COMBINED 2013 AND 2014
SANTA PAULA BASIN ANNUAL REPORT

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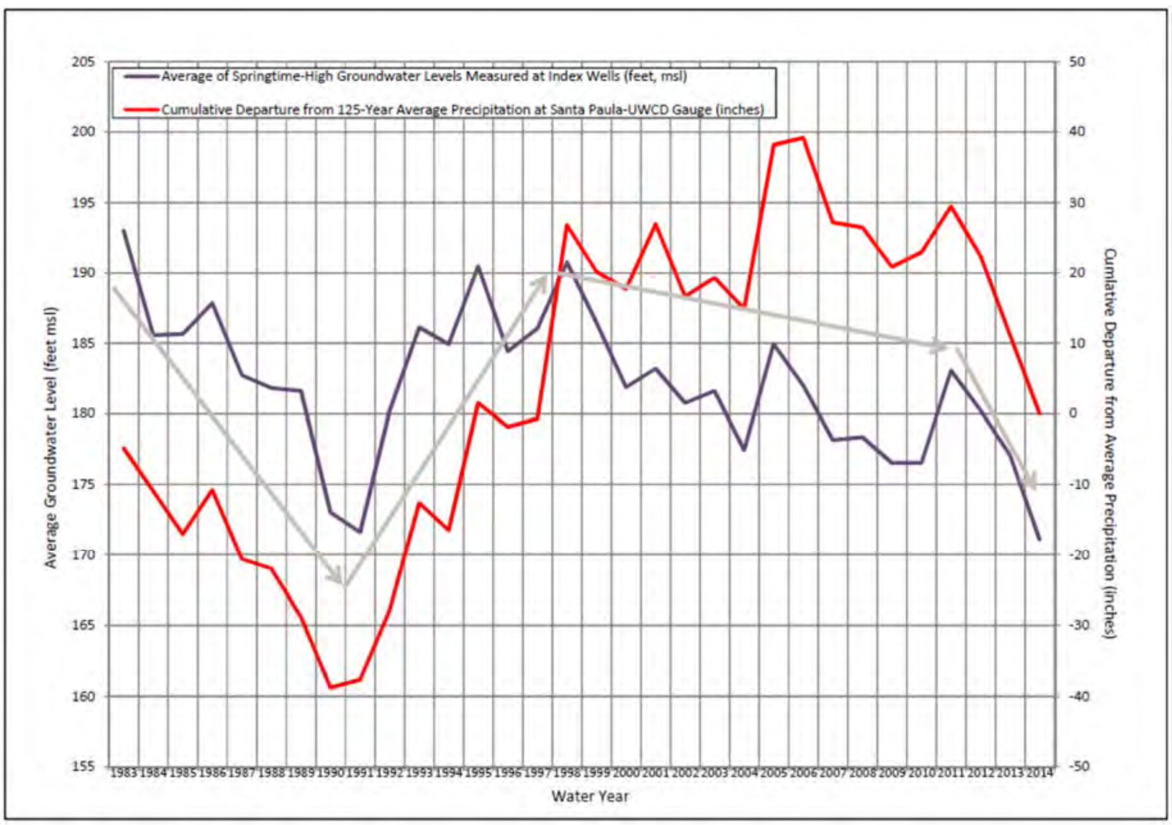

PREPARED BY:

SANTA PAULA BASIN TECHNICAL ADVISORY COMMITTEE

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(UWCD PROFESSIONAL PAPER 2016-01)

FOREWORD

In March 1996, the Superior Court of the State of California for the County of Ventura entered a stipulated judgment to establish pumping allocations and establish a management plan for the Santa Paula basin (*United Water Conservation District vs. City of San Buenaventura,* original March 7, 1996, amended August 24, 2010 [hereinafter "Judgment"]). Detailed background information on the Santa Paula basin settlement and pumping allocations are included in the Judgment. The Judgment recognized that all of the parties have an interest in the Santa Paula basin, and in the proper management and protection of both the quantity and quality of this important groundwater supply. The basin is a significant water resource in the County of Ventura. Members of the Santa Paula Basin Pumpers Association (SPBPA) and the City of San Buenaventura exercise rights to pump water from the basin for reasonable and beneficial uses. United Water Conservation District (UWCD) does not produce groundwater from the basin, but the basin is located within its boundaries and the UWCD is authorized to engage in groundwater management and replenishment activities and to commence actions to protect the water supplies which are of common benefit to the lands within the UWCD or its inhabitants.

The Judgment provides for the creation of a Santa Paula Basin Technical Advisory Committee (TAC) with equal representation from UWCD, the SPBPA, and the City of San Buenaventura. The TAC is charged with establishing a program to "monitor conditions in the basin, including but not necessarily limited to verification of future pumping amounts, measurements of groundwater levels, estimates of inflow to and outflow from the Basin, increases and decreases in groundwater storage, and analyses of groundwater quality." The Judgment also allows for the development of a management plan for the operation of the basin and empowers the TAC to determine the safe yield of the basin.

The Judgment requires annual reports of the results of the monitoring program, and further specifically provides that "United Water Conservation District shall have the primary responsibility for collecting, collating, and verifying the data required under the monitoring program, and shall present the results thereof in annual reports to the Technical Advisory Committee." The UWCD submits the draft annual reports to the TAC members for review, comment, and approval. The primary groundwater management objective in the Santa Paula basin is to ensure that production from the basin does not exceed the long-term sustainable yield of suitable quality groundwater for current and anticipated future uses (i.e., municipal, domestic, agricultural, and industrial). The TAC's specialty studies and annual monitoring provide data and analysis intended to support this objective.

In 2010 the Judgment was amended to join various pumpers that were not previously included as parties to the settlement, and to clarify certain provisions pertaining to shortage conditions, the responsibilities of the SPBPA and groundwater production by its members, and water rights transfer procedures. Also in 2010, a Santa Paula Basin TAC Working Group was established that consists of technical experts from the UWCD, the SPBPA, and the City of San Buenaventura. Since its formation, the Working Group has completed a series of specialty studies to better understand the factors that affect safe yield in the Santa Paula basin, including:

- "Santa Paula Basin Pumping Trend Effects and Assessment" (UWCD, 2011)
- "Percolation of Santa Clara River Flow Within the Santa Paula Basin" (UWCD, 2013a)
- "Santa Paula Creek Percolation: an Update" (UWCD, 2013b)
- "Santa Paula Basin Groundwater Elevation Trend Assessment" (UWCD, 2013c)
- "Task No. 5: Crop Changes Over Time-Santa Paula Groundwater Basin" (Frank B & Associates, 2013a)

Draft reports for four additional specialty studies were submitted to the TAC in 2012 and 2013, and are anticipated to be finalized in 2015 or 2016:

- "Draft Memorandum—Santa Paula Basin: Rainfall" (GEI Consultants, 2012a)
- "Draft Memorandum—Santa Paula Basin: Streamflow" (GEI Consultants, 2012b).
- "Task No. 11: Groundwater Production Reporting Accuracy" (Frank B & Associates, 2013b)
- "Task No. 12 (draft): Alluvial Pumping & Surface Diversions Outside of Judgment Authority" (Frank B & Associates, 2013c)

The following specialty studies are currently being conducted on behalf of the TAC Working Group, and are expected to be completed in 2015 or 2016:

- Investigation of groundwater underflow between the Fillmore and Santa Paula basins (Steven Bachman, PhD)
- Confining bed evaluation for Santa Paula basin (Kenneth D. Schmidt & Associates)
- Evaluation of historical changes to the Santa Paula Creek channel and potential effects on basin recharge (Hopkins Groundwater Consultants)
- Santa Paula basin yield enhancement options (Steven Bachman, PhD)

In addition to the specialty studies listed above, UWCD commissioned a consulting firm (Daniel B. Stephens & Associates, Inc.) in 2014 to conduct a hydrogeologic characterization and safe yield study for Santa Paula basin. This study is currently in progress, and a draft report is anticipated to be submitted to the TAC for review in early 2016.

Rainfall and streamflow in the Santa Paula basin during water years 2013 and 2014 were well below average, resulting in groundwater level declines during both years. Because of similarities in climatic, hydrologic, and groundwater conditions throughout 2013 and 2014, monitoring data for both years are presented in this single, combined Annual Report.

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EXECUTIVE SUMMARY / STATUS OF BASIN

Significant hydrologic indicators for Santa Paula basin during water years (WYs) and calendar years (CYs) 2013 and 2014 (the reporting period) are summarized and compared to long-term averages in Table 1, below. This was an exceptionally dry two-year period in the basin, with measured annual rainfall amounts in Santa Paula of 6.03 during WY 2013 and 6.12 inches during WY 2014 (at the Santa Paula-UWCD gauging station). The last time precipitation of less than 7 inches was recorded during two consecutive water years in Santa Paula was during WYs 1898 and 1899. Stream flows in the Santa Clara River and Santa Paula Creek were also well below average during WYs 2013 and 2014 (the lowest measured since WYs 1990 and 1961, respectively) as a result of the low rainfall amounts.

Total groundwater extractions from the Santa Paula basin reported to UWCD during CYs 2013 and 2014 were 26,485 acre-feet per year (AF/yr) and 27,437 AF/yr, respectively. These extractions were greater than the average for the period of record (CY 1980 to present), which is consistent with a period of below-average rainfall. Groundwater imports to the stipulated area of the Santa Paula basin Judgment in CYs 2013 and 2014 from wells east of the stipulated area (in the transition area between the Santa Paula and Fillmore basins) were approximately 3,300 to 4,400 AF/yr greater than the long-term (CY 1985 through 2014) average of 1,500 AF/yr. The increases in groundwater imports from this area during CYs 2013 and 2014 likely reduced the need for groundwater extraction from Santa Paula basin during this drought period.

Not surprisingly, considering the low rainfall and stream flows, and the above-average groundwater extractions during the reporting period, average groundwater levels, represented by the groundwater-level index (GLI), in Santa Paula basin declined 9 feet during WYs 2013 and 2014 at an average rate of 4.5 feet per year, which was comparable to the average rate of decline observed in WYs 1990 and 1991, at the end of the previous major drought in the area. By spring 2014, the GLI had declined to 171.06 feet above mean sea level (ft msl), a record low for the 32-year period that the GLI has been calculated (CY 1983 to present). The spring 2014 GLI was 0.54 ft below the previous record low of 171.60 ft msl, in the spring of 1991.

Concentrations of selected major groundwater quality constituents (chloride, nitrate, TDS, and sulfate) in the Santa Paula basin during the reporting period remained within historical ranges. As noted in past Annual Reports, concentrations of chloride, TDS, and sulfate generally increase from east to west in the basin. However, groundwater samples obtained from two irrigation wells in the eastern part of the basin during the reporting period contained nitrate concentrations in excess of the Primary MCL, similar to past years. Neither the magnitude nor the extent of these nitrate exceedances in groundwater appear to be increasing. Hardness, alkalinity, iron, and manganese concentrations in groundwater in the Santa Paula basin during the reporting period also remained within the range of previously detected levels. Elevated hardness and alkalinity historically present in groundwater in the basin pose a "severe plugging hazard" to micro-irrigation systems in the basin, while iron and manganese pose a "moderate plugging hazard," according to guidelines developed by Pitts and Peterson and the University of California.

Table 1. Significant Hydrologic Indicators in Santa Paula Basin

Hydrologic Indicator	**2013**	**2014**	**Long-Term Average (per year)**	**Long-Term Median (per year)**	**Long-Term Period of Record**
Water-Year[a] Precipitation at Santa Paula-UWCD[b] (inches)	6.03	6.12	17.27	14.94	1890 through 2014
Calendar-Year Precipitation at Santa Paula-UWCD[b] (inches)	3.29	9.83	17.11	15.48	1890 through 2014
Water-Year Discharge in Santa Paula Creek at Mupu Bridge[b] (AF/yr)	1,165	1,788	18,417	8,351	1928 through 2014
Water-Year Discharge in Santa Clara River at Freeman Diversion[b] (AF/yr)	22,678	22,553	215,532	119,559	1956 through 2014
Calendar-Year Reported Groundwater Extractions in Santa Paula Basin (AF/yr)	26,485	27,437	25,771	26,244	1980 through 2014
Groundwater Level Index (ft msl)	177. 07	171. 06	182.04	181.94	1983 through 2014

Notes:

[a] A water year (WY) is defined as the period from October 1 of the previous year through September 30 of the year indicated. For example, WY 2014 is from 10/1/2013 through 9/30/2014.

[b] Locations and identification numbers for rain and stream gauges are indicated on Figure 1.

Based on the findings presented in this Annual Report, the TAC recommends implementing or continuing the following data collection and evaluation efforts:

- Complete the ongoing safe yield evaluation for the Santa Paula basin (currently in progress by a consultant under contract to UWCD);
- Complete the study of groundwater-yield-enhancement options for Santa Paula basin (currently in progress by Dr. Steven Bachman);
- Complete the remaining specialty studies that have been initiated by TAC, with priority given to those that will provide key information in support of the safe-yield evaluation, including:
  - Investigation of groundwater underflow between the Fillmore and Santa Paula basins (in progress by Dr. Steven Bachman);
  - Evaluation of groundwater confinement in the Santa Paula basin and differentiate wells by aquifer (in progress by Kenneth D. Schmidt and Associates);
  - Investigation of groundwater storage change in the Santa Paula basin (planned by GEI Consultants).
- The pressure transducer program (see TAC Activities section) should continue and additional wells, as appropriate, should be equipped with this technology. The transducer data allow an understanding of the magnitude of interference drawdown between wells and more accurately record maximum and minimum groundwater levels in the basin than manual groundwater elevation measurements. This level of understanding could prove important for future studies and analyses of basin yield.

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(UWCD PROFESSIONAL PAPER 2015-02)

INTRODUCTION

This is the eighteenth Annual Report presenting key climatic, hydrologic, and hydrogeologic data to support management of groundwater resources in the Santa Paula Basin. Data for calendar-years (CYs) and water-years (WYs) 2013 and 2014 (the reporting period) are included in this report. This is the second Annual Report to combine two years of data in a combined Annual Report (the previous combined Annual Report was for 2009 and 2010). Because conditions were similar during 2013 and 2014, the Santa Paula Basin Technical Advisory Committee (TAC) elected to prepare a single combined Annual Report for both years to maximize efficiency in the analysis and reporting effort.

This Annual Report provides the TAC—which consists of representatives from United Water Conservation District (UWCD), the City of San Buenaventura (Ventura), and the Santa Paula Basin Pumpers Association (SPBPA)—with monitoring results and other data to be used for management of the basin in accordance with the 1996 Santa Paula basin stipulated judgment by the Superior Court of the State of California for the County of Ventura (*United Water Conservation District vs. City of San Buenaventura,* original March 7, 1996, amended August 24, 2010 [hereinafter “Judgment”]). This Annual Report includes information on the hydrogeologic setting, precipitation, streamflow, surface water quality, production well installations and destructions, groundwater extractions and pumping allocations, groundwater levels, and groundwater quality in the Santa Paula basin.

REPORT ORGANIZATION

The information presented in this Annual Report is organized as follows:

- Introduction—Describes the objectives and scope of the Annual Report, TAC activities during the reporting period, and the methods used to collect the monitoring data presented.
- Description of Basin—Provides background information on the hydrogeologic setting of the Santa Paula basin.
- Data Summary and Evaluation—Presents the monitoring data collected during the current reporting period, including tables, graphs, and maps to aid in interpretation.

- Findings and Recommendations—Summarizes key findings from the reporting period and provides recommendations for future monitoring and evaluation activities that are likely to provide information useful for managing groundwater resources in the Santa Paula basin.
- References—Lists the documents cited in this Annual Report.
- Appendices—Include tables, graphs, and maps of selected historical and recent data that support the analyses presented in this Annual Report.

TAC ACTIVITIES DURING THE REPORTING PERIOD

TAC specialty studies completed or in progress during the reporting period are summarized in Table 2, below. Completion of these studies is intended to advance understanding of the hydrogeology and recharge mechanisms of the Santa Paula basin, in support of determination of safe yield.

Table 2. TAC Investigations Completed or in Progress During the Reporting Period

Investigation or Report	Lead Entity/Author	Status/Reference
"Percolation of Santa Clara River Flow Within the Santa Paula Basin"	UWCD	Complete (UWCD, 2013a)
"Santa Paula Creek Percolation: an Update"	UWCD	Complete (UWCD, 2013b)
"Santa Paula Basin Groundwater Elevation Trend Assessment"	UWCD	Complete (UWCD, 2013c)
"Task No. 5: Crop Changes Over Time-Santa Paula Groundwater Basin"	SPBPA	Complete (Frank B & Associates, 2013a)
"Task No. 11: Groundwater Production Reporting Accuracy"	SPBPA	Draft submitted to TAC (Frank B & Associates, 2013b); final on hold until 2016
"Task No. 12 (draft): Alluvial Pumping & Surface Diversions Outside of Judgment Authority"	SPBPA	Draft submitted to TAC (Frank B & Associates, 2013c); final on hold until 2016

Table 2. TAC Investigations Completed or in Progress During the Reporting Period

Investigation or Report	Lead Entity/Author	Status/Reference
"Draft Memorandum—Santa Paula Basin: Rainfall"	SPBPA/GEI Consultants	Draft submitted to TAC; in review (GEI Consultants, 2012a)
"Draft Memorandum—Santa Paula Basin: Streamflow"	SPBPA/GEI Consultants	Draft submitted to TAC; in review (GEI Consultants, 2012b)
Confining bed evaluation for Santa Paula basin	SPBPA/ Kenneth D. Schmidt and Associates	In progress
Investigation of groundwater underflow between the Fillmore and Santa Paula basins	SPBPA/Steven Bachman, Ph.D	In progress
Evaluation of historical changes to the Santa Paula Creek channel and potential effects on basin recharge	Ventura/Hopkins Groundwater Consultants	In progress
Santa Paula basin yield enhancement options	SPBPA/Steven Bachman, Ph.D.	In progress
Evaluation of water-level trends in both confined and unconfined parts of the basin	Ventura/Hopkins Groundwater Consultants	On hold
Investigation of groundwater storage change	SPBPA/GEI Consultants	Planned

Key findings of TAC specialty studies completed during the reporting period include:

- "Percolation of Santa Clara River Flow Within the Santa Paula Basin" (UWCD, 2013a) concluded that surface water infiltration in the reach of the Santa Clara River from Willard Road to Orr Road is "limited both currently and historically." This is the reach of the Santa Clara River where the river flows north of the trace of the Oak Ridge Fault. Dry weather stream gauging during average-precipitation WY 2010 showed infiltration ranging from approximately 200 to 800 AF per month (3.7 to 12.6 cubic feet per second [cfs]).
- "Santa Paula Creek Percolation: An Update" (UWCD, 2013b) concluded that "recent measurements show little to no percolation in lower Santa Paula Creek, suggesting the

COE (Corps of Engineers) flood control project in 1998 has impaired the ability of the creek to recharge the groundwater basin."

- "Santa Paula Basin Groundwater Elevation Trend Assessment" (UWCD, 2013c) concluded that groundwater levels in the basin have generally declined from the beginning to end of several historical evaluation periods considered during the study. Some specific wells showed a slight increase in groundwater levels, but the majority showed a modest decline (ranging from 1.6 to 13.3 feet), depending on the evaluation period considered.
- "Task No. 5: Crop Changes Over Time-Santa Paula Groundwater Basin" (Frank B & Associates, 2013a) concluded that crop acreage has decreased slightly from 2002 to 2010, while 1,300 acres or more of tree crops (primarily citrus) were replaced by berries and other specialty crops with higher water demands. However, efficiency of water use in the Santa Paula basin has improved at the same time, such that the overall allocation of groundwater to the SPBPA is not being exceeded. Ongoing management of groundwater allocations and transfers by SPBPA for irrigation of crops in the basin is expected to mitigate potential increases in future groundwater pumping as a result of crop changes.

The TAC has also sponsored the installation of several automated groundwater level sensors (i.e., pressure transducers) and data loggers within selected wells in the basin. Through CY 2013 and part of CY 2014, 21 wells selected by the TAC in the Santa Paula basin were equipped with pressure transducers and data loggers. One of these pressure transducers was removed following repair of the corresponding well during spring 2014 and was not replaced. The pressure transducer program is designed to provide more detailed information on timing and magnitude of seasonal and annual groundwater-level changes. UWCD has the lead responsibility for the installation, maintenance, and downloading of the pressure transducers and data loggers, and for processing and analyzing the resulting data.

DATA SOURCES

Sources of the monitoring data presented in this Annual Report include:

PRECIPITATION:

Precipitation data for most rain gauges in Ventura County are available from the Web-based "Hydrologic Data Server" maintained by the Ventura County Watershed Protection District (VCWPD), at http://www.vcwatershed.net/hydrodata. Precipitation has also been measured by UWCD at a series of locations in the City of Santa Paula. Since WY 2011, data from the current gauge located on the roof of UWCD's office in downtown Santa Paula ("Santa Paula-UWCD") are no longer reviewed and reported by the VCWPD. However, UWCD still measures and records rainfall at this gauge in a manner consistent with historical practices; these data are included in this Annual Report.

SURFACE WATER FLOW AND QUALITY:

Flow rates in the Santa Clara River at the Freeman Diversion are estimated by UWCD operations staff. Flow rates at other stream gauges in the Santa Paula basin are downloaded from the VCWPD's Web-based "Hydrologic Data Server" (http://www.vcwatershed.net/hydrodata/). UWCD collects quarterly surface-water quality samples from the Santa Clara River (at Willard Road), Santa Paula Creek, and Todd Barranca, and approximately biweekly samples (for an abbreviated analyte list) from the Santa Clara River at the Freeman Diversion. In addition, Canyon Irrigation Company has collected samples for general-constituent analysis from Santa Paula Creek at the Harvey Diversion for many years, and provides the data to UWCD.

PRODUCTION WELL INSTALLATIONS AND DESTRUCTIONS:

Information regarding production well installations and destructions in the Santa Paula basin are obtained from the VCWPD, which is the permitting agency for water wells in Ventura County.

GROUNDWATER EXTRACTIONS:

Groundwater extractions are reported on semi-annual groundwater production statements filed with UWCD's Finance Department by individual pumpers. These production statements constitute all reported pumping from the Santa Paula basin.

GROUNDWATER LEVELS AND QUALITY:

UWCD's groundwater database includes historical groundwater-level data for approximately 150 wells in the Santa Paula basin; extensive records exist for about 90 of these wells. The groundwater-level database is a compilation of information supplied by several cooperating entities. Each of these entities has their own protocol for measuring water levels, and these protocols may vary over time. UWCD and VCWPD collect a significant portion of the data in the basin and jointly measure water levels at several wells within UWCD boundaries. This process allows for the evaluation of the repeatability of the measurements obtained by different field technicians, improving groundwater-level measurement reliability and providing an element of quality control on the data collection process. Other entities that may contribute groundwater-level data include the City of Santa Paula, Farmers Irrigation Company (FICO), Alta Mutual Water Company, and the City of Ventura.

Groundwater levels are normally measured in wells that are not pumping; these measurements are referred to as "static." For the purpose of evaluating trends in long-term groundwater levels, static groundwater level measurements are preferred. However, the groundwater level in a non-pumping well may remain depressed for some time due to residual drawdown in the well being monitored and/or pumping interference from a nearby well. Although it is not possible to completely eliminate all effects of pumping when manually measuring groundwater levels in a developed groundwater basin, manual monitoring by UWCD is only conducted when the measured well is shut off and no nearby wells are known to be pumping. When groundwater levels are measured during the low-irrigation season (winter and early spring), potential pumping effects on the measurements are typically reduced.

In addition to manual measurements, 21 wells within the Santa Paula basin were equipped with pressure transducers and data loggers during the reporting period. The exact number of pressure transducers operating in wells in the Santa Paula basin can vary over time, as the transducers are damaged, replaced, or new ones purchased and installed. Wells are selected for pressure transducer installation to provide broad geographic coverage, and to provide data from each of the major hydrogeologic units. The data loggers managed by UWCD are typically programmed to record water levels every four hours. Measurements at this frequency provide a detailed record of groundwater level changes over time. Many of the pressure transducers present in wells in the Santa Paula basin were first deployed by UWCD in spring 2011. Additional pressure transducer data (prior to spring 2011) exist for several wells in the Santa Paula basin during specific timeframes.

Most of the groundwater quality data available for the Santa Paula basin are provided by owners and/or operators of individual wells, including FICO, Limoneira, and Thermal Belt Mutual Water Company. UWCD collects samples from its two clustered monitoring well sites SP-1 and SP-2 (nine individual wells) and from a few selected additional private wells. The VCWPD collects groundwater quality samples from several irrigation and water-supply wells in Santa Paula basin, and provides the data to UWCD. UWCD obtained CY 2013 groundwater quality data for City of Santa Paula and Ventura water-supply wells from the California Department of Public Health online database, and CY 2014 data from the State Water Resources Control Board (which assumed responsibility for oversight of water quality in 2015) online database.

DESCRIPTION OF BASIN

Key information regarding historical climate, surface water, and groundwater conditions in the Santa Paula basin are summarized in this section, to provide background information useful for interpreting data from the current reporting period.

LOCATION AND CLIMATE

The Santa Paula basin is located along the Santa Clara River, extending from near the confluence of the Santa Clara River with Santa Paula Creek in the east to Ventura in the west, and from the Sulphur Mountain foothills on the north to South Mountain on the south, as shown on Figure 1. The Santa Paula groundwater basin was defined by John F. Mann Jr. and Associates (1959) as being coincident "with the alluvial and terrace deposits along the Santa Clara River." These groundwater basin extents (as defined by John F. Mann Jr. and Associates) are similar to the area of "unconsolidated deposits of the late Pleistocene and Holocene epochs" comprising the upper aquifer system as defined by Hanson and others (2003). In this annual report, this area is referred to as the "limits of the alluvial aquifer in Santa Paula basin" (Figure 1). This area is elongated in a northeast-southwest direction, approximately 10 miles long and 1.5 to 3.5 miles wide, with a surface area of approximately 13,000 acres. Within this area, land-surface elevation ranges from approximately 130 feet above mean sea level (ft msl) in the Santa Clara River channel near Ventura, to 500 ft msl along Santa Paula Creek north of the City of Santa Paula.

The area stipulated in the Santa Paula basin Judgment (stipulated area) is larger than the 13,000-acre area of the alluvial aquifer in Santa Paula basin, described above, because it includes outcrops of freshwater-bearing, semi-consolidated sedimentary rock of the San Pedro Formation (discussed in more detail below). The stipulated area is approximately coincident with the "Santa Paula sub-basin" defined by the California Department of Water Resources (2003). This stipulated area is approximately 10 miles long and 2 to 3.5 miles wide, with a surface area of 22,800 acres. In this annual report, the term "Santa Paula basin" refers to the area stipulated in the Judgment (the area within the "Santa Paula Settlement Boundary" on Figure 1).

The Santa Paula basin has a Mediterranean-type climate, with hot, dry summers (typically moderated by an onshore breeze from the Pacific Ocean) and mild winters, when most rainfall occurs in the basin. Historical precipitation data for the City of Santa Paula, in the eastern part of the basin, and for Saticoy, in the western part of the basin, are shown on Figures 2 and 3. Locations for selected rain gauges in the Santa Paula basin are shown on Figure 1; data from these five gauges were selected for inclusion in this report primarily based on location (targeting wide spatial distribution across the basin), and secondarily on period of record.

The period of record for the Santa Paula-UWCD gauge is much longer (WY 1890 to present) than the combined period of record for the Saticoy Fire Station and County Yard gauges (WY 1957 to present) or other rain gauges in the basin. Therefore, precipitation data and summary statistics from the Santa Paula-UWCD gauge are generally used in this report for comparisons of long-term average annual rainfall to surface-water flows and groundwater elevation trends in the basin. Tabulated historical data from the Santa Paula-UWCD rain gauge are provided in Appendix A, Table A-1.

The average annual rainfall in the Saticoy area (recorded at the Saticoy Fire Station and County Yard gauges) for WYs 1957 through 2014 is 16.4 inches, which is approximately 1.3 inches less than average annual rainfall recorded at the Santa Paula-UWCD gauge during the same period (17.7 inches). This difference likely results from the increasing land-surface elevation and narrowing of the basin eastward from Saticoy to Santa Paula. The average annual precipitation across the Santa Paula basin for WYs 1957 through 2014 is assumed to be approximately 17.0 inches, which is the mean of annual precipitation amounts reported for the Saticoy and Santa Paula gauges.

SURFACE WATER

The major perennial streams in the Santa Paula basin include the Santa Clara River and Santa Paula Creek, which are described in more detail below.

SANTA CLARA RIVER

Within the Santa Paula basin, the Santa Clara River receives varying amounts of inflow from the following primary sources:

- rising groundwater at hydrogeologic constrictions, particularly near the east boundary of the Santa Paula basin;
- ephemeral flows (typically following winter storms) in tributaries to the Santa Clara River (in addition to Santa Paula Creek, notable tributaries to the Santa Clara River within Santa Paula basin include: Fagan, Adams, Wheeler, and Aliso Creeks [John F. Mann & Associates, 1959]);
- surface water flows from upstream reaches of the Santa Clara River (in the Fillmore, Piru, and Eastern basins) that may reach the Santa Paula basin, particularly in wet years or following large winter storm events (Sespe Creek typically contributes the majority of flow in the Santa Clara River upstream from the Santa Paula basin); and
- fall conservation releases by UWCD from Lake Piru that may continue as surface flows in the Santa Clara River through Fillmore basin to reach Santa Paula basin (however, in fall 2013 there were no fall conservation releases from Lake Piru due to low water conditions).

Discharge rates measured in the Santa Clara River within the Santa Paula basin have been highly variable through time, as is typical for streams in southern California that are dominated by ephemeral or seasonal intermittent flows. Historical annual discharge rates for the Santa Clara River at Freeman Diversion throughout the period of record (WY 1956 through WY 2014) are shown on Figure 4. Annual discharge data are tabulated in Table A-2 of Appendix A. The long-term average annual discharge rate for the Santa Clara River at the Freeman Diversion for the period of record is 215,532 acre-feet per year (AF/yr), and the median annual discharge rate for the period of record is

119,559 AF/yr. The maximum annual discharge in the Santa Clara River during the period of record was 1,153,883 AF (WY 2005), and the minimum was 6,209 AF (WY 1961).

Preliminary results from a TAC specialty study currently being conducted by Frank B & Associates (2013c) indicate that surface water is diverted from the Santa Clara River for irrigation use at four locations within the Santa Paula Basin, all in the eastern part of the basin, where surface flow is perennial. The estimated total of diverted streamflow as of 2013 was 1,900 AF/yr, with the possibility of greater diversions occurring in the future if more land is irrigated this way.

Santa Paula Creek

Within the Santa Paula basin, Santa Paula Creek receives varying amounts of inflow from the following primary sources:

- rising groundwater at a hydrogeologic constriction located near the northern limit of the alluvial basin-fill deposits along Santa Paula Creek north of the City of Santa Paula (Figure 1);
- perennial surface-water flows from the upper reaches of Santa Paula Creek (north of the Santa Paula basin) and from Mud Creek (the major tributary to Santa Paula Creek within the Santa Paula basin); and
- ephemeral flows (typically following winter storms) in smaller tributaries to Santa Paula Creek.

Similar to the Santa Clara River, discharge rates measured in Santa Paula Creek within the Santa Paula basin have been highly variable through time. Historical annual discharge rates for the period of record (WYs 1928 through 2014) at gauging stations located immediately upstream from the City of Santa Paula are shown on Figure 5; the location of the current gauging station on Santa Paula Creek ("Santa Paula Creek at Mupu Bridge") is shown on Figure 1. Annual discharge data are tabulated in Table A-3 of Appendix A. The long-term average annual discharge rate for Santa Paula Creek for the period of record is 18,417 AF/yr, and the median annual discharge rate for the period of record is 8,351 AF/yr. The maximum annual discharge in Santa Paula Creek during the period of record was 112,696 AF/yr (WY 1969), and the minimum was 992 AF/yr (WY 1951).

GROUNDWATER

This section briefly summarizes hydrogeologic conditions in the Santa Paula basin, including freshwater-bearing strata, basin boundaries, sources of groundwater recharge and discharge, and historical groundwater elevation and quality trends.

Freshwater-Bearing Strata and Basin Boundaries

Ongoing displacement along the Oak Ridge Fault and other faults has created a deep basin in the valley of the Santa Clara River that has filled to great depths with sedimentary deposits (John F. Mann Jr. and Associates, 1959). The major sedimentary units and faults in the basin are shown on Figure

6. The principal freshwater-bearing strata of the Santa Paula basin are (from youngest [top] to oldest [bottom]):

- Holocene river and stream sediments deposited locally along the Santa Clara River and its tributaries;
- Holocene to Pleistocene alluvial fan deposits eroded from the uplifted mountain blocks;
- Pleistocene river deposits of the ancient Santa Clara River; and
- Pleistocene marine and continental (fluvial) gravel, sand, silt, and clay layers of the San Pedro Formation.

These freshwater-bearing strata overlie relatively impermeable Pliocene and older rocks of the Santa Barbara and Pico Formations. In addition, thick (100 feet or more) layers of fine-grained sediments (mostly clay and silt) are reported in drillers' logs to occur in the upper 100 to 200 feet of sediments across much of the Santa Paula basin. These fine-grained layers may reduce the potential for groundwater recharge and act as a confining aquitard where present.

These strata have been warped into a syncline that is oriented in a northeast-southwest direction along the center of the basin. Faults and low-permeability bedrock units exposed in the limbs of this syncline form the northern and southern boundaries of the Santa Paula basin. To the south, the Oak Ridge Fault forms a partial barrier to groundwater movement, and the poorly permeable Santa Barbara and Pico Formations are present at a shallow depth and in outcrops on South Mountain. To the north, the Santa Barbara and Pico Formations are exposed in outcrops throughout the Sulphur Mountain foothills, and are not believed to transmit significant quantities of groundwater to the basin.

At its eastern boundary, the Santa Paula basin is in direct hydraulic communication with the Fillmore basin, which provides a significant amount of groundwater underflow to Santa Paula basin. The western boundary of the Santa Paula basin is more complex, with local uplift, artesian conditions, and faults that likely restrict groundwater flow. Although there is general agreement that a hydraulic connection exists between Santa Paula basin, the Oxnard Forebay basin, and the Mound basin, the degree of connection is uncertain. Additional aquifer testing, geophysical surveys, geochemical sampling and analysis, and groundwater-level monitoring will be necessary to quantify the subsurface flow between Santa Paula basin and the adjacent Mound and Oxnard Forebay basins.

Recharge

Significant sources of groundwater recharge to the Santa Paula basin include:

- percolation of surface water from the Santa Clara River (and Santa Paula Creek, prior to 1998 flood-control modifications of its channel);
- deep percolation of rainfall and irrigation water (often referred to as "return flows") at land surface;
- underflow from Fillmore basin; and

- percolation of treated water from the City of Santa Paula's Water Recycling Facility.

Previous investigations of hydrogeologic conditions in the Santa Paula basin estimated that streamflow infiltration rates from the Santa Clara River ranged from approximately 4,100 AF/yr (California State Water Resources Board, 1956) to 15,700 AF/yr (John F. Mann Jr. and Associates, 1959), depending on annual surface flows and pre-existing conditions in the underlying shallow aquifer. Qualitative results from a more recent study by the U. S. Geological Survey (USGS) using stable isotopes of hydrogen and oxygen combined with tritium analysis (Reichard and others, 1999) indicated that the Santa Paula basin receives some recharge from the Santa Clara River. However, a TAC study completed by UWCD (2013a) concluded that surface water infiltration in the reach of the Santa Clara River from Willard Road to Orr Road is "limited both currently and historically." Dry-weather stream gauging during WY 2010 (a year of average precipitation) showed infiltration ranging from approximately 200 AF per month to approximately 800 AF per month (UWCD, 2013a). Data also suggest that the dry-weather gradient away from the river in the shallower zones may have induced a greater amount of recharge in the past when wells screened in the shallowest producing aquifer zones were in operation (UWCD, 2011a and 2013a). The reach of the Santa Clara River from Willard Road to Orr Road is where the river channel generally lies north of the trace of the Oak Ridge Fault and directly overlies highly permeable alluvial sedimentary deposits. West of Orr Road in the Santa Paula basin, the Santa Clara River overlies the much less permeable Oak Ridge Fault and the San Pedro and Santa Barbara Formations.

Percolation of surface water from Santa Paula Creek has historically also been a source of recharge to the Santa Paula basin. However, in 1998 the U.S. Army Corps of Engineers (COE) straightened and compacted most of the reach of Santa Paula Creek that overlies Pleistocene and Holocene alluvial deposits in Santa Paula basin. Results from a recent TAC study conducted by UWCD (2013b) indicate that "recent measurements show little to no percolation in lower Santa Paula Creek, suggesting the COE flood control project in 1998 has impaired the ability of the creek to recharge the groundwater basin." Further study of percolation rates in Santa Paula Creek over a wider range of stream flows is planned by UWCD.

Deep percolation (also referred to as direct infiltration) of rainfall and excess irrigation water is another significant source of recharge to the Santa Paula basin. Early investigators have estimated annual deep percolation rates from rainfall ranging from 0 to 26,200 AF/yr, depending on annual rainfall in the basin (California Department of Public Works, 1934; California State Water Resources Board, 1956; John F. Mann Jr. and Associates, 1959). Since the time of those early recharge estimates, land use in the basin has changed extensively as a result of development and changes in agriculture; therefore, present recharge rates may be significantly different than in the past. Deep percolation of agricultural irrigation return flows likely also contributes recharge to the shallow aquifer in the basin, although it has not typically been quantified by previous investigators separately from deep percolation of rainfall. The quantity and areal extent of deep percolation of rainfall and irrigation water may be limited by the presence of shallow clay soils in some parts of the basin; their occurrence and impact on underlying aquifers is currently being investigated by the TAC.

Underflow of groundwater from the upgradient Fillmore basin is recognized as another significant source of recharge to the Santa Paula basin by previous workers (Kawano and Parsons, 1956; John F. Mann Jr. and Associates, 1959; California State Water Resources Board, 1956). Studies conducted by the TAC (investigation of groundwater underflow between the Fillmore and Santa Paula basins, expected completion date in 2015) and UWCD (safe-yield in Santa Paula basin, expected completion date in 2016) will provide updated estimates of the quantity of underflow from the Fillmore basin to the Santa Paula basin.

Effluent from the City of Santa Paula's Water Recycling Facility discharged to percolation ponds at Todd Lane (Figure 1) is believed to contribute a modest quantity of groundwater recharge in the Santa Paula basin. Recycled water is directed to the percolation ponds at an average rate of approximately 2,100 AF/yr in CY 2013 and 2,000 AF/yr in CY 2014 (PERC Water, 2014 and 2015). Recharge quantities from other treated or recycled waste water sources in the basin are currently being investigated by the TAC.

DISCHARGE

Significant groundwater discharges from the Santa Paula basin include:

- withdrawals from water-supply wells;
- underflow to the Mound and Oxnard Forebay basins; and
- rising groundwater and evapotranspiration (including phreatophytes) in the Santa Clara River channel.

Pumping from wells (primarily for irrigation, municipal, and industrial uses) is the largest source of groundwater discharge from the Santa Paula basin. Approximately 12,000 acres of lemons, avocados, strawberries, row crops, and nurseries in the Santa Paula basin are irrigated by groundwater, and the cities of Santa Paula and Ventura both operate municipal water-supply wells in the basin. Reported groundwater extractions from the Santa Paula basin during the period of record (CY 1980 to present) are summarized in Table 3 and shown on Figure 7. The extractions ranged from a low of 16,710 AF in 1983 (a very "wet" year with respect to precipitation) to a high of 33,453 AF in 1990 (the peak of the last period of sustained drought in the basin).

At the western boundary of the Santa Paula basin, groundwater flows from the Santa Paula basin into the adjacent Mound and Oxnard Forebay basins, but the exact quantities and directions of flow are uncertain. An estimate of groundwater underflow at the western boundary of the Santa Paula basin will be included in the safe-yield study, which is currently underway.

Table 3. Historical Santa Paula Basin Groundwater Extractions

Calendar Year	Groundwater Extractions (AF)	Calendar Year	Groundwater Extractions (AF)	Calendar Year	Groundwater Extractions (AF)
1980	26,820	1992	24,355	2004	27,306
1981	27,545	1993	26,998	2005	24,700
1982	22,925	1994	26,244	2006	24,830
1983	16,710	1995	25,042	2007	28,077
1984	29,455	1996	26,008	2008	26,686
1985	26,533	1997	28,961	2009	25,820
1986	21,617	1998	21,622	2010	23,115
1987	24,852	1999	27,700	2011	24,202
1988	25,370	2000	26,798	2012	25,824
1989	29,362	2001	22,530	2013	26,485
1990	33,453	2002	27,259	2014	27,437
1991	27,056	2003	22,280		
				Average	25,771

Note: The groundwater extractions shown on this table are based on semi-annual groundwater production statements submitted to UWCD's Finance Department.

A potentially significant quantity of groundwater discharges to surface flows in the Santa Clara River from the Fillmore basin; this "rising groundwater" has been observed in the river near the western end of the Fillmore basin and the eastern boundary of the Santa Paula basin upstream of the confluence of Santa Paula Creek. However, some of the surface flows resulting from rising groundwater percolate back down through the river channel farther downstream, to recharge groundwater in the reach upstream of the Freeman Diversion (UWCD, 2013a). Groundwater present within the upper several feet below ground surface along the Santa Clara River is also subject to the combined effects of evaporation and transpiration (through uptake in the root zone of phreatophytes). These processes are referred to collectively as evapotranspiration. The net quantity of groundwater lost to surface water flows and evapotranspiration is uncertain, and likely varies depending on seasonal and annual rainfall in the basin, the extent of riparian vegetation, and the depth to the water table in the vicinity of the river.

IMPORTS AND EXPORTS

In addition to the primary sources of groundwater recharge and discharge described above, smaller, but still significant, quantities of groundwater are imported and exported into and out of the Santa Paula basin. Much of the imported groundwater is used to irrigate crops or landscaping, and a portion of that irrigation water likely recharges the underlying aquifer via return flows. However, considering improvements over time in irrigation efficiency of applied water, the annual volume of return flows likely has changed considerably over the years. Groundwater pumped from within Santa Paula basin and exported outside of the basin is included in the pumping totals shown in Table 3.

Water is imported to the Santa Paula basin from both the Fillmore basin in the east and the Oxnard Forebay basin in the southwest. Water imports and exports are summarized in Table 4, below, and the changes in import and export quantities from CYs 2005 through 2014 are graphically illustrated on Figure 8. Groundwater pumped from wells 03N21W01N02 (Teague #6) and 03N21W12F07 (FICO #12), which are located in the Fillmore basin approximately 1,500 and 200 feet east of the boundary with the Santa Paula basin, respectively, is conveyed westward into Santa Paula basin, where it is used for irrigation. Groundwater produced by FICO #12 is transported to the west end of the Basin via pipeline; however, groundwater produced by Teague #6 is used nearby in the immediate vicinity of the well, east of Santa Paula Creek. In CYs 2013 and 2014, the combined reported pumpage from these two wells was 4,718 and 3,962 AF, respectively. Limoneira staff reported that approximately 60% of the groundwater pumped from the Teague #6 well is used for irrigation in the stipulated area of the Santa Paula basin; the remaining 40% is used on land east of the stipulated area, in Fillmore basin (Gunderson, 2015). Similarly, much of the groundwater pumped from wells 02N22W11A01S (Alta #3) and 02N22W02R05S (Alta #11), which are located in the Oxnard Forebay basin approximately 970 feet south of the south of the boundary with the Santa Paula basin, is conveyed northward into Santa Paula basin and beyond, in the service area of the Alta Mutual Water Company, where it is also used for irrigation. In CYs 2013 and 2014, the combined reported pumpage from these two wells was 1,858 and 1,345 AF, respectively. Approximately two-thirds of the acreage irrigated by the Alta #3 and #11 wells lies within Santa Paula basin; therefore, it is assumed that 67% of the pumpage from these wells is imported to the Santa Paula basin from the Oxnard Forebay basin.

Some of the groundwater pumped from wells in the east part of Santa Paula basin is exported westward to the Mound basin. Approximately 783 and 915 AF of water from FICO's water-distribution system in Santa Paula Basin were exported to the Mound basin for irrigation use in CYs 2013 and 2014, respectively, with production from both the Santa Paula Basin and the Fillmore Basin. In addition, Ventura pumped 673 and 629 AF of groundwater from well 02N22W02K09 (Saticoy #2) during CYs 2013 and 2014, respectively, for municipal and industrial use within their service area, which overlies both Santa Paula and Mound basins. The specific volume of groundwater from this well exported to the Mound basin is unknown.

Inspection of Figure 8 indicates that significantly more groundwater was imported into the stipulated area of Santa Paula basin from the Fillmore basin in CYs 2013 and 2014 (and, to a lesser extent, CY 2012) compared to previous years, while imports from the Oxnard Forebay basin and exports to the Mound basin have remained relatively stable in comparison. Groundwater imports to the stipulated area in CYs 2013 and 2014 from wells in the Fillmore basin were approximately 3,300 to 4,400 AF/yr greater than the long-term (CY 1985 through 2014) average of 1,500 AF/yr. The increases in groundwater imports during CYs 2013 and 2014 likely reduced the need for groundwater extraction from Santa Paula basin during this drought period.

Table 4. Summary of Groundwater Extractions, Imports, and Exports in Santa Paula Basin, CYs 2013 and 2014

	Volume (AF)	
Description	**2013**	**2014**
Groundwater extractions within Santa Paula basin	26,485	27,437
Groundwater imports from Fillmore basin (assume 60% of total pumpage from Teague #6 and 100% from FICO #12)	+4,594	+3,850
Groundwater imports from Oxnard Forebay basin (assume 67% of total pumpage from Alta #3 and Alta #11 of 1,858 and 1,345 AF in CYs 2013 and 2014, respectively)	+1,245	+901
Water exports to Mound basin from FICO distribution system	-783	-915
Groundwater exports to Mound basin by Ventura (unknown, but no more than the total pumpage from Saticoy #2)	-0 to 673	-0 to 629
Estimated net groundwater use in Santa Paula basin (sum of extractions plus imports, less exports)	**= 30,868 to 31,541**	**= 30,644 to 31,273**

Levels and Trends

Groundwater levels in the majority of wells throughout the basin show a seasonal variation in the range of 10 to 20 feet. Longer-term groundwater level trends are summarized through the use of a "Groundwater Level Index" (GLI). The GLI is calculated as the average of spring-high groundwater elevations measured at nine key wells selected for their relatively long record and their geographic distribution across the basin. The GLI for WY 1982 through WY 2014 is shown on Figure 9, together with the cumulative departure from long-term (WY 1890 through 2014) average precipitation at Santa Paula-UWCD. Following are observations based on inspection of Figure 9:

- **WYs 1983 to 1991** – a declining GLI caused by a major drought, as indicated by the increasingly negative cumulative departure from average precipitation during that period;
- **WYs 1991 to 1998** – a rising GLI corresponding to a period of above-average precipitation (cumulative departure from average precipitation shifts from negative to positive);

- **WYs 1998 to 2011** – an overall gradual decline in the GLI, despite a net positive cumulative departure from average precipitation during this period (partial rebounds in the GLI are apparent during the particularly wet WYs 2005 and 2011); and,
- **WYs 2011 to 2014** – a steep decline in the GLI, corresponding to below-average precipitation since WY 2012, including the driest back-to-back water years (2013 and 2014) recorded since WYs 1898 and 1899.

QUALITY

Groundwater quality generally degrades from east to west in the Santa Paula basin, with higher chloride, sulfate, and TDS concentrations detected in wells located west of Peck Road. Deeper wells in the basin tend to have elevated iron and manganese concentrations, and both the City of Santa Paula and City of San Buenaventura operate treatment facilities to reduce these constituents in delivered municipal water. Reported nitrate concentrations from wells throughout the basin are generally low to moderate; however, recent groundwater samples from two wells in the eastern portion of the basin had nitrate concentrations exceeding the State Primary (health-based) Maximum Contaminant Level (MCL) of 45 mg/l. Individual constituent concentrations vary with groundwater elevation changes in some wells. More detailed characterizations of groundwater quality in the Santa Paula basin can be found in the update of the Water Quality Control Plan (Basin Plan) for the Piru, Sespe, and Santa Paula Hydrologic Areas (California Department of Water Resources, 1989) and in the Lower Santa Clara River Salt and Nutrient Management Plan (Larry Walker Associates, 2015).

DATA SUMMARY AND EVALUATION

Monitoring data relevant to evaluation of groundwater conditions in the Santa Paula basin during the reporting period are summarized in this section and compared to long-term trends, where appropriate.

PRECIPITATION

Monthly precipitation at five selected rain gauges distributed across Santa Paula basin during the reporting period are shown on Figure 10. The annual precipitation totals measured at the Santa Paula-UWCD rain gauge during WYs 2013 and 2014 were 6.03 and 6.12 inches, respectively. These totals are approximately 35 percent of the long-term average annual precipitation of 17.27 inches for WYs 1890 through WY 2014 at the Santa Paula-UWCD gauge, and 40 percent of the long-term median annual precipitation of 15.01 inches. Only WY 2007 had lower annual precipitation (5.30 inches). However, it was immediately preceded and followed by years with near-average rainfall (Figure 2). The only other back-to-back water years at Santa Paula-UWCD with reported annual precipitation totals less than 7 inches were WYs 1898 and 1899.

Precipitation at the Santa Paula-UWCD rain gauge during CY 2013 was 3.28 inches, which is less than 20 percent of the average annual precipitation rate for CYs 1890 through 2014. This is the record-low calendar-year annual precipitation reported for Santa Paula-UWCD. Precipitation at this gauge during CY 2014 was 9.83 inches, but 3.76 inches of that total fell in December 2014, resulting in most of CY 2014 being exceptionally dry, similar to CY 2013.

Annual rainfall reported by the VCWPD at other selected locations in Santa Paula basin during WYs 2013 and 2014 were similarly at or near record lows, including:

- Saticoy County Yard—7.01 and 6.00 inches for WYs 2013 and 2014, respectively;
- Santa Paula-Wilson Ranch—5.96 and 6.15 inches for WYs 2013 and 2014, respectively;
- Santa Paula-Limoneira Ranch—9.38 inches for WY 2013 (no data reported for WY 2014); and,
- Wheeler Canyon—8.34 and 8.09 inches for WYs 2013 and 2014, respectively.

SURFACE WATER FLOWS

Daily streamflow rates measured in the Santa Clara River (at Freeman Diversion) and Santa Paula Creek (at Mupu Bridge) during CYs and WYs 2013 and 2014 are shown on Figure 11. Flow rates in the Santa Clara River were typically 3 to 10 times greater than flow rates in Santa Paula Creek, except during December 2013, when flow in Santa Paula Creek was typically greater.

The annual discharges measured in the Santa Clara River at Freeman Diversion during WYs 2013 and 2014 were 22,678 and 22,553 AF/yr, respectively. The long-term average annual discharge is 215,532 AF/yr, and the median annual discharge is 119,559 AF/yr, for the period of record (WYs

1956 through 2014). Annual discharges in the Santa Clara River during WYs 2013 and 2014 were the seventh and sixth lowest, respectively, recorded during the 59-year period of record.

The annual discharges measured in Santa Paula Creek at Mupu Bridge during WYs 2013 and 2014 were 1,165 and 1,788 AF/yr, respectively. The long-term average annual discharge in Santa Paula Creek at Mupu Bridge (or at preceding gauging stations nearby on Santa Paula Creek) is 18,417 AF/yr, and the median annual discharge is 8,351 AF/yr, for the period of record (WYs 1928 through 2014). Annual discharges in Santa Paula Creek during WYs 2013 and 2014 were the second and sixth lowest, respectively, recorded during the 87-year period of record.

SURFACE WATER QUALITY

Minimum, maximum, and average concentrations of selected major water quality constituents (chloride, nitrate, TDS, and sulfate) detected in surface water samples from the Santa Clara River at Freeman Diversion during CYs 2013 and 2014 are summarized in Table 5, below. Concentrations of these constituents detected throughout the historical record (CY 1925 to present) are shown on Figure 12. Table 5 indicates that average concentrations of chloride, TDS, and sulfate increased from CYs 2013 to 2014, while average nitrate concentrations have decreased. Inspection of Figure 12 indicates that these trends began in CY 2012, which was the first year of the current drought. Chloride, TDS, and sulfate concentrations in the Santa Clara River reached record highs in CY 2014, likely in response to record- or near-record-low annual precipitation and streamflow during CYs (and WYs) 2013 and 2014. Figure 13 compares chloride, nitrate, TDS, and sulfate concentrations with streamflow at the Santa Clara River at Freeman Diversion during CYs 2013 and 2014. UWCD (1996) identified a strong correlation between low flows in the Santa Clara River and increased concentrations of sulfate, chloride and TDS in the Santa Clara River. This relationship is discernible in the CY 2013 and 2014 data, as well, with the recent records of poor water quality being associated with very low flows in the Santa Clara River (Figure 13). Excluding CYs 2013 and 2014, the overall concentration trends for sulfate, chloride, TDS, and nitrate in the Santa Clara River appear to be stable to downward since the 1960s (Figure 12).

Table 5. Summary of Major Surface Water Quality Parameters in Santa Clara River at Freeman Diversion

Statistic	Concentration (mg/L)			
	Chloride	Nitrate[a]	TDS	Sulfate
CY 2013 Minimum	67.3	ND	1,110	556
CY 2014 Minimum	78.0	ND	470	690
CY 2013 Maximum	140	7.7	1,570	870
CY 2014 Maximum	180	6.4	2,070	1,160
CY 2013 Average	92.8	3.9	1,380	708
CY 2014 Average	125	1.54	1,600	889
Long-Term Average[b]	63.2	5.95	1,120	521

Notes:

[a] As nitrate

[b] Includes reported data in UWCD's database from the entire period of record: CY 1925 to present for chloride and sulfate, CY 1936 to present for nitrate, and CY 1960 to present for TDS.

Minimum, maximum, and average concentrations of selected major water quality constituents (chloride, nitrate, TDS, and sulfate) detected in surface water samples from Santa Paula Creek near Santa Paula during CYs 2013 and 2014 are summarized in Table 6, below. Concentrations of these constituents detected throughout the historical record (CY 1980 to present) are shown on Figure 14. Table 6 indicates that average concentrations of chloride, TDS, sulfate, and nitrate increased from CY 2013 to 2014. Inspection of Figure 14 indicates that the increasing trends in Santa Paula Creek, although not as apparent as similar increasing trends in the Santa Clara River, may have also begun in CY 2012, and likely are also a result of low precipitation and streamflow during the current drought. Excluding CYs 2013 and 2014, the overall concentration trends for sulfate, chloride, TDS, and nitrate in Santa Paula Creek appear to be stable to downward since CY 2000 (insufficient data are available to ascertain concentration trends prior to CY 2000).

Table 6. Summary of Major Surface Water Quality Parameters in Santa Paula Creek near Santa Paula

Statistic	Concentration (mg/L)			
	Chloride	Nitrate[a]	TDS	Sulfate
CY 2013 Minimum	44.0	4.31	823	307
CY 2014 Minimum	74.6	13.3	1,190	512
CY 2013 Maximum	77.2	19.2	1,240	578
CY 2014 Maximum	113	21.0	1,540	625
CY 2013 Average	65.2	12.3	1,110	496
CY 2014 Average	84.8	17.0	1,310	567
Long-Term Average[b]	39.4	7.58	770	339

Notes:

[a] As nitrate

[b] Includes reported data in UWCD's database from the entire period of record: CY 1980 to present for hardness, sulfate and chloride; CY 1981 to present for nitrate.

PRODUCTION WELL INSTALLATIONS AND DESTRUCTIONS

Two production wells were installed and one was destroyed within the Santa Paula basin during the reporting period; these wells are listed in Table 7, below. One of the production wells installed during CY 2013 (by Alta Mutual Water Company) was a replacement for an existing production well scheduled to be destroyed during early CY 2014.

Table 7. Production Well Installations and Destructions During the Reporting Period

Production Wells Destroyed	Production Wells Drilled
02N22W02K07S, Alta Mutual Water Company	03N21W21L02S, Roger D. Clow et al
	02N22W02K10S, Alta Mutual Water Company

GROUNDWATER EXTRACTION AND PUMPING ALLOCATIONS

Groundwater extractions reported for Santa Paula basin wells during the reporting period are summarized in Table 8, below.

Table 8. Summary of Groundwater Extractions During the Reporting Period

Pumper	2013 Extractions (AF)	2014 Extractions (AF)
City of San Buenaventura[a]	901	791
SPBPA Pumpers with Individual Party Allocations (adjusted by SPBPA)[b]	25,530	26,610
SPBPA Pumpers with Individual Party Allocations (reported to UWCD)[c]	25,554	26,613
Non-stipulated Parties[b]	14	17
De Minimis Pumpers[b]	16	16
Total extractions (adjusted by SPBPA / reported to UWCD)	26,461 / 26,485	27,434 / 27,437

Notes:

[a] Includes pumping from well 02N/22W-03E01S (Appendix D, Table D-5)

[b] From Appendix D compiled by SPBPA

[c] From UWCD Finance Department records

The total groundwater extraction volumes from Santa Paula basin during CYs 2013 and 2014 were somewhat greater than the long-term average (CY 1980 to present) of 25,775 AF/yr. The relative magnitude of groundwater extractions at individual wells during CYs 2013 and 2014 is shown on Figures 15 and 16.

The Judgment governs groundwater production on a seven-year rolling average, which allows parties to produce more or less than their allocation in any particular year so long as their rolling seven-year average does not exceed their allocation. Appendix D summarizes groundwater extractions for the past seven years (CYs 2008 through 2014), as well as Individual Party Allocations (IPAs) for the SPBPA (with transfers, de minimis parties, non parties) and the City of Ventura.

The Judgment also allows for “de minimis” production by landowners that are not allocated an Individual Party Allocation, which allows these landowners to produce groundwater for uses on their overlying property, so long as such use does not exceed five AF in any given year. In CYs 2013 and

2014, there were five de minimis producers, which are identified together with their actual CYs 2013 and 2014 production in Appendix D, Table D-2.

The total combined pumping allocations of the SPBPA (party and non-party) and the City of San Buenaventura are now at 30,771.6 AF/yr. Amendments to the Judgment in 2010 provided the SPBPA with an additional 280.2 AF/yr of allocation, which was granted to pumpers that were not previously parties to or identified within the Judgment. The current allocations were calculated and granted using the lesser of the following two options: 1) the average production reported to UWCD from CYs 2002 through 2008; or 2) the average production reported to UWCD prior to the Judgment (CYs 1989 to 1995). Ventura acquired an additional 220 AF/yr of SPBPA allocation through a land purchase and a 5.8 AF/yr of SPBPA allocation through a water allocation transfer.

The SPBPA's CY 2013 and 2014 allocations were 27,545.8 AF/yr (excluding non-parties) distributed among its members, with a seven-year rolling-average surplus of 2,123.8 AF (also excluding non-parties) from pumping below the allocation. Some parties have exceeded their 7-year-average IPAs, but the total volume of groundwater used by the SPBPA members is well below the SPBPA's seven-year-rolling-average allocation, resulting in the surplus noted above. Ventura's CY 2013 and 2014 allocations were 3,000 AF/yr plus 225.8 AF/yr of prior SPBPA allocation, with a seven-year rolling average surplus of 2,293.6 AF from pumping below its allocation.

GROUNDWATER LEVELS

Groundwater elevations were monitored during CYs 2013 and 2014 at selected wells in and adjacent to the Santa Paula basin, as shown on Figure 17. Groundwater elevation hydrographs for selected wells are shown in Appendix B. Two hydrographs are included for each well at different scales, as follows:

- The first hydrograph for each well is scaled with a consistent vertical axis range of -60 to 380 feet so that, for most wells, the relationships between static groundwater levels, top and bottom of well screens, and RPs at different wells in the basin can be visually compared. These hydrographs also include a consistent horizontal axis of CYs 1922 to 2018 for long-term data sets, or CYs 1972 to 2014 for short-term data sets. The information provided in these hydrographs displays the relationship between the (static) water level variations and the production zones of wells in the basin.

- The second hydrograph for each well is scaled to allow easier comparison of the magnitude of the static groundwater level changes in the wells. The vertical axis range of 80 feet captures the range of water levels on an expanded scale for visual inspection of groundwater level trends and comparison between wells. These plots include annotations regarding the reference point (RP) and depth of the well screen (which is indicated in parentheses to the right of the well number).

Groundwater elevation contour maps for spring and fall of 2013 and 2014 in Santa Paula basin are shown on Figures 18 through 21. The contours were drawn using groundwater elevation data from wells in the Santa Paula basin and in the adjacent, hydraulically-connected Fillmore, Mound, and Oxnard Forebay basins. The contours represent lines of equal groundwater elevation (total hydraulic head), and generally define the water table (in unconfined portions of the aquifer) and potentiometric surface (in confined portions of the aquifer). Most of the groundwater elevations used for contouring were measured at wells screened at depths greater than 100 feet. The screened interval contoured at UWCD's cluster monitor well sites SP-1 and SP-2 are 370 to 390 feet, and 290 to 310 feet, respectively. Groundwater elevations measured at shallow wells in these clusters are typically 10 to 30 feet higher than groundwater elevations in the deeper aquifer, indicating a strong downward hydraulic gradient in this area, particularly during periods of drought.

The groundwater elevation contour maps (Figures 18 through 21) depict a general northeast to southwest hydraulic gradient along the axis of the basin. A notable deviation from this pattern occurs at the southwest margin of the Santa Paula basin, where a steepening of the hydraulic gradient occurs (indicated by closely-spaced groundwater elevation contours). This steepening may indicate a zone of relatively low transmissivity, possibly caused by a partial barrier to groundwater flow, such as a fault. Local-scale variations in the hydraulic gradient can result from cones of depression created by pumping wells, or from transient (short-term) changes in groundwater levels occurring at wells at approximately the same time that groundwater levels were measured, yielding a measurement that is not representative of seasonal average conditions (for example, if a nearby production well began or ceased pumping shortly before the water-level measurement was made).

GROUNDWATER QUALITY

Minimum, maximum, and long-term average concentrations of selected major water quality constituents (sulfate, chloride, nitrate and TDS) detected in groundwater samples during CYs 2013 and 2014 are summarized in Table 9, and are discussed in more detail in the following subsections.

Table 9. Summary of Major Groundwater Quality Parameters

Statistic	Concentration (mg/L)			
	Chloride	**Nitrate**[a]	**TDS**	**Sulfate**
CY 2013 Minimum	34.0	ND	800	340
CY 2014 Minimum	32.0	ND	820	337
CY 2013 Maximum	291	53.0	3,410	2,140
CY 2014 Maximum	340	53.6	4,230	2,000
CY 2013 Average	64.6	8.24	1,270	574
CY 2014 Average	67.0	7.43	1,290	564
Long-Term Average[b]	69.9	10.4	1,310	538
Primary MCL	none	45	none	none
Secondary MCLR-“Recommended”	250	none	500	250
Secondary MCLR-“Upper”	500	none	1,000	500
Water Quality Objectives (East/West of Peck Rd.)	100/110	45/45	1,200/2,000	600/800

Notes:

ND = not detected

MCL = Maximum Contaminant Level

MCLR = Maximum Contaminant Level Range

[a] As NO_3.

[b] Includes reported data in UWCD’s database from the entire period of record: CY 1903 to present for chloride, TDS, and sulfate; CY 1923 to present for nitrate.

Nitrate

The average nitrate concentrations (as nitrate) for all groundwater samples obtained from Santa Paula basin in CYs 2013 and 2014 and reported to UWCD (Table 9) were below the long-term average of 10.4 mg/L. The California Regional Water Quality Control Board—Los Angeles Region (LARWQCB), established a water quality objective (WQO) for nitrate (as NO_3) in Santa Paula basin of 45 mg/L (LARWQCB, 1994), which is also the State Primary MCL for nitrate in public drinking-water systems. Maximum nitrate concentrations reported for wells in the Santa Paula basin during CYs 2013 and 2014 are mapped on Figures C-1 and C-2 of Appendix C. Only two samples from each year (four samples total), contained nitrate concentrations greater than 45 mg/L, out of 126 samples analyzed for nitrate during the reporting period. These exceedances occurred at Canyon Irrigation Company wells #8 and #9, in Santa Paula.

Chloride

The average chloride concentrations for all groundwater samples obtained from Santa Paula basin in CYs 2013 and 2014 and reported to UWCD (Table 9) were slightly less than the long-term average of 69.9 mg/L. LARWQCB's WQOs for chloride in Santa Paula basin are 100 mg/L east of Peck Road and 110 mg/L west of Peck Road (LARWQCB, 1994); these WQOs are lower than the State "Recommended" and "Upper" Secondary Maximum Contaminant Level Ranges (MCLRs) for chloride in public water supplies of 250 and 500 mg/L, respectively. Most chloride concentrations detected in the basin during the reporting period were below the WQOs, and all were below the "Upper" Secondary MCLR. In a 1959 evaluation of the quality of irrigation waters in Ventura County, the California Department of Water Resources classified water with less than 5 milliequivalents per liter of chloride (equal to 177 mg/L chloride) as "Class 1 – Excellent to Good" for agricultural purposes (California Department of Water Resources, 1959). A more recent literature review indicated that some sensitive crops, such as avocados and strawberries, may experience impaired yields when the chloride concentration of irrigation water exceeds 117 mg/L (CH2M HILL, 2005).

Maximum-detected chloride concentrations reported for wells in the Santa Paula basin during CYs 2013 and 2014 are mapped on Figures C-3 and C-4 of Appendix C. Maximum chloride concentrations generally increase from east to west in the basin, with two notable exceptions. One is the shallow-screened (50 to 70 ft bgs) well in UWCD's monitoring well cluster SP-2, in Santa Paula at Teague Park, where chloride concentrations are commonly the highest detected in the basin due to the typically lower quality of shallow groundwater in the basin. The other is a shallow (100 ft bgs) well located southwest (and hydraulically downgradient) of the City of Santa Paula Water Recycling Facility percolation ponds. Chloride concentrations detected in weekly 24-hour composite samples of effluent discharged from the facility in CYs 2013 and 2014 averaged 143 and 140 mg/l, respectively (PERC Water, 2014 and 2015).

Sulfate

The average sulfate concentrations for all groundwater samples obtained from Santa Paula basin in CYs 2013 and 2014 and reported to UWCD (Table 9) were slightly greater than the long-term average of 538 mg/L. LARWQCB's (1994) WQOs for sulfate in Santa Paula basin are 600 mg/L east of Peck Road and 800 mg/L west of Peck Road; these WQOs are greater than the State "Recommended" and "Upper" Secondary MCLRs for sulfate in community water systems of 250 and 500 mg/L, respectively, and were selected based on water quality conditions present within the basin as of 1994. The majority of sulfate concentrations detected in groundwater samples obtained east of Peck Road were less than the WQO for the eastern part of the basin. However, approximately half of the sulfate concentrations detected in groundwater samples obtained west of Peck Road exceeded the WQO for the western part of basin.

Maximum-detected sulfate concentrations reported for wells in the Santa Paula basin during CYs 2013 and 2014 are mapped on Figures C-5 and C-6 of Appendix C. Maximum sulfate concentrations detected in groundwater generally increase from east to west in the basin; however, the highest sulfate concentrations in the basin commonly are detected at the shallow-screened (50 to 70 ft bgs) well in UWCD's monitoring well cluster SP-2, in Santa Paula at Teague Park. As noted previously, shallow groundwater (which is intercepted by this well) is typically of lower quality than deeper groundwater in much of the basin.

TDS

The average TDS concentrations for all groundwater samples obtained from Santa Paula basin in CYs 2013 and 2014 and reported to UWCD (Table 9) were slightly less than the long-term average of 1,310 mg/L. LARWQCB's WQOs for TDS in Santa Paula basin are 1,200 mg/L east of Peck Road and 2,000 mg/L west of Peck Road; these WQOs are greater than the State "Recommended" and "Upper" Secondary MCLRs for TDS in public water supplies of 500 and 1,000 mg/L, respectively. The majority of groundwater samples obtained from the basin in CYs 2013 and 2014 contained TDS concentrations below the WQOs; however, TDS concentrations in excess of the WQOs were detected in several wells both east and west of Peck Road.

Maximum TDS concentrations reported for wells in the Santa Paula basin during CYs 2013 and 2014 are mapped on Figures C-7 and C-8 of Appendix C. In theory, TDS concentrations should be approximately equal to the sum of concentrations of ionic species in solution. In the Santa Paula basin, sulfate is generally the dominant dissolved anion in groundwater; therefore, the distribution of TDS in the basin tends to reflect the distribution of sulfate. Similar to sulfate, TDS concentrations generally increase from east to west in the basin; however, also similar to sulfate, the highest TDS concentrations in the basin commonly occur at the shallow-screened (50 to 70 ft bgs) well in UWCD's monitoring well cluster SP-2, in Santa Paula at Teague Park. Again, shallow groundwater (which is intercepted by this well) is typically of lower quality than deeper groundwater in much of the basin.

Hardness, Alkalinity, Iron and Manganese

High concentrations of hardness, alkalinity, iron, and manganese can limit the suitability of water for some domestic purposes and accelerate plugging of micro-irrigation systems, which are commonly used to improve efficiency of irrigation in the Santa Paula basin. Pitts and Peterson (undated), as part of their mobile irrigation laboratory work with the Cachuma Resource Conservation District, proposed water quality criteria for plugging-hazard potential associated with use of groundwater in drip-irrigation systems in Santa Barbara County. The University of California Division of Agriculture and Natural Resources has similar criteria for determining the clogging potential of irrigation water (University of California, 2015). Minimum, maximum, and long-term average concentrations of these groundwater constituents detected in groundwater samples during CYs 2013 and 2014 are summarized in Table 10, together with Secondary MCLs for iron and manganese, and the micro-irrigation plugging hazard criteria developed by Pitts and Peterson and the University of California.

Table 10. Summary of Hardness, Alkalinity, Iron, and Manganese in Groundwater in the Santa Paula Basin

Statistic		Concentration (mg/L)			
		Hardness[a]	Alkalinity[a]	Iron	Manganese
CY 2013 Minimum		429	200	ND	ND
CY 2014 Minimum		463	210	ND	ND
CY 2013 Maximum		1,380	463	3.32	0.810
CY 2014 Maximum		1,250	405	0.656	0.781
CY 2013 Average		656	270	0.096	0.275
CY 2014 Average		649	257	0.119	0.262
Long-Term Average[b]		645	272	0.153	0.239
Secondary MCL		NA	NA	0.3	0.05
Pitts and Peterson Plugging Hazard Potential	Moderate	150-300	100-200	0.1 - 1.0	0.1 - 1.0
	Severe	>300	>200	>1.0	>1.0
Univ. of Calif. Clogging Potential	Moderate	NA	100	0.2 - 1.5	0.1 - 1.5
	Severe	NA	NA	>1.5	>1.5

Notes:
ND = not detected
NA = not applicable or not reported
> = greater than the value shown
[a] As calcium carbonate ($CaCO_3$).
[b] Includes reported data in UWCD's database from the entire period of record: CY 1929 to present for hardness and alkalinity; CY 1937 to present for iron and manganese.

The majority of iron concentrations detected in groundwater samples from the Santa Paula basin in CYs 2013 and 2014 did not exceed the Secondary MCL of 0.3 mg/L. However, the majority of manganese concentrations detected in the basin did exceed the Secondary MCL of 0.05 mg/L. Iron and manganese occur naturally in groundwater, and the elevated concentrations detected in the Santa Paula basin are thought to be a result of local geochemical conditions rather than man-made sources (e.g. mining or heavy industry). Treatment to remove iron or manganese from groundwater is performed by municipal water purveyors in the Santa Paula basin where needed to achieve Secondary MCLs in delivered water. All of the detected concentrations of hardness and alkalinity in the Santa Paula basin during CYs 2013 and 2014 exceeded the Pitts and Peterson and the University of California criteria for a “severe plugging hazard,” and many of the iron and manganese concentrations exceeded the criteria for a “moderate plugging hazard.”

FINDINGS AND RECOMMENDATIONS

Findings and recommendations resulting from evaluation of groundwater data obtained from the Santa Paula basin in 2013 and 2014 include:

1. Results of TAC specialty studies completed during the reporting period indicate that:
   a. Surface water infiltration in the reach of the Santa Clara River from Willard Road to Orr Road is "limited both currently and historically" (UWCD, 2013a).
   b. Little to no percolation occurred in lower Santa Paula Creek during study periods in 2010 and 2011, "suggesting the COE flood control project in 1998 has impaired the ability of the creek to recharge the groundwater basin" (UWCD, 2013b).
   c. Groundwater levels in the majority of wells in the Santa Paula basin have declined to some degree during the past 10 to 70 years, depending on the specific evaluation (base) period considered (UWCD, 2013c).
   d. Crop acreage in the Santa Paula basin decreased slightly during the period from 2002 to 2010, while 1,300 acres or more of tree crops (primarily citrus) were replaced by higher-water-demand berries and other specialty crops. However, efficiency of water use in the Santa Paula basin has also increased at the same time, such that the overall allocation of groundwater to the SPBPA is not being exceeded (Frank B & Associates, 2013a).
2. Key findings of the Santa Paula basin monitoring program during the reporting period include:
   a. The annual precipitation totals measured at the Santa Paula-UWCD rain gauge during WYs 2013 and 2014 were 6.03 and 6.12 inches, respectively. These totals are approximately 35 percent of the average water-year precipitation of 17.27 inches. The only other time that consecutive annual water-year precipitation amounts of less than 7 inches were reported occurred in WYs 1898 and 1899. Precipitation totals for other rain gauges in the Santa Paula basin during the reporting period were also well below average.
   b. The annual discharges measured in the Santa Clara River at Freeman Diversion during WYs 2013 and 2014 were 22,678 and 22,553 AF/yr, respectively. These were the seventh and sixth lowest annual discharges, respectively, recorded during the 59-year period of record.
   c. The annual discharges measured in Santa Paula Creek at Mupu Bridge during WYs 2013 and 2014 were 1,165 and 1,788 AF/yr, respectively. These were the second and sixth lowest annual discharges, respectively, recorded during the 87-year period of record.
   d. Average concentrations of chloride, sulfate, and TDS detected in surface water samples from the Santa Clara River increased from CY 2013 to 2014, while average nitrate concentrations decreased. The increasing trends began in CY 2012, which was the first year of the current drought. Chloride, sulfate, and TDS concentrations in the Santa Clara River reached record highs in CY 2014, likely in response to record- or near-record-low annual precipitation and streamflow during CYs (and WYs) 2013 and 2014. However, excluding CYs 2013 and 2014,

the overall concentration trends for sulfate, chloride, TDS, and nitrate in the Santa Clara River have been stable to downward since the 1960s and 1970s.

e. Average concentrations of chloride, sulfate, TDS, and nitrate detected in surface water samples from Santa Paula Creek also increased from CY 2013 to 2014. Similar to the Santa Clara River, these increasing trends are likely a result of low precipitation and streamflow during the current drought. Longer-term concentration trends (since CY 2000) appear to be stable or decreasing.

f. The total annual groundwater extraction rates from Santa Paula basin during CYs 2013 and 2014 were 26,485 and 27,437 AF/yr, respectively. These rates were slightly greater than the long-term (CY 1980 to present) average of 25,775 AF/yr, as expected during a period of drought, but are below the total of allocations under the Judgment (currently 30,812 AF/yr).

g. Significantly more groundwater was imported from the Fillmore basin in CYs 2013 and 2014 compared to previous years, while imports from the Oxnard Forebay basin and exports to the Mound basin have remained relatively stable in comparison. Groundwater imports to the stipulated area of the Santa Paula basin Judgment in CYs 2013 and 2014 from wells east of the stipulated area (in the transition area between the Santa Paula and Fillmore basins) were approximately 3,300 to 4,400 AF/yr greater than the long-term (CY 1985 through 2014) average of 1,500 AF/yr. The increases in groundwater imports from this area during CYs 2013 and 2014 likely mitigated the need for additional groundwater extraction from Santa Paula basin during this drought period.

h. Average groundwater levels in the Santa Paula basin, represented by the GLI, declined 9 feet during WYs 2013 and 2014 at an average rate of 4.5 feet per year, which was comparable to the average rate of decline observed in WYs 1990 and 1991, at the end of the previous major drought. By spring 2014, the GLI had declined to 171.06 ft msl, a record low for the 32-year period that the index wells have been monitored (since WY 1983). The spring 2014 GLI was 0.54 ft below the previous record low of 171.60 ft msl, in the spring of 1991.

i. As in past years, a general northeast to southwest hydraulic groundwater gradient exists along the axis of the basin, with steeper gradients along the southwest and west boundaries of the basin.

j. Basin-wide average concentrations of the major groundwater quality parameters (chloride, nitrate, TDS, and sulfate) during the reporting period were less than long-term basin-wide averages. As noted in past years, concentrations of chloride, sulfate, and TDS generally increase from east to west in the basin. Groundwater samples obtained from two irrigation wells in the eastern part of the basin contained nitrate concentrations exceeding the Primary MCL in CYs 2013 and 2014, similar to past years. Neither the magnitude nor the extent of these nitrate exceedances in groundwater appear to be increasing.

k. Basin-wide average hardness, alkalinity, iron, and manganese concentrations in groundwater during the reporting period remained within the range of previously detected levels. Elevated hardness and alkalinity pose a “severe plugging hazard” to micro-irrigation systems in the basin, while iron and manganese concentrations pose a “moderate plugging hazard,” according to guidelines developed by Pitts and Peterson and the University of California.

3. Based on the findings listed above, the TAC recommends implementing or continuing the following data collection and evaluation efforts:

   a. Complete the ongoing safe yield evaluation for the Santa Paula basin (currently in progress by a consultant under contract to UWCD);

   b. Complete the study of groundwater-yield-enhancement options for Santa Paula basin (currently in progress by Dr. Steven Bachman);

   c. Complete the remaining specialty studies that have been initiated by TAC, with priority given to those that will provide key information in support of the safe-yield evaluation, including:

      i. Investigation of groundwater underflow between the Fillmore and Santa Paula basins (in progress by Dr. Steven Bachman);

      ii. Evaluation of groundwater confinement in the Santa Paula basin and differentiate wells by aquifer (in progress by Kenneth D. Schmidt and Associates);

      iii. Investigation of groundwater storage change in the Santa Paula basin (planned by GEI Consultants).

   d. The pressure transducer program (see “TAC Activities” in the “Introduction” section) should continue and additional wells, as appropriate, should be equipped with this technology. The transducer data allow an understanding of the magnitude of interference drawdown between wells and more accurately record maximum and minimum groundwater levels in the basin than manual groundwater elevation measurements. This level of understanding could prove important for future studies and analyses of basin yield.

   e. The TAC may wish to evaluate the potential benefit of the following projects which address increasing the sustainability of the basin:

      i. Source salt reduction and/or Santa Paula Water Recycling Facility effluent treatment for irrigation use within the context of the new salt and nutrient management plan for the Lower Santa Clara River (Larry Walker Associates, 2015).

      ii. Increase the production and transport of better-quality groundwater from the eastern portion of the Santa Paula basin or western end of the Fillmore basin, where groundwater levels are high, to western portions of the Santa Paula basin where groundwater quality is poorer and groundwater levels are lower. This process could lower groundwater levels in the eastern portion of the Santa Paula basin, thereby potentially inducing greater recharge from the Santa Clara River and improve delivered irrigation water quality and groundwater levels in the western portion of the Santa Paula basin.

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FIGURES

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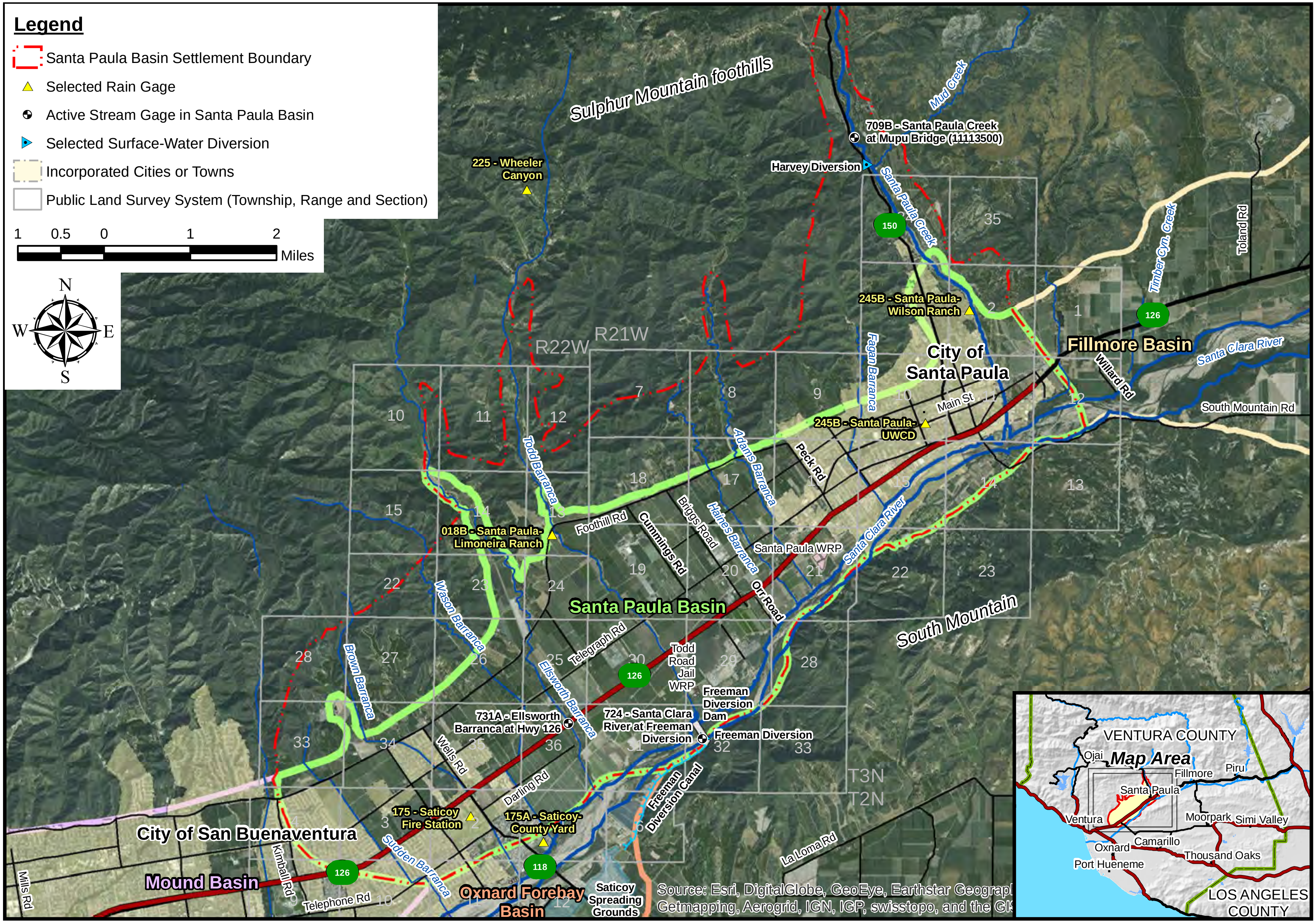

Figure 1. Santa Paula Basin Location Map

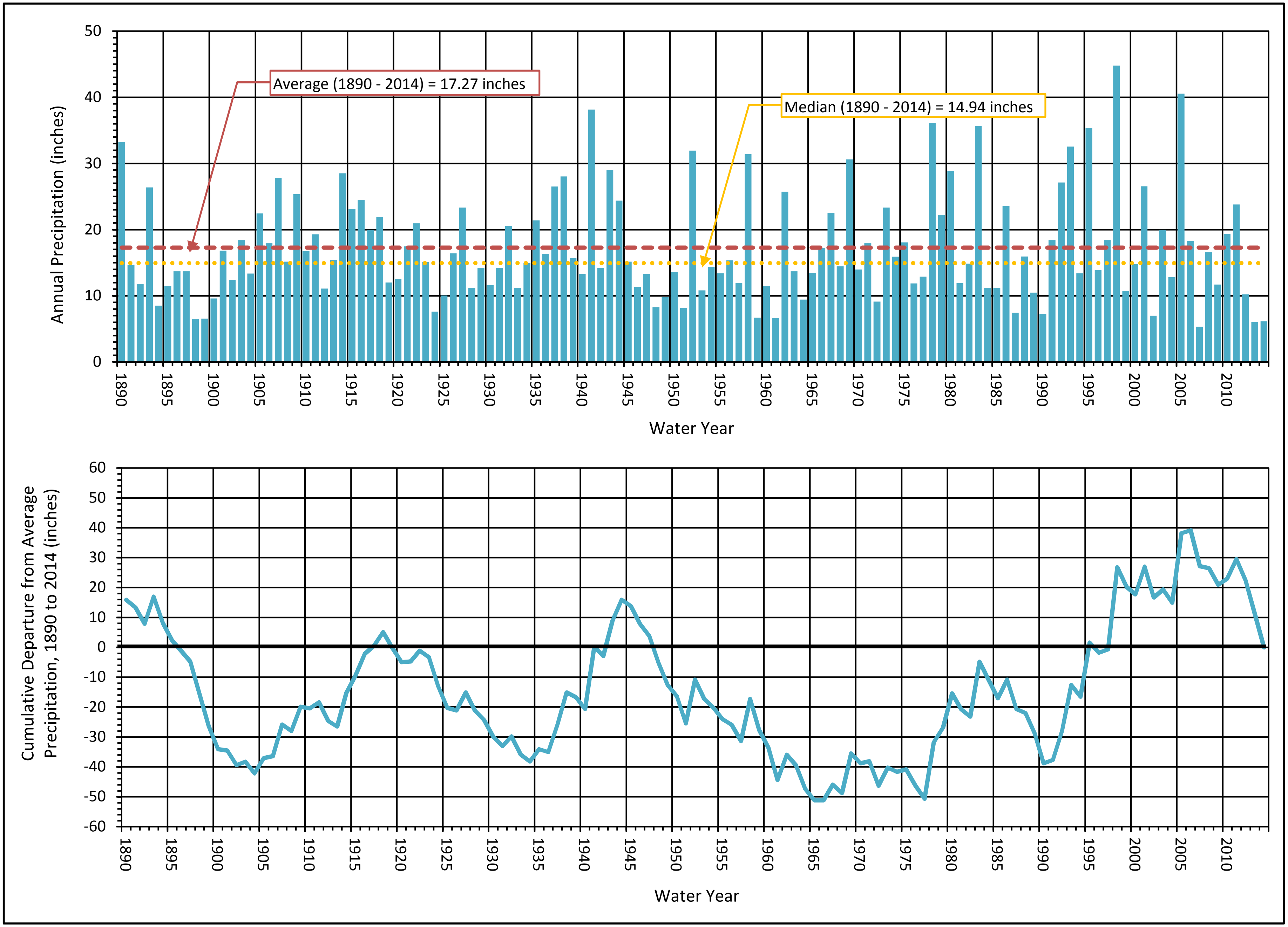

Figure 2. Annual Precipitation at Santa Paula and Departure from Average, WYs 1890 through 2014

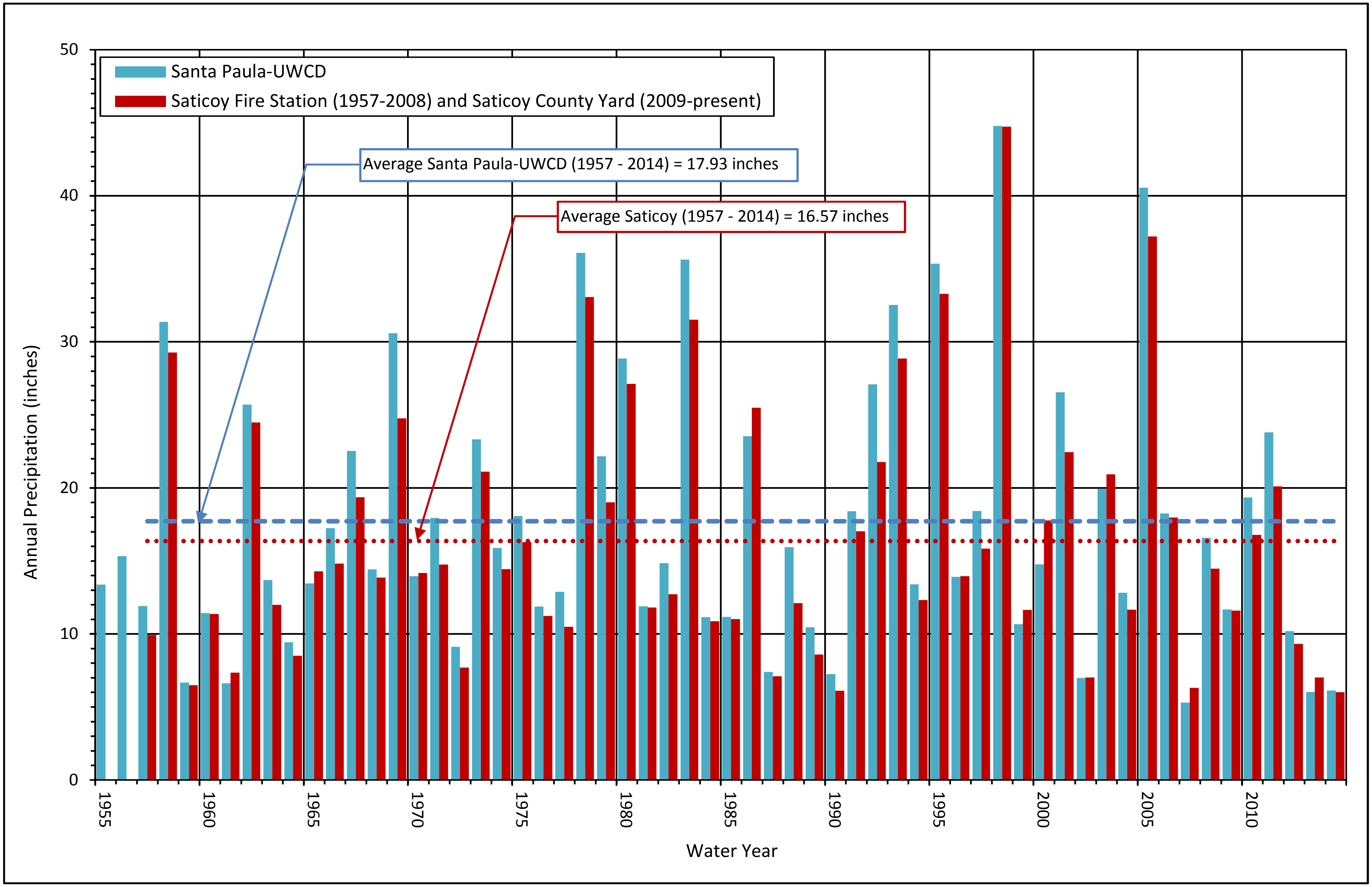

Figure 3. Annual Precipitation at Saticoy and Santa Paula, WYs 1955 through 2014

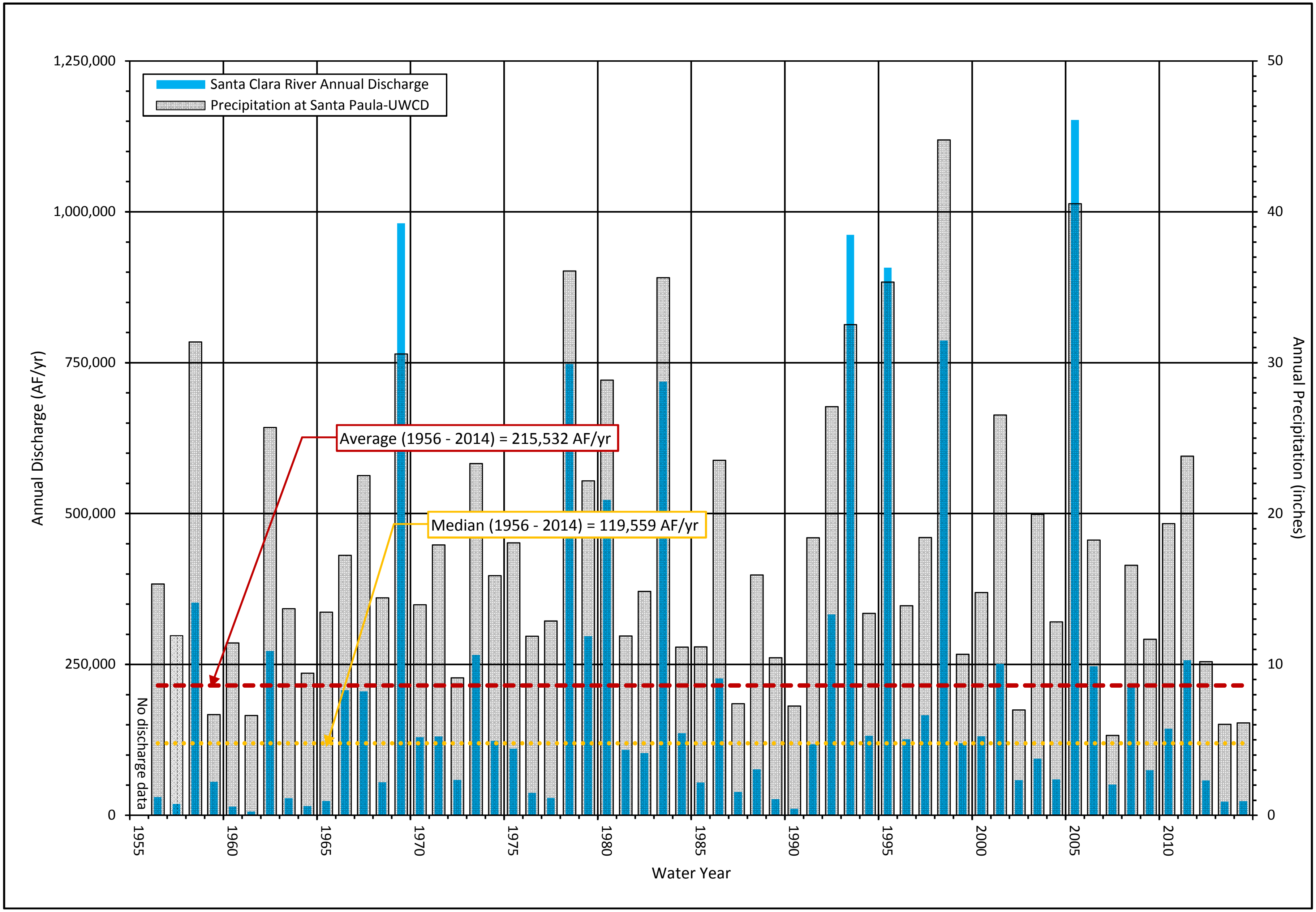

Figure 4. Annual Discharge of Santa Clara River at the Freeman Diversion, WYs 1956 through 2014

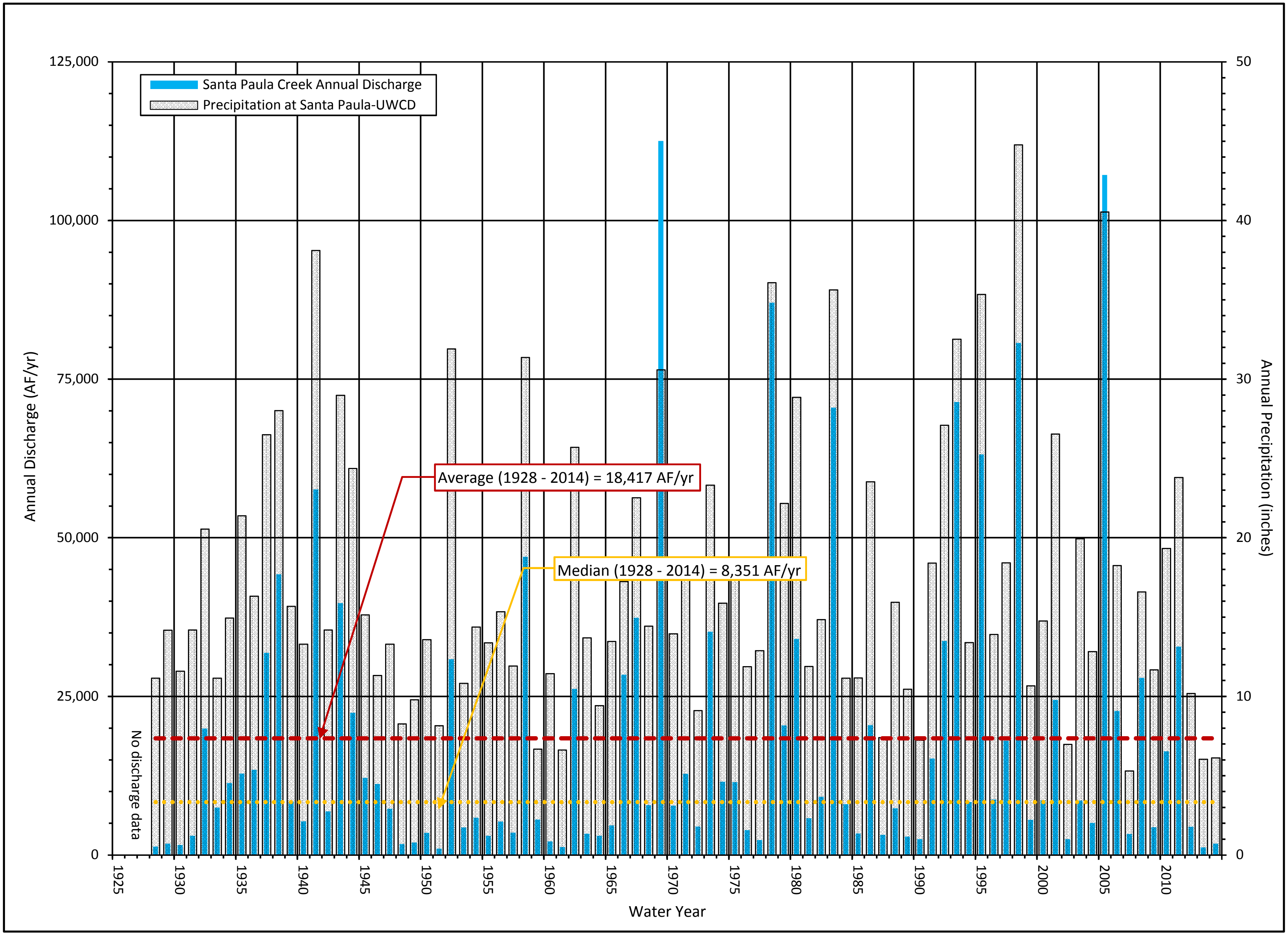

Figure 5. Annual Discharge of Santa Paula Creek Near Santa Paula, WYs 1928 through 2014

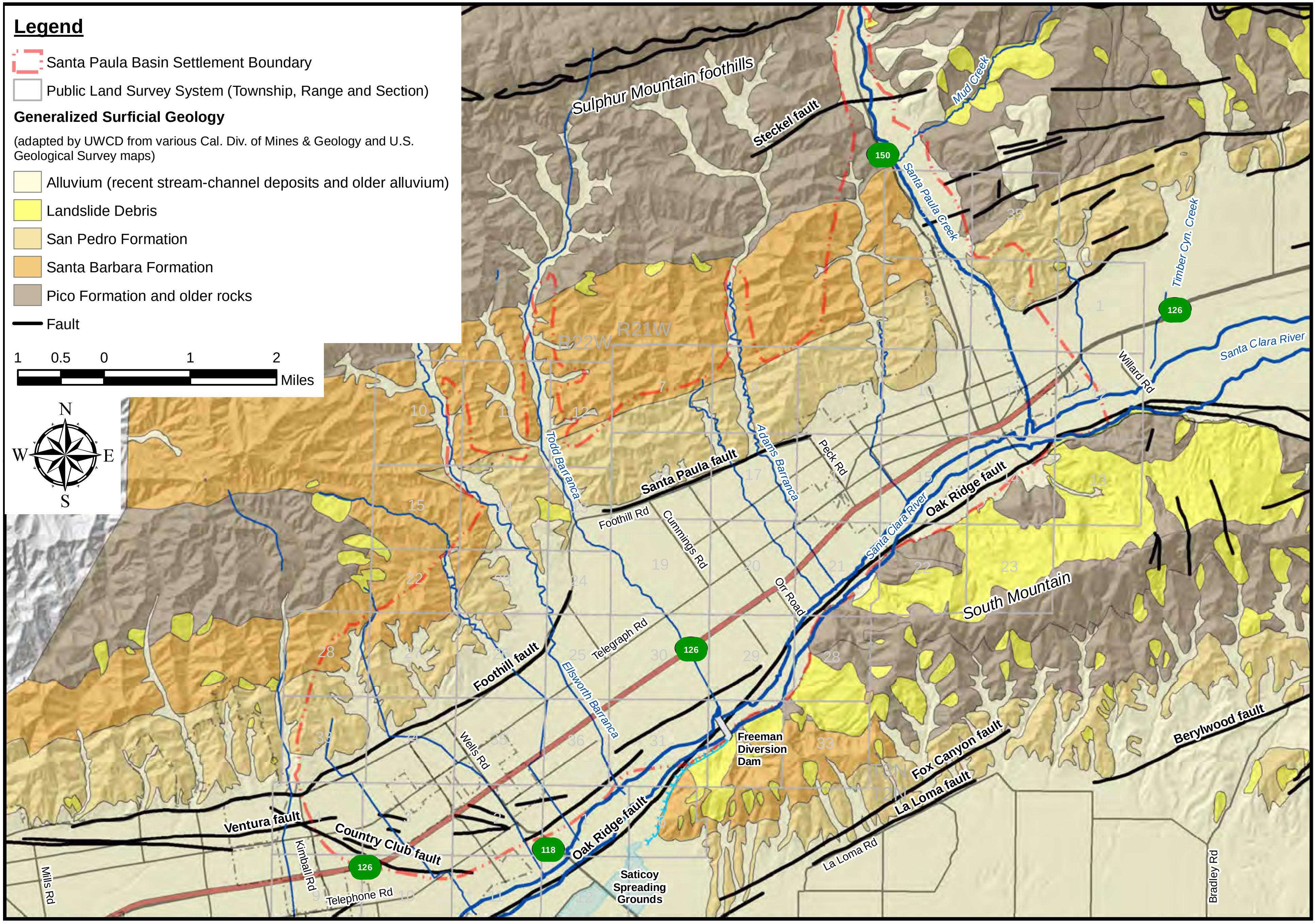

Figure 6. Generalized Geologic Map of Santa Paula Basin

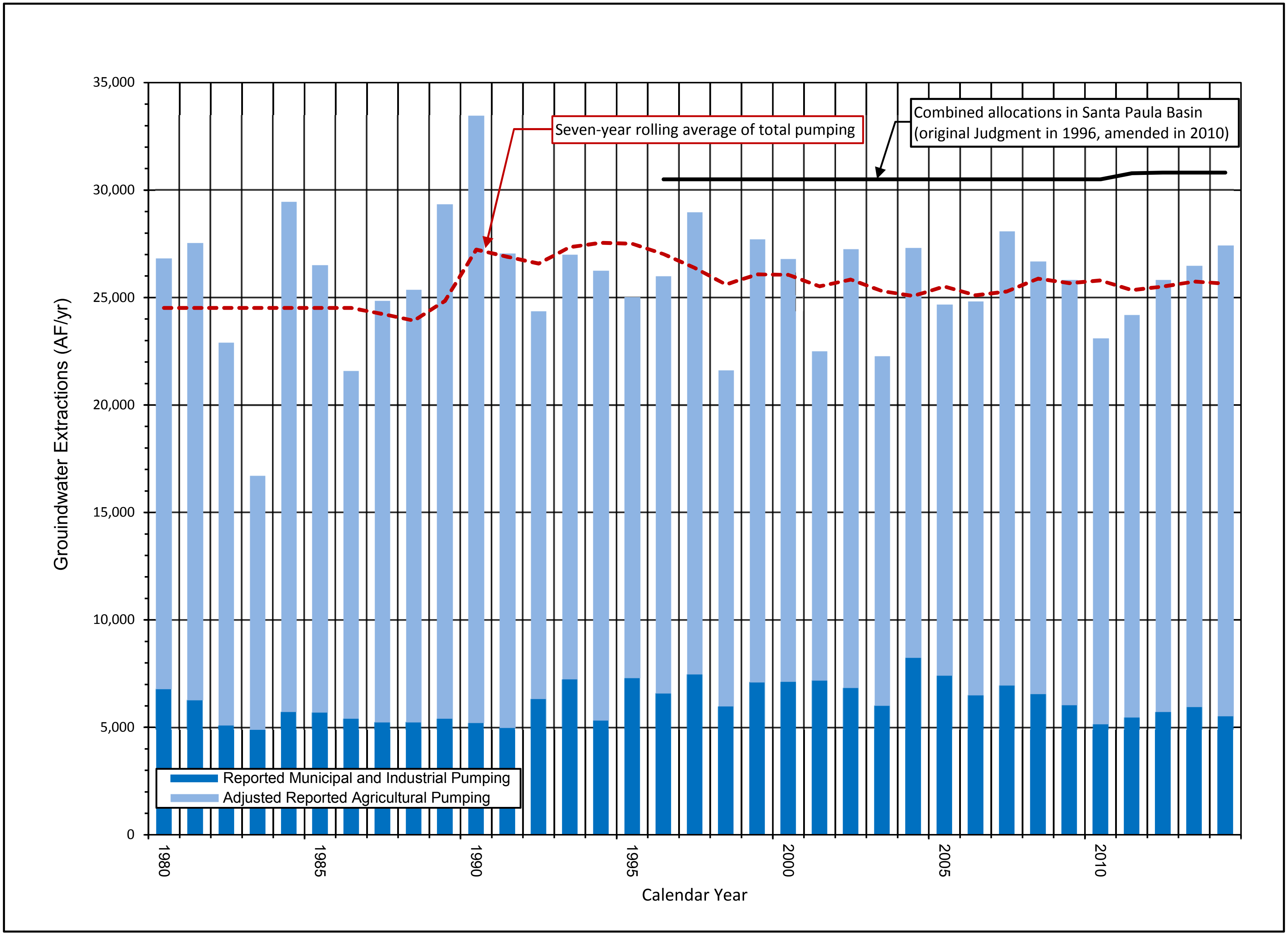

Figure 7. Historical Annual Groundwater Extractions from Santa Paula Basin, CYs 1980 through 2014

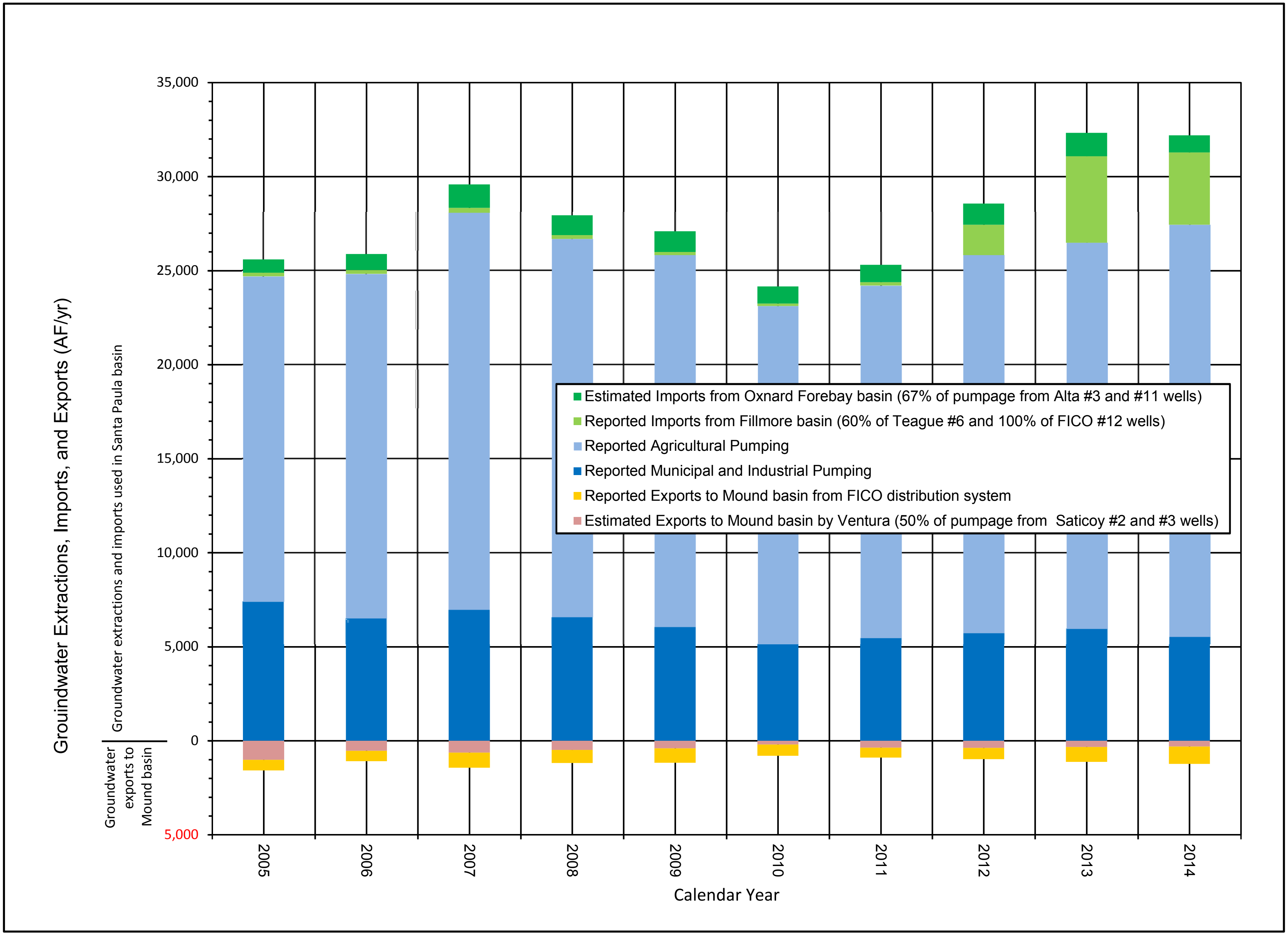

Figure 8. Annual Groundwater Extractions, Imports, and Exports from Santa Paula Basin, CYs 2005 through 2014

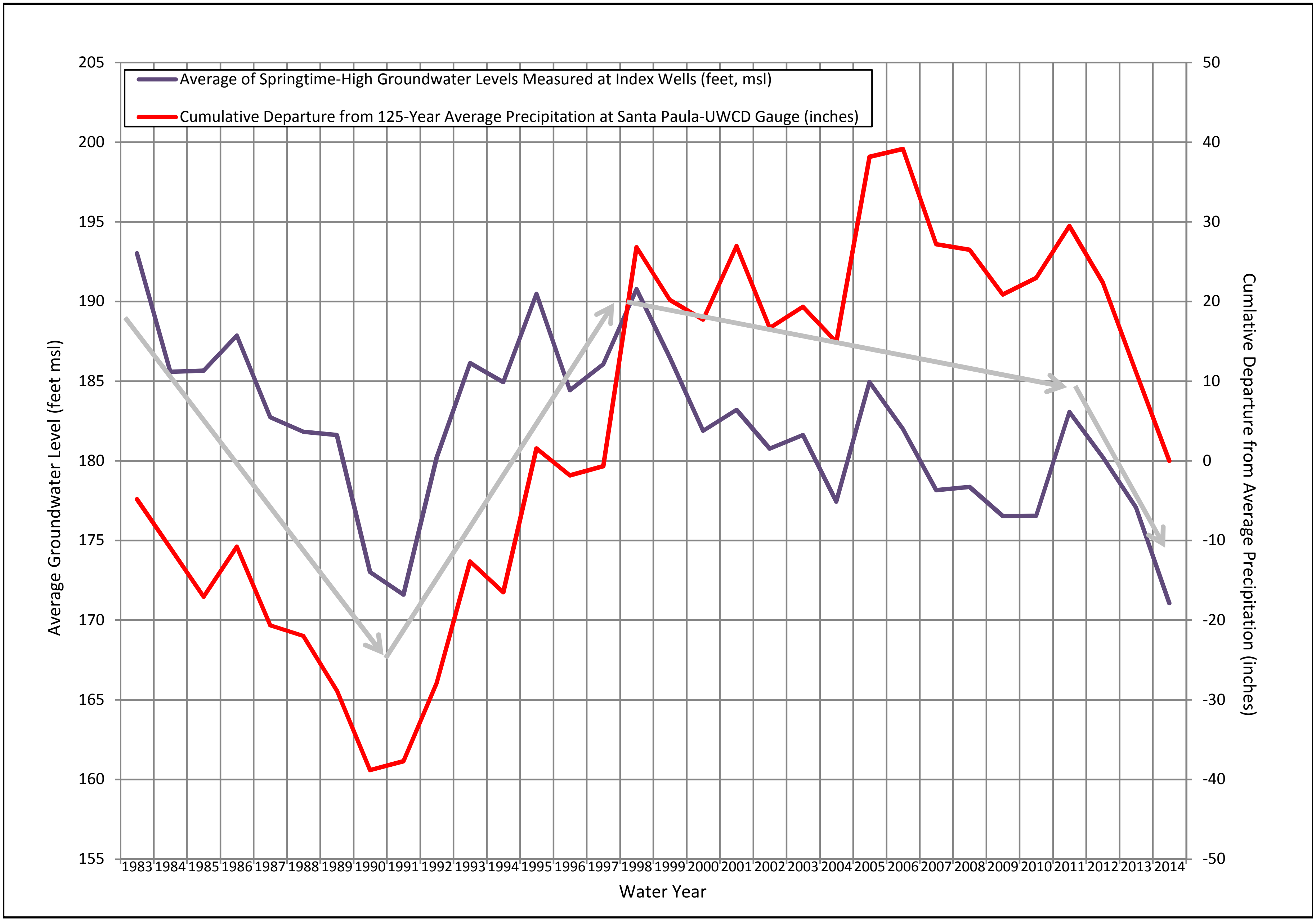

Figure 9. Groundwater Level Index and Cumulative Departure from Average Precipitation in Santa Paula Basin, WYs 1983 through 2014

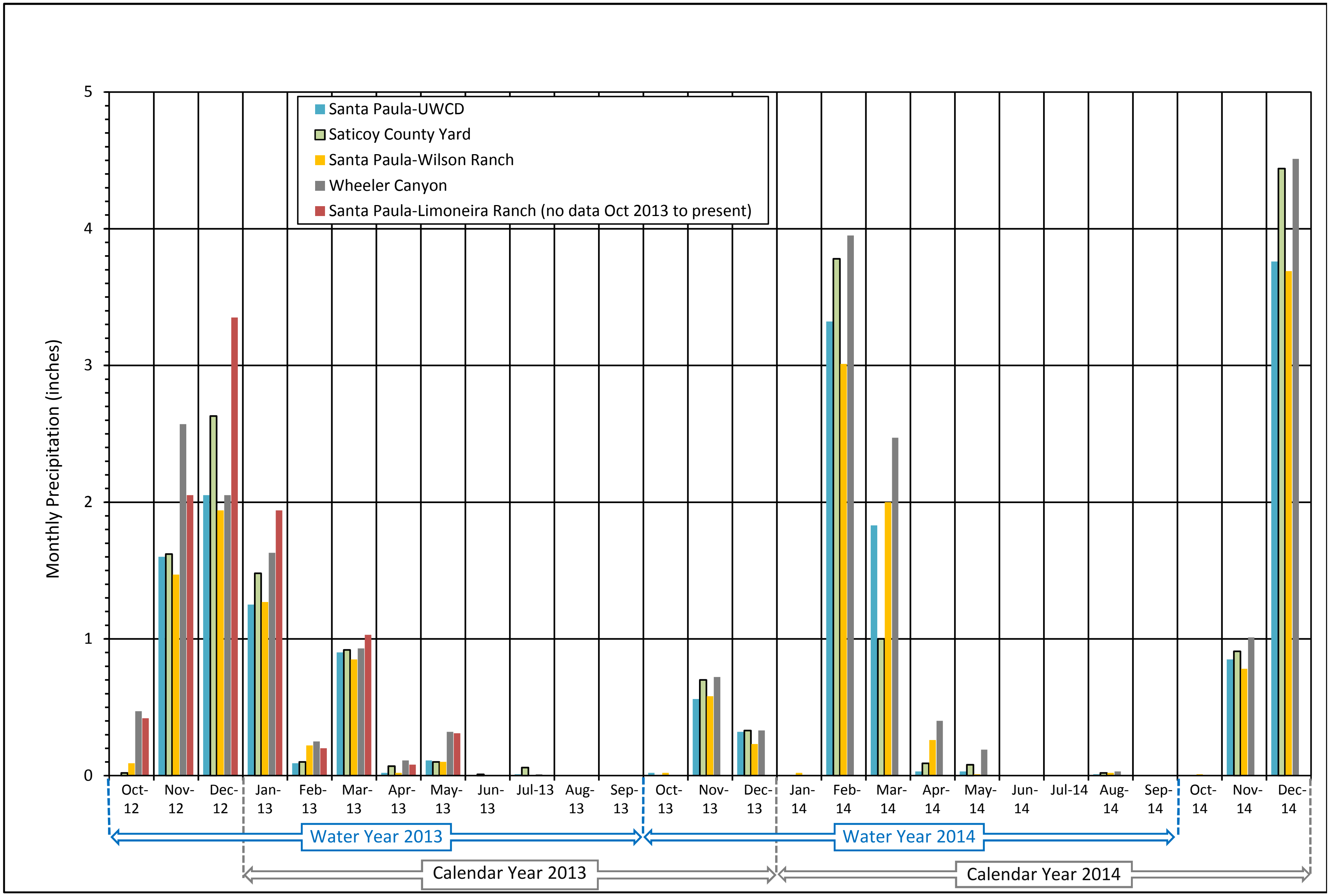

Figure 10. Monthly Precipitation in Santa Paula Basin, CYs and WYs 2013 and 2014

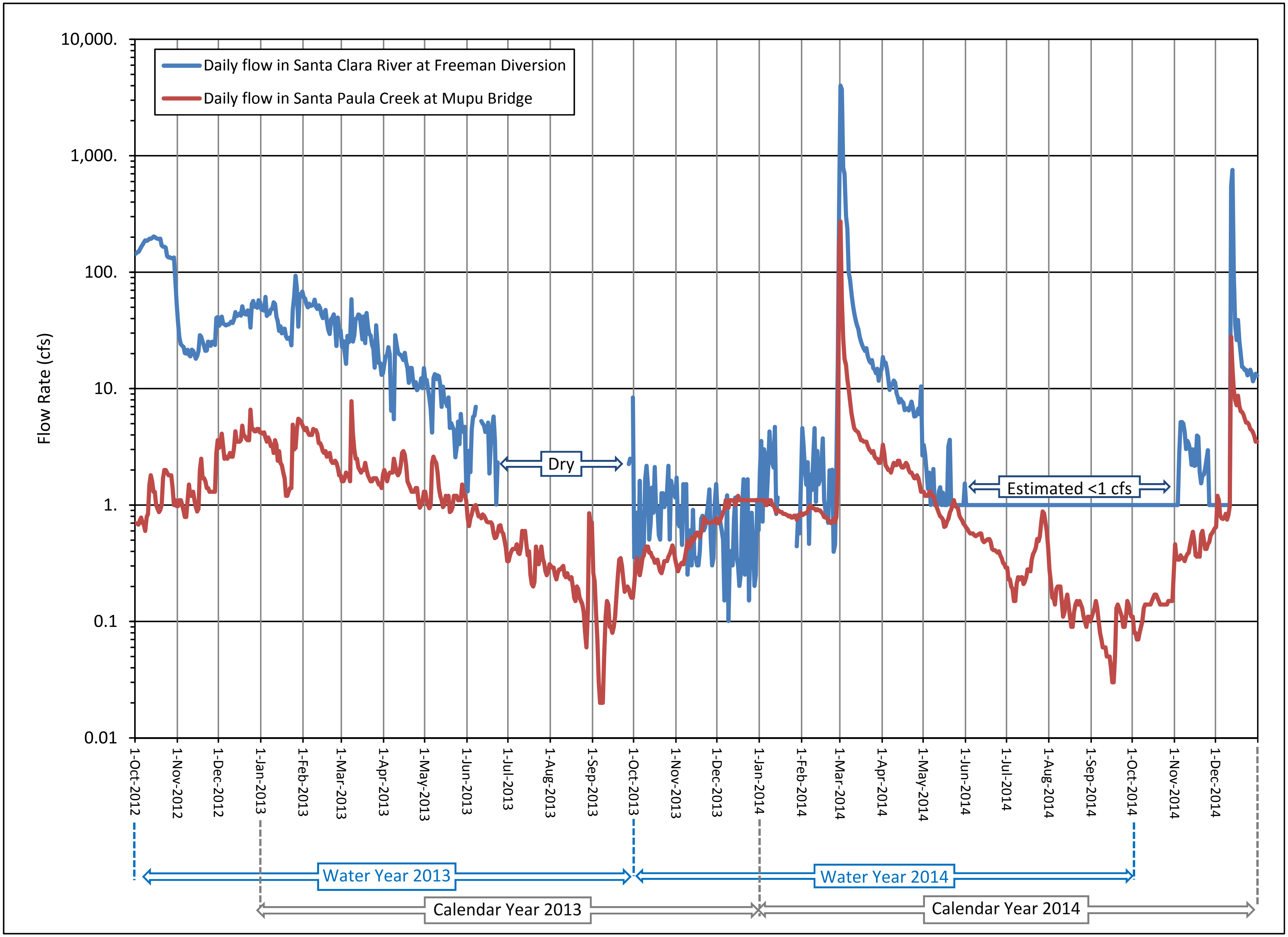

Figure 11. Daily Streamflow in Santa Paula Creek and Santa Clara River, WYs and CYs 2013 and 2014

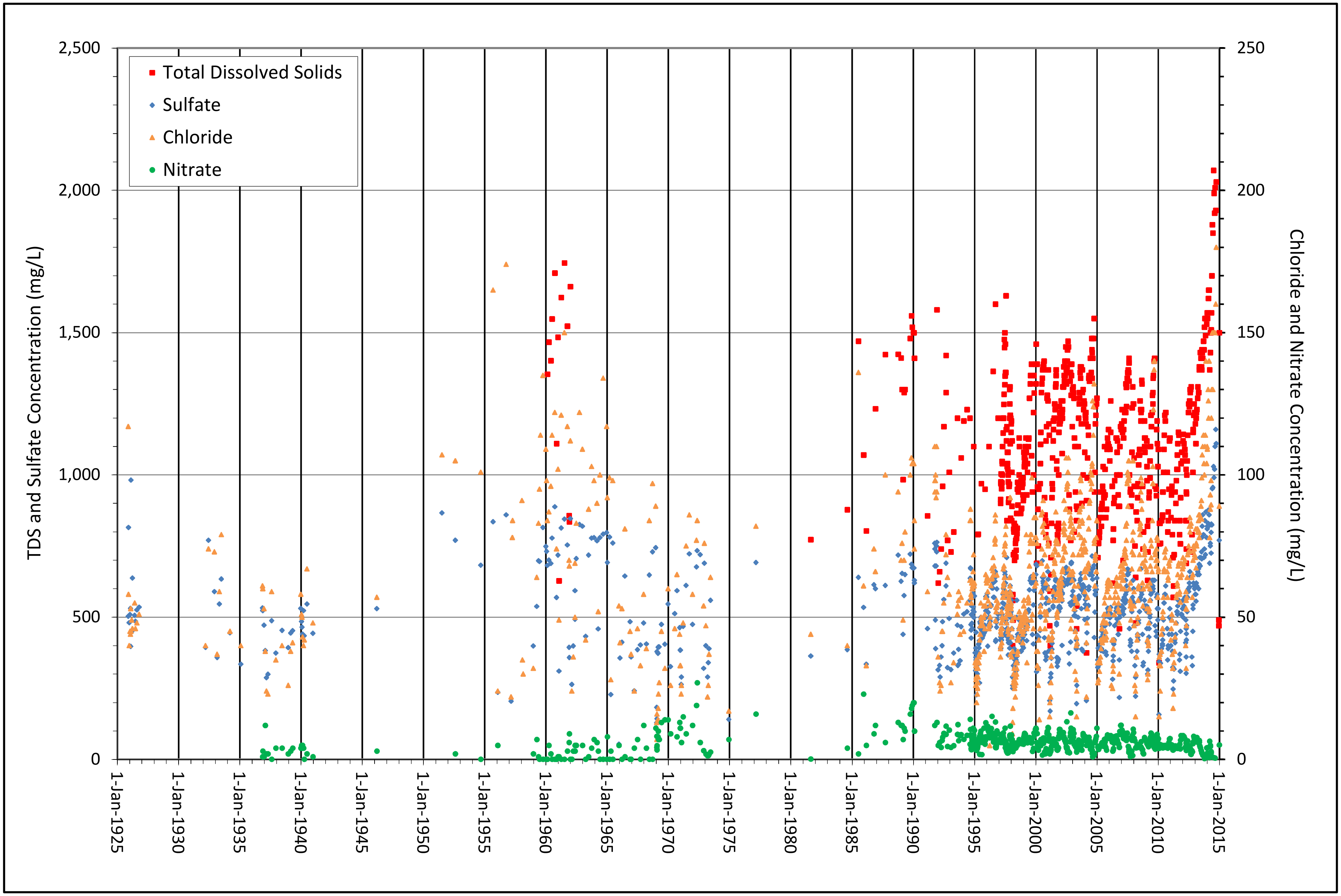

Figure 12. Concentrations of Selected Major Surface Water Quality Parameters in the Santa Clara River at Freeman Diversion, CYs 1925 through 2014

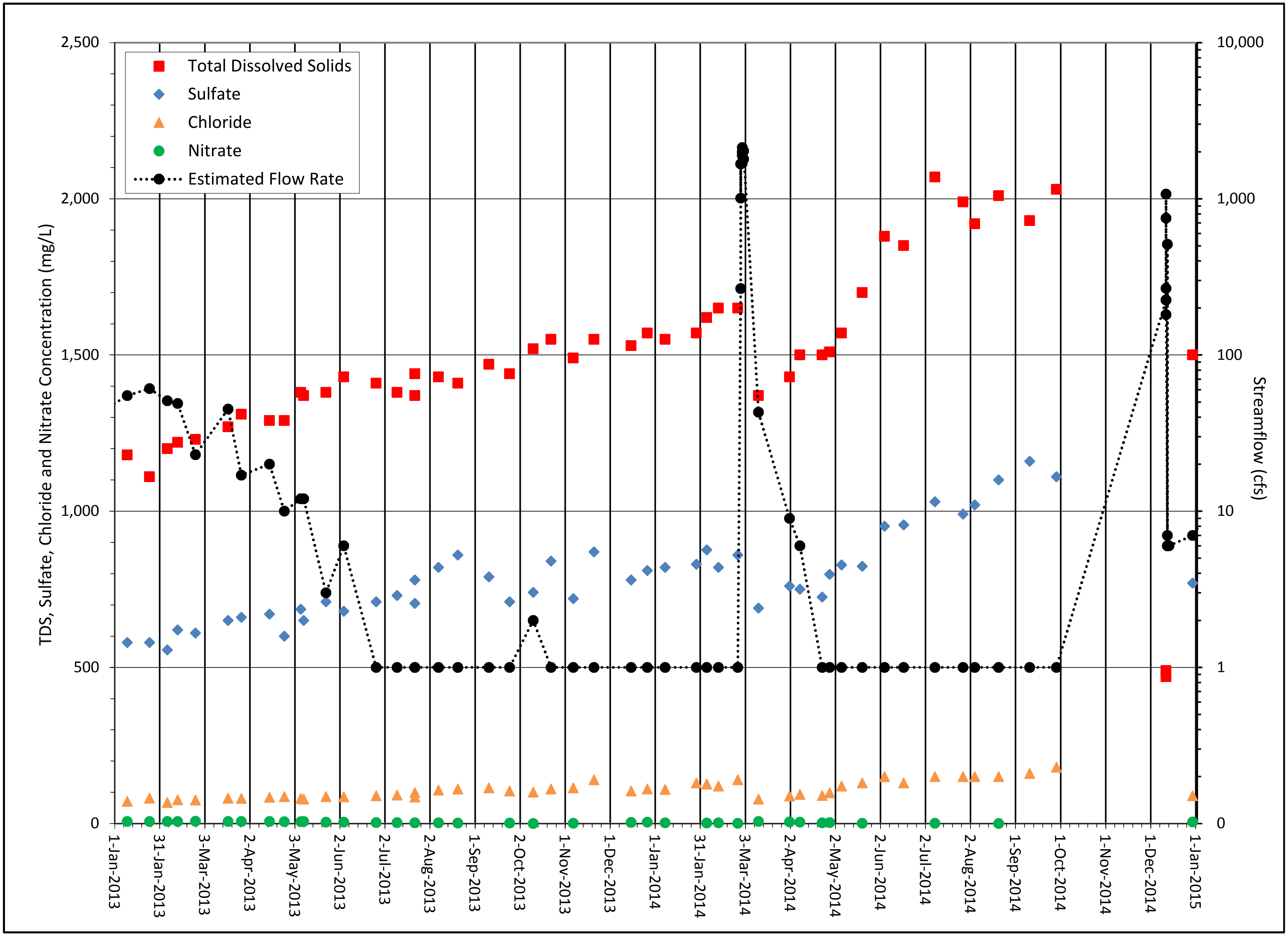

Figure 13. Water Quality and Streamflow in Santa Clara River at the Freeman Diversion, CYs 2013 and 2014

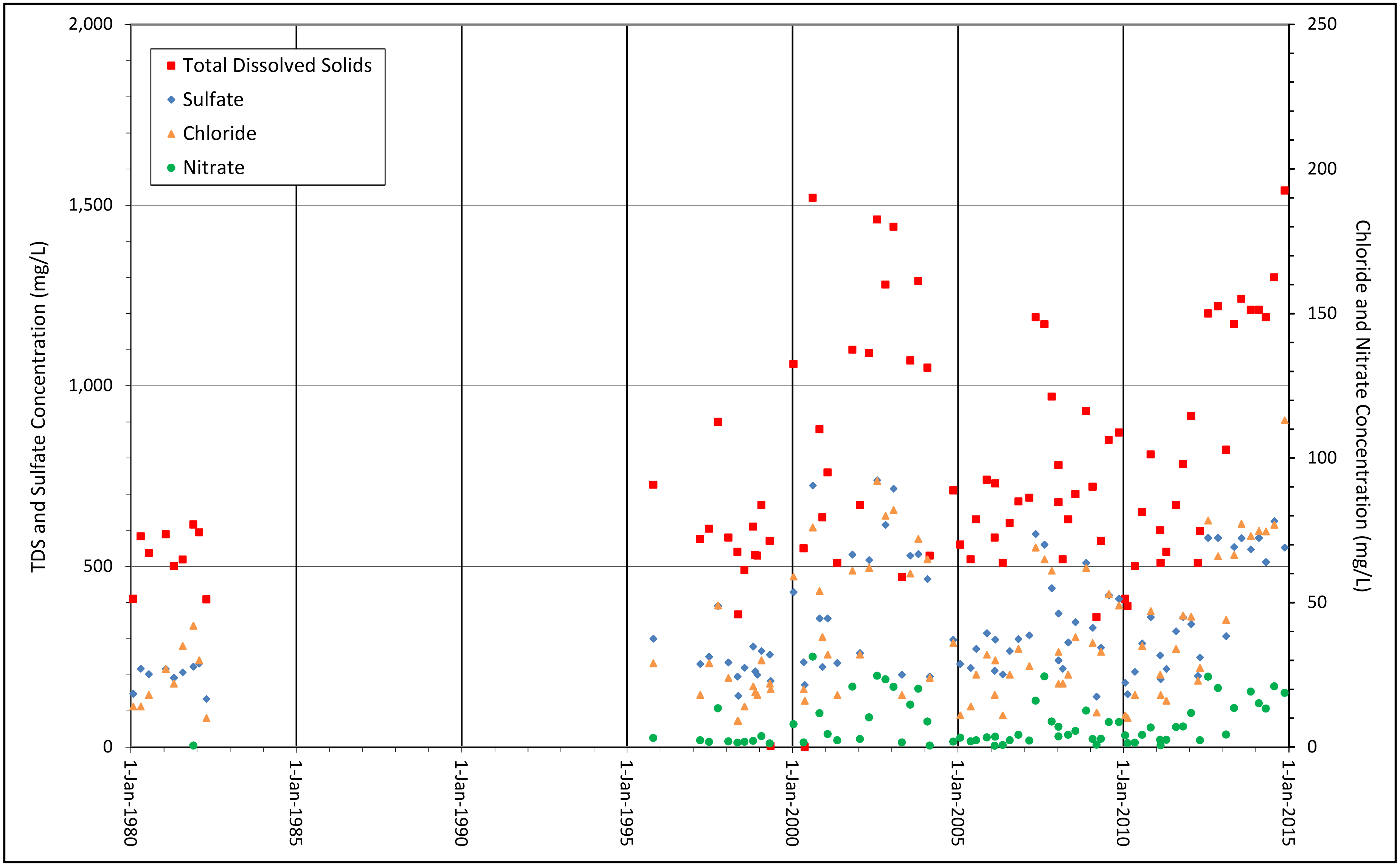

Figure 14. Concentrations of Selected Major Surface Water Quality Parameters in Santa Paula Creek Near Santa Paula, CYs 1980 through 2014

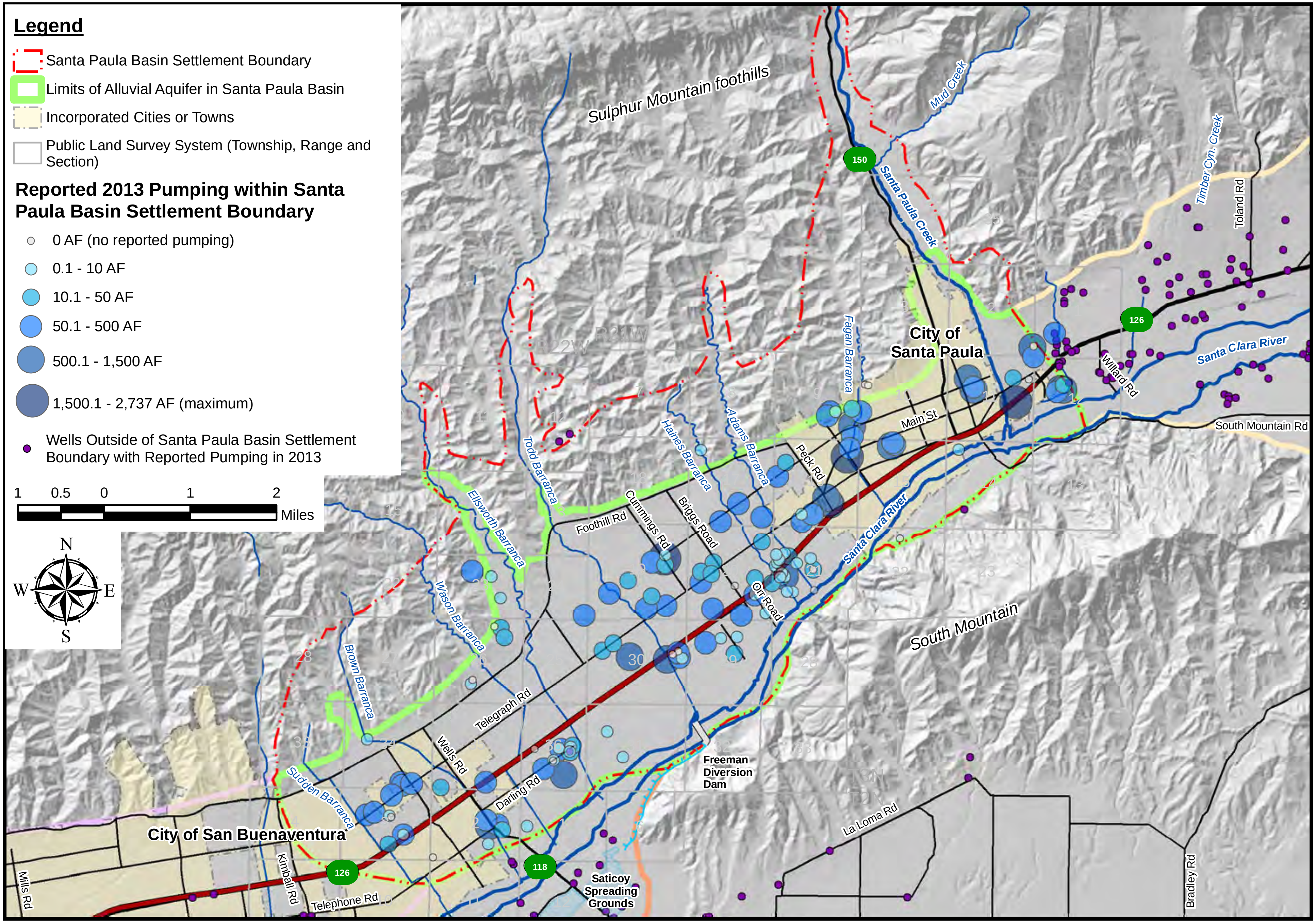

Figure 15. Santa Paula Basin Groundwater Extractions by Well, CY 2013

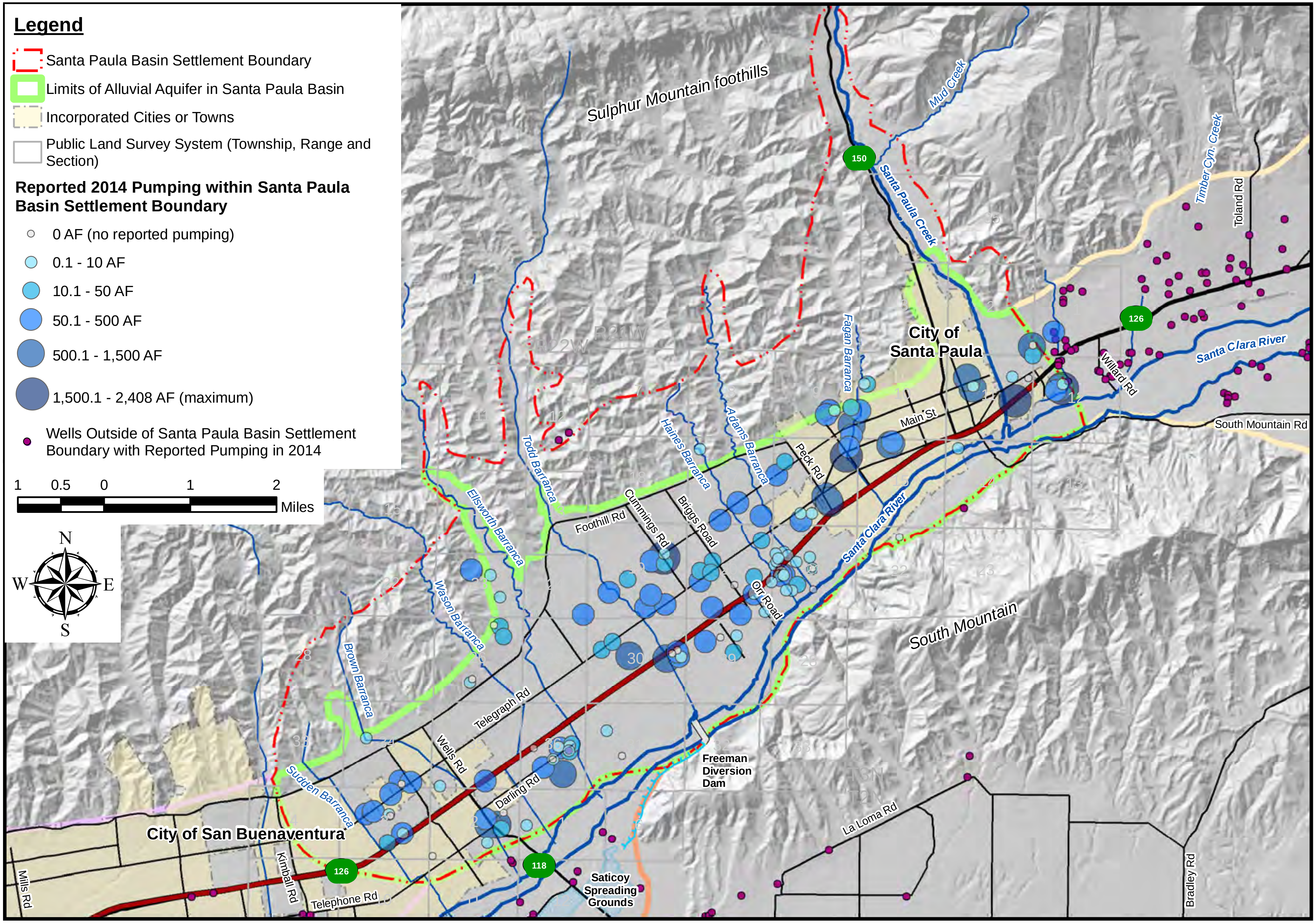

Figure 16. Santa Paula Basin Groundwater Extractions by Well, CY 2014

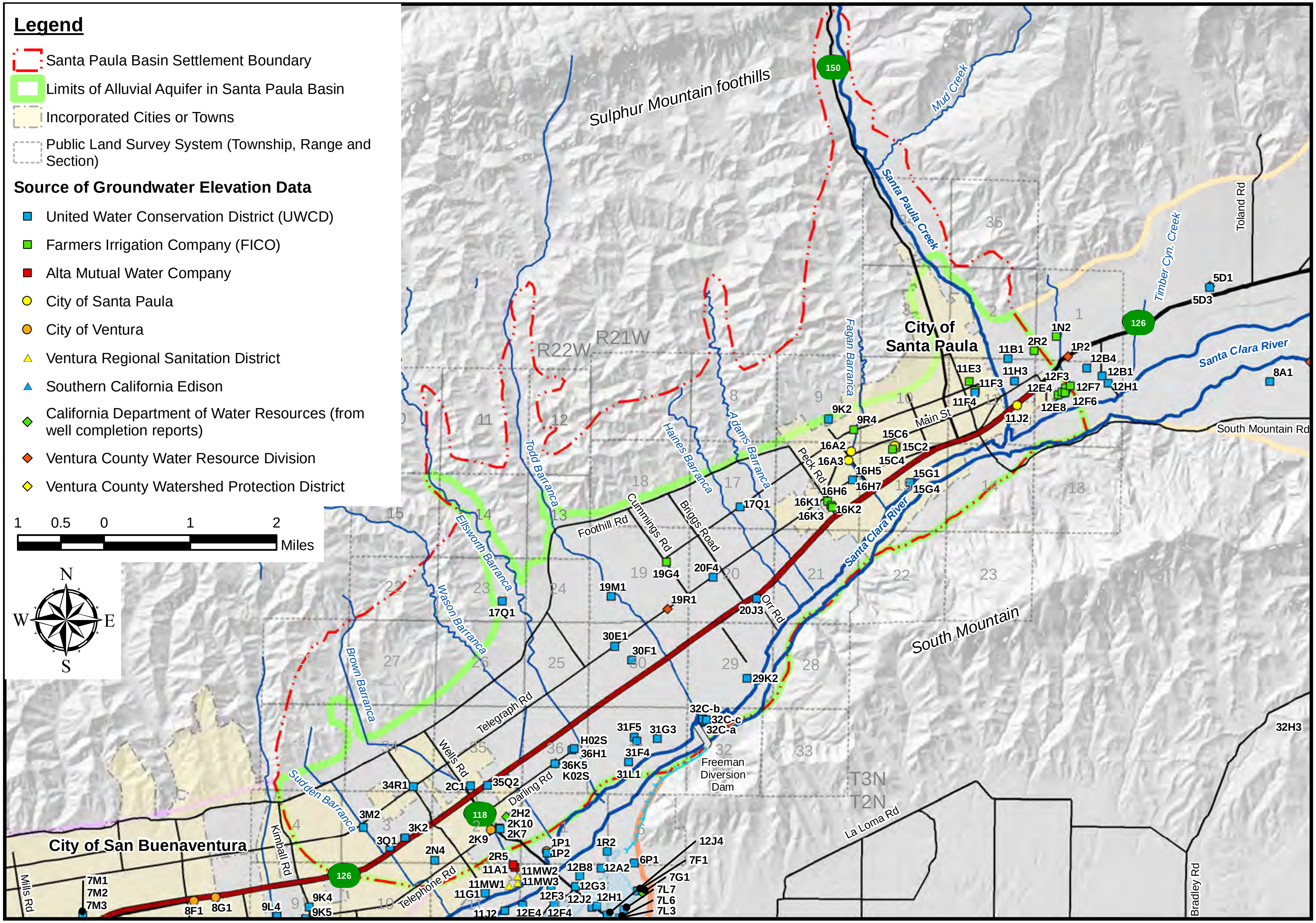

Figure 17. Locations of Wells used to Monitor Groundwater Levels in Santa Paula Basin, CYs 2013 and 2014

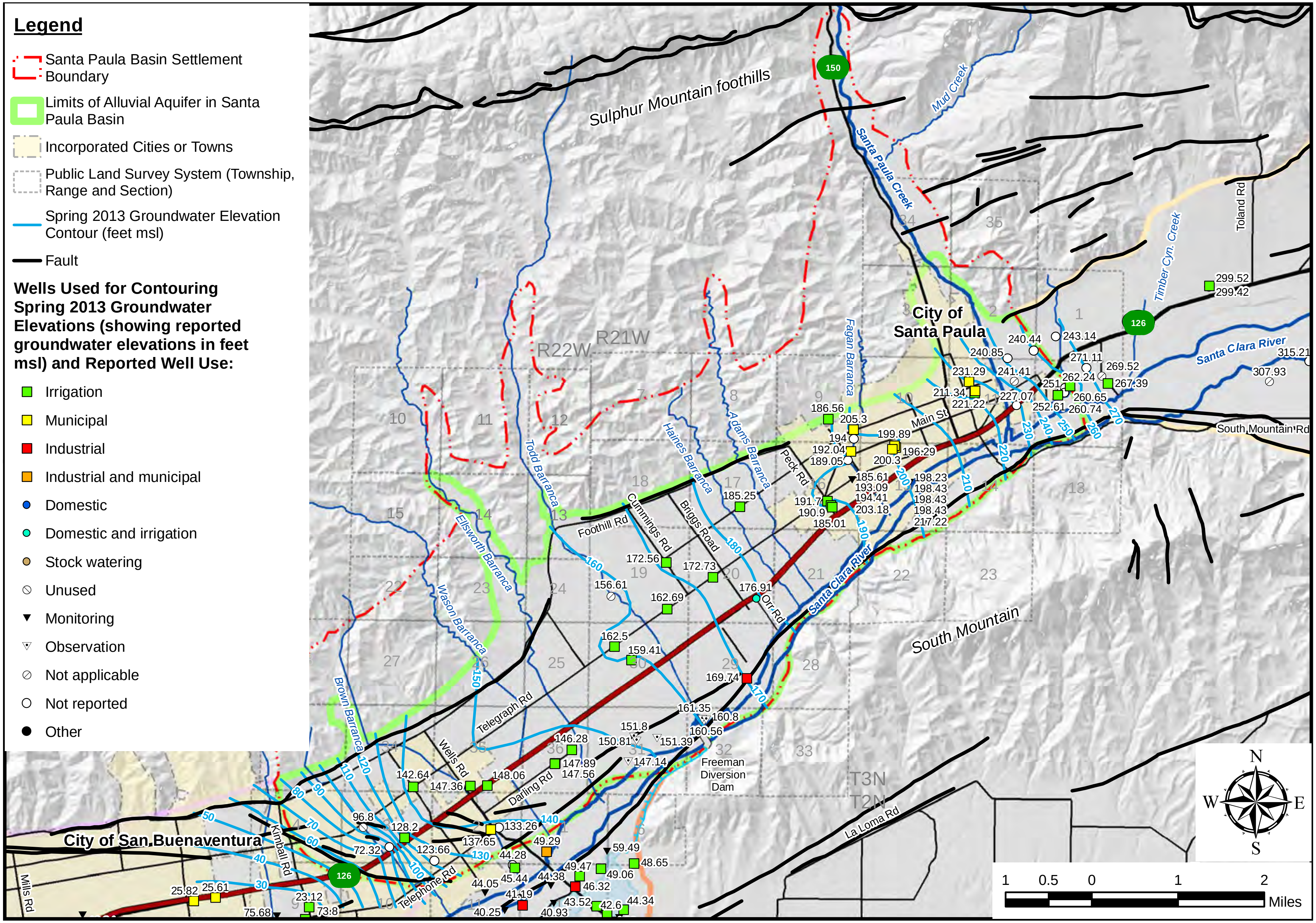

Figure 18. Santa Paula Basin Groundwater Elevation Contours, Spring 2013

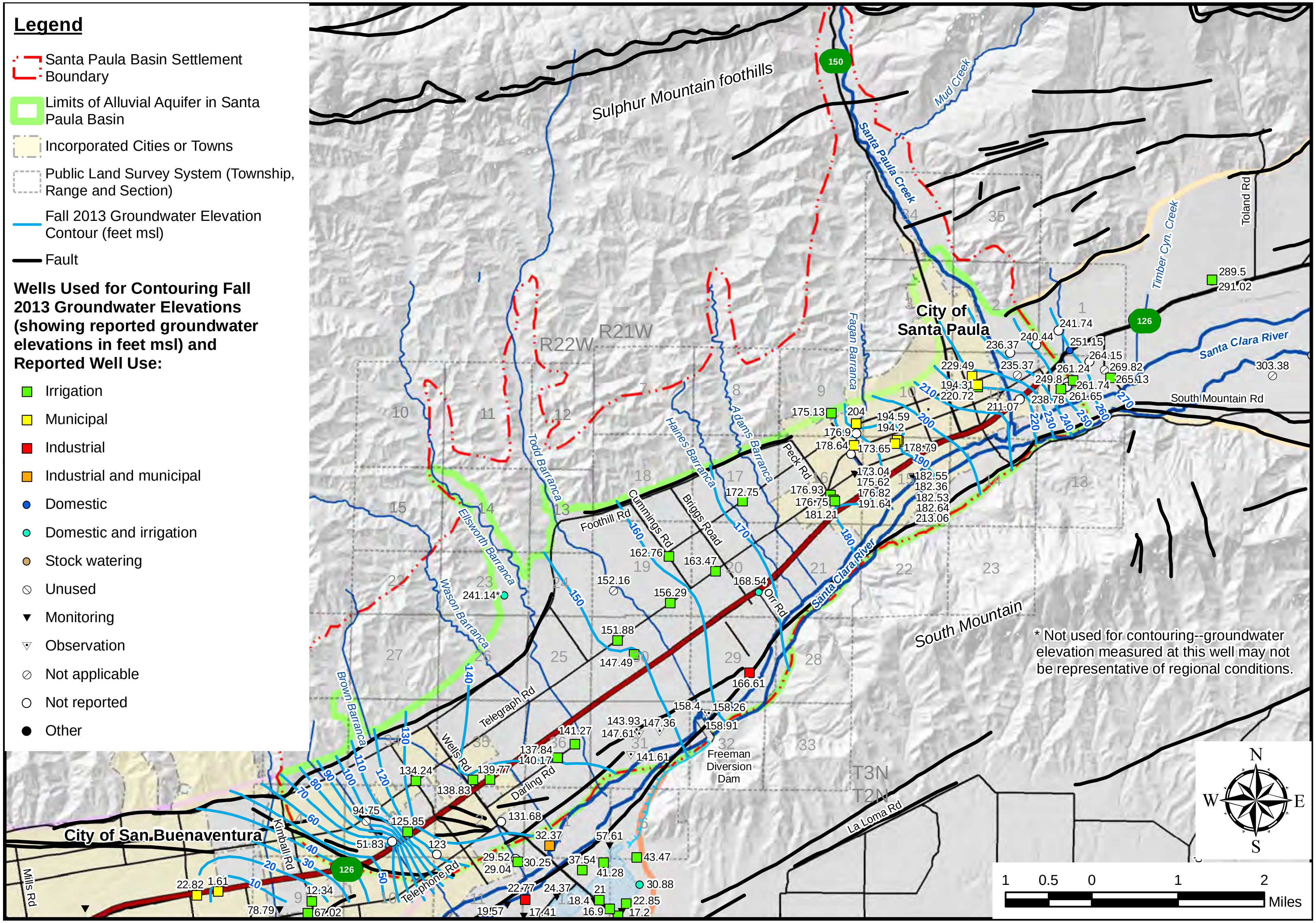

Figure 19. Santa Paula Basin Groundwater Elevation Contours, Fall 2013

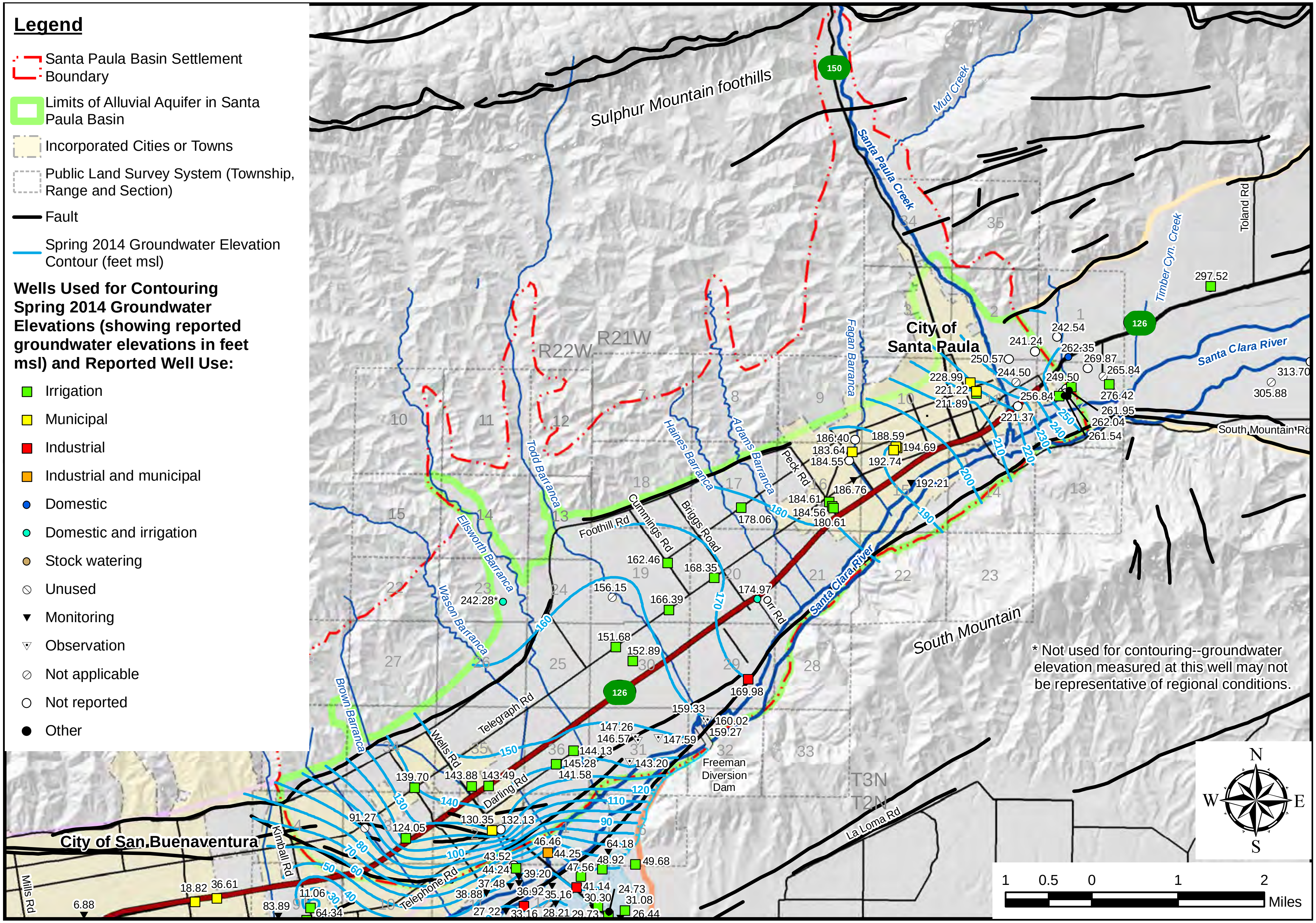

Figure 20. Santa Paula Basin Groundwater Elevation Contours, Spring 2014

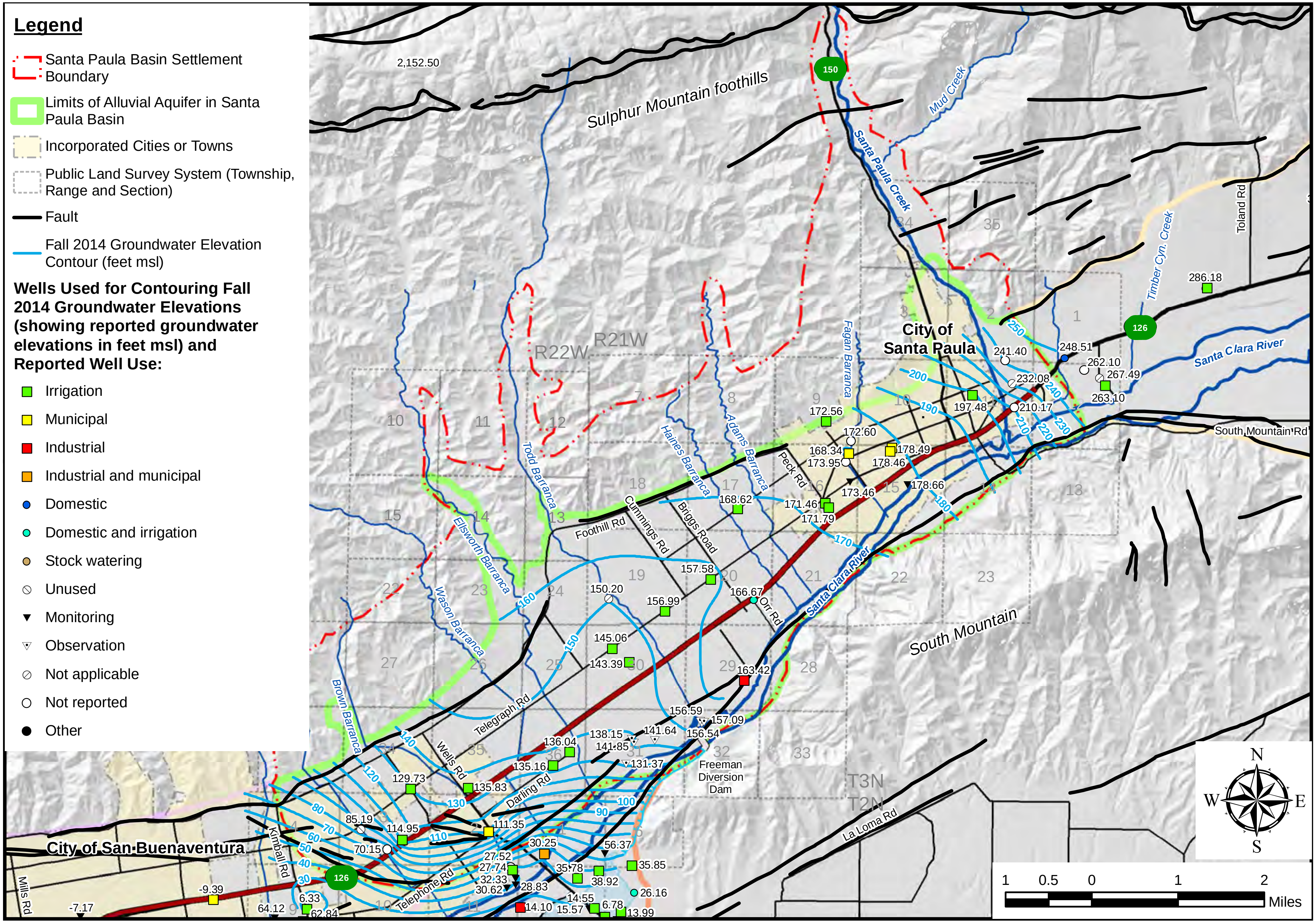

Figure 21. Santa Paula Basin Groundwater Elevation Contours, Fall 2014

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APPENDIX A - Historical Precipitation and Streamflow Tables

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APPENDIX A - Table A-1. Santa Paula - UWCD Historical Precipitation

WATER YEAR (WY)	MONTHLY PRECIPITATION (inches) OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	WY PRECIPITATION (inches)	CUMULATIVE DEPARTURE (inches)	CALENDAR YEAR PRECIPITATION (inches)
1890	6.30	1.81	16.55	5.40	2.00	0.47	0.05	0.00	0.00	0.00	0.00	0.62	33.20	15.93	11.46
1891	0.00	0.34	2.58	0.48	8.73	1.40	0.82	0.13	0.00	0.00	0.00	0.19	14.67	13.33	13.27
1892	0.00	0.00	1.52	0.70	3.99	3.24	0.54	1.80	0.00	0.00	0.00	0.00	11.79	7.85	24.31
1893	0.56	7.30	6.18	2.30	2.81	6.81	0.40	0.00	0.00	0.00	0.00	0.00	26.36	16.94	17.03
1894	0.87	0.20	3.64	1.04	0.55	0.42	0.23	0.46	0.00	0.10	0.00	0.98	8.49	8.16	5.05
1895	0.14	0.18	0.95	5.42	0.00	4.77	0.00	0.00	0.00	0.00	0.00	0.00	11.46	2.35	10.19
1896	0.00	0.00	0.00	5.03	4.98	3.24	0.00	0.00	0.00	0.00	0.00	0.45	13.70	-1.22	13.70
1897	0.00	0.00	0.00	5.03	4.98	3.24	0.00	0.00	0.00	0.00	0.00	0.45	13.70	-4.79	14.87
1898	1.17	0.00	0.00	0.92	0.70	1.55	0.00	1.22	0.00	0.00	0.00	0.86	6.42	-15.64	5.59
1899	0.08	0.00	0.26	3.44	0.00	2.41	0.35	0.00	0.00	0.00	0.00	0.00	6.54	-26.37	10.87
1900	1.84	1.17	1.66	1.67	0.00	1.36	0.38	1.49	0.00	0.00	0.00	0.00	9.57	-34.07	9.61
1901	0.00	4.71	0.00	4.57	4.34	0.42	0.91	1.14	0.00	0.00	0.00	0.71	16.80	-34.54	14.87
1902	2.24	0.54	0.00	1.30	4.49	3.31	0.50	0.00	0.00	0.00	0.00	0.00	12.38	-39.43	15.38
1903	0.00	4.75	1.03	1.66	1.98	6.23	2.65	0.10	0.00	0.00	0.00	0.00	18.40	-38.30	12.62
1904	0.00	0.00	0.00	0.31	3.83	5.94	1.46	0.00	0.00	0.00	0.00	1.82	13.36	-42.21	15.92
1905	0.38	0.00	2.18	2.54	8.02	5.50	0.67	3.15	0.00	0.00	0.00	0.00	22.44	-37.04	21.38
1906	0.00	1.50	0.00	3.35	3.60	9.03	0.40	0.05	0.00	0.00	0.00	0.00	17.93	-36.38	22.68
1907	0.00	0.00	6.25	13.23	1.95	6.22	0.18	0.00	0.00	0.00	0.00	0.00	27.83	-25.82	24.88
1908	2.72	0.00	0.58	5.73	4.56	0.05	0.94	0.00	0.00	0.00	0.00	0.55	15.13	-27.96	15.48
1909	0.15	2.40	1.10	10.88	5.94	4.88	0.00	0.00	0.00	0.00	0.00	0.00	25.35	-19.88	30.46
1910	0.13	1.36	7.27	2.82	0.00	2.36	0.00	0.00	0.00	0.00	0.00	2.78	16.72	-20.43	9.23
1911	0.62	0.33	0.32	9.54	2.88	5.53	0.00	0.00	0.00	0.00	0.00	0.07	19.29	-18.41	19.23
1912	0.00	0.00	1.21	0.18	0.00	7.17	1.67	0.84	0.00	0.00	0.00	0.00	11.07	-24.61	10.53
1913	0.56	0.11	0.00	3.79	9.51	0.00	0.47	0.00	0.47	0.00	0.50	0.00	15.41	-26.47	20.16
1914	0.00	3.09	2.33	12.73	8.40	0.66	0.76	0.51	0.00	0.00	0.00	0.00	28.48	-15.27	27.67
1915	0.15	0.13	4.33	5.38	9.30	0.98	1.16	1.69	0.00	0.00	0.00	0.00	23.12	-9.42	21.79
1916	0.00	0.68	2.60	18.17	1.07	0.53	0.00	0.00	0.00	0.00	0.00	1.44	24.49	-2.20	30.00
1917	2.36	0.00	6.43	3.24	7.24	0.12	0.37	0.19	0.00	0.00	0.00	0.00	19.95	0.48	11.46
1918	0.00	0.30	0.00	0.26	13.00	6.28	0.00	0.00	0.00	0.26	0.00	1.78	21.88	5.09	25.76
1919	0.00	3.01	1.17	1.33	1.89	2.65	0.00	0.22	0.00	0.00	0.00	1.71	11.98	-0.20	10.43
1920	0.33	0.12	2.18	0.41	2.93	5.74	0.82	0.00	0.00	0.00	0.00	0.00	12.53	-4.94	13.39
1921	0.30	1.86	1.33	6.60	1.02	1.99	0.23	3.95	0.00	0.00	0.00	0.17	17.45	-4.76	24.96
1922	0.34	0.00	10.66	4.55	3.43	1.49	0.00	0.46	0.00	0.00	0.00	0.00	20.93	-1.10	19.00
1923	0.43	1.63	7.01	1.86	1.03	0.00	2.97	0.00	0.00	0.00	0.00	0.14	15.07	-3.30	6.76
1924	0.72	0.00	0.04	1.94	0.18	3.46	1.23	0.00	0.00	0.00	0.00	0.00	7.57	-13.00	10.03
1925	1.02	1.12	1.08	0.31	1.25	2.25	2.02	0.88	0.08	0.00	0.00	0.00	10.01	-20.26	10.72
1926	0.81	0.89	2.23	2.04	4.42	0.12	5.72	0.16	0.02	0.00	0.00	0.00	16.41	-21.12	19.38
1927	0.13	5.49	1.28	1.89	10.66	2.34	1.53	0.00	0.00	0.00	0.00	0.00	23.32	-15.07	22.17
1928	1.84	1.27	2.64	0.00	2.27	2.25	0.29	0.59	0.00	0.00	0.00	0.00	11.15	-21.19	10.79
1929	0.06	2.04	3.29	2.47	2.10	1.51	1.89	0.00	0.12	0.00	0.00	0.69	14.17	-24.29	8.78
1930	0.00	0.00	0.00	6.58	0.92	3.14	0.17	0.76	0.00	0.00	0.00	0.02	11.59	-29.97	14.29
1931	0.02	2.68	0.00	3.94	4.09	0.00	2.00	1.25	0.00	0.00	0.21	0.00	14.19	-33.05	25.40
1932	0.05	3.13	10.73	5.78	0.09	0.54	0.02	0.05	0.00	0.00	0.00	0.15	20.54	-29.78	7.77
1933	0.24	0.00	0.90	8.84	0.00	0.23	0.32	0.13	0.40	0.00	0.09	0.00	11.15	-35.90	17.31
1934	0.44	0.00	6.86	3.19	3.85	0.00	0.00	0.00	0.00	0.52	0.00	0.08	14.94	-38.23	17.18
1935	1.62	3.16	4.76	3.97	0.82	3.31	3.50	0.00	0.00	0.00	0.25	0.00	21.39	-34.11	15.08
1936	0.37	1.12	1.74	0.17	10.32	1.91	0.69	0.00	0.00	0.00	0.00	0.00	16.32	-35.06	23.60
1937	4.16	0.00	6.35	3.24	7.93	4.48	0.12	0.21	0.00	0.00	0.00	0.00	26.49	-25.84	20.90
1938	0.00	0.00	4.92	0.87	9.49	11.17	1.23	0.09	0.00	0.00	0.00	0.25	28.02	-15.09	30.09
1939	0.00	0.00	6.99	2.95	1.33	2.29	0.53	0.00	0.00	0.00	0.00	1.59	15.68	-16.68	10.22
1940	0.00	0.31	1.22	3.57	5.24	0.73	2.22	0.00	0.00	0.00	0.00	0.00	13.29	-20.66	21.02
1941	1.80	0.15	7.31	5.97	10.52	8.70	3.66	0.00	0.00	0.00	0.00	0.00	38.11	0.18	36.80
1942	1.01	0.44	6.50	0.47	0.54	1.91	3.32	0.00	0.00	0.00	0.00	0.00	14.19	-2.90	8.50
1943	1.07	0.19	1.00	16.53	2.96	6.42	0.81	0.00	0.00	0.00	0.00	0.00	28.98	8.81	34.96
1944	0.14	0.20	7.90	1.44	10.02	3.49	1.18	0.00	0.00	0.00	0.00	0.00	24.37	15.91	20.28
1945	0.00	3.13	1.02	0.02	5.69	5.27	0.00	0.00	0.00	0.00	0.00	0.00	15.13	13.77	16.79
1946	1.00	0.26	4.55	0.25	1.45	3.59	0.22	0.00	0.00	0.00	0.00	0.00	11.32	7.82	16.83
1947	0.45	7.21	3.66	0.46	0.29	0.62	0.08	0.06	0.03	0.00	0.43	0.00	13.29	3.84	3.30
1948	0.05	0.00	1.28	0.00	1.22	3.83	1.79	0.06	0.04	0.00	0.00	0.00	8.27	-5.16	10.18
1949	0.00	0.00	3.24	2.39	1.43	1.54	0.07	1.06	0.06	0.00	0.00	0.00	9.79	-12.64	12.06
1950	0.00	1.18	4.33	3.17	2.59	0.93	1.11	0.00	0.00	0.02	0.00	0.24	13.57	-16.34	9.61
1951	0.45	0.94	0.16	2.53	1.32	0.86	1.89	0.00	0.00	0.00	0.00	0.00	8.15	-25.46	14.92

APPENDIX A - Table A-1. Santa Paula - UWCD Historical Precipitation

WATER YEAR (WY)	MONTHLY PRECIPITATION (inches)												WY PRECIPITATION (inches)	CUMULATIVE DEPARTURE (inches)	CALENDAR YEAR PRECIPITATION (inches)
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP			
1952	0.88	2.47	4.97	12.29	0.10	9.52	1.68	0.00	0.00	0.00	0.00	0.00	31.91	-10.82	31.27
1953	0.00	3.38	4.30	1.33	0.00	0.55	1.26	0.00	0.00	0.00	0.00	0.00	10.82	-17.27	5.34
1954	0.00	2.13	0.07	4.85	3.38	3.56	0.38	0.00	0.00	0.00	0.00	0.00	14.37	-20.17	14.21
1955	0.00	0.93	1.11	5.25	1.56	0.33	2.24	1.94	0.00	0.00	0.02	0.00	13.38	-24.06	15.84
1956	0.00	1.38	3.12	6.98	0.72	0.00	2.18	0.95	0.00	0.00	0.00	0.00	15.33	-26.00	11.09
1957	0.01	0.00	0.25	5.75	1.88	2.07	1.17	0.62	0.16	0.00	0.00	0.00	11.91	-31.36	19.05
1958	2.48	0.53	4.39	2.82	7.27	8.14	5.48	0.00	0.00	0.00	0.00	0.26	31.37	-17.26	24.09
1959	0.05	0.07	0.00	2.07	3.91	0.00	0.55	0.00	0.00	0.00	0.00	0.02	6.67	-27.86	8.03
1960	0.09	0.00	1.39	3.95	2.80	0.50	2.70	0.00	0.00	0.00	0.00	0.00	11.43	-33.70	14.75
1961	0.00	4.27	0.53	1.24	0.00	0.49	0.02	0.00	0.00	0.00	0.03	0.04	6.62	-44.35	6.45
1962	0.00	3.57	1.06	2.46	17.26	1.27	0.00	0.07	0.01	0.00	0.00	0.00	25.70	-35.92	21.42
1963	0.31	0.00	0.04	0.69	8.04	0.00	2.47	0.11	0.49	0.00	0.17	1.37	13.69	-39.50	17.18
1964	0.46	3.30	0.08	2.68	0.00	2.00	0.76	0.02	0.11	0.00	0.01	0.00	9.42	-47.36	12.09
1965	0.66	1.30	4.55	0.54	0.07	1.08	4.94	0.00	0.01	0.02	0.11	0.18	13.46	-51.17	21.51
1966	0.00	9.60	4.96	1.52	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.09	17.24	-51.20	12.76
1967	0.20	3.62	6.26	4.58	0.24	2.24	5.02	0.04	0.00	0.00	0.00	0.32	22.52	-45.95	20.04
1968	0.00	6.39	1.21	0.99	1.24	3.47	0.90	0.03	0.00	0.00	0.19	0.00	14.42	-48.80	9.78
1969	0.80	0.68	1.48	17.95	7.75	0.85	0.96	0.01	0.00	0.09	0.00	0.01	30.58	-35.49	29.49
1970	0.00	1.79	0.08	2.34	3.70	6.04	0.00	0.00	0.00	0.00	0.00	0.00	13.95	-38.81	26.49
1971	0.02	7.09	7.30	1.01	0.71	0.69	0.59	0.51	0.00	0.00	0.00	0.01	17.93	-38.15	12.09
1972	0.11	0.43	8.03	0.12	0.26	0.00	0.08	0.04	0.04	0.00	0.00	0.00	9.11	-46.31	6.35
1973	0.31	4.57	0.93	5.89	9.00	2.61	0.00	0.01	0.00	0.00	0.00	0.00	23.32	-40.26	20.81
1974	0.24	1.95	1.11	9.52	0.06	2.93	0.07	0.00	0.00	0.00	0.00	0.00	15.88	-41.65	20.67
1975	1.03	0.10	6.96	0.00	3.86	4.59	1.46	0.00	0.00	0.00	0.00	0.06	18.06	-40.86	10.22
1976	0.18	0.00	0.07	0.00	5.33	1.39	0.72	0.02	0.10	0.01	0.00	4.05	11.87	-46.26	12.49
1977	0.00	0.22	0.65	6.74	0.21	2.04	0.00	2.03	0.00	0.00	0.99	0.00	12.88	-50.65	16.72
1978	0.03	0.15	4.53	8.11	8.54	11.57	2.25	0.00	0.00	0.00	0.00	0.90	36.08	-31.84	35.90
1979	0.18	2.03	2.32	6.37	3.97	7.17	0.00	0.02	0.02	0.00	0.00	0.09	22.17	-26.94	20.74
1980	0.46	0.83	1.81	8.32	12.95	3.82	0.41	0.23	0.00	0.00	0.00	0.02	28.85	-15.36	27.02
1981	0.00	0.00	1.27	2.26	1.58	6.07	0.68	0.02	0.00	0.00	0.00	0.00	11.88	-20.75	13.87
1982	0.50	2.20	0.56	2.55	0.58	5.66	1.93	0.00	0.00	0.00	0.00	0.86	14.84	-23.18	19.22
1983	0.53	4.53	2.58	9.52	5.35	6.76	4.27	0.10	0.00	0.00	0.97	1.02	35.63	-4.82	38.31
1984	2.96	3.36	4.00	0.00	0.00	0.37	0.09	0.00	0.00	0.00	0.04	0.33	11.15	-10.94	7.84
1985	0.22	2.86	3.93	1.84	1.06	1.18	0.00	0.01	0.00	0.02	0.00	0.04	11.16	-17.05	8.91
1986	0.43	3.62	0.71	3.60	8.72	4.59	1.21	0.00	0.00	0.00	0.00	0.65	23.53	-10.79	20.74
1987	0.03	1.64	0.30	1.85	1.02	2.16	0.21	0.02	0.05	0.09	0.00	0.03	7.40	-20.66	12.73
1988	1.48	1.18	4.64	2.63	2.07	0.67	3.22	0.00	0.04	0.00	0.00	0.00	15.93	-22.00	13.98
1989	0	1.08	4.27	0.49	3.50	0.80	0.04	0.22	0.00	0.00	0.00	0.05	10.45	-28.82	5.90
1990	0.27	0.43	0.10	2.74	2.49	0.00	0.44	0.74	0.00	0.00	0.04	0.00	7.25	-38.84	7.03
1991	0.00	0.52	0.06	1.18	2.87	13.64	0.04	0.00	0.03	0.00	0.01	0.05	18.40	-37.71	22.49
1992	0.40	0.17	4.10	2.48	12.51	7.02	0.04	0.01	0.00	0.36	0.00	0.00	27.09	-27.89	29.10
1993	1.65	0.00	5.03	10.62	10.66	3.77	0.00	0.14	0.65	0.00	0.00	0.00	32.52	-12.64	28.59
1994	0.28	0.79	1.68	0.60	6.29	2.98	0.31	0.35	0.00	0.00	0.00	0.11	13.39	-16.52	13.85
1995	0.98	1.05	1.18	19.87	1.34	9.02	0.47	1.04	0.37	0.02	0.00	0.00	35.34	1.55	34.32
1996	0.00	0.15	2.04	1.04	7.85	2.04	0.50	0.28	0.00	0.00	0.00	0.00	13.90	-1.82	23.11
1997	2.47	2.57	6.36	6.67	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.12	18.41	-0.68	16.10
1998	0.00	2.31	6.78	2.79	20.13	3.87	2.03	6.04	0.01	0.00	0.00	0.81	44.77	26.82	37.13
1999	0.00	0.83	0.62	2.44	1.02	2.65	2.56	0.00	0.38	0.00	0.00	0.17	10.67	20.22	9.98
2000	0.00	0.76	0	1.92	6.76	2.56	2.61	0.00	0.00	0.00	0.00	0.15	14.76	17.71	15.48
2001	1.47	0.00	0.01	7.02	9.21	7.10	1.73	0.00	0.00	0.00	0.00	0.00	26.54	26.97	30.06
2002	0.27	3.21	1.52	1.02	0.38	0.37	0.07	0.09	0.00	0.00	0.00	0.05	6.98	16.68	10.48
2003	0.00	5.22	3.28	0.00	4.75	3.53	1.77	1.30	0.09	0.00	0.00	0.00	19.94	19.35	16.02
2004	0.00	2.73	1.85	0.64	6.78	0.49	0.33	0.00	0.00	0.00	0.00	0.00	12.82	14.90	18.63
2005	4.74	0.03	5.62	15.85	10.56	2.53	0.80	0.25	0.00	0.00	0.00	0.16	40.54	38.17	32.37
2006	1.00	0.70	0.52	3.41	3.58	4.00	3.87	1.17	0.00	0.00	0.00	0.00	18.25	39.15	17.29
2007	0.27	0.10	0.89	2.04	0.79	0.07	0.84	0.00	0.00	0.00	0.00	0.30	5.30	27.18	7.90
2008	0.26	0.15	3.45	10.78	1.85	0.00	0.05	0.04	0.00	0.00	0.00	0.00	16.58	26.49	17.43
2009	0.10	2.34	2.27	0.81	5.45	0.57	0.12	0.00	0.01	0.00	0.00	0.00	11.67	20.89	13.07
2010	2.66	0.00	3.45	7.29	3.51	0.41	1.87	0.13	0.00	0.01	0.00	0.00	19.33	22.95	26.01
2011	2.11	1.07	9.61	0.30	3.64	6.03	0.00	0.89	0.14	0.00	0.00	0.01	23.80	29.48	14.62
2012	1.58	1.87	0.16	1.35	0.03	2.93	2.20	0.00	0.00	0.00	0.05	0.01	10.18	22.39	10.22
2013	0.00	1.60	2.05	1.25	0.09	0.90	0.02	0.11	0.00	0.01	0.00	0.00	6.03	11.15	3.28

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WATER YEAR (WY)	MONTHLY PRECIPITATION (inches)												WY PRECIPITATION (inches)	CUMULATIVE DEPARTURE (inches)	CALENDAR YEAR PRECIPITATION (inches)
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP			
2014	0.02	0.56	0.32	0.00	3.32	1.83	0.03	0.03	0.00	0.00	0.01	0.00	6.12	0.00	9.83
2015	0.00	0.85	3.76	---	---	---	---	---	---	---	---	---	---	---	---
AVERAGE:	0.59	1.47	2.78	3.89	3.90	2.95	1.03	0.34	0.03	0.01	0.03	0.24	17.27	---	17.11
MEDIAN:	0.18	0.81	1.71	2.53	2.87	2.25	0.53	0.01	0.00	0.00	0.00	0.00	14.94	---	15.48

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APPENDIX A - Table A-2. Santa Clara River at Freeman Diversion Historical Annual Streamflow

WATER YEAR	ACRE-FEET	WATER YEAR	ACRE-FEET	WATER YEAR	ACRE-FEET	WATER YEAR	ACRE-FEET
1956	30,140	**1972**	58,807	**1988**	76,426	**2004**	59,397
1957	18,668	**1973**	265,962	**1989**	26,610	**2005**	1,153,883
1958	352,671	**1974**	123,279	**1990**	10,787	**2006**	246,950
1959	55,462	**1975**	110,294	**1991**	117,639	**2007**	51,065
1960	14,557	**1976**	37,116	**1992**	333,441	**2008**	214,847
1961	6,209	**1977**	28,818	**1993**	963,059	**2009**	74,645
1962	272,542	**1978**	748,780	**1994**	131,823	**2010**	143,938
1963	28,495	**1979**	297,212	**1995**	908,663	**2011**	257,205
1964	15,345	**1980**	523,154	**1996**	125,982	**2012**	57,761
1965	23,696	**1981**	108,357	**1997**	166,052	**2013**	22,678
1966	207,602	**1982**	103,255	**1998**	788,007	**2014**	22,553
1967	205,577	**1983**	719,692	**1999**	119,559		
1968	54,656	**1984**	136,205	**2000**	130,933		
1969	982,425	**1985**	54,431	**2001**	251,235		
1970	129,540	**1986**	226,857	**2002**	58,072		
1971	130,717	**1987**	38,796	**2003**	93,844		
						AVERAGE	215,532
						MEDIAN	119,559

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APPENDIX A-Table A-3. Santa Paula Creek Historical Annual Streamflow

WATER YEAR	ACRE-FEET	WATER YEAR	ACRE-FEET	WATER YEAR	ACRE-FEET	WATER YEAR	ACRE-FEET
1928	1,332	**1951**	992	**1974**	11,552	**1997**	18,015
1929	1,801	**1952**	30,882	**1975**	11,506	**1998**	80,799
1930	1,554	**1953**	4,340	**1976**	3,906	**1999**	5,562
1931	3,014	**1954**	5,861	**1977**	2,361	**2000**	8,609
1932	19,958	**1955**	3,012	**1978**	87,150	**2001**	24,461
1933	7,485	**1956**	5,257	**1979**	20,453	**2002**	2,513
1934	11,353	**1957**	3,527	**1980**	34,108	**2003**	8,563
1935	12,830	**1958**	47,074	**1981**	5,818	**2004**	5,054
1936	13,444	**1959**	5,593	**1982**	9,177	**2005**	107,309
1937	31,909	**1960**	2,123	**1983**	70,594	**2006**	22,708
1938	44,310	**1961**	1,254	**1984**	8,017	**2007**	3,305
1939	8,465	**1962**	26,203	**1985**	3,394	**2008**	27,945
1940	5,297	**1963**	3,340	**1986**	20,486	**2009**	4,393
1941	57,682	**1964**	3,026	**1987**	3,179	**2010**	16,342
1942	6,882	**1965**	4,665	**1988**	7,361	**2011**	32,887
1943	39,739	**1966**	28,458	**1989**	2,893	**2012**	4,465
1944	22,425	**1967**	37,423	**1990**	2,485	**2013**	1,165
1945	12,172	**1968**	7,866	**1991**	15,214	**2014**	1,788
1946	11,194	**1969**	112,696	**1992**	33,768		
1947	7,295	**1970**	7,779	**1993**	71,474		
1948	1,715	**1971**	12,795	**1994**	8,351		
1949	1,965	**1972**	4,492	**1995**	63,209		
1950	3,492	**1973**	35,236	**1996**	8,752		
						AVERAGE	18,417
						MEDIAN	8,351

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APPENDIX B - Groundwater Elevation Hydrographs and Map of Index Well Locations

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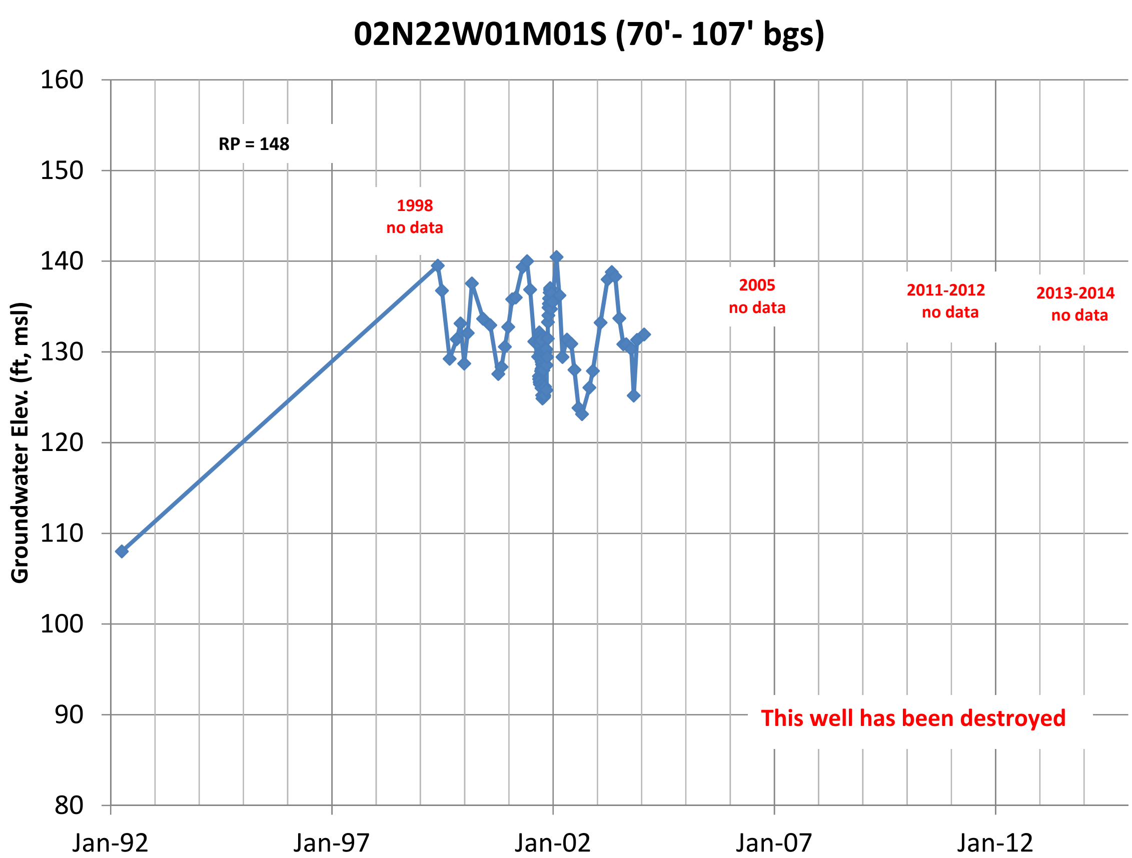
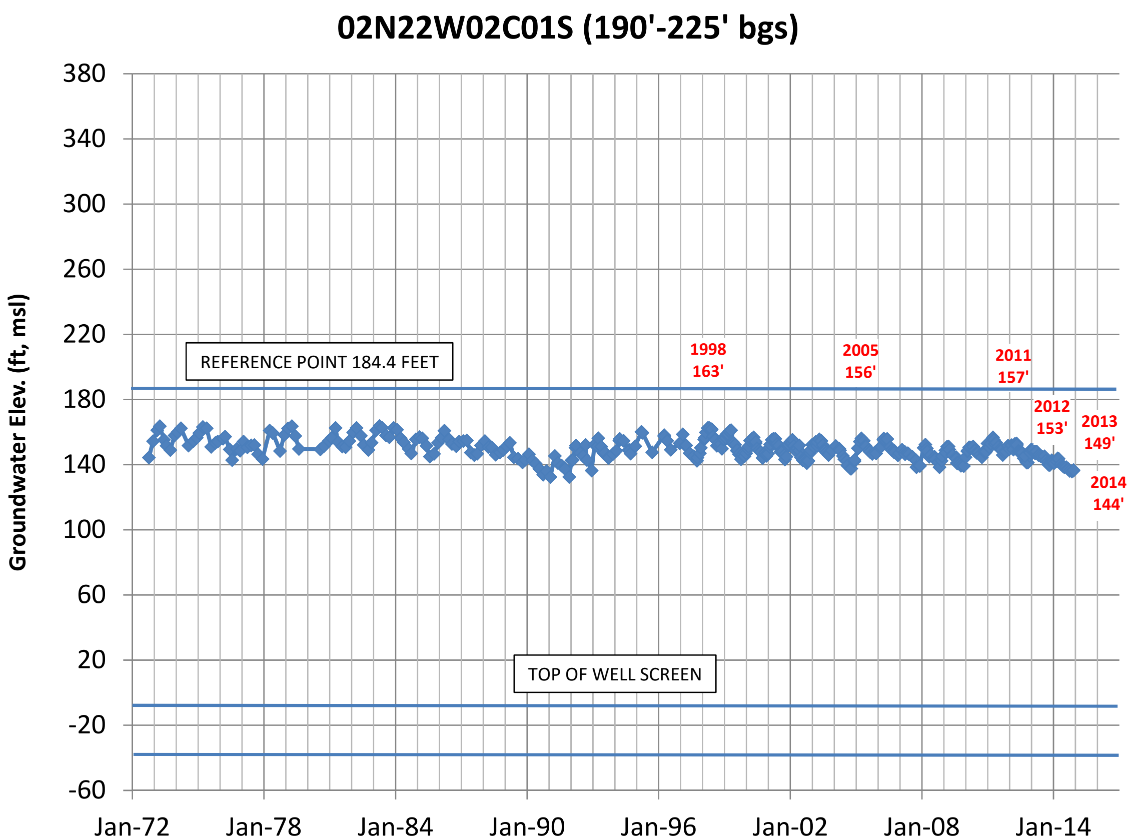


Figure B-1


02N22W02C01S (190'-225' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 184.4 FEET
TOP OF WELL SCREEN
1998
163'
2005
156'
2011
157'
2012
153'
2013
149'
2014
144'

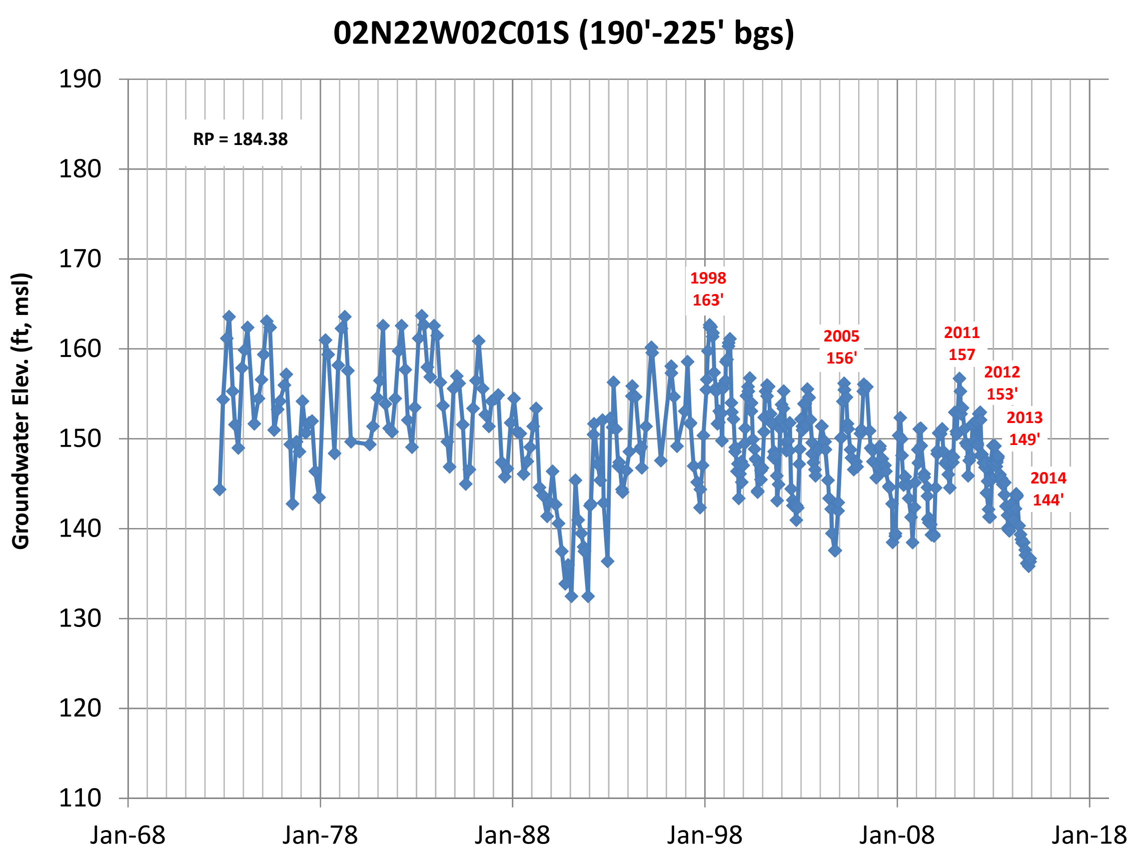
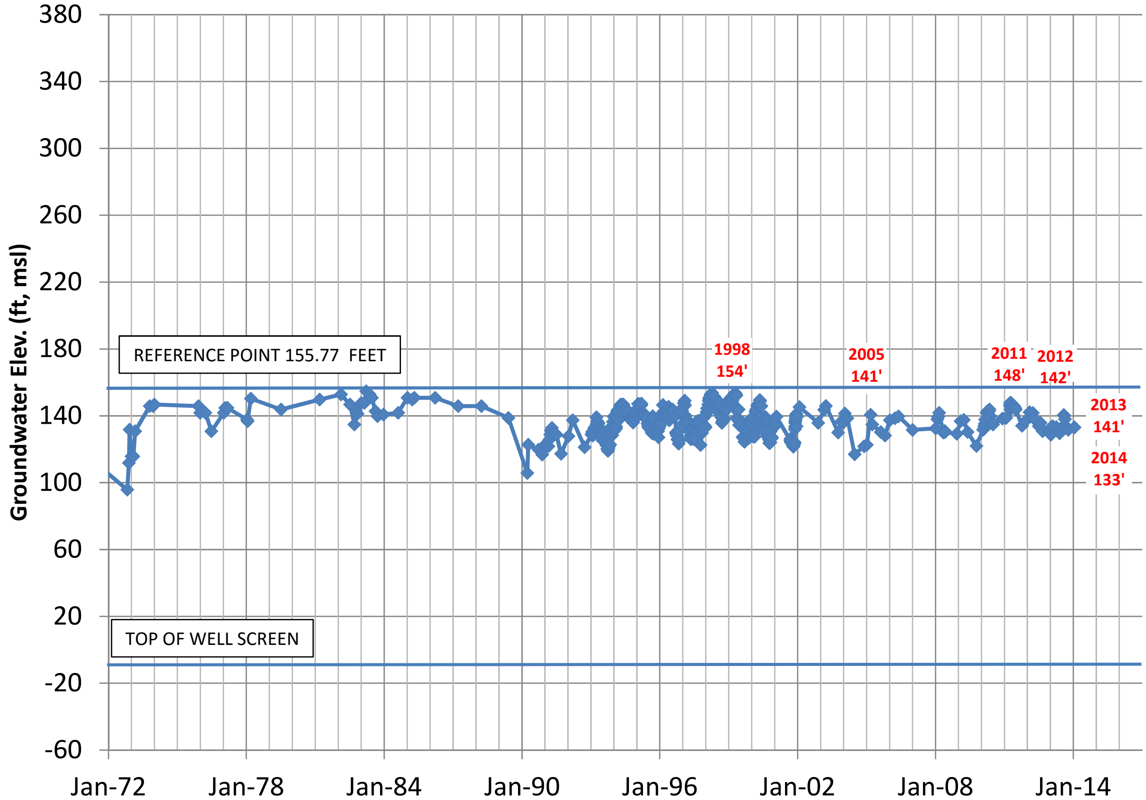

02N22W02C01S (190'-225' bgs)
Groundwater Elev. (ft, msl)
190
180
170
160
150
140
130
120
110
Jan-68
Jan-78
Jan-88
Jan-98
Jan-08
Jan-18
RP = 184.38
1998
163'
2005
156'
2011
157
2012
153'
2013
149'
2014
144'

Figure B-2

02N22W02K07S (168'-698' bgs)



02N22W02K07S (168'-698' bgs)

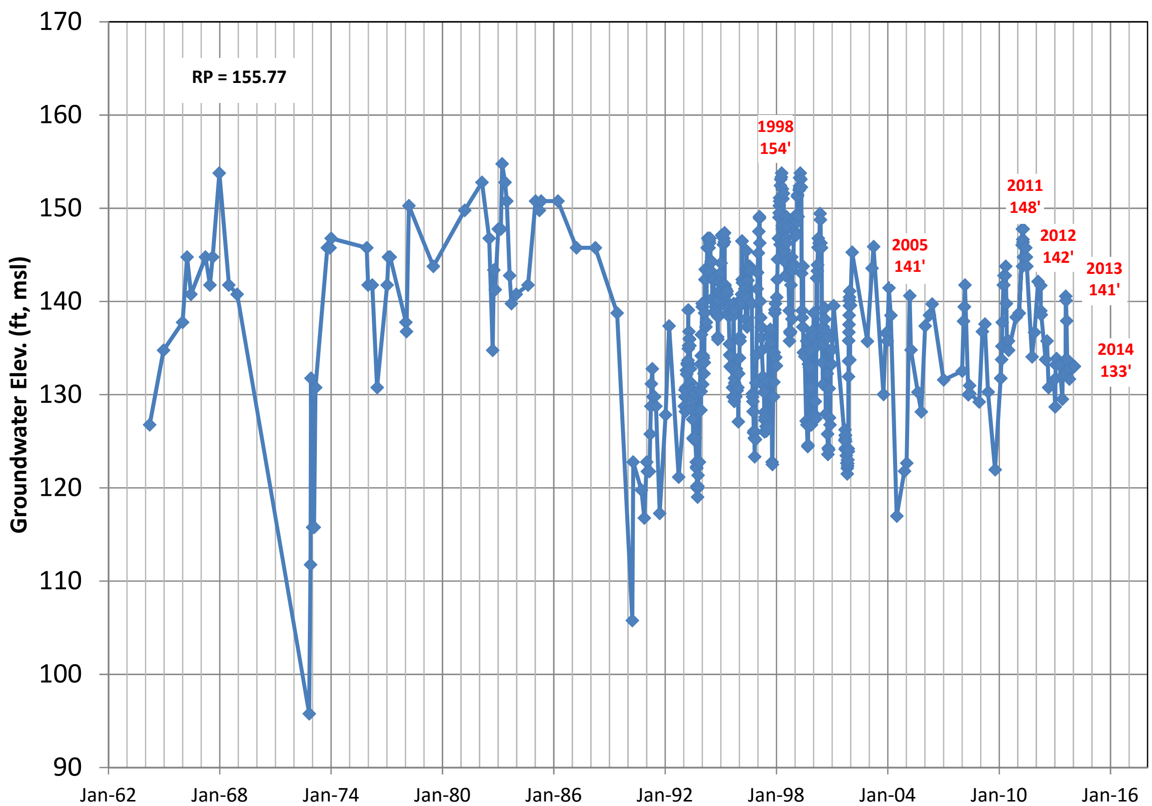
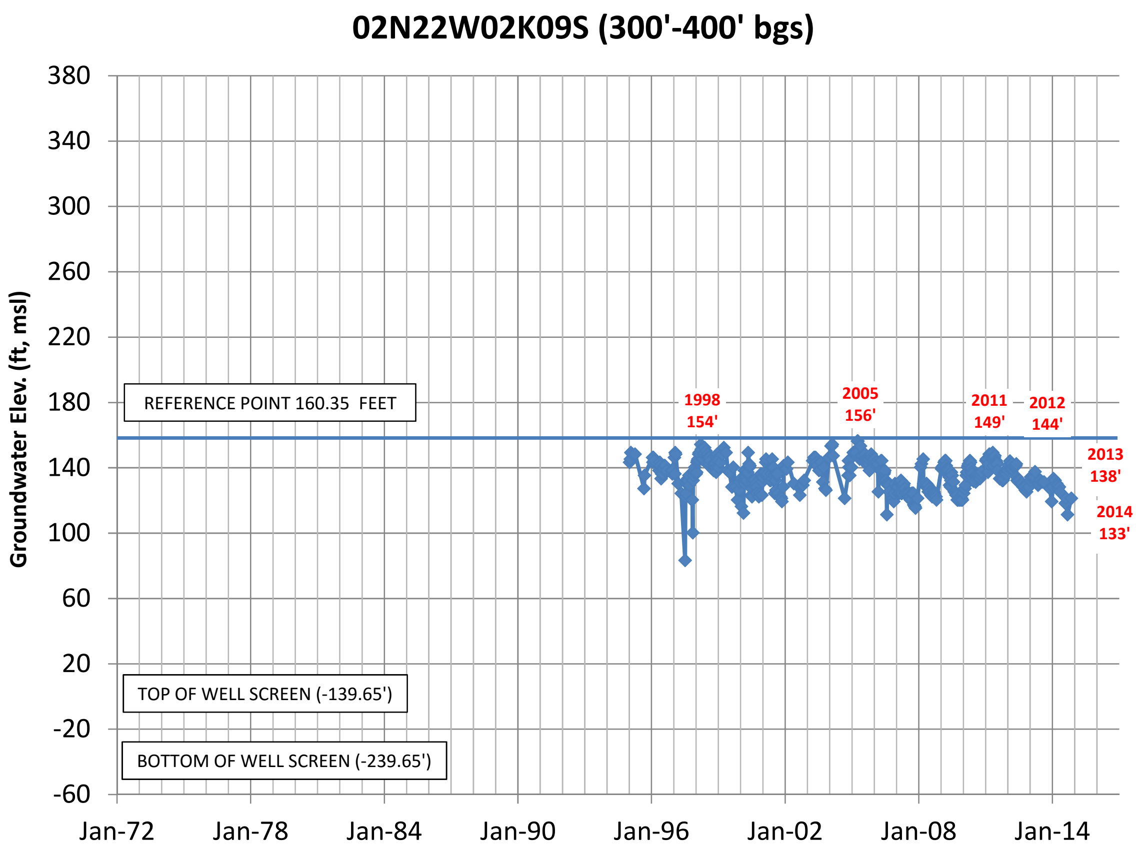


Figure B-3


02N22W02K09S (300'-400' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 160.35 FEET
TOP OF WELL SCREEN (-139.65')
BOTTOM OF WELL SCREEN (-239.65')
1998
154'
2005
156'
2011
149'
2012
144'
2013
138'
2014
133'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

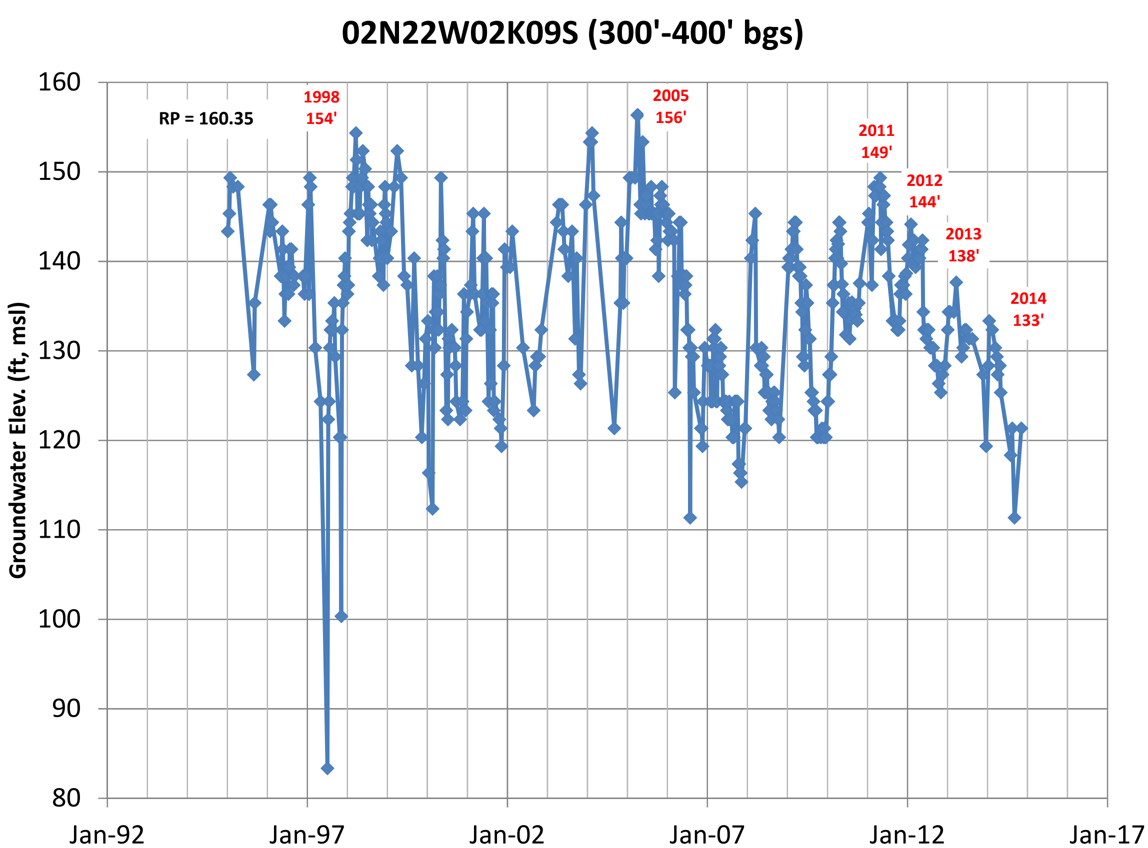
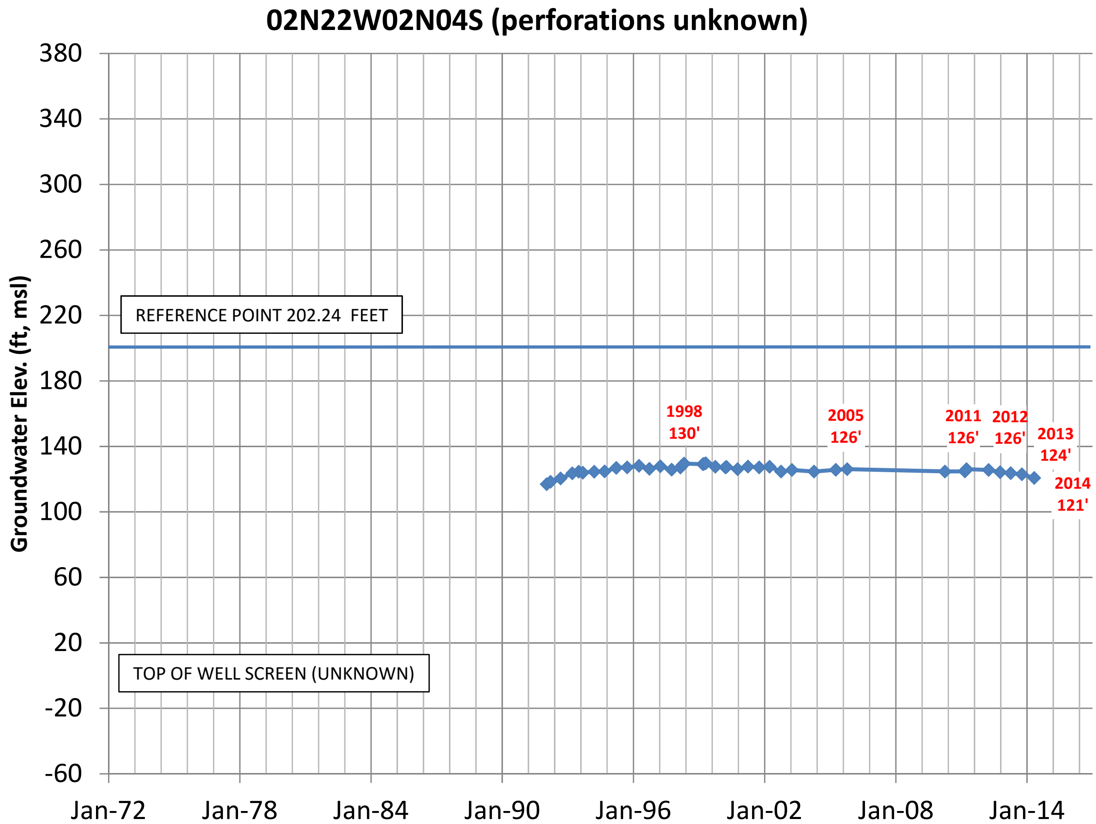

02N22W02K09S (300'-400' bgs)
Groundwater Elev. (ft, msl)
RP = 160.35
1998
154'
2005
156'
2011
149'
2012
144'
2013
138'
2014
133'
160
150
140
130
120
110
100
90
80
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-4


02N22W02N04S (perforations unknown)
Groundwater Elev. (ft, msl)
REFERENCE POINT 202.24 FEET
TOP OF WELL SCREEN (UNKNOWN)
1998 130'
2005 126'
2011 126'
2012 126'
2013 124'
2014 121'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

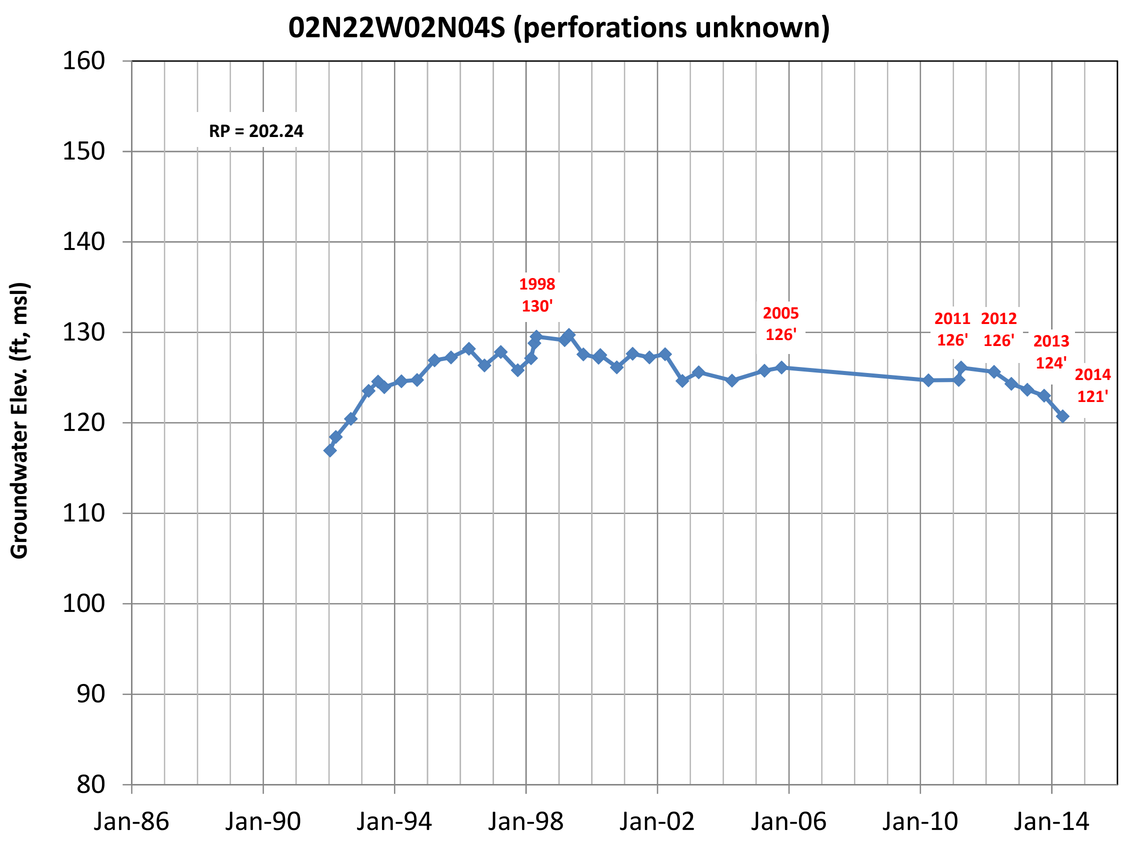

02N22W02N04S (perforations unknown)
Groundwater Elev. (ft, msl)
RP = 202.24
1998 130'
2005 126'
2011 126'
2012 126'
2013 124'
2014 121'
160
150
140
130
120
110
100
90
80
Jan-86
Jan-90
Jan-94
Jan-98
Jan-02
Jan-06
Jan-10
Jan-14

Figure B-5

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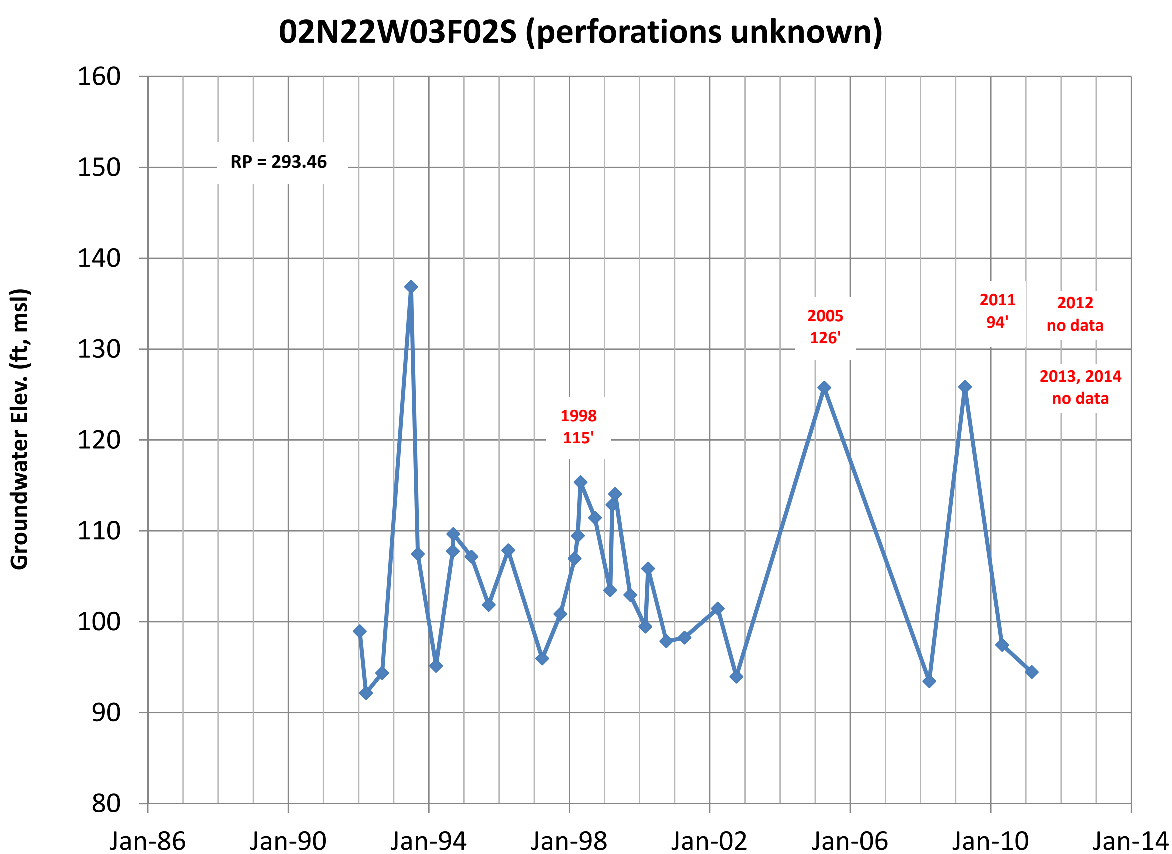

Figure B-6

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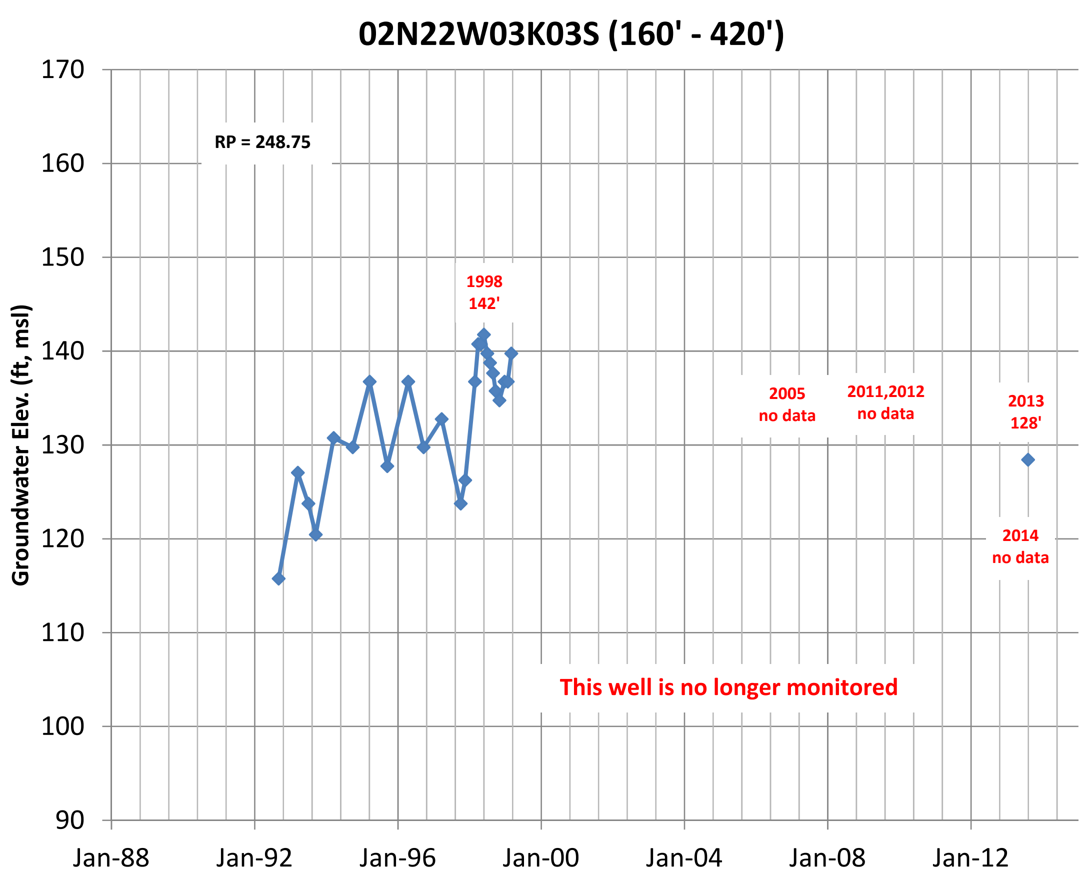
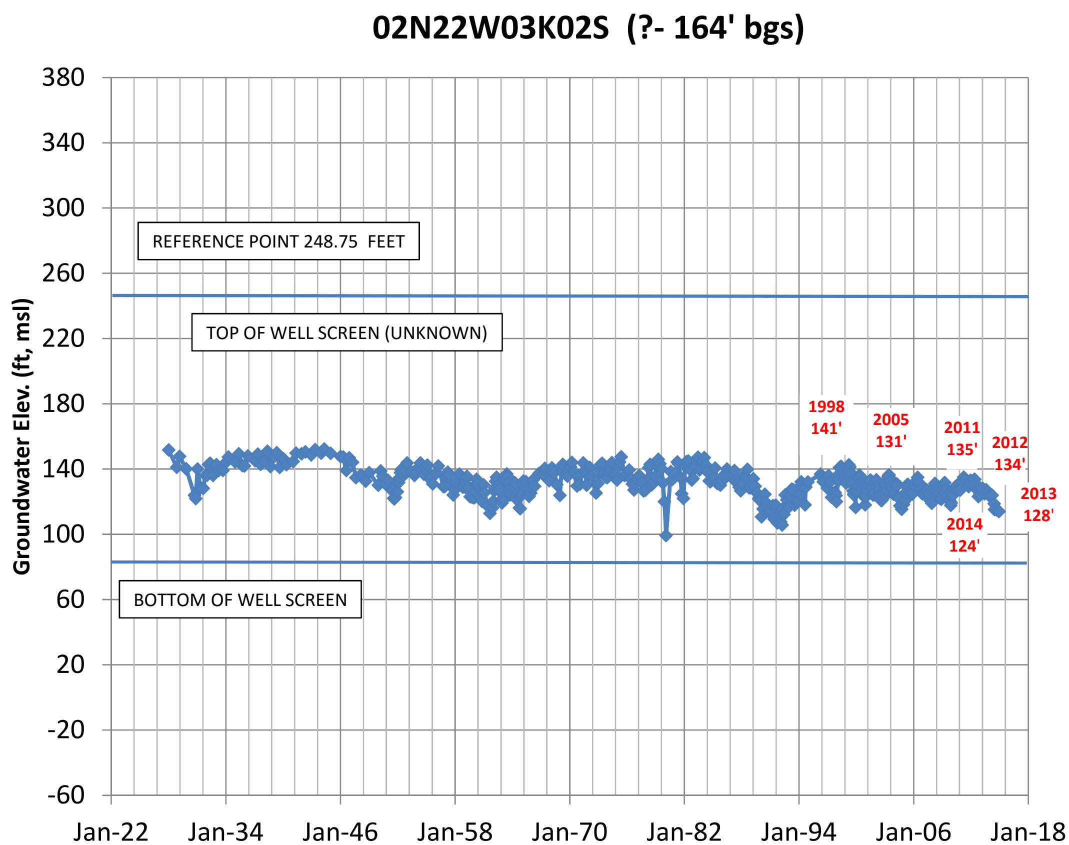


Figure B-7


02N22W03K02S (?- 164' bgs)
REFERENCE POINT 248.75 FEET
TOP OF WELL SCREEN (UNKNOWN)
BOTTOM OF WELL SCREEN
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-22
Jan-34
Jan-46
Jan-58
Jan-70
Jan-82
Jan-94
Jan-06
Jan-18
1998
141'
2005
131'
2011
135'
2012
134'
2013
128'
2014
124'

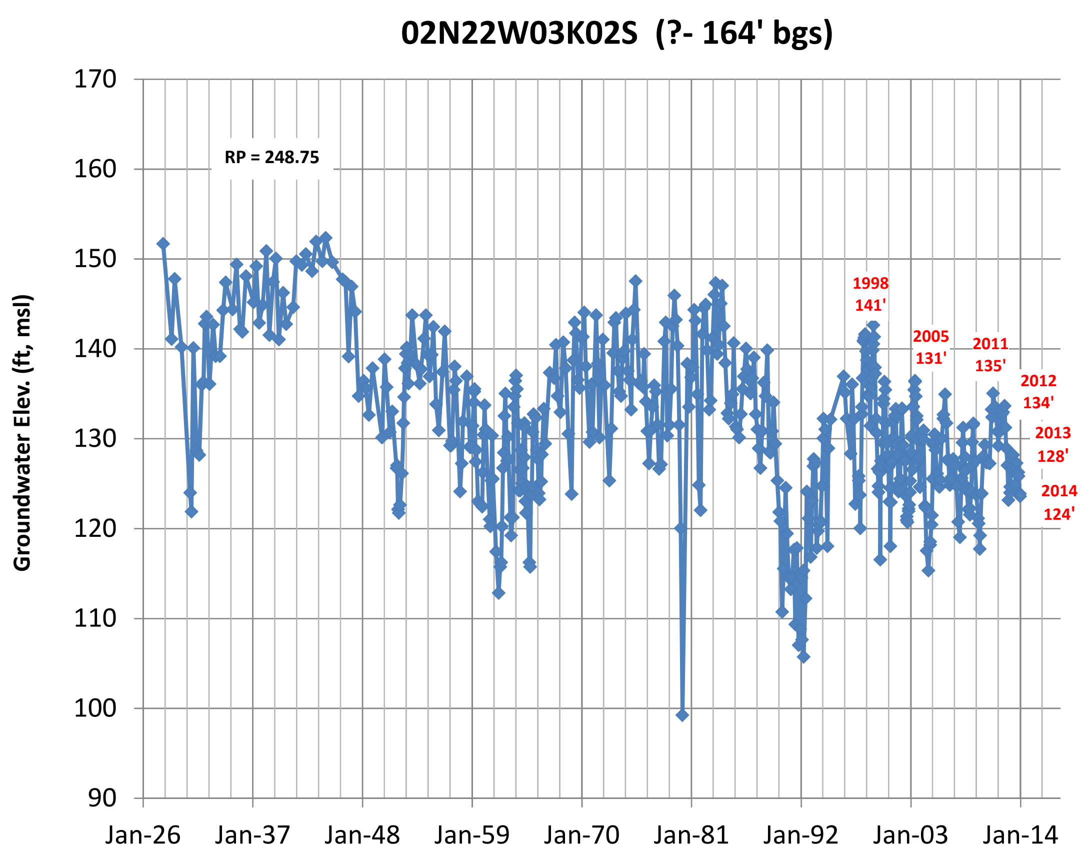
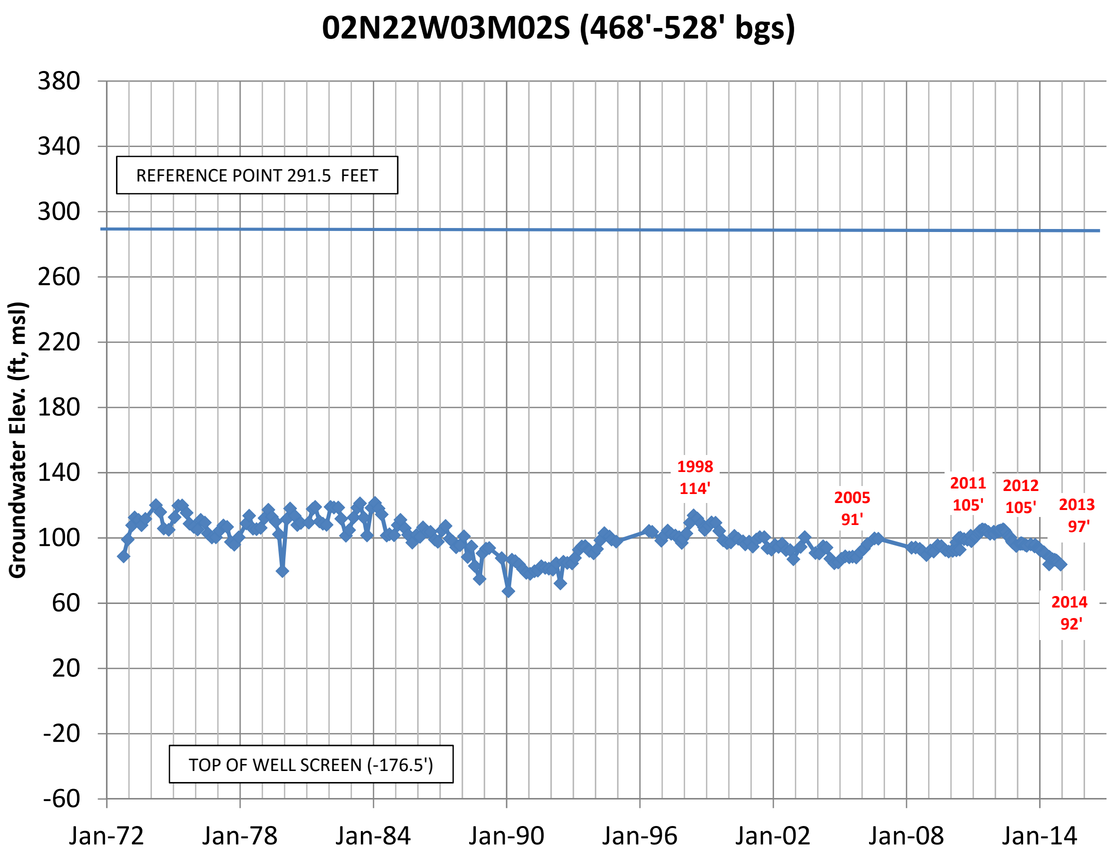

02N22W03K02S (?- 164' bgs)
RP = 248.75
Groundwater Elev. (ft, msl)
170
160
150
140
130
120
110
100
90
Jan-26
Jan-37
Jan-48
Jan-59
Jan-70
Jan-81
Jan-92
Jan-03
Jan-14
1998
141'
2005
131'
2011
135'
2012
134'
2013
128'
2014
124'

Figure B-8


02N22W03M02S (468'-528' bgs)
REFERENCE POINT 291.5 FEET
TOP OF WELL SCREEN (-176.5')
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
1998
114'
2005
91'
2011
105'
2012
105'
2013
97'
2014
92'

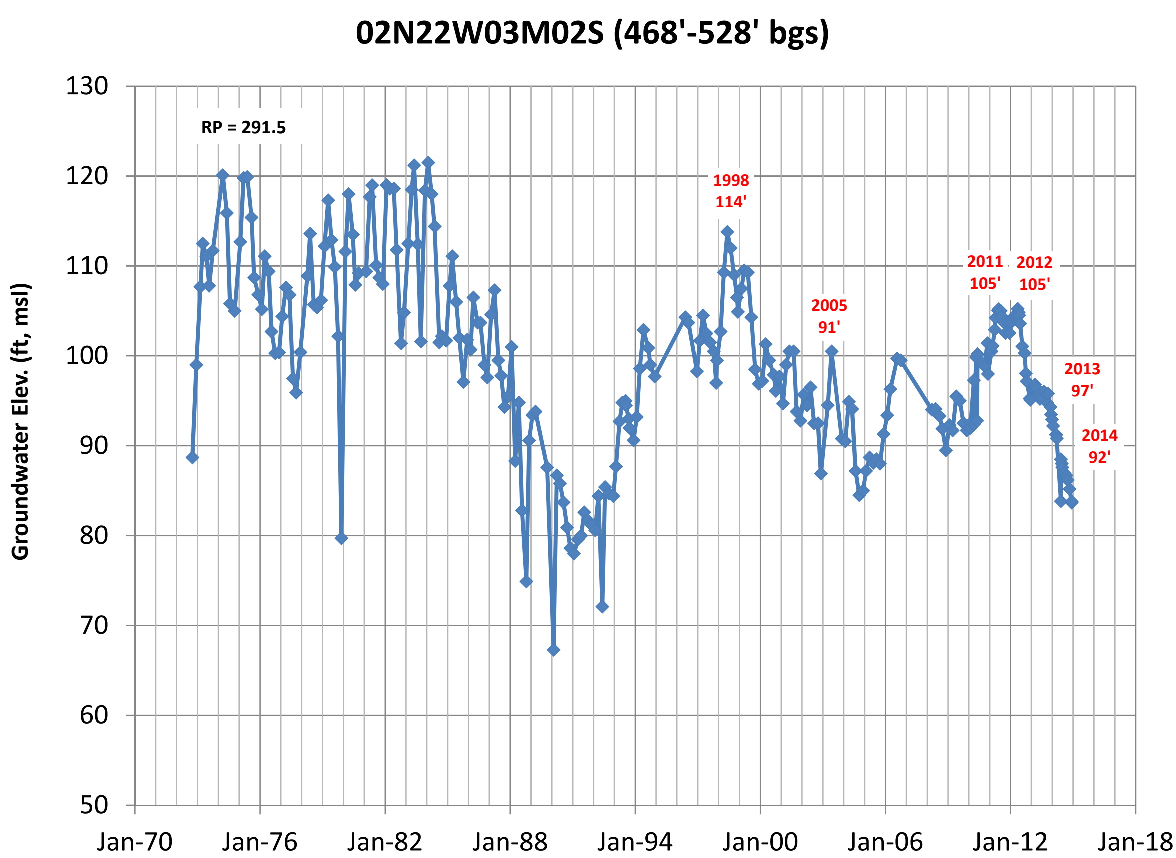

02N22W03M02S (468'-528' bgs)
RP = 291.5
Groundwater Elev. (ft, msl)
130
120
110
100
90
80
70
60
50
Jan-70
Jan-76
Jan-82
Jan-88
Jan-94
Jan-00
Jan-06
Jan-12
Jan-18
1998
114'
2005
91'
2011
105'
2012
105'
2013
97'
2014
92'

Figure B-9

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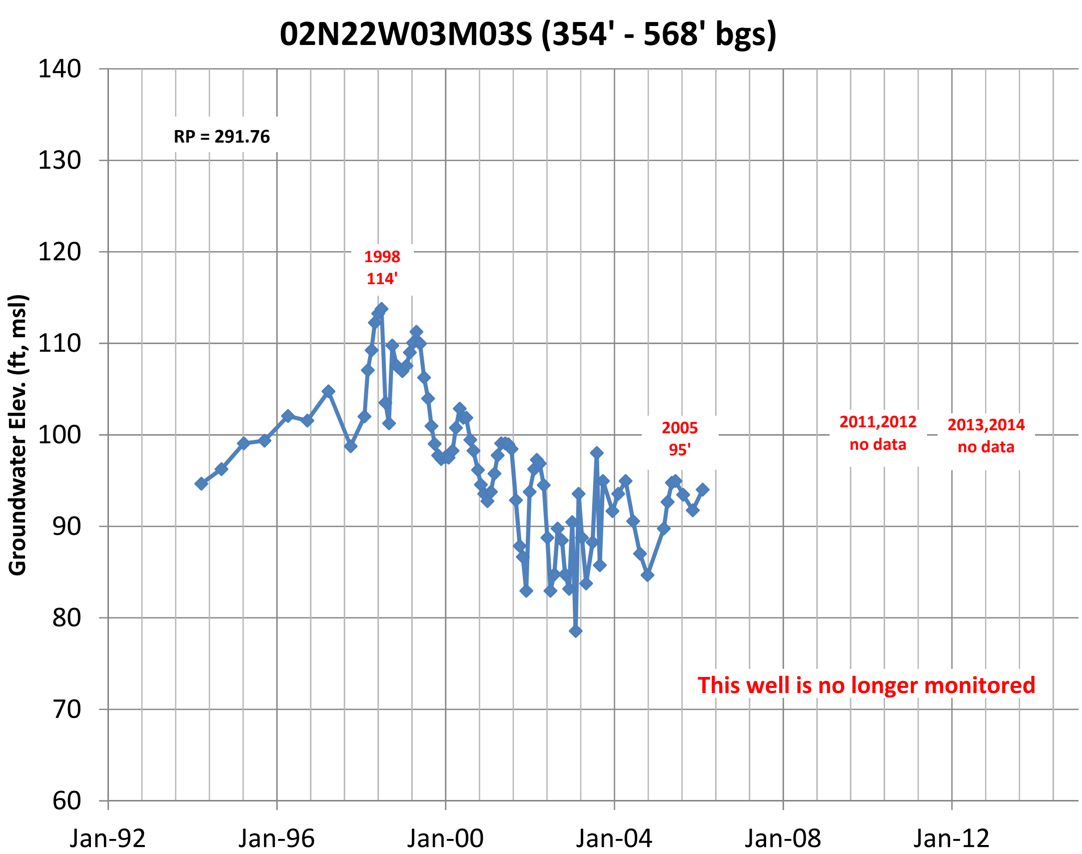
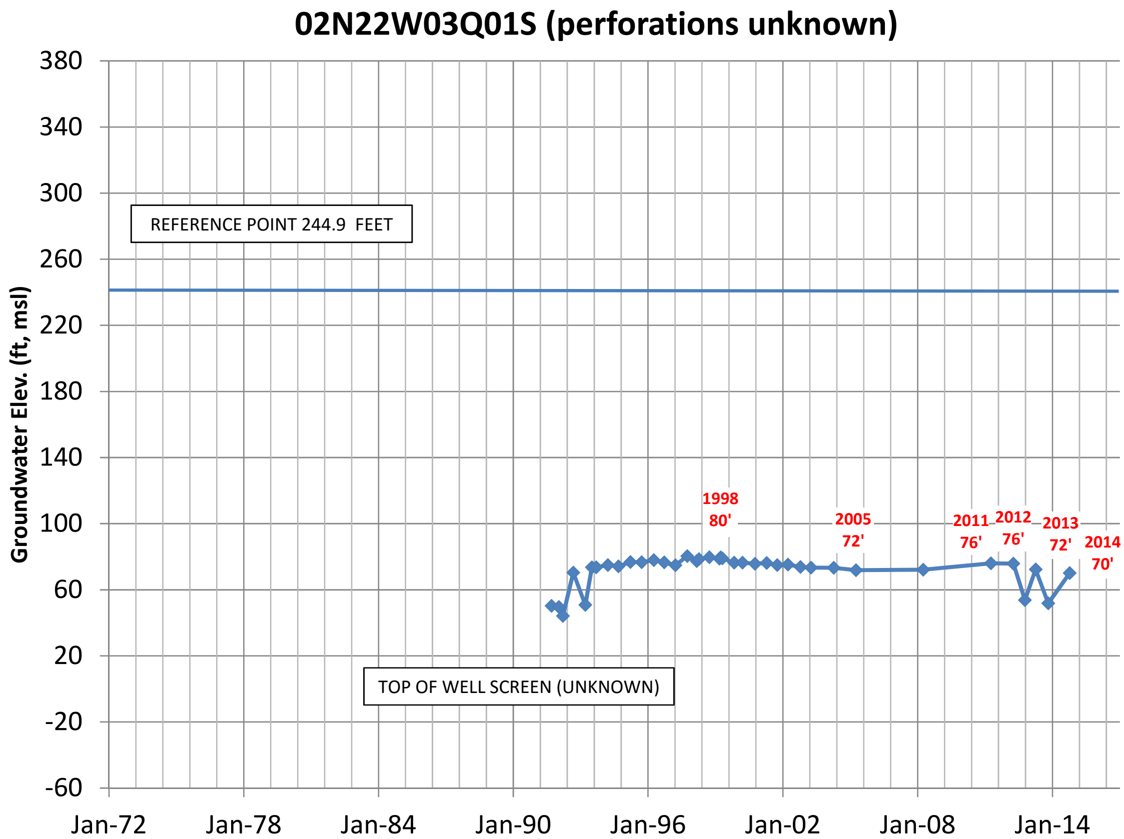


Figure B-10


02N22W03Q01S (perforations unknown)
Groundwater Elev. (ft, msl)
REFERENCE POINT 244.9 FEET
TOP OF WELL SCREEN (UNKNOWN)
1998
80'
2005
72'
2011
76'
2012
76'
2013
72'
2014
70'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

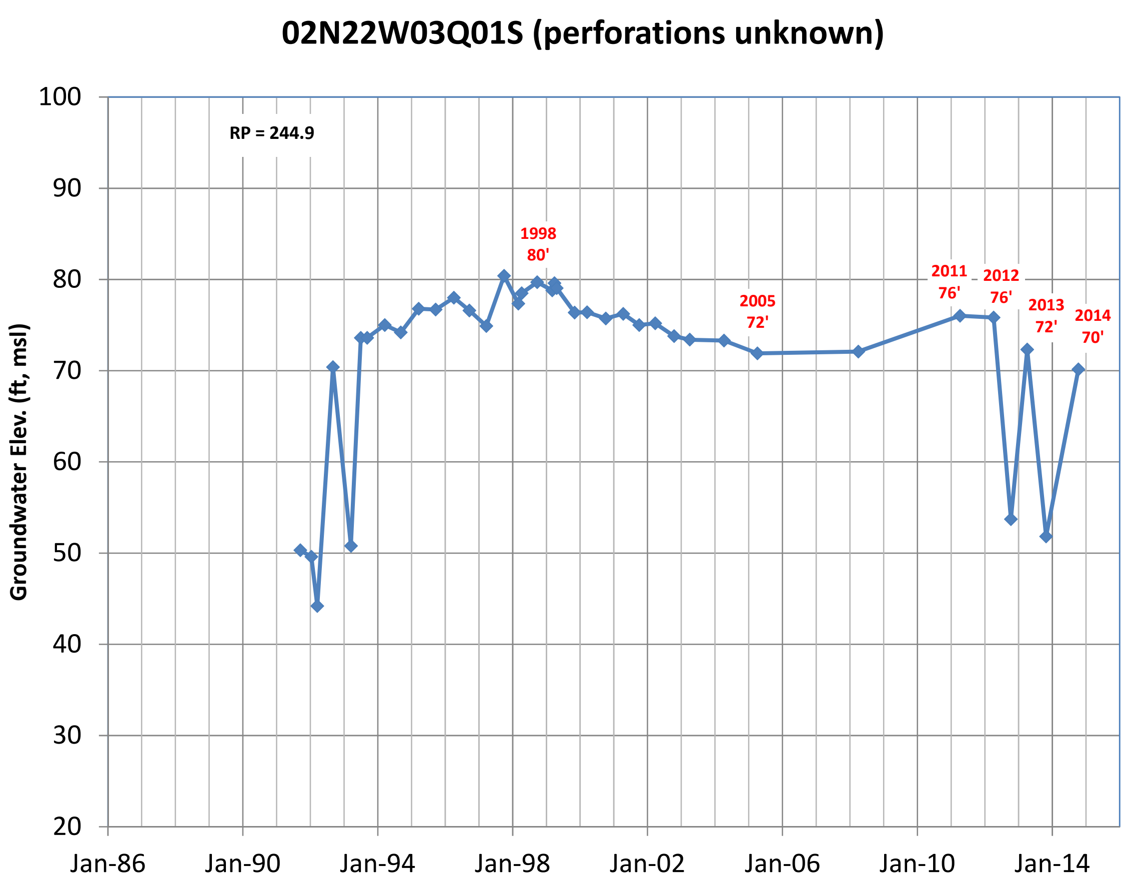
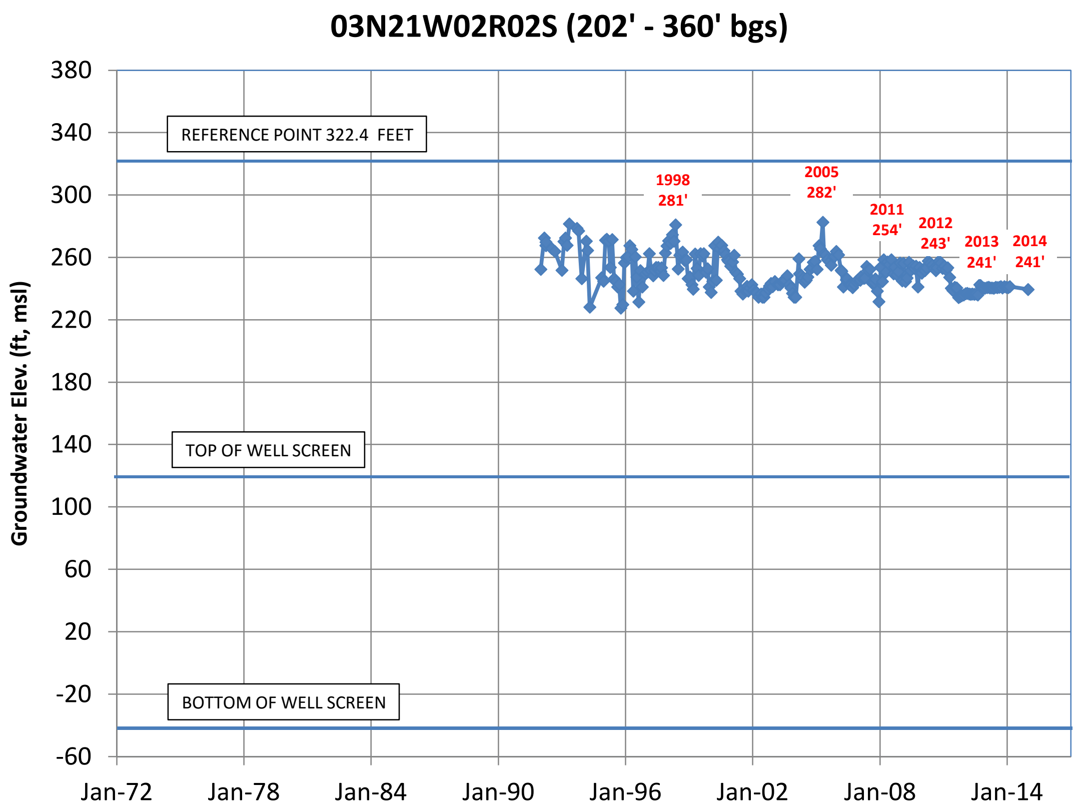

02N22W03Q01S (perforations unknown)
Groundwater Elev. (ft, msl)
RP = 244.9
1998
80'
2005
72'
2011
76'
2012
76'
2013
72'
2014
70'
100
90
80
70
60
50
40
30
20
Jan-86
Jan-90
Jan-94
Jan-98
Jan-02
Jan-06
Jan-10
Jan-14

Figure B-11


03N21W02R02S (202' - 360' bgs)
REFERENCE POINT 322.4 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
281'
2005
282'
2011
254'
2012
243'
2013
241'
2014
241'
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

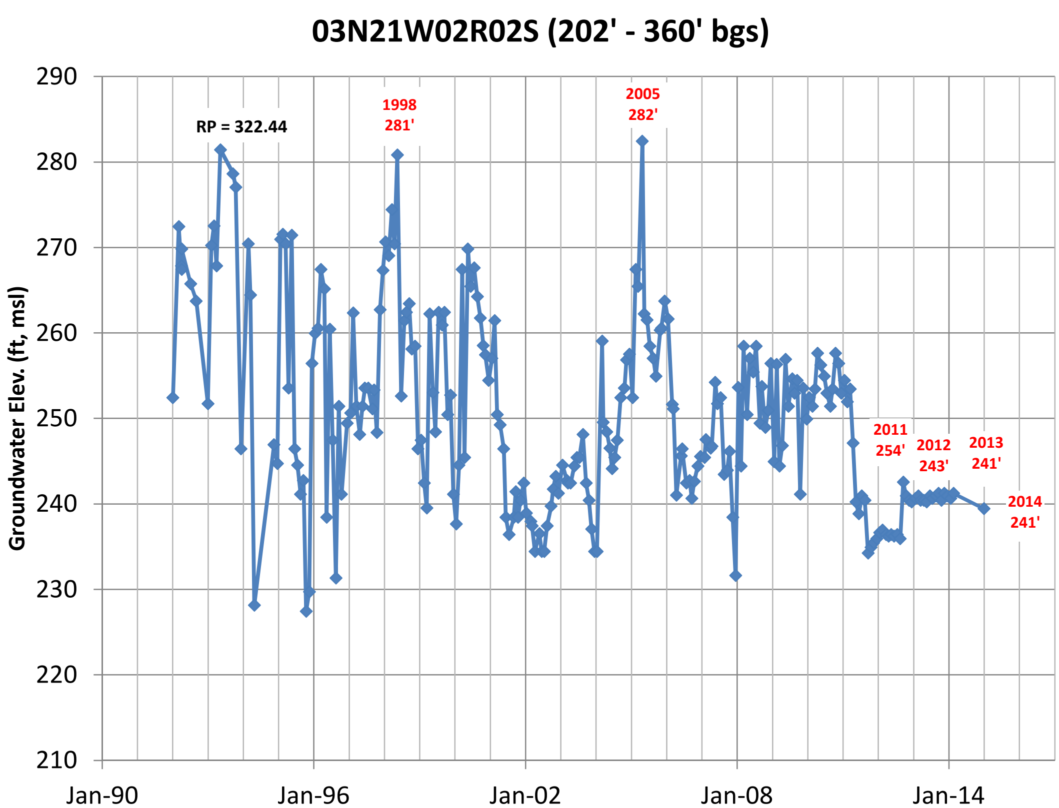
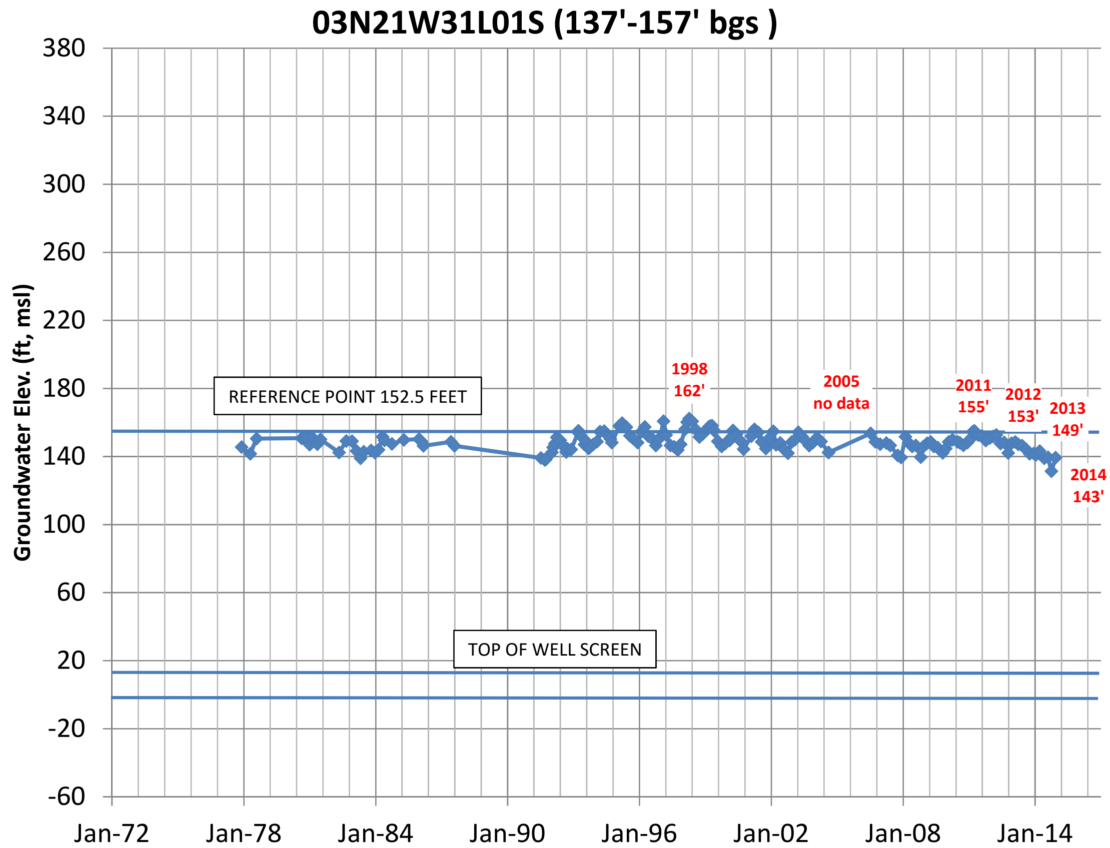

03N21W02R02S (202' - 360' bgs)
RP = 322.44
1998
281'
2005
282'
2011
254'
2012
243'
2013
241'
2014
241'
Groundwater Elev. (ft, msl)
290
280
270
260
250
240
230
220
210
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

Figure B-12


03N21W31L01S (137'-157' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 152.5 FEET
TOP OF WELL SCREEN
1998
162'
2005
no data
2011
155'
2012
153'
2013
149'
2014
143'

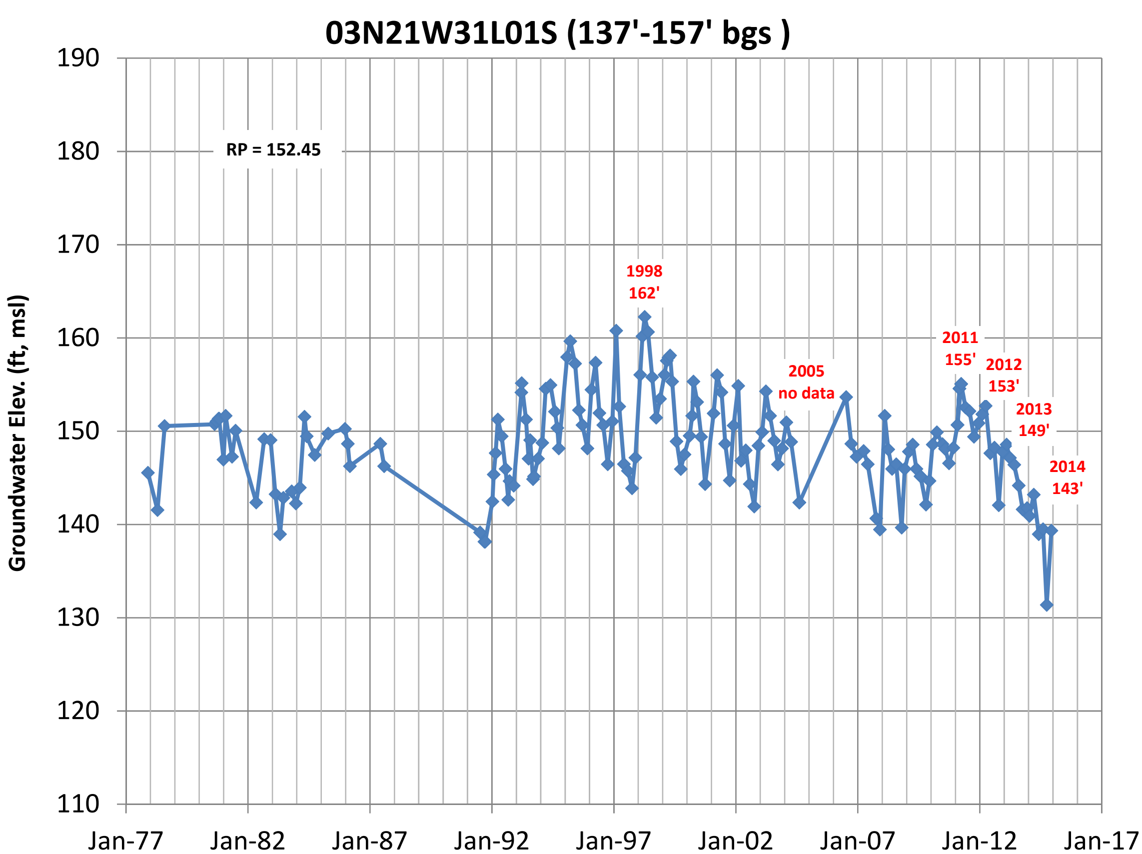
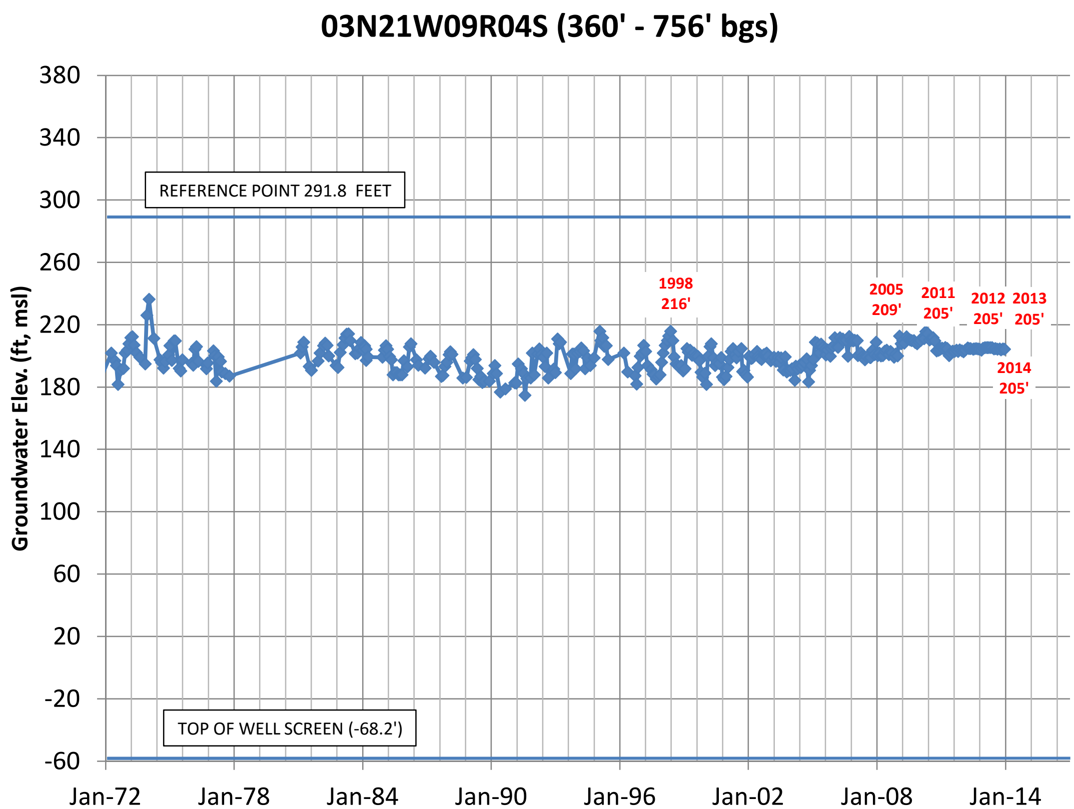

03N21W31L01S (137'-157' bgs)
Groundwater Elev. (ft, msl)
190
180
170
160
150
140
130
120
110
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17
RP = 152.45
1998
162'
2005
no data
2011
155'
2012
153'
2013
149'
2014
143'

Figure B-13


03N21W09R04S (360' - 756' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 291.8 FEET
TOP OF WELL SCREEN (-68.2')
1998
216'
2005
209'
2011
205'
2012
205'
2013
205'
2014
205'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

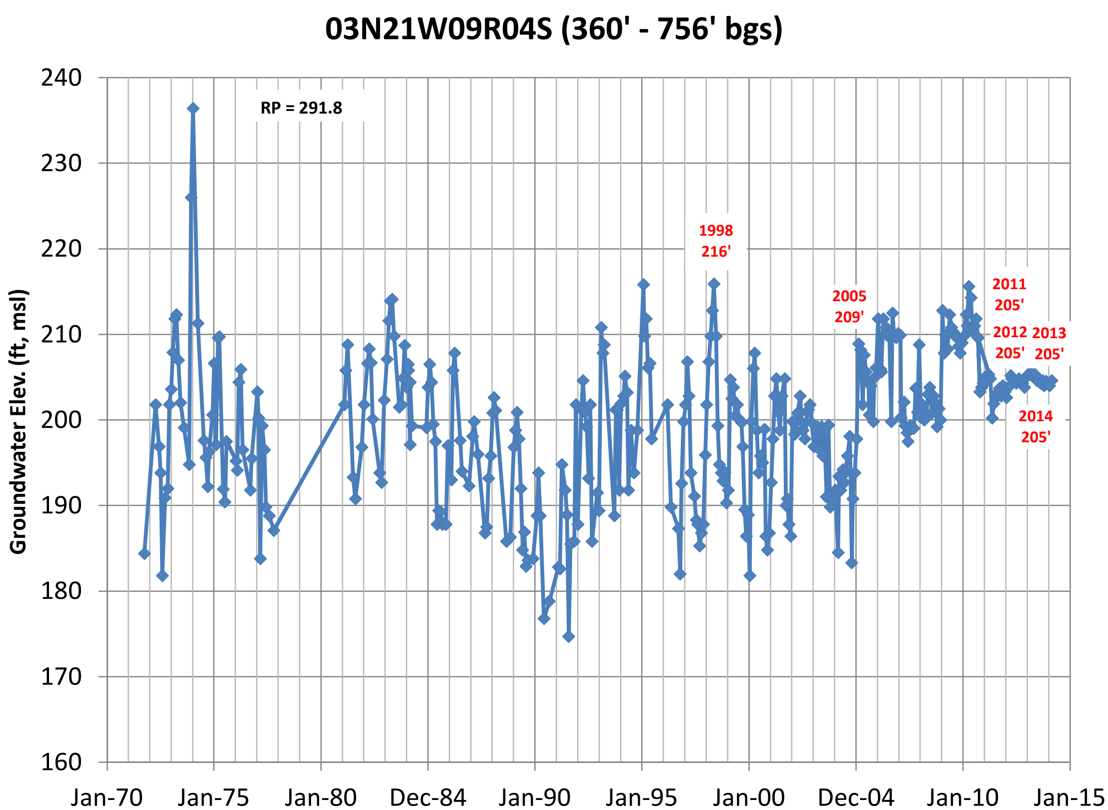
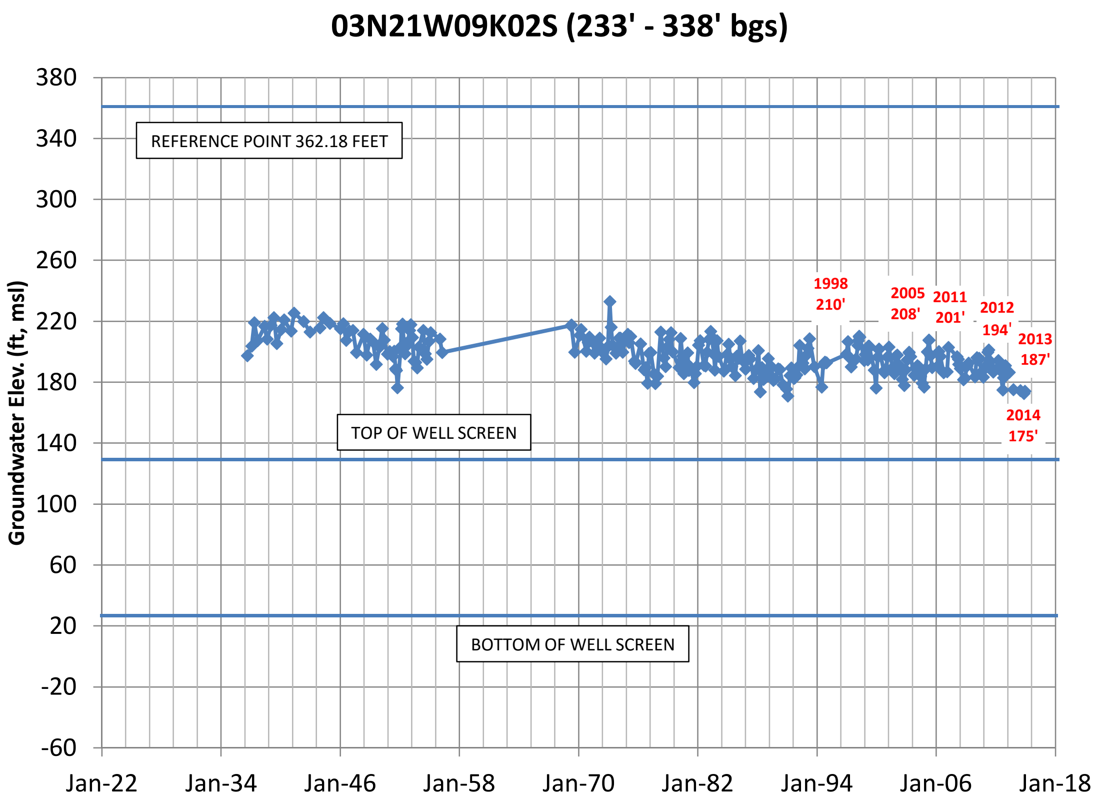

03N21W09R04S (360' - 756' bgs)
Groundwater Elev. (ft, msl)
RP = 291.8
1998
216'
2005
209'
2011
205'
2012
205'
2013
205'
2014
205'
240
230
220
210
200
190
180
170
160
Jan-70
Jan-75
Jan-80
Dec-84
Jan-90
Jan-95
Jan-00
Dec-04
Jan-10
Jan-15

Figure B-14


03N21W09K02S (233' - 338' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
REFERENCE POINT 362.18 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998 210'
2005 208'
2011 201'
2012 194'
2013 187'
2014 175'
Jan-22
Jan-34
Jan-46
Jan-58
Jan-70
Jan-82
Jan-94
Jan-06
Jan-18

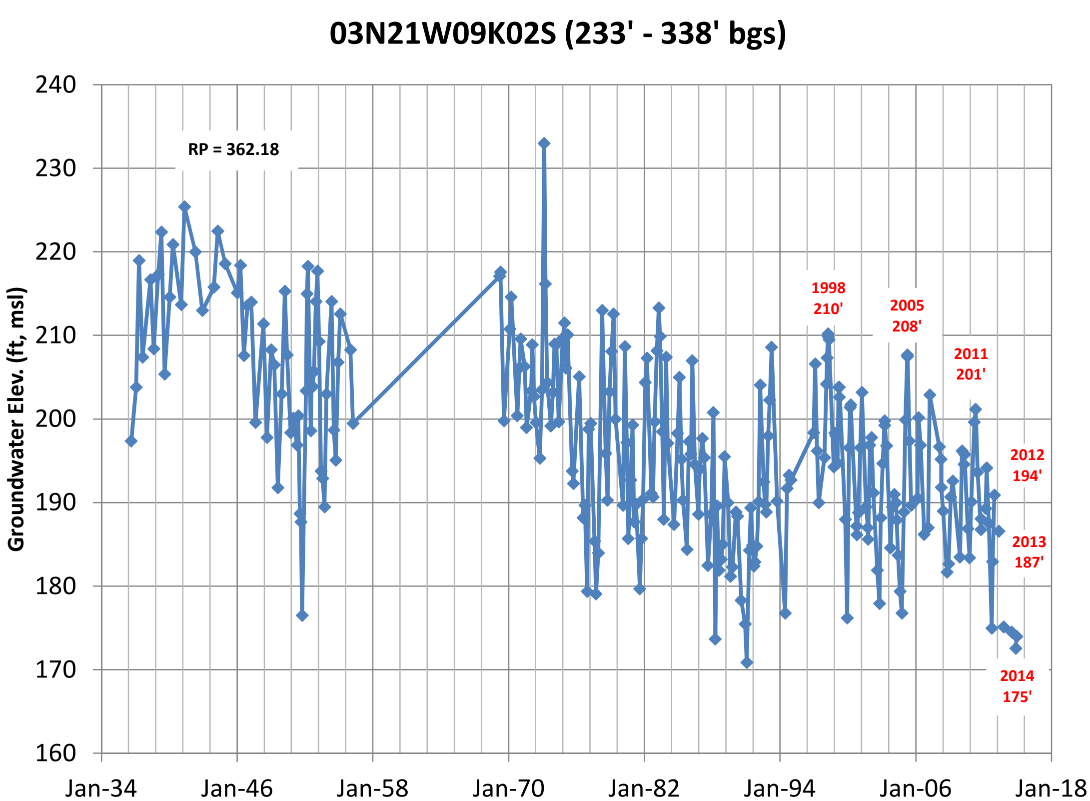
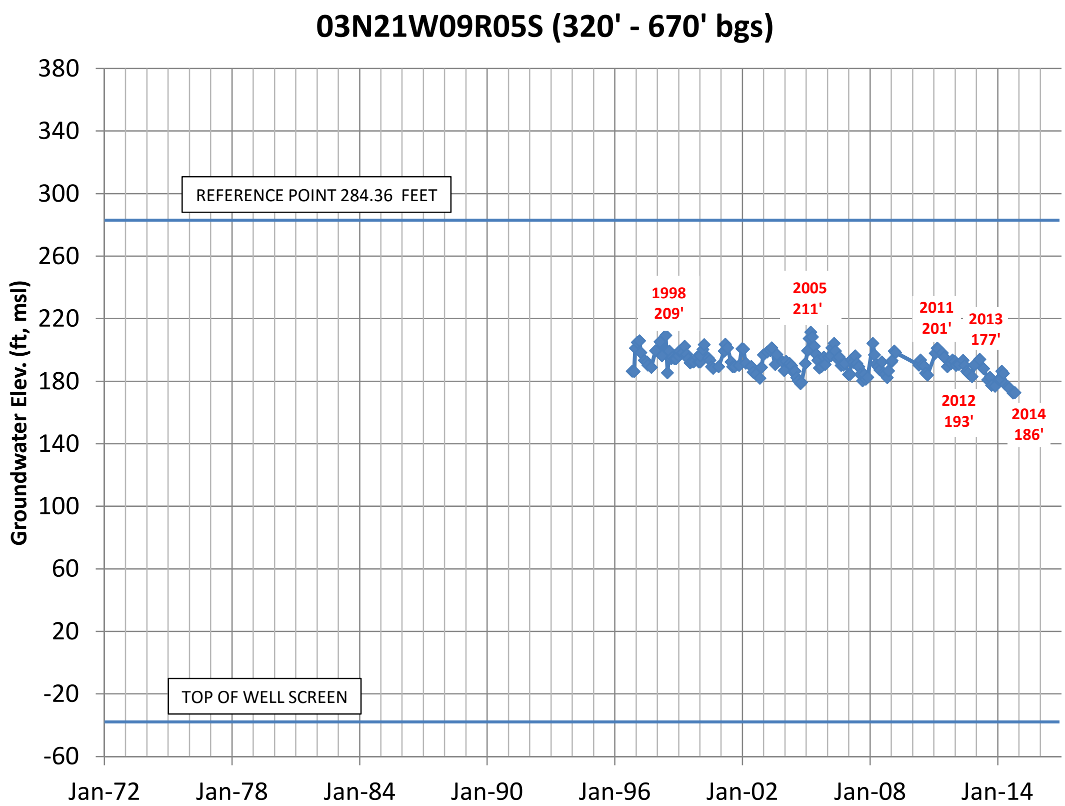

03N21W09K02S (233' - 338' bgs)
Groundwater Elev. (ft, msl)
240
230
220
210
200
190
180
170
160
RP = 362.18
1998 210'
2005 208'
2011 201'
2012 194'
2013 187'
2014 175'
Jan-34
Jan-46
Jan-58
Jan-70
Jan-82
Jan-94
Jan-06
Jan-18

Figure B-15


03N21W09R05S (320' - 670' bgs)
REFERENCE POINT 284.36 FEET
TOP OF WELL SCREEN
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
1998
209'
2005
211'
2011
201'
2013
177'
2012
193'
2014
186'

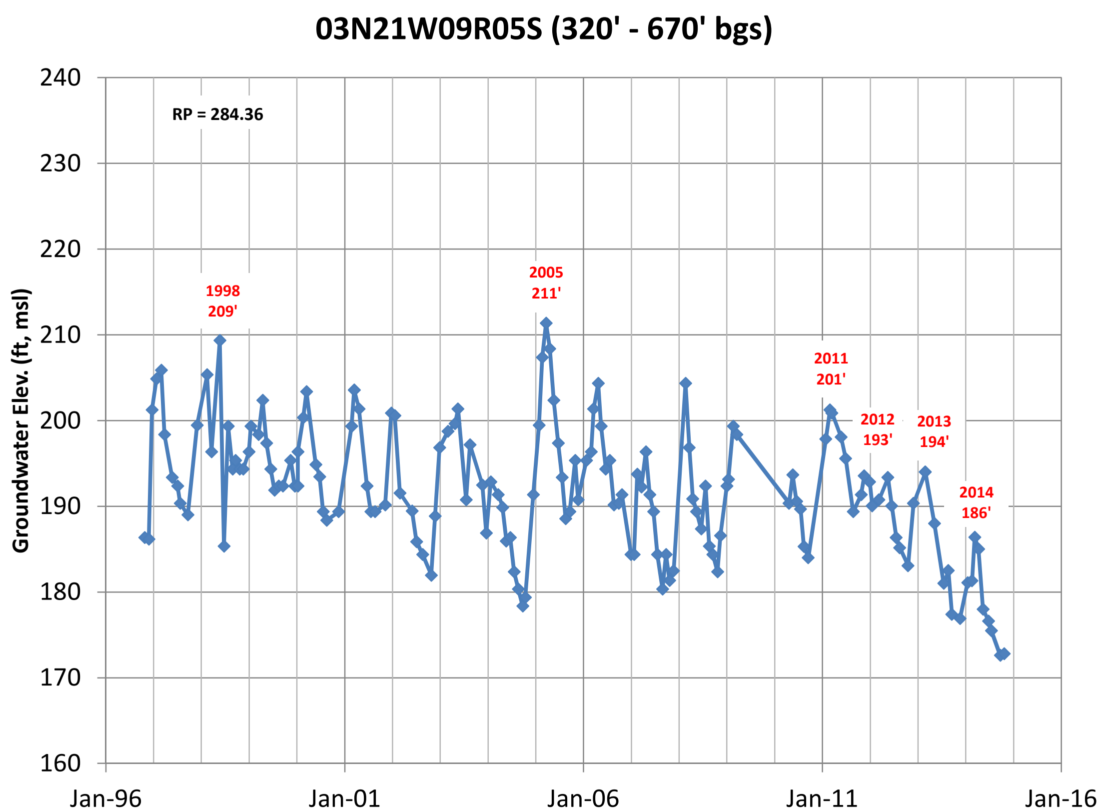
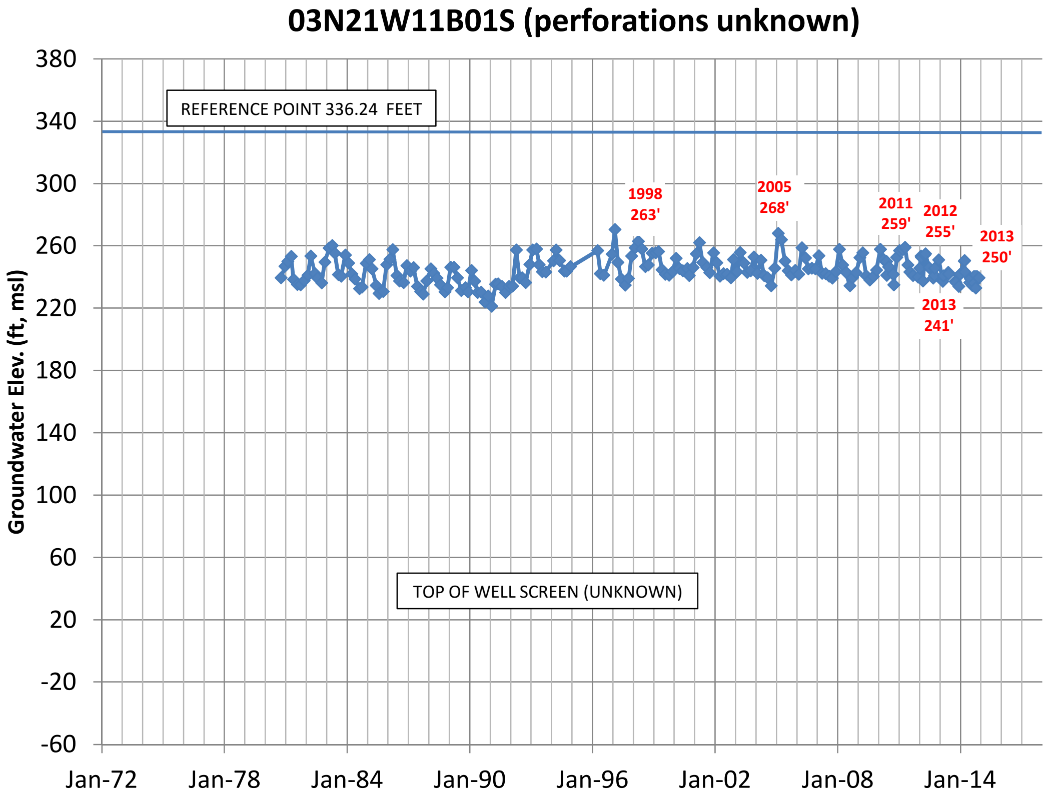

03N21W09R05S (320' - 670' bgs)
RP = 284.36
Groundwater Elev. (ft, msl)
240
230
220
210
200
190
180
170
160
Jan-96
Jan-01
Jan-06
Jan-11
Jan-16
1998
209'
2005
211'
2011
201'
2012
193'
2013
194'
2014
186'

Figure B-16


03N21W11B01S (perforations unknown)
REFERENCE POINT 336.24 FEET
TOP OF WELL SCREEN (UNKNOWN)
Groundwater Elev. (ft, msl)
1998
263'
2005
268'
2011
259'
2012
255'
2013
250'
2013
241'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

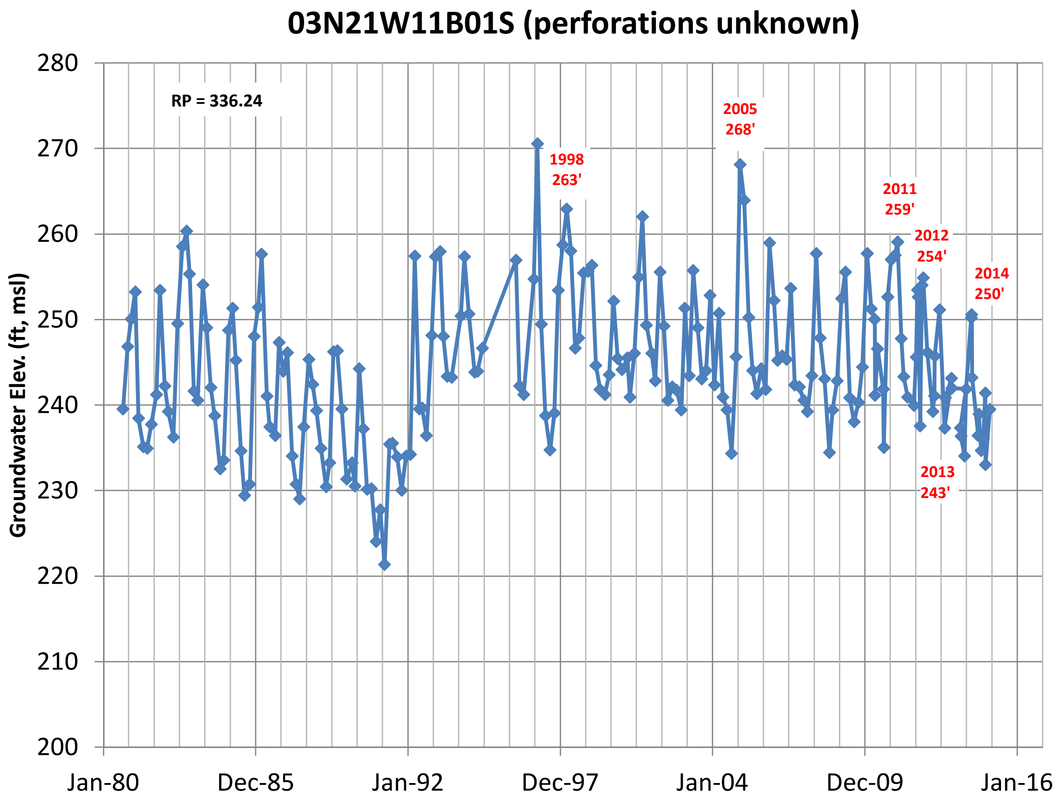
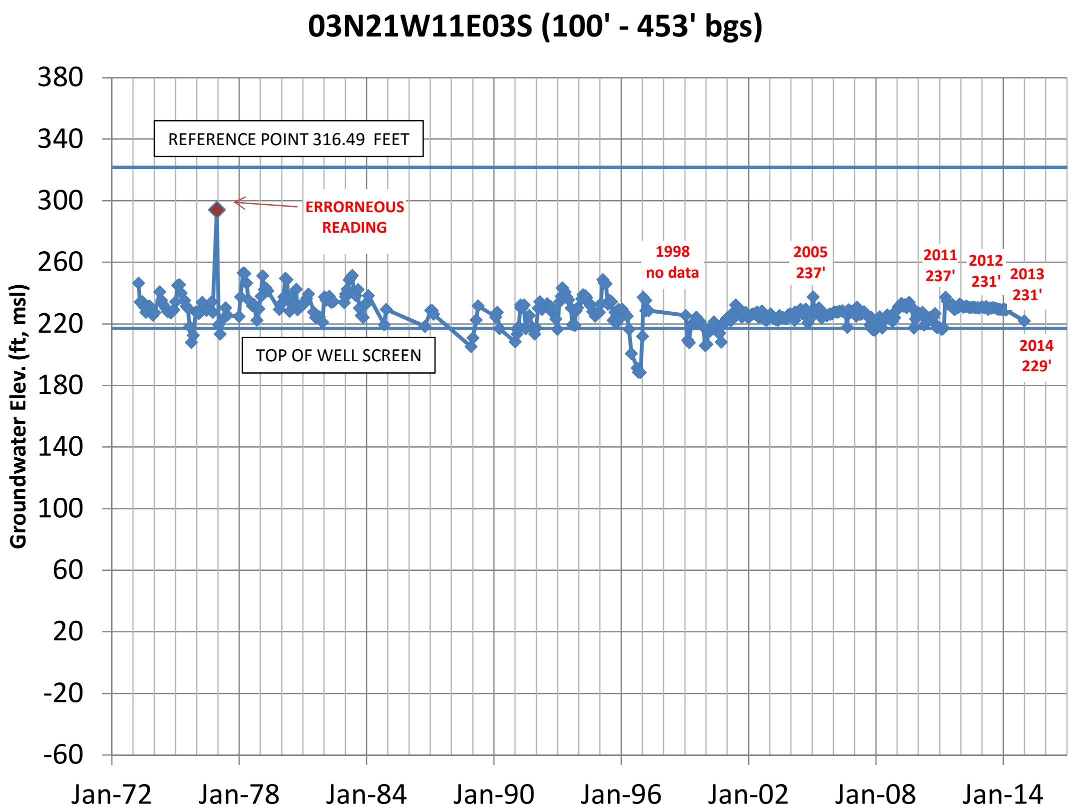

03N21W11B01S (perforations unknown)
RP = 336.24
Groundwater Elev. (ft, msl)
1998
263'
2005
268'
2011
259'
2012
254'
2014
250'
2013
243'
280
270
260
250
240
230
220
210
200
Jan-80
Dec-85
Jan-92
Dec-97
Jan-04
Dec-09
Jan-16

Figure B-17


03N21W11E03S (100' - 453' bgs)
REFERENCE POINT 316.49 FEET
ERRORNEOUS READING
TOP OF WELL SCREEN
1998 no data
2005 237'
2011 237'
2012 231'
2013 231'
2014 229'
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

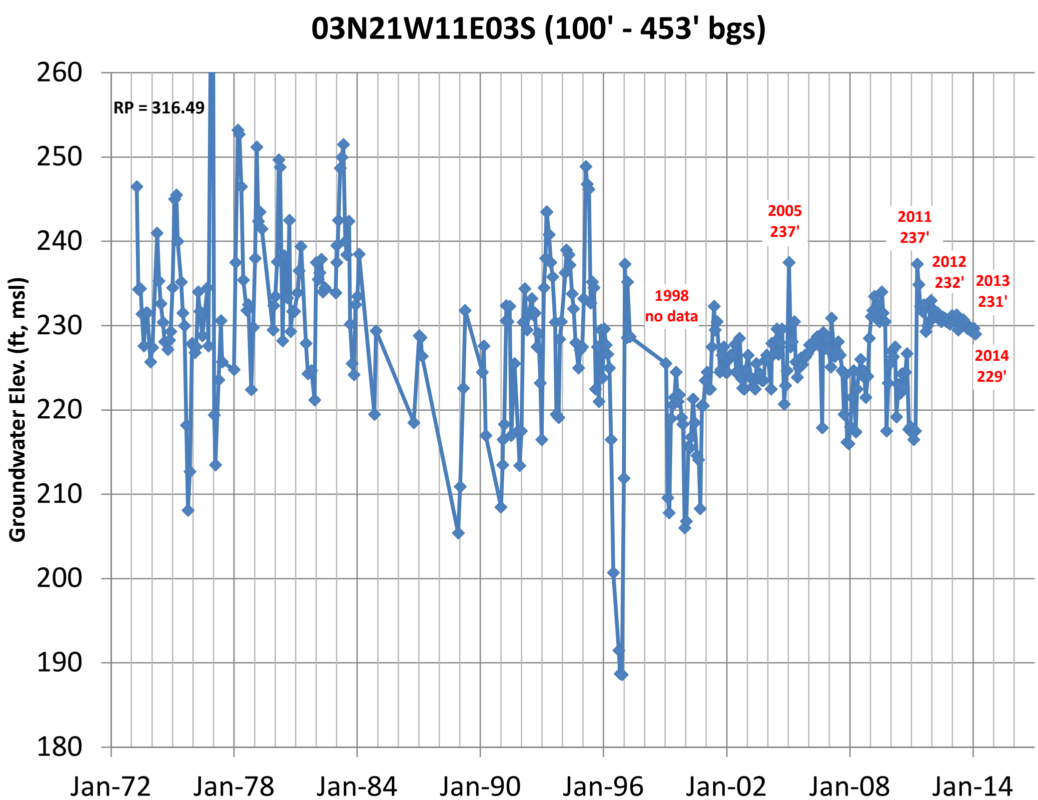
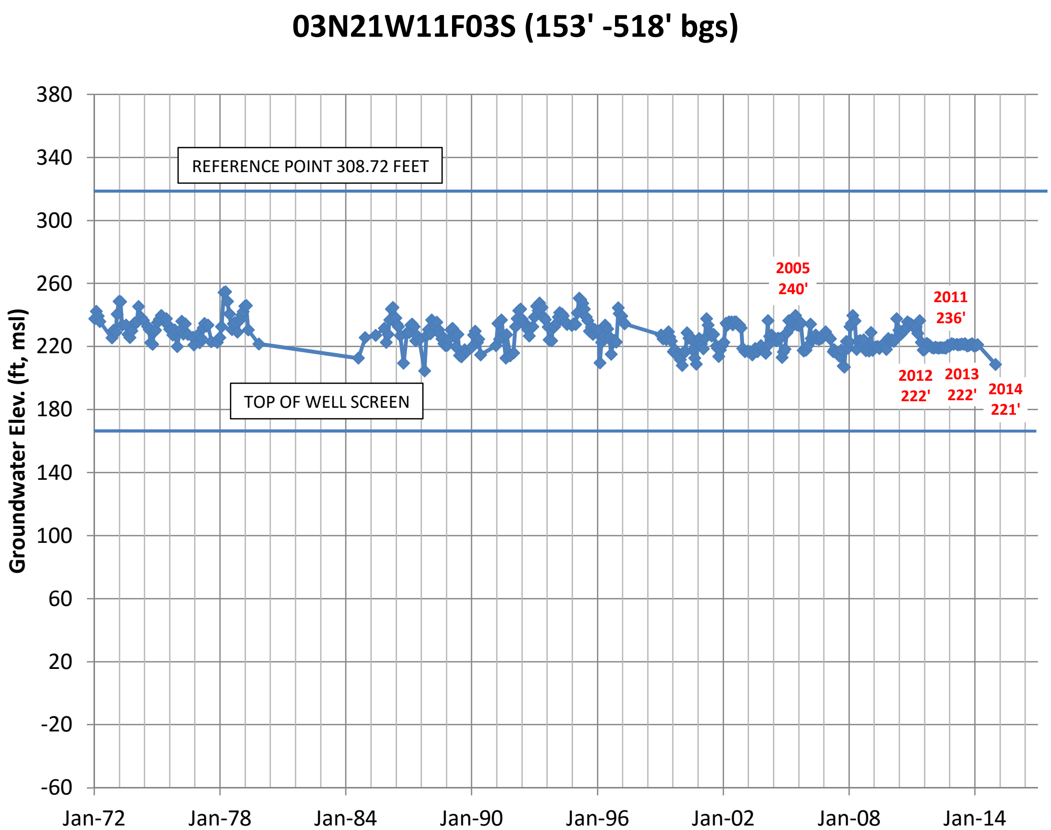

03N21W11E03S (100' - 453' bgs)
RP = 316.49
1998 no data
2005 237'
2011 237'
2012 232'
2013 231'
2014 229'
Groundwater Elev. (ft, msl)
260
250
240
230
220
210
200
190
180
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

Figure B-18


03N21W11F03S (153' -518' bgs)
REFERENCE POINT 308.72 FEET
TOP OF WELL SCREEN
2005
240'
2011
236'
2012
222'
2013
222'
2014
221'
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

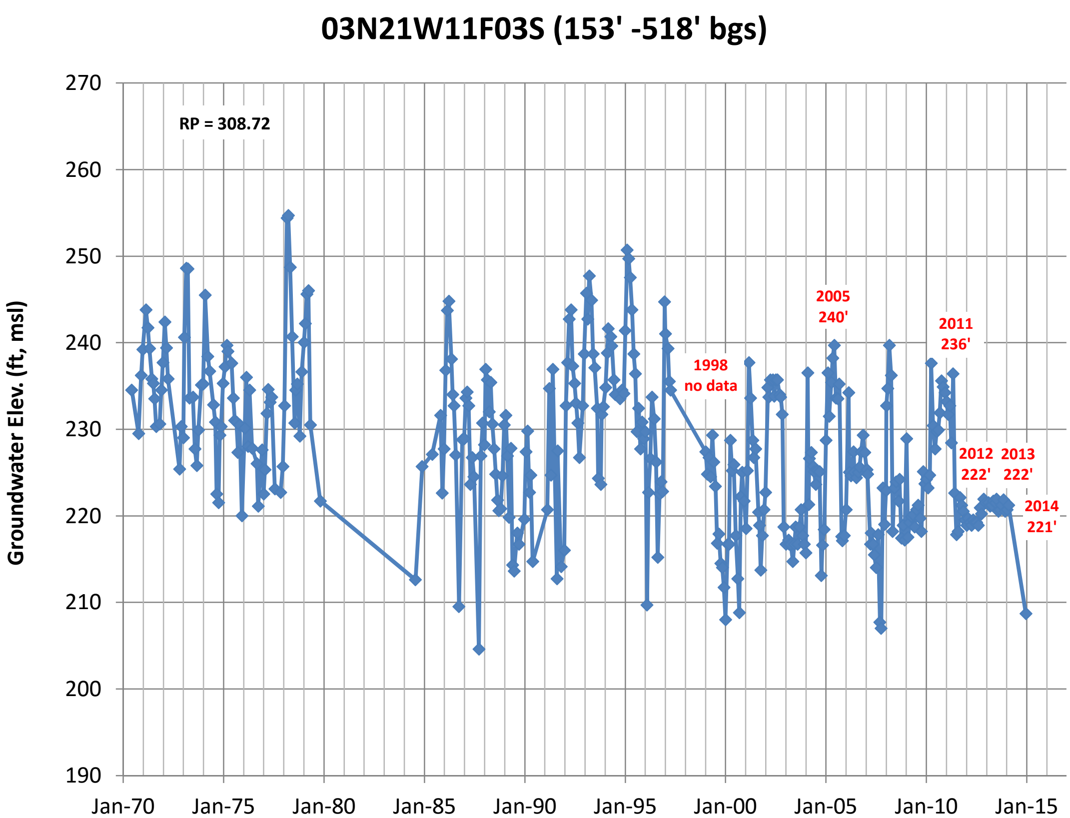
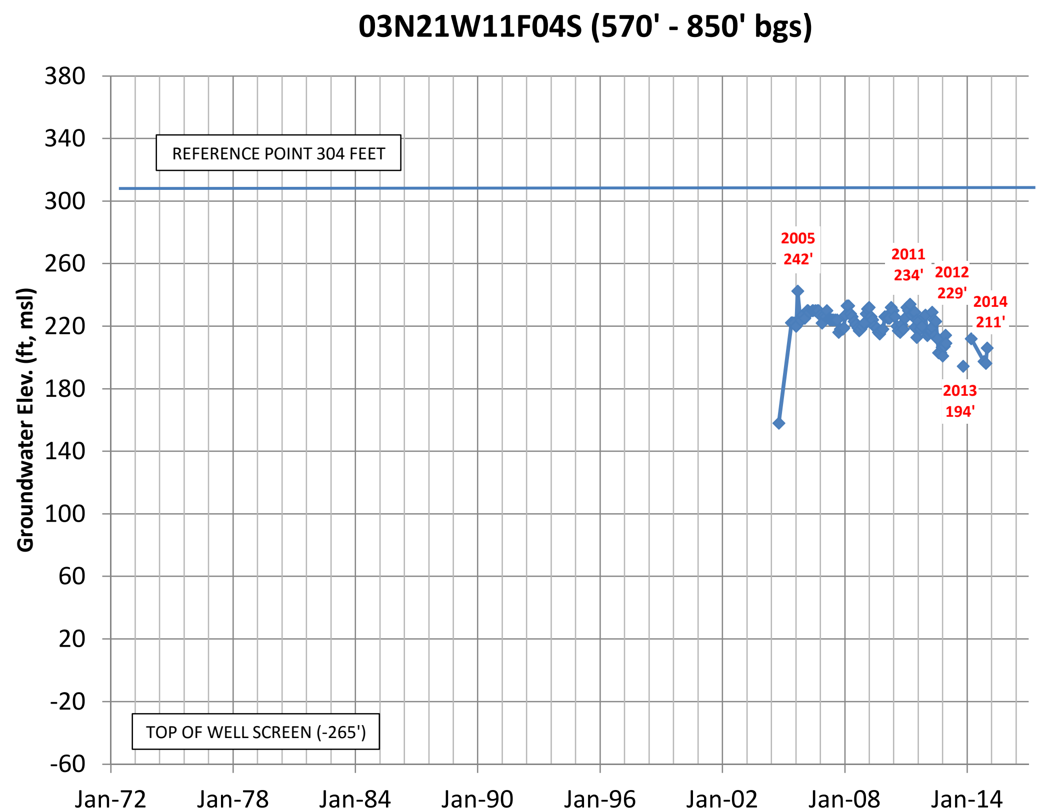

03N21W11F03S (153' -518' bgs)
RP = 308.72
1998
no data
2005
240'
2011
236'
2012
222'
2013
222'
2014
221'
Groundwater Elev. (ft, msl)
270
260
250
240
230
220
210
200
190
Jan-70
Jan-75
Jan-80
Jan-85
Jan-90
Jan-95
Jan-00
Jan-05
Jan-10
Jan-15

Figure B-19


03N21W11F04S (570' - 850' bgs)
REFERENCE POINT 304 FEET
TOP OF WELL SCREEN (-265')
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
2005
242'
2011
234'
2012
229'
2014
211'
2013
194'

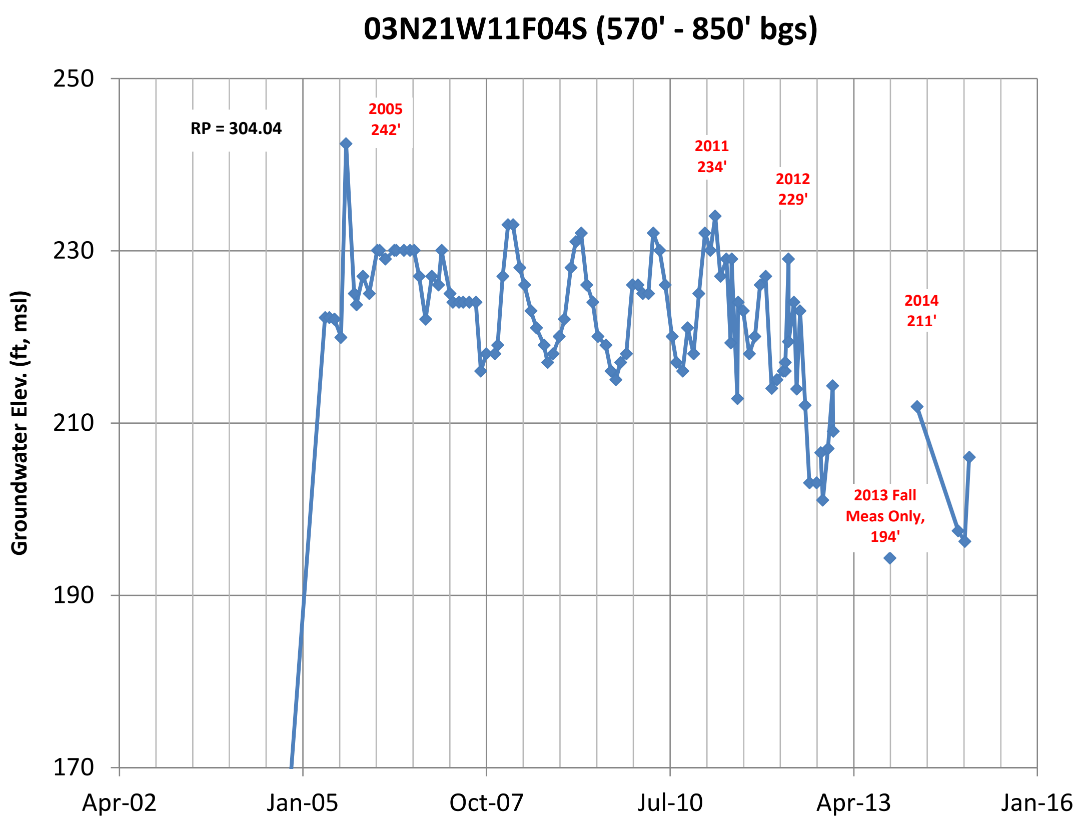
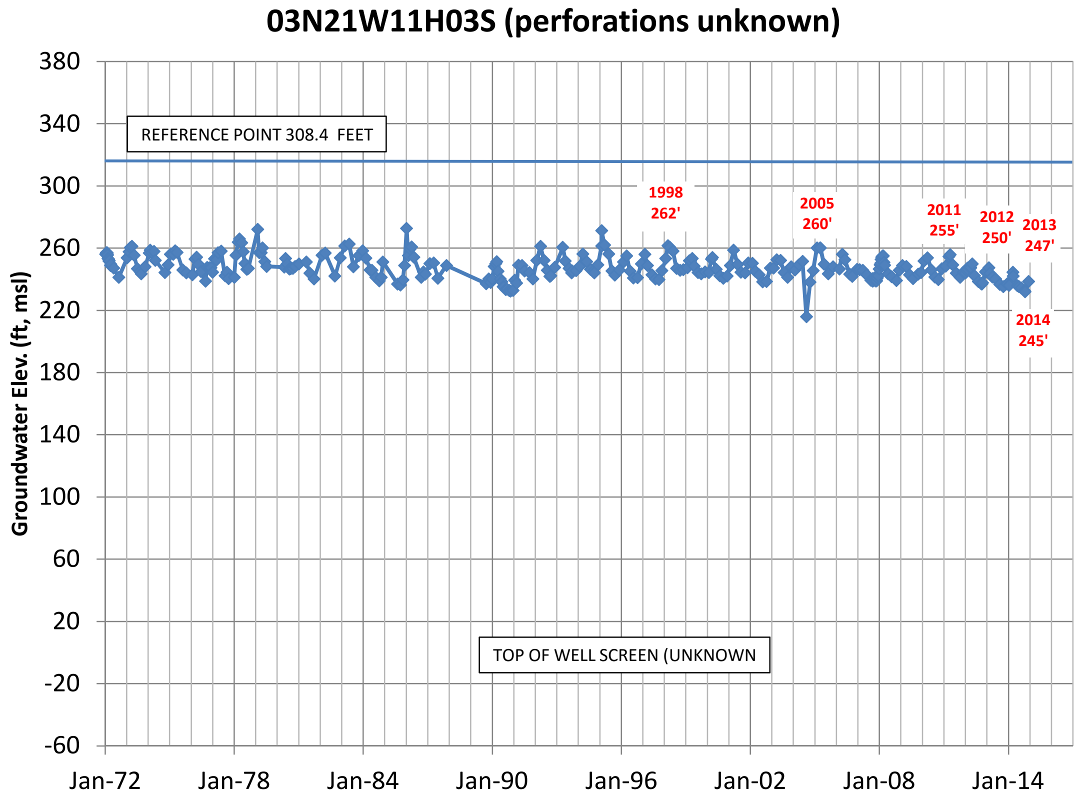

03N21W11F04S (570' - 850' bgs)
RP = 304.04
Groundwater Elev. (ft, msl)
250
230
210
190
170
Apr-02
Jan-05
Oct-07
Jul-10
Apr-13
Jan-16
2005
242'
2011
234'
2012
229'
2014
211'
2013 Fall
Meas Only,
194'

Figure B-20


03N21W11H03S (perforations unknown)
REFERENCE POINT 308.4 FEET
TOP OF WELL SCREEN (UNKNOWN
1998
262'
2005
260'
2011
255'
2012
250'
2013
247'
2014
245'
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

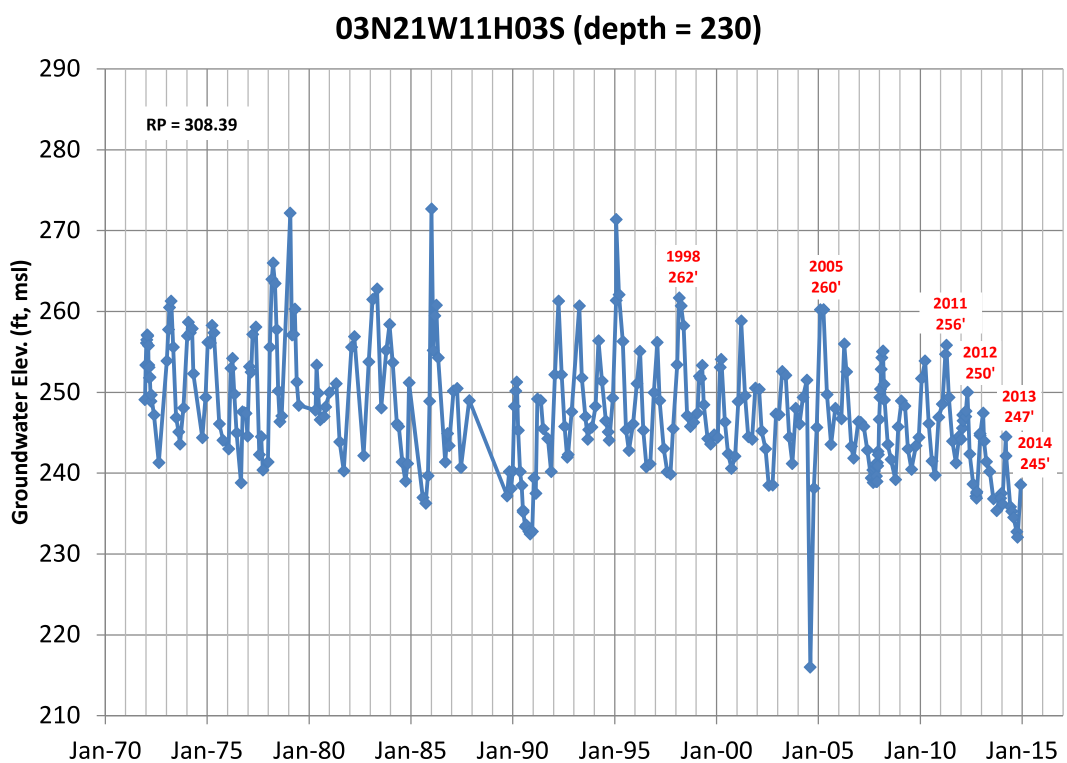

03N21W11H03S (depth = 230)
RP = 308.39
1998
262'
2005
260'
2011
256'
2012
250'
2013
247'
2014
245'
Groundwater Elev. (ft, msl)
290
280
270
260
250
240
230
220
210
Jan-70
Jan-75
Jan-80
Jan-85
Jan-90
Jan-95
Jan-00
Jan-05
Jan-10
Jan-15

Figure B-21

Intentionally Left Blank

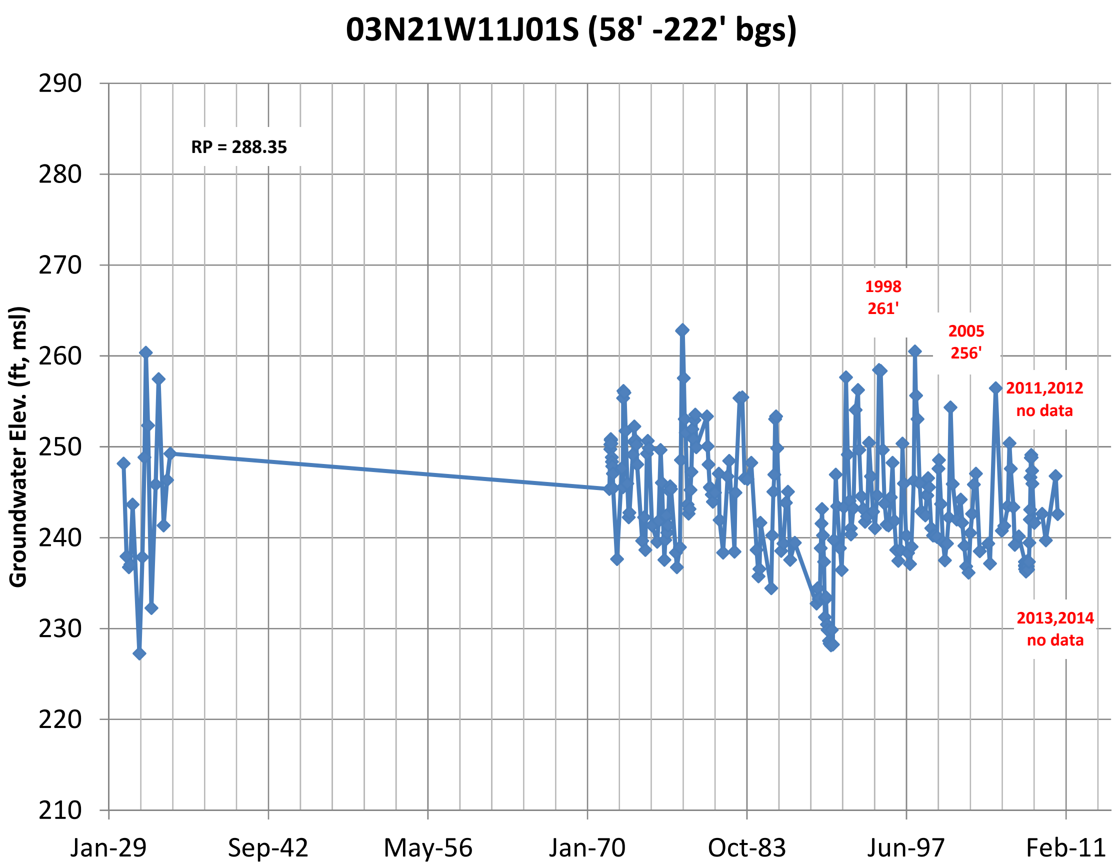
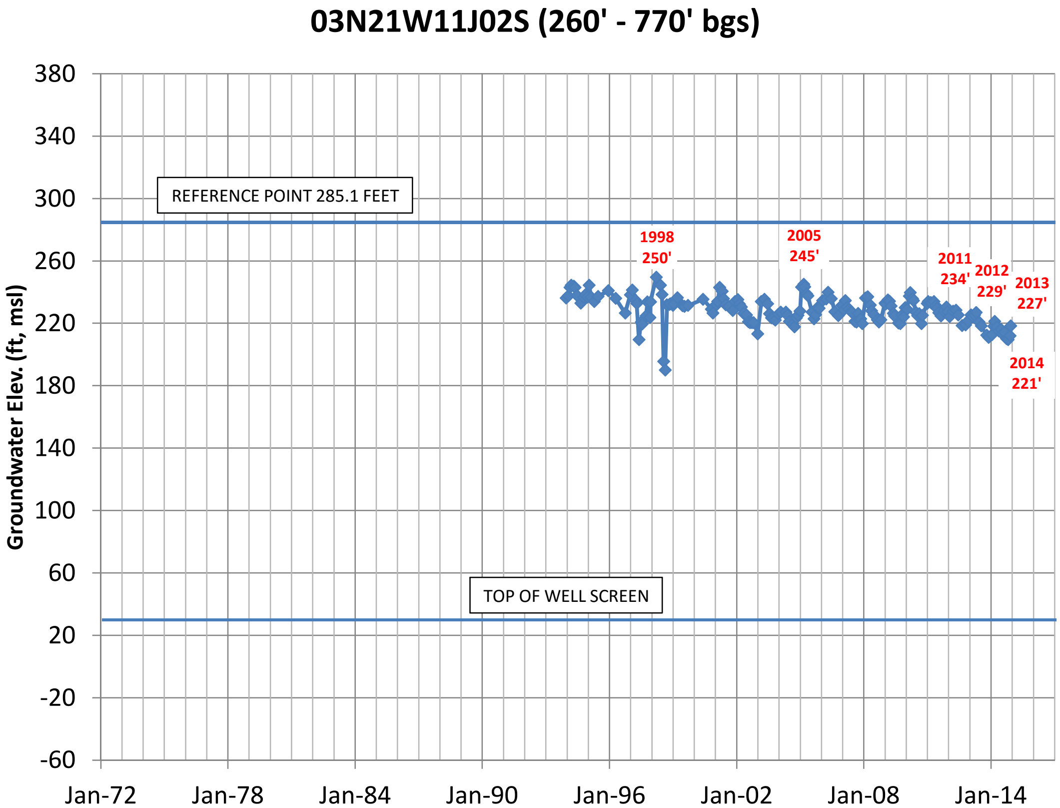


Figure B-22


03N21W11J02S (260' - 770' bgs)
REFERENCE POINT 285.1 FEET
TOP OF WELL SCREEN
Groundwater Elev. (ft, msl)
1998 250'
2005 245'
2011 234'
2012 229'
2013 227'
2014 221'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

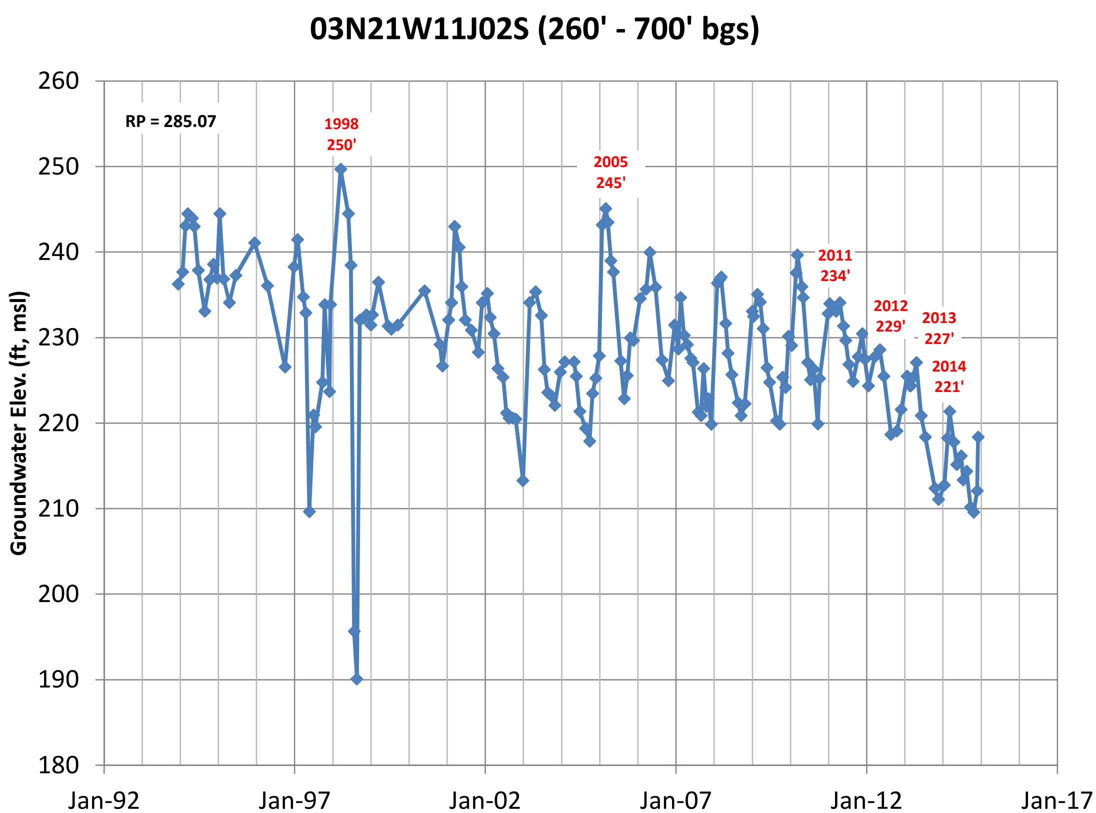
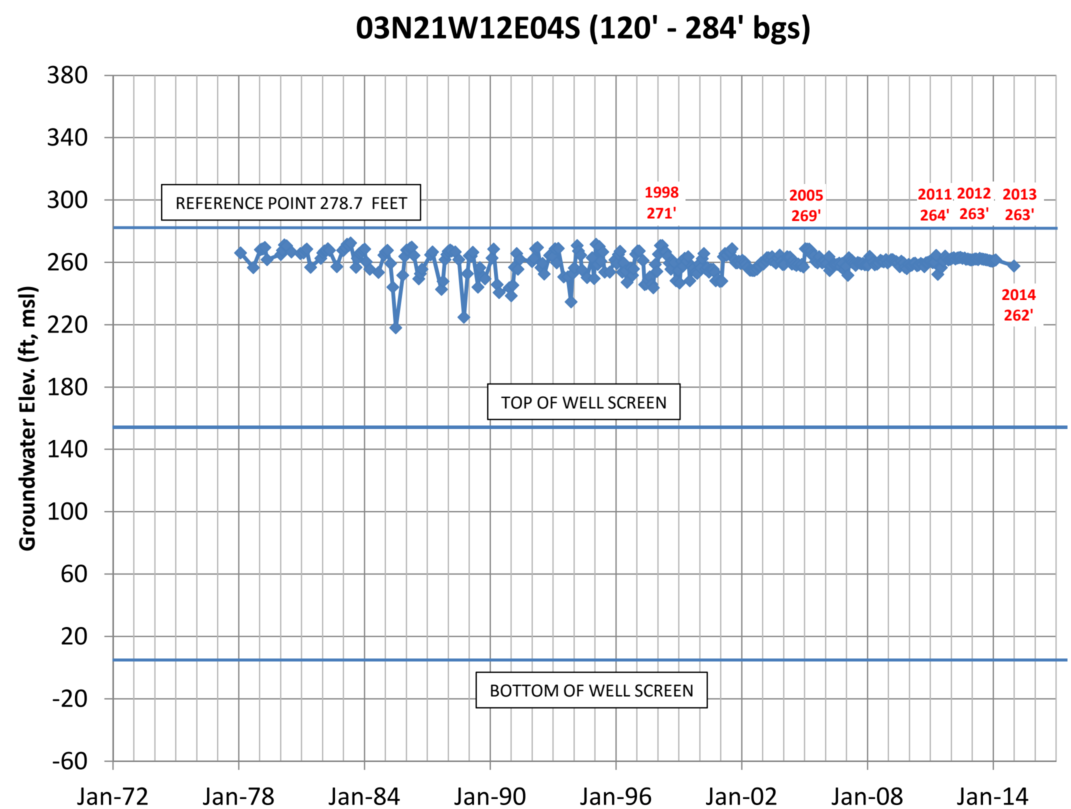

03N21W11J02S (260' - 700' bgs)
RP = 285.07
Groundwater Elev. (ft, msl)
1998 250'
2005 245'
2011 234'
2012 229'
2013 227'
2014 221'
260
250
240
230
220
210
200
190
180
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-23


03N21W12E04S (120' - 284' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 278.7 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
271'
2005
269'
2011
264'
2012
263'
2013
263'
2014
262'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

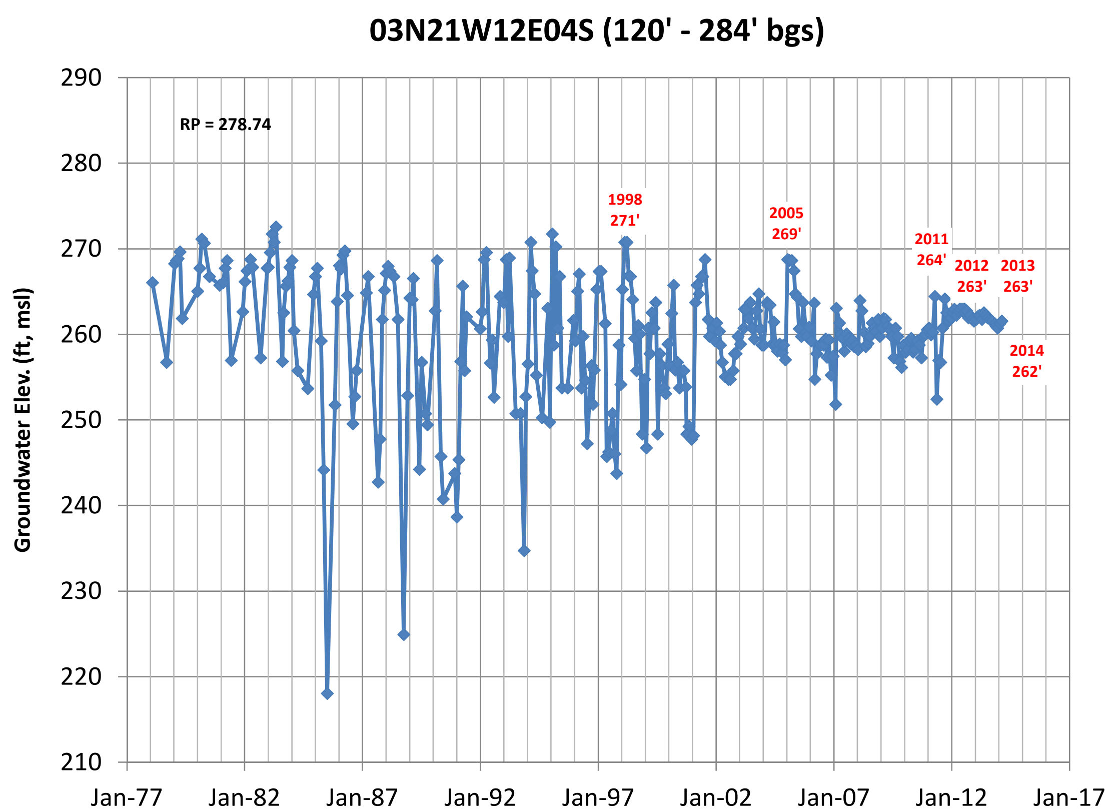
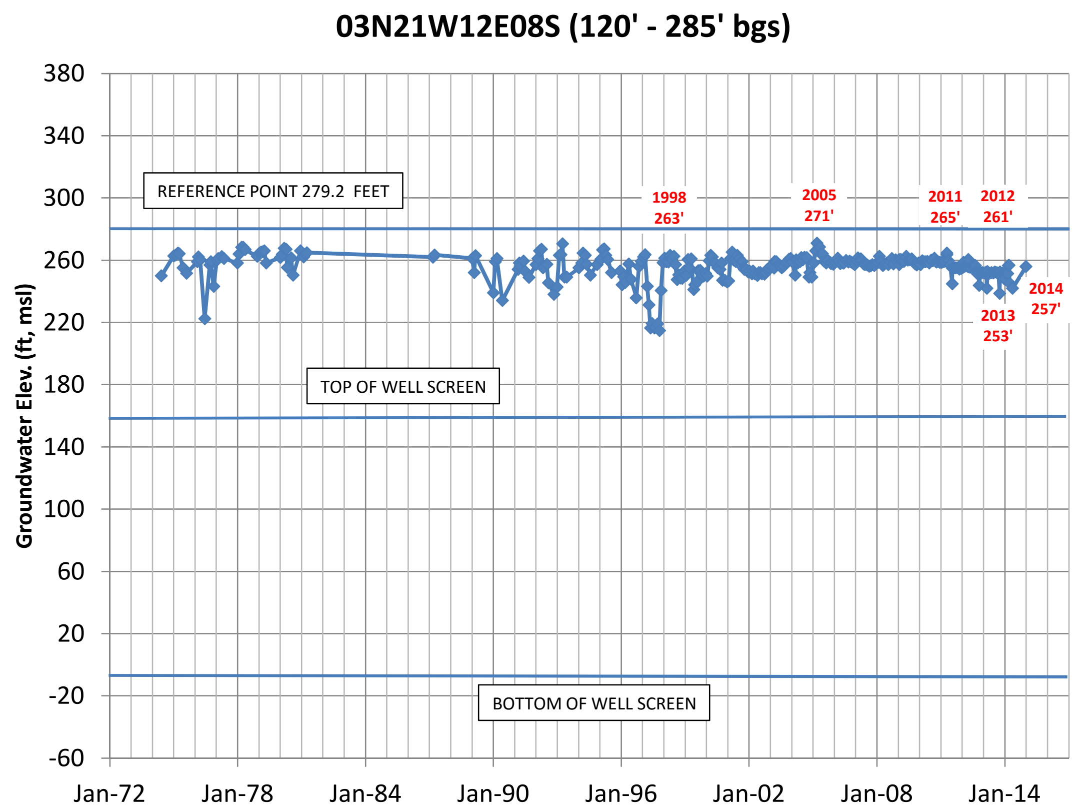

03N21W12E04S (120' - 284' bgs)
Groundwater Elev. (ft, msl)
RP = 278.74
1998
271'
2005
269'
2011
264'
2012
263'
2013
263'
2014
262'
290
280
270
260
250
240
230
220
210
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-24


03N21W12E08S (120' - 285' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 279.2 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
263'
2005
271'
2011
265'
2012
261'
2013
253'
2014
257'

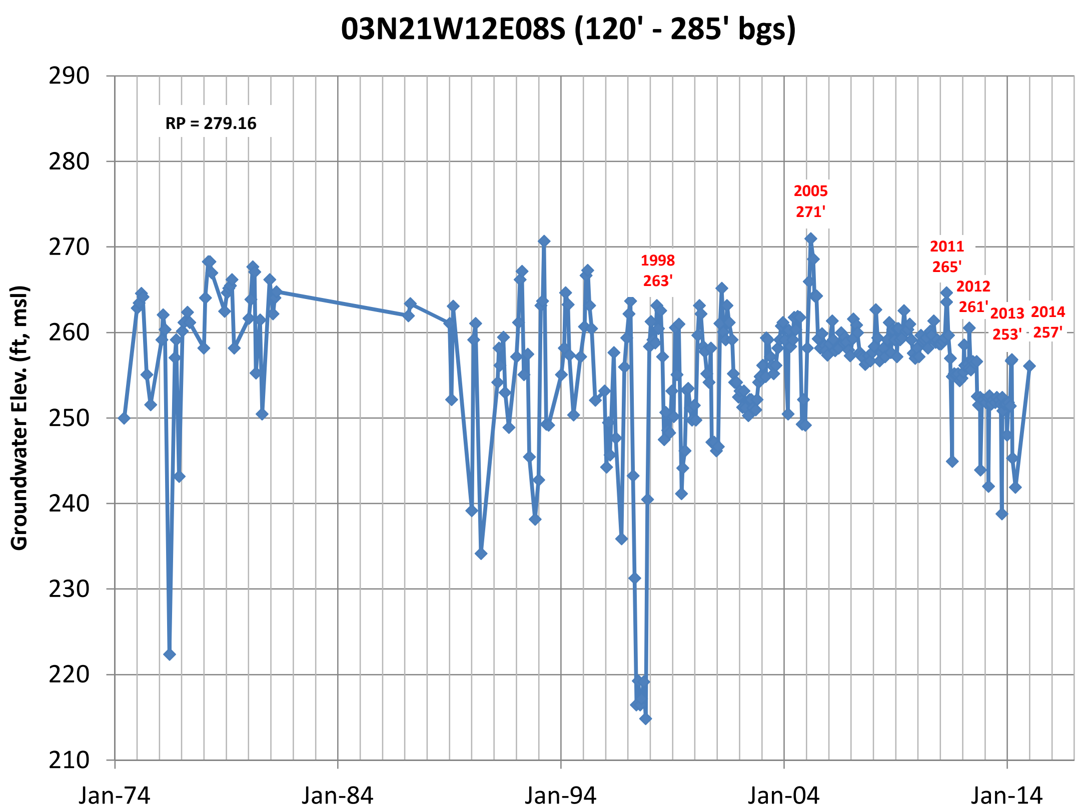
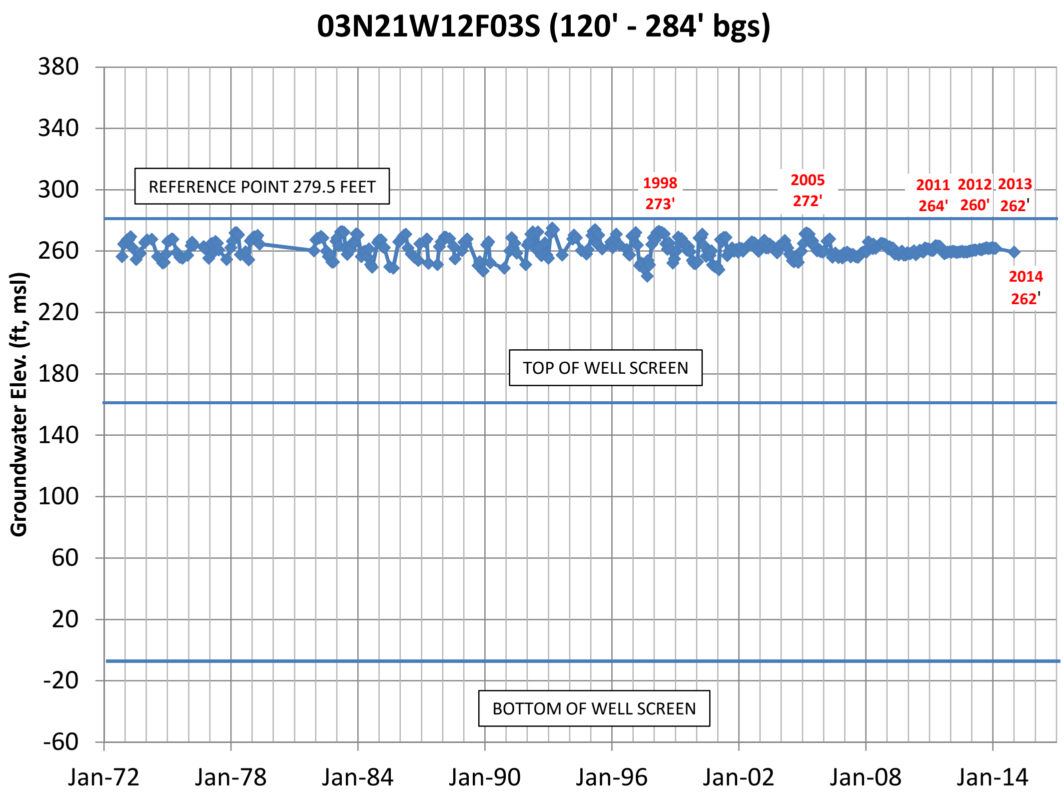

03N21W12E08S (120' - 285' bgs)
Groundwater Elev. (ft, msl)
290
280
270
260
250
240
230
220
210
Jan-74
Jan-84
Jan-94
Jan-04
Jan-14
RP = 279.16
1998
263'
2005
271'
2011
265'
2012
261'
2013
253'
2014
257'

Figure B-25


03N21W12F03S (120' - 284' bgs)
REFERENCE POINT 279.5 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998 273'
2005 272'
2011 264'
2012 260'
2013 262'
2014 262'
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

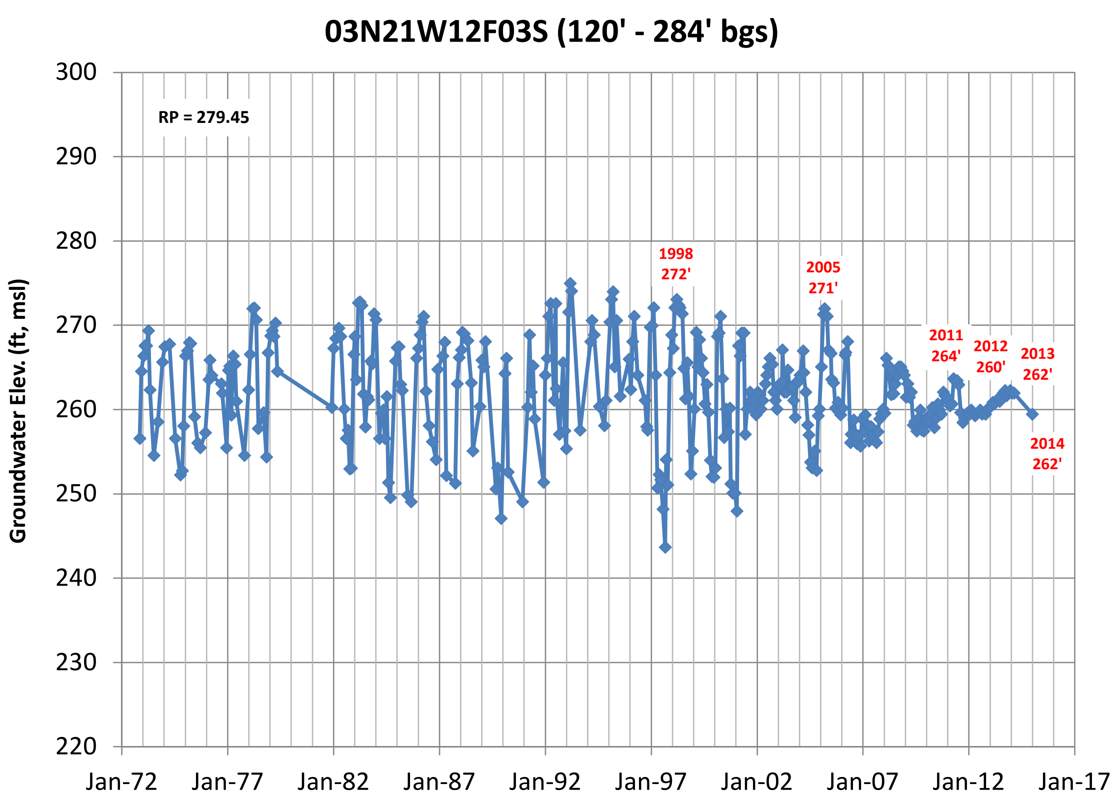
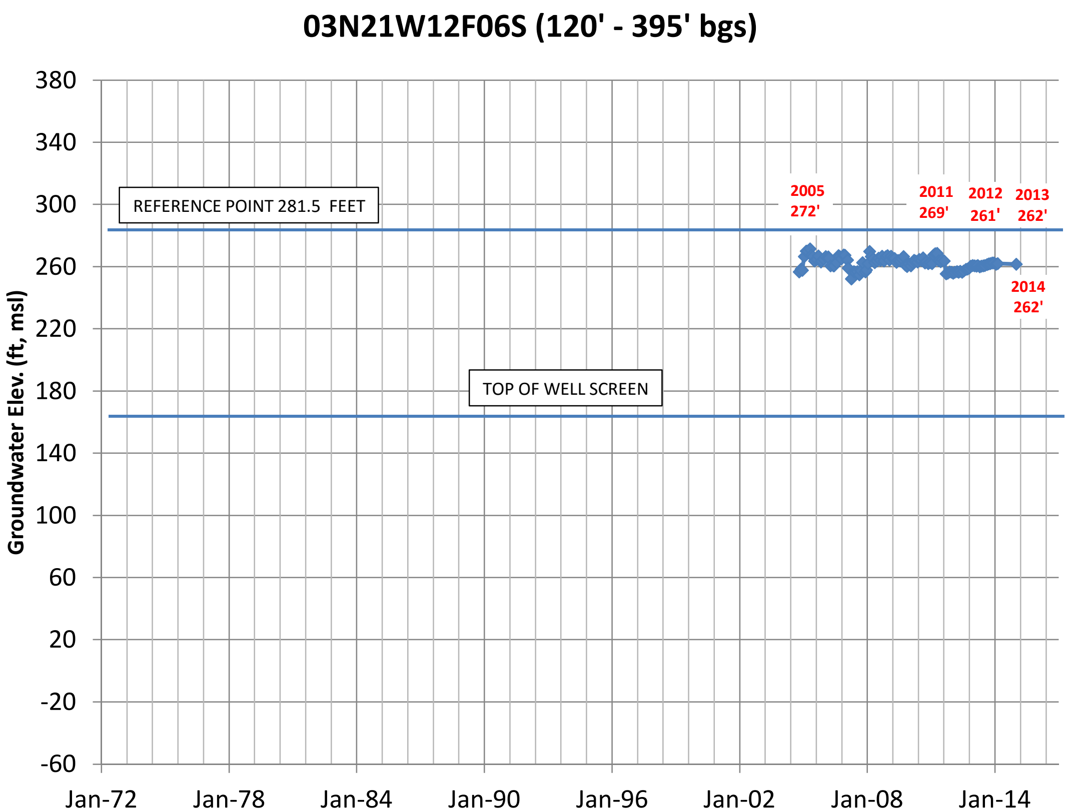
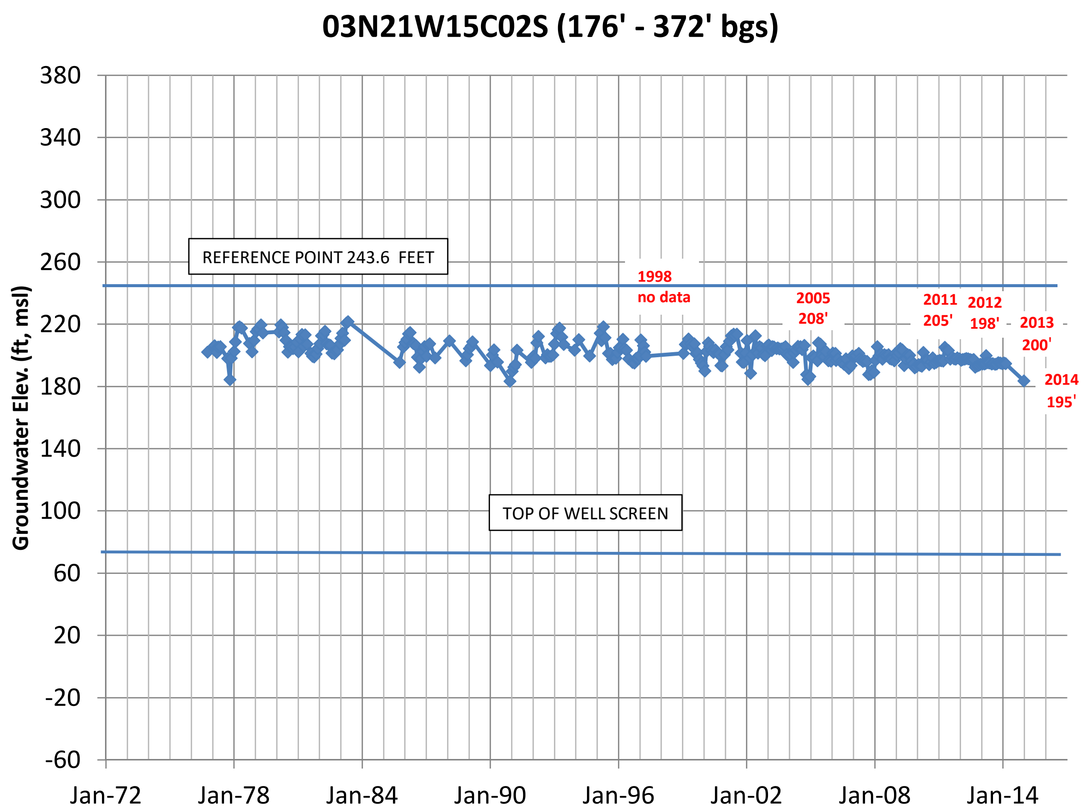

03N21W12F03S (120' - 284' bgs)
RP = 279.45
1998 272'
2005 271'
2011 264'
2012 260'
2013 262'
2014 262'
Groundwater Elev. (ft, msl)
300
290
280
270
260
250
240
230
220
Jan-72
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-26


03N21W12F06S (120' - 395' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 281.5 FEET
TOP OF WELL SCREEN
2005
272'
2011
269'
2012
261'
2013
262'
2014
262'


03N21W12F06S (120' - 395' bgs)
Groundwater Elev. (ft, msl)
300
290
280
270
260
250
240
230
220
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
RP = 281.54
2005
272'
2011
269'
2012
261'
2013
262'
2014
262'

Figure B-27


03N21W15C02S (176' - 372' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 243.6 FEET
TOP OF WELL SCREEN
1998
no data
2005
208'
2011
205'
2012
198'
2013
200'
2014
195'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

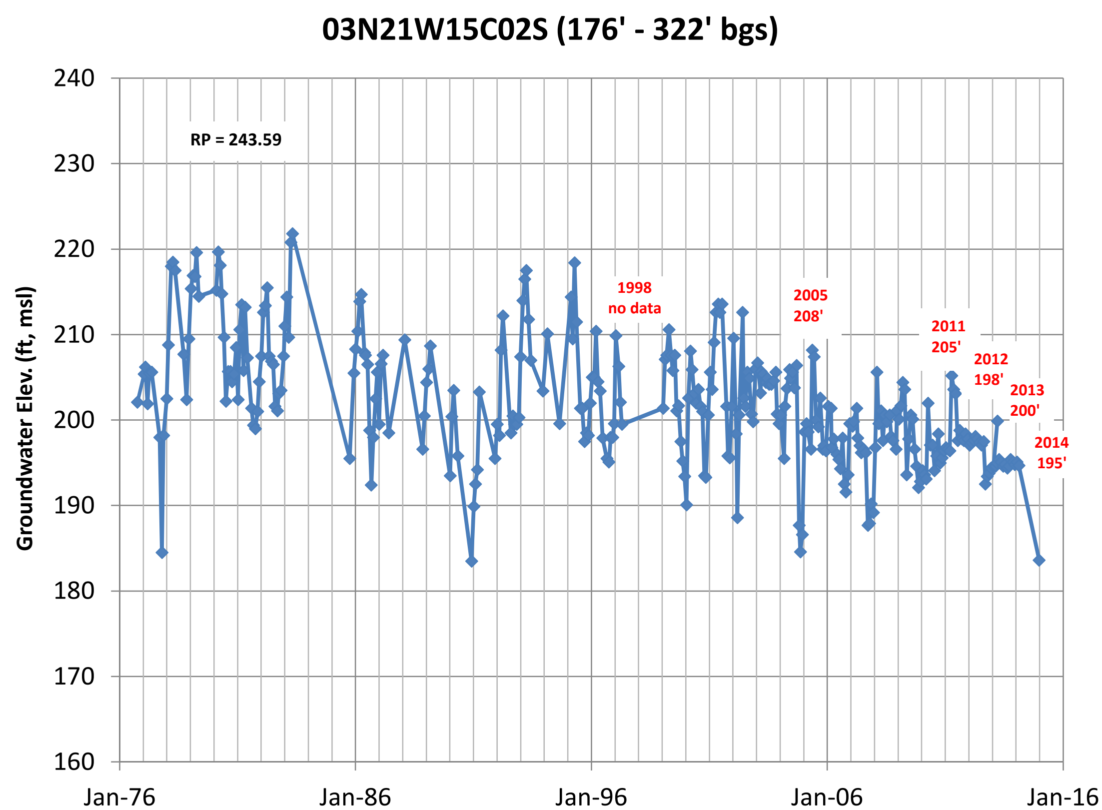

03N21W15C02S (176' - 322' bgs)
Groundwater Elev. (ft, msl)
RP = 243.59
1998
no data
2005
208'
2011
205'
2012
198'
2013
200'
2014
195'
240
230
220
210
200
190
180
170
160
Jan-76
Jan-86
Jan-96
Jan-06
Jan-16

Figure B-28

Intentionally Left Blank

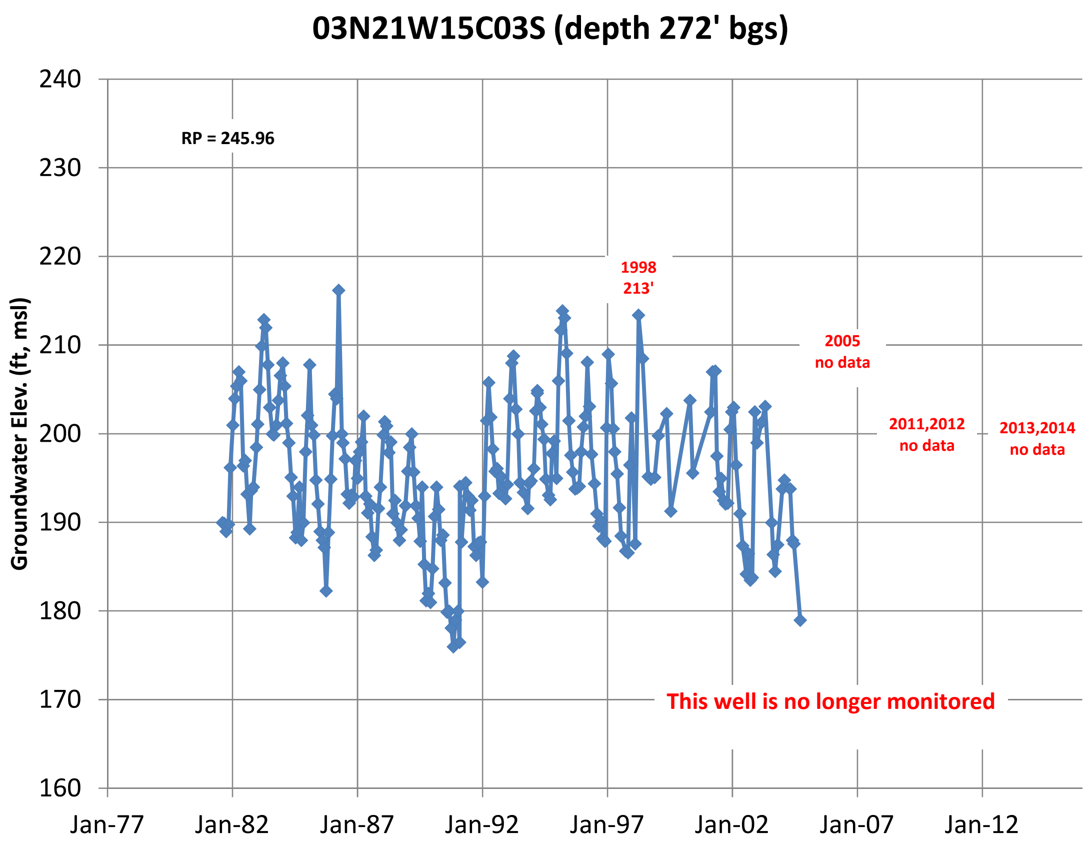
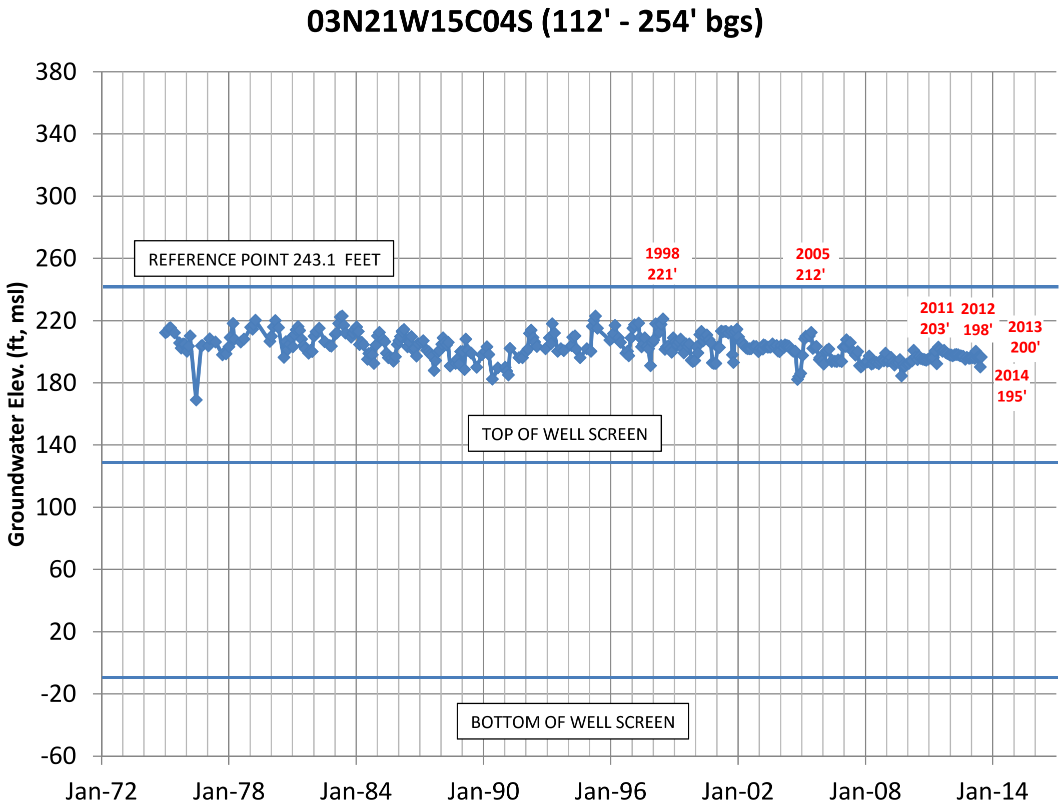


Figure B-29


03N21W15C04S (112' - 254' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 243.1 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
221'
2005
212'
2011
203'
2012
198'
2013
200'
2014
195'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

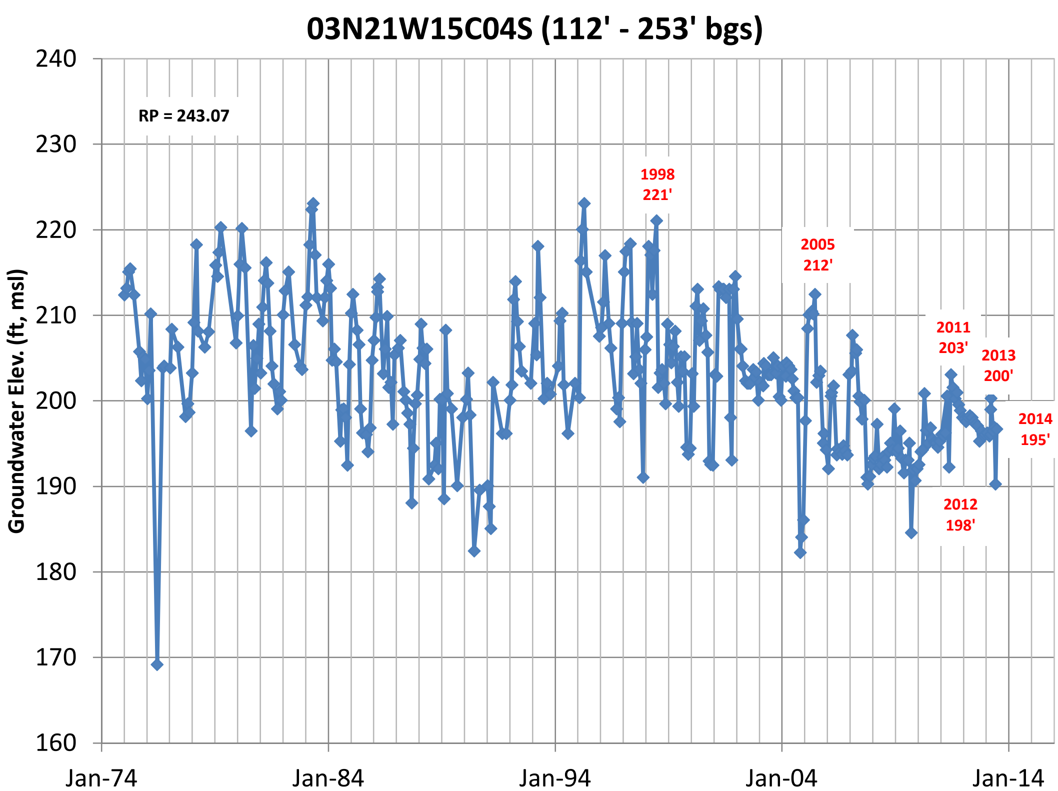
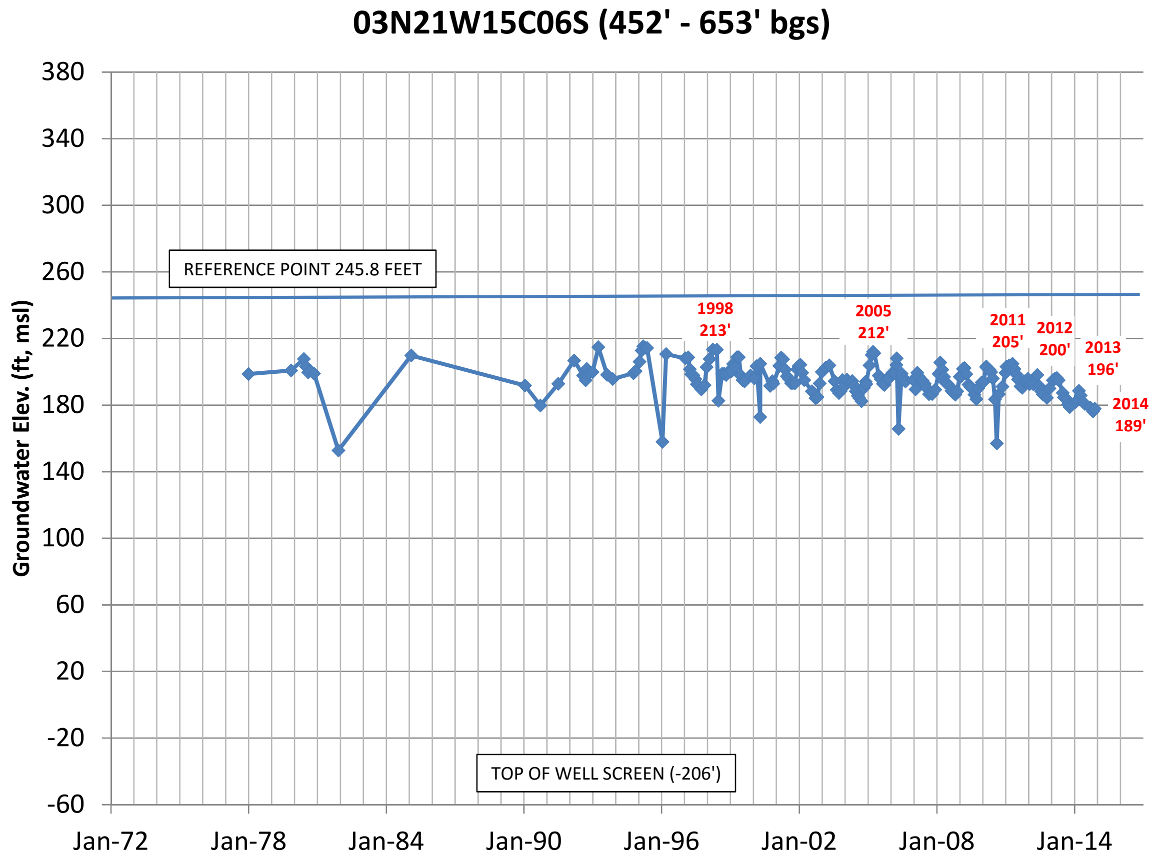

03N21W15C04S (112' - 253' bgs)
Groundwater Elev. (ft, msl)
RP = 243.07
1998
221'
2005
212'
2011
203'
2013
200'
2014
195'
2012
198'
240
230
220
210
200
190
180
170
160
Jan-74
Jan-84
Jan-94
Jan-04
Jan-14

Figure B-30


03N21W15C06S (452' - 653' bgs)
REFERENCE POINT 245.8 FEET
TOP OF WELL SCREEN (-206')
1998
213'
2005
212'
2011
205'
2012
200'
2013
196'
2014
189'
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

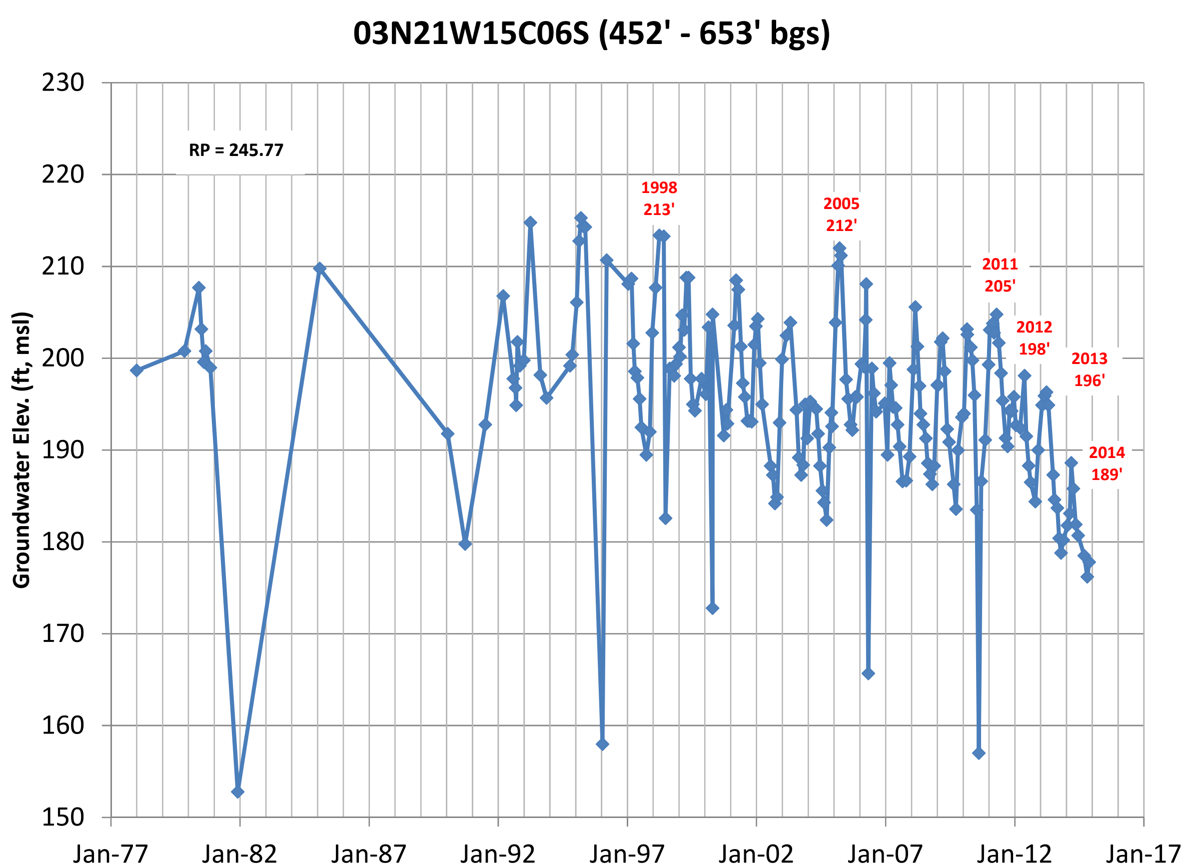
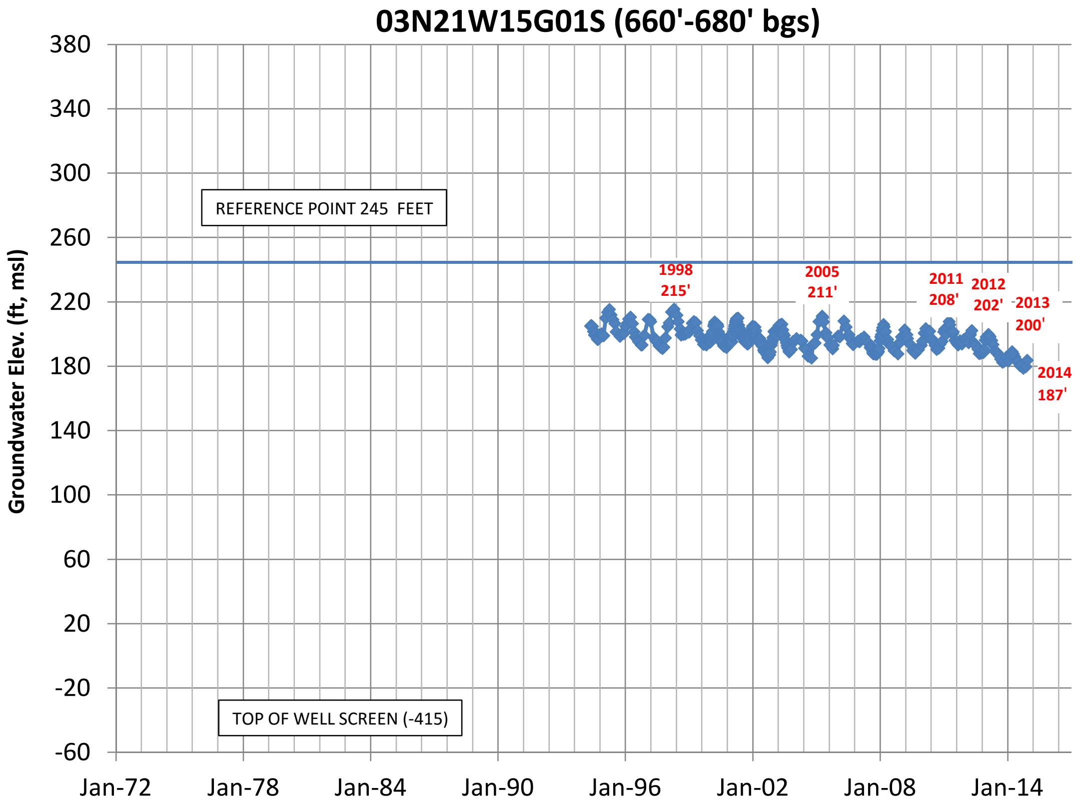

03N21W15C06S (452' - 653' bgs)
RP = 245.77
1998
213'
2005
212'
2011
205'
2012
198'
2013
196'
2014
189'
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-31


03N21W15G01S (660'-680' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 245 FEET
TOP OF WELL SCREEN (-415)
1998 215'
2005 211'
2011 208'
2012 202'
2013 200'
2014 187'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

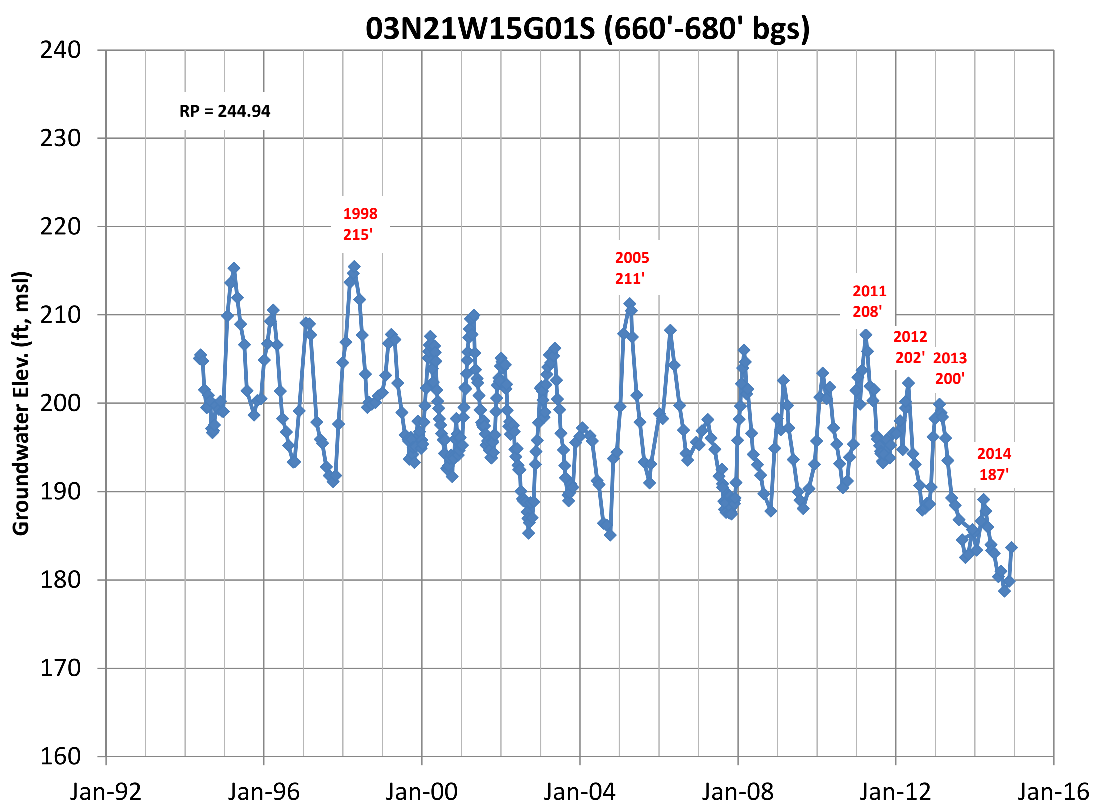
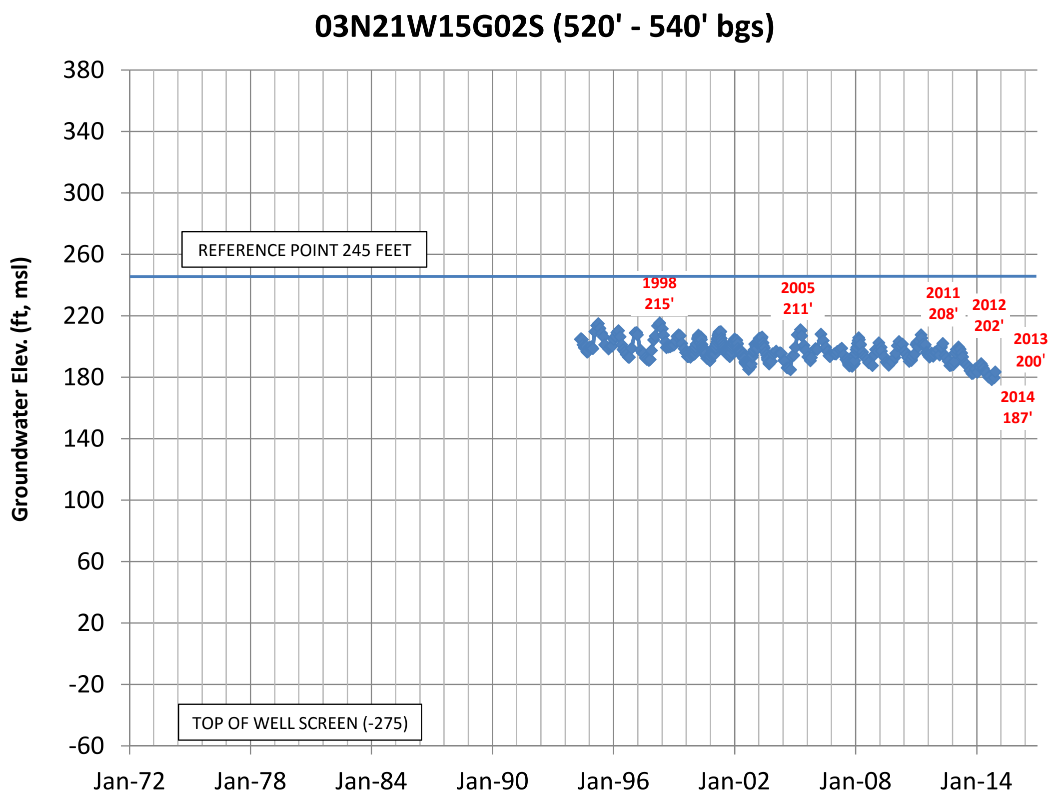

03N21W15G01S (660'-680' bgs)
Groundwater Elev. (ft, msl)
RP = 244.94
1998 215'
2005 211'
2011 208'
2012 202'
2013 200'
2014 187'
240
230
220
210
200
190
180
170
160
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16

Figure B-32


03N21W15G02S (520' - 540' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
REFERENCE POINT 245 FEET
TOP OF WELL SCREEN (-275)
1998
215'
2005
211'
2011
208'
2012
202'
2013
200'
2014
187'
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

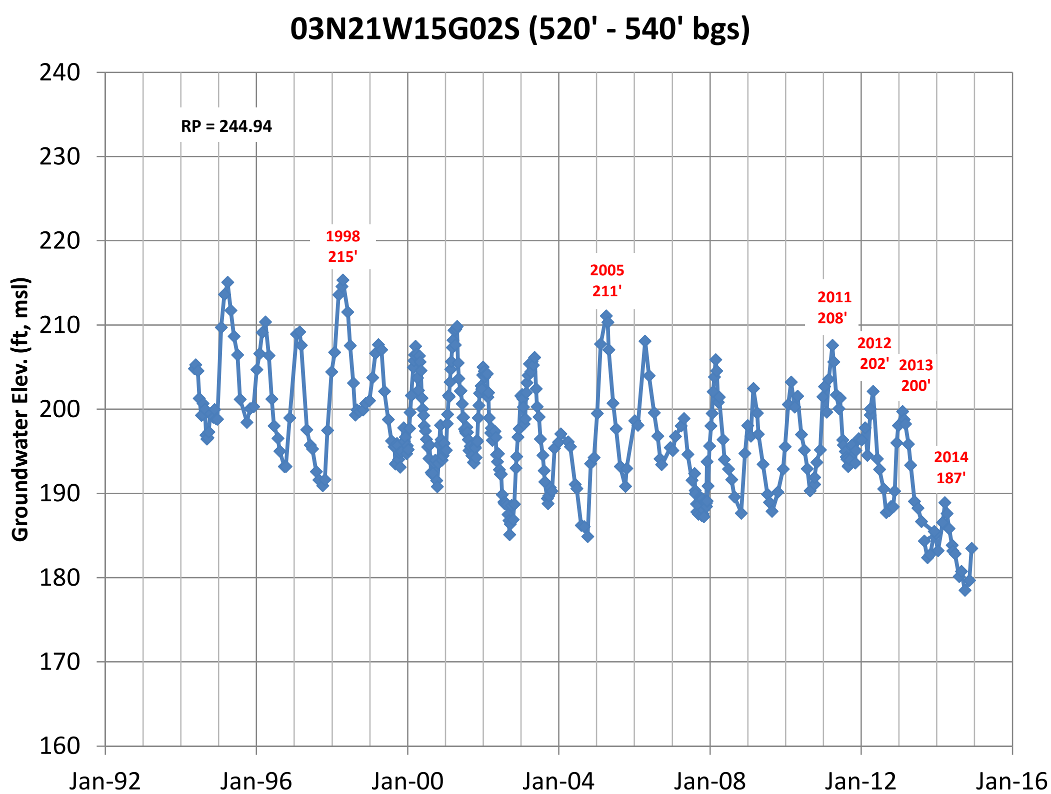
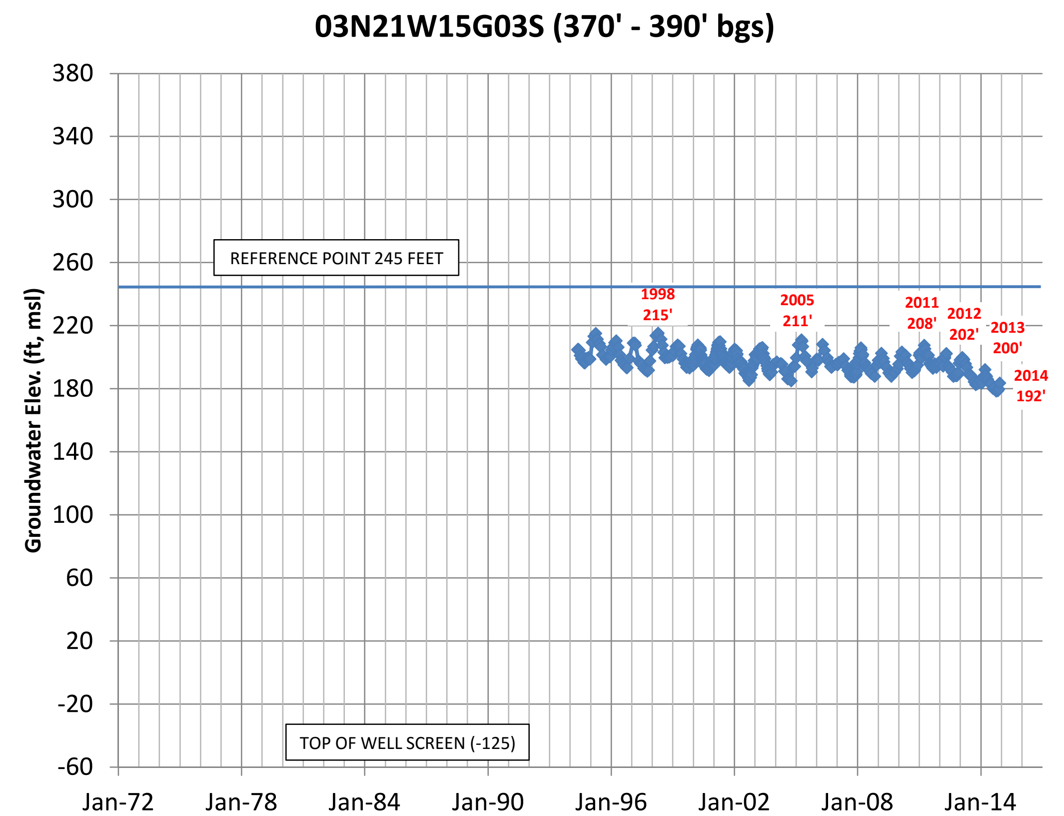

03N21W15G02S (520' - 540' bgs)
Groundwater Elev. (ft, msl)
240
230
220
210
200
190
180
170
160
RP = 244.94
1998
215'
2005
211'
2011
208'
2012
202'
2013
200'
2014
187'
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16

Figure B-33


03N21W15G03S (370' - 390' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 245 FEET
TOP OF WELL SCREEN (-125)
1998
215'
2005
211'
2011
208'
2012
202'
2013
200'
2014
192'

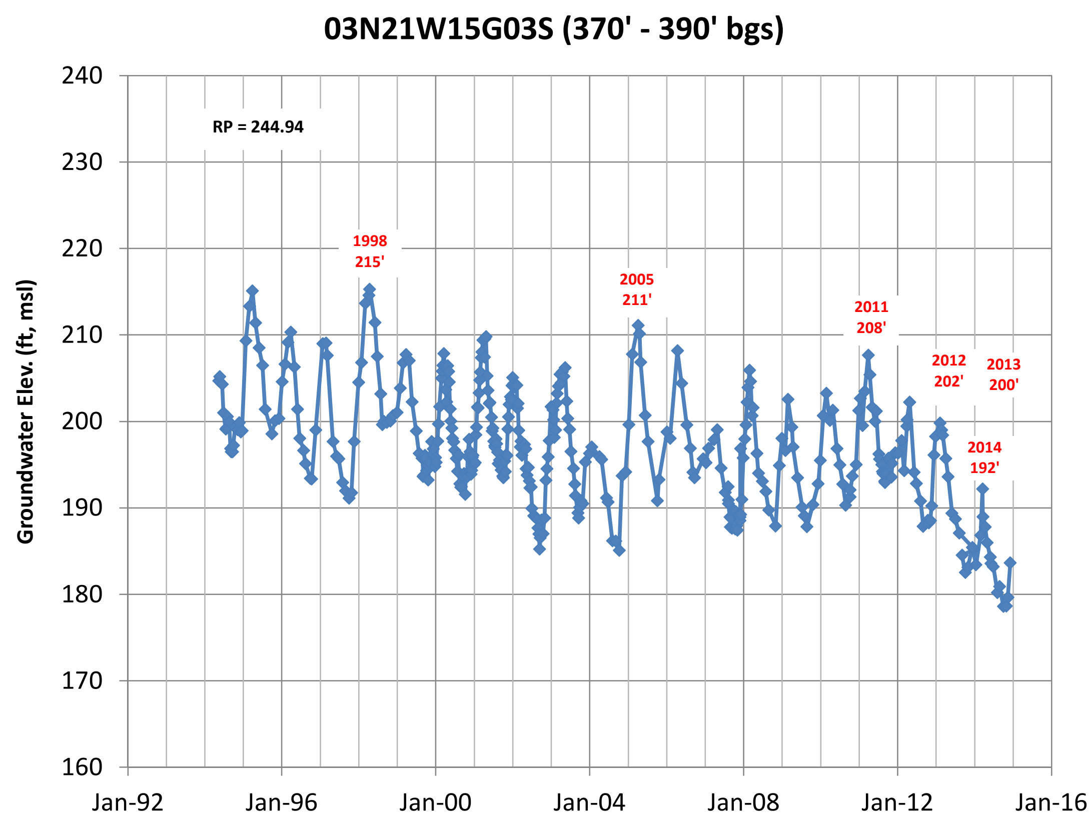
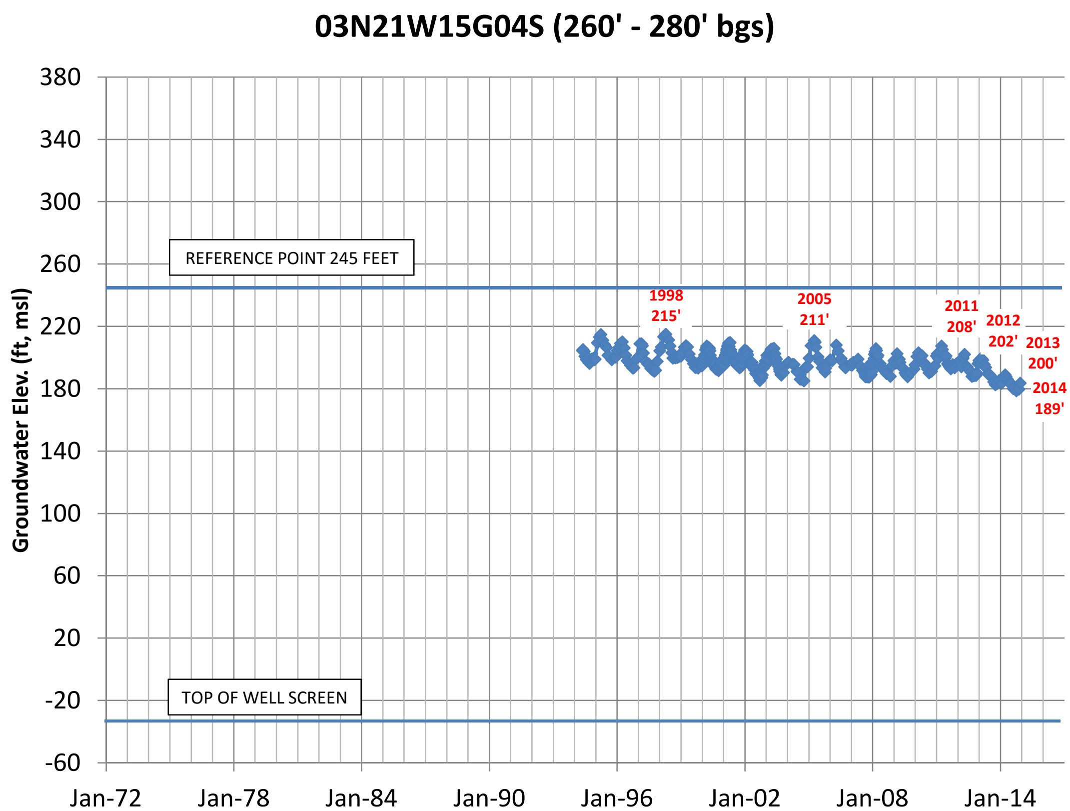

03N21W15G03S (370' - 390' bgs)
Groundwater Elev. (ft, msl)
240
230
220
210
200
190
180
170
160
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
RP = 244.94
1998
215'
2005
211'
2011
208'
2012
202'
2013
200'
2014
192'

Figure B-34


03N21W15G04S (260' - 280' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 245 FEET
TOP OF WELL SCREEN
1998
215'
2005
211'
2011
208'
2012
202'
2013
200'
2014
189'

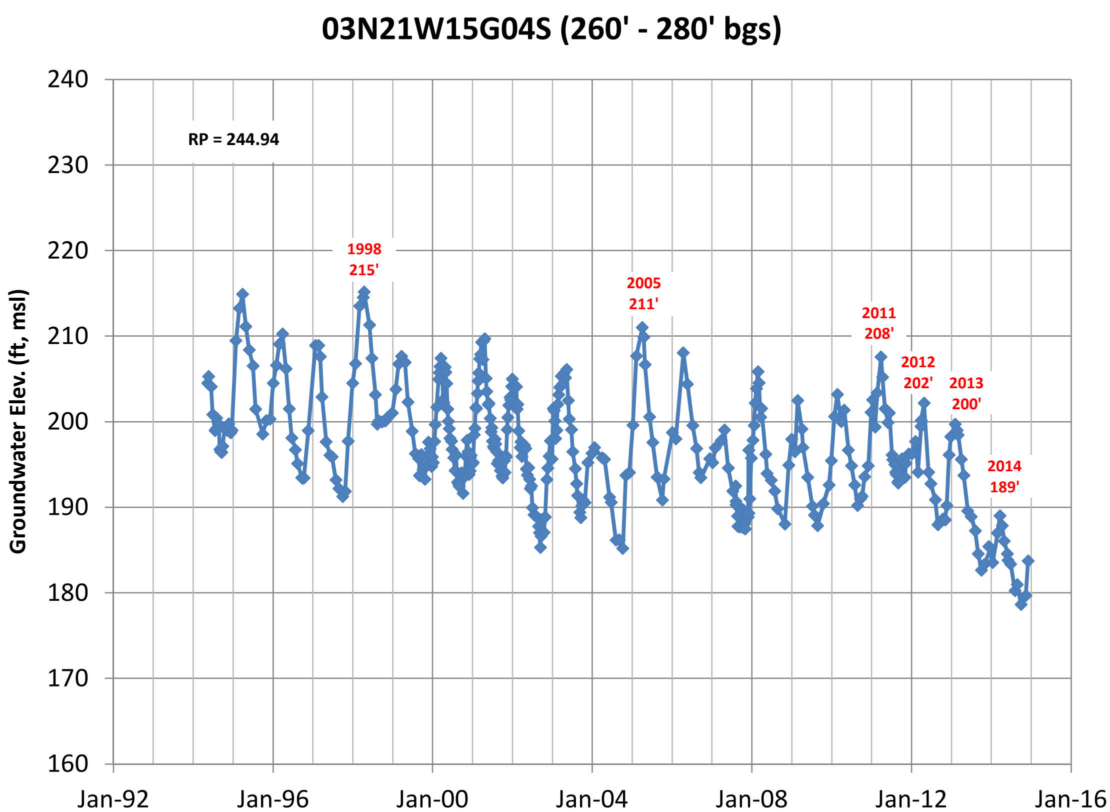
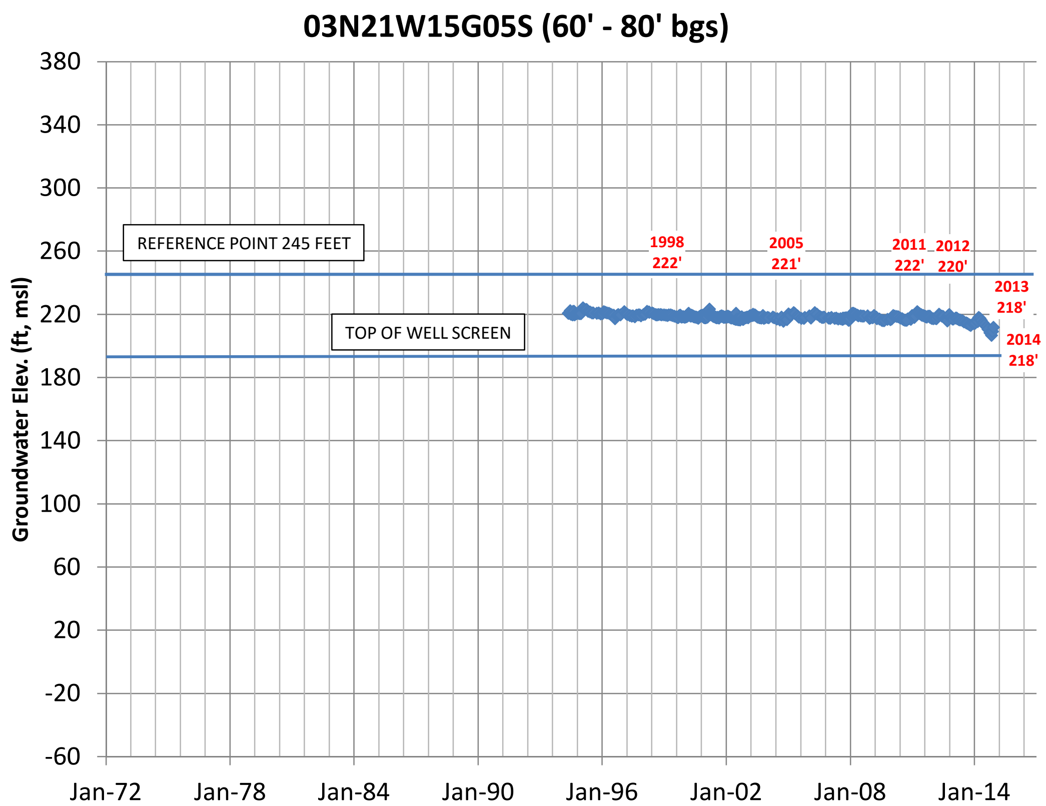

03N21W15G04S (260' - 280' bgs)
Groundwater Elev. (ft, msl)
240
230
220
210
200
190
180
170
160
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
RP = 244.94
1998
215'
2005
211'
2011
208'
2012
202'
2013
200'
2014
189'

Figure B-35


03N21W15G05S (60' - 80' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 245 FEET
TOP OF WELL SCREEN
1998 222'
2005 221'
2011 222'
2012 220'
2013 218'
2014 218'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

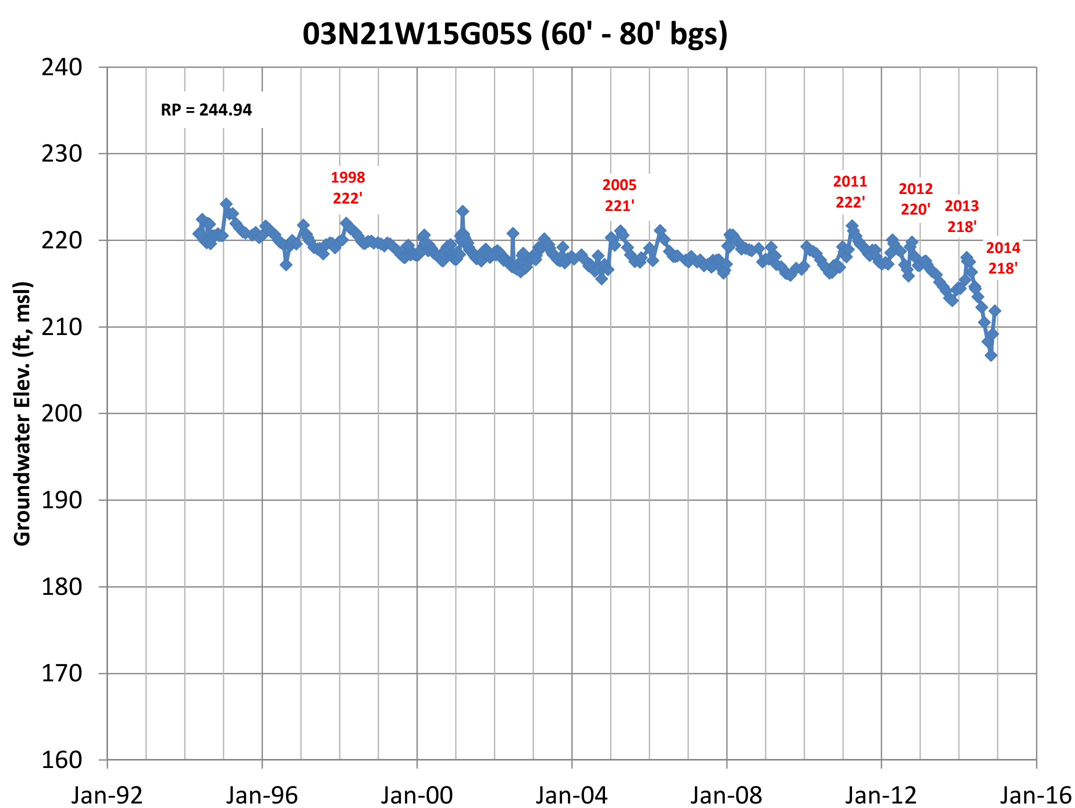
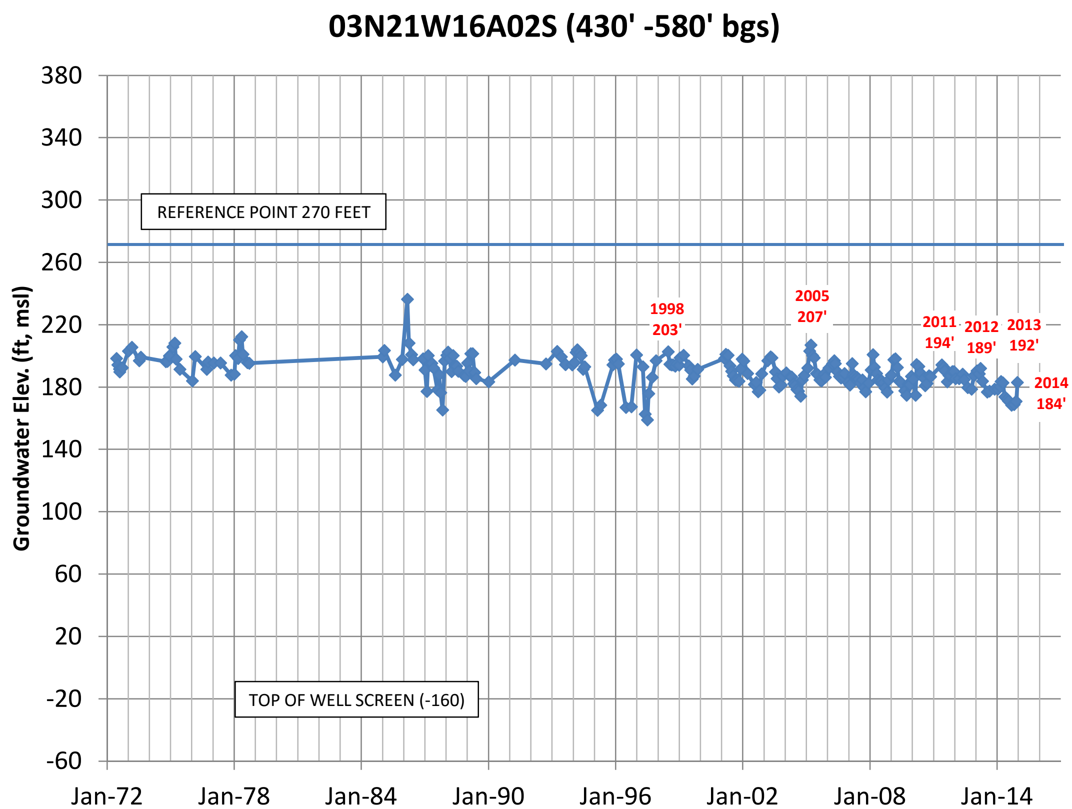

03N21W15G05S (60' - 80' bgs)
Groundwater Elev. (ft, msl)
RP = 244.94
1998 222'
2005 221'
2011 222'
2012 220'
2013 218'
2014 218'
240
230
220
210
200
190
180
170
160
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16

Figure B-36


03N21W16A02S (430' -580' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
REFERENCE POINT 270 FEET
TOP OF WELL SCREEN (-160)
1998
203'
2005
207'
2011
194'
2012
189'
2013
192'
2014
184'
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

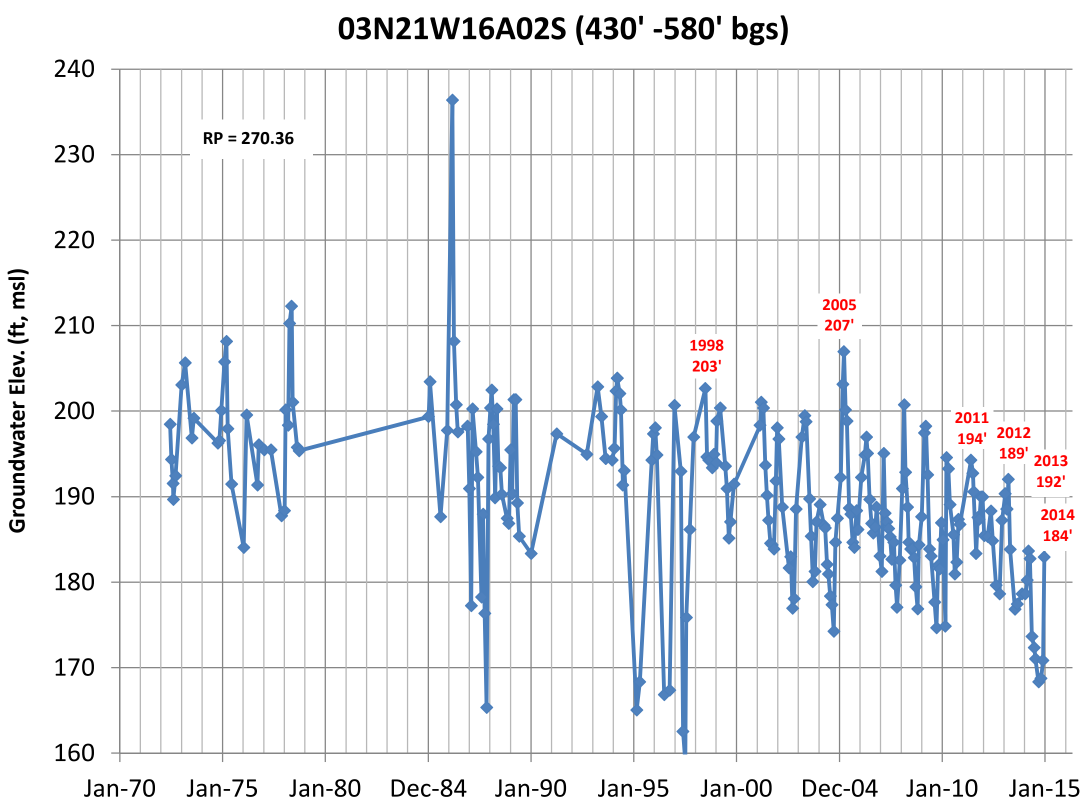
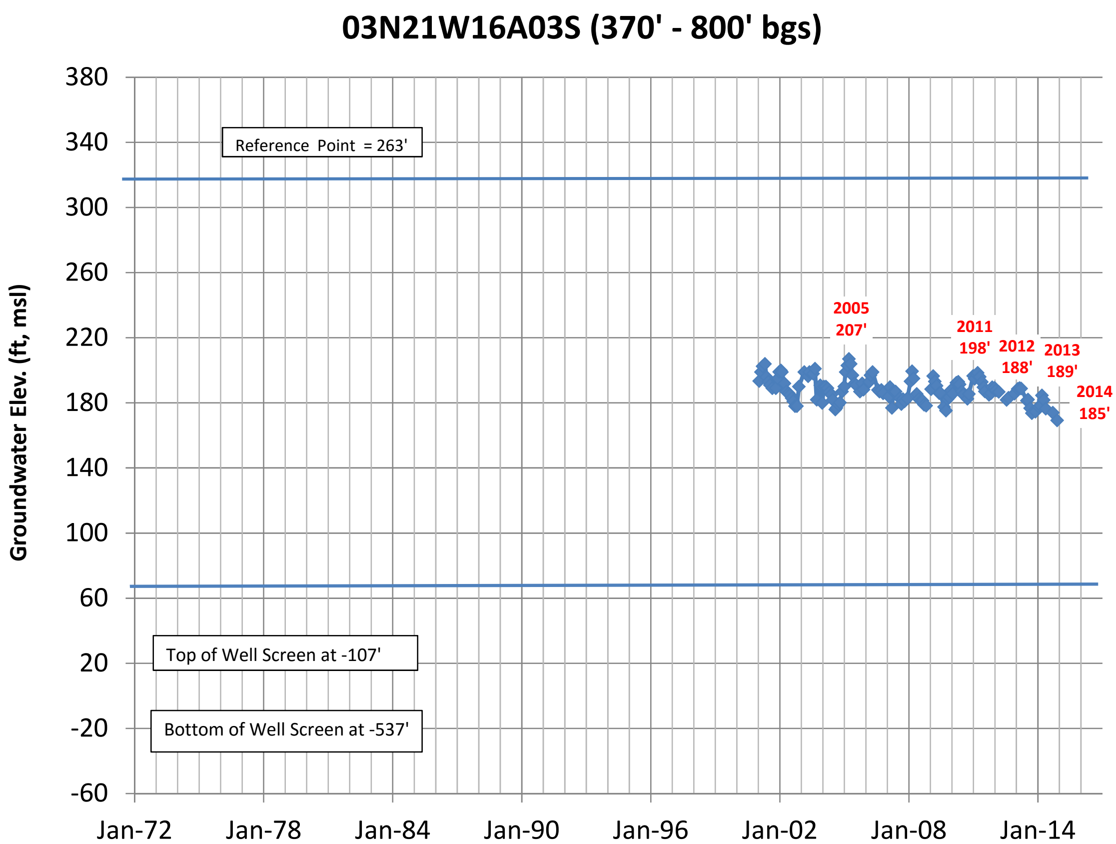

03N21W16A02S (430' -580' bgs)
Groundwater Elev. (ft, msl)
240
230
220
210
200
190
180
170
160
RP = 270.36
1998
203'
2005
207'
2011
194'
2012
189'
2013
192'
2014
184'
Jan-70
Jan-75
Jan-80
Dec-84
Jan-90
Jan-95
Jan-00
Dec-04
Jan-10
Jan-15

Figure B-37


03N21W16A03S (370' - 800' bgs)
Reference Point = 263'
Top of Well Screen at -107'
Bottom of Well Screen at -537'
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
2005
207'
2011
198'
2012
188'
2013
189'
2014
185'

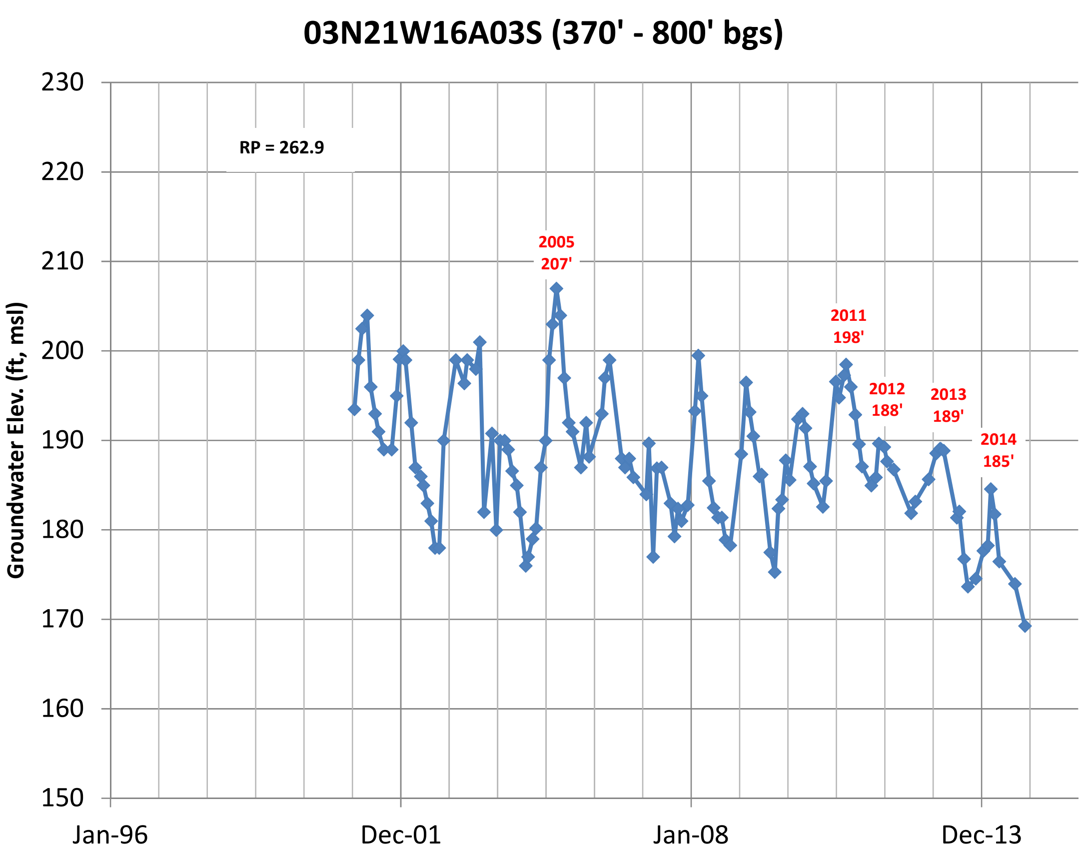

03N21W16A03S (370' - 800' bgs)
RP = 262.9
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
Jan-96
Dec-01
Jan-08
Dec-13
2005
207'
2011
198'
2012
188'
2013
189'
2014
185'

Figure B-38

Intentionally Left Blank

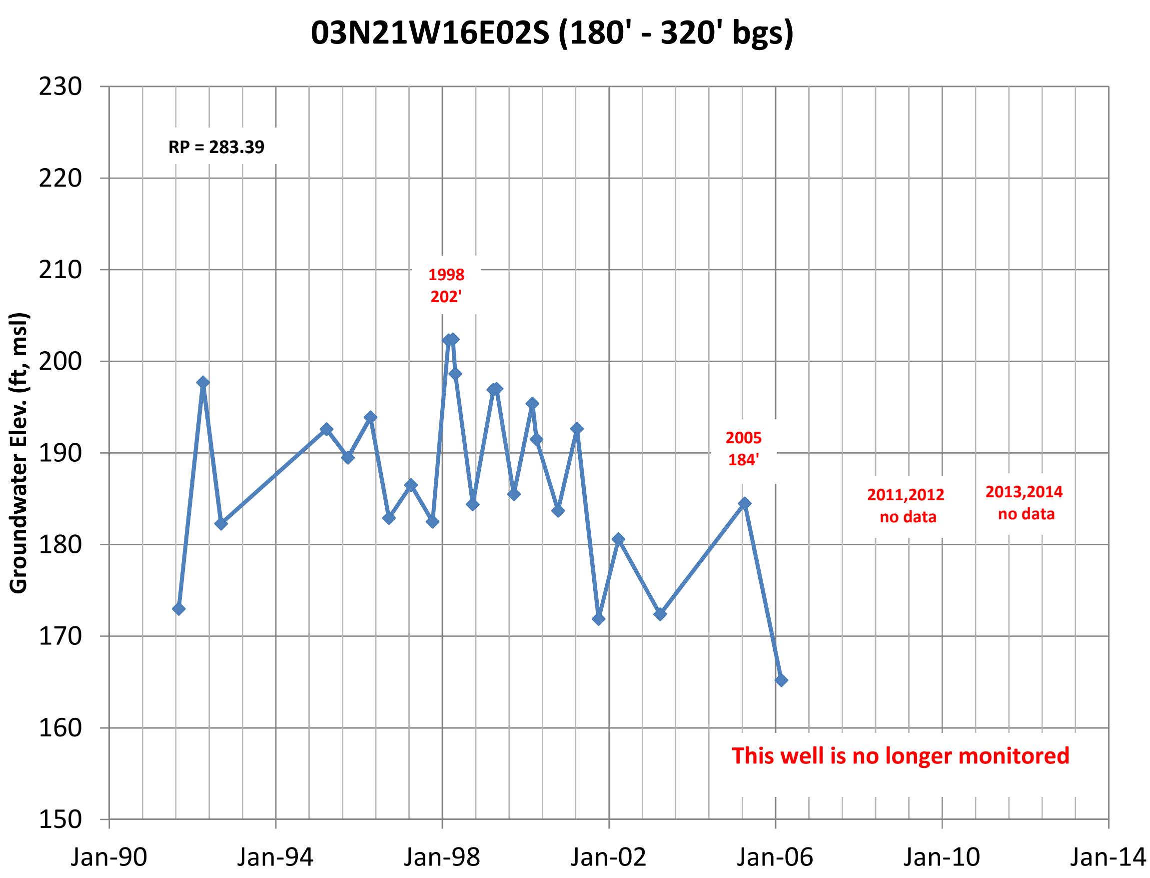


Figure B-39

Intentionally Left Blank

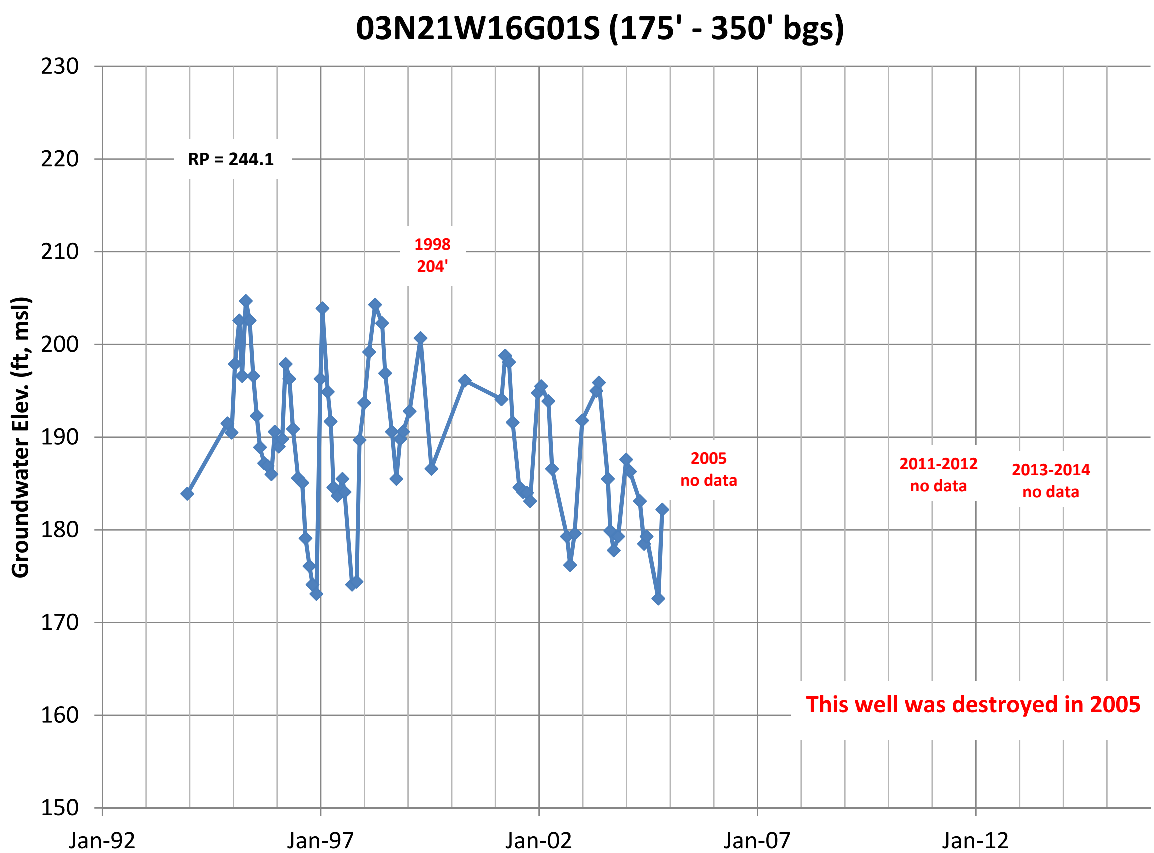
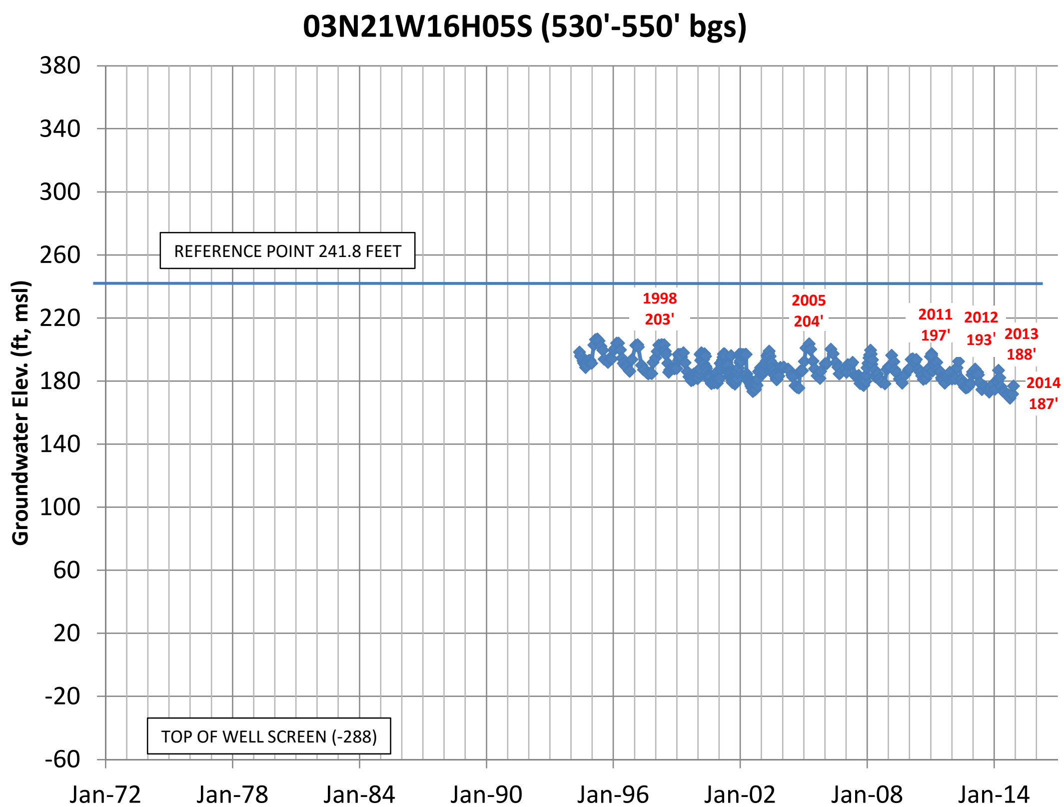


Figure B-40


03N21W16H05S (530'-550' bgs)
REFERENCE POINT 241.8 FEET
TOP OF WELL SCREEN (-288)
Groundwater Elev. (ft, msl)
1998 203'
2005 204'
2011 197'
2012 193'
2013 188'
2014 187'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

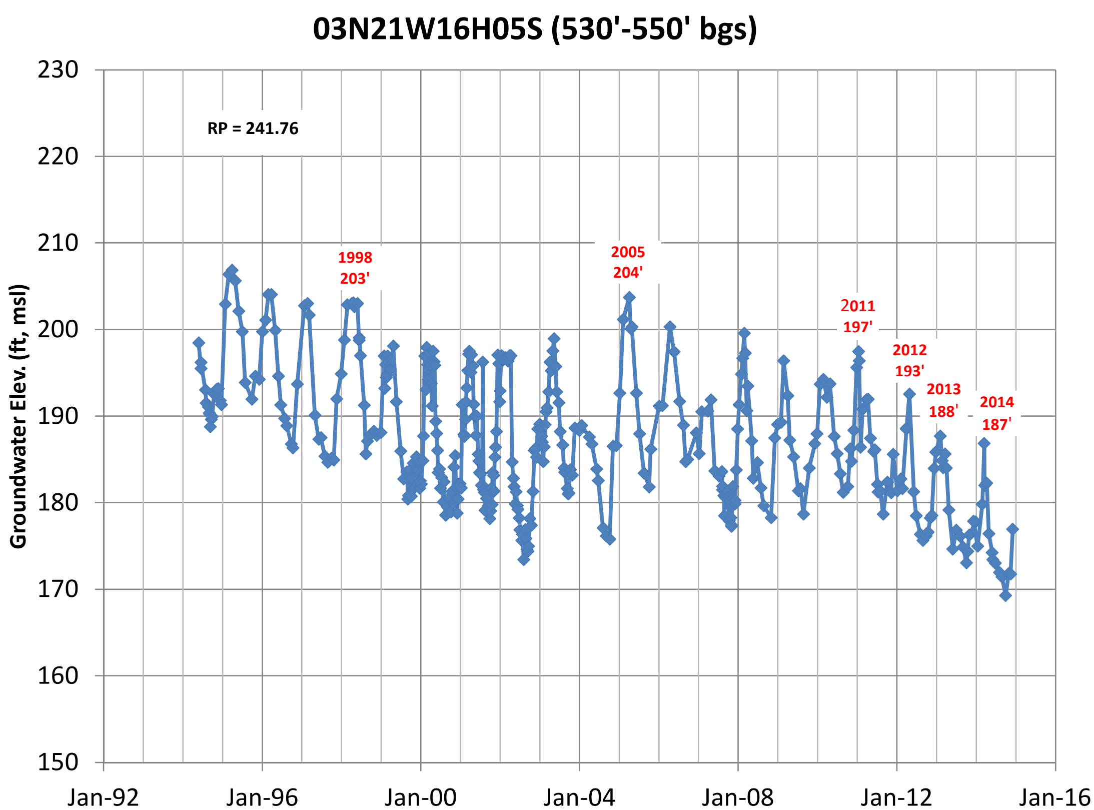
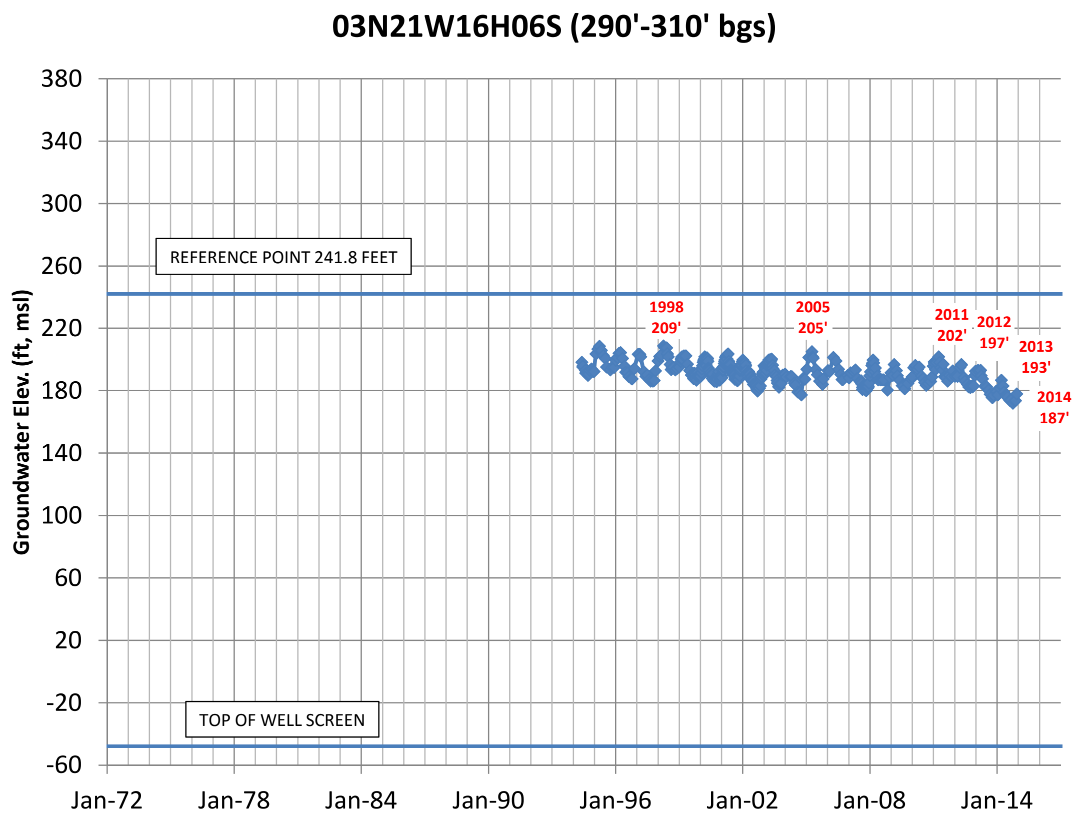

03N21W16H05S (530'-550' bgs)
RP = 241.76
Groundwater Elev. (ft, msl)
1998 203'
2005 204'
2011 197'
2012 193'
2013 188'
2014 187'
230
220
210
200
190
180
170
160
150
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16

Figure B-41


03N21W16H06S (290'-310' bgs)
REFERENCE POINT 241.8 FEET
TOP OF WELL SCREEN
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
1998
209'
2005
205'
2011
202'
2012
197'
2013
193'
2014
187'

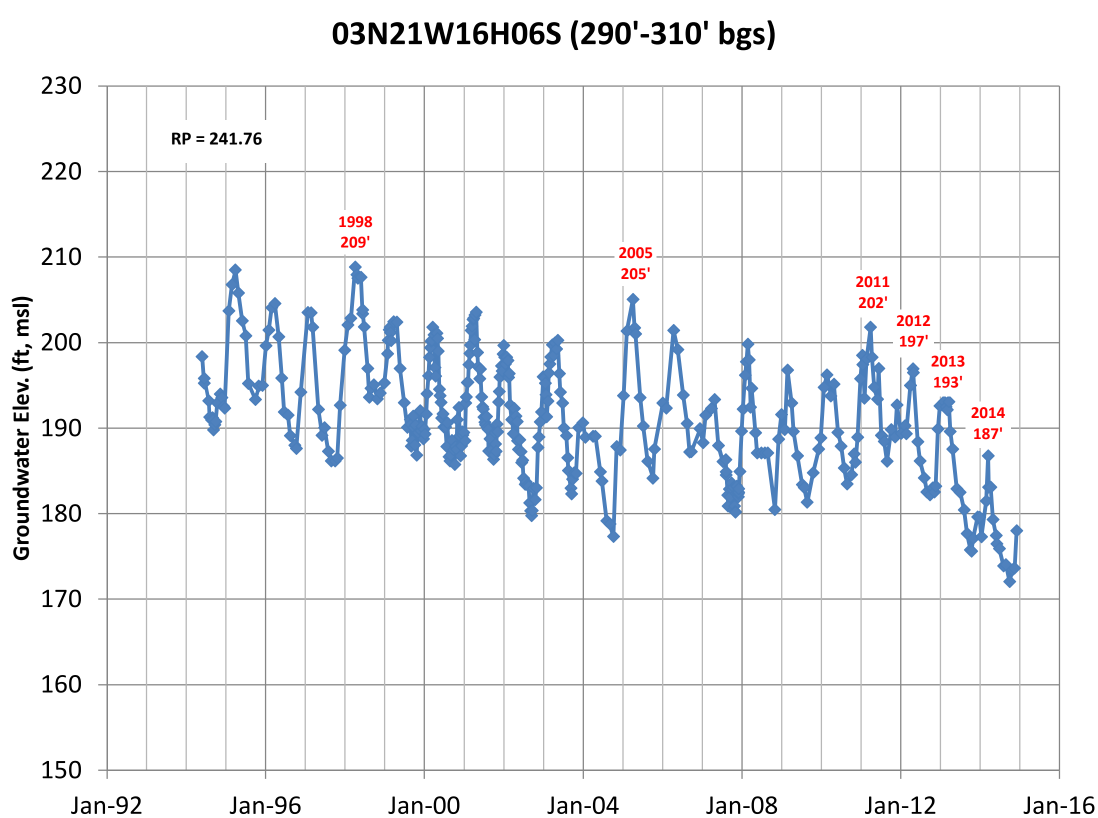
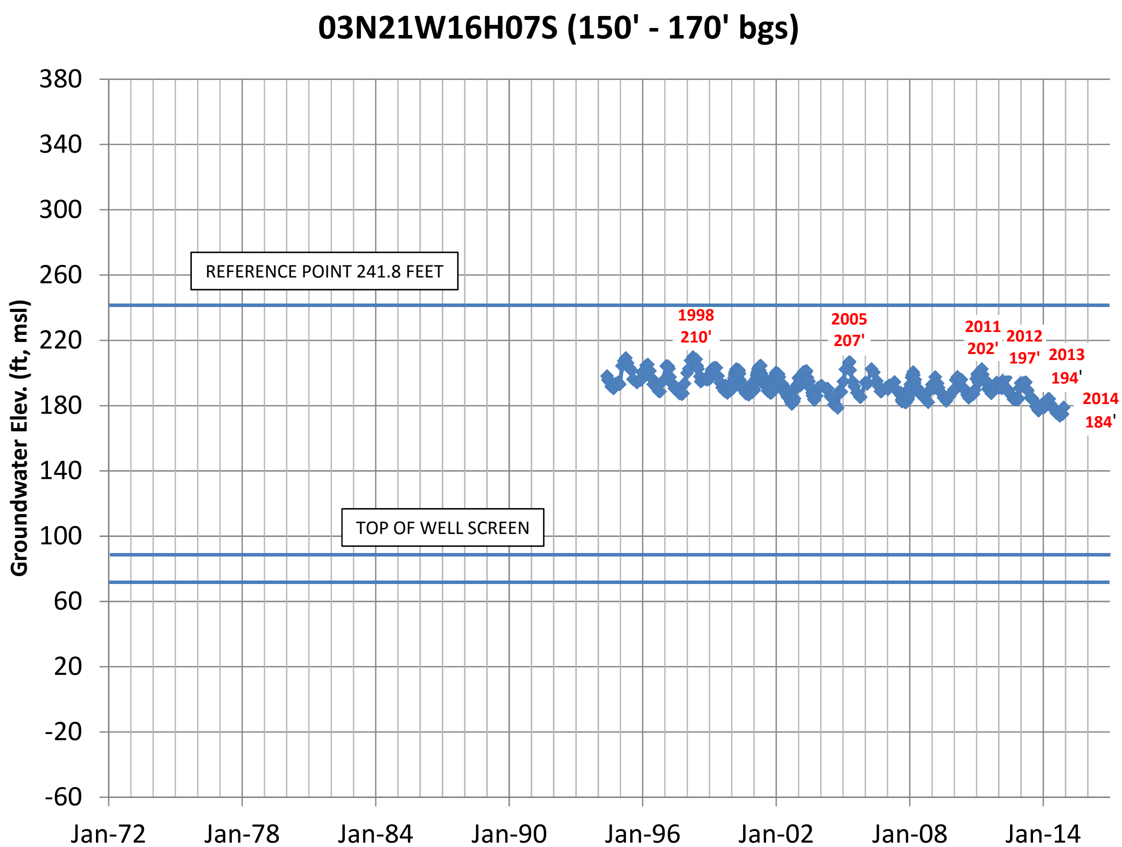

03N21W16H06S (290'-310' bgs)
RP = 241.76
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
1998
209'
2005
205'
2011
202'
2012
197'
2013
193'
2014
187'

Figure B-42


03N21W16H07S (150' - 170' bgs)
REFERENCE POINT 241.8 FEET
TOP OF WELL SCREEN
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
1998
210'
2005
207'
2011
202'
2012
197'
2013
194'
2014
184'

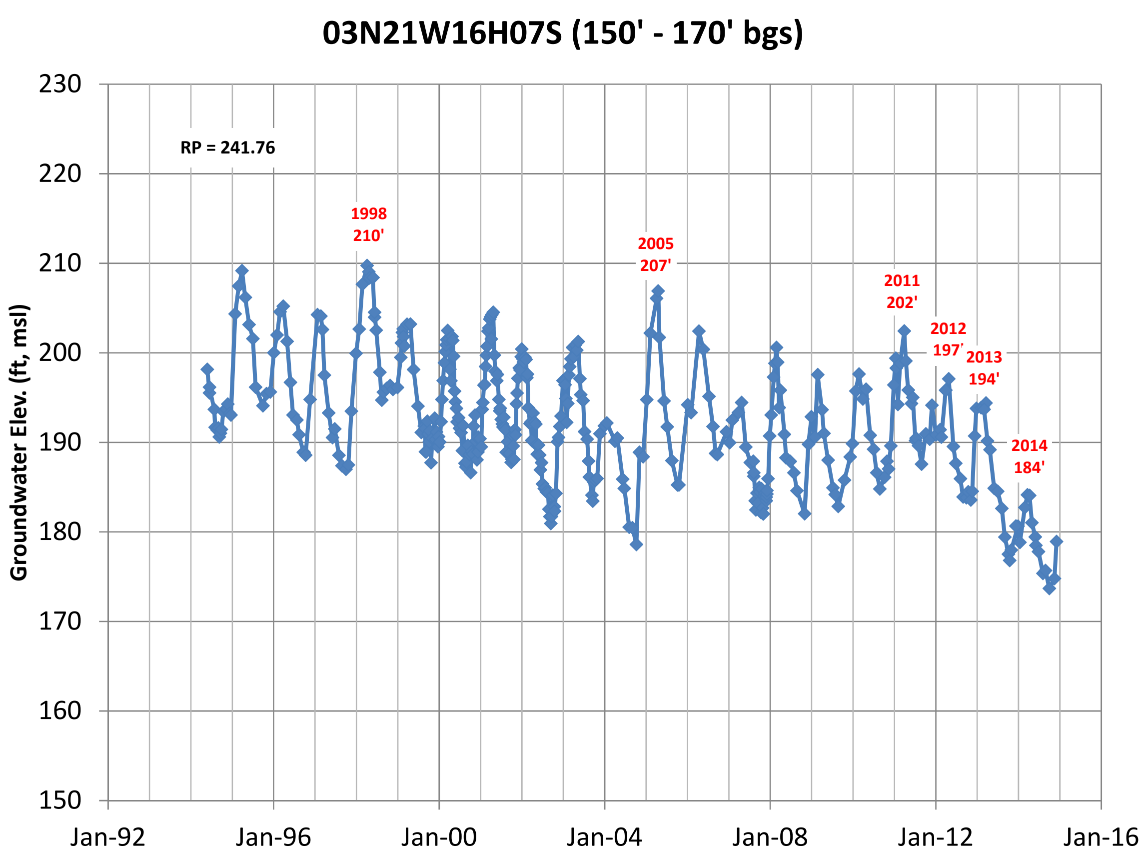
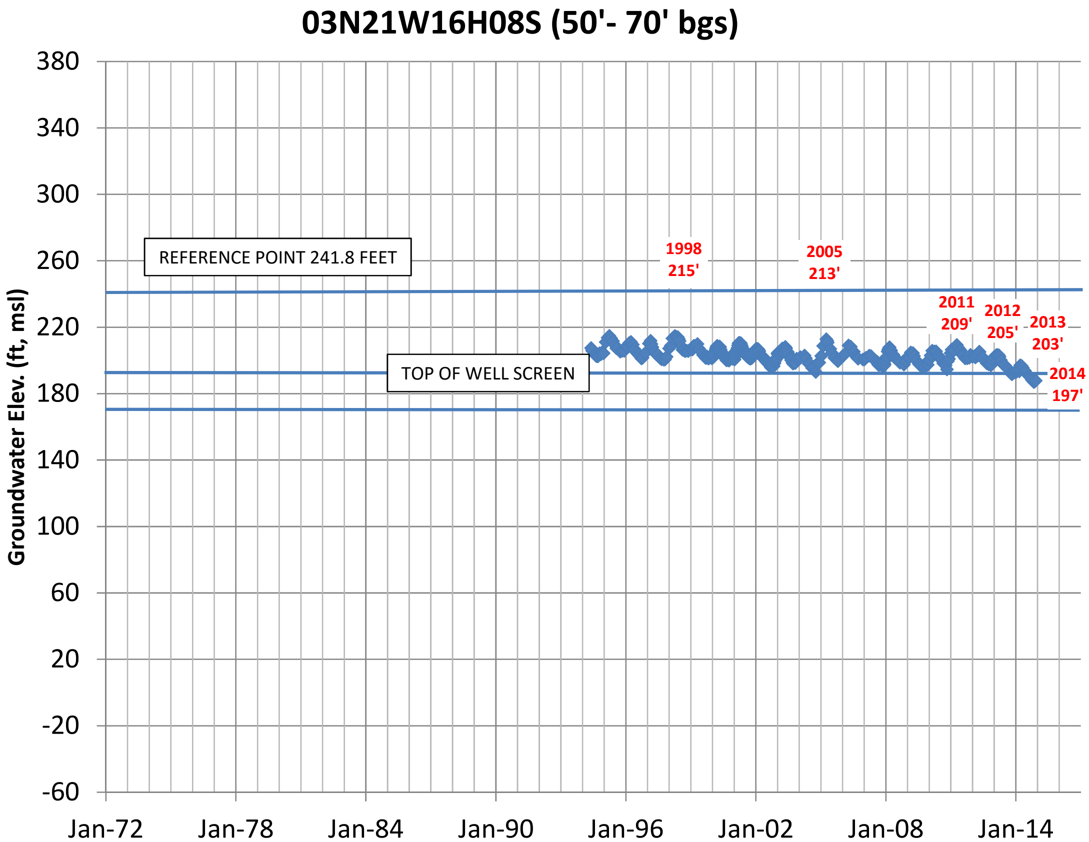

03N21W16H07S (150' - 170' bgs)
RP = 241.76
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
1998
210'
2005
207'
2011
202'
2012
197'
2013
194'
2014
184'

Figure B-43


03N21W16H08S (50'- 70' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 241.8 FEET
TOP OF WELL SCREEN
1998
215'
2005
213'
2011
209'
2012
205'
2013
203'
2014
197'

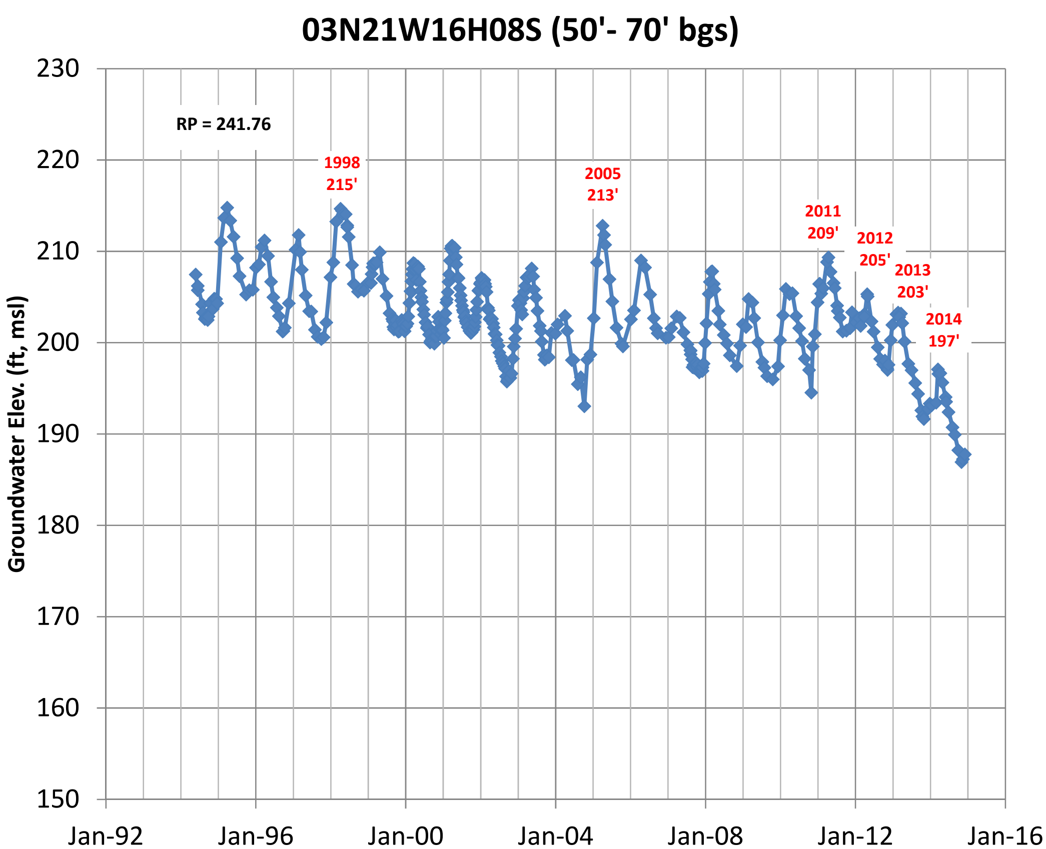
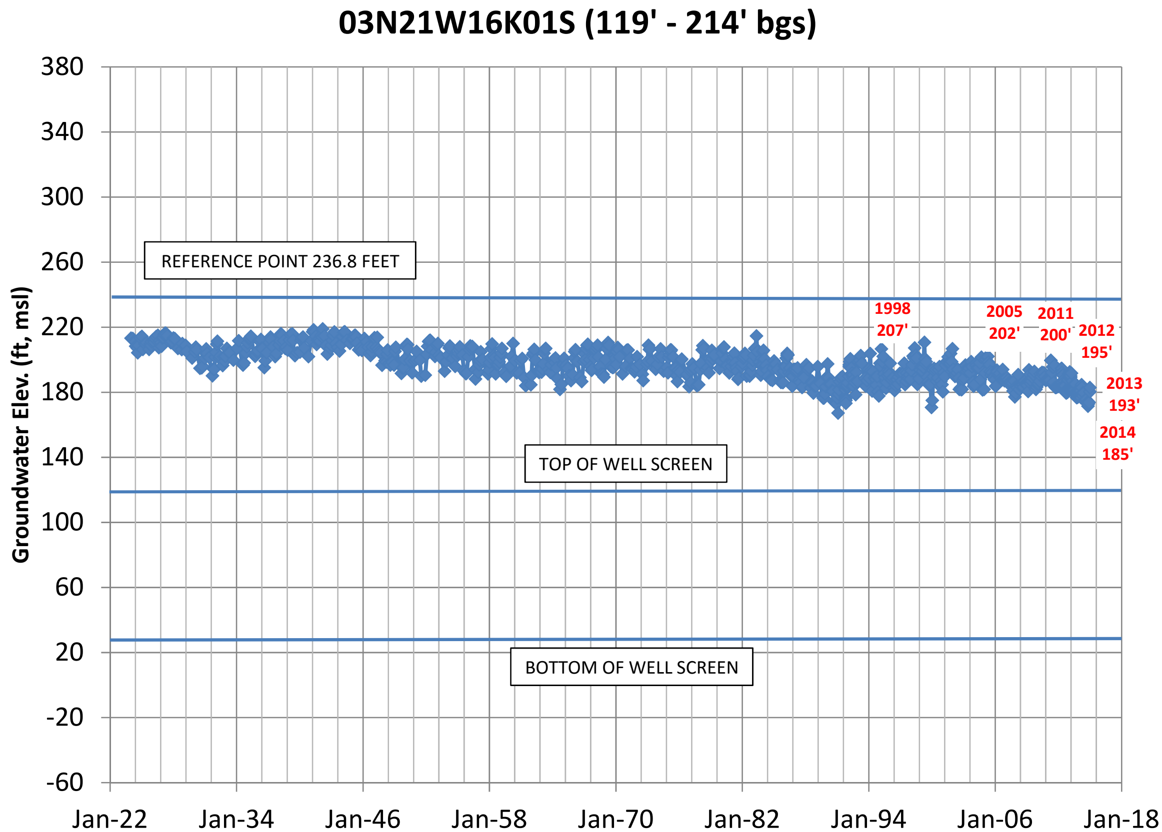

03N21W16H08S (50'- 70' bgs)
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
RP = 241.76
1998
215'
2005
213'
2011
209'
2012
205'
2013
203'
2014
197'

Figure B-44


03N21W16K01S (119' - 214' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
REFERENCE POINT 236.8 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
207'
2005
202'
2011
200'
2012
195'
2013
193'
2014
185'
Jan-22
Jan-34
Jan-46
Jan-58
Jan-70
Jan-82
Jan-94
Jan-06
Jan-18

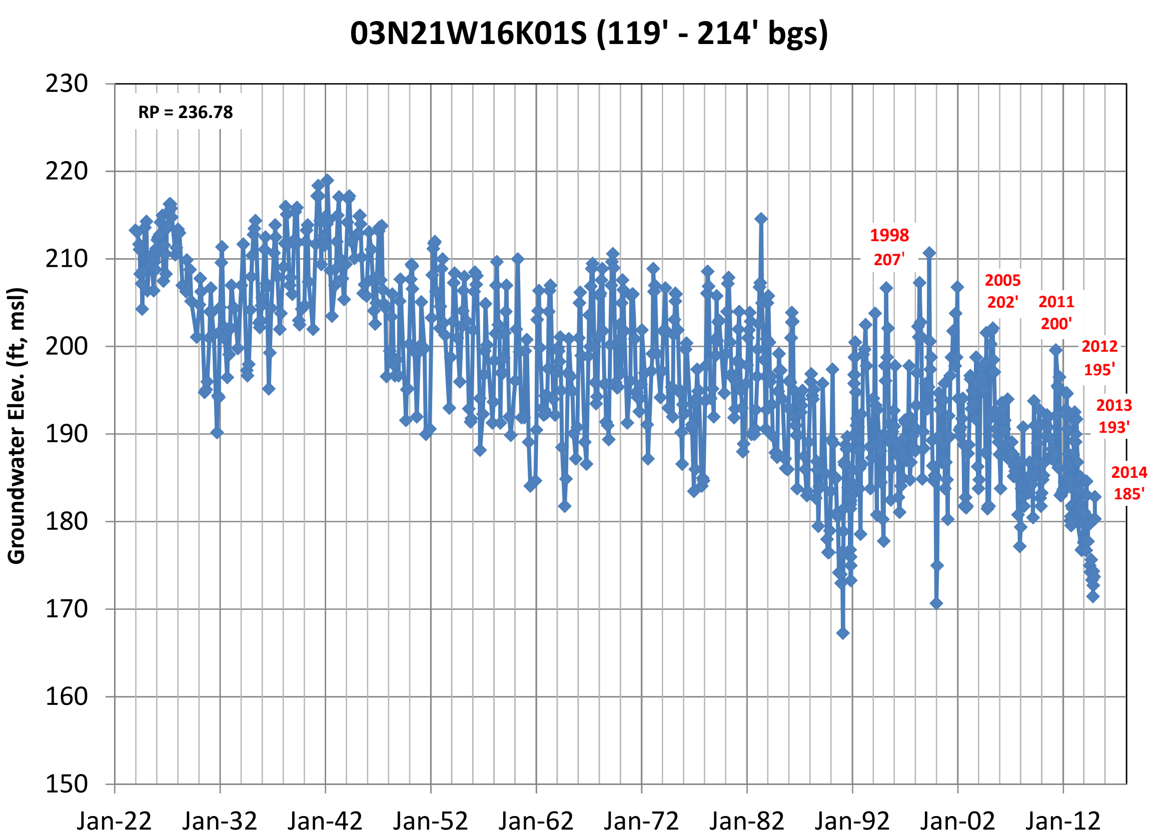
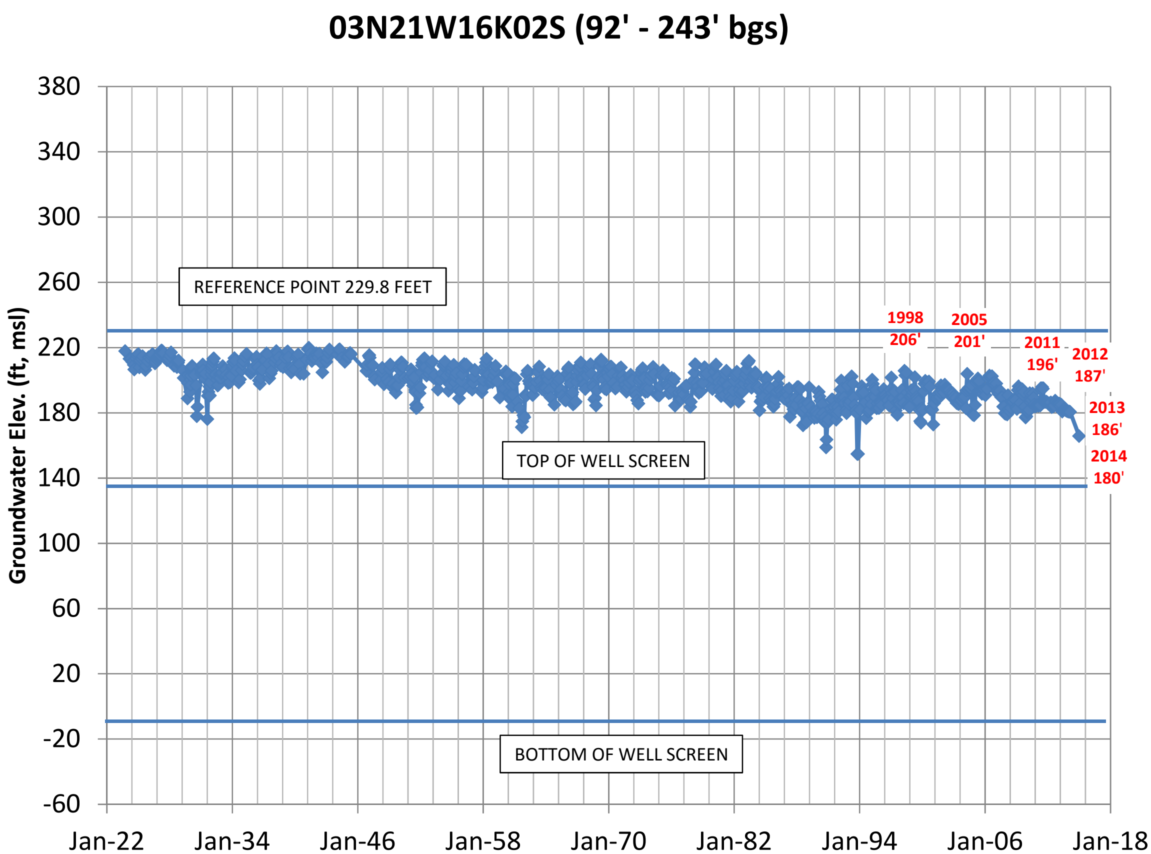

03N21W16K01S (119' - 214' bgs)
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
RP = 236.78
1998
207'
2005
202'
2011
200'
2012
195'
2013
193'
2014
185'
Jan-22
Jan-32
Jan-42
Jan-52
Jan-62
Jan-72
Jan-82
Jan-92
Jan-02
Jan-12

Figure B-45


03N21W16K02S (92' - 243' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
REFERENCE POINT 229.8 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
206'
2005
201'
2011
196'
2012
187'
2013
186'
2014
180'
Jan-22
Jan-34
Jan-46
Jan-58
Jan-70
Jan-82
Jan-94
Jan-06
Jan-18

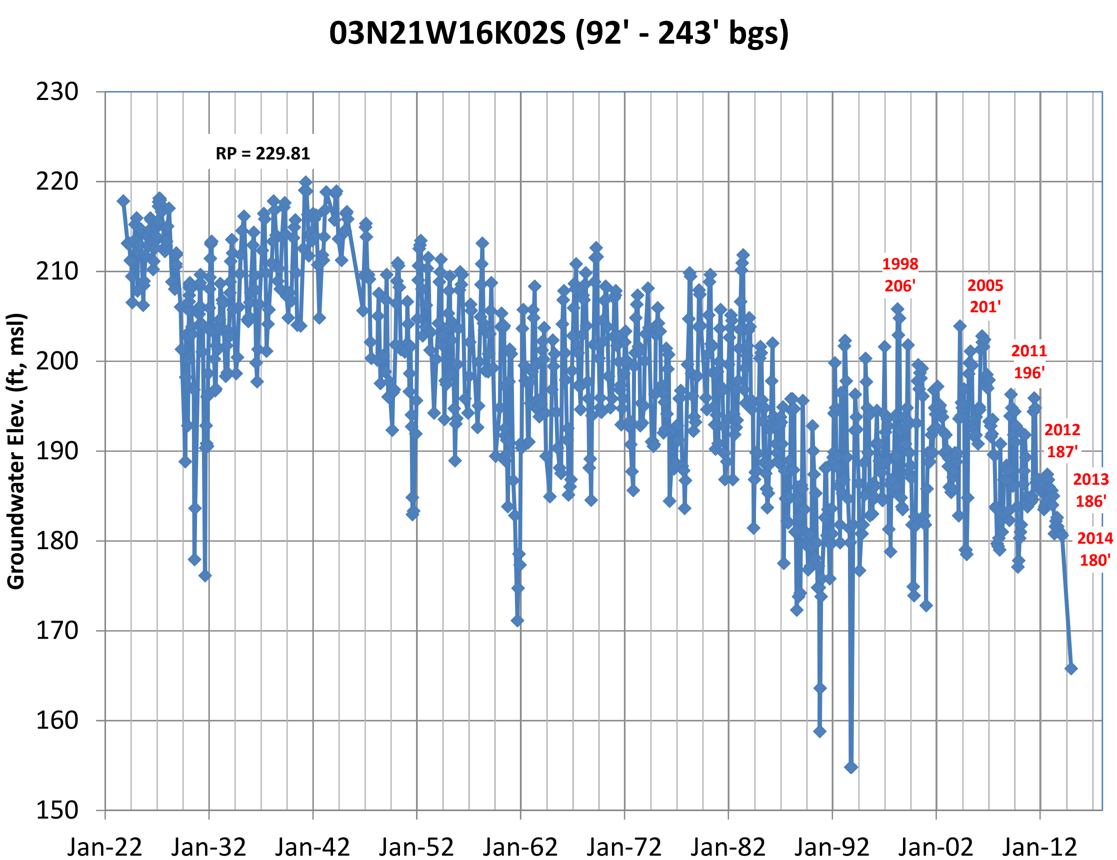
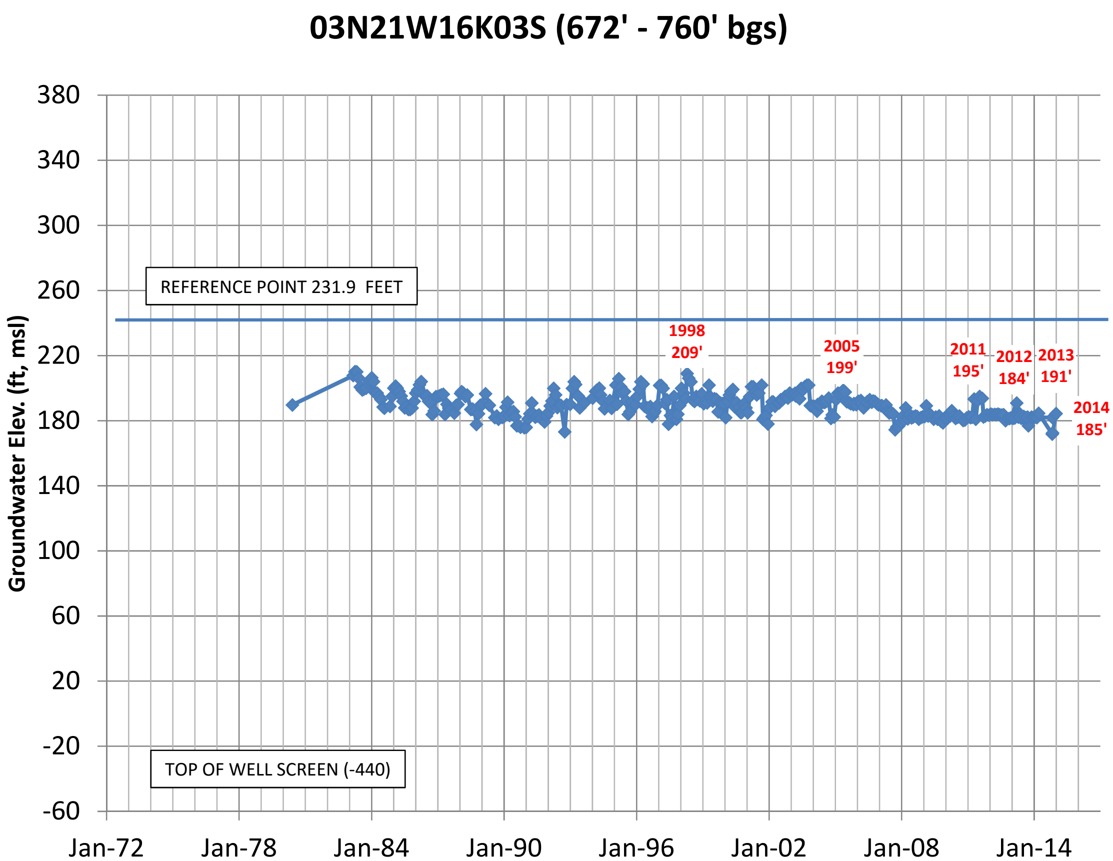

03N21W16K02S (92' - 243' bgs)
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
RP = 229.81
1998
206'
2005
201'
2011
196'
2012
187'
2013
186'
2014
180'
Jan-22
Jan-32
Jan-42
Jan-52
Jan-62
Jan-72
Jan-82
Jan-92
Jan-02
Jan-12

Figure B-46


03N21W16K03S (672' - 760' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
REFERENCE POINT 231.9 FEET
TOP OF WELL SCREEN (-440)
1998
209'
2005
199'
2011
195'
2012
184'
2013
191'
2014
185'
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

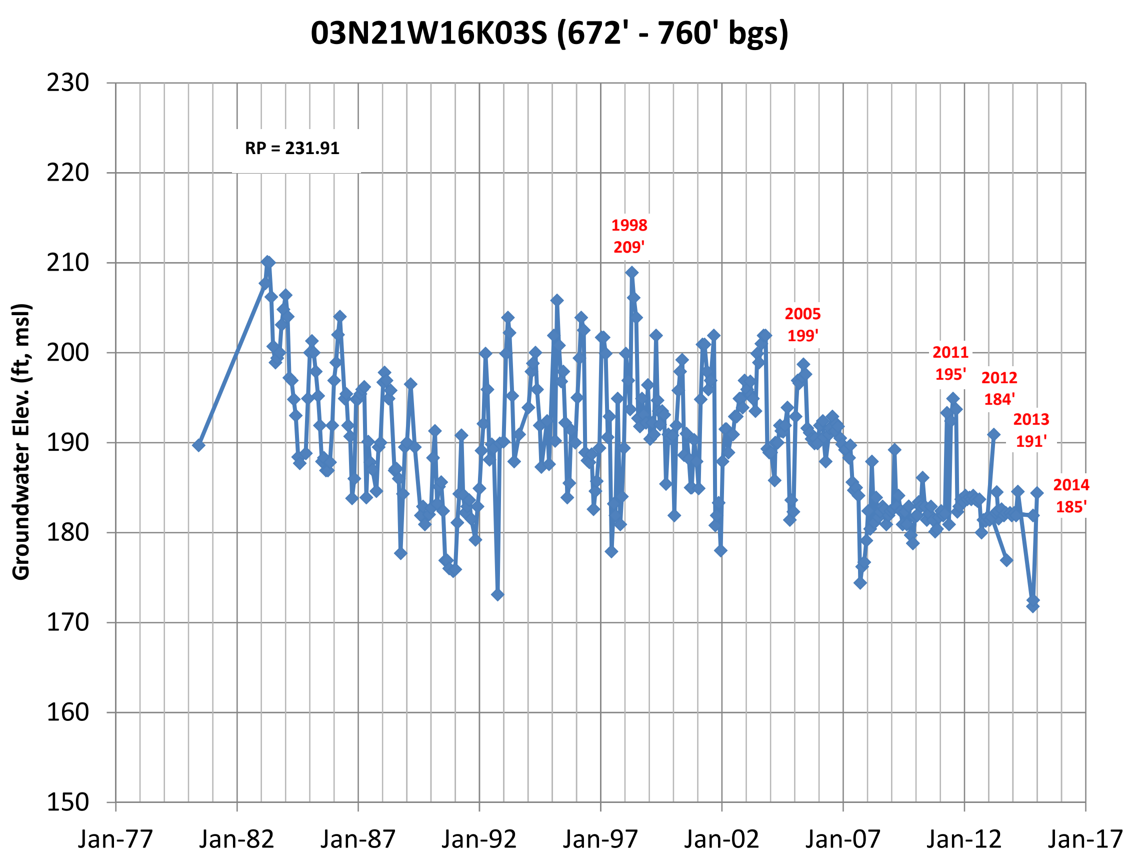
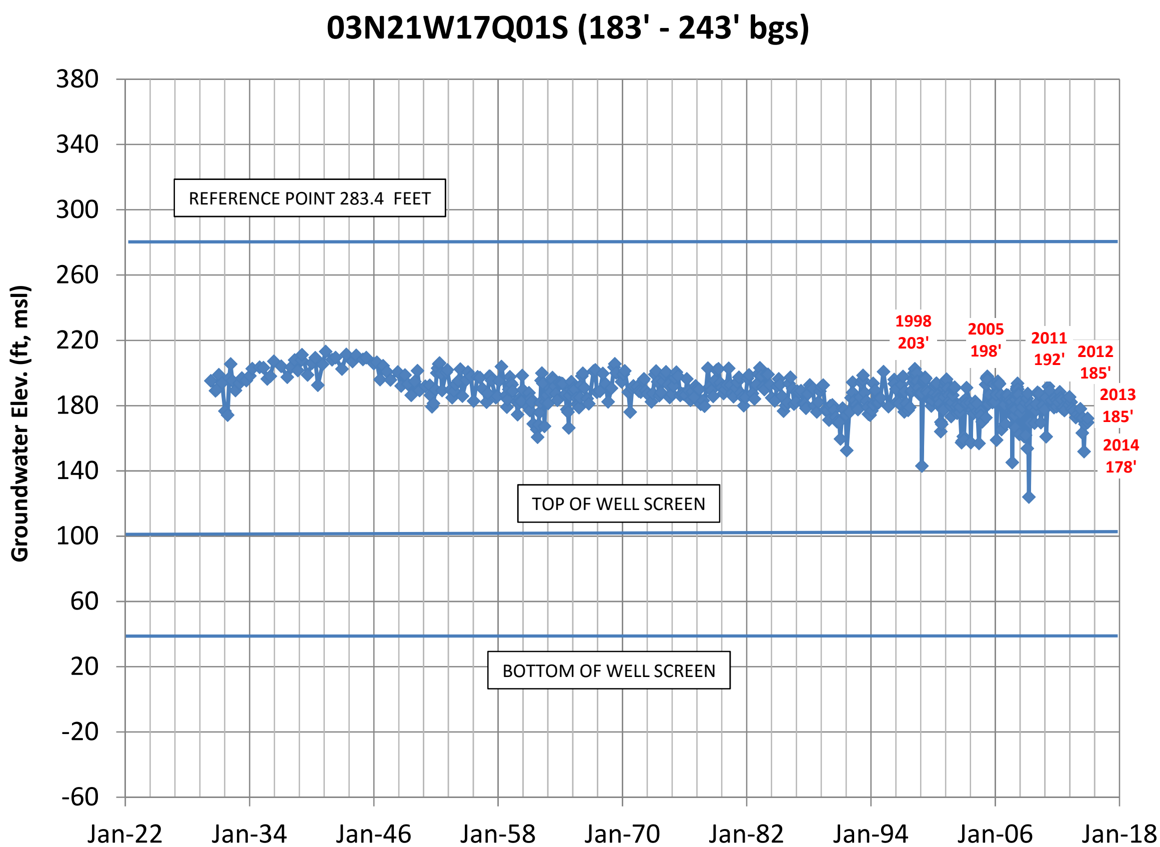

03N21W16K03S (672' - 760' bgs)
Groundwater Elev. (ft, msl)
230
220
210
200
190
180
170
160
150
RP = 231.91
1998
209'
2005
199'
2011
195'
2012
184'
2013
191'
2014
185'
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-47


03N21W17Q01S (183' - 243' bgs)
REFERENCE POINT 283.4 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-22
Jan-34
Jan-46
Jan-58
Jan-70
Jan-82
Jan-94
Jan-06
Jan-18
1998
203'
2005
198'
2011
192'
2012
185'
2013
185'
2014
178'

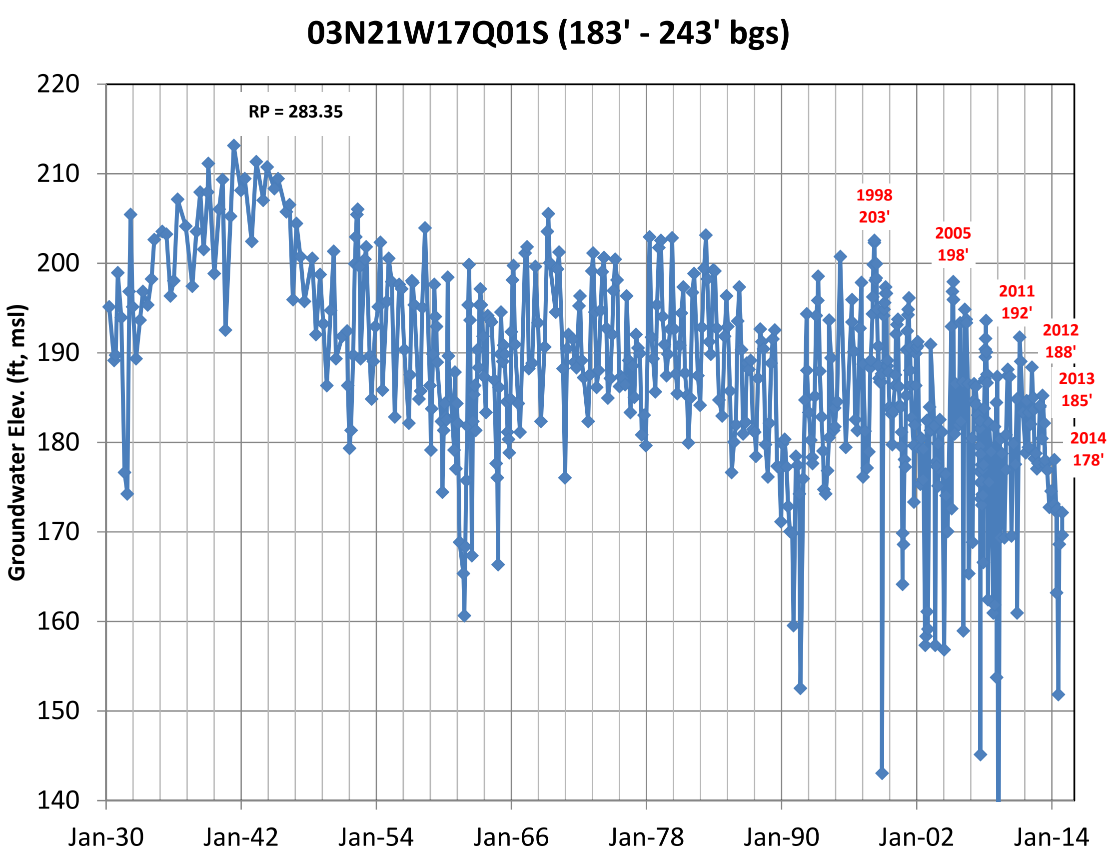

03N21W17Q01S (183' - 243' bgs)
RP = 283.35
Groundwater Elev. (ft, msl)
220
210
200
190
180
170
160
150
140
Jan-30
Jan-42
Jan-54
Jan-66
Jan-78
Jan-90
Jan-02
Jan-14
1998
203'
2005
198'
2011
192'
2012
188'
2013
185'
2014
178'

Figure B-48

Intentionally Left Blank

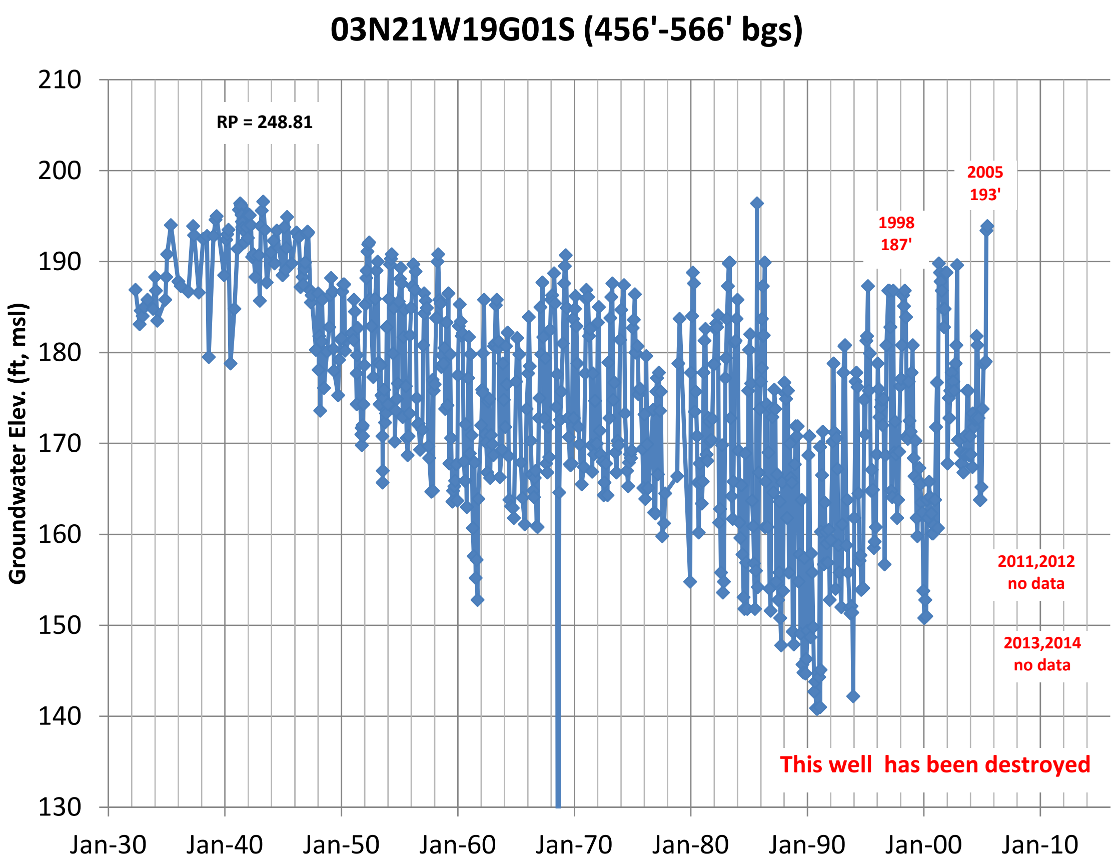
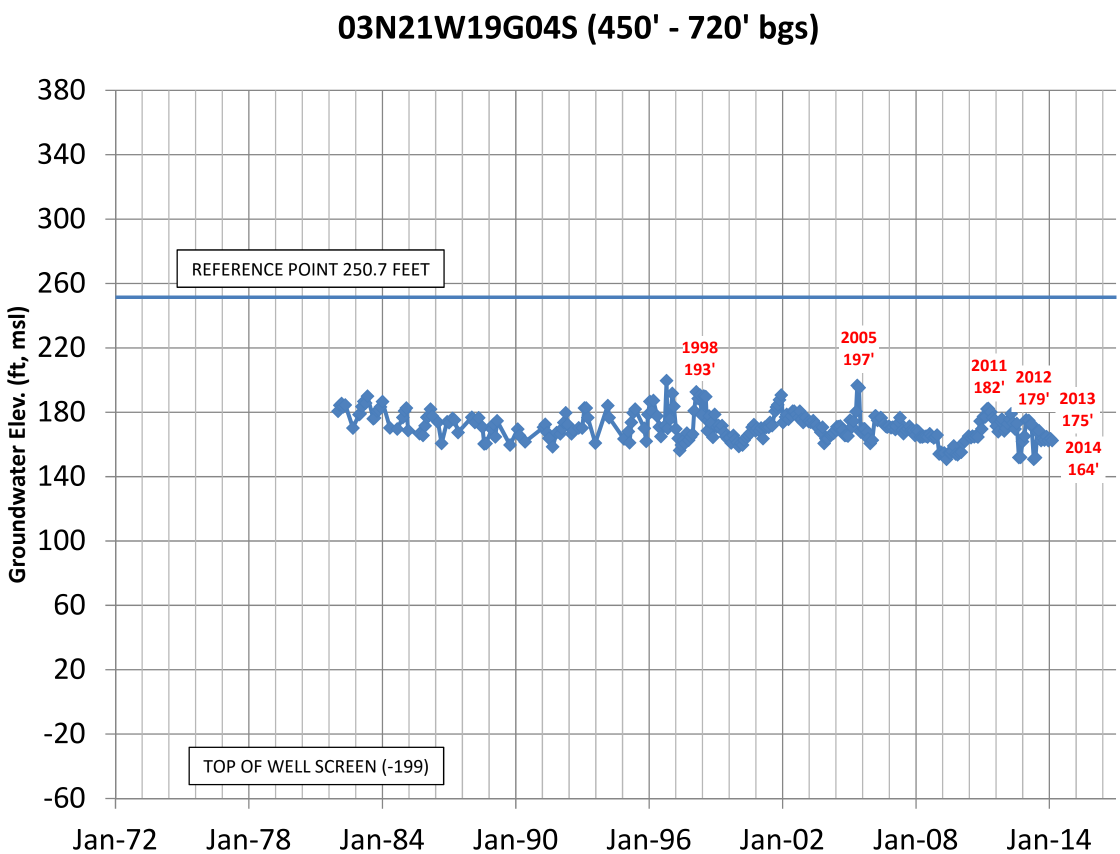


Figure B-49


03N21W19G04S (450' - 720' bgs)
REFERENCE POINT 250.7 FEET
TOP OF WELL SCREEN (-199)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
1998
193'
2005
197'
2011
182'
2012
179'
2013
175'
2014
164'

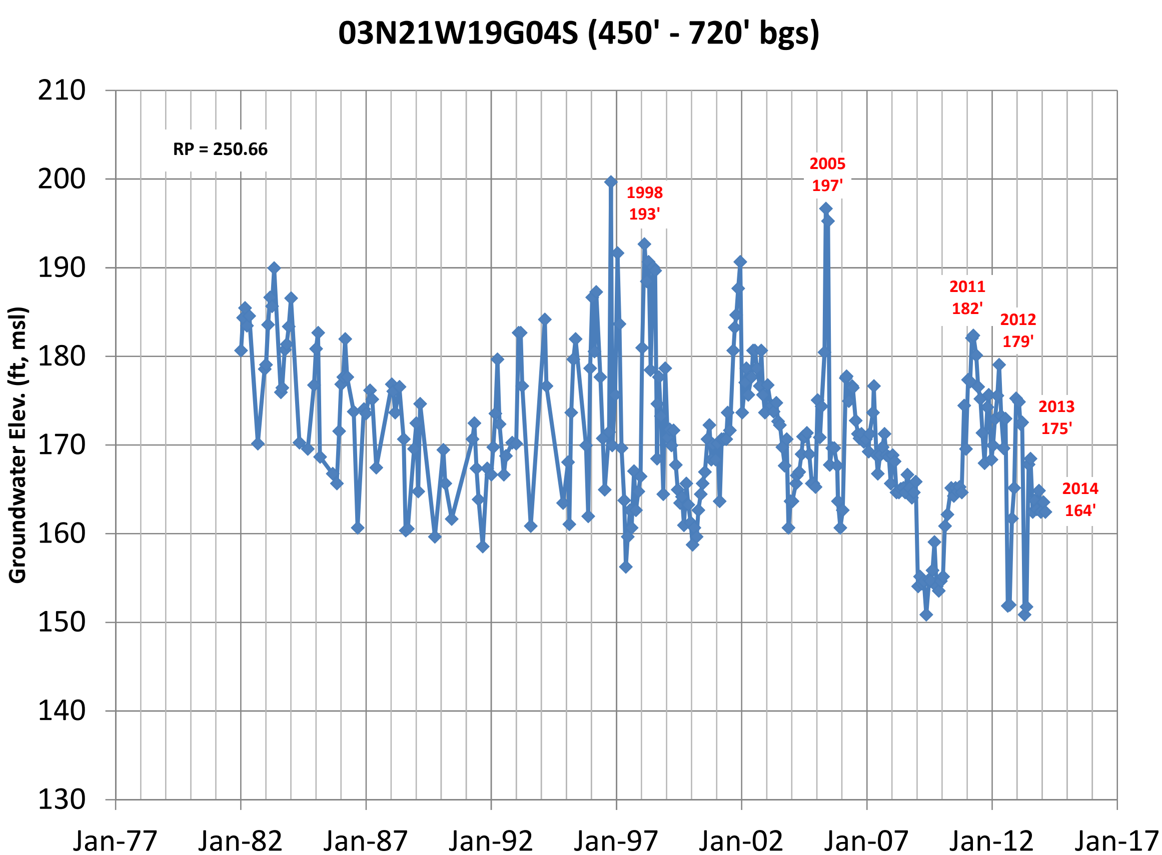

03N21W19G04S (450' - 720' bgs)
RP = 250.66
Groundwater Elev. (ft, msl)
210
200
190
180
170
160
150
140
130
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17
1998
193'
2005
197'
2011
182'
2012
179'
2013
175'
2014
164'

Figure B-50

Intentionally Left Blank

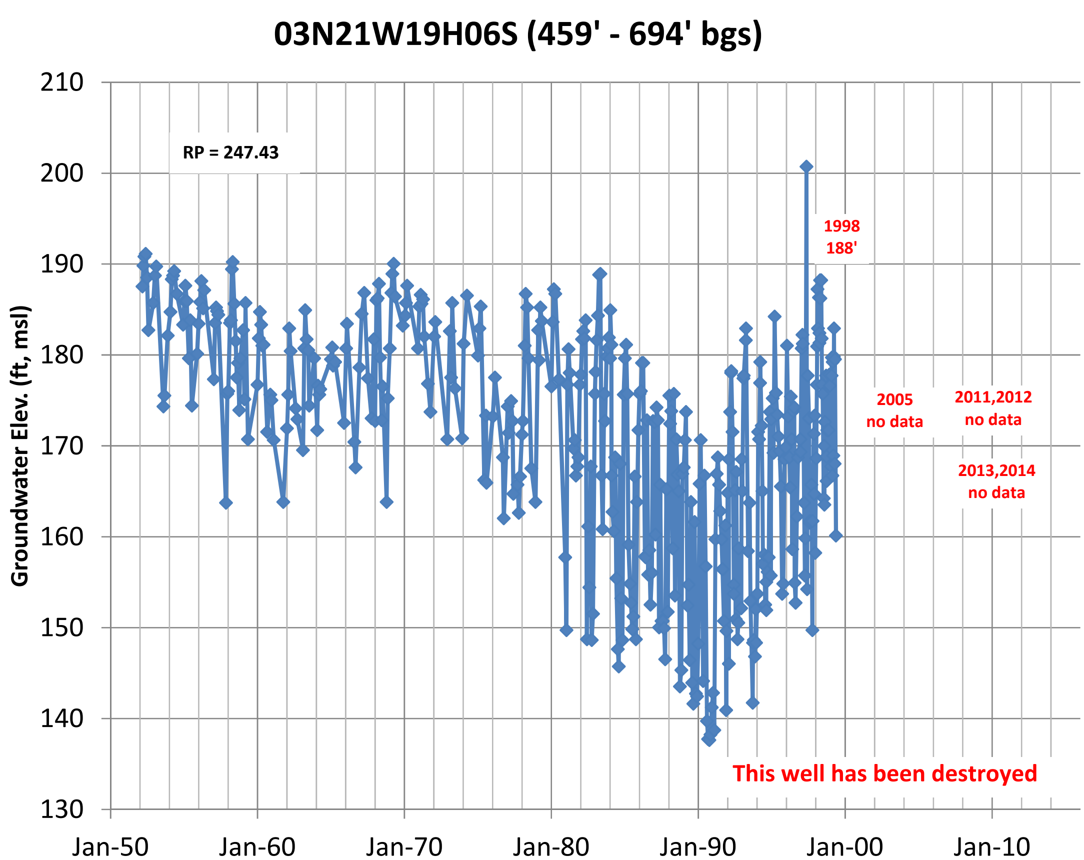
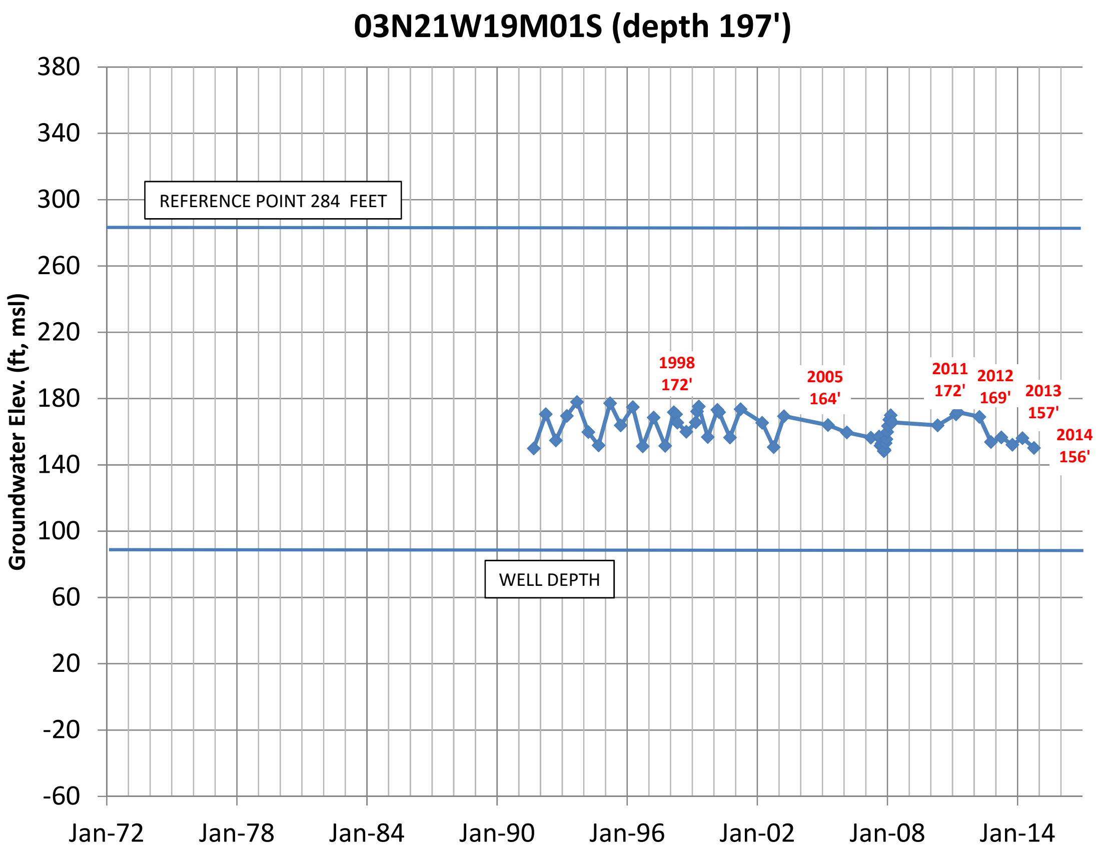


Figure B-51


03N21W19M01S (depth 197')
Groundwater Elev. (ft, msl)
REFERENCE POINT 284 FEET
WELL DEPTH
1998
172'
2005
164'
2011
172'
2012
169'
2013
157'
2014
156'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

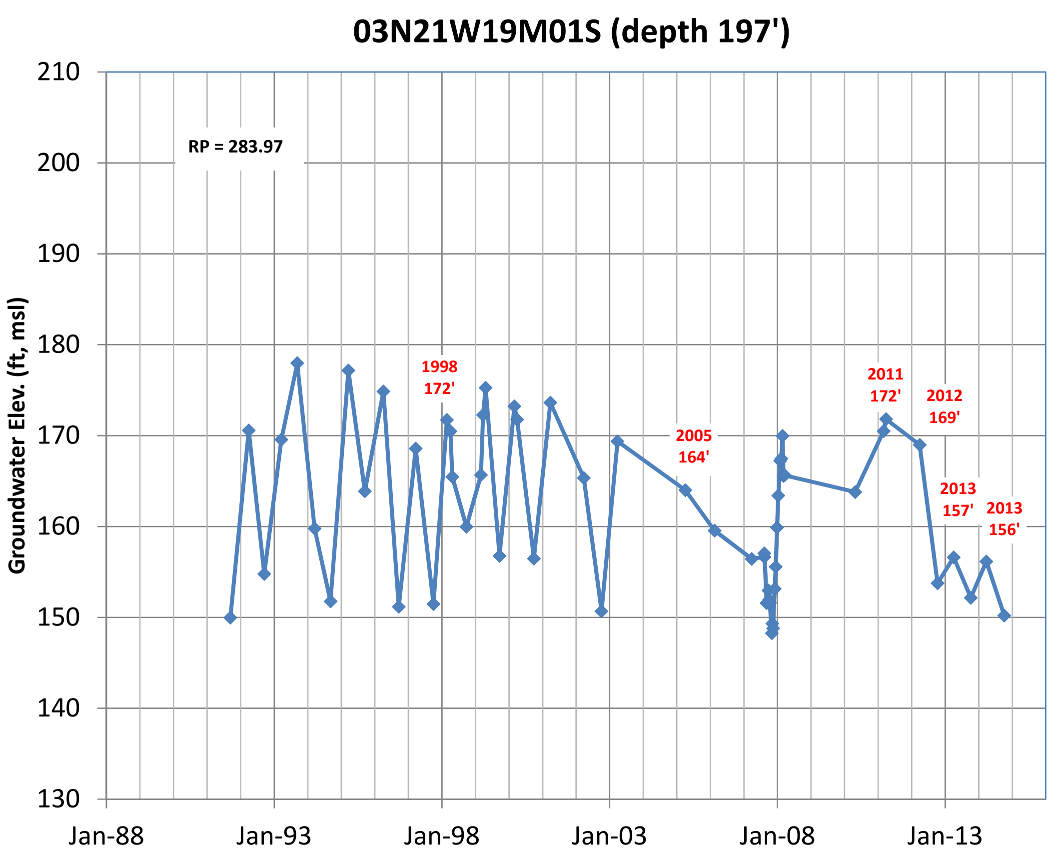
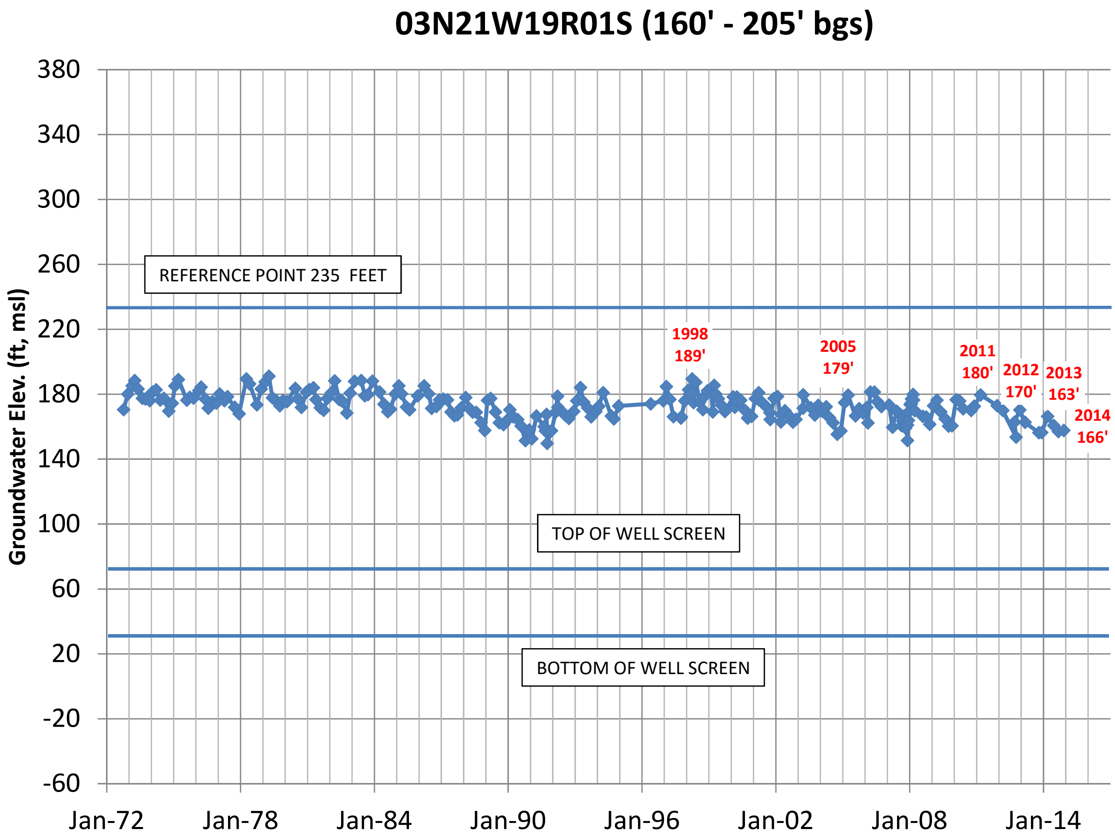

03N21W19M01S (depth 197')
Groundwater Elev. (ft, msl)
RP = 283.97
1998
172'
2005
164'
2011
172'
2012
169'
2013
157'
2013
156'
210
200
190
180
170
160
150
140
130
Jan-88
Jan-93
Jan-98
Jan-03
Jan-08
Jan-13

Figure B-52


03N21W19R01S (160' - 205' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 235 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
189'
2005
179'
2011
180'
2012
170'
2013
163'
2014
166'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

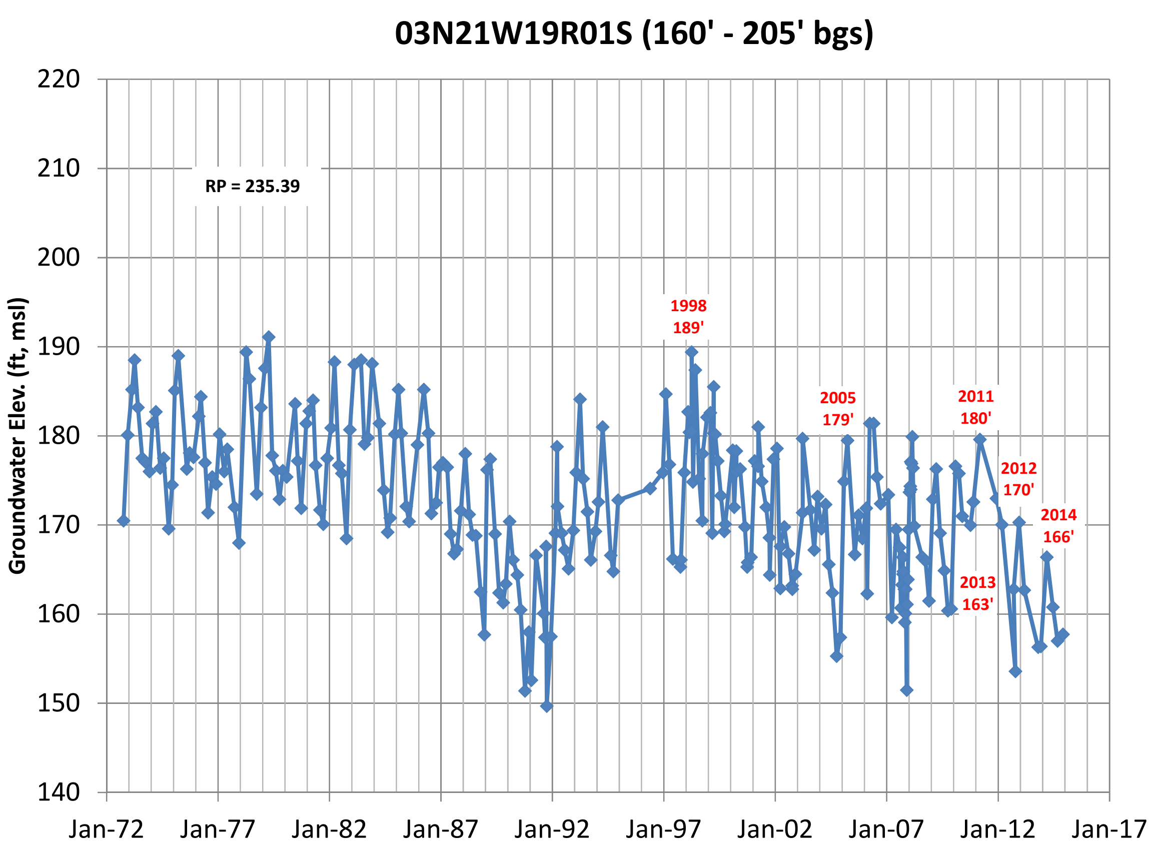
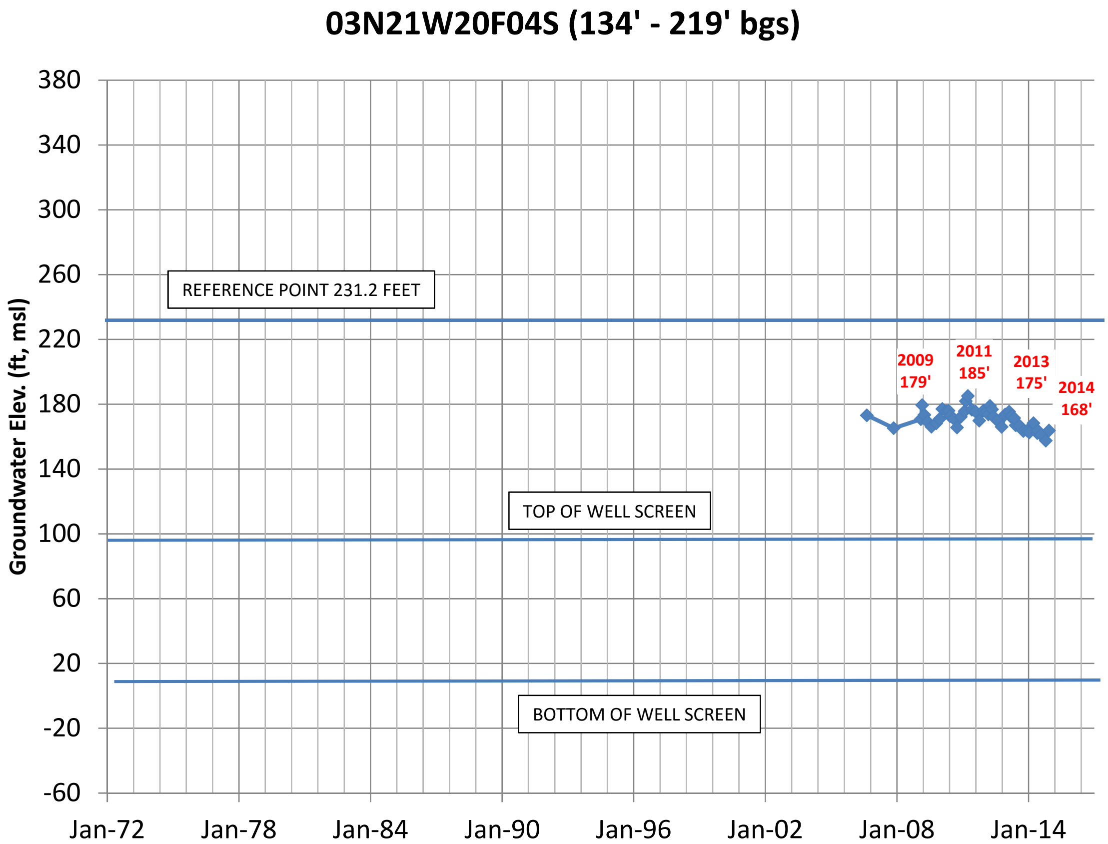

03N21W19R01S (160' - 205' bgs)
Groundwater Elev. (ft, msl)
RP = 235.39
1998
189'
2005
179'
2011
180'
2012
170'
2013
163'
2014
166'
220
210
200
190
180
170
160
150
140
Jan-72
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-53


03N21W20F04S (134' - 219' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 231.2 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
2009
179'
2011
185'
2013
175'
2014
168'

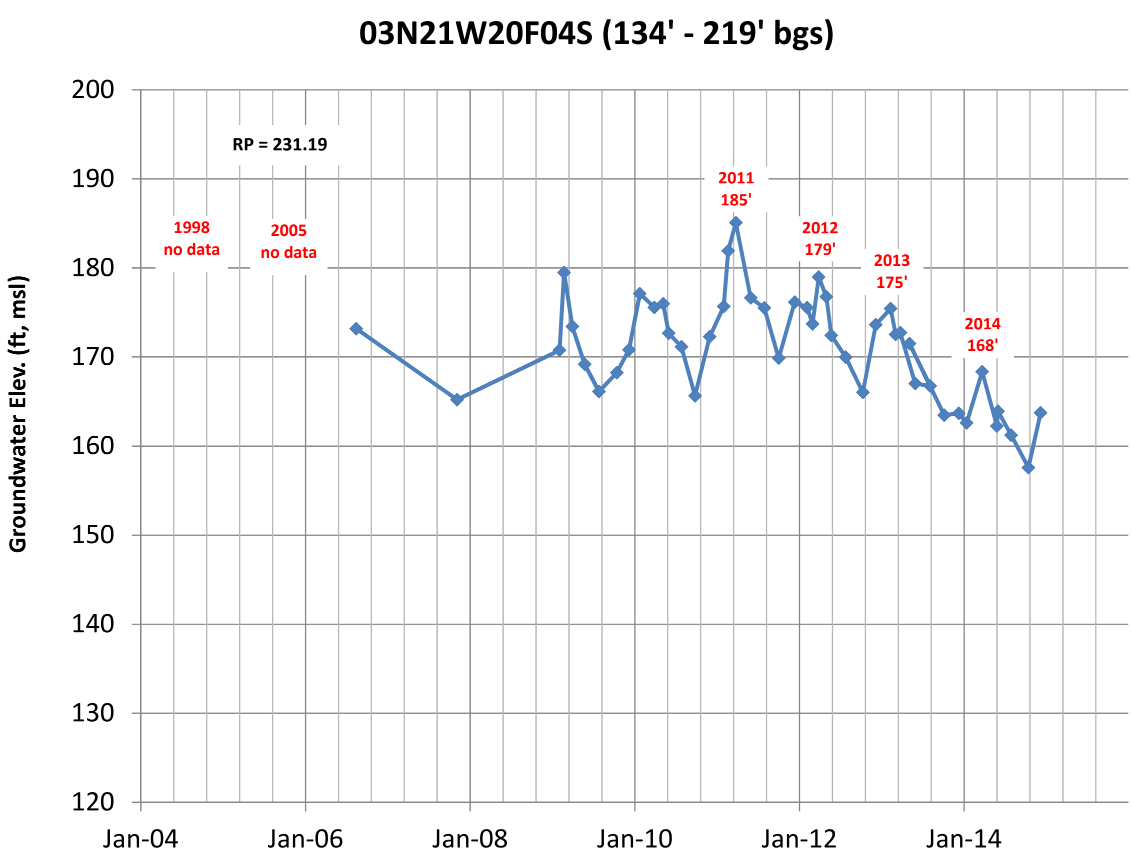
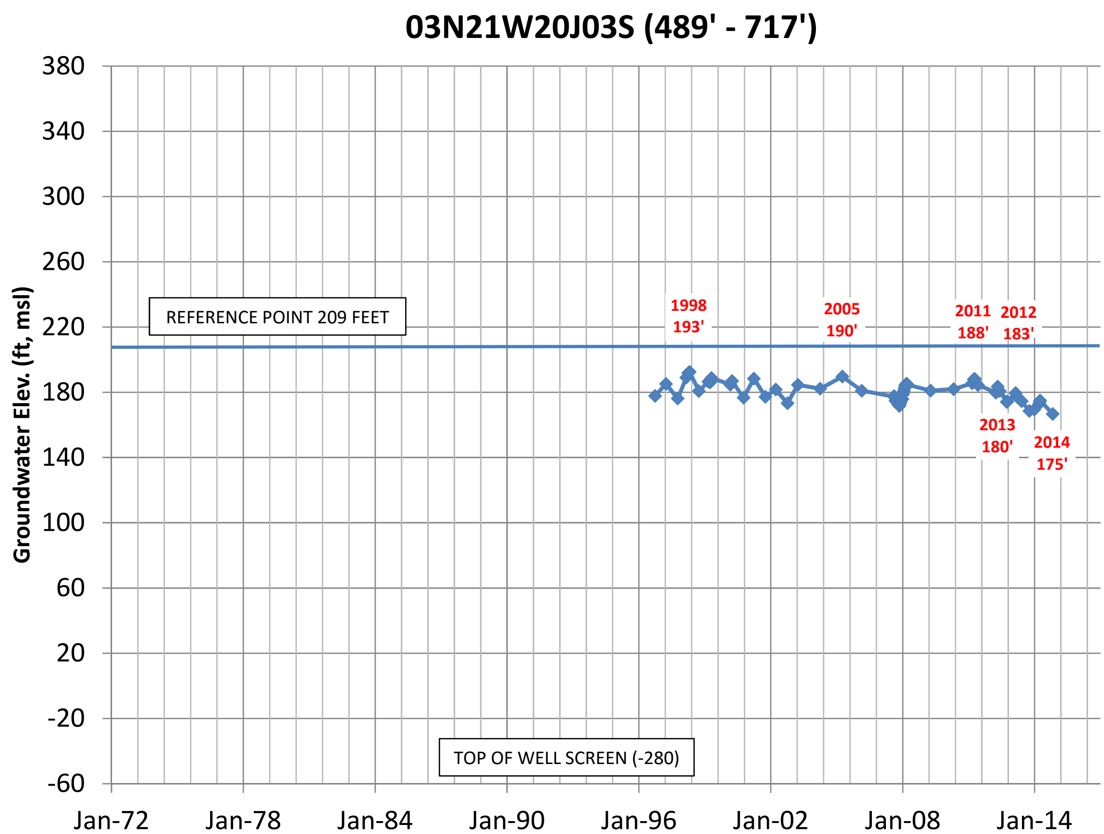

03N21W20F04S (134' - 219' bgs)
Groundwater Elev. (ft, msl)
200
190
180
170
160
150
140
130
120
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
RP = 231.19
1998
no data
2005
no data
2011
185'
2012
179'
2013
175'
2014
168'

Figure B-54


03N21W20J03S (489' - 717')
Groundwater Elev. (ft, msl)
REFERENCE POINT 209 FEET
TOP OF WELL SCREEN (-280)
1998
193'
2005
190'
2011
188'
2012
183'
2013
180'
2014
175'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

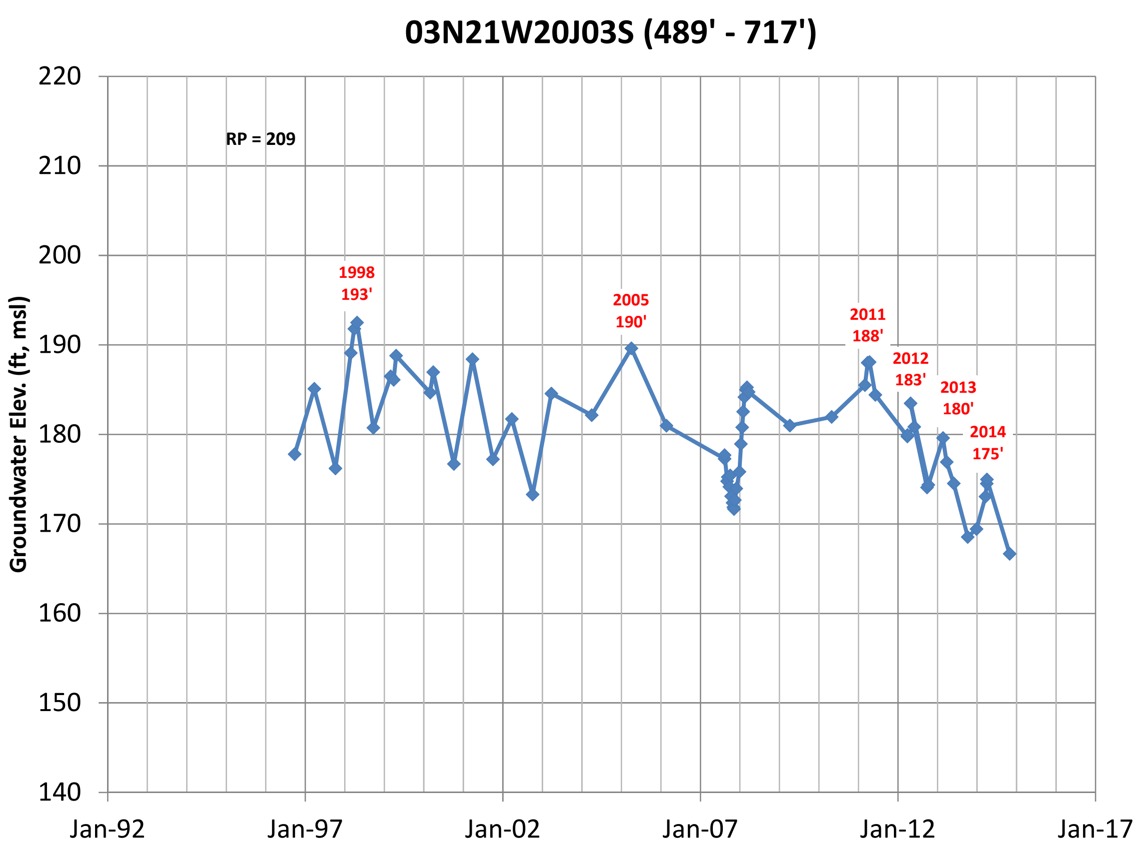

03N21W20J03S (489' - 717')
Groundwater Elev. (ft, msl)
RP = 209
1998
193'
2005
190'
2011
188'
2012
183'
2013
180'
2014
175'
220
210
200
190
180
170
160
150
140
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-55

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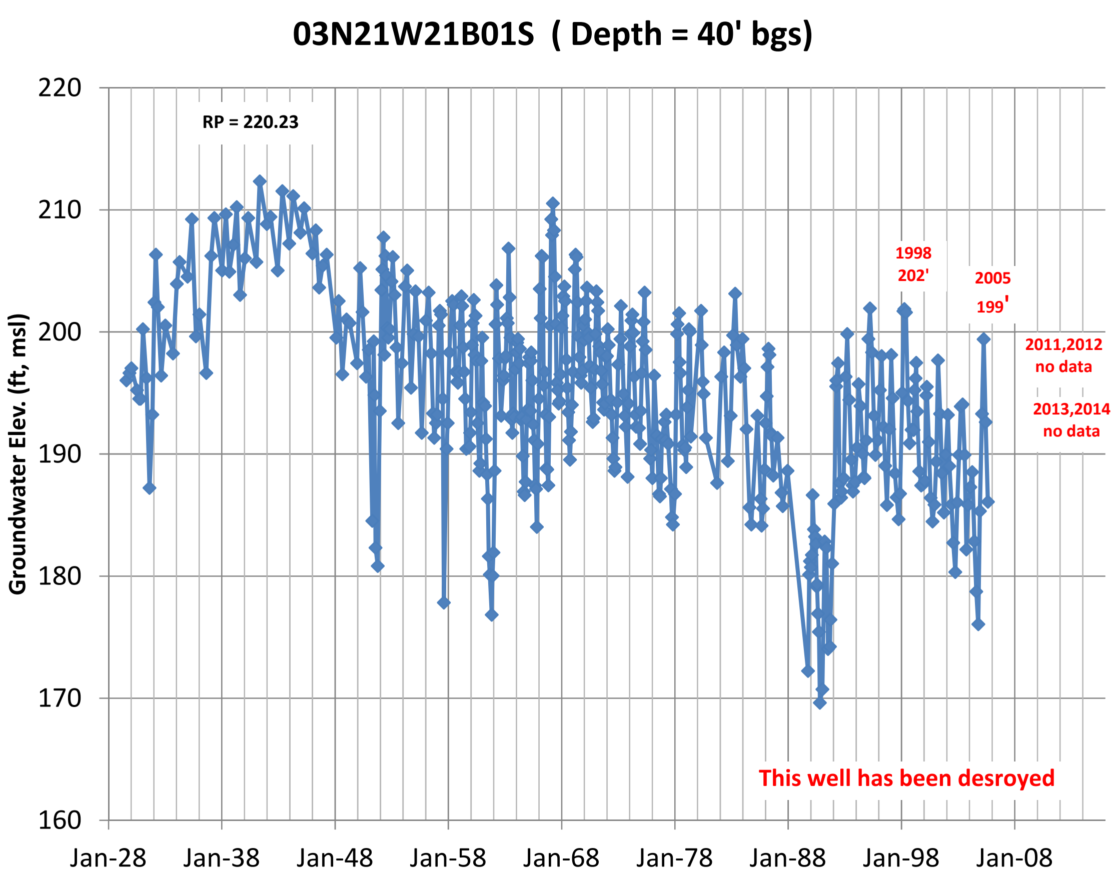
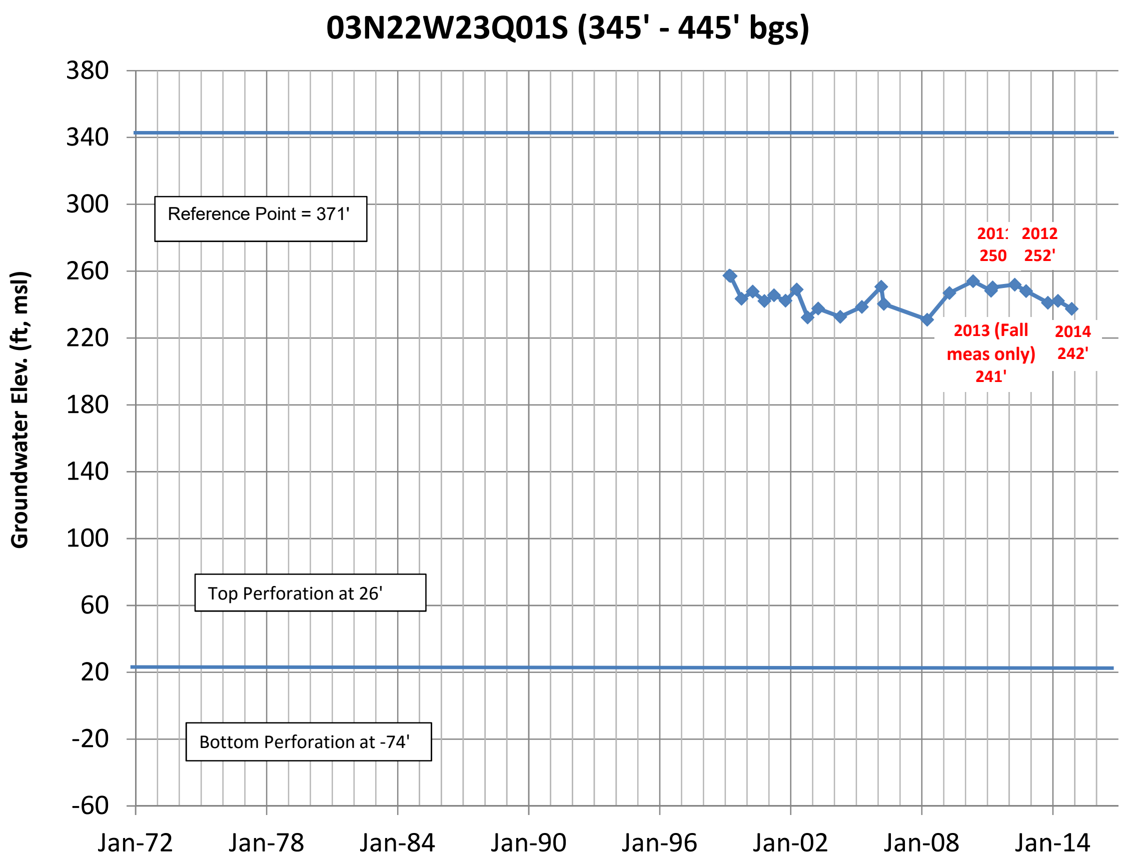


Figure B-56


03N22W23Q01S (345' - 445' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
Reference Point = 371'
Top Perforation at 26'
Bottom Perforation at -74'
2012
252'
2013 (Fall meas only) 241'
2014
242'

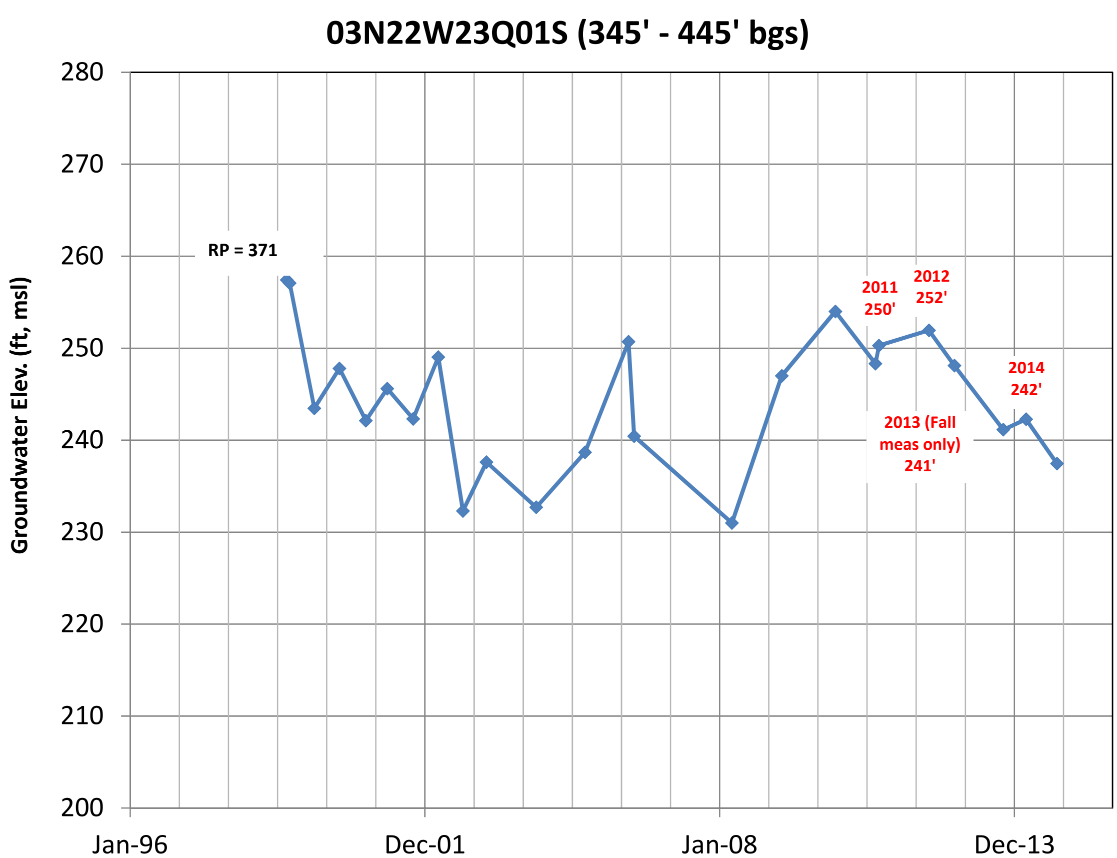

03N22W23Q01S (345' - 445' bgs)
Groundwater Elev. (ft, msl)
280
270
260
250
240
230
220
210
200
Jan-96
Dec-01
Jan-08
Dec-13
RP = 371
2011
250'
2012
252'
2014
242'
2013 (Fall meas only) 241'

Figure B-57

Intentionally Left Blank

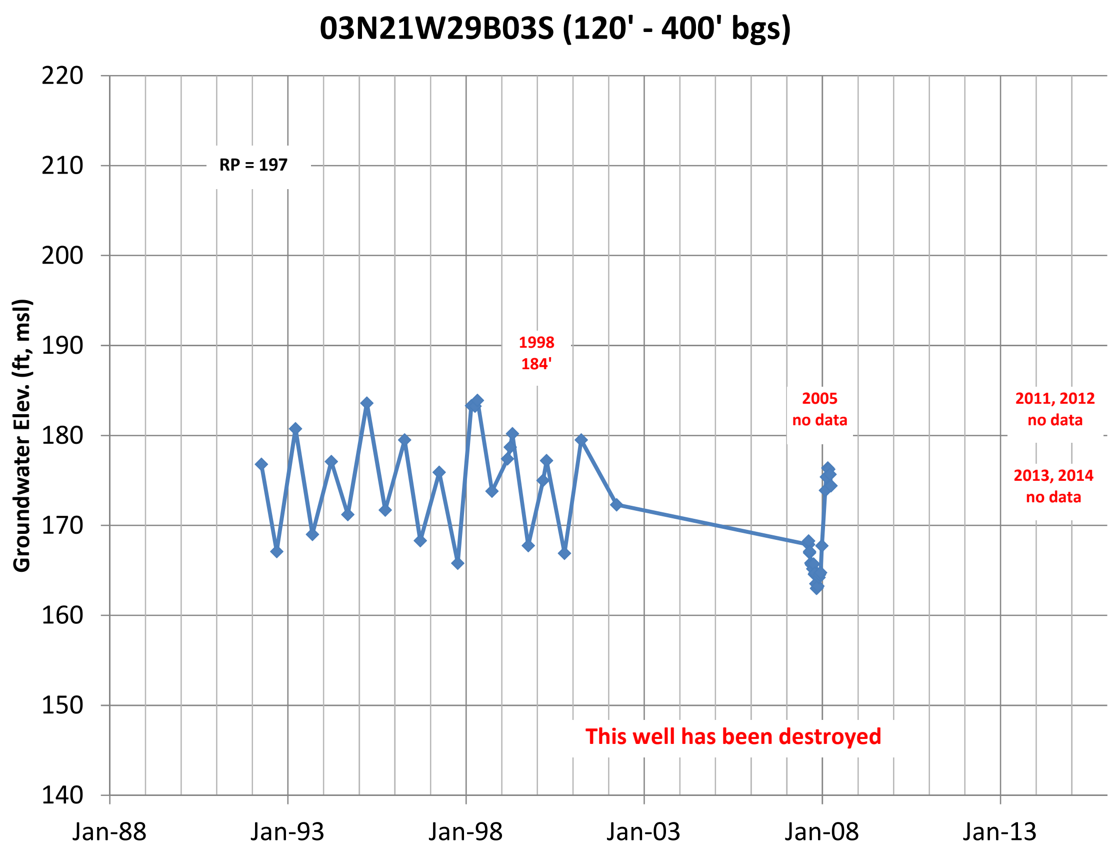
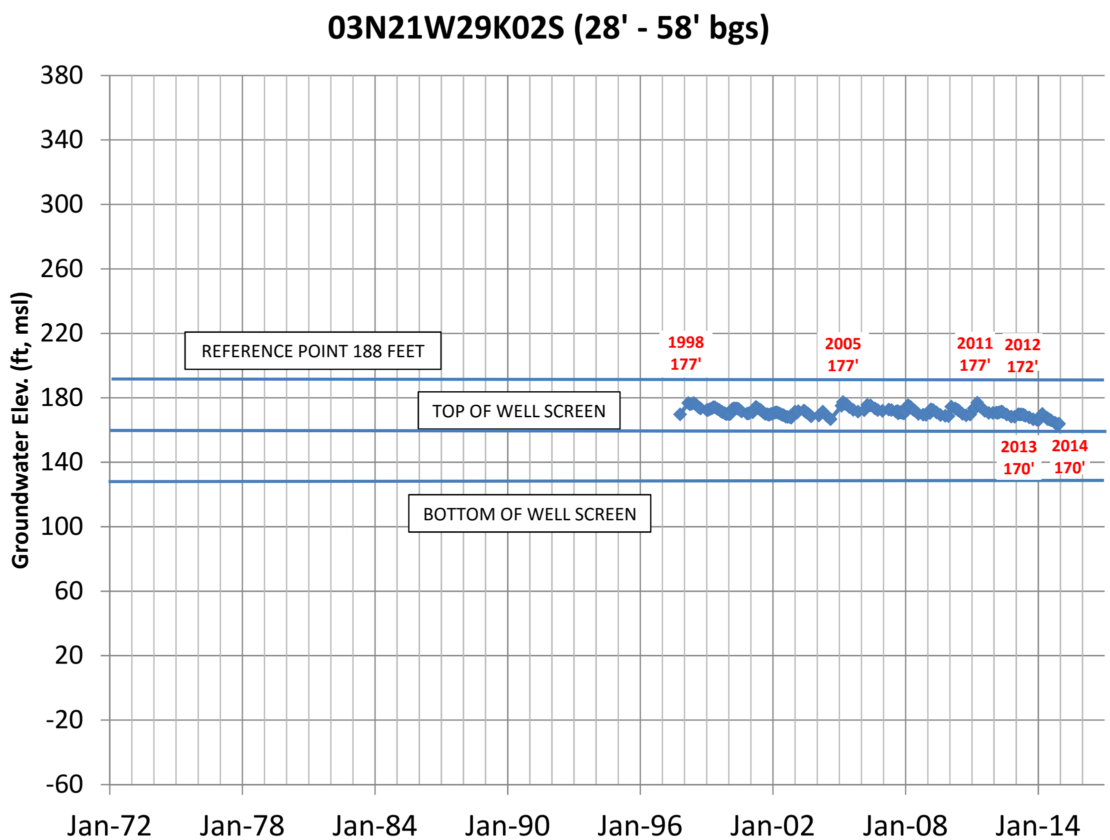


Figure B-58


03N21W29K02S (28' - 58' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 188 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
1998
177'
2005
177'
2011
177'
2012
172'
2013
170'
2014
170'

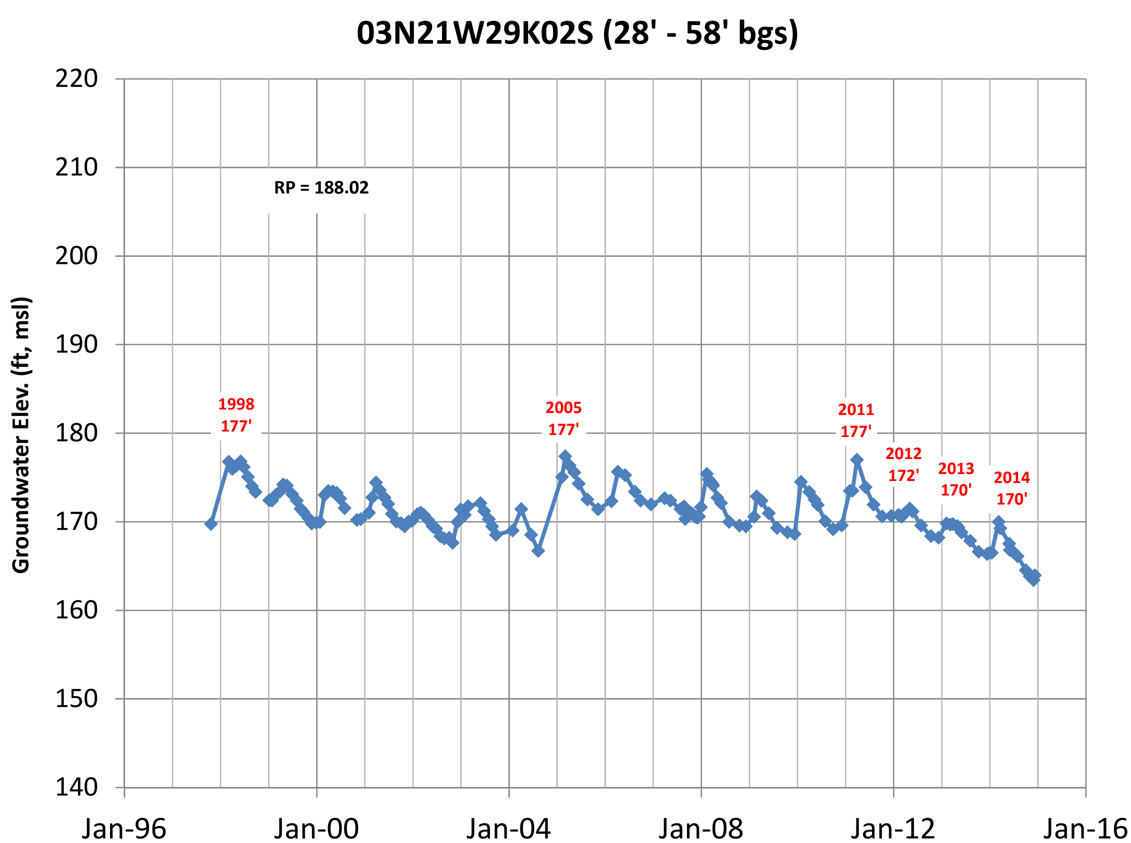

03N21W29K02S (28' - 58' bgs)
Groundwater Elev. (ft, msl)
220
210
200
190
180
170
160
150
140
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
RP = 188.02
1998
177'
2005
177'
2011
177'
2012
172'
2013
170'
2014
170'

Figure B-59

Intentionally Left Blank

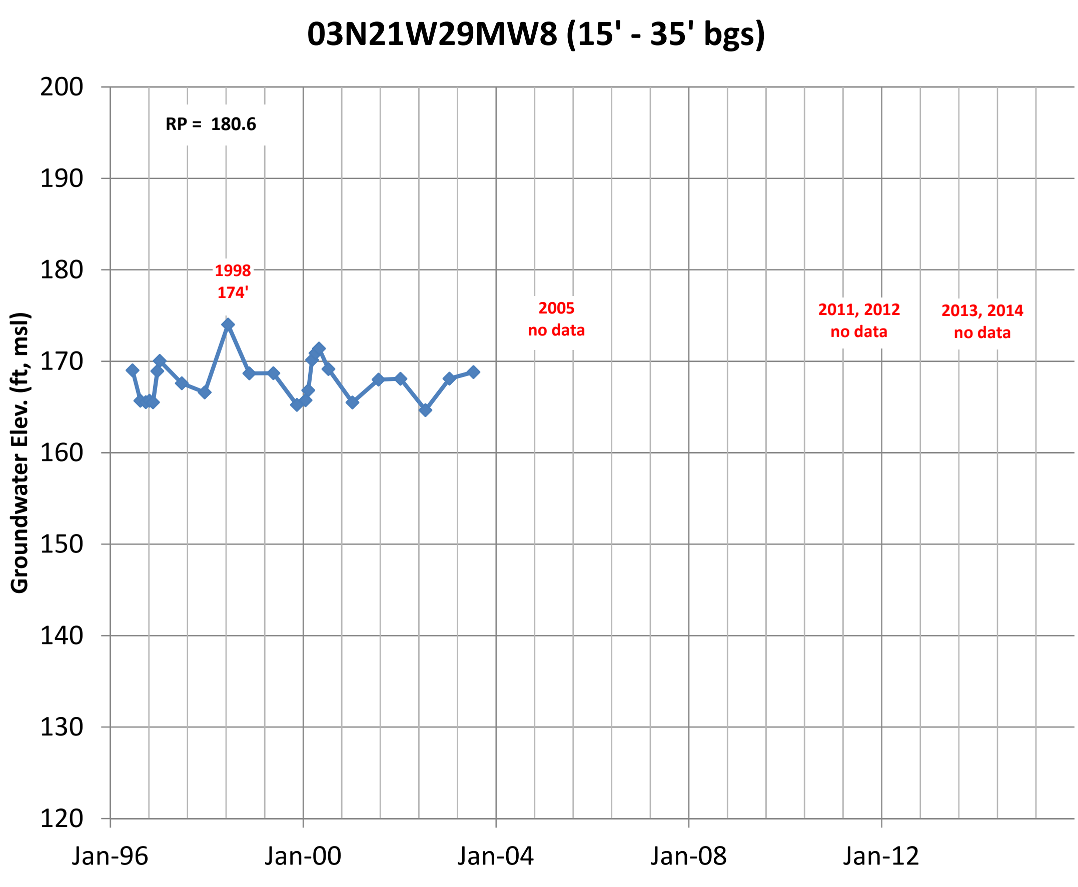


Figure B-60

Intentionally Left Blank

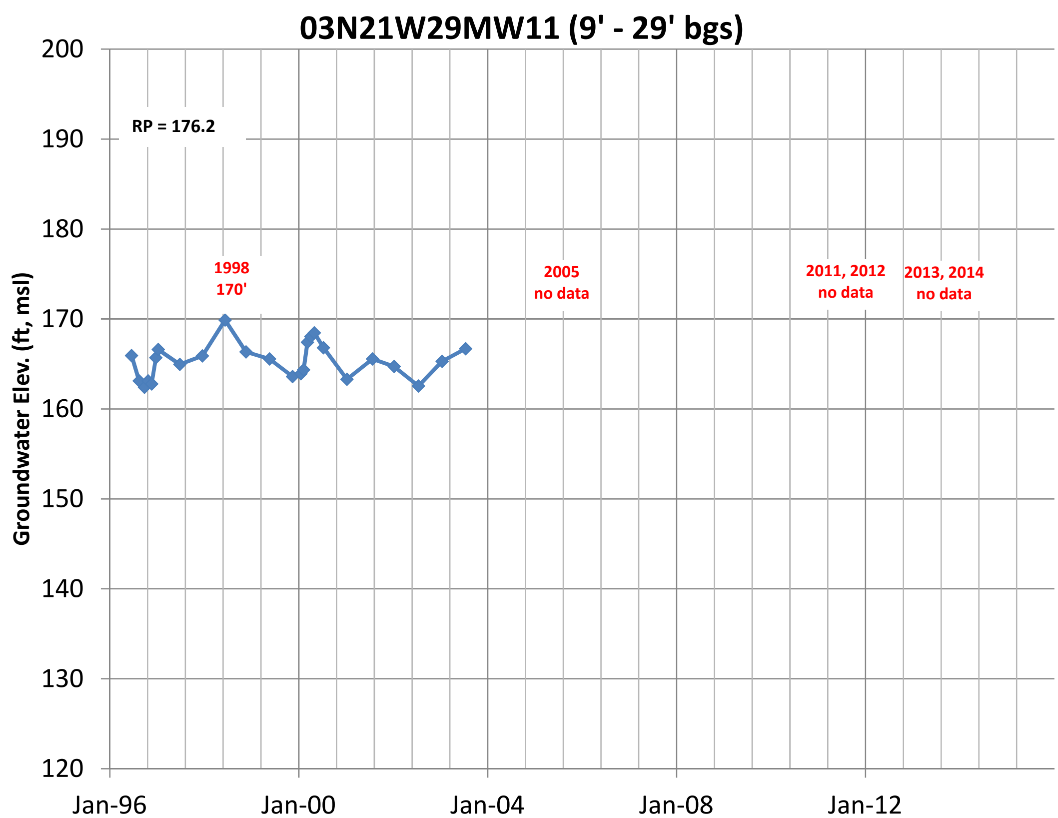


Figure B-61

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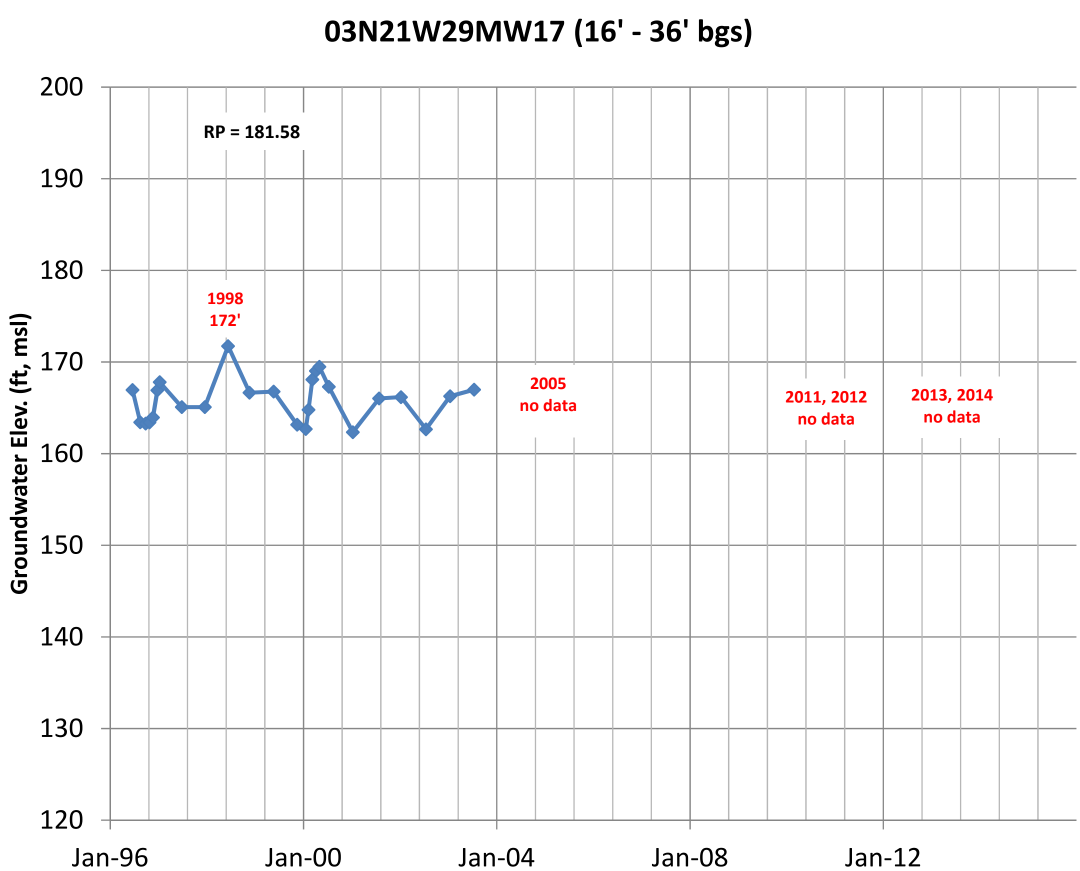
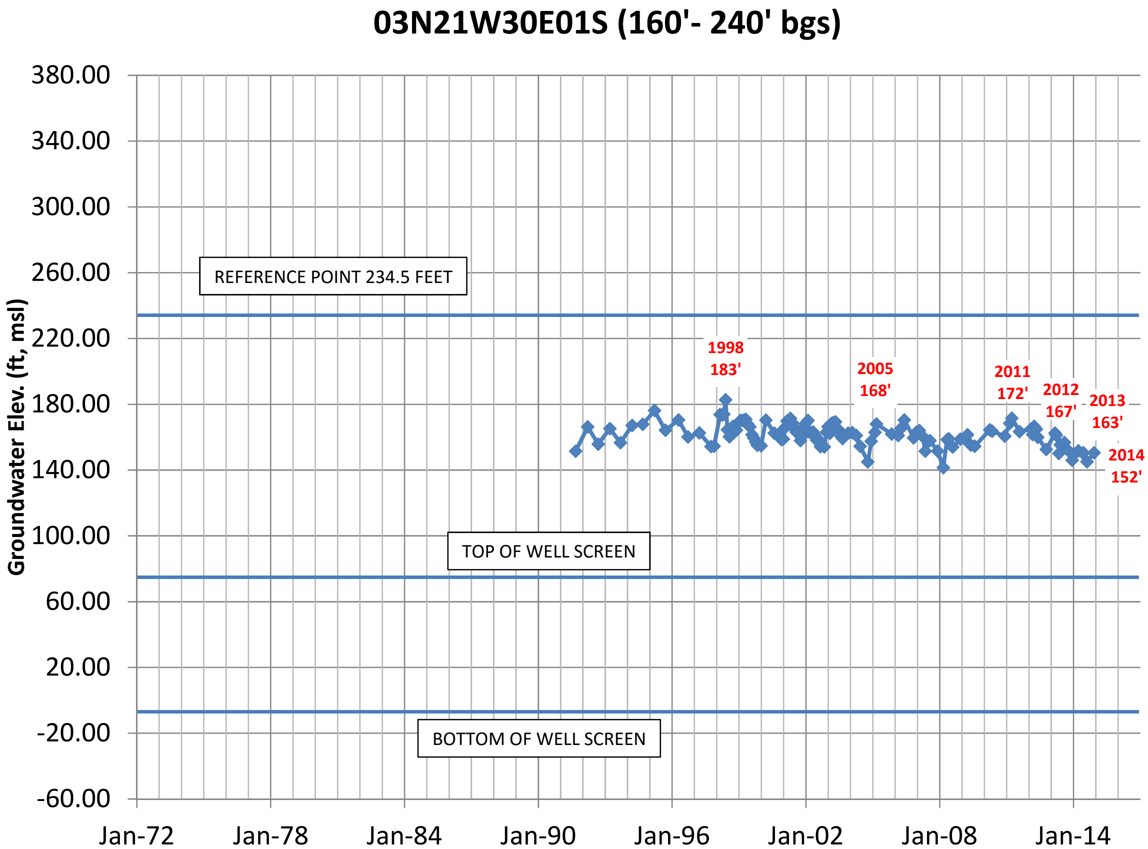


Figure B-62


03N21W30E01S (160'- 240' bgs)
REFERENCE POINT 234.5 FEET
TOP OF WELL SCREEN
BOTTOM OF WELL SCREEN
Groundwater Elev. (ft, msl)
380.00
340.00
300.00
260.00
220.00
180.00
140.00
100.00
60.00
20.00
-20.00
-60.00
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
1998 183'
2005 168'
2011 172'
2012 167'
2013 163'
2014 152'

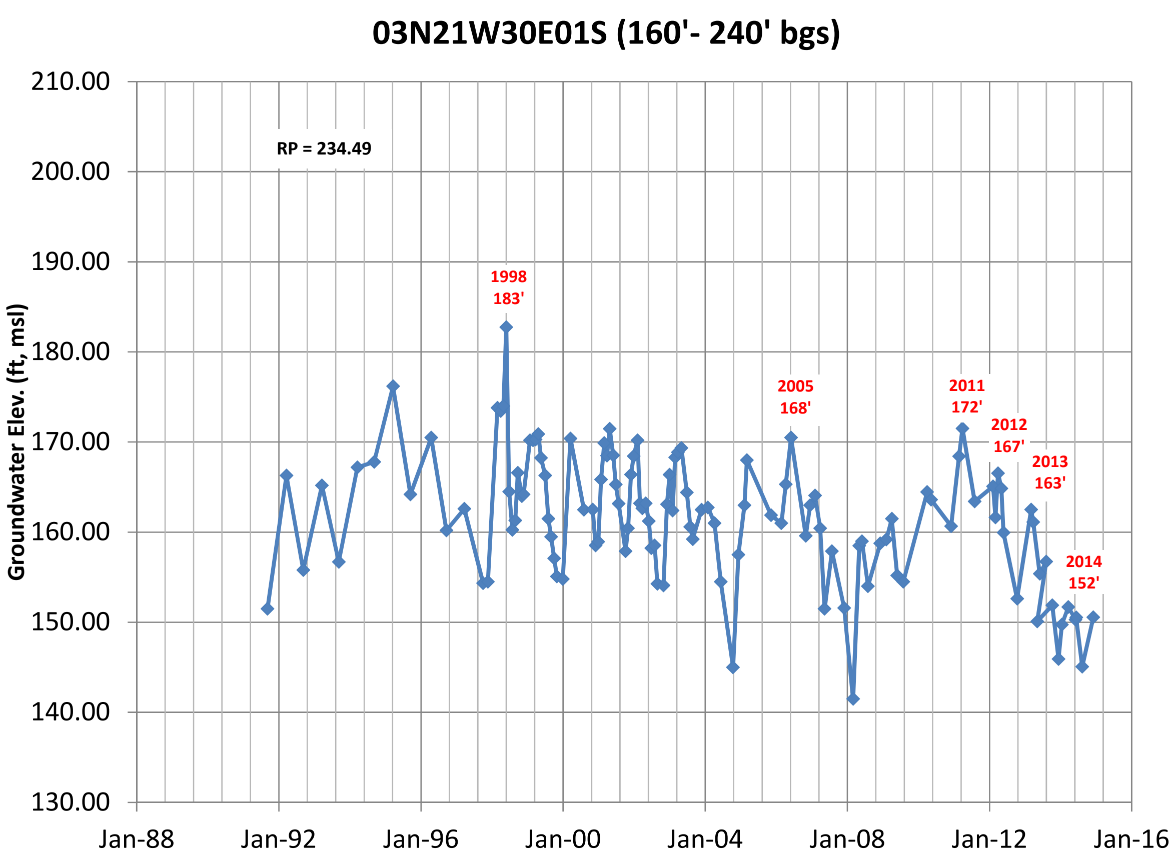
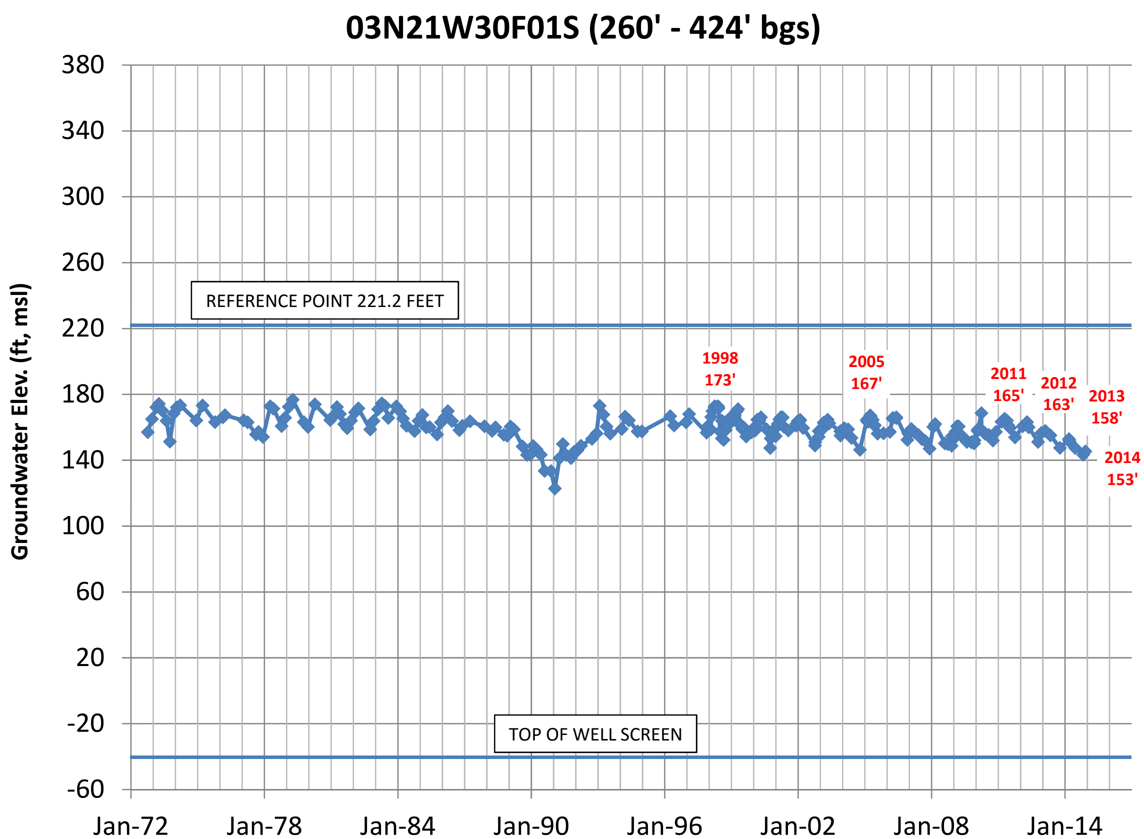

03N21W30E01S (160'- 240' bgs)
RP = 234.49
Groundwater Elev. (ft, msl)
210.00
200.00
190.00
180.00
170.00
160.00
150.00
140.00
130.00
Jan-88
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
1998 183'
2005 168'
2011 172'
2012 167'
2013 163'
2014 152'

Figure B-63


03N21W30F01S (260' - 424' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 221.2 FEET
TOP OF WELL SCREEN
1998 173'
2005 167'
2011 165'
2012 163'
2013 158'
2014 153'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

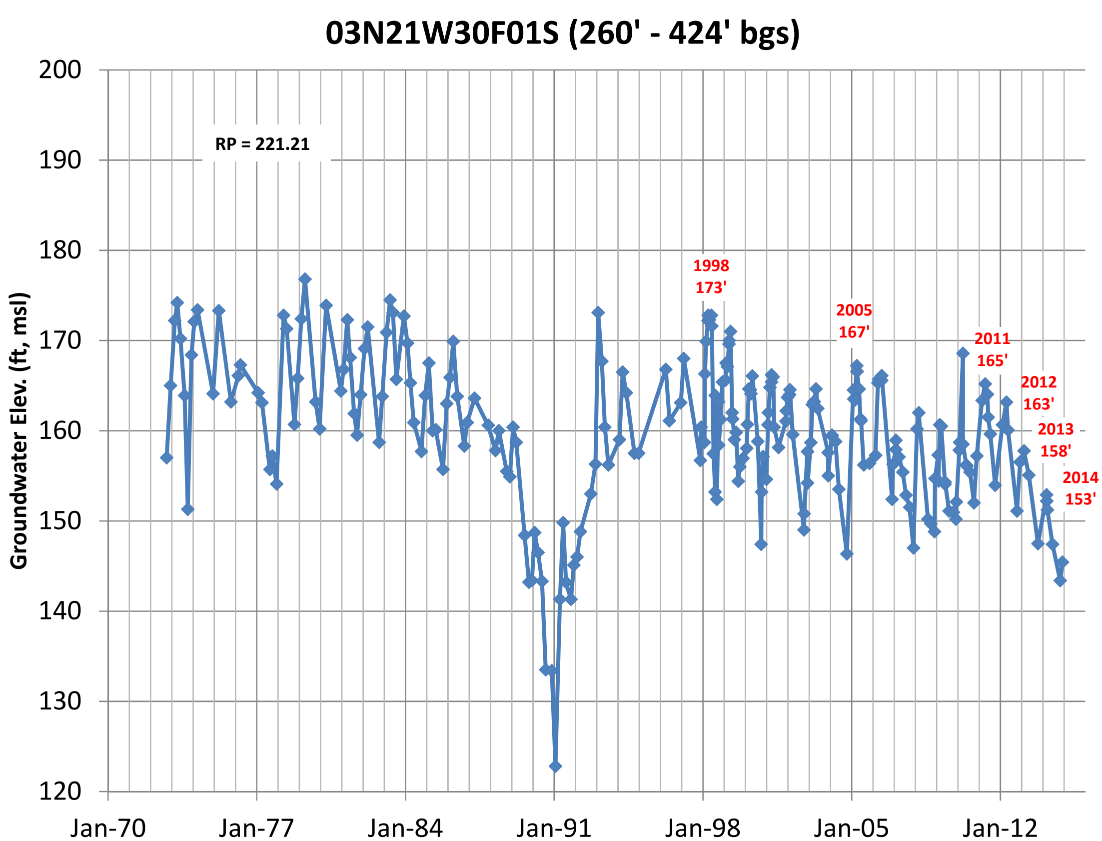
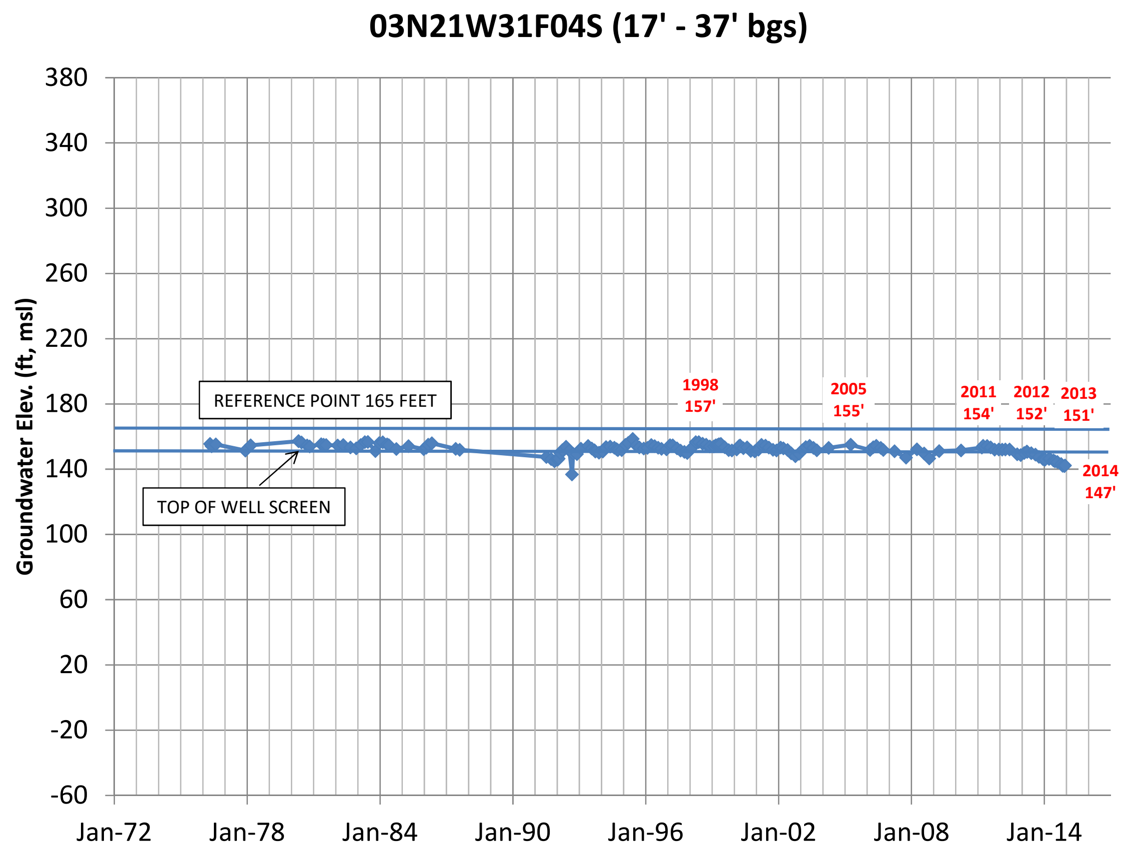

03N21W30F01S (260' - 424' bgs)
Groundwater Elev. (ft, msl)
RP = 221.21
1998 173'
2005 167'
2011 165'
2012 163'
2013 158'
2014 153'
200
190
180
170
160
150
140
130
120
Jan-70
Jan-77
Jan-84
Jan-91
Jan-98
Jan-05
Jan-12

Figure B-64


03N21W31F04S (17' - 37' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 165 FEET
TOP OF WELL SCREEN
1998 157'
2005 155'
2011 154'
2012 152'
2013 151'
2014 147'

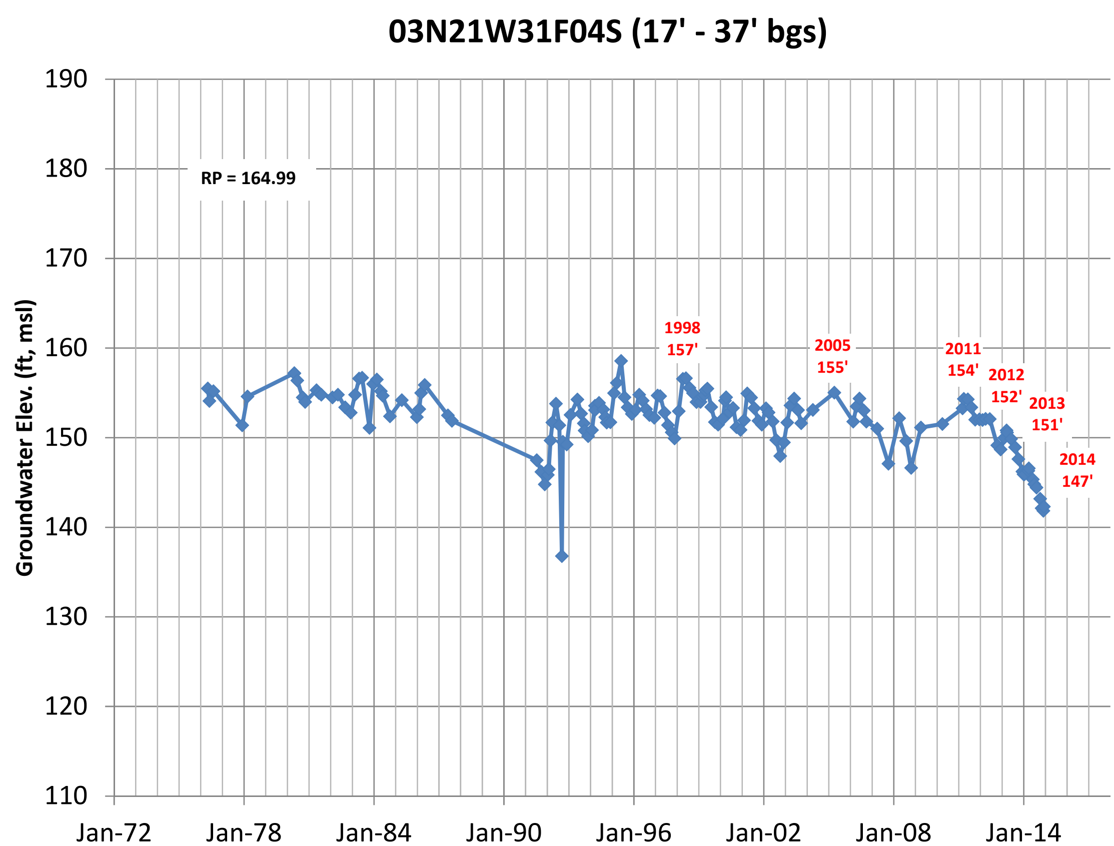

03N21W31F04S (17' - 37' bgs)
Groundwater Elev. (ft, msl)
190
180
170
160
150
140
130
120
110
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
RP = 164.99
1998 157'
2005 155'
2011 154'
2012 152'
2013 151'
2014 147'

Figure B-65

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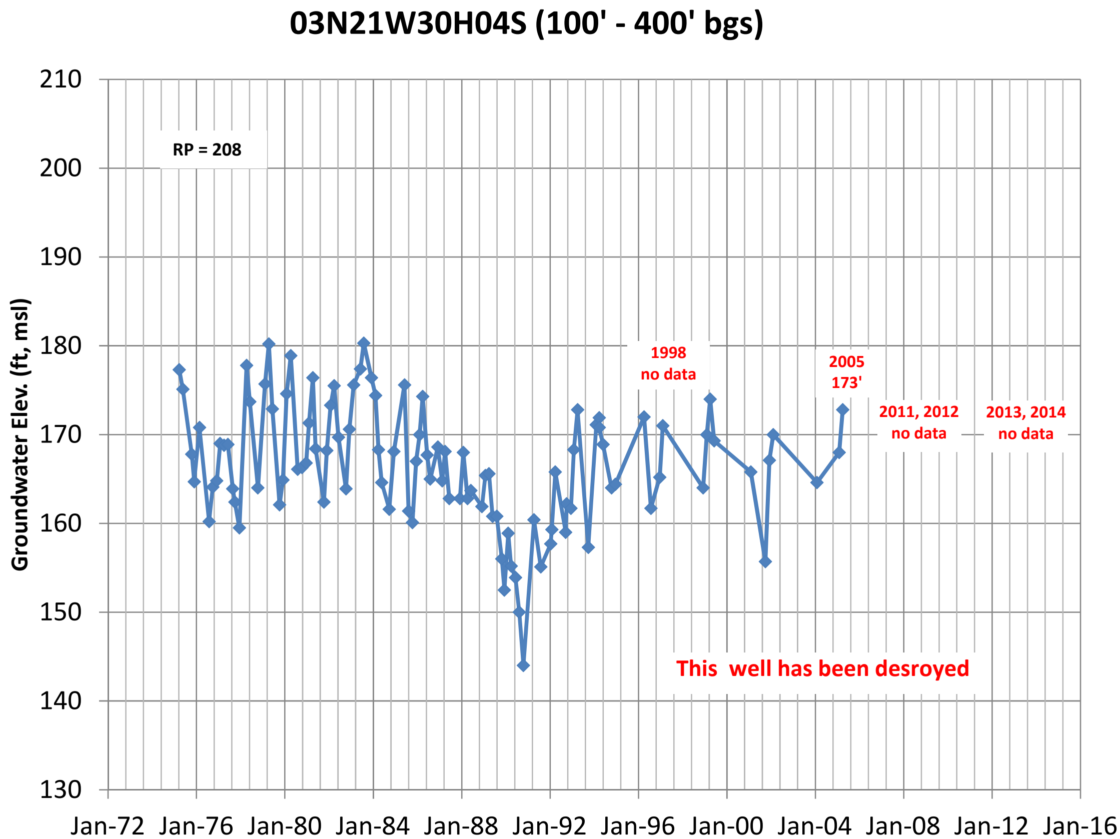

Figure B-66

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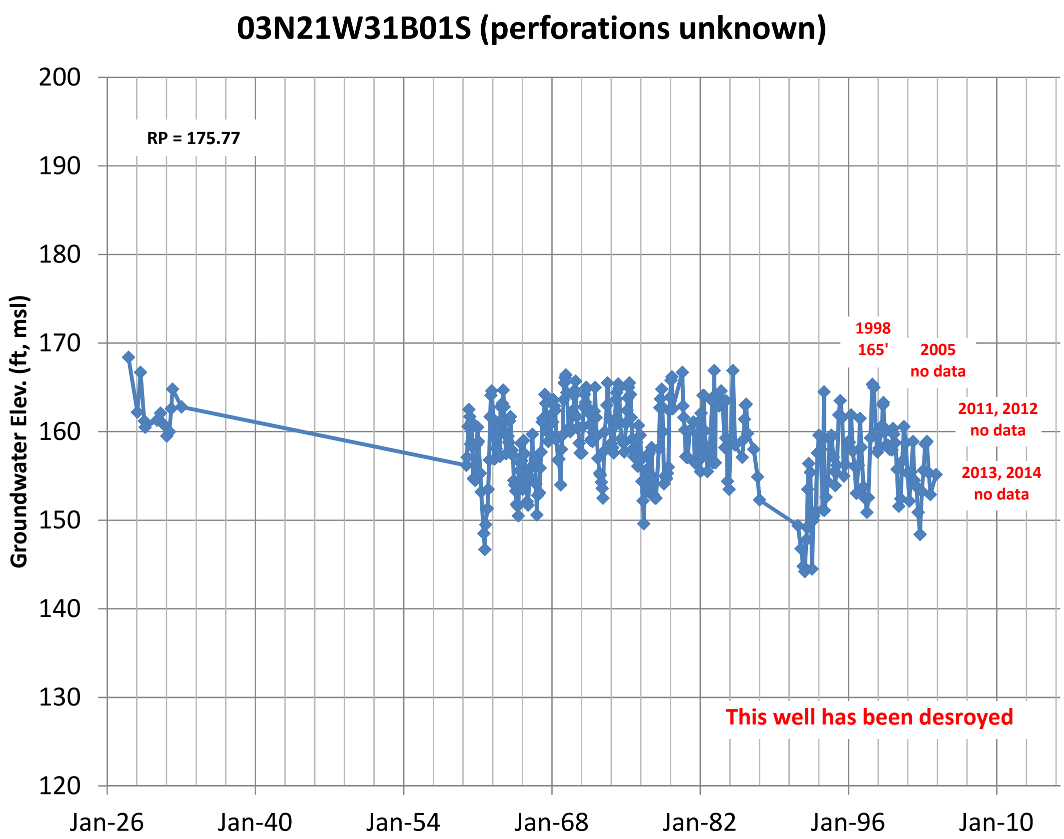
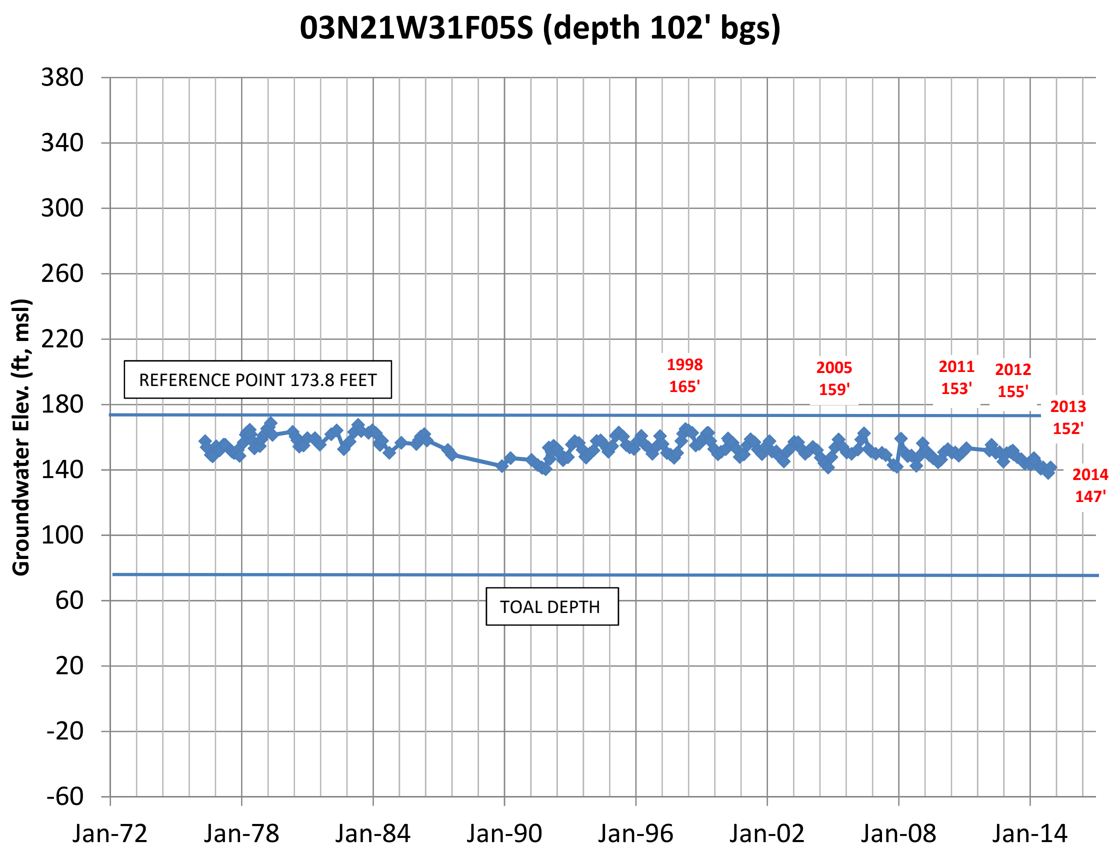


Figure B-67


03N21W31F05S (depth 102' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 173.8 FEET
TOAL DEPTH
1998
165'
2005
159'
2011
153'
2012
155'
2013
152'
2014
147'

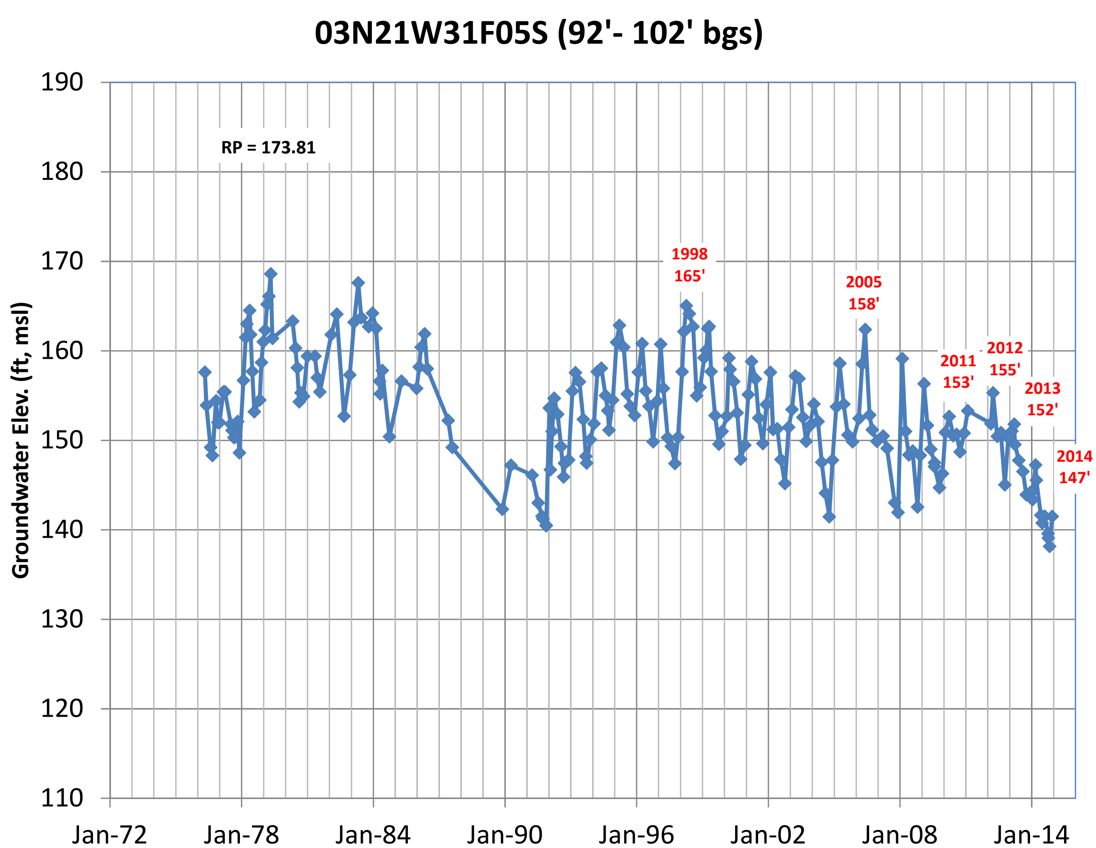
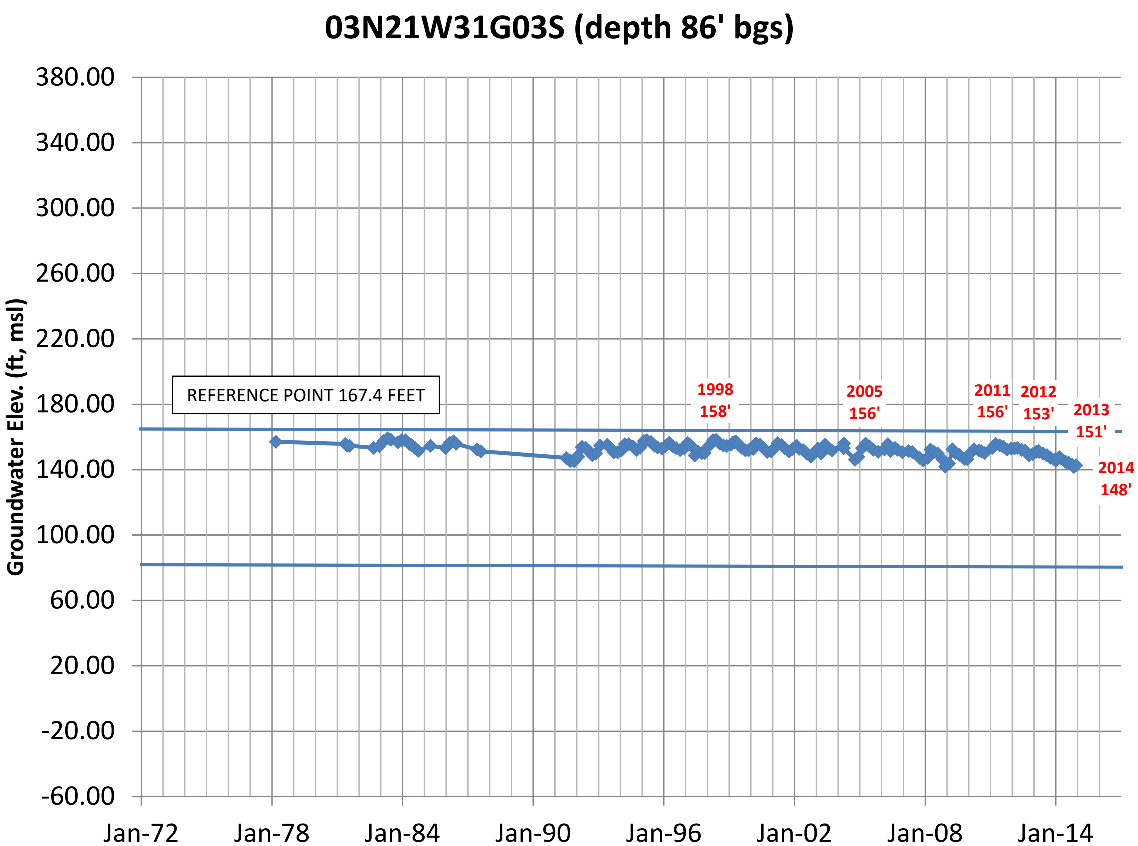

03N21W31F05S (92'- 102' bgs)
Groundwater Elev. (ft, msl)
190
180
170
160
150
140
130
120
110
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
RP = 173.81
1998
165'
2005
158'
2011
153'
2012
155'
2013
152'
2014
147'

Figure B-68


03N21W31G03S (depth 86' bgs)
Groundwater Elev. (ft, msl)
380.00
340.00
300.00
260.00
220.00
180.00
140.00
100.00
60.00
20.00
-20.00
-60.00
REFERENCE POINT 167.4 FEET
1998
158'
2005
156'
2011
156'
2012
153'
2013
151'
2014
148'
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

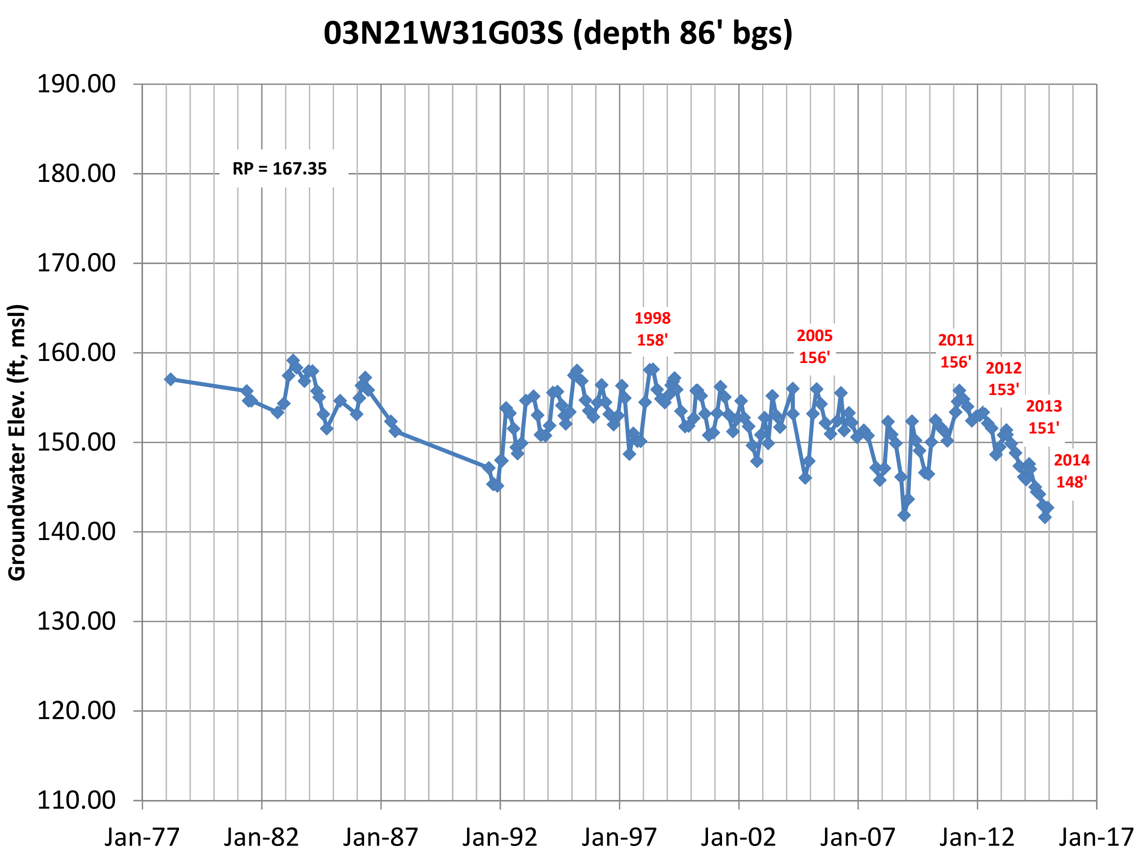
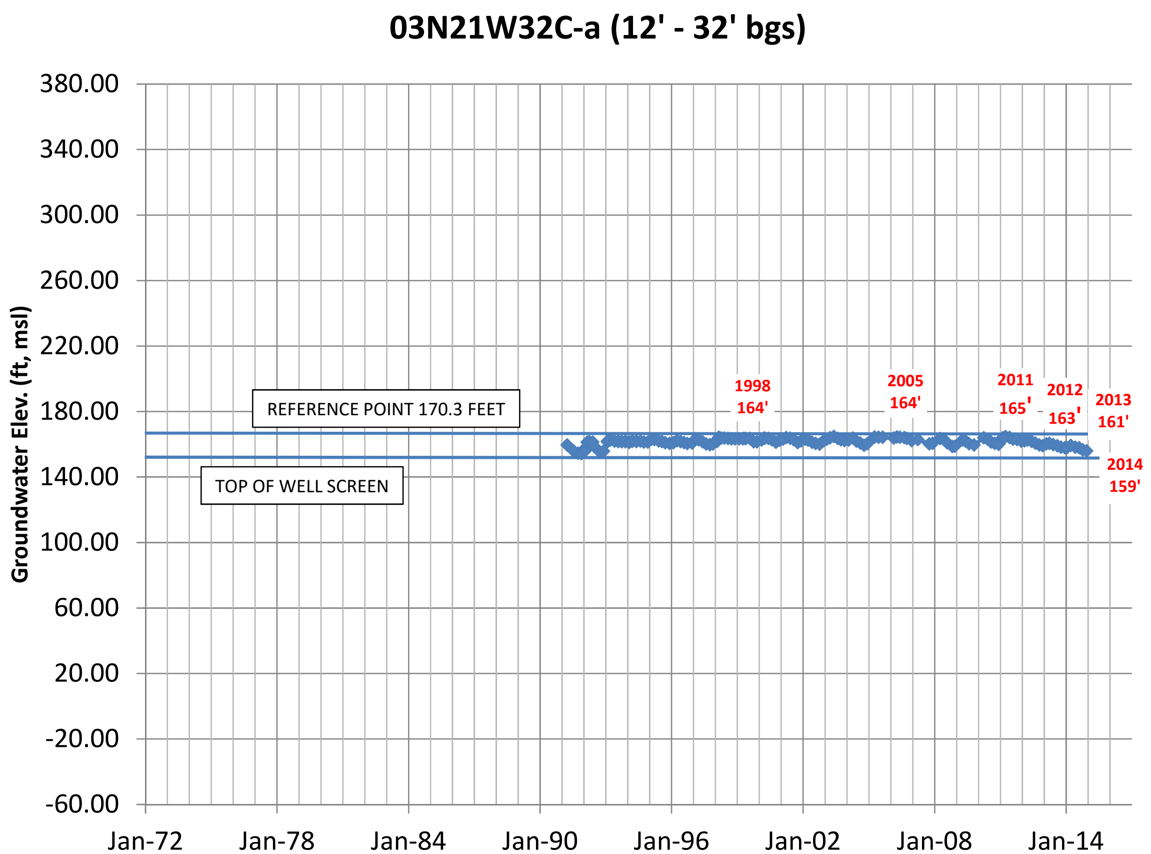

03N21W31G03S (depth 86' bgs)
Groundwater Elev. (ft, msl)
190.00
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
RP = 167.35
1998
158'
2005
156'
2011
156'
2012
153'
2013
151'
2014
148'
Jan-77
Jan-82
Jan-87
Jan-92
Jan-97
Jan-02
Jan-07
Jan-12
Jan-17

Figure B-69


03N21W32C-a (12' - 32' bgs)
Groundwater Elev. (ft, msl)
380.00
340.00
300.00
260.00
220.00
180.00
140.00
100.00
60.00
20.00
-20.00
-60.00
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 170.3 FEET
TOP OF WELL SCREEN
1998 164'
2005 164'
2011 165'
2012 163'
2013 161'
2014 159'

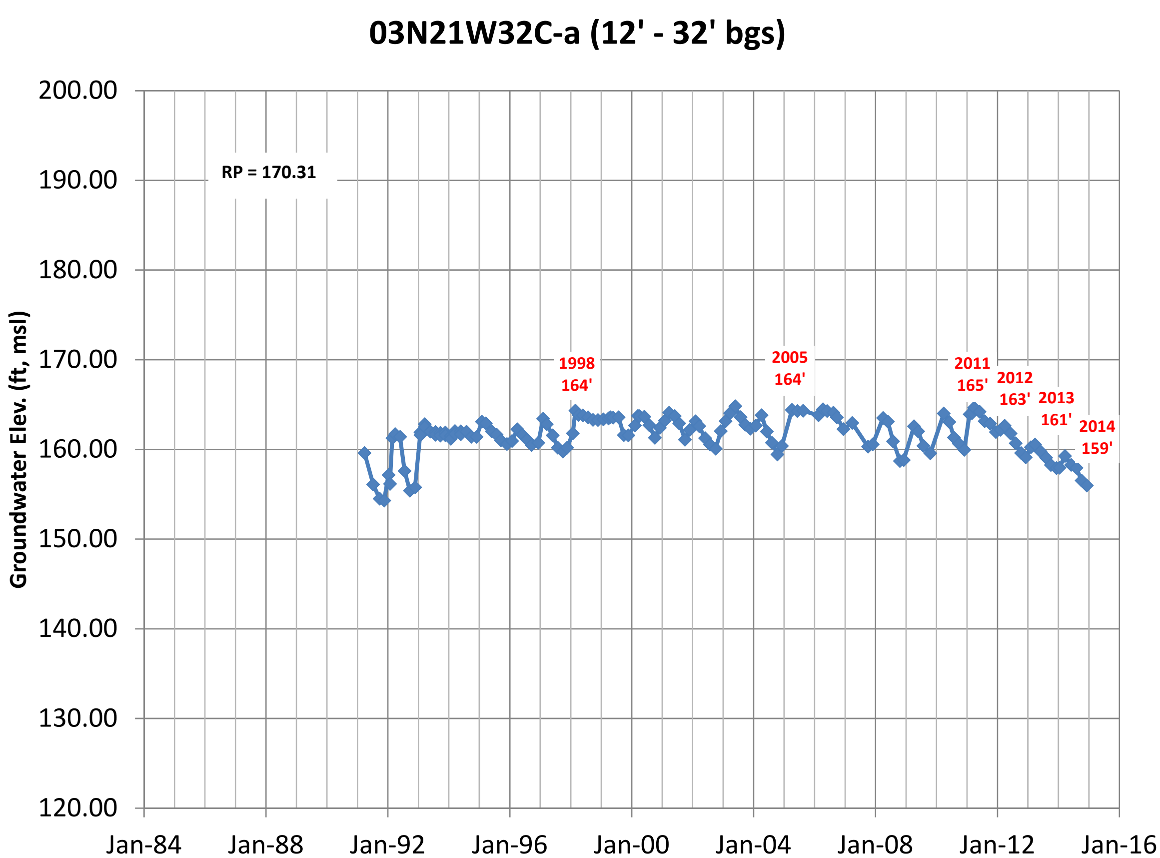

03N21W32C-a (12' - 32' bgs)
Groundwater Elev. (ft, msl)
200.00
190.00
180.00
170.00
160.00
150.00
140.00
130.00
120.00
Jan-84
Jan-88
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
RP = 170.31
1998 164'
2005 164'
2011 165'
2012 163'
2013 161'
2014 159'

Figure B-70

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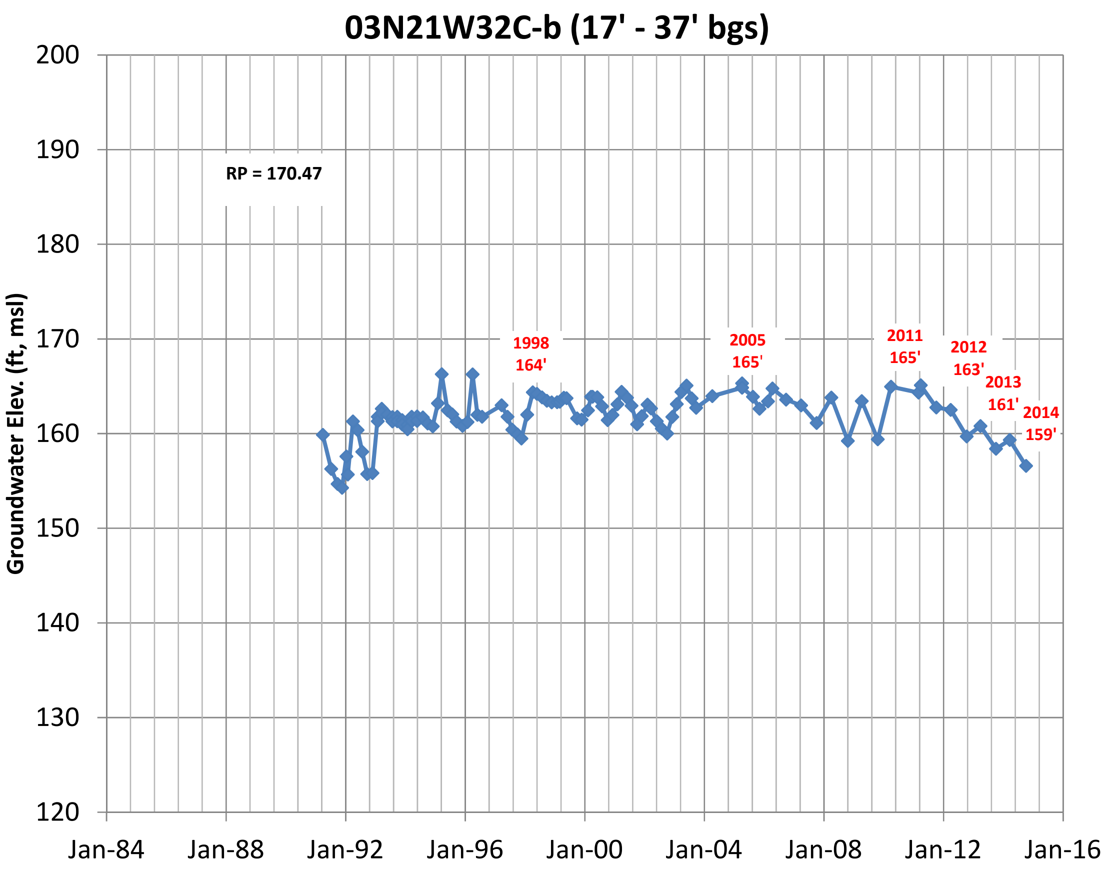

Figure B-71

Intentionally Left Blank

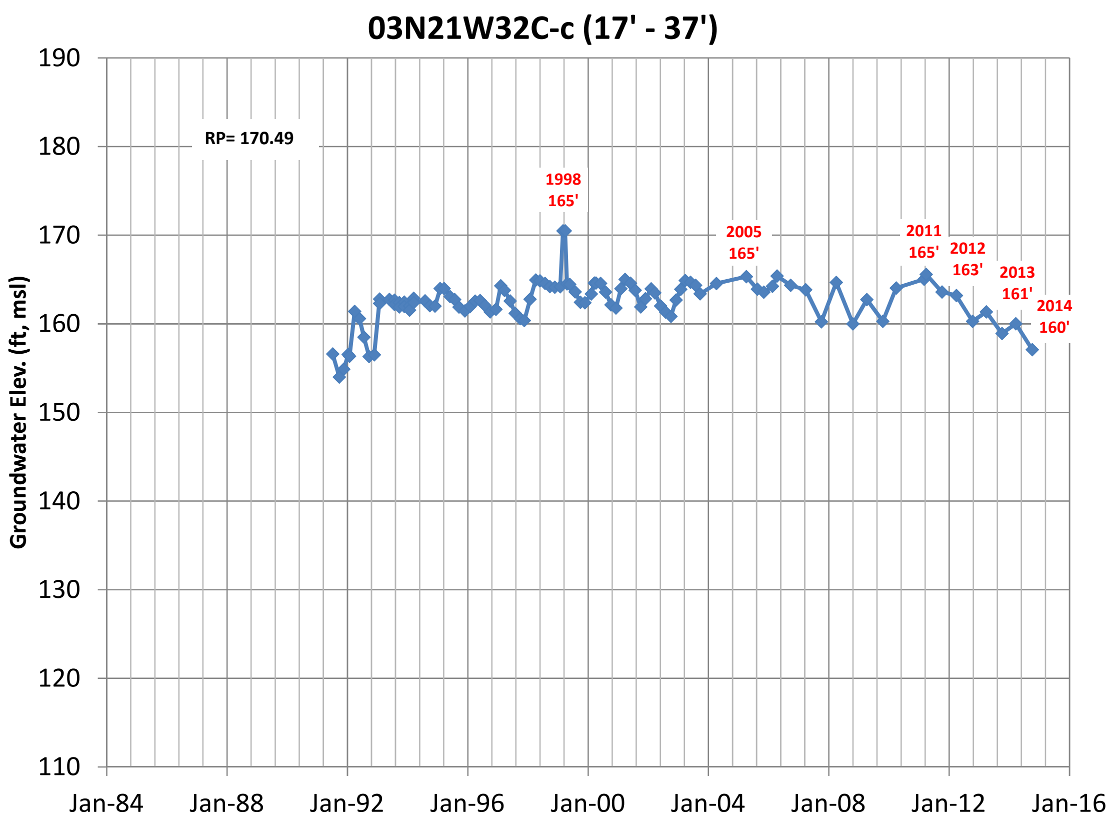

Figure B-72

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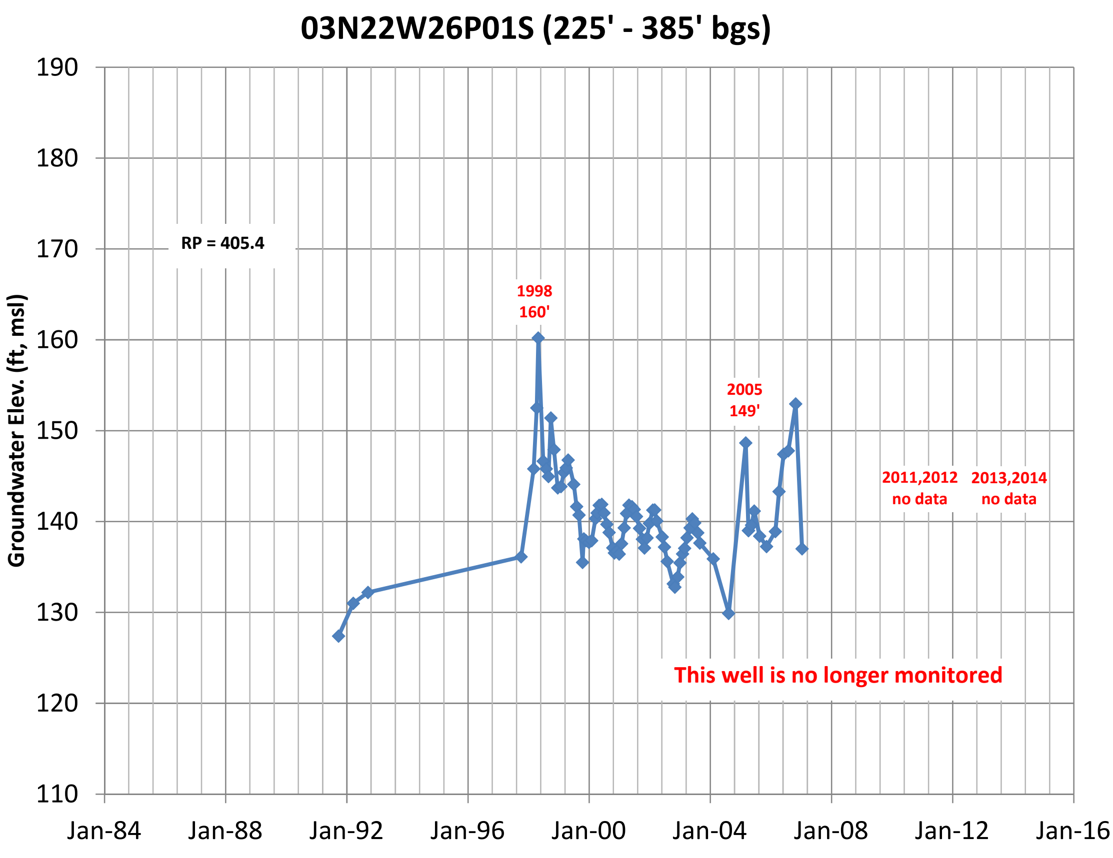
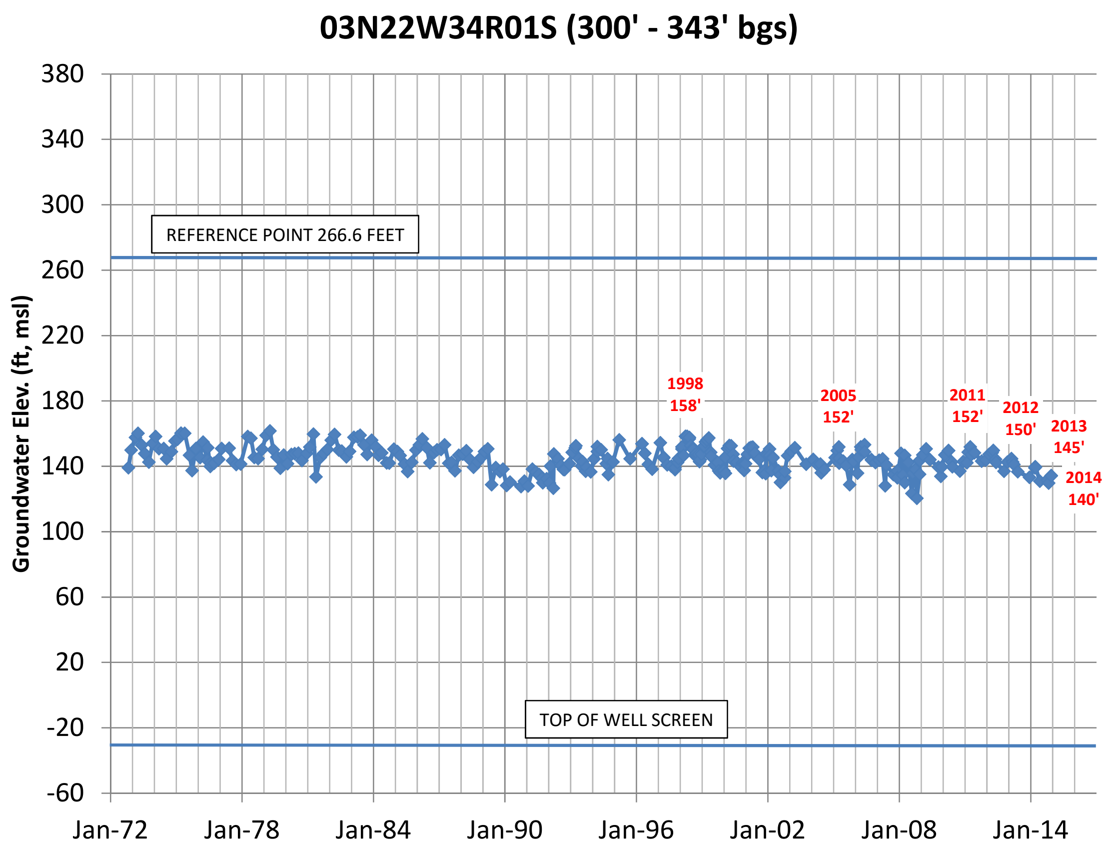


Figure B-73


03N22W34R01S (300' - 343' bgs)
Groundwater Elev. (ft, msl)
REFERENCE POINT 266.6 FEET
TOP OF WELL SCREEN
1998
158'
2005
152'
2011
152'
2012
150'
2013
145'
2014
140'
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

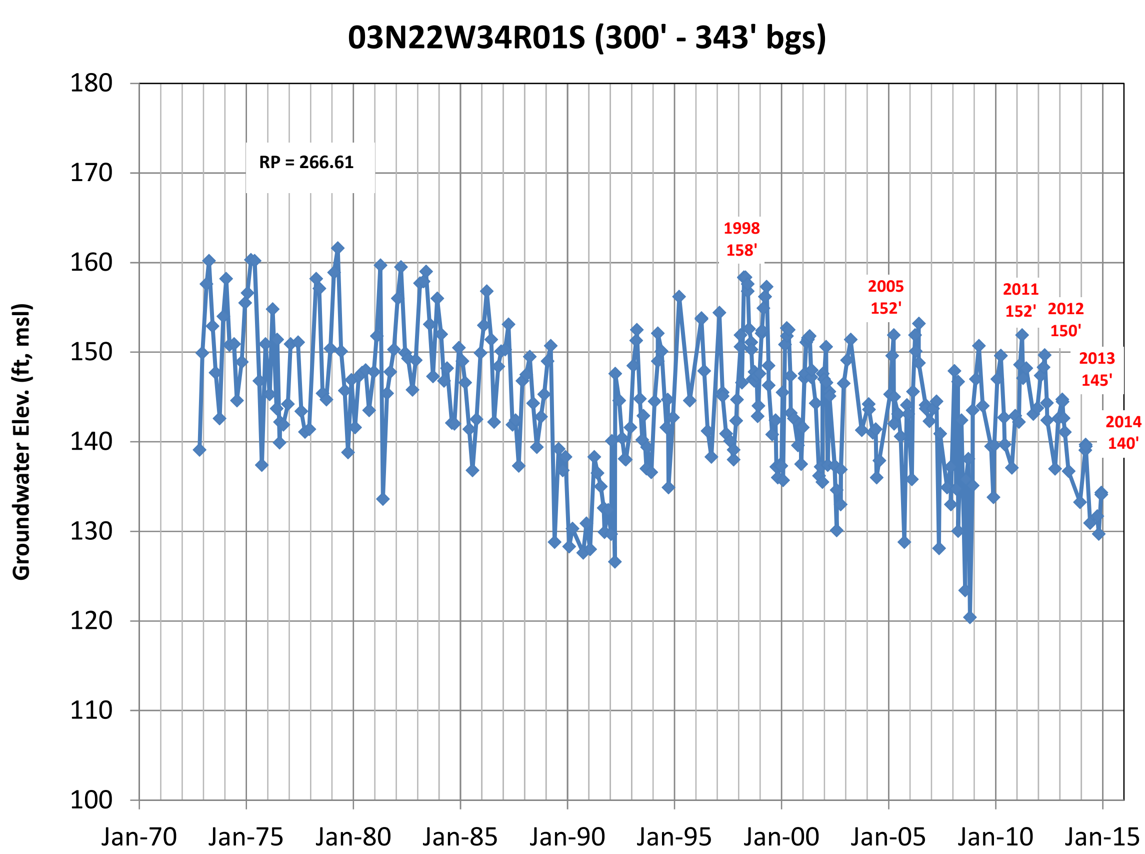
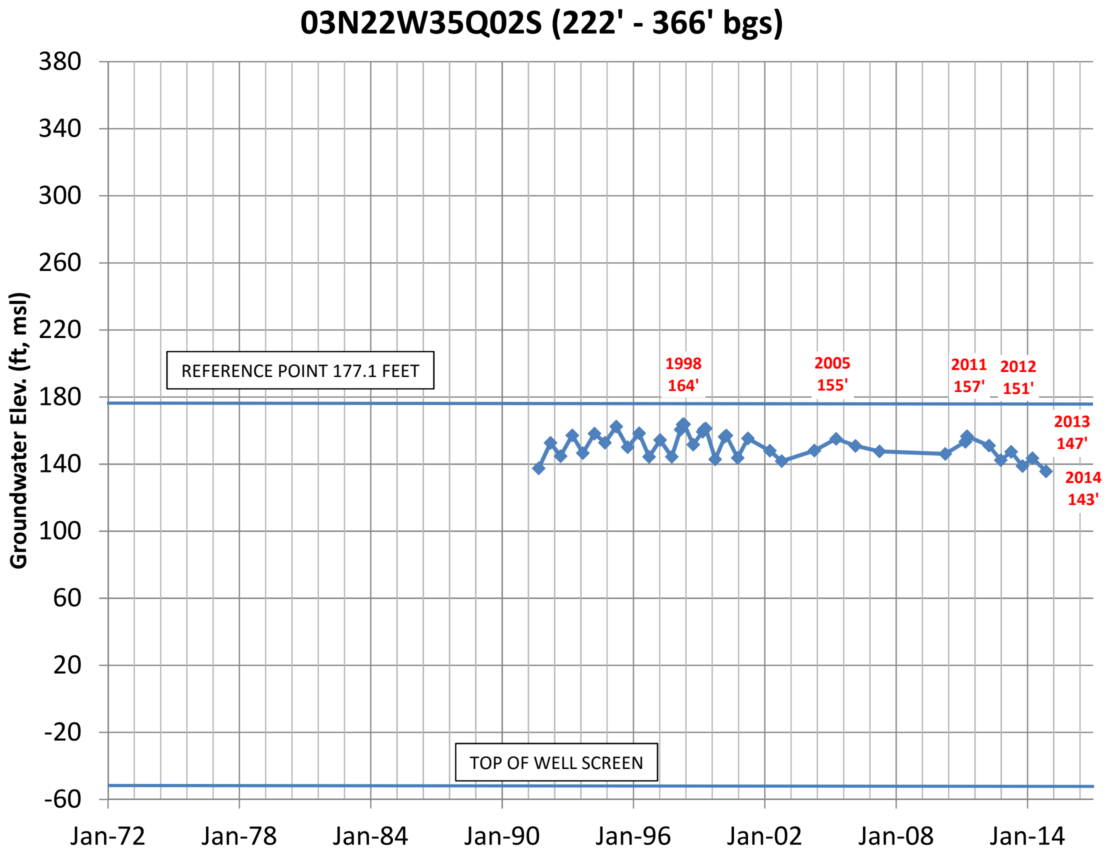

03N22W34R01S (300' - 343' bgs)
Groundwater Elev. (ft, msl)
RP = 266.61
1998
158'
2005
152'
2011
152'
2012
150'
2013
145'
2014
140'
180
170
160
150
140
130
120
110
100
Jan-70
Jan-75
Jan-80
Jan-85
Jan-90
Jan-95
Jan-00
Jan-05
Jan-10
Jan-15

Figure B-74


03N22W35Q02S (222' - 366' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
REFERENCE POINT 177.1 FEET
TOP OF WELL SCREEN
1998
164'
2005
155'
2011
157'
2012
151'
2013
147'
2014
143'
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

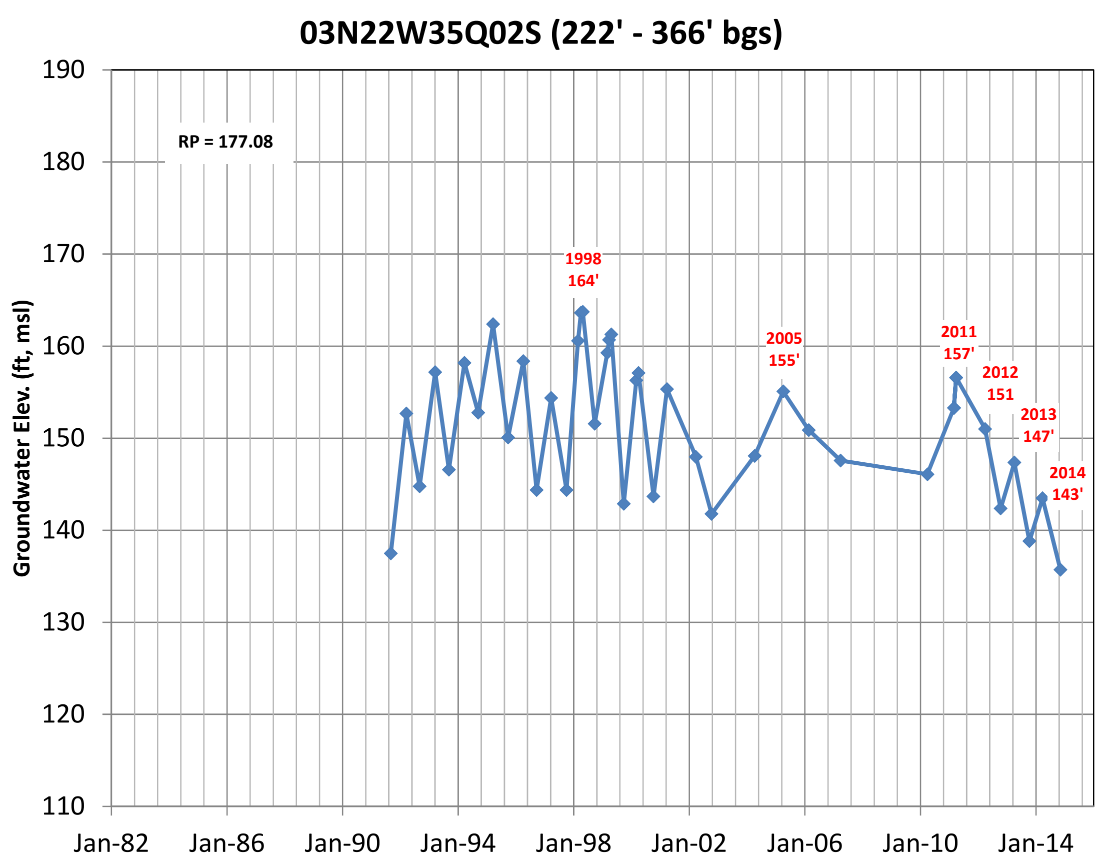
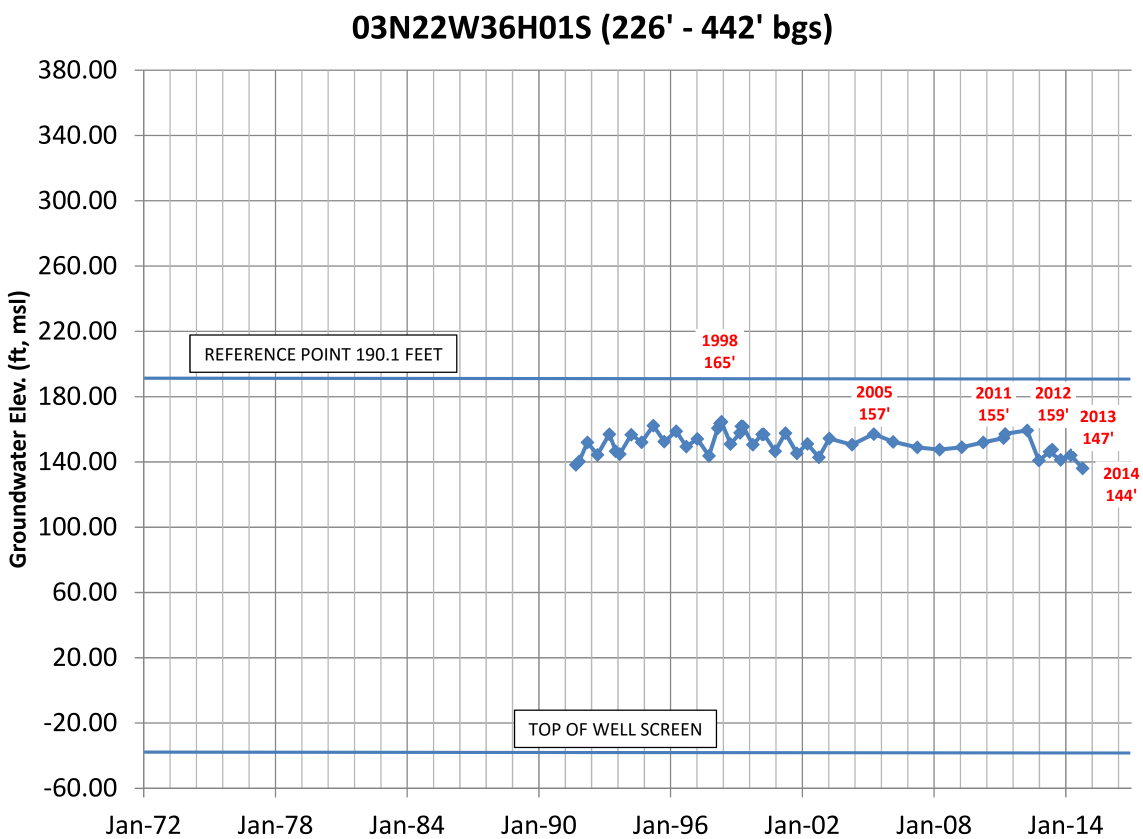

03N22W35Q02S (222' - 366' bgs)
Groundwater Elev. (ft, msl)
190
180
170
160
150
140
130
120
110
RP = 177.08
1998
164'
2005
155'
2011
157'
2012
151
2013
147'
2014
143'
Jan-82
Jan-86
Jan-90
Jan-94
Jan-98
Jan-02
Jan-06
Jan-10
Jan-14

Figure B-75


03N22W36H01S (226' - 442' bgs)
Groundwater Elev. (ft, msl)
380.00
340.00
300.00
260.00
220.00
180.00
140.00
100.00
60.00
20.00
-20.00
-60.00
REFERENCE POINT 190.1 FEET
TOP OF WELL SCREEN
1998
165'
2005
157'
2011
155'
2012
159'
2013
147'
2014
144'
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14

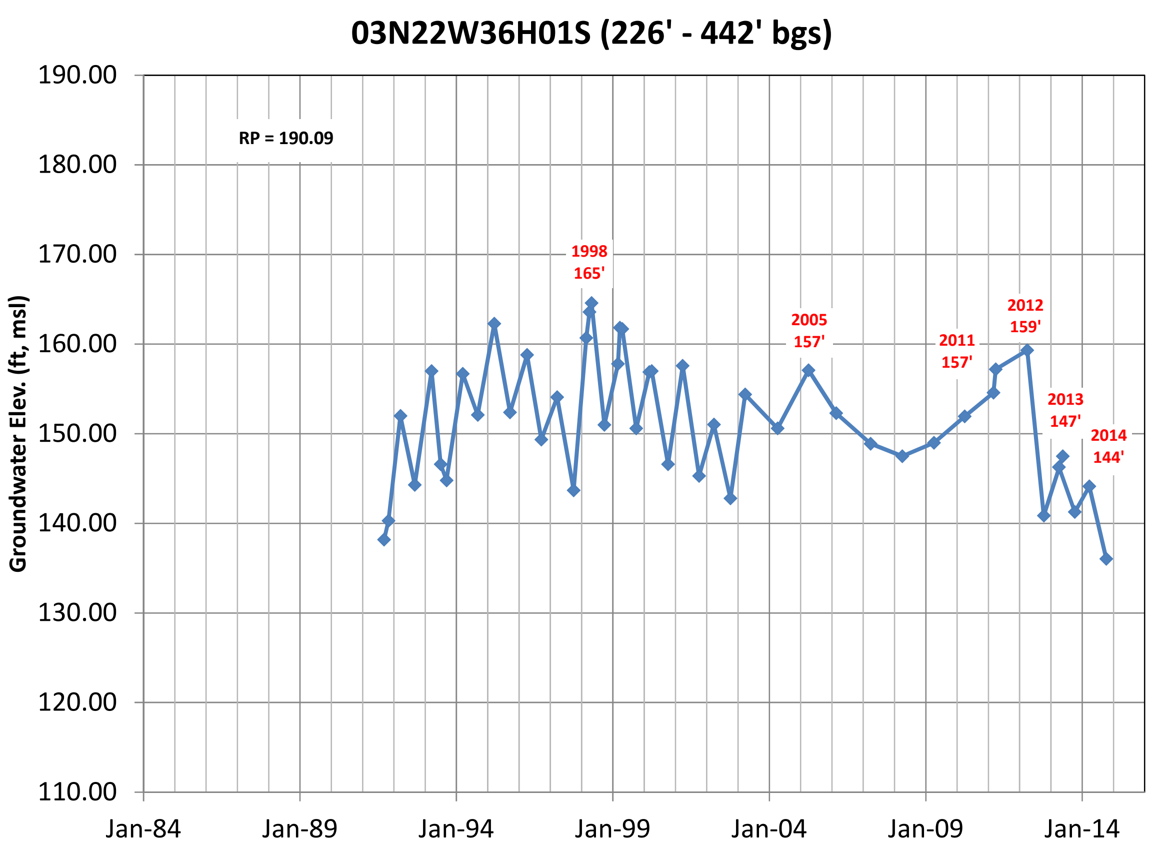
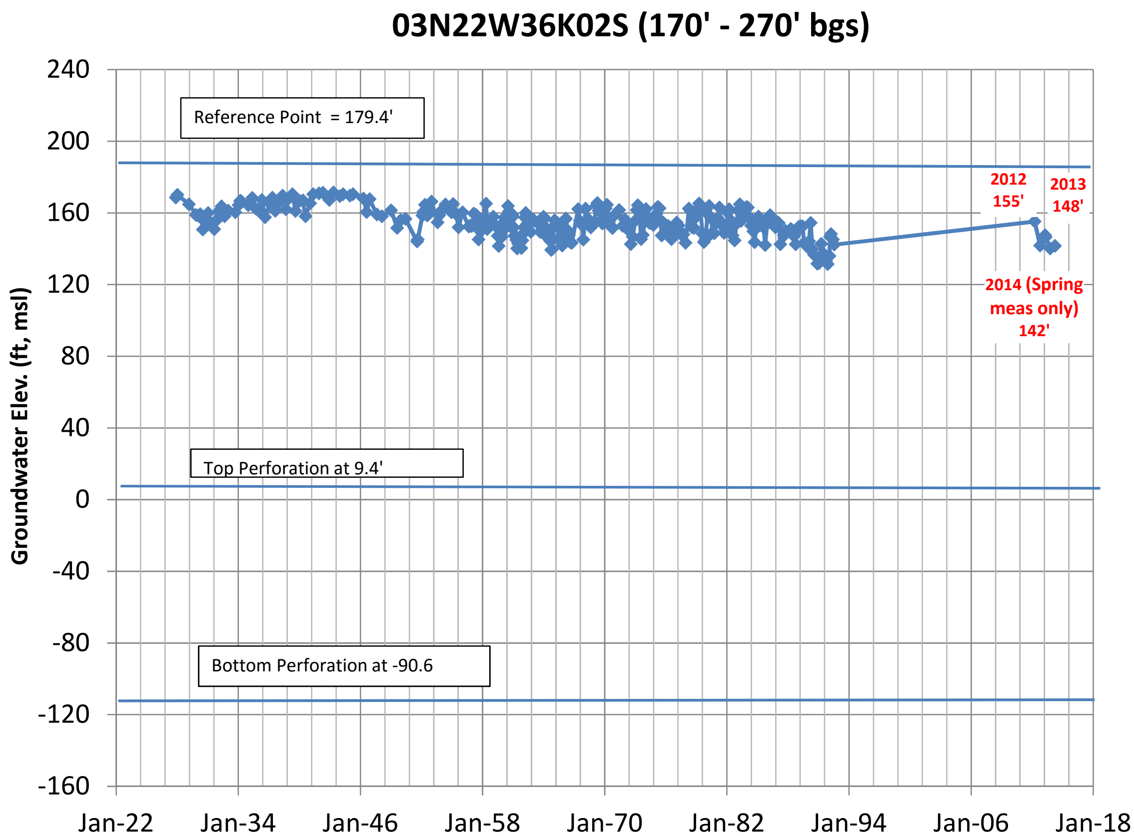

03N22W36H01S (226' - 442' bgs)
Groundwater Elev. (ft, msl)
190.00
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
RP = 190.09
1998
165'
2005
157'
2011
157'
2012
159'
2013
147'
2014
144'
Jan-84
Jan-89
Jan-94
Jan-99
Jan-04
Jan-09
Jan-14

Figure B-76


03N22W36K02S (170' - 270' bgs)
Reference Point = 179.4'
Top Perforation at 9.4'
Bottom Perforation at -90.6
2012
155'
2013
148'
2014 (Spring
meas only)
142'
Groundwater Elev. (ft, msl)
240
200
160
120
80
40
0
-40
-80
-120
-160
Jan-22
Jan-34
Jan-46
Jan-58
Jan-70
Jan-82
Jan-94
Jan-06
Jan-18

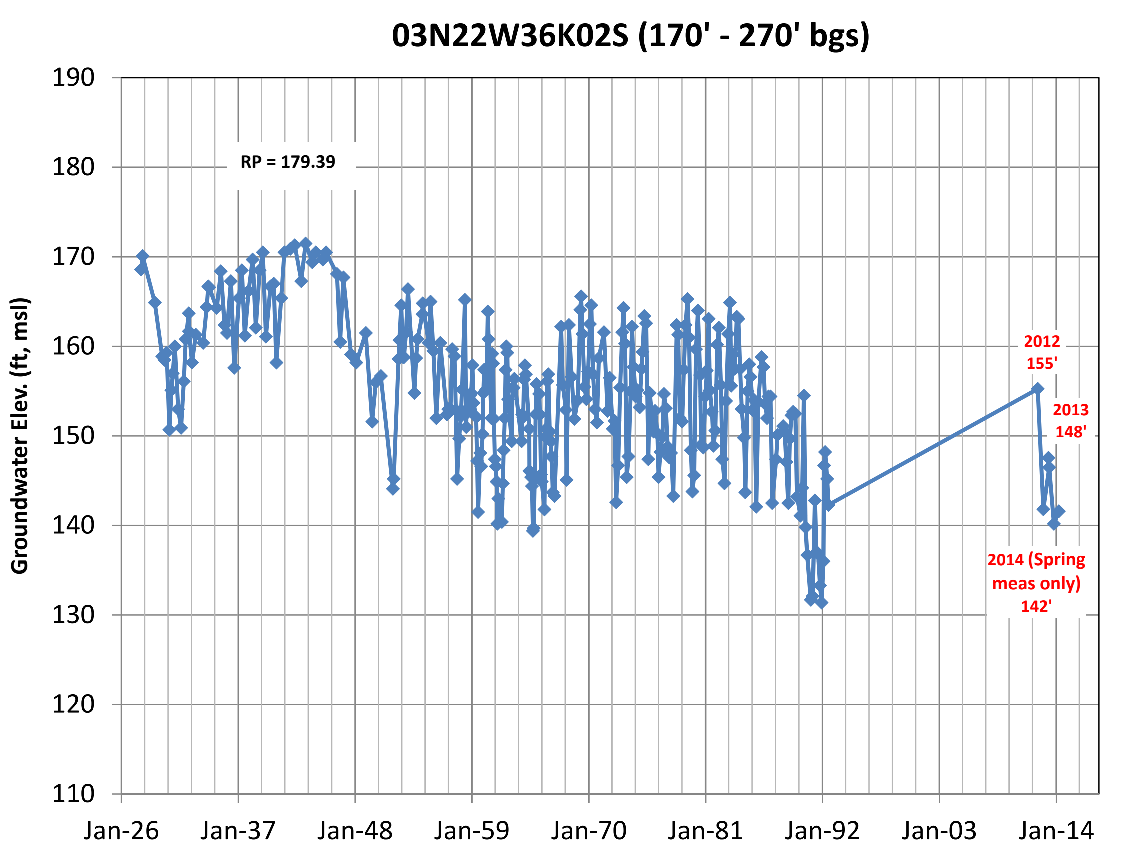
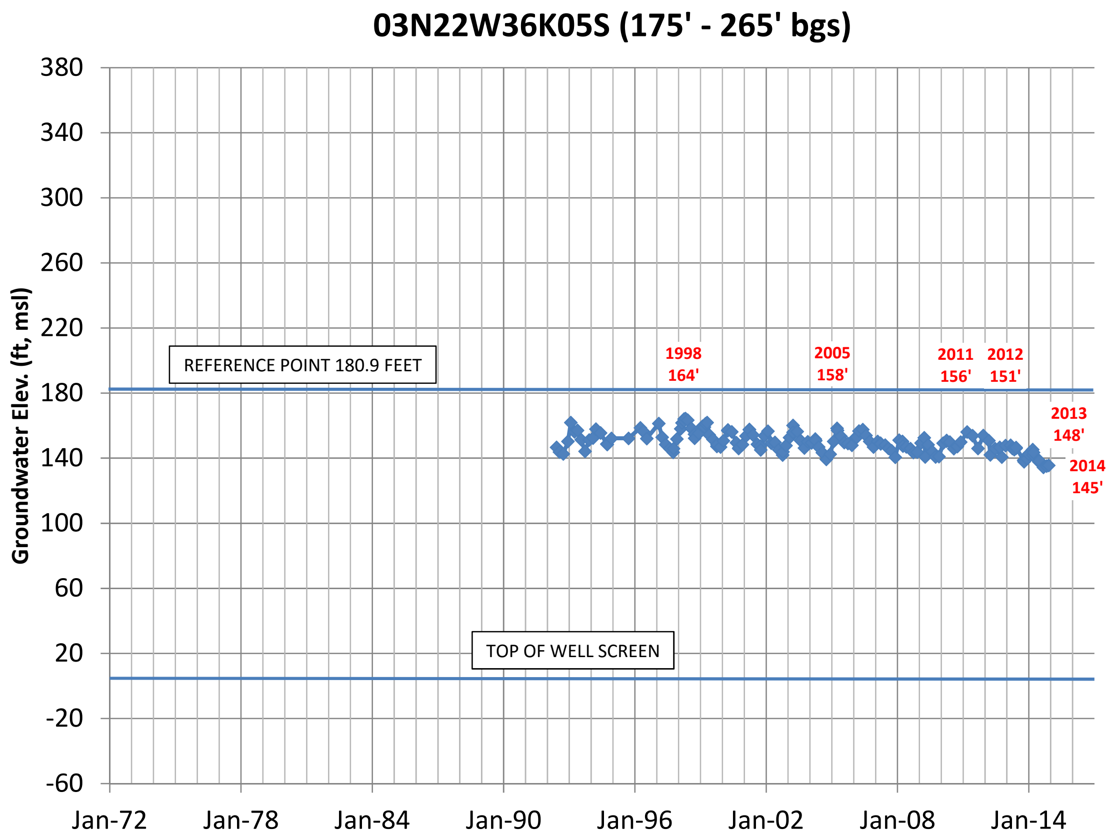

03N22W36K02S (170' - 270' bgs)
RP = 179.39
2012
155'
2013
148'
2014 (Spring
meas only)
142'
Groundwater Elev. (ft, msl)
190
180
170
160
150
140
130
120
110
Jan-26
Jan-37
Jan-48
Jan-59
Jan-70
Jan-81
Jan-92
Jan-03
Jan-14

Figure B-77


03N22W36K05S (175' - 265' bgs)
Groundwater Elev. (ft, msl)
380
340
300
260
220
180
140
100
60
20
-20
-60
Jan-72
Jan-78
Jan-84
Jan-90
Jan-96
Jan-02
Jan-08
Jan-14
REFERENCE POINT 180.9 FEET
TOP OF WELL SCREEN
1998 164'
2005 158'
2011 156'
2012 151'
2013 148'
2014 145'

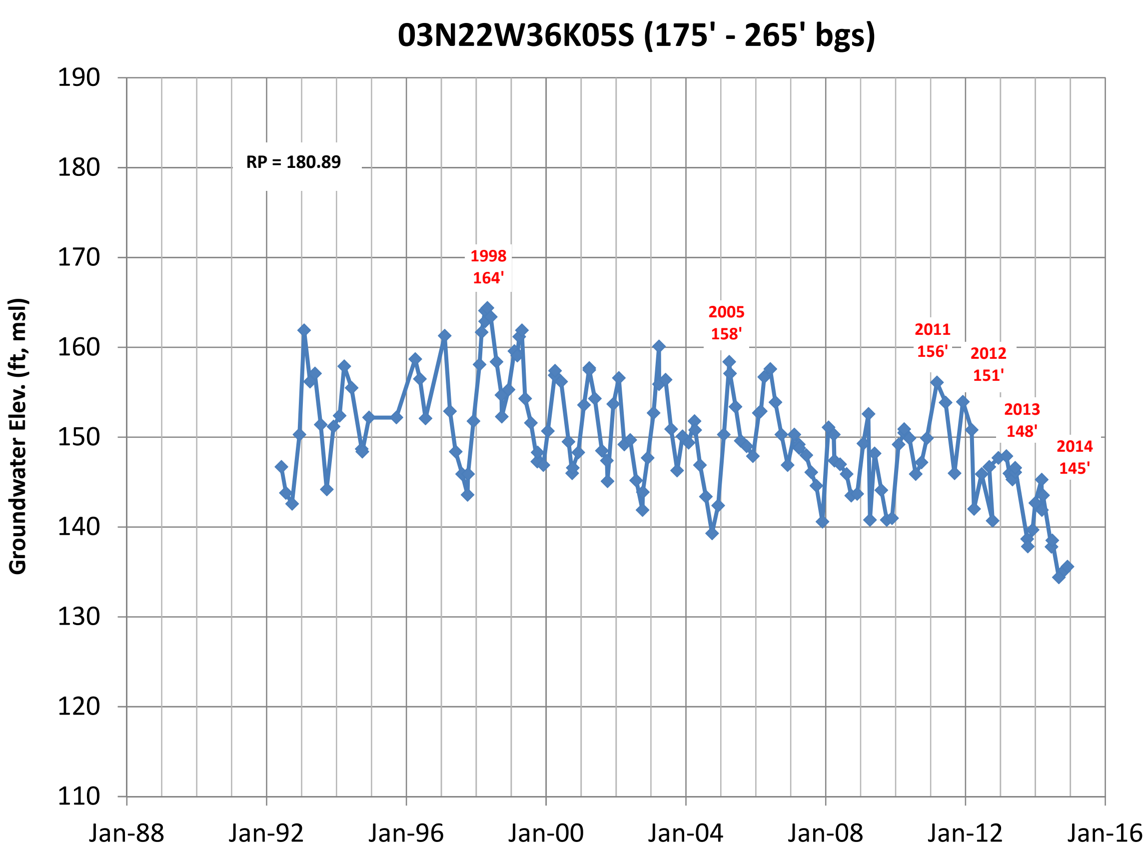

03N22W36K05S (175' - 265' bgs)
Groundwater Elev. (ft, msl)
190
180
170
160
150
140
130
120
110
Jan-88
Jan-92
Jan-96
Jan-00
Jan-04
Jan-08
Jan-12
Jan-16
RP = 180.89
1998 164'
2005 158'
2011 156'
2012 151'
2013 148'
2014 145'

Figure B-78

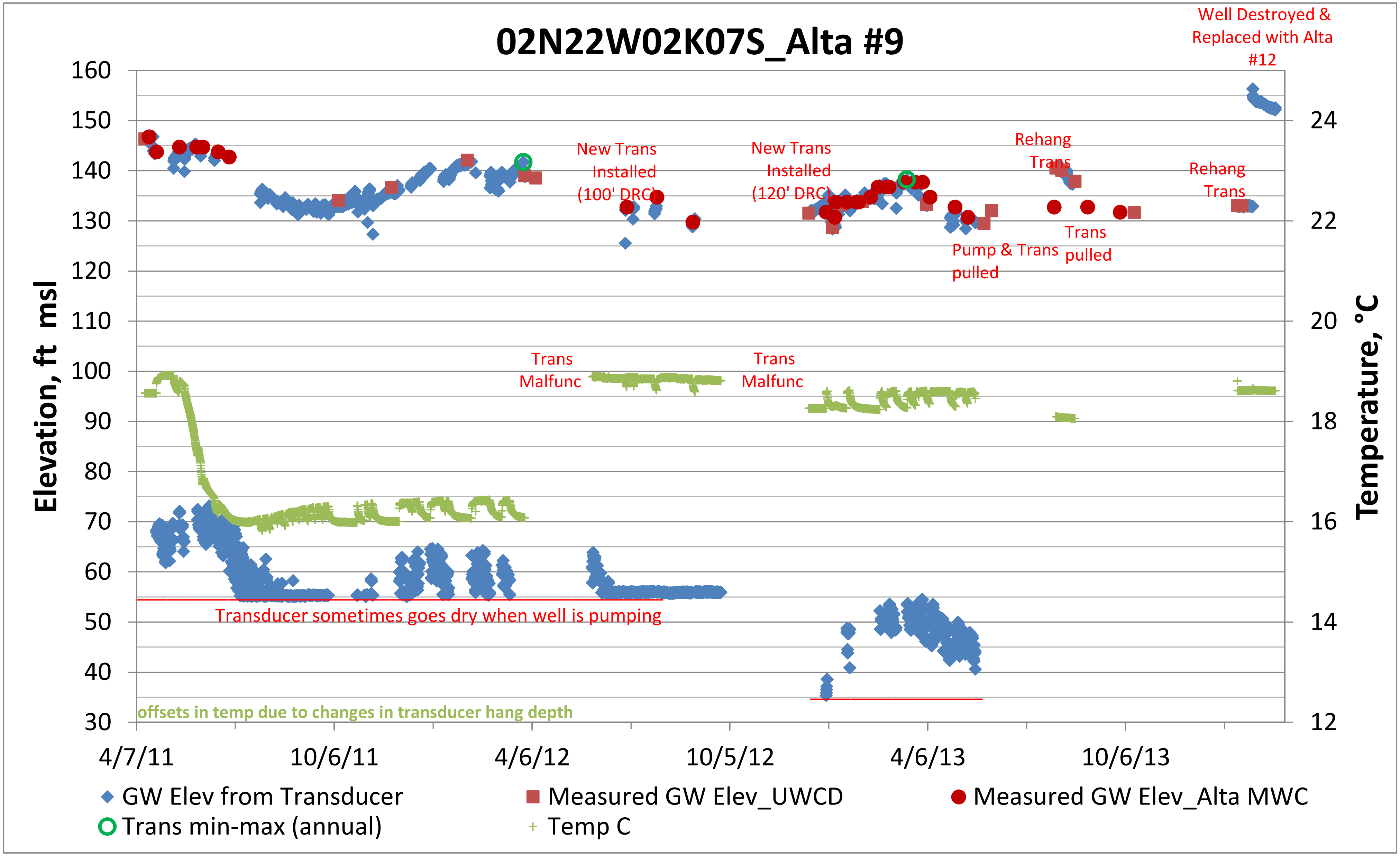

02N22W02K07S_Alta #9
Well Destroyed & Replaced with Alta #12
Elevation, ft msl
Temperature, °C
160
150
140
130
120
110
100
90
80
70
60
50
40
30
24
22
20
18
16
14
12
New Trans Installed (100' DRC)
New Trans Installed (120' DRC)
Rehang Trans
Rehang Trans
Trans pulled
Pump & Trans pulled
Trans Malfunc
Trans Malfunc
Transducer sometimes goes dry when well is pumping
offsets in temp due to changes in transducer hang depth
4/7/11
10/6/11
4/6/12
10/5/12
4/6/13
10/6/13
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_Alta MWC
Trans min-max (annual)
Temp C

Figure B-79

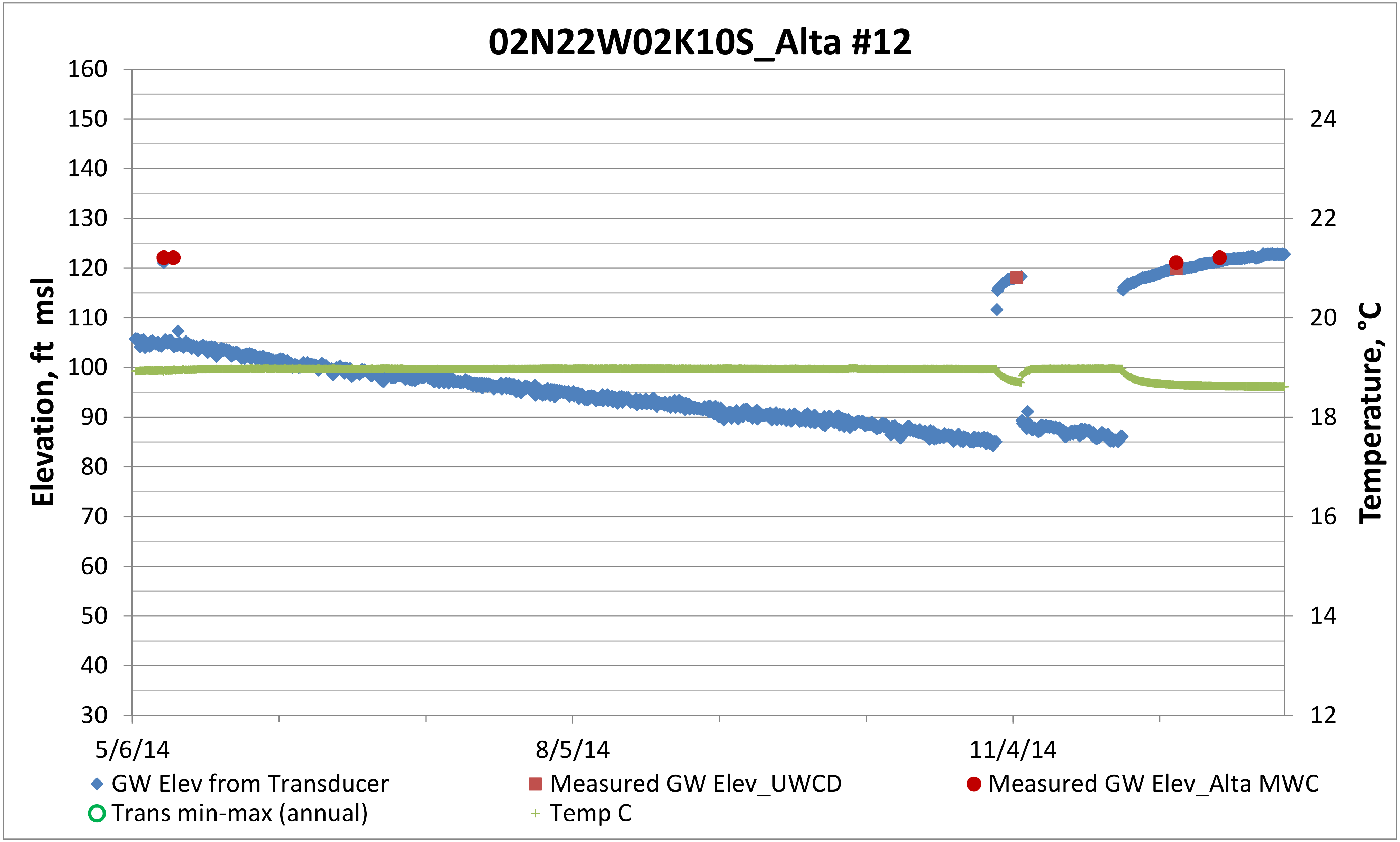

02N22W02K10S_Alta #12
Elevation, ft msl
Temperature, °C
160
150
140
130
120
110
100
90
80
70
60
50
40
30
24
22
20
18
16
14
12
5/6/14
8/5/14
11/4/14
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_Alta MWC
Trans min-max (annual)
Temp C

Figure B-80

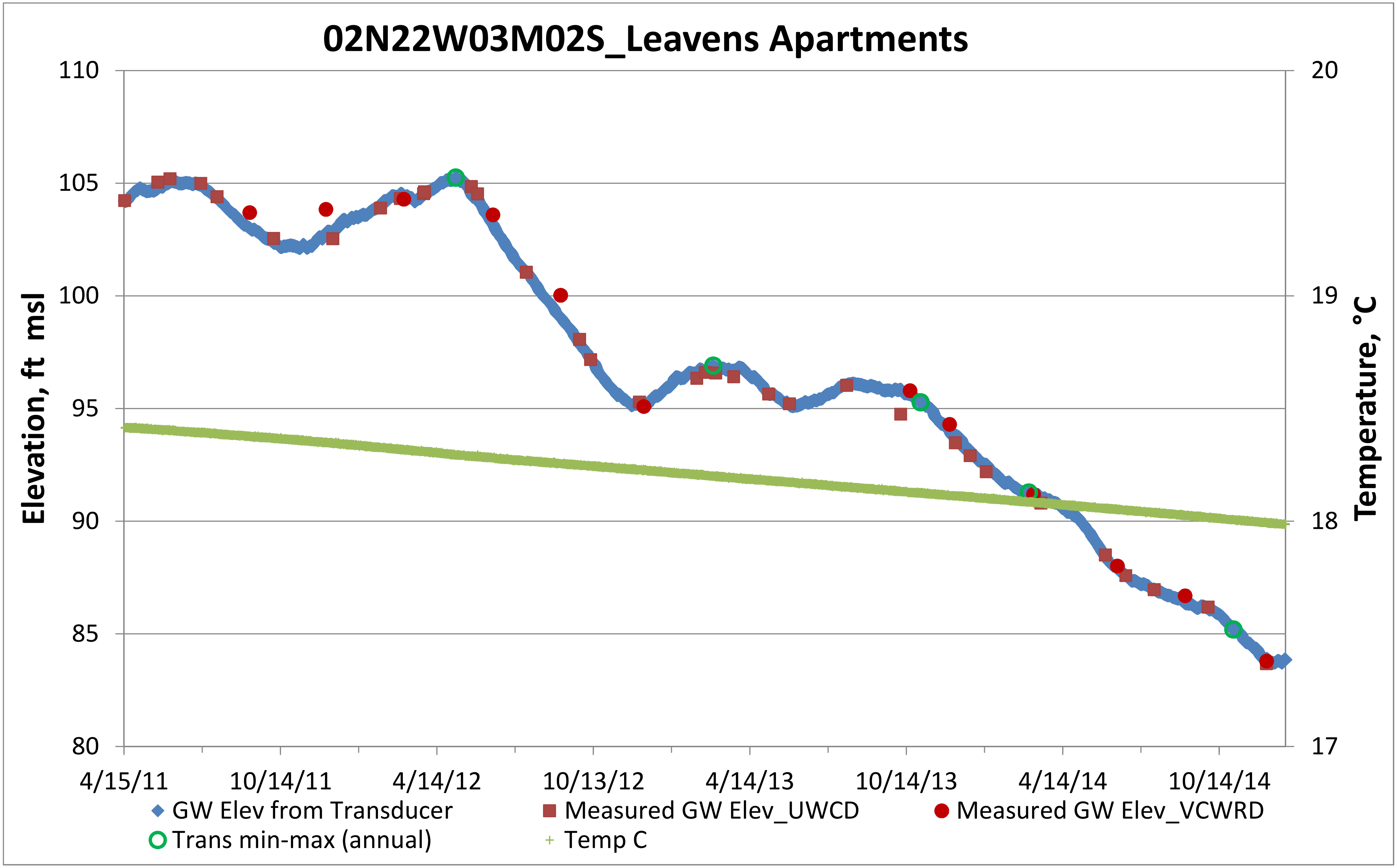

02N22W03M02S_Leavens Apartments
Elevation, ft msl
Temperature, °C
110
105
100
95
90
85
80
20
19
18
17
4/15/11
10/14/11
4/14/12
10/13/12
4/14/13
10/14/13
4/14/14
10/14/14
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_VCWRD
Trans min-max (annual)
Temp C

Figure B-81

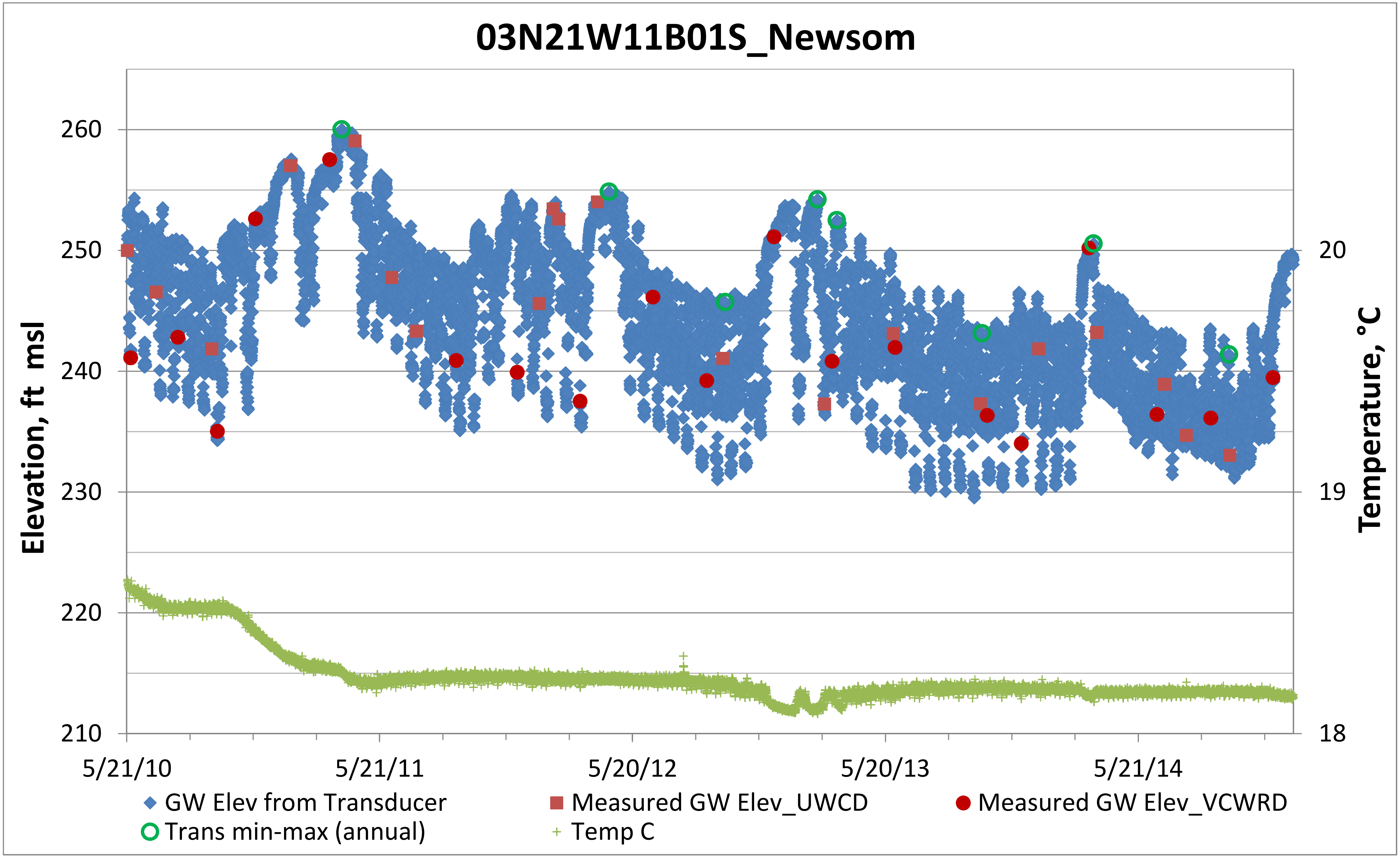
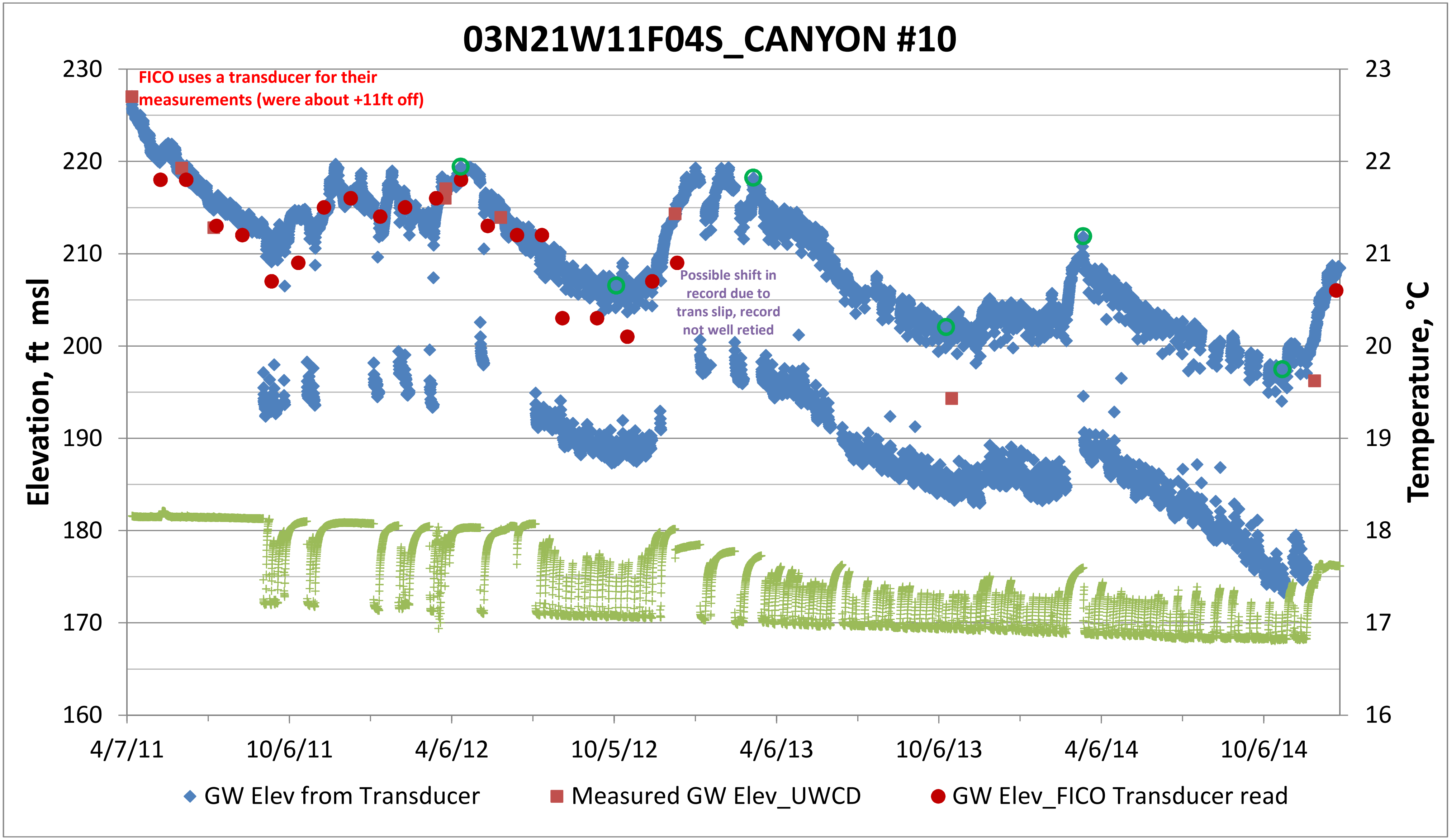

03N21W11B01S_Newsom
Elevation, ft msl
Temperature, °C
260
250
240
230
220
210
20
19
18
5/21/10
5/21/11
5/20/12
5/20/13
5/21/14
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_VCWRD
Trans min-max (annual)
Temp C

Figure B-82



03N21W11F04S_CANYON #10
FICO uses a transducer for their measurements (were about +11ft off)
Possible shift in record due to trans slip, record not well retied
Elevation, ft msl
Temperature, °C
230
220
210
200
190
180
170
160
23
22
21
20
19
18
17
16
4/7/11
10/6/11
4/6/12
10/5/12
4/6/13
10/6/13
4/6/14
10/6/14
GW Elev from Transducer
Measured GW Elev_UWCD
GW Elev_FICO Transducer read

Figure B-83

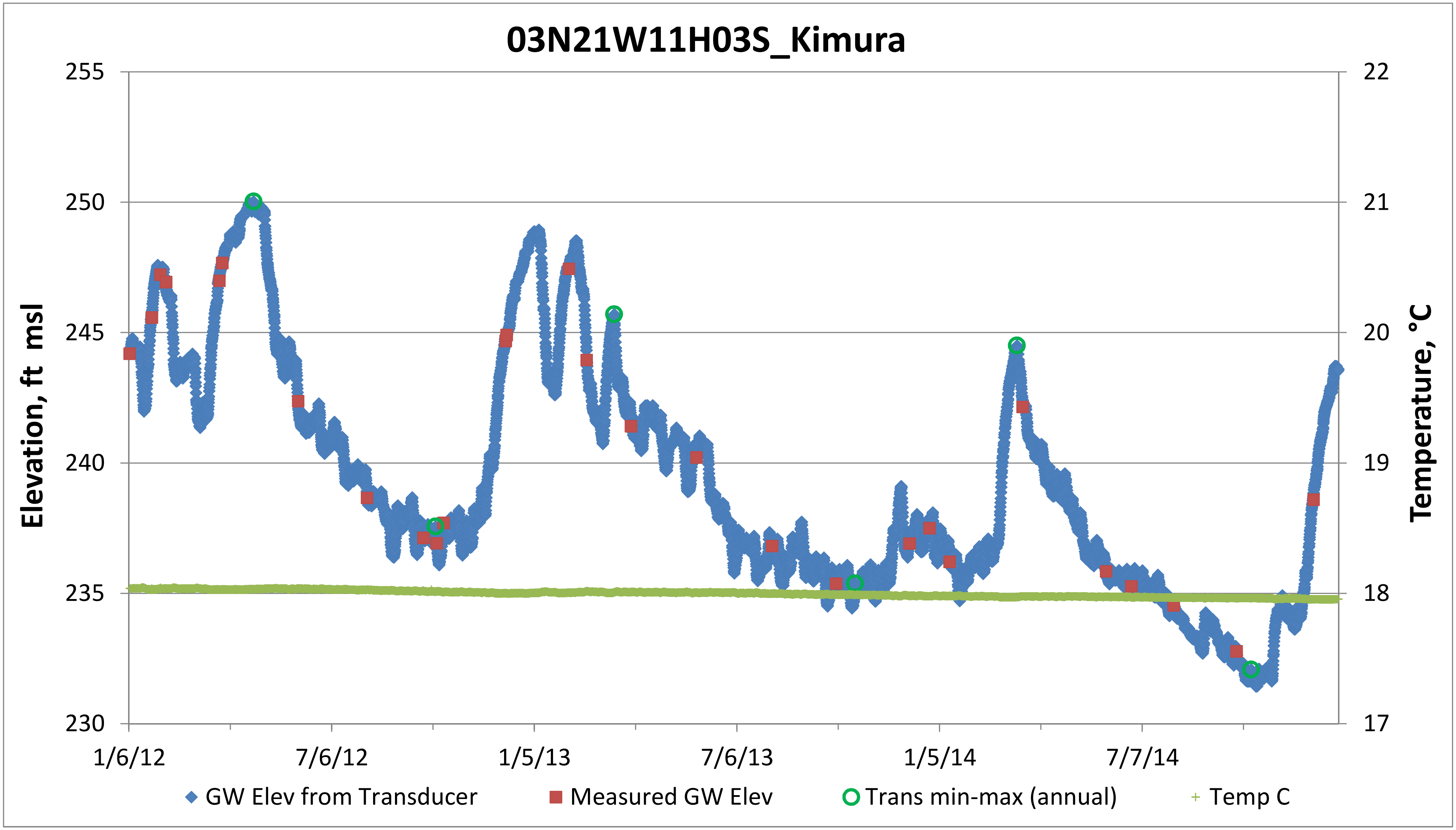

03N21W11H03S_Kimura
Elevation, ft msl
Temperature, °C
255
250
245
240
235
230
22
21
20
19
18
17
1/6/12
7/6/12
1/5/13
7/6/13
1/5/14
7/7/14
GW Elev from Transducer
Measured GW Elev
Trans min-max (annual)
Temp C

Figure B-84

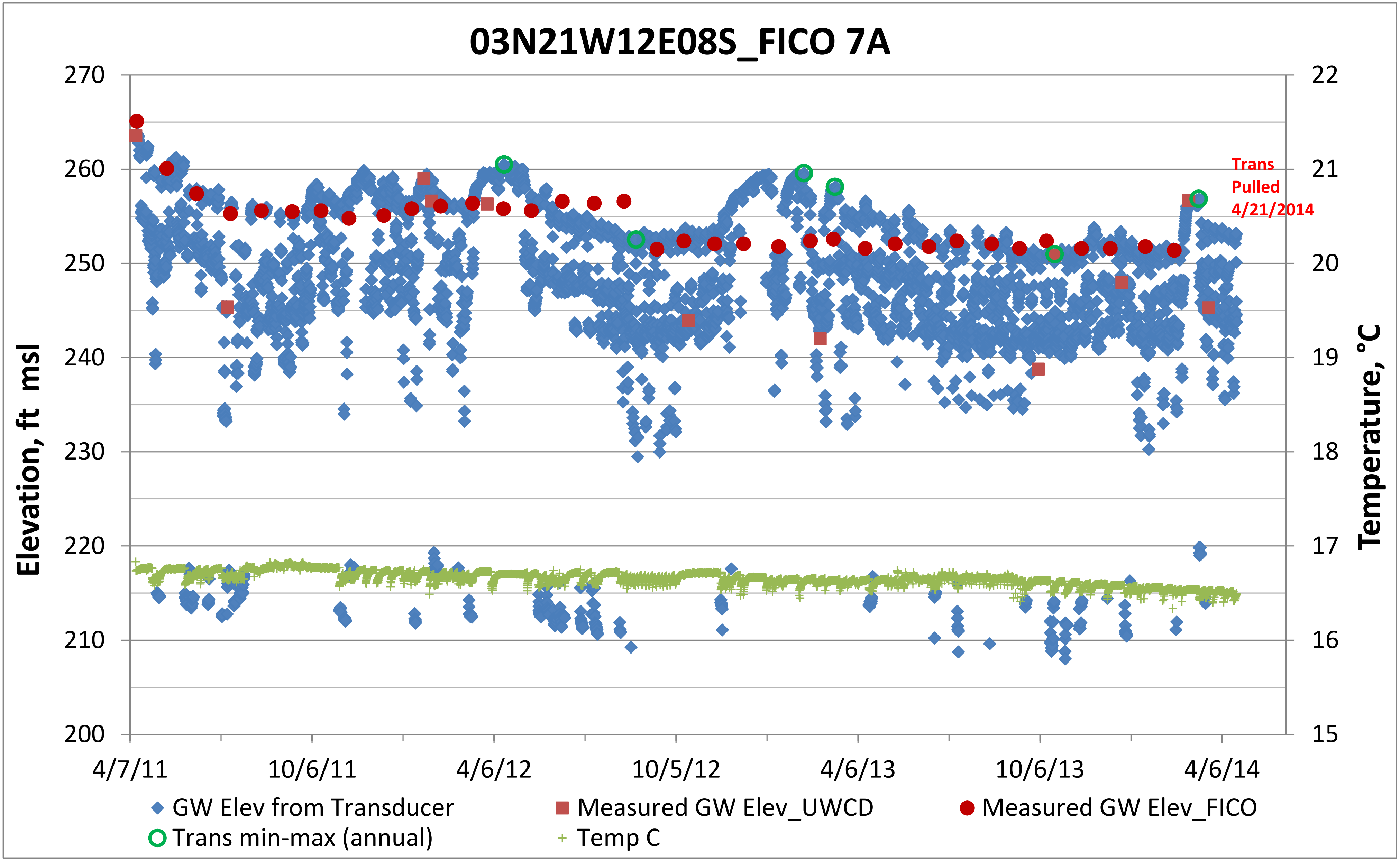

03N21W12E08S_FICO 7A
Elevation, ft msl
Temperature, °C
270
260
250
240
230
220
210
200
22
21
20
19
18
17
16
15
4/7/11
10/6/11
4/6/12
10/5/12
4/6/13
10/6/13
4/6/14
Trans
Pulled
4/21/2014
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_FICO
Trans min-max (annual)
Temp C

Figure B-85

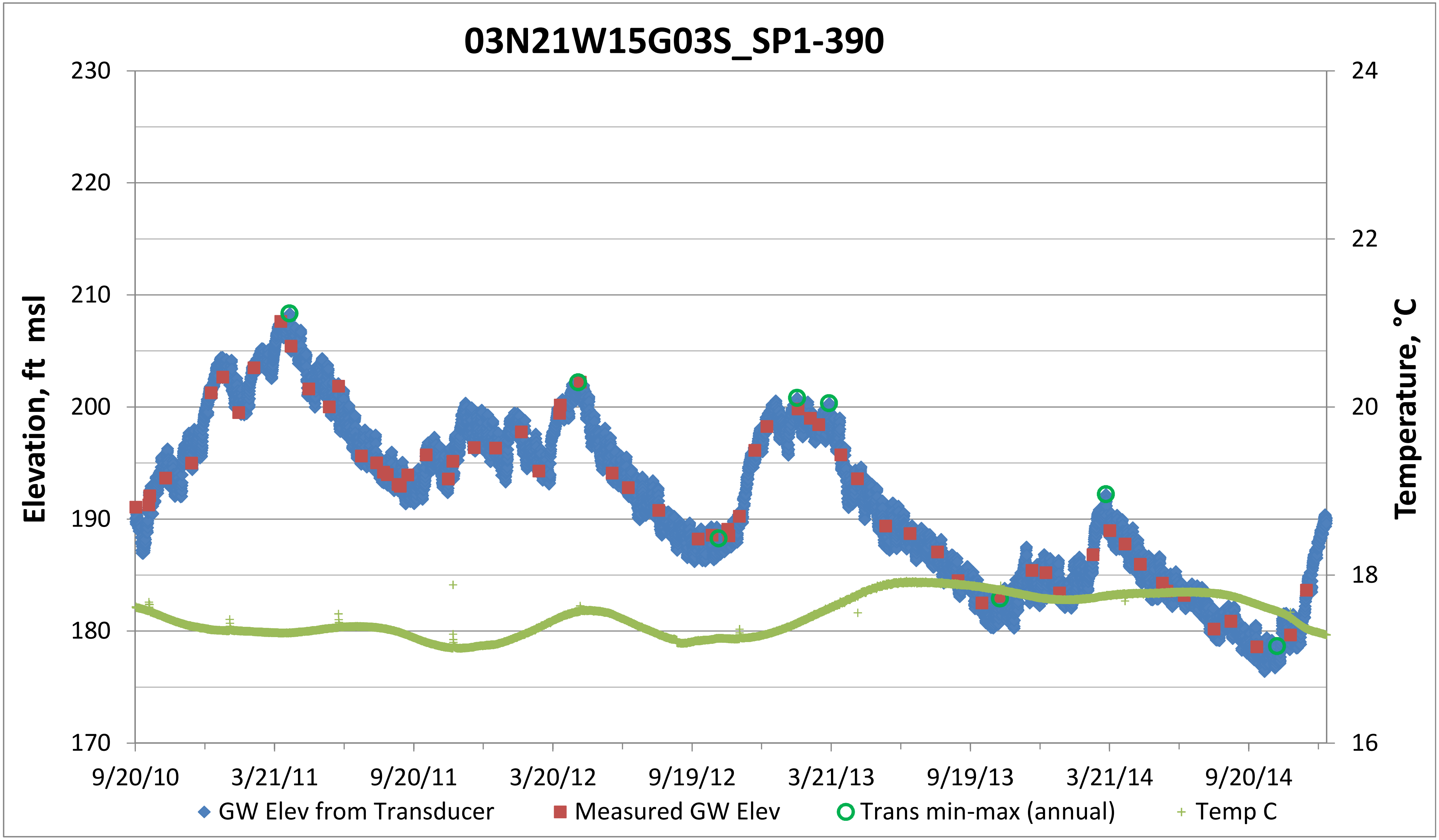

03N21W15G03S_SP1-390
Elevation, ft msl
Temperature, °C
230
220
210
200
190
180
170
24
22
20
18
16
9/20/10
3/21/11
9/20/11
3/20/12
9/19/12
3/21/13
9/19/13
3/21/14
9/20/14
GW Elev from Transducer
Measured GW Elev
Trans min-max (annual)
Temp C

Figure B-86

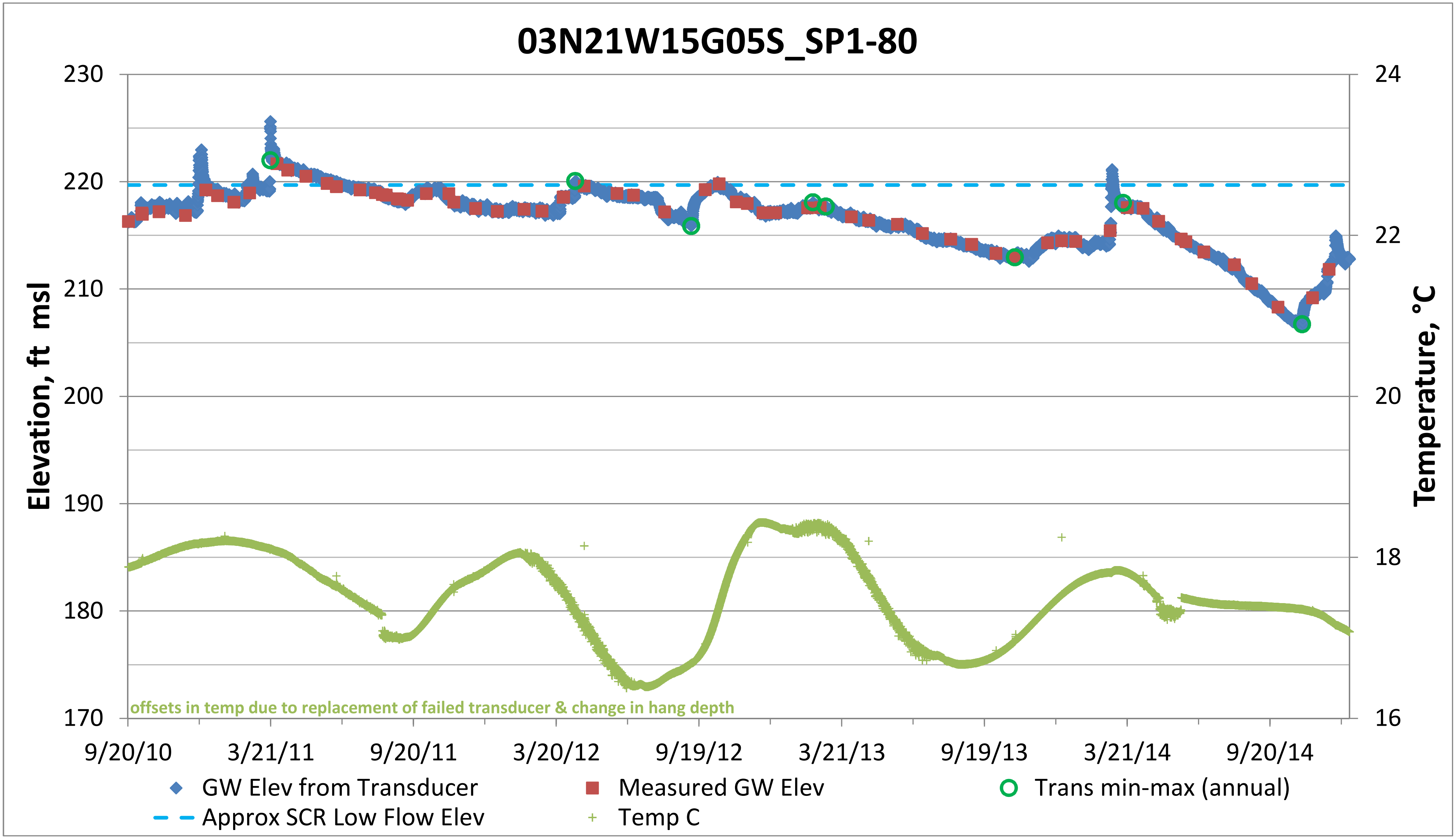

03N21W15G05S_SP1-80
Elevation, ft msl
Temperature, °C
230
220
210
200
190
180
170
24
22
20
18
16
9/20/10
3/21/11
9/20/11
3/20/12
9/19/12
3/21/13
9/19/13
3/21/14
9/20/14
offsets in temp due to replacement of failed transducer & change in hang depth
GW Elev from Transducer
Measured GW Elev
Trans min-max (annual)
Approx SCR Low Flow Elev
Temp C

Figure B-87

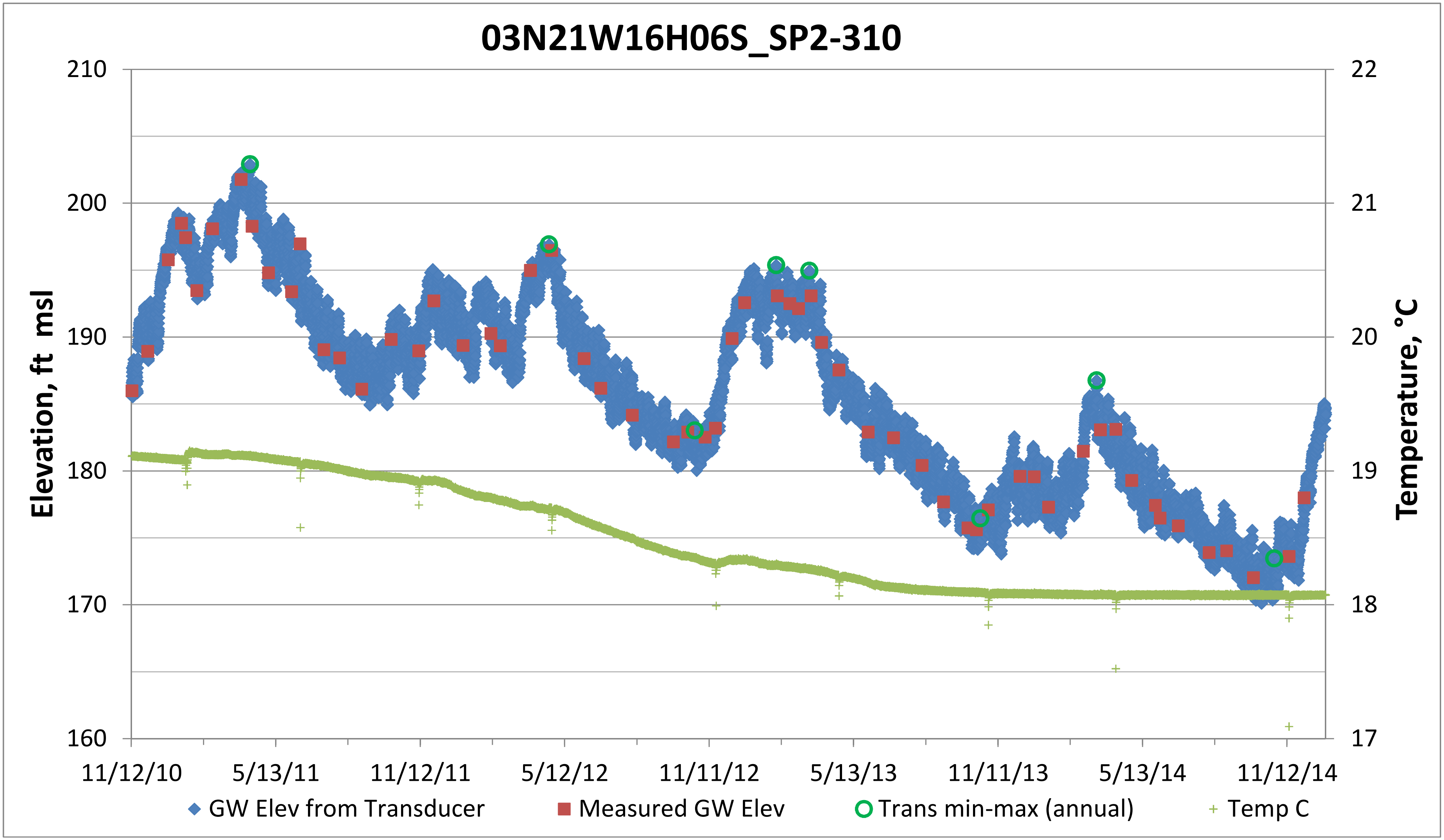

03N21W16H06S_SP2-310
Elevation, ft msl
Temperature, °C
210
200
190
180
170
160
22
21
20
19
18
17
11/12/10
5/13/11
11/12/11
5/12/12
11/11/12
5/13/13
11/11/13
5/13/14
11/12/14
GW Elev from Transducer
Measured GW Elev
Trans min-max (annual)
Temp C

Figure B-88

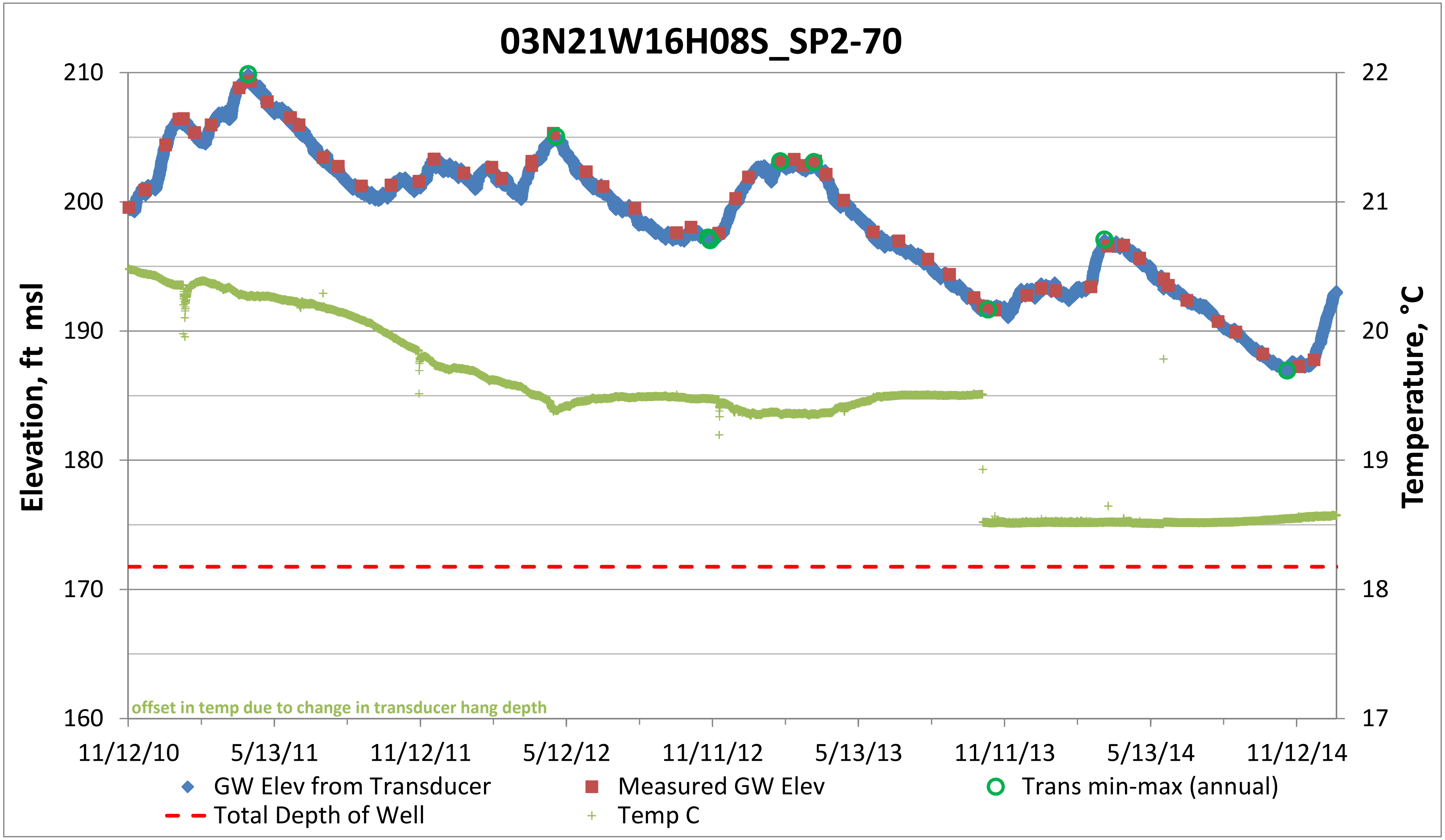

03N21W16H08S_SP2-70
Elevation, ft msl
Temperature, °C
210
200
190
180
170
160
22
21
20
19
18
17
11/12/10
5/13/11
11/12/11
5/12/12
11/11/12
5/13/13
11/11/13
5/13/14
11/12/14
offset in temp due to change in transducer hang depth
GW Elev from Transducer
Measured GW Elev
Trans min-max (annual)
Total Depth of Well
Temp C

Figure B-89

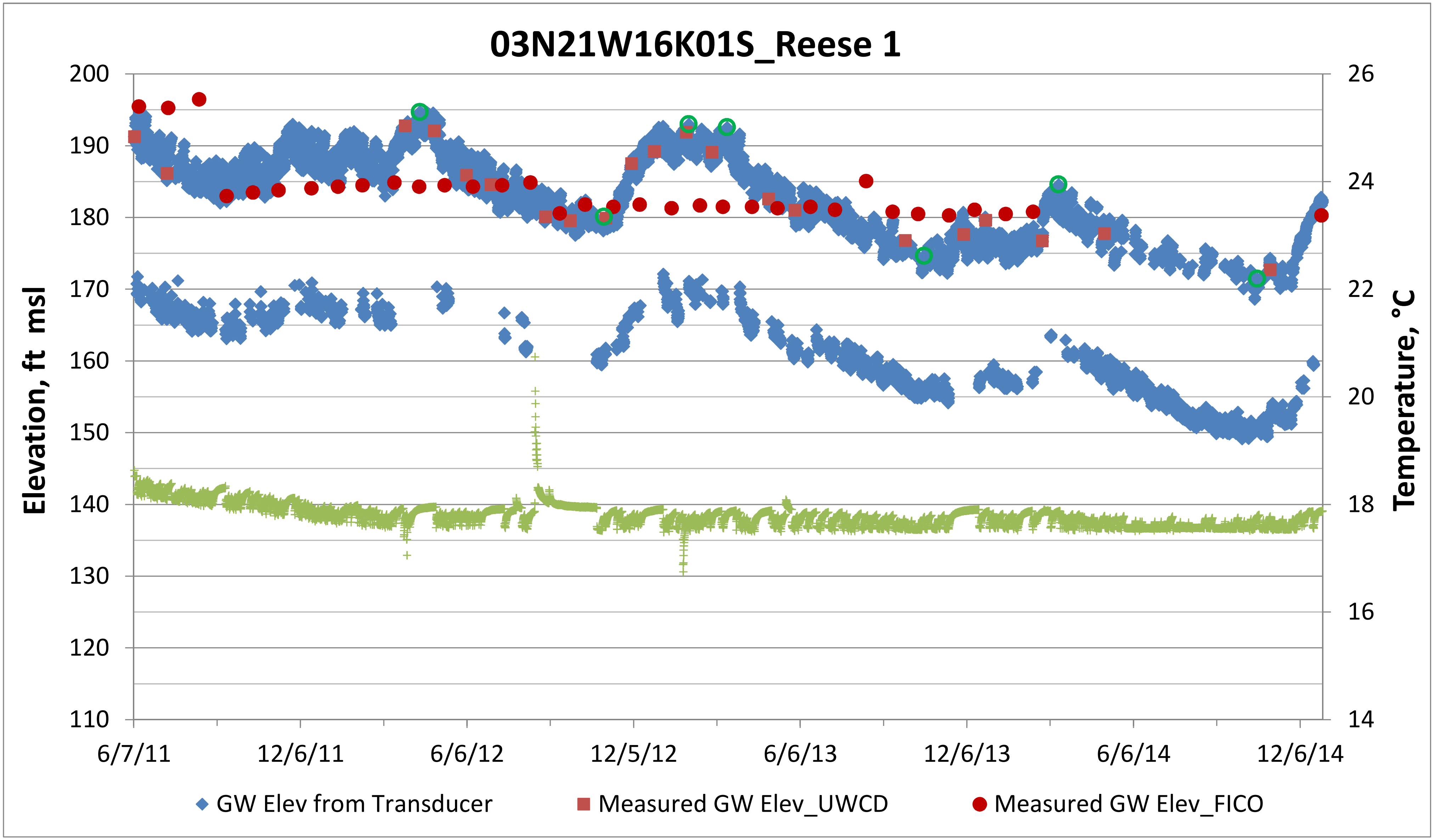

03N21W16K01S_Reese 1
Elevation, ft msl
Temperature, °C
200
190
180
170
160
150
140
130
120
110
26
24
22
20
18
16
14
6/7/11
12/6/11
6/6/12
12/5/12
6/6/13
12/6/13
6/6/14
12/6/14
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_FICO

Figure B-90

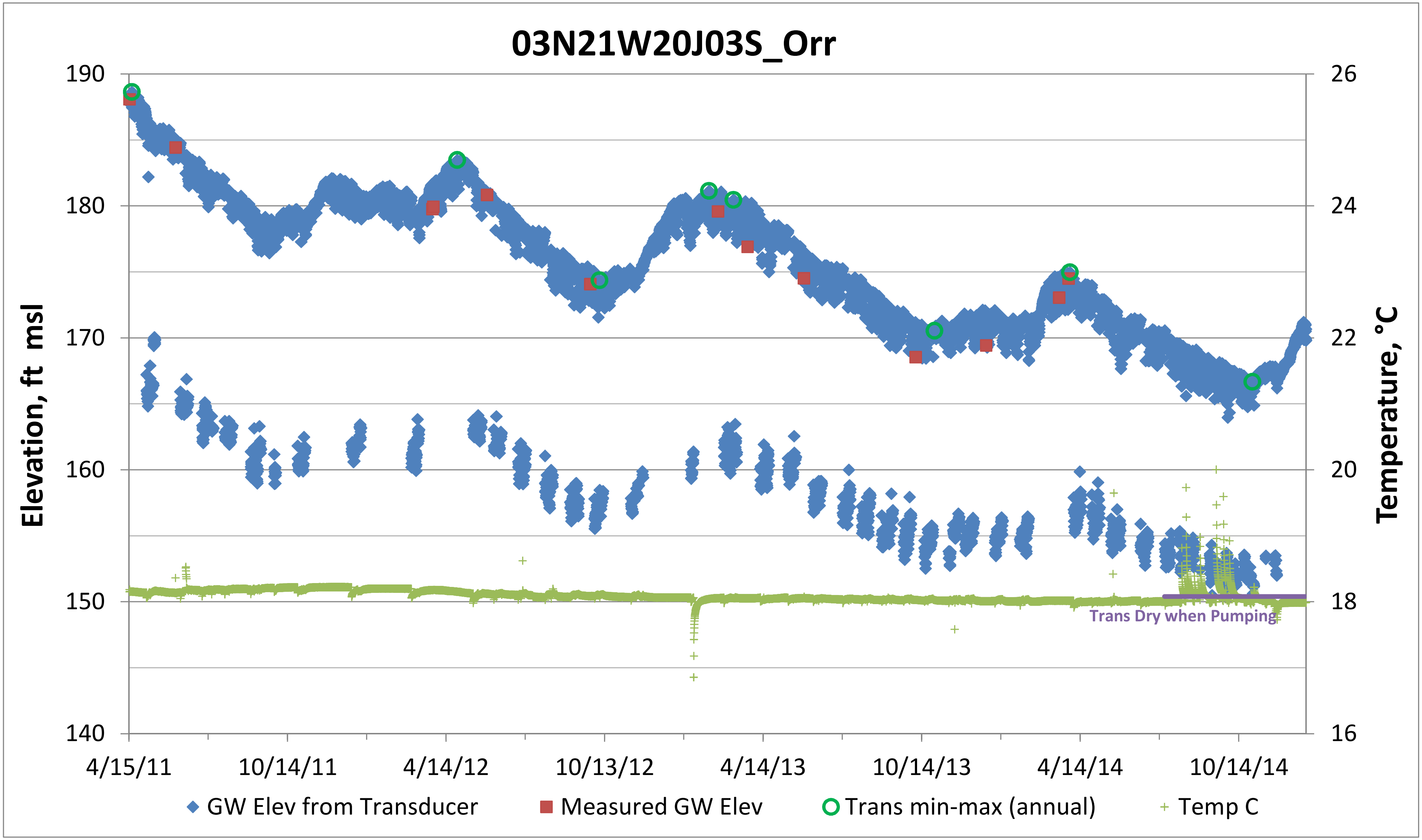

03N21W20J03S_Orr
190
180
170
160
150
140
26
24
22
20
18
16
Elevation, ft msl
Temperature, °C
4/15/11
10/14/11
4/14/12
10/13/12
4/14/13
10/14/13
4/14/14
10/14/14
Trans Dry when Pumping
GW Elev from Transducer
Measured GW Elev
Trans min-max (annual)
Temp C

Figure B-91

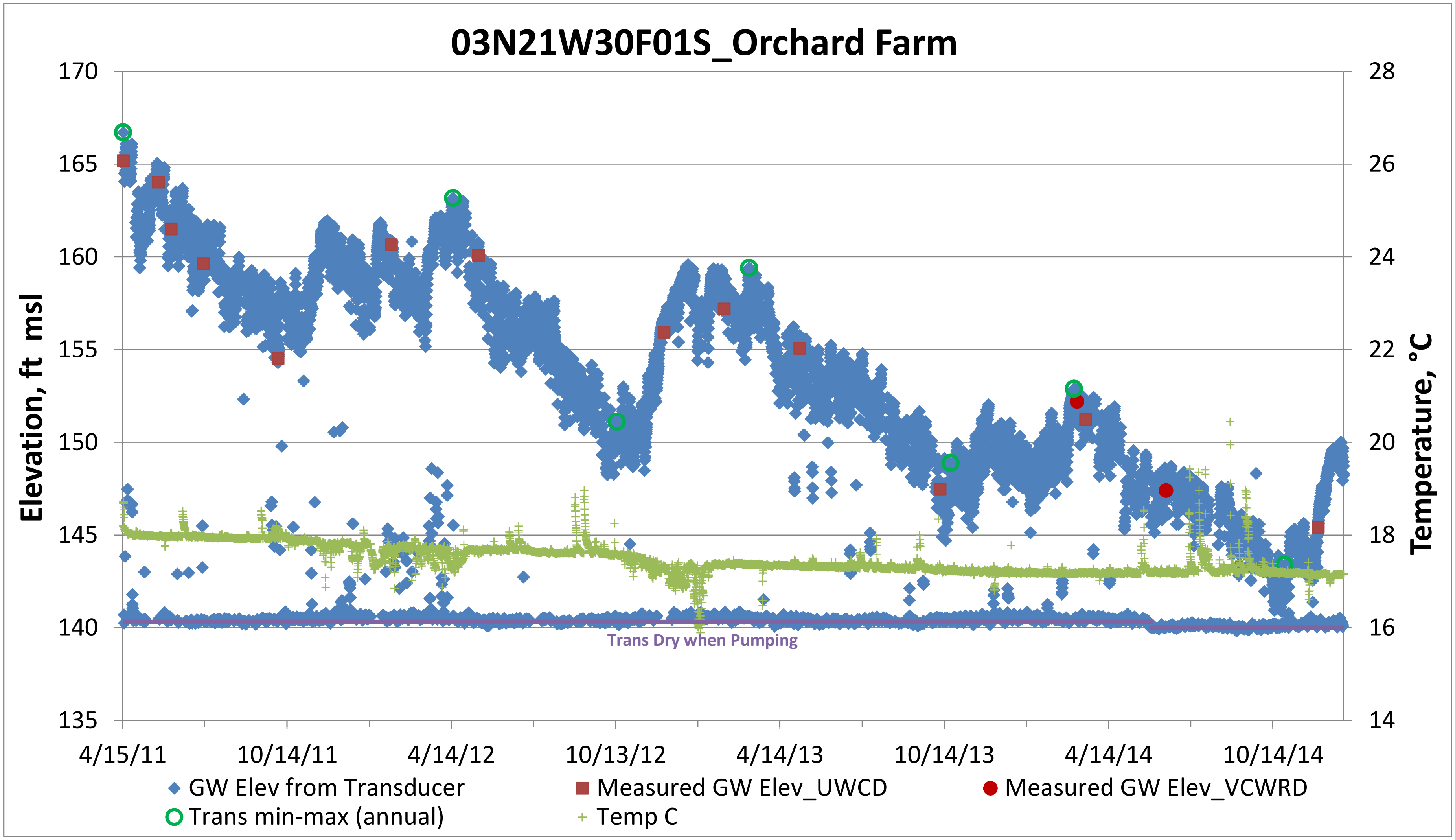

03N21W30F01S_Orchard Farm
Elevation, ft msl
Temperature, °C
170
165
160
155
150
145
140
135
28
26
24
22
20
18
16
14
4/15/11
10/14/11
4/14/12
10/13/12
4/14/13
10/14/13
4/14/14
10/14/14
Trans Dry when Pumping
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_VCWRD
Trans min-max (annual)
Temp C

Figure B-92

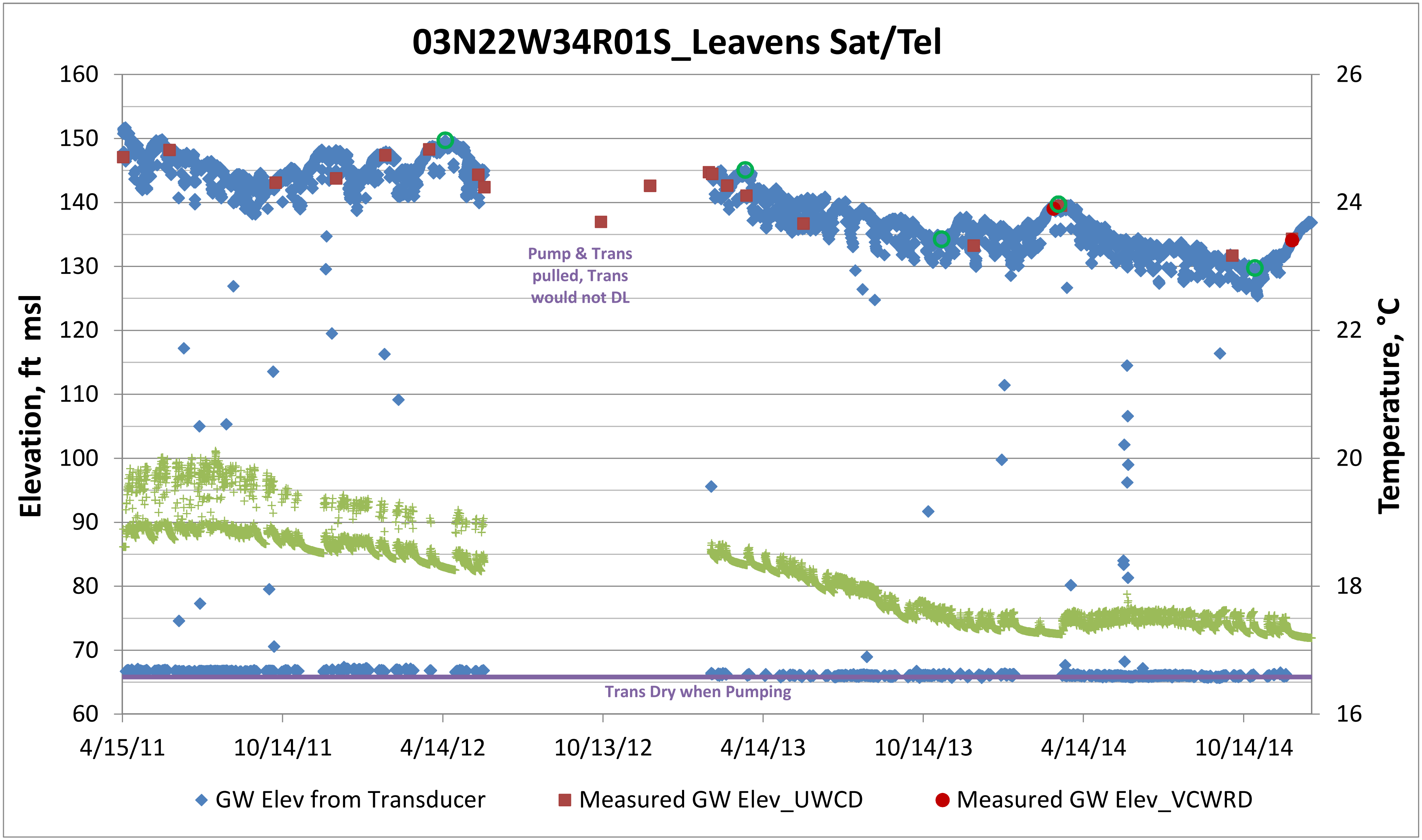

03N22W34R01S_Leavens Sat/Tel
Elevation, ft msl
Temperature, °C
160
150
140
130
120
110
100
90
80
70
60
26
24
22
20
18
16
4/15/11
10/14/11
4/14/12
10/13/12
4/14/13
10/14/13
4/14/14
10/14/14
Pump & Trans pulled, Trans would not DL
Trans Dry when Pumping
GW Elev from Transducer
Measured GW Elev_UWCD
Measured GW Elev_VCWRD

Figure B-93

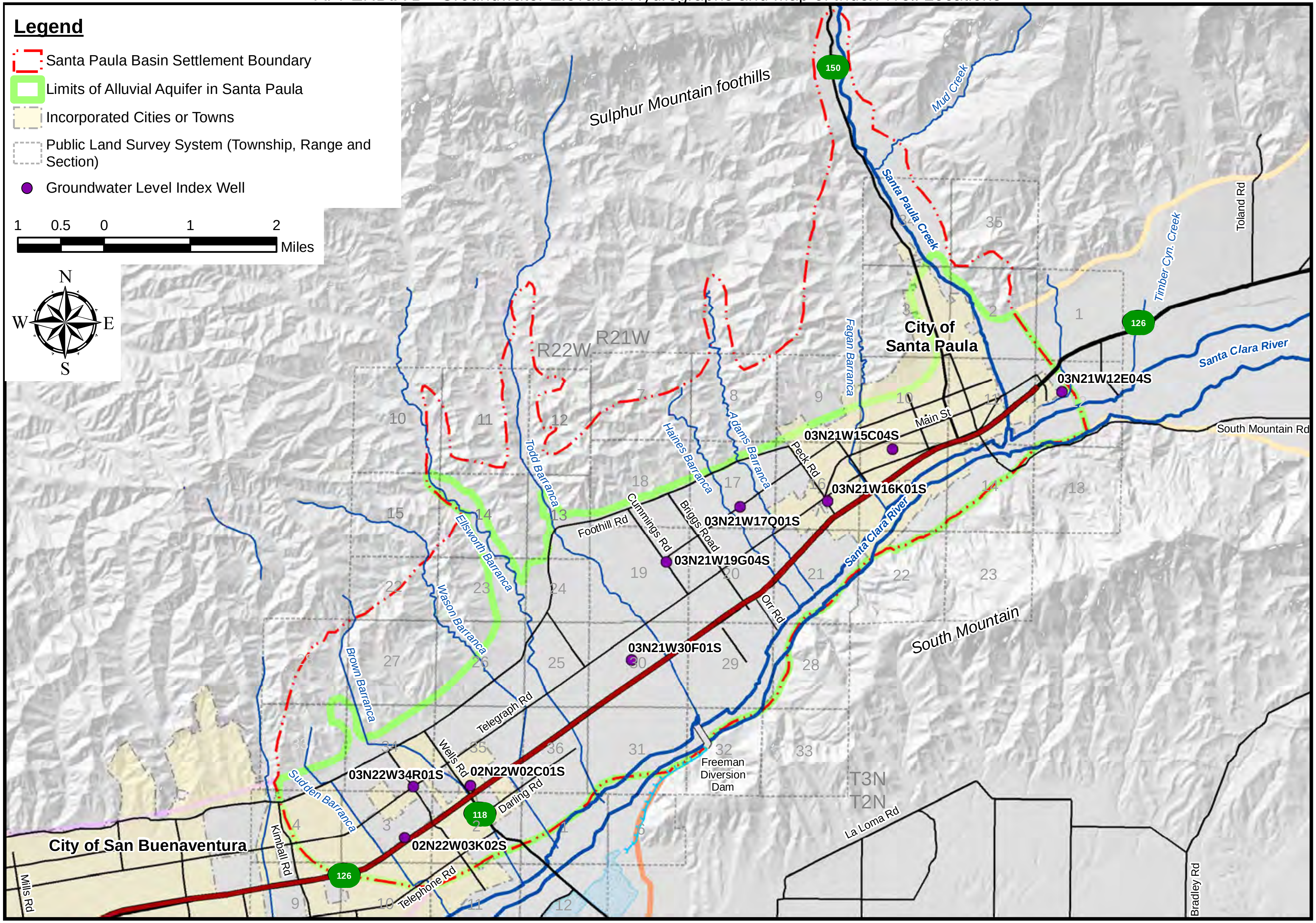


Figure B-94

Location of Santa Paula Basin Groundwater Level Index Wells

UWCD Prof. Paper 2016-01
Combined 2013 and 2014 Santa Paula Basin Annual Report

APPENDIX C - Groundwater Quality Maps

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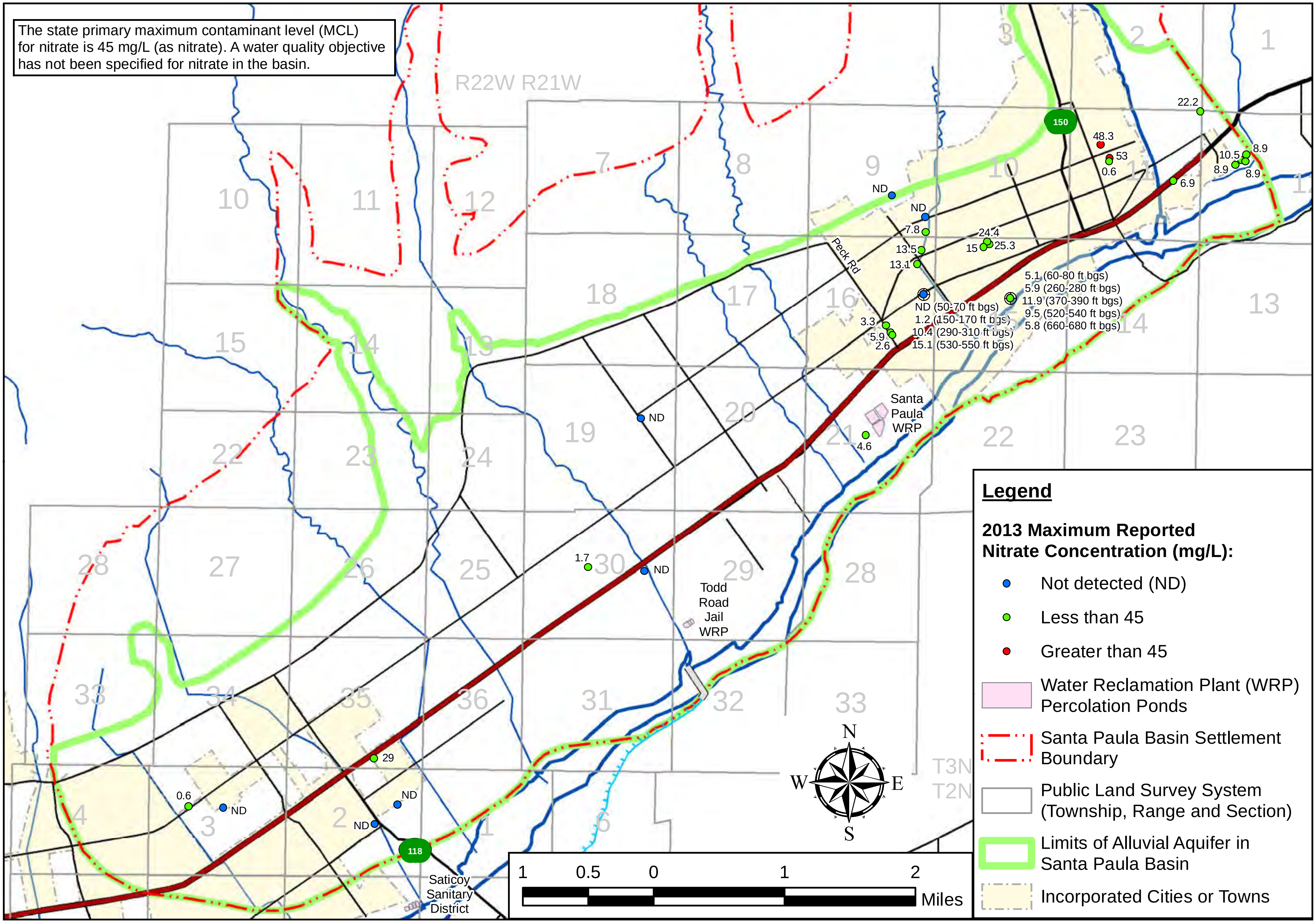

Figure C-1. Maximum Reported Nitrate Concentrations in Groundwater, CY 2013

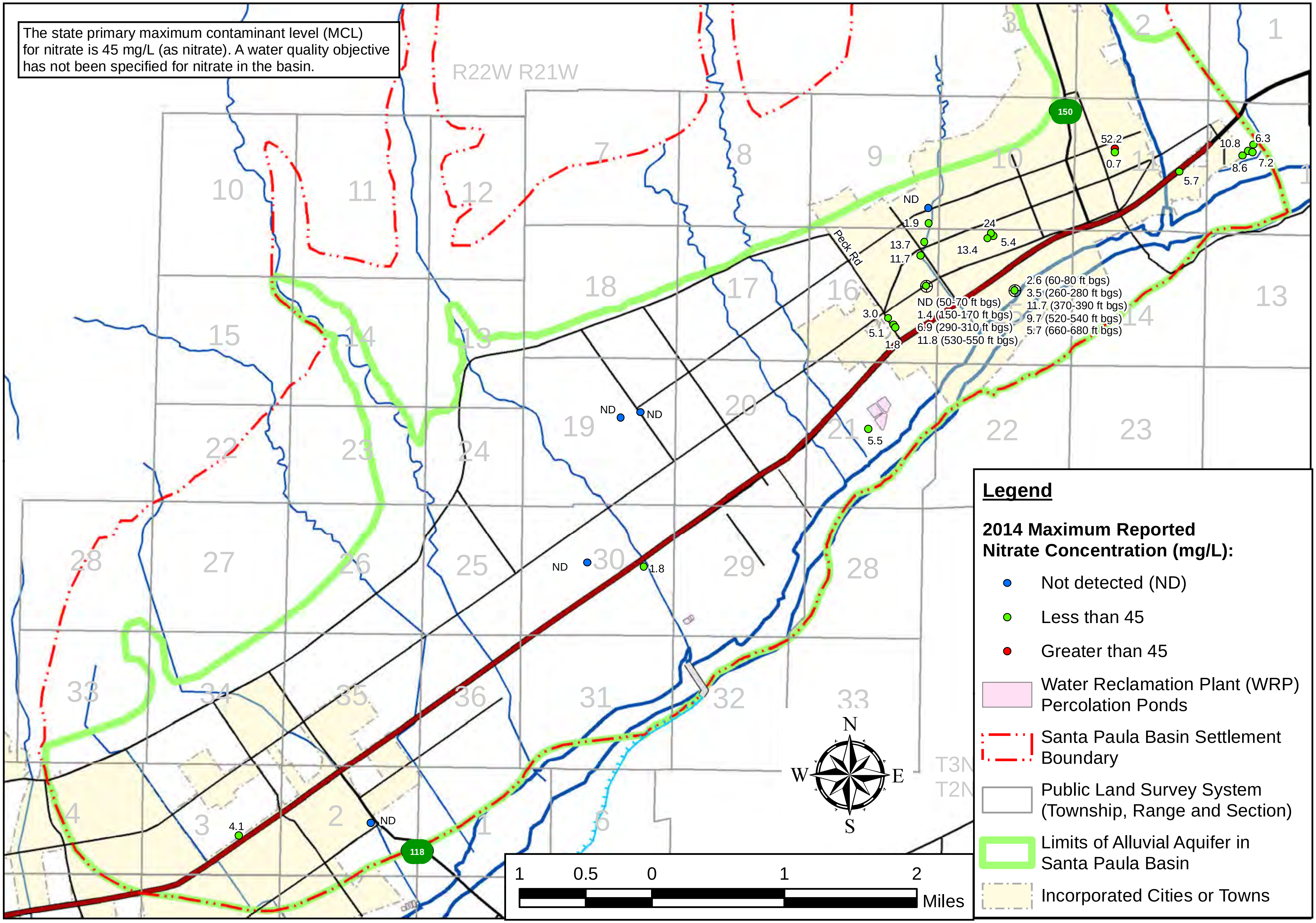

Figure C-2. Maximum Reported Nitrate Concentrations in Groundwater, CY 2014

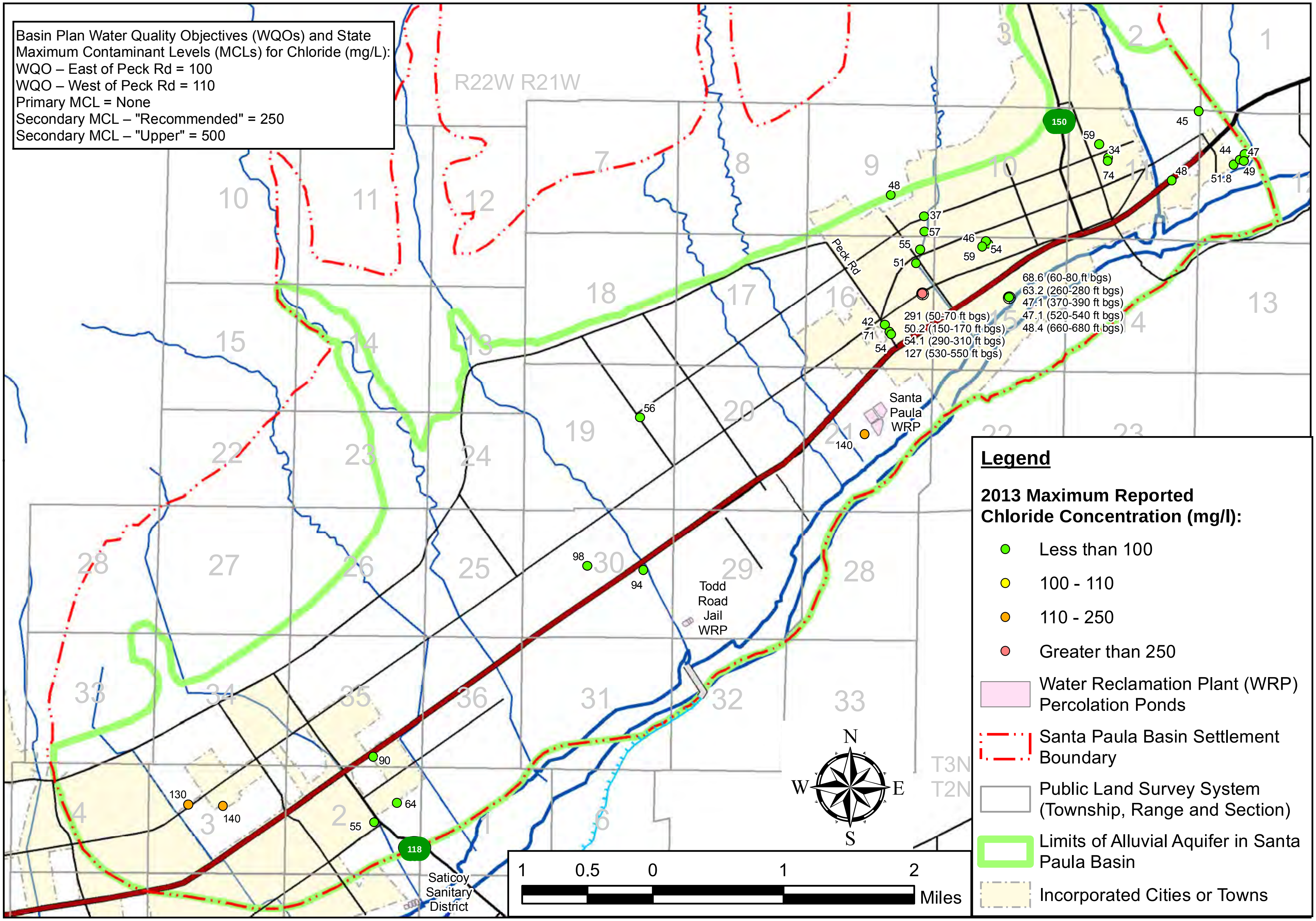

Figure C-3. Maximum Reported Chloride Concentrations in Groundwater, CY 2013

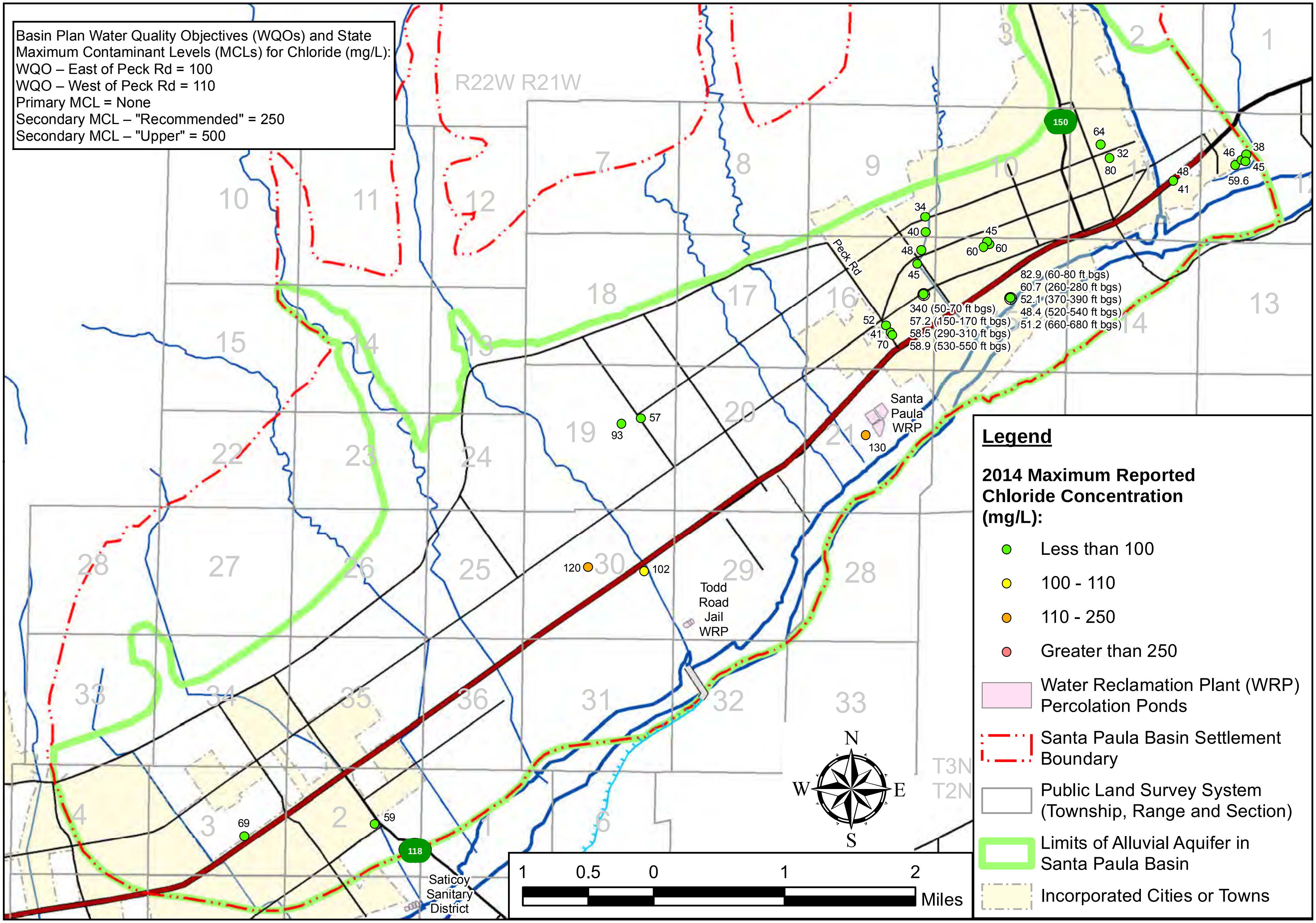

Figure C-4. Maximum Reported Chloride Concentrations in Groundwater, CY 2014

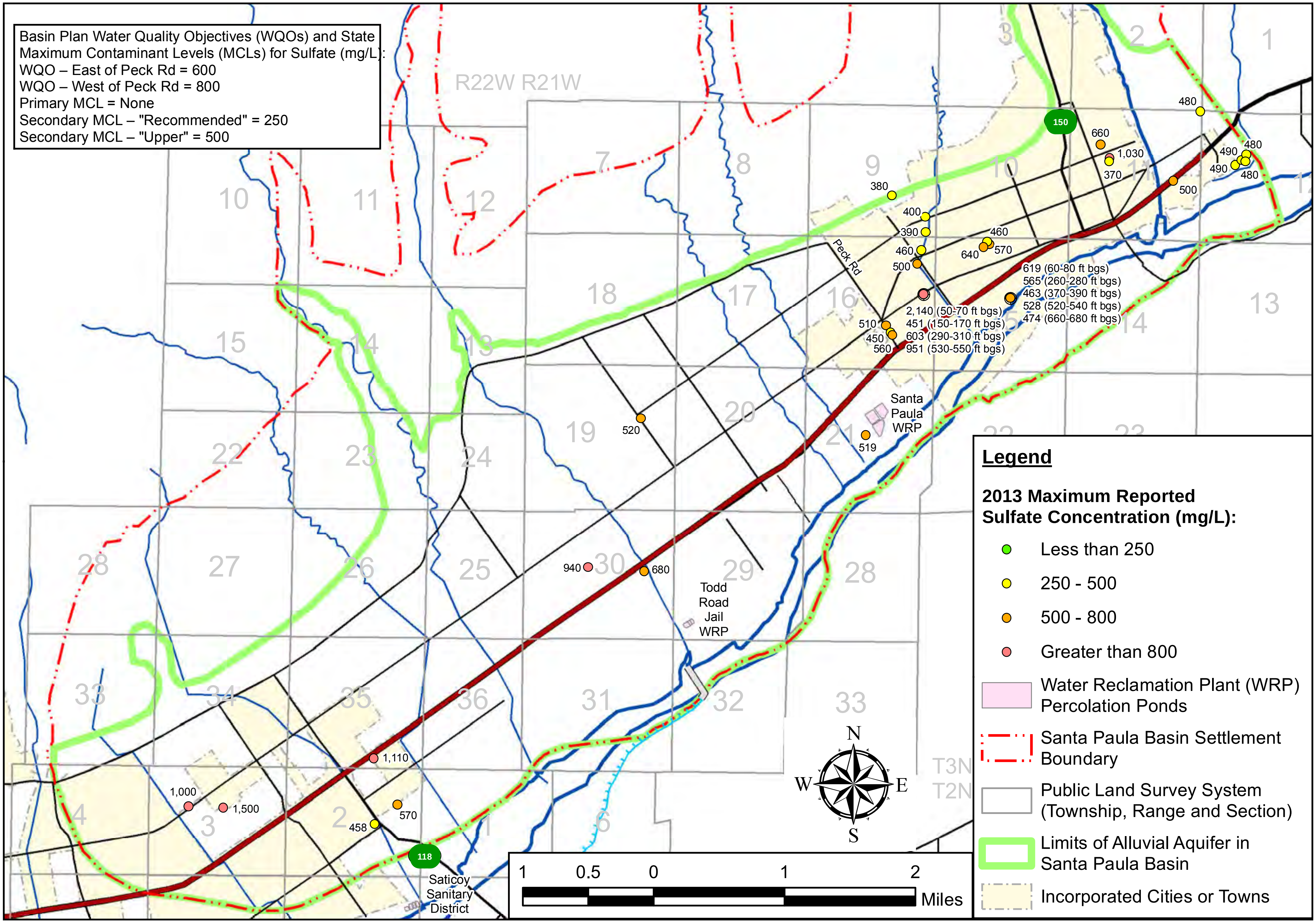

Figure C-5. Maximum Reported Sulfate Concentrations in Groundwater, CY 2013

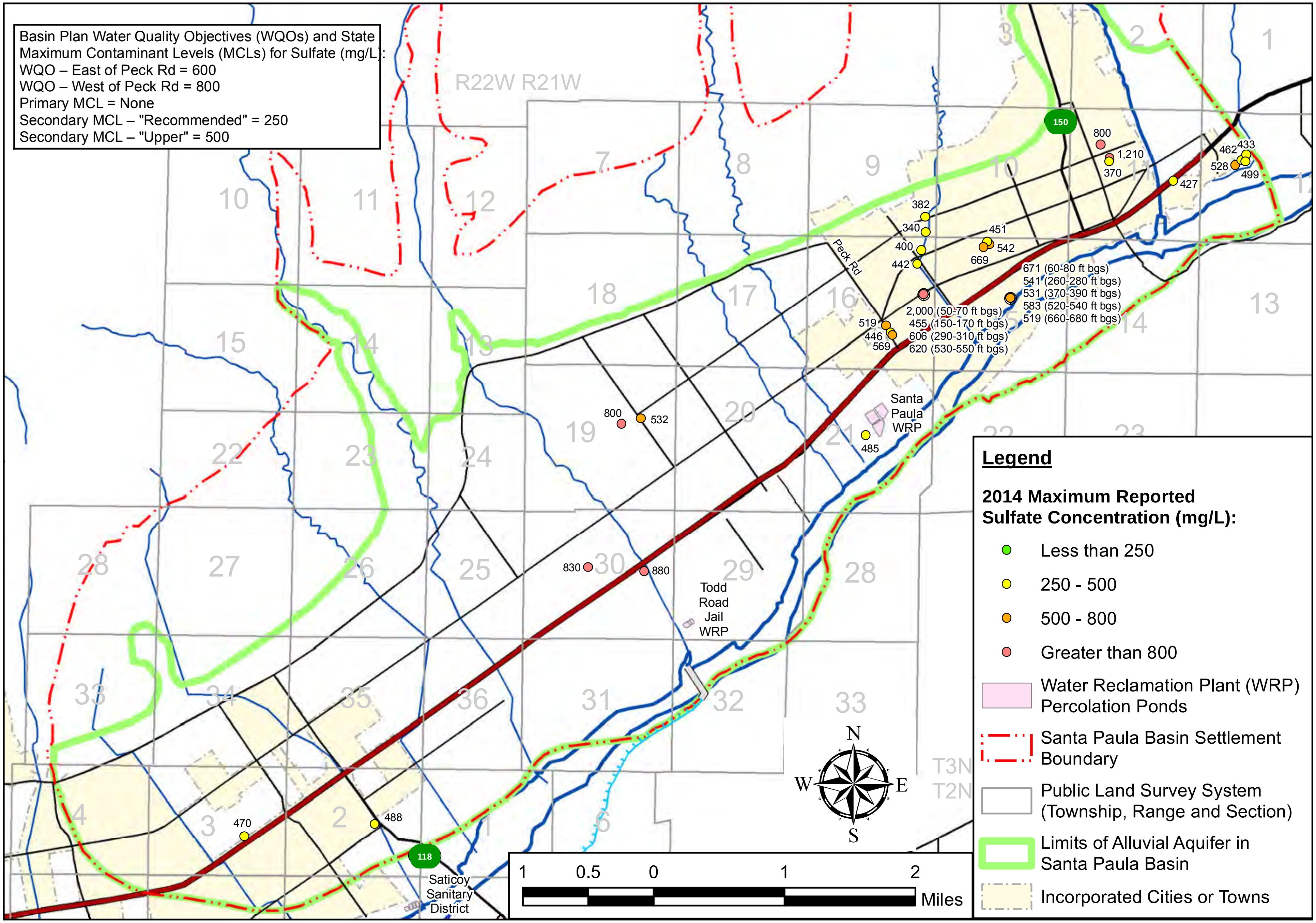

Figure C-6. Maximum Reported Sulfate Concentrations in Groundwater, CY 2014

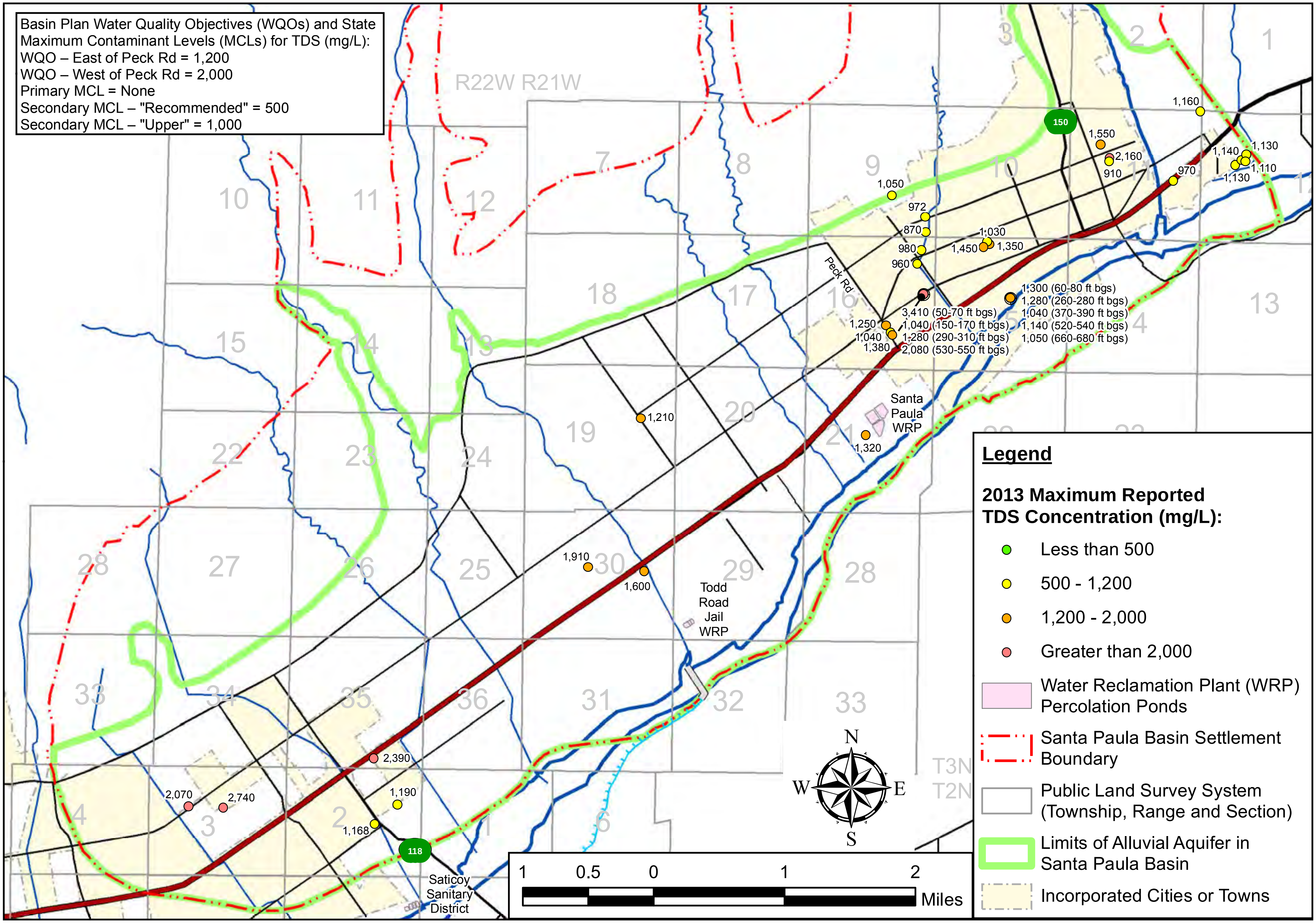

Figure C-7. Maximum Reported TDS Concentrations in Groundwater, CY 2013

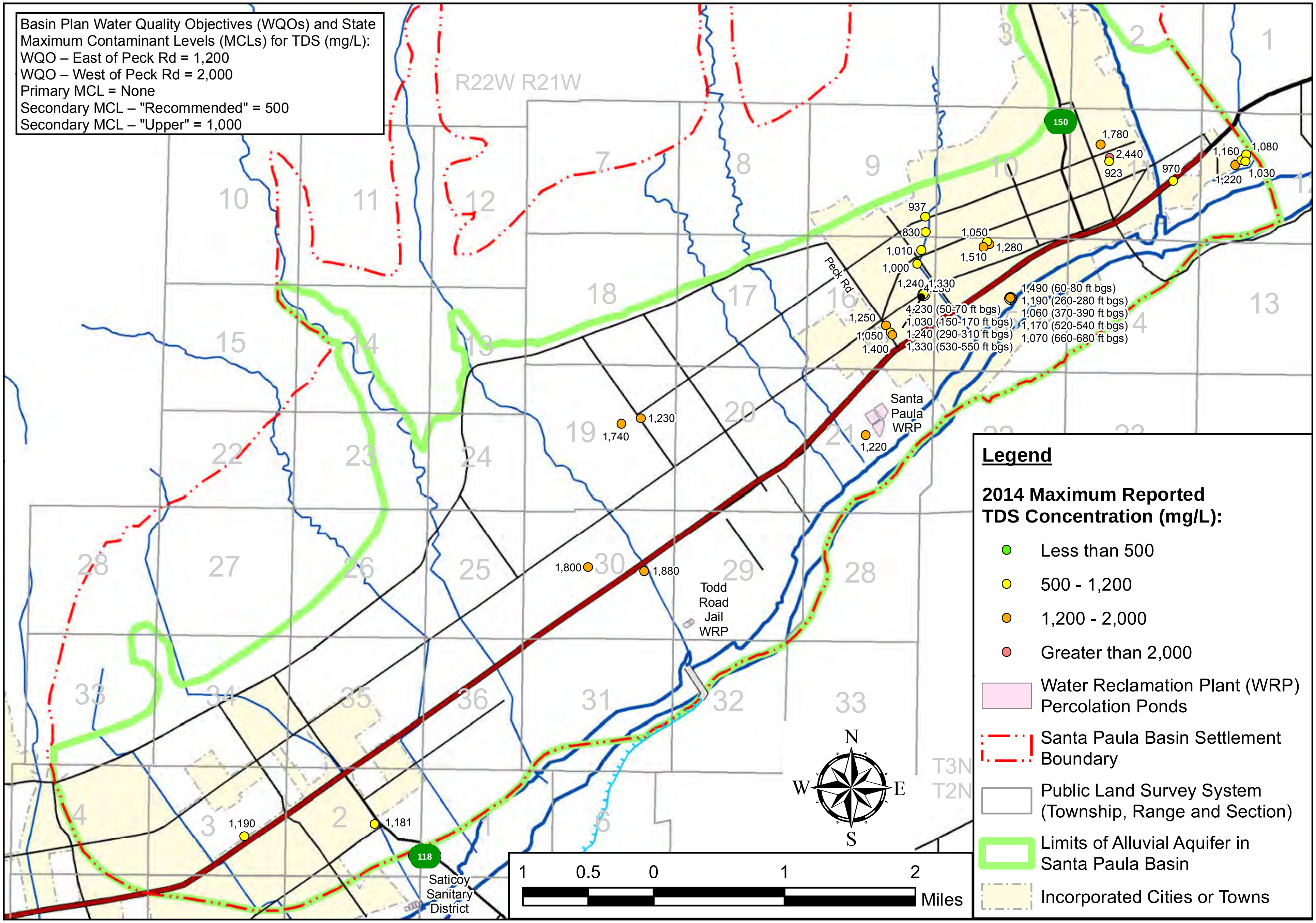

Figure C-8. Maximum Reported TDS Concentrations in Groundwater, CY 2014

APPENDIX D - Individual Party Allocations and Groundwater Extractions (from Frank B & Associates)

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Draft

Table "D-1"
IPA's 2008 - 2014 Production & Averages

10/12/2015

2008 (11)	2009 (12) (14)	2010 (16) (19)	2011 (2)	2012 (2)	2013 (2)	2014 (2)	7 Year Average	Avg Over + Under (-)	Acre Feet	Party Name	Well Number
									0.0	ABC Rubarb Farms	03N/21W-16P01
1.2	0.7	0.7	0.7	0.7	1.0	0.8	0.8	(1.0)	1.8	Aliso Vista Ranch	03N/22W-23Q01
									0.0	Alsono, Andrew	03N/21W-21M01
684.4	684.5	563.3	595.9	757.6	241.0	1,018.4	649.3	(113.8)	763.1	Alta Mutual Water Company, Inc.	02N/22W-02K07, 02N/22W-02K10
10.7	10.7	10.7	10.7	10.3	10.3	6.2	9.9	7.0	2.9	Arambula, Pedro	03N/21W-21E02
									0.0	Associated Concrete Products, Inc.	3N/21W-29K03 D
									0.0	Axell, Randall as Trustee of the Dorthey E. Axell Trust	3N/21W16P02, 3N/21W16P03
0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0	Basso Properties	03N/21W-09J01
-10.6	-9.4	-8.2	-8.2	-8.2	-3.6		0.7	0.7	0	Bender Farms (23) (29)	03N/21W-16P01
374.4	214.4	307.7	251.3	316.5	401.1	283.7	307.0	4.4	302.6	Bender Realty LTD (19) (29)	3N/21W16P02, 3N/21W16P03, 3N21W17R01 (4)
											03N/21W-17R01
72.9	76.8	93.0	33.0	61.6	70.6	62.1	67.1	(33.7)	100.8	Billiwhack Ranch	03N/22W-23F02
									0.0	Birky, Angie E. Trustee	3N/21W-10E01
									0.0	Brucker, Frank R. as Trustee of the Frank R. Brucker Trust	03N/21W-29E1, 3N/21W-29C3
	1.2	2.4	2.4	2.4	2.4	2.5	1.9	(4.1)	6.0	Bratcher Family Revocable Tr 1-24-02 & Cutright Revocable Tr 8-18-03 (22)	03N/21W-16P01
518.0	437.0	409.0	388.0	379.0	363.0	561.9	436.6	160.1	276.5	Brucker Family Trust (29)	3N/21W-19Q1
											03N/21W-29E1, 3N/21W-29C3
208.0	164.7	105.2	101.5	76.1	128.8	137.0	131.6	(150.7)	282.3	Campbell Dan	03N/21W-19R01
7.6	6.9	6.2	3.9	0.9	0.8	0.6	3.8	2.7	1.1	Canine Adoption and Rescue League	03N/21W-29B02
690.1	901.9	407.6	238.7	1,442.4	2,069.1	2,013.9	1,109.1	436.1	673.0	Canyon Irrigation Company	03N/21W-11F03, 3N/21W-11E3, 3N/21W-11F4
29.9	34.4	19.7	28.1	35.6	40.1	46.5	33.5	(65.8)	99.3	Casa De Oro Ranch	03N/21W-20F01
85.0	85.0	85.0	85.0	44.7	63.8	88.0	76.6	(24.8)	101.4	Castaneda, Albert and Mary	03N/21W-19L01 (1), 3N21W19K01
											03N/21W-19L01
										Coffman, Laura K. McAvoy, Successor Trustee of the Gladys Daily Coffman Trust dated June 16, 1993	03N/22W-35N01

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Table "D-1"
IPA's 2008 - 2014 Production & Averages

10/12/2015

2008 (11)	2009 (12) (14)	2010 (16) (19)	2011 (2)	2012 (2)	2013 (2)	2014 (2)	7 Year Average	Avg Over + Under (-)	Acre Feet	Party Name	Well Number
5,352.8	4,901.5	4,456.3	4,474.1	4,722.4	5,005.0	4,642.7	4,793.5	(694.4)	5,487.9	City of Santa Paula	03N/21W-21B03
											3N/21W9R5, 03N/21W11J02, 03N/21W15C06, 03N/21W16A02, 3N/21W16A3
99.8	99.1	63.8	51.6	63.6	26.4	39.0	63.3	(30.3)	93.6	Clow, The Roger D. Clow Trust, Dated September 15, 1994	3N/21W20J04 (17)
											03N/21W-20A02, 03N21WL02S
									0.0	Conklin, Patricia	03N/21W-21D02
11.5	11.5	11.6	6.4	5.94	9.87	8.85	9.4	(0.2)	9.6	The Judson T. Cook & Suzette H. Cook Revocable Trust dated December 5, 2007 (28)	3N/22W-26B1
213.9	179.7	154.7	155.0	70.1	175.2	168.2	159.5	(12.7)	172.2	County of Ventura, General Services Agency (26)	03N/21W-30H08, 3N/21W-30H02
111.0	157.6	134.5	100.2	67.6	142.4	134.6	121.1	(9.9)	131.0	County of Ventura, General Services Agency	02N/22W-02G01
									0.0	Cummings, Paul R. and Irene & Sons	03N/21W-19L01
										Dabney, George & Rebecca Trust Inter Vivos	3N/22W-26B1
225.0	212.4	212.5	212.5	212.5	212.5	295.5	226.1	(95.1)	321.2	Dickenson, D&P Dickenson Family Revocable Trust, Louise Dickenson, Bruce E. Dickenson, Virginia Dickenson, Reed and Diana G.	03N/21W-10M01
										Dominguez, G. (6)	03N/21W-12E07
									0.0	Evergreen Ranch AKA San Miguel Products	03N/21W-19R01
42.6	46.4	31.8	31.2	28.5	33.7	9.3	31.9	(65.1)	97.0	Fam, J. LLC	03N/22W-35N01
9,261.2	9,644.9	8,202.5	9,567.0	9,443.5	8,294.6	9,542.8	9,136.6	(776.6)	9,913.2	Farmers Irrigation Company, Inc.	
											03N/21W09R04, 03N/21W12E04, 03N/21W12E08, 03N/21W12F03, 03N/21W16K01, 03N/21W16K02, 03N/21W16K03, 03N/21W19H07, 3N/21W19G4, 3N/21W12F6, 03N21W15C04, 3N21W15C02
			75.0	27.2	44.7	33.8	25.8	25.8	0.0	Fiano, Michael (21)	3N/22W26B02 & 3
											03N/21W-15C02, 03N/21W-15C04
216.0	216.0	206.9	129.4	154.5	205.4	211.3	191.3	(22.1)	213.4	Finch, J.J. & H.H.	3N/22W-34Q02, 3N22W34Q03
									0.0	Galbreaith Brothers, Inc.	03N/21W-17Q01
11.5	11.5	11.6	3.1	13.31	13.45	13.89	11.2	1.6	9.6	Garcia, Elias & Guadalupe (15)	3N/22W-26B1
25.0	25.0	25.0	25.0	25.0	25.0	18.4	24.1	(18.7)	42.8	Gilbert, Patricia L., Trustee of the Gilbert Family Survivor's Trust	03N/21W-16E01

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Table "D-1"
IPA's 2008 - 2014 Production & Averages

10/12/2015

2008 (11)	2009 (12) (14)	2010 (16) (19)	2011 (2)	2012 (2)	2013 (2)	2014 (2)	7 Year Average	Avg Over + Under (-)	Acre Feet	Party Name	Well Number
135.0	135.0	143.8	152.5	115.6	128.9	136.3	135.3	33.5	101.8	Gooding Ranch (John F. Gooding)	03N/21W-09K02
46.4	33.1	58.8	60.0	60.0	36.6	41.5	48.1	(4.8)	52.9	Grant Family Ranches, LLC (20) (30)	3N22W3E01, 3N21W20E01
									0.0	Gregory, Eva as Trustee of the Gregory Family Trust	
98.3	65.7	46.9	62.7	55.7	59.4	62.2	64.4	(33.2)	97.6	Grether, Elizabeth Broome, Ann B. Priske, John S. Broome Jr. as Trustee of the John S. Broome Jr. Trust	03N/22W-35Q02
128.2	128.2	128.2	128.2	128.2	128.2	91.4	122.9	(6.3)	129.2	Hadley-Williams Partnership	02N/22W-03E01 (9)
18.8	8.5	6.9	7.0	4.2	3.6	8.3	8.2	(13.7)	21.9	Hampton Canyon Ranch (Leslie)	03N/21W-19A02
0.0	0.0	0.0	0.0				0.0	(7.9)	7.9	Held, Family Trust dtd 1-16-03	03N/22W-23F02
0.0	0.0	0.0	0.0				0.0	(33.8)	33.8	Held, Joann	03N/22W-23F02
125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	0.0	125	JKJ Farms, LLC (29)	3N/21W-16P01 3N/21W-16P02&3
									0.0	Juanamaria Land Company	02N/22W-03E01
									2.0	JVP Citrus, Inc.	
19.4	15.2	13.3	17.1	20.4	19.8	16.5	17.4	(20.1)	37.5	Kimura, Albert	03N/21W-11H03
									0.0	Kimura, Tama	03N/21W-11H01
									0.0	La Mesa Partnership #1	3N/21W-17R01
									0.0	Lassich, Madeline	03N/21W-29B02
164.1	170.5	168.5	161.6	178.5	176.5	236.5	179.5	(15.8)	195.3	Leavens Ranches	03N/22W-24R01 (13), 2N22W03F02
1,911.3	1,700.4	1,694.5	2,177.8	2,387.2	2,846.2	2,458.4	2,168.0	(1,443.2)	3,611.2	Limoneira Company	03N/21W-01N02, 03N/21W-02Q01, 03N/21W-02R02, 03N/21W-19G02, 03N/21W-30F01, 03N/21W-30H04, 03N/21W-31E03, 3N/21W-31L2
											03N/21W-11A01
											See Limoneira
	0.0	0.0	0.5	3.8	1.2	1.1	0.9	(9.1)	10.0	Little Clara Ranch LLC (30)	3N22W34E01
											3N22W34E01
38.0	37.5	32.6	30.3	30.3	30.3	7.2	29.4	(6.9)	36.3	Malzacher, Fred H. & Elaine C.,	

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Table "D-1"
IPA's 2008 - 2014 Production & Averages

10/12/2015

2008 (11)	2009 (12) (14)	2010 (16) (19)	2011 (2)	2012 (2)	2013 (2)	2014 (2)	7 Year Average	Avg Over + Under (-)	Acre Feet	Party Name	Well Number
										Trustees of the Fred H. Malzacher and Elaine C. Malzacher Revocable Trust dated January 16, 1992 U/D/T dated November 25, 2009, as amended	03N/21W-21G03
31.5	31.5	31.5	31.5	31.5	31.5	15.8	29.2	(5.1)	34.3	Martinez, Esther	3N21W-29G02
26.0	26.0	25.3	20.9	20.3	22.3	23.8	23.5	(1.2)	24.7	McConica, John II	2N/22W-3Q1
										McConica, John R. et al.	3N/21W21B3
										McConica, John R. II et al.	03N/21W-21B03
151.5	292.0	168.9	122.9	176.5	149.6	124.8	169.5	(12.1)	181.6	McGaelic Group	03N/21W17R01 (4), 3N/21W11H01
377.4	343.1	351.2	288.9	356.8	570.6	392.0	382.8	99.2	283.6	McGrath, John & Sons (18)	03N/21W21E05, 3N/21W21E11, 3N/21W-20J04 (17) & 3N/21W-20R3
12.5	12.5	12.5	12.5	9.4	12.5	6.3	11.2	(3.9)	15.1	Mondol, J.K.	03N/21W-10E01, 3N/21W-10E2
									0.0	Newsom, Alice C. as Trustee of the Newsom Family Trust	03N/21W-11A01
38.7	42.1	28.6	20.9	23.3	31.8	27.4	30.4	(16.3)	46.7	Nichols Associates	03N/22W36H01, 03N/22W36H02
28.7	28.9	24.3	31.1	25.9	33.5	28.1	28.6	(97.8)	126.4	Nutwood Farms	03N/22W-36J01, 36J02 & 36J03
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	(7.8)	7.9	Oba Family Trust dtd 12-22-92	03N/22W23F02, 3N/21W17D03(10)
0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		Orr, Roger as Trustee of the Orr Family Trust	03N/21W-20J03, 3N/21W-20J2
160.3	160.2	160.3	159.9	159.9	159.9	261.3	174.5	(19.4)	193.9	Orr Ranch Co. (25)	03N/21W-20J03, 3N/21W-20J2
188.2	159.7	99.3	92.40	116.32	95.01	89.82	120.1	81.5	38.6	Ortiz Trust - Joseph & Sons (3)	03N/21W-30E01
											3N/21W-30E2, 3N/21W-20H1
442.2	422.8	225.6	255.4	303.4	406.7	445.8	357.4	(52.9)	410.3	Panamerican Seed, aka Ball Horticultural	3N/21W20K01, 3N/21W20M01 03N/21W20P01 & 3N/21W20F4
										Pear Blossom Town & Country Marke	03N/21W-10E01, 3N/21W-10E2
57.9	75.0	44.6	66.0	73.1	85.5	86.8	69.8	(46.2)	116.0	Petty Ranch LP	03N/22W-36K04, 3N/22W-36K6
							0.0			Pinkerton, Dan C. and Susan V. Pinkerton, Co-Trustees of the Pinkerton Family Living Trust dated March 19, 1990	03N/21W-17P02
17.0	17.2						4.9	(34.2)	39.1	Pinkerton, Arlene	3N21W17Q01 (5)
									2	Pinkerton, Jennifer Paulene	
77.0	50.0	38.7	25.5	46.5	41.1	59.2	48.3	(13.6)	61.9	Pinkerton, Murray	03N/21W-21E01
									2	Pinkerton Ranch Trust	
									0.0	Pinkerton, W. B. Limited Partnership	3N21W17Q01

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Table "D-1"
IPA's 2008 - 2014 Production & Averages

10/12/2015

2008 (11)	2009 (12) (14)	2010 (16) (19)	2011 (2)	2012 (2)	2013 (2)	2014 (2)	7 Year Average	Avg Over + Under (-)	Acre Feet	Party Name	Well Number
										Pinkerton, W. J. Estate Ranch 1 & 2	03N/21W-16E02, 3N/21W-29B4
118.5	108.5	103.4	110.4	111.1	142.5	127.2	117.4	(41.3)	158.7	Pinkerton, W. J. Estate Ranch	3N/21W-16E02
									0.0	Pinkerton, Wesley Estate	03N/21W-21E01
									0.0	Rancho Attilio	2N/22W-2Q01
107.6	115.2	93.2	116.5	130.2	157.9	160.6	125.9	6.3	119.6	Rancho Filoso, LLC	03N/21W-09K03, 3N/21W-9K4
1.0	1.0	2.0	2.4	2.4	0.5	0.5	1.4	1.3	0.1	Ray, Richard T. and Ruth L.	03N/22W026P01
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	Regents of the University of California (31)	3N/22W-34R1
1,330.3	1,222.0	1,151.8	1,252.6	1,225.2	1,017.1	1,092.2	1,184.4	420.9	763.5	Riverbank Citrus, LLC	3N/22W36K7 & 3N/22W36Q1, 3N22W36K05
									0.0	R.F. Robertson as Trustee of the Robertson Family Trust	03N/21W-17Q01
217.3	198.5	210.2	229.5	185.1	439.2	245.4	246.5	(117.3)	363.8	Santana, Jamie, L. Trustee of the Survivor's Trust Under the Jamime L. Santana Family Trust dated May 30, 1984 as amended	3N/22W-24R01 (13)
											03N/21W-17Q01 (5)
											03N/21W-17Q01 (5)
											3N21W17R01 (4)
											3N21W9J01 (24)
											2N22W03E01
95.8	106.2	91.5	89.5	119.9	101.1	75.9	97.1	(36.9)	134.0	Saticoy Foods Corp.	03N/21W-30H05 (7), 3N/21W-30H6, 3N/21W-30H9
214.7	198.1	145.3	81.1	80.0	115.2	114.4	135.5	(31.8)	167.3	Sharp, J. M. Company	03N/21W-19M01
										Shores, John Family Partnership	03N/21W-20J04 (17), 3N/21W-20R2
76.0	76.0	20.2	59.7	69.9	85.1	87.6	67.8	(4.4)	72.2	Shozi Ventura, LLC	02N/22W-03B01, 02N/22W-03B02
	0.0						0.0	(108.6)	108.6	Silva, Frank	02N/22W-01M03, 02N/22W-01M04
									0.0	Southern California Edison Co.	3N/22W-27M02 D
57.5	57.4	57.5	54.7	51.4	64.1	103.6	63.7	1.6	62.1	Strata Holdings LP	03N/21W-17P02
	0.0						0.0	(107.5)	107.5	The Nature Conservency	3N/21W29K1, 03N/21W-29K02
									0.0	Thermal Belt Mutual Water Co. Inc.	03N/21W-15C02, 03N/21W-15C04
									0.0	Tri-Leaf Nursery (Bruce Arikawa)	3N/21W-30E01
19.9	55.8	146.3	93.3	103.6	162.3	134.4	102.2	34.2	68.0	Tucker Ranch	02N/22W-03K02, 2N/22W-3K3
172.0	210.8	187.6	102.1	206.3	315.4	206.0	200.0	67.5	132.5	TVC Pinkerton Ranch LLC	3N21W-29B4
								0.0		Twyford Plant Laboratories, Inc Fedes	03N/21W-17R01
	0.0						0.0	(5.8)	5.8	Utility Vault (Newbasis is Parent Co)	3N/21W-29K03 D (8)

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Table "D-1"

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10/12/2015

2008 (11)	2009 (12) (14)	2010 (16) (19)	2011 (2)	2012 (2)	2013 (2)	2014 (2)	7 Year Average	Avg Over + Under (-)	Acre Feet	Party Name	Well Number
1.0	1.0	1.0	1.0	1.1	1.2	1.2	1.1	(6.9)	8.0	Vanoni, David or Mary - Mary	02N/22W-02Q01
22.1	13.4	13.0	10.8	12.3	12.9	11.1	13.7	0.7	13.0	Walking Beam Ranches	03N/21W-19G03
									0.0	Wallace, William	3N/21W-21E01
15.0	15.0	15.0	11.3	11.5	46.8	47.6	23.2	13.4	9.8	We 5 Properties	02N/22W-02J03
97.3	112.4	97.8	100.5	61.0	74.5	97.6	91.6	68.5	23.1	WH Ventura 165 LLC (30)	3N/22W-34R1
2.5	2.7	3.0	1.8	1.3	2.0	2.2	2.2	(25.4)	27.6	Williams, James W. III	03N/22W-23G01
							0.0	0.0	0	Wittenberg-Livingston Inc. (30)	02N/22W-02Q01
										Von Chmielewski, Wolfgang (15)	03N/21W-10E01, 3N/21W-10E2
4.8	4.8	4.8	4.8	4.8	4.8	2.4	4.5	(26.5)	31.0	Yoon Family Trust, (Soo Han Yoon)	2N/22W-3L01
25.8	24.9	24.5	13.6	13.2	11.7	15.0	18.4	(2.4)	20.8	Zimmerman, Wade N. III and Patricia	3N/21W-21E08
										B. Zimmerman Trust	03N/21W-21D02
25,124.7	**24,727.6**	**21,518.8**	**22,960.3**	**24,804.0**	**25,530.0**	**26,609.8**	**24,467.9**	(3,071.9)	**27,545.8**	**Total Basin IPA Stipulated Parties**	
27,500.0	**27,500.0**	**27,554.4**	**27,554.4**	**27,586.5**	**27,586.5**	**27,586.5**	**27,552.6**		**27,586.5**	**Historical Association IPA With Non-Parties (40.7 AF)**	
							20	**1,467.1**	**IPA Over Production**		
							52	(4,538.96)	**IPA Under Production**		

2008	2009	2010	2011	2012	2013	2014	7 Year Average				
26,384	**25,820**	**22,189**	**23,952**	**25,823**	**26,461**	**27,434**	**25,438**			**Total IPA, Ventura, Non-Parties and De Minimus**	
26,686	**25,820**	**23,115**	**24,202**	**25,823**	**26,479**	**27,434**				**United Water Conservation District Totals**	
(302.31)	0.00	(926.16)	**(249.53)**	(0.00)	(17.94)	0.00				**Over/Under Amounts (1) (3) (19)**	

(1) Albert and Mary Casteneda (03N21W19L01S) used the UWCD crop factor estimating 2011 production at 271.25 ac-ft. Subsequent to 2011 they installed a water meter which indicates that their production is likely much lower. The SPBPA then lowered their 2011 production by 186.25 ac-ft to 85 ac-ft which they feel more accurately reflects 2011 production. UWCD does not accept the reduction of the 2011 production for Albert and Mary Castaneda as they did not have a meter installed in 2011.
(2) Source of production data for 2011, 2012, 2013 and 2014 was the United Water Conservation District, reviewed by the Association.
(3) Ortiz-Trust – Joseph and Sons (03N21W30E01S, 03N21W30E02S, 03N21W20H01S) according to the SPBPA used the wrong meter readings and over reported 2011 production by 131.08 ac-ft . UWCD accepts only 63.8 ac-ft the reduction of the 2011 production for Ortiz Trust-Joseph and Sons for a total 2011 production of 159.68 ac-ft.
(4) Shared well amoung Bender Realty LTD, Santana, Jamie L. and McGaelic Group. Production is split in accorance with each parties metered use.
(5) Shared well need to determine how to allocate production between Santana and Pinkerton, Arlene.
(6) G. Dominguez was a listed non-party in the original Judgment and the 0.9 acre-feet has been removed from this list reducing the total by 0.9 acre-feet.

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Table "D-1"
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10/12/2015

2008 (11)	2009 (12) (14)	2010 (16) (19)	2011 (2)	2012 (2)	2013 (2)	2014 (2)	7 Year Average	Avg Over + Under (-)	Acre Feet	Party Name	Well Number

(7) Well number 3N/21W-30H3 should be changed to 3N/21W-30H5.

(8) Newbasis is the reporting party, Utility Vault is parent.

(9) Shared well allocated 356.0 AF/Year of production for 2007 to 2013 between City of San Buenaventura and Hadley Williams Partnership by 64/36% of allocation, production meter should be installed to allocate produced water.

(10) Well number was added Oba.

(11) Source of well production data: Santa Paula Basin 2008 Annual Report (2004-2008), Appendix D - Groundwater Allocations and Pumpage, Table D-1 and Table D-2.

(12) Source of well productin data for 2009: United Water Conservation District 2009SPbasinbywell.xls

(13) Shared well (3N/22W-24R01) between Leavens Ranches and Jamie Santana Family Trust. Production is reported separately.

(14)

(15) Spelling correction

(16) Source of well production data for 2010: United Water Conservation District SP 10-1 and SP 10-2.

(17) Roger Clow is a 1/3 owner of the Shores well; however, Clow used 100% of the water for 2007 and 2008. Clow's usage totals 30.5 AF for 2007 and 61 AF for 2008 were reallocated from Shores.

(18) McGrath, John & Sons production for 2008 has been reduced from 673.47 to 365.166 a reduction of 302.305 Acre-Feet, resulting in total produciton of 371.4 for the year 2008

(19) Bender Reality 2010 production (03N21W16P02S, 03N21W16P03S) has been reduced by the SPBPA from 1,356.63 ac-ft (UWCD records) to 532.7 ac-ft for a reduction of 823.93 ac-ft. UWCD does not accept the reduction of the 2010 production of Bender Reality as no documentation was presented to UWCD within 6 month adjustment period.

(20) Grant Family Ranches stipulated to 32.1 acre-feet of allocation in 2012 increasing the Association from 27,514.6 to 27546.7 acre-feet.

(21) Michael Fiano stipulated in 2012 and will be leasing all water pumped annually going forward, transfers to date have been estimated and any remaining balances will be made current with 2014 recorded production.

(22) Bratcher Cutright IPA From Bender Farms

(23) Bender Reality and Bender Farms are owned by the same person, Bender Farms transferred 4.6 AF to the City of Santa Paula in 2012 and 6.0 AF to Bratcher in 2014, minus numbers reflect remaining allocation for prior years, plus Bratcher reported production for the years reported to United Water Conservation District.

(24) Basso Properties Sold to Jaime Santana Trust 43.4 acre-feet with property

(25) Roger Orr as Trustee of the Orr Family Trust so the Orr Ranch Co. to Bryce R. and Elaine V. Bannatyne Co Trustees of the Bannatyne Trust

(26) County of Ventura over reported 158.62 acre-feet in 2013, (331.2+2.67-158.62=175.2) United Water Conservation Distrcit did not recognize that production correction in their records.

(27) Pinkerton, W. J. Estate Ranch 1 & 2, Sold to Pinkerton W. J. Estate Ranch 158.7 AF of IPA and 132.5 AF of IPA to TVC Pinkerton Ranch LLC in 2014, combined over production is reflected on TVC Pinkerton

(28) The Judson T. Cook & Suzette H. Cook Revocable Trust dated December 5, 2007 Purchased the Dabney, George and Rebecca Trust Inter Vivos in January 2015

(29) Bender Reality and Bender Farms sold property to JNJ Farms LLC with 125 acre-feet of allocation and transferred 100 acre-feet to Brucker Family Trust

(30) Wittenberg-Livingston, Inc. sold 4 acre-feet to Little Clara Ranch and 20.8 acre-feet to Grant Family Ranches

(31) Regents of California sold property and water rights to WH Ventura 165 LLC

D = Destroyed Well.

Table "D-2"

De Minimus 2008-2014 Production & Averages

(Production Not to Exceed 5 AFY)

2007 (1)	2008 (1)	2009 (2)	2010 (3)	2011	2012	2013	2014	7 Year Average	Party Name	Well Number	Contact Person
3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	Chapman, Kenneth	3N/21W21F1	Ken Chapman
0.0	2.8	3.4	3.5	3.5	3.5	3.5	3.4	3.4	Chavez, Joel and Carmen	3N/21W21E07	Joel Chavez
0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	Loza, Jesus and Veronica	Not yet assigned	Chuy Loza
4.4	4.8	8.6	8.7	4.3	8.6	4.3	4.3	6.2	Rogers, Charles W., Jason C. Rogers, and Aaron W. Rogers	2N/22W-1M2	Chuck Rogers
7.5	15.0	10.0	10.0	3.6	3.6	3.6	4.1	7.1	Santa Paula Airport Association	3N21W14D01	Rowena Mason
3.5	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5	Sullivan, Russell J.	3N21W21L1	Russell Sulivan
18.4	**27.1**	**26.4**	**26.7**	**15.9**	**20.2**	**15.9**	**16.3**	**21.2**	**Total De Minimus Producers**		

Table "D-3"

Non-Party 2008-2014 Production & Averages

2007 (3)	2008 (3)	2009 (4)	2010 (6)	2011 (7)	2012 (7)	2013 (7)	2014 (7)	2008-14 Average AFY Production	Name	Well Number
4.4	4.2	4.0	2.0	4.0	4.0	3.2	3.2	3.5	Davis, Linda Trust	3N21W21E04, 3N/21W-21E10 (2)
									Dominguez, G.(5) (0.9 AF)	03N/21W-12E07
								Stipulated in 2012	Fiano, Michael	3N/22W26B02 & 3
1.0	1.0	1.0	1.0	0.0	0.0	0.0		0.5	Garman, William (5) (2.0 AF)	02N/22W-02N04
								Stipulated in 2012	Grant Family Ranches, LLC	3N22W3E01 (1), 3N21W20E01 (2)
2.0	2.0	2.0	2.0	1.3	1.5	1.4	2.0	1.7	Minero, Gilbert (5) (1.1 AF)	03N/21W-21M01
3.8	3.8	4.0	2.0	3.6	3.6	3.8	4.4	3.6	Sanchez, Martin	3N/21W-21E6
									Sullivan, Russell J.	3N21W21L1
									Ventura Unified School District (5) (30.8 AF)	02N/22W-03P01
2.0	2.0	2.0	1.0	1.0	2.0	1.0	2.0	1.6	Vint, Thomas H. (5) (4.9 AF)	03N/21W-21E03
6.0	6.0	6.0	5.5	5.0	5.0	5.0	5.0	5.4	Westerdale Trust (5) 1.0 AF)	03N/21W-21G01
19.2	**19.0**	**19.0**	**13.5**	**14.9**	**16.1**	**14.4**	**16.6**	**16.3**	**Total Average AFY Production (Average 2007-2013)**	

Footnotes to Non-Stipulating Pumpers

40.7 Acre-Feet for Non Parties from

(1) Incorrect well number.
(2) Added well number.
(3) Source of well production data: Santa Paula Basin 2008 Annual Report, Appendix D - Groundwater Allocations and Pumpage, Table D-1 and Table D-2.
(4) Source of well production data: United Water Conservation District 2009SPbasinbywell.xls
(5) Non-party individuals named in the Original Judgment, 40.7 Acre-Feet 7/28/2011
(6) Source of well productin data: United Water Conservation District SP 10-1 and SP 10-2
(7) Source of production data for 2011, 2012, 2013 and 2014 was the United Water Conservation District, reviewed by the Association.

Table "D-4"
Temporary Water Transfers DRAFT

10/12/2015

2007 for reference	2008	2009	2010	2011	2012	2013	2014	7 Year Average	Avg Over + Under (-)	AF Annual Allocation	Transfering Parties
2,100	1,911	1,700	1,694	2,178	2,387	2,846	2,458	2,168.0	(1,443)	3,611	**From: Limoneira Company**
			118.6		689.5	1,242.0	674.0				**To:** Canyon Irrigation Company
					72.5	120.4	136.1				**To:** Canyon Irrigation Company for Rancho La Cuesta
			109.0	394.0	413.0	160.7	231.0				**To:** Riverbank Citrus LLC
				20.0		37.0	48.7				**To:** Fiano, Michael J. Trust
							135.1				**To:** Leavens Ranches
							74.5				**To:** Regents of the University of Califorrnia
					2.0						**To:** Dabney
						146.2	90.0				**To:** Tucker Ranch
						28.1	35.0				**To:** Gooding Ranch
2099.6	1911.3	1700.4	1922.1	2591.8	3564.2	4,552.5	3,882.7	2,875.0	(736)	3,611	**Limoneira Company Balance**
				75.0	27.2	44.7	33.8	25.8	26	-	**Fiano, Michael J. Trust**
					-20.0	-37.0	-48.7				**From:** Limoneira Company
0.0	0.0	0.0	0.0	75.0	7.2	7.7	-14.9	10.7	11	-	**Fiano, Michael J. Trust Balance**
10,039.9	9,261.2	9,644.9	8,202.5	9,567.0	9,443.5	8,294.6	9,542.8	9,136.6	(777)	9,913	**From: Farmers Irrigation Company**
13.4	113.6	75.3	328.2	214.9							**To:** Canyon Irrigation Company
				4.0							**To:** Brucker Family Trust
				53.9	77.7	56.4	51.2				**To:** Ortiz Trust - Joseph & Sons
						98.9					**To:** Bender Reality LTD
						32.9					**To:** Rancho Filoso, LLC
					190.0	306.0					**To:** McGrath, John & Sons
						3.9	3.3				**To:** Aramblua, Pedro
							100.0				**To:** Strata Holdings LP
						4.5					**To:** Grant Family Ranches
						113.4	359.1				**To:** TVC Pinkerton Ranch LLC
10,053.2	9,374.8	9,720.2	8,530.7	9,839.8	9,711.2	8,910.6	10,056.4	9,449.1	(464)	9,913	**Farmers Irrigation Company Balance**
1204.1	690.1	901.9	407.6	238.7	1442.4	2069.1	2013.9	1,109.1	436	673	**Canyon Irrigtion Company**
-13.4	-113.6	-75.3	-328.2	-214.9	0.0	0.0	0.0				**To:** City of Santa Paula
					0.0	0.0	0.0				**Returned to Creek**
13.4	113.6	75.3	328.2	214.9	0.0	0.0	0.0				**From:** Farmers Irrigation Company
					-72.5	-120.4	-136.1				**From:** Limoneira Company for La Cuesta over use
			-118.6		-689.5	-1242.0	-674.0				**From:** Limoneira Company
1204.1	690.1	901.9	289.0	238.7	680.4	706.6	1203.8	672.9	(0)	673	**Canyon Irrigation Company Balance**
5470.8	5352.8	4901.5	4456.3	4474.1	4722.4	5005.0	4642.7	4,793.5	(694)	5,488	**City of Santa Paula**
-13.4	-113.6	-75.3	-328.2	-214.9							**From:** Canyon Irrigation Company
5457.4	5239.2	4826.2	4128.1	4259.2	4722.4	5005.0	4642.7	4,689.0	(799)	5,488	**City of Santa Paula Balance**
237.5	225	212.4	212.5	212.5	212.5	212.5	295.51	226.1	(95)	321.2	**From:** Dickenson, D&P Dickenson Family Revocable Tr.
			34.5	51.0	13.8						**To:** Gooding Ranch (John F. Gooding)
237.5	225	212.4	247	263.5	226.3	212.5	295.51	240.3	(81)	321.2	**Dickenson, D&P Dickenson Family Rev. Tr Balance**
135	135	135	143.75	152.5	115.6	128.9	136.29	135.3	33	101.8	**Gooding Ranch (John F. Gooding)**
			-34.5	-51.0	-13.8						**From:** Dickeson, D&P Dickenson Family Rev. Tr.
						-28.1	-35.0				**From:** Limoneira Company
135	135	135	109.25	101.5	101.8	100.8	101.29	112.1	10.3	101.8	**Gooding Ranch (John F. Gooding) Balance**
142.5	151.5	292.0	168.9	122.9	176.5	149.6	124.8	169.5	(12)	181.6	**From: McGaelic Group (1)**
							48.8				**To:** McGrath, John & Sons (Permanent Transfer of 55.9)
142.5	151.5	292.0	168.9	122.9	176.5	149.6	173.6	176.4	(5)	181.6	**McGaelic Group Balance**
0	0	0	0	0	0	0	0	-	-	0.0	**From: Shores, John Family Partnership**

Table "D-4"
Temporary Water Transfers DRAFT

10/12/2015

2007 for reference	2008	2009	2010	2011	2012	2013	2014	7 Year Average	Avg Over + Under (-)	AF Annual Allocation	Transfering Parties
	113.4	120.5	120.4	0.0	85.4	-439.7					**To:** McGrath, John & Sons (Permanent Transfer of 126.7)
0	113.4	120.5	120.4	0.0	85.4	-439.7	0.0	(0.0)	(0)	0.0	**Shores, John Family Partnership Balance**
5.1	377.4	343.1	351.2	288.9	356.8	570.6	392.0	382.8	99	283.6	**McGrath, John & Sons**
							-48.8				**From:** McGaelic Group
											From: Shores, John Family Partnership
					-190	-306.0	-150.0	184.7			**From:** Farmers Irrigation Company
5.1	377.4	343.1	351.2	288.9	166.8	264.6	193.2	283.6	(0.0)	283.6	**McGrath, John & Sons Balance**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	**Regents of the University of California**
			0	0.0	0.0	0.0	0.0				**From:** Leavens Ranches
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	**Regents of the University of California Balance**
100.8	97.3	112.4	97.8	100.5	61.0	74.5	97.6	91.6	68.5	23.1	**WH Ventura 165 LLC (Regents)**
			-73.9	-60.0	-60.0	-52.0		(35.1)			**From: Leavens Ranches**
							-74.5	(10.6)			**From: Limoneira Company**
100.8	97.3	112.4	23.9	40.5	1.0	22.5	23.1	45.8	23	23.1	**WH Ventura 165 LLC**
184.2	164.1	170.5	168.5	161.6	178.5	176.5	236.5	179.5	(16)	195.3	**From: Leavens Ranches**
			73.9	60.0	60.0	52.0					**To:** Regents of the University of California
							-135.1				**From:** Limoneira Company
184.2	164.1	170.5	242.4	221.6	238.5	228.5	101.4	195.3	(0.0)	195.3	**Leavens Ranches Balance**
1106.3	1330.3	1222.0	1151.8	1252.6	1225.2	1017.1	1092.2	1,184.4	421	763.5	**Riverbank Citrus LLC**
			-109.0	-394.0	-413.0	-160.7	-231.0				**From:** Limoneira Company
-96.6	-97.7	-97.5	-102.1	-95.3	-48.7	-141.9	-98.3				**From:** Nutwood Farms
1009.7	1232.6	1124.5	940.7	763.3	763.5	714.5	762.9	900.3	136.8	763.5	**Riverbank Citrus LLC Balance**
29.8	28.7	28.9	24.3	31.1	25.9	33.5	28.1	28.6	(98)	126.4	**Nutwood Farms**
96.6	97.7	97.5	102.1	95.3	48.7	141.9	98.3				**To:** Riverbank Citrus LLC
126.4	126.4	126.4	126.4	126.4	74.6	175.4	126.4	126.0	(0)	126.4	**Nutwood Farms Balance**
0.0	0.0	0.0	0.0	0.5	3.8	1.2	1.1	0.9	(9)	10.0	**From: Little Clara Ranch LLC**
			5.2								**To:** We 5 Properties
0.0	0.0	0.0	5.2	0.5	3.8	1.2	1.1	1.7	(8)	10.0	**Little Clara Ranch Balance**
15.0	15.0	15.0	15.0	11.3	11.5	46.8	47.6	23.2	13	9.8	**We 5 Properties**
			-5.2								**From:** Little Clara Ranch LLC
						-30.2					**From:** Alta Mutual Water Company
15.0	15.0	15.0	9.8	11.3	11.5	16.6	47.6	18.1	8	9.8	**We 5 Properties Balance**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	(108)	107.5	**From: The Nature Conservency**
				107.5	107.5	107.5	100.0				**To:** Brucker Family Trust
0.0	0.0	0.0	0.0	107.5	107.5	107.5	100.0	60.4	(47.1)	107.5	**The Nature Conservancy Balance**
535.0	518.0	437.0	409.0	388.0	379.0	363.0	561.9	436.6	160	276.5	**Brucker Family Trust**
				-107.5	-107.5	-107.5	-100				**From:** The Nature Conservency
				-4.0			-185.4				**From:** Farmers Irrigation Company
535.0	518.0	437.0	409.0	276.5	271.5	255.5	276.5	349.1	73	276.5	**Brucker Family Trust Balance**
188.2	188.2	159.7	99.3	92.4	116.3	95.0	89.8	120.1	81	38.6	**Ortiz Trust - Joseph & Sons**
				-53.8	-77.7	-56.4	-51.2				**From:** Farmers Irrigation Company
188.2	188.2	159.7	99.3	38.6	38.6	38.6	38.6	85.9	47	38.6	**Ortiz Trust - Joseph & Sons Balance**
11.6	11.5	11.5	11.6	6.4	5.9	9.9	8.9	9.4	(0)	9.6	**The Judson T. Cook & Suzette H. Cook Revocable Trus**
					-2.0						From: Limoneira Company

Table "D-4"
Temporary Water Transfers DRAFT

10/12/2015

2007 for reference	2008	2009	2010	2011	2012	2013	2014	7 Year Average	Avg Over + Under (-)	AF Annual Allocation	Transfering Parties
11.6	11.5	11.5	11.6	6.4	3.9	9.9	8.9	9.1	(0.5)	9.6	**The Judson T. Cook & Suzette H. Cook Revocable Trust dat**
692.9	684.4	684.5	563.3	595.9	757.6	241.0	1018.4	649.3	(114)	763.1	**From: Alta Mutual Water Company**
						30.2					**To:** We 5 Properties
692.9	684.4	684.5	563.3	595.9	757.6	271.2	1018.4	653.6	(109)	763.1	**Alta Mutual Water Company Balance**
43.35	19.91	55.8	146.29	93.31	103.6	162.34	134.36	102.2	34	68.0	**Tucker Ranch**
						-146.2	-90.0				From: Limoneira Company
43.35	19.91	55.8	146.29	93.31	103.6	16.1	44.4	68.5	0.5	68.0	**Tucker Ranch Balance**
10.7	10.7	10.65	10.7	10.7	10.3	10.3	6.21	9.9	7	2.9	**Arambula, Pedro**
						-3.9	-3.3				From: Farmers Irrigation Company
						-3.5					From: Correction of Reporting to United (3)
10.7	10.7	10.65	10.7	10.7	10.3	2.9	2.9	8.4	6	2.9	**Arambula, Pedro Balance**
361.2	363.8	205.0	299.5	243.1	308.3	397.5	283.7	311.2	9	302.6	**Bender Reality, LTD & Bender Farms**
						-98.9					From: Farmers Irrigation Company
361.18	363.76	205	299.49	243.09	308.28	298.6	283.7	286.0	(17)	302.6	**Arambula, Pedro Balance**
11.6	11.5	11.5	11.6	3.1	13.3	13.5	13.9	11.2	2	9.6	**Garcia, Elias & Guadalupe**
						-3.9	-4.3				From: Castaneda, Albert & Mary
11.6	11.5	11.5	11.6	3.14	13.31	9.6	9.6	10.0	0.4	9.6	**Garcia, Elias Balance**
85.0	85.0	85.0	85.0	85.0	44.7	63.8	88.0	76.6	(25)	101.4	**Castaneda, Albert & Mary**
						3.9	4.3				To: Garcia, Elias & Guadalupe
85	85	85	85	84.95	44.67	67.7	92.3	77.8	(24)	101.4	**Castaneda, Albert & Mary**
34.5	46.4	33.1	58.8	60.0	60.0	36.6	41.5	48.1	(5)	52.9	**Grant Family Ranches**
						-4.5					From:Farmers Irrigation Company
34.46	46.43	33.1	58.75	60	60	32.1	41.5	47.4	(5)	52.9	**Grant Family Ranches Balance**
149.3	107.6	115.2	93.2	116.5	130.2	157.9	160.6	125.9	6	119.6	**Rancho Filoso, LLC**
							-11.2				From: JM Sharp Company
						-32.9					From:Farmers Irrigation Company
149.27	107.55	115.2	93.21	116.52	130.22	125.0	149.4	119.6	(0.0)	119.6	**Ranch Filoso, LLC Balance**
251.75	214.66	198.1	145.28	81.09	79.99	115.15	114.37	135.5	(31.8)	167.3	**Sharp, JM Compnay**
							11.2				To: Rancho Filloso
251.75	214.66	198.1	145.28	81.09	79.99	115.15	125.57	137.1	(30.2)	167.3	**Sharp, JM Company Balance**
97.25	171.99	210.8	187.55	102.11	206.31	315.42	206.04	200.0	67.5	132.5	**TVC Pinkerton Ranch LLC**
		-322.5				-113.4	-359.1				From: Farmers Irrigation Company
97.25	171.99	-111.7	187.55	102.11	206.31	202.02	-153.06	86.5	(46.0)	132.5	**TVC Pinkerton Ranch LLC Balance**
57.5	57.5	57.4	57.5	54.67	51.44	64.07	103.6	63.7	0.7	62.1	**Strata Holdings LP**
							-100.0				From: Farmers Irrigation Company
57.5	57.5	57.4	57.5	54.67	51.44	64.07	3.6	49.5	(12.6)	62.1	**Strata Holding LP Balance**

The amounts reflected in Red above represent amounts that need to be leased to be compliant

Table "D-5"

Original and Acquired Allocation of the City of San Buenaventura

2007 (4)	2008 (4)	2009 (5)	2010 (6)	2011 (7)	2012 (7)	2013 (7)	2014 (7)	7 Year Average	Over (+) Under (-)	Acre Feet	Party Name	Well Number	Predecessor
227.8	227.8	227.8	227.8	227.8	227.8	227.8	162.4	218.49	(1.5)	220.0	City of San Buenaventura	02N/22W-03E01 (1)	Juanamaria Land Company
										5.8	City of San Buenaventura	3N/21W-21B3	McConica, John R. et al. (3)
227.8	227.8	227.8	227.8	227.8	227.8	227.8	162.4	218.49	(7.3)	**225.8**	**Total Aquired by City of San Buenaventura**		

1,262.8	985.6	818.9	402.0	733.2	754.7	672.9	629.0	713.75	(2,286.2)	3,000.0	City of San Buenaventura	02N/22W-02K09 (2)	
1,490.6	1,213.4	1,046.7	629.8	961.0	982.5	900.7	791.4	932.24	(2,293.6)	**3,225.8**	**Total City of San Buenaventura**		

(1) Shared well allocated 356.0 AF/Year of production for 2007 to 2013 between City of San Buenaventura and Hadley Williams Partnership by 64/36% of allocation a production meter should be used.
(2) Well number was added.

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