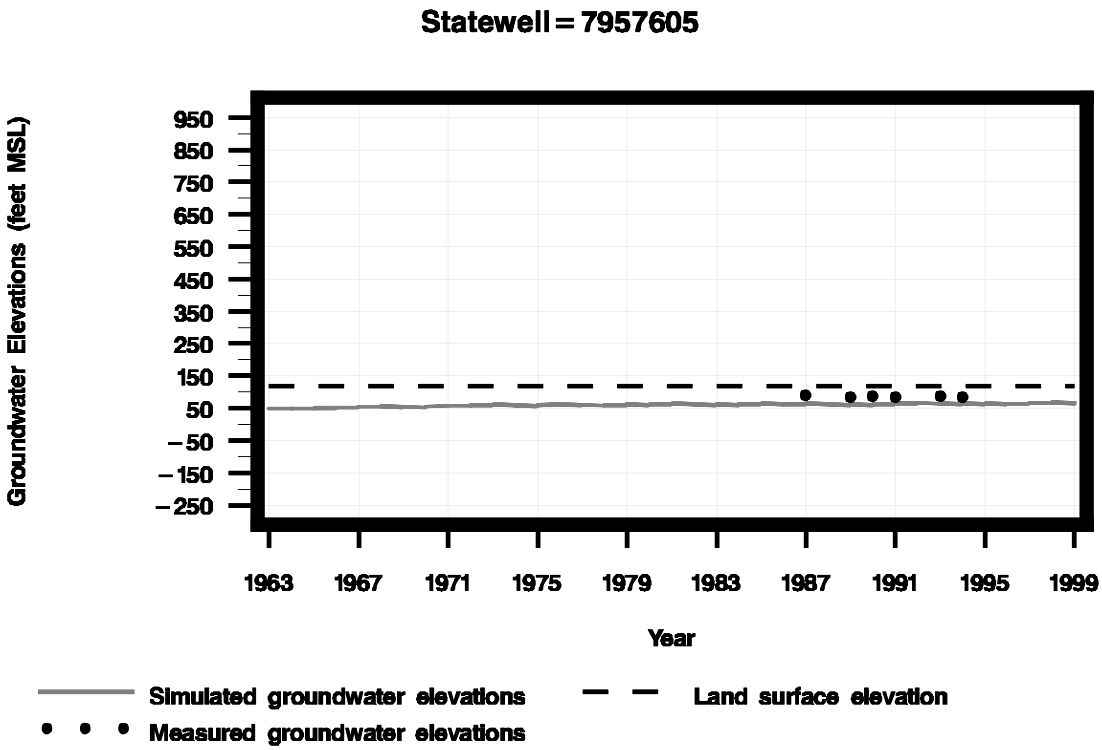
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7957605
Groundwater Elevations (feet MSL)
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−50
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1963
1967
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1975
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1983
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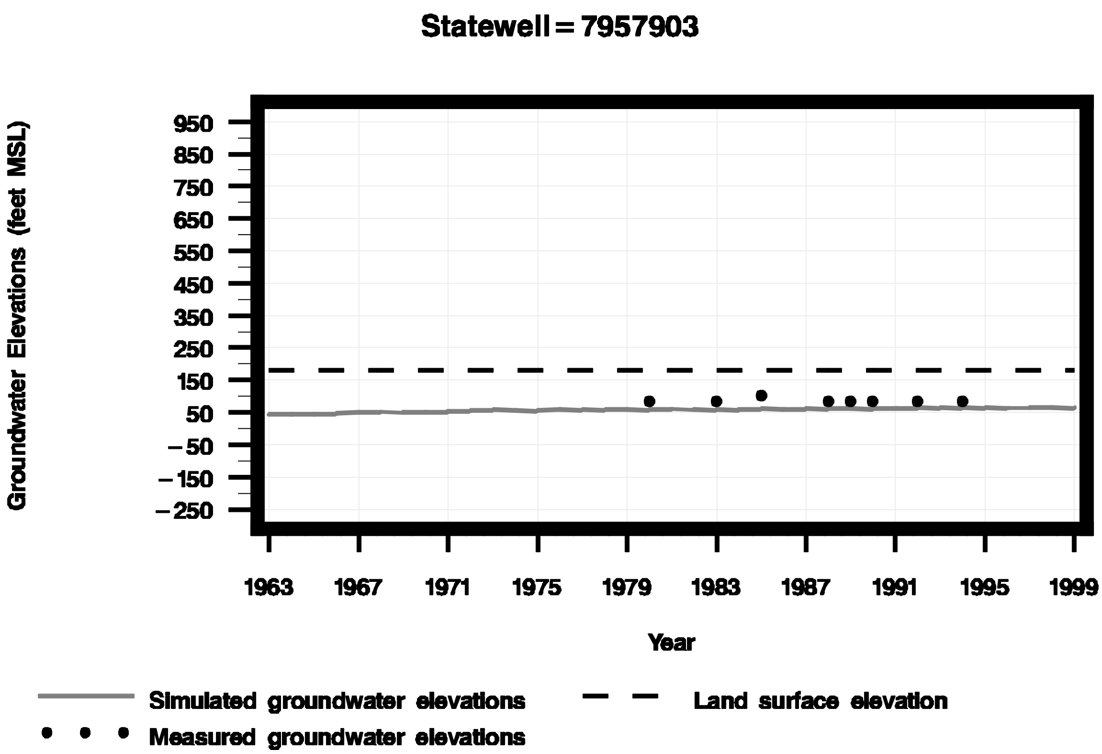
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7957903
Groundwater Elevations (feet MSL)
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450
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−50
−150
−250
1963
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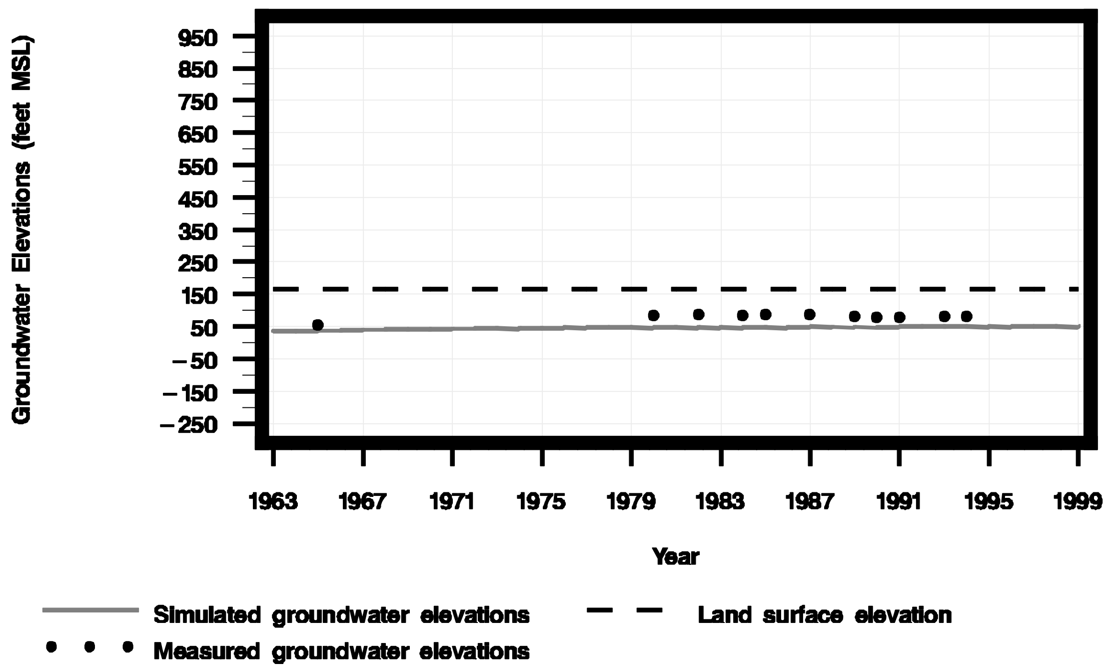
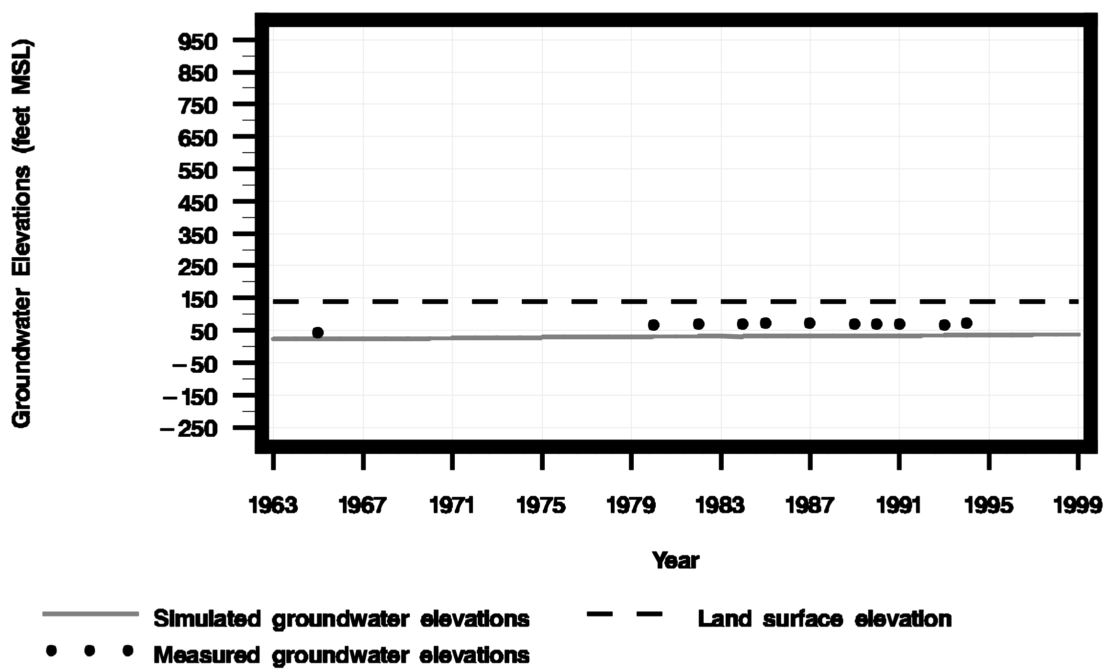
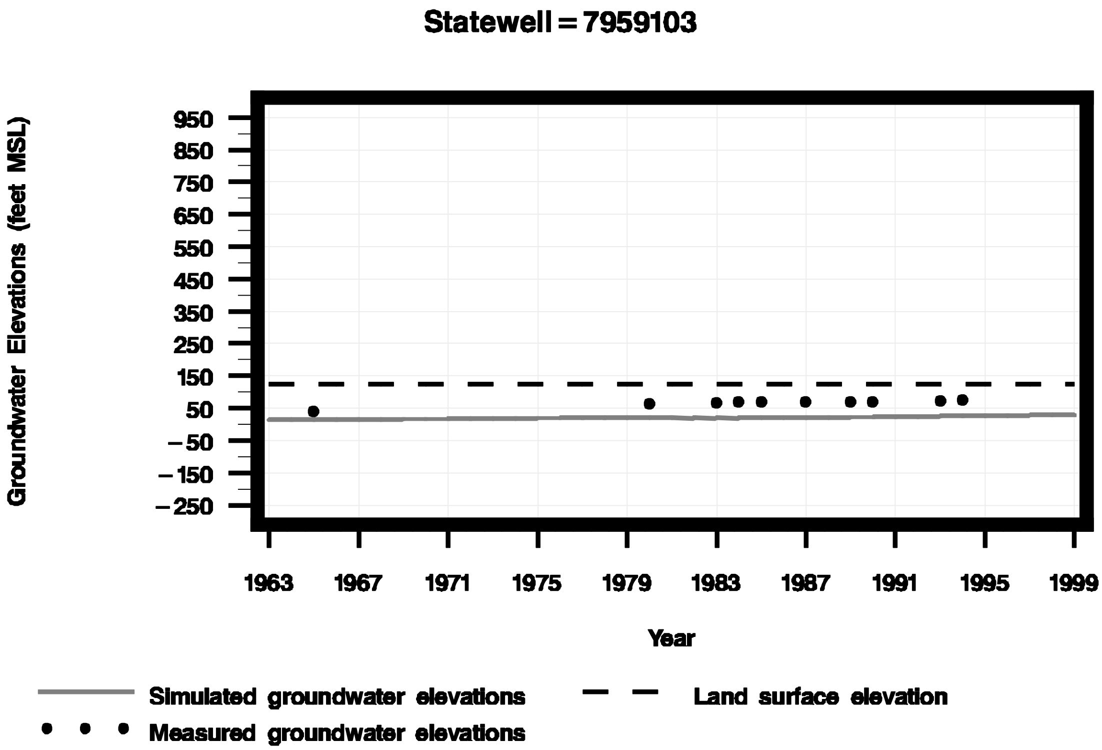
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 7958201



Statewell = 7958302




Statewell = 7959103
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
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150
50
−50
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1967
1971
1975
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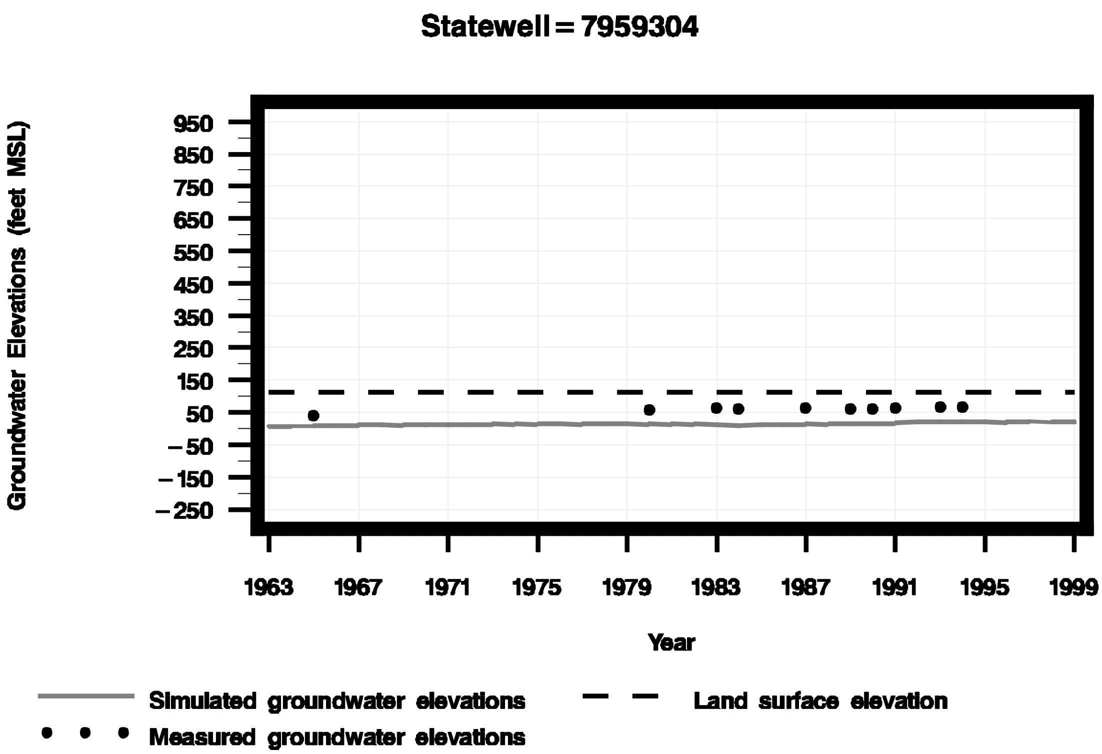
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7959304
Groundwater Elevations (feet MSL)
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850
750
650
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450
350
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150
50
−50
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1967
1971
1975
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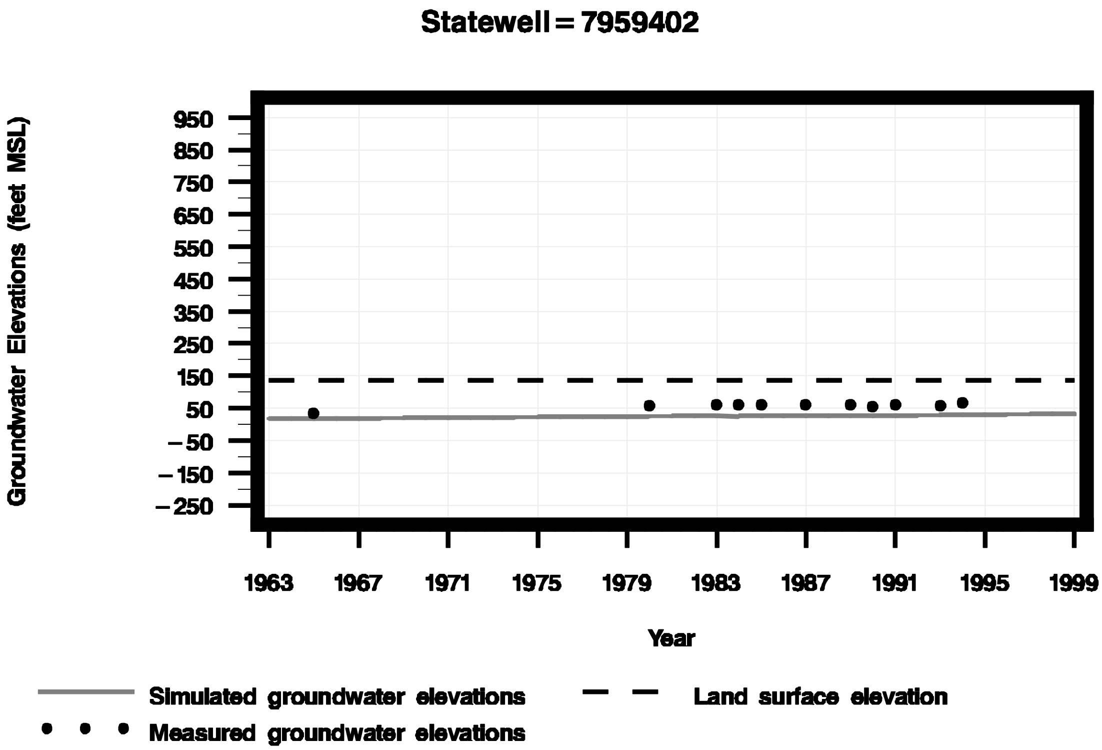
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7959402
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
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50
−50
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−250
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1967
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1983
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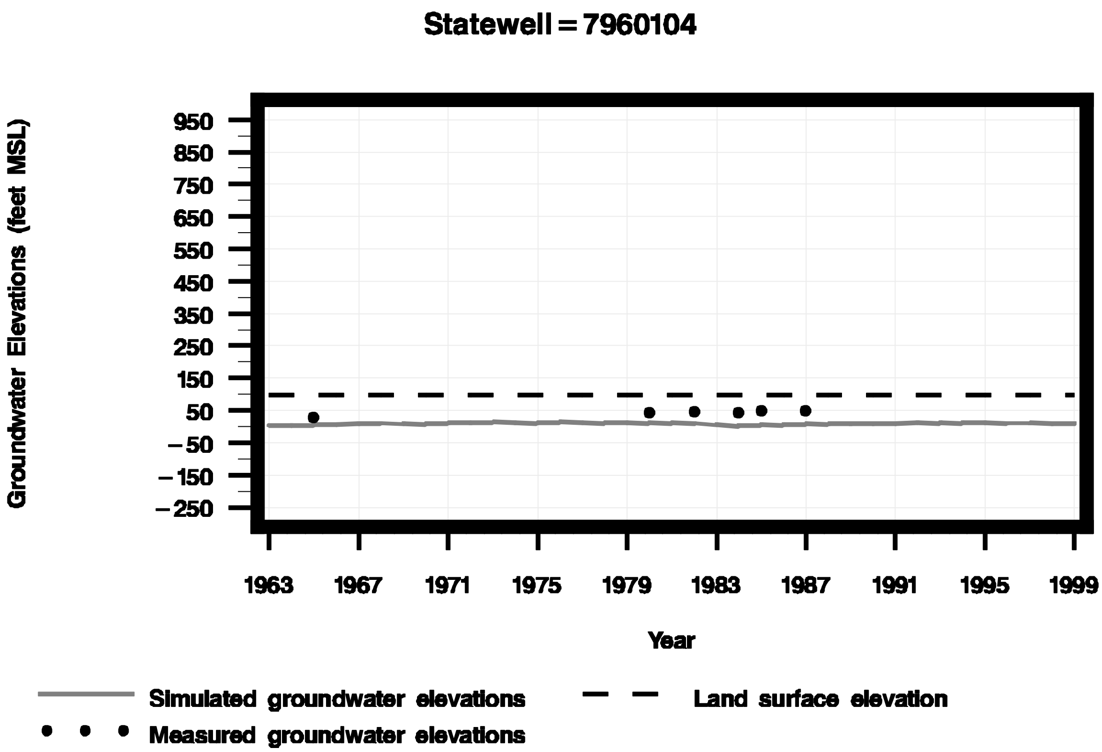
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7960104
Groundwater Elevations (feet MSL)
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850
750
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450
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50
−50
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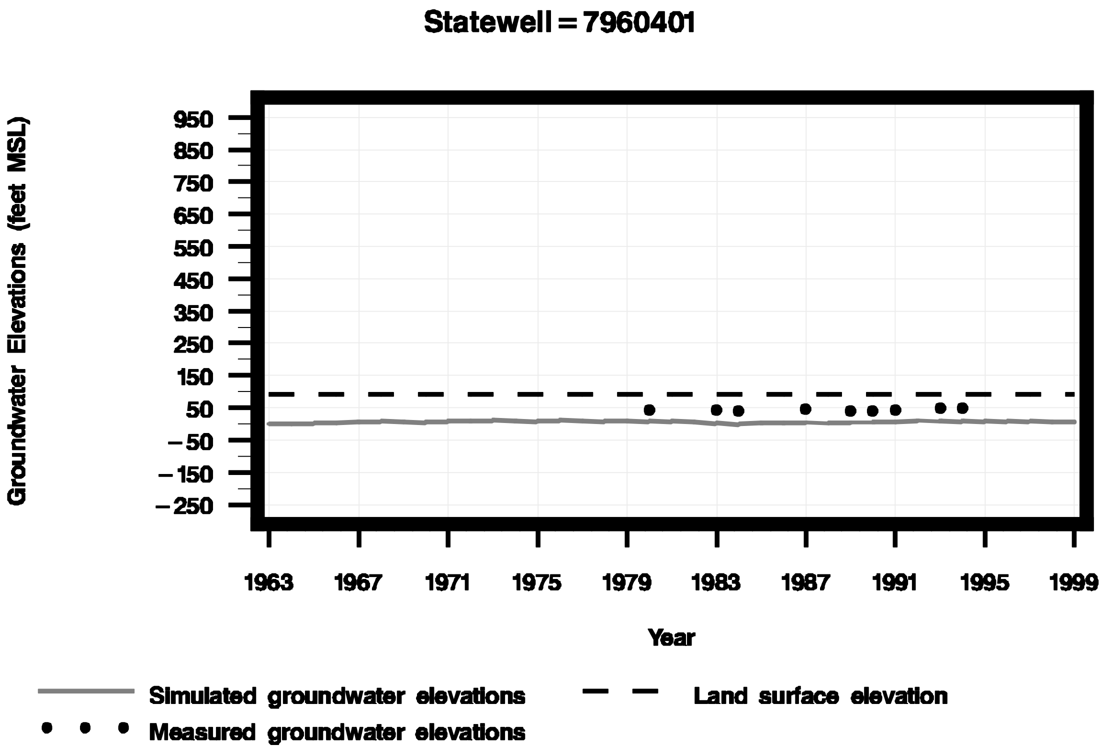
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7960401
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1967
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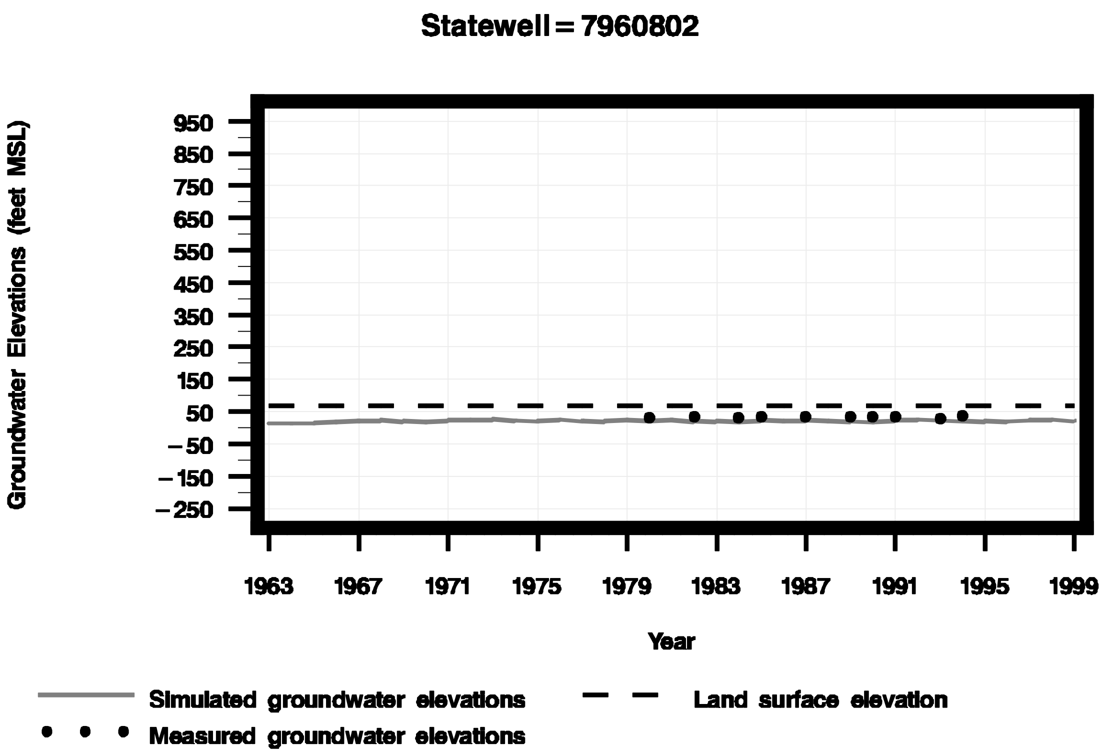
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7960802
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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250
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50
−50
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1967
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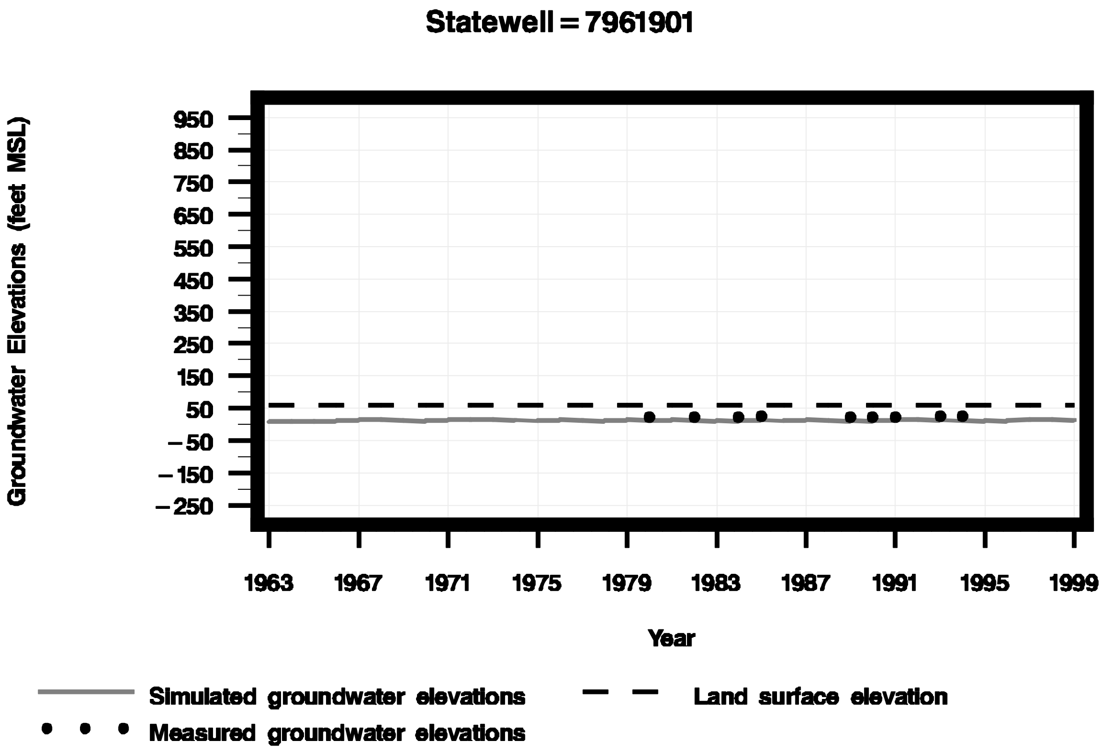
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7961901
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1967
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1983
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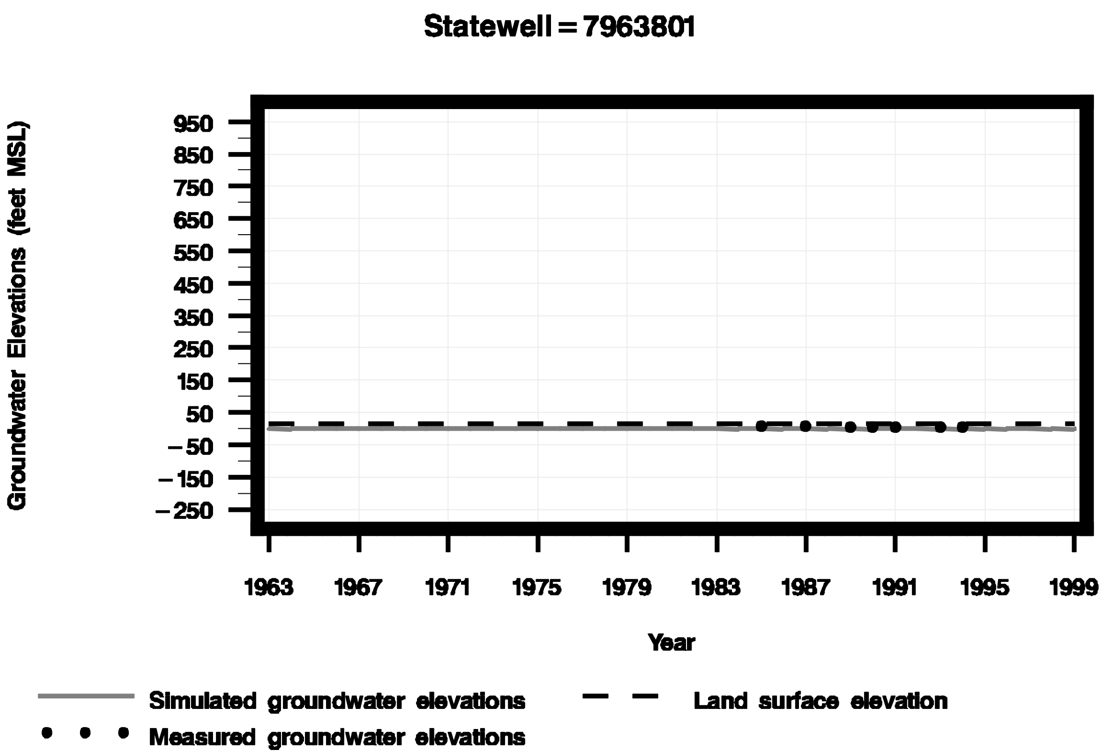
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7963801
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
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1967
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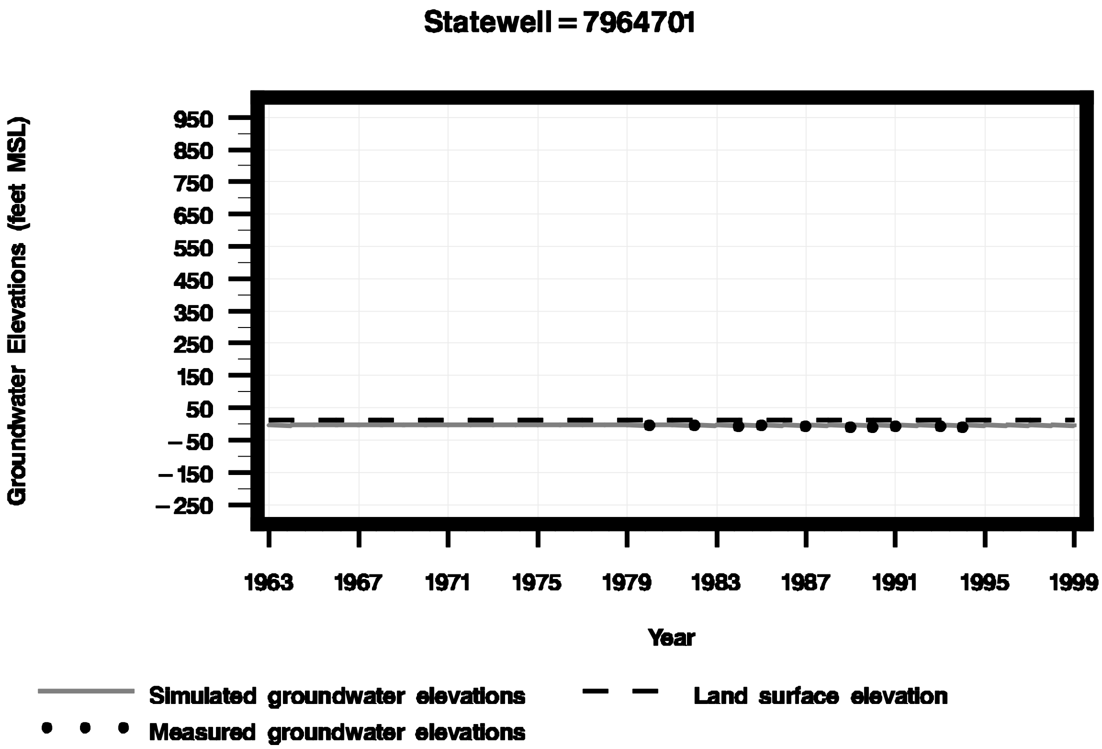
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7964701
Groundwater Elevations (feet MSL)
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850
750
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450
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−50
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1967
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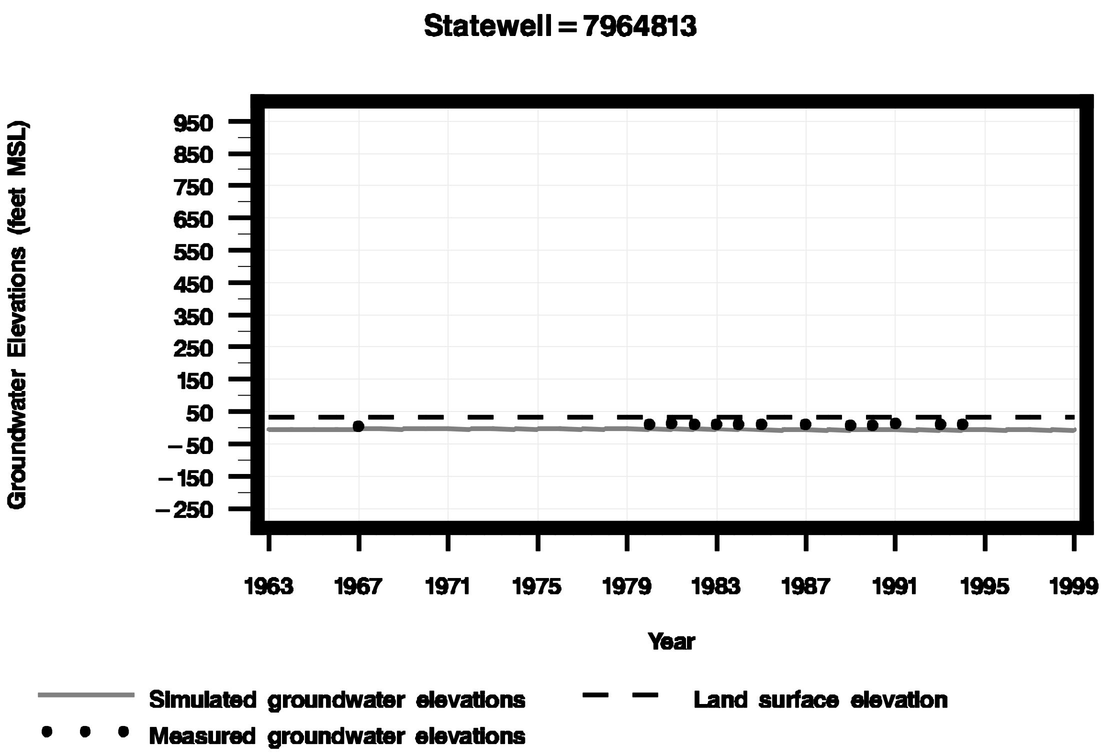
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 7964813
Groundwater Elevations (feet MSL)
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850
750
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450
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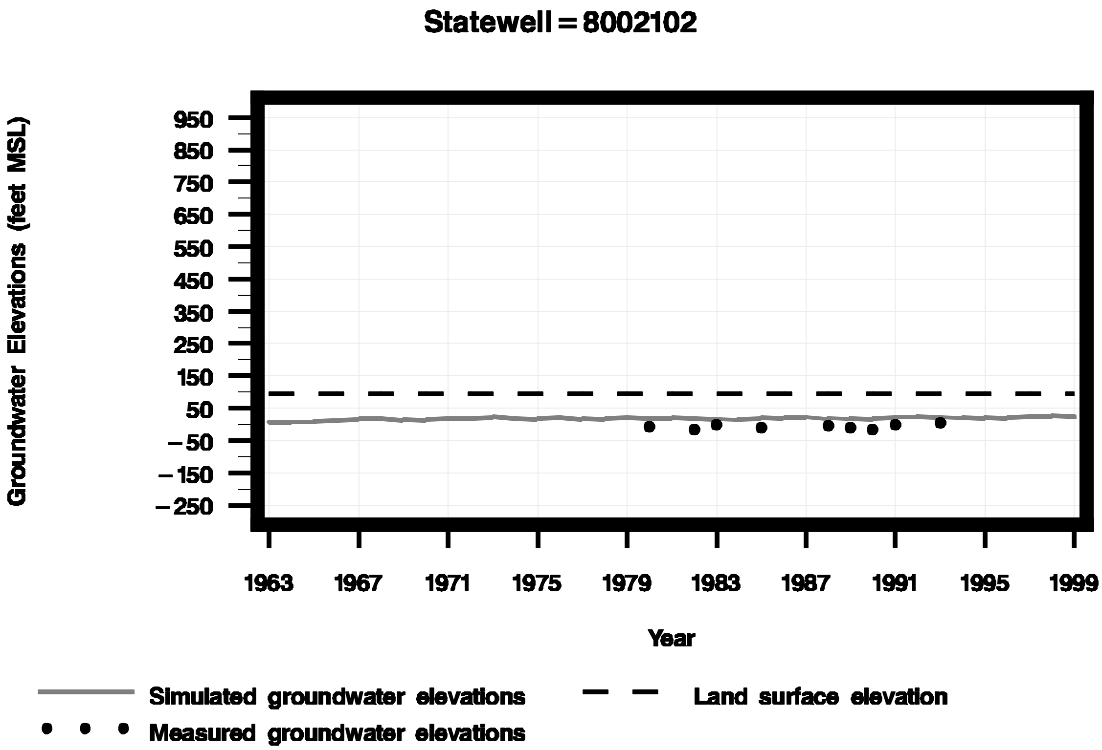
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8002102
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850
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650
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450
350
250
150
50
−50
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−250
Groundwater Elevations (feet MSL)
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1991
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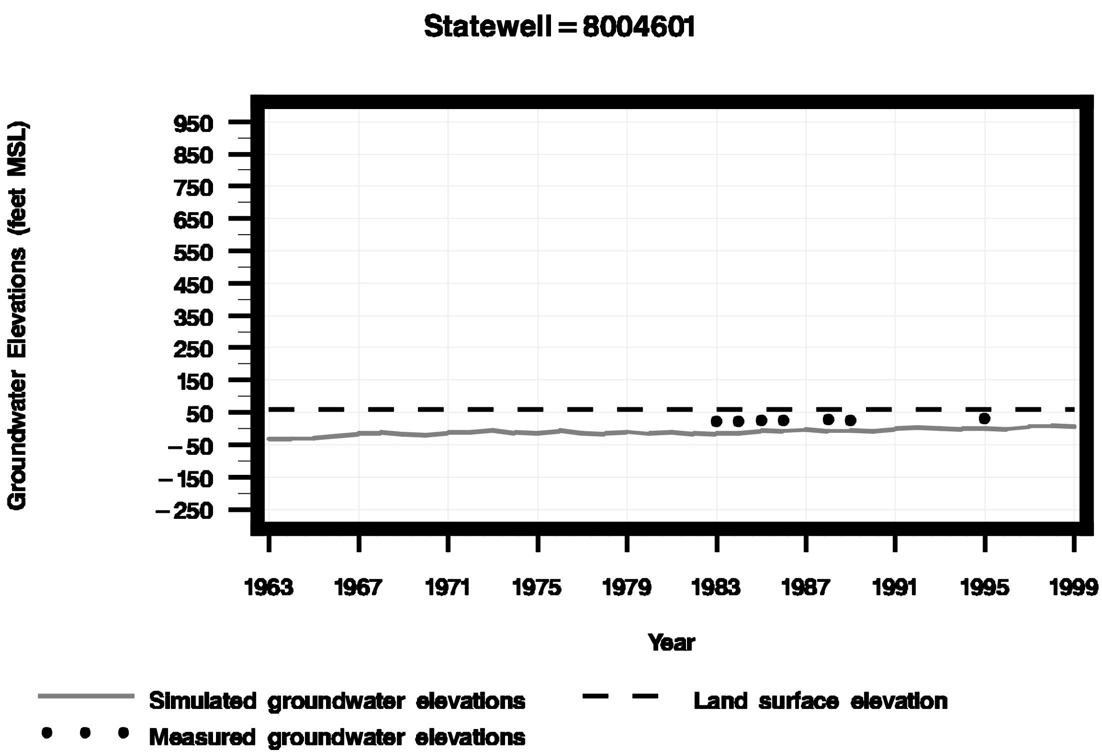
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8004601
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450
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250
150
50
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−250
Groundwater Elevations (feet MSL)
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1967
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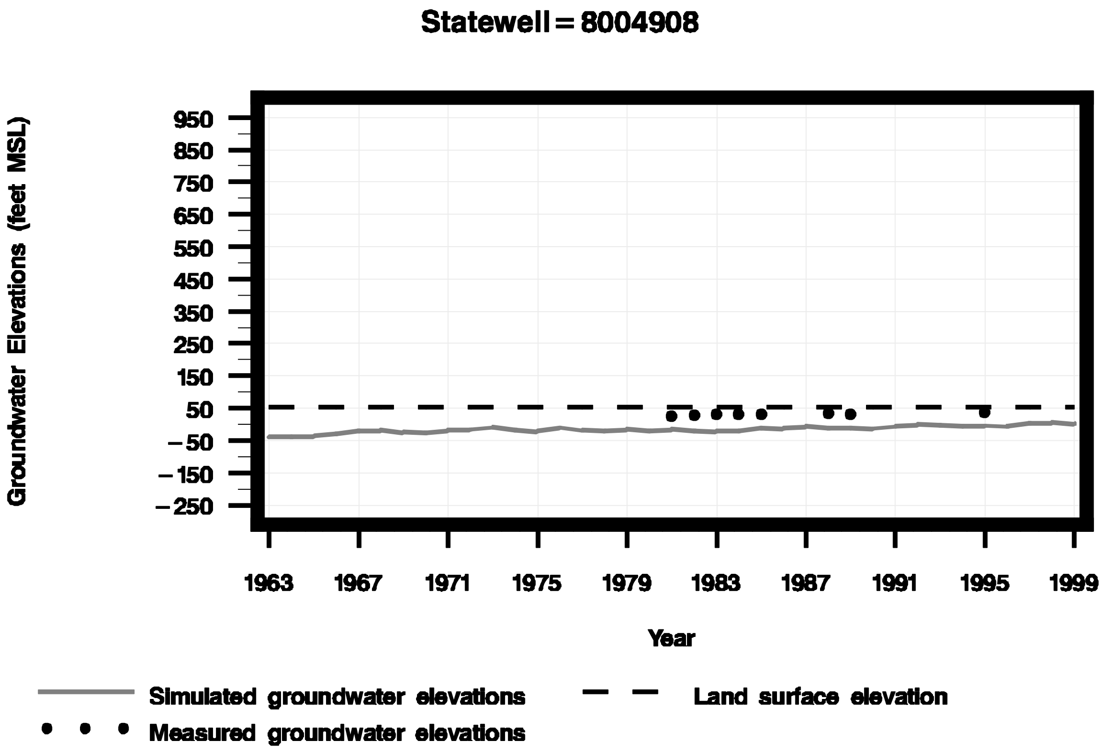
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8004908
Groundwater Elevations (feet MSL)
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650
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450
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50
−50
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1967
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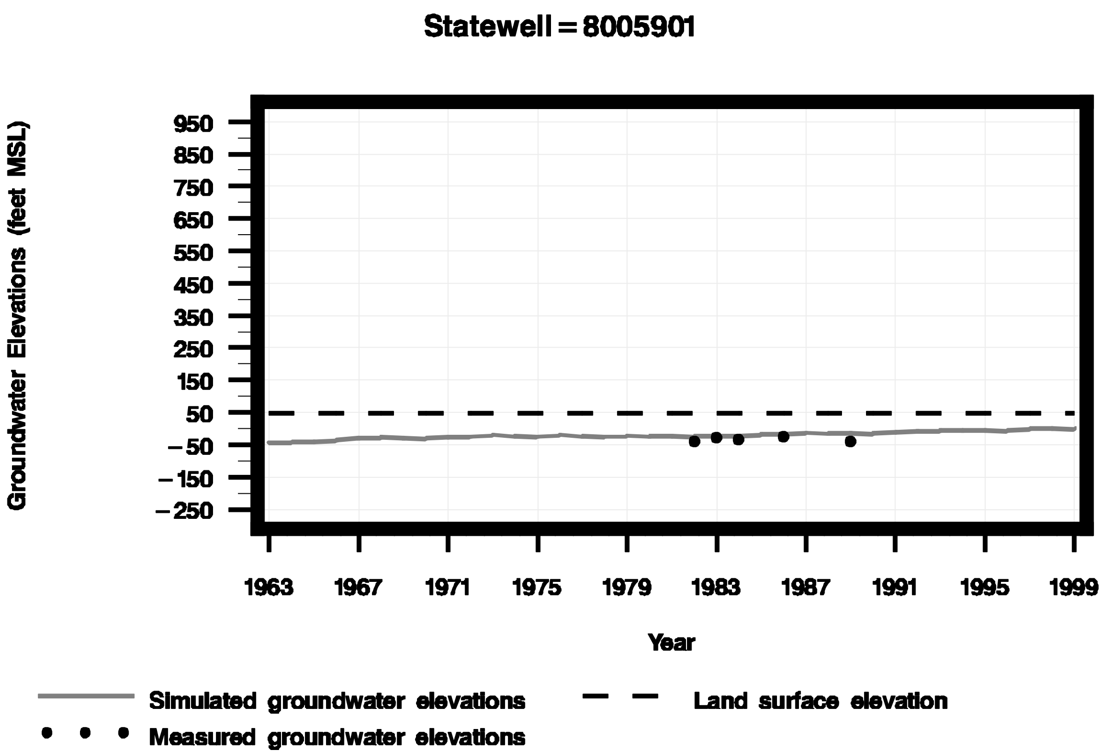
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8005901
Groundwater Elevations (feet MSL)
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650
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450
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150
50
−50
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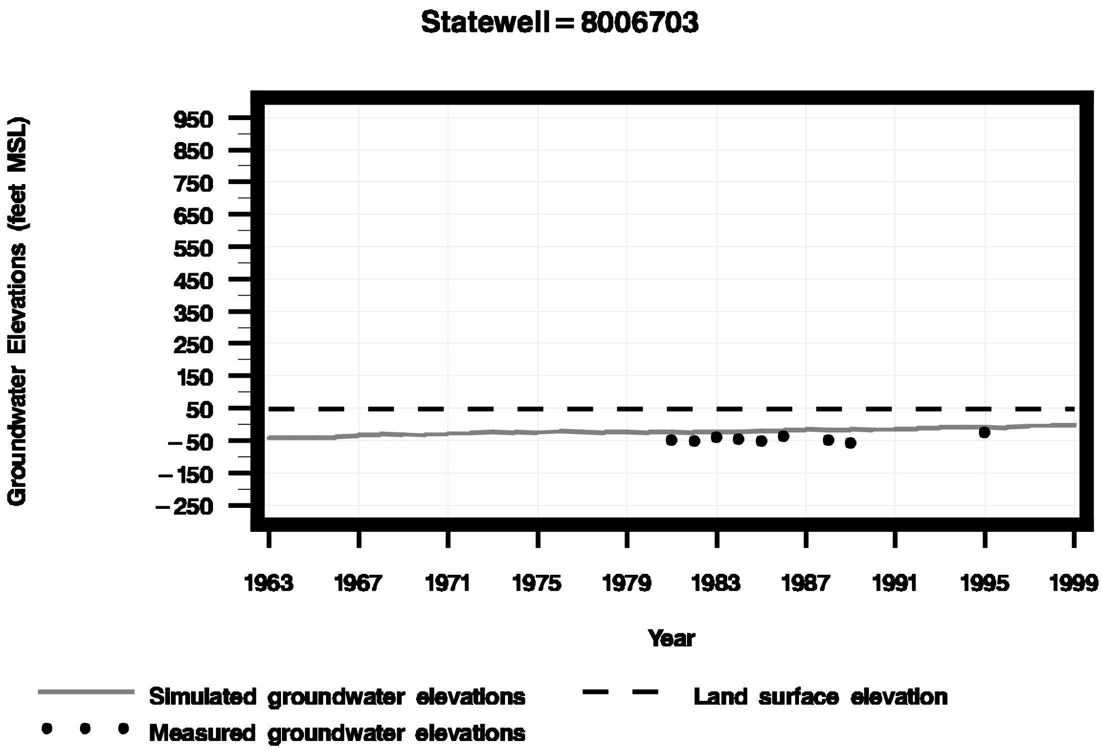
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8006703
Groundwater Elevations (feet MSL)
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750
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450
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50
−50
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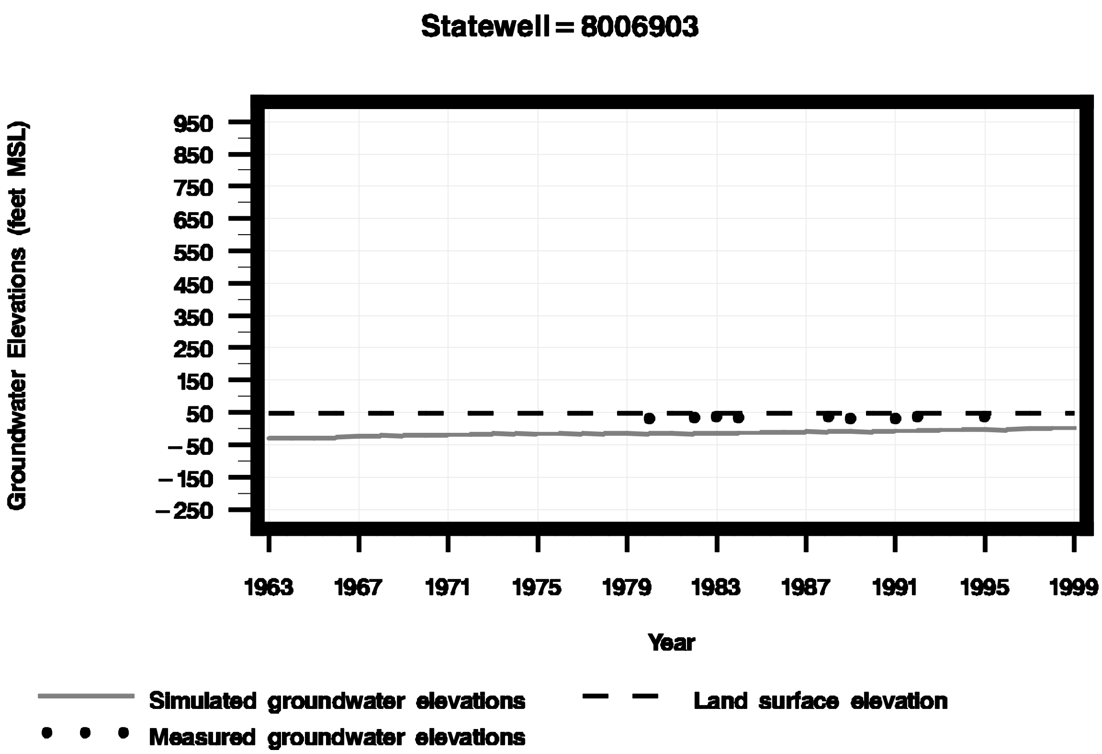
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8006903
Groundwater Elevations (feet MSL)
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450
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−50
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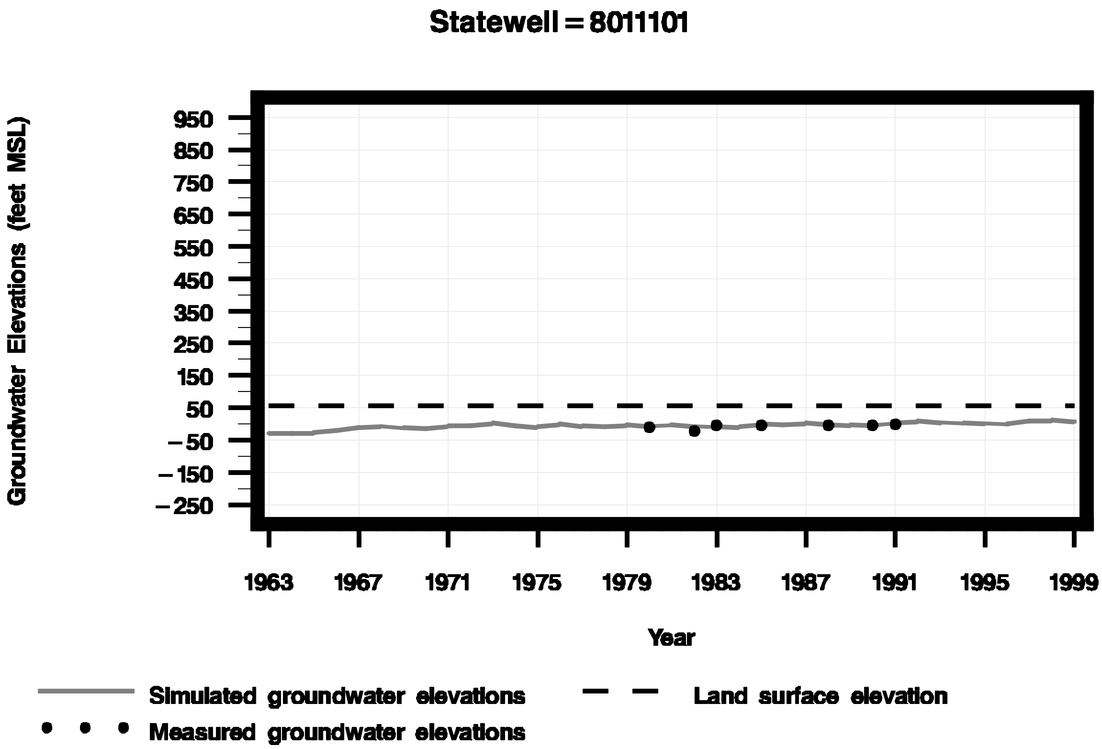
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8011101
Groundwater Elevations (feet MSL)
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550
450
350
250
150
50
−50
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1991
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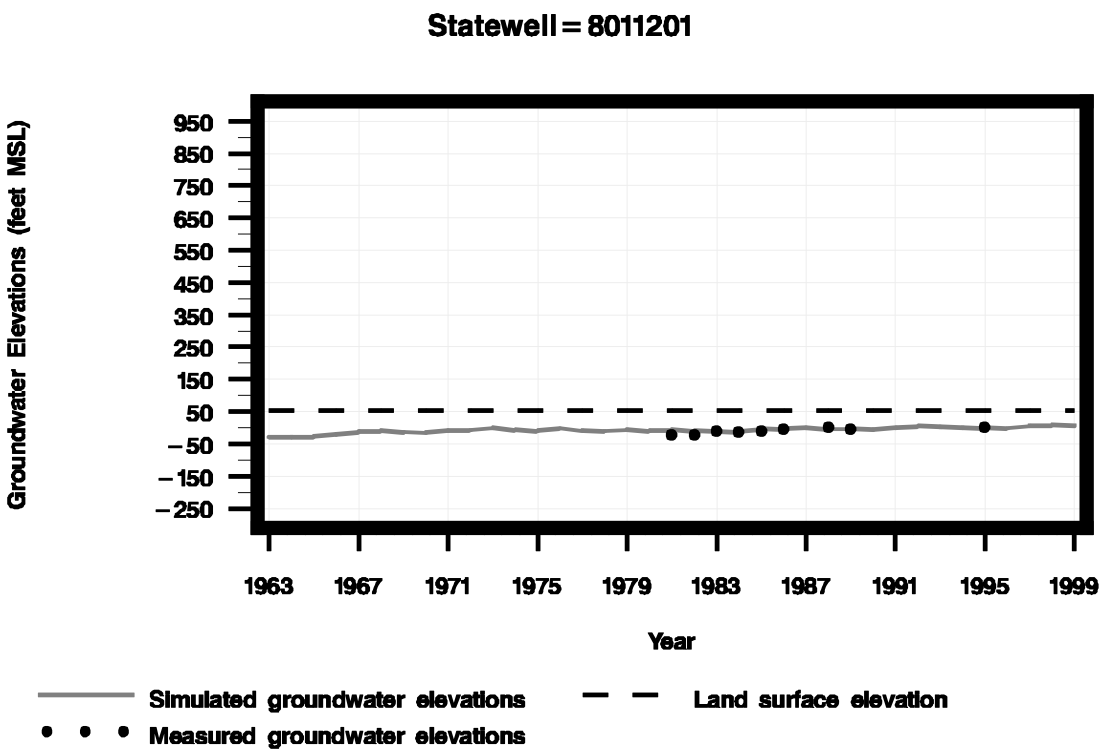
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8011201
Groundwater Elevations (feet MSL)
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450
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50
−50
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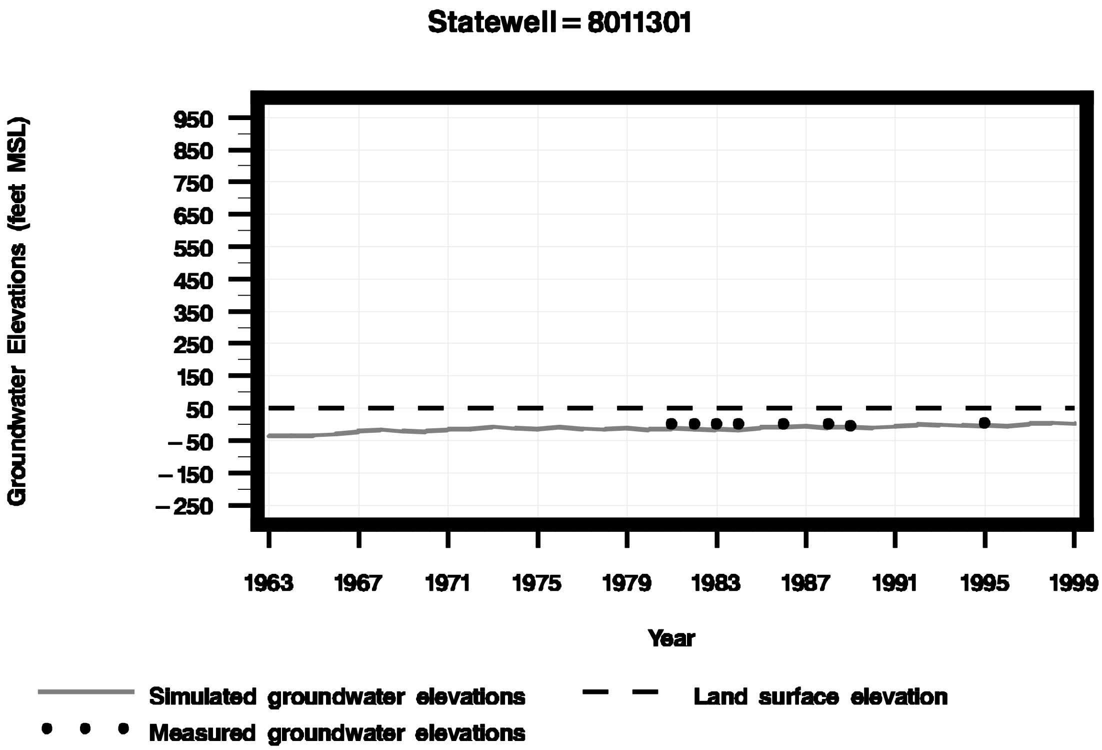
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8011301
Groundwater Elevations (feet MSL)
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−50
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1967
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1975
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1991
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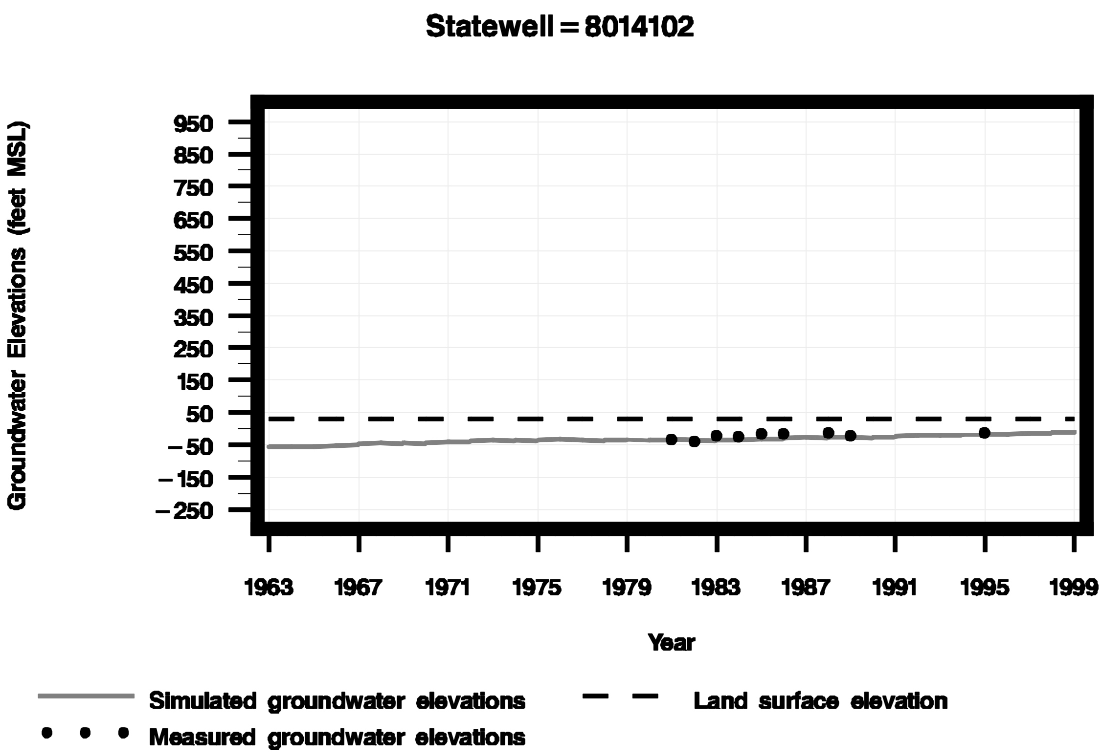
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8014102
Groundwater Elevations (feet MSL)
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1975
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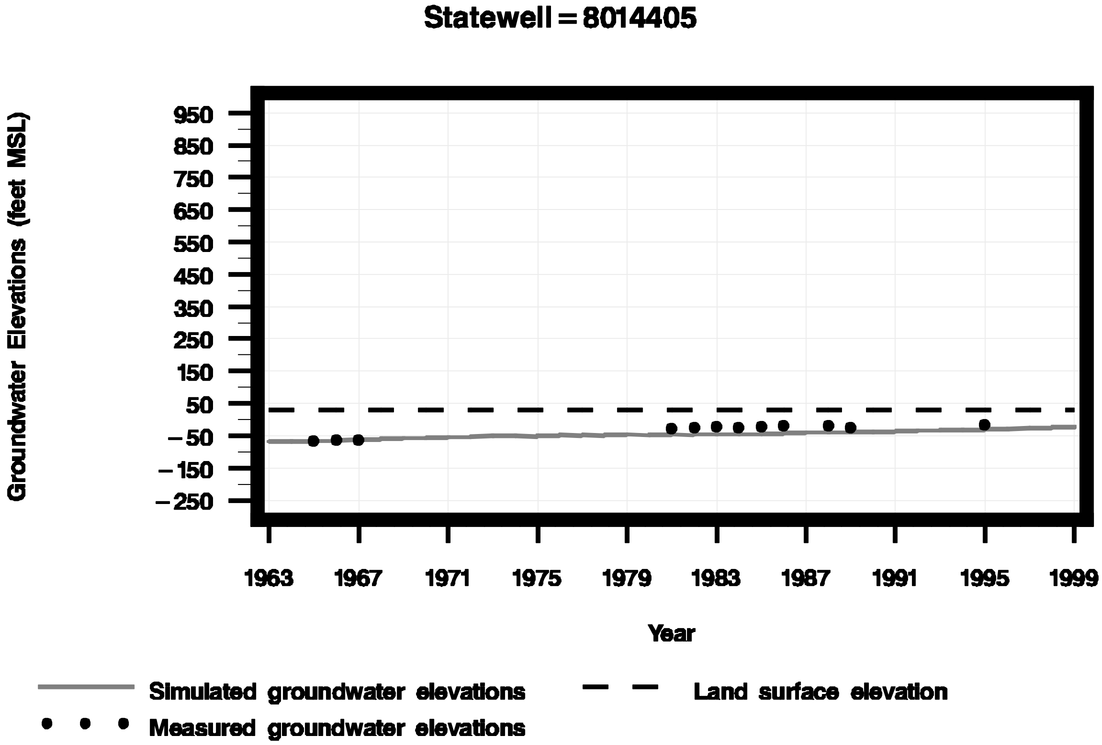
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8014405
Groundwater Elevations (feet MSL)
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−50
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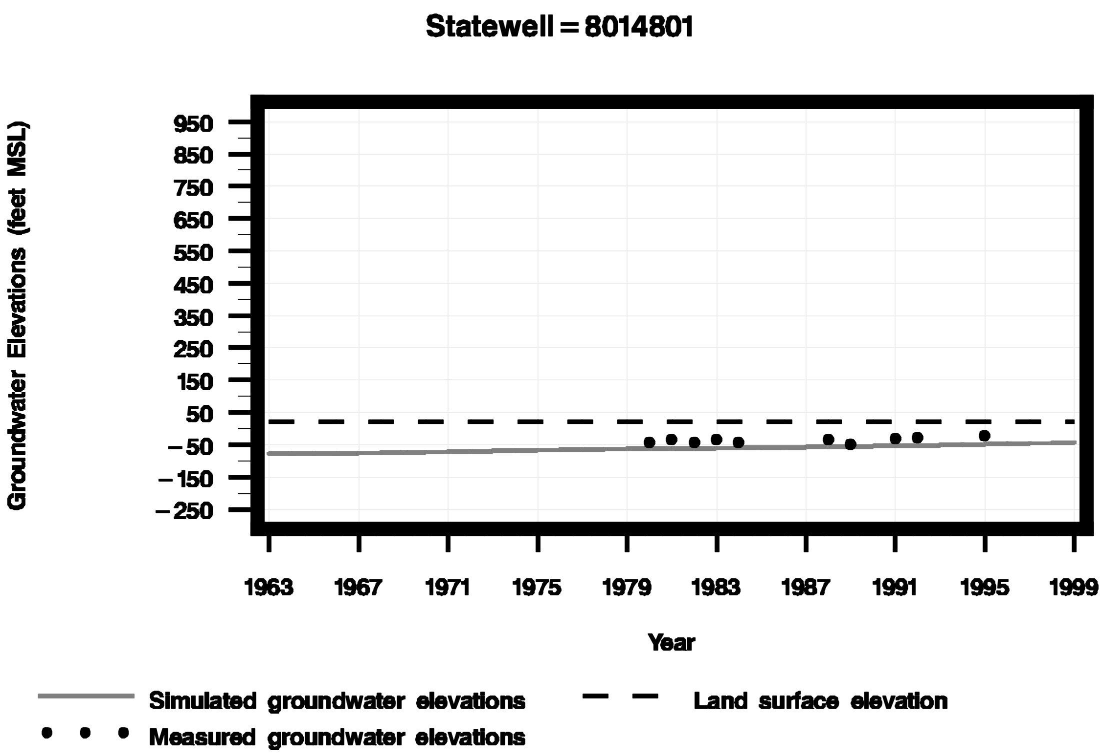
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8014801
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
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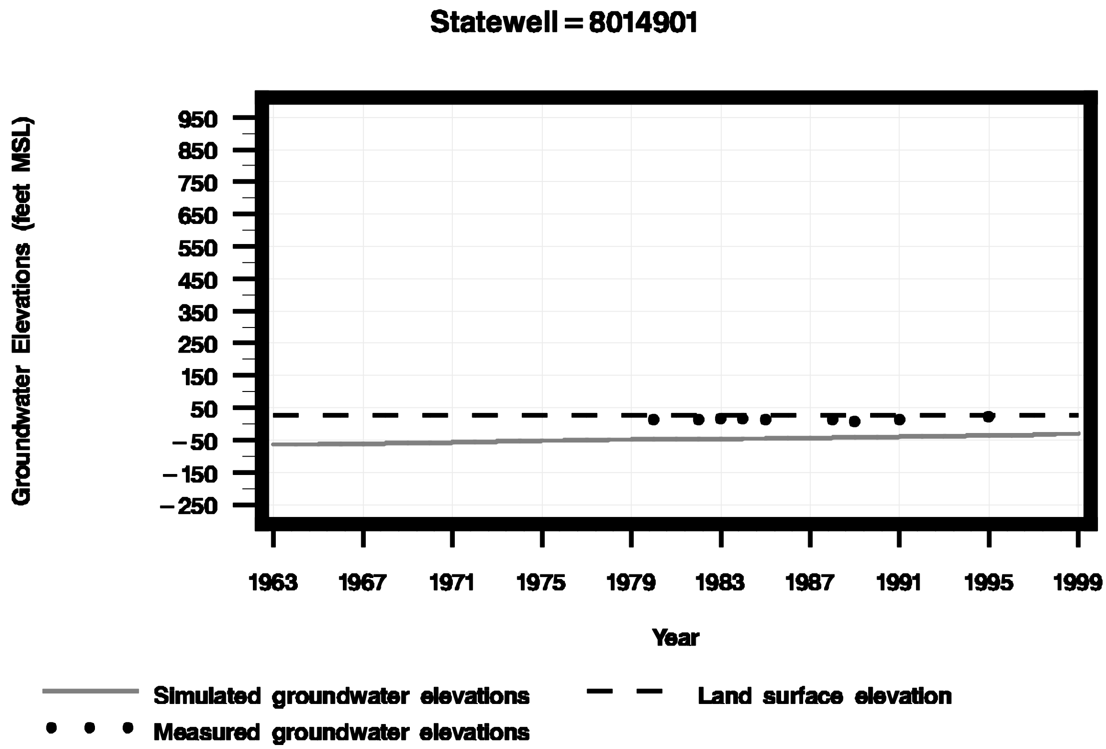
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8014901
Groundwater Elevations (feet MSL)
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450
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1991
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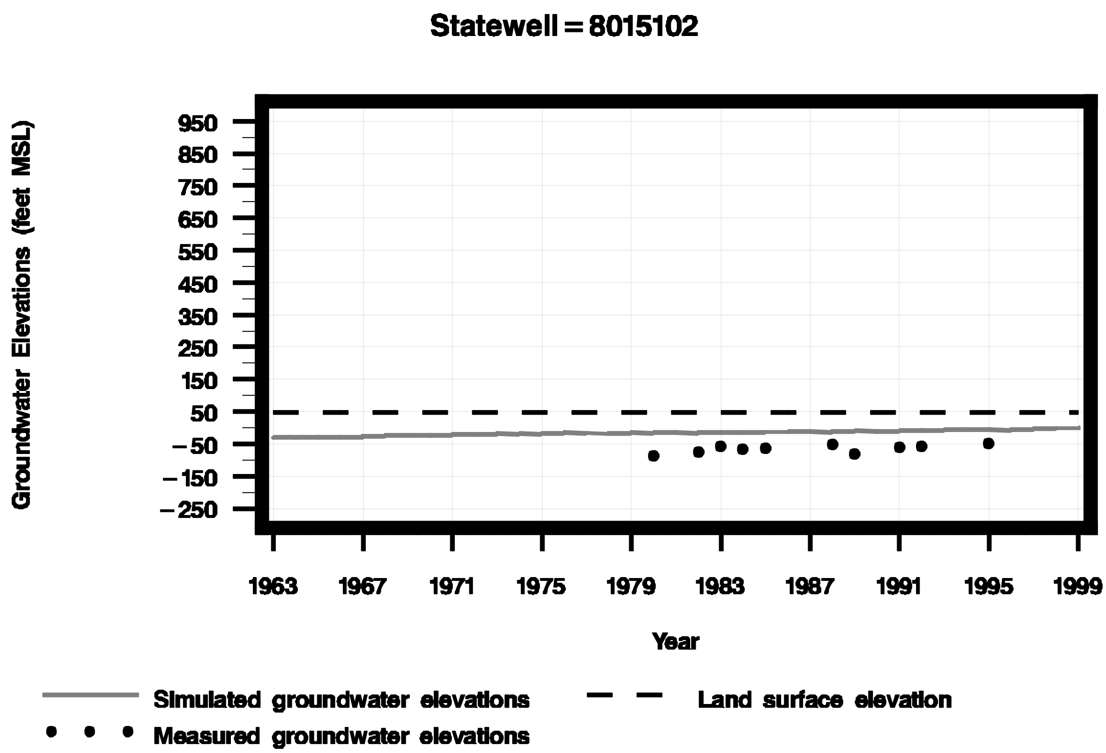
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8015102
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−250
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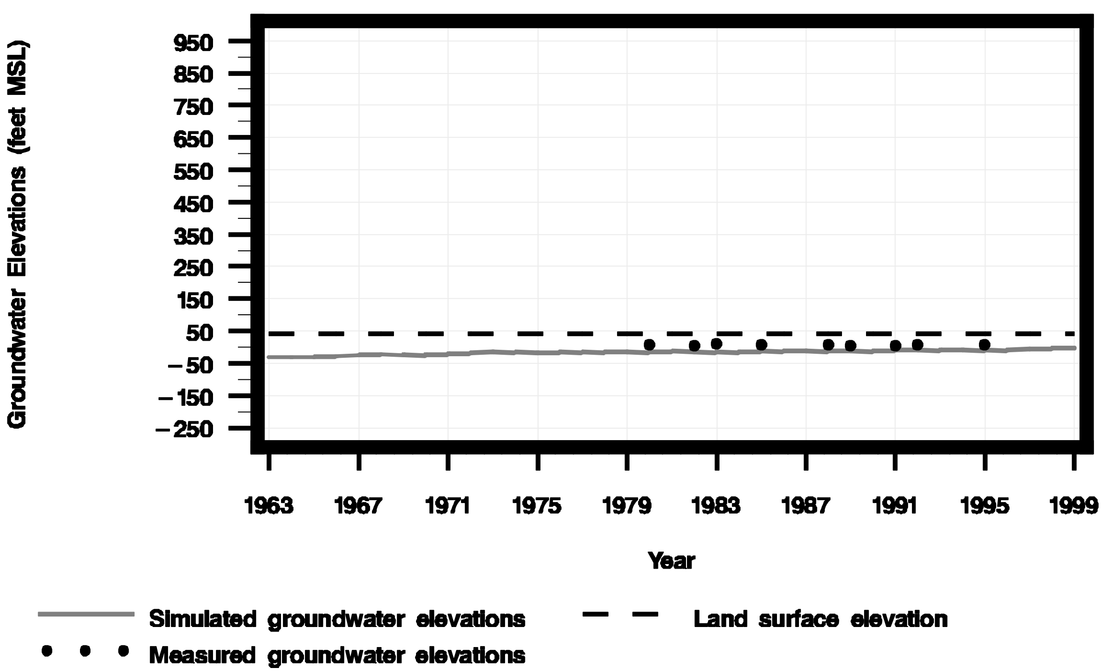
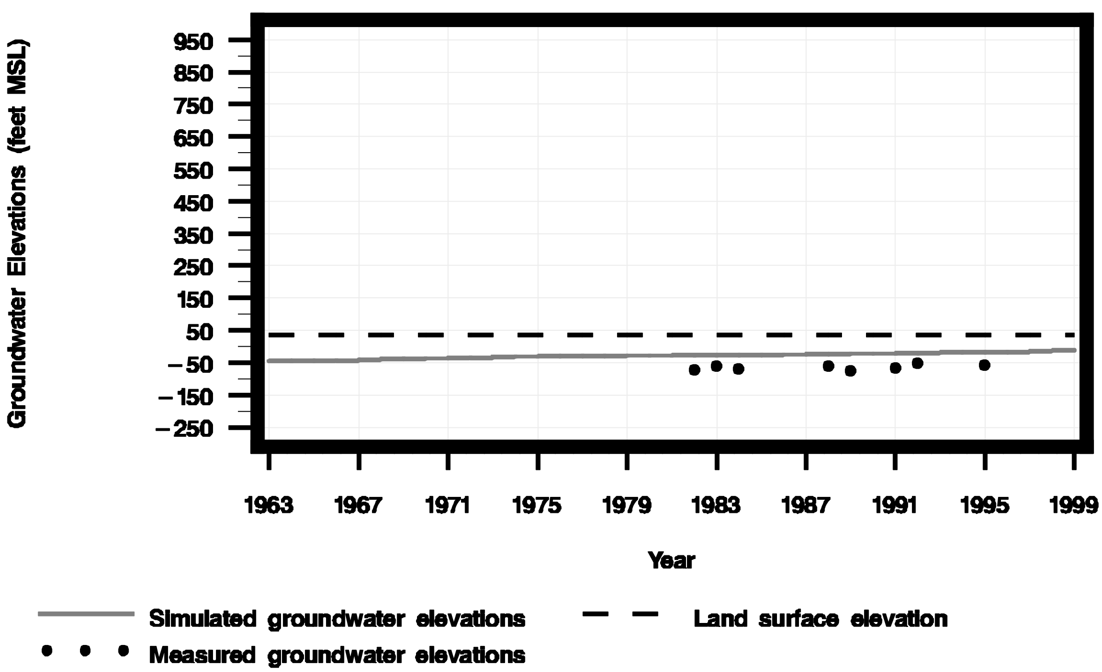
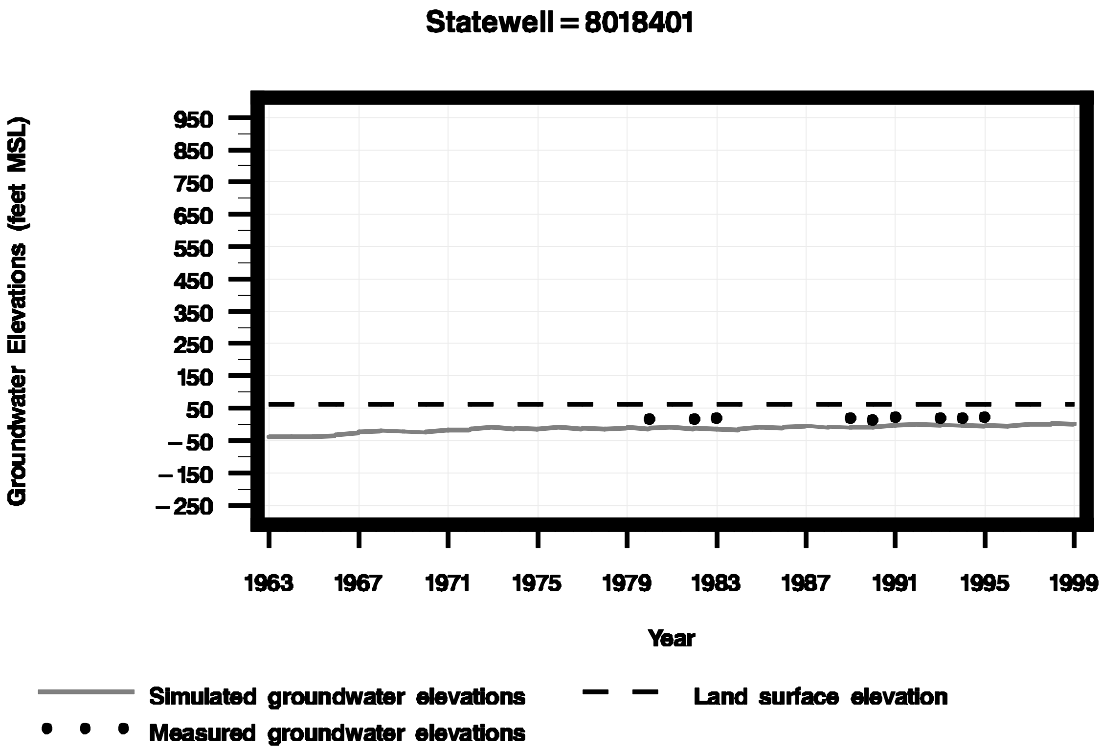
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 8015301



Statewell = 8015402




Statewell = 8018401
Groundwater Elevations (feet MSL)
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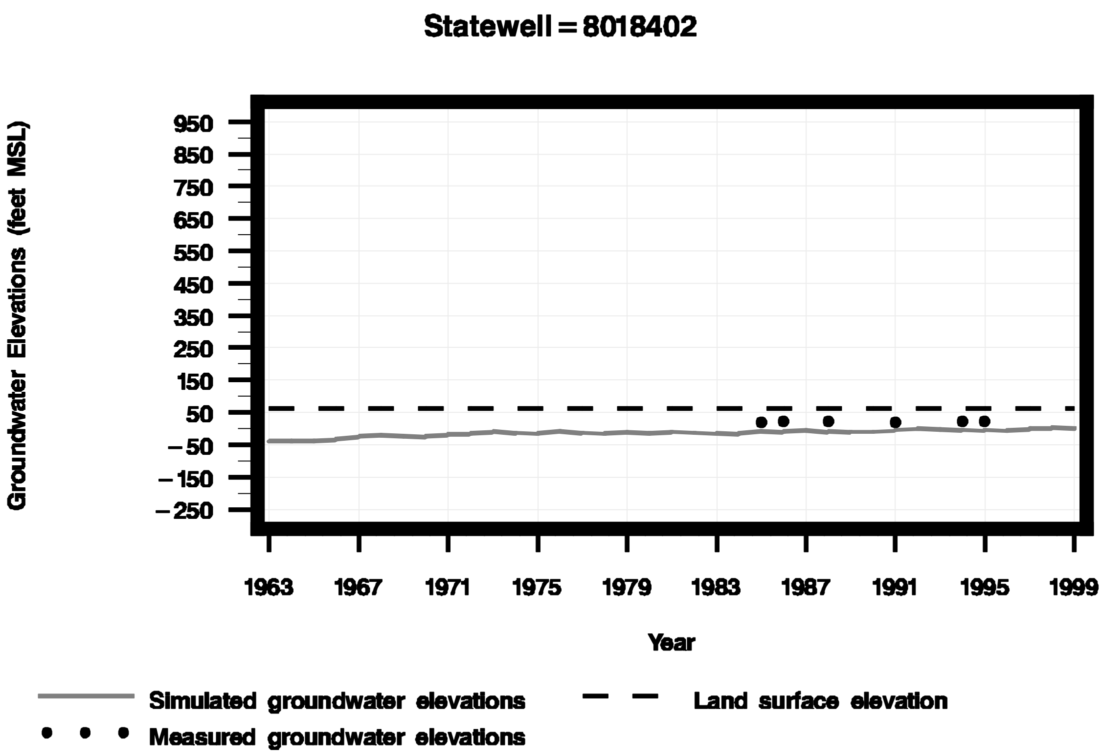
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8018402
Groundwater Elevations (feet MSL)
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−50
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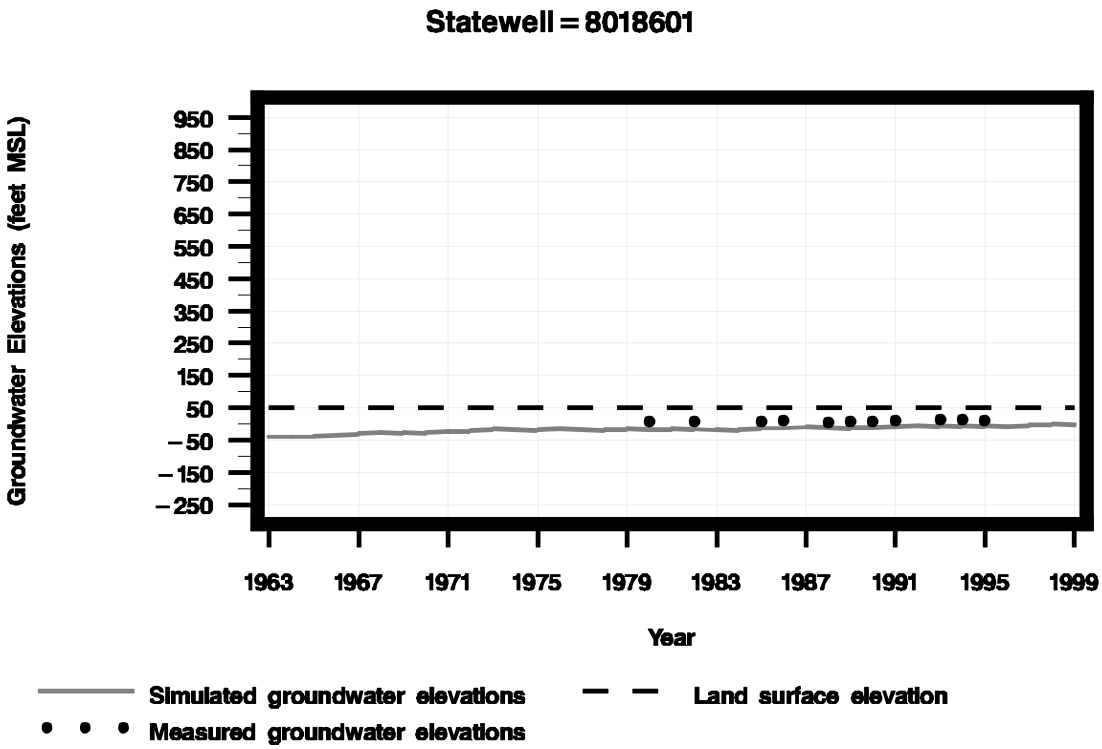
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8018601
Groundwater Elevations (feet MSL)
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−50
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1991
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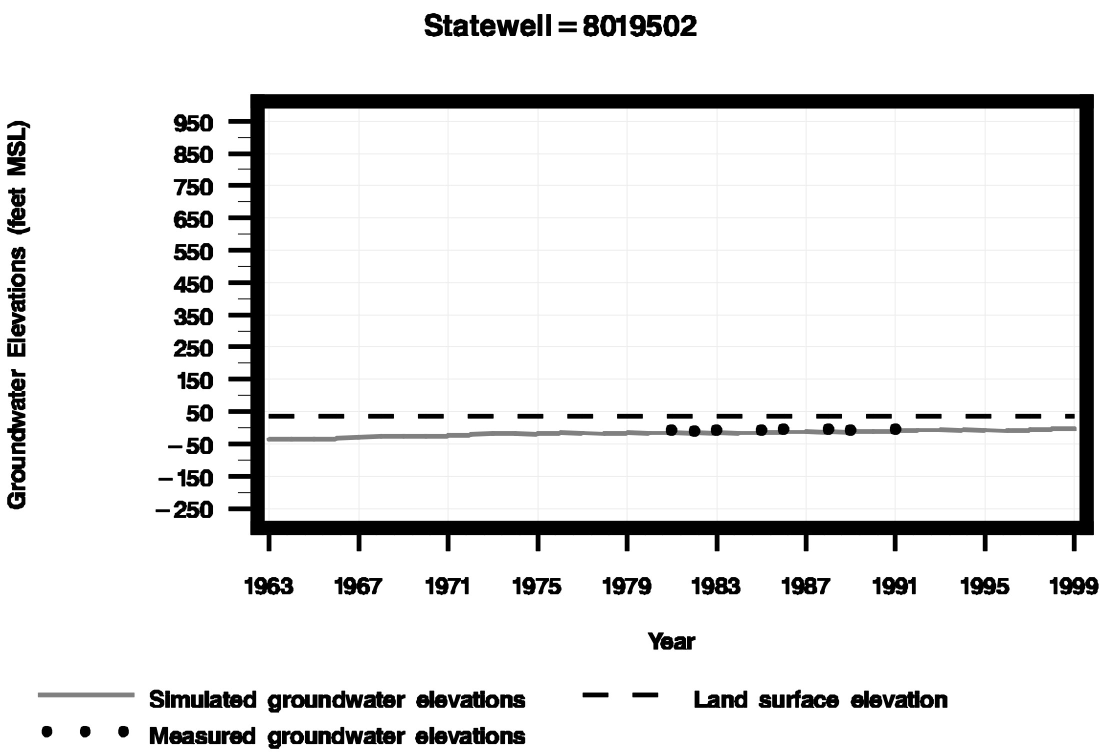
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8019502
Groundwater Elevations (feet MSL)
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450
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50
−50
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1983
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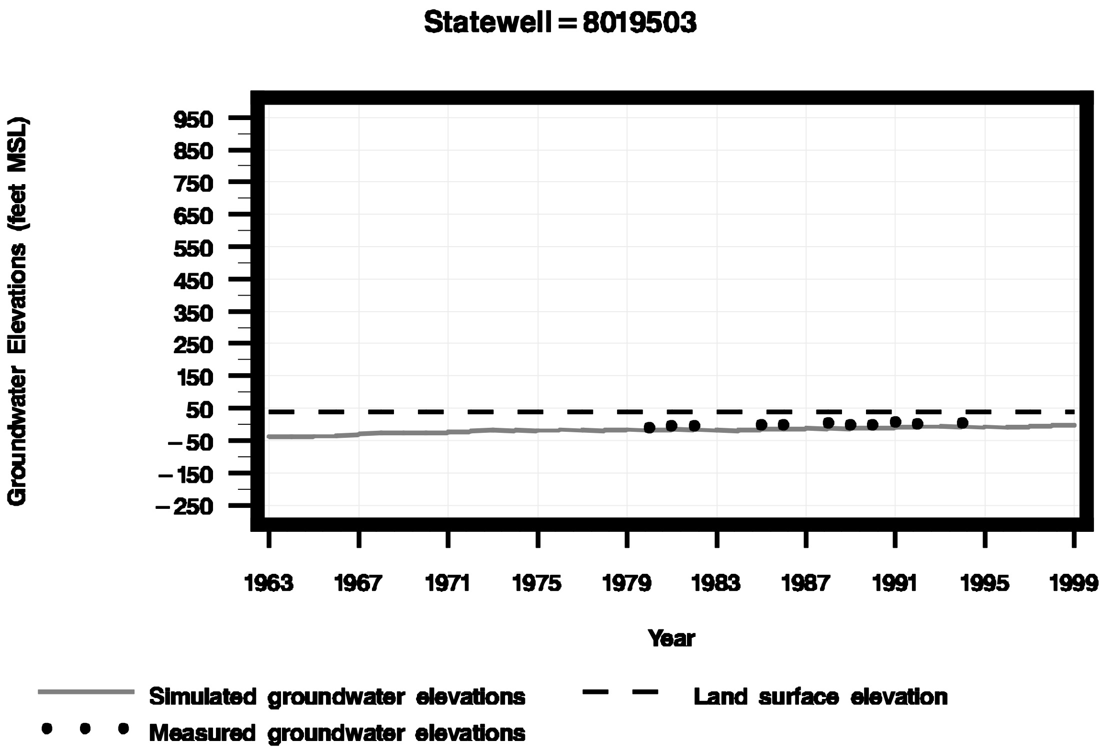
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8019503
Groundwater Elevations (feet MSL)
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450
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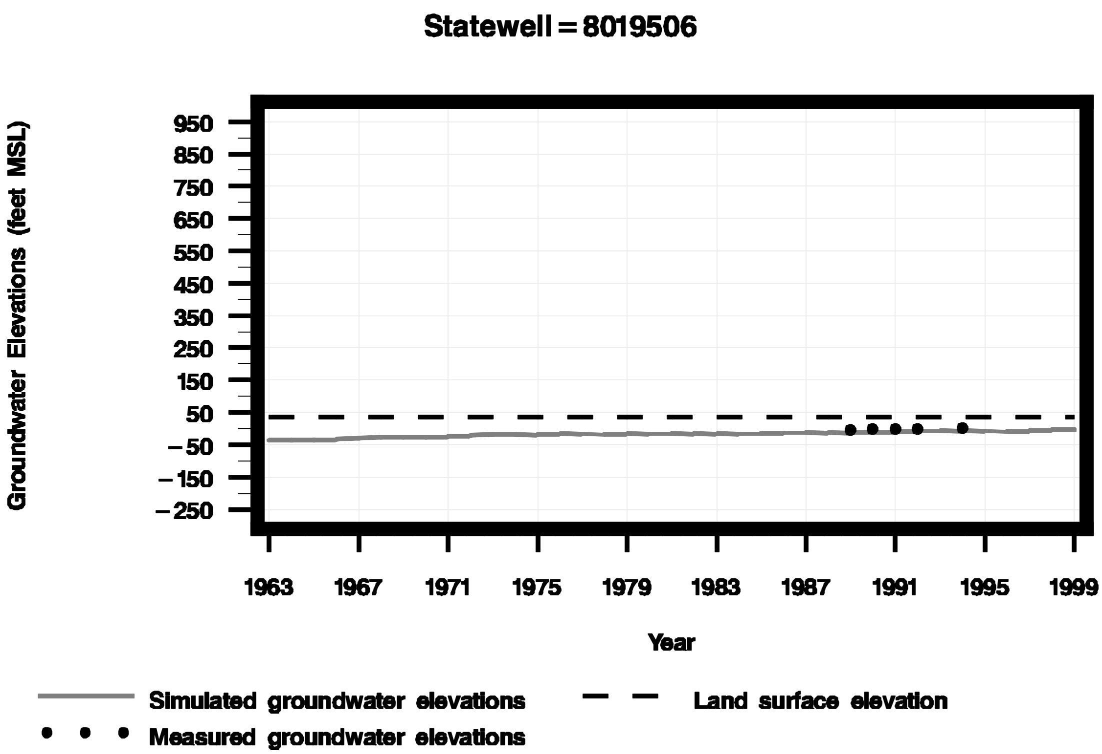
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8019506
Groundwater Elevations (feet MSL)
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−50
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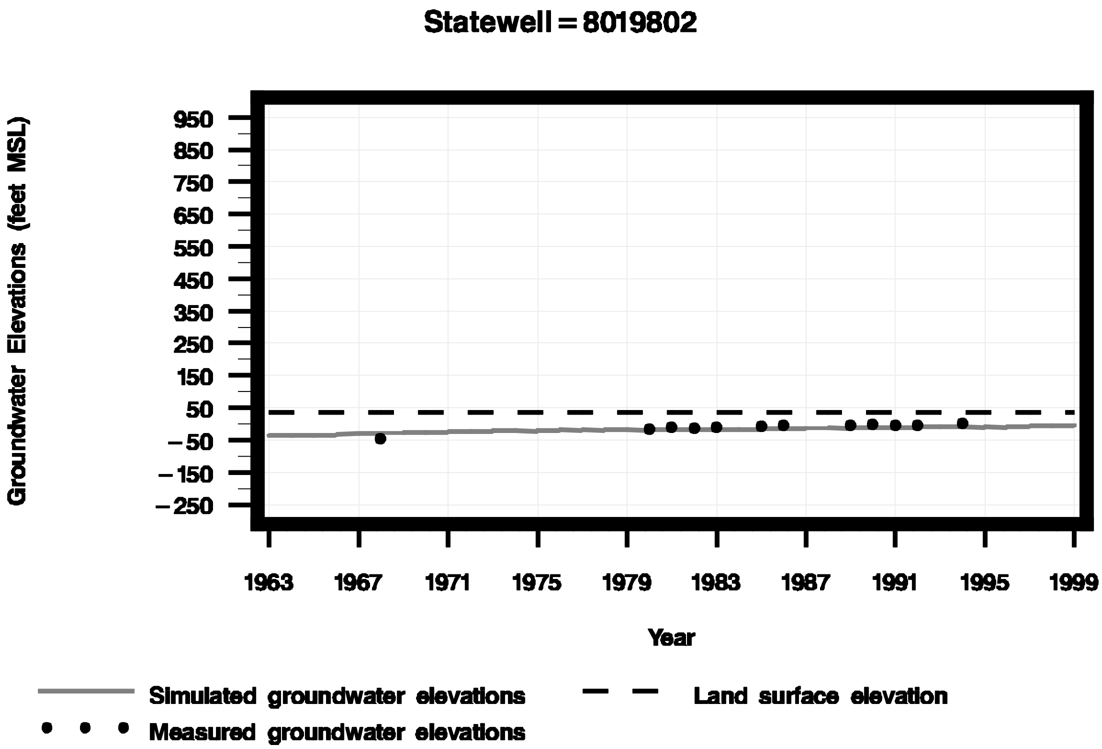
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8019802
Groundwater Elevations (feet MSL)
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450
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1963
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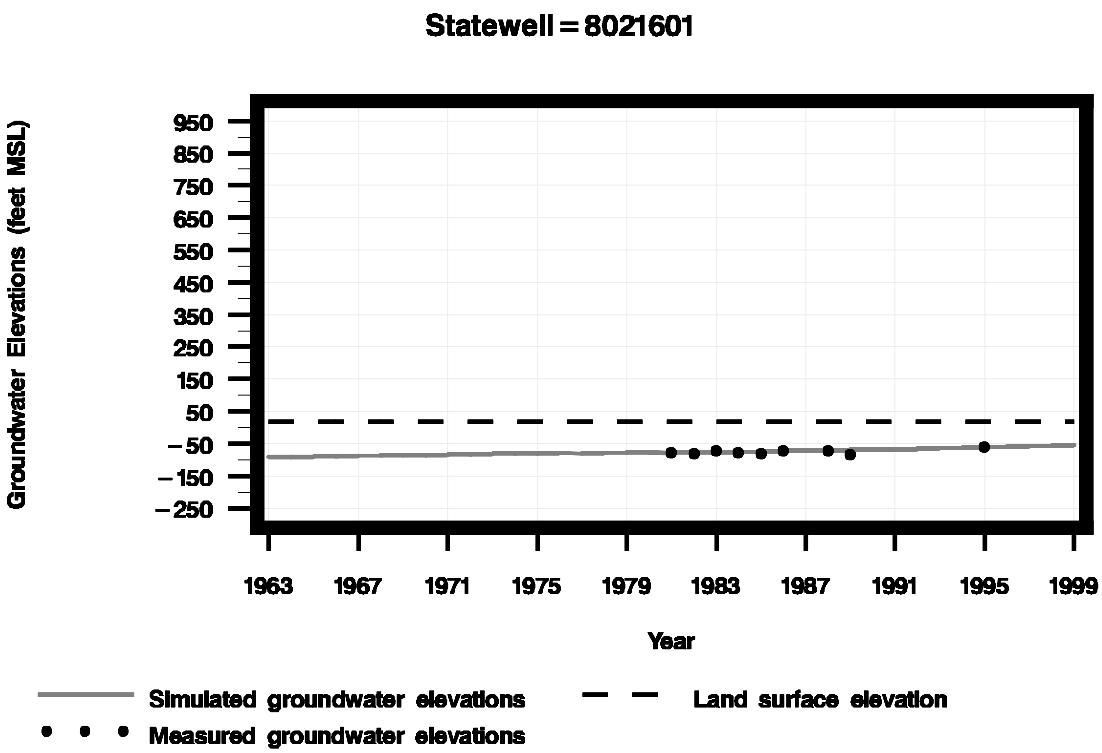
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8021601
Groundwater Elevations (feet MSL)
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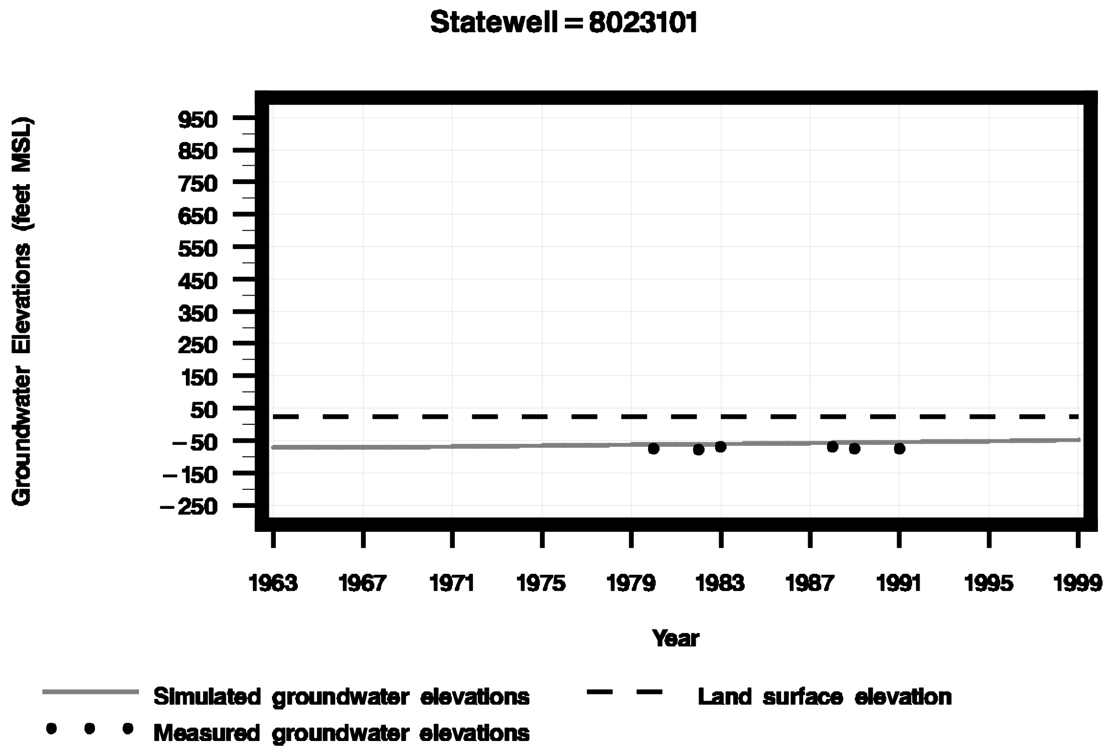
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8023101
Groundwater Elevations (feet MSL)
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−50
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1967
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1983
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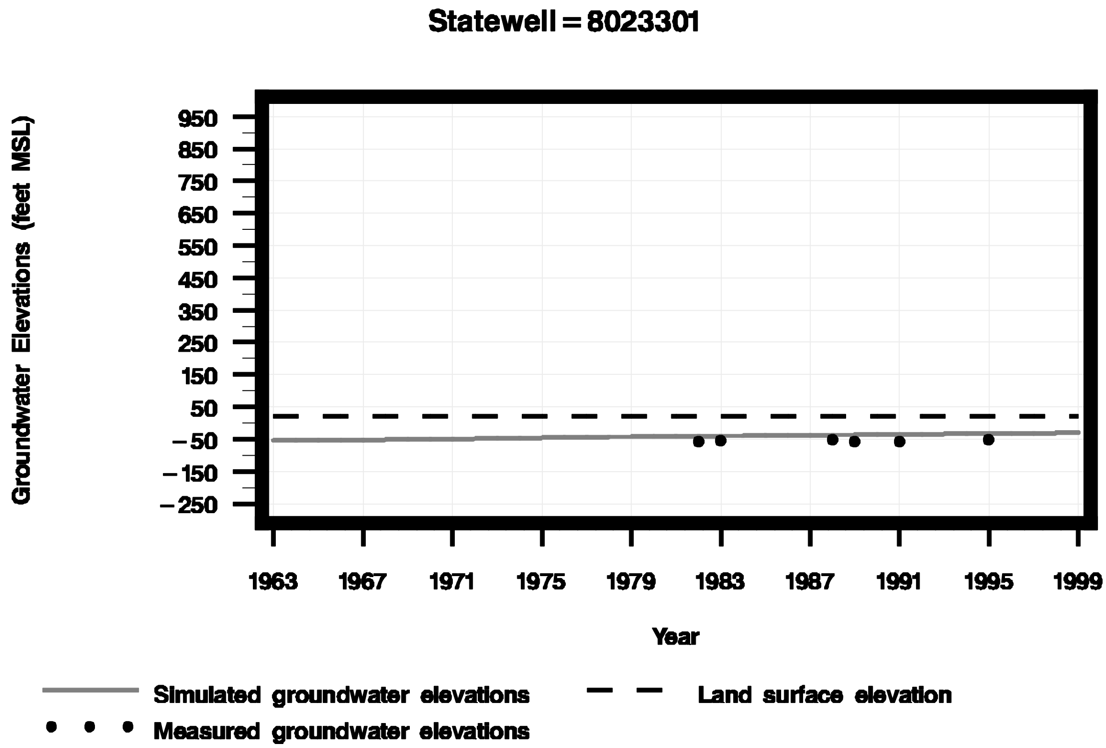
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8023301
Groundwater Elevations (feet MSL)
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450
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50
−50
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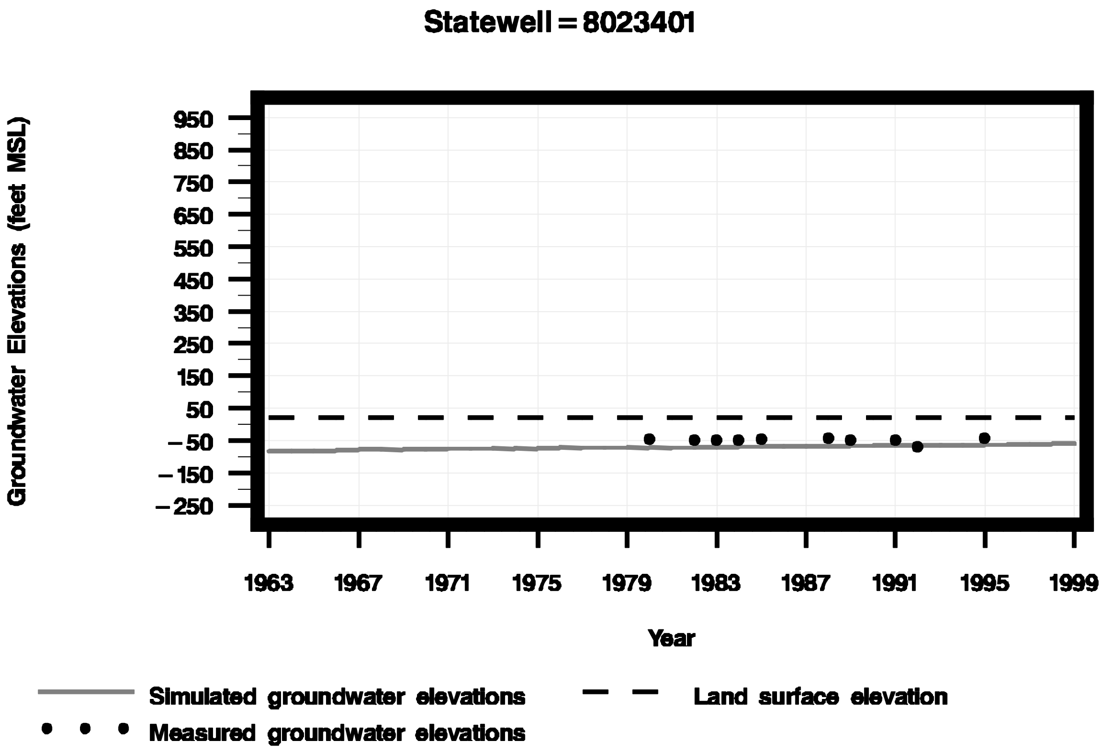
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8023401
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Groundwater Elevations (feet MSL)
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1983
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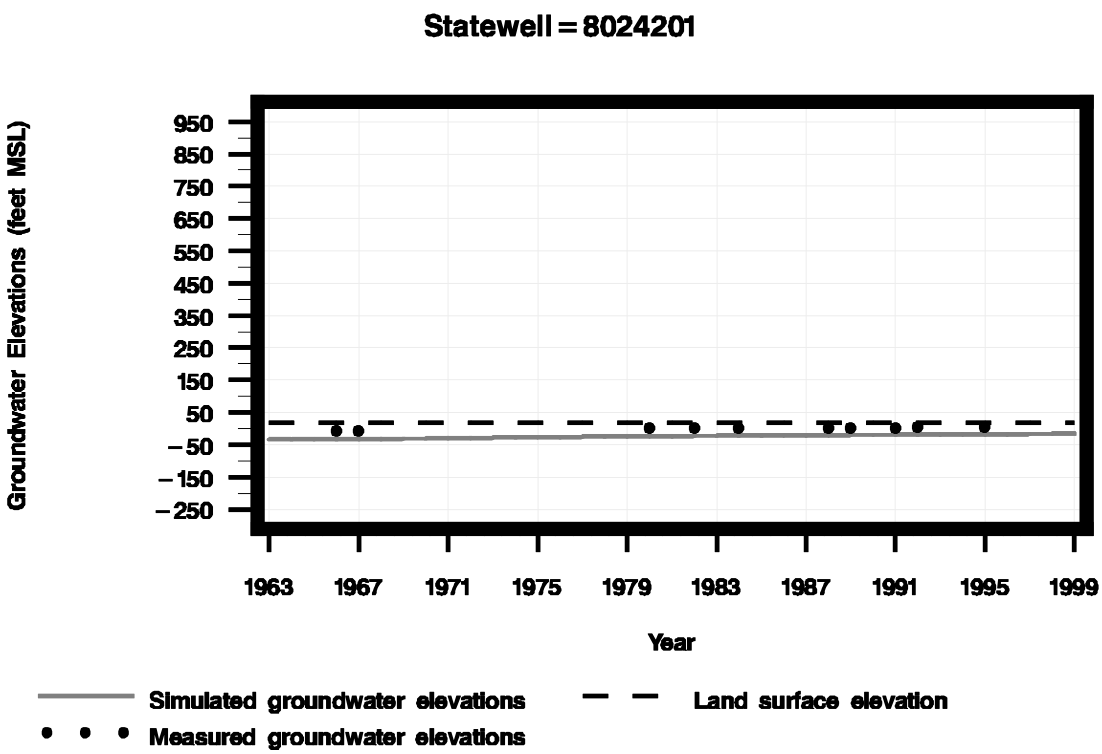
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8024201
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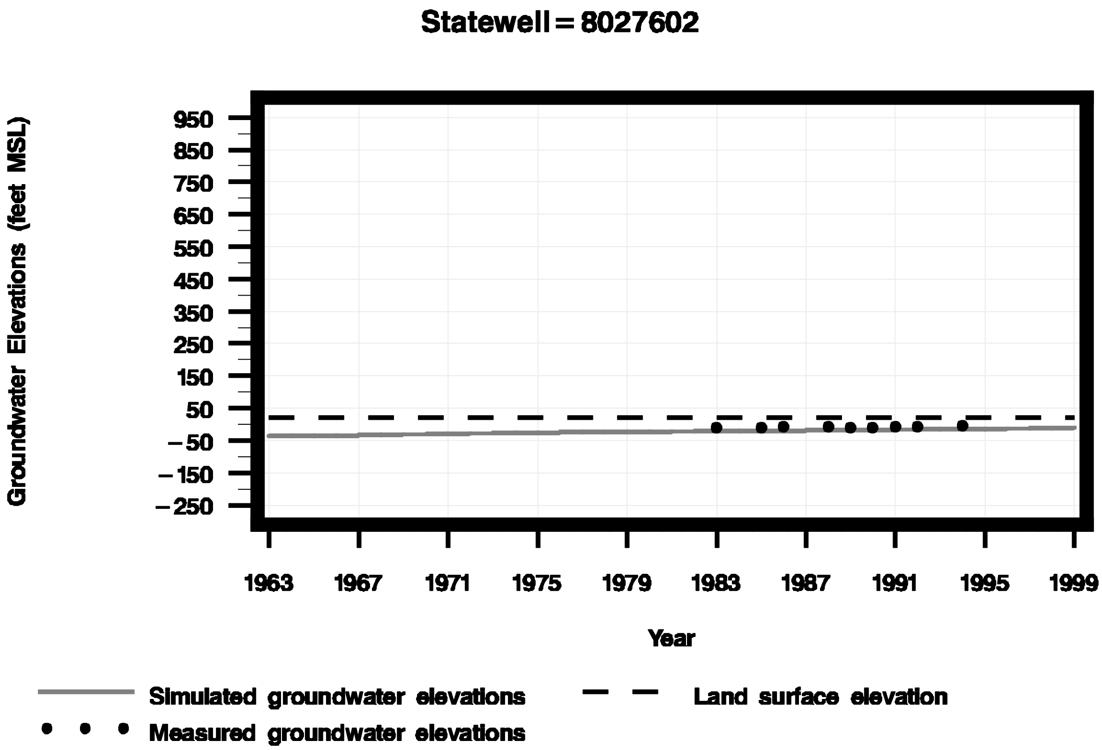
Groundwater Elevations (feet MSL)
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8027602
Groundwater Elevations (feet MSL)
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850
750
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450
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50
−50
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−250
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1967
1971
1975
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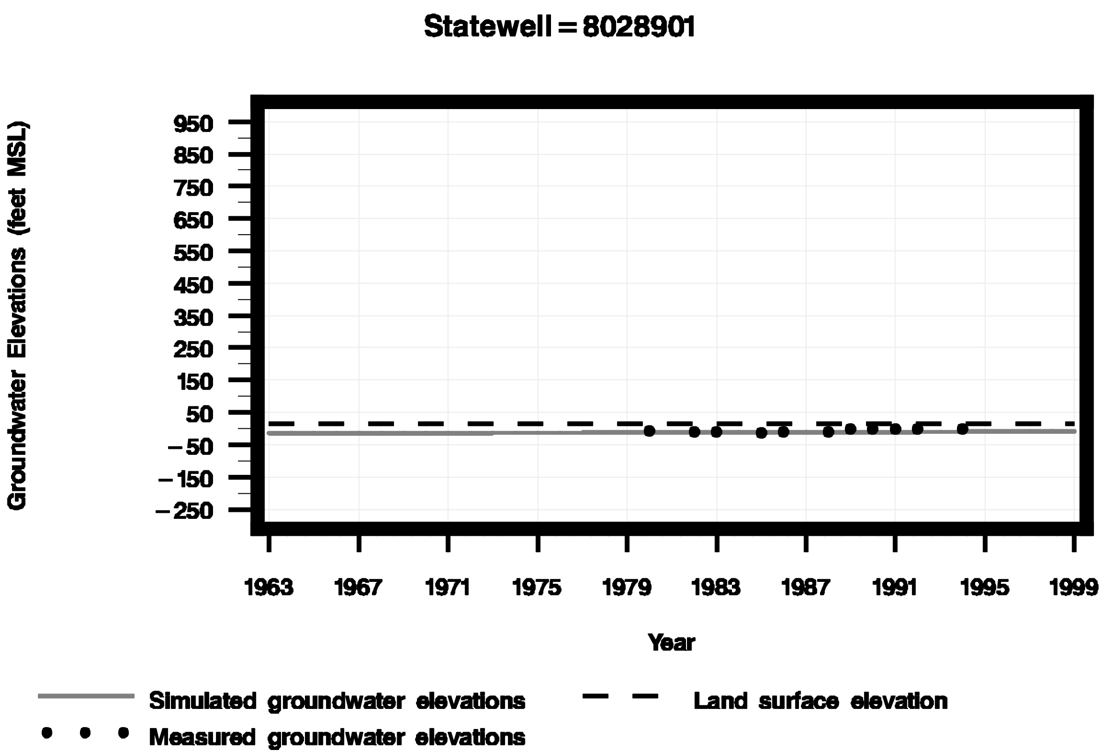
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8028901
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
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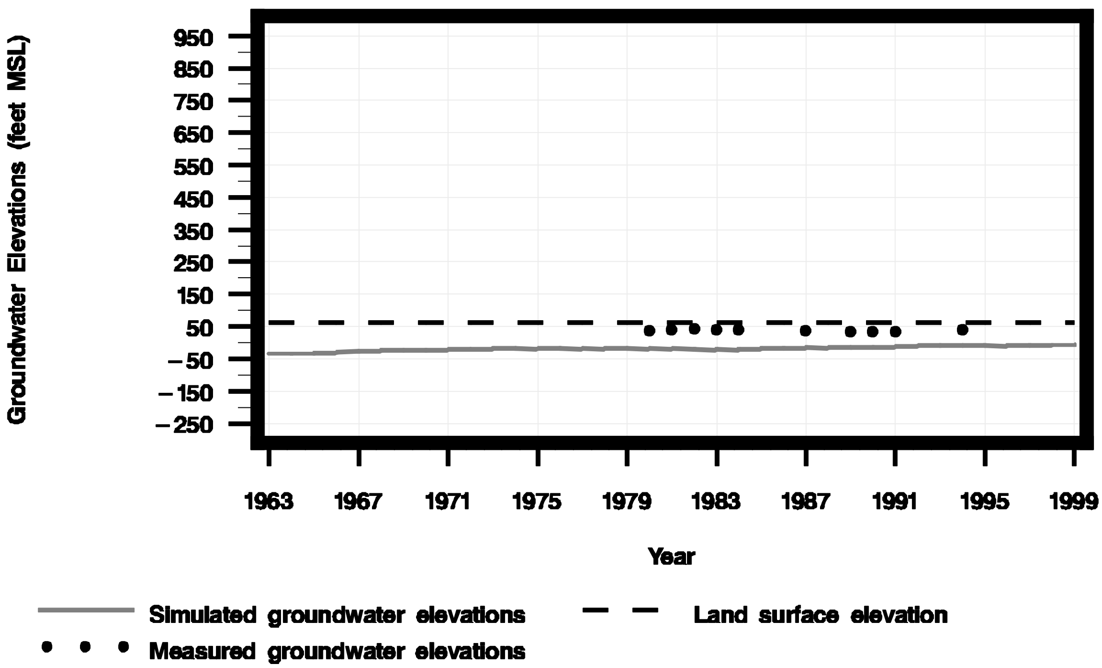
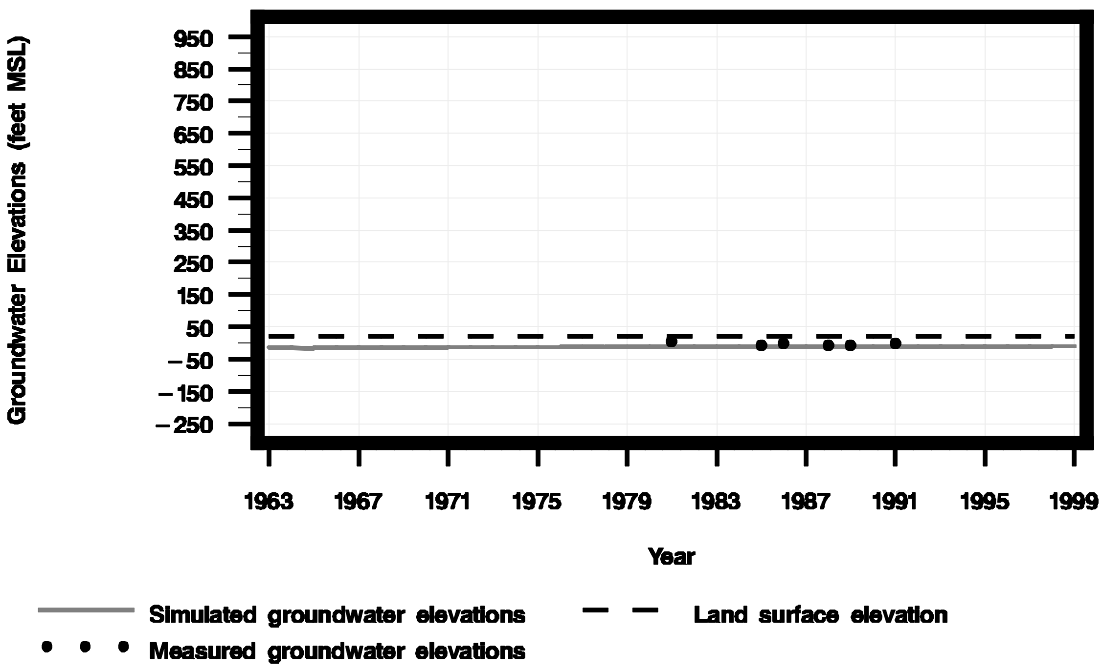
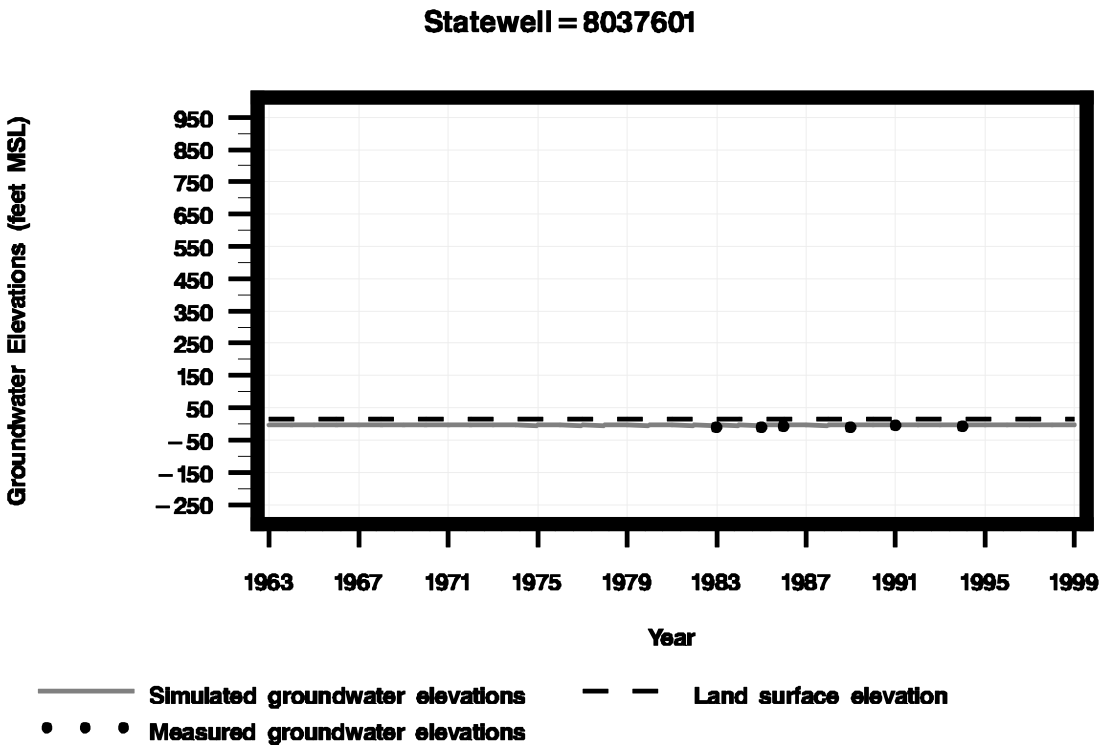
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 8033102



Statewell = 8036501





Statewell = 8037601
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
−150
−250
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1967
1971
1975
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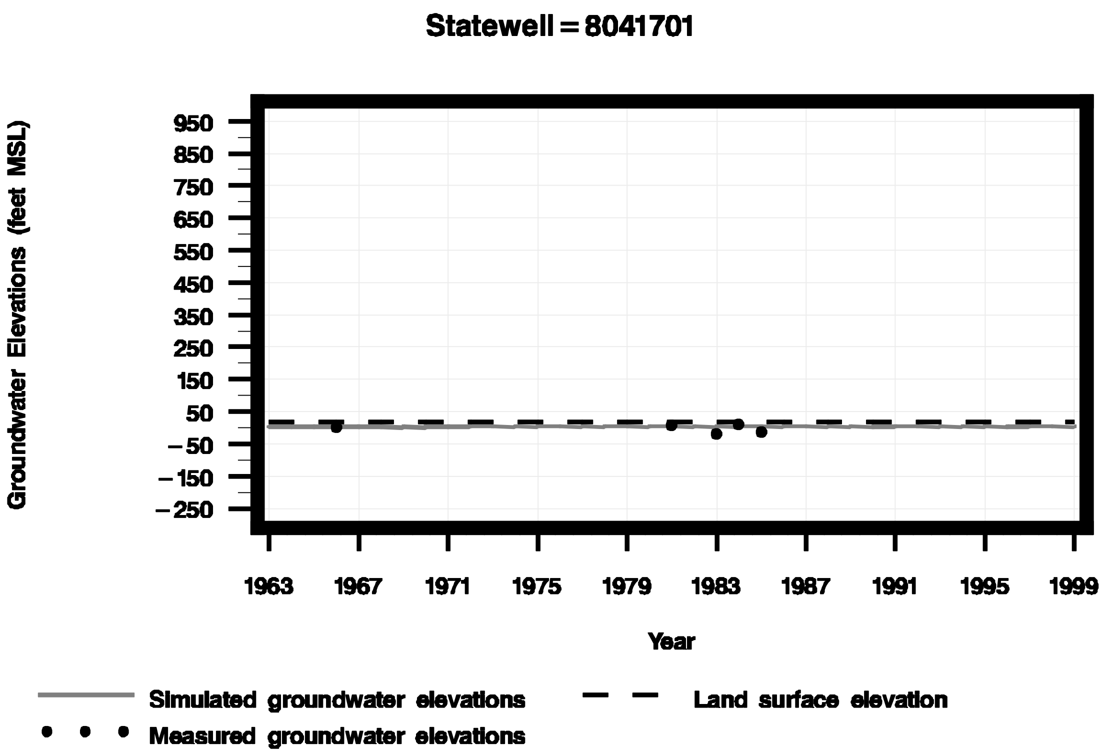
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8041701
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
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−250
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1967
1971
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1983
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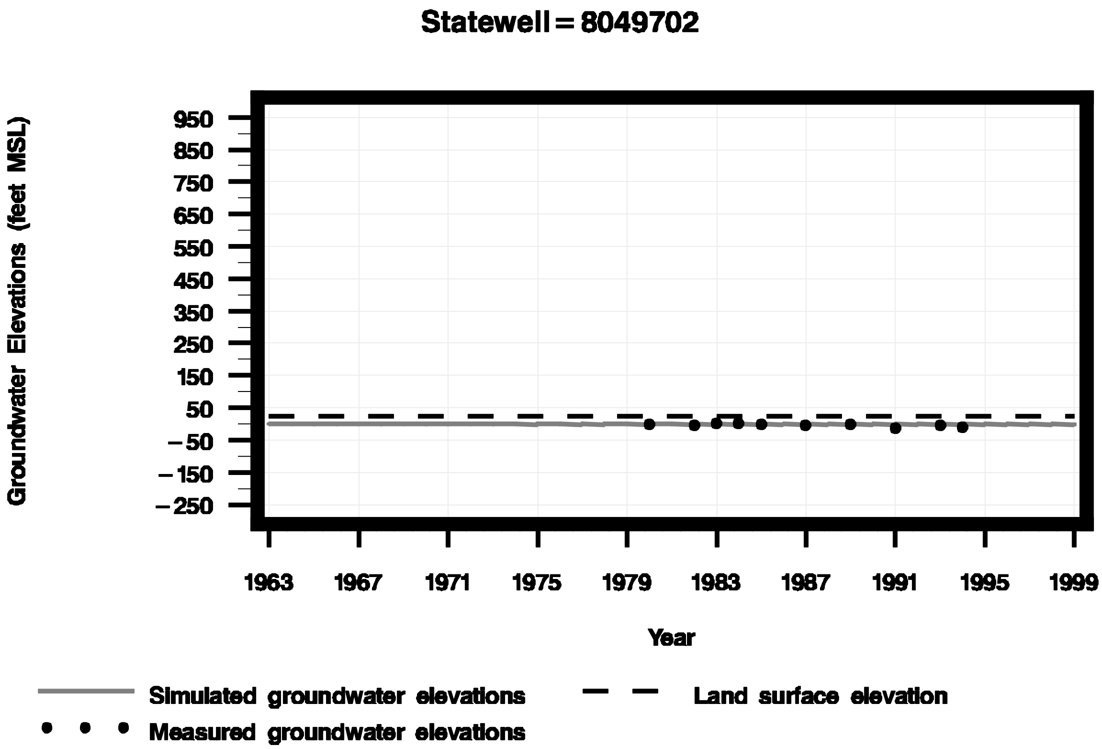
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8049702
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
−150
−250
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1967
1971
1975
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1983
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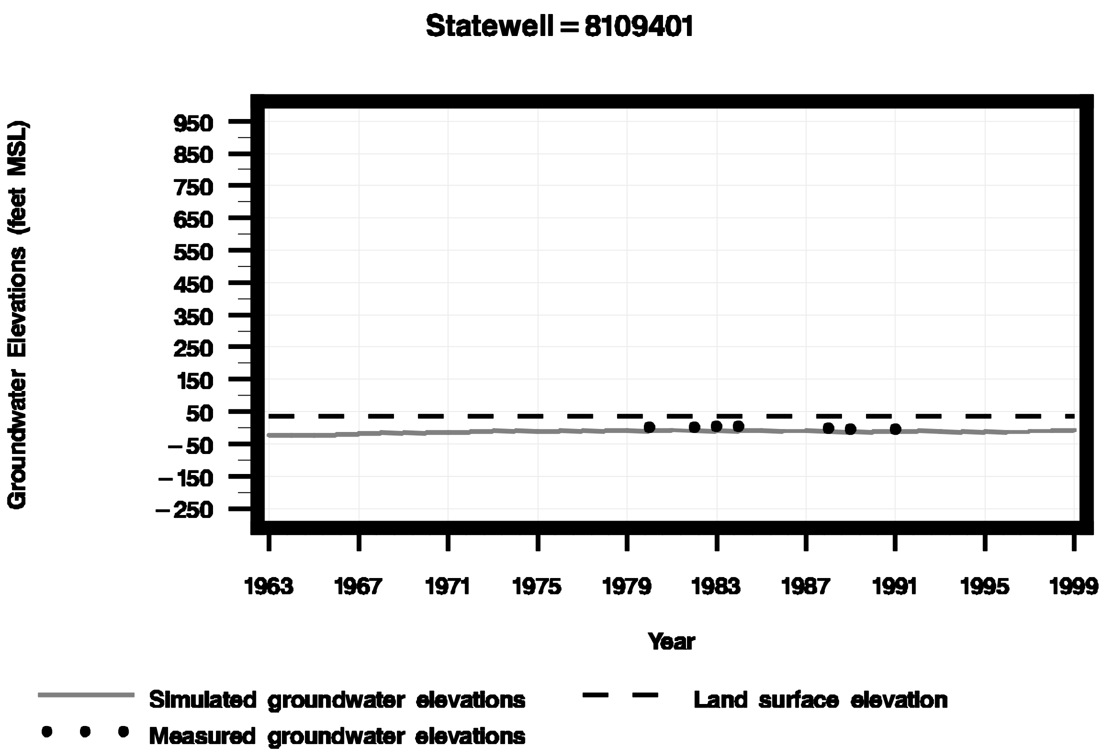
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8109401
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
−150
−250
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1967
1971
1975
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1983
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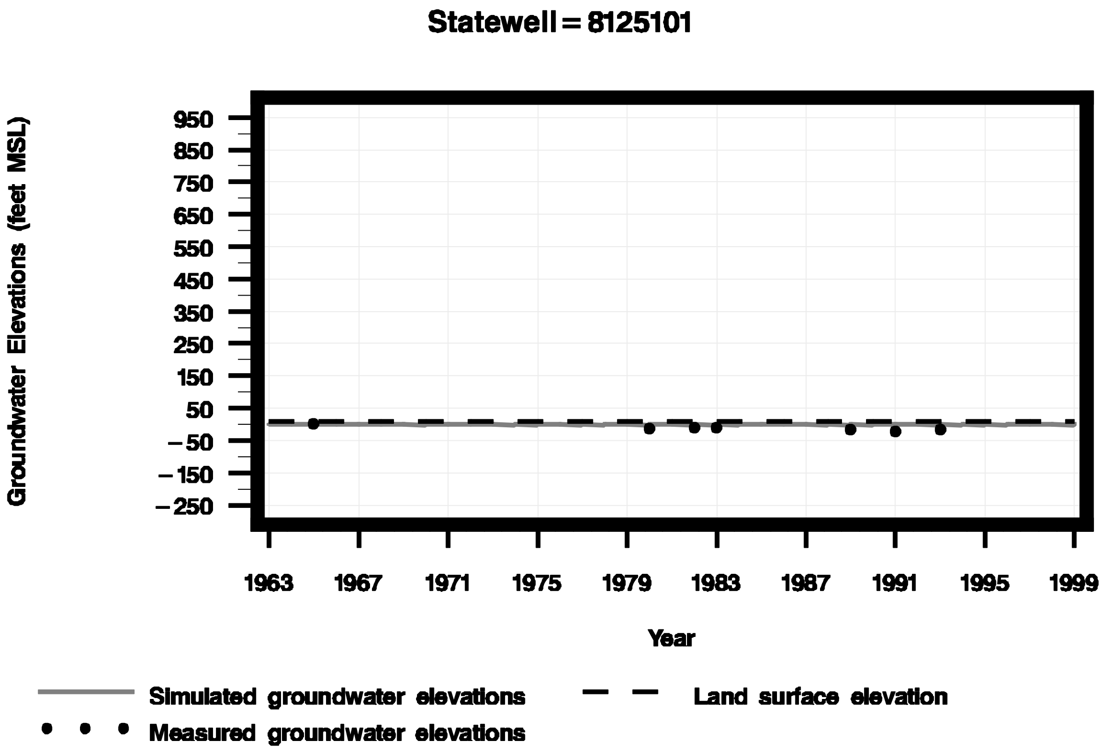
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8125101
Groundwater Elevations (feet MSL)
950
850
750
650
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450
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250
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50
−50
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−250
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1967
1971
1975
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1983
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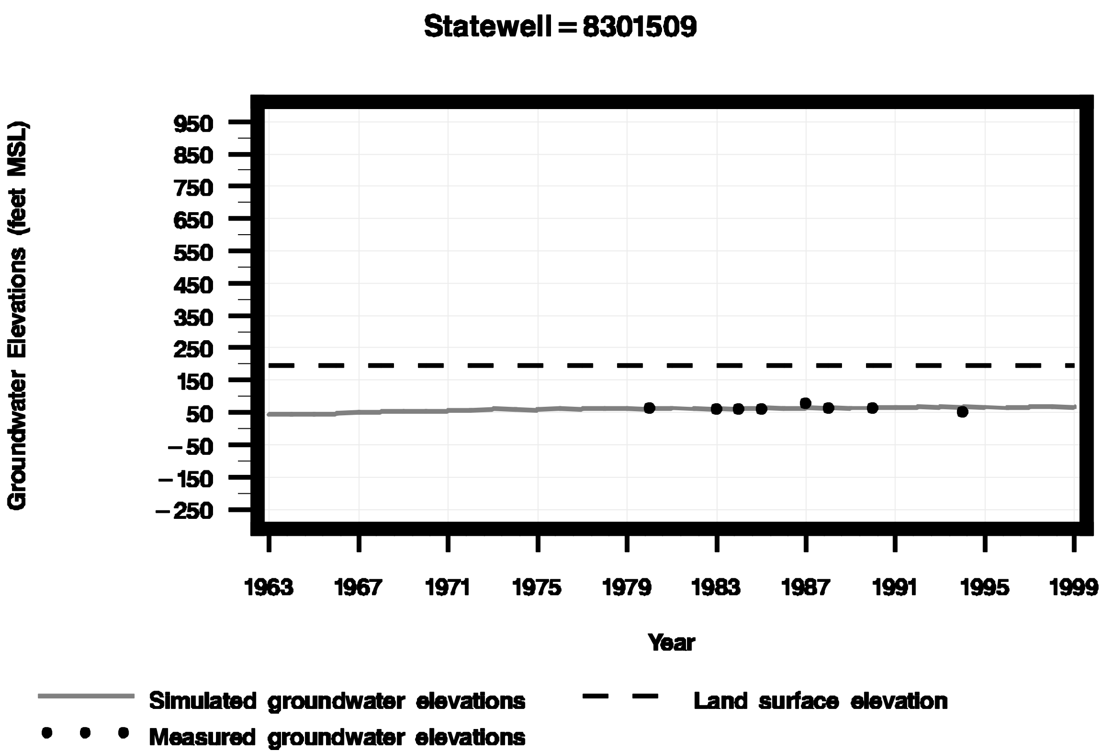
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8301509
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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50
−50
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1967
1971
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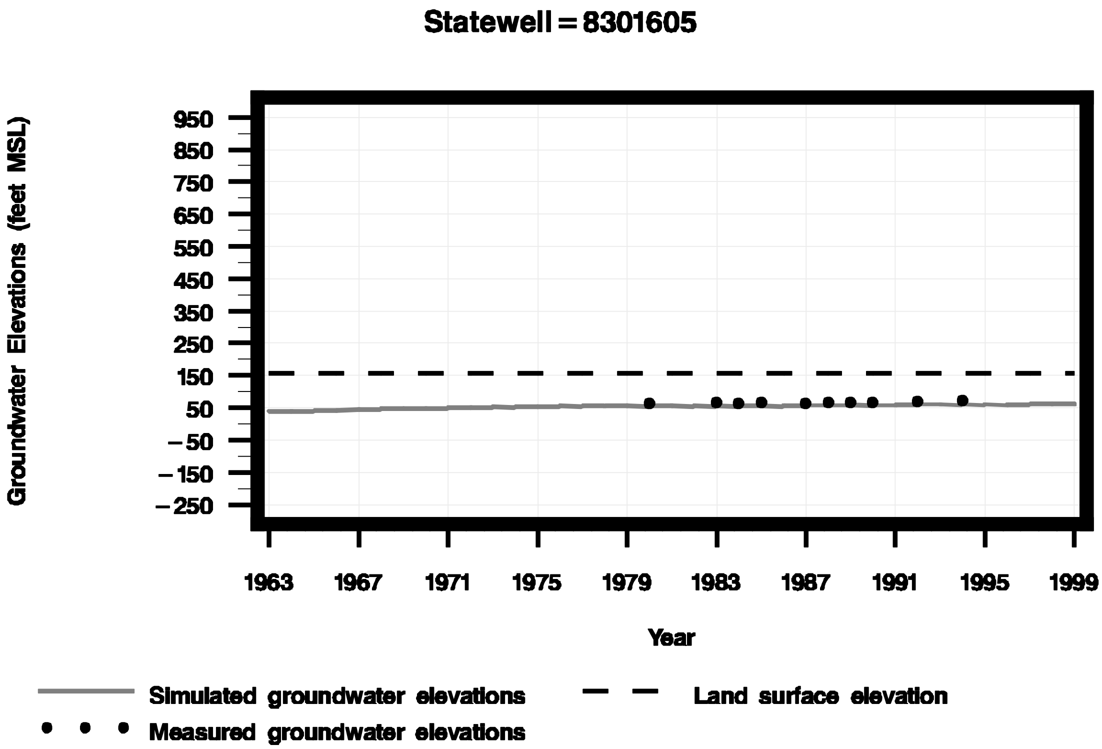
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8301605
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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250
150
50
−50
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−250
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1967
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1975
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1983
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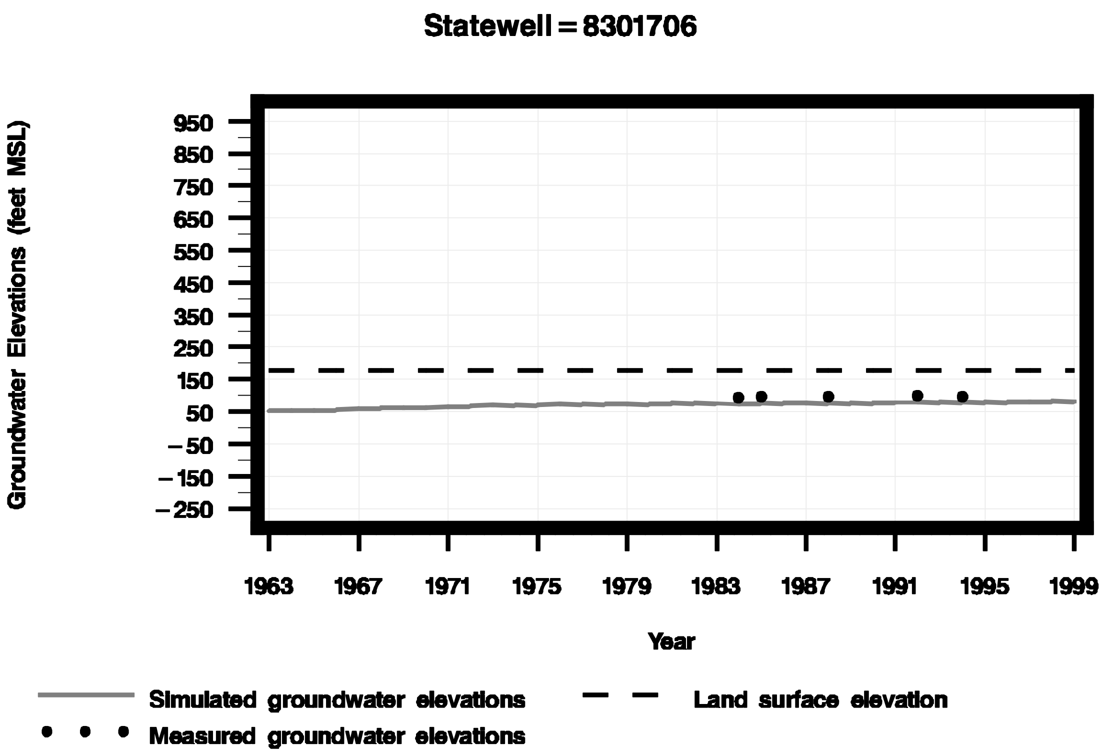
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8301706
Groundwater Elevations (feet MSL)
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850
750
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550
450
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250
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50
−50
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−250
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1967
1971
1975
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1983
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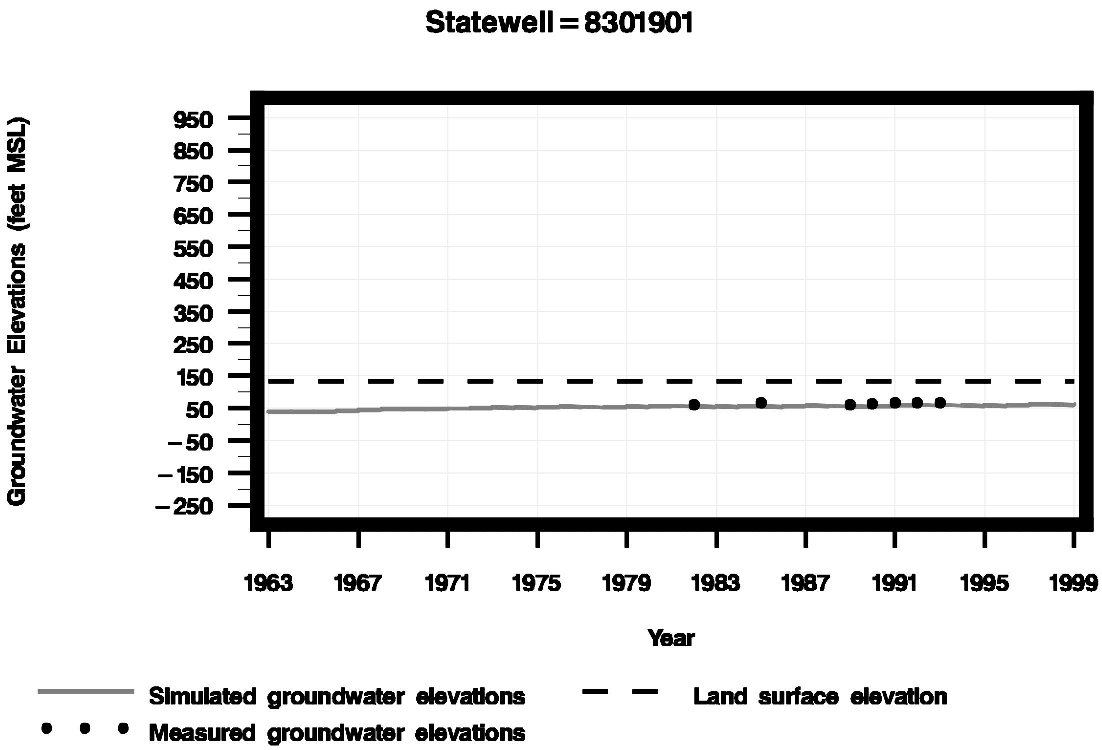
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8301901
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
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1967
1971
1975
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1983
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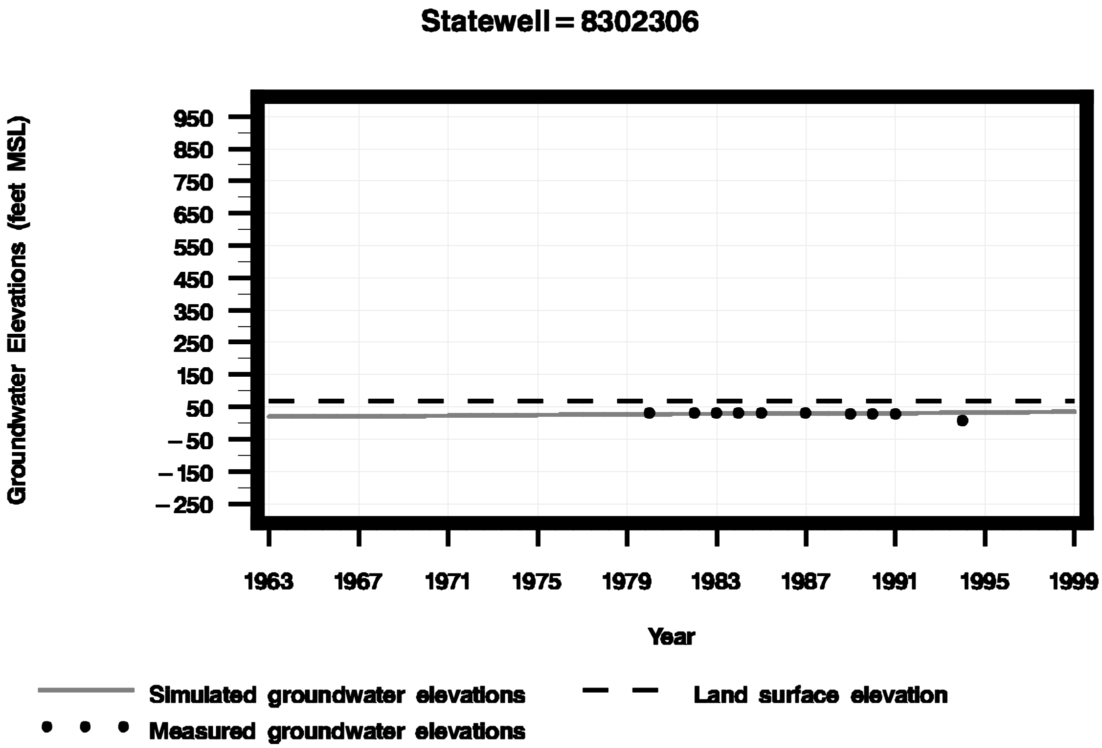
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8302306
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
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−250
1963
1967
1971
1975
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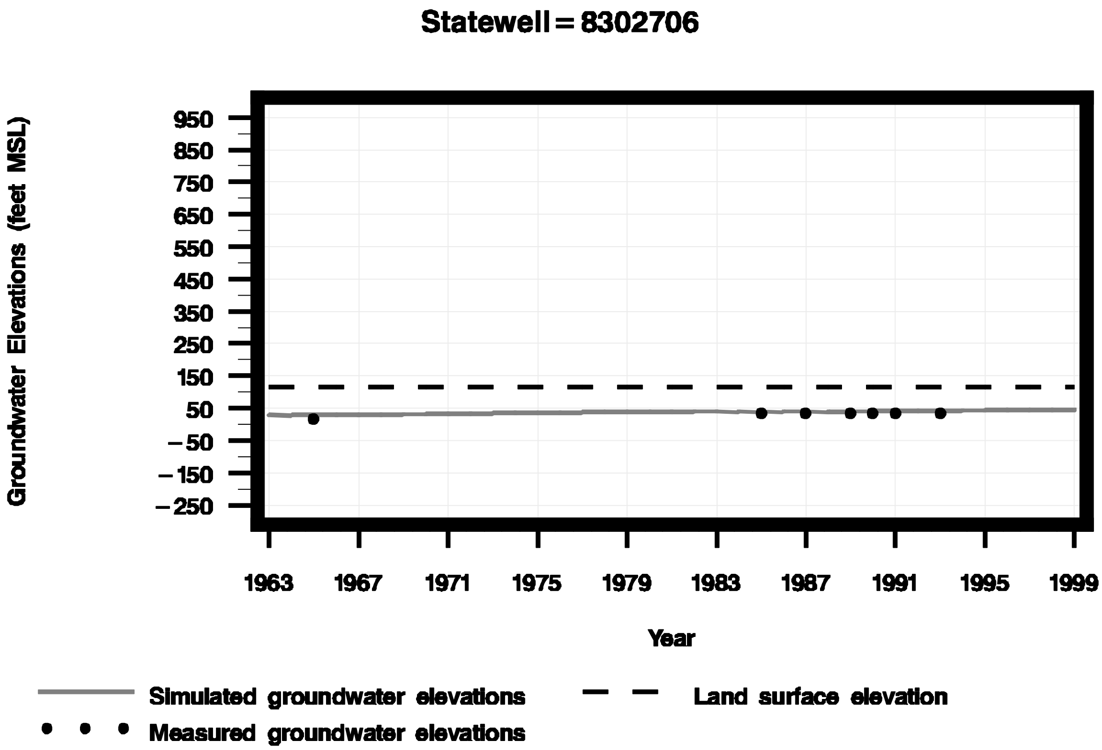
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation



Statewell = 8302706
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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250
150
50
−50
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−250
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1967
1971
1975
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1983
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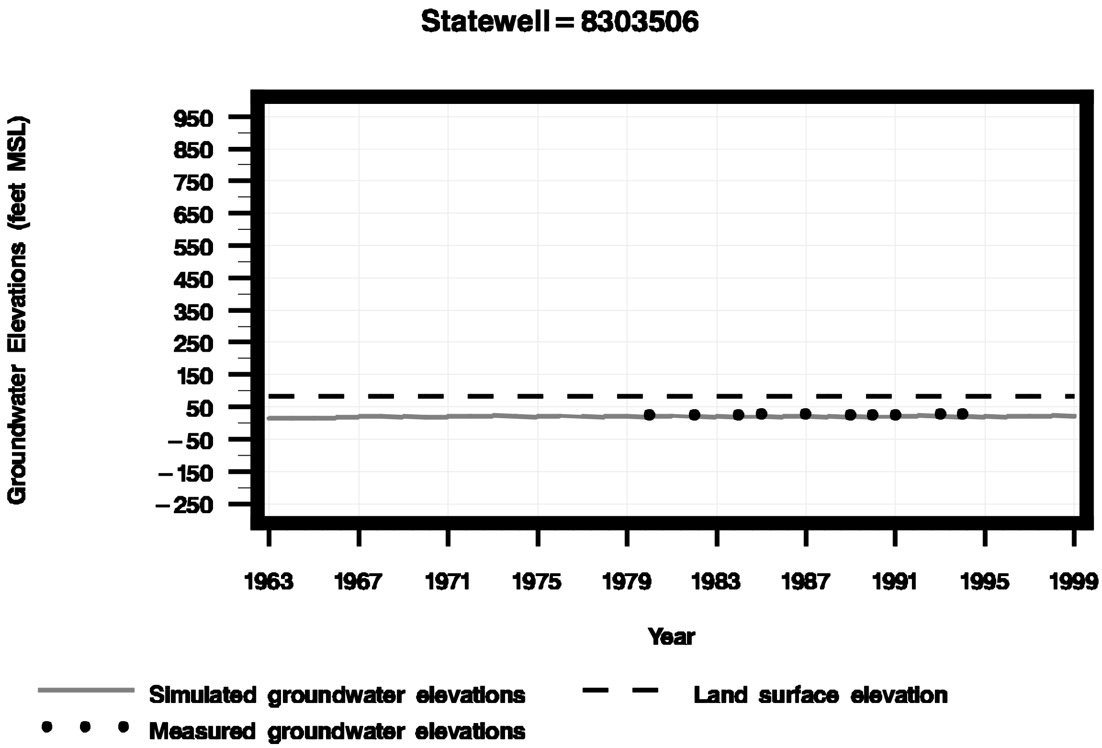
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8303506
Groundwater Elevations (feet MSL)
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850
750
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550
450
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150
50
−50
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−250
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1967
1971
1975
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1983
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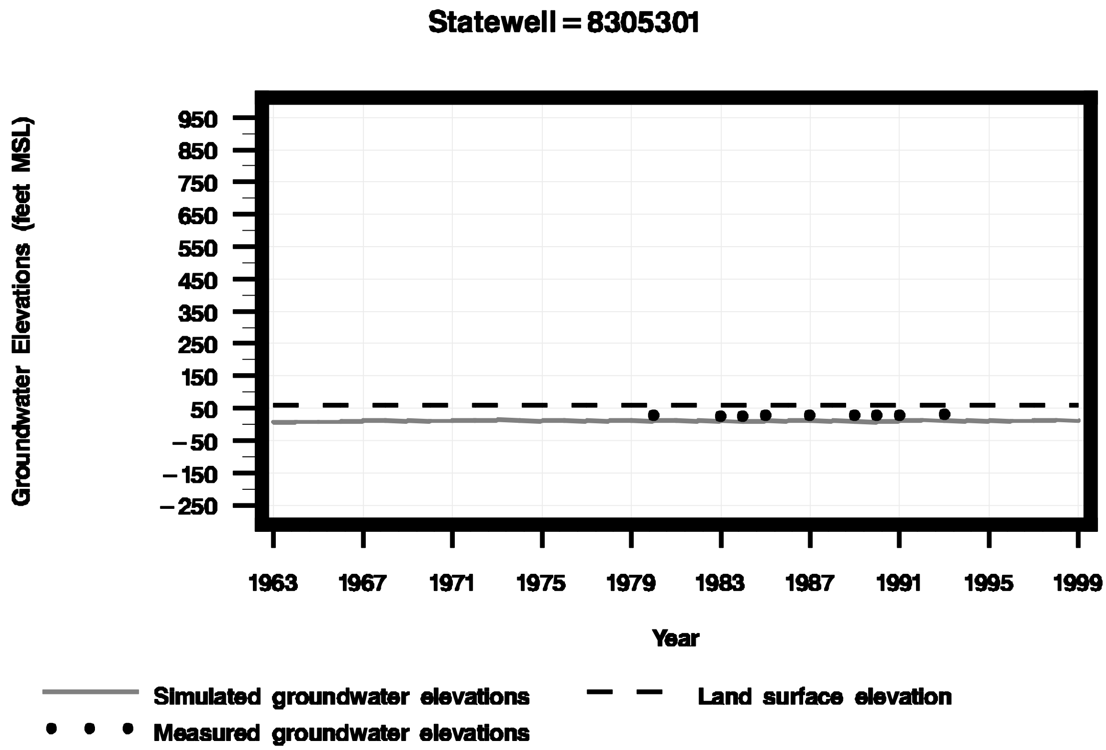
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8305301
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
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−250
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1967
1971
1975
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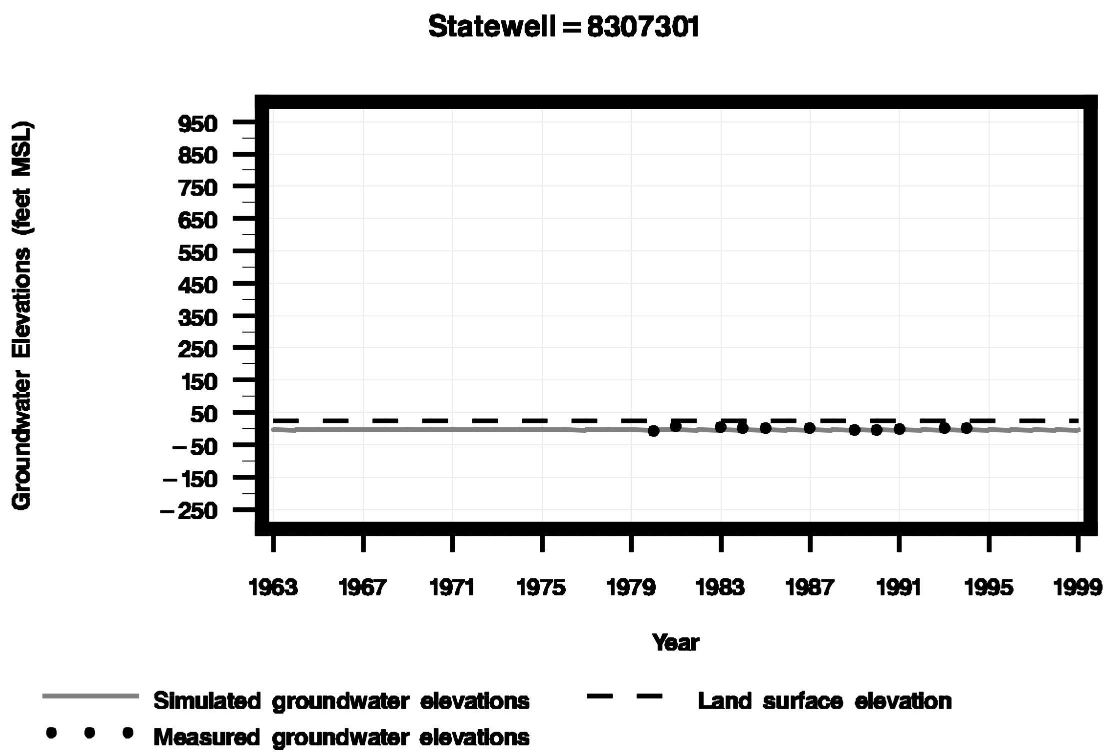
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8307301
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
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−250
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1967
1971
1975
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1983
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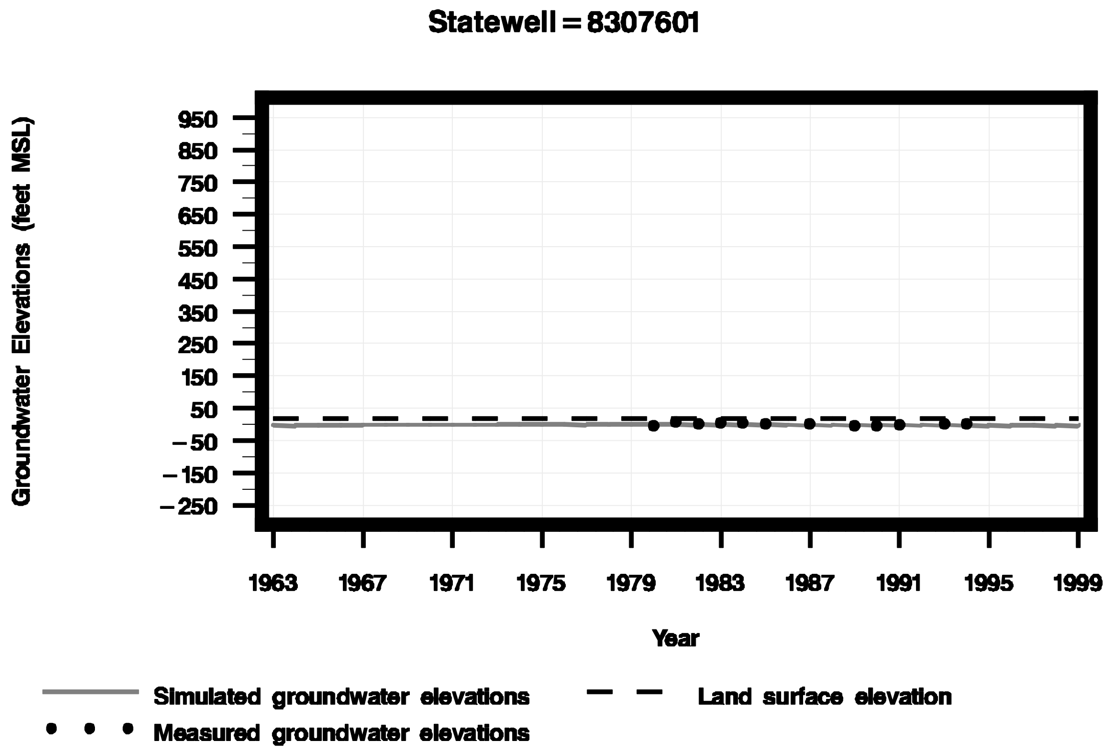
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8307601
Groundwater Elevations (feet MSL)
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650
550
450
350
250
150
50
−50
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−250
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1967
1971
1975
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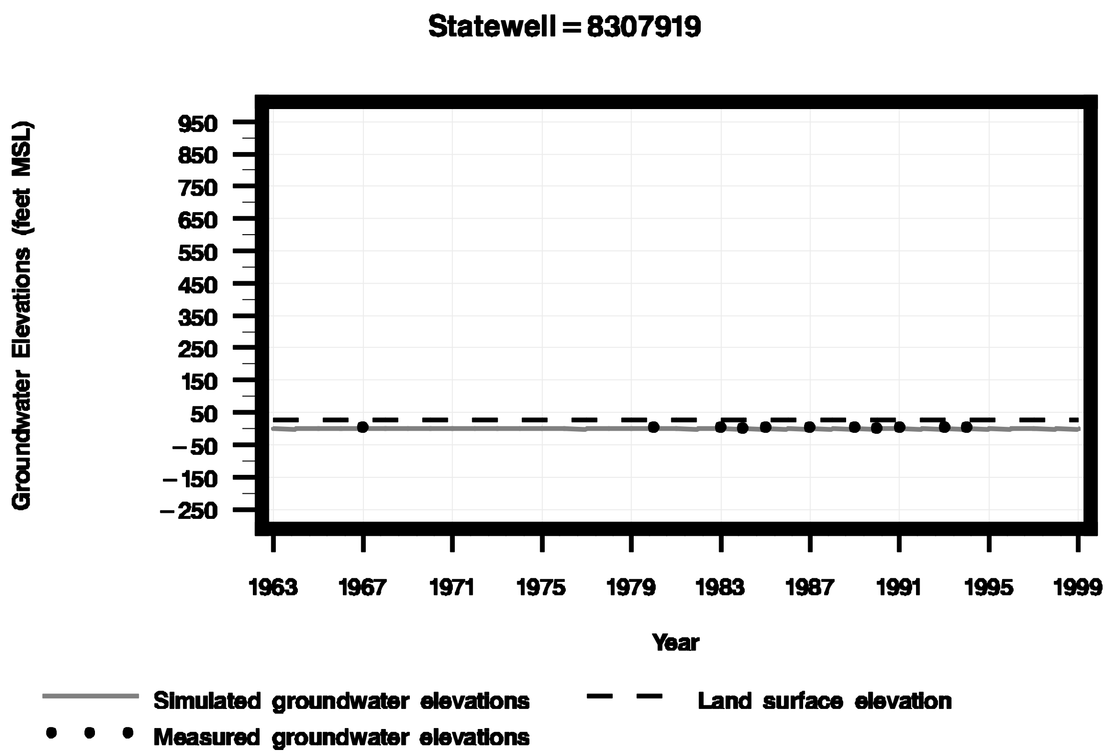
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8307919
Groundwater Elevations (feet MSL)
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550
450
350
250
150
50
−50
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−250
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1967
1971
1975
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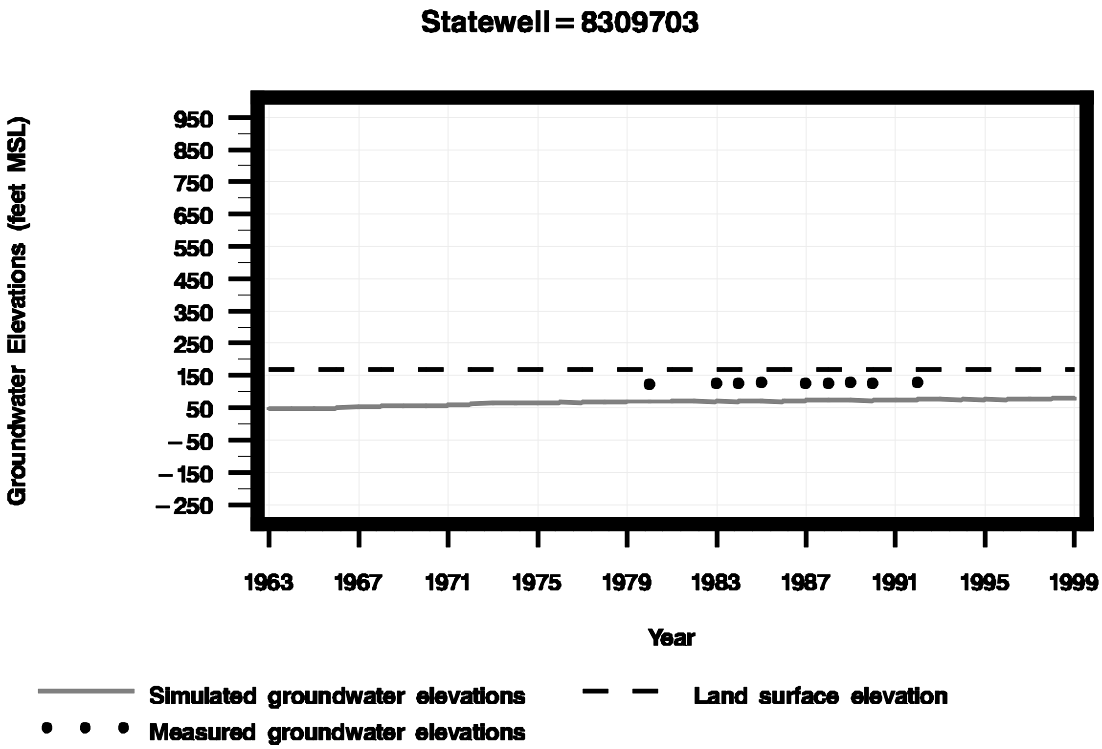
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8309703
Groundwater Elevations (feet MSL)
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50
−50
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1967
1971
1975
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1983
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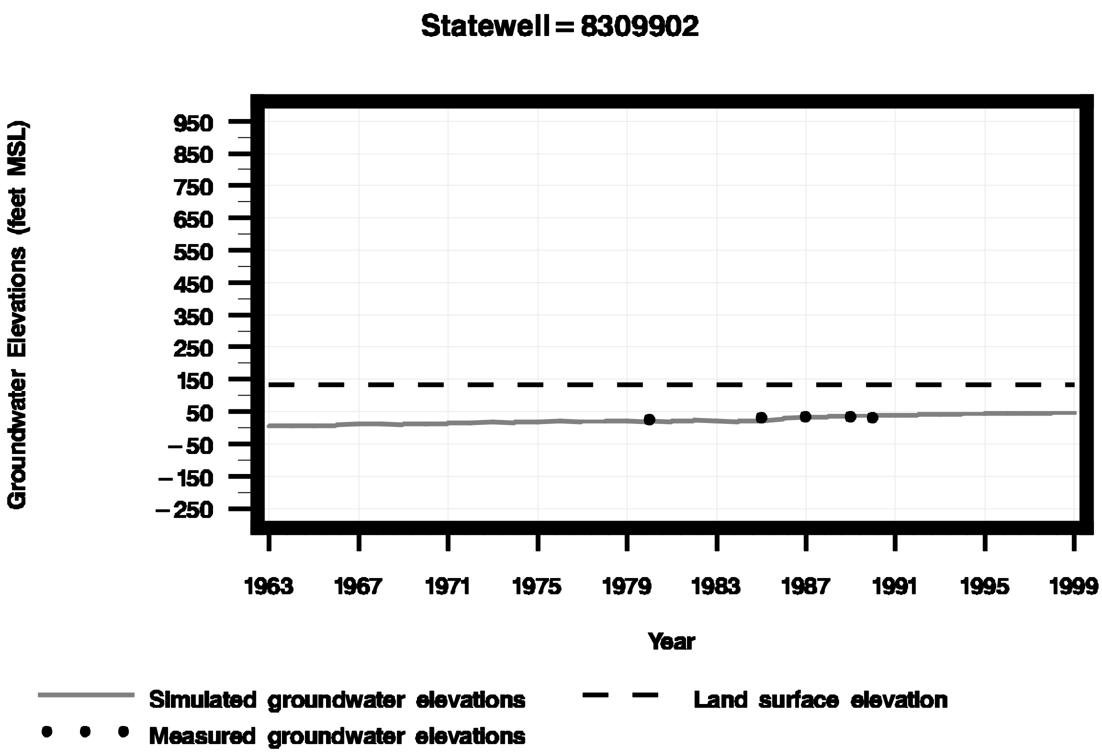
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8309902
Groundwater Elevations (feet MSL)
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850
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450
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50
−50
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1975
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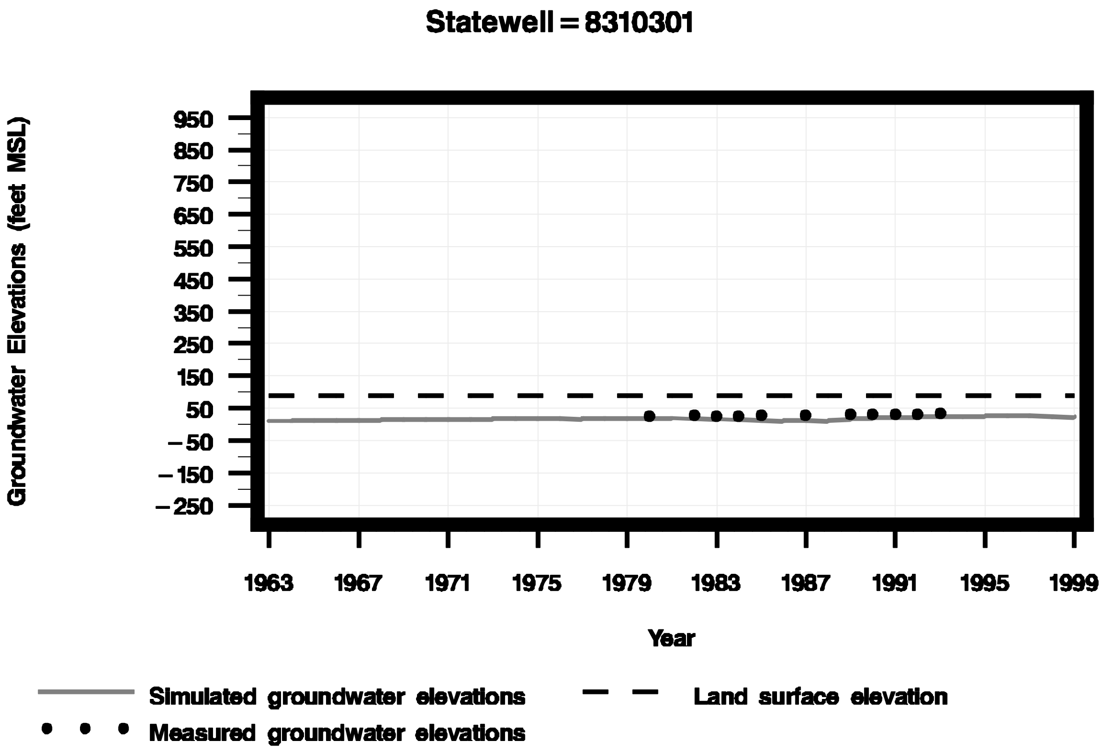
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation



Statewell = 8310301
Groundwater Elevations (feet MSL)
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550
450
350
250
150
50
−50
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−250
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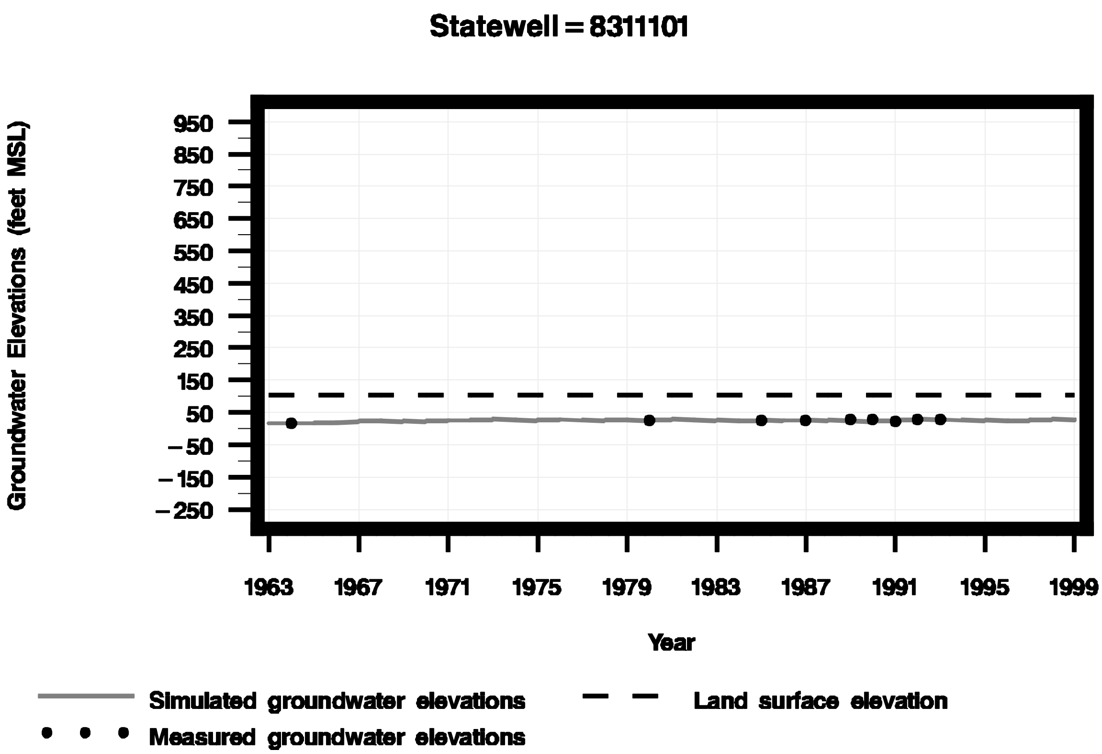
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8311101
Groundwater Elevations (feet MSL)
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450
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250
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50
−50
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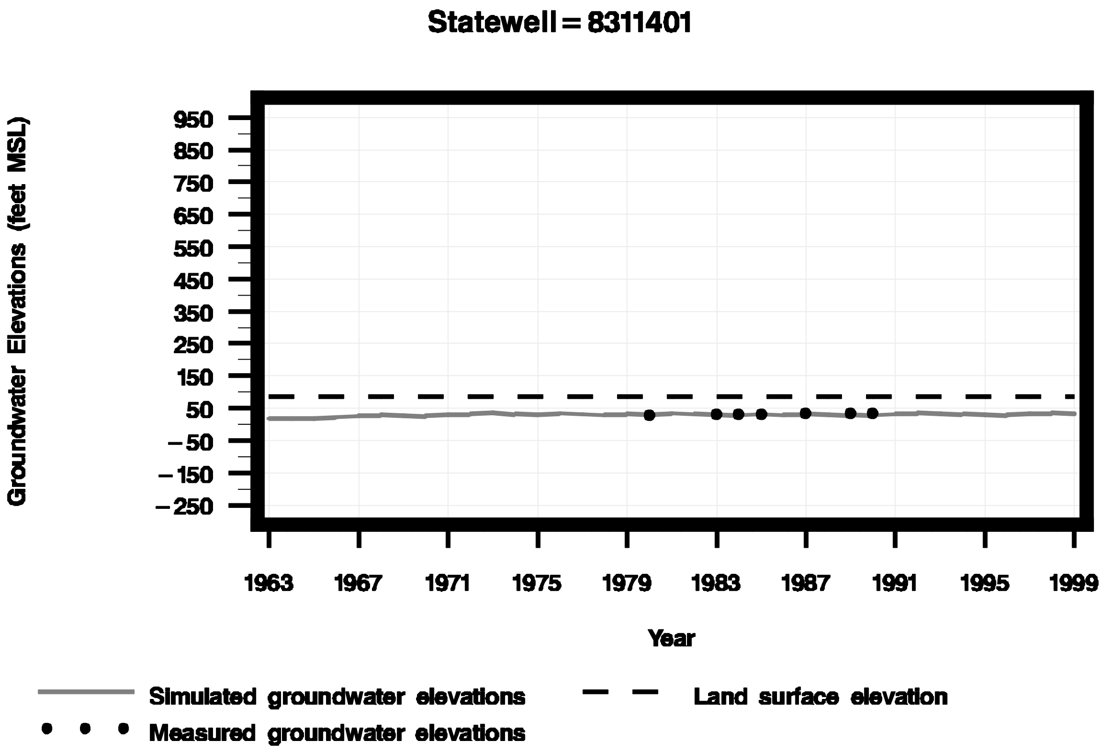
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8311401
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
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1983
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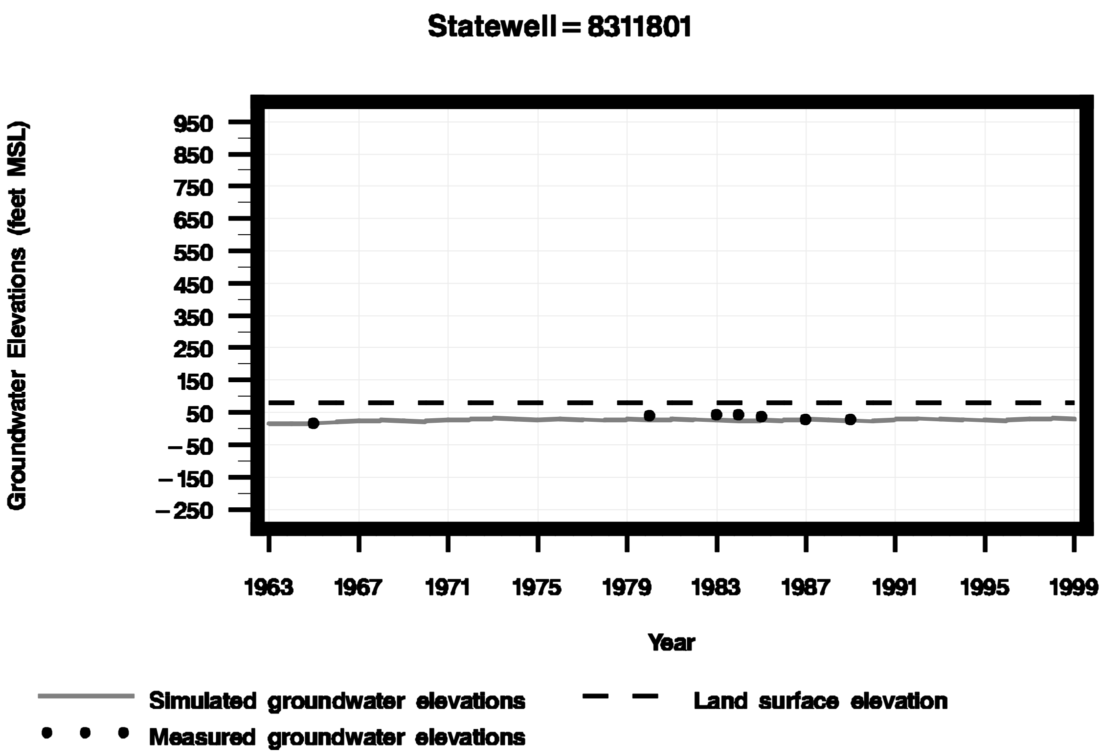
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8311801
Groundwater Elevations (feet MSL)
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750
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550
450
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50
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1967
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1983
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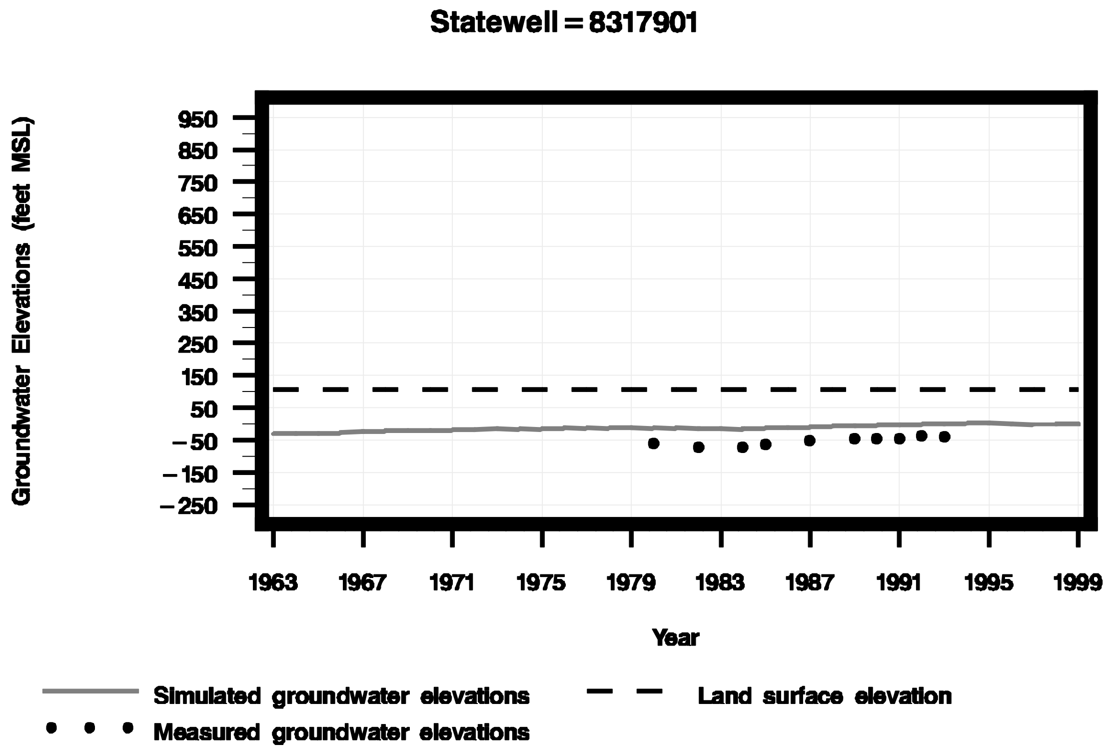
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8317901
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
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−250
1963
1967
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1983
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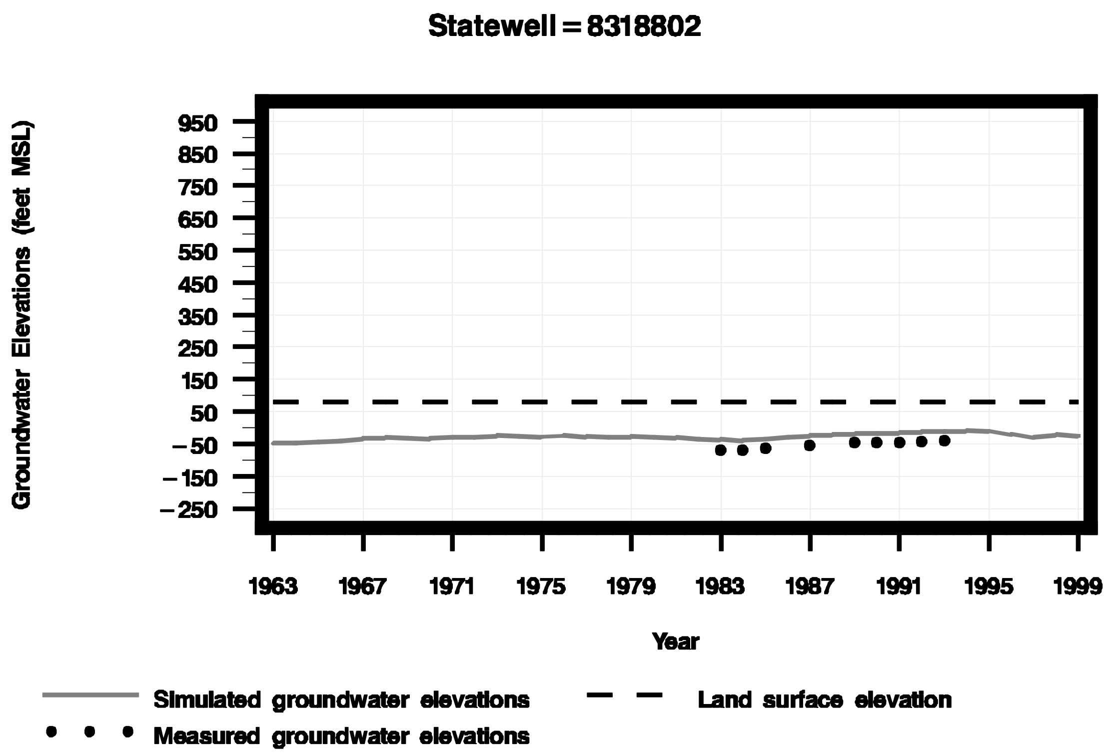
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8318802
Groundwater Elevations (feet MSL)
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550
450
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50
−50
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1963
1967
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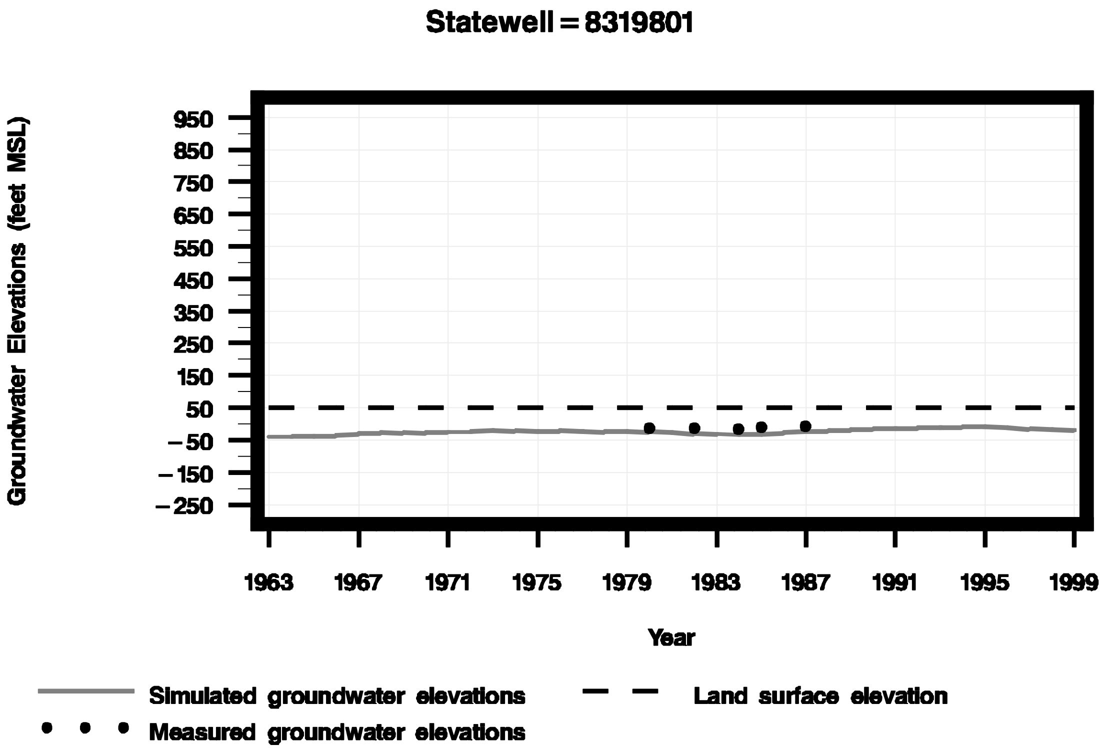
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8319801
Groundwater Elevations (feet MSL)
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450
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1983
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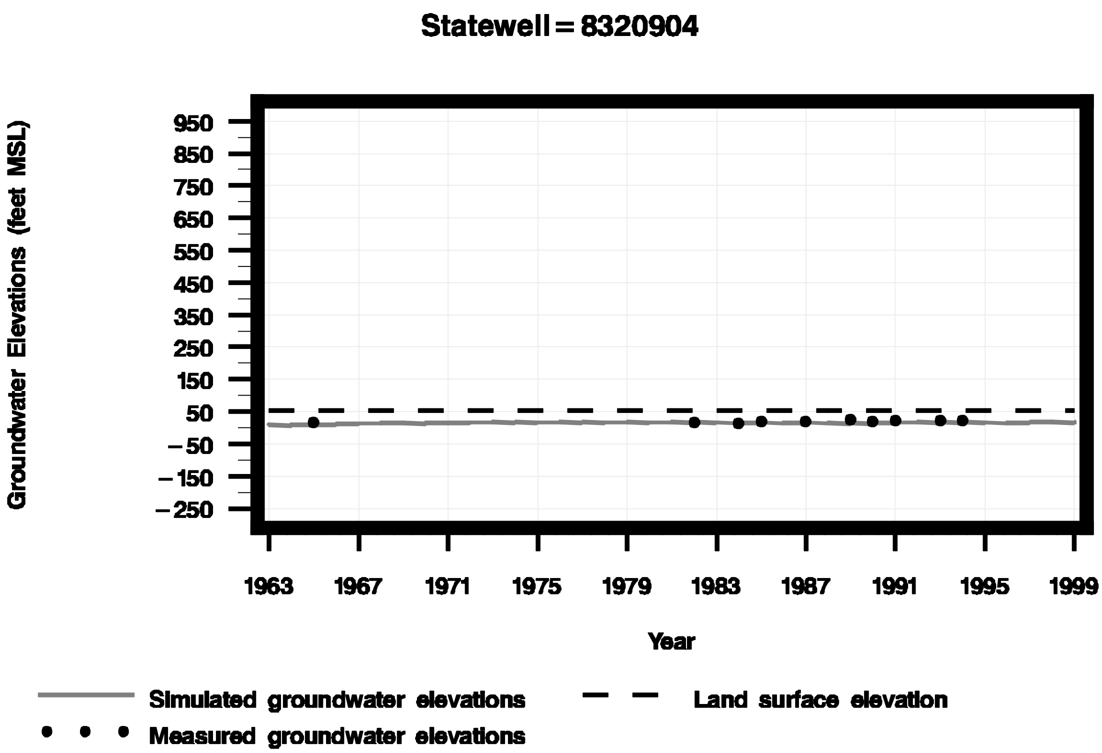
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8320904
Groundwater Elevations (feet MSL)
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450
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50
−50
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1963
1967
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1983
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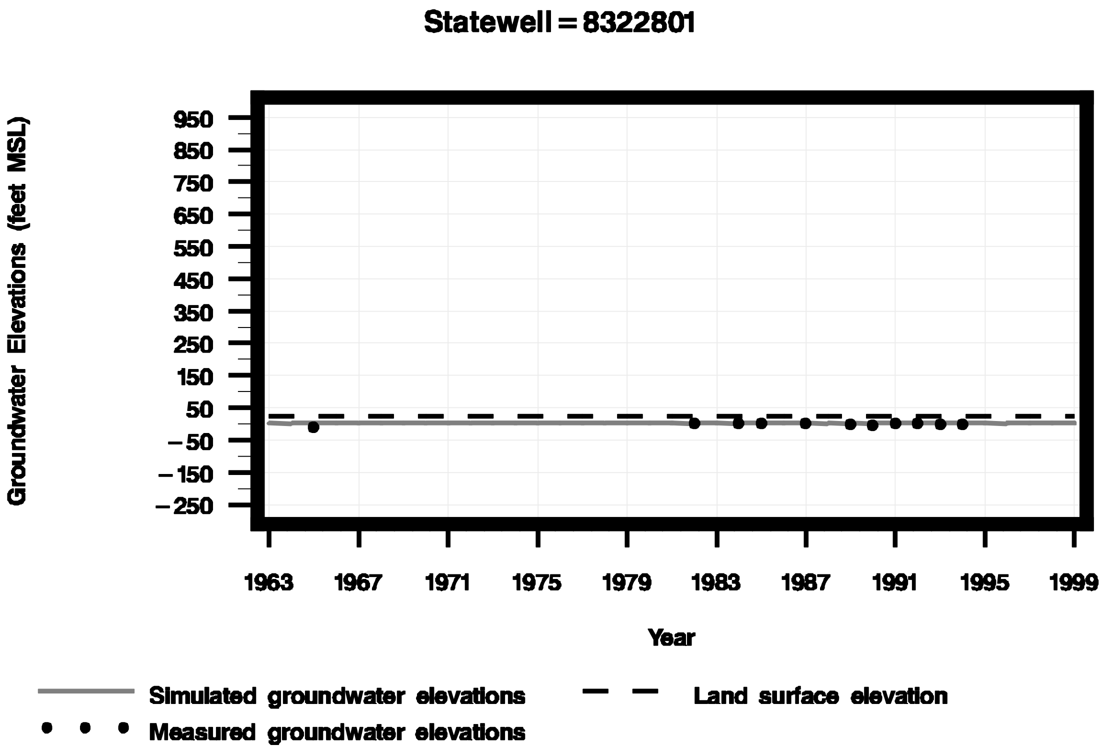
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8322801
Groundwater Elevations (feet MSL)
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550
450
350
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150
50
−50
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−250
1963
1967
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1975
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1983
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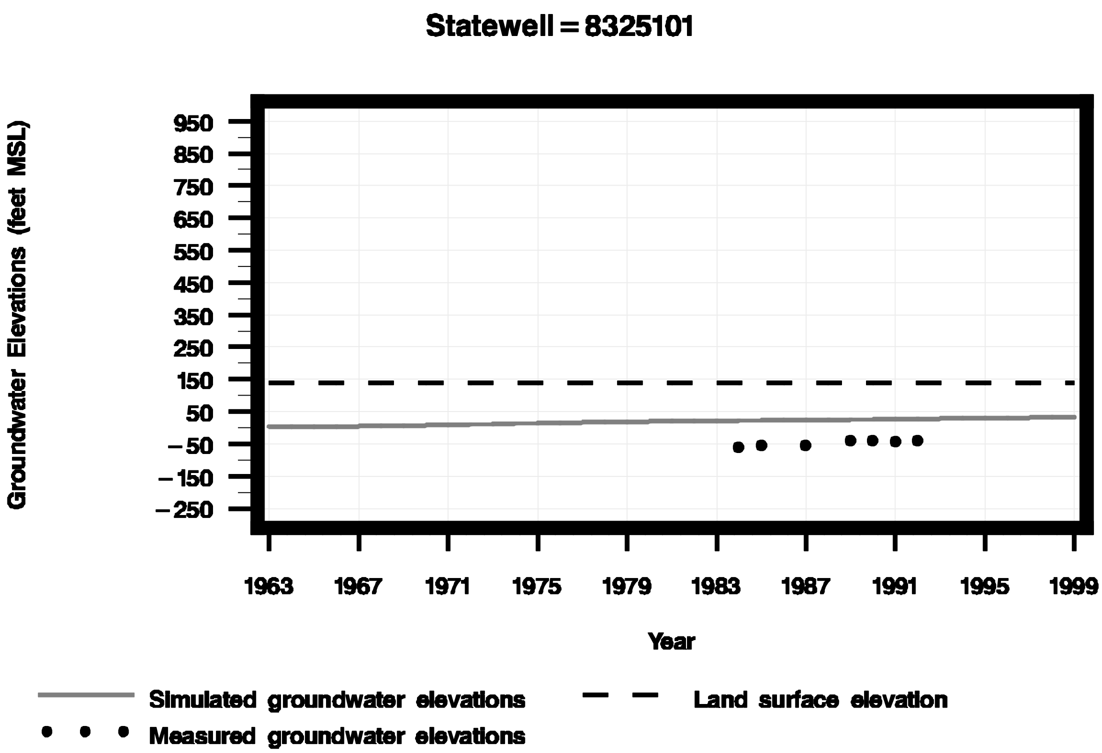
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8325101
Groundwater Elevations (feet MSL)
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450
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50
−50
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1963
1967
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1983
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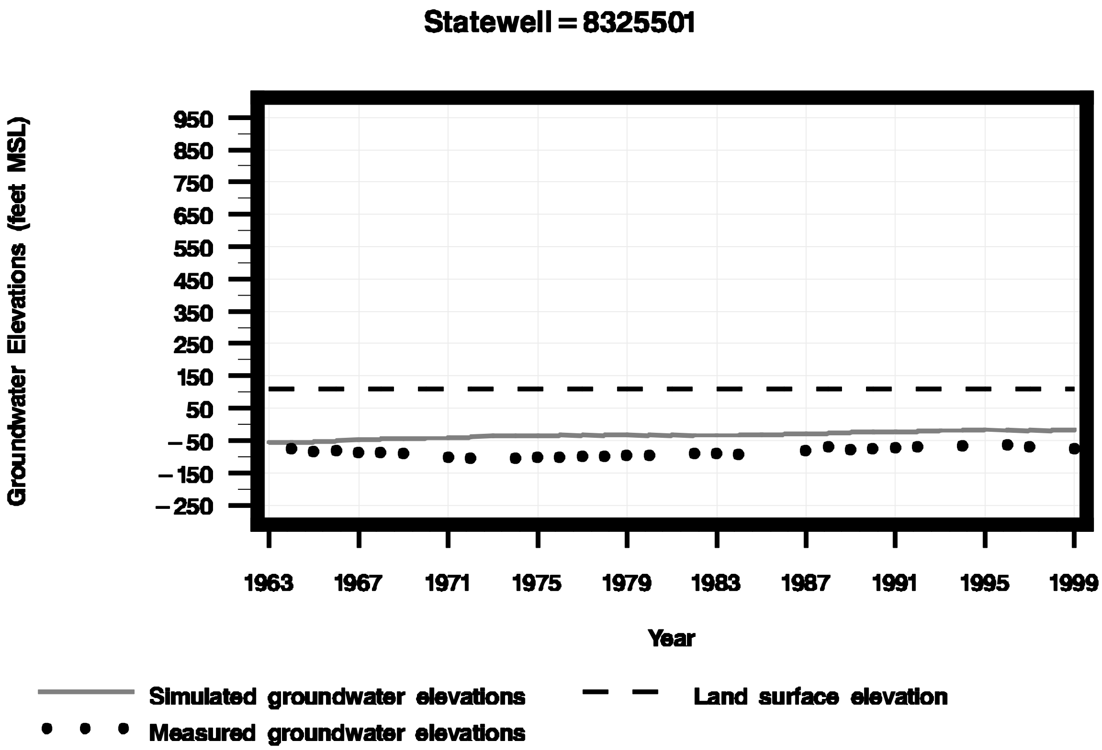
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8325501
Groundwater Elevations (feet MSL)
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650
550
450
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50
−50
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1963
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1983
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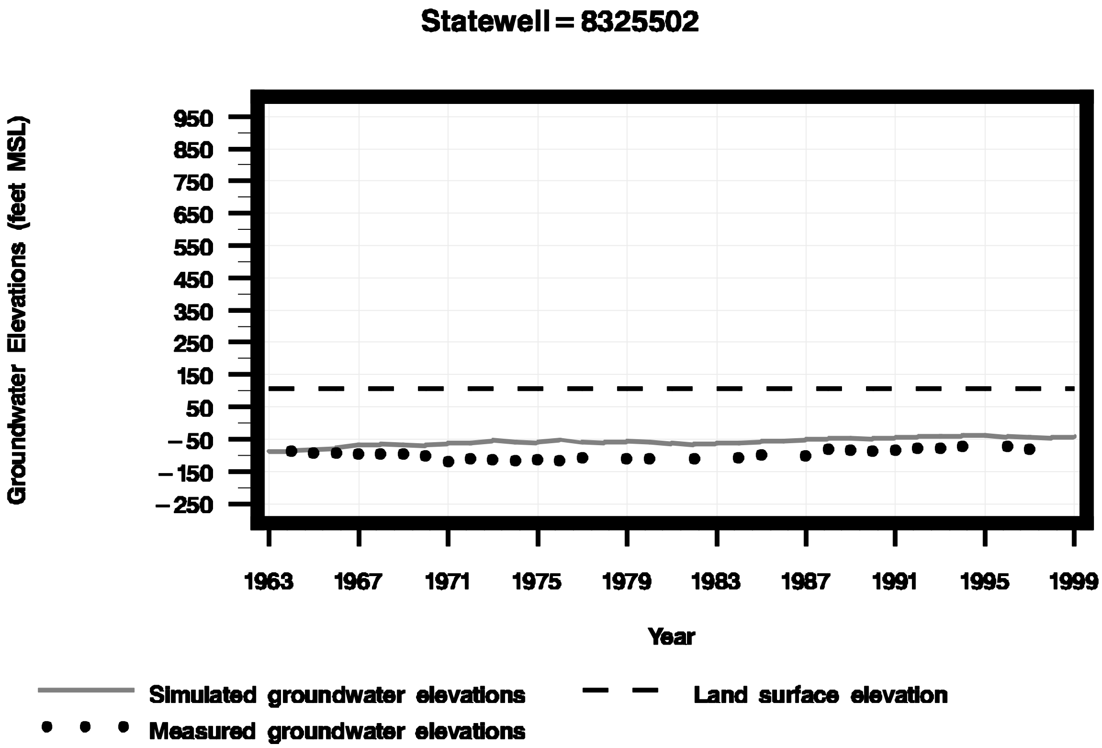
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8325502
Groundwater Elevations (feet MSL)
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550
450
350
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50
−50
−150
−250
1963
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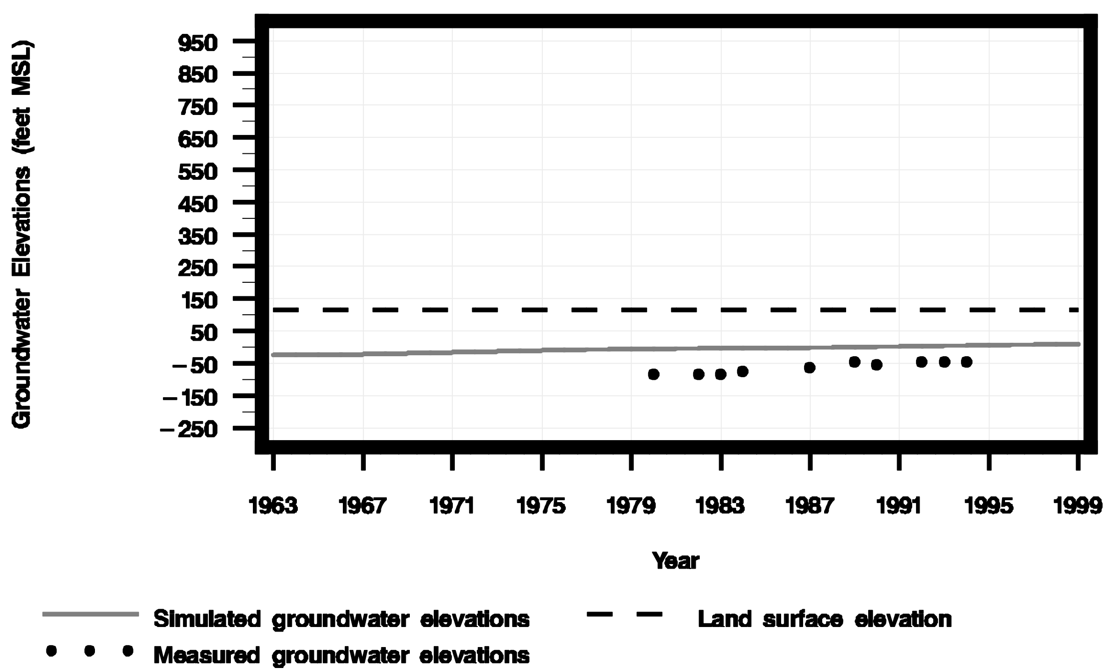
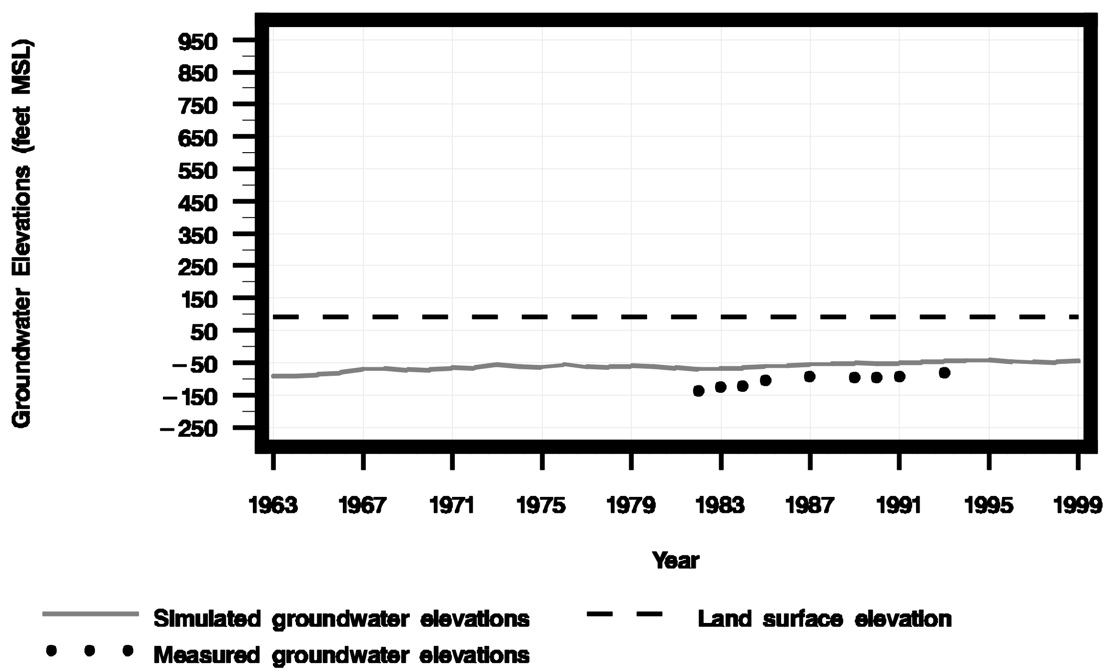
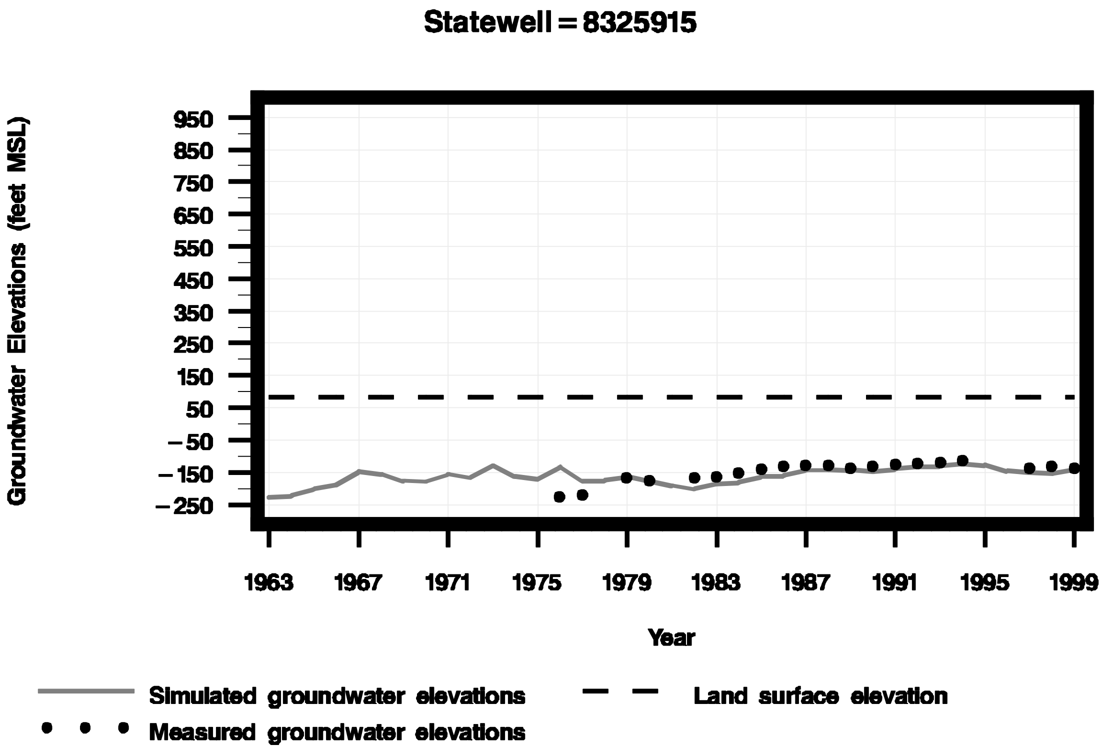
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 8325701



Statewell = 8325801




Statewell = 8325915
Groundwater Elevations (feet MSL)
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650
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450
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50
−50
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1963
1967
1971
1975
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1983
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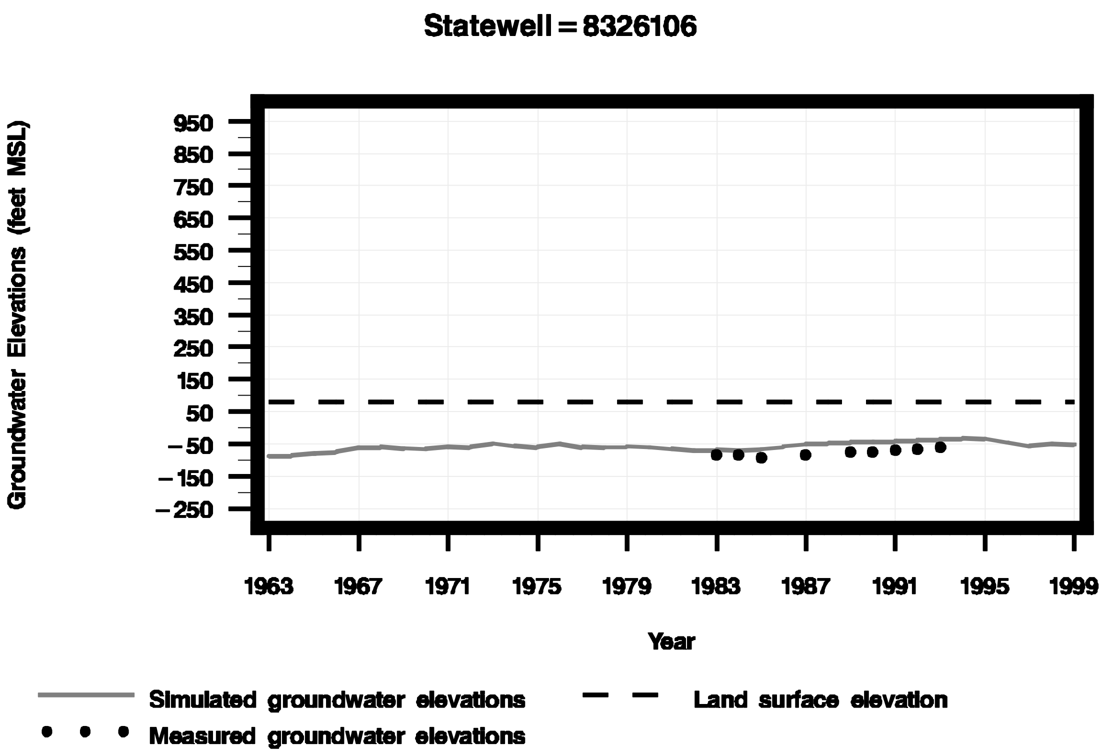
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8326106
Groundwater Elevations (feet MSL)
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1963
1967
1971
1975
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1983
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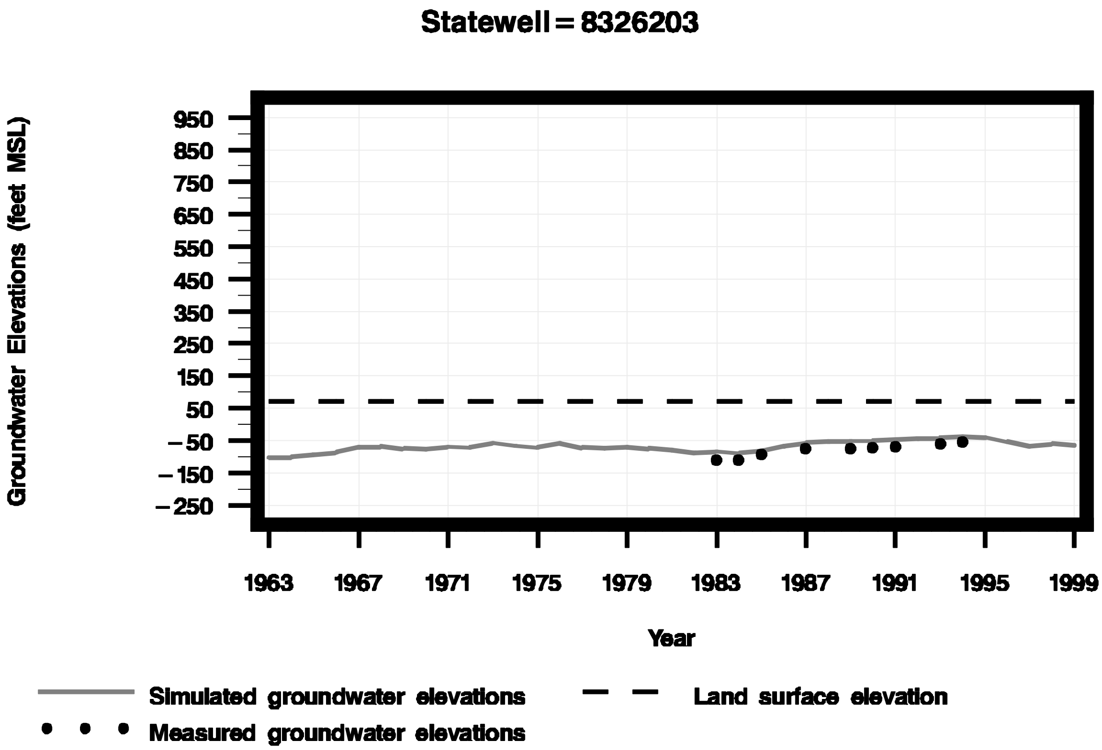
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8326203
Groundwater Elevations (feet MSL)
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450
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−50
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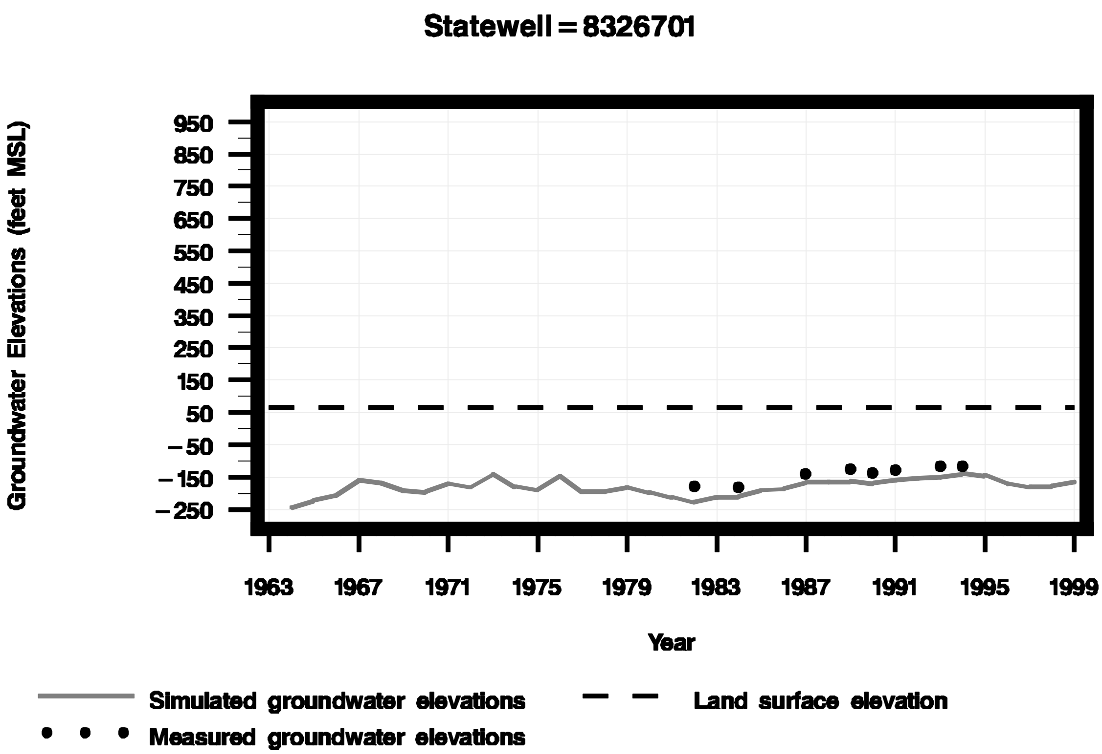
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8326701
Groundwater Elevations (feet MSL)
950
850
750
650
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450
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50
−50
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−250
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1967
1971
1975
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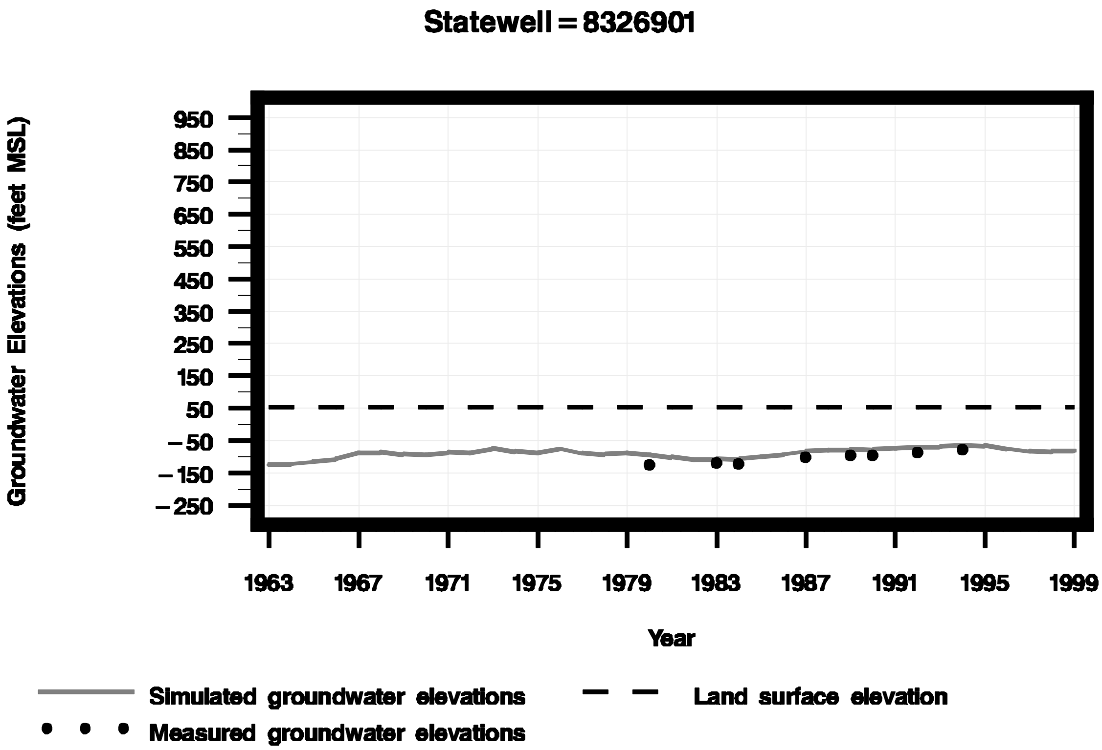
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8326901
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850
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450
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250
150
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−50
−150
−250
Groundwater Elevations (feet MSL)
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1967
1971
1975
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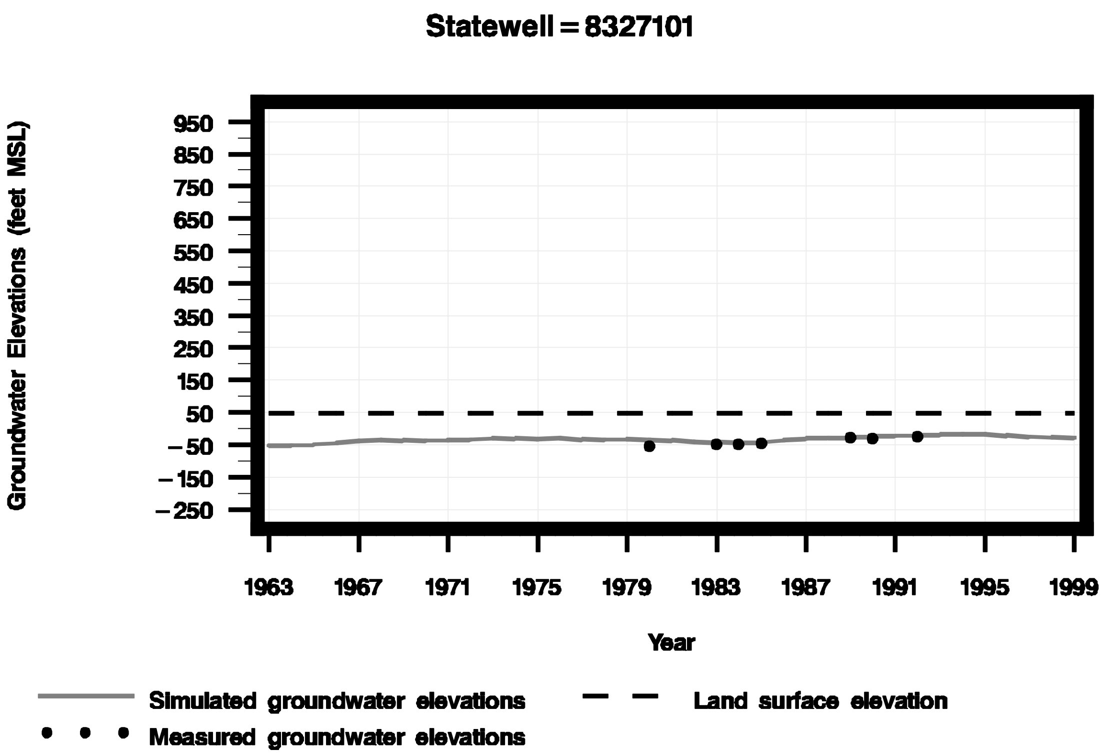
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8327101
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450
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250
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−50
−150
−250
Groundwater Elevations (feet MSL)
1963
1967
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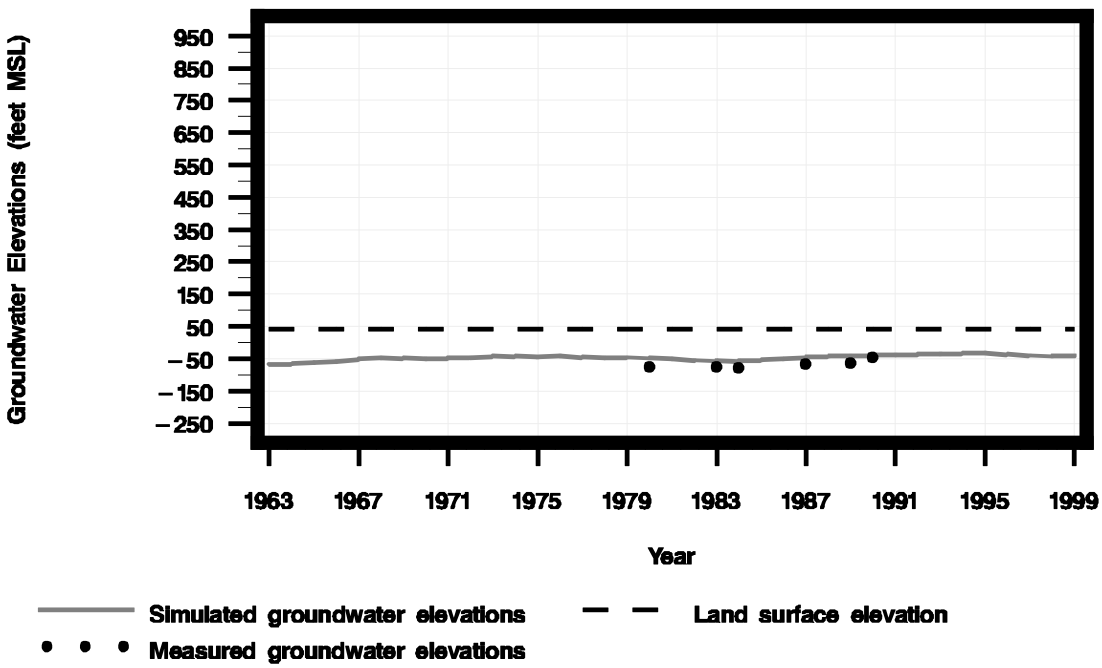
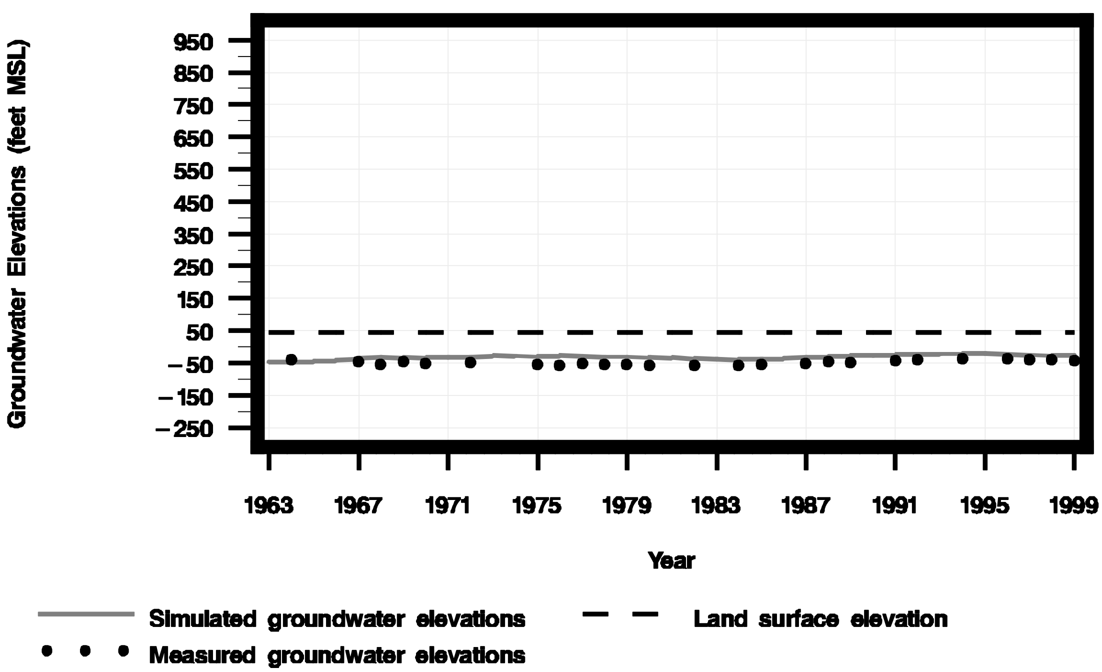
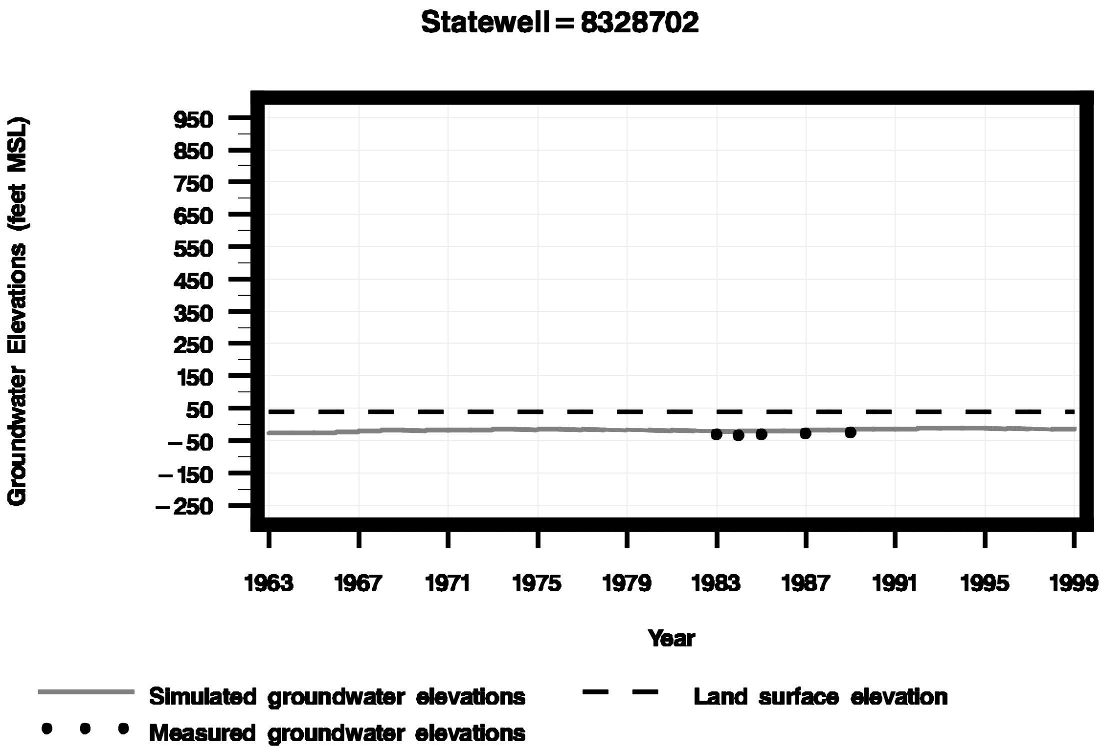
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 8327801



Statewell = 8327802




Statewell = 8328702
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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−50
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1963
1967
1971
1975
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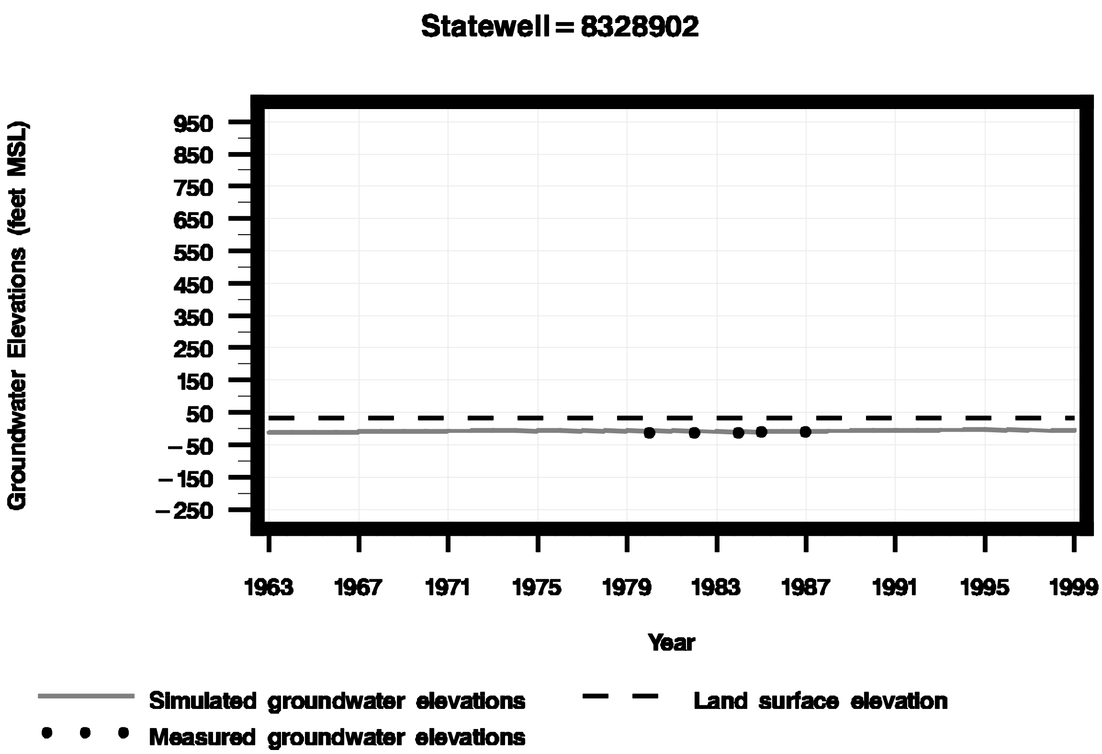
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8328902
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
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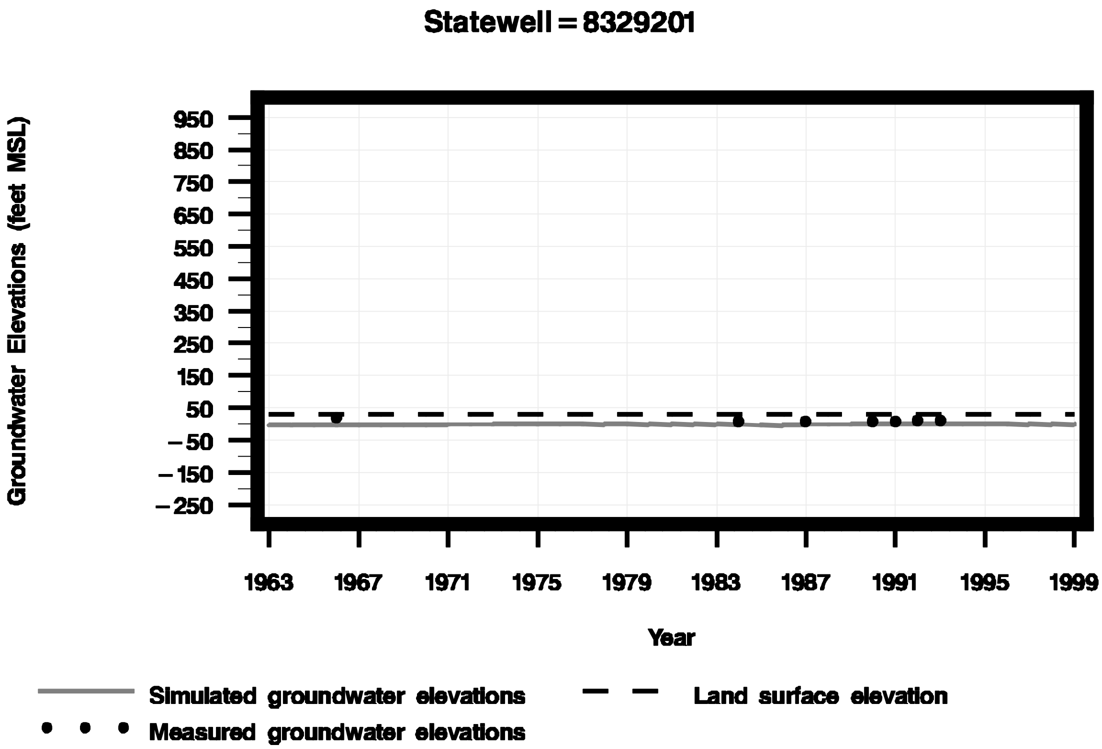
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8329201
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
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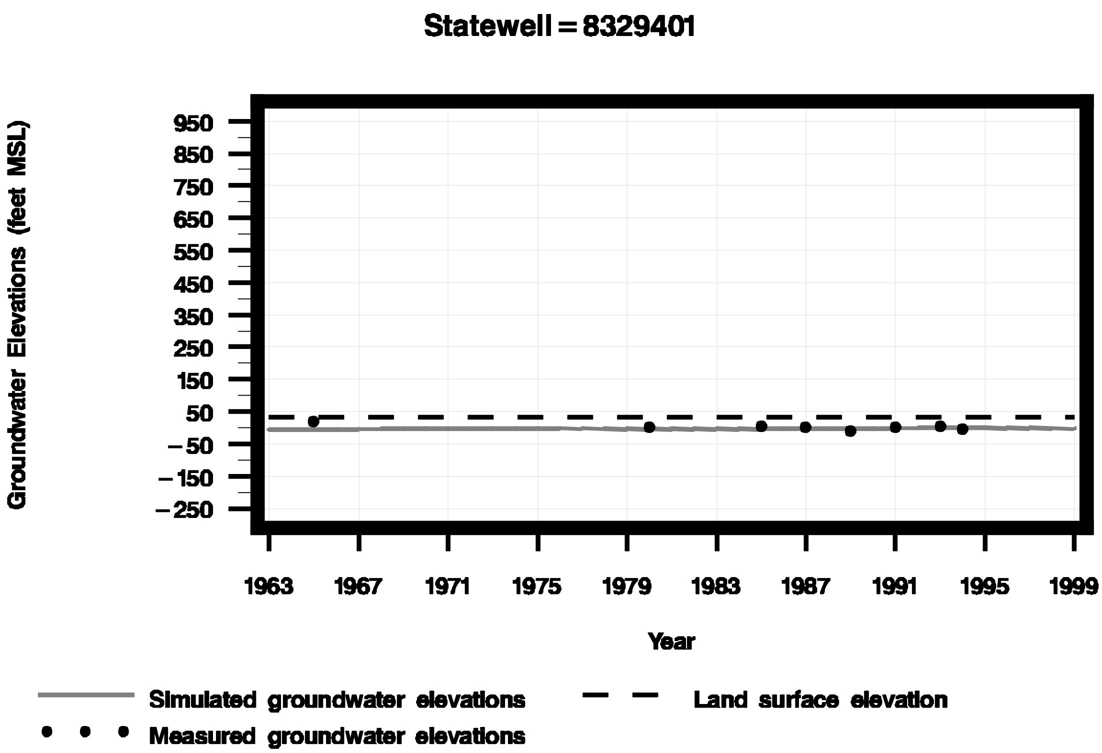
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8329401
Groundwater Elevations (feet MSL)
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850
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650
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450
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50
−50
−150
−250
1963
1967
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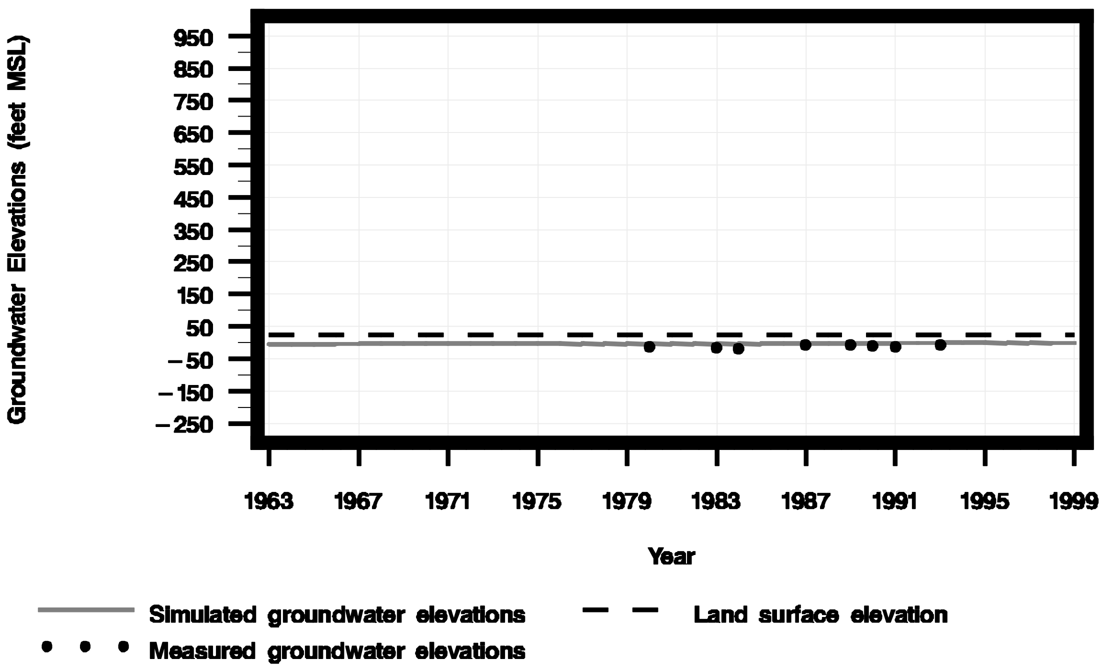
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 8329702



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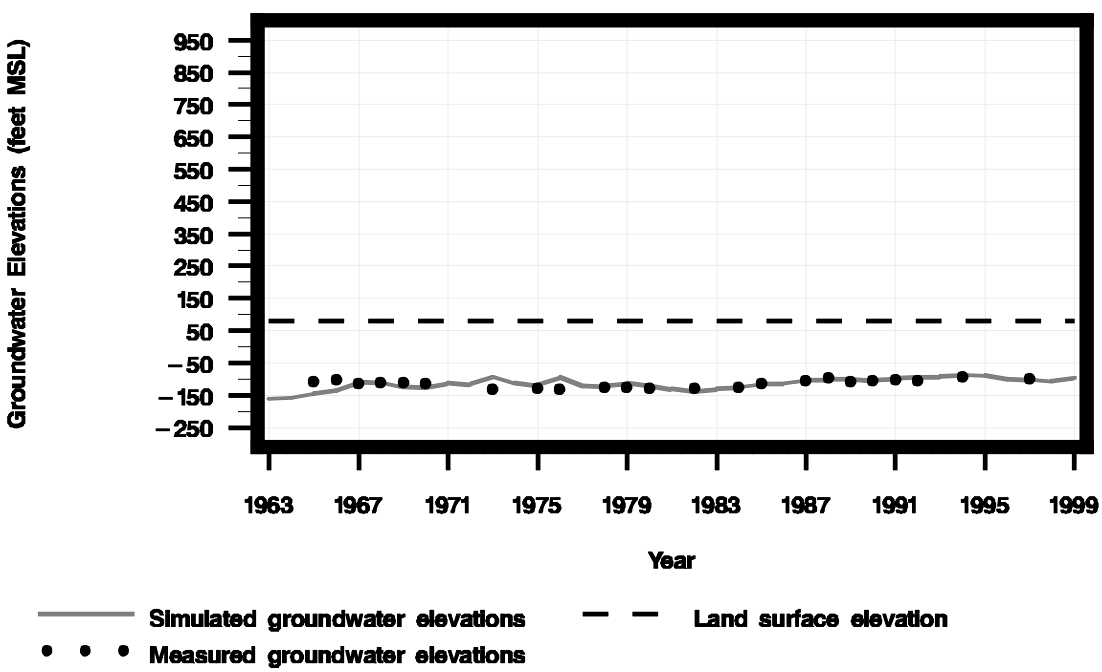

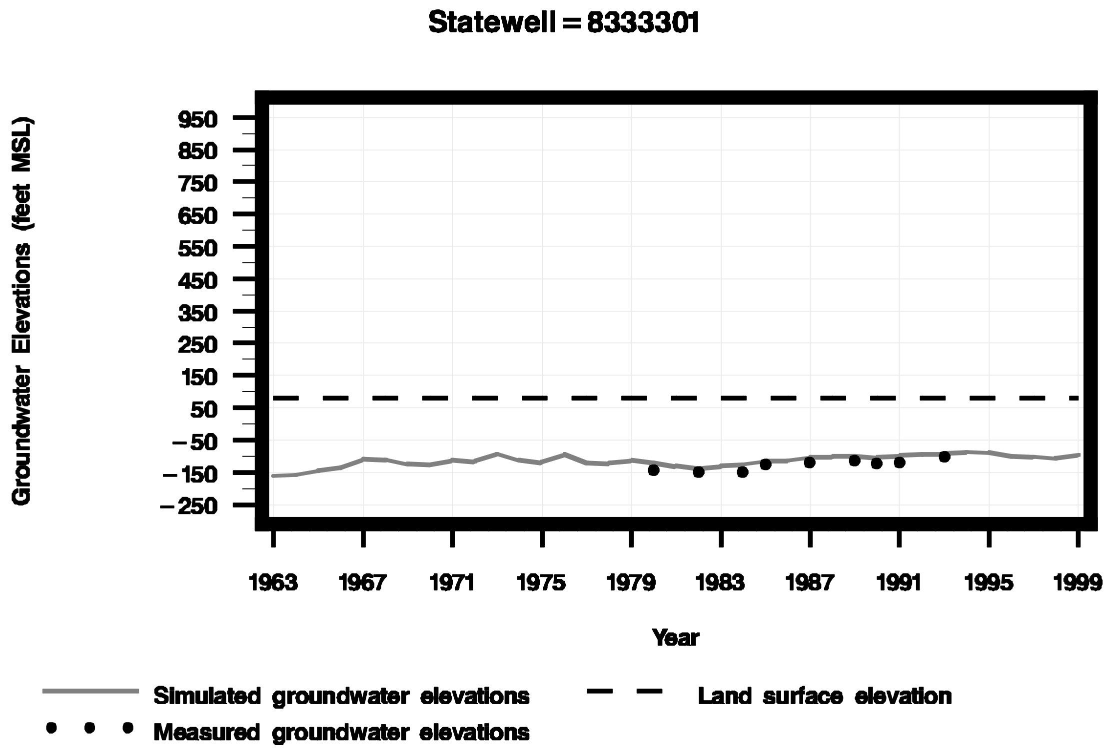
Statewell = 8333301
Groundwater Elevations (feet MSL)
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850
750
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450
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150
50
−50
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1967
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1991
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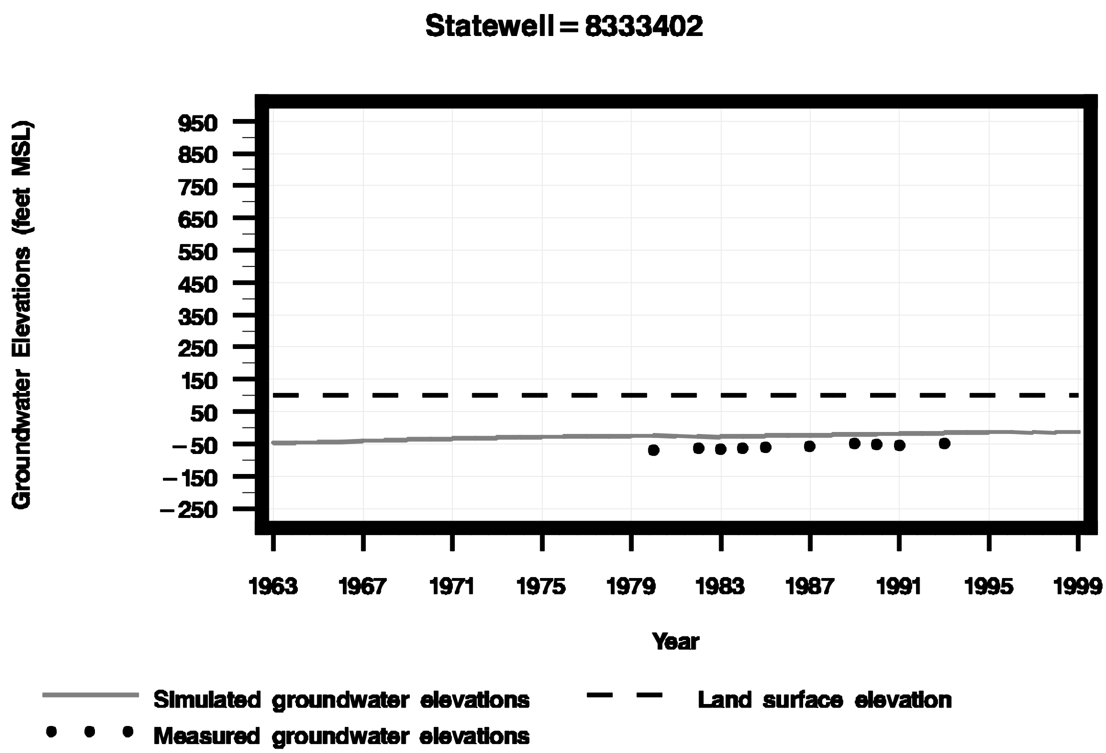
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8333402
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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150
50
−50
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−250
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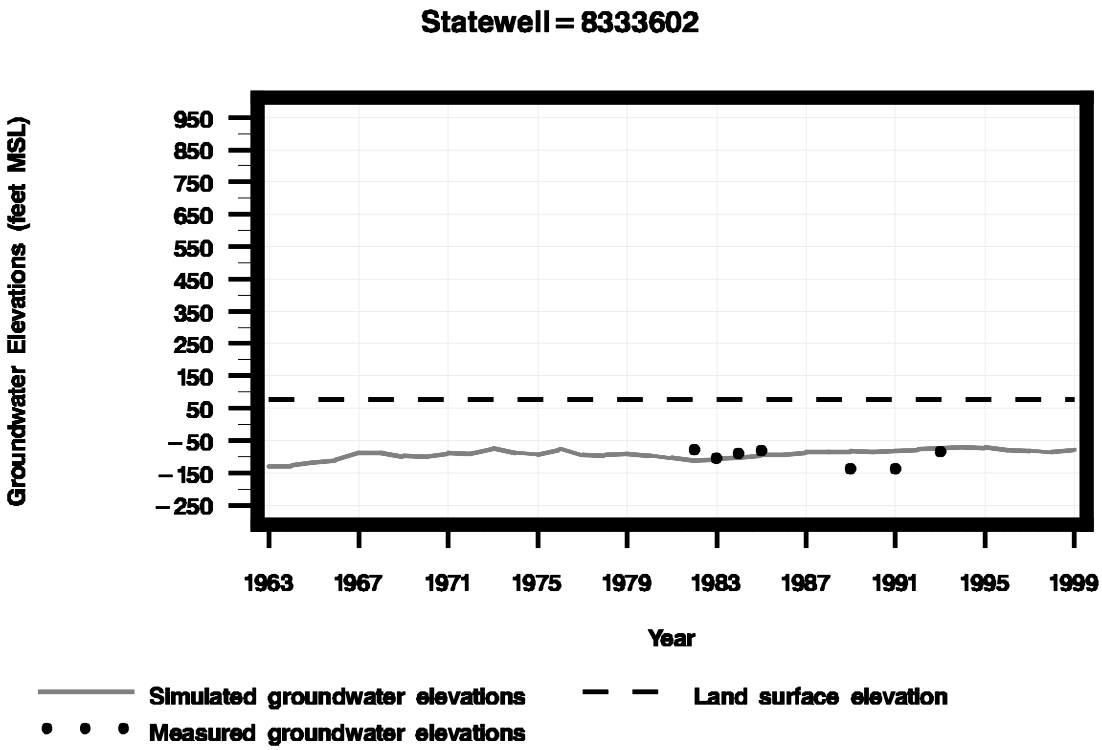
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8333602
Groundwater Elevations (feet MSL)
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650
550
450
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50
−50
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−250
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1967
1971
1975
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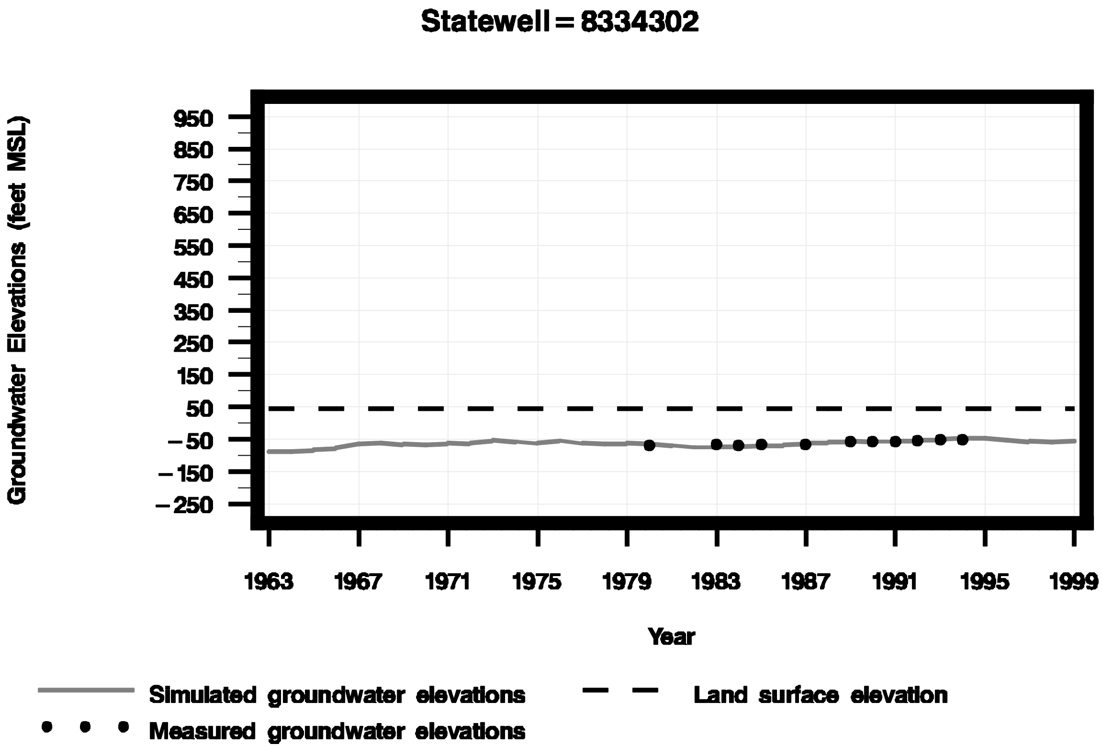
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8334302
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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150
50
−50
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1967
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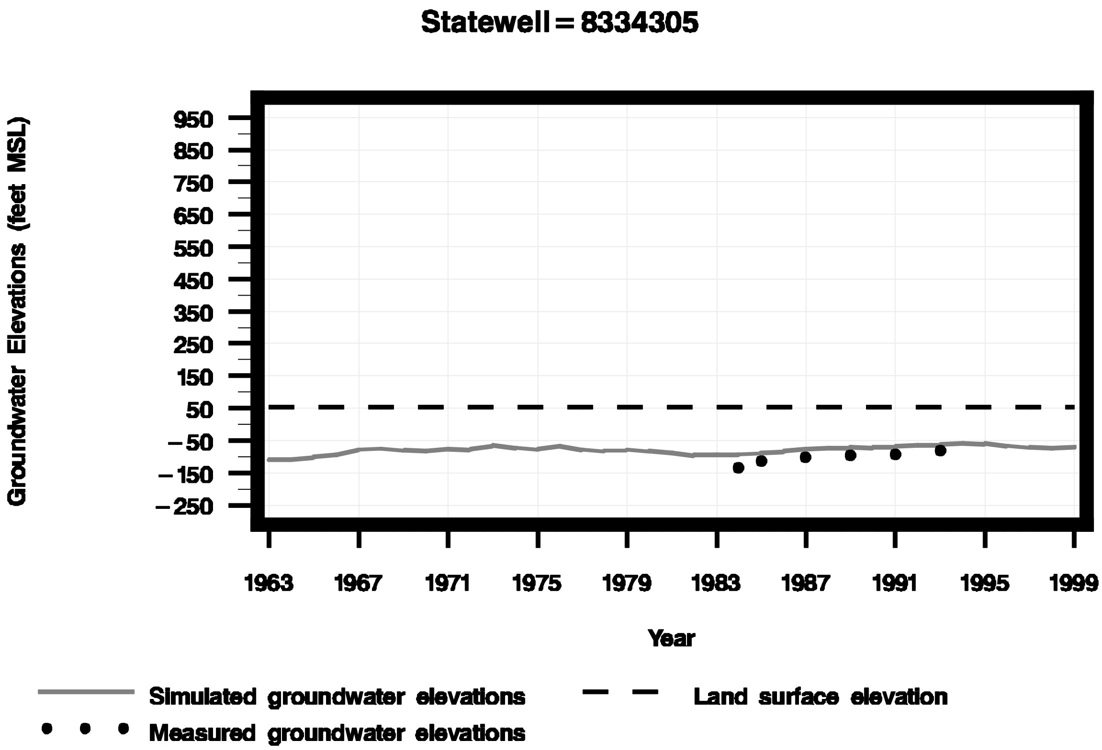
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8334305
Groundwater Elevations (feet MSL)
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450
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150
50
−50
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−250
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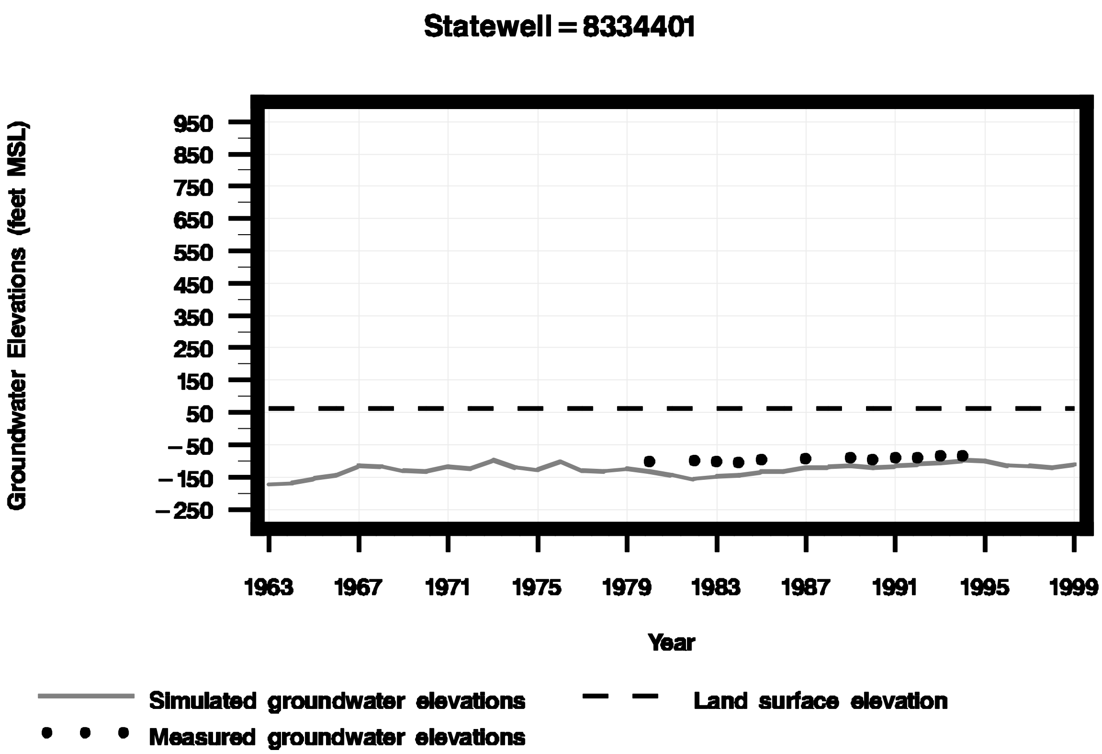
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8334401
Groundwater Elevations (feet MSL)
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850
750
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450
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250
150
50
−50
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−250
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1967
1971
1975
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1983
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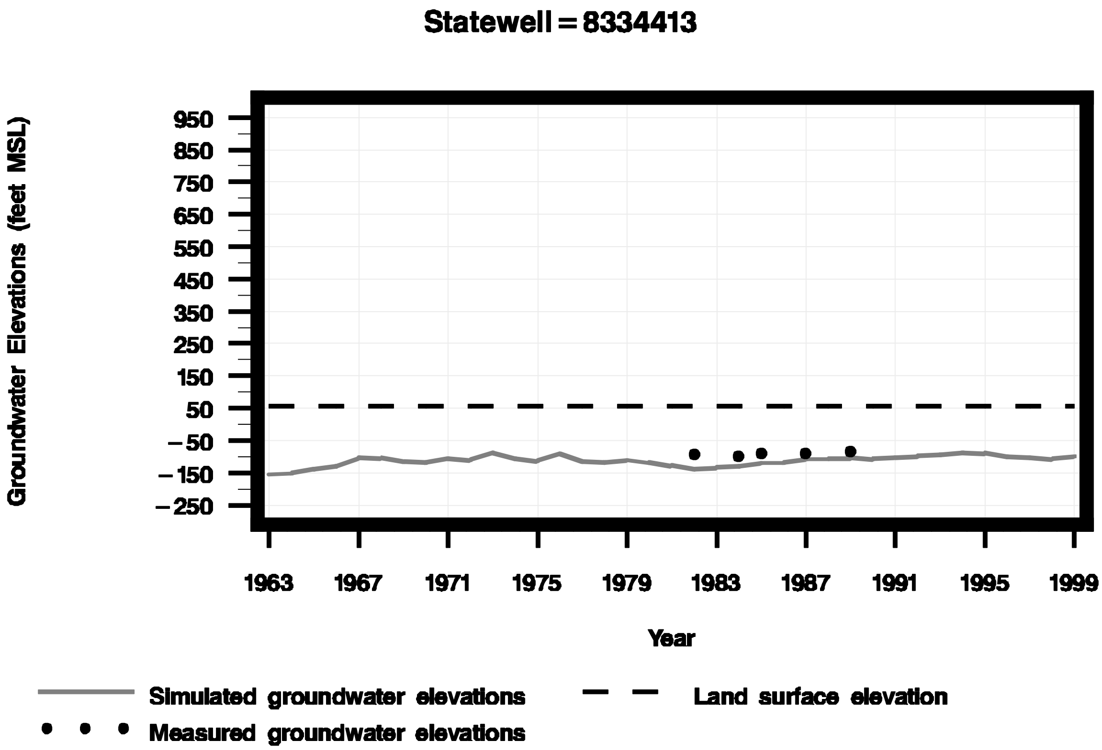
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8334413
Groundwater Elevations (feet MSL)
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150
50
−50
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1967
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1975
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1983
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1991
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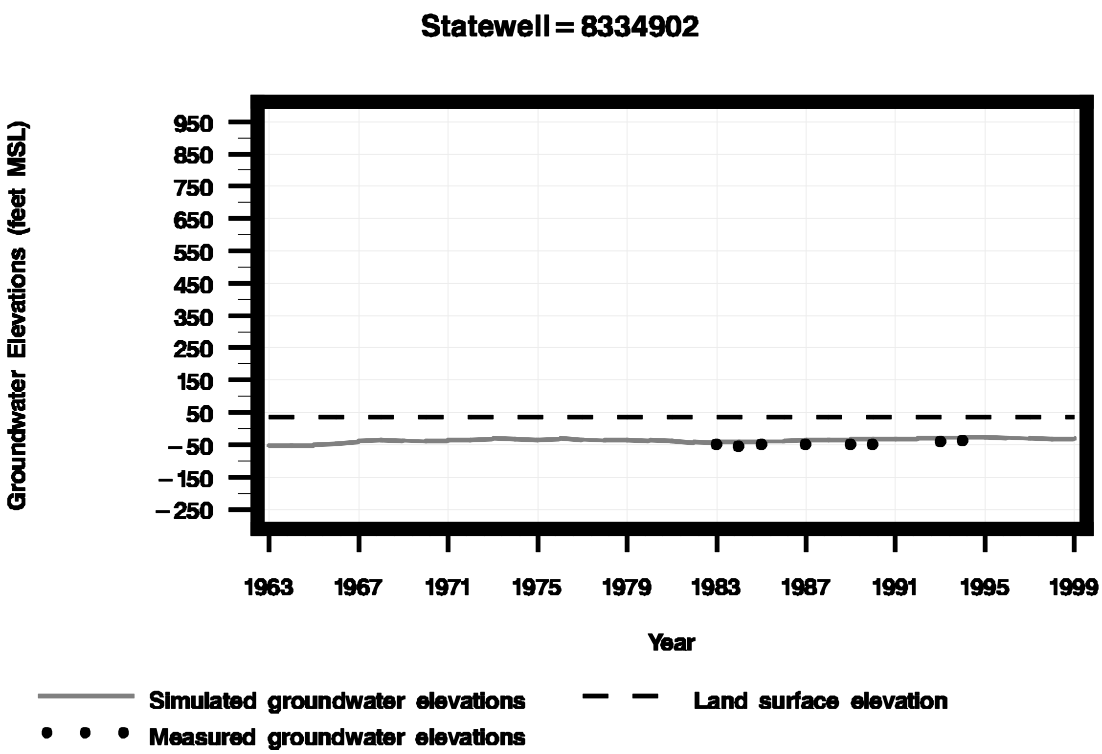
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8334902
Groundwater Elevations (feet MSL)
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−50
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1975
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1983
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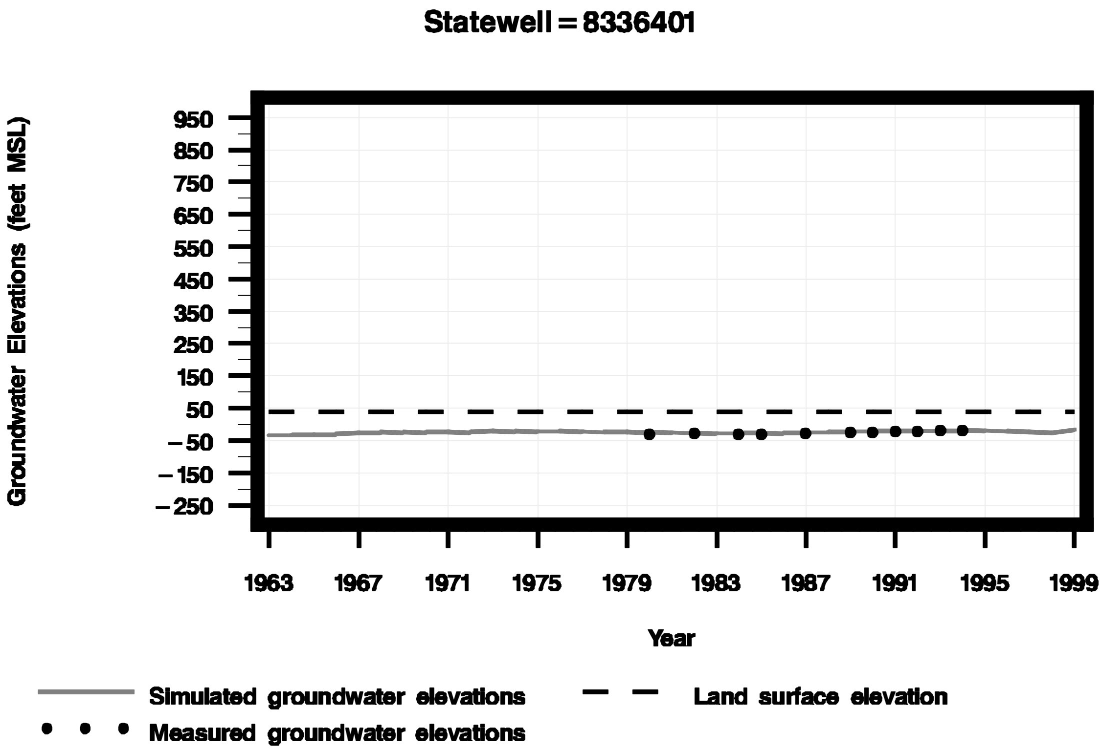
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8336401
Groundwater Elevations (feet MSL)
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450
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50
−50
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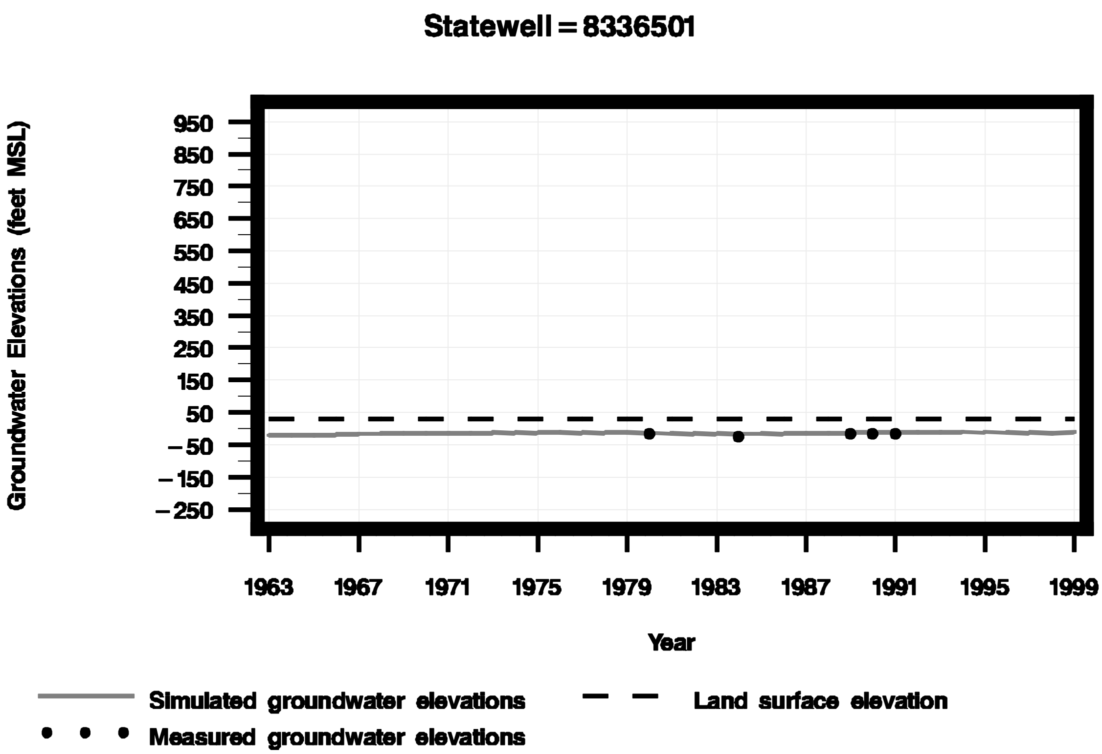
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8336501
Groundwater Elevations (feet MSL)
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450
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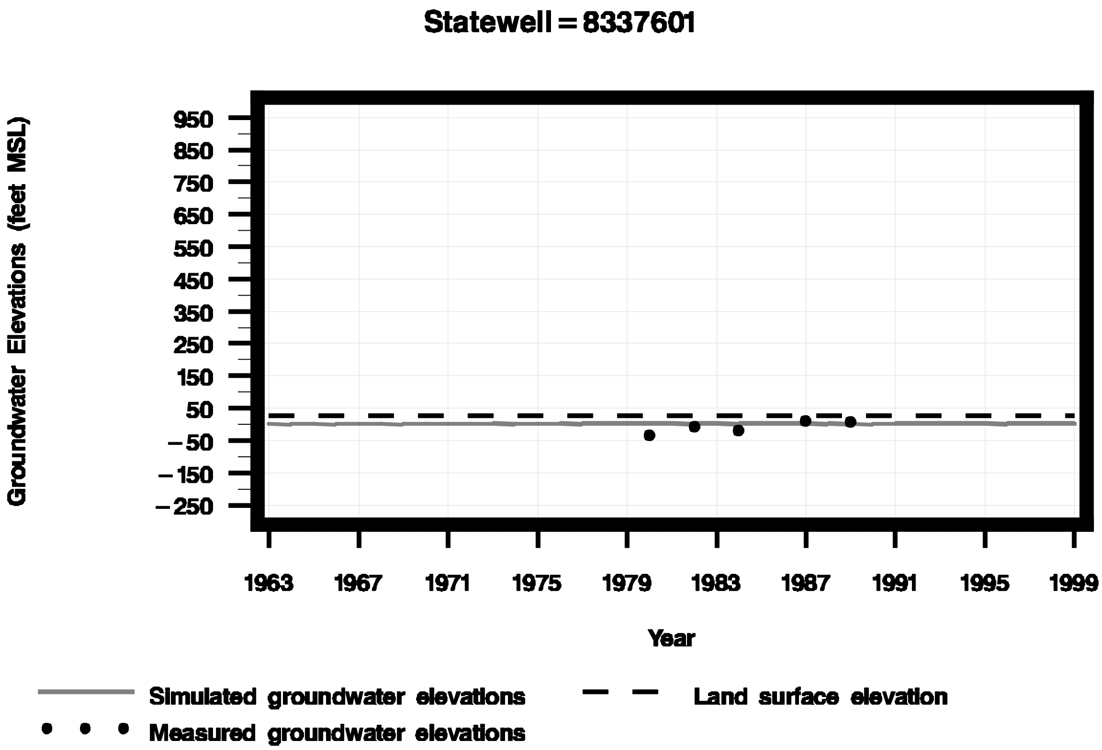
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8337601
Groundwater Elevations (feet MSL)
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450
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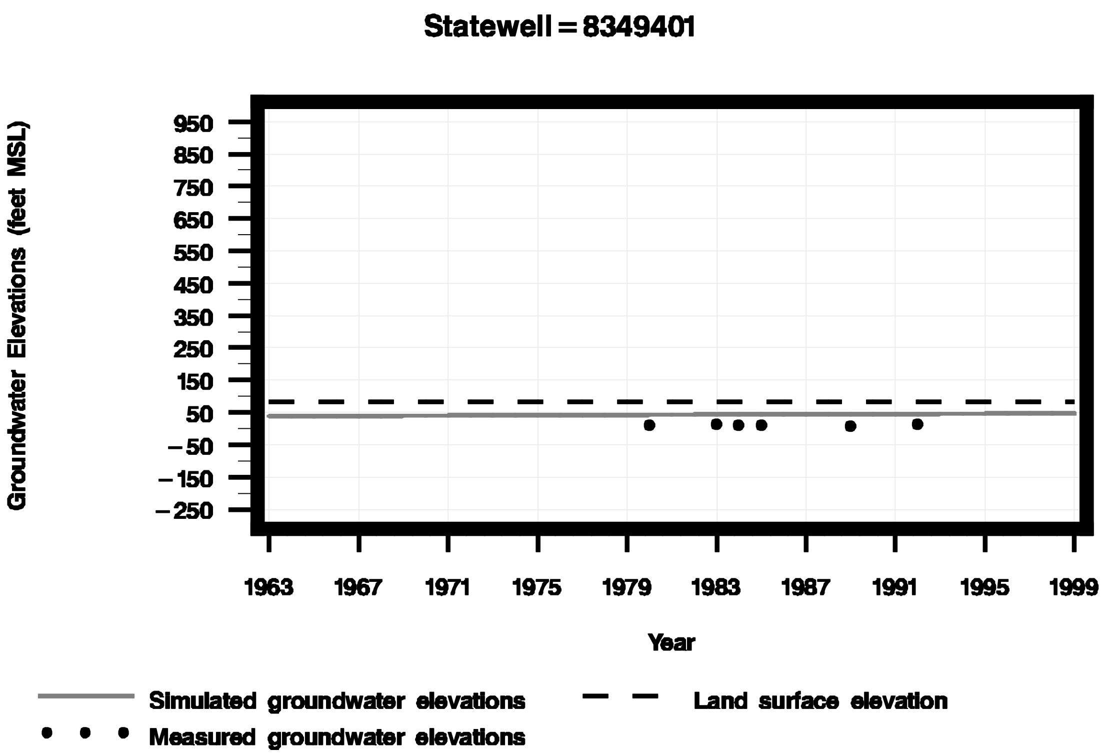
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8349401
Groundwater Elevations (feet MSL)
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450
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50
−50
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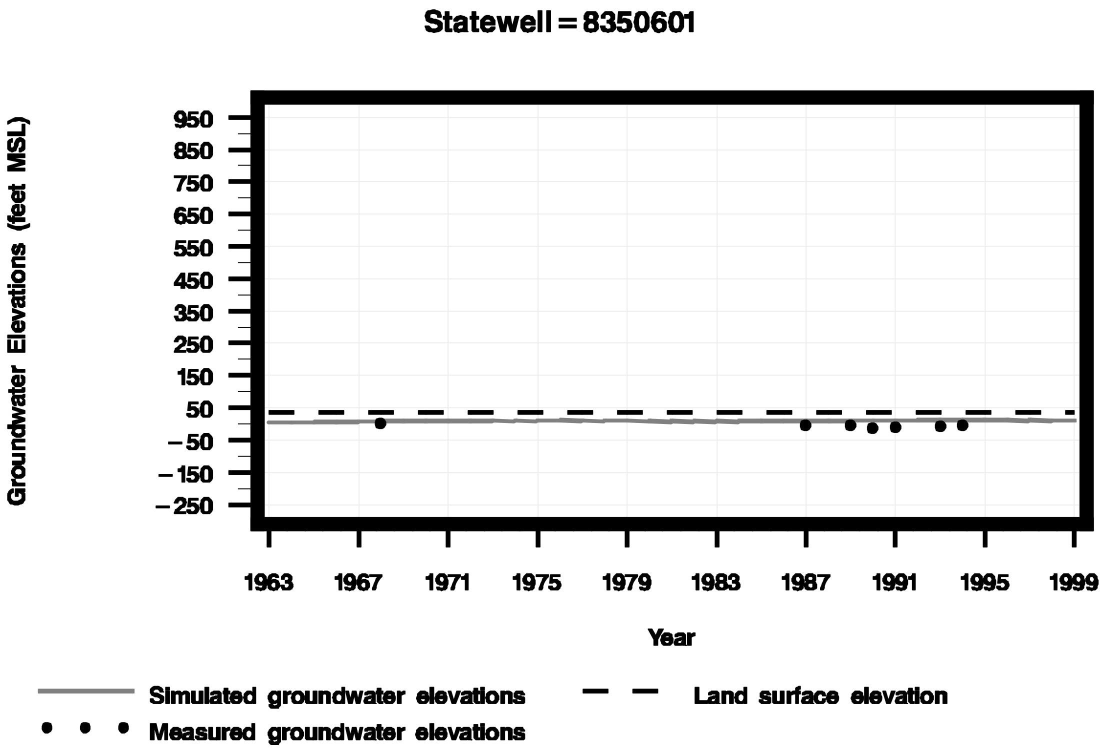
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8350601
Groundwater Elevations (feet MSL)
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450
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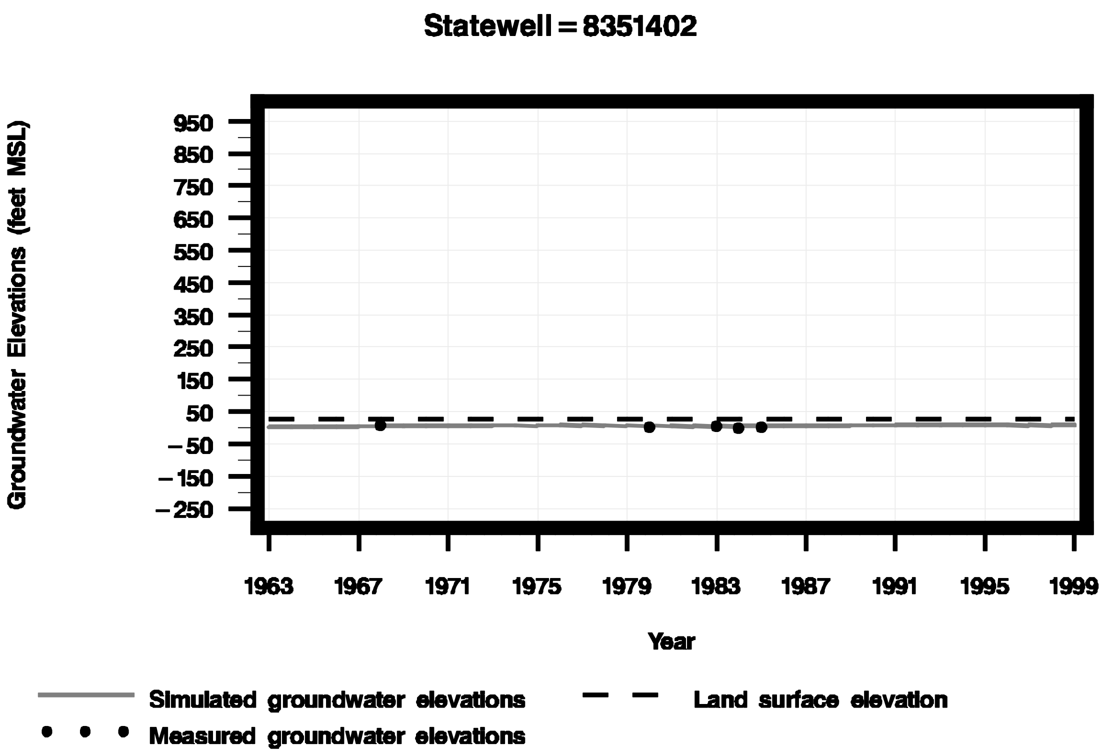
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8351402
Groundwater Elevations (feet MSL)
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450
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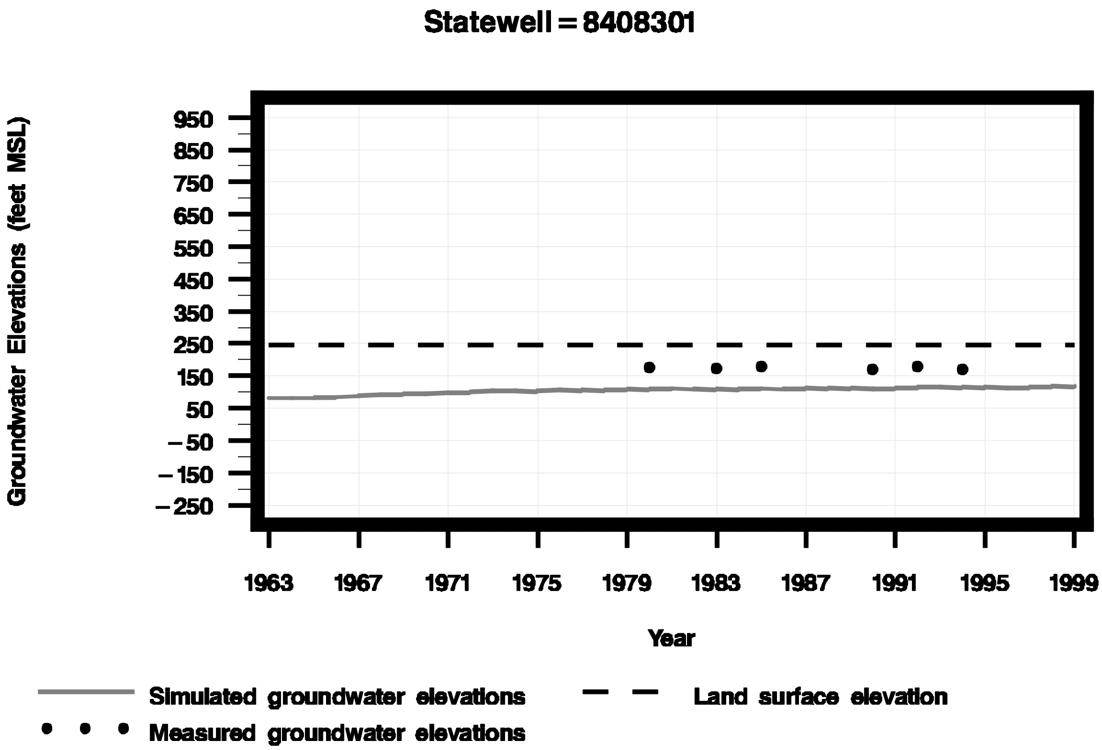
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8408301
Groundwater Elevations (feet MSL)
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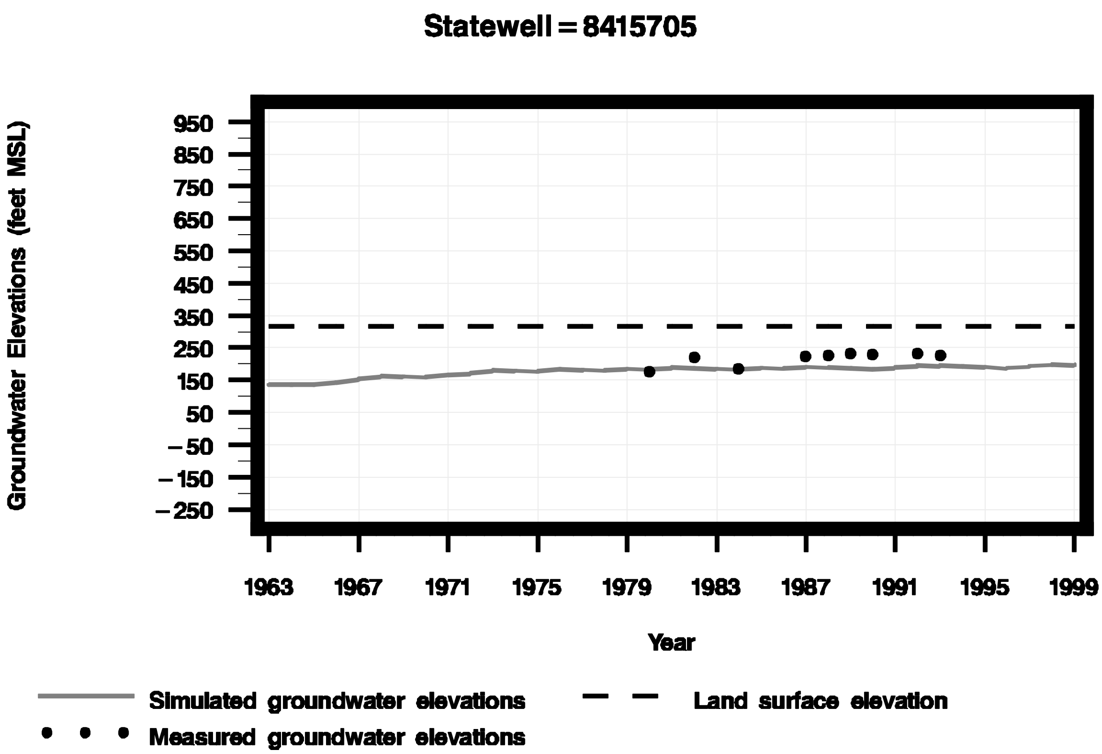
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8415705
Groundwater Elevations (feet MSL)
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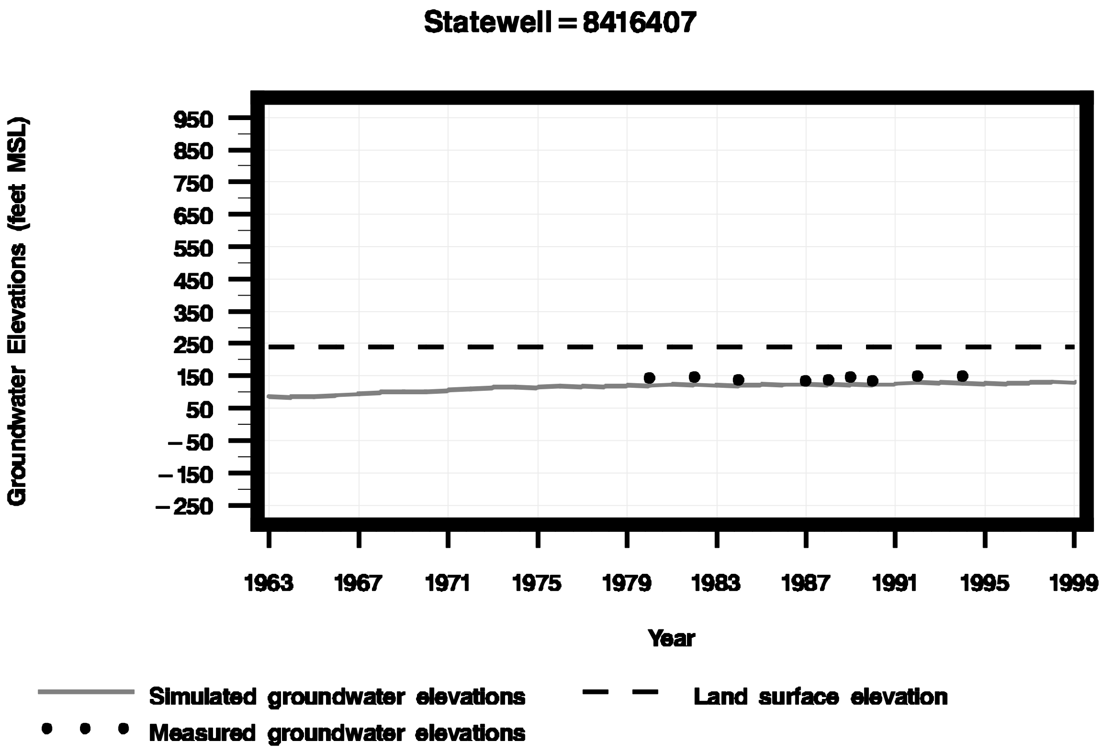
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8416407
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
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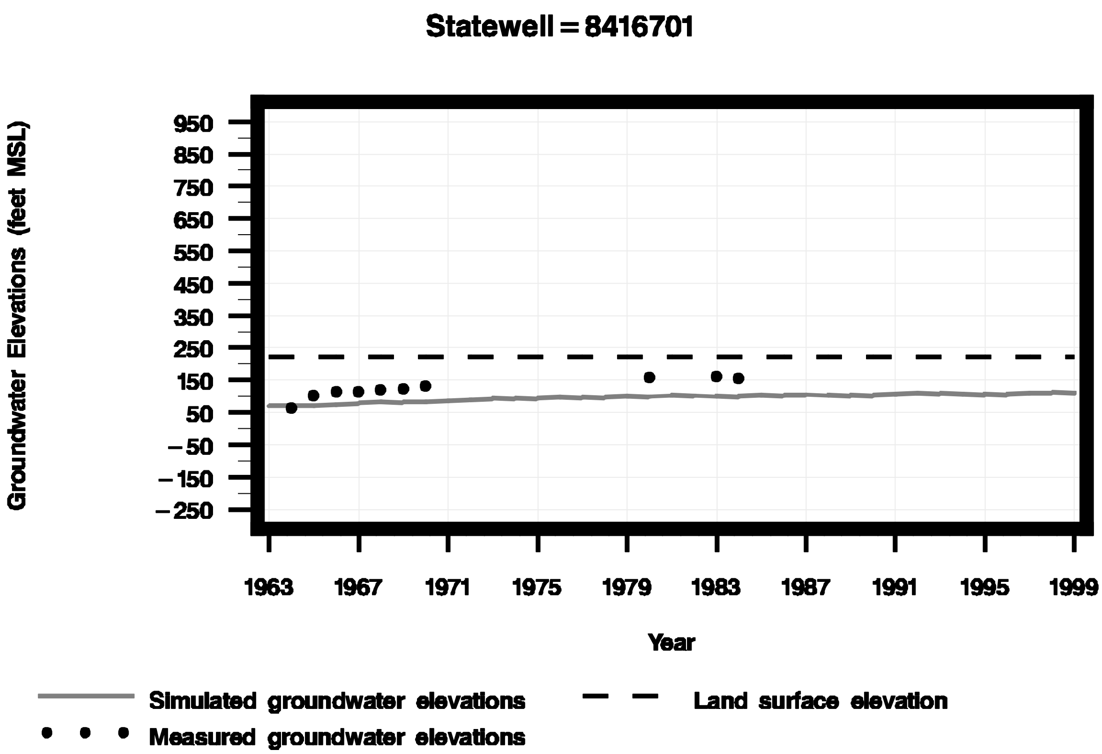
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation



Statewell = 8416701
Groundwater Elevations (feet MSL)
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450
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250
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50
−50
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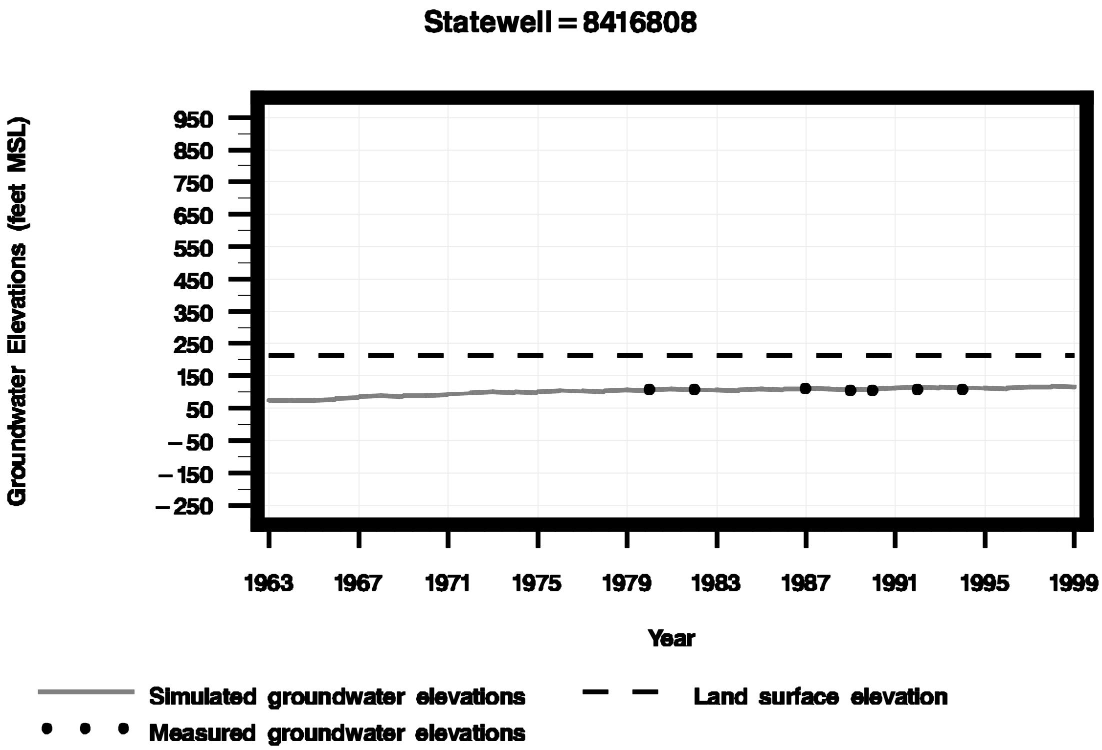
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8416808
Groundwater Elevations (feet MSL)
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450
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50
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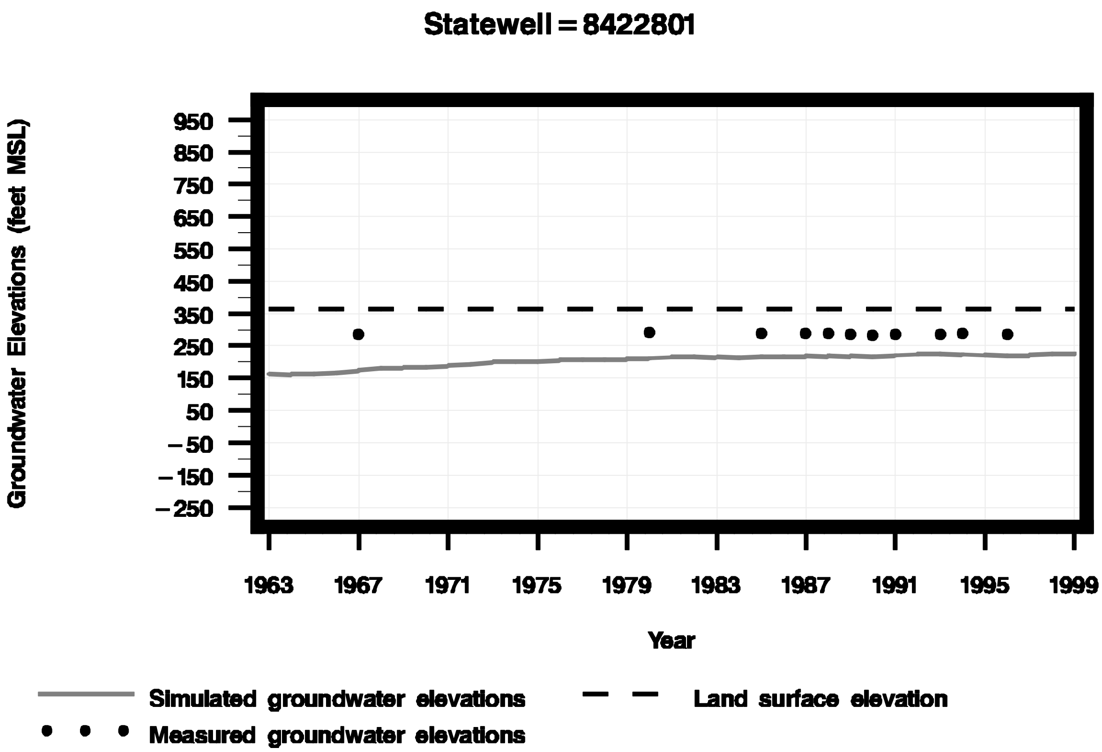
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8422801
Groundwater Elevations (feet MSL)
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450
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50
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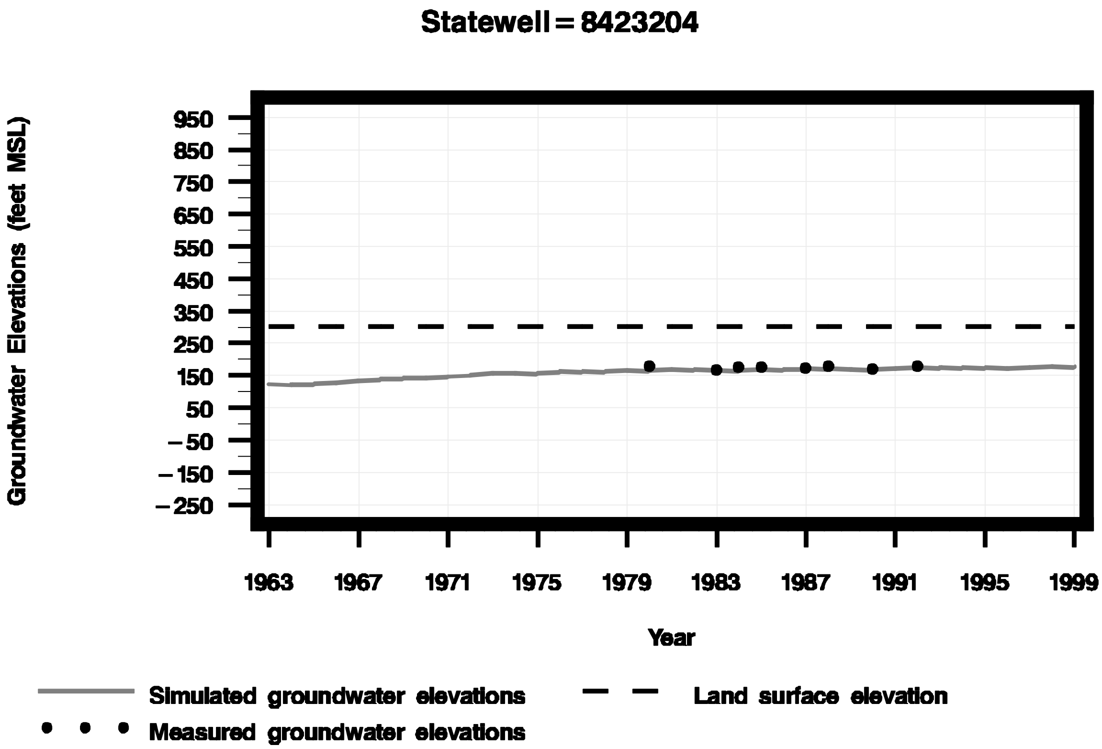
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8423204
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
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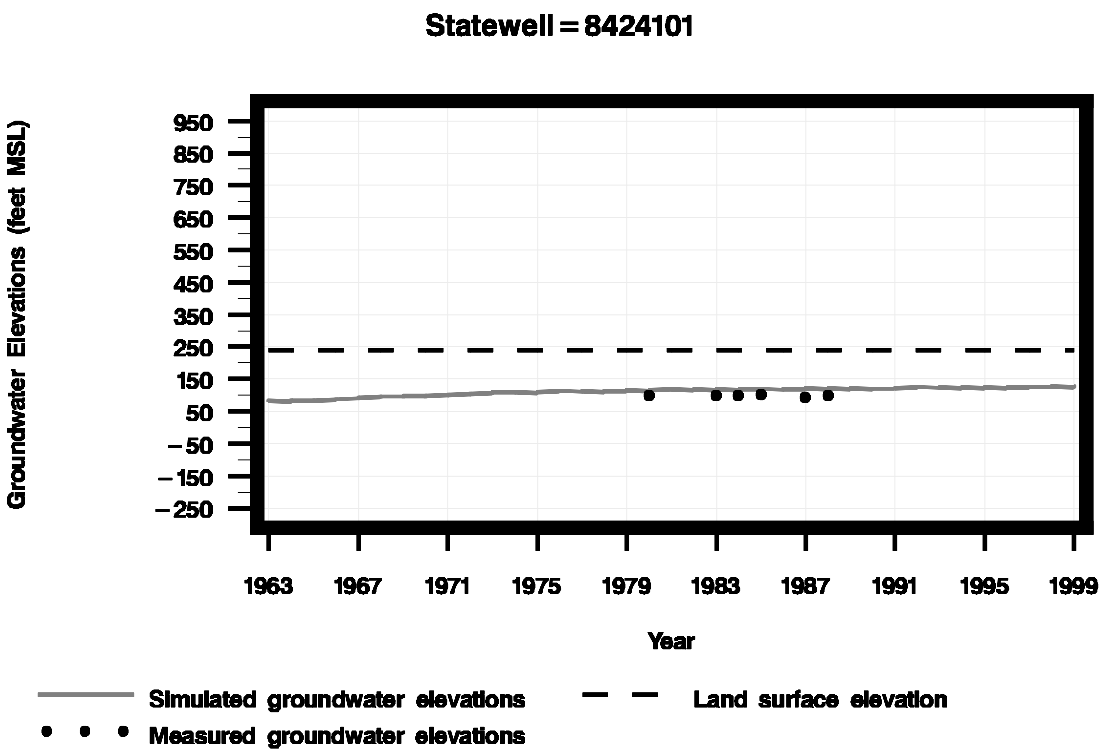
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8424101
Groundwater Elevations (feet MSL)
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450
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50
−50
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1963
1967
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1975
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1983
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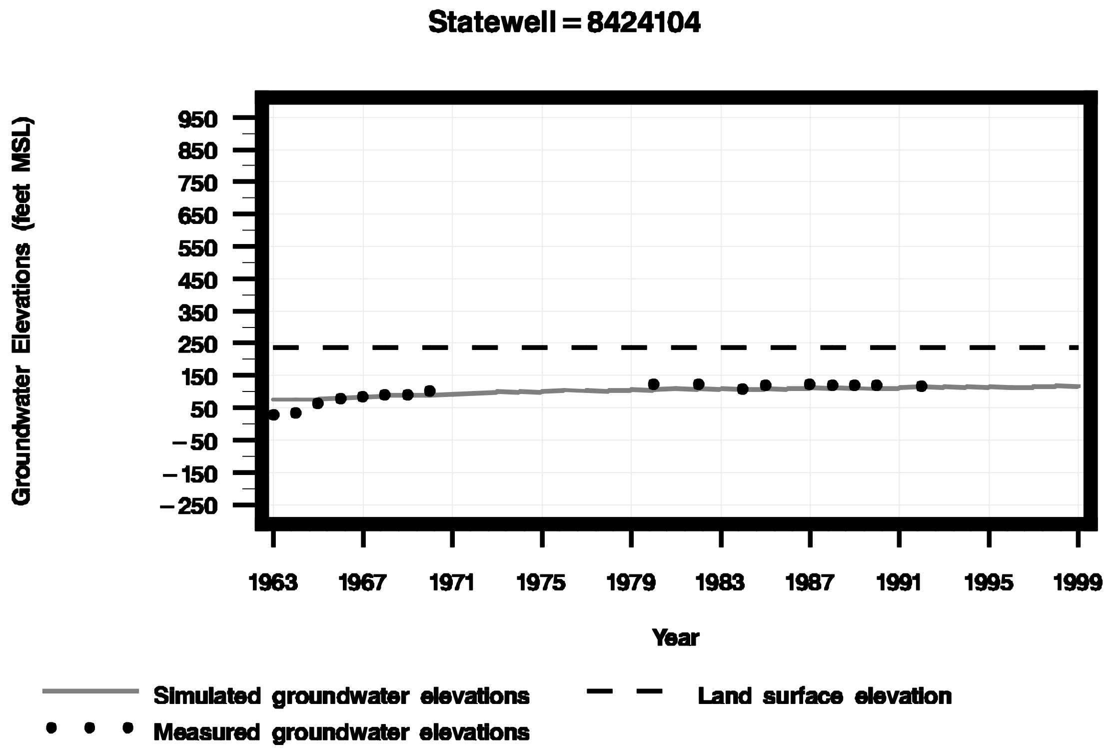
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8424104
Groundwater Elevations (feet MSL)
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550
450
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−50
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1983
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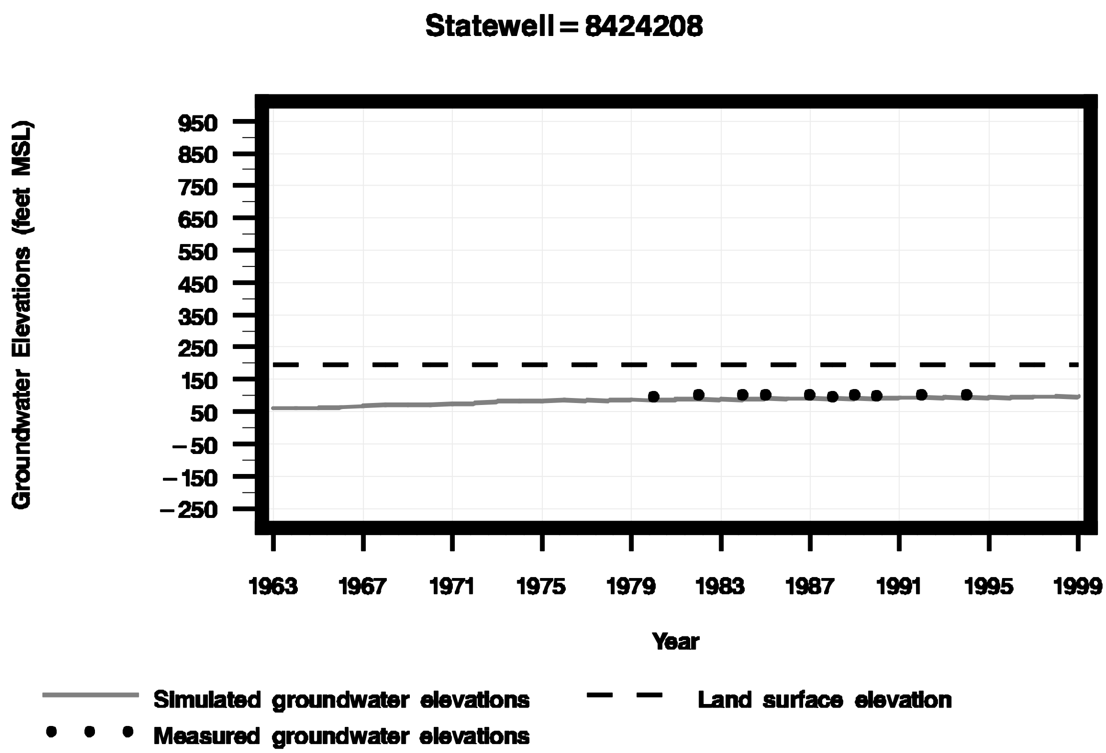
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8424208
Groundwater Elevations (feet MSL)
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450
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50
−50
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1963
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1975
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1983
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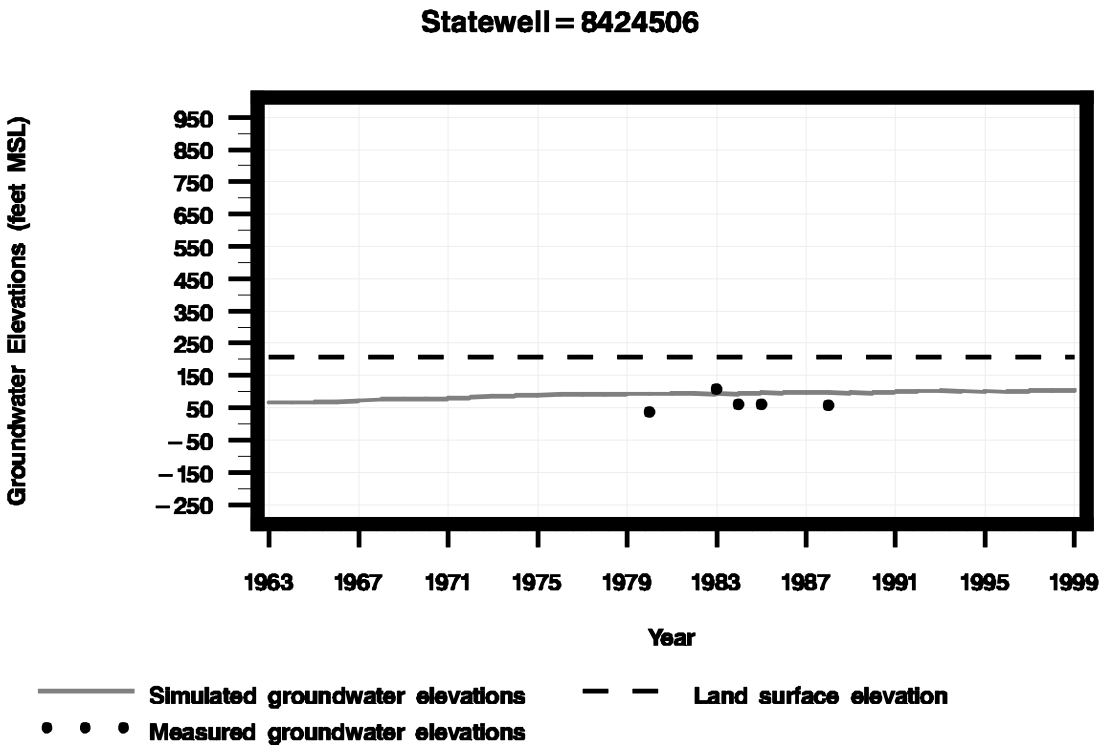
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8424506
Groundwater Elevations (feet MSL)
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450
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50
−50
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1963
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1975
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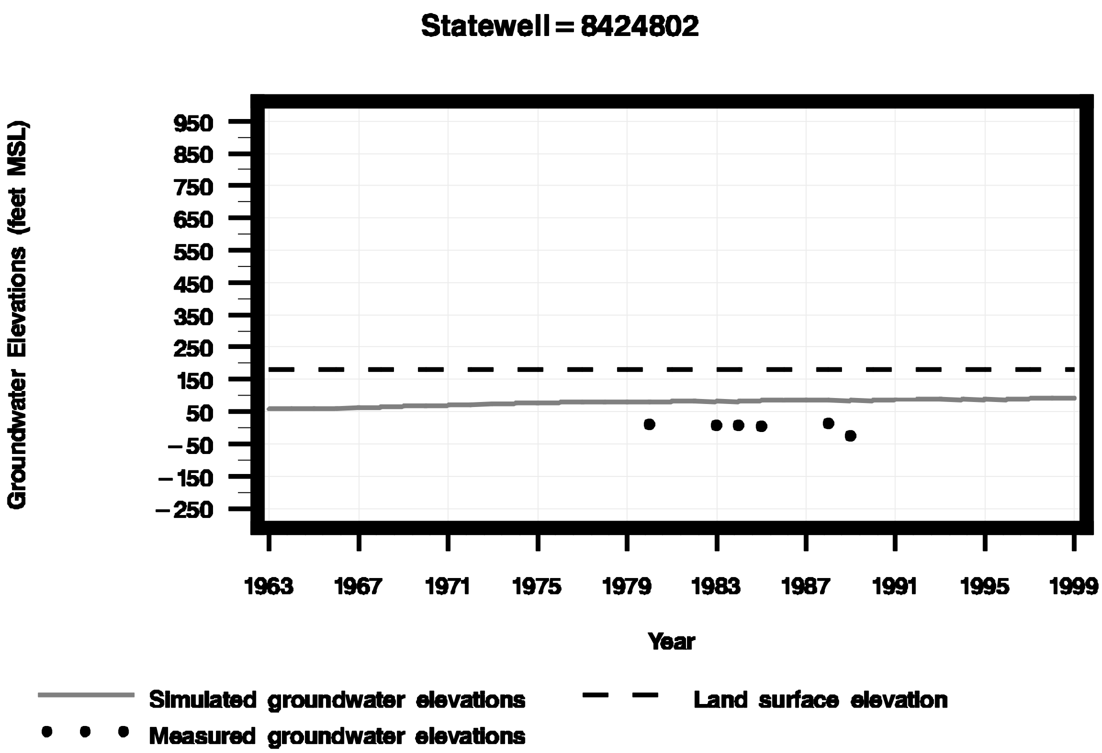
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8424802
Groundwater Elevations (feet MSL)
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750
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550
450
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50
−50
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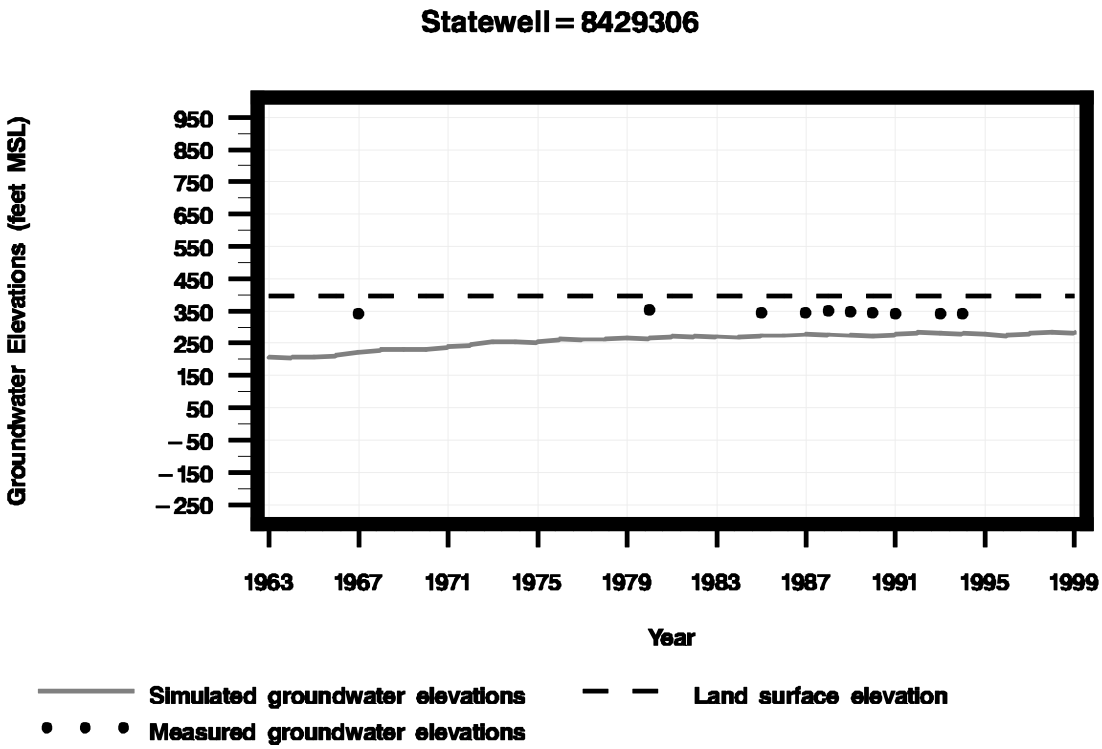
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8429306
Groundwater Elevations (feet MSL)
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50
−50
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1963
1967
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1975
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1983
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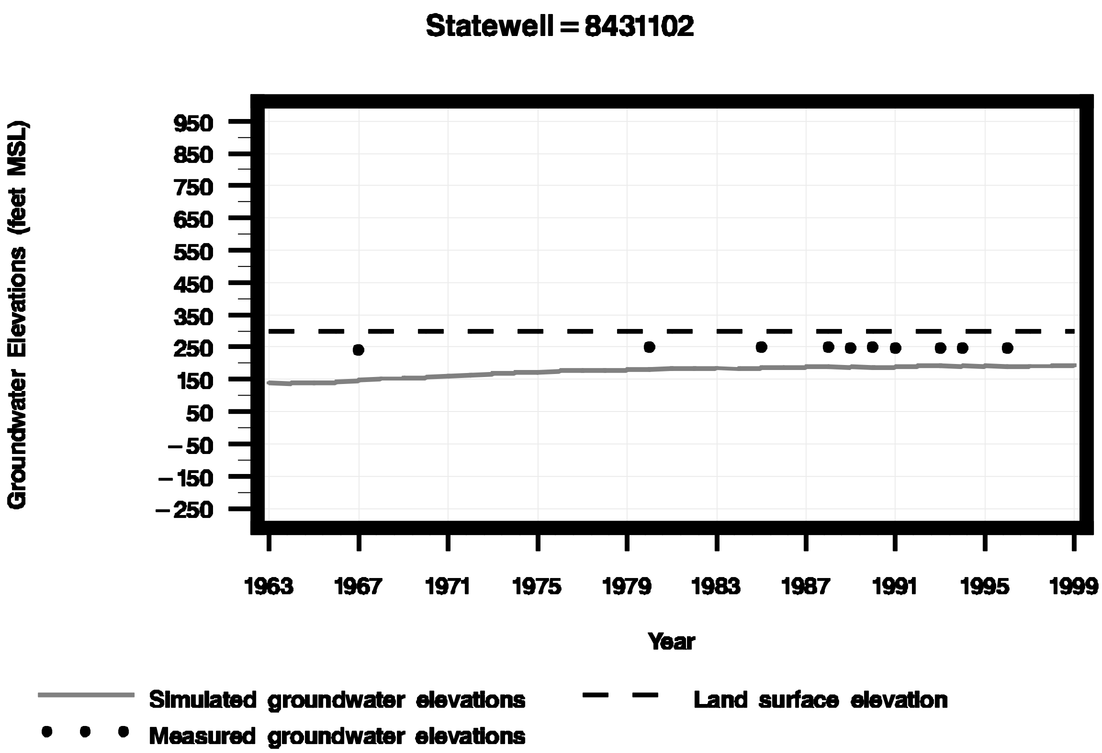
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8431102
Groundwater Elevations (feet MSL)
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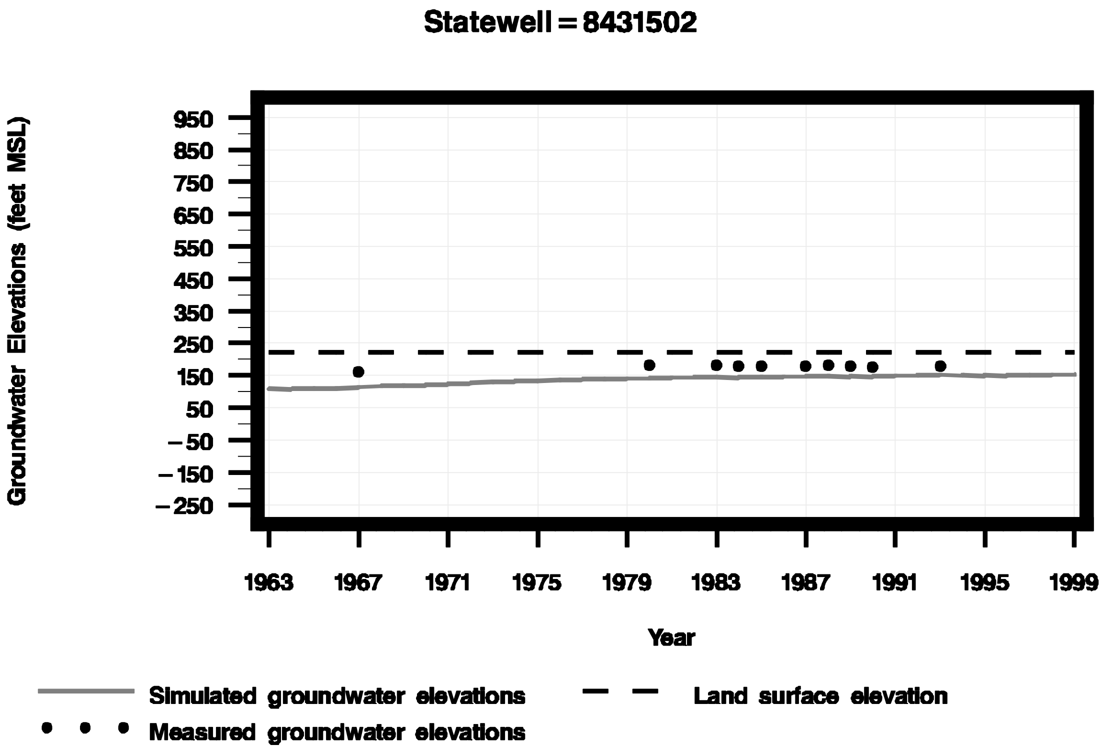
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8431502
Groundwater Elevations (feet MSL)
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850
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450
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−50
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1967
1971
1975
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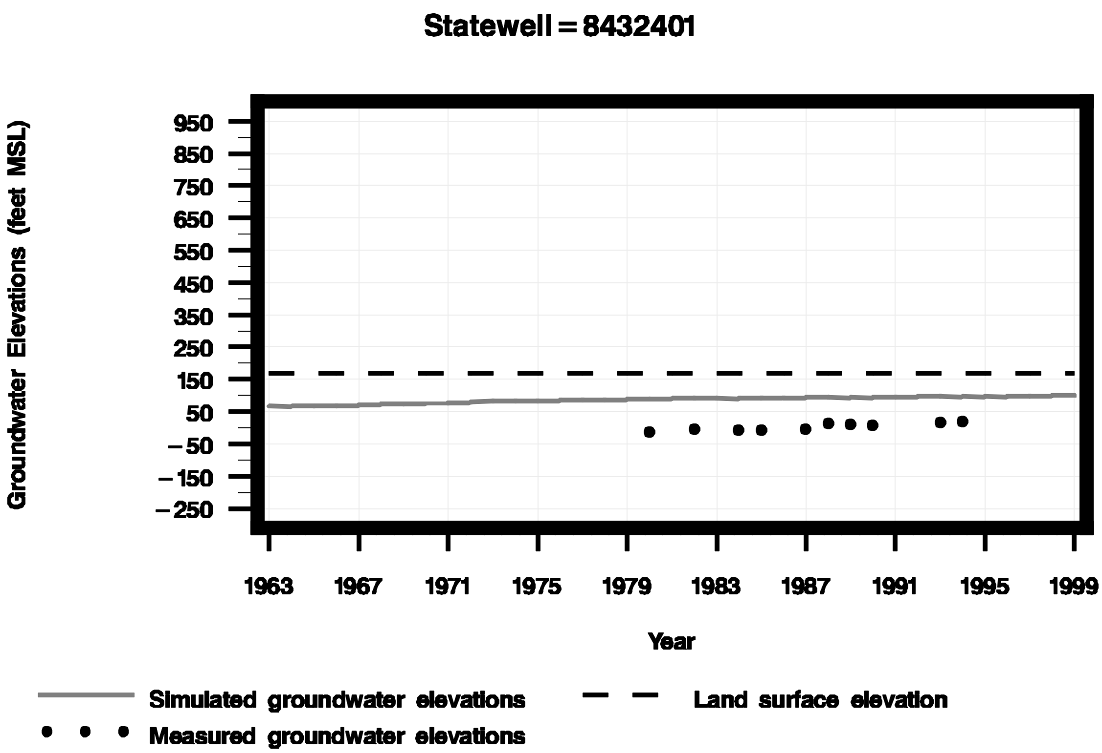
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8432401
Groundwater Elevations (feet MSL)
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450
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−250
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1983
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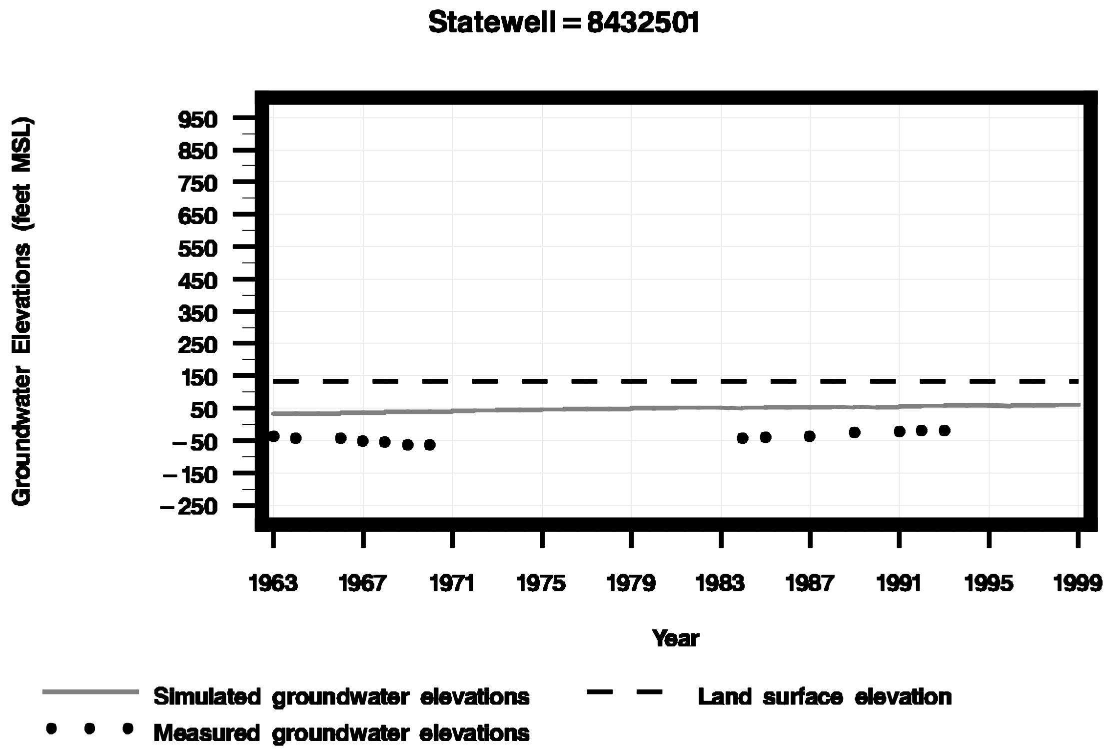
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8432501
Groundwater Elevations (feet MSL)
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450
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−50
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−250
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1967
1971
1975
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1983
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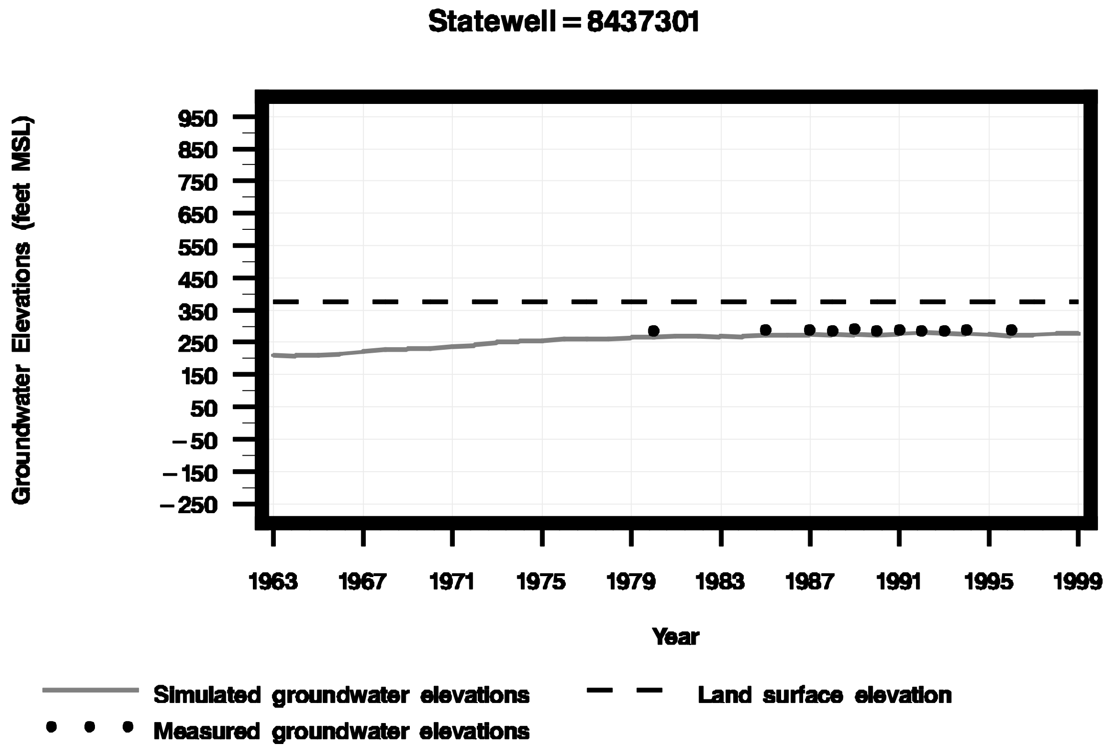
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8437301
Groundwater Elevations (feet MSL)
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650
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450
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1967
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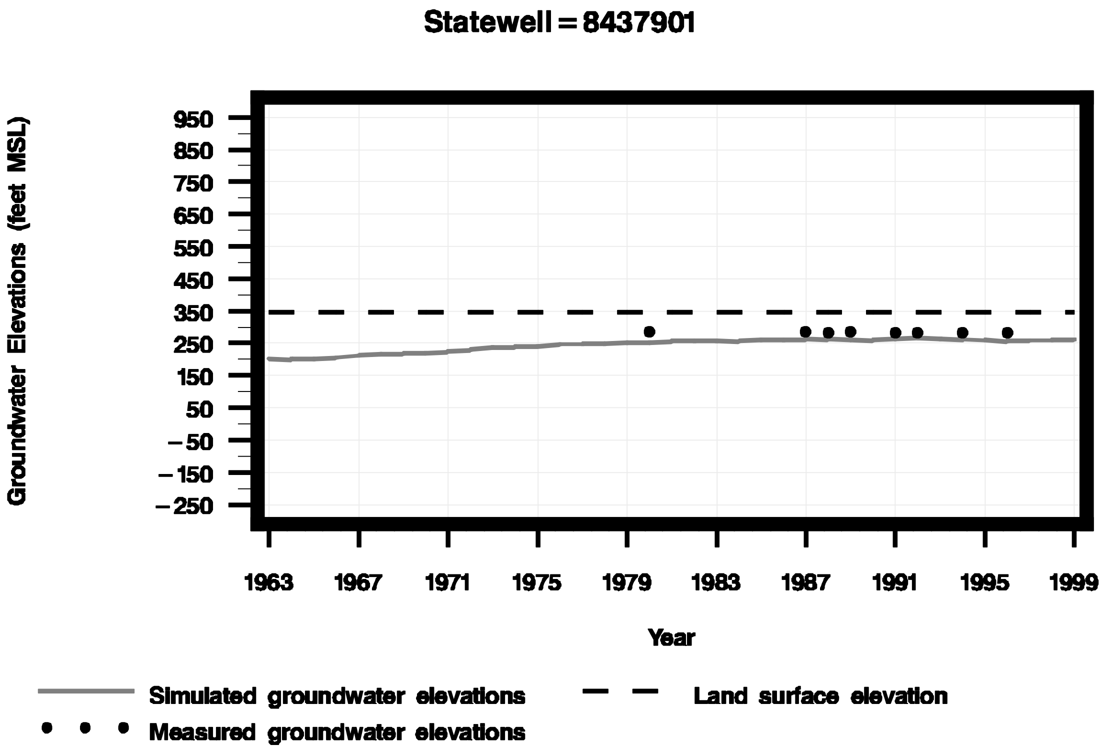
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8437901
Groundwater Elevations (feet MSL)
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650
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450
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−50
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1967
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1983
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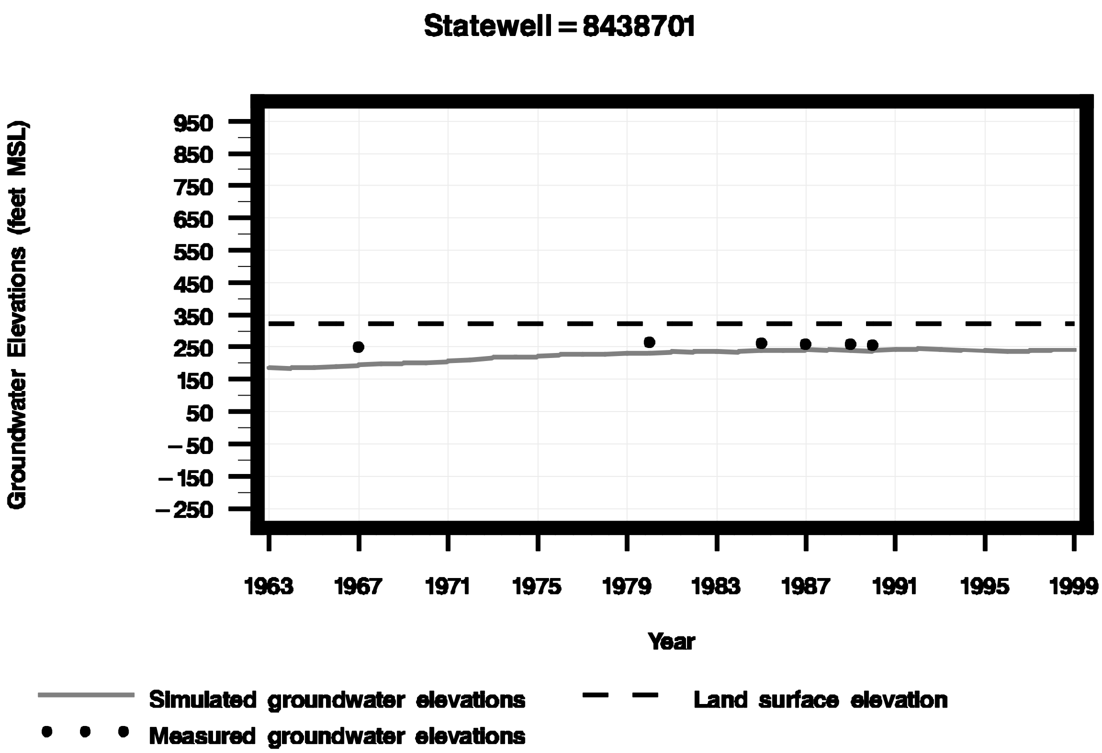
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8438701
Groundwater Elevations (feet MSL)
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650
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450
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50
−50
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1967
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1975
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1983
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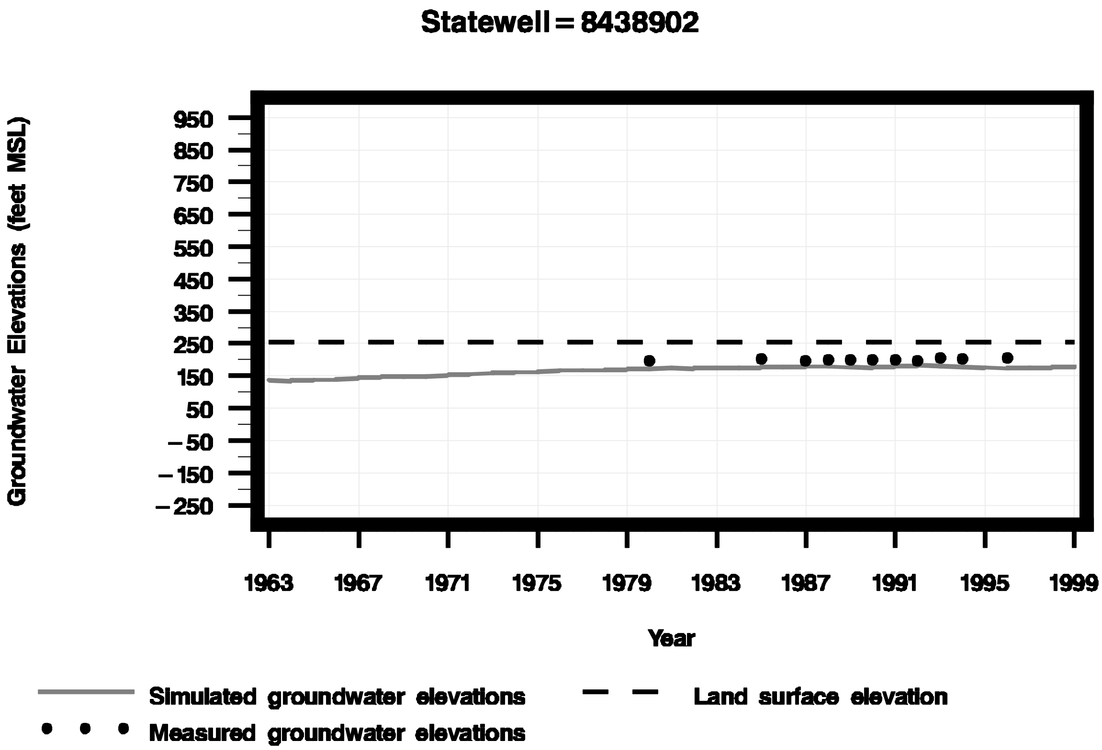
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8438902
Groundwater Elevations (feet MSL)
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850
750
650
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50
−50
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−250
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1967
1971
1975
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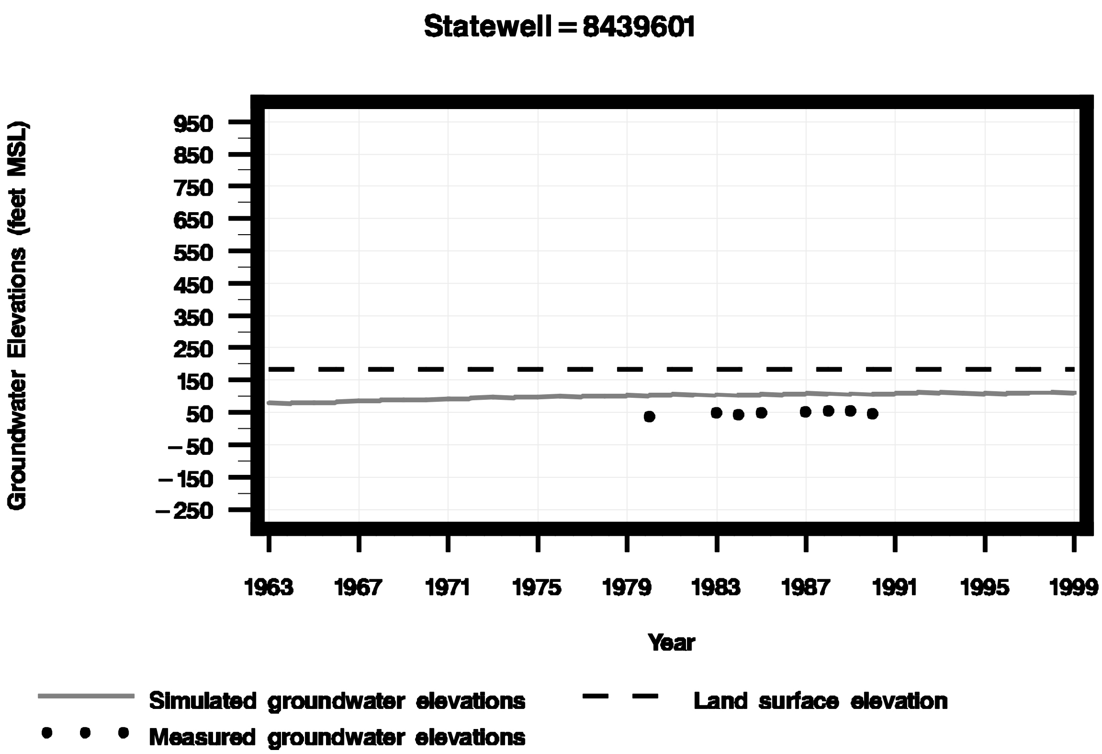
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8439601
Groundwater Elevations (feet MSL)
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450
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−50
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1975
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1983
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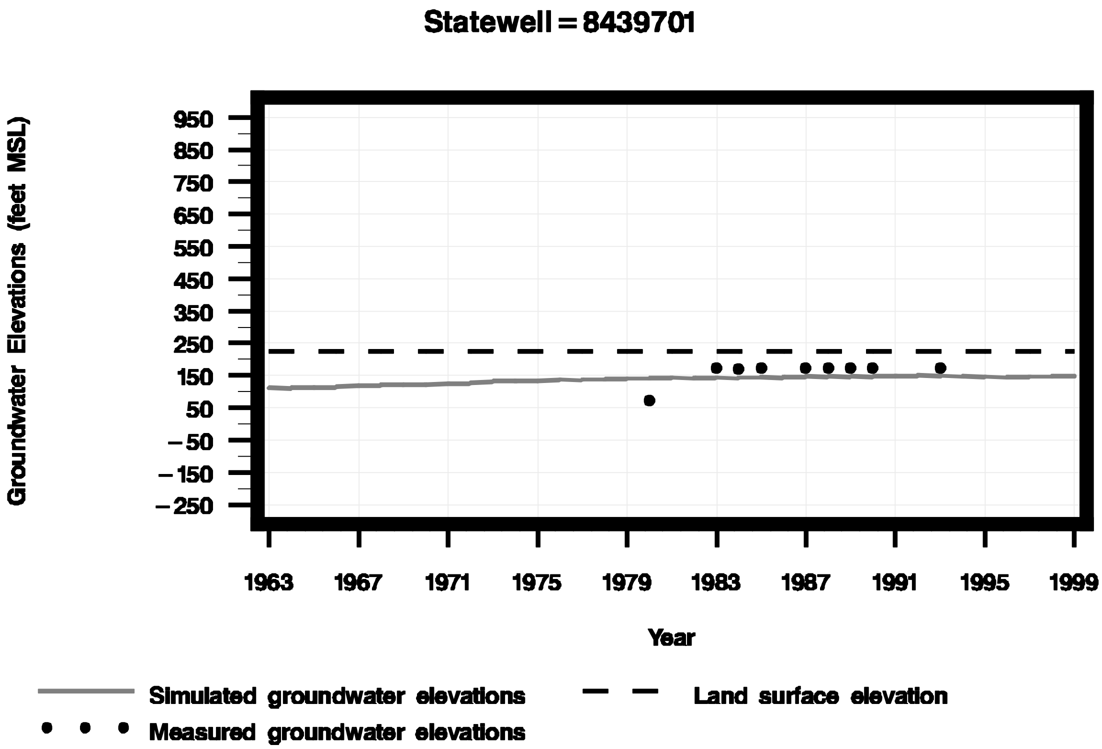
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8439701
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850
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650
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450
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250
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50
−50
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−250
Groundwater Elevations (feet MSL)
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1967
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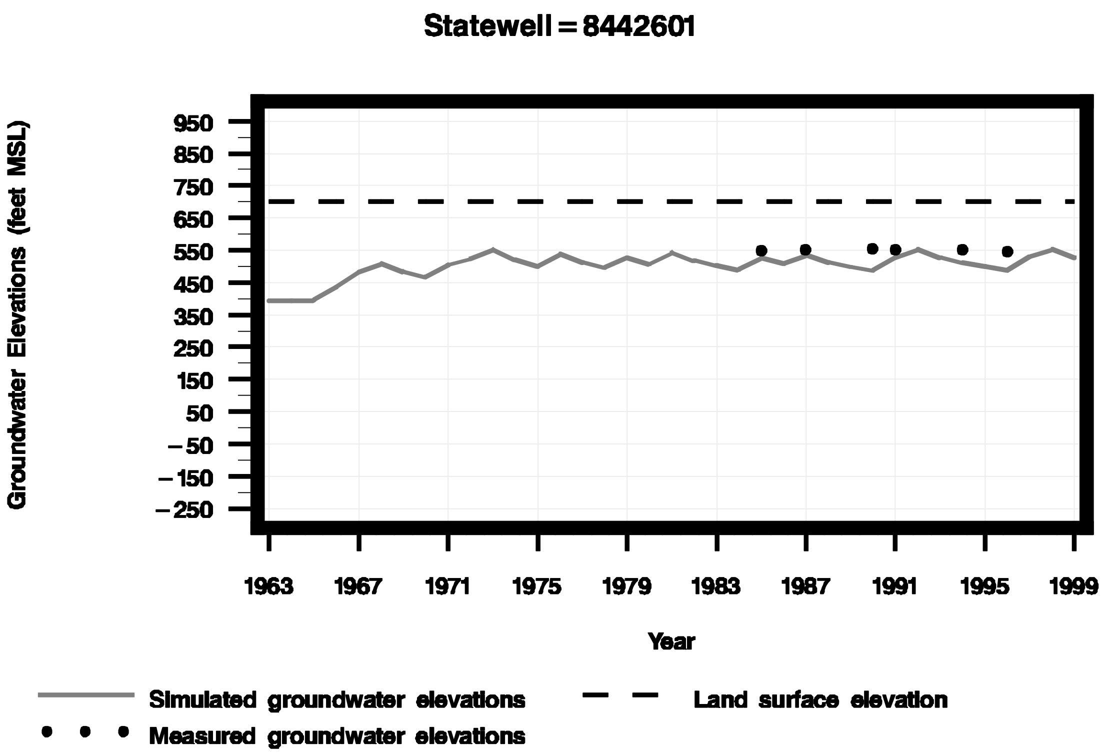
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8442601
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−250
Groundwater Elevations (feet MSL)
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1983
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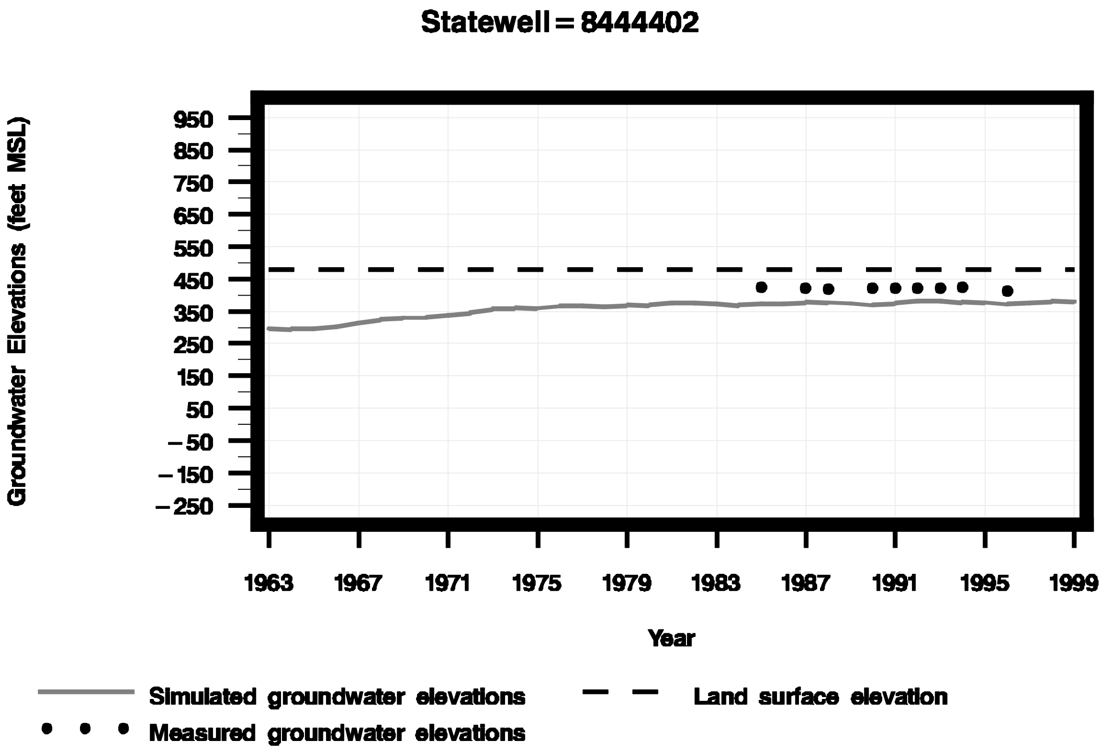
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8444402
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
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1975
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1983
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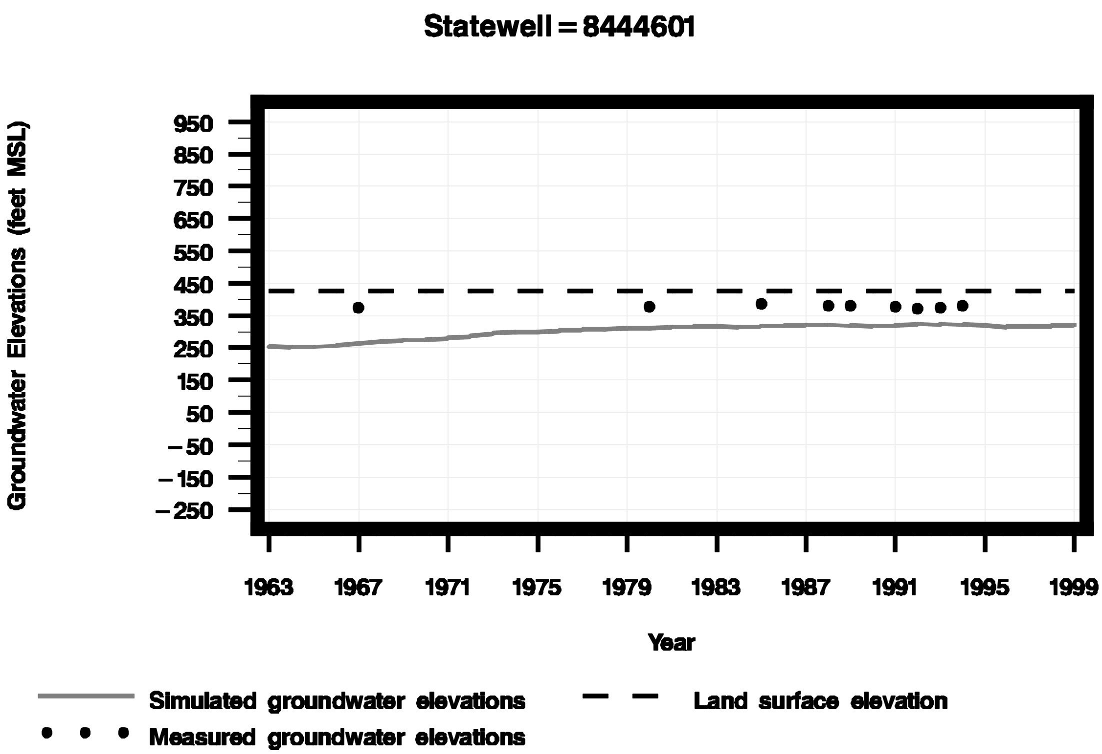
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8444601
Groundwater Elevations (feet MSL)
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750
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450
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50
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1967
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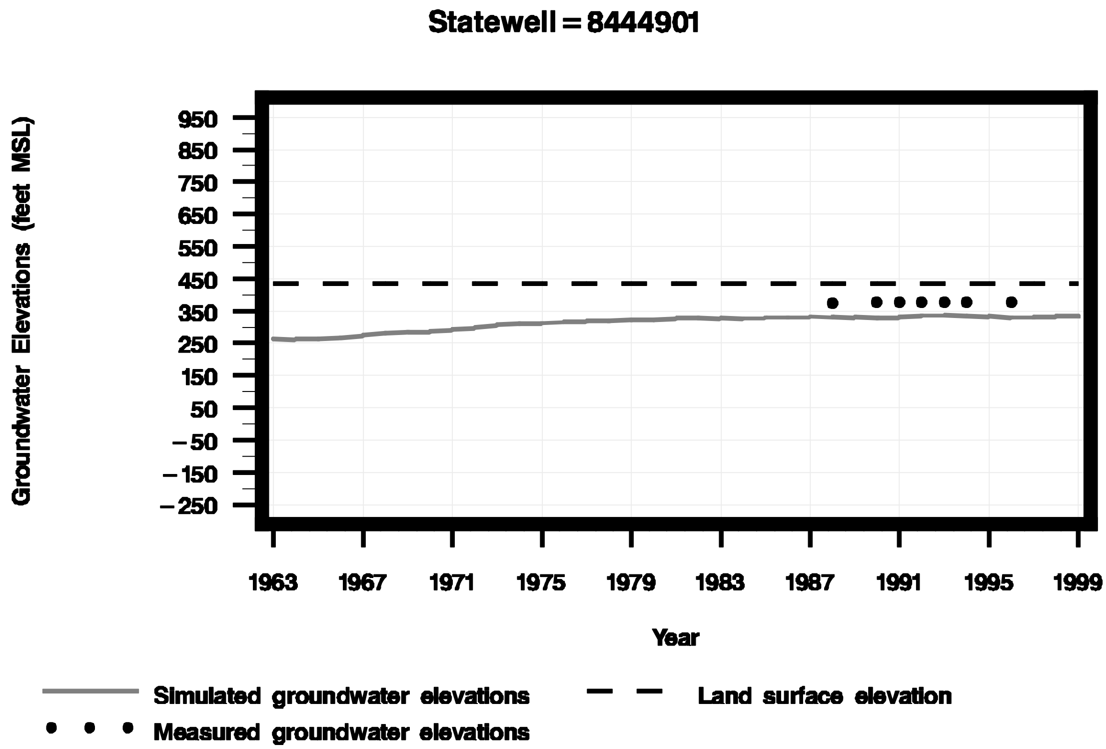
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8444901
Groundwater Elevations (feet MSL)
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750
650
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450
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50
−50
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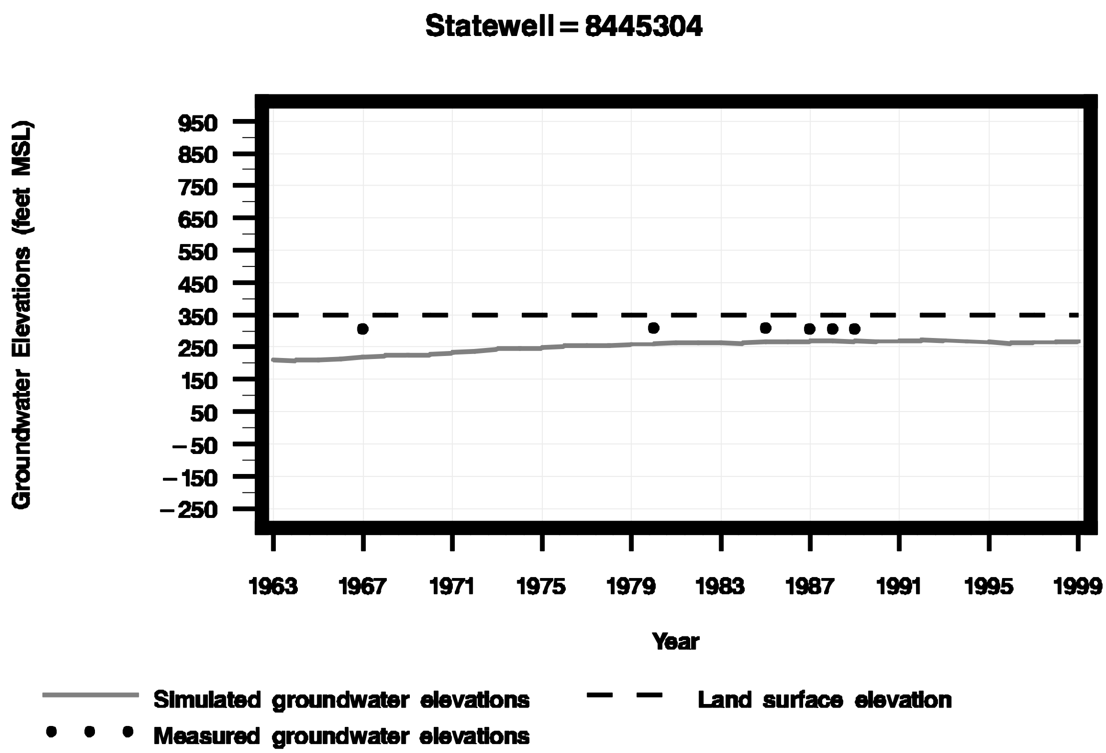
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8445304
Groundwater Elevations (feet MSL)
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1967
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1975
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1991
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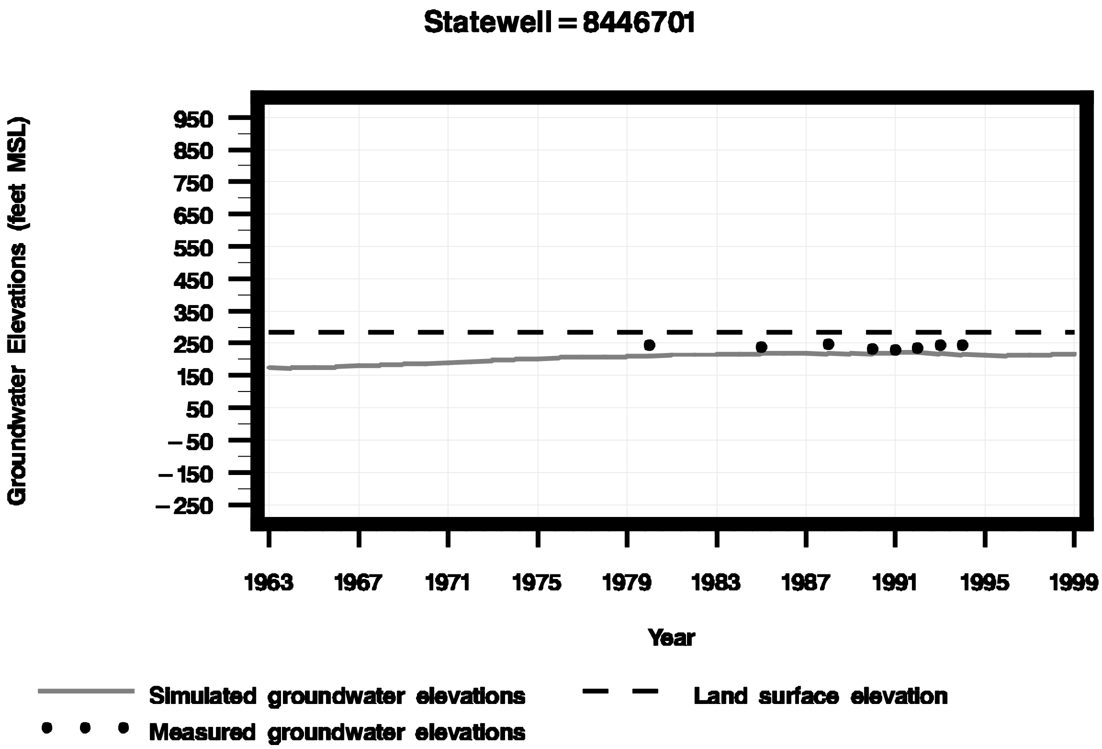
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8446701
Groundwater Elevations (feet MSL)
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450
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50
−50
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1975
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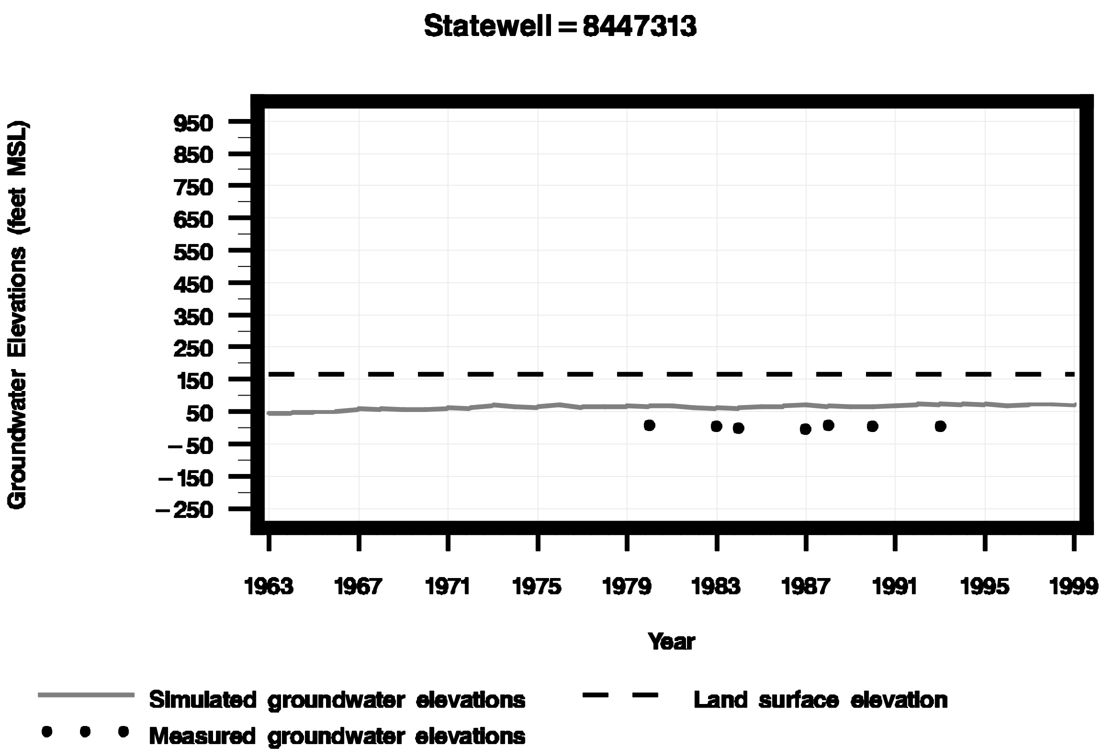
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8447313
Groundwater Elevations (feet MSL)
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450
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50
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1975
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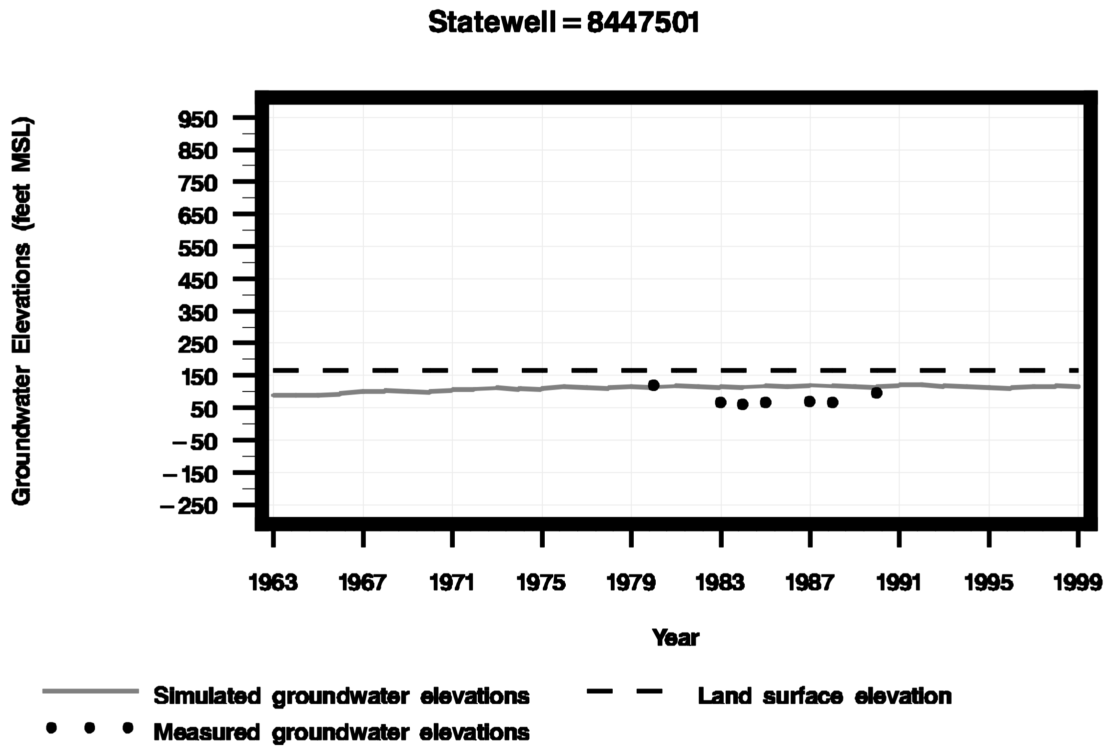
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8447501
Groundwater Elevations (feet MSL)
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450
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50
−50
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1967
1971
1975
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1983
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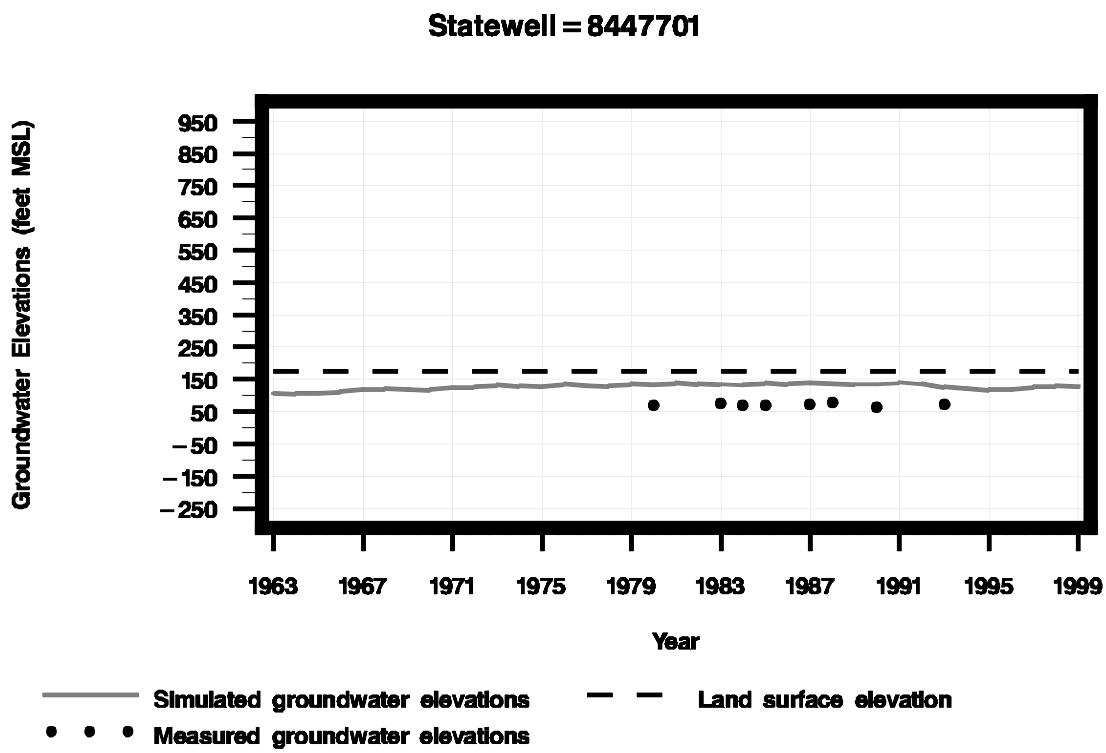
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8447701
Groundwater Elevations (feet MSL)
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450
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1967
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1975
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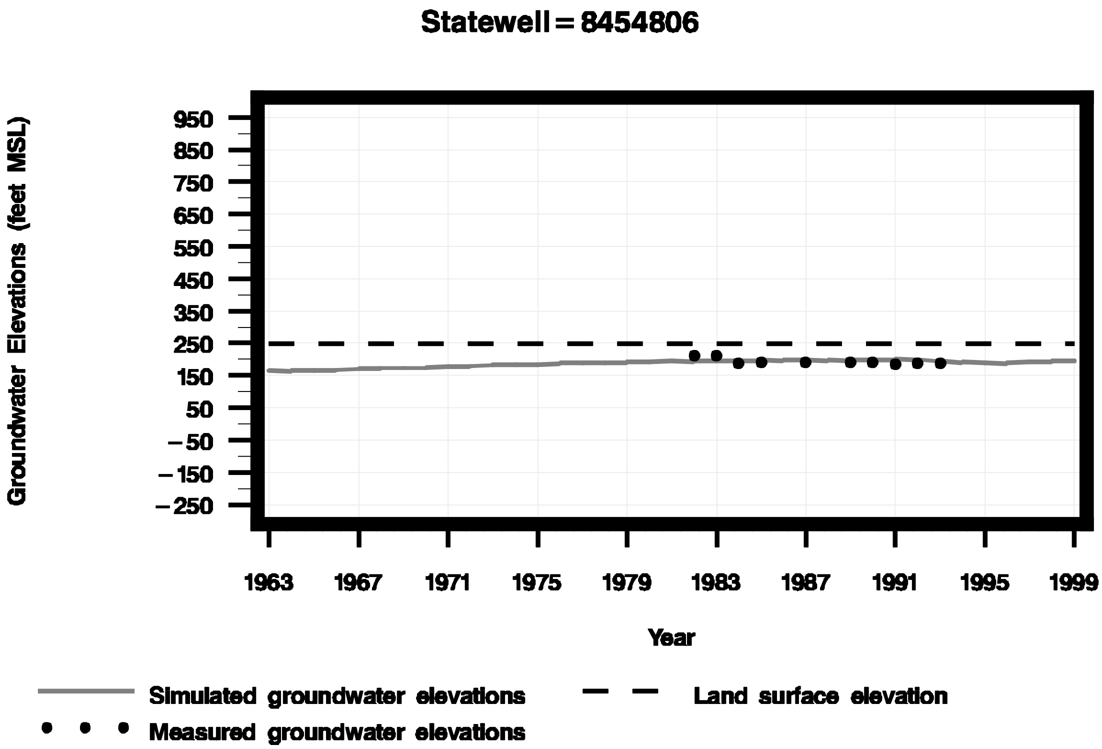
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8454806
Groundwater Elevations (feet MSL)
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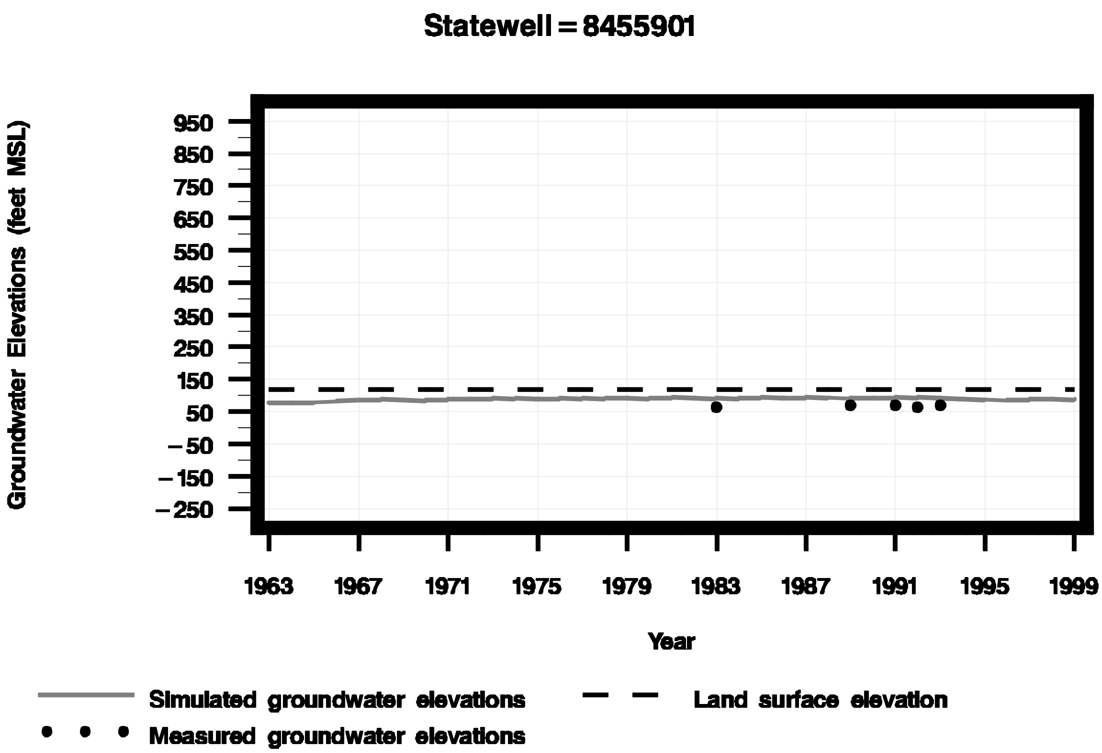
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8455901
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1983
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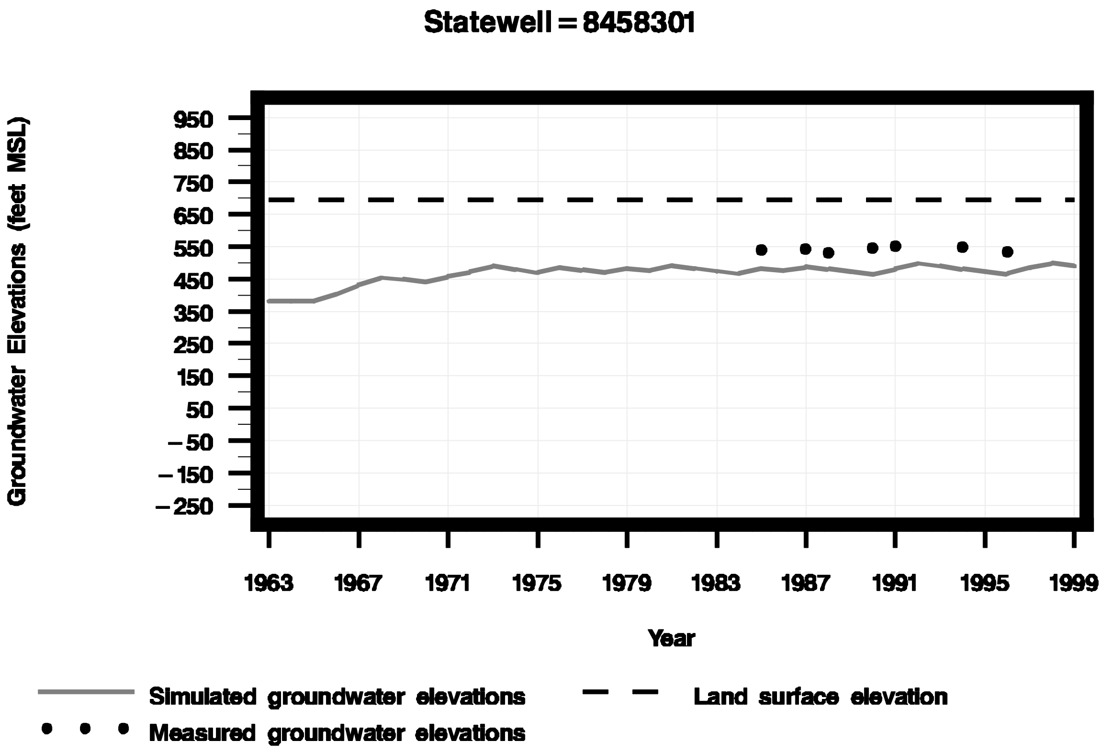
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8458301
Groundwater Elevations (feet MSL)
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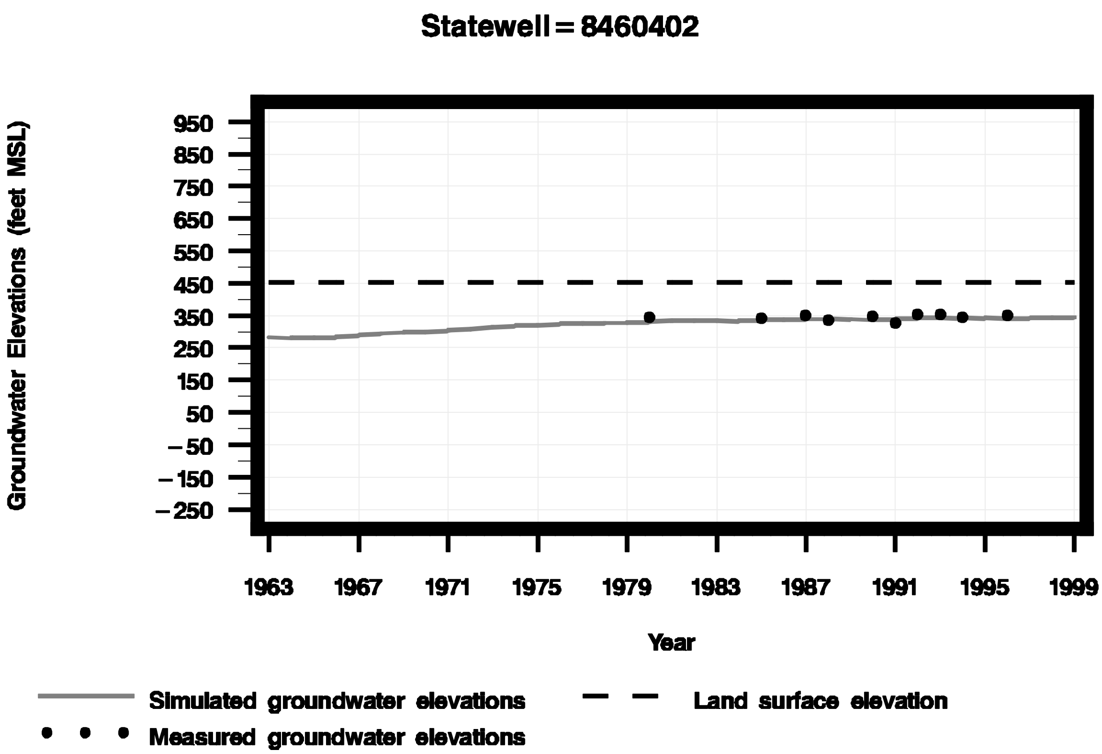
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8460402
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−250
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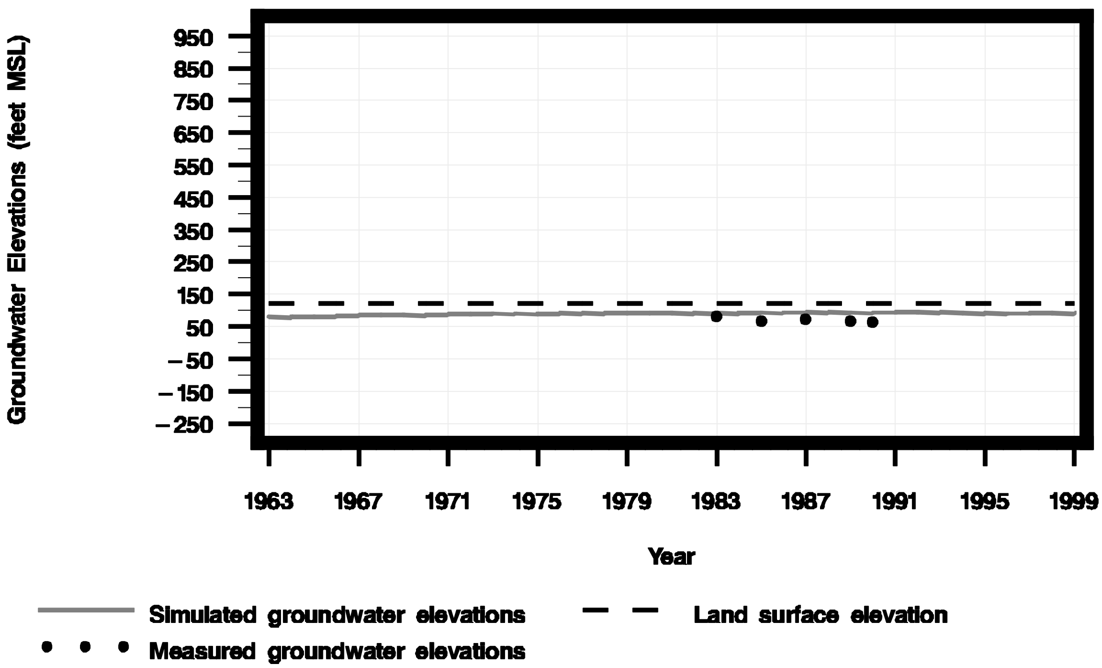
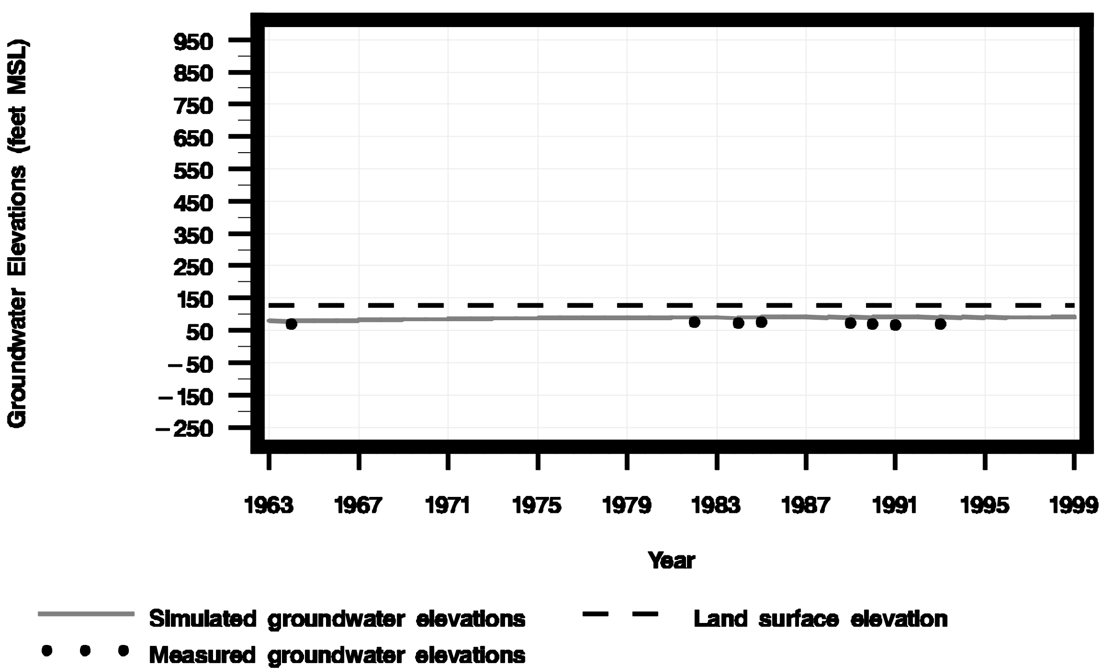
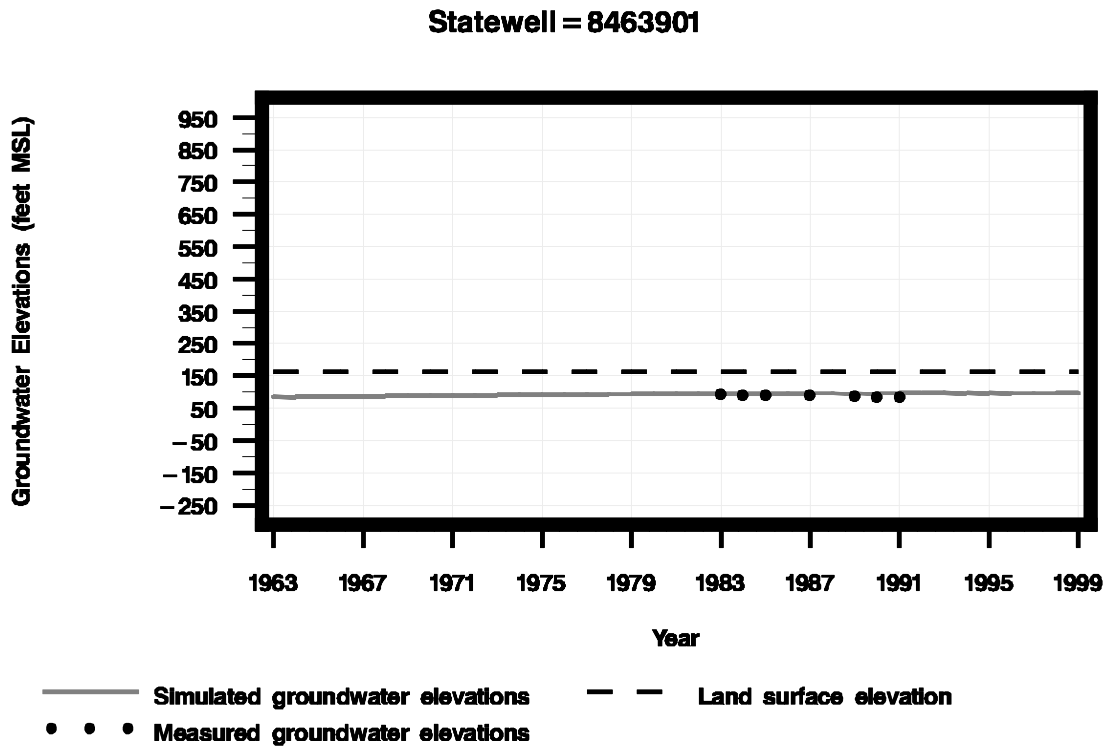
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 8463301



Statewell = 8463602

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Groundwater Elevations (feet MSL)
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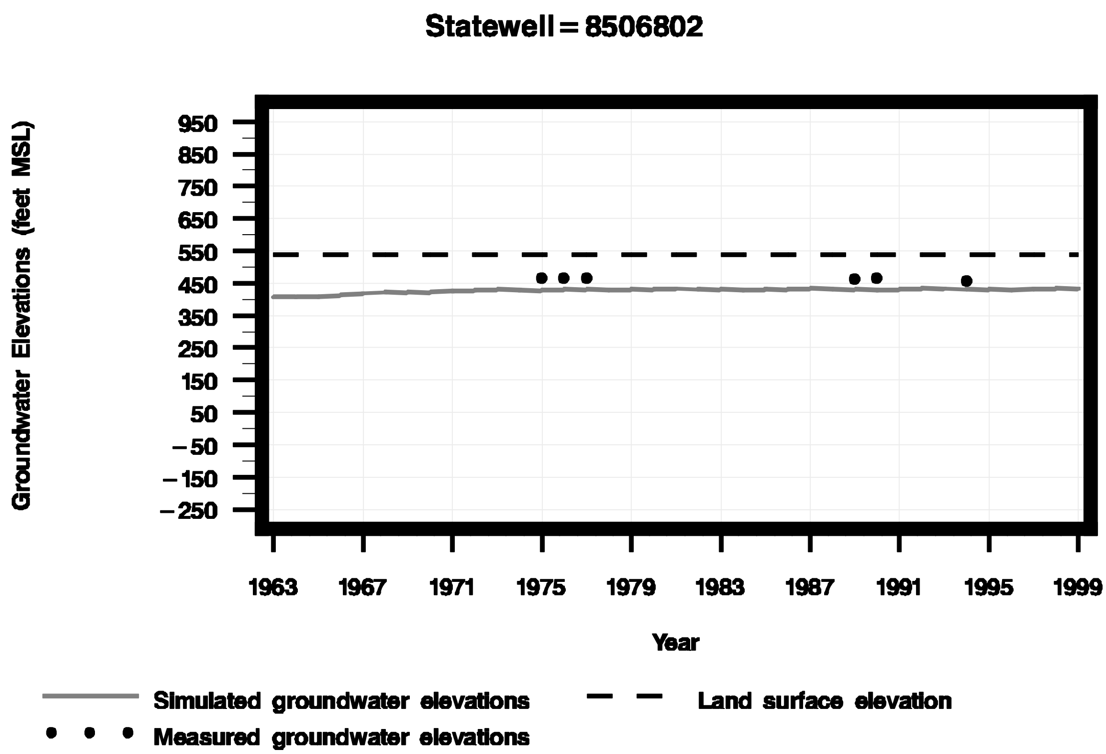
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8506802
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Groundwater Elevations (feet MSL)
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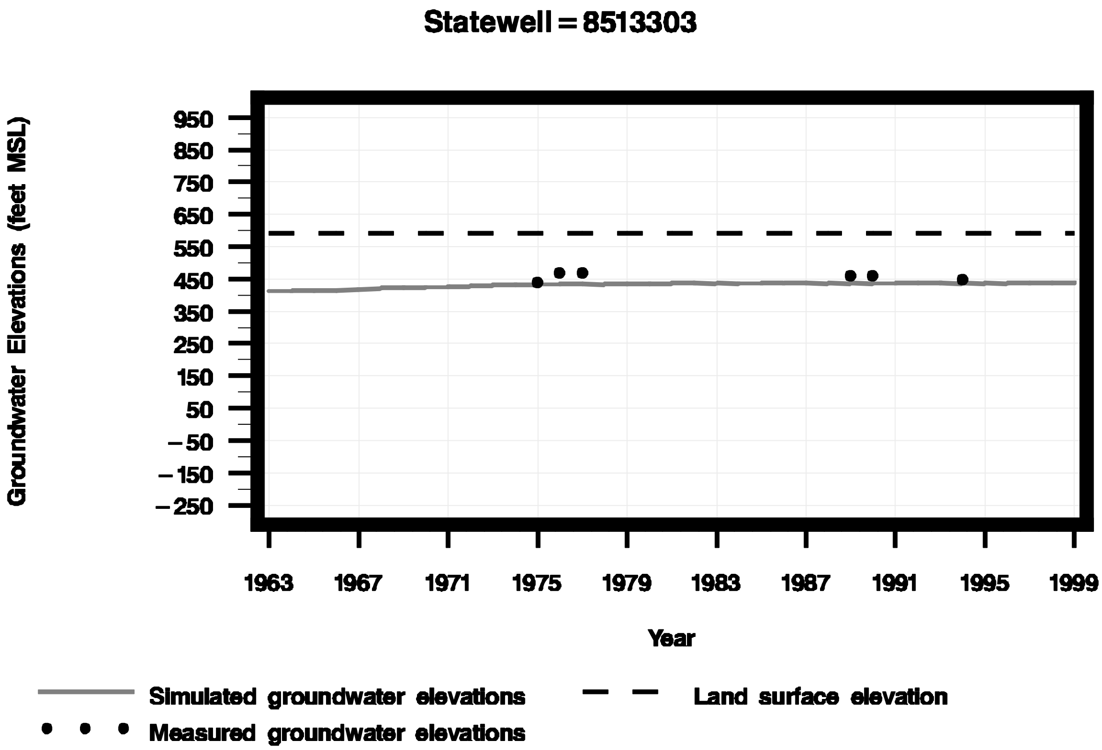
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8513303
Groundwater Elevations (feet MSL)
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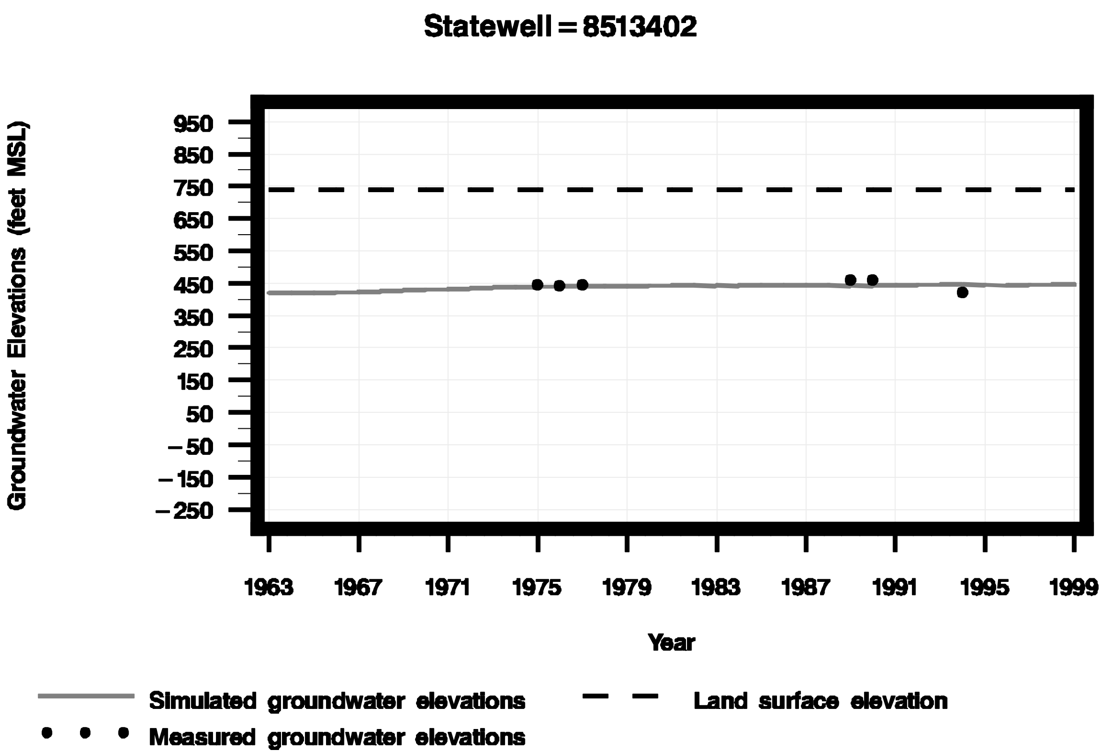
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8513402
Groundwater Elevations (feet MSL)
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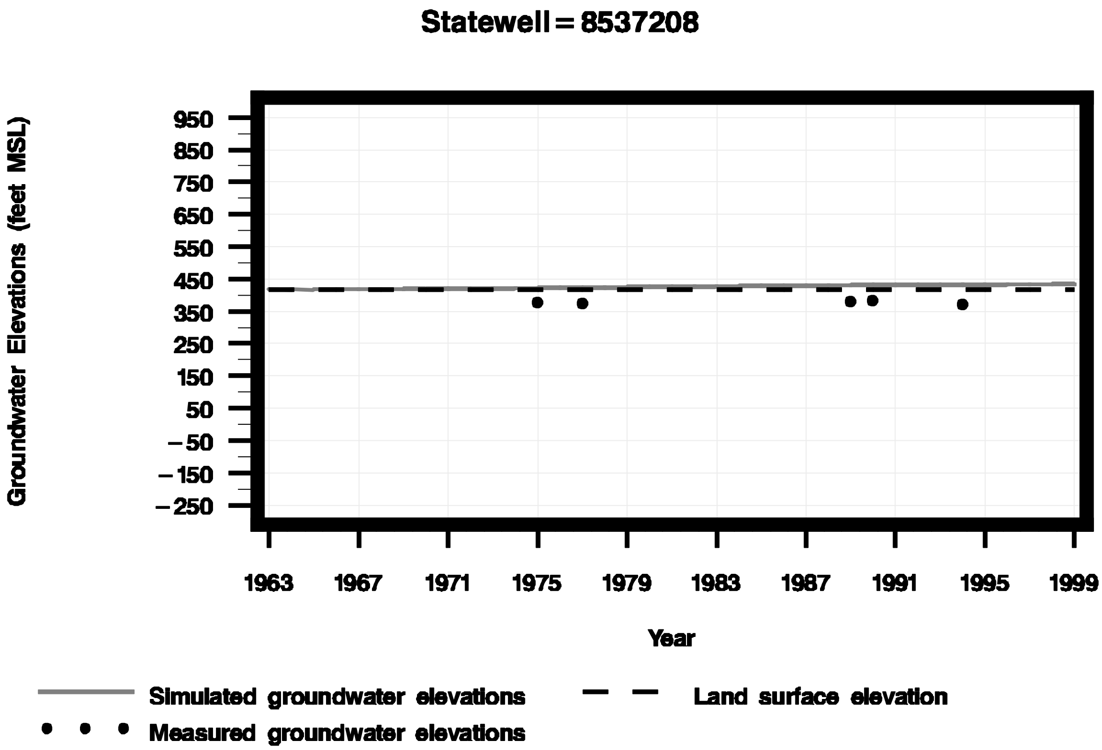
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8537208
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Groundwater Elevations (feet MSL)
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1991
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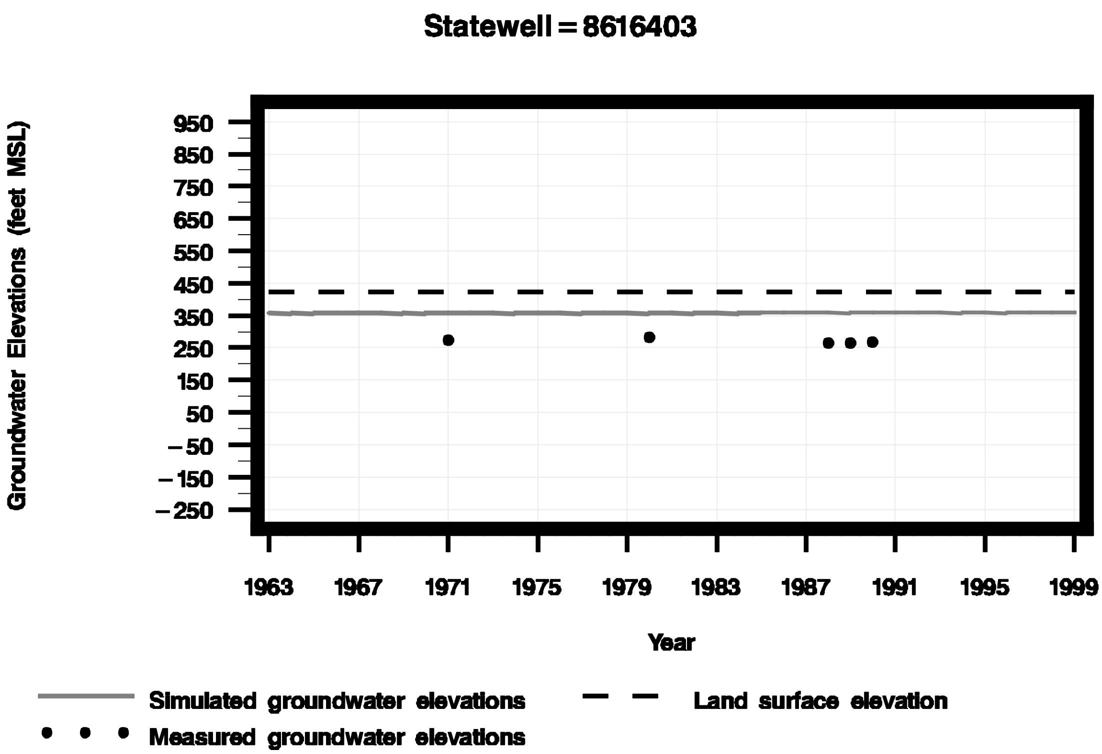
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8616403
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Groundwater Elevations (feet MSL)
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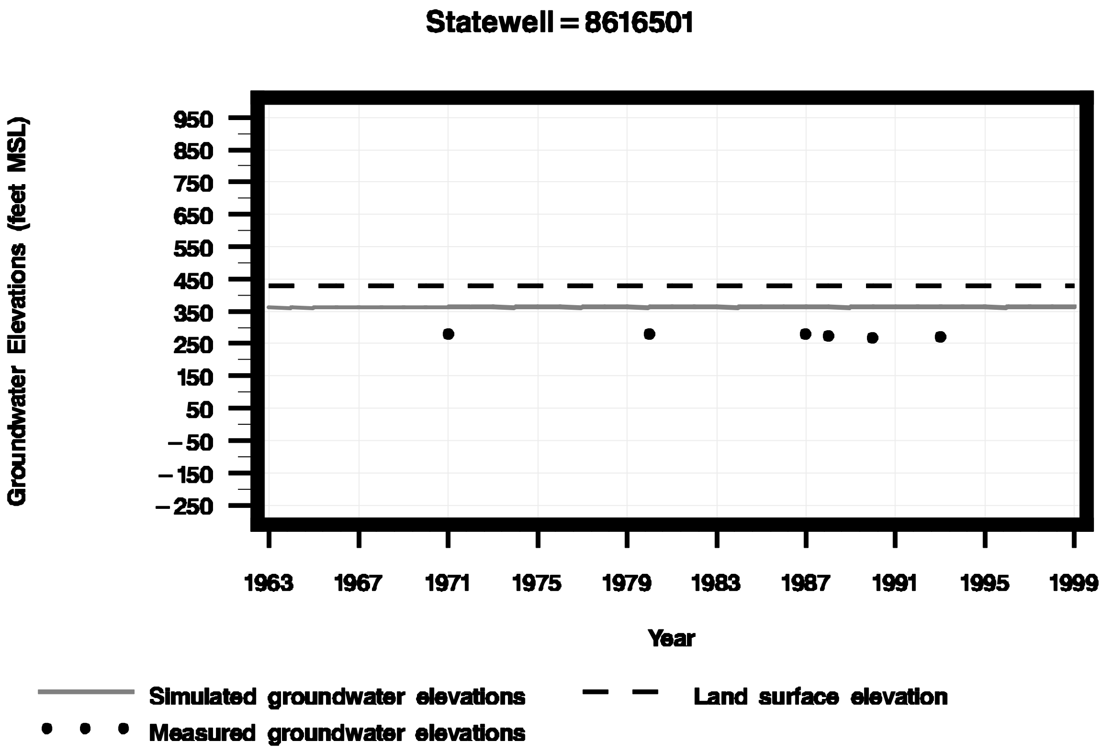
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8616501
Groundwater Elevations (feet MSL)
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1967
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1983
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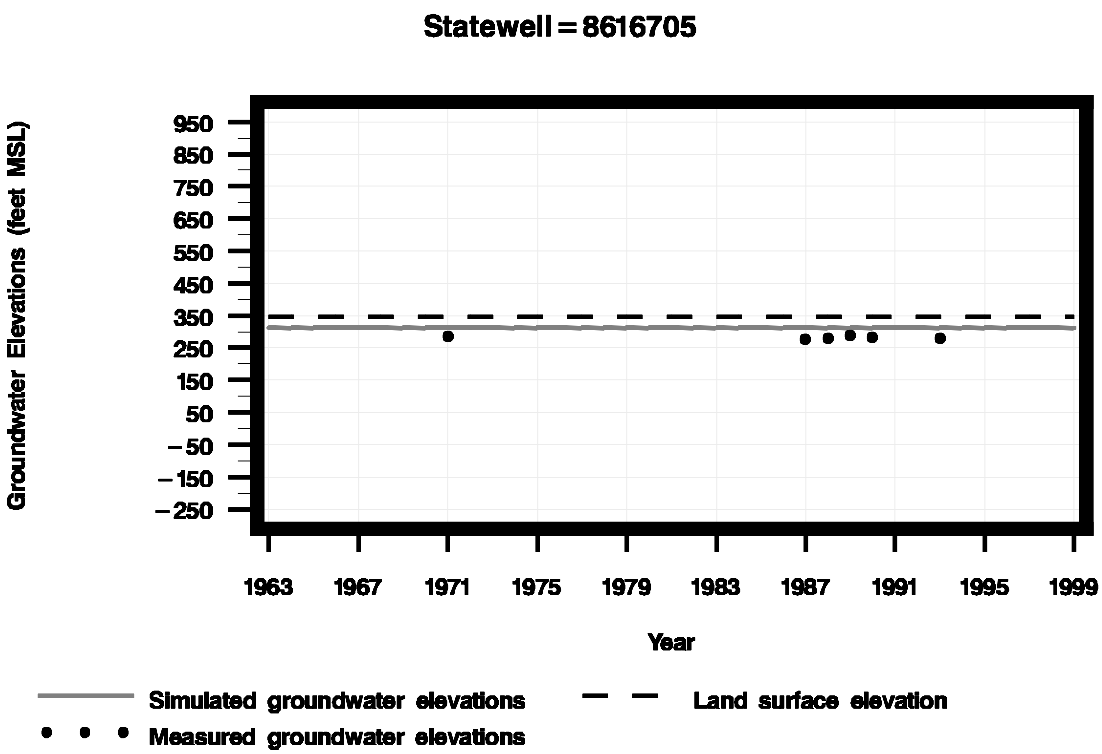
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8616705
Groundwater Elevations (feet MSL)
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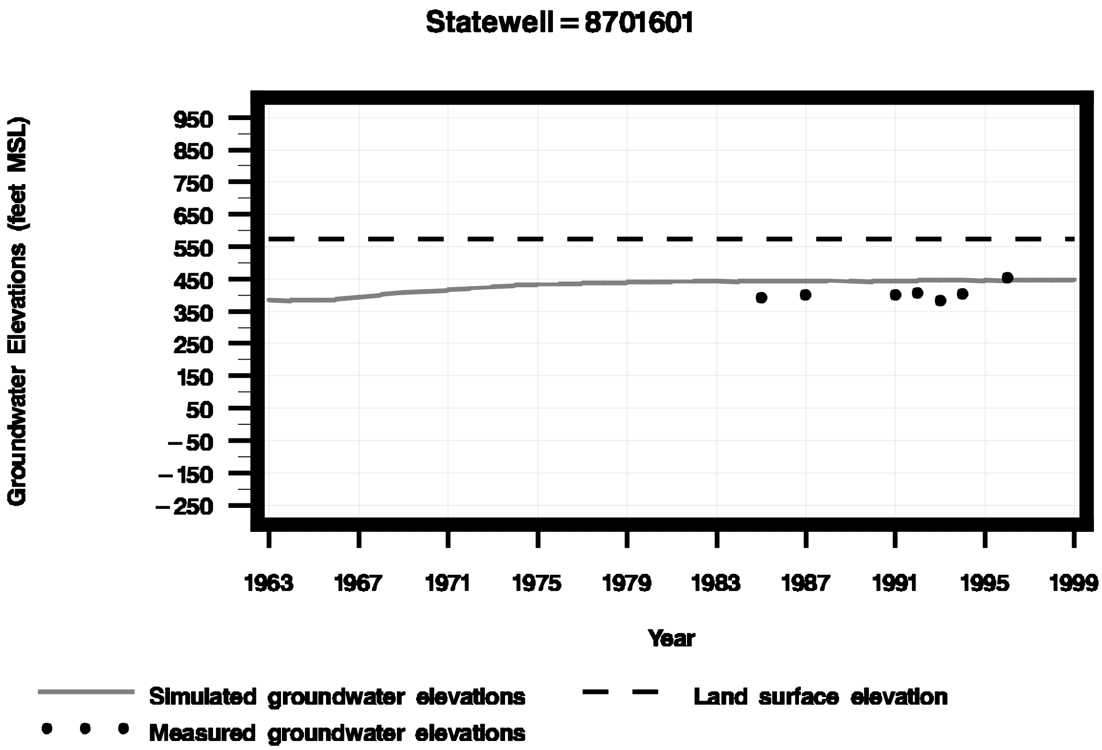
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8701601
Groundwater Elevations (feet MSL)
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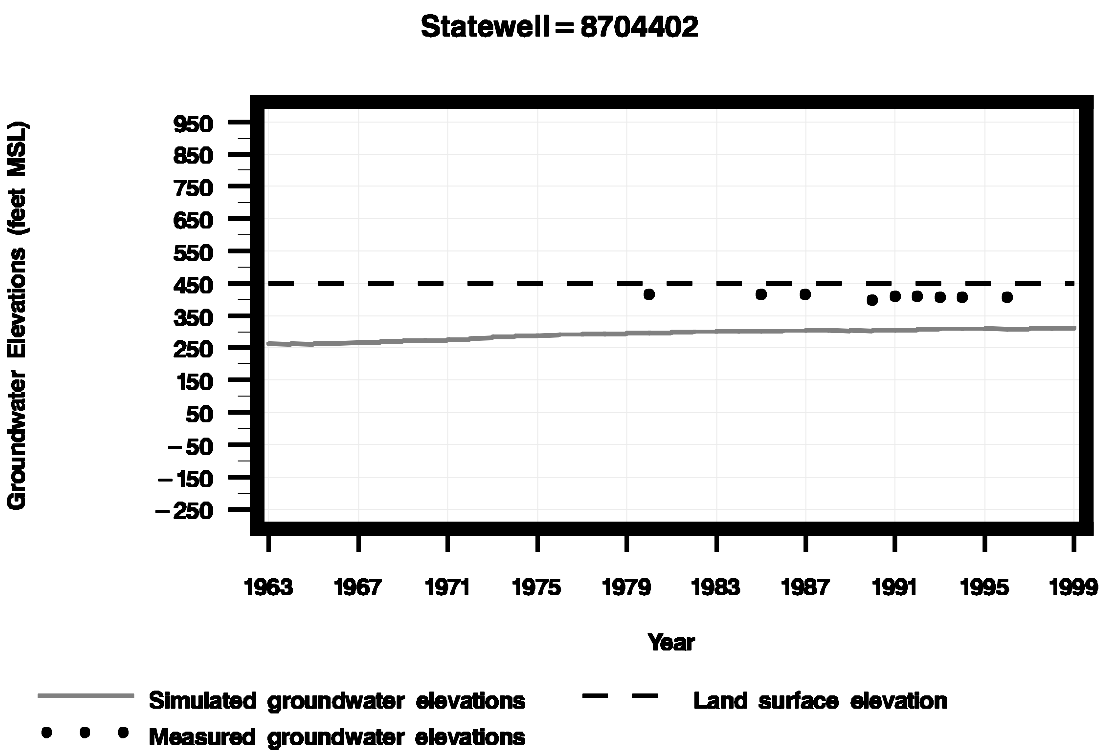
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8704402
Groundwater Elevations (feet MSL)
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50
−50
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1967
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1983
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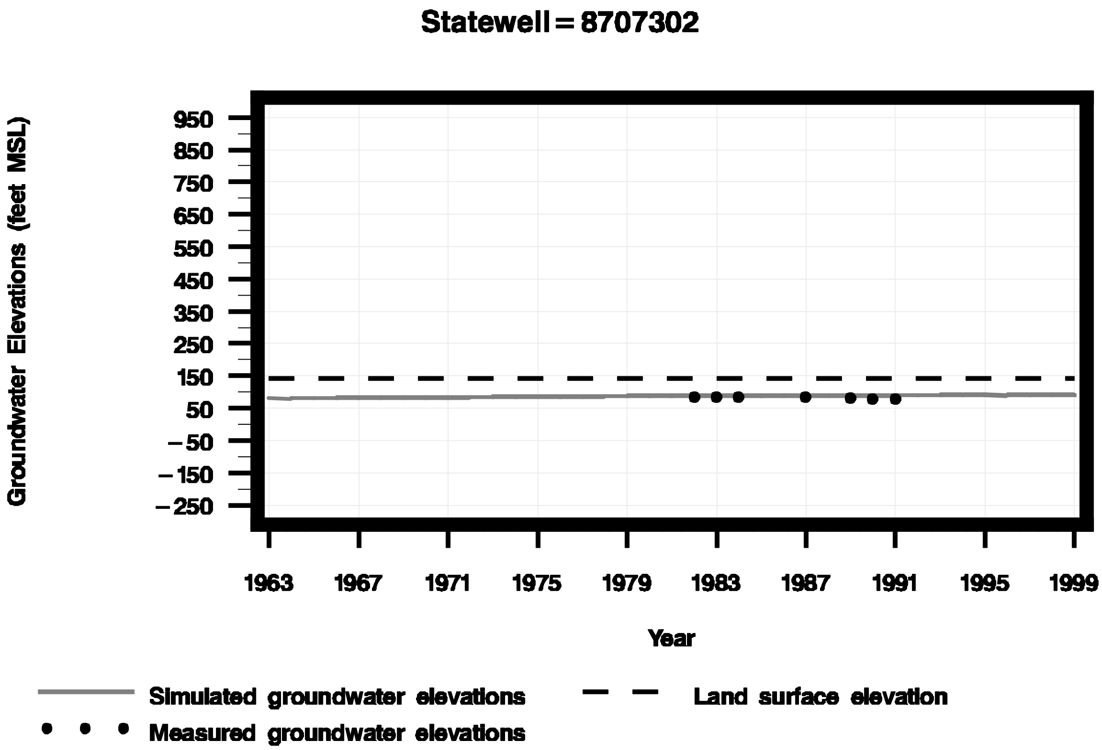
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8707302
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1963
1967
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1975
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1983
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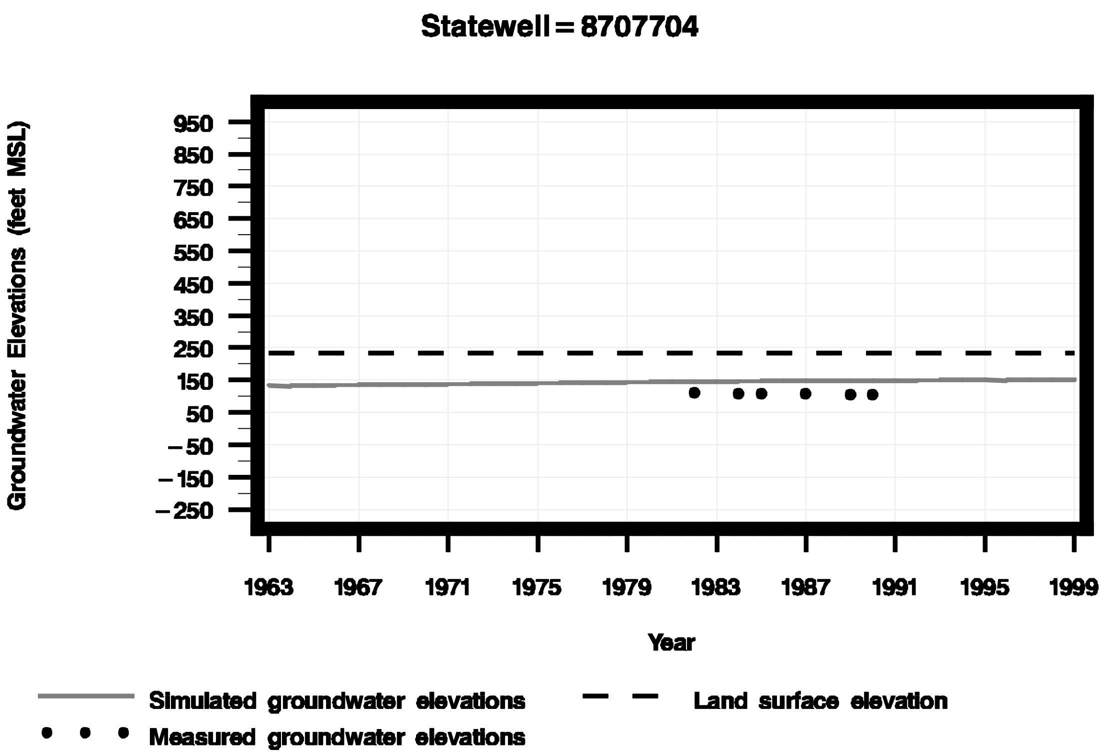
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8707704
Groundwater Elevations (feet MSL)
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450
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50
−50
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1963
1967
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1983
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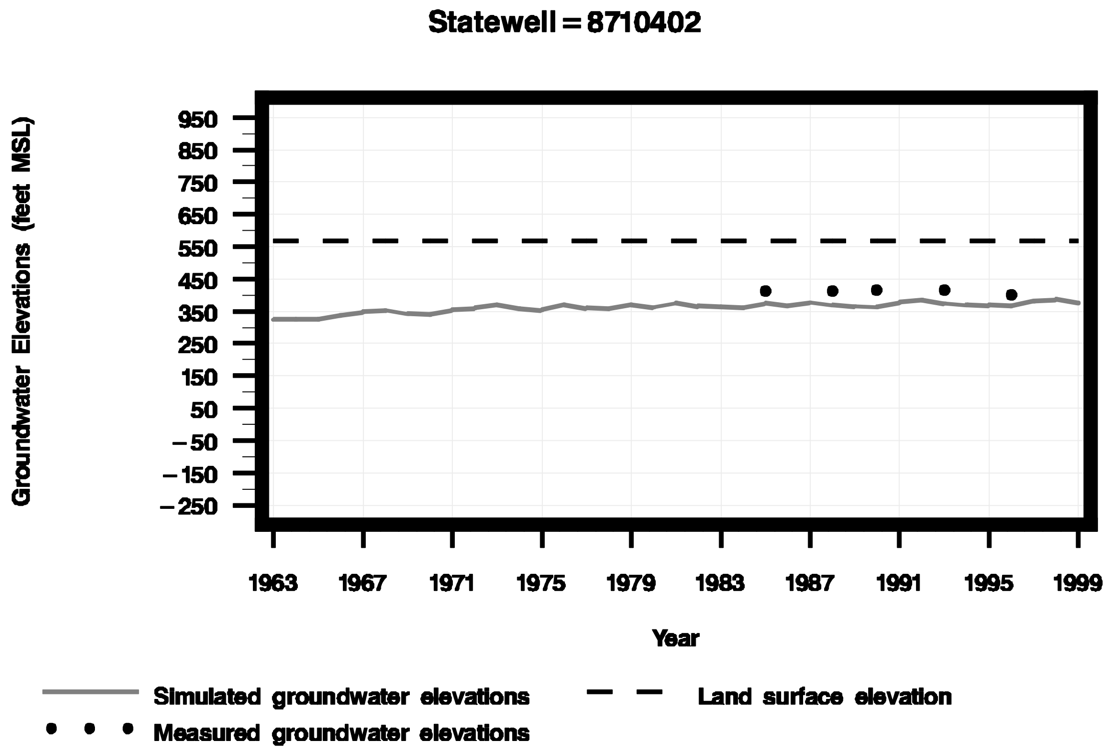
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8710402
Groundwater Elevations (feet MSL)
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1963
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1983
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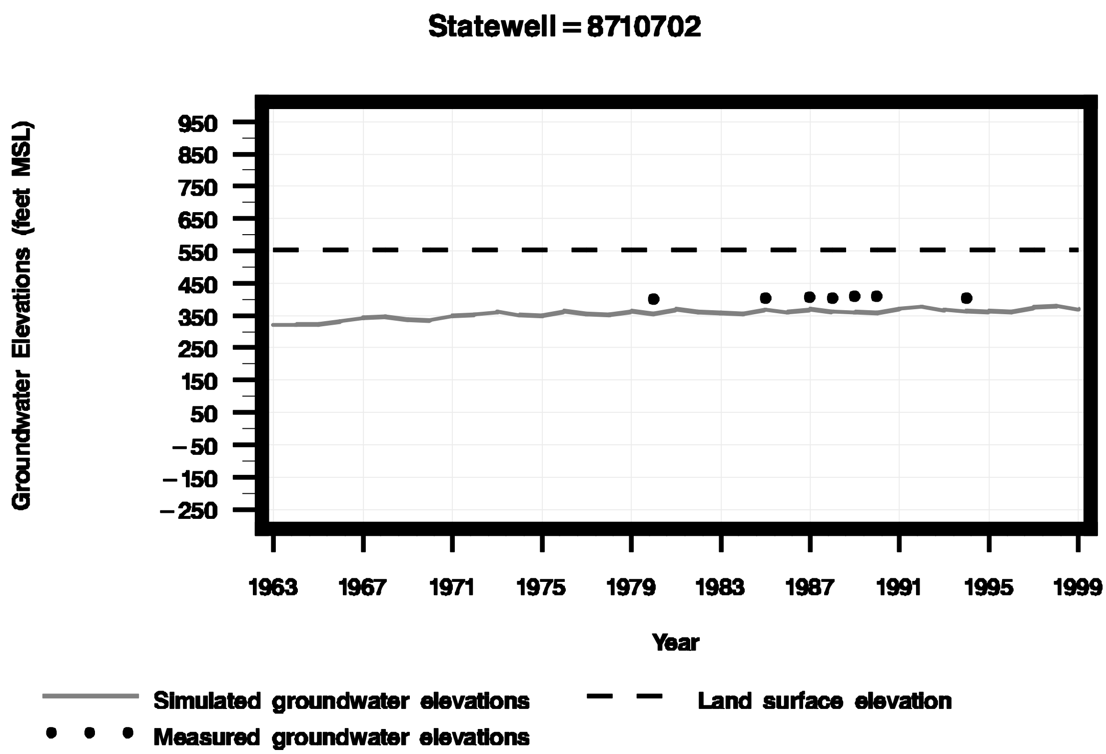
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8710702
Groundwater Elevations (feet MSL)
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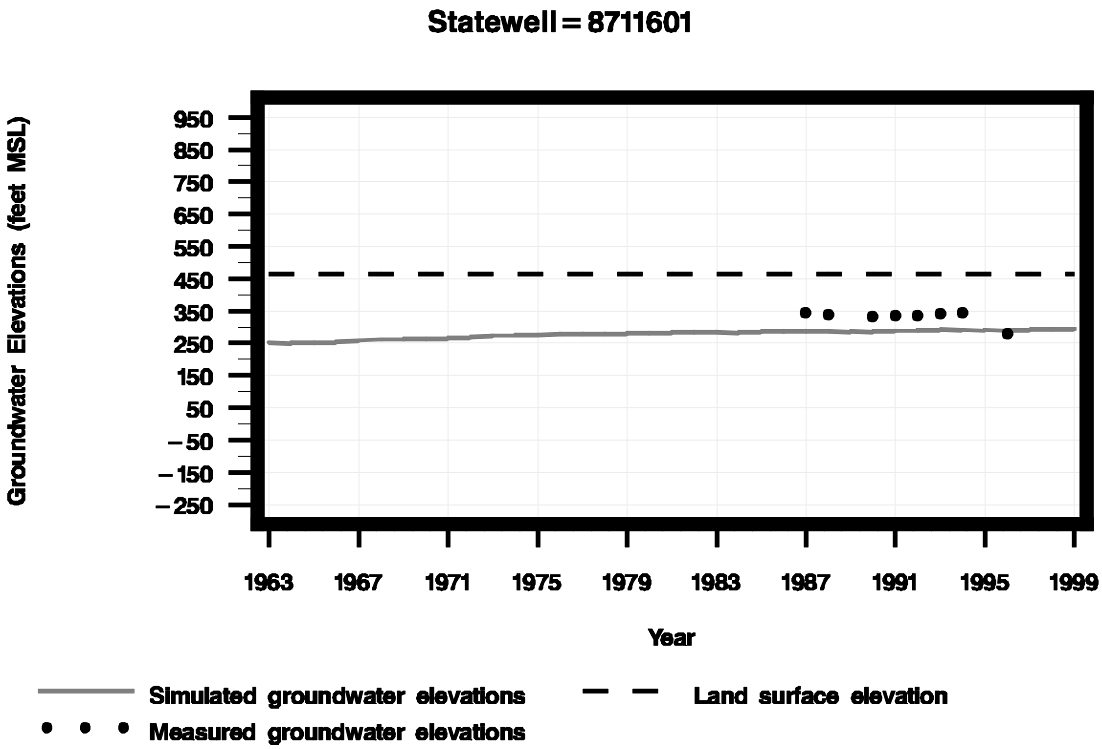
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8711601
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
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−250
1963
1967
1971
1975
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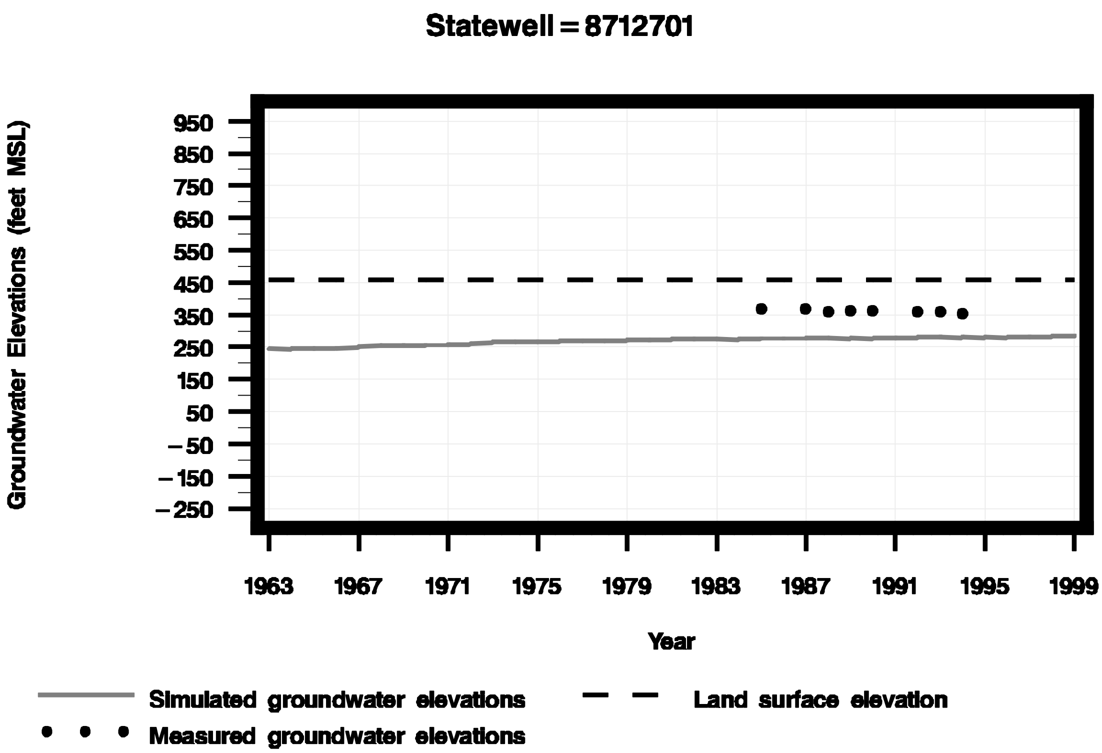
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8712701
Groundwater Elevations (feet MSL)
950
850
750
650
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450
350
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150
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−50
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−250
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1967
1971
1975
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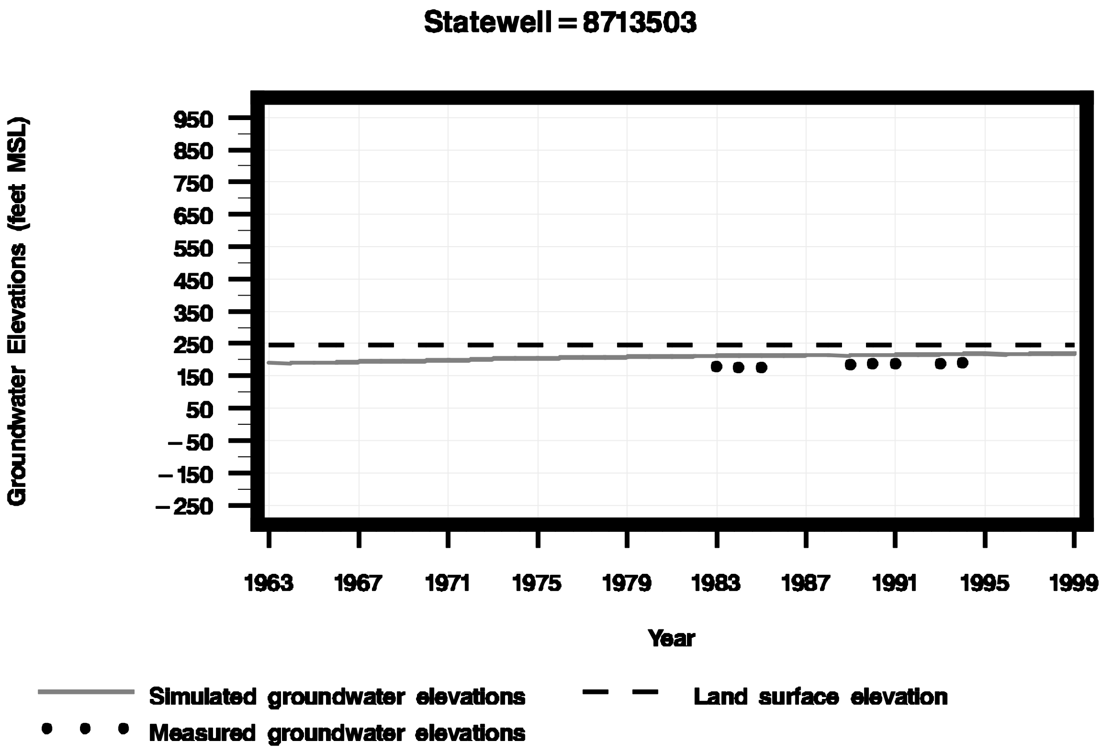
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8713503
Groundwater Elevations (feet MSL)
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850
750
650
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450
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50
−50
−150
−250
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1967
1971
1975
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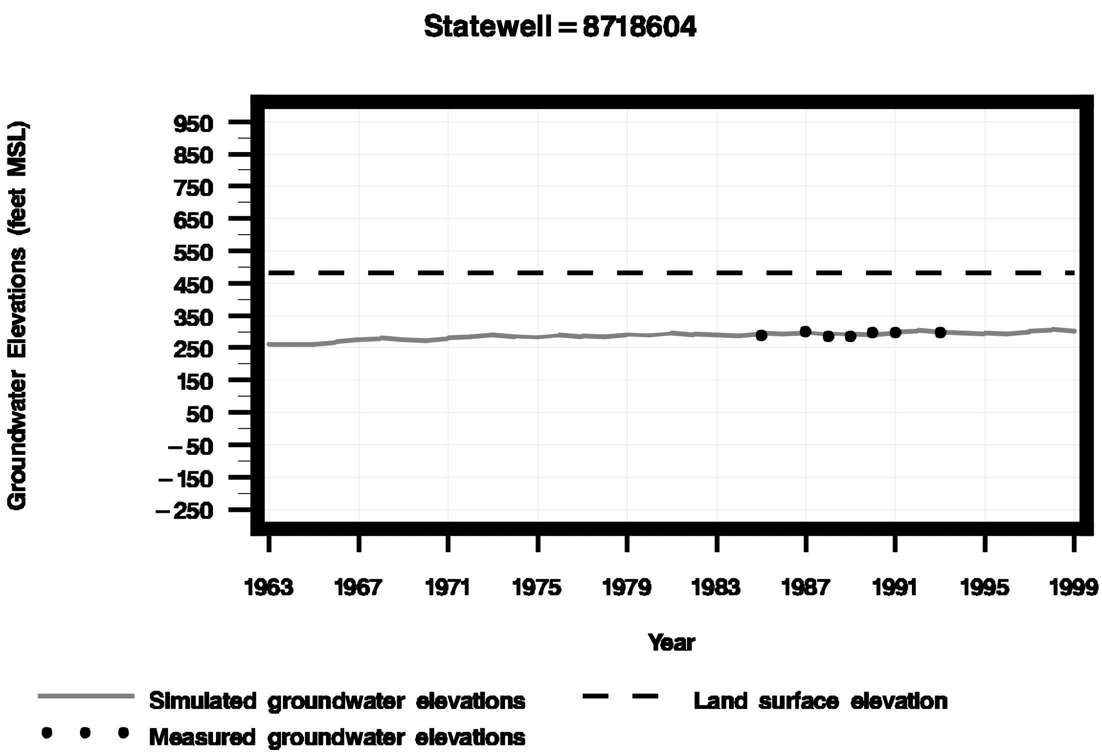
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation



Statewell = 8718604
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
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50
−50
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−250
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1967
1971
1975
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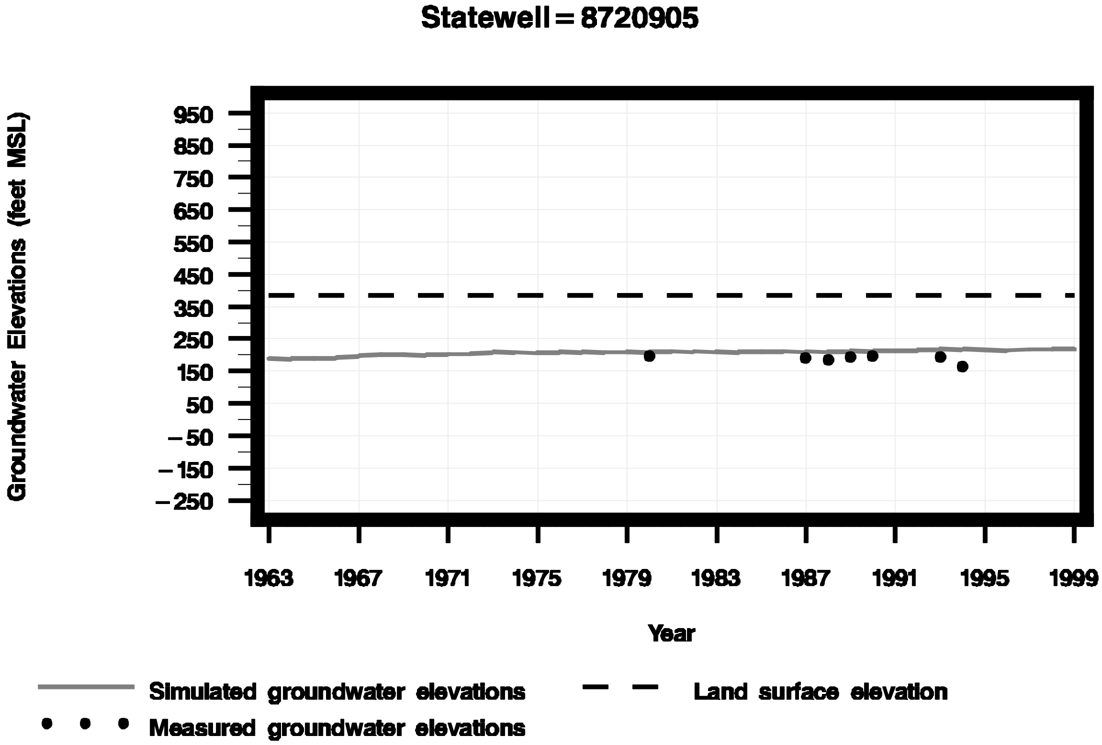
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Measured groundwater elevations
Land surface elevation


Statewell = 8720905
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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50
−50
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1967
1971
1975
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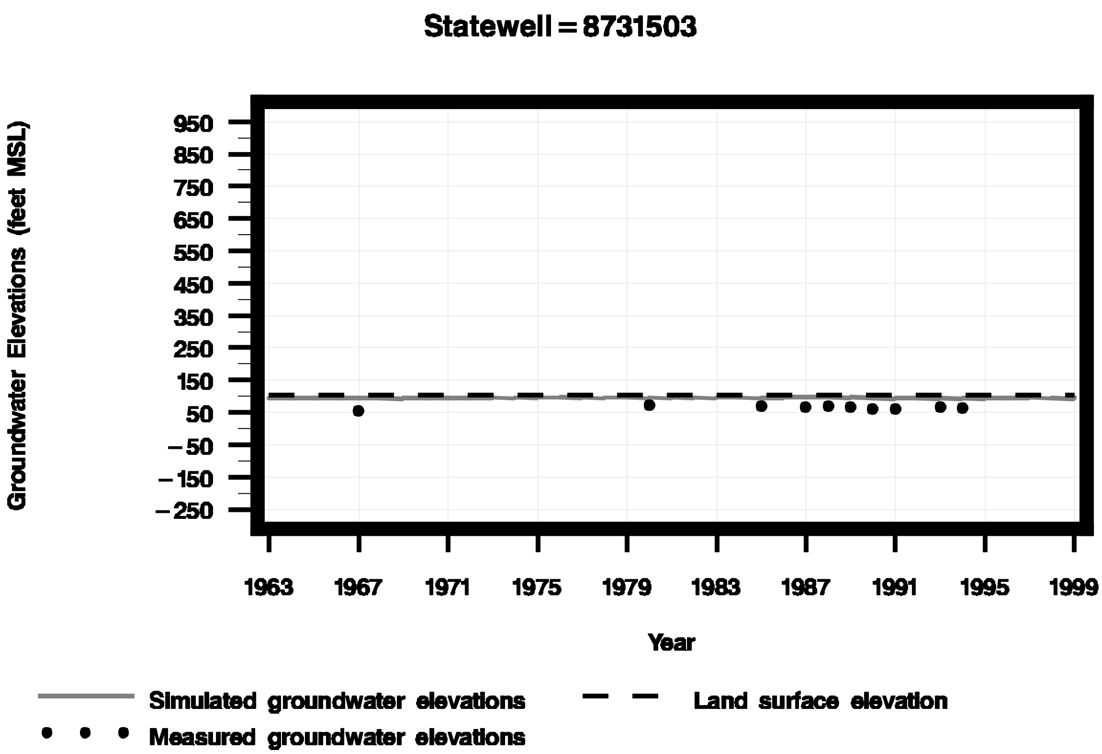
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8731503
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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150
50
−50
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−250
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1967
1971
1975
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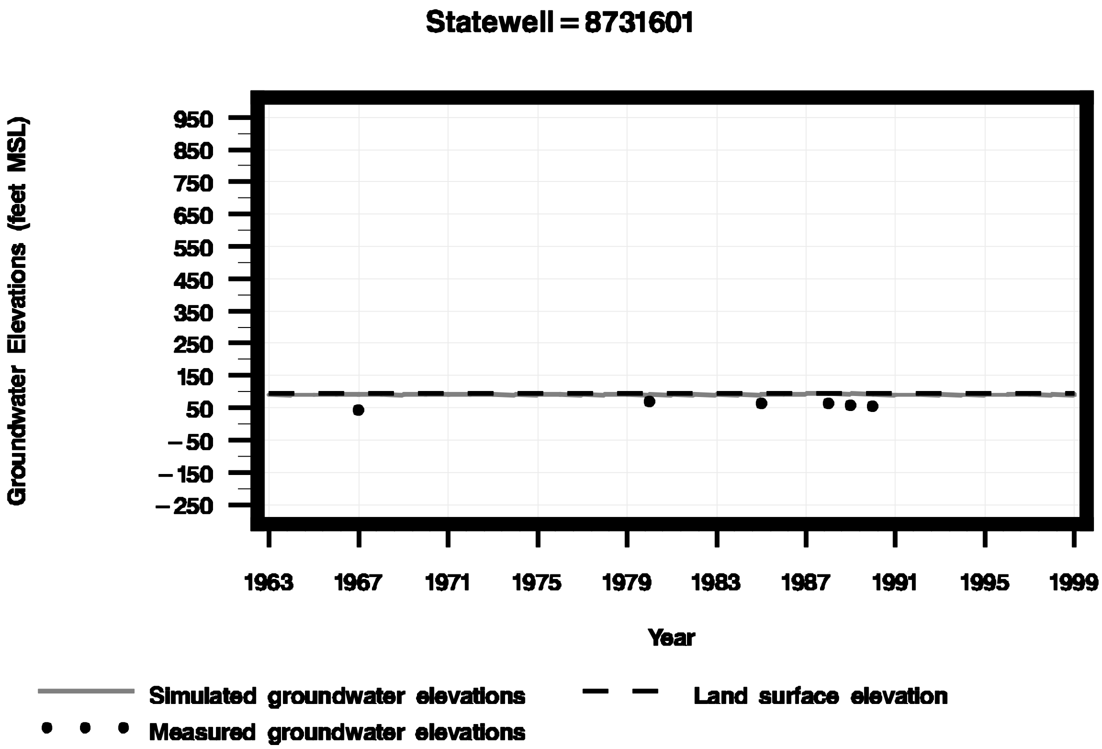
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8731601
Groundwater Elevations (feet MSL)
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850
750
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450
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50
−50
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−250
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1967
1971
1975
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1983
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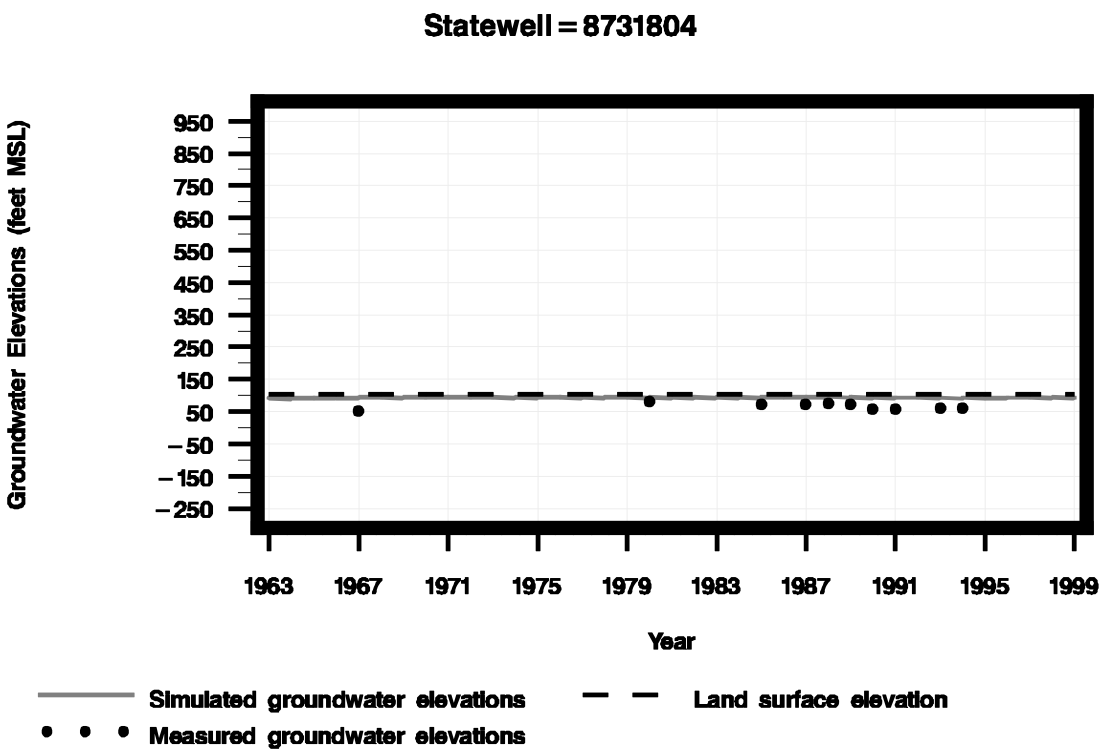
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8731804
Groundwater Elevations (feet MSL)
950
850
750
650
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450
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50
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1967
1971
1975
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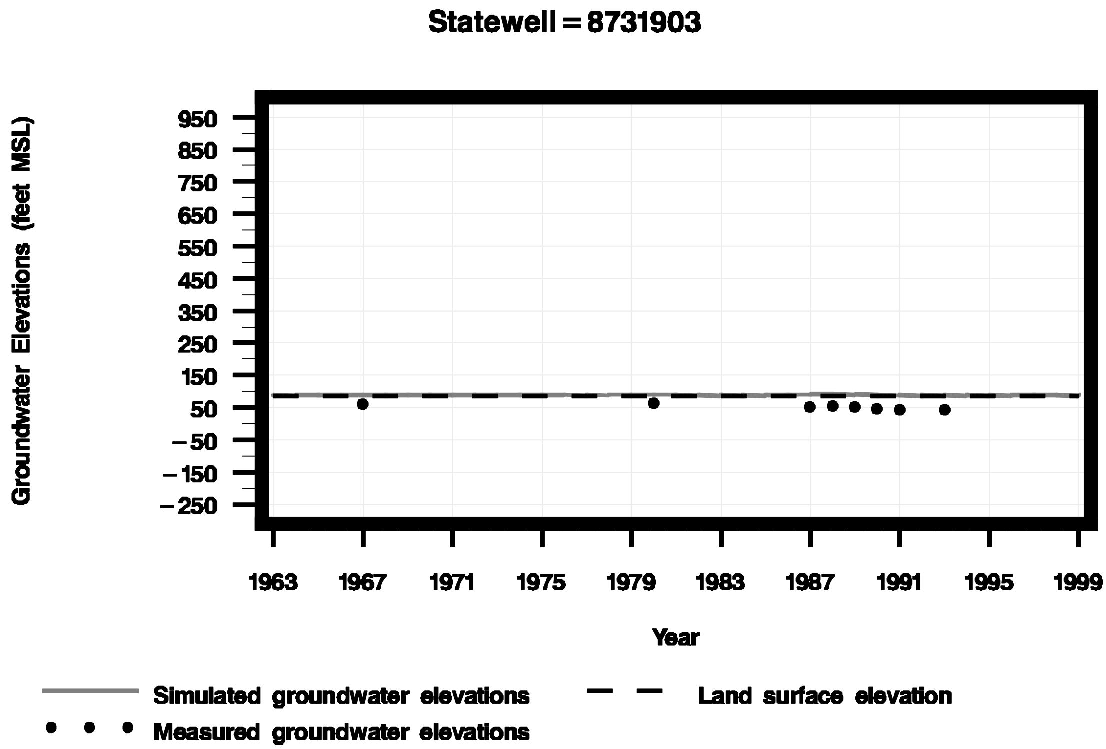
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8731903
Groundwater Elevations (feet MSL)
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850
750
650
550
450
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250
150
50
−50
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−250
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1967
1971
1975
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1983
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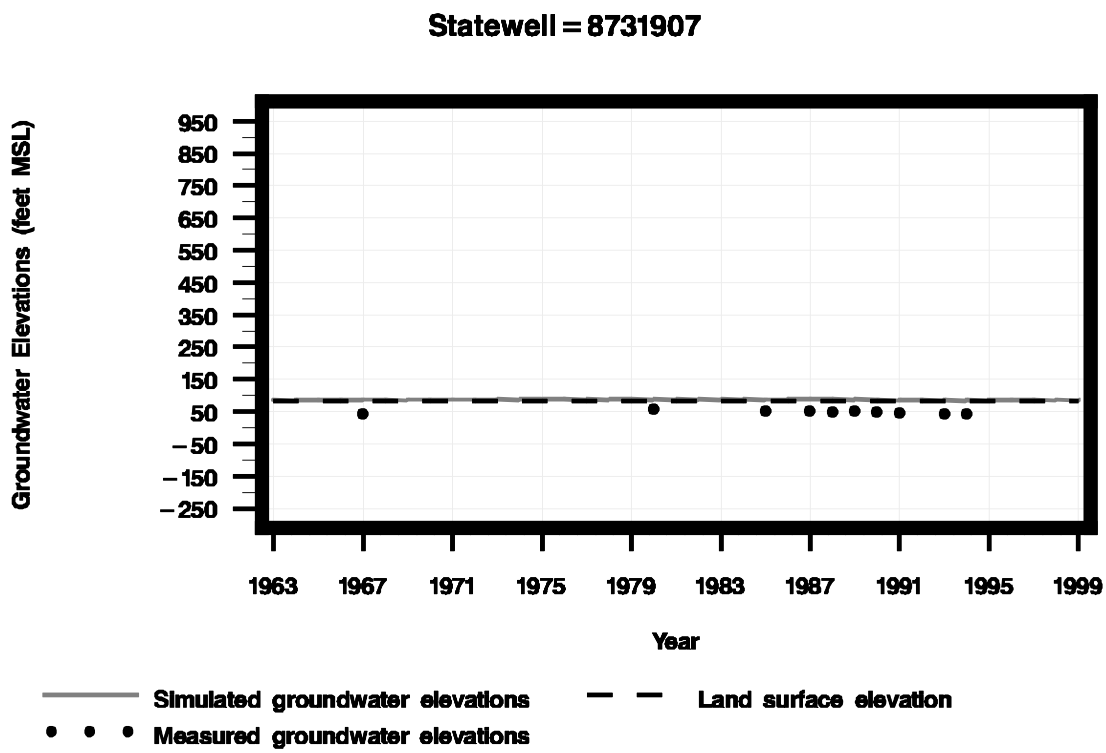
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8731907
Groundwater Elevations (feet MSL)
950
850
750
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550
450
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50
−50
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−250
1963
1967
1971
1975
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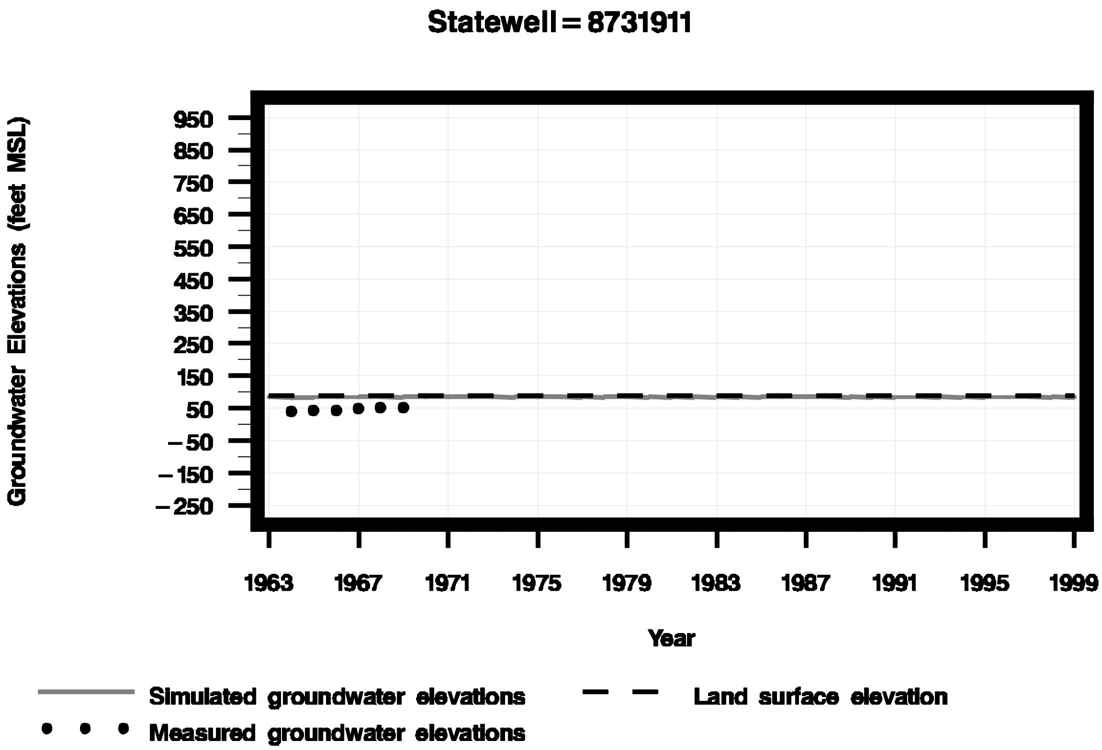
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8731911
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850
750
650
550
450
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250
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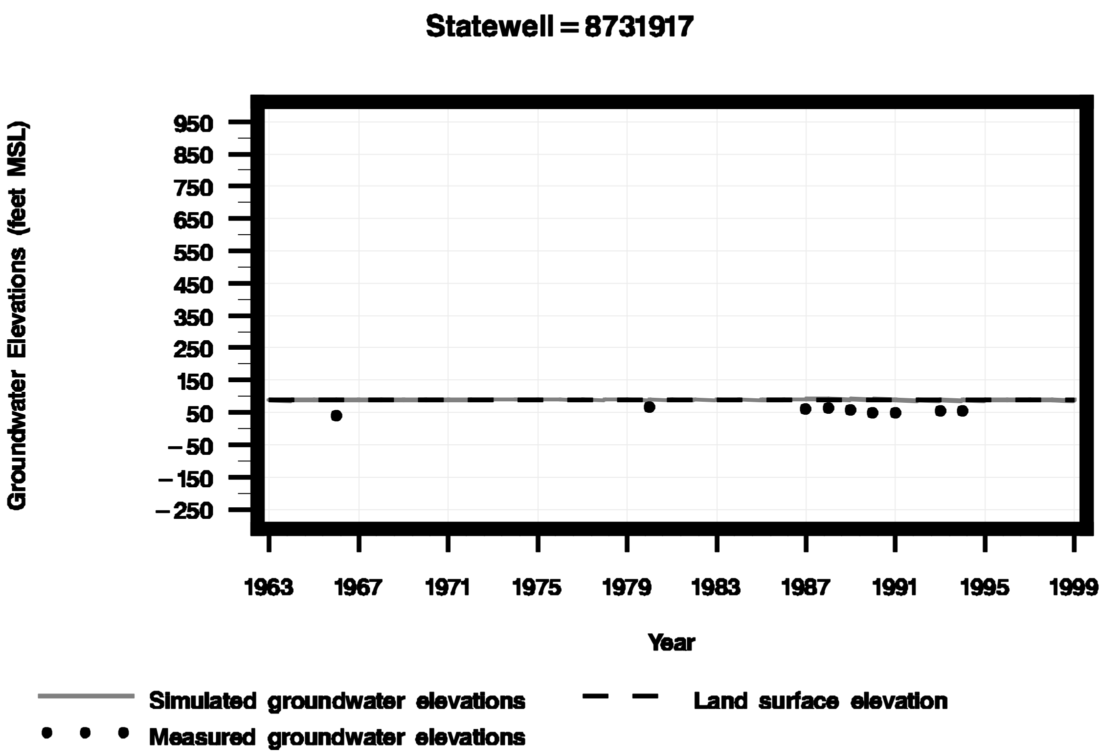
50
−50
−150
−250
Groundwater Elevations (feet MSL)
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8731917
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
Groundwater Elevations (feet MSL)
1963
1967
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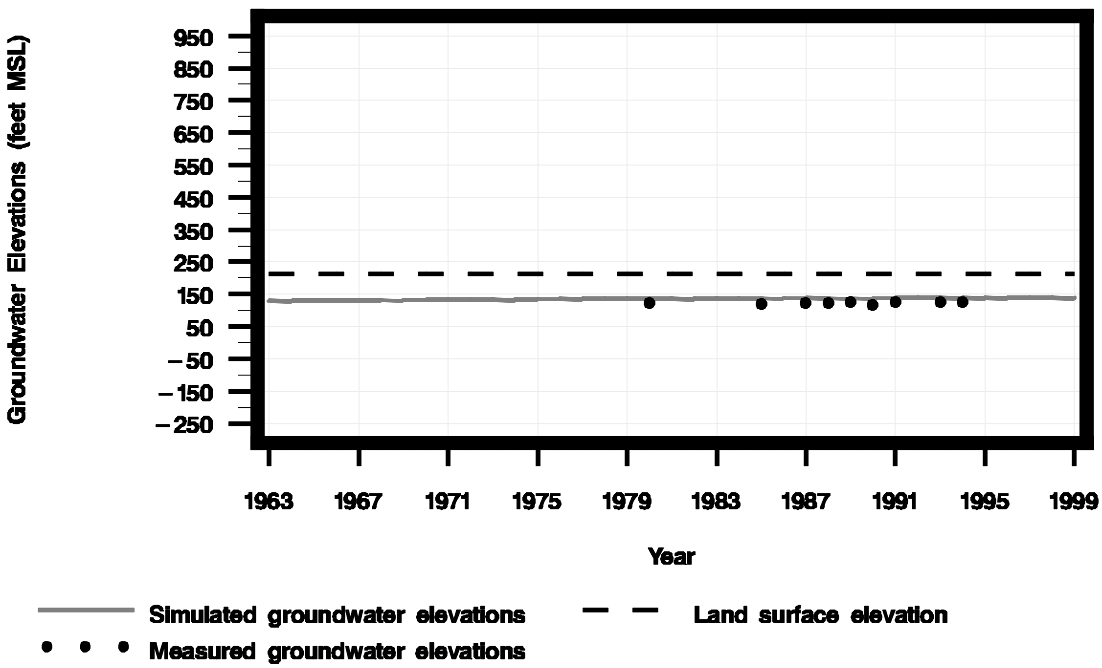
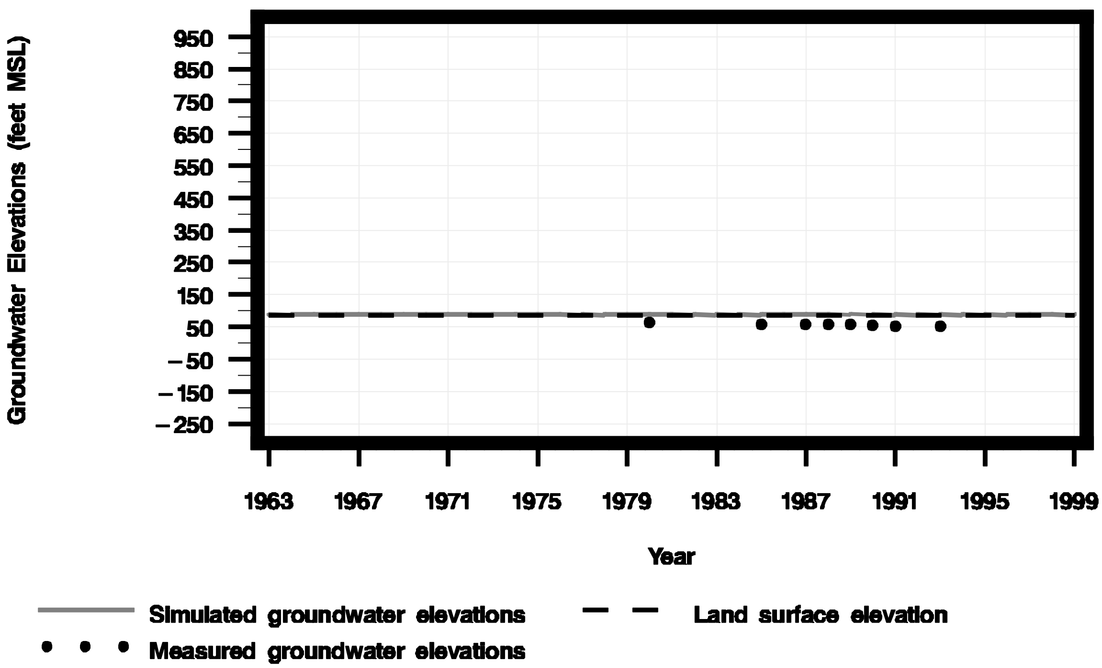
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

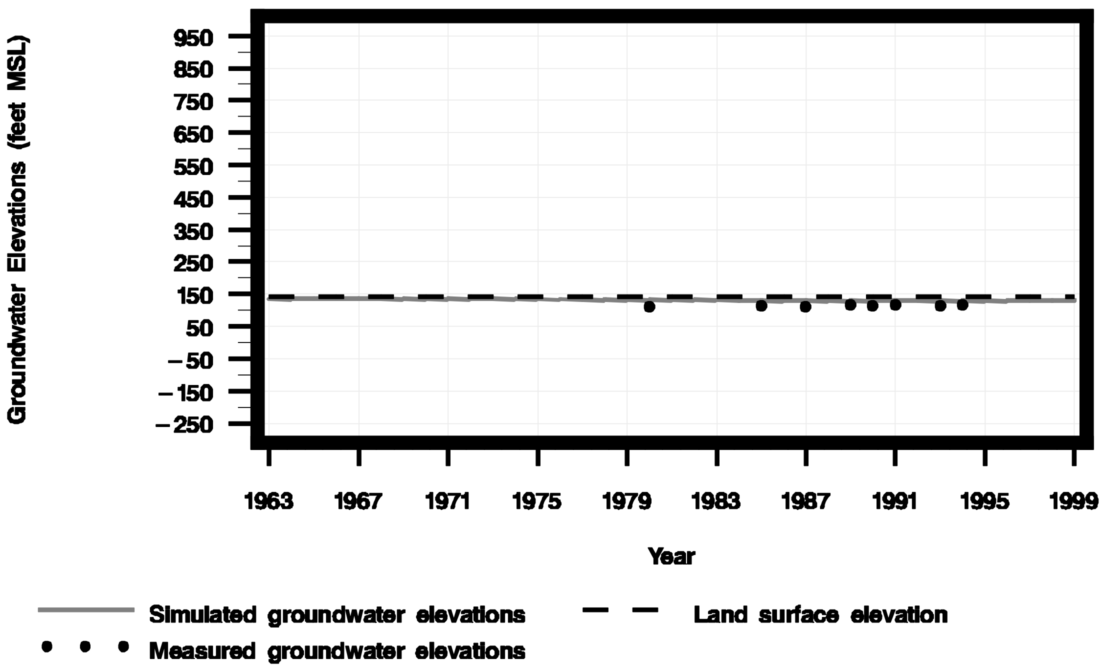
Statewell = 8738201



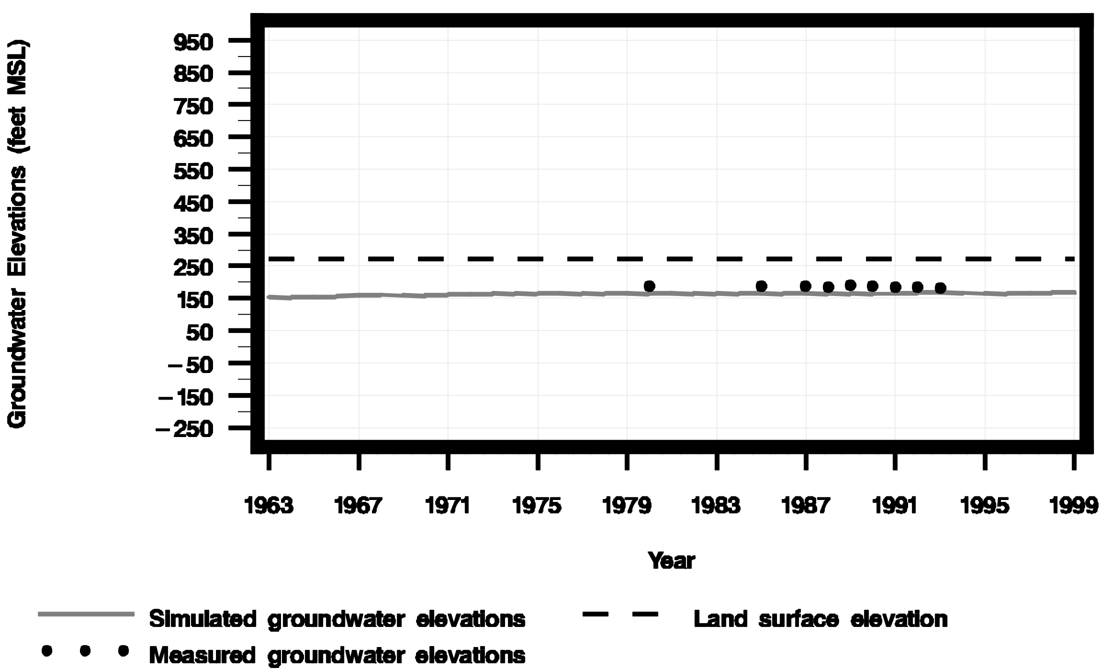
Statewell = 8739301

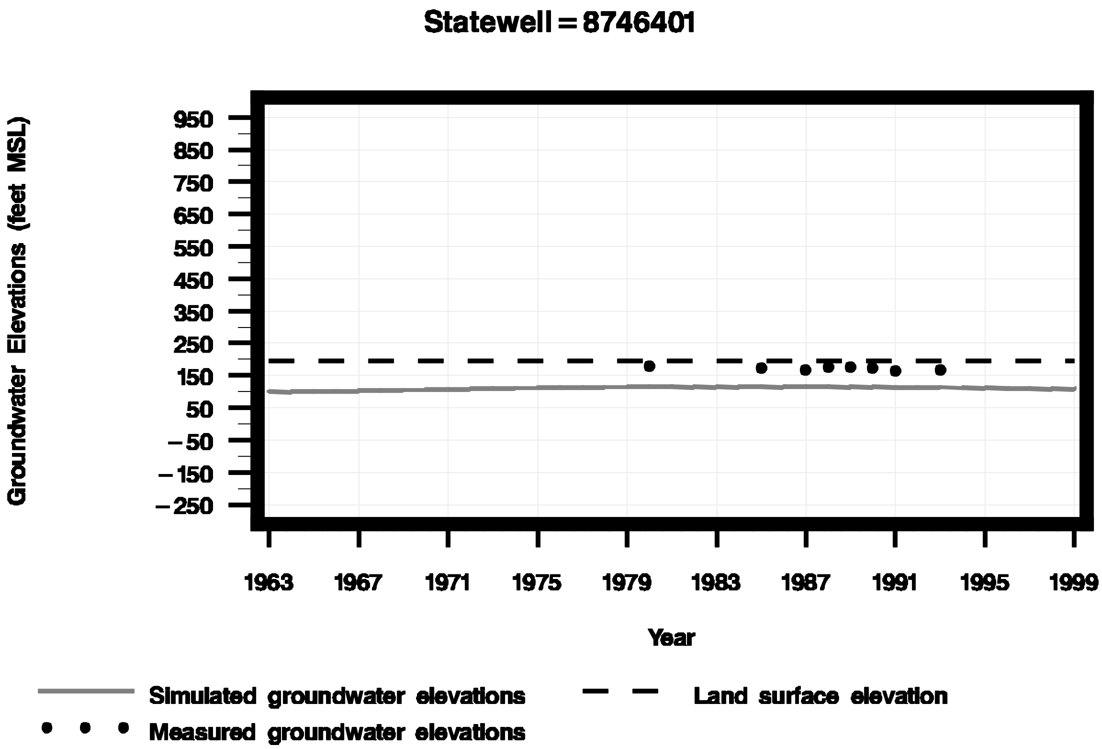


Statewell = 8743813



Statewell = 8744501





Statewell = 8746401
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
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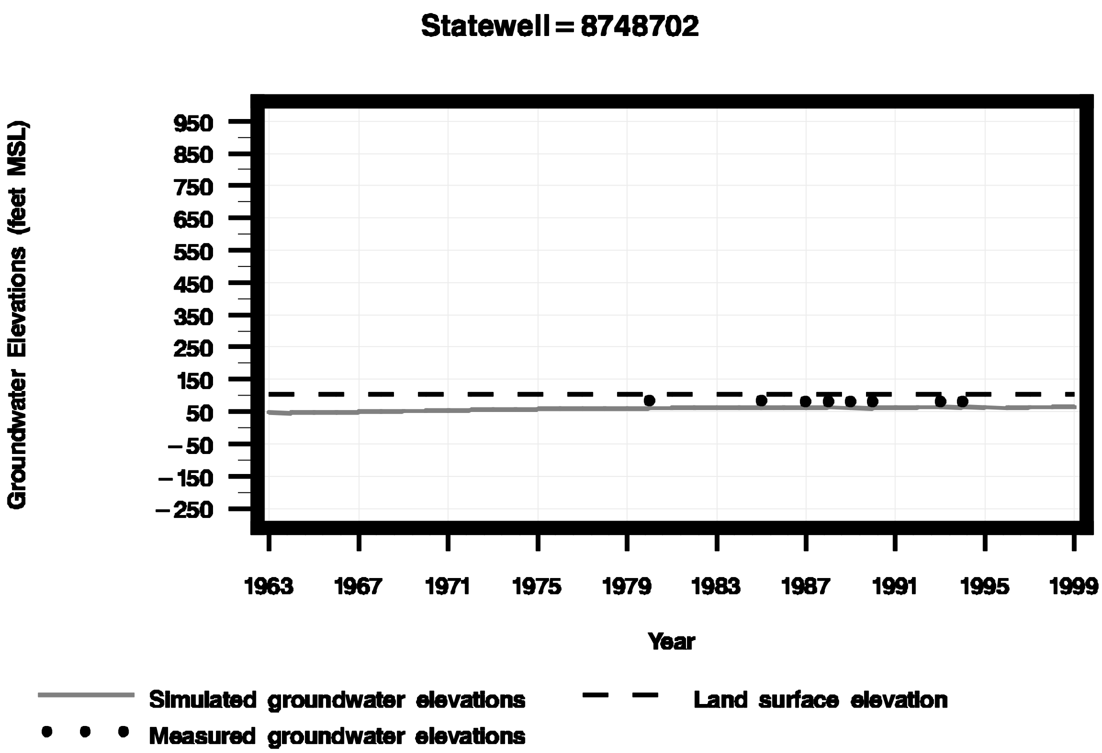
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8748702
Groundwater Elevations (feet MSL)
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850
750
650
550
450
350
250
150
50
−50
−150
−250
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1967
1971
1975
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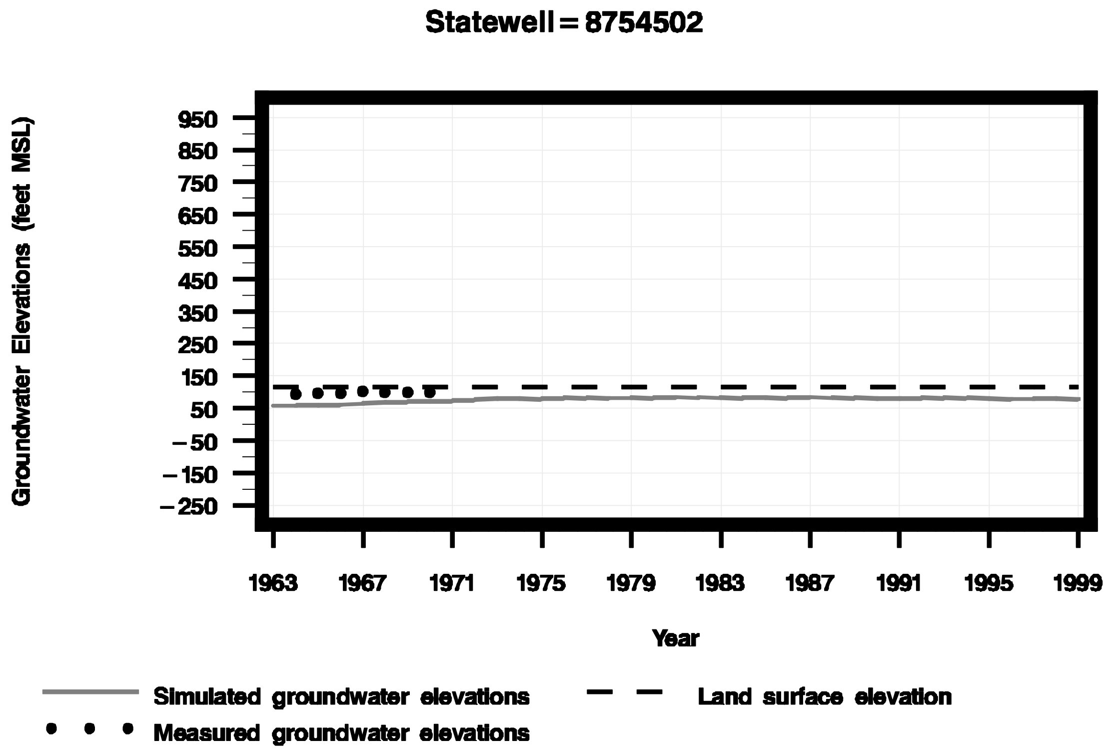
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8754502
Groundwater Elevations (feet MSL)
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850
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450
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250
150
50
−50
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−250
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1967
1971
1975
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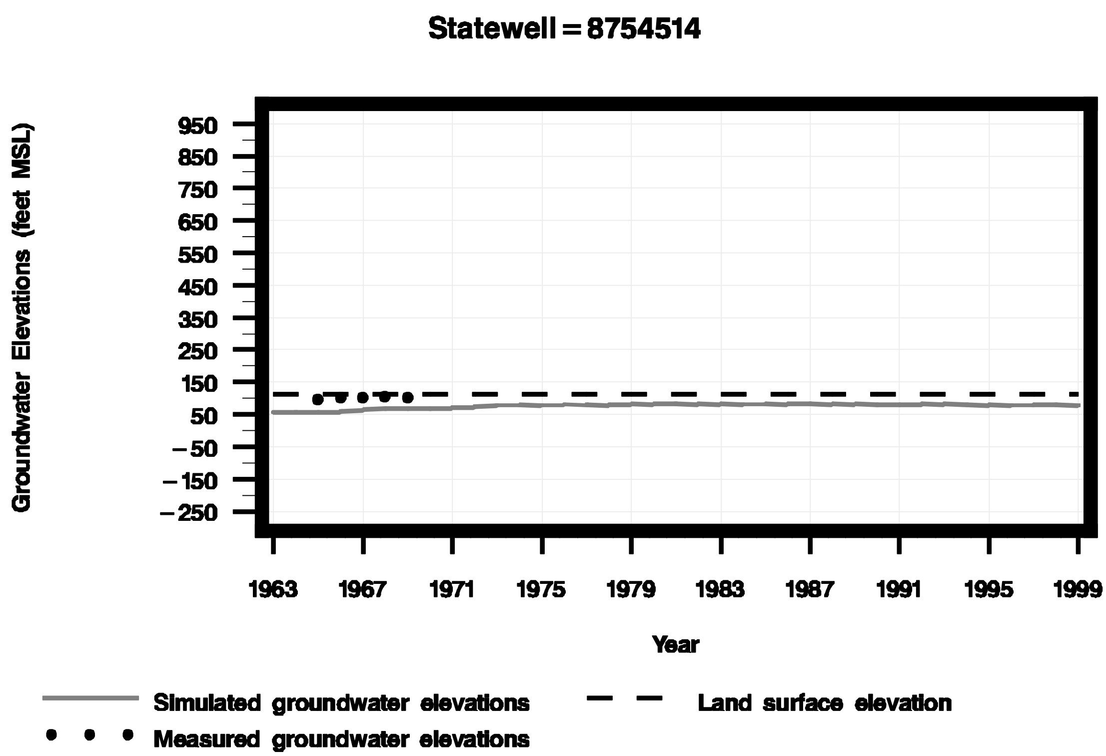
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8754514
Groundwater Elevations (feet MSL)
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450
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150
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−50
−150
−250
1963
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1987
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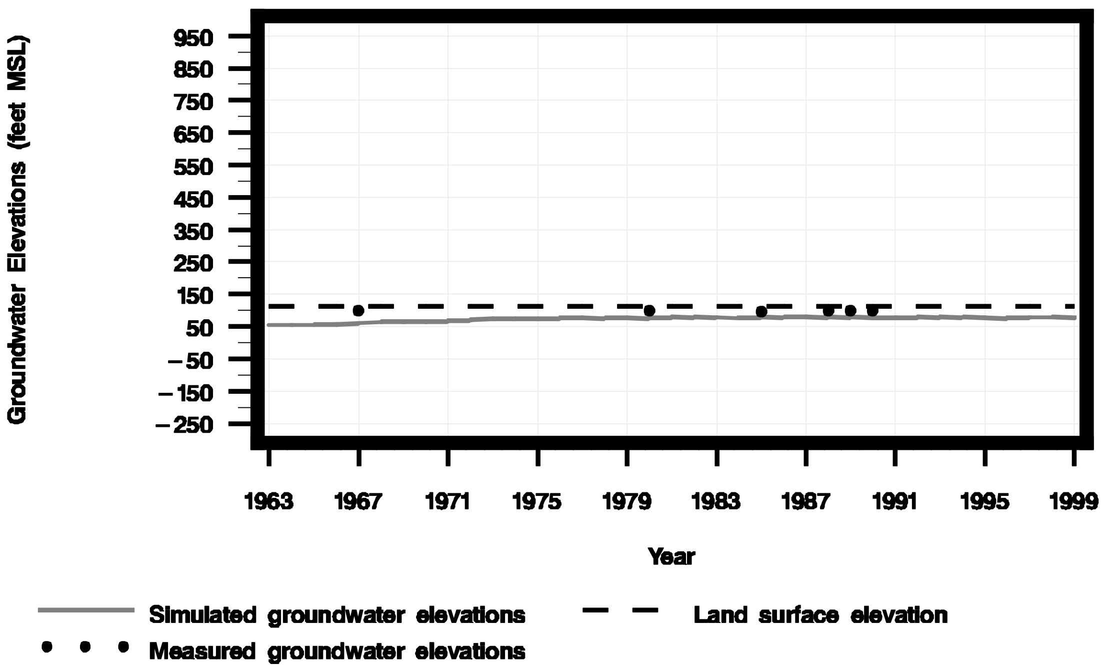
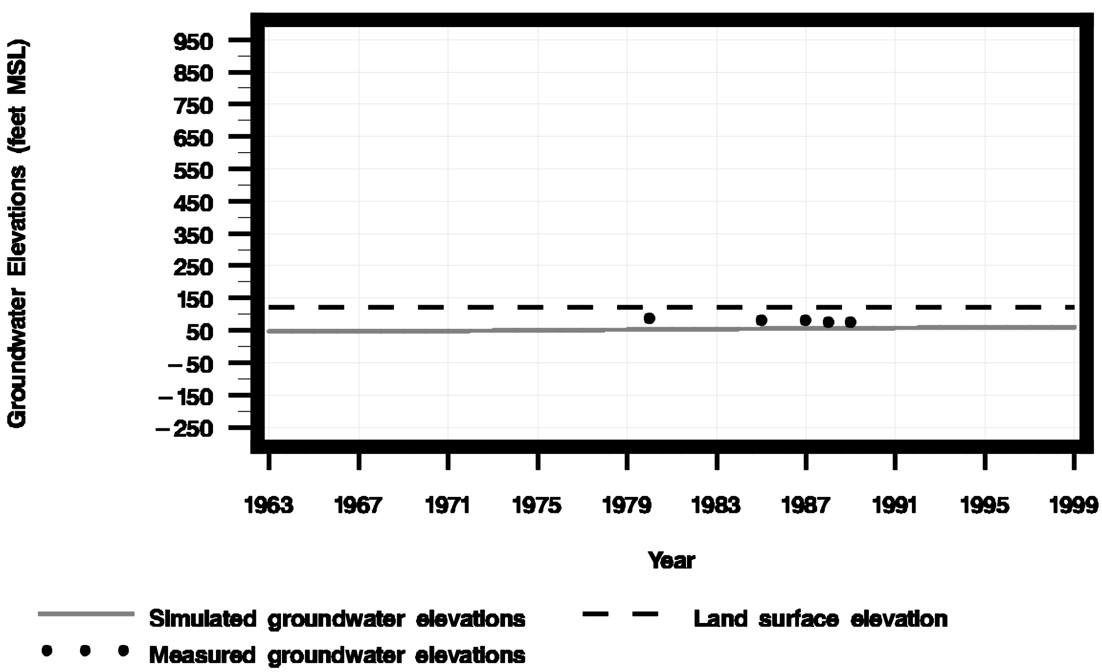
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

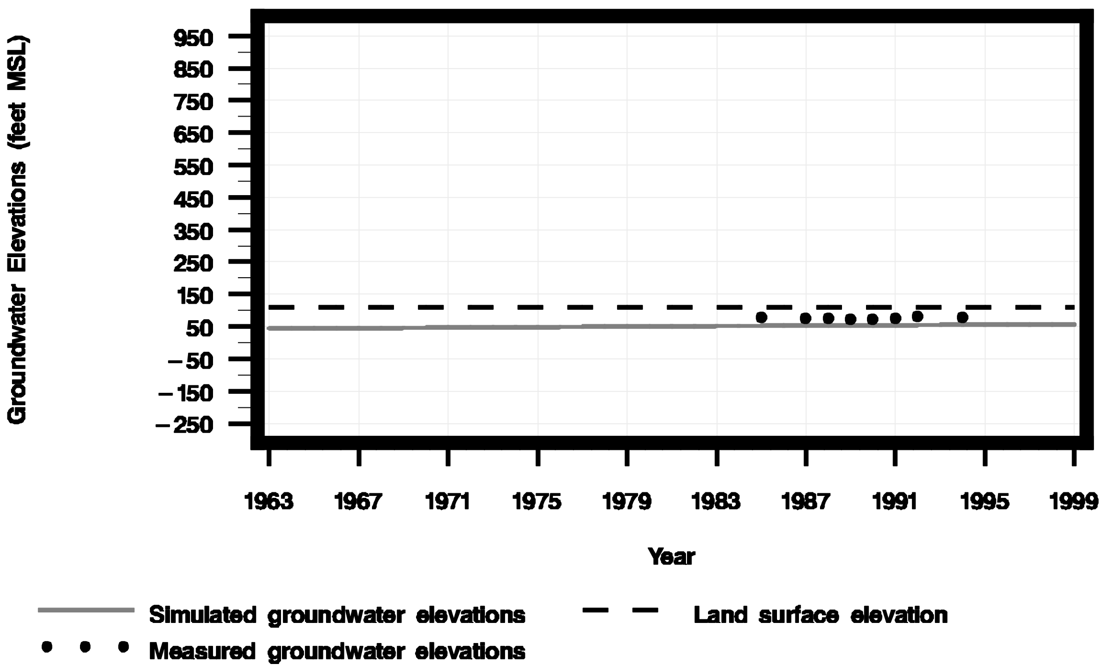
Statewell = 8754810



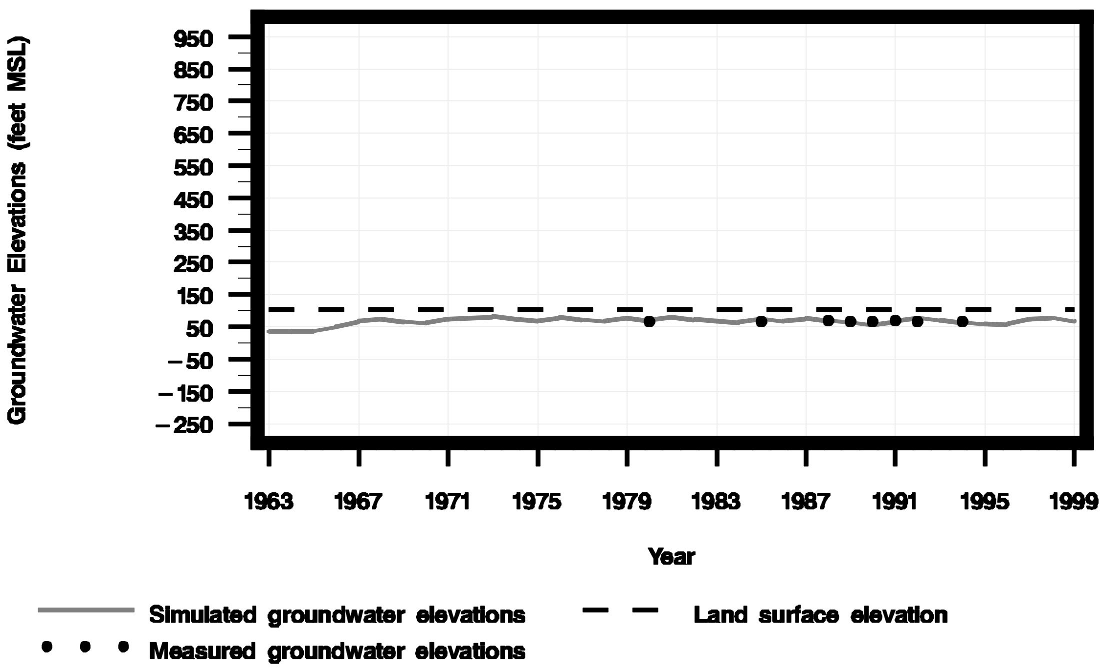
Statewell = 8755601

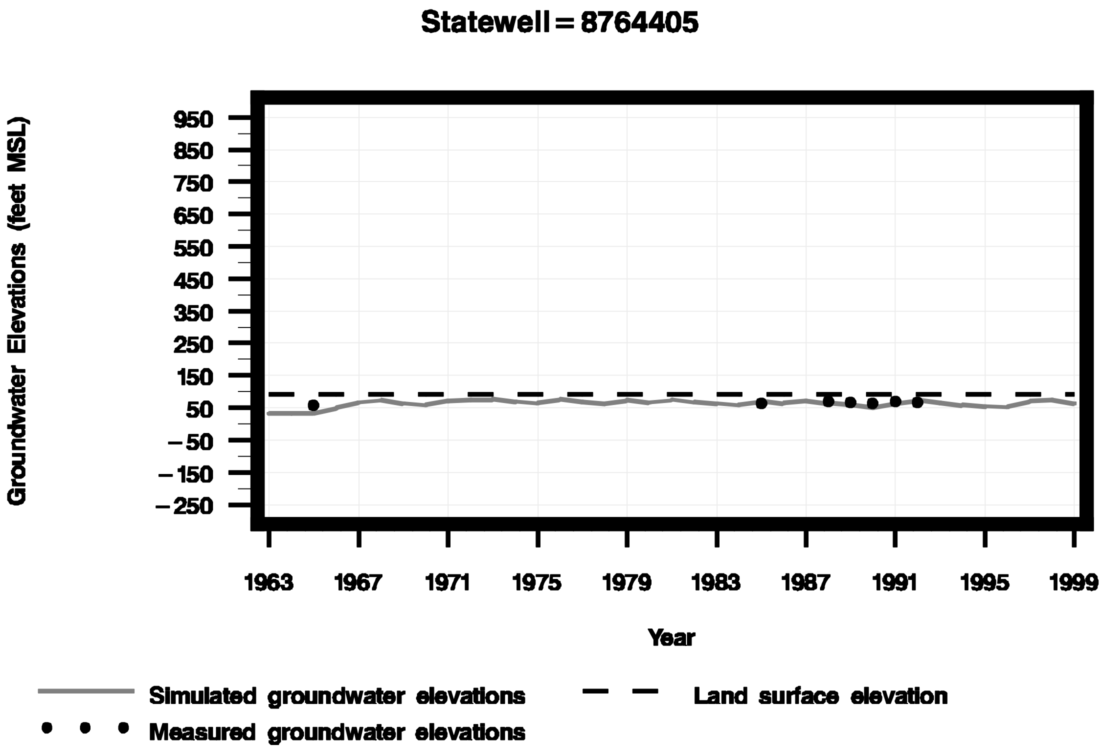


Statewell = 8756701



Statewell = 8763601




Statewell = 8764405
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750
650
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450
350
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−50
−150
−250
Groundwater Elevations (feet MSL)
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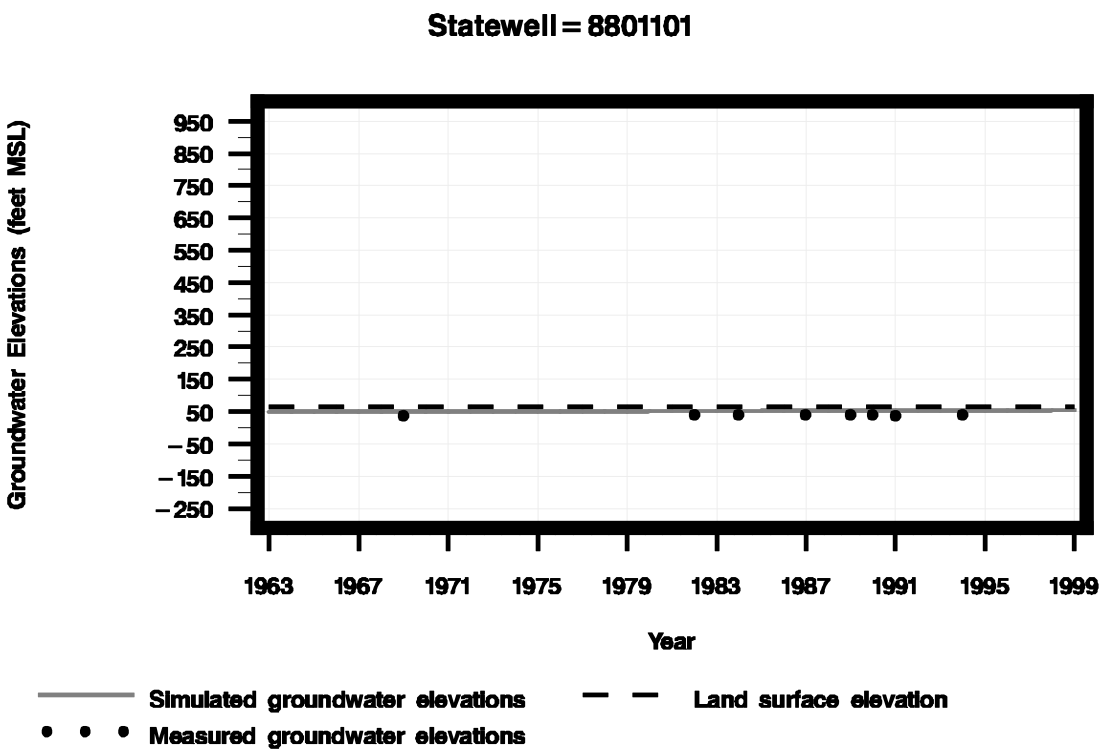
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8801101
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−250
Groundwater Elevations (feet MSL)
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1967
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1983
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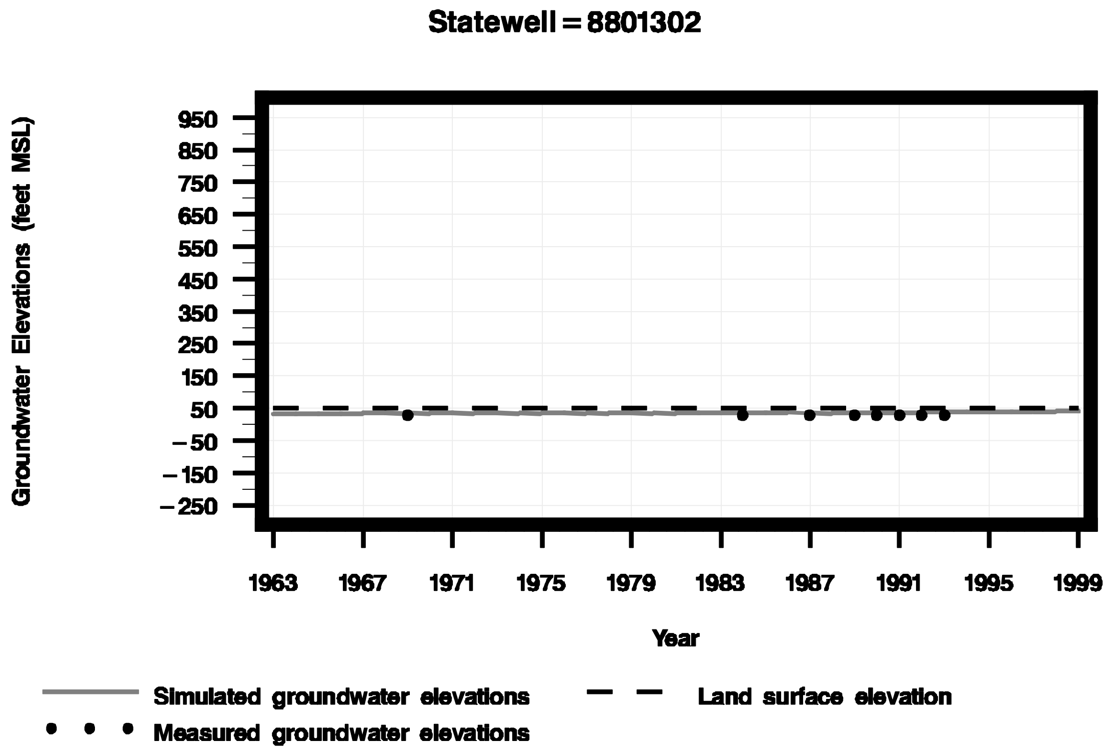
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8801302
Groundwater Elevations (feet MSL)
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450
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50
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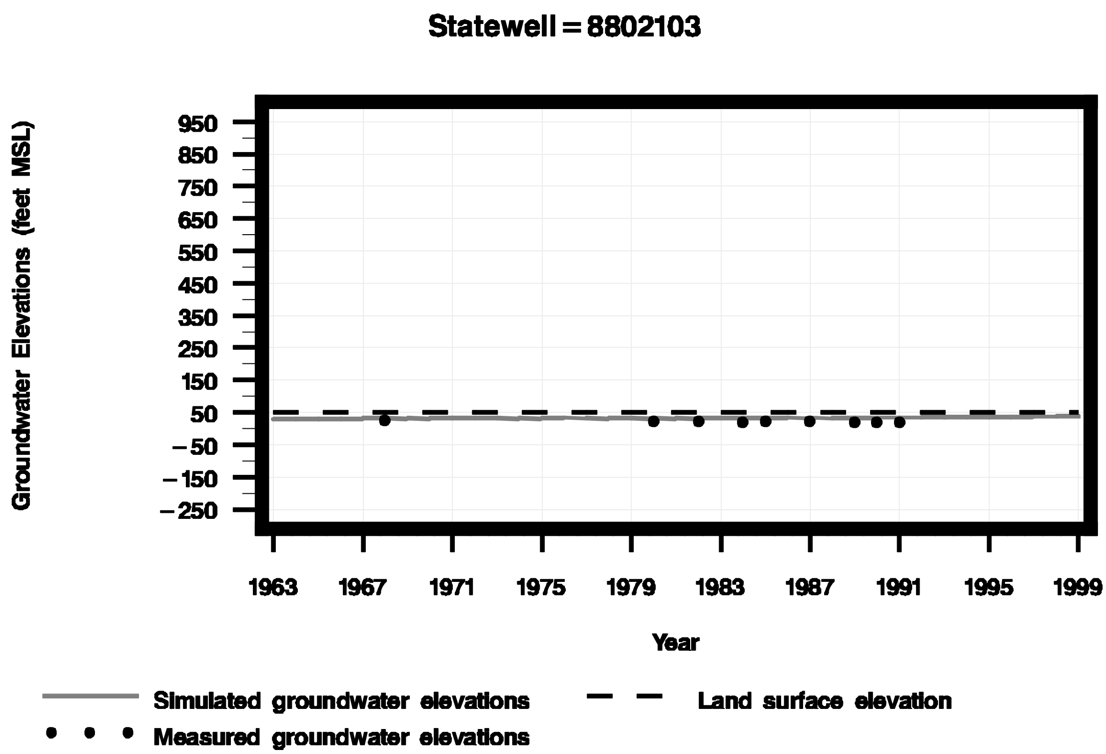
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8802103
Groundwater Elevations (feet MSL)
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450
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50
−50
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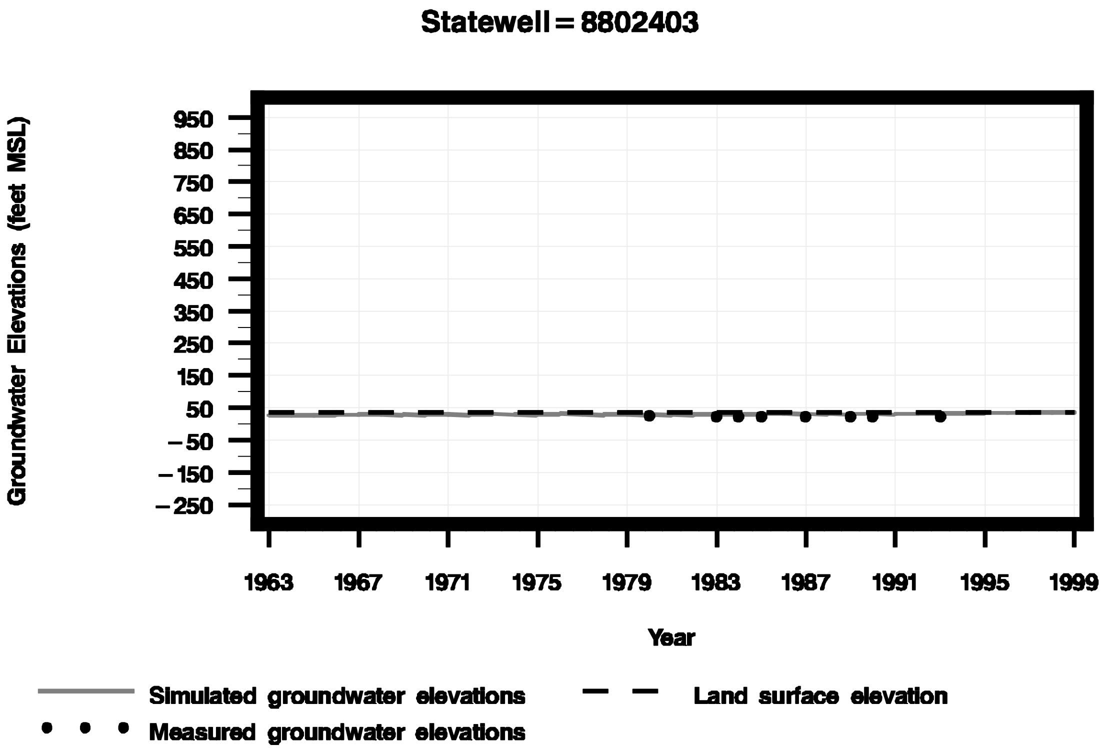
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8802403
Groundwater Elevations (feet MSL)
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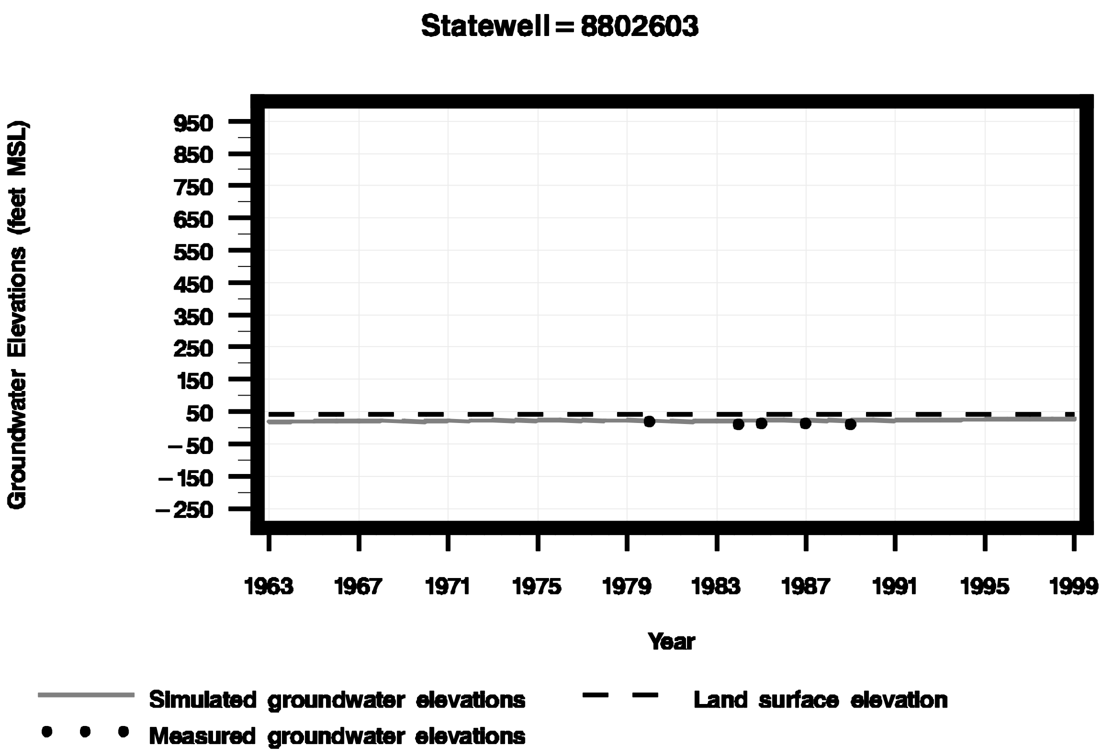
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8802603
Groundwater Elevations (feet MSL)
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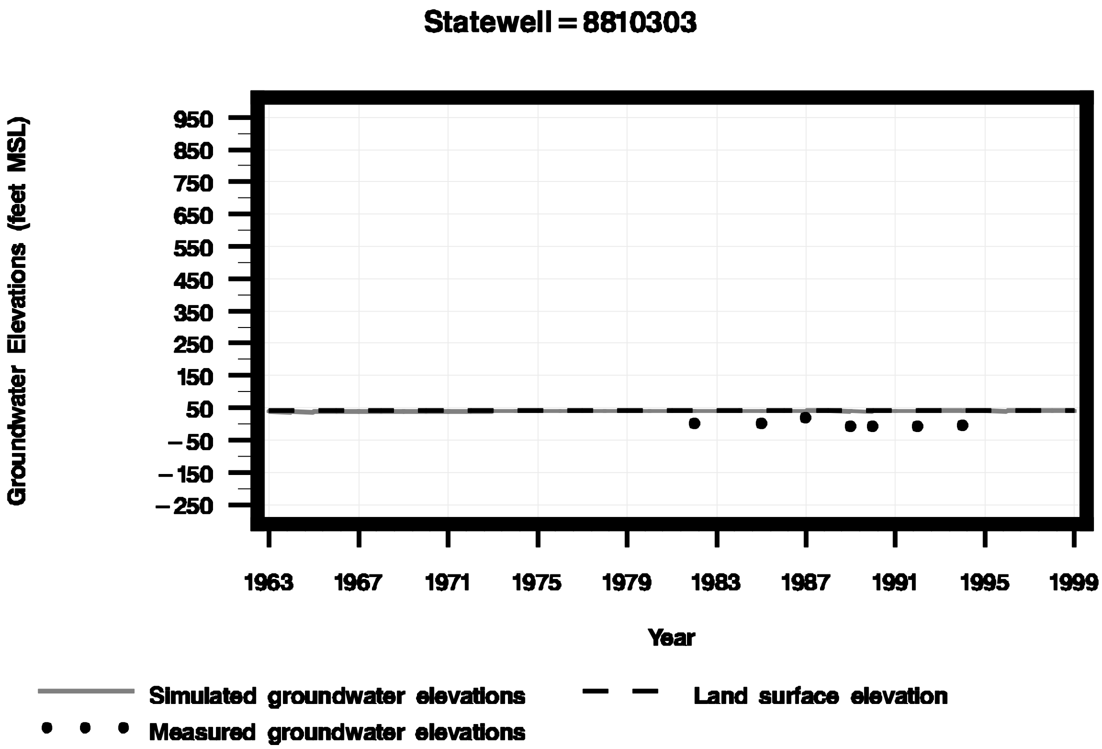
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8810303
Groundwater Elevations (feet MSL)
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50
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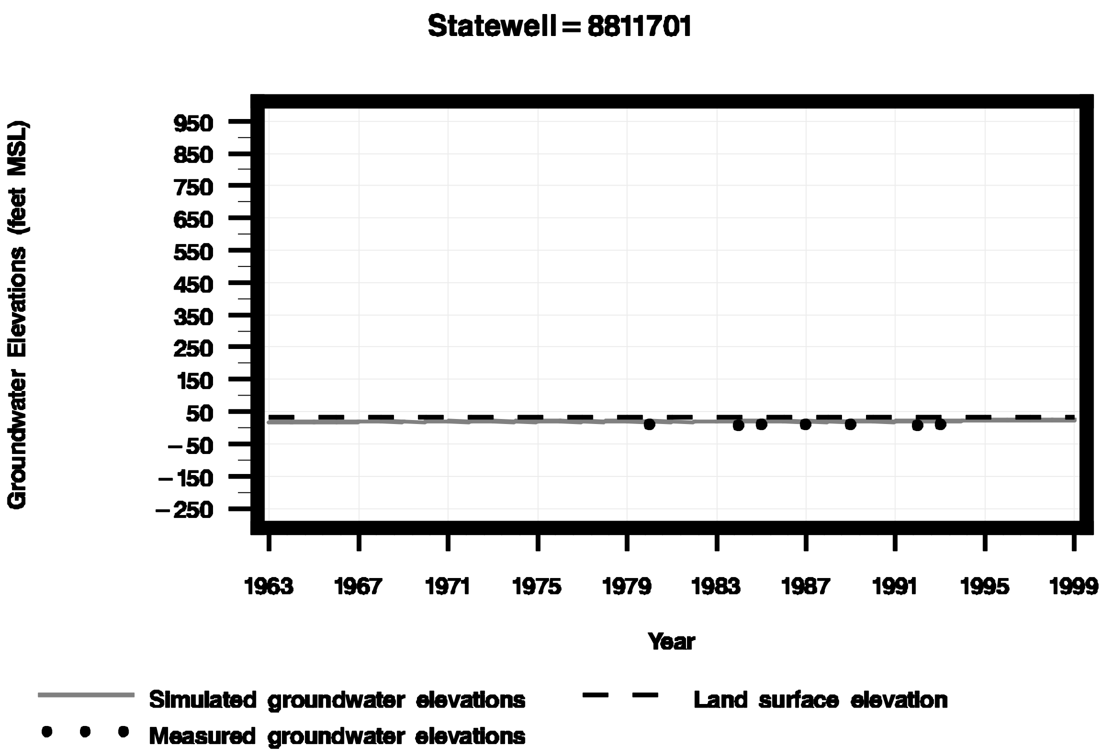
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8811701
Groundwater Elevations (feet MSL)
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450
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50
−50
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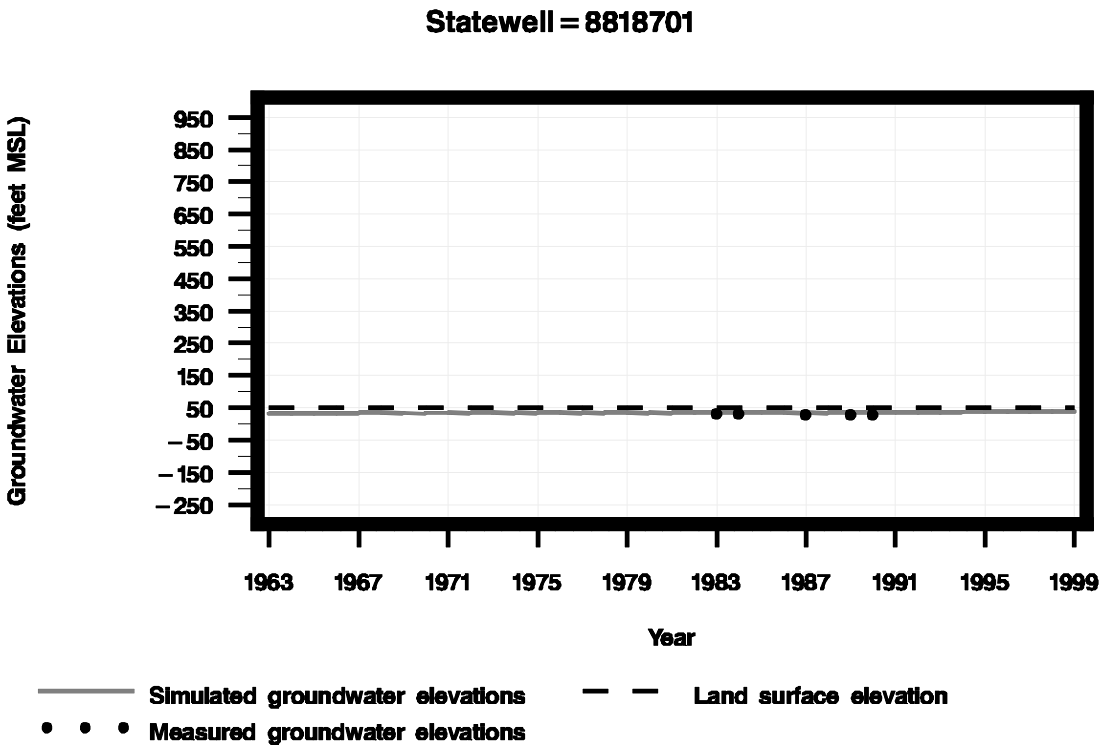
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8818701
Groundwater Elevations (feet MSL)
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450
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50
−50
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−250
1963
1967
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1983
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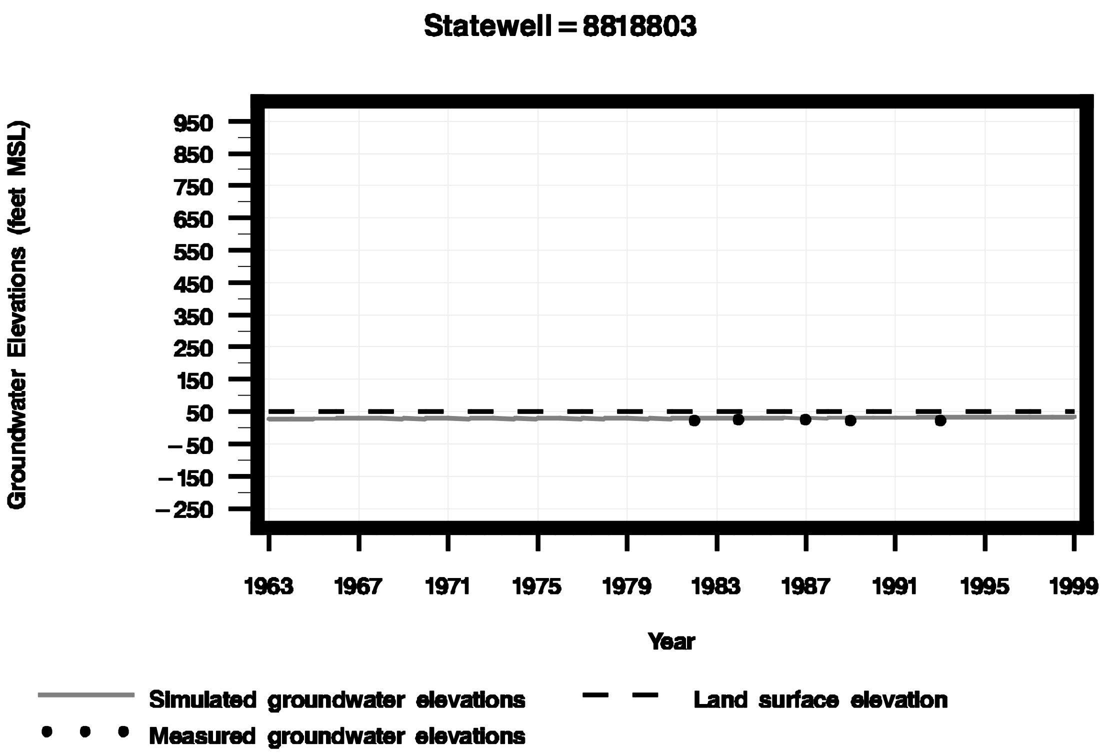
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8818803
Groundwater Elevations (feet MSL)
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450
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50
−50
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−250
1963
1967
1971
1975
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1983
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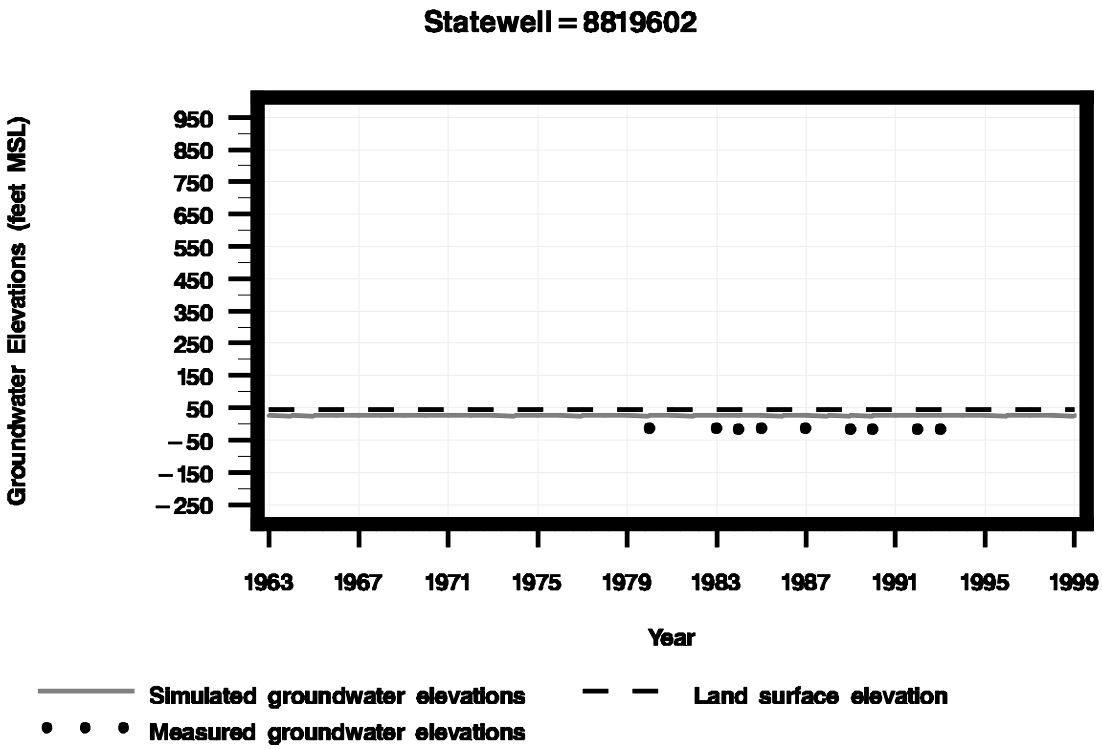
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8819602
Groundwater Elevations (feet MSL)
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−50
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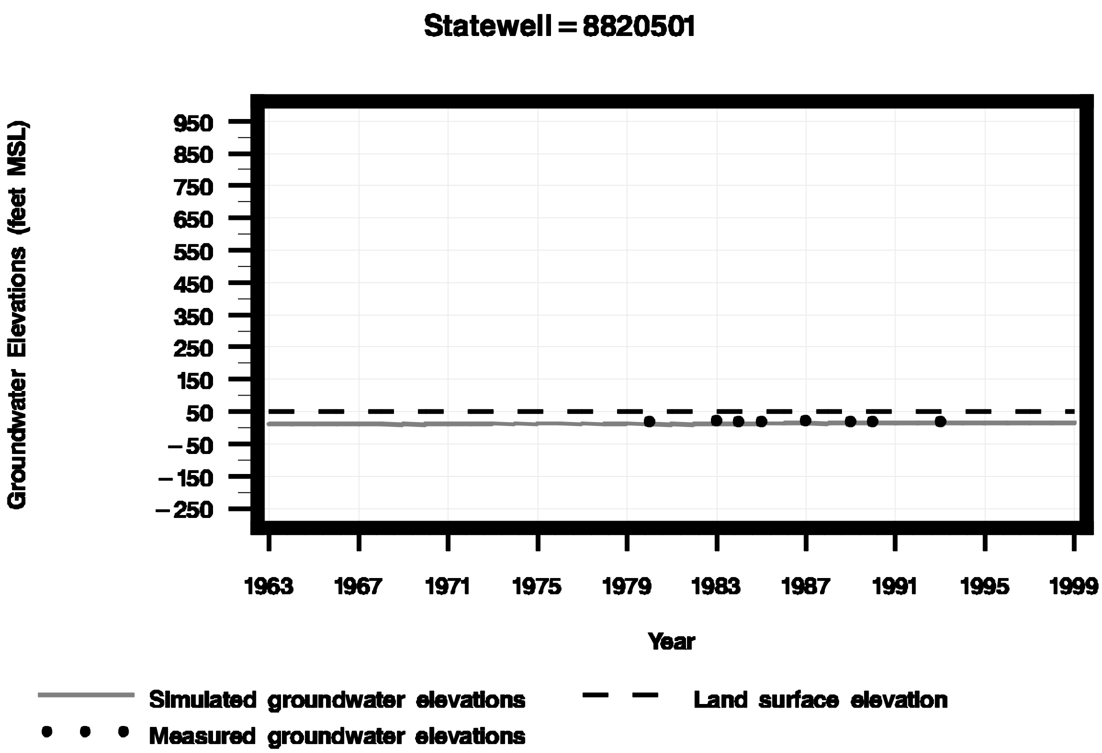
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8820501
Groundwater Elevations (feet MSL)
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450
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−50
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1963
1967
1971
1975
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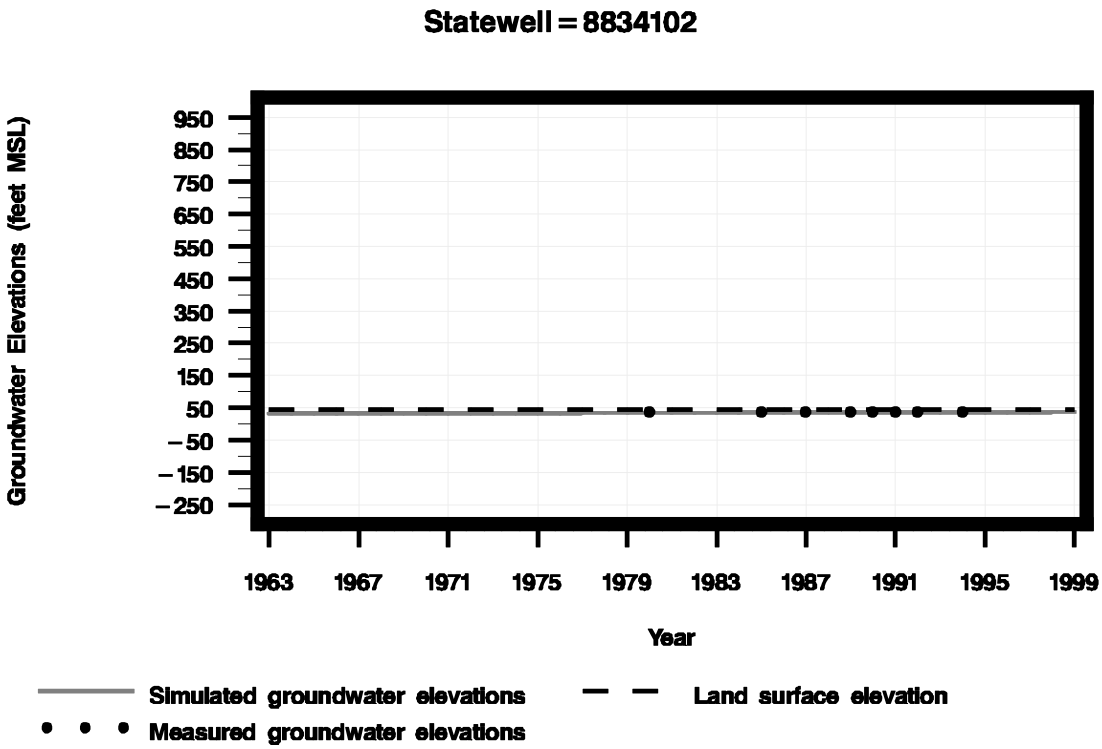
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8834102
Groundwater Elevations (feet MSL)
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450
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1983
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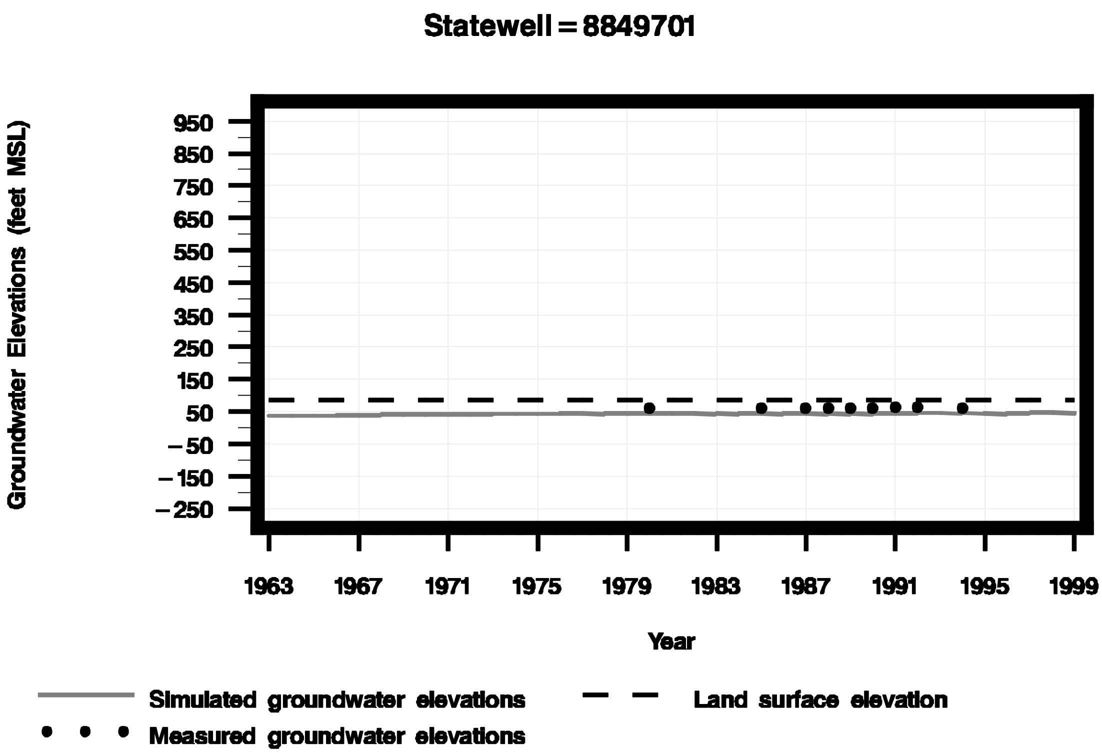
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations



Statewell = 8849701
Groundwater Elevations (feet MSL)
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450
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−50
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1963
1967
1971
1975
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1983
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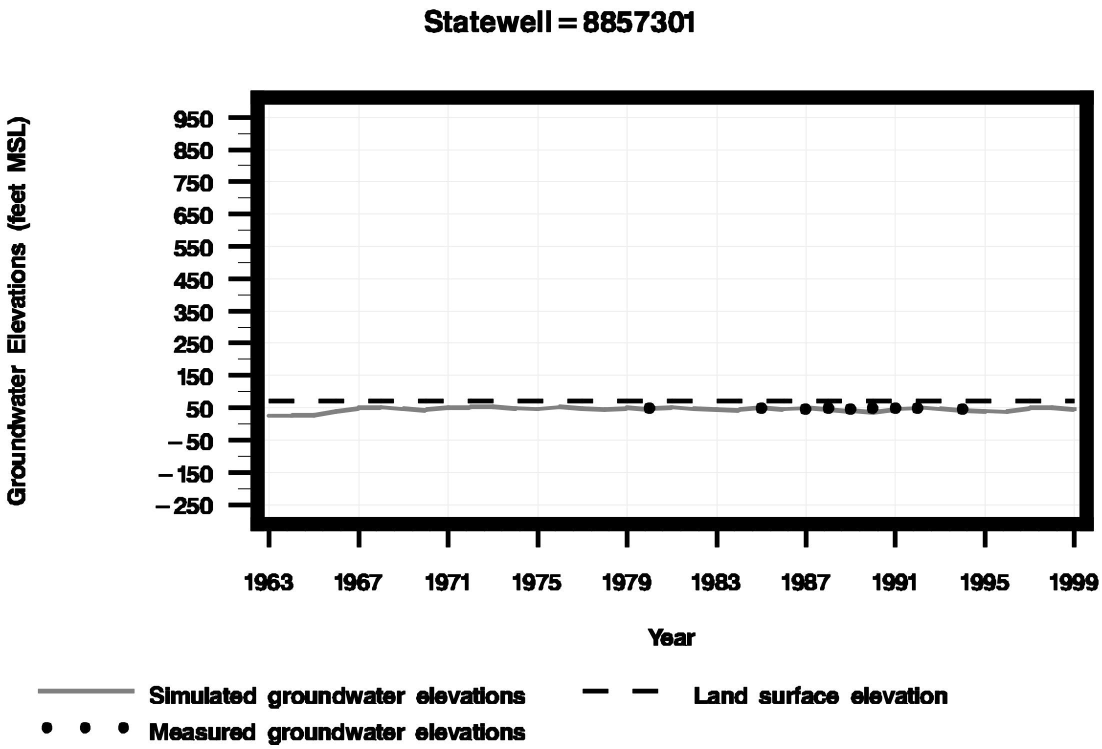
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8857301
Groundwater Elevations (feet MSL)
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650
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450
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−50
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1963
1967
1971
1975
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1983
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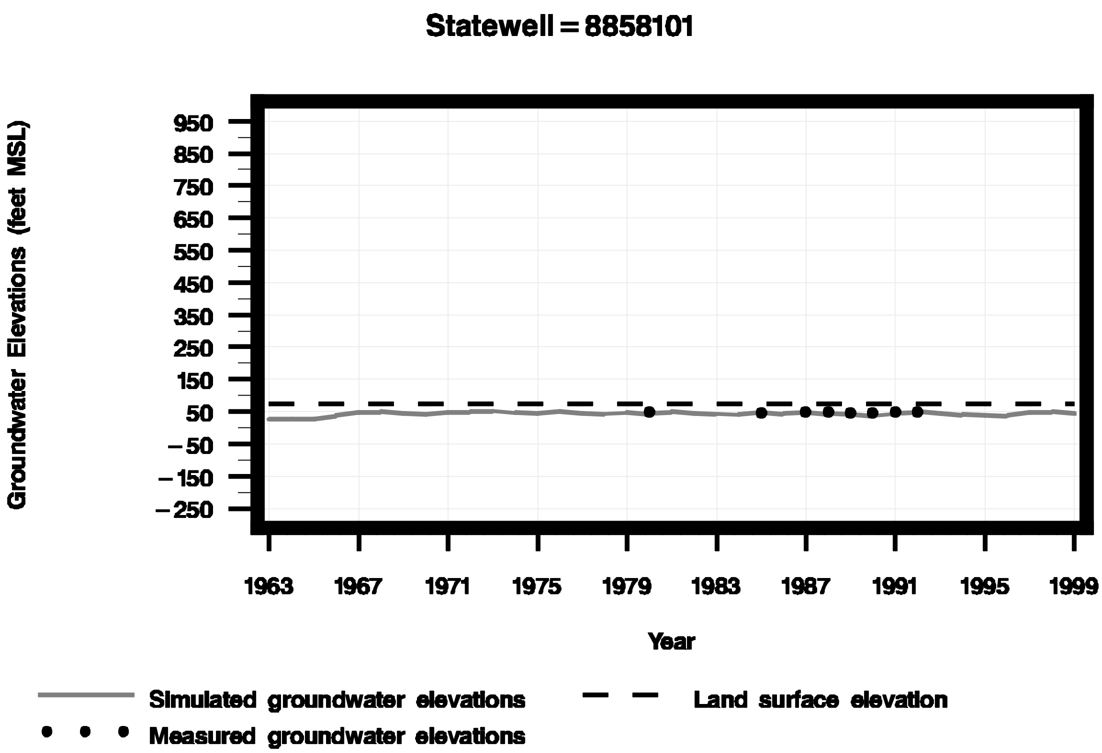
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8858101
Groundwater Elevations (feet MSL)
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450
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1963
1967
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1983
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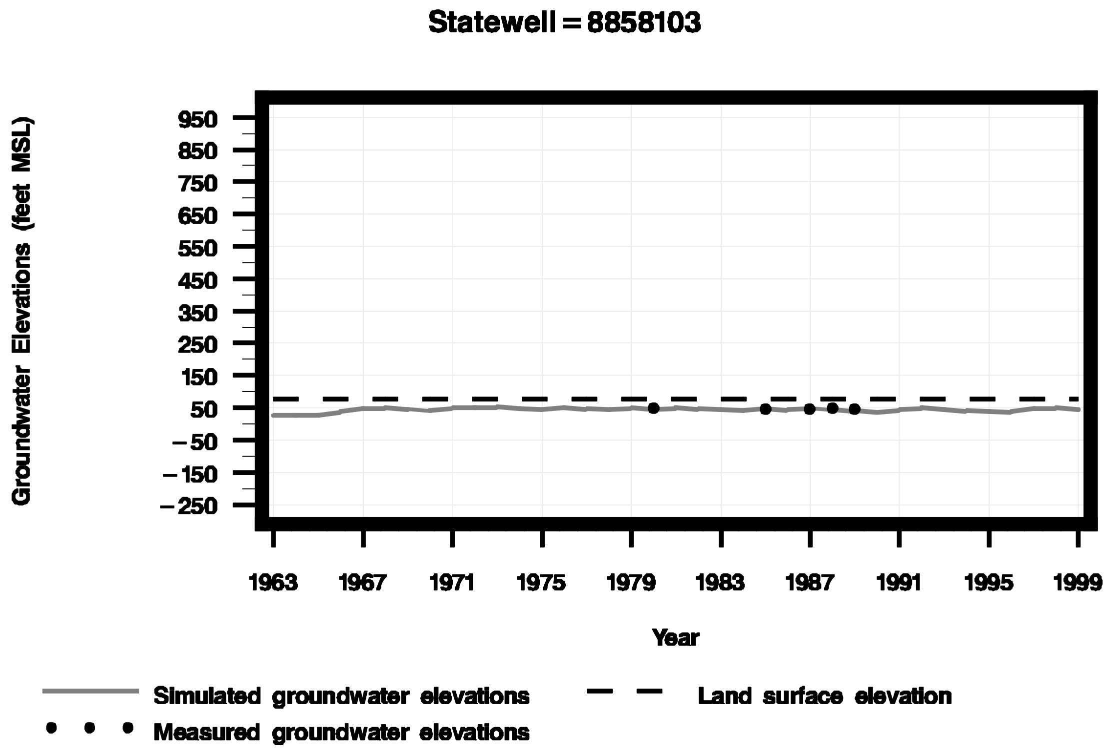
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations


Statewell = 8858103
Groundwater Elevations (feet MSL)
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550
450
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−50
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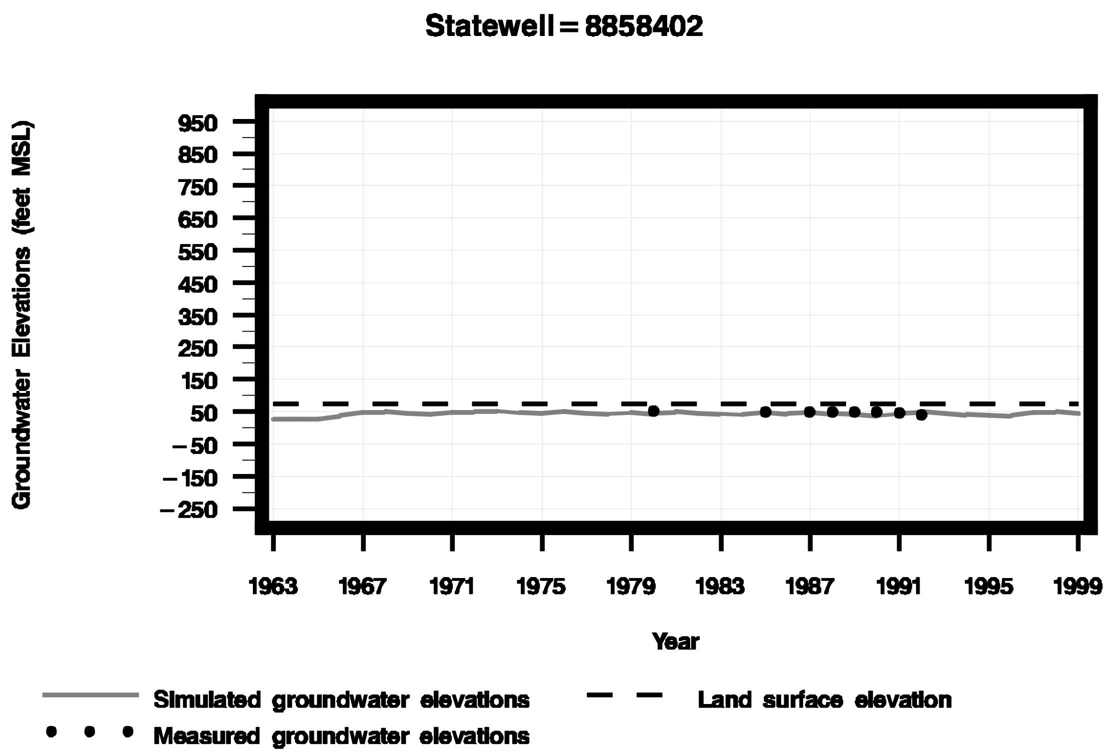
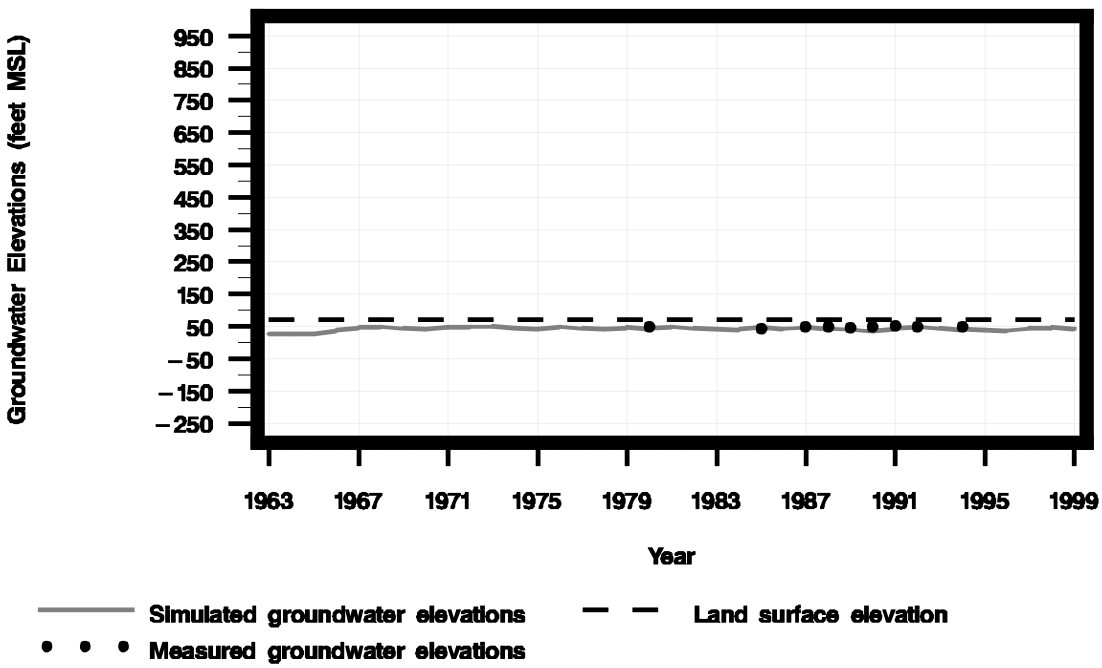
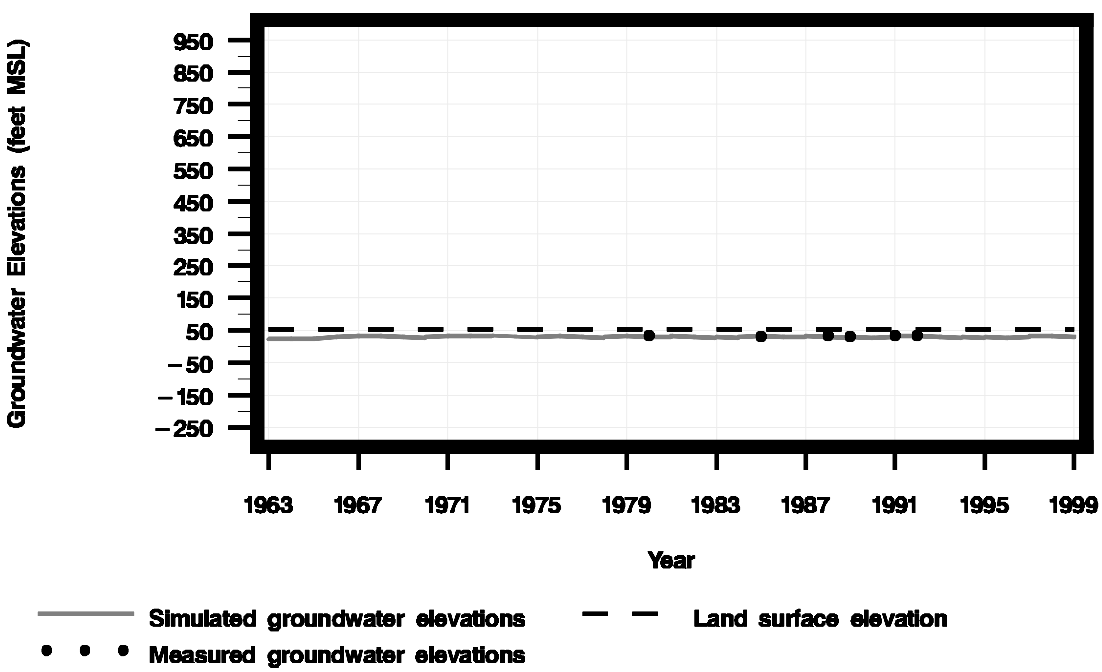
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

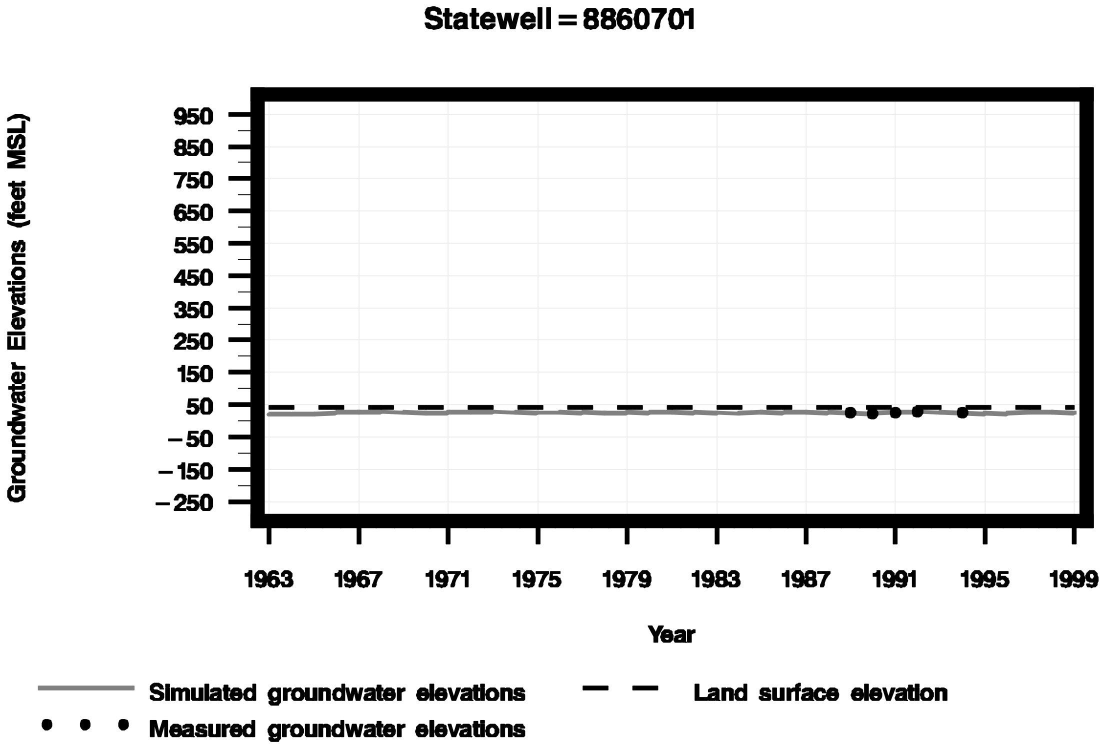

Statewell = 8858402
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

Statewell = 8858502



Statewell = 8859102




Statewell = 8860701
Groundwater Elevations (feet MSL)
950
850
750
650
550
450
350
250
150
50
−50
−150
−250
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
Year
Simulated groundwater elevations
Land surface elevation
Measured groundwater elevations

APPENDIX C:
Annual Water Budget

Table C-1. Annual groundwater budget for the Gulf Coast Aquifer, Groundwater Management Area 16 portion of Bee County Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW								OUTFLOW									
Year	River Leakage	Recharge	Net Vertical Leakage Lower	Lateral Flow From Bee15	Lateral Flow From Bee 16 White	Lateral Flow From Karnes15	Lateral Flow From LiveOak	Total Inflow	Wells	Net Vertical Leakage Lower	Lateral Flow To Bee 16 White	Net Lateral Flow To LiveOak	Lateral Flow To San Patricio	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	470	1,460	837	2,047	-	6	249	5,069	2,282	-	1,317	-	2,181	5,780	-711	-711	0	0.00%
1964	588	1,694	881	2,105	-	6	249	5,523	2,198	-	1,273	-	2,164	5,635	-112	-112	0	0.00%
1965	705	2,275	951	2,139	-	6	214	6,290	1,902	-	1,111	-	2,145	5,158	1,132	1,132	0	0.00%
1966	4,936	2,054	1,954	4,361	-	6	102	13,413	1,796	-	1,066	-	1,947	4,809	8,604	8,605	-1	0.01%
1967	6,581	2,764	2,215	4,603	-	6	-	16,169	1,247	-	771	76	1,882	3,976	12,193	12,193	0	0.00%
1968	5,641	2,609	2,179	4,619	-	6	-	15,054	1,564	-	916	215	2,045	4,740	10,314	10,315	-1	0.01%
1969	705	2,270	1,689	3,508	-	6	-	8,178	1,881	-	1,074	258	2,405	5,618	2,560	2,561	-1	0.01%
1970	705	2,091	1,350	3,032	-	6	-	7,184	1,838	-	1,056	271	2,513	5,678	1,506	1,502	4	0.05%
1971	5,876	2,728	1,713	4,162	-	6	-	14,485	1,479	-	877	358	2,337	5,051	9,434	9,432	2	0.01%
1972	5,171	2,328	1,711	4,258	-	6	-	13,474	1,733	-	1,001	421	2,450	5,605	7,869	7,867	2	0.01%
1973	6,816	3,062	1,567	4,226	-	6	-	15,677	1,141	-	691	537	2,532	4,901	10,776	10,778	-2	0.01%
1974	705	2,289	1,138	3,232	-	6	-	7,370	1,838	-	1,028	521	2,915	6,302	1,068	1,066	2	0.02%
1975	705	1,855	824	2,819	-	6	-	6,209	1,838	-	1,046	489	2,996	6,369	-160	-160	0	0.00%
1976	6,581	3,137	1,113	3,796	-	6	-	14,633	1,226	-	736	557	2,763	5,282	9,351	9,352	-1	0.01%
1977	588	2,027	730	2,917	-	6	-	6,268	2,071	-	1,155	509	3,076	6,811	-543	-543	0	0.00%
1978	705	2,081	474	2,575	-	6	-	5,841	1,860	-	1,065	474	3,110	6,509	-668	-668	0	0.00%
1979	5,289	2,361	842	3,671	-	6	-	12,169	1,691	-	986	504	2,909	6,090	6,079	6,081	-2	0.02%
1980	705	2,453	512	2,827	-	6	-	6,503	1,944	-	1,103	480	3,114	6,641	-138	-138	0	0.00%
1981	6,346	3,029	655	3,871	-	6	-	13,907	2,113	-	1,215	504	2,934	6,766	7,141	7,140	1	0.01%
1982	588	1,684	290	3,016	-	6	-	5,584	2,035	-	1,562	471	3,247	7,315	-1,731	-1,732	1	0.01%
1983	705	2,187	71	2,705	-	6	-	5,674	1,953	-	1,356	442	3,318	7,069	-1,395	-1,394	-1	0.01%
1984	588	1,773	-	2,440	-	6	-	4,807	1,910	100	1,344	404	3,357	7,115	-2,308	-2,310	2	0.03%
1985	5,524	2,629	552	3,523	-	6	-	12,234	1,459	-	538	530	3,077	5,604	6,630	6,630	0	0.00%
1986	705	2,122	462	2,418	-	6	-	5,713	1,533	-	33	549	3,285	5,400	313	312	1	0.01%
1987	4,936	2,252	713	3,151	-	6	-	11,058	1,222	-	11	642	3,135	5,010	6,048	6,047	1	0.01%
1988	470	1,299	409	2,128	8	6	-	4,320	1,470	-	-	654	3,348	5,472	-1,152	-1,151	-1	0.02%
1989	470	1,230	198	1,743	15	6	-	3,662	2,273	-	-	567	3,280	6,120	-2,458	-2,459	1	0.02%
1990	588	2,110	54	1,590	23	6	-	4,371	2,769	-	-	497	3,183	6,449	-2,078	-2,079	1	0.02%
1991	5,876	2,642	593	3,072	6	6	-	12,195	2,929	-	-	530	2,884	6,343	5,852	5,855	-3	0.02%
1992	5,876	2,935	592	3,257	4	6	-	12,670	2,067	-	-	647	2,908	5,622	7,048	7,049	-1	0.01%
1993	705	1,854	282	2,291	16	6	-	5,154	1,154	-	-	706	3,269	5,129	25	25	0	0.00%
1994	705	2,268	34	1,892	19	6	-	4,924	1,087	-	-	711	3,342	5,140	-216	-215	-1	0.02%
1995	705	1,725	-	1,635	20	6	-	4,091	746	124	-	732	3,367	4,969	-878	-879	1	0.02%
1996	470	1,377	-	1,380	25	6	-	3,258	2,148	206	-	615	3,298	6,267	-3,009	-3,008	-1	0.02%
1997	6,111	2,887	281	2,806	6	6	-	12,097	1,319	-	-	693	3,083	5,095	7,002	7,002	0	0.00%
1998	5,406	2,561	449	3,061	10	6	-	11,493	2,752	-	-	654	3,131	6,537	4,956	4,956	0	0.00%
1999	588	1,582	165	2,131	19	6	-	4,491	2,068	-	-	667	3,399	6,134	-1,643	-1,644	1	0.01%

Table C-2. Annual groundwater budget for the Gulf Coast Aquifer, Groundwater Management Area 16 portion of Bee County not covered by a Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW				OUTFLOW						
Year	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From Bee16	Total Inflow	Wells	Net Lateral Flow To Bee16	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	12	897	1317	2226	2232	-	2232	-6	-6	0	0.00%
1964	16	865	1273	2154	2149	-	2149	5	4	1	0.05%
1965	22	752	1111	1885	1860	-	1860	25	24	1	0.05%
1966	20	712	1066	1798	1757	-	1757	41	41	0	0.00%
1967	22	504	771	1297	1219	-	1219	78	77	1	0.08%
1968	23	618	916	1557	1529	-	1529	28	27	1	0.06%
1969	21	739	1074	1834	1839	-	1839	-5	-6	1	0.05%
1970	19	725	1056	1800	1798	-	1798	2	3	-1	0.06%
1971	28	589	877	1494	1447	-	1447	47	48	-1	0.07%
1972	24	681	1001	1706	1695	-	1695	11	12	-1	0.06%
1973	30	459	691	1180	1116	-	1116	64	63	1	0.08%
1974	22	716	1028	1766	1798	-	1798	-32	-33	1	0.06%
1975	19	722	1046	1787	1798	-	1798	-11	-11	0	0.00%
1976	29	490	736	1255	1199	-	1199	56	56	0	0.00%
1977	19	804	1155	1978	2025	-	2025	-47	-48	1	0.05%
1978	21	731	1065	1817	1819	-	1819	-2	-2	0	0.00%
1979	24	667	986	1677	1653	-	1653	24	23	1	0.06%
1980	24	760	1103	1887	1901	-	1901	-14	-14	0	0.00%
1981	30	826	1215	2071	2067	-	2067	4	6	-2	0.10%
1982	15	1076	1562	2653	2700	-	2700	-47	-48	1	0.04%
1983	21	922	1356	2299	2292	-	2292	7	7	0	0.00%
1984	18	919	1344	2281	2292	-	2292	-11	-11	0	0.00%
1985	23	341	538	902	805	-	805	97	97	0	0.00%
1986	21	20	33	74	13	-	13	61	62	-1	1.34%
1987	22	12	11	45	11	-	11	34	34	0	0.00%
1988	11	11	-	22	12	8	20	2	2	0	0.00%
1989	12	11	-	23	15	15	30	-7	-8	1	3.28%
1990	22	9	-	31	13	23	36	-5	-4	-1	2.82%
1991	24	10	-	34	13	6	19	15	15	0	0.00%

Table C-3. Annual groundwater budget for the Gulf Coast Aquifer, Groundwater Management Area 16 portion of Brush Country Groundwater Conservation District in Brooks County. All values in acre-feet per year, except as noted.

Year	INFLOW						OUTFLOW														
	Net River Leakage	Recharge	Vertical Leakage Lower	Net Lateral Flow From JimHogg	Net Lateral Flow From JimWells Brush Country	Total Inflow	Wells	Net River Leakage	Net Lateral Flow To Brooks Kenedy	Net Lateral Flow To Duval	Net Lateral Flow To Hidalgo Brush Country	Net Lateral Flow To Jim Wells Brush Country	Net Lateral Flow To Kenedy	Net Lateral Flow To Kleburg Kenedy	Net Lateral Flow To Kleburg White	Net Lateral Flow To Starr	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	726	1,385	2,074	5,341	-	9,526	1,466	-	5,783	1,325	275	243	186	288	123	397	10,086	-560	-559	-1	0.01%
1964	908	1,323	2,077	5,349	-	9,657	1,411	-	5,787	1,322	275	253	187	290	124	399	10,048	-391	-392	1	0.01%
1965	1,090	1,951	2,057	5,332	-	10,430	1,221	-	5,823	1,286	277	266	189	292	126	398	9,878	552	553	-1	0.01%
1966	7,498	2,217	2,033	5,326	-	17,074	1,154	-	6,401	1,299	298	718	225	366	164	409	11,034	6,040	6,043	-3	0.02%
1967	8,815	3,669	2,022	5,366	-	19,872	801	-	6,928	1,190	310	989	303	399	187	411	11,518	8,354	8,355	-1	0.01%
1968	6,971	2,243	2,131	5,449	-	16,794	1,004	-	7,125	1,101	305	955	335	378	182	397	11,782	5,012	5,013	-1	0.01%
1969	657	1,601	2,249	5,556	-	10,063	1,208	-	6,755	989	280	452	267	298	141	375	10,765	-702	-703	1	0.01%
1970	896	1,758	2,285	5,624	-	10,563	1,181	-	6,654	976	278	285	243	280	127	374	10,398	165	165	0	0.00%
1971	7,527	2,402	2,259	5,656	-	17,844	950	-	7,164	987	308	695	311	346	160	403	11,324	6,520	6,519	1	0.01%
1972	6,088	1,810	2,325	5,722	-	15,945	1,113	-	7,332	937	308	715	341	341	162	408	11,657	4,288	4,288	0	0.00%
1973	7,553	3,374	2,330	5,794	-	19,051	733	-	7,756	830	323	810	400	349	170	423	11,794	7,257	7,258	-1	0.01%
1974	97	1,769	2,457	5,889	-	10,212	1,181	-	7,256	737	295	255	303	264	126	409	10,826	-614	-615	1	0.01%
1975	501	1,956	2,487	5,944	-	10,888	1,181	-	7,133	754	297	87	270	248	112	419	10,501	387	386	1	0.01%
1976	7,656	2,738	2,441	5,948	-	18,783	787	-	7,742	766	335	550	365	323	149	460	11,477	7,306	7,306	0	0.00%
1977	51	1,491	2,533	6,000	-	10,075	1,330	-	7,334	725	310	122	290	254	117	453	10,935	-860	-860	0	0.00%
1978	516	1,923	2,532	6,015	-	10,986	1,194	-	7,259	727	315	5	267	243	107	471	10,588	398	398	0	0.00%
1979	6,198	1,948	2,507	6,006	-	16,659	1,086	-	7,699	784	344	388	333	303	137	503	11,577	5,082	5,082	0	0.00%
1980	258	1,899	2,546	6,021	-	10,724	1,249	-	7,414	723	327	60	285	250	113	499	10,920	-196	-196	0	0.00%
1981	7,177	2,666	2,507	6,035	-	18,385	1,357	-	7,963	812	358	476	374	313	144	527	12,324	6,061	6,060	1	0.01%
1982	-	1,406	2,589	6,086	-	10,081	1,376	64	7,560	711	335	39	298	245	111	519	11,258	-1,177	-1,177	0	0.00%
1983	393	2,030	2,582	6,092	93	11,190	1,457	-	7,477	712	340	-	275	235	102	531	11,129	61	62	-1	0.01%
1984	431	1,473	2,582	6,072	137	10,695	1,426	-	7,414	726	344	-	261	235	100	543	11,049	-354	-355	1	0.01%
1985	6,455	2,359	2,521	6,044	-	17,379	1,355	-	7,904	759	373	303	339	302	135	572	12,042	5,337	5,339	-2	0.01%
1986	244	1,755	2,574	6,057	140	10,770	2,413	-	7,581	606	357	-	288	245	108	568	12,166	-1,396	-1,398	2	0.02%
1987	5,557	2,034	2,562	6,070	-	16,223	1,857	-	7,956	683	383	186	345	288	129	601	12,428	3,795	3,793	2	0.01%
1988	-	1,362	2,614	6,102	163	10,241	1,813	116	7,631	579	361	-	289	234	103	581	11,707	-1,466	-1,466	0	0.00%
1989	198	1,079	2,623	6,106	280	10,286	1,735	-	7,537	607	370	-	267	225	95	597	11,433	-1,147	-1,146	-1	0.01%
1990	477	1,411	2,593	6,095	251	10,827	1,191	-	7,501	699	376	-	257	229	96	607	10,956	-129	-128	-1	0.01%
1991	6,864	2,163	2,528	6,064	-	17,619	1,432	-	8,023	756	404	222	343	301	133	631	12,245	5,374	5,374	0	0.00%
1992	6,343	2,300	2,582	6,114	-	17,339	4,603	-	8,248	444	405	95	396	303	139	632	15,265	2,074	2,076	-2	0.01%
1993	75	2,153	2,709	6,246	541	11,724	5,811	-	7,790	318	381	-	314	225	99	611	15,549	-3,825	-3,826	1	0.01%
1994	522	1,689	2,768	6,347	787	12,113	6,109	-	7,596	368	381	-	283	207	85	608	15,637	-3,524	-3,523	-1	0.01%
1995	770	2,029	2,766	6,413	924	12,902	6,261	-	7,451	332	383	-	267	203	80	611	15,588	-2,686	-2,686	0	0.00%
1996	628	1,136	2,773	6,431	925	11,893	5,030	-	7,309	537	382	-	253	201	76	612	14,400	-2,507	-2,506	-1	0.01%
1997	7,955	2,149	2,686	6,418	434	19,642	4,431	-	7,830	812	410	-	342	274	114	628	14,841	4,801	4,801	0	0.00%
1998	6,539	2,089	2,688	6,423	420	18,159	5,023	-	7,921	751	408	-	379	270	117	625	15,494	2,665	2,665	0	0.00%
1999	285	2,005	2,718	6,441	746	12,195	4,041	-	7,516	575	384	-	301	200	81	601	13,699	-1,504	-1,502	-2	0.01%

Table C-4. Annual groundwater budget for the Gulf Coast Aquifer, Groundwater Management Area 16 portion of Kenedy County Groundwater Conservation District in Brooks County. All values in acre-feet per year, except as noted.

	INFLOW					OUTFLOW										
Year	Net River Leakage	Recharge	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From Hidalgo Brush Country	Total Inflow	Wells	Net River Leakage	Net Lateral Flow To Hidalgo Brush Country	Net Lateral Flow To Hidalgo Kenedy	Net Lateral Flow To Kenedy	Net Lateral Flow To Kleburg Kenedy	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	443	5,783	23	6,249	47	293	-	1,071	4,149	851	6,411	-162	-161	-1	0.02%
1964	-	405	5,787	23	6,215	45	249	-	1,073	4,141	850	6,358	-143	-144	1	0.02%
1965	-	611	5,823	21	6,455	39	226	-	1,074	4,144	858	6,341	114	114	0	0.00%
1966	957	667	6,401	2	8,027	37	-	-	1,269	4,275	1,000	6,581	1,446	1,446	0	0.00%
1967	1,361	1,127	6,928	-	9,416	25	-	13	1,453	4,702	1,172	7,365	2,051	2,050	1	0.01%
1968	1,057	735	7,125	-	8,917	32	-	12	1,462	4,943	1,250	7,699	1,218	1,217	1	0.01%
1969	-	565	6,755	11	7,331	38	357	-	1,232	4,714	1,159	7,500	-169	-169	0	0.00%
1970	-	583	6,654	19	7,256	37	326	-	1,174	4,587	1,087	7,211	45	45	0	0.00%
1971	1,149	783	7,164	-	9,096	30	-	2	1,419	4,842	1,192	7,485	1,611	1,610	1	0.01%
1972	909	599	7,332	-	8,840	35	-	6	1,453	5,047	1,262	7,803	1,037	1,036	1	0.01%
1973	1,347	971	7,756	-	10,074	23	-	16	1,583	5,426	1,358	8,406	1,668	1,669	-1	0.01%
1974	-	538	7,256	10	7,804	37	415	-	1,305	4,999	1,244	8,000	-196	-196	0	0.00%
1975	-	642	7,133	19	7,794	37	382	-	1,245	4,822	1,159	7,645	149	148	1	0.01%
1976	1,301	825	7,742	-	9,868	25	-	7	1,531	5,206	1,278	8,047	1,821	1,821	0	0.00%
1977	-	465	7,334	14	7,813	42	442	-	1,298	4,963	1,210	7,955	-142	-142	0	0.00%
1978	-	575	7,259	19	7,853	38	376	-	1,257	4,840	1,146	7,657	196	195	1	0.01%
1979	937	616	7,699	-	9,252	34	-	-	1,475	5,097	1,235	7,841	1,411	1,411	0	0.00%
1980	-	623	7,414	13	8,050	40	404	-	1,311	4,963	1,192	7,910	140	141	-1	0.01%
1981	1,215	823	7,963	-	10,001	43	-	8	1,574	5,361	1,300	8,286	1,715	1,716	-1	0.01%
1982	-	426	7,560	12	7,998	41	459	-	1,343	5,081	1,227	8,151	-153	-153	0	0.00%
1983	-	653	7,477	18	8,148	37	402	-	1,306	4,958	1,166	7,869	279	278	1	0.01%
1984	-	492	7,414	20	7,926	35	419	-	1,282	4,874	1,127	7,737	189	189	0	0.00%
1985	987	711	7,904	-	9,602	37	-	3	1,530	5,188	1,240	7,998	1,604	1,604	0	0.00%
1986	-	567	7,581	12	8,160	53	425	-	1,364	5,035	1,198	8,075	85	86	-1	0.01%
1987	799	624	7,956	-	9,379	47	-	3	1,537	5,269	1,260	8,116	1,263	1,262	1	0.01%
1988	-	429	7,631	13	8,073	49	497	-	1,363	5,073	1,197	8,179	-106	-105	-1	0.01%
1989	-	335	7,537	17	7,889	39	461	-	1,320	4,947	1,135	7,902	-13	-10	-3	0.04%
1990	-	425	7,501	18	7,944	38	415	-	1,314	4,883	1,107	7,757	187	186	1	0.01%
1991	1,085	672	8,023	-	9,780	54	-	6	1,585	5,250	1,237	8,132	1,648	1,649	-1	0.01%
1992	1,033	716	8,248	-	9,997	51	-	14	1,670	5,565	1,339	8,639	1,358	1,357	1	0.01%
1993	-	709	7,790	7	8,506	43	476	-	1,444	5,239	1,250	8,452	54	56	-2	0.02%
1994	-	545	7,596	15	8,156	46	442	-	1,388	5,049	1,173	8,098	58	57	1	0.01%
1995	-	638	7,451	17	8,106	44	432	-	1,374	4,936	1,126	7,912	194	192	2	0.02%
1996	-	378	7,309	19	7,706	44	479	-	1,345	4,841	1,086	7,795	-89	-90	1	0.01%
1997	1,125	701	7,830	-	9,656	41	-	7	1,631	5,195	1,215	8,089	1,567	1,566	1	0.01%
1998	874	657	7,921	-	9,452	38	-	12	1,678	5,429	1,300	8,457	995	995	0	0.00%
1999	-	624	7,516	9	8,149	40	523	-	1,450	5,116	1,211	8,340	-191	-193	2	0.02%

Table C-5. Annual groundwater budget for the Gulf Coast Aquifer, Cameron County. All values in acre-feet per year, except as noted.

	INFLOW						OUTFLOW								
Year	Net River Leakage	Recharge	Net Lateral Flow From Hidalgo White	Net Lateral Flow From Mexico	Net Lateral Flow From Willacy White	Total Inflow	Wells	Net River Leakage	Net Lateral Flow To Gulf	Net Lateral Flow To Willacy White	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	2,282	393	2,971	203	5,849	1,297	3,768	982	-	6,047	-198	-197	-1	0.02%
1964	-	1,477	446	2,942	185	5,050	1,249	2,782	970	-	5,001	49	50	-1	0.02%
1965	-	1,977	649	2,848	147	5,621	1,081	2,168	972	-	4,221	1,400	1,400	0	0.00%
1966	20,717	2,465	2,094	1,670	-	26,946	1,021	-	968	716	2,705	24,241	24,239	2	0.01%
1967	10,613	3,514	4,233	2,189	-	20,549	708	-	997	1,173	2,878	17,671	17,797	-126	0.61%
1968	-	2,687	4,425	3,007	-	10,119	889	1,847	1,016	1,038	4,790	5,329	5,329	0	0.00%
1969	-	2,099	3,898	3,648	-	9,645	1,069	18,472	1,024	600	21,165	-11,520	-11,521	1	0.00%
1970	-	2,802	3,406	3,779	-	9,987	1,045	12,849	1,033	434	15,361	-5,374	-5,350	-24	0.15%
1971	8,195	2,520	4,319	3,368	-	18,402	841	-	1,036	887	2,764	15,638	15,638	0	0.00%
1972	-	2,588	4,443	3,591	-	10,622	985	3,583	1,048	828	6,444	4,178	4,179	-1	0.01%
1973	-	3,247	4,513	3,634	-	11,394	648	2,579	1,062	803	5,092	6,302	6,302	0	0.00%
1974	-	2,025	4,154	4,299	-	10,478	1,045	21,441	1,070	458	24,014	-13,536	-13,534	-2	0.01%
1975	-	2,700	3,811	4,309	-	10,820	1,045	14,634	1,078	354	17,111	-6,291	-6,259	-32	0.18%
1976	7,146	3,791	4,497	3,709	-	19,143	696	-	1,092	781	2,569	16,574	16,573	1	0.01%
1977	-	2,248	4,003	4,187	-	10,438	1,177	19,669	1,099	394	22,339	-11,901	-11,899	-2	0.01%
1978	-	2,542	3,698	4,236	-	10,476	1,057	13,371	1,106	311	15,845	-5,369	-5,364	-5	0.03%
1979	5,652	2,597	4,333	3,722	-	16,304	961	-	1,102	720	2,783	13,521	13,518	3	0.02%
1980	-	1,929	3,970	4,097	-	9,996	1,105	17,063	1,102	378	19,648	-9,652	-9,652	0	0.00%
1981	6,165	2,776	4,313	3,768	-	17,022	1,201	-	1,100	773	3,074	13,948	13,951	-3	0.02%
1982	-	2,323	4,211	4,232	-	10,766	1,461	19,504	1,106	378	22,449	-11,683	-11,685	2	0.01%
1983	-	2,818	3,949	4,321	-	11,088	1,819	13,310	1,109	271	16,509	-5,421	-5,422	1	0.01%
1984	-	3,083	3,632	4,266	-	10,981	2,030	11,709	1,120	148	15,007	-4,026	-4,028	2	0.01%
1985	8,816	2,479	4,311	3,616	-	19,222	973	-	1,114	660	2,747	16,475	16,474	1	0.01%
1986	-	2,511	3,790	4,041	-	10,342	1,496	16,538	1,119	286	19,439	-9,097	-9,095	-2	0.01%
1987	3,296	2,806	4,320	3,808	-	14,230	1,729	-	1,128	609	3,466	10,764	10,764	0	0.00%
1988	-	2,018	3,758	4,198	-	9,974	1,461	17,729	1,126	251	20,567	-10,593	-10,594	1	0.00%
1989	-	1,813	3,332	4,329	-	9,474	2,301	12,489	1,120	127	16,037	-6,563	-6,563	0	0.00%
1990	-	1,507	2,128	4,291	-	7,926	2,287	9,080	1,105	31	12,503	-4,577	-4,576	-1	0.01%
1991	13,516	2,817	3,464	3,400	-	23,197	2,229	-	1,109	678	4,016	19,181	19,183	-2	0.01%
1992	320	2,954	4,486	3,675	-	11,435	2,263	-	1,124	672	4,059	7,376	7,384	-8	0.07%
1993	-	2,550	3,821	4,214	-	10,585	1,894	18,719	1,140	309	22,062	-11,477	-11,476	-1	0.00%
1994	-	2,333	3,164	4,412	-	9,909	2,339	12,529	1,137	208	16,213	-6,304	-6,304	0	0.00%
1995	-	2,821	2,764	4,331	-	9,916	2,317	10,211	1,141	110	13,779	-3,863	-3,864	1	0.01%
1996	-	1,950	2,704	4,375	20	9,049	3,043	9,825	1,131	-	13,999	-4,950	-4,949	-1	0.01%
1997	14,704	3,005	4,327	3,588	-	25,624	3,577	-	1,130	675	5,382	20,242	20,247	-5	0.02%
1998	-	2,414	4,605	3,902	-	10,921	3,627	368	1,127	585	5,707	5,214	5,214	0	0.00%
1999	-	2,037	4,008	4,364	-	10,409	2,820	18,242	1,123	203	22,388	-11,979	-11,979	0	0.00%

Table C-6. Annual groundwater budget for the Gulf Coast Aquifer, Duval County. All values in acre-feet per year, except as noted.

Year	INFLOW							OUTFLOW									
	Net River Leakage	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From JimHogg	Net Lateral Flow From Webb16	Total Inflow	Wells	Net Vertical Leakage Lower	Net Lateral Flow To Jim Wells Brush Country	Net Lateral Flow To LiveOak	Net Lateral Flow To Mcmullen 16	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	4,989	4,571	2,746	1,325	660	515	14,806	4,468	-	12,609	2	23	17,102	-2,296	-2,297	1	0.01%
1964	6,235	5,071	2,599	1,322	660	514	16,401	4,302	-	12,580	3	23	16,908	-507	-506	-1	0.01%
1965	7,484	5,843	2,410	1,286	662	514	18,199	3,723	-	12,622	4	23	16,372	1,827	1,826	1	0.01%
1966	52,391	7,920	-	1,299	684	494	62,788	3,516	3,202	12,700	28	27	19,473	43,315	43,314	1	0.00%
1967	69,854	10,200	-	1,190	772	486	82,502	2,441	5,076	13,176	57	27	20,777	61,725	61,726	-1	0.00%
1968	59,875	6,937	-	1,101	895	490	69,298	3,061	3,540	13,494	74	25	20,194	49,104	49,102	2	0.00%
1969	7,484	5,659	2,788	989	986	512	18,418	3,682	-	13,673	60	21	17,436	982	985	-3	0.01%
1970	7,484	6,166	1,792	976	989	511	17,918	3,599	-	13,665	51	23	17,338	580	579	1	0.00%
1971	62,370	10,763	-	987	971	479	75,570	2,896	5,705	13,874	74	31	22,580	52,990	52,989	1	0.00%
1972	54,886	7,190	-	937	1,021	470	64,504	3,392	4,292	14,186	87	31	21,988	42,516	42,516	0	0.00%
1973	70,117	10,857	-	830	1,088	449	83,341	2,234	6,867	14,631	107	34	23,873	59,468	59,470	-2	0.00%
1974	7,484	7,190	887	737	1,134	473	17,905	3,599	-	14,846	90	29	18,564	-659	-661	2	0.01%
1975	7,484	5,819	-	754	1,101	470	15,628	3,599	131	14,840	77	32	18,679	-3,051	-3,053	2	0.01%
1976	68,813	10,855	-	766	1,048	429	81,911	2,399	8,681	15,069	102	41	26,292	55,619	55,618	1	0.00%
1977	6,235	5,351	55	725	1,071	449	13,886	4,054	-	15,242	86	37	19,419	-5,533	-5,533	0	0.00%
1978	7,484	7,556	-	727	1,026	447	17,240	3,641	953	15,278	77	40	19,989	-2,749	-2,748	-1	0.00%
1979	56,012	7,532	-	784	990	417	65,735	3,310	7,370	15,347	94	46	26,167	39,568	39,567	1	0.00%
1980	7,484	6,185	-	723	1,001	433	15,826	3,806	692	15,519	83	44	20,144	-4,318	-4,316	-2	0.01%
1981	65,292	10,029	-	812	991	397	77,521	4,137	8,842	15,548	105	51	28,683	48,838	48,840	-2	0.00%
1982	6,235	5,445	-	711	1,005	420	13,816	4,152	846	15,711	90	47	20,846	-7,030	-7,029	-1	0.00%
1983	7,484	6,274	-	712	960	419	15,849	3,964	1,774	15,680	80	49	21,547	-5,698	-5,699	1	0.00%
1984	6,235	5,396	-	726	887	416	13,660	3,804	1,797	15,635	73	51	21,360	-7,700	-7,699	-1	0.00%
1985	57,999	9,124	-	759	831	388	69,101	3,261	8,596	15,702	95	57	27,711	41,390	41,390	0	0.00%
1986	7,484	6,214	-	606	856	408	15,568	3,245	1,509	15,934	83	54	20,825	-5,257	-5,256	-1	0.00%
1987	51,929	7,666	-	683	903	388	61,569	4,571	7,606	15,843	99	58	28,177	33,392	33,392	0	0.00%
1988	4,989	4,813	-	579	925	407	11,713	3,787	1,272	16,012	86	55	21,212	-9,499	-9,501	2	0.01%
1989	4,989	3,674	-	607	959	405	10,634	4,437	1,633	15,846	75	56	22,047	-11,413	-11,414	1	0.00%
1990	6,235	6,178	-	699	912	401	14,425	4,813	1,949	15,734	69	58	22,623	-8,198	-8,198	0	0.00%
1991	60,842	8,663	-	756	866	368	71,495	4,430	9,061	15,777	94	64	29,426	42,069	42,068	1	0.00%
1992	57,886	8,164	-	444	917	360	67,771	4,729	8,029	15,893	112	64	28,827	38,944	38,944	0	0.00%
1993	7,484	6,730	-	318	1,001	381	15,914	7,091	1,876	15,706	96	58	24,827	-8,913	-8,915	2	0.01%
1994	7,484	7,234	-	368	1,049	386	16,521	8,743	2,302	15,393	85	60	26,583	-10,062	-10,063	1	0.00%
1995	7,484	8,679	-	332	1,023	385	17,903	7,812	2,496	15,284	77	61	25,730	-7,827	-7,828	1	0.00%
1996	4,989	3,486	-	537	975	387	10,374	8,331	1,949	15,056	69	63	25,468	-15,094	-15,093	-1	0.00%
1997	62,354	7,899	-	812	996	355	72,416	7,638	9,382	15,036	94	68	32,218	40,198	40,198	0	0.00%
1998	53,395	6,802	-	751	992	352	62,292	6,485	7,716	15,298	109	67	29,675	32,617	32,618	-1	0.00%
1999	6,235	5,927	-	575	1,109	376	14,222	7,172	1,609	15,597	94	62	24,534	-10,312	-10,310	-2	0.01%

Table C-7. Annual groundwater budget for the Gulf Coast Aquifer, Hidalgo County, Brush Country Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW							OUTFLOW							
Year	River Leakage	Recharge	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From Brooks Kenedy	Net Lateral Flow From Hidalgo White	Net Lateral Flow From Starr	Total Inflow	Wells	Net Lateral Flow To Brooks Kenedy	Net Lateral Flow To Hidalgo Kenedy	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	1	44	275	-	402	552	1,274	9	23	1,252	1,284	-10	-9	-1	0.08%
1964	2	37	275	-	399	550	1,263	9	23	1,247	1,279	-16	-14	-2	0.16%
1965	2	55	277	-	401	551	1,286	7	21	1,250	1,278	8	7	1	0.08%
1966	14	61	298	-	386	550	1,309	7	2	1,241	1,250	59	61	-2	0.15%
1967	19	101	310	13	377	561	1,381	5	-	1,251	1,256	125	125	0	0.00%
1968	16	63	305	12	370	569	1,335	6	-	1,257	1,263	72	72	0	0.00%
1969	2	44	280	-	384	576	1,286	7	11	1,278	1,296	-10	-10	0	0.00%
1970	2	58	278	-	399	581	1,318	7	19	1,298	1,324	-6	-6	0	0.00%
1971	17	64	308	2	385	584	1,360	6	-	1,298	1,304	56	59	-3	0.22%
1972	15	54	308	6	380	590	1,353	7	-	1,298	1,305	48	48	0	0.00%
1973	20	88	323	16	375	603	1,425	4	-	1,316	1,320	105	103	2	0.14%
1974	2	49	295	-	389	613	1,348	7	10	1,339	1,356	-8	-9	1	0.07%
1975	2	61	297	-	402	620	1,382	7	19	1,362	1,388	-6	-6	0	0.00%
1976	19	70	335	7	384	624	1,439	5	-	1,364	1,369	70	71	-1	0.07%
1977	2	41	310	-	394	630	1,377	8	14	1,373	1,395	-18	-18	0	0.00%
1978	2	46	315	-	400	633	1,396	7	19	1,386	1,412	-16	-16	0	0.00%
1979	15	50	344	-	385	633	1,427	7	-	1,381	1,388	39	41	-2	0.14%
1980	2	49	327	-	395	639	1,412	8	13	1,392	1,413	-1	-2	1	0.07%
1981	19	69	358	8	381	641	1,476	8	-	1,394	1,402	74	73	1	0.07%
1982	2	40	335	-	390	647	1,414	8	12	1,405	1,425	-11	-11	0	0.00%
1983	2	53	340	-	396	651	1,442	7	18	1,421	1,446	-4	-3	-1	0.07%
1984	2	45	344	-	400	650	1,441	6	20	1,427	1,453	-12	-13	1	0.07%
1985	16	61	373	3	384	650	1,487	6	-	1,421	1,427	60	59	1	0.07%
1986	2	44	357	-	388	656	1,447	22	12	1,425	1,459	-12	-10	-2	0.14%
1987	14	51	383	3	374	655	1,480	5	-	1,426	1,431	49	49	0	0.00%
1988	1	40	361	-	386	659	1,447	18	13	1,433	1,464	-17	-18	1	0.07%
1989	1	30	370	-	387	661	1,449	20	17	1,440	1,477	-28	-28	0	0.00%
1990	2	40	376	-	389	662	1,469	22	18	1,444	1,484	-15	-15	0	0.00%
1991	17	56	404	6	372	661	1,516	21	-	1,435	1,456	60	61	-1	0.07%
1992	17	60	405	14	363	665	1,524	16	-	1,433	1,449	75	75	0	0.00%
1993	2	57	381	-	377	674	1,491	16	7	1,455	1,478	13	13	0	0.00%
1994	2	43	381	-	384	676	1,486	17	15	1,468	1,500	-14	-14	0	0.00%
1995	2	47	383	-	389	678	1,499	18	17	1,474	1,509	-10	-11	1	0.07%
1996	1	29	382	-	390	674	1,476	16	19	1,471	1,506	-30	-30	0	0.00%
1997	18	62	410	7	376	672	1,545	16	-	1,461	1,477	68	67	1	0.06%
1998	16	56	408	12	368	672	1,532	14	-	1,457	1,471	61	61	0	0.00%
1999	2	52	384	-	383	681	1,502	16	9	1,475	1,500	2	0	2	0.13%

Table C-8. Annual groundwater budget for the Gulf Coast Aquifer, Hidalgo County, Kenedy County Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW					OUTFLOW							
Year	Recharge	Net Lateral Flow From Brooks Kenedy	Net Lateral Flow From Hidalgo Brush Country	Net Lateral Flow From Hidalgo White	Total Inflow	Wells	Net River Leakage	Net Lateral Flow To Kenedy	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	217	1,071	1,252	1,112	3,652	38	2,839	811	3,688	-36	-37	1	0.03%
1964	176	1,073	1,247	1,104	3,600	37	2,808	810	3,655	-55	-55	0	0.00%
1965	254	1,074	1,250	1,100	3,678	32	2,805	809	3,646	32	32	0	0.00%
1966	292	1,269	1,241	1,033	3,835	30	2,614	822	3,466	369	369	0	0.00%
1967	455	1,453	1,251	987	4,146	21	2,762	828	3,611	535	534	1	0.02%
1968	296	1,462	1,257	983	3,998	26	2,886	831	3,743	255	255	0	0.00%
1969	235	1,232	1,278	1,056	3,801	32	3,111	820	3,963	-162	-164	2	0.05%
1970	289	1,174	1,298	1,094	3,855	31	3,047	812	3,890	-35	-34	-1	0.03%
1971	322	1,419	1,298	1,026	4,065	25	2,818	817	3,660	405	405	0	0.00%
1972	273	1,453	1,298	1,010	4,034	29	2,944	823	3,796	238	237	1	0.02%
1973	397	1,583	1,316	985	4,281	19	2,988	824	3,831	450	449	1	0.02%
1974	234	1,305	1,339	1,065	3,943	31	3,256	818	4,105	-162	-163	1	0.02%
1975	308	1,245	1,362	1,103	4,018	31	3,188	809	4,028	-10	-9	-1	0.02%
1976	344	1,531	1,364	1,029	4,268	21	2,944	813	3,778	490	491	-1	0.02%
1977	205	1,298	1,373	1,083	3,959	35	3,250	811	4,096	-137	-136	-1	0.02%
1978	230	1,257	1,386	1,105	3,978	31	3,166	804	4,001	-23	-23	0	0.00%
1979	257	1,475	1,381	1,042	4,155	29	2,953	812	3,794	361	363	-2	0.05%
1980	245	1,311	1,392	1,085	4,033	33	3,226	809	4,068	-35	-35	0	0.00%
1981	337	1,574	1,394	1,024	4,329	36	2,991	826	3,853	476	477	-1	0.02%
1982	195	1,343	1,405	1,081	4,024	33	3,281	816	4,130	-106	-107	1	0.02%
1983	270	1,306	1,421	1,105	4,102	30	3,223	808	4,061	41	39	2	0.05%
1984	223	1,282	1,427	1,118	4,050	26	3,191	803	4,020	30	30	0	0.00%
1985	280	1,530	1,421	1,047	4,278	24	2,991	813	3,828	450	451	-1	0.02%
1986	228	1,364	1,425	1,086	4,103	98	3,271	800	4,169	-66	-68	2	0.05%
1987	254	1,537	1,426	1,042	4,259	21	3,059	815	3,895	364	365	-1	0.02%
1988	196	1,363	1,433	1,090	4,082	80	3,290	808	4,178	-96	-96	0	0.00%
1989	139	1,320	1,440	1,108	4,007	88	3,199	802	4,089	-82	-83	1	0.02%
1990	189	1,314	1,444	1,112	4,059	96	3,163	801	4,060	-1	0	-1	0.02%
1991	278	1,585	1,435	1,037	4,335	94	2,969	817	3,880	455	454	1	0.02%
1992	300	1,670	1,433	1,007	4,410	69	3,119	819	4,007	403	403	0	0.00%
1993	283	1,444	1,455	1,072	4,254	71	3,387	810	4,268	-14	-13	-1	0.02%
1994	219	1,388	1,468	1,102	4,177	74	3,306	797	4,177	0	1	-1	0.02%
1995	264	1,374	1,474	1,113	4,225	78	3,289	787	4,154	71	71	0	0.00%
1996	158	1,345	1,471	1,119	4,093	70	3,248	784	4,102	-9	-10	1	0.02%
1997	308	1,631	1,461	1,039	4,439	71	3,050	797	3,918	521	521	0	0.00%
1998	279	1,678	1,457	1,017	4,431	62	3,210	803	4,075	356	356	0	0.00%
1999	248	1,450	1,475	1,082	4,255	71	3,432	790	4,293	-38	-36	-2	0.05%

Table C-9. Annual groundwater budget for the Gulf Coast Aquifer, Hidalgo County, Red Sands Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW			OUTFLOW					
Year	Recharge	Net Lateral Flow From Hidalgo White	Total Inflow	Wells	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	103	245	348	358	358	-10	-11	1	0.28%
1964	69	242	311	345	345	-34	-34	0	0.00%
1965	113	235	348	299	299	49	49	0	0.00%
1966	139	228	367	282	282	85	85	0	0.00%
1967	196	214	410	196	196	214	214	0	0.00%
1968	125	208	333	246	246	87	87	0	0.00%
1969	93	209	302	295	295	7	7	0	0.00%
1970	136	211	347	289	289	58	58	0	0.00%
1971	128	204	332	232	232	100	100	0	0.00%
1972	125	205	330	272	272	58	57	1	0.30%
1973	178	194	372	179	179	193	193	0	0.00%
1974	110	200	310	289	289	21	20	1	0.31%
1975	137	206	343	289	289	54	54	0	0.00%
1976	152	196	348	192	192	156	156	0	0.00%
1977	92	207	299	325	325	-26	-26	0	0.00%
1978	94	211	305	292	292	13	14	-1	0.32%
1979	107	212	319	266	266	53	53	0	0.00%
1980	108	218	326	305	305	21	20	1	0.30%
1981	144	228	372	332	332	40	40	0	0.00%
1982	89	233	322	330	330	-8	-8	0	0.00%
1983	114	239	353	329	329	24	25	-1	0.28%
1984	103	246	349	347	347	2	3	-1	0.27%
1985	120	260	380	393	393	-13	-13	0	0.00%
1986	99	214	313	14	14	299	298	1	0.32%
1987	106	186	292	7	7	285	285	0	0.00%
1988	89	164	253	11	11	242	242	0	0.00%
1989	62	200	262	403	403	-141	-140	-1	0.23%
1990	85	273	358	758	758	-400	-398	-2	0.26%
1991	121	322	443	730	730	-287	-288	1	0.13%
1992	129	300	429	308	308	121	122	-1	0.23%
1993	118	313	431	476	476	-45	-46	1	0.20%
1994	93	332	425	546	546	-121	-121	0	0.00%
1995	102	340	442	489	489	-47	-47	0	0.00%
1996	64	320	384	308	308	76	76	0	0.00%
1997	131	300	431	225	225	206	205	1	0.23%
1998	116	315	431	442	442	-11	-12	1	0.21%
1999	107	327	434	457	457	-23	-23	0	0.00%

Table C-10. Annual groundwater budget for the Gulf Coast Aquifer, Hidalgo County, non-district area. All values in acre-feet per year, except as noted.

	INFLOW						OUTFLOW												
Year	Net River Leakage	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From Mexico	Net Lateral Flow From Starr	Total Inflow	Wells	Net Lateral Flow To Cameron	Net Lateral Flow To Hidalgo Brush Country	Net Lateral Flow To Hidalgo Kenedy	Net Lateral Flow To Hidalgo Red Sands	Net Lateral Flow To Kenedy	Net Lateral Flow To Willacy Kenedy	Net Lateral Flow To Willacy White	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	1,832	3,707	495	5,533	3,715	15,282	12,476	393	402	1,112	245	217	234	628	15,707	-425	-424	-1	0.01%
1964	2,473	2,497	506	5,452	3,720	14,648	12,014	446	399	1,104	242	217	234	627	15,283	-635	-634	-1	0.01%
1965	3,096	3,984	510	4,971	3,729	16,290	10,397	649	401	1,100	235	216	233	624	13,855	2,435	2,434	1	0.01%
1966	25,646	5,193	654	4,691	3,942	40,126	9,819	2,094	386	1,033	228	216	233	641	14,650	25,476	25,476	0	0.00%
1967	28,924	7,080	736	3,822	4,259	44,821	6,816	4,233	377	987	214	215	233	628	13,703	31,118	31,702	-584	1.29%
1968	19,264	4,364	749	4,373	4,464	33,214	8,548	4,425	370	983	208	215	233	625	15,607	17,607	17,608	-1	0.00%
1969	2,146	3,322	590	3,332	4,381	13,771	10,281	3,898	384	1,056	209	215	233	645	16,921	-3,150	-3,150	0	0.00%
1970	2,766	4,841	500	3,307	4,275	15,689	10,050	3,406	399	1,094	211	215	233	662	16,270	-581	-581	0	0.00%
1971	22,772	4,513	626	4,156	4,437	36,504	8,086	4,319	385	1,026	204	214	233	653	15,120	21,384	21,382	2	0.01%
1972	15,650	4,595	652	4,553	4,576	30,026	9,473	4,443	380	1,010	205	215	233	647	16,606	13,420	13,427	-7	0.02%
1973	14,575	6,361	687	4,038	4,791	30,452	6,238	4,513	375	985	194	214	233	645	13,397	17,055	17,094	-39	0.13%
1974	543	4,046	514	3,538	4,684	13,325	10,050	4,154	389	1,065	200	215	234	656	16,963	-3,638	-3,638	0	0.00%
1975	2,211	5,001	416	3,363	4,564	15,555	10,050	3,811	402	1,103	206	215	234	667	16,688	-1,133	-1,132	-1	0.00%
1976	19,610	5,651	555	4,327	4,749	34,892	6,700	4,497	384	1,029	196	214	234	659	13,913	20,979	21,061	-82	0.23%
1977	858	3,344	427	3,711	4,650	12,990	11,321	4,003	394	1,083	207	215	234	660	18,117	-5,127	-5,124	-3	0.01%
1978	2,422	3,490	358	3,539	4,547	14,356	10,166	3,698	400	1,105	211	215	234	667	16,696	-2,340	-2,341	1	0.00%
1979	18,990	3,877	475	4,461	4,667	32,470	9,242	4,333	385	1,042	212	215	234	660	16,323	16,147	16,149	-2	0.01%
1980	1,628	3,902	368	3,666	4,592	14,156	10,628	3,970	395	1,085	218	215	234	659	17,404	-3,248	-3,247	-1	0.00%
1981	19,985	5,290	495	5,189	4,778	35,737	11,552	4,313	381	1,024	228	216	234	659	18,607	17,130	17,150	-20	0.06%
1982	589	3,216	360	4,028	4,695	12,888	10,981	4,211	390	1,081	233	217	235	655	18,003	-5,115	-5,114	-1	0.00%
1983	2,304	4,208	291	4,024	4,604	15,431	11,306	3,949	396	1,105	239	216	235	657	18,103	-2,672	-2,672	0	0.00%
1984	2,033	3,799	250	4,075	4,506	14,663	11,512	3,632	400	1,118	246	216	235	655	18,014	-3,351	-3,349	-2	0.01%
1985	21,368	4,305	429	5,319	4,671	36,092	11,453	4,311	384	1,047	260	215	235	646	18,551	17,541	17,543	-2	0.01%
1986	1,852	3,696	344	4,652	4,632	15,176	13,887	3,790	388	1,086	214	214	233	636	20,448	-5,272	-5,273	1	0.00%
1987	18,169	3,854	443	5,618	4,739	32,823	13,018	4,320	374	1,042	186	214	234	636	20,024	12,799	12,796	3	0.01%
1988	745	3,283	343	4,894	4,657	13,922	13,499	3,758	386	1,090	164	214	233	633	19,977	-6,055	-6,055	0	0.00%
1989	1,405	2,229	301	5,138	4,583	13,656	13,879	3,332	387	1,108	200	214	233	640	19,993	-6,337	-6,334	-3	0.01%
1990	2,073	3,084	263	7,809	4,519	17,748	22,719	2,128	389	1,112	273	214	232	639	27,706	-9,958	-9,959	1	0.00%
1991	27,024	4,451	426	8,863	4,714	45,478	22,257	3,464	372	1,037	322	214	232	635	28,533	16,945	16,953	-8	0.02%
1992	19,338	4,741	501	6,212	4,917	35,709	12,052	4,486	363	1,007	300	213	231	623	19,275	16,434	16,680	-246	0.69%
1993	1,524	4,249	368	5,710	4,872	16,723	15,665	3,821	377	1,072	313	213	231	623	22,315	-5,592	-5,595	3	0.01%
1994	2,404	3,345	316	6,693	4,782	17,540	19,119	3,164	384	1,102	332	212	231	632	25,176	-7,636	-7,638	2	0.01%
1995	2,606	3,740	296	6,795	4,737	18,174	18,229	2,764	389	1,113	340	210	231	638	23,914	-5,740	-5,738	-2	0.01%
1996	1,407	2,188	284	5,701	4,630	14,210	15,583	2,704	390	1,119	320	209	231	635	21,191	-6,981	-6,982	1	0.00%
1997	26,273	4,772	463	5,879	4,841	42,228	13,790	4,327	376	1,039	300	209	230	634	20,905	21,323	21,322	1	0.00%
1998	18,680	4,117	525	7,093	5,006	35,421	19,421	4,605	368	1,017	315	209	230	622	26,787	8,634	8,640	-6	0.02%
1999	1,290	3,777	394	6,675	4,936	17,072	19,581	4,008	383	1,082	327	208	230	623	26,442	-9,370	-9,367	-3	0.01%

Table C-11. Annual groundwater budget for the Gulf Coast Aquifer, Jim Hogg County. All values in acre-feet per year, except as noted.

	INFLOW						OUTFLOW								
Year	Net River Leakage	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From Webb16	Net Lateral Flow From Zapata	Total Inflow	Wells	Net Lateral Flow To Brooks Brush Country	Net Lateral Flow To Duval	Net Lateral Flow To Starr	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	891	2,617	2,755	494	12	6,769	766	5,341	660	1,119	7,886	-1,117	-1,116	-1	0.01%
1964	1,114	2,790	2,732	494	12	7,142	737	5,349	660	1,123	7,869	-727	-728	1	0.01%
1965	1,337	3,352	2,679	494	12	7,874	638	5,332	662	1,115	7,747	127	128	-1	0.01%
1966	9,359	4,300	1,137	511	12	15,319	603	5,326	684	1,092	7,705	7,614	7,613	1	0.01%
1967	12,479	6,664	1,173	519	11	20,846	418	5,366	772	1,041	7,597	13,249	13,251	-2	0.01%
1968	10,696	3,850	2,398	513	11	17,468	525	5,449	895	998	7,867	9,601	9,601	0	0.00%
1969	1,337	2,907	4,981	484	12	9,721	631	5,556	986	1,005	8,178	1,543	1,543	0	0.00%
1970	1,337	3,464	4,438	471	12	9,722	617	5,624	989	1,047	8,277	1,445	1,447	-2	0.02%
1971	11,142	5,142	1,809	482	11	18,586	496	5,656	971	1,088	8,211	10,375	10,376	-1	0.01%
1972	9,805	3,873	2,563	475	11	16,727	581	5,722	1,021	1,096	8,420	8,307	8,307	0	0.00%
1973	12,925	6,726	1,437	473	11	21,572	383	5,794	1,088	1,102	8,367	13,205	13,207	-2	0.01%
1974	1,337	3,501	4,846	438	11	10,133	617	5,889	1,134	1,133	8,773	1,360	1,360	0	0.00%
1975	1,337	4,079	4,243	425	11	10,095	617	5,944	1,101	1,195	8,857	1,238	1,238	0	0.00%
1976	12,479	5,414	963	441	11	19,308	411	5,948	1,048	1,239	8,646	10,662	10,662	0	0.00%
1977	1,114	2,866	4,367	412	11	8,770	695	6,000	1,071	1,274	9,040	-270	-269	-1	0.01%
1978	1,337	3,638	3,856	407	11	9,249	624	6,015	1,026	1,335	9,000	249	248	1	0.01%
1979	10,028	3,880	1,543	420	10	15,881	567	6,006	990	1,375	8,938	6,943	6,945	-2	0.01%
1980	1,337	2,914	4,011	401	10	8,673	652	6,021	1,001	1,395	9,069	-396	-395	-1	0.01%
1981	12,033	5,151	904	419	10	18,517	709	6,035	991	1,417	9,152	9,365	9,366	-1	0.01%
1982	1,114	3,166	4,162	393	10	8,845	914	6,086	1,005	1,427	9,432	-587	-586	-1	0.01%
1983	1,337	3,636	3,685	386	10	9,054	959	6,092	960	1,467	9,478	-424	-425	1	0.01%
1984	1,114	2,543	3,524	382	10	7,573	1,087	6,072	887	1,507	9,553	-1,980	-1,979	-1	0.01%
1985	10,473	4,557	1,153	405	9	16,597	1,117	6,044	831	1,526	9,518	7,079	7,079	0	0.00%
1986	1,337	3,029	3,812	392	9	8,579	989	6,057	856	1,525	9,427	-848	-851	3	0.03%
1987	9,359	4,212	1,540	410	9	15,530	937	6,070	903	1,543	9,453	6,077	6,077	0	0.00%
1988	891	2,813	3,853	391	9	7,957	936	6,102	925	1,548	9,511	-1,554	-1,553	-1	0.01%
1989	891	2,290	3,382	387	9	6,959	403	6,106	959	1,562	9,030	-2,071	-2,070	-1	0.01%
1990	1,114	3,098	3,116	385	9	7,722	786	6,095	912	1,582	9,375	-1,653	-1,653	0	0.00%
1991	11,142	4,348	690	406	8	16,594	1,017	6,064	866	1,591	9,538	7,056	7,057	-1	0.01%
1992	11,142	4,721	1,022	410	8	17,303	1,209	6,114	917	1,561	9,801	7,502	7,502	0	0.00%
1993	1,337	4,019	3,901	389	8	9,654	945	6,246	1,001	1,538	9,730	-76	-75	-1	0.01%
1994	1,337	3,059	3,410	380	8	8,194	1,114	6,347	1,049	1,558	10,068	-1,874	-1,874	0	0.00%
1995	1,337	4,771	2,965	377	8	9,458	1,046	6,413	1,023	1,584	10,066	-608	-608	0	0.00%
1996	891	2,080	3,043	377	8	6,399	1,263	6,431	975	1,606	10,275	-3,876	-3,875	-1	0.01%
1997	11,588	4,275	210	401	8	16,482	710	6,418	996	1,593	9,717	6,765	6,765	0	0.00%
1998	10,251	3,951	1,189	402	8	15,801	1,303	6,423	992	1,553	10,271	5,530	5,529	1	0.01%
1999	1,114	3,538	3,564	381	8	8,605	1,038	6,441	1,109	1,531	10,119	-1,514	-1,512	-2	0.02%

Table C-12. Annual groundwater budget for the Gulf Coast Aquifer, Jim Wells County, Brush Country Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW								OUTFLOW												
Year	Net River Leakage	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From Duval	Net Lateral Flow From Jim Wells White	Net Lateral Flow From LiveOak	Total Inflow	Wells	Net Lateral Flow To Brooks Brush Country	Net Lateral Flow To Jim Wells Kenedy	Net Lateral Flow To Kleburg Kenedy	Net Lateral Flow To Kleburg White	Net Lateral Flow To LiveOak	Net Lateral Flow To Nueces White	Net Lateral Flow To San Patricio	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	1,847	1,460	3,574	243	12,609	29	725	20,487	5,569	-	6,775	2,642	795	-	5,196	462	21,439	-952	-951	-1	0.00%
1964	2,309	1,770	3,514	253	12,580	31	710	21,167	5,363	-	6,760	2,633	794	-	5,192	478	21,220	-53	-51	-2	0.01%
1965	2,770	2,278	3,432	266	12,622	31	683	22,082	4,641	-	6,754	2,600	793	-	5,188	504	20,480	1,602	1,602	0	0.00%
1966	19,394	2,644	1,530	718	12,700	122	206	37,314	4,383	-	6,150	2,194	729	-	4,906	1,022	19,384	17,930	17,932	-2	0.01%
1967	24,636	3,291	1,004	989	13,176	203	-	43,299	3,042	-	5,757	1,857	730	132	4,670	1,168	17,356	25,943	25,943	0	0.00%
1968	20,879	2,591	1,377	955	13,494	227	-	39,523	3,816	-	5,795	1,859	806	192	4,721	1,040	18,229	21,294	21,294	0	0.00%
1969	2,615	2,413	3,419	452	13,673	126	250	22,948	4,589	-	6,602	2,361	945	-	5,301	652	20,450	2,498	2,497	1	0.00%
1970	2,706	2,295	3,401	285	13,665	65	349	22,766	4,486	-	7,040	2,627	981	-	5,648	621	21,403	1,363	1,363	0	0.00%
1971	21,715	3,358	1,178	695	13,874	154	-	40,974	3,610	-	6,616	2,295	906	162	5,352	991	19,932	21,042	21,045	-3	0.01%
1972	18,688	2,470	1,556	715	14,186	210	-	37,825	4,228	-	6,626	2,253	933	234	5,396	889	20,559	17,266	17,266	0	0.00%
1973	22,822	3,650	1,333	810	14,631	256	-	43,502	2,785	-	6,604	2,167	961	407	5,470	767	19,161	24,341	24,340	1	0.00%
1974	2,095	2,301	3,433	255	14,846	166	75	23,171	4,486	-	7,518	2,713	1,099	-	6,041	554	22,411	760	761	-1	0.00%
1975	2,231	2,001	3,442	87	14,840	103	189	22,893	4,486	-	7,969	2,982	1,122	-	6,391	559	23,509	-616	-616	0	0.00%
1976	22,552	3,686	1,253	550	15,069	203	-	43,313	2,991	-	7,489	2,602	1,032	331	6,129	783	21,357	21,956	21,955	1	0.00%
1977	1,590	1,888	3,526	122	15,242	162	119	22,649	5,053	-	8,145	2,995	1,128	-	6,526	542	24,389	-1,740	-1,739	-1	0.00%
1978	2,148	2,410	3,469	5	15,278	114	205	23,629	4,538	-	8,451	3,172	1,140	-	6,754	552	24,607	-978	-979	1	0.00%
1979	18,668	2,525	1,611	388	15,347	196	-	38,735	4,125	-	7,995	2,857	1,061	225	6,482	783	23,528	15,207	15,206	1	0.00%
1980	1,989	2,446	3,497	60	15,519	157	138	23,806	4,744	-	8,474	3,130	1,132	-	6,767	552	24,799	-993	-992	-1	0.00%
1981	21,323	3,381	1,506	476	15,548	244	-	42,478	5,157	-	7,916	2,807	1,059	297	6,492	672	24,400	18,078	18,077	1	0.00%
1982	1,456	1,566	3,622	39	15,711	195	118	22,707	5,413	-	8,551	3,179	1,158	-	6,881	512	25,694	-2,987	-2,987	0	0.00%
1983	2,036	2,238	3,570	-	15,680	148	204	23,876	5,358	93	8,801	3,350	1,166	-	7,104	534	26,406	-2,530	-2,529	-1	0.00%
1984	1,680	1,841	3,635	-	15,635	132	268	23,191	5,307	137	8,962	3,436	1,156	-	7,265	548	26,811	-3,620	-3,617	-3	0.01%
1985	19,258	2,924	1,665	303	15,702	230	-	40,082	4,471	-	8,369	3,024	1,064	219	6,934	801	24,882	15,200	15,199	1	0.00%
1986	1,956	2,059	3,604	-	15,934	189	153	23,895	5,059	140	8,799	3,286	1,137	-	7,176	565	26,162	-2,267	-2,265	-2	0.01%
1987	17,115	2,447	1,915	186	15,843	237	-	37,743	4,643	-	8,412	3,051	1,088	205	6,942	716	25,057	12,686	12,685	1	0.00%
1988	1,022	1,647	3,743	-	16,012	181	144	22,749	4,662	163	8,917	3,336	1,164	-	7,299	537	26,078	-3,329	-3,328	-1	0.00%
1989	1,123	1,141	3,747	-	15,846	138	198	22,193	3,834	280	9,128	3,477	1,172	-	7,467	570	25,928	-3,735	-3,736	1	0.00%
1990	1,627	1,858	3,677	-	15,734	123	240	23,259	4,158	251	9,202	3,522	1,159	-	7,463	601	26,356	-3,097	-3,096	-1	0.00%
1991	20,087	2,744	1,684	222	15,777	236	-	40,750	3,907	-	8,490	3,063	1,063	253	6,984	832	24,592	16,158	16,158	0	0.00%
1992	18,885	2,804	1,902	95	15,893	303	-	39,882	3,471	-	8,280	2,912	1,073	361	6,857	632	23,586	16,296	16,298	-2	0.01%
1993	1,603	2,353	3,629	-	15,706	216	16	23,523	3,591	541	8,896	3,310	1,175	-	7,191	545	25,249	-1,726	-1,724	-2	0.01%
1994	1,735	2,339	3,623	-	15,393	158	114	23,362	3,862	787	9,137	3,489	1,182	-	7,376	561	26,394	-3,032	-3,030	-2	0.01%
1995	1,829	2,281	3,621	-	15,284	135	156	23,306	3,616	924	9,236	3,575	1,156	-	7,438	596	26,541	-3,235	-3,234	-1	0.00%
1996	1,025	1,249	3,767	-	15,056	128	213	21,438	3,931	925	9,255	3,636	1,129	-	7,498	599	26,973	-5,535	-5,535	0	0.00%
1997	20,264	2,675	1,733	-	15,036	246	-	39,954	3,515	434	8,462	3,176	1,009	275	7,031	747	24,649	15,305	15,303	2	0.01%
1998	17,232	2,421	2,086	-	15,298	312	-	37,349	4,599	420	8,241	3,079	1,013	324	6,888	570	25,134	12,215	12,218	-3	0.01%
1999	1,104	2,094	3,735	-	15,597	222	48	22,800	4,396	746	8,858	3,334	1,110	-	7,231	518	26,193	-3,393	-3,395	2	0.01%

Table C-13. Annual groundwater budget for the Gulf Coast Aquifer, Jim Wells County, Kenedy County Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW				OUTFLOW							
Year	River Leakage	Recharge	Net Lateral Flow From Jim Wells Brush Country	Total Inflow	Wells	Net Lateral Flow To Kleburg Kenedy	Net Lateral Flow To Nueces White	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	168	69	6,775	7,012	61	5,717	1,299	7,077	-65	-65	0	0.00%
1964	210	74	6,760	7,044	59	5,702	1,297	7,058	-14	-13	-1	0.01%
1965	251	113	6,754	7,118	51	5,664	1,283	6,998	120	121	-1	0.01%
1966	1,760	123	6,150	8,033	48	4,975	1,164	6,187	1,846	1,846	0	0.00%
1967	2,347	166	5,757	8,270	33	4,412	1,068	5,513	2,757	2,756	1	0.01%
1968	2,012	123	5,795	7,930	42	4,407	1,084	5,533	2,397	2,396	1	0.01%
1969	251	108	6,602	6,961	50	5,275	1,246	6,571	390	391	-1	0.01%
1970	251	108	7,040	7,399	49	5,785	1,339	7,173	226	225	1	0.01%
1971	2,095	153	6,616	8,864	39	5,272	1,256	6,567	2,297	2,297	0	0.00%
1972	1,844	114	6,626	8,584	46	5,194	1,268	6,508	2,076	2,076	0	0.00%
1973	2,431	183	6,604	9,218	30	5,096	1,274	6,400	2,818	2,817	1	0.01%
1974	251	102	7,518	7,871	49	6,036	1,451	7,536	335	335	0	0.00%
1975	251	102	7,969	8,322	49	6,557	1,548	8,154	168	168	0	0.00%
1976	2,347	176	7,489	10,012	33	5,981	1,459	7,473	2,539	2,541	-2	0.02%
1977	210	89	8,145	8,444	55	6,621	1,587	8,263	181	180	1	0.01%
1978	251	120	8,451	8,822	50	6,972	1,652	8,674	148	148	0	0.00%
1979	1,886	121	7,995	10,002	45	6,473	1,580	8,098	1,904	1,905	-1	0.01%
1980	251	122	8,474	8,847	52	6,927	1,663	8,642	205	206	-1	0.01%
1981	2,263	165	7,916	10,344	56	6,395	1,596	8,047	2,297	2,297	0	0.00%
1982	210	77	8,551	8,838	55	7,020	1,726	8,801	37	36	1	0.01%
1983	251	117	8,801	9,169	53	7,340	1,788	9,181	-12	-12	0	0.00%
1984	210	88	8,962	9,260	52	7,516	1,830	9,398	-138	-138	0	0.00%
1985	1,970	141	8,369	10,480	40	6,849	1,729	8,618	1,862	1,861	1	0.01%
1986	251	107	8,799	9,157	49	7,262	1,802	9,113	44	46	-2	0.02%
1987	1,760	117	8,412	10,289	45	6,888	1,742	8,675	1,614	1,615	-1	0.01%
1988	168	79	8,917	9,164	41	7,386	1,833	9,260	-96	-97	1	0.01%
1989	168	59	9,128	9,355	28	7,656	1,869	9,553	-198	-198	0	0.00%
1990	210	83	9,202	9,495	30	7,751	1,871	9,652	-157	-158	1	0.01%
1991	2,095	136	8,490	10,721	28	6,981	1,737	8,746	1,975	1,975	0	0.00%
1992	2,095	133	8,280	10,508	24	6,696	1,703	8,423	2,085	2,085	0	0.00%
1993	251	132	8,896	9,279	27	7,349	1,812	9,188	91	92	-1	0.01%
1994	251	114	9,137	9,502	30	7,694	1,869	9,593	-91	-90	-1	0.01%
1995	251	119	9,236	9,606	26	7,835	1,881	9,742	-136	-137	1	0.01%
1996	168	64	9,255	9,487	28	7,911	1,901	9,840	-353	-352	-1	0.01%
1997	2,179	135	8,462	10,776	24	7,092	1,779	8,895	1,881	1,881	0	0.00%
1998	1,928	122	8,241	10,291	41	6,849	1,768	8,658	1,633	1,633	0	0.00%
1999	210	116	8,858	9,184	37	7,434	1,881	9,352	-168	-168	0	0.00%

Table C-14. Annual groundwater budget for the Gulf Coast Aquifer, Jim Wells County, non-district area. All values in acre-feet per year, except as noted.

	INFLOW			OUTFLOW						
Year	River Leakage	Recharge	Total Inflow	Wells	Net Lateral Flow To Jim Wells Brush Country	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	46	13	59	41	29	70	-11	-11	0	0.00%
1964	57	17	74	40	31	71	3	3	0	0.00%
1965	69	23	92	35	31	66	26	26	0	0.00%
1966	480	26	506	33	122	155	351	352	-1	0.20%
1967	640	28	668	23	203	226	442	442	0	0.00%
1968	549	24	573	28	227	255	318	318	0	0.00%
1969	69	25	94	34	126	160	-66	-67	1	0.57%
1970	69	24	93	33	65	98	-5	-6	1	0.95%
1971	571	34	605	27	154	181	424	424	0	0.00%
1972	503	25	528	31	210	241	287	286	1	0.19%
1973	663	35	698	21	256	277	421	420	1	0.14%
1974	69	22	91	33	166	199	-108	-109	1	0.48%
1975	69	19	88	33	103	136	-48	-49	1	0.73%
1976	640	36	676	22	203	225	451	451	0	0.00%
1977	57	18	75	38	162	200	-125	-124	-1	0.50%
1978	69	23	92	34	114	148	-56	-56	0	0.00%
1979	514	25	539	31	196	227	312	312	0	0.00%
1980	69	24	93	35	157	192	-99	-100	1	0.52%
1981	617	33	650	38	244	282	368	367	1	0.15%
1982	57	15	72	23	195	218	-146	-147	1	0.46%
1983	69	21	90	23	148	171	-81	-81	0	0.00%
1984	57	17	74	21	132	153	-79	-79	0	0.00%
1985	537	26	563	17	230	247	316	316	0	0.00%
1986	69	20	89	20	189	209	-120	-121	1	0.48%
1987	480	23	503	18	237	255	248	248	0	0.00%
1988	46	18	64	17	181	198	-134	-135	1	0.50%
1989	46	11	57	12	138	150	-93	-94	1	0.66%
1990	57	19	76	14	123	137	-61	-61	0	0.00%
1991	571	26	597	13	236	249	348	349	-1	0.17%
1992	571	25	596	11	303	314	282	282	0	0.00%
1993	69	24	93	13	216	229	-136	-136	0	0.00%
1994	69	23	92	14	158	172	-80	-81	1	0.58%
1995	69	22	91	12	135	147	-56	-57	1	0.68%
1996	46	12	58	13	128	141	-83	-84	1	0.71%
1997	594	24	618	12	246	258	360	361	-1	0.16%
1998	526	24	550	19	312	331	219	219	0	0.00%
1999	57	20	77	17	222	239	-162	-161	-1	0.42%

Table C-15. Annual groundwater budget for the Gulf Coast Aquifer, Kenedy County. All values in acre-feet per year, except as noted.

Year	INFLOW							OUTFLOW									Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
	Net River Leakage	Recharge	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From Brooks Kenedy	Net Lateral Flow From Hidalgo Kenedy	Net Lateral Flow From Hidalgo White	Total Inflow	Wells	Net River Leakage	Net Lateral Flow To Gulf	Net Lateral Flow To Kleburg Kenedy	Net Lateral Flow To Kleburg White	Net Lateral Flow To Willacy Kenedy	Net Lateral Flow To Willacy White	Total Outflow					
1963	-	2,901	186	4,149	811	217	8,264	1,261	177	4,299	2,277	795	401	177	9,387	-1,123	-1,122	-1	0.01%
1964	-	2,635	187	4,141	810	217	7,990	1,214	125	4,276	2,269	792	399	175	9,250	-1,260	-1,260	0	0.00%
1965	-	3,695	189	4,144	809	216	9,053	1,051	82	4,275	2,291	789	403	175	9,066	-13	-13	0	0.00%
1966	1,316	4,085	225	4,275	822	216	10,939	992	-	4,280	2,475	772	355	174	9,048	1,891	1,889	2	0.02%
1967	694	6,507	303	4,702	828	215	13,249	689	-	4,318	2,524	765	342	175	8,813	4,436	4,433	3	0.02%
1968	49	4,993	335	4,943	831	215	11,366	864	-	4,335	2,511	770	334	172	8,986	2,380	2,379	1	0.01%
1969	-	3,676	267	4,714	820	215	9,692	1,039	554	4,318	2,501	793	362	168	9,735	-43	-43	0	0.00%
1970	-	4,087	243	4,587	812	215	9,944	1,016	320	4,326	2,489	791	383	170	9,495	449	447	2	0.02%
1971	421	5,338	311	4,842	817	214	11,943	817	-	4,352	2,474	771	366	171	8,951	2,992	2,992	0	0.00%
1972	-	4,166	341	5,047	823	215	10,592	957	159	4,352	2,479	779	347	168	9,241	1,351	1,351	0	0.00%
1973	-	5,584	400	5,426	824	214	12,448	631	500	4,377	2,504	772	353	167	9,304	3,144	3,144	0	0.00%
1974	-	3,261	303	4,999	818	215	9,596	1,016	909	4,354	2,459	799	378	163	10,078	-482	-484	2	0.02%
1975	-	4,429	270	4,822	809	215	10,545	1,016	582	4,363	2,465	799	395	166	9,786	759	761	-2	0.02%
1976	-	5,125	365	5,206	813	214	11,723	677	15	4,388	2,482	773	381	169	8,885	2,838	2,837	1	0.01%
1977	-	3,085	290	4,963	811	215	9,364	1,144	819	4,366	2,465	803	389	165	10,151	-787	-789	2	0.02%
1978	-	4,054	267	4,840	804	215	10,180	1,027	548	4,382	2,468	804	406	167	9,802	378	378	0	0.00%
1979	2	4,314	333	5,097	812	215	10,773	934	-	4,392	2,437	786	380	167	9,096	1,677	1,676	1	0.01%
1980	-	3,732	285	4,963	809	215	10,004	1,074	747	4,381	2,476	808	394	166	10,046	-42	-43	1	0.01%
1981	-	5,120	374	5,361	826	216	11,897	1,168	184	4,398	2,491	791	355	166	9,553	2,344	2,341	3	0.03%
1982	-	2,911	298	5,081	816	217	9,323	1,105	872	4,382	2,472	820	382	163	10,196	-873	-874	1	0.01%
1983	-	4,227	275	4,958	808	216	10,484	1,046	618	4,389	2,475	819	401	165	9,913	571	571	0	0.00%
1984	-	3,442	261	4,874	803	216	9,596	984	492	4,389	2,477	814	418	167	9,741	-145	-146	1	0.01%
1985	15	4,242	339	5,188	813	215	10,812	838	-	4,398	2,447	795	390	167	9,035	1,777	1,777	0	0.00%
1986	-	3,672	288	5,035	800	214	10,009	870	767	4,397	2,483	816	410	166	9,909	100	100	0	0.00%
1987	-	4,255	345	5,269	815	214	10,898	982	240	4,399	2,430	793	379	166	9,389	1,509	1,509	0	0.00%
1988	-	2,924	289	5,073	808	214	9,308	1,015	821	4,375	2,455	807	398	164	10,035	-727	-728	1	0.01%
1989	-	2,376	267	4,947	802	214	8,606	986	567	4,348	2,445	799	416	162	9,723	-1,117	-1,118	1	0.01%
1990	-	2,701	257	4,883	801	214	8,856	981	423	4,327	2,447	793	421	162	9,554	-698	-700	2	0.02%
1991	83	4,539	343	5,250	817	214	11,246	997	-	4,345	2,427	774	370	165	9,078	2,168	2,168	0	0.00%
1992	-	4,878	396	5,565	819	213	11,871	678	575	4,374	2,472	778	366	166	9,409	2,462	2,460	2	0.02%
1993	-	5,028	314	5,239	810	213	11,604	806	1,070	4,398	2,429	798	397	167	10,065	1,539	1,539	0	0.00%
1994	-	3,675	283	5,049	797	212	10,016	654	728	4,400	2,427	795	431	168	9,603	413	413	0	0.00%
1995	-	4,735	267	4,936	787	210	10,935	607	605	4,417	2,436	793	450	172	9,480	1,455	1,456	-1	0.01%
1996	-	2,536	253	4,841	784	209	8,623	677	505	4,397	2,436	792	463	171	9,441	-818	-817	-1	0.01%
1997	58	5,261	342	5,195	797	209	11,862	600	-	4,442	2,437	778	422	173	8,852	3,010	3,009	1	0.01%
1998	-	4,714	379	5,429	803	209	11,534	611	589	4,463	2,462	780	411	172	9,488	2,046	2,045	1	0.01%
1999	-	3,844	301	5,116	790	208	10,259	495	1,011	4,451	2,429	799	449	172	9,806	453	451	2	0.02%

Table C-16. Annual groundwater budget for the Gulf Coast Aquifer, Kleburg County, Kenedy County Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW										OUTFLOW									
Year	Net River Leakage	Recharge	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From Brooks Kenedy	Net Lateral Flow From Jim Wells Brush Country	Net Lateral Flow From Jim Wells Kenedy	Net Lateral Flow From Kenedy	Net Lateral Flow From Nueces Kenedy	Net Lateral Flow From Nueces White	Total Inflow	Wells	Drains	Net River Leakage	Net Lateral Flow To Gulf	Net Lateral Flow To Kleburg White	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	996	288	851	2,642	5,717	2,277	164	1,576	14,511	1,390	616	4,678	76	8,363	15,123	-612	-613	1	0.01%
1964	-	1,026	290	850	2,633	5,702	2,269	165	1,554	14,489	1,339	609	4,366	73	8,210	14,597	-108	-109	1	0.01%
1965	-	1,654	292	858	2,600	5,664	2,291	169	1,532	15,060	1,157	622	4,246	79	7,690	13,794	1,266	1,264	2	0.01%
1966	4,678	1,636	366	1,000	2,194	4,975	2,475	277	1,882	19,483	1,093	651	-	87	7,947	9,778	9,705	9,704	1	0.01%
1967	6,715	2,411	399	1,172	1,857	4,412	2,524	368	2,416	22,274	759	717	-	111	8,305	9,892	12,382	12,382	0	0.00%
1968	3,447	1,915	378	1,250	1,859	4,407	2,511	389	2,836	18,992	953	757	-	125	9,528	11,363	7,629	7,629	0	0.00%
1969	-	1,425	298	1,159	2,361	5,275	2,501	318	2,869	16,206	1,145	760	7,846	127	9,135	19,013	-2,807	-2,808	1	0.00%
1970	-	1,615	280	1,087	2,627	5,785	2,489	289	2,730	16,902	1,119	772	7,082	133	8,717	17,823	-921	-920	-1	0.01%
1971	4,522	2,081	346	1,192	2,295	5,272	2,474	370	2,972	21,524	901	818	-	146	9,199	11,064	10,460	10,458	2	0.01%
1972	1,880	1,798	341	1,262	2,253	5,194	2,479	379	3,125	18,711	1,056	848	-	153	10,301	12,358	6,353	6,352	1	0.01%
1973	4,451	2,649	349	1,358	2,167	5,096	2,504	398	3,176	22,148	695	908	-	175	10,715	12,493	9,655	9,653	2	0.01%
1974	-	1,393	264	1,244	2,713	6,036	2,459	338	3,398	17,845	1,120	892	9,020	175	10,072	21,279	-3,434	-3,431	-3	0.01%
1975	-	1,686	248	1,159	2,982	6,557	2,465	318	3,207	18,622	1,120	898	8,133	179	9,580	19,910	-1,288	-1,288	0	0.00%
1976	4,911	2,456	323	1,278	2,602	5,981	2,482	377	3,136	23,546	747	948	-	195	10,161	12,051	11,495	11,493	2	0.01%
1977	-	1,292	254	1,210	2,995	6,621	2,465	325	3,301	18,463	1,262	925	9,050	188	10,333	21,758	-3,295	-3,297	2	0.01%
1978	-	1,780	243	1,146	3,172	6,972	2,468	310	3,133	19,224	1,133	929	8,047	190	9,686	19,985	-761	-759	-2	0.01%
1979	2,391	1,802	303	1,235	2,857	6,473	2,437	360	3,147	21,005	1,030	951	-	196	10,410	12,587	8,418	8,417	1	0.00%
1980	-	1,787	250	1,192	3,130	6,927	2,476	320	3,209	19,291	1,185	948	8,606	193	10,164	21,096	-1,805	-1,804	-1	0.00%
1981	4,117	2,315	313	1,300	2,807	6,395	2,491	376	3,255	23,369	1,289	984	-	193	12,036	14,502	8,867	8,870	-3	0.01%
1982	-	1,144	245	1,227	3,179	7,020	2,472	325	3,316	18,928	1,263	956	9,153	182	11,136	22,690	-3,762	-3,761	-1	0.00%
1983	-	1,844	235	1,166	3,350	7,340	2,475	308	3,075	19,793	1,383	960	8,182	176	10,234	20,935	-1,142	-1,140	-2	0.01%
1984	-	1,291	235	1,127	3,436	7,516	2,477	287	2,644	19,013	1,236	939	8,013	169	9,704	20,061	-1,048	-1,047	-1	0.00%
1985	3,054	2,107	302	1,240	3,024	6,849	2,447	349	2,712	22,084	1,094	972	-	177	10,533	12,776	9,308	9,306	2	0.01%
1986	-	1,647	245	1,198	3,286	7,262	2,483	310	2,997	19,428	1,427	960	8,544	176	10,063	21,170	-1,742	-1,743	1	0.00%
1987	1,370	1,697	288	1,260	3,051	6,888	2,430	355	3,049	20,388	1,258	975	-	183	10,586	13,002	7,386	7,386	0	0.00%
1988	-	1,121	234	1,197	3,336	7,386	2,455	312	3,013	19,054	1,167	955	9,129	189	9,792	21,232	-2,178	-2,177	-1	0.00%
1989	-	997	225	1,135	3,477	7,656	2,445	292	2,918	19,145	1,148	939	8,431	191	9,369	20,078	-933	-935	2	0.01%
1990	-	1,117	229	1,107	3,522	7,751	2,447	282	2,925	19,380	1,158	929	7,819	195	9,407	19,508	-128	-129	1	0.00%
1991	3,895	2,105	301	1,237	3,063	6,981	2,427	364	3,102	23,475	1,075	972	-	213	10,612	12,872	10,603	10,601	2	0.01%
1992	2,254	2,016	303	1,339	2,912	6,696	2,472	385	3,280	21,657	1,014	1,001	-	226	11,702	13,943	7,714	7,718	-4	0.02%
1993	-	2,134	225	1,250	3,310	7,349	2,429	337	3,494	20,528	1,162	1,012	9,305	230	10,337	22,046	-1,518	-1,522	4	0.02%
1994	-	1,663	207	1,173	3,489	7,694	2,427	322	3,323	20,298	1,152	1,002	8,541	239	9,643	20,577	-279	-280	1	0.00%
1995	-	1,853	203	1,126	3,575	7,835	2,436	316	3,246	20,590	1,319	1,003	8,213	242	9,507	20,284	306	306	0	0.00%
1996	-	984	201	1,086	3,636	7,911	2,436	305	2,946	19,505	1,438	975	8,377	231	9,578	20,599	-1,094	-1,095	1	0.00%
1997	4,027	2,358	274	1,215	3,176	7,092	2,437	373	2,808	23,760	1,587	1,027	-	231	11,015	13,860	9,900	9,902	-2	0.01%
1998	1,035	1,994	270	1,300	3,079	6,849	2,462	381	3,297	20,667	1,725	1,045	-	225	12,251	15,246	5,421	5,419	2	0.01%
1999	-	1,840	200	1,211	3,334	7,434	2,429	328	3,163	19,939	300	1,041	9,567	264	10,452	21,624	-1,685	-1,687	2	0.01%

Table C-17. Annual groundwater budget for the Gulf Coast Aquifer, Kleburg County, non-district area. All values in acre-feet per year, except as noted.

	INFLOW								OUTFLOW									
Year	Recharge	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From Gulf	Net Lateral Flow From Jim Wells Brush Country	Net Lateral Flow From Kenedy	Net Lateral Flow From Kleburg Kenedy	Net Lateral Flow From Nueces White	Total Inflow	Wells	Drains	Net River Leakage	Net Lateral Flow To Gulf	Net Lateral Flow To Nueces White	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	304	123	45	795	795	8,363	114	10,539	7,208	434	3,059	-	-	10,701	-162	-163	1	0.01%
1964	305	124	49	794	792	8,210	112	10,386	6,952	434	2,964	-	-	10,350	36	38	-2	0.02%
1965	511	126	38	793	789	7,690	100	10,047	6,019	447	3,021	-	-	9,487	560	558	2	0.02%
1966	495	164	25	729	772	7,947	78	10,210	5,668	525	1,280	-	-	7,473	2,737	2,738	-1	0.01%
1967	728	187	-	730	765	8,305	8	10,723	3,943	610	3,111	9	-	7,673	3,050	3,051	-1	0.01%
1968	591	182	-	806	770	9,528	-	11,877	4,935	637	5,145	27	14	10,758	1,119	1,120	-1	0.01%
1969	440	141	-	945	793	9,135	-	11,454	5,952	587	6,270	21	6	12,836	-1,382	-1,380	-2	0.02%
1970	489	127	-	981	791	8,717	63	11,168	5,816	554	5,298	19	-	11,687	-519	-518	-1	0.01%
1971	638	160	-	906	771	9,199	85	11,759	4,679	616	3,820	31	-	9,146	2,613	2,615	-2	0.02%
1972	560	162	-	933	779	10,301	48	12,783	5,468	640	5,812	37	-	11,957	826	825	1	0.01%
1973	815	170	-	961	772	10,715	72	13,505	3,605	675	7,342	61	-	11,683	1,822	1,820	2	0.01%
1974	409	126	-	1,099	799	10,072	31	12,536	5,816	618	7,547	53	-	14,034	-1,498	-1,499	1	0.01%
1975	509	112	-	1,122	799	9,580	94	12,216	5,818	588	6,370	49	-	12,825	-609	-608	-1	0.01%
1976	744	149	-	1,032	773	10,161	134	12,993	3,868	652	5,671	66	-	10,257	2,736	2,737	-1	0.01%
1977	392	117	-	1,128	803	10,333	66	12,839	6,554	606	7,272	50	-	14,482	-1,643	-1,643	0	0.00%
1978	527	107	-	1,140	804	9,686	113	12,377	5,883	585	6,236	46	-	12,750	-373	-373	0	0.00%
1979	539	137	-	1,061	786	10,410	139	13,072	5,350	631	5,133	50	-	11,164	1,908	1,909	-1	0.01%
1980	544	113	-	1,132	808	10,164	82	12,843	6,135	605	7,040	44	-	13,824	-981	-979	-2	0.01%
1981	716	144	-	1,059	791	12,036	163	14,909	6,688	650	5,968	42	-	13,348	1,561	1,560	1	0.01%
1982	351	111	-	1,158	820	11,136	88	13,664	7,062	608	7,376	22	-	15,068	-1,404	-1,404	0	0.00%
1983	564	102	-	1,166	819	10,234	123	13,008	6,261	588	6,402	24	-	13,275	-267	-268	1	0.01%
1984	388	100	-	1,156	814	9,704	125	12,287	6,097	567	5,942	20	-	12,626	-339	-338	-1	0.01%
1985	649	135	-	1,064	795	10,533	132	13,308	5,526	627	4,899	29	-	11,081	2,227	2,226	1	0.01%
1986	503	108	-	1,137	816	10,063	59	12,686	5,878	601	6,972	29	-	13,480	-794	-793	-1	0.01%
1987	521	129	-	1,088	793	10,586	107	13,224	5,140	635	5,703	38	-	11,516	1,708	1,705	3	0.02%
1988	338	103	-	1,164	807	9,792	48	12,252	5,291	603	7,184	37	-	13,115	-863	-862	-1	0.01%
1989	312	95	-	1,172	799	9,369	91	11,838	5,283	578	6,279	37	-	12,177	-339	-339	0	0.00%
1990	340	96	-	1,159	793	9,407	112	11,907	5,743	553	5,824	31	-	12,151	-244	-244	0	0.00%
1991	631	133	-	1,063	774	10,612	136	13,349	5,309	623	4,916	47	-	10,895	2,454	2,451	3	0.02%
1992	622	139	-	1,073	778	11,702	109	14,423	5,106	660	7,395	60	-	13,221	1,202	1,202	0	0.00%
1993	672	99	-	1,175	798	10,337	56	13,137	4,947	635	7,977	76	-	13,635	-498	-494	-4	0.03%
1994	503	85	-	1,182	795	9,643	101	12,309	4,726	604	7,026	76	-	12,432	-123	-122	-1	0.01%
1995	581	80	-	1,156	793	9,507	122	12,239	4,933	597	6,628	83	-	12,241	-2	-2	0	0.00%
1996	300	76	-	1,129	792	9,578	136	12,011	5,598	574	6,282	68	-	12,522	-511	-510	-1	0.01%
1997	765	114	-	1,009	778	11,015	175	13,856	5,342	650	5,541	77	-	11,610	2,246	2,245	1	0.01%
1998	647	117	-	1,013	780	12,251	142	14,950	5,721	673	7,734	77	-	14,205	745	744	1	0.01%
1999	594	81	-	1,110	799	10,452	91	13,127	4,899	638	8,086	74	-	13,697	-570	-569	-1	0.01%

Table C-18. Annual groundwater budget for the Gulf Coast Aquifer, Live Oak County. All values in acre-feet per year, except as noted.

	INFLOW								OUTFLOW											
Year	Net River Leakage	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From Bee16	Net Lateral Flow From Duval	Net Lateral Flow From Jim Wells Brush Country	Net Lateral Flow From Karnes 15	Net Lateral Flow From Mcmullen 16	Total Inflow	Wells	Drains	Net River Leakage	Net Lateral Flow To Bee 16	Net Lateral Flow To Jim Wells Brush Country	Net Lateral Flow To Karnes 15	Net Lateral Flow To San Patricio	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	5,166	5,736	-	2	-	3	174	11,081	3,299	294	7,122	249	725	-	1,220	12,909	-1,828	-1,827	-1	0.01%
1964	-	5,219	6,050	-	3	-	4	175	11,451	3,177	293	6,653	249	710	-	1,217	12,299	-848	-849	1	0.01%
1965	-	7,113	6,410	-	4	-	4	176	13,707	2,749	299	6,429	214	683	-	1,213	11,587	2,120	2,120	0	0.00%
1966	6,622	6,721	13,826	-	28	-	2	205	27,404	2,596	321	-	102	206	-	1,201	4,426	22,978	22,979	-1	0.00%
1967	7,784	10,326	14,220	76	57	132	-	229	32,824	1,802	346	-	-	-	1	1,175	3,324	29,500	29,499	1	0.00%
1968	3,637	8,640	12,554	215	74	192	-	237	25,549	2,260	354	-	-	-	2	1,165	3,781	21,768	21,766	2	0.01%
1969	-	7,254	6,174	258	60	-	-	211	13,957	2,718	345	9,252	-	250	1	1,166	13,732	225	224	1	0.00%
1970	-	6,673	6,160	271	51	-	-	205	13,360	2,657	343	7,998	-	349	-	1,172	12,519	841	842	-1	0.01%
1971	6,186	8,747	13,116	358	74	162	-	240	28,883	2,138	365	-	-	-	2	1,171	3,676	25,207	25,207	0	0.00%
1972	1,869	7,191	12,020	421	87	234	-	251	22,073	2,505	372	-	-	-	3	1,173	4,053	18,020	18,021	-1	0.00%
1973	4,649	9,632	12,105	537	107	407	-	270	27,707	1,649	388	-	-	-	4	1,163	3,204	24,503	24,503	0	0.00%
1974	-	8,058	6,290	521	90	-	-	240	15,199	2,657	375	10,548	-	75	3	1,181	14,839	360	362	-2	0.01%
1975	-	5,277	6,373	489	77	-	-	233	12,449	2,657	368	8,812	-	189	2	1,194	13,222	-773	-772	-1	0.01%
1976	6,313	10,800	13,067	557	102	331	-	270	31,440	1,772	398	-	-	-	3	1,194	3,367	28,073	28,073	0	0.00%
1977	-	6,470	6,451	509	86	-	-	247	13,763	2,993	380	10,887	-	119	1	1,214	15,594	-1,831	-1,833	2	0.01%
1978	-	6,210	6,636	474	77	-	-	240	13,637	2,688	377	9,040	-	205	1	1,224	13,535	102	102	0	0.00%
1979	3,444	6,984	12,753	504	94	225	-	269	24,273	2,444	395	-	-	-	1	1,226	4,066	20,207	20,206	1	0.00%
1980	-	8,293	6,928	480	83	-	-	249	16,033	2,810	389	10,479	-	138	-	1,237	15,053	980	980	0	0.00%
1981	4,768	9,501	12,884	504	105	297	-	281	28,340	3,054	407	-	-	-	2	1,247	4,710	23,630	23,630	0	0.00%
1982	-	5,906	6,576	471	90	-	-	256	13,299	3,957	393	11,115	-	118	1	1,247	16,831	-3,532	-3,529	-3	0.01%
1983	-	6,302	6,743	442	80	-	-	248	13,815	3,869	384	9,306	-	204	-	1,256	15,019	-1,204	-1,203	-1	0.01%
1984	-	5,614	6,615	404	73	-	2	244	12,952	4,219	374	9,335	-	268	-	1,266	15,462	-2,510	-2,510	0	0.00%
1985	4,104	9,395	13,194	530	95	219	-	275	27,812	5,377	399	-	-	-	-	1,261	7,037	20,775	20,774	1	0.00%
1986	-	6,609	7,209	549	83	-	1	255	14,706	3,992	391	10,411	-	153	-	1,271	16,218	-1,512	-1,510	-2	0.01%
1987	1,741	7,122	12,486	642	99	205	-	277	22,572	3,737	397	-	-	-	-	1,274	5,408	17,164	17,164	0	0.00%
1988	-	4,419	6,762	654	86	-	1	255	12,177	3,827	382	11,035	-	144	-	1,278	16,666	-4,489	-4,488	-1	0.00%
1989	-	3,802	6,583	567	75	-	2	248	11,277	3,553	377	9,810	-	198	-	1,291	15,229	-3,952	-3,952	0	0.00%
1990	-	6,862	6,913	497	69	-	3	245	14,589	4,900	366	9,378	-	240	-	1,295	16,179	-1,590	-1,592	2	0.01%
1991	4,900	8,814	13,691	530	94	253	1	279	28,562	5,810	374	-	-	-	-	1,290	7,474	21,088	21,088	0	0.00%
1992	1,534	8,818	12,822	647	112	361	-	292	24,586	6,365	361	-	-	-	1	1,304	8,031	16,555	16,555	0	0.00%
1993	-	5,681	7,326	706	96	-	1	264	14,074	5,231	332	10,929	-	16	-	1,302	17,810	-3,736	-3,736	0	0.00%
1994	-	7,656	7,269	711	85	-	1	254	15,976	4,973	325	9,701	-	114	-	1,316	16,429	-453	-450	-3	0.01%
1995	-	5,745	7,371	732	77	-	2	251	14,178	4,177	337	9,344	-	156	-	1,340	15,354	-1,176	-1,174	-2	0.01%
1996	-	3,924	6,934	615	69	-	3	247	11,792	4,399	343	9,735	-	213	-	1,350	16,040	-4,248	-4,248	0	0.00%
1997	5,326	9,055	13,881	693	94	275	1	282	29,607	3,201	384	-	-	-	-	1,359	4,944	24,663	24,664	-1	0.00%
1998	229	7,884	12,519	654	109	324	-	291	22,010	2,871	398	-	-	-	1	1,341	4,611	17,399	17,399	0	0.00%
1999	-	5,092	7,072	667	94	-	-	264	13,189	1,942	387	11,280	-	48	-	1,341	14,998	-1,809	-1,807	-2	0.01%

Table C-19. Annual groundwater budget for the Gulf Coast Aquifer, Groundwater Management Area 16 of McMullen County. All values in acre-feet per year, except as noted.

	INFLOW				OUTFLOW								
Year	Net River Leakage	Recharge	Net Lateral Flow From Duval	Total Inflow	Wells	Net Vertical Leakage Lower	Net Lateral Flow To LiveOak	Net Lateral Flow To McMullen 13	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	1,964	1,609	23	3,596	26	3,990	174	8	4,198	-602	-601	-1	0.02%
1964	2,467	1,544	23	4,034	25	3,871	175	8	4,079	-45	-44	-1	0.02%
1965	2,967	2,005	23	4,995	22	3,755	176	8	3,961	1,034	1,034	0	0.00%
1966	20,751	2,300	27	23,078	21	1,338	205	8	1,572	21,506	21,506	0	0.00%
1967	27,016	3,041	27	30,084	14	2,044	229	8	2,295	27,789	27,790	-1	0.00%
1968	23,020	2,486	25	25,531	18	3,349	237	9	3,613	21,918	21,919	-1	0.00%
1969	2,831	1,960	21	4,812	22	5,785	211	9	6,027	-1,215	-1,213	-2	0.02%
1970	2,892	2,041	23	4,956	21	5,632	205	9	5,867	-911	-910	-1	0.01%
1971	24,091	2,835	31	26,957	17	3,356	240	9	3,622	23,335	23,336	-1	0.00%
1972	21,032	2,108	31	23,171	20	4,355	251	9	4,635	18,536	18,536	0	0.00%
1973	27,710	2,949	34	30,693	13	4,858	270	9	5,150	25,543	25,542	1	0.00%
1974	2,715	2,406	29	5,150	21	7,004	240	9	7,274	-2,124	-2,125	1	0.01%
1975	2,835	1,641	32	4,508	21	6,755	233	9	7,018	-2,510	-2,509	-1	0.01%
1976	26,803	3,332	41	30,176	14	4,616	270	9	4,909	25,267	25,266	1	0.00%
1977	2,242	1,751	37	4,030	24	7,137	247	9	7,417	-3,387	-3,386	-1	0.01%
1978	2,828	1,902	40	4,770	21	6,768	240	9	7,038	-2,268	-2,267	-1	0.01%
1979	21,523	2,169	46	23,738	19	4,710	269	9	5,007	18,731	18,731	0	0.00%
1980	2,731	2,527	44	5,302	22	6,907	249	9	7,187	-1,885	-1,884	-1	0.01%
1981	25,808	3,004	51	28,863	24	4,960	281	9	5,274	23,589	23,588	1	0.00%
1982	2,221	1,812	47	4,080	24	7,422	256	9	7,711	-3,631	-3,631	0	0.00%
1983	2,817	1,837	49	4,703	18	7,112	248	9	7,387	-2,684	-2,684	0	0.00%
1984	2,351	1,722	51	4,124	27	6,999	244	9	7,279	-3,155	-3,156	1	0.01%
1985	22,493	3,109	57	25,659	17	4,703	275	9	5,004	20,655	20,655	0	0.00%
1986	2,738	2,193	54	4,985	18	7,078	255	9	7,360	-2,375	-2,374	-1	0.01%
1987	20,060	2,278	58	22,396	19	5,255	277	9	5,560	16,836	16,837	-1	0.00%
1988	1,792	1,420	55	3,267	19	7,537	255	9	7,820	-4,553	-4,554	1	0.01%
1989	1,862	1,232	56	3,150	18	7,298	248	9	7,573	-4,423	-4,422	-1	0.01%
1990	2,358	2,272	58	4,688	18	6,918	245	9	7,190	-2,502	-2,501	-1	0.01%
1991	23,964	2,746	64	26,774	19	4,619	279	9	4,926	21,848	21,849	-1	0.00%
1992	23,810	2,622	64	26,496	13	5,588	292	9	5,902	20,594	20,594	0	0.00%
1993	2,694	1,628	58	4,380	12	7,654	264	9	7,939	-3,559	-3,558	-1	0.01%
1994	2,785	2,756	60	5,601	17	7,389	254	9	7,669	-2,068	-2,070	2	0.02%
1995	2,818	2,261	61	5,140	17	7,171	251	9	7,448	-2,308	-2,307	-1	0.01%
1996	1,865	1,034	63	2,962	26	7,242	247	9	7,524	-4,562	-4,561	-1	0.01%
1997	24,905	2,727	68	27,700	18	4,843	282	9	5,152	22,548	22,548	0	0.00%
1998	21,876	2,261	67	24,204	20	5,912	291	9	6,232	17,972	17,971	1	0.00%
1999	2,205	1,697	62	3,964	19	7,811	264	9	8,103	-4,139	-4,140	1	0.01%

Table C-20 Annual groundwater budget for the Gulf Coast Aquifer, Nueces County, Corpus Christi Aquifer Storage and Recovery Conservation District. All values in acre-feet per year, except as noted.

	INFLOW					OUTFLOW									
Year	Recharge	Net Lateral Flow From Nueces Kenedy	Net Lateral Flow From Nueces White	Net Lateral Flow From San Patricio	Total Inflow	Wells	Drains	Net River Leakage	Net Lateral Flow To Gulf	Net Lateral Flow To San Patricio	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	238	84	1,662	-	1,984	63	144	884	851	222	2,164	-180	-180	0	0.00%
1964	324	85	1,681	-	2,090	61	143	873	845	222	2,144	-54	-54	0	0.00%
1965	415	89	1,745	-	2,249	53	146	887	851	227	2,164	85	84	1	0.04%
1966	416	132	2,681	-	3,229	50	163	700	895	297	2,105	1,124	1,122	2	0.06%
1967	587	171	3,454	-	4,212	35	202	969	1,001	382	2,589	1,623	1,623	0	0.00%
1968	591	188	3,686	-	4,465	43	241	1,453	1,104	432	3,273	1,192	1,192	0	0.00%
1969	400	160	2,831	-	3,391	52	255	1,706	1,134	396	3,543	-152	-154	2	0.05%
1970	521	140	2,631	-	3,292	51	267	1,506	1,145	371	3,340	-48	-50	2	0.06%
1971	581	170	3,673	-	4,424	41	288	1,361	1,188	436	3,314	1,110	1,110	0	0.00%
1972	517	185	3,802	-	4,504	48	310	1,744	1,237	470	3,809	695	696	-1	0.02%
1973	624	209	4,259	-	5,092	32	339	1,901	1,297	521	4,090	1,002	1,002	0	0.00%
1974	391	175	3,233	-	3,799	51	341	2,157	1,298	465	4,312	-513	-515	2	0.05%
1975	463	152	2,989	-	3,604	51	340	1,831	1,282	430	3,934	-330	-331	1	0.02%
1976	625	185	4,088	-	4,898	34	357	1,697	1,313	496	3,897	1,001	1,001	0	0.00%
1977	360	160	3,127	-	3,647	57	351	2,074	1,300	450	4,232	-585	-586	1	0.02%
1978	505	143	2,953	-	3,601	52	349	1,795	1,285	421	3,902	-301	-302	1	0.03%
1979	574	169	3,802	-	4,545	47	357	1,674	1,304	471	3,853	692	692	0	0.00%
1980	445	150	3,089	-	3,684	54	353	1,978	1,295	437	4,117	-433	-433	0	0.00%
1981	604	183	4,043	-	4,830	59	368	1,730	1,328	498	3,983	847	846	1	0.02%
1982	304	158	3,123	-	3,585	93	356	2,063	1,305	450	4,267	-682	-681	-1	0.02%
1983	532	144	2,913	-	3,589	125	353	1,773	1,294	420	3,965	-376	-377	1	0.03%
1984	341	133	2,709	-	3,183	164	334	1,597	1,252	393	3,740	-557	-557	0	0.00%
1985	547	167	3,674	-	4,388	210	341	1,491	1,255	432	3,729	659	658	1	0.02%
1986	437	150	2,934	-	3,521	190	334	1,827	1,244	399	3,994	-473	-473	0	0.00%
1987	439	173	3,698	-	4,310	157	339	1,598	1,252	442	3,788	522	521	1	0.02%
1988	291	152	2,927	-	3,370	221	328	1,820	1,228	398	3,995	-625	-625	0	0.00%
1989	258	137	2,782	-	3,177	71	318	1,604	1,202	387	3,582	-405	-407	2	0.06%
1990	307	128	2,742	-	3,177	94	310	1,500	1,184	381	3,469	-292	-291	-1	0.03%
1991	657	166	3,863	-	4,686	95	330	1,441	1,240	459	3,565	1,121	1,121	0	0.00%
1992	555	192	4,145	-	4,892	83	348	1,842	1,289	502	4,064	828	829	-1	0.02%
1993	541	166	3,324	-	4,031	88	355	2,090	1,308	465	4,306	-275	-275	0	0.00%
1994	481	149	3,142	-	3,772	90	353	1,830	1,297	439	4,009	-237	-236	-1	0.02%
1995	489	138	3,007	-	3,634	55	349	1,727	1,283	412	3,826	-192	-193	1	0.03%
1996	261	128	2,851	-	3,240	55	333	1,613	1,245	387	3,633	-393	-394	1	0.03%
1997	637	169	3,984	-	4,790	88	353	1,559	1,283	452	3,735	1,055	1,055	0	0.00%
1998	491	195	4,838	94	5,618	2,628	361	1,923	914	-	5,826	-208	-209	1	0.02%
1999	435	170	3,457	-	4,062	55	360	2,110	1,253	401	4,179	-117	-117	0	0.00%

Table C-21. Annual groundwater budget for the Gulf Coast Aquifer, Nueces County, Kenedy County Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW				OUTFLOW									
Year	Net River Leakage	Recharge	Net Lateral Flow From Nueces White	Total Inflow	Wells	Net River Leakage	Net Lateral Flow To Gulf	Net Lateral Flow To Kleburg Kenedy	Net Lateral Flow To Nueces CC	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	76	49	158	283	6	-	70	164	84	324	-41	-41	0	0.00%
1964	95	59	157	311	6	-	69	165	85	325	-14	-15	1	0.30%
1965	114	83	159	356	5	-	69	169	89	332	24	25	-1	0.28%
1966	600	77	193	870	5	-	70	277	132	484	386	386	0	0.00%
1967	672	119	239	1,030	3	-	73	368	171	615	415	416	-1	0.10%
1968	455	101	349	905	4	-	77	389	188	658	247	247	0	0.00%
1969	11	66	338	415	5	-	79	318	160	562	-147	-146	-1	0.16%
1970	52	95	327	474	5	-	81	289	140	515	-41	-42	1	0.17%
1971	466	105	413	984	4	-	84	370	170	628	356	357	-1	0.10%
1972	259	105	510	874	4	-	87	379	185	655	219	220	-1	0.11%
1973	263	132	637	1,032	3	-	91	398	209	701	331	332	-1	0.10%
1974	-	76	513	589	5	147	93	338	175	758	-169	-169	0	0.00%
1975	-	104	437	541	5	26	95	318	152	596	-55	-55	0	0.00%
1976	312	129	614	1,055	3	-	97	377	185	662	393	391	2	0.19%
1977	-	67	489	556	5	125	98	325	160	713	-157	-157	0	0.00%
1978	-	105	420	525	5	9	99	310	143	566	-41	-41	0	0.00%
1979	263	108	550	921	4	-	100	360	169	633	288	289	-1	0.11%
1980	-	86	457	543	5	77	101	320	150	653	-110	-109	-1	0.14%
1981	281	110	614	1,005	5	-	102	376	183	666	339	339	0	0.00%
1982	-	57	483	540	6	130	102	325	158	721	-181	-181	0	0.00%
1983	-	104	406	510	5	11	103	308	144	571	-61	-62	1	0.16%
1984	15	66	357	438	7	-	102	287	133	529	-91	-91	0	0.00%
1985	341	106	469	916	8	-	102	349	167	626	290	290	0	0.00%
1986	-	89	377	466	11	25	102	310	150	598	-132	-133	1	0.16%
1987	262	84	495	841	7	-	102	355	173	637	204	205	-1	0.12%
1988	-	58	385	443	12	45	101	312	152	622	-179	-179	0	0.00%
1989	4	51	362	417	8	-	100	292	137	537	-120	-121	1	0.18%
1990	31	55	351	437	7	-	99	282	128	516	-79	-80	1	0.19%
1991	383	130	486	999	7	-	101	364	166	638	361	362	-1	0.10%
1992	212	105	611	928	5	-	103	385	192	685	243	242	1	0.11%
1993	-	111	521	632	6	150	105	337	166	764	-132	-134	2	0.24%
1994	-	91	466	557	7	51	106	322	149	635	-78	-79	1	0.15%
1995	-	91	432	523	5	8	107	316	138	574	-51	-49	-2	0.33%
1996	8	50	397	455	4	-	106	305	128	543	-88	-88	0	0.00%
1997	319	140	577	1,036	4	-	108	373	169	654	382	381	1	0.10%
1998	126	103	644	873	7	-	109	381	195	692	181	179	2	0.23%
1999	-	90	539	629	6	191	110	328	170	805	-176	-176	0	0.00%

Table C-22. Annual groundwater budget for the Gulf Coast Aquifer, Nueces County, non-district area. All values in acre-feet per year, except as noted.

	INFLOW							OUTFLOW													
Year	Net River Leakage	Recharge	Net Lateral Flow From Aransas	Net Lateral Flow From Jim Wells Brush Country	Net Lateral Flow From Jim Wells Kenedy	Net Lateral Flow From Kleburg White	Total Inflow	Wells	Drains	Net River Leakage	Net Lateral Flow To Gulf	Net Lateral Flow To Kleburg Kenedy	Net Lateral Flow To Kleburg White	Net Lateral Flow To Nueces CC	Net Lateral Flow To Nueces Kenedy	Net Lateral Flow To San Patricio	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	991	8	5,196	1,299	-	7,494	3,650	88	596	51	1,576	114	1,662	158	281	8,176	-682	-683	1	0.01%
1964	-	1,243	8	5,192	1,297	-	7,740	3,515	89	272	49	1,554	112	1,681	157	286	7,715	25	24	1	0.01%
1965	30	1,598	8	5,188	1,283	-	8,107	3,042	94	-	50	1,532	100	1,745	159	301	7,023	1,084	1,085	-1	0.01%
1966	11,253	1,685	8	4,906	1,164	-	19,016	2,873	113	-	49	1,882	78	2,681	193	455	8,324	10,692	10,690	2	0.01%
1967	14,514	2,230	8	4,670	1,068	-	22,490	1,994	147	-	52	2,416	8	3,454	239	478	8,788	13,702	13,702	0	0.00%
1968	11,095	2,090	6	4,721	1,084	14	19,010	2,501	168	-	54	2,836	-	3,686	349	468	10,062	8,948	8,948	0	0.00%
1969	-	1,765	6	5,301	1,246	6	8,324	3,008	166	1,542	53	2,869	-	2,831	338	334	11,141	-2,817	-2,817	0	0.00%
1970	-	1,891	6	5,648	1,339	-	8,884	2,940	164	1,264	54	2,730	63	2,631	327	378	10,551	-1,667	-1,666	-1	0.01%
1971	11,709	2,444	6	5,352	1,256	-	20,767	2,366	186	-	55	2,972	85	3,673	413	538	10,288	10,479	10,480	-1	0.00%
1972	8,802	1,922	6	5,396	1,268	-	17,394	2,771	197	-	55	3,125	48	3,802	510	522	11,030	6,364	6,365	-1	0.01%
1973	10,846	2,564	5	5,470	1,274	-	20,159	1,825	224	-	54	3,176	72	4,259	637	620	10,867	9,292	9,293	-1	0.00%
1974	-	1,531	4	6,041	1,451	-	9,027	2,940	212	2,561	53	3,398	31	3,233	513	440	13,381	-4,354	-4,356	2	0.01%
1975	-	1,717	4	6,391	1,548	-	9,660	2,940	204	2,108	52	3,207	94	2,989	437	434	12,465	-2,805	-2,807	2	0.01%
1976	11,256	2,540	4	6,129	1,459	-	21,388	1,960	227	-	53	3,136	134	4,088	614	616	10,828	10,560	10,561	-1	0.00%
1977	-	1,360	4	6,526	1,587	-	9,477	3,312	211	2,784	51	3,301	66	3,127	489	438	13,779	-4,302	-4,304	2	0.01%
1978	-	1,815	4	6,754	1,652	-	10,225	2,974	206	2,086	51	3,133	113	2,953	420	444	12,380	-2,155	-2,156	1	0.01%
1979	8,842	1,987	4	6,482	1,580	-	18,895	2,704	218	-	52	3,147	139	3,802	550	587	11,199	7,696	7,694	2	0.01%
1980	-	1,883	4	6,767	1,663	-	10,317	3,109	211	2,370	51	3,209	82	3,089	457	443	13,021	-2,704	-2,707	3	0.02%
1981	10,482	2,429	4	6,492	1,596	-	21,003	3,380	224	-	53	3,255	163	4,043	614	618	12,350	8,653	8,653	0	0.00%
1982	-	1,189	3	6,881	1,726	-	9,799	3,973	212	2,826	51	3,316	88	3,123	483	448	14,520	-4,721	-4,723	2	0.01%
1983	-	1,884	5	7,104	1,788	-	10,781	4,369	203	2,100	53	3,075	123	2,913	406	435	13,677	-2,896	-2,896	0	0.00%
1984	-	1,414	5	7,265	1,830	-	10,514	5,260	190	2,103	53	2,644	125	2,709	357	426	13,867	-3,353	-3,353	0	0.00%
1985	9,932	2,208	7	6,934	1,729	-	20,810	5,174	203	-	57	2,712	132	3,674	469	509	12,930	7,880	7,881	-1	0.00%
1986	-	1,620	8	7,176	1,802	-	10,606	4,142	196	2,103	57	2,997	59	2,934	377	360	13,225	-2,619	-2,620	1	0.01%
1987	8,195	1,750	9	6,942	1,742	-	18,638	3,605	207	-	58	3,049	107	3,698	495	502	11,721	6,917	6,918	-1	0.01%
1988	-	1,159	10	7,299	1,833	-	10,301	4,391	197	2,727	58	3,013	48	2,927	385	347	14,093	-3,792	-3,792	0	0.00%
1989	-	982	9	7,467	1,869	-	10,327	2,626	191	2,434	50	2,918	91	2,782	362	434	11,888	-1,561	-1,562	1	0.01%
1990	-	1,208	9	7,463	1,871	-	10,551	2,163	179	1,980	49	2,925	112	2,742	351	476	10,977	-426	-427	1	0.01%
1991	10,686	2,290	8	6,984	1,737	-	21,705	2,174	197	-	50	3,102	136	3,863	486	616	10,624	11,081	11,082	-1	0.00%
1992	8,812	2,105	6	6,857	1,703	-	19,483	2,062	215	-	49	3,280	109	4,145	611	631	11,102	8,381	8,381	0	0.00%
1993	-	2,062	7	7,191	1,812	-	11,072	2,178	211	2,793	52	3,494	56	3,324	521	497	13,126	-2,054	-2,052	-2	0.01%
1994	-	1,818	5	7,376	1,869	-	11,068	2,146	206	2,385	48	3,323	101	3,142	466	492	12,309	-1,241	-1,240	-1	0.01%
1995	-	1,892	7	7,438	1,881	-	11,218	2,130	106	2,157	52	3,246	122	3,007	432	438	11,690	-472	-474	2	0.02%
1996	-	1,023	7	7,498	1,901	-	10,429	2,740	89	2,529	50	2,946	136	2,851	397	428	12,166	-1,737	-1,738	1	0.01%
1997	10,440	2,346	8	7,031	1,779	-	21,604	3,020	107	-	53	2,808	175	3,984	577	577	11,301	10,303	10,302	1	0.00%
1998	7,139	1,922	12	6,888	1,768	-	17,729	2,412	110	-	65	3,297	142	4,838	644	586	12,094	5,635	5,633	2	0.01%
1999	-	1,723	10	7,231	1,881	-	10,845	2,893	104	3,231	59	3,163	91	3,457	539	454	13,991	-3,146	-3,142	-4	0.03%

Table C-23. Annual groundwater budget for the Gulf Coast Aquifer, San Patricio County. All values in acre-feet per year, except as noted.

	INFLOW										OUTFLOW										
Year	Net River Leakage	Recharge	Vertical Leakage Lower	Net Lateral Flow From Bee 16	Net Lateral Flow From Jim Wells Brush Country	Net Lateral Flow From Live Oak	Net Lateral Flow From Nueces CC	Net Lateral Flow From Nueces White	Net Lateral Flow From Refugio	Total Inflow	Wells	Drains	Net River Leakage	Net Lateral Flow To Aransas	Net Lateral Flow To Gulf	Net Lateral Flow To Nueces CC	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	1,262	91	2,181	462	1,220	222	281	1,070	6,789	4,781	984	1,223	145	407	-	7,540	-751	-752	1	0.01%
1964	-	1,818	90	2,164	478	1,217	222	286	1,056	7,331	4,604	1,001	1,009	145	413	-	7,172	159	159	0	0.00%
1965	-	1,936	90	2,145	504	1,213	227	301	1,026	7,442	3,984	1,068	880	149	436	-	6,517	925	924	1	0.01%
1966	5,904	2,146	89	1,947	1,022	1,201	297	455	842	13,903	3,763	1,451	-	155	503	-	5,872	8,031	8,031	0	0.00%
1967	6,090	2,842	87	1,882	1,168	1,175	382	478	918	15,022	2,612	2,050	-	163	619	-	5,444	9,578	9,579	-1	0.01%
1968	2,907	2,868	87	2,045	1,040	1,165	432	468	1,158	12,170	3,276	2,410	-	161	675	-	6,522	5,648	5,646	2	0.02%
1969	-	2,376	88	2,405	652	1,166	396	334	1,277	8,694	3,940	2,227	4,531	153	635	-	11,486	-2,792	-2,791	-1	0.01%
1970	-	2,463	89	2,513	621	1,172	371	378	1,291	8,898	3,852	2,074	3,351	153	602	-	10,032	-1,134	-1,133	-1	0.01%
1971	4,632	2,823	87	2,337	991	1,171	436	538	1,185	14,200	3,099	2,387	-	162	656	-	6,304	7,896	7,897	-1	0.01%
1972	1,818	2,467	87	2,450	889	1,173	470	522	1,326	11,202	3,630	2,582	-	163	686	-	7,061	4,141	4,142	-1	0.01%
1973	2,474	2,934	86	2,532	767	1,163	521	620	1,572	12,669	2,391	2,916	-	171	755	-	6,233	6,436	6,437	-1	0.01%
1974	-	1,988	87	2,915	554	1,181	465	440	1,504	9,134	3,852	2,637	5,733	160	700	-	13,082	-3,948	-3,945	-3	0.02%
1975	-	1,997	88	2,996	559	1,194	430	434	1,476	9,174	3,852	2,395	4,205	160	652	-	11,264	-2,090	-2,090	0	0.00%
1976	4,261	2,980	86	2,763	783	1,194	496	616	1,450	14,629	2,568	2,753	-	173	722	-	6,216	8,413	8,411	2	0.01%
1977	-	1,787	88	3,076	542	1,214	450	438	1,466	9,061	4,339	2,492	5,411	162	668	-	13,072	-4,011	-4,013	2	0.01%
1978	-	2,072	88	3,110	552	1,224	421	444	1,452	9,363	3,896	2,318	3,992	163	640	-	11,009	-1,646	-1,646	0	0.00%
1979	2,986	2,552	86	2,909	783	1,226	471	587	1,363	12,963	3,542	2,559	-	170	682	-	6,953	6,010	6,011	-1	0.01%
1980	-	2,198	87	3,114	552	1,237	437	443	1,413	9,481	4,073	2,410	4,834	164	658	-	12,139	-2,658	-2,659	1	0.01%
1981	3,838	3,094	87	2,934	672	1,247	498	618	1,497	14,485	4,427	2,684	-	169	691	-	7,971	6,514	6,513	1	0.01%
1982	-	1,380	88	3,247	512	1,247	450	448	1,517	8,889	5,143	2,388	5,323	158	628	-	13,640	-4,751	-4,752	1	0.01%
1983	-	2,624	88	3,318	534	1,256	420	435	1,563	10,238	5,872	2,193	3,960	150	576	-	12,751	-2,513	-2,514	1	0.01%
1984	-	1,738	88	3,357	548	1,266	393	426	1,557	9,373	6,568	1,902	3,454	140	505	-	12,569	-3,196	-3,197	1	0.01%
1985	3,985	2,675	87	3,077	801	1,261	432	509	1,407	14,234	4,470	2,277	-	168	599	-	7,514	6,720	6,723	-3	0.02%
1986	-	1,802	88	3,285	565	1,271	399	360	1,483	9,253	4,810	2,172	4,464	169	592	-	12,207	-2,954	-2,954	0	0.00%
1987	2,527	2,131	87	3,135	716	1,274	442	502	1,429	12,243	4,162	2,391	-	181	632	-	7,366	4,877	4,879	-2	0.02%
1988	-	1,394	88	3,348	537	1,278	398	347	1,504	8,894	4,644	2,201	4,881	180	598	-	12,504	-3,610	-3,611	1	0.01%
1989	-	1,082	89	3,280	570	1,291	387	434	1,474	8,607	3,877	2,048	3,867	183	584	-	10,559	-1,952	-1,950	-2	0.02%
1990	-	1,574	89	3,183	601	1,295	381	476	1,413	9,012	3,889	1,955	3,353	193	576	-	9,966	-954	-954	0	0.00%
1991	4,416	2,778	88	2,884	832	1,290	459	616	1,308	14,671	3,811	2,368	-	200	646	-	7,025	7,646	7,645	1	0.01%
1992	1,861	2,808	89	2,908	632	1,304	502	631	1,500	12,235	2,685	2,776	-	219	753	-	6,433	5,802	5,800	2	0.02%
1993	-	2,313	89	3,269	545	1,302	465	497	1,496	9,976	3,043	2,680	5,772	221	743	-	12,459	-2,483	-2,482	-1	0.01%
1994	-	2,072	90	3,342	561	1,316	439	492	1,488	9,800	3,028	2,521	4,507	227	711	-	10,994	-1,194	-1,195	1	0.01%
1995	-	2,140	91	3,367	596	1,340	412	438	1,436	9,820	3,102	2,414	4,016	234	691	-	10,457	-637	-637	0	0.00%
1996	-	1,192	91	3,298	599	1,350	387	428	1,403	8,748	3,248	2,234	3,954	240	659	-	10,335	-1,587	-1,586	-1	0.01%
1997	4,238	2,886	90	3,083	747	1,359	452	577	1,365	14,797	3,182	2,646	-	248	727	-	6,803	7,994	7,992	2	0.01%
1998	1,100	2,381	89	3,131	570	1,341	-	586	1,579	10,777	4,223	2,801	-	246	881	94	8,245	2,532	2,531	1	0.01%
1999	-	1,941	90	3,399	518	1,341	401	454	1,571	9,715	3,728	2,633	5,804	235	747	-	13,147	-3,432	-3,432	0	0.00%

Table C-24. Annual groundwater budget for the Gulf Coast Aquifer, Starr County. All values in acre-feet per year, except as noted.

	INFLOW							OUTFLOW									
Year	Net River Leakage	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From Brooks Brush Country	Net Lateral Flow From Jim Hogg	Net Lateral Flow From Mexico	Total Inflow	Wells	Net River Leakage	Net Vertical Leakage Lower	Net Lateral Flow To Hidalgo Brush Country	Net Lateral Flow To Hidalgo White	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	2,624	372	397	1,119	44	4,556	475	306	-	552	3,715	5,048	-492	-495	3	0.06%
1964	136	2,497	243	399	1,123	44	4,442	457	-	-	550	3,720	4,727	-285	-287	2	0.04%
1965	548	3,008	86	398	1,115	44	5,199	396	-	-	551	3,729	4,676	523	522	1	0.02%
1966	15,164	3,667	-	409	1,092	43	20,375	374	-	4,846	550	3,942	9,712	10,663	10,664	-1	0.00%
1967	20,006	6,095	-	411	1,041	42	27,595	259	-	6,713	561	4,259	11,792	15,803	15,802	1	0.00%
1968	16,719	3,676	-	397	998	40	21,830	325	-	5,653	569	4,464	11,011	10,819	10,820	-1	0.00%
1969	315	2,444	-	375	1,005	39	4,178	391	-	424	576	4,381	5,772	-1,594	-1,594	0	0.00%
1970	831	3,346	-	374	1,047	39	5,637	382	-	1,125	581	4,275	6,363	-726	-726	0	0.00%
1971	18,516	3,560	-	403	1,088	39	23,606	308	-	7,218	584	4,437	12,547	11,059	11,061	-2	0.01%
1972	15,695	3,347	-	408	1,096	38	20,584	360	-	6,087	590	4,576	11,613	8,971	8,968	3	0.01%
1973	20,728	5,218	-	423	1,102	36	27,507	237	-	7,916	603	4,791	13,547	13,960	13,960	0	0.00%
1974	698	2,596	-	409	1,133	36	4,872	382	-	1,359	613	4,684	7,038	-2,166	-2,167	1	0.01%
1975	1,284	3,787	-	419	1,195	36	6,721	382	-	2,097	620	4,564	7,663	-942	-943	1	0.01%
1976	21,142	4,434	-	460	1,239	36	27,311	255	-	8,908	624	4,749	14,536	12,775	12,774	1	0.00%
1977	764	2,256	-	453	1,274	35	4,782	431	-	1,862	630	4,650	7,573	-2,791	-2,791	0	0.00%
1978	1,763	2,762	-	471	1,335	35	6,366	387	-	2,612	633	4,547	8,179	-1,813	-1,815	2	0.02%
1979	17,506	2,768	-	503	1,375	35	22,187	352	-	8,007	633	4,667	13,659	8,528	8,528	0	0.00%
1980	1,726	2,427	-	499	1,395	34	6,081	404	-	2,589	639	4,592	8,224	-2,143	-2,144	1	0.01%
1981	20,926	4,342	-	527	1,417	35	27,247	440	-	9,194	641	4,778	15,053	12,194	12,197	-3	0.01%
1982	1,381	2,468	-	519	1,427	33	5,828	457	-	2,705	647	4,695	8,504	-2,676	-2,677	1	0.01%
1983	2,267	3,277	-	531	1,467	32	7,574	473	-	3,461	651	4,604	9,189	-1,615	-1,615	0	0.00%
1984	1,932	2,458	-	543	1,507	32	6,472	506	-	3,505	650	4,506	9,167	-2,695	-2,697	2	0.02%
1985	18,922	3,692	-	572	1,526	36	24,748	502	-	8,303	650	4,671	14,126	10,622	10,622	0	0.00%
1986	1,803	2,671	-	568	1,525	34	6,601	506	-	2,296	656	4,632	8,090	-1,489	-1,490	1	0.01%
1987	16,410	2,992	-	601	1,543	36	21,582	641	-	7,335	655	4,739	13,370	8,212	8,213	-1	0.00%
1988	827	2,497	-	581	1,548	35	5,488	613	-	1,885	659	4,657	7,814	-2,326	-2,327	1	0.01%
1989	1,099	2,029	-	597	1,562	34	5,321	347	-	2,159	661	4,583	7,750	-2,429	-2,429	0	0.00%
1990	1,808	2,503	-	607	1,582	34	6,534	383	-	2,933	662	4,519	8,497	-1,963	-1,961	-2	0.02%
1991	19,963	3,216	-	631	1,591	37	25,438	446	-	9,029	661	4,714	14,850	10,588	10,589	-1	0.00%
1992	19,113	3,452	-	632	1,561	36	24,794	439	-	8,381	665	4,917	14,402	10,392	10,394	-2	0.01%
1993	1,756	3,337	-	611	1,538	35	7,277	317	-	2,622	674	4,872	8,485	-1,208	-1,208	0	0.00%
1994	2,068	2,269	-	608	1,558	34	6,537	325	-	2,884	676	4,782	8,667	-2,130	-2,130	0	0.00%
1995	2,153	2,616	-	611	1,584	33	6,997	243	-	3,012	678	4,737	8,670	-1,673	-1,673	0	0.00%
1996	1,307	1,587	-	612	1,606	32	5,144	386	-	2,697	674	4,630	8,387	-3,243	-3,243	0	0.00%
1997	20,523	3,756	-	628	1,593	36	26,536	233	-	9,089	672	4,841	14,835	11,701	11,702	-1	0.00%
1998	17,409	3,489	-	625	1,553	36	23,112	519	-	7,743	672	5,006	13,940	9,172	9,173	-1	0.00%
1999	1,230	2,991	-	601	1,531	34	6,387	394	-	2,445	681	4,936	8,456	-2,069	-2,069	0	0.00%

Table C-25. Annual groundwater budget for the Gulf Coast Aquifer, Groundwater Management Area 16 portion of Webb County. All values in acre-feet per year, except as noted.

	INFLOW				OUTFLOW								
Year	River Leakage	Recharge	Net Lateral Flow From Zapata	Total Inflow	Wells	Net Vertical Leakage Lower	Net Lateral Flow To Duval	Net Lateral Flow To JimHogg	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	192	642	4	838	133	25	515	494	1,167	-329	-328	-1	0.09%
1964	240	639	4	883	128	21	514	494	1,157	-274	-275	1	0.08%
1965	288	771	4	1,063	111	29	514	494	1,148	-85	-86	1	0.08%
1966	2,013	1,098	4	3,115	104	3	494	511	1,112	2,003	2,001	2	0.06%
1967	2,684	1,438	4	4,126	73	402	486	519	1,480	2,646	2,645	1	0.02%
1968	2,300	895	4	3,199	91	939	490	513	2,033	1,166	1,167	-1	0.03%
1969	288	752	4	1,044	109	1,100	512	484	2,205	-1,161	-1,162	1	0.05%
1970	288	830	4	1,122	107	781	511	471	1,870	-748	-749	1	0.05%
1971	2,396	1,468	4	3,868	86	589	479	482	1,636	2,232	2,232	0	0.00%
1972	2,109	1,011	4	3,124	101	1,023	470	475	2,069	1,055	1,054	1	0.03%
1973	2,780	1,586	4	4,370	66	1,481	449	473	2,469	1,901	1,899	2	0.05%
1974	288	990	4	1,282	107	1,382	473	438	2,400	-1,118	-1,118	0	0.00%
1975	288	928	4	1,220	107	974	470	425	1,976	-756	-756	0	0.00%
1976	2,684	1,425	4	4,113	71	910	429	441	1,851	2,262	2,262	0	0.00%
1977	240	731	4	975	120	1,086	449	412	2,067	-1,092	-1,093	1	0.05%
1978	288	934	4	1,226	108	784	447	407	1,746	-520	-521	1	0.05%
1979	2,157	1,007	4	3,168	98	667	417	420	1,602	1,566	1,564	2	0.06%
1980	288	741	3	1,032	113	899	433	401	1,846	-814	-815	1	0.05%
1981	2,588	1,337	3	3,928	123	919	397	419	1,858	2,070	2,069	1	0.03%
1982	240	854	3	1,097	123	1,074	420	393	2,010	-913	-913	0	0.00%
1983	288	819	3	1,110	127	784	419	386	1,716	-606	-606	0	0.00%
1984	240	635	3	878	127	593	416	382	1,518	-640	-642	2	0.13%
1985	2,252	1,225	3	3,480	123	499	388	405	1,415	2,065	2,065	0	0.00%
1986	288	800	3	1,091	168	753	408	392	1,721	-630	-631	1	0.05%
1987	2,013	1,123	3	3,139	106	698	388	410	1,602	1,537	1,537	0	0.00%
1988	192	669	3	864	140	861	407	391	1,799	-935	-936	1	0.05%
1989	192	581	3	776	143	662	405	387	1,597	-821	-822	1	0.06%
1990	240	859	3	1,102	119	495	401	385	1,400	-298	-300	2	0.13%
1991	2,396	1,164	3	3,563	122	512	368	406	1,408	2,155	2,155	0	0.00%
1992	2,396	1,205	3	3,604	125	1,125	360	410	2,020	1,584	1,586	-2	0.06%
1993	288	941	2	1,231	136	1,165	381	389	2,071	-840	-841	1	0.04%
1994	288	869	2	1,159	103	850	386	380	1,719	-560	-559	-1	0.05%
1995	288	1,364	2	1,654	120	625	385	377	1,507	147	147	0	0.00%
1996	192	557	2	751	115	508	387	377	1,387	-636	-636	0	0.00%
1997	2,492	1,071	2	3,565	114	528	355	401	1,398	2,167	2,168	-1	0.03%
1998	2,205	906	2	3,113	130	1,099	352	402	1,983	1,130	1,130	0	0.00%
1999	240	767	2	1,009	134	1,145	376	381	2,036	-1,027	-1,027	0	0.00%

Table C-26. Annual groundwater budget for the Gulf Coast Aquifer, Willacy County, Kenedy County Groundwater Conservation District. All values in acre-feet per year, except as noted.

	INFLOW				OUTFLOW						
Year	Recharge	Net Lateral Flow From Hidalgo White	Net Lateral Flow From Kenedy	Total Inflow	Wells	Net Lateral Flow To Willacy White	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	156	234	401	791	11	794	805	-14	-14	0	0.00%
1964	126	234	399	759	11	779	790	-31	-32	1	0.13%
1965	155	233	403	791	9	775	784	7	7	0	0.00%
1966	185	233	355	773	9	630	639	134	134	0	0.00%
1967	253	233	342	828	6	632	638	190	191	-1	0.12%
1968	190	233	334	757	8	654	662	95	95	0	0.00%
1969	157	233	362	752	9	778	787	-35	-35	0	0.00%
1970	204	233	383	820	9	814	823	-3	-2	-1	0.12%
1971	205	233	366	804	7	685	692	112	111	1	0.12%
1972	180	233	347	760	9	687	696	64	65	-1	0.13%
1973	225	233	353	811	6	691	697	114	114	0	0.00%
1974	133	234	378	745	9	803	812	-67	-66	-1	0.12%
1975	218	234	395	847	9	840	849	-2	-2	0	0.00%
1976	230	234	381	845	6	717	723	122	122	0	0.00%
1977	147	234	389	770	10	820	830	-60	-60	0	0.00%
1978	172	234	406	812	9	838	847	-35	-34	-1	0.12%
1979	186	234	380	800	8	716	724	76	76	0	0.00%
1980	152	234	394	780	10	812	822	-42	-41	-1	0.12%
1981	226	234	355	815	10	703	713	102	102	0	0.00%
1982	132	235	382	749	9	805	814	-65	-66	1	0.12%
1983	187	235	401	823	9	828	837	-14	-14	0	0.00%
1984	160	235	418	813	8	831	839	-26	-27	1	0.12%
1985	172	235	390	797	7	698	705	92	92	0	0.00%
1986	148	233	410	791	4	804	808	-17	-18	1	0.12%
1987	177	234	379	790	5	706	711	79	78	1	0.13%
1988	125	233	398	756	5	803	808	-52	-52	0	0.00%
1989	82	233	416	731	5	807	812	-81	-82	1	0.12%
1990	114	232	421	767	5	801	806	-39	-39	0	0.00%
1991	185	232	370	787	6	658	664	123	123	0	0.00%
1992	194	231	366	791	4	671	675	116	116	0	0.00%
1993	192	231	397	820	4	802	806	14	13	1	0.12%
1994	148	231	431	810	3	829	832	-22	-22	0	0.00%
1995	214	231	450	895	3	855	858	37	36	1	0.11%
1996	129	231	463	823	4	854	858	-35	-35	0	0.00%
1997	211	230	422	863	4	717	721	142	142	0	0.00%
1998	183	230	411	824	4	727	731	93	93	0	0.00%
1999	159	230	449	838	4	848	852	-14	-13	-1	0.11%

Table C-27. Annual groundwater budget for the Gulf Coast Aquifer, Willacy County, non-district area. All values in acre-feet per year, except as noted.

	INFLOW							OUTFLOW								
Year	Net River Leakage	Recharge	Net Lateral Flow From Cameron	Net Lateral Flow From Hidalgo White	Net Lateral Flow From Kenedy	Net Lateral Flow From Willacy Kenedy	Total Inflow	Wells	Net River Leakage	Net Lateral Flow To Cameron	Net Lateral Flow To Gulf	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	1,321	-	628	177	794	2,920	438	1,670	203	728	3,039	-119	-120	1	0.03%
1964	-	961	-	627	175	779	2,542	422	1,488	185	722	2,817	-275	-276	1	0.04%
1965	-	1,228	-	624	175	775	2,802	365	1,389	147	721	2,622	180	181	-1	0.03%
1966	1,835	1,551	716	641	174	630	5,547	345	-	-	724	1,069	4,478	4,479	-1	0.02%
1967	829	2,102	1,173	628	175	632	5,539	240	-	-	739	979	4,560	4,561	-1	0.02%
1968	-	1,625	1,038	625	172	654	4,114	300	632	-	745	1,677	2,437	2,439	-2	0.05%
1969	-	1,221	600	645	168	778	3,412	361	3,406	-	739	4,506	-1,094	-1,095	1	0.02%
1970	-	1,697	434	662	170	814	3,777	353	2,741	-	742	3,836	-59	-61	2	0.04%
1971	425	1,640	887	653	171	685	4,461	284	-	-	748	1,032	3,429	3,428	1	0.02%
1972	-	1,471	828	647	168	687	3,801	333	1,142	-	748	2,223	1,578	1,578	0	0.00%
1973	-	1,859	803	645	167	691	4,165	219	923	-	753	1,895	2,270	2,270	0	0.00%
1974	-	1,139	458	656	163	803	3,219	353	4,045	-	746	5,144	-1,925	-1,927	2	0.04%
1975	-	1,707	354	667	166	840	3,734	353	3,201	-	748	4,302	-568	-569	1	0.02%
1976	81	1,975	781	659	169	717	4,382	235	-	-	756	991	3,391	3,390	1	0.02%
1977	-	1,236	394	660	165	820	3,275	398	3,958	-	750	5,106	-1,831	-1,831	0	0.00%
1978	-	1,536	311	667	167	838	3,519	357	3,089	-	755	4,201	-682	-683	1	0.02%
1979	-	1,573	720	660	167	716	3,836	325	302	-	758	1,385	2,451	2,451	0	0.00%
1980	-	1,212	378	659	166	812	3,227	373	3,604	-	753	4,730	-1,503	-1,504	1	0.02%
1981	-	1,795	773	659	166	703	4,096	406	168	-	756	1,330	2,766	2,765	1	0.02%
1982	-	1,145	378	655	163	805	3,146	283	3,970	-	751	5,004	-1,858	-1,860	2	0.04%
1983	-	1,556	271	657	165	828	3,477	161	3,151	-	753	4,065	-588	-588	0	0.00%
1984	-	1,532	148	655	167	831	3,333	39	2,995	-	760	3,794	-461	-460	-1	0.02%
1985	-	1,384	660	646	167	698	3,555	20	21	-	760	801	2,754	2,754	0	0.00%
1986	-	1,328	286	636	166	804	3,220	15	3,627	-	760	4,402	-1,182	-1,184	2	0.04%
1987	-	1,580	609	636	166	706	3,697	14	743	-	766	1,523	2,174	2,172	2	0.05%
1988	-	1,113	251	633	164	803	2,964	14	3,815	-	763	4,592	-1,628	-1,629	1	0.02%
1989	-	836	127	640	162	807	2,572	16	3,079	-	759	3,854	-1,282	-1,282	0	0.00%
1990	-	926	31	639	162	801	2,559	16	2,714	-	753	3,483	-924	-922	-2	0.06%
1991	352	1,585	678	635	165	658	4,073	29	-	-	758	787	3,286	3,287	-1	0.02%
1992	-	1,692	672	623	166	671	3,824	26	1,120	-	765	1,911	1,913	1,915	-2	0.05%
1993	-	1,636	309	623	167	802	3,537	53	4,031	-	771	4,855	-1,318	-1,319	1	0.02%
1994	-	1,315	208	632	168	829	3,152	22	3,211	-	771	4,004	-852	-850	-2	0.05%
1995	-	1,672	110	638	172	855	3,447	22	3,002	-	772	3,796	-349	-350	1	0.02%
1996	-	1,020	-	635	171	854	2,680	27	2,955	20	764	3,766	-1,086	-1,086	0	0.00%
1997	319	1,785	675	634	173	717	4,303	32	-	-	772	804	3,499	3,500	-1	0.02%
1998	-	1,563	585	622	172	727	3,669	29	1,437	-	773	2,239	1,430	1,432	-2	0.05%
1999	-	1,199	203	623	172	848	3,045	24	4,041	-	766	4,831	-1,786	-1,786	0	0.00%

Table C-28. Annual groundwater budget for the Gulf Coast Aquifer, Groundwater Management Area 16. All values in acre-feet per year, except as noted.

	INFLOW							OUTFLOW									
Year	Net River Leakage	Recharge	Net Vertical Leakage Lower	Net Lateral Flow From GMA 13	Net Lateral Flow From GMA 15	Net Lateral Flow From Mexico	Total Inflow	Wells	Drains	Net River Leakage	Net Vertical Leakage Lower	Net Lateral Flow To Gulf	Total Outflow	Inflow - Outflow	Storage Change	Model Error	Model Error (percent)
1963	-	36,642	15,562	7	2,990	8,547	63,748	53,852	2,560	13,411	-	7,422	77,245	-13,497	-13,495	-2	0.00%
1964	-	35,812	15,666	8	3,032	8,437	62,955	51,868	2,569	6,754	-	7,369	68,560	-5,605	-5,606	1	0.00%
1965	-	47,023	15,593	7	3,034	7,862	73,519	44,887	2,675	1,382	-	7,418	56,362	17,157	17,157	0	0.00%
1966	208,696	54,182	12,548	8	5,063	6,403	286,900	42,377	3,223	-	-	7,554	53,154	233,746	233,746	0	0.00%
1967	246,432	77,957	7,726	7	5,370	6,053	343,545	29,424	4,072	-	-	7,919	41,415	302,130	302,838	-708	0.21%
1968	178,627	57,328	8,613	6	5,626	7,419	257,619	36,894	4,567	-	-	8,160	49,621	207,998	207,998	0	0.00%
1969	-	45,298	15,412	6	4,641	7,018	72,375	44,389	4,339	38,338	-	8,131	95,197	-22,822	-22,820	-2	0.00%
1970	-	50,586	13,202	6	4,182	7,125	75,101	43,389	4,173	25,503	-	8,138	81,203	-6,102	-6,077	-25	0.02%
1971	208,798	65,403	4,510	6	5,194	7,562	291,473	34,911	4,661	-	-	8,297	47,869	243,604	243,606	-2	0.00%
1972	151,638	52,909	5,838	6	5,431	8,182	224,004	40,884	4,948	-	-	8,402	54,234	169,770	169,775	-5	0.00%
1973	196,937	75,930	-	6	5,634	7,708	286,215	26,927	5,450	-	1,119	8,627	42,123	244,092	244,132	-40	0.01%
1974	-	48,568	10,621	6	4,582	7,873	71,650	43,390	5,075	51,494	-	8,544	108,503	-36,853	-36,852	-1	0.00%
1975	-	49,164	8,640	6	4,143	7,708	69,661	43,393	4,794	34,275	-	8,497	90,959	-21,298	-21,268	-30	0.02%
1976	216,580	73,700	-	5	5,080	8,071	303,436	28,918	5,335	-	3,148	8,685	46,086	257,350	257,432	-82	0.03%
1977	-	41,079	8,894	5	4,229	7,933	62,140	48,880	4,966	51,792	-	8,574	114,212	-52,072	-52,062	-10	0.01%
1978	-	49,122	7,027	5	3,872	7,810	67,836	43,889	4,763	31,944	-	8,555	89,151	-21,315	-21,311	-4	0.00%
1979	173,244	52,483	-	5	4,872	8,218	238,822	39,901	5,112	-	269	8,637	53,919	184,903	184,903	0	0.00%
1980	-	48,951	7,626	5	4,084	7,796	68,462	45,869	4,916	41,959	-	8,579	101,323	-32,861	-32,860	-1	0.00%
1981	204,201	68,517	-	4	5,207	8,992	286,921	49,878	5,317	-	4,051	8,664	67,910	219,011	219,033	-22	0.01%
1982	-	39,317	6,715	4	4,384	8,293	58,713	53,021	4,913	52,044	-	8,531	118,509	-59,796	-59,796	0	0.00%
1983	-	50,397	4,821	4	4,130	8,376	67,728	53,304	4,681	32,488	-	8,478	98,951	-31,223	-31,223	0	0.00%
1984	-	41,694	4,620	4	3,869	8,372	58,559	55,095	4,306	32,364	-	8,370	100,135	-41,576	-41,577	1	0.00%
1985	189,099	61,249	-	3	4,776	8,971	264,098	48,777	4,819	-	2,160	8,490	64,246	199,852	199,852	0	0.00%
1986	-	45,992	6,477	3	3,747	8,728	64,947	50,923	4,654	40,245	-	8,477	104,299	-39,352	-39,353	1	0.00%
1987	154,647	52,614	-	3	4,414	9,461	221,139	47,966	4,943	-	1,135	8,561	62,605	158,534	158,535	-1	0.00%
1988	-	35,625	6,269	3	3,469	9,126	54,492	49,218	4,667	51,947	-	8,478	114,310	-59,818	-59,817	-1	0.00%
1989	-	28,723	5,182	3	3,052	9,501	46,461	47,549	4,450	39,775	-	8,392	100,166	-53,705	-53,703	-2	0.00%
1990	-	40,947	4,420	3	2,828	12,134	60,332	59,169	4,291	28,832	-	8,321	100,613	-40,281	-40,282	1	0.00%
1991	210,834	59,981	-	2	4,196	12,300	287,313	59,056	4,865	-	3,508	8,511	75,940	211,373	211,383	-10	0.00%
1992	169,449	61,087	-	2	4,550	9,923	245,011	49,486	5,361	-	3,603	8,743	67,193	177,818	178,075	-257	0.10%
1993	-	51,527	4,995	2	3,579	9,959	70,062	54,788	5,224	48,914	-	8,822	117,748	-47,686	-47,683	-3	0.00%
1994	-	48,641	4,094	2	3,167	11,139	67,043	60,350	5,010	34,607	-	8,788	108,755	-41,712	-41,714	2	0.00%
1995	-	52,907	3,689	2	2,853	11,159	70,610	57,434	4,806	29,319	-	8,789	100,348	-29,738	-29,738	0	0.00%
1996	-	28,785	4,301	2	2,559	10,108	45,755	58,536	4,548	36,507	-	8,652	108,243	-62,488	-62,487	-1	0.00%
1997	215,663	62,046	-	1	3,937	9,504	291,151	52,803	5,167	-	4,489	8,826	71,285	219,866	219,872	-6	0.00%
1998	150,702	54,171	-	1	4,411	11,031	220,316	64,739	5,388	-	2,915	8,638	81,680	138,636	138,645	-9	0.00%
1999	-	44,513	4,740	1	3,484	11,073	63,811	56,656	5,163	52,958	-	8,848	123,625	-59,814	-59,810	-4	0.00%