~~FINAL~~UPDATED

Groundwater Resources Investigation Report
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Pine Valley, San Diego County, California

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GLOSSARY OF TERMS AND ACRONYMS

afy	Acre-Feet per Year
APN	Assessor's Parcel Number
bgs	below ground surface
btoc	below top of casing
CIMIS	California Irrigation Management Information System
CN	Curve Number
CNM	Curve Number Method
County	County of San Diego
DPLU	Department of Planning and Land Use
DWR	Department of Water Resources
ET	Evapotranspiration
GMMP	Groundwater Monitoring and Mitigation Plan
gpd	gallons per day
gpd/ft	gallons per day/foot
gpm	gallons per minute
MCLs	Maximum Contaminant Levels
mg/L	Milligrams per Liter
NO_3	nitrate
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resource Conservation Service
NWS	National Weather Service
P	Precipitation
PDS	Planning and Development Services
PVMWC	Pine Valley Mutual Water Company
Q	Runoff
S	Soil Moisture Retention
sf	square foot
SDSU	San Diego State University
TDS	Total Dissolved Solids
TOC	Top of Casing
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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EXECUTIVE SUMMARY

In accordance with the San Diego County Planning guidance, Dudek has prepared this groundwater resources investigation to examine the potential impact of purchasing water from the PVMWC on groundwater resources within Pine Valley, California. The water purchased from the PVMWC would be used to supplement the non-potable water required during the construction of the proposed Rugged Solar Farm Project.

The Rugged Project is expected to require approximately 16 acre-feet of off-site water during the first 60 days of construction when Rugged's on-site wells cannot meet the peak water demands required for site grading.

Several off-site water sources, including PVMWC Well No. 5, have been identified to supplement the construction water demands of the Rugged Solar Farm Project. The PVMWC has agreed to dedicate Well No. 5 to the Rugged Solar Farm Project. Well No. 5 is presently not used or certified as a potable water source by PVMWC. Historical production from Well No. 5 has ranged from 0.5 to 22.7 acre-feet per water-year. Production at these rates between the year 2000 and the present has not resulted in adverse impacts to the amount of groundwater in storage or caused off-site well interference.

This analysis was performed to simulate the potential impact on PVMWC groundwater resources based on a production of 16 acre-feet from Well No. 5 over a 60 day period.

The results of the groundwater resource investigation report are as follows:

- The PVMWC intends to make up to 16 acre-feet of water available to the Rough Acres Water Company for use at the Rugged Solar Farm Project Site, from Well No. 5. This volume of water is within the historical production range from Well No. 5, which has ranged from 0.~~5~~ 4 to 22.7 acre-feet per water year. Annual production from Well No. 5 for PVMWC use has averaged 3.~~0~~ 1 acre-feet since 2010.
- During peak construction water demand for the Rugged Solar Project, it is anticipated that approximately 16 acre-feet of water will be required from off-site sources during the first 60 days of bulk grading. Well No. 5 has historically produced up to 70 gallons per minute. At this rate over 60 days, Well No. 5 could produce up to 18.6 acre-feet.
- The results of the water budget analysis indicate that the amount of groundwater in storage in the Pine North basin would not be reduced to a level of 50% or less as a result of producing 16 acre-feet of water from Well No. 5.

- The water level drawdown at an irrigation well located approximately 620 feet from Well No. 5 is estimated to be 1.4 feet if pumping occurs over 60 days (Cooper-Jacob approximation). The drawdown at the same irrigation well is estimated to be 2.2 feet, 1.7 feet, and 0.6 feet if 16 acre-feet of water are produced from Well No. 5 over 90 days, 1 year, and 5 years, respectively. All of these estimates of drawdown are less than significant impacts based on County of San Diego well interference threshold guidance (County of San Diego, 2007).
- The nearest groundwater dependent habitat is riparian forest associated with Pine Creek approximately 50 feet from Well No. 5. After 60 days of Project pumping, groundwater drawdown 50 feet from Well No. 5 is anticipated to be 26.2 feet. Therefore, this Project may potentially cause water levels to exceed historical low water levels from baseline conditions of pumping that would result in potentially significant impacts to groundwater dependent habitat.
- All water supplied by Well No. 5 is intended for construction use only. Impacts at the Rugged Solar site due to the use of non-potable water for construction would be less than significant.

A separate Groundwater Monitoring and Mitigation Plan (GMMP) has been prepared for the proposed groundwater extraction from Well No. 5, which details thresholds for off-site well interference and groundwater dependent habitat. The GMMP will provide recommendations for ongoing water level monitoring and establish impact thresholds for off-site well interference and drawdown at groundwater dependent habitat locations.

1.0 INTRODUCTION

1.1 Purpose of the Report

This groundwater resources investigation was prepared on behalf of Rugged Solar Farm, LLC (Rugged) and the Rough Acres Water Company, Inc. (Rough Acres) for submittal to County of San Diego Planning and Development Services (PDS; formerly DPLU) to evaluate the one time use of up to 16 acre-feet of groundwater from the Pine Valley Mutual Water Company (PVMWC). The structure of this report and the analyses performed in the report were done in accordance with the directions provided in the County of San Diego's scoping letter, dated October 1, 2013. The results of this report should not be relied upon for use for any other groundwater proposal subject to County review in Pine Valley.

1.2 Project Location and Description

Rough Acres proposes purchasing up to a maximum of 16 acre feet of water from the PVMWC for use during the approximately 60 day peak construction phase of the Rugged Solar Farm Project, located north of Interstate 8, east of Ribbonwood Road and west of McCain Valley Road, near Boulevard, California. The requested 16 acre-feet of water to be supplied by the PVMWC is referred to herein as the "Project".

The PVMWC owns and operates 10 water supply wells that serve approximately 675 residences and 20 commercial entities in and around Pine Valley, California (Figures 1 and 2). Pine Valley is located in the Peninsular Ranges Physiographic Province of South California. It is bound to the west by the Guatay and Cuyamaca Mountains, and to the east by the Laguna Mountains. Pine Valley lies within the Pine Hydrologic sub-area of the Monument Hydrologic area of the Tijuana Hydrologic Unit (County of San Diego 2010a). The Pine sub-area can be divided into two basins (Pine North and Pine South) along Pine Valley Creek (Figure 3; County of San Diego 2010a).

The historical average pumping from the PVMWC well field is approximately 270 acre-feet per year (afy). Wells No. 1 and No. 10 (Figure 2) are the primary production wells, supplying approximately 77% of the total water produced by the PVMWC well field. The other wells in the well field are rotated into service on an as needed basis.

The PVMWC has agreed to dedicate Well No. 5 to the Rugged Solar Farm Project for the 60 day peak construction period. Based on the past performance of this well and the anticipated total demand on the well field, the PVMWC anticipates being able to supply up to 16 acre-feet from this well over the 60 day period. Wells No. 1 and 10 will continue to supply the bulk of the water to the PVMWC customer base and the remaining wells will continue to be used as needed to meet any additional demand during the 60 days that Well No 5 will be dedicated to the Project.

1.3 Applicable Groundwater Regulations

The County Guidelines for Determining Significance—Groundwater Resources contain a series of thresholds for determining significance of water use impacts specific to groundwater quantity and groundwater quality. Project impacts that meet or exceed the thresholds set forth in the County Guidelines would be considered significant.

To evaluate the long term impact to groundwater storage as a result of this Project, the following guideline for determining significance is typically used:

> For proposed projects in fractured rock basins, groundwater impacts will be considered significant if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction (County of San Diego 2007).

To evaluate off-site well interference as a result of this Project, the following guideline for determining significance is typically used:

> As an initial screening tool, off-site well interference will be considered a significant impact if after a 5 year projection of drawdown, the results indicate a decrease in water level of 5 feet or more in the off-site wells. If site-specific data indicates alluvium or sedimentary rocks exist which substantiate a saturated thickness of 100 feet in offsite wells, a decrease in saturated thickness of 5% or more in the offsite wells would be considered a significant impact (County of San Diego 2007).

In addition to the thresholds for determining significance of water use impacts specific to groundwater quantity and groundwater quality, the County assigned a project specific threshold for determining significance to groundwater dependent habitat that differs from the standard significance threshold. The Project specific threshold was selected because of U.S. Fish and Wildlife Service (USFWS) concern for arroyo toad critical habitat in Pine Creek and the limited site specific biological data available to prepare this report. The Project specific threshold is:

> If drawdown as a result of pumping for this project would cause water levels to exceed historical low water levels from baseline conditions of pumping… this would be a potentially significant impact (County of San Diego 2013).

The Project specific threshold to determine significance for groundwater dependent habitat is unique to the conditions and circumstances of this investigation and should not be applied to other projects without justification. The Project is not subject to the San Diego County Groundwater Ordinance because the requested water will be supplied by a Water Service Agency, as defined within the Ordinance.

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2.0 BACKGROUND AND EXISTING CONDITONS

The following subsections include descriptions of the previous studies of water demands in the Project area, historical groundwater production volumes from Well No. 5, and historical groundwater levels in Well No. 5.

2.1 Previous Work

At the directive of the San Diego County Board of Supervisors, the DPLU prepared a report, issued in 2010, evaluating the impacts of existing and proposed land uses on groundwater resources within Pine Valley (County of San Diego 2010a; appendix A). The Pine Valley Cumulative Groundwater Study details the groundwater elevations, production volumes, and relative drawdown in the PVMWC wells between 1991 and 2008.

Historical Groundwater Levels

Historical groundwater levels between 1991 and 2013 are presented for wells No. 1, 2, 4, 5, 8, and 10 (Figures 4 through 7). Wells No. 2 and 8 have been inactive since the early 1990s as a result of contamination to the aquifer from a nearby leaky underground fuel tank. These wells, therefore, provide a record of groundwater levels in the residuum in the absence of pumping. For the active pumping wells, the groundwater level reported is the level measured at times that the pumps were off, although the groundwater level may not have fully recovered when the water level was measured.

Historical groundwater levels in Wells No. 2 and 8 peak in the spring and early summer of 1993, 1995, and 1998, all three of which were above-average precipitation years (Figures 4 and 7). Between 1998 and 2004, San Diego County experienced six consecutive years of below average rainfall, corresponding to the decreasing water level trend observed in Wells No. 2 and 8 (County of San Diego 2010a). With the onset of precipitation in October 2004 water levels in Wells No. 2 and 8 began to recover, peaking in June 2005. The June 2005 peak is lower than the peak water levels observed in 1993, 1995 and 1998.

Water levels in Wells No. 1, 4, 5 and 10 follow the same general pattern as water levels in Wells No 2 and 8, though the high water levels observed in the mid 1990's are less pronounced (Figures 5 and 6). There is little variability in the highest observed water levels in Well No. 5 (Figure 6). The lowest water level in Well No. 5 was recorded in September 2004, corresponding to the end of a 6 year drought period. Well No. 5 is completed within the residuum, approximately 100 feet above the underlying granite bedrock, and is located close to Pine Creek (Figure 2). Pine Creek provides seasonal recharge to the groundwater in the vicinity of Well No. 5. Spring water levels in the well vary by less than 10 feet over the entire data set, with the water level recorded in March of 2004, at the end of the 6 year drought, 8 feet lower than the highest water level recorded in March of 1993.

The 6 year drought between 1998 and 2004 is one of the worst drought periods observed in San Diego County in the past 50 years (County of San Diego 2010a). The lowest recorded static water level in Well No. 5 was 50 feet below ground surface (bgs) in September 2004.

Long-term Groundwater Availability Analysis

The County also analyzed the long-term availability of groundwater in the Pine North and South basins, using a soil moisture balance approach that estimates recharge to each basin over a 34 year period. Impacts to each basin were evaluated for four separate land use scenarios. Impacts were considered significant if the groundwater in storage dropped below 50% of the total storage capacity of the basin at any time during the 34 year simulation. The County analysis found that up to 340 afy can be pumped from the Pine South basin without causing a significant impact to the basin. The Pine North basin did not experience significant groundwater depletion under any scenario run in the County report. The maximum groundwater production analyzed in the Pine North basin was 112 afy.

2.2 Existing Conditions

2.2.1 Groundwater Production Volumes

The average production volume from the PVMWC wells between 1999 and ~~2012~~ 2013 was ~~270~~ 268 afy. Production from the well field peaked in 2007 at ~~319~~ 314 acre-feet (Figure 8) and has been below 250 afy since 2010. The Pine North basin provided approximately 19% (50 afy) of the annual PVMWC production between 1999 and 2012, with the remaining 81% coming from the Pine South basin.

In the Pine South basin, Wells No. 1 and 10 are the primary production wells, supplying approximately 71% of the total water produced by the PVMWC well field. These wells produced, on average, 191 afy between 1999 and 2012. In the Pine North basin, wells No. 4 and 5 are the primary production wells, supplying 72% of the water from the Pine North basin, or 13% of the total water produced by the entire PVMWC well field.

Since the peak water demand in 2007, the PVMWC well field has produced on average 249 afy of water, or approximately 92% of the long term average. Over the past 6 years production from Well No. 5 has declined steeply. Between 2008 and ~~2012~~2013, Well No. 5 produced, on average, ~~10~~ 7 afy. In contrast, between 1999 and 2007 this well produced an average of 16 afy. In part, the production decline in well No. 5 is the result of nitrate detected in water samples from the well at concentrations of 54 milligrams per liter (mg/L) (P. Boermann, pers com). This concentration is above the maximum contaminant level (MCL) of 45 mg/L.

2.2.2 Groundwater Levels

A summary of the static water levels from ~~May~~ April ~~2013~~2014, the most recent data provided by the PVMWC, along with the historical high and low static water levels from each well is provided in Table 2-1 below.

Table 2-1
Historical Water Level Summary

Well Name	~~May 2013~~April 2014 Static Water Level (feet bgs)	Historical High Water Level (feet bgs)	Date of Historical High Water Level	Historical Low Water Level (feet bgs)	Date of Historical low Water Level
Well No 1	~~25.0~~38.1	9.5	3/31/1993	109	9/30/2004
Well No 2	~~38.1~~46.1*	15	3/31/1995	50.5	11/31/2007
Well No 3	~~31.0~~24.0	17.3	5/31/2012	293.1	9/30/2004
Well No 4	~~37~~37.~~0~~1	22.5	1/31/1995	51	9/30/2001
Well No 5	1~~1.1~~2.1	6	3/31/1993	50	9/30/2004
Well No 6	~~22.0~~24.1	13	2/28/1993	53	8/31/2004
Well No 7	~~1~~213.0	3.7	3/31/1993	297.1	6/30/2004
Well No 8	~~41.1~~48.1	13	5/31/1993	58	10/31/1996
Well No 9	~~112.1~~122.1	16.1	3/31/2000	245.1	9/31/2002
Well No 10	~~24.0~~17.1	10.1	4/30/1998	131.1	10/31/2003

* Data from Well No. 2 is from March 2014.

As stated in Section 2.1, groundwater levels recorded in the PVMWC well field follow precipitation trends. Recharge occurs during the winter and spring, with the historical high water levels typically measured in March and April (Table 2-1). Historical low water levels typically occur at the end of the summer, in September and October (Table 2-1).

In order to compare water levels to each other, and assess the current water levels in their historical context, it is best to compare water levels measured within a given month. The current, average, historical high and historical low static water levels for March and October are presented in Table 2-2 and Table 2-3, respectively. These two months were chosen because they represent the typical high and low annual water levels measured in the wells.

Table 2-2
March Historical Water Level Summary

Well Name	~~2013~~ 2014 Static Water Level (feet bgs)	Mean Water Level (feet bgs)	Low Water Level (feet bgs)	High Water Level (feet bgs)
Well No 1	37.1~~23.0~~	32.6	65.0	9.5
Well No 2	46.1~~35.0~~	34.1	45.0	15.0

Table 2-2
March Historical Water Level Summary

Well Name	~~2013~~ 2014 Static Water Level (feet bgs)	Mean Water Level (feet bgs)	Low Water Level (feet bgs)	High Water Level (feet bgs)
Well No 3	30.0~~21.0~~	44.0	138.1	19.0
Well No 4	38.1~~35.0~~	32.5	~~37~~38.1~~0~~	25.0
Well No 5	11.1~~11.1~~	10.8	15.0	6.0
Well No 6	24.1~~22.1~~	21.9	36.0	15.0
Well No 7	19.1~~19.1~~	24.1	121.6	3.7
Well No 8	48.0~~41.0~~	39.0	51.0	22.0
Well No 9	126.0~~115.3~~	131.5	194.1	16.1
Well No 10	31.1~~19.1~~	29.3	59.1	15.0

The March ~~2013~~ 2014 water levels are, for the most part, similar to the long term average water levels, with a few notable exceptions. The water levels in Wells No. ~~1,~~ 3, 7, and ~~10~~ 9 are 5 or more feet higher than the long term average, likely reflecting the decrease in pumping from these wells over the past 5 years. The water levels in Wells 2, 4, and 8 are 5 or more feet lower than the long-term average.

Table 2-3
October Historical Water Level Summary

Well Name	~~2012~~ 2013 Static Water Level (feet bgs)	Mean Water Level (feet bgs)	Low Water Level (feet bgs)	High Water Level (feet bgs)
Well No 1	39.1~~28.0~~	42.6	105.0	13.1
Well No 2	45.0~~36.0~~	40.8	50.5	33.0
Well No 3	96.1~~39.0~~	135.3	252.1	23.0
Well No 4	39.1~~40.8~~	36.1	40.8	32.1
Well No 5	13.1~~12.0~~	18.3	32.1	11.0
Well No 6	25.0~~26.7~~	24.8	33.1	18.3
Well No 7	14.1~~21.4~~	88.1	181.0	13.0
Well No 8	45.1~~37.5~~	41.7	58.0	21.1
Well No 9	118.1~~118.5~~	163.1	229.0	105.3
Well No 10	35.0~~32.5~~	42.1	131.1	13

The October ~~2012~~ 2013 water levels are also similar to the long term average water levels, in Wells No. ~~2~~1, 2, ~~3,~~ 4, ~~5,~~ 6, and 8. Wells No. ~~1,~~ 3, 5, 7, 9, and 10 have groundwater levels 5 or more feet ~~significantly~~ higher than the long term average levels.

3.0 WATER QUANTITY IMPACT ANALYSIS

This section discusses the potential impacts of the Project on local groundwater resources in terms of the County PDS significance criteria.

3.1 50% Reduction of Groundwater in Storage

The water quantity analyses that follow were performed for both the Pine North and Pine South basins, encompassing a total area of approximately 29.3 square miles (County of San Diego, 2010a). The basins are divided in Pine Valley along the axis of the east/west running Pine Creek (Figure 3). The Pine South basin is approximately 3,615 acres, and the Pine North Basin is approximately 15,189 acres.

3.1.1 Guidelines for Determination of Significance

The following requirement is set forth in the County of San Diego Guidelines (2007):

> For proposed projects in fractured rock and sedimentary basins, groundwater impacts will be considered significant if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction.

A project-specific soil moisture based water balance analysis was performed for each basin. While the bulk of the Project water will be supplied by Well No 5 in the Pine North basin, some will also likely be supplied by the general PVMWC well field. Therefore, both basins were analyzed. The analysis evaluates whether the one time extraction of up to 16 acre feet of water for the Project will cause the groundwater in storage to drop below the 50% threshold in either the Pine North or Pine South basin.

3.1.2 Methodology

A soil moisture balance method was used to evaluate rainfall recharge in the Pine North and Pine South basins. Rainfall, runoff, and evapotranspiration, were used to calculate groundwater recharge on a monthly interval over a 34 year period. The change in the volume of groundwater in storage over the 34-year period was evaluated for three scenarios as described in Section 3.1.2.2. The maximum cumulative depletion of groundwater in storage was compared to the maximum volume of water potentially available as groundwater storage, to determine whether the 50% reduction significance threshold was met.

The aquifer storage capacity for each basin was estimated by the PDS based on the estimated acreage of 4 distinct hydrologic units within the study area: moderately fractured crystalline rock, slightly fractured crystalline rock, alluvium and residuum (County of San Diego, 2010a). The estimated maximum groundwater storage capacity in the Pine South basin is 2,138 acre-feet. The estimated maximum groundwater storage capacity in the Pine North basin is 2,694 acre-feet (County of San Diego, 2010a).

3.1.2.1 Groundwater Recharge

Groundwater recharge was estimated using a monthly soil-moisture balance approach based on the computer code provided in the San Diego County Department of Planning and Land Use (DPLU) General Plan Update Groundwater Study (County of San Diego 2009) and similar to the methodology used in the RECHARG2 program developed by Dr. David Huntley at San Diego State University (SDSU). Groundwater recharge occurs when the amount of rainfall entering the area exceeds the amount subsequently lost to runoff and evapotranspiration and the soil moisture capacity is met. The monthly recharge equation is as follows:

$$\textbf{Recharge}(i) = \textbf{PPT}(i) - \textbf{RO}(i) - \textbf{PET}(i) - (\textbf{SMC-SM}(i))$$

where:

Recharge(i) = Recharge during month i
PPT(i) = Rainfall during month i
RO(i) = Runoff during month i
PET(i) = Potential Evapotranspiration during month i
SMC = Soil Moisture Capacity
SM(i) = Soil Moisture at beginning of month i

Excel spreadsheets were developed for data input, groundwater recharge calculations, and the comparison of the cumulative effect on groundwater in storage.

Data Compilation

The data required to provide groundwater recharge estimates were obtained from the PDS and are discussed below.

Precipitation

Simulated monthly rainfall data for a 34-year period, July 1971 through June 2005, were used in this analysis. The data were generated by multiplying the average precipitation value for each 300-foot by 300-foot grid cell within the Pine North and Pine South basins on the County's

Groundwater Limitations Map by the fractional annual and monthly distribution of rainfall across the county between 1971 and 2001. The full description of the derived precipitation record is provided in the County's 2010 Pine Valley Cumulative Groundwater Study (County of San Diego, 2010a). The data used for this study were provided by the County of San Diego, and are the same data used in the 2010 Cumulative Groundwater Study.

Evapotranspiration

Reference evapotranspiration (ETo) data are provided by the California Irrigation Management Information System (CIMIS) throughout the state of California. CIMIS maintains a number of weather stations statewide that provide the meteorological parameters used to calculate published reference ETo values. These ETo values are dependent on parameters including incident solar radiation, vapor pressure, air temperature, and cloud cover. The ETo values published by CIMIS and used in this analysis overestimate actual rates of evapotranspiration at the Project site because the CIMIS ETo is a calculated water need for well-watered grass rather than for non-irrigated native vegetation and soil. CIMIS has designated the area surrounding the Project site as Zone 16 (CIMIS 1999). The monthly average ETo values provided by CIMIS for Zone 16 were used in this analysis. The total annual ETo for Zone 16 is reported as 62.5 inches/year (CIMIS 1999).

Soil Moisture Capacity

Soil moisture capacity or water-holding capacity is the capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point (USDA 1973). Soil water-holding capacity is dependent on the soil type and site-specific soil properties, including rock fragments, organic matter, bulk density, osmotic pressure, texture, and rooting depth (USDA 1998). The USDA has defined a range of water-holding capacity values for each type of soil present in San Diego County (USDA 1973). The mean value of the reported range of values for each soil type was used as the soil moisture capacity for this analysis. Soil type and coverage on the Project site provided by the County of San Diego and are the same as the data used in the County's 2010 Pine Valley Groundwater Study (County of San Diego, 2010a).

Runoff

Because there are no long term records of runoff from stream gaging stations in Pine Valley, the runoff volumes used in this study were derived from the Natural Resources Conservation Service (NRCS) curve number method (CNM) as expounded in the County of San Diego Hydrology Manual (2003). The CNM was designed to estimate runoff for watersheds in which no direct

measurement was available. The CNM is based on a simplified infiltration model of runoff and empirical approximations.

In order to compute runoff (Q) using the CNM, two parameters must be known: precipitation (P) and the maximum soil moisture retention after runoff has begun (S), based on the following relationship.

$$Q = (P-0.2S)^2/(P+0.8S)$$

The maximum soil moisture retention (S) is a function of soil type, with all soils having been classified into one of four hydrologic groups, A through D. Soils are classified by the USDA's NRCS into four hydrologic soil groups based on the soil's runoff potential. The four hydrologic soils groups are A, B, C, and D. Soils in Group A generally have the smallest runoff potential and highest infiltration rates while soils in group D have the greatest runoff potential, lowest infiltration rates, and lowest soil moisture retention.

The CNM requires the selection of a curve number based on a combination of soil conditions, land use (ground cover), and hydrologic conditions to assign a runoff factor to the area. These runoff factors, called runoff curve numbers (CNs), indicate the runoff potential of an area. The higher the CN, the higher the runoff potential (County of San Diego 2003). Curve numbers were assigned to each soil type by the County of San Diego in its 2010 Pine Valley Cumulative Groundwater Study (County of San Diego 2010a).

The maximum soil moisture retention (S) is calculated from the curve numbers based on the following relationship:

$$S = 1000/CN-10$$

Using the monthly precipitation record and the assigned curve numbers, anticipated monthly runoff values for the Project area were calculated for the 30-year period of record of the precipitation data. A calibration analysis included in the 2010 General Plan Update Groundwater Study (County of San Diego 2009) compared the runoff values using the NRCS curve number method to existing conditions for periods when historical groundwater level data were available in the Lee Valley Basin. The County concluded that runoff values calculated using the NRCS curve number method were overestimated. A reasonable relative match between calculated groundwater in storage compared to historical groundwater levels was obtained by applying an adjustment factor of 0.5 to the calculated runoff values. This adjustment factor of 0.5 was used in this analysis.

3.1.2.2 Groundwater Demand – Pine North Basin

Groundwater demand was evaluated for three scenarios in the Pine Valley North Basin using the County provided synthetic precipitation data as follows:

1. Water demand based on existing use, including discretionary projects in process and recently approved.
2. Water demand of the combined existing use and the one-time 16 acre-foot Project water demand.
3. Water demand of the combined existing use, Project water demand and full General Plan build-out.

The groundwater demands for each scenario are presented in tables 3-1 through 3-3 below.

Table 3-1
Scenario 1—Existing Conditions Pine North Basin

Land Use	Quantity	Water Demand Per Unit (acre-feet/year)	Total Water Demand (acre-feet/year)	Total Water Demand Over 34 Years (acre-feet)
Single Family Residential	125	0.5	62.5	2,125
Second Dwelling Units	1	0.25	0.25	8.5
Pine Valley Bible Conference Center	1	19.9	19.9	676.6
U.S. Forest Service Cabins	37	0.1	3.7	125.8
Tentative Parcel Map 20857	1	0.5	0.5	17
Total Existing Water Demand Under Scenario 1			**87**	**2,952.9**

Table 3-2
Scenario 2—Existing and Proposed Project Conditions Pine North Basin

Land Use	Quantity	Water Demand Per Unit (acre-feet/year)	Water Demand (acre-feet/year)	Total Water Demand Over 30 Years
Sum of Existing Conditions and Discretionary Projects in Progress	n/a	n/a	87	2,952.9
One-time Demand				
Pine Valley Mutual Water Company	n/a	n/a	16	16
Total Water Demand Under Scenario 2			**103**	**2,968.9**

Table 3-3
Scenario 3—Existing and Proposed Project Conditions with Full General Plan Buildout Pine North Basin

Land Use	Quantity	Water Demand Per Unit (acre-feet/year)	Water Demand (acre-feet/year)	Total Water Demand Over 30 Years
Sum of Existing Conditions and Discretionary Projects in Progress	n/a	n/a	87	2,952.9
Additional Single-Family Residential Units (at Theoretical Full General Plan Buildout)	26	0.5	13	442
One-time Demand				
Pine Valley Mutual Water Company	1	16	16	16
Total Water Demand Under Scenario 3			**115**	**3,382**

3.1.2.3 Groundwater in Storage – Pine North Basin

Annual precipitation and recharge to the Pine Valley watershed is highly variable, with periods of prolonged drought punctuated by rainfall years that are as much as 1.8 times higher than the 30 year mean rainfall (County of San Diego, 2010a). Therefore, in order to support the long-term continuous use of groundwater from the Pine Valley North basin, there must be sufficient groundwater in storage to provide water during periods of extended drought. The groundwater is stored in the 4 hydrologic units discussed in Section 3.1.2 above and in the County's 2010 Pine Valley Cumulative Groundwater Study (County of San Diego, 2010a). The estimated maximum volume of groundwater in storage in the Pine North basin is 2,694 acre-feet (County of San Diego, 2010a).

3.1.2.4 Long-Term Groundwater Availability – Pine North Basin

Long-term groundwater availability was evaluated using the calculated groundwater recharge, the estimated water demand detailed in three scenarios (described in Section 3.1.2.2) and the calculated maximum groundwater storage capacity (Section 3.1.2.3). The volume of groundwater in storage varies depending on the rate of recharge and the volume of water pumped from storage (water demand). Excel spreadsheets showing the calculations of the 34 year study period were provided by the PDS for this study, and are included in Appendix B. The Project has an estimated one-time/short-term construction demand of 16 acre-feet, which will be extracted over an approximate 60 day peak construction period. To conservatively incorporate this one-time extraction into the analysis, the water demand of 16 acre-feet was removed during November 2002, the month with the lowest volume of groundwater in storage in the 34 year period analyzed.

In addition to the long-term groundwater storage evaluated over the 34 year precipitation record, the water level fluctuations in PVMWC Well No. 5 were also evaluated between 2000 and 2012, the timeframe in which the PVMWC provided overlapping production, precipitation, and water level data. The data are presented in Table 3-4 below. The production and precipitation data were tabulated over a water year, which in this report is defined as extending from October 1 through the following September 30. For example, the 2000 water year extends from October 1999, through September 2000. The water level drawdown was determined for each year, as the difference between the March and October water levels in that calendar year. The recovery was determined as the difference in water levels between October of one calendar year and March of the subsequent year.

Table 3-4
Well No. 5 Summary Recovery Table

Water Year[1] (October – September)	Precipitation[2] (in)	Well No. 5 Production (acre-feet)	March Water Level (feet btoc)	September Water Level (feet btoc)	Drawdown (feet) (March to September)	Recovery (feet) (October to March)
2000	14.5	13.8	11.0	13.1	-2.1	
2001	19.5	16.1	10.1	20	-9.9	3.0
2002	8.4	18.7	13	36.1	-23.1	7
2003	26.2	12.9	15	25	-10.0	21.1
2004	14.8	22.7	14	50	-36.0	11.0
2005	46.5	8.7	9	11	-2.0	41.0
2006	20.5	14.1	12	13	-1.0	-1.0
2007	12.3	18.2	14	25	-11.0	-1.0
2008	24.6	14.0	12.3	24.3	-12.0	12.7
2009	23.2	14.8	12.0	30.6	-18.6	12.3
2010	35.9	9.9	11.3	15.8	-4.5	19.3
2011	35.3	3.2	9.8	12.0	-2.2	6.0
2012	21.1	2.4	11.0	12.4	-1.4	6.0

1 The water year is defined here as October through September. The 2000 water year is October 1999- September 2000.
2 The water year precipitation for 2000-2005 is from the synthetic record of precipitation in the Pine North basin, prepared by the County. The water year precipitation for 2006-2012 is approximated based on the average precipitation in the Pine North basin of 26.5 inches / year, and a fractional average water year from the rain gauges surrounding Pine Valley.

Analysis of the data above indicates that groundwater levels in PVMWC Well No. 5 are controlled by the combined effects of precipitation and pumping. The water level in September of each year correlates with the production from that same year, with a correlation coefficient of 0.78. Similarly, the observed recovery in the well from October through March, correlates with the water year precipitation, with a correlation coefficient of 0.75.

Strikingly, however, the March water level is not well correlated with the water year precipitation ($R^2 = 0.58$).

The lack of correlation between the March water level and the water year precipitation can be explained, in large part, by the proximity of Well No. 5 to Pine Creek. As discussed in Section 2.1, PVMWC Well No. 5 is adjacent to Pine Creek, which provides seasonal recharge to the aquifer surrounding the well (recharge boundary condition). This recharge allows water levels in the well to recover each spring regardless of the amount of precipitation received by the watershed. In 2003, after several years of below average rainfall and above average well production, the March water level was 15 feet below the top of the casing. In years of high rainfall, such as the 2005 water year, the water level in Well No. 5 was 9 feet below the top of the well casing, or only 6 feet higher than that in 2003 at the end of a drought period. Thus the March water levels are controlled primarily by recharge from Pine Creek, rather than precipitation or well production.

The observed response in Well No. 5 between the 2000 and 2002 water years is indicative of the anticipated response resulting from this Project. Between 2000 and 2002, the Pine Valley watershed experienced two sequential years of relatively high production (16 to 19 acre feet) and low precipitation (30 to 70% of average). By the end of these two years, the March 2002 water level was only 2 feet lower than the March 2000 water level. With continued production and average to below average rainfall in 2003 and 2004, the March water level dropped an additional 2 feet, but recharge in the winter of 2004-2005 returned the water level in the well to with 9 feet of the top of the casing, or 2 feet higher than the March 2000 water level.

Given that the current water levels are similar to those measured in March 2002 (J. Bennett, pers. com.), a year in which 18.7 acre-feet of water was produced by Well No. 5, the production of 16-acre feet of water from this well can be anticipated to cause an approximate 10 foot drawdown in the water levels between March 2014 and September 2014, similar to that observed in 2002. If there is average to above average rainfall between October 2014 and March 2015, the water levels in Well No. 5 would be expected to fully recover. If there is below average rainfall, the March 2015 water level may be as much as 2 feet lower than the March 2014 water level.

3.1.2.5 Groundwater Demand – Pine South Basin

Groundwater demand was evaluated for three scenarios in the Pine South Basin using the County provided synthetic precipitation data as follows:

1. Water demand based on existing use, including discretionary projects in process and recently approved.

2. Water demand of the combined existing use and the one-time 16 acre-foot Project water demand.
3. Water demand of the combined existing use, Project water demand and full General Plan build-out.

The scenarios listed above assume the entire 16 acre-feet of water requested by the Rugged Solar Farm Project will come from the Pine South basin. This assumption is, however, overly conservative because Well No. 5 is located in the Pine North, not the Pine South basin. If Well No. 5 cannot provide the entire 16 acre-feet, some water may be supplied by the rest of the PVMWC well field, spread in both the Pine North and Pine South basins. Therefore, at no time is the Project anticipated to withdraw 16 acre-feet of water from the Pine South basin alone.

The groundwater demands for each scenario are presented in tables 3-4 through 3-6 below.

Table 3-5
Scenario 1—Existing Conditions Pine South Basin

Land Use	Quantity	Water Demand Per Unit (acre-feet/year)	Total Water Demand (acre-feet/year)	Total Water Demand Over 34 Years (acre-feet)
Single Family Residential	530	0.5	2,655	9,010
Second Dwelling Units	8	0.25	2	68
Commercial Uses	12	0.3	4	122.4
County Park	5.2	3.1	16	548.1
15-Acre Vineyard	15	1.98	30	1,009.8
Tentative Map 5236	3	0.5	2	51
Tentative Parcel Map 20765	4	0.5	2	68
Tentative Parcel Map 20951	4	0.5	2	68
Total Existing Water Demand Under Scenario 1				**10,945.3**

Table 3-6
Scenario 2—Existing and Proposed Project Conditions Pine South Basin

Land Use	Quantity	Water Demand Per Unit (acre-feet/year)	Water Demand (acre-feet/year)	Total Water Demand Over 30 Years
Sum of Existing Conditions and Discretionary Projects in Progress	n/a	n/a	322	10,945.3
One-time Demand				
Pine Valley Mutual Water Company	n/a	n/a	16	16
Total Water Demand Under Scenario 2			**322**	**10,961.3**

Table 3-7
Scenario 3—Existing and Proposed Project Conditions with Full General Plan Buildout Pine South Basin

Land Use	Quantity	Water Demand Per Unit (acre-feet/year)	Water Demand (acre-feet/year)	Total Water Demand Over 30 Years
Sum of Existing Conditions Water Demand	n/a	n/a	316	10,961.3
Additional Single-Family Residential Units (at Theoretical Full General Plan Buildout)	224	0.5	112	3,808
One-time Demand				
Pine Valley Mutual Water Company	1	16	16	16
Total Water Demand Under Scenario 3			**428**	**14,582.3**

It should be noted that the County analyzed for the general plan build out scenario in the 2010 Pine Valley Cumulative Groundwater Study for the Pine South basin. In this scenario, storage in the Pine South basin dropped below 50% twice in the 34 year period analyzed (County of San Diego, 2010a), without a one-time withdrawal of 16 acre-feet. A withdrawal of 16 acre-feet represents 0.1% of the total groundwater pumped from the basin in this scenario over 34 years and, given the assumptions built into the analysis discussed above in Section 3.1.1, provides no additional measureable stress to the basin.

3.1.2.6 Groundwater in Storage – Pine South Basin

Annual precipitation and recharge to the Pine Valley watershed is highly variable, with periods of prolonged drought punctuated by rainfall years that are as much as 1.8 times higher than the 30 year mean rainfall (County of San Diego, 2010a). Therefore, in order to support the long-term continuous use of groundwater from the Pine South basin, there must be sufficient groundwater in storage to provide water during periods of extended drought. The groundwater is stored in the 4 hydrologic units discussed in Section 3.1.2 and in the County's 2010 Pine Valley Cumulative Groundwater Study (County of San Diego, 2010a). The estimated maximum volume of groundwater in storage in the Pine South basin is 2138 acre-feet (County of San Diego, 2010a).

3.1.2.7 Long-Term Groundwater Availability – Pine South Basin

Long-term groundwater availability was evaluated using the calculated groundwater recharge, the estimated water demand detailed in three scenarios (described in Section 3.1.2.2) and the calculated maximum groundwater storage capacity (Section 3.1.2.3). The volume of groundwater in storage varies depending on the rate of recharge and the volume of

water pumped from storage (water demand). Excel spreadsheets showing the calculations of the 34 year study period were provided by the PDS for this study, and are included in Appendix B. The Project has an estimated one-time/short-term project construction demand of 16 acre-feet, which will be extracted over an approximate 60 day peak construction period. To conservatively incorporate this one-time extraction into the analysis, the water demand of 16 acre-feet was removed during January 1991, the month with the lowest volume of groundwater in storage in the 34 year period analyzed.

3.1.3 Significance of Impacts Prior to Mitigation

The results of the analysis show that for each of the three water demand scenarios involving the Project in the Pine North basin, the volume of groundwater in storage remains above the 50% significance threshold over the 30 year period. The volume of water in storage in the Pine South basin falls below the 50% threshold for the full general plan build-out scenario, as the County discussed in their 2010 Pine Valley Cumulative Groundwater Study (County of San Diego 2010a). The following presents the results of each groundwater demand scenario for the Pine North and Pine South basins.

3.1.3.1 Pine North Basin

As discussed above, the total groundwater in storage within the Pine North basin is estimated to be 2,694 acre-feet. The volume of groundwater in storage over a 34 year record of precipitation and recharge are presented for Scenario 1, Scenario 2, and Scenario 3, in Exhibits 3-A, 3-B, and 3-C respectively. As shown in Table 3-8, the minimum volume of groundwater in storage over the 34-year period was approximately 2,537 acre-feet, or 94% of the initial groundwater storage capacity under Scenario 1. Under Scenario 2, the minimum volume of groundwater in storage over the 34-year period was approximately 2,521 acre-feet, or 94% of the initial groundwater storage capacity. Scenario 3 is the most water-intensive, and results in a minimum volume of groundwater in storage over the 34 year period of approximately 2,516 acre-feet, or 93% of the initial groundwater storage capacity.

Table 3-8
Groundwater in Storage by Scenario for the Pine North Basin

	Scenario 1 Existing Conditions	Scenario 2 Existing Conditions with Project	Scenario 3 Existing Conditions with Project and General Plan Build-out
Minimum (af)	2,537	2,521	2,516
Maximum (af)	2,694	2,694	2,694
Average (af)	2,660	2,660	2,656
Percent Minimum Groundwater in Storage Over 30-year Period	94.2	93.6	93.4

3.1.3.2 Pine South Basin

As discussed above, the total groundwater in storage within the Pine South basin is estimated to be 2,138 acre-feet. The volume of groundwater in storage over a 34 year record of precipitation and recharge for Scenario 1, Scenario 2, and Scenario 3, are presented in Exhibits 3-D, 3-E, and 3-F respectively. As shown in Table 3-9, the minimum volume of groundwater in storage over the 34-year period was approximately 1,166 acre-feet, or 55% of the initial groundwater storage capacity under Scenario 1. Under Scenario 2, the minimum volume of groundwater in storage over the 34-year period was approximately 1,150 acre-feet, or 54% of the initial groundwater storage capacity. Scenario 3 is the most water-intensive, and results in a minimum volume of groundwater in storage over the 34 year period of approximately 653 acre-feet, or 31% of the initial groundwater storage capacity.

Table 3-9
Groundwater in Storage by Scenario for the Pine South Basin

	Scenario 1 Existing Conditions	Scenario 2 Existing Conditions with Project	Scenario 3 Existing Conditions with Project and General Plan Build-out
Minimum (af)	1,166	1,150	653
Maximum (af)	2,138	2,138	2,138
Average (af)	1,835	1,834	1,643
Percent Minimum Groundwater in Storage Over 30-year Period	54.5	53.8	30.5

Exhibit 3-A
Pine North Basin Scenario 1 – Existing Demand Groundwater In Storage

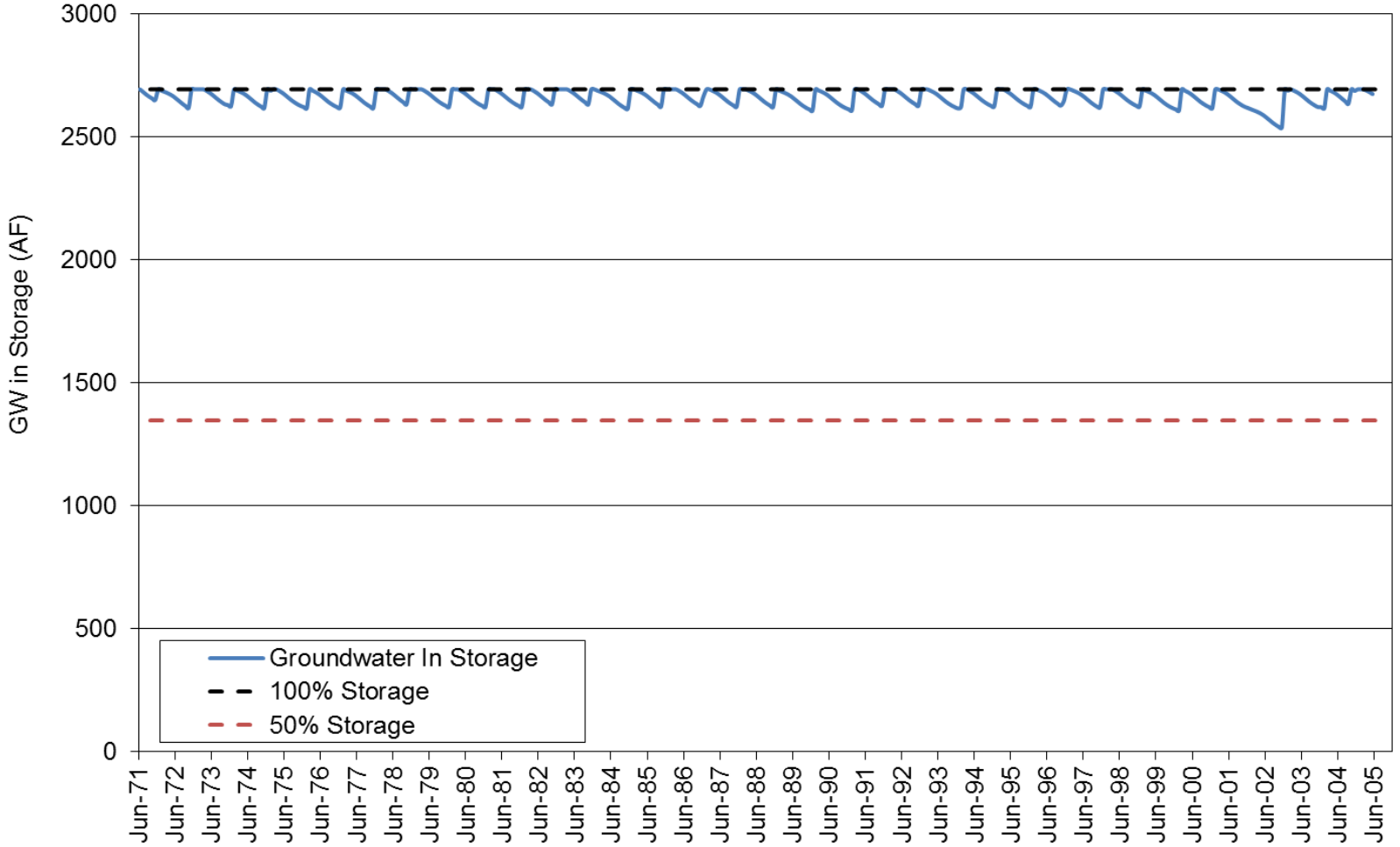


Exhibit 3-B
Pine North Basin Scenario 2 – Existing Demand Plus Project Demand

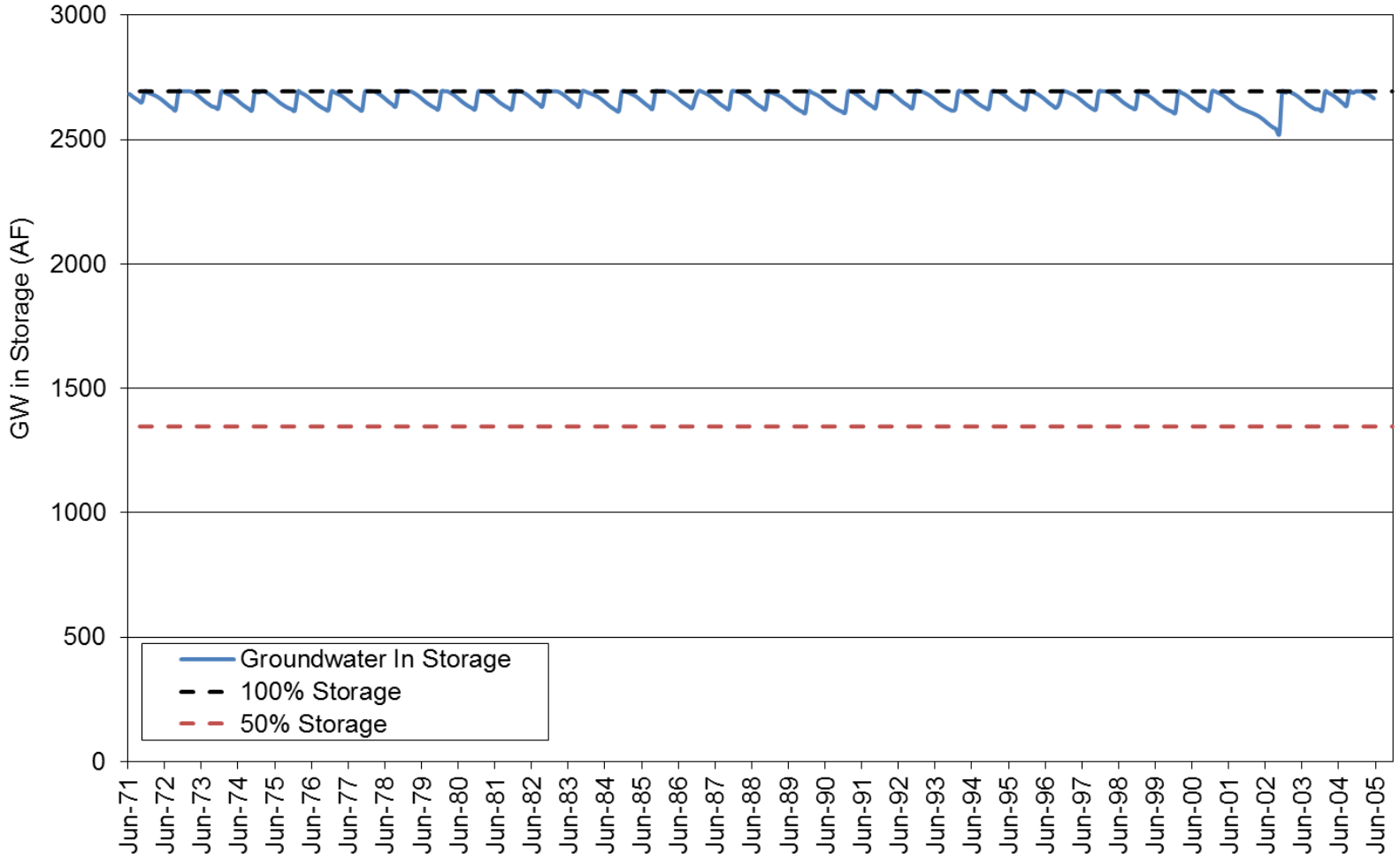


Exhibit 3-C
Pine North Basin Scenario 3 – Full General Plan Buildout

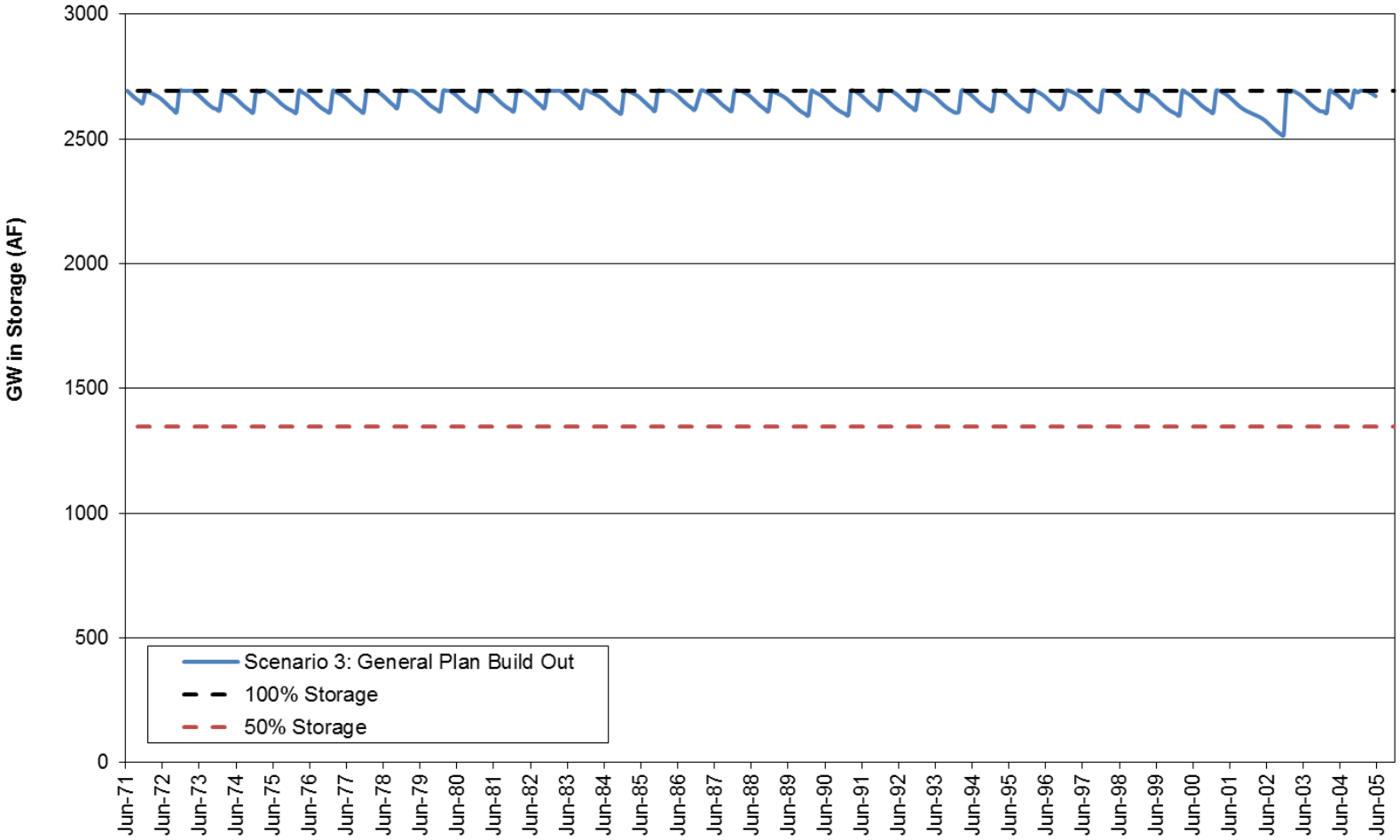


Exhibit 3-D
Pine South Basin Scenario 1 – Existing Demand Groundwater In Storage

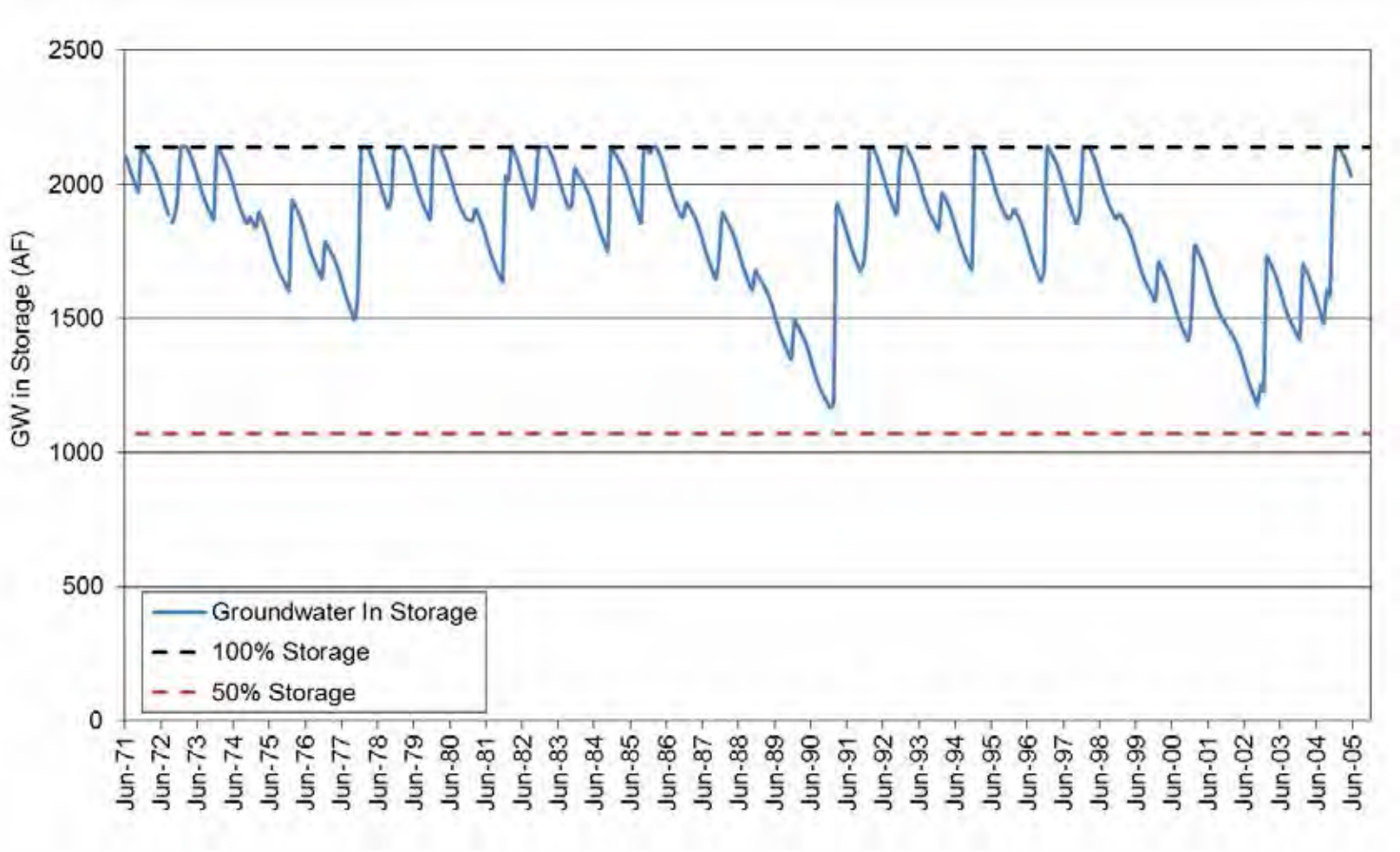


Exhibit 3-E
Pine South Basin Scenario 2: Existing Demand Plus Project Demand

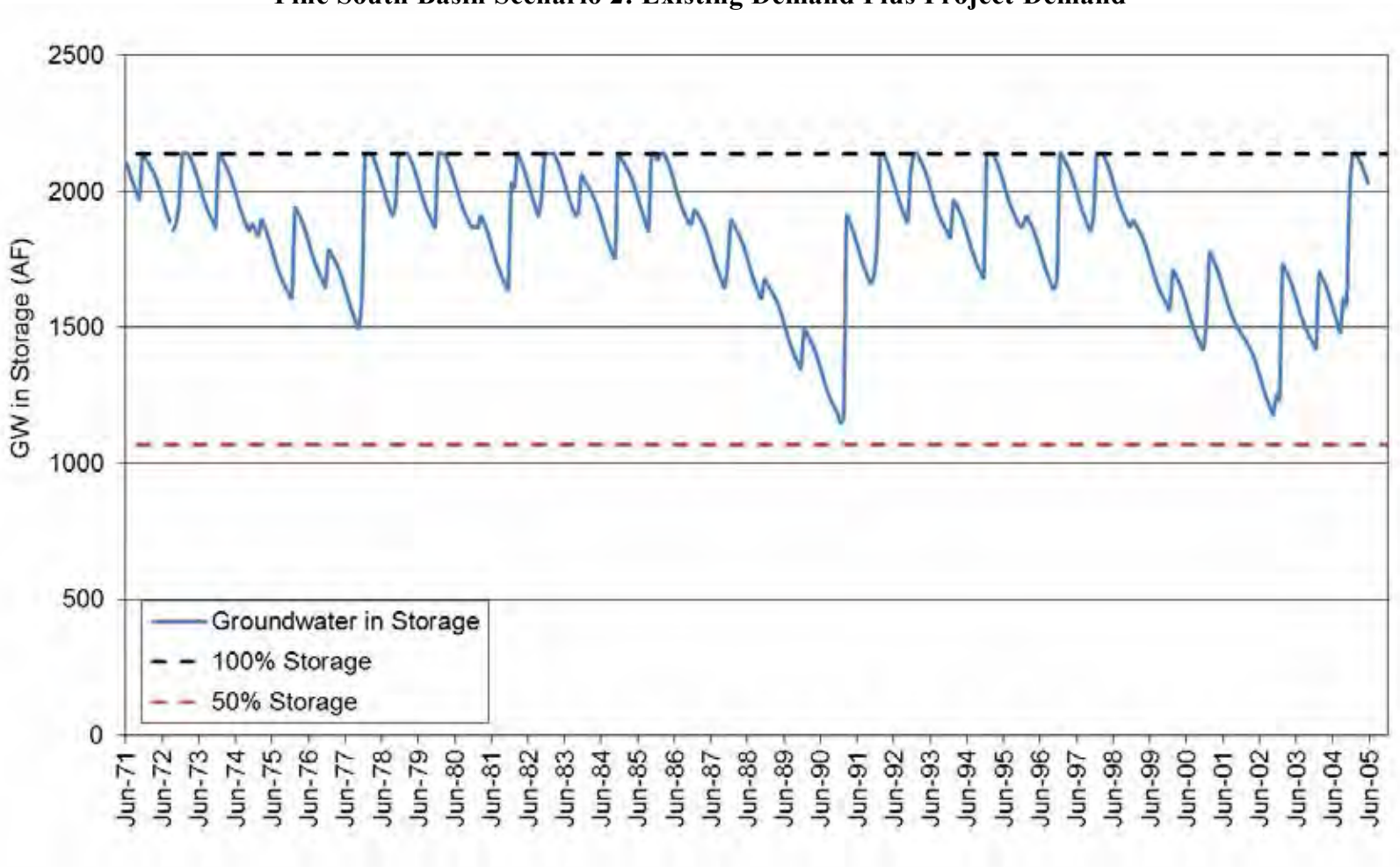
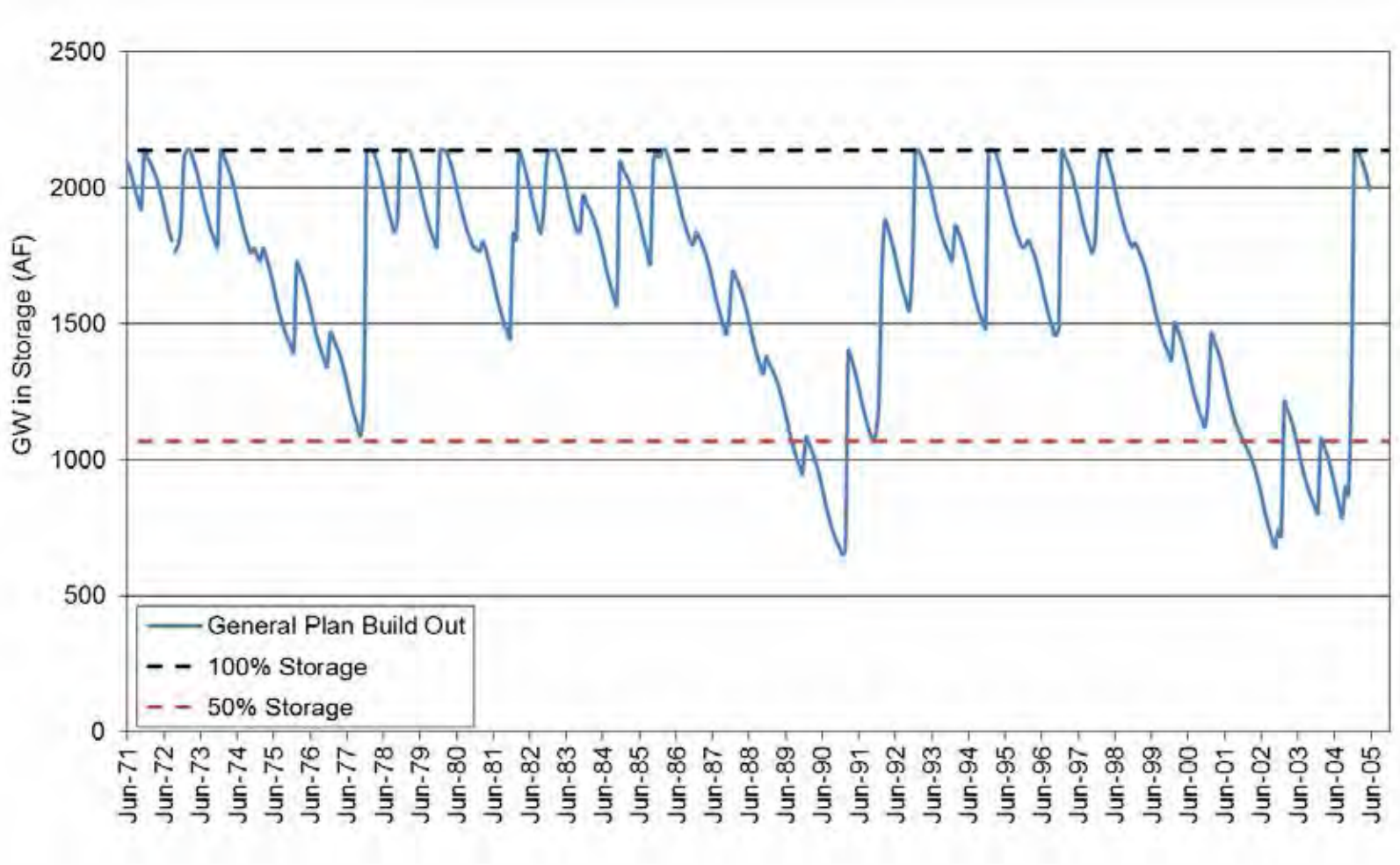


Exhibit 3-F
Pine South Basin Scenario 3 - Full General Plan Buildout



3.1.4 Mitigation Measures and Design Considerations

Because actual conditions during groundwater extraction for the Project may vary from the above analysis, a GMMP has been prepared to ensure that pumping does not unduly impact existing well users. The GMMP includes monitoring the duration and rate of pumping in order to verify the total volume of groundwater removed, and water level monitoring of the pumping well and appropriate monitoring wells as available.

3.1.5 Conclusions

The proposed Project is determined to have a less-than significant impact to groundwater in storage in the Pine North basin, as defined by the County PDS guidelines (County of San Diego, 2007). A significant impact may occur in the Pine South basin if the Pine Valley area is allowed to expand according to the County general plan. The impact from Project pumping under this scenario is not a contributing factor to the potential overdraft of the basin, as Project pumping constitutes less than 0.1% of the water demand for the basin over the 34 year period analyzed. The County's Pine Valley Cumulative Groundwater study suggests that the PVMWC install additional production wells in the Pine North basin to mitigate the potential effects on the Pine South basin (County of San Diego, 2010a).

3.2 Direct Impacts Analysis, Well No. 5

A well test of PVMWC Well No. 5 was not conducted for this report. Instead, the long-term record of water levels and production volumes were used to assess the well production capacity and potential for off-site well interference.

3.2.1 Well No. 5 Production Capacity

The reported maximum production rate for Well No. 5 is 70 gpm (Philip Boerman, pers. com.). If the pump were to run 24 hours per day, 7 days per week, the maximum monthly production volume from Well No. 5 would be 30,240,000 gallons, or 9.3 acre-feet. Under this scenario, the well could provide up to 18.6 acre-feet of water in 60 days. The PVMWC has limited on-site storage. Therefore, in order to provide the necessary water for the Project, the well may be pumped over a 90 day period at an average rate of 40.2 gpm with up to 5 acre-feet of water stored on the Rugged Solar Farm site prior to the onset of peak construction.

3.2.2 Well No. 5 Well Interference Analysis

The closest well to PVMWC Well No. 5 is an irrigation well located approximately 620 feet north of Well No. 5 (Figure 2). Although this well is not one of the PVMWC supply wells, it is

also not technically an off-site well because the owners of the irrigation wells are members of the PVMWC. Calculated drawdown at this well was used, nonetheless, to provide a conservative estimate of the potential for well interference from pumping at PVMWC Well No. 5.

A rough estimate of the potential drawdown from pumping Well No. 5 was also calculated, using the Theis equation. The transmissivity of the aquifer in the vicinity of Well No. 5 was estimated from the specific capacity of the well using:

$$T = \frac{Q}{(h_o - h)} \frac{2.3}{4\pi} \log \frac{2.25Tt}{r^2 S}$$

where

$\frac{Q}{h_o - h}$ is the specific capacity of the well

t is the period of pumping (days)
T is the aquifer transmissivity (ft^2/day)
S is the aquifer storativity

T appears on both sides of the equals sign in the equation above. In order to solve the equation for T when the specific capacity is known, an initial guess of T must be made and the equation must be solved for specific capacity. The value of T is then adjusted until the computed specific capacity is reasonably close to the known specific capacity.

In this case, the specific capacity of Well No. 5 is not known. A specific capacity can be estimated from the water level data and the known maximum pumping rate of the well. Assuming the drawdown in the well when the pump is on is approximately 72 feet, based on the average drawdown recorded between 2001 and 2004, and the known maximum production rate from the well is 70 gpm, the specific capacity is approximately 1.0 foot per gpm (72 feet/70 gpm). Assuming the period of pumping is 90 days, and the storativity is 0.05, the County assigned value for storage in the residuum (County of San Diego, 2010c), T can be estimated to be 187.2 ft^2/day.

The following estimate of groundwater drawdown at the nearest irrigation well, induced by Project pumping, relies on the Cooper-Jacob approximation of the Theis non-equilibrium flow equation (USGS 1962):

$$s=\frac{264\ Q}{T}\log_{10}\frac{2.25\ Tt}{r^2S}$$

Where:

s = predicted drawdown (feet)
Q = amortized pumping rate (gpm) = 40 gpm (90 days), 10 gpm (1 year), 2 gpm (5 years)
T = Transmissivity (gpd/ft) = 187.2 gpd/ft
t = time (days) = Calculated at 90 days, 365 days and 1,825 days
r = distance from pumping well (feet) = varies
S = coefficient of storage (dimensionless) = 0.050

Drawdown at the closest agricultural well (620 feet north) as a result of Project pumping from Well 5 after 60 days, 1 year and 5 years is predicted to be 1.4 feet, 1.7 feet and 0.4 feet, respectively. This is considered a less than significant impact based on County of San Diego well interference threshold listed Section 1.3. Table 3-10 indicates projected drawdown at select distances from the pumping well using the Cooper-Jacob approximation of the Theis non-equilibrium flow equation.

Table 3-10
Estimated Drawdown as a Result of Pumping at PVMWC Well No. 5

	Drawdown (feet) 60 days	Drawdown (feet) 90 days	Drawdown (feet) 1 year	Drawdown (feet) 5 years
1	64.8	44.5	12.1	1.4
50	26.2	18.8	5.8	1.4
100	19.4	14.2	4.6	1.2
250	10.3	8.2	3.2	0.9
500	3.5	3.6	2.0	0.7
600	1.7	2.4	1.7	0.6
620	1.4	2.2	1.7	0.6
700	0.2	1.4	1.5	0.6
800	-	0.6	1.3	0.5
1000	-	-	0.9	0.4
1500	-	-	0.3	0.3
1800	-	-	-	0.3

The estimated drawdown in Table 3-10 above, agrees with the observed water levels in Wells PIN-21, PIN-22, and PIN-04, provided by the County of San Diego. These wells are approximately 920 north, 620 feet northwest, and 2,200 feet north of Well No. 5 respectively. The water levels in these wells are shown in Figure 9. While the water level records from PIN-21 and PIN-22 are too short to correlate with the record at Well No. 5, the water levels in these wells show a similar trend to those in Well No. 5 over the 6 month period of observation. This indicates that these wells likely receive recharge from Pine Creek, similar to what is observed at Well No. 5, and will not be affected by the pumping from Well No. 5.

The long-term record of water level at PIN-04 was compared to that at PVMWC Well No. 5. The water levels in the two wells are not well correlated, with a correlation coefficient of 0.56. This is not unexpected, as there is no predicted effect from pumping at PVMWC Well No. 5 on PIN-04, located 2,200 feet to the north. Although the wells are not mathematically correlated, Figure 9 indicates that they follow similar trends. During the drought period from 2000-2004, water levels in both wells dropped. The pumping at Well No. 5, however, caused a steeper, longer-term water level decline, than was observed at PIN-04. In September 2004, the water level at Well No. 5 was 50 feet below the measurement point. In contrast, the lowest water level measured at PIN-04 was approximately 32 feet below the measurement point, in February of 2003. By September of 2004, when the water level had dropped to the lowest static water level recorded in Well No. 5, the water level at PIN-04 had recovered to 21 feet below the measurement point, or 11 feet above the previous low water level recorded in February 2003. As is indicated by both the correlation and drawdown analyses, the water levels at PIN-04 do not appear to be influenced by pumping at PVMWC Well No. 5.

3.2.3 Methodology

The County assigned the following project specific threshold for determining a significant impact to riparian habitat or a sensitive natural community:

If drawdown as a result of pumping for this project would cause water levels to exceed historical low water levels from baseline conditions of pumping… this would be a potentially significant impact (County of San Diego 2013). Groundwater-dependent vegetation habitats mapped near PVMWC Well No. 5 are depicted in Figure 10. Habitat mapped within a 0.5 mile radius of Well No. 5 includes mixed oak woodland (50 acres - forest), dense coast live oak woodland (28 acres - woodland), and southern riparian scrub (12.1 acres - riparian and bottomland habitat) (SanGIS, 2013). Additionally, RC Biological Consulting has mapped southern arroyo willow riparian forest (2.5 acres), big sagebrush scrub (10.1 acres), Jeffery pine forest (1.9 acres) and developed land (1.9 acres) north of PVMWC Well No. 5 (RC Biological Consulting 2010). Based on review of aerial photography, the closest groundwater dependent habitat to PVMWC

Well No. 5 is riparian forest associated with Pine Creek approximately 50 feet to the west of the well (Figure 9).

Based on the Cooper Jacob approximation of the Theis non equilibrium flow equation analysis, drawdown at the nearest groundwater dependent habitat 50 feet from Well No. 5 after 60 days of pumping is estimated to be 26.2 feet (Table 3-10).

As discussed in Section 3.1.2, the water levels in PVMWC Well No. 5 are, in large part, controlled by the recharge from Pine Creek. Water levels in the habitat along the creek are also controlled by recharge along the creek. The estimated drawdown does not account for recharge from the creek, and is likely an overestimate of the actual drawdown in the riparian habitat. Based on the historical water levels in the well (Figure 6), it is anticipated that the water levels will recover from the proposed single, short term withdrawal within a year, as spring recharge from the Creek causes the water levels to rise.

Although the single withdrawal of 16 acre-feet is unlikely to cause significant impacts to any groundwater dependent habitat within 100 feet of Pine Creek, the analysis above cannot rule out significant impacts after 60 days of pumping. Therefore, impacts to groundwater dependent habitat as a result of this project may be potentially significant. A GMMP has been prepared to mitigate any potential effects of the Project on the nearby groundwater dependent habitat.

3.2.4 Significance of Impacts Prior to Mitigation

Based on the Cooper-Jacob approximation of the Theis non-equilibrium flow equation analysis, drawdown due to water production of 58,000 gpd (40 gpm) from Well 5 results in predicted drawdown of 2.2 feet at the location of the nearest irrigation well (620 feet from Well No. 5) after 90 days of continuous pumping. If pumping is amortized over 1 year predicted drawdown is 1.7 feet. Amortizing pumping over 5 years results in predicted drawdown of 0.6 feet at the nearest agricultural well (Table 3-10). Thus, well interference is not predicted to exceed the County threshold of significance that results in a decrease in water level of 20 feet or more in the off-site wells after a 5-year projection of drawdown.

The historical low groundwater level in the vicinity of the groundwater dependent habitats within 0.5 miles of Well No. 5 is not known over the period corresponding to the lifespan of the vegetation. This lack of historical water level data precludes determination of the historical low water levels from baseline pumping conditions. However, as projected by the Cooper-Jacob approximation of the Theis non-equilibrium flow equation analysis, after 60 days of pumping, the groundwater level drawdown may be as much as 26.2 feet at a distance of 50 feet from Well No. 5 (Table 3-10). Based on this analysis, well production may exceed the Project specific County threshold of significance of a drop in water levels that exceeds the

historical low water levels from baseline pumping conditions that would result in potentially significant impacts to groundwater dependent habitat (County of San Diego 2013).

3.2.5 Mitigation Measures and Design Considerations

As the analysis contained herein is based on limited well data, monitoring will be conducted to ensure that water levels remain stable in the wells surrounding PVMWC Well No. 5. A GMMP, which details establishment of groundwater thresholds for off-site well interference and groundwater dependent habitat has been prepared for off-site water supply.

Although the Project will require water for the 60 day peak construction period, production from PVMWC Well No. 5 may occur over a 90 day period to accommodate the storage limitations within the PVMWC system and potential trucking schedules to move the water from Well No. 5 to the Rugged Project site. The analyses performed above indicate that pumping over a 90 day period will not cause significant impacts to off-site wells, but may exceed the County's project specific groundwater dependent habitat threshold. As stated above, a GMMP has been prepared for off-site water supply.

3.2.6 Conclusions

The analysis using San Diego County methodology indicated that off-site well interference is not predicted to be an impact as a result of off-site water supply at a pumping rate of 40 gpm amortized over a 90 day period. Water level monitoring will be performed in several wells to record water levels during groundwater extraction. A GMMP, which details establishment of groundwater thresholds for off-site well interface and groundwater dependent habitat has been prepared. Annual review of water level data will be conducted by a Certified Hydrogeologist registered in the State of California to evaluate long-term impacts.

4.0 WATER QUALITY IMPACT ANALYSIS

This section identifies and defines the potential effects of the Project on water quality.

4.1 Guidelines for the Determination of Significance

The Project would result in a significant impact with respect to water quality if the groundwater resources to be used on-site exceed the primary state or federal MCLs for applicable contaminants. Groundwater resources would be utilized solely for the purposes of dust control during construction. Thus, drinking water MCLs would not apply.

4.2 Methodology

Sampling procedures and analytical methods are described below.

4.2.1 Sampling Procedures

To determine whether Well No. 5 would exceed applicable MCLs, water samples from Well No. 5 collected and analyzed between December 2010 and August 2013 were evaluated. The samples were analyzed by Institute for Environmental Health Environmental Engineering Laboratory of San Diego, California and E.S. Babcock & Sons, Inc. of Riverside, California.

4.2.2 Sampling Analysis

Well No. 5 has historically been used as a potable supply well for PVMWC. However, starting in 2011, elevated concentrations of nitrate (as NO_3) were detected around the MCL of 45 mg/L. Results of nitrate sampling are presented in Exhibit 4-1, which indicate that the most recent water quality samples detected nitrate below the MCL.

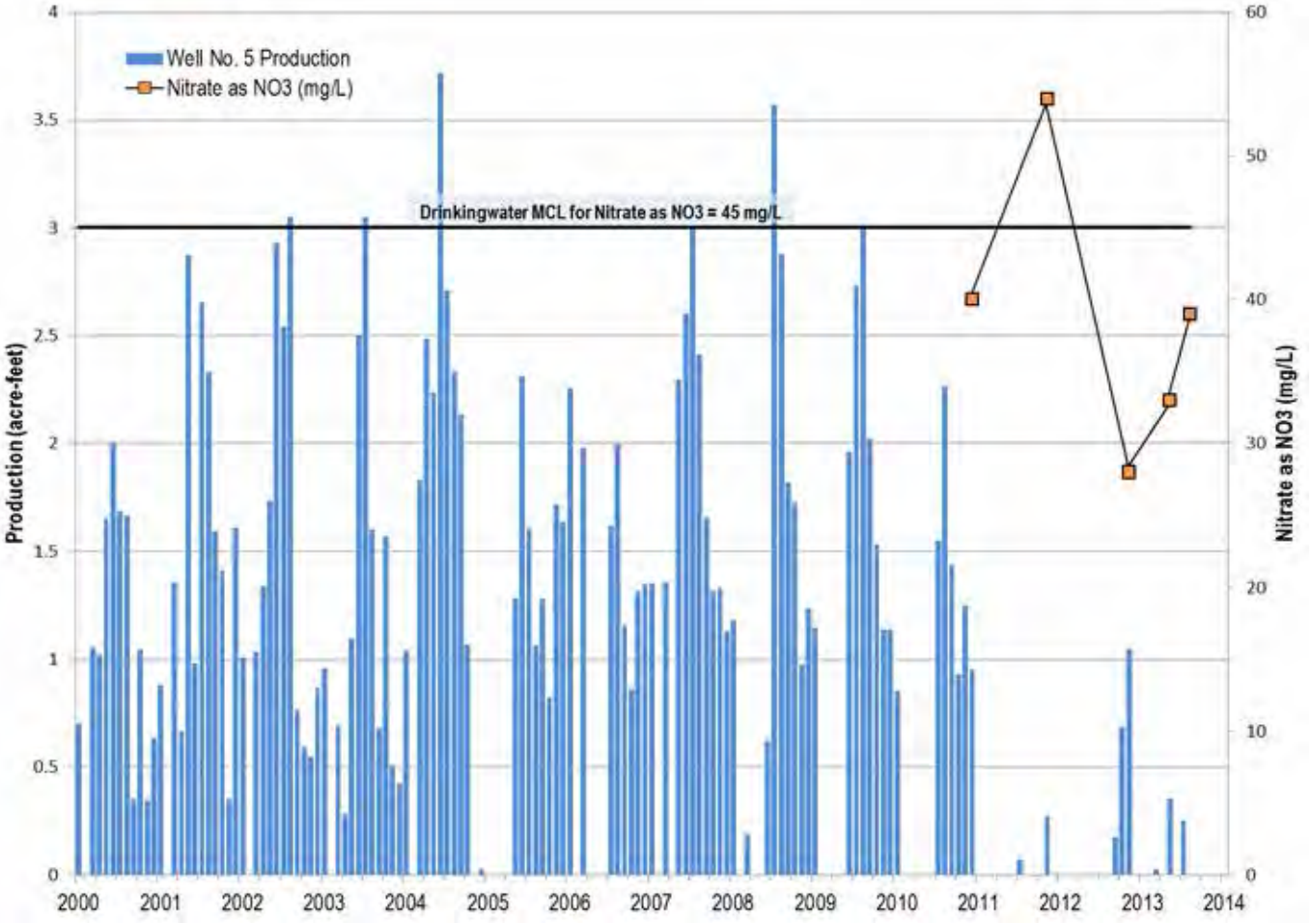
4.3 Significance of Impacts Prior to Mitigation

Because water from Well No. 5 is only intended for non-potable use, the impact with respect to groundwater quality is considered less than significant.

4.4 Mitigation Measures and Design Considerations

No mitigation measures are required or recommended because nitrate concentrations over the duration of Project pumping are expected to be near the MCL for drinking water.

Exhibit 4-A
Well No. 5 Production and Nitrate Results



4.5 Conclusions

Water quality analyses indicate that groundwater pumped from Well No. 5 is suitable for use for construction activities such as dust control and to obtain optimum soil moisture for compaction during grading.

5.0 SUMMARY OF PROJECT IMPACTS AND MITIGATION

5.1 50% Reduction in Groundwater Storage

As presented in Section 3.1, a soil moisture balance analysis was performed to evaluate the potential impacts of the Project on the surrounding 15,189 acre watershed contributing to Well No. 5. The analysis indicates that the volume of groundwater in storage in the Pine North basin remains above the 50% significance threshold. Assuming a combined water demand of existing conditions, the Project, and full General Plan buildout, the minimum volume of groundwater in storage over the 34-year period analyzed was approximately 93% of the maximum groundwater storage capacity. The soil moisture balance analysis employed conservative values for precipitation, runoff, and evapotranspiration as discussed in Section 3.1.

A soil moisture balance analysis was also performed to evaluate the potential impacts of the Project on the 3,615 acre Pine South basin. Although the water for the Rugged Solar Farm project will be supplied, primarily, from Well No. 5, impacts to the Pine South basin were evaluated should the PVMWC decide to meet the Project demands from other wells in the system. The analysis indicates that the volume of groundwater in storage in the Pine South basin drops below the 50% significance threshold for the combined water demand of the existing conditions, the Project, and the full general plan buildout. This scenario fails even without adding the Project pumping, which is approximately 0.1% of the total 34 year demand. Under this unrealistically conservative scenario, there may be significant impacts to the groundwater in storage in the Pine South basin.

As the Project will not exceed the 50% reduction in groundwater storage threshold in the Pine North basin, and other cumulative groundwater demands will be met by the PVMWC system as a whole, groundwater impacts to storage will be less than significant.

5.2 Well Interference

As presented in Section 3.2, based on the Cooper-Jacob approximation of the Theis non-equilibrium flow equation analysis, drawdown at the closest irrigation well 620 feet away from PVMWC Well No 5 is predicted to be 1.4 feet, 1.7 feet, and 0.6 feet after production of 16 acre-feet from Well No. 5 in a 60 day, 1 year, and 5 year period (Table 3-10). Thus, well interference is not predicted to exceed the County threshold of significance of a decrease in water level of 20 feet or more in off-site wells (County of San Diego 2007).

5.3 Groundwater Dependent Habitat

As presented in Section 3.2.3 the coast live oak woodland, the mixed woodland, and the riparian shrub habitats rely on groundwater. The closest groundwater dependent habitat, riparian forest, is approximately 50 feet away from PVMWC Well No. 5. Based on the Cooper-Jacob approximation of the Theis non-equilibrium flow equation analysis, at the end of pumping for off-site supply, 26.2 feet of drawdown is predicted in the aquifer (Table 3-10). A drawdown of 26.2 feet would result in potentially significant impacts to groundwater dependent habitat. Therefore, a GMMP will be prepared detailing the establishment of groundwater thresholds for groundwater dependent habitat for off-site water supply.

5.4 Water Quality

Elevated concentrations of nitrate (as NO_3) were detected in Well No. 5 around the MCL of 45 mg/L. Water quality analyses indicate that groundwater pumped from Well No. 5 is suitable for use for construction activities such as dust control and to obtain optimum soil moisture for compaction during grading.

5.5 Mitigation Measures

Monitoring will be in place during production from Well No. 5 to ensure that impacts to groundwater storage, well interference and groundwater dependent habitat do not occur. A GMMP will be prepared, which details establishment of groundwater thresholds for off-site well interface and groundwater dependent habitat.

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7.0 LIST OF PREPARERS AND PERSONS AND ORGANIZATIONS CONTACTED

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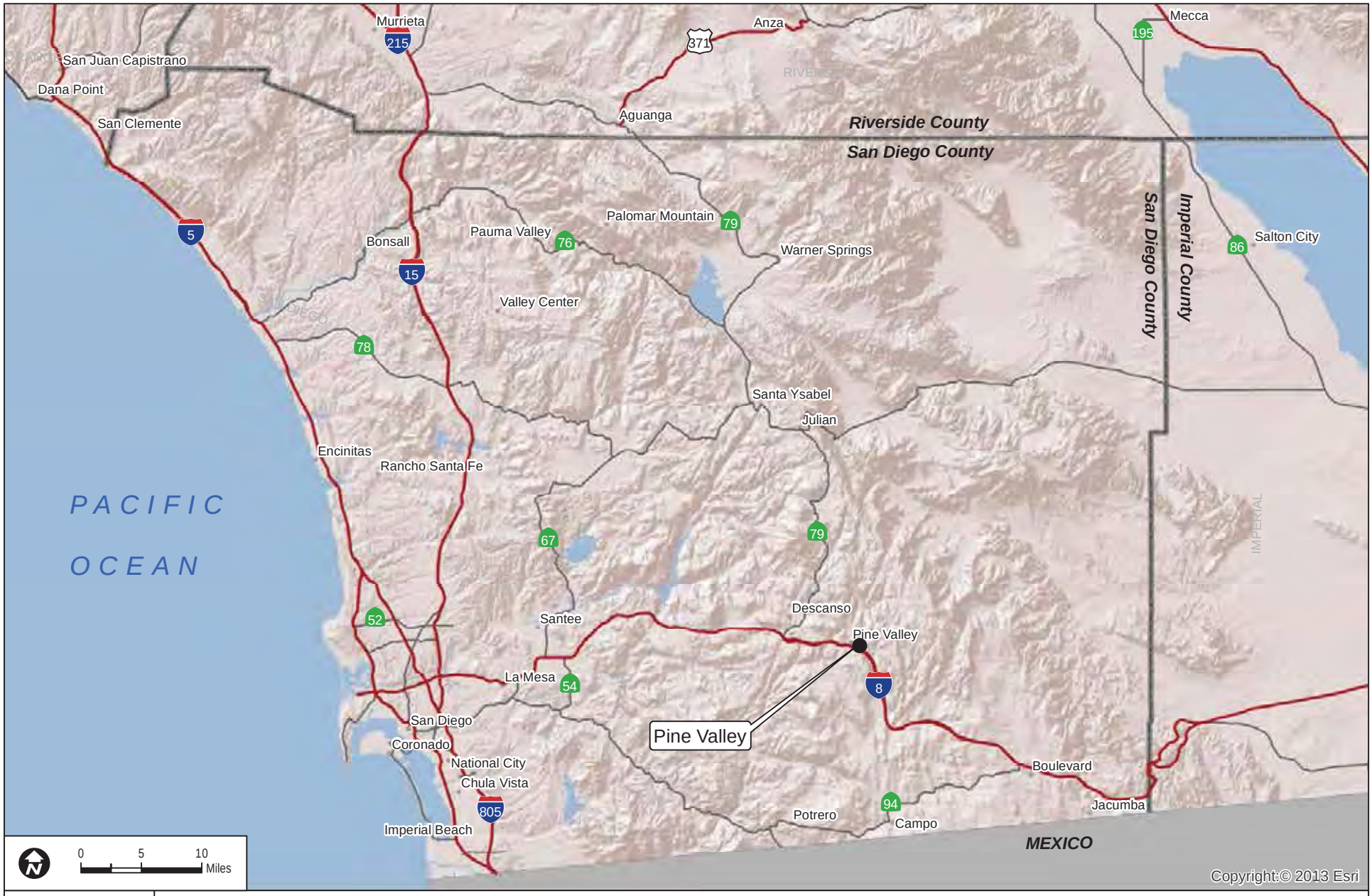

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FIGURE 1

Regional Location

Groundwater Resources Investigation Report, Pine Valley Mutual Water Company

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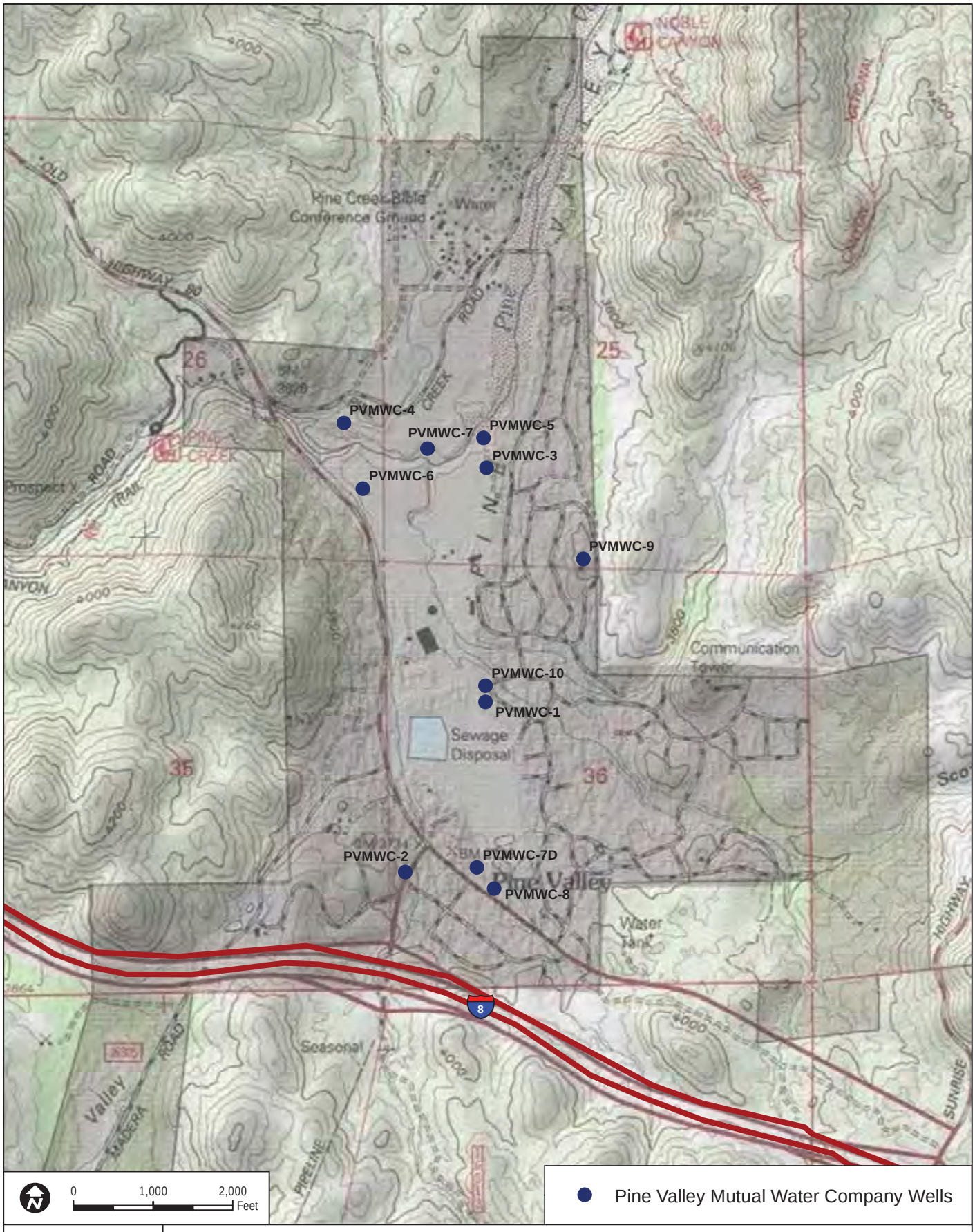

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SOURCE: U.S. Geological Survey National Hydrography Dataset, San Diego RWQCB 1995

FIGURE 2
Vicinity Map

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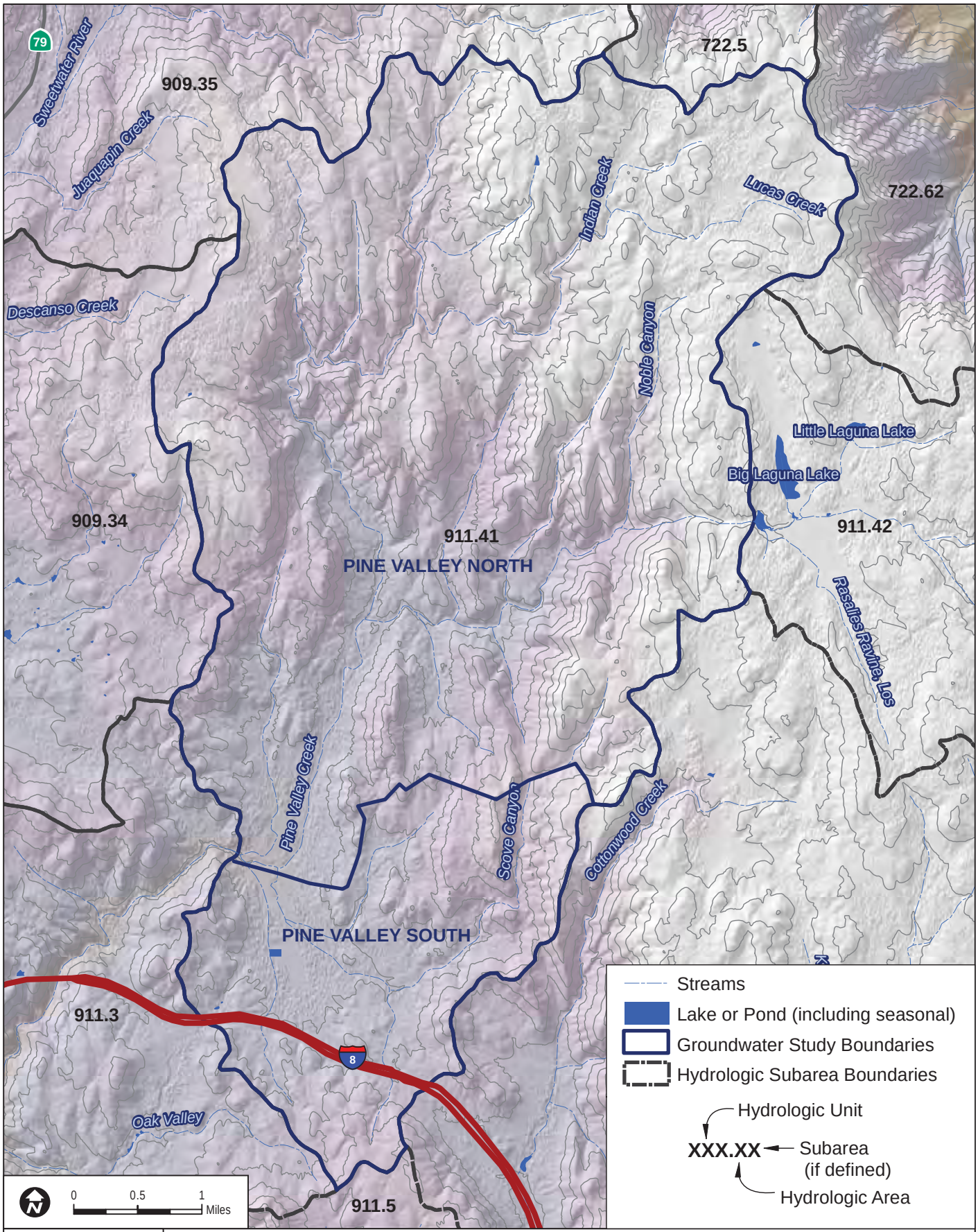

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SOURCE: U.S. Geological Suvey National Hydrography Dataset, San Diego RWQCB 1995

FIGURE 3

Groundwater Study Boundaries

Groundwater Resources Investigation Report, Pine Valley Mutual Water Company

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Figure 4. Historical Water Levels in PVMWC Wells No 2 and 8

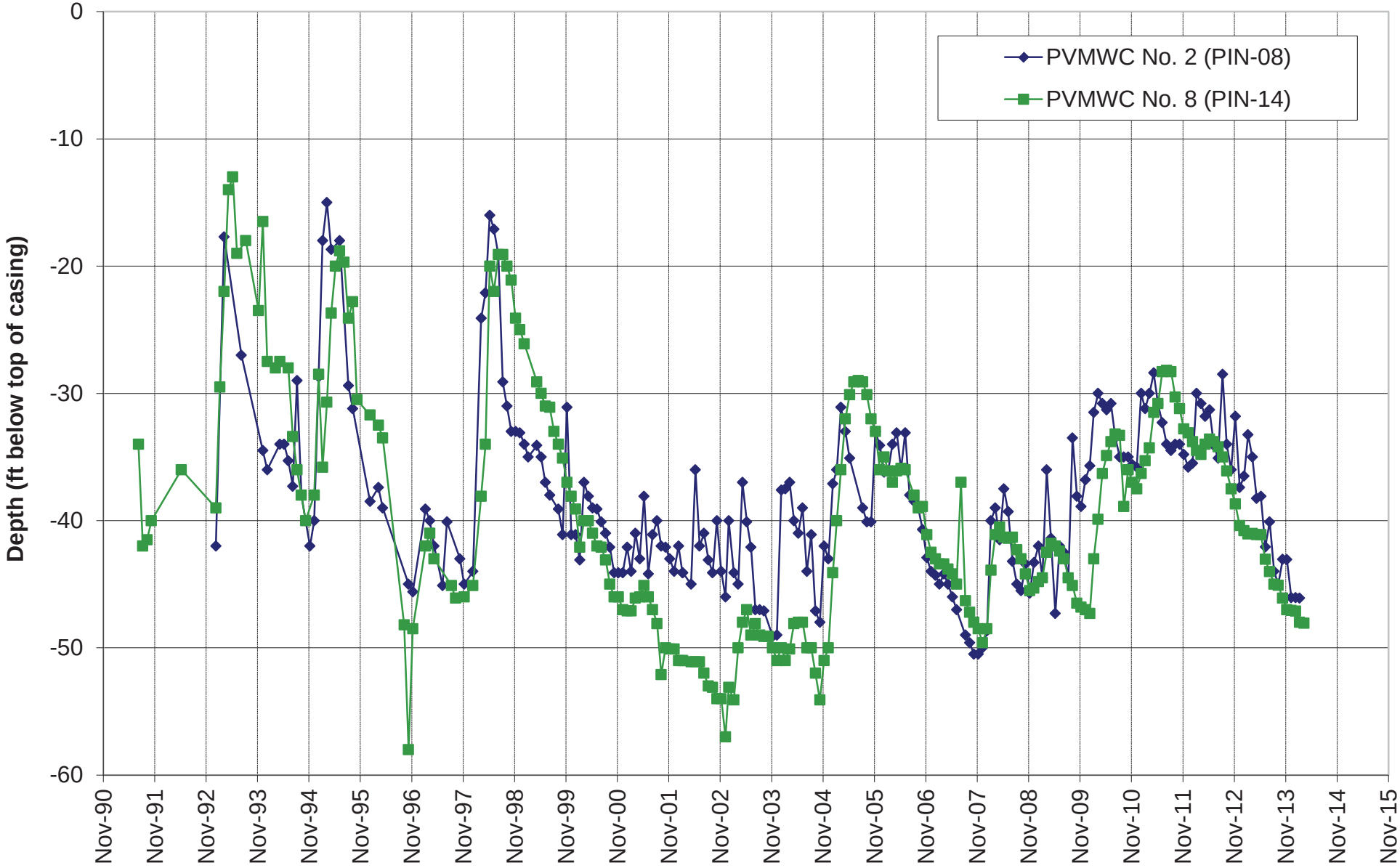

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Figure 5. Historical Water Levels in PVMWC Wells No 1 and 10

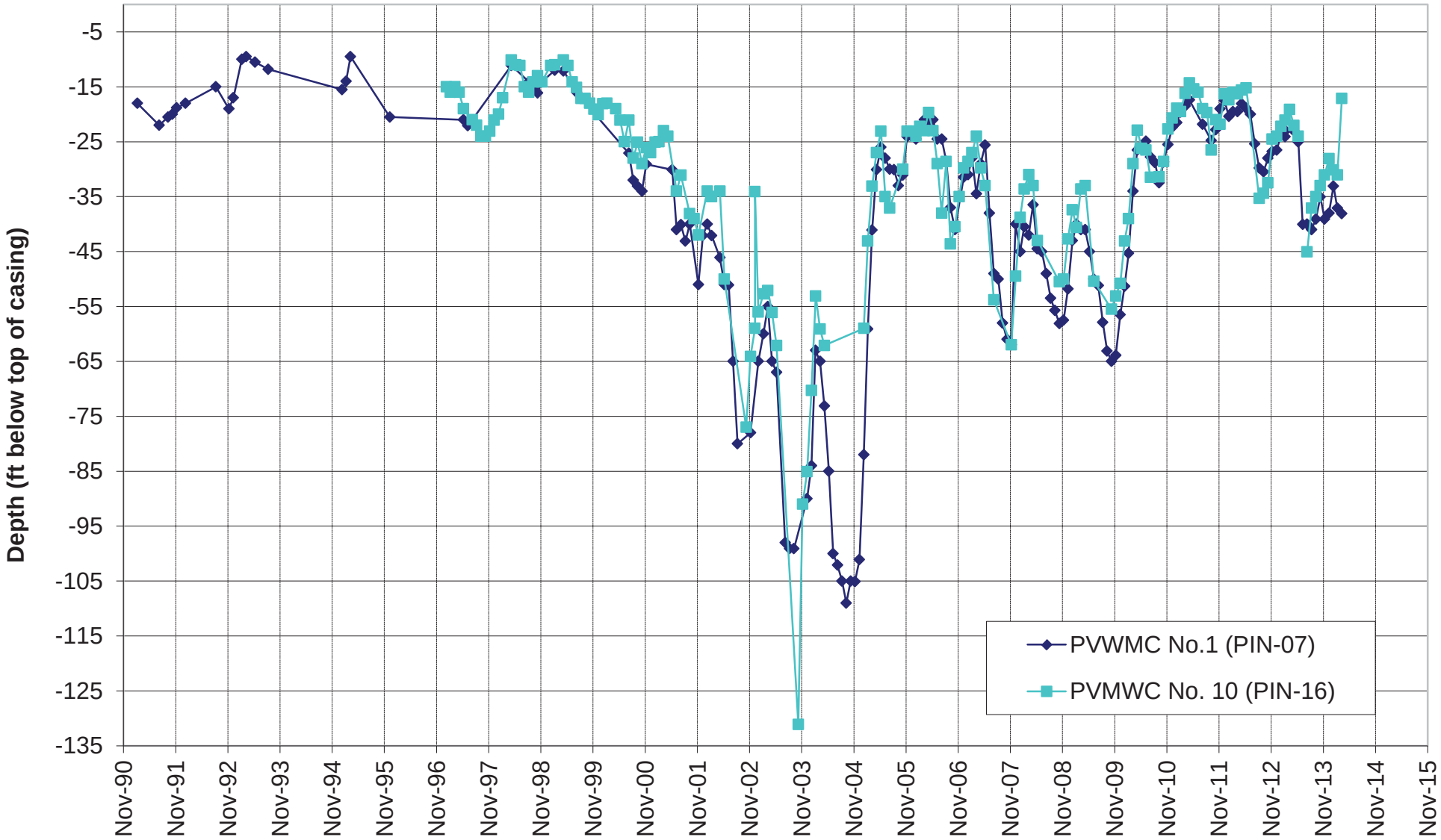

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Figure 6. Historical Water Levels in PVMWC Wells No 4 and 5

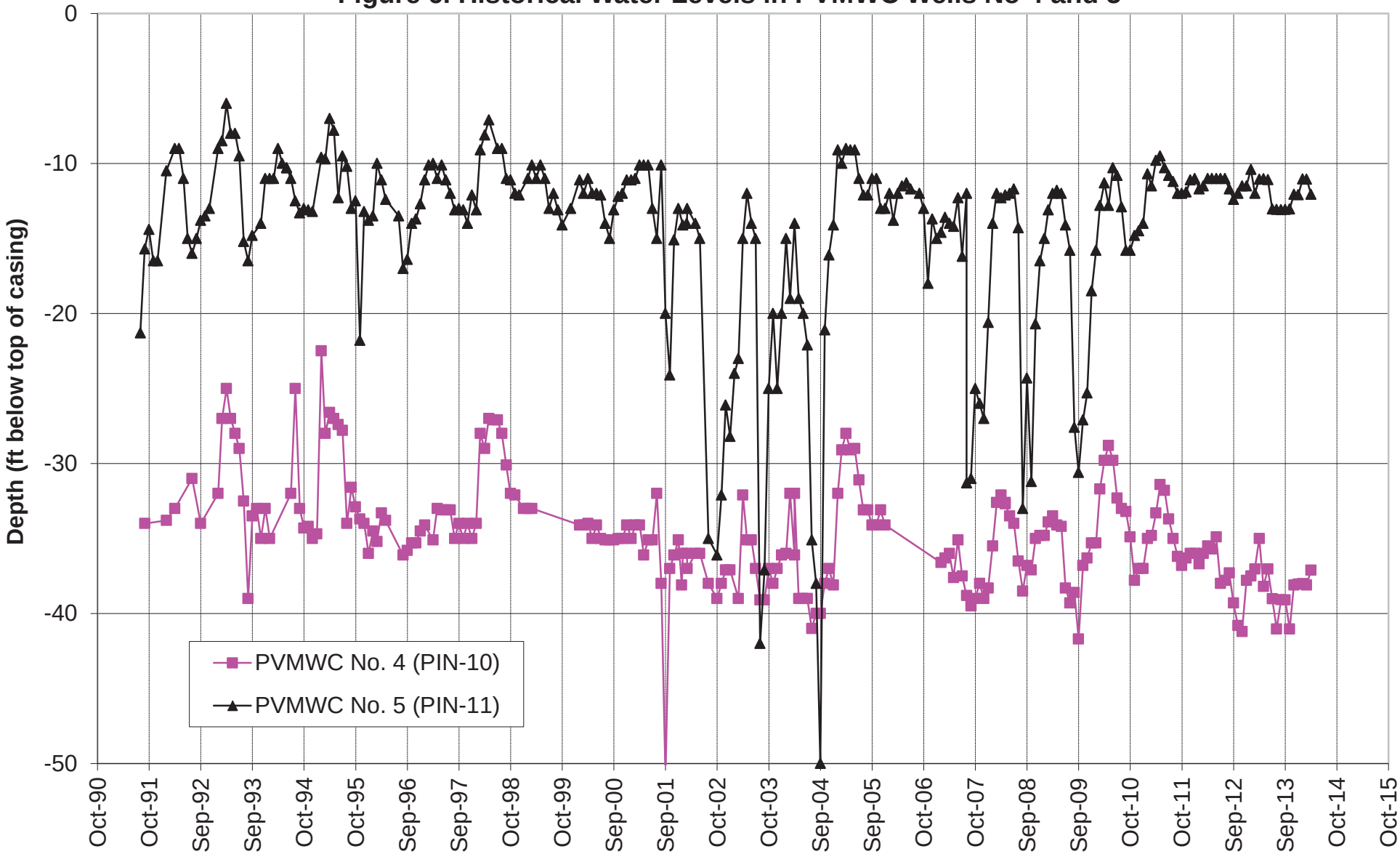

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Figure 7. Historical Water Levels in PVMWC Well No. 3

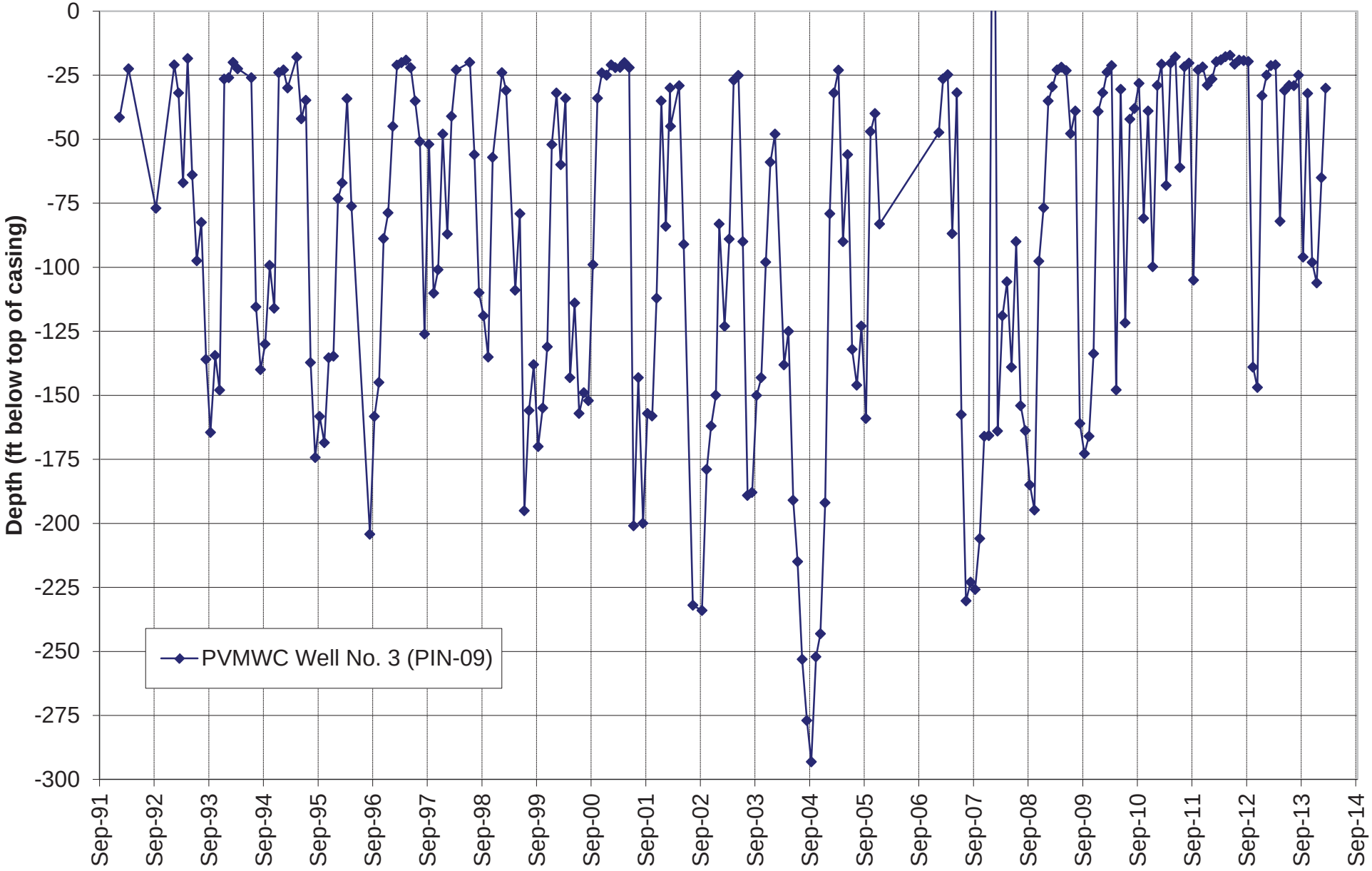

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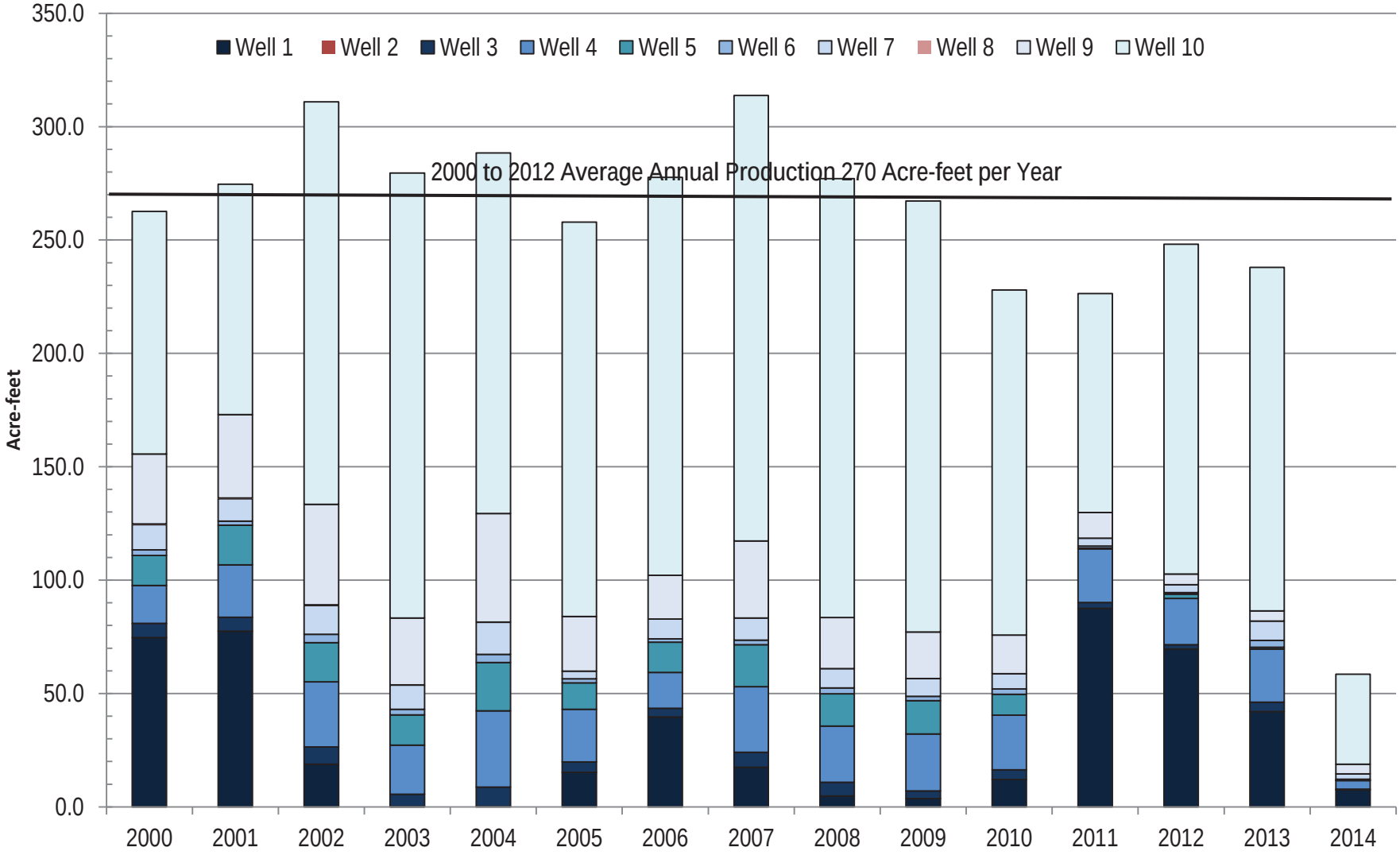
Figure 8. PVMWC Production Volumes



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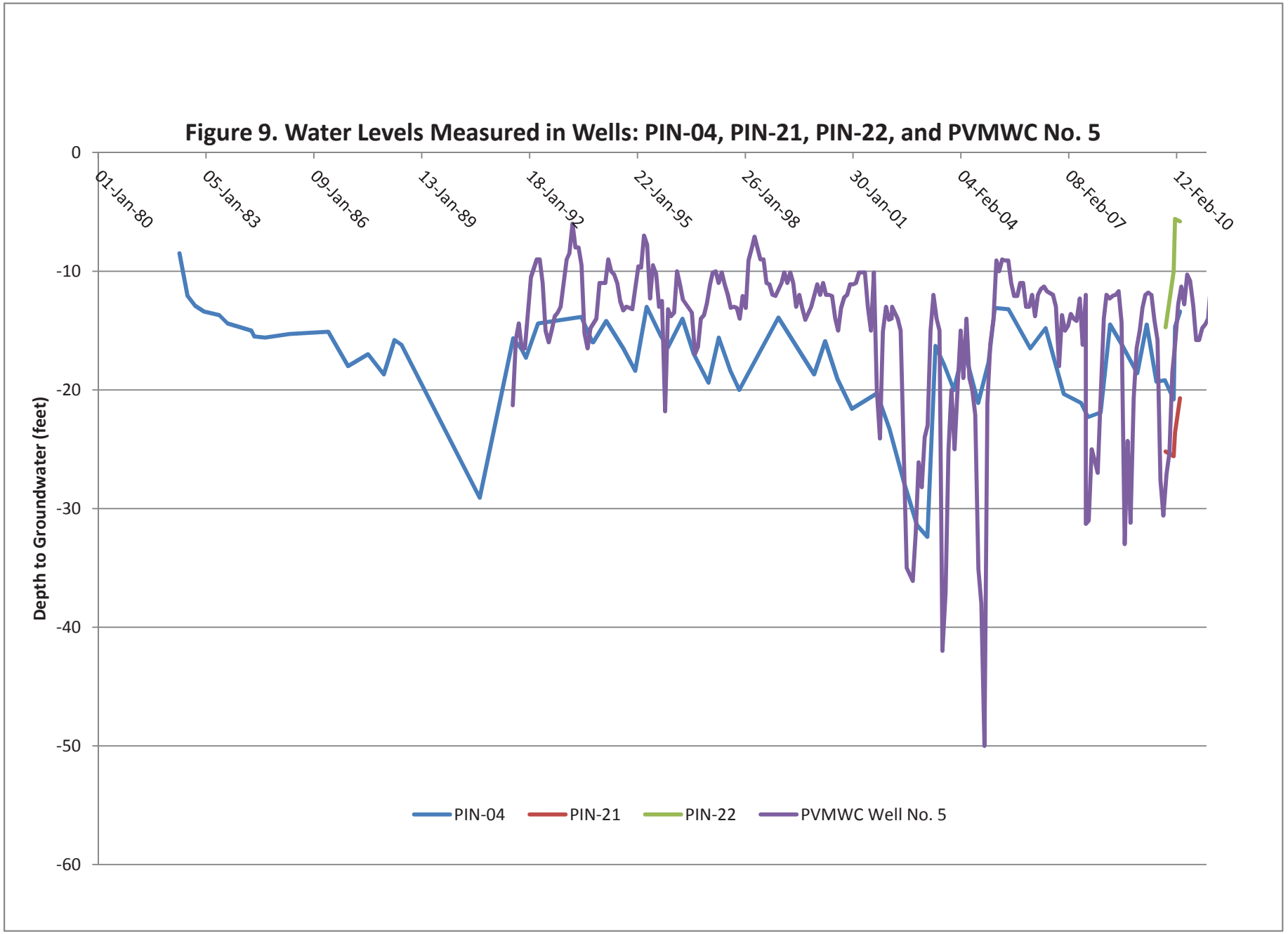
Figure 9. Water Levels Measured in Wells: PIN-04, PIN-21, PIN-22, and PVMWC No. 5
0
-10
-20
-30
-40
-50
-60
Depth to Groundwater (feet)
01-Jan-80
05-Jan-83
09-Jan-86
13-Jan-89
18-Jan-92
22-Jan-95
26-Jan-98
30-Jan-01
04-Feb-04
08-Feb-07
12-Feb-10
PIN-04
PIN-21
PIN-22
PVMWC Well No. 5

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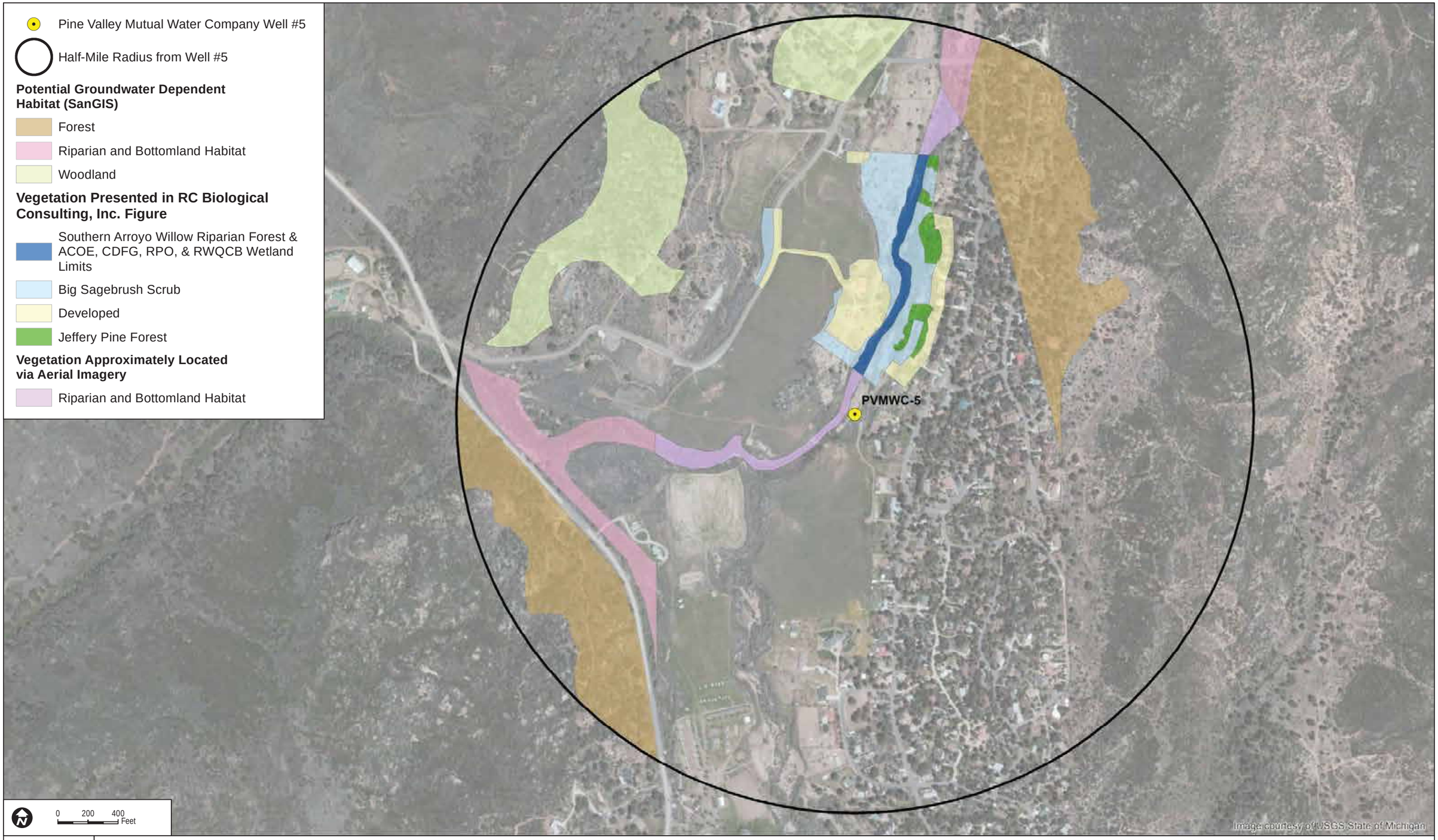

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SOURCE: Bing Maps, SanGIS 2013.
NOTE: Vegetation from RC Biological Consulting, Inc. was georeferenced from the Biological Resources Map for the Kenyon Property, Figure 4 in the Revised Biological Resources Report for the Kenyon Property, prepared by RC Biological Consulting, Inc. on July 9, 2010

FIGURE 10
Potential Groundwater-Dependent Vegetation

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APPENDIX A

County of San Diego
Department of Planning and Land Use,
Pine Valley Cumulative Groundwater Study

County of San Diego
Department of Planning and Land Use
Pine Valley Cumulative Groundwater Study

Prepared by:

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April 2010

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ATTACHMENT

Selected Data from Woodward, Clyde, Sherard and Associates, 1961

LIST OF ACRONYMS

afy	acre-feet per year
bgs	below the ground surface
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System
CWA	San Diego County Water Authority
DEH	San Diego County, Department of Environmental Health
DPLU	San Diego County, Department of Planning and Land Use
DWR	California Department of Water Resources
EPA	Environmental Protection Agency
ETo	Potential Evapotranspiration
ft	feet
GIS	Geographical Information Systems
GP	General Plan
GPEIR	General Plan Environmental Impact Report
gpm	Gallons per Minute
GWET	Groundwater Evapotranspiration

msl	Mean Sea Level
PVMWC	Pine Valley Mutual Water Company
USDA	United States Department of Agriculture

1 INTRODUCTION

On May 21, 2003, on motion of Supervisor Jacob, and seconded by Supervisor Horn, the County of San Diego Board of Supervisors unanimously directed the Chief Administrative Officer to conduct a comprehensive groundwater study for the Pine Valley area. This directive was part of confirmation of direction for staff's activities being conducted on the General Plan 2020 (now known as the General Plan Update). This groundwater study has been prepared to satisfy that request. The report evaluates the impacts of existing and proposed land uses on groundwater resources within Pine Valley, a groundwater dependent unincorporated community of San Diego County (Figure 1).

1.1 Objectives

The objectives of this report are to:

1) Evaluate current impacts to groundwater resources from existing land uses in Pine Valley;

2) Evaluate the impacts to groundwater resources from the maximum build-out of the current General Plan (GP) and the proposed GP Update in Pine Valley;

3) Provide potential mitigation and alternatives to proposed GP Update land use densities in the event of predicted significant unavoidable impacts to groundwater resources.

1.2 Scope of Work

To meet the objectives of this report, the study included the following tasks:

1) Compiling and summarizing existing groundwater conditions in Pine Valley. This includes a discussion of topography, climate, land use, groundwater demand, geology, soils, aquifer types, hydrologic inventory, well inventory, and historical groundwater levels.

2) Application of a Geographical Information Systems (GIS) analytical tool to apply the Thornthwaite Method soil moisture balance methodology and obtain an estimate of groundwater recharge through 34 years of precipitation including severe droughts and wet periods. This includes compilation of historical precipitation and evapotranspiration rates, estimates of surface water runoff rates, and soil types and soil moisture capacity of soils;

3) Estimation of groundwater demand from existing land uses, additional demand from current discretionary permits in process at the County of San Diego Department of Planning and Land Use (DPLU), land uses proposed under the current GP, and land uses proposed under the GP Update;

4) Mapping of aquifer types and estimation of groundwater storage capacity of aquifers in basins which serve Pine Valley;

5) An evaluation of long-term groundwater availability by comparison of estimated monthly groundwater recharge estimated over a 34 year period of record to groundwater demand from (1) existing land uses, (2) existing land uses plus groundwater demand from discretionary permits currently in process, (3) land uses proposed under the current GP, and (4) land uses proposed under the GP Update. Each of the two evaluated basins will indicate predicted changes of groundwater in storage for the various land-use scenarios through 34 years;

6) Compile estimates of the minimum volume of groundwater in storage in each of two basins in Pine Valley under the various land-use scenarios: existing groundwater demand, proposed groundwater demand under the current GP, and proposed groundwater demand under the GP update. If at any time, groundwater in storage is reduced to a level of 50% or less of maximum theoretical storage capacity as a result of groundwater extraction, groundwater impacts would be considered potentially significant; and

7) Development of possible mitigation measures, recommendations, and alternatives to reduce any potentially significant and unavoidable impacts to groundwater resources.

1.3 Study Boundaries

The Pine Valley study area comprises approximately 29.3 square miles which is entirely groundwater dependent. The study area contains two separate basins which are referred to in this study as “Pine North” and “Pine South” (Figure 2). The community of Pine Valley is surrounded by the Cleveland National Forest. The study area is bounded by the Laguna Mountains to the east, and Guatay Mountain and the Cuyamaca Mountains to the west. It is assumed that no imported water is, or will likely be available for the foreseeable future within the study area. This is due to the lack of infrastructure, the limited availability of water in the desert southwest, the cost of providing these services, and the political approval needed to extend the San Diego County Water Authority (CWA) boundaries further to the east.

2 EXISTING CONDITIONS

The following subsections include details describing the physical, geologic, and hydrogeologic characteristics of the Pine Valley study area. This includes a discussion of topography, climate, land use, groundwater demand, geology, soils, aquifer types, well inventory, and historical groundwater levels.

2.1 Topographic Setting

The study area lies within the Peninsular Ranges Physiographic Province of Southern California, which is characterized by mountainous ridges and hills interspersed by intermountain valleys and basins. According to the State Water Resources Control Board (SWRCB), Pine Valley lies within the Pine Hydrologic sub-area of the Monument Hydrologic area of the Tijuana Hydrologic Unit. For this groundwater study, the 29.3 square-mile Pine hydrologic sub-area was further subdivided into two basins (Pine North and Pine South) to assess local groundwater conditions at maximum build out in Pine Valley (Figure 2). The subdivision between the two basins was aligned with Pine Valley Creek, and then follows a local ridge line eastward until it encounters the regional watershed ridge line of the Laguna Mountains. The 1.8 square-mile community of Pine Valley lies within an intermountain valley with land surface elevations ranging from approximately 3,650 feet mean sea level (ft msl) to 3,800 ft msl. The discharge point of the two basins along Pine Valley Creek is at an elevation of approximately 3,628 ft msl. Ridge line elevations exceed 5,600 ft msl in the northern and eastern headwaters of Pine North basin, and exceed 5,200 ft msl in the northeastern headwaters of Pine South basin.

2.2 Climate

For the purposes of this study, climate is defined as the areal and temporal rainfall distribution and evapotranspiration within each of the basins. In 2004, DPLU produced an updated County-wide average precipitation map known as the Groundwater Limitations Map on file with the Clerk of the Board of Supervisors as Document No. 195172 (County of San Diego, 2004). The map utilized 95 rainfall stations to depict average annual precipitation based on over 50,000 monthly records collected from July 1971 through June 2001 (Pine Valley area of map, Figure 3). The methodology used rainfall data combined with environmental variables such as elevation and location in a spatial autoregressive model that employed maximum likelihood estimation to produce a precipitation surface. The resulting precipitation map is the most accurate representation of average precipitation ever produced for the County of San Diego. Potential evapotranspiration rates were obtained from the California Irrigation Management Information System [CIMIS) (DWR, 1999)].

2.2.1 Precipitation

Based on the County Groundwater Limitations Map, the Pine North and Pine South basins receive on average approximately 26.5 inches and 24 inches per year of precipitation respectively (Figure 3). Average annual precipitation within the country town boundaries of the community of Pine Valley ranges between 21 and 24 inches per year, while upper elevations receive between 24 to 30 inches per year on average. The higher precipitation in the mountainous regions is attributed to the orographic effect created by the relatively high elevation of the Laguna and Cuyamaca Mountains, which raises and cools moist marine air as it moves inland over the mountains. Most rainfall occurs between the months of November and April, with infrequent precipitation events occurring in the summer, often as thunderstorms.

There are no long-term government sanctioned precipitation records available within the study area. Precipitation values were simulated for the Pine North and South basins results by taking the 30-year average rainfall estimate as calculated on the County Groundwater Limitations Map and utilizing data from nearby government sanctioned precipitation stations to fractionalize the data into yearly and monthly values. Looking at these simulated annual precipitation values in Pine Valley from 1971 to 2005, it is readily apparent that year-to-year rainfall has been highly variable (Figure 4). In only a few years precipitation approximated average rainfall, with most years either above or below-average. The current below average rainfall period began in the 1998-1999 rainfall season punctuated by one significantly above-average year of precipitation in 2004-2005 and one fairly-average rainfall season in 2002-2003. The dry period between 1998 and 2004 has included at least two of the driest years on record for the region since 1948. This below average period is similar to conditions in the late 1950s to early 1960s, which included three of the driest years on record in the County in the past 60 years.

2.2.2 Evapotranspiration

The term “evapotranspiration” refers to the total transfer of moisture to the atmosphere from the soil, water bodies, vegetative canopy, and plants. Evapotranspiration represents a significant portion of water lost from a given watershed. Types of vegetation and land use significantly affect evapotranspiration and therefore, the amount of water leaving a watershed. Factors that affect evapotranspiration include the plant type (root structure and depth), the plant’s growth or level of maturity, percentage of soil cover, solar radiation, humidity, temperature, and wind. No direct measurements of evapotranspiration occur within the watershed. Monthly reference evapotranspiration (ETo), which is a measure of potential evapotranspiration from a known surface, such as irrigated grass or alfalfa has been estimated for various zones in San Diego County by CIMIS. As would be expected, the lowest ETo rates are typically during the cooler and wet winter months and highest during the summer.

Both Pine North and Pine South basins lay within CIMIS Zone 16 in which average monthly ETo rates are as follows:

CIMIS Zone 16 ETo rates (inches/month)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.55	2.52	4.03	5.70	7.75	8.70	9.30	8.37	6.30	4.34	2.40	1.55

2.3 Water Demand

An estimation of existing groundwater demand is provided below for Pine South and Pine North basins based on the current land uses known to utilize groundwater within each basin:

Pine South Existing Conditions Water Demand

Land Use	Quantity	Water Demand Per Unit or Acre (afy)	Total Water Demand (afy)
Single-Family Residential	530	0.5	265
Second Dwelling Units	8	0.25	2
Commercial Uses	12	0.3	4
County Park	5.2 acres	3.1	16.1
Total Existing Estimated Water Demand			287

Pine North Existing Conditions Water Demand

Land Use	Quantity	Water Demand Per Unit (afy)	Total Water Demand (afy)
Single-Family Residential	125	0.5	62.5
Second Dwelling Units	1	0.25	0.25
Pine Valley Bible Conference Center	1	19.9	19.9
United State Forest Service Cabins	37	0.1	3.7
Total Existing Estimated Water Demand			86

2.4 Geology and Soils

2.4.1 Geology

The study area is located within the Peninsular Ranges Province of Southern California, a geomorphic province with a long and active geologic history. The Peninsular Ranges are underlain by an extensive Mesozoic-aged plutonic complex known as the Southern California batholith. The batholith contains hundreds of individual plutons that were intruded into pre-existing older rocks such as the Triassic Julian Schist and late Triassic-Jurassic gneissic and granitic rocks in the Cuyamaca-Laguna Mountain belt (Walawender, 2000). The intrusive rocks of the Southern California batholith consist largely of granitic and gabbroic rocks.

Intrusive rocks within the study area consist largely of granitic and gabbroic rocks, along with a wide band of older metasedimentary rocks (Figure 5).

The Peninsular Ranges were subject to regional uplift and erosion throughout the Tertiary Period. Continued erosion and down cutting of drainage courses through the Quaternary Period have resulted in the present topography. In general, trends of several of the major drainage courses that have developed appear to be controlled by ancient fractures or major joint systems within the crystalline bedrock. Drainages and the valley area within the study area are underlain by thin to moderate thicknesses of sandy stream-deposited alluvium.

A weathering profile of variable thickness has developed upon bedrock that underlies the valley floor within the study area. The ongoing weathering process has created a layer of residuum (decomposed granite), which typically consists of moderately to highly decomposed rock material that grades erratically downward to unweathered bedrock material. Residuum is generally deeper in flat and valley bottom areas, and thinner to non-existent in the steeper upland areas.

2.4.2 Soils

The United States Department of Agriculture Soil Conservation Service (USDA, 1973) mapped 44 soil types within the Pine South and Pine North basins (Figure 6). Soil moisture capacities are shown for each of the soil types.

2.5 Hydrogeologic Units

Water is stored within four different hydrogeologic units within the study area. These include: 1) moderately fractured rocks, 2) slightly fractured rocks 3) alluvium, and 4) residuum (Figure 7). To estimate groundwater in storage for each hydrogeologic unit, estimates of specific yield, the potential saturated thickness, and the areal extent of each unit were required. Specific yield is the ratio of volume of water that rock or soil will yield by gravity drainage to the volume of rock or soil. Estimates of groundwater in storage for Pine South and Pine North basins are provided below along with a discussion of each hydrogeologic unit.

Pine South Estimated Maximum Groundwater in Storage

Hydrogeologic Unit	Estimated Area (acres)	Estimated Specific Yield	Assumed Saturated Thickness (feet)	Maximum Storage Capacity (acre-feet)
Moderately Fractured Crystalline Rock	1,129	0.1%	500	565
Slightly Fractured Crystalline Rock	2,486	0.01%	500	124
Alluvium	268	10%	28.4	761
Residuum - underlying alluvium	268	5%	45	603
Residuum (outside of alluvium)	85	5%	20	85
Estimated Maximum Groundwater Storage Capacity (acre-feet)				**2,138**

Pine North Estimated Maximum Groundwater in Storage

Hydrogeologic Unit	Estimated Area (acres)	Estimated Specific Yield	Assumed Saturated Thickness (feet)	Maximum Storage Capacity (acre-feet)
Moderately Fractured Crystalline Rock	3,636	0.1%	500	1,818
Slightly Fractured Crystalline Rock	11,553	0.01%	500	578
Alluvium	186	10%	10	186
Residuum - underlying alluvium	186	5%	10	93
Residuum - (outside of alluvium)	37	5%	10	19
Estimated Maximum Groundwater Storage Capacity (acre-feet)				**2,694**

Moderately Fractured Crystalline Rock (Figure 7): The entire study area is underlain by fractured bedrock. The areal extent of this unit was limited to areas underlain by fractured rock with slopes less than 25%. While the actual range of specific yield in rock likely ranges from about 0.0001% to 1%, a value of 0.1% in valley areas is a generally accepted estimate of average conditions in moderately fractured rock aquifers in the County.

Slightly Fractured Crystalline Rock (Figure 7): The areal extent of this unit was limited to areas underlain by fractured rock with slopes greater than 25%. While the actual range for specific yield in rock likely ranges from about 0.0001% to 1%, a value of 0.01% in steep slope areas is a generally accepted estimate of average conditions in the County.

Alluvium (see Attachment, and Figures 8 & 9): Recent alluvial deposits overlie both residuum and granitic rock. The alluvium is largely confined to active drainage channels and the valley floor. Woodward, Clyde, Sherard, and Associates (WCSA, 1961) collected core samples from borings drilled through the alluvium. The porosity of the sediment from 10 samples collected from four borings ranged from 31 to 38%. An analysis of the site-specific porosity measurements by WCSA from three borings and a van Genuchten curve fit of moisture content and soil sample height above the water table, indicate that the alluvium has a specific

yield of approximately 29% (Wiedlin, 2006). Though this approach is technically valid, the site-specific data is limited to only a few areas and it may potentially provide specific values that are biased high relative to specific yield measurements derived from aquifer pumping tests. Aquifer pumping tests are the industry standard for measuring specific yield. In the absence of basin-specific aquifer test data, a specific yield of 10% for alluvium was used for this study.

Based on eighteen test borings logged by WCSA (WCSA, 1961), the alluvium consists of loose silty sands, sandy silts, and locally gravelly sands (see Attachment). The test borings indicated that the maximum thickness of the alluvium ranges from 30 to 60 feet. WCSA prepared a structure contour map depicting the bottom of the alluvium based on their exploratory drilling (See Attachment).

Pine South Basin: The volume of saturated alluvium was estimated for the Pine South basin by comparing the WCSA structure contour map (See Attachment) and groundwater elevations prepared by DPLU from spring 1998 groundwater data collected by the Pine Valley Mutual Water Company (PVMWC) (Figure 8). The two surfaces were digitized and the volume between the two surfaces was calculated using Geographic Information Systems (GIS) software. An isopach contour map was produced to visually represent the results of the estimated saturated thickness of alluvium (Figure 9). Based on this calculation, the storage capacity of the alluvium (using a specific yield of 10%) under the high groundwater conditions existing in the spring of 1998 was approximately 761 acre-feet within the 268-acre area underlain by alluvium in the Pine South basin. The average saturated alluvium thickness is estimated to be approximately 28.4 feet within the Pine South basin.

Pine North Basin: The volume of saturated alluvium was estimated for the Pine North basin by taking the area WCSA structure contour map (See Attachment) and conservatively assuming a saturated thickness of 10 feet would occur under high groundwater conditions within the 186- acre area of alluvium underlying the Pine North basin. Based on this estimate, the storage capacity of the alluvium (using a conservative specific yield of 10%) is approximately 186 acre-feet within the Pine North basin.

Residuum (Figure 10): Differential weathering of bedrock, due to non-uniform fracturing and differences in mineralogy, produce an undulating contact between unweathered bedrock and decomposed granite (residuum). Due to these factors, it is not possible to accurately predict the thickness of residuum underlying a specific region without site-specific information such as boring or well logs.

In borings advanced by WCSA, two residuum samples had porosity values of 26 and 31%. Specific yield values within this unit were not estimated by WCSA. As is the case with alluvium, there is no site-specific aquifer test data available to verify the specific yield of the residuum within Pine Valley. In the absence of site-specific aquifer test data, a specific yield of 5% for residuum was used for this study.

Pine South Basin: Over 1,100 acres of land is located in valley areas with slopes less than 25%, which is more likely to contain appreciable thicknesses of residuum when compared to the nearly 2,500 acres of steep slope area within the Pine South basin. For this study, the areal extent of potentially saturated residuum is assumed to be limited to (1) the same 268-acre area as the alluvial deposits, and (2) an approximately 85-acre area to the southwest of the alluvial deposits in which data was available to document that amount of residuum that occurs below the water table.

The estimate of saturated residuum underlying the 268-acre alluvial aquifer was evaluated by inspecting well and boring logs. Figure 10 shows the locations of the wells reviewed and the estimated thickness of saturated residuum at each location. The saturated thickness, based on high groundwater levels documented in the spring of 1998, ranged from 49 to 74 feet. Based on this review, a saturated thickness of 45 feet was conservatively applied to residuum underlying the alluvial aquifer.

Data was compiled from three drilling logs within an approximately 85-acre area to the southwest of the alluvial deposits. The saturated thickness of three wells reviewed in this area ranged from 15 to 40 feet. Based on this review, a saturated thickness of 20 feet was applied to residuum in this 85-acre area.

Since no data is available over the rest of the Pine South basin to substantiate saturated residuum, the rest of the basin is assumed to have no saturated residuum. This is conservative and likely results in an underestimation of the amount of groundwater in storage. As an example, if there was a potential of 10 to 20 feet of saturated residuum underlying the rest of the 750+ acres of valley areas in the Pine South basin, this would result in an additional 375 to 750 acre-feet of groundwater in storage which was unaccounted for in this study.

Pine North Basin: The areal extent of potentially saturated residuum is assumed to be limited to (1) the same 186-acre area as the alluvial deposits, and (2) 37 acres along the alignment of Pine Creek further to the north of the documented alluvial deposits. Both areas were confined to 10 feet saturated thickness.

2.6 Inventory of Wells

Water well information within Pine Valley was identified through information provided by the Pine Valley Mutual Water Company (PVMWC), the DPLU groundwater level records database, and the County of San Diego Department of Environmental Health (DEH) database of parcels with permitted water wells (Figure 11).

The PVMWC owns 10 water supply wells within their service area which are spread throughout the Pine South and Pine North basins (Figure 11). Eight of these wells are currently in operation. Two wells (Well No.s 2 and 8) are not in production due to an underground fuel storage tank (LUFT) release at a local service station. As of 2008, the water company provided water service to approximately 695 service connections, of which 675

were residential users and 20 were commercial entities including a County park with 5.2 acres of irrigated grass. It appears that nearly all residences within Pine Valley have water service from the PVMWC, although a small number of homeowners also may be utilizing groundwater to supplement their water obtained by the PVMWC. There are records of 19 domestic well permits in the Pine South basin, and 10 permits recorded within the Pine North basin. Between 1999 and 2005, PVMWC's highest annual production was 311 acre-feet in 2002 (approximately 0.45 acre-feet per service connection), and averaged approximately 274 acre-feet per year (approximately 0.39 acre-feet per service connection). There has been a slow increase per service connection demand that has occurred through this time period. According to PVWMC personnel, this increase may be attributable to more residences going to full-time use as more people make home in Pine Valley their permanent residence. Approximately 19% (average of 52 acre-feet per year, maximum of 59 acre-feet per year) came from wells located in the Pine North basin, and approximately 81% (average of 222 acre-feet per year, maximum of 252 acre-feet in 2002) came from wells located in the Pine South basin. The land-use-based water demand estimate in Section 2.3 estimated that the Pine North basin currently uses approximately 63 acre-feet per year from residential uses. This is approximately 20% more water than that drawn on average by the PVMWC. For the Pine South basin, the demand from the land use based analysis estimated approximately 287 acre-feet per year of demand. This is approximately 29% more water than that drawn on average by the PVMWC. It can be concluded that the estimation of water demand in Section 2.3 accounts for more than the water demand of the PVMWC within each basin. Since there are private domestic wells being utilized in each basin by residences as shown on Figure 11, the additional water estimated by the land use based method allows for additional unaccounted water use by these private well users.

One other notable groundwater user in the study area is the Pine Valley Bible Conference Center in the Pine North basin. No records of groundwater wells or production from the facility are available. According to County DEH records, there is an average of 356 guests year-round at the facility. Assuming 50 gallons per day per guest results in a groundwater demand estimate of approximately 19.9 acre-feet per year, which will be used to estimate demand for this facility in this study. As shown on Figure 11, since 1983 the County has monitored a well designated as "PIN-04" 200 feet east of the Bible Center. Depth to groundwater in the well has fluctuated between 6 and 30 feet below the ground surface (bgs), with the most recent water level recorded in April 2009 at 12.3 feet bgs.

2.7 Historical Groundwater Levels

Well Hydrographs

To provide an understanding of groundwater level trends, well hydrographs have been generated from wells monitored by the PVMWC and DPLU. Figure 11 depicts locations of wells with historical water level data. The legend on each well hydrograph figure indicates

whether wells have been actively used ("active") versus unused ("inactive") at any point during its period of record. Water levels were obtained from "active" wells when the well was not pumping, but it is possible in some cases that water levels were collected before the well had fully recovered to static water level conditions. Therefore, it is likely that some "active" wells water levels were recorded as deeper than actual static water level conditions.

Figures 12 through 16 depict groundwater levels from wells with records ranging from 1981 to 2008. The wells are located within the valley area of the community of Pine Valley, which is underlain by an alluvial basin and residuum over fractured bedrock. The water level trends from the five figures provide a more detailed understanding of groundwater conditions within different hydrogeologic settings in Pine Valley.

Figure 12 depicts groundwater levels of PVMWC Well Nos 2 and 8 in the southern end of the valley. These wells are underlain by 35 and 87 feet of residuum, respectively, overlying fractured bedrock. These two wells were taken out of production in the 1990s due to contamination of the aquifer from a nearby LUFT. The water levels have varied between 13 and 58 feet bgs, with lows reached in 1996, 2002, and 2007. Groundwater levels were shallowest during each of the three well-above-average rainfall years in the 1990s. Water levels in the spring of 2005 following the above-average precipitation in 2004-2005 rebounded 17 and 25 feet respectively, but were still about 10 to 15 feet below water levels recorded in the spring of 1998.

Figure 13 depicts groundwater levels of wells PVMWC Well No.s 1 and 10, which recently have accounted for approximately 65% of PVMWC well production. These wells are underlain by 75 to 80 feet of alluvium and residuum overlying fractured bedrock. The water levels have varied between 10 and 131 feet bgs, with historic lows reached in 2003 and 2004. Water levels rebounded in 2005 and 2006 in response to well above-average rainfall in the rainfall season of 2004-2005. Overall, the water levels show the stress of pumping large amounts of groundwater from these wells during the extended drought period from 1998 to 2004. Water levels in early 2006 were at approximately 20 feet bgs, which is approximately 10 feet deeper than historic shallow groundwater levels recorded in the spring of 1998. This indicates that the wells have shown a significant recovery of the water table from one above-average rainfall season in 2004-2005.

Figure 14 depicts groundwater levels of PVMWC Well No.s 4 and 5. Well No. 4 is located at the discharge point of the Pine watershed near Pine Creek. Well No. 5 is also located near Pine Creek within the Pine North basin. These two wells have recently accounted for approximately 15% of PVMWC well production and are underlain by as much as 98 feet of alluvium and residuum overlying fractured bedrock. The water levels have varied between 6 and 51 feet bgs, with historic lows reached between 2002 and 2004. The water levels show the stress of pumping of groundwater from these wells during the extended drought period

from 1998 to 2004. However, recharge was evident during each wet season through the dryer years of 1998-2004. This is likely due to the wells proximity to Pine Creek. Water levels in early 2005 were at approximately 27 and 7.1 feet bgs in Well No. 4 and 5, which is approximately 1 to 2 feet deeper than historic shallow groundwater levels recorded in the spring of 1998. The wells have shown nearly a full recovery of the water table from one above-average rainfall season in 2004-2005.

Figure 15 depicts groundwater levels of PVMWC Well No. 3. This well is underlain by fractured bedrock with likely very little (if any) saturated alluvium/residuum. PVMWC Well No.7 and Well No.9 (not shown as well hydrographs) are located near PVMWC Well No.3 and are also underlain by fractured bedrock with little to no saturated alluvium/residuum. Well No.7 has had similar historic water level patterns, although Well No.9 has had much less drawdown relative to drawdown seen in Well No.3. The water levels in Well No.3 have varied between 18 and 293 feet bgs, with historic lows reached in 2004. Water levels rebounded approximately 270 feet in March 2005 to 23 feet bgs. Summer groundwater pumping routinely draws down groundwater levels more than 150 feet (and over 200 feet in the driest years). In most years, water levels recover during the wet season to approximately 20 to 30 feet bgs. The three PVMWC wells in this area are heavily pumped and draw from a fractured rock aquifer with little saturated sediments. This area is subject to rapid declines in water table elevation during the summer months. However, based on the water level records, recharge to these wells appears rapid and reliable in the wet season, with the water table recovering each winter.

Figure 16 depicts groundwater levels of well PIN-04. Well PIN-04 is a private domestic well which provides water for a single-family residence across the street from the Pine Valley Bible Conference Center in the Pine North basin. Water levels have varied between 6 and 30 feet bgs. The shallowest groundwater levels were recorded in 1982, 1995, and 2005 in response to above average rainfall in those years. Historic lows were reached in 1990 and 2003.

Spring 1998 Groundwater Elevations

Using static groundwater depths from the spring of 1998 which are representative of shallow groundwater conditions within Pine Valley, DPLU prepared a groundwater contour map of groundwater elevations in map view (Figure 8). It should be noted that nearly all the points used are data from actively pumped wells and water levels may be at various degrees from achieving complete static equilibrium. These data indicate that from the southern portion of Pine Valley, groundwater flows from south to north toward the Pine Creek outlet on the west side of the valley, where it crosses US 80. Limited water level data were obtained outside of the PVMWC service area. However, from this data it can be reasonably inferred that groundwater in the northern portion of Pine Valley flows from north to south towards the

same point. Hence groundwater flow is converging toward the center of the valley and exits to the west.

Summer/Fall 2004 Groundwater Drawdown

In the spring of 1998, groundwater levels could be considered to be close to representative of full groundwater storage capacity for Pine Valley. From 1999 through the fall of 2004, a six year drought occurred and resulted in a progressive increase in drawdown of wells throughout the valley each year. Some groundwater recharge was in evidence during the winter months of each year. The recharge however occurred at a rate less than the groundwater production rate. To depict groundwater drawdown at the peak of the six-year drought DPLU prepared a groundwater drawdown map for the summer/fall of 2004 (Figure 17), which was plotted in reference to the high groundwater conditions that occurred in the Spring of 1998 (Figure 9).

The worst area of drawdown in the summer/fall of 2004 centers around PVMWC Well No.s 3 and 7, which have contributed only 7% of PVMWC's total production, respectively. Each summer, drawdown at these two wells peaked, ranging from over 100 feet at the beginning of the drought cycle, to nearly 300 feet toward the end of the drought cycle. However, water levels recovered each winter and drawdown would often be near zero during the winter despite below average rainfall seasons that occurred (Figure 15). These water level recoveries may be attributable to their proximity to Pine Creek. The low production capacity of these two wells and their wide fluctuations of water levels are attributable to the wells being installed within fractured bedrock with little to no saturated sediments unlike most other wells utilized by the PVMWC.

PVMWC Well No.s 1, 9, and 10, which have contributed approximately 77% of PVWMC's total production, all have similar drawdown of over 100 feet in 2004, with Well No. 9 having the most (over 140 feet of drawdown).

PVWMWC Well No.s 4, 5, and 6, which have contributed approximately 16% of PVMWC's total production, experienced the least amount of drawdown of the producing wells. Of these three wells, Well No.s 5 and 6 experienced the greatest amount of drawdown; approximately 40 feet in the summer of 2004. Well No. 4 experienced approximately 13 feet of drawdown in the summer of 2004. As in other wells in the study area, peak drawdown increased each summer of the drought leading to the summer of 2004.

PVWMWC Well No.s 2 and 8 are inactive wells that are located on the southern edge of the PVMWC service area. The drawdown in these wells is least affected by the actively pumped wells drawdown. Maximum drawdown in these wells was 30 to 35 feet.

DPLU monitors water levels at Well PIN-04 located north of the PVWMC wells in the Pine North basin. While not included on the groundwater drawdown map due to its isolated

location to the north, the water level in the summer of 2004 was about 7 feet lower than the spring of 1998. These data suggest that the groundwater drawdown in the Pine South basin induced by the PVMWC well field does not measurably extend to the northern end of the valley.

Spring 2005/Spring 2006 Groundwater Drawdown

To depict groundwater drawdown following the well-above-average precipitation that occurred between October 2004 and April 2005, DPLU prepared a groundwater drawdown map for the spring of 2005/spring of 2006 (Figure 18), which was plotted in reference to the high groundwater conditions that occurred in the spring of 1998 (Figure 9). The depth to groundwater in some wells was shallower in 2006, indicating a possible delayed response to the recharge that occurred in 2004-2005. To include full recovery from this apparent delayed recharge response in some of the wells, the shallowest groundwater levels recorded during those two years was utilized in construction of the map.

Looking at all the wells, groundwater levels in the spring of 2005 and spring of 2006 were approximately 1 to 16.5 feet deeper than those recorded in the spring of 1998. It is apparent that from just one year of well above average precipitation, that the rapid rise of water levels resulted in a near full recovery of drawdown that had occurred during the six year extended drought period. PVMWC Well No.s 3 and 7, which had the worst area of drawdown in the summer/fall of 2004, recovered to within 3 feet of water levels recorded in the spring of 1998. PVMWC Well No. 9, above the valley floor had the greatest amount of drawdown compared to Spring of 1998, with water levels about 16.5 feet deeper than in the spring of 1998.

PVMWC Well Field Discussion

The six-year drought between 1999 and 2004 was among one of the worst drought periods in the past 50 years and provided a significant test on the ability for the PVMWC to supply groundwater to its 695 service connections. According to discussions with PVWMC personnel, groundwater production continued unabated through the drought with no interruptions in service or mandated conservation measures. It can be concluded that PVMWC production at its current rates is sustainable through a six-year drought. However, progressive increases in drawdown through the drought period, particularly at less productive wells (PVMWC No.s 3 and 7) are an indication that recent groundwater production rates in these wells are approaching their limit in the context of drought condition. However, with the exception of Well No.1, which has a relatively shallow depth to the bottom of the well, high production wells are less impacted by drawdown and appear to be able to continue pumping through a more extended drought period. Based on an evaluation by Wiedlin & Associates (2006) of groundwater production capacity of the PVMWC well field, it appears that Well No.s 4, 5, and 6 are underutilized and could produce additional groundwater to make up for any potential impacts to production from Well No.s 3 and 7. Additionally, Well No. 9, though subject to drawdown greater than 100 feet, also appears to have the capability to

handle additional drawdown and produce additional groundwater if its pump intake were lowered. As additional development occurs and groundwater demand increases, improved well production management would likely be necessary to keep up with the increased demand. The most likely worst case scenario would be that additional wells may need to be installed to more evenly distribute the extent of drawdown across the PVMWC well field in response to increased water demand.

Several of the PVMWC wells were installed between the late 1950s and early 1970s. Water wells over time typically experience decreased well yield from chemical incrustation or bio-fouling of the well screen and the formation materials around the intake portion of the well. Infilling of the well is also possible from sedimentation. Without proper maintenance, individual well performance may be substantially reduced and cause individual wells to fail. Even with maintenance, wells have a limited practical service life and eventually require replacement to optimize production capacity. As PVMWC wells lose well production capability over time in individual wells, it is recommended that PVMWC provide routine maintenance and rehabilitation of these wells. Additionally, with increased demand and lower production capacity from its existing well field, PVMWC may need to drill additional production wells to keep up with demand.

3 LONG-TERM GROUNDWATER AVAILABILITY ANALYSIS

To evaluate the long-term groundwater availability of a given basin, the County Guidelines for Determining Significance – Groundwater Resources contains the following guideline that if met, would be considered a significant impact to groundwater resources as a result of project implementation:

For proposed projects in fractured rock basins, groundwater impacts will be considered significant if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction. (County of San Diego, 2007)

This guideline was applied to the two basins which underlie the community of Pine Valley, to evaluate whether there would be sufficient long-term groundwater supplies under the following four land use scenarios:

1. Existing Conditions
2. Existing Conditions plus all discretionary permits currently in process at DPLU
3. Current GP Buildout
4. GP Update Buildout (Referral Map alternative)

3.1 Methodology

The soil moisture balance analysis of the Pine South and Pine North basins involved estimating groundwater recharge a 34-year period, comparing monthly recharge with proposed extraction through the 34-year period, tracking cumulative depletion of storage during successive years of storage depletion (drought), and determining if extraction is in excess of sustained yield if the cumulative depletion of storage exceeds 50% of the total storage capacity of a given basin. The 50% criterion was established to address the unique characteristics of the County fractured rock aquifers which are characterized by limited storage capacity and very limited groundwater recharge during droughts and excess recharge during wet periods. These unique characteristics typically cause large fluctuations of the groundwater table over the short-term which are generally not observed in aquifers with large storage capacity. Such short-term changes are evident in wells monitored within Pine Valley. Such an analysis incorporates climate variability and provides assurance that groundwater use, even during periods of limited recharge in extended drought periods, does not produce a significant impact to groundwater users dependent on groundwater. During drought years, recharge may be negligible, and water extracted from the aquifer may be derived solely from storage. The available storage in the aquifer must be large enough to supply water throughout the duration of the drought. To assure sustainable groundwater use through drought conditions, the resulting sustainable yield for a basin as calculated from the water balance analysis is a fraction of average annual groundwater recharge.

3.1.1 Basin Approach

Groundwater typically occurs within a basin, which is defined as a hydrologic unit of groundwater storage more or less separate from neighboring groundwater storage areas. For fractured rock aquifers, which include the entire Pine watershed, the edges of the basin are presumed to be the topographic divides or watershed boundaries.

As discussed in Section 2.1, the 29.3 square-mile Pine hydrologic sub-area was subdivided into two basins (Pine North and Pine South) to assess local groundwater conditions at maximum build out in Pine Valley (Figure 2). The subdivision between the two basins was aligned with Pine Valley Creek, and then follows a local ridge line eastward until it encounters the regional watershed ridge line of the Laguna Mountains.

3.1.2 Groundwater Recharge

Recharge Equation

The equation used to calculate groundwater recharge using the Thornthwaite Method (soil moisture balance methodology) is:

$$R(i) = P(i) - RO(i) - PET(i) - (SMC - SM(i))$$

where

R(i)	=	Recharge during the i^{th} month.
P(i)	=	Precipitation during the i^{th} month.
RO(i)	=	Run-off during the i^{th} month
PET(i)	=	Potential evapotranspiration during the i^{th} month.
SMC	=	Soil moisture capacity
SM(i)	=	Soil moisture at beginning of i^{th} month.

Conceptually, this equation states that any precipitation in excess of runoff (infiltration) is available for evapotranspiration up to a limiting rate, called the potential evapotranspiration. If infiltration exceeds potential evapotranspiration in any month, excess moisture can be stored by the soil, up to the soil moisture capacity. Any infiltration in excess of potential evapotranspiration which increases the soil moisture above the soil moisture capacity results in groundwater recharge. Water stored in the soil during periods of excess precipitation is available for evapotranspiration during periods when potential evapotranspiration exceeds infiltration.

The recharge estimation for this study was taken from recharge calculations that were programmed into computer code and integrated with GIS software as part of the County of San Diego GP Update Groundwater Study (DPLU, 2009). Estimation of groundwater recharge required data compilation to estimate monthly precipitation, runoff, potential

evapotranspiration, and soil moisture capacity. Utilizing 408 unique monthly values of precipitation from July 1971 to June 2005, groundwater recharge was estimated for each month through the 34 year period evaluated.

Recharge Processes in Pine Valley

Groundwater recharge to the study area may occur from both basin-wide rainfall infiltration, and from infiltration of surface water runoff along the creek beds that drain the watershed. Recharge from surface water runoff may be the dominant recharge process in the study area. However, because this process has not been adequately quantified through long-term stream gauging records, it is not included in the water balance calculation presented later herein.

Data Compilation

Estimation of groundwater recharge required data compilation to estimate monthly precipitation, runoff, potential evapotranspiration, and soil moisture capacity.

Precipitation: Rainfall is the principal means for replenishment of soil moisture and groundwater recharge. The County's Groundwater Limitations Map as described in Section 2.2 provides an estimate of the 30-year average rainfall throughout the County from July 1971 through June 2001. The map was produced at a resolution of 300 feet, with average precipitation contained within individual 300-foot-by-300-foot grid cells in GIS. Since the soil moisture balance methodology requires monthly precipitation data in order to estimate groundwater recharge, further work was needed to provide an estimation of monthly values of precipitation for each 300-foot-by-300-foot grid. P(i) was derived by multiplying the average precipitation value within each grid by a fractional statistical yearly and monthly distribution obtained from precipitation records utilized in creation of the County Groundwater Limitations Map. Additional precipitation data were also obtained from July 2001 through June 2005 to include the end of a severe drought through October 2004 and the very wet winter of 2004-2005. Table 1 shows the 34 yearly fractions and 408 monthly fractions of precipitation from July 1971 through June 2005. This table was then applied to the 30-year average precipitation value contained within each 300-foot-by-300-foot to provide 408 unique monthly values of precipitation.

Runoff: Measurements of runoff from stream gauging stations provide the most accurate depiction of runoff occurring within a given watershed. Since long-term runoff records are unavailable for Pine Valley, runoff must be estimated. The United States Department of Agriculture (USDA) Soil Conservation Service (SCS) developed the Curve Number Method which considers the hydrologic soil group and land use type in determining an antecedent runoff condition (USDA, 1986). The technique is based on a simplified infiltration model of runoff and empirical approximations. The method is based on selection of a curve number that has been developed by empirically rating the hydrologic performance of a large number of soils and vegetative covers throughout the United States. The type of land use dictates the

amount of impervious cover and greatly influences the ability of water to infiltrate the soil surface. While the method was designed for a single storm event, it can be scaled to find average monthly runoff values.

With the exception of Rancho Cuyamaca State Park, infiltration rates of soils have been classified by the USDA into four hydrologic soil groups according to their minimum infiltration rate throughout the study area. Runoff curves were developed for various combinations of hydrologic soil groups and land uses (Table 2) which was then incorporated into GIS to code each 300-foot-by-300-foot grid cell with a unique curve number. RO(i) was calculated by using the SCS runoff equation for each cell based on the amount of rainfall that occurred in a given month.

As documented within Appendix D of the GP Update Groundwater Study (DPLU, 2009), the calibrated results of recharge which are being utilized in this study resulted in an overestimation of surface water runoff. For the Pine South basin, an average of 27% of all precipitation that was estimated to occur in the 34 year period was assumed to be runoff. Runoff was utilized as a lumped parameter to incorporate elements of the water balance that are not explicitly quantified (e.g., groundwater evapotranspiration [GWET] from phreatophyte consumption, potential surface water base flow supported by groundwater, and/or groundwater discharge out of the basin). Since data does not exist in which to more accurately quantify these parameters, runoff as calculated is subject to substantial uncertainty.

Evapotranspiration: ETo, which is a measure of potential evapotranspiration from a known surface, such as grass or alfalfa has been estimated for San Diego County by CIMIS (see Section 2.2.2). For this study, the ETo rates published by CIMIS were used as a surrogate for PET rates required by the Thornthwaite method. PET(i) was calculated from the ETo rates to code each 300-foot-by-300-foot grid. Using these values is conservative because they are based on irrigation needs of grass/alfalfa crops which assume a continuous source of moisture and does not consider summer dormancy (caused by decreased soil moisture beyond the wilting point) exhibited by many native species.

Soil Moisture Capacity: The USDA mapped nearly 250 soil types in their study of the County. The USDA included a range of SMC for nearly all of these soil types. SMC was estimated for as the mean value from the USDA data to code each 300-foot-by-300-foot grid (Figure 6). For cases where no SMC was listed by the USDA, an estimation of SMC was made for that particular soil type based on similar soil types.

3.1.3 Groundwater Demand

Groundwater demand was estimated in Pine South and Pine North basins for the four land use scenarios (existing conditions, existing conditions plus all discretionary permits currently in process at DPLU, current GP build-out, and GP Update build-out) evaluated in this study.

The current GP Map for Pine Valley is included as Figure 19 and the GP Update Referral Map is included as Figure 20. Tables 3 and 4 provide a summary of all water uses within Pine South and Pine North basins, and the estimated amount of groundwater demand for each land use scenario. Additionally, the annual demand was broken into monthly fractions to account for seasonal patterns of groundwater usage.

A number of constraints were taken into consideration to provide a more realistic expectation of future development potential under the GP scenarios. Constraints included already built lands, 100-year flood plains, wetlands, public lands, future roads, habitat preserves, forest conservation initiative lands, slopes greater than 25%, Tier I and II vegetation, and pre-approved mitigation areas.

3.1.4 Groundwater in Storage

Because groundwater recharge does not occur at a constant rate from year to year, there must be sufficient drainable groundwater in storage to provide water during years of below average recharge. Groundwater is stored within five hydrogeologic units as defined, quantified and discussed in detail in Section 2.5.

3.1.5 Long-Term Groundwater Availability

In order to estimate long-term groundwater availability within the project's watershed, the recharge calculations were first programmed into computer code that was integrated with GIS software. Groundwater demand for each of the four land use scenarios was input into GIS, and groundwater in storage was also input. The computer code and GIS tools were used to calculate inflow to groundwater storage and outflow from groundwater storage on a month-by-month basis for the project watershed over a 34-year period. The output was an Excel spreadsheet, which indicates whether groundwater in storage will be reduced to 50% or less at any time as a result of groundwater extraction over a 34-year period. A summary of the long-term groundwater availability results for the Pine South and Pine North basins is included in Tables 5 and 6.

3.2 Significance of Impacts Prior to Mitigation

A summary of long-term groundwater availability results for the Pine South and Pine North basins and is provided in Tables 5 and 6. The results presented indicate the minimum groundwater in storage estimated to occur in any given month over the 34-year period for each land use scenario analyzed.

3.2.1 Pine South Basin Impacts

Impacts Under Existing Conditions Plus Discretionary Permits in Process: Under existing conditions, the South Pine basin is estimated to have a groundwater consumptive use of approximately 287 acre-feet per year, and would increase to 302 acre-feet per year with addition of the proposed discretionary projects currently in process at DPLU. The minimum groundwater in storage estimated during any given month under existing conditions with the

addition of the discretionary projects would be 59%, which is does not exceed the 50% threshold. The 50% threshold is not exceeded until 341 acre-feet of groundwater per year are used.

Impacts Under Current GP Buildout: Under the worst-case scenario of maximum build out of the current GP taking into consideration environmental constraints, the Pine South basin would have an estimated 247 additional homes with an estimated total consumptive use of approximately 410 acre-feet per year (assumes 0.5 acre-feet per year per each new residence). Under this scenario, the minimum groundwater in storage estimated in any given month would be 35% of maximum storage, which exceeds the 50% threshold. Therefore, cumulative impacts to the Pine South basin under theoretical maximum build out of the current GP are considered to be significant.

Impacts Under Proposed GP Update Buildout: Under the scenario of maximum build out of the proposed GP Update (Referral Map alternative), the Pine South basin would have an estimated 224 additional homes with an estimated total consumptive use of approximately 399 acre-feet per year (assumes 0.5 acre-feet per year per each new residence). Under this scenario, the minimum groundwater in storage estimated in any given month would be 37% of maximum storage, which exceeds the 50% threshold. Therefore, cumulative impacts to the project watershed under theoretical maximum build out of the proposed GP Update (Referral Map alternative) are considered to be significant.

The GP Update also includes a number of alternatives including the Environmentally Superior alternative, which provides the lowest land use densities of any of the alternatives. Under the scenario of the GP Update Environmentally Superior alternative, the Pine South basin would have an estimated 178 additional homes with an estimated total consumptive use of 376 acre-feet per year (assumes 0.5 acre-feet per year per each new residence). Under this scenario, the minimum groundwater in storage estimated in any given month would be 43% of maximum storage, which while an improvement over the GP Update Referral Map alternative, still exceeds the 50% threshold. Therefore, cumulative impacts to the Pine South basin under theoretical maximum build out of the GP Update Environmentally Superior alternative are considered significant.

3.2.2 Pine North Basin Impacts

Impacts under Existing Conditions plus Discretionary Permits in Process: Under existing conditions, the project watershed is estimated to have a groundwater consumptive use of approximately 86 acre-feet per year, and would increase to 87 acre-feet per year with addition of the one proposed discretionary project currently in process at DPLU. The minimum groundwater in storage estimated during any given month under existing conditions with the addition of the discretionary projects would be 94%, which does not exceed the 50% threshold.

Impacts Under Current GP Buildout: Under the worst-case scenario of maximum build out of the current GP taking into consideration environmental constraints, the Pine North basin would have an estimated 52 additional homes with an estimated total consumptive use of

approximately 112 acre-feet per year (assumes 0.5 acre-feet per year per each new residence). Under this scenario, the minimum groundwater in storage estimated in any given month would be 92% of maximum storage, which does not exceed the 50% threshold. The average groundwater in storage through the 34 year period analyzed is estimated at approximately 98% of maximum storage of the basin. Cumulative impacts to the Pine North basin under theoretical maximum build out are considered to be less than significant.

Impacts Under Proposed GP Update Buildout: Under the scenario of maximum build out of the proposed GP Update (Referral Map alternative), the Pine North basin would have an estimated 26 additional homes with an estimated total consumptive use of approximately 100 acre-feet per year (assumes 0.5 acre-feet per year per each new residence). Under this scenario, the minimum groundwater in storage estimated in any given month would be 93% of maximum storage, which does not exceed the 50% threshold. The average groundwater in storage through the 34 year period analyzed is estimated at approximately 99% of maximum storage of the basin. Cumulative impacts to the Pine North basin under theoretical maximum build out of the proposed GP Update (Referral Map alternative) are considered to be less than significant.

3.2.3 Conclusions

Pine South: Using the soil moisture balance methodology and conservative assumptions based on data availability, the Pine South basin, which is more heavily used than the Pine North basin is calculated to have a significant cumulative impact to groundwater resources at the theoretical maximum build out of the current GP and the proposed GP Update. Under the current GP scenario, groundwater was estimated to drop below 50% of maximum storage from May 1990 to February 1991, from April 2002 to January 2003, from August 2003 to January 2004, and from June 2004 to November 2004. This equates to 32 months, or 2.7 years out of 34 years in which groundwater would exceed the 50% threshold. For the GP Update Referral Map alternative, impacts are similar but slightly less with 24 months, or 2 years out 34 years in which groundwater would exceed the 50% threshold.

The sustainable yield as calculated for Pine South basin is approximately 340 acre-feet per year. This is short of the amount of water estimated to be consumed at theoretical build out of the current GP (410 acre-feet per year), the GP Update Referral Map alternative (399 acre-feet per year), or the GP Update Environmentally Superior alternative (376 acre-feet per year). However, the current discretionary permits in process in DPLU when added to the existing conditions water use would result in a total consumptive use of 302 acre-feet per year, within the calculated sustainable yield of 340 acre-feet per year for the Pine South basin.

Pine North: Using the soil moisture balance methodology, the Pine North basin, which is less used than the Pine South basin, is calculated to have a sufficient water supply under all scenarios analyzed. Under the worst-case scenario of maximum build out of the current GP, the basin is anticipated to have on average approximately 98% of maximum storage through the 34 year period analyzed, with the minimum groundwater in storage in any month estimated at 92% of maximum storage in November 2002. As a comparison to this calculated

value, the deepest water levels ever recorded in well PIN-04 were recorded in November 2002 and February 2003 (Figure 16).

Data Limitations: Due to data limitations, the following conservative assumptions were taken in the long-term groundwater availability calculations:

1. Assumed no saturated residuum or alluvium in areas where no data was available (i.e., well or boring logs).
2. In the absence of site-specific aquifer test data, a specific yield of 10% for alluvium was used.
3. Recharge from surface water runoff may be the dominant recharge process in the study area. Since this process has not been adequately quantified through long-term stream gauging records, it was not directly calculated and included in the water balance calculations.

3.3 Mitigation Measures and Alternatives

As calculated, the Pine South basin is anticipated to have a significant cumulative impact to groundwater resources before approaching maximum build out of the current GP as well as any of the alternatives proposed for the GP Update. Conversely, the Pine North basin is anticipated to have an adequate groundwater supply under all scenarios analyzed. For potentially significant cumulative impacts to a given groundwater basin, mitigation would be limited to finding a water source elsewhere to import into the basin. The one measure available to mitigate groundwater impacts to a level of less than significant in the Pine South basin would be for the PVWMC to install additional production wells in the Pine North basin for use within their service area in the Pine South basin. Under the worst-case scenario of maximum build out of the current GP, an additional 70 acre-feet of groundwater per year would be needed (approximately 43 gallons per minute) beyond the calculated sustainable yield of the Pine South basin of 340 acre-feet per year. This could likely be accommodated by one to three additional production wells in the Pine North basin.

Additionally, the GP Update Environmentally Superior alternative could be selected to minimize future development potential in the Pine South basin. Land use densities within the Environmentally Superior alternative could be revised to allow only large rural lots and thereby limit growth to within the calculated sustainable yield of the basin.

4 SUMMARY OF GROUNDWATER IMPACTS AND MITIGATION

The water balance analysis provided in the report indicates that groundwater resources are adequate in both Pine South and Pine North basins to meet the demands under existing conditions and with the addition of additional residences if all discretionary permits currently in process at DPLU were approved. The sustainable yield for the Pine South basin as calculated in this study is 340 acre-feet per year, which would be exceeded under the theoretical build out of the GP or any of the land use alternatives of the proposed GP Update. The North Pine basin under all scenarios analyzed is not anticipated to exceed its sustainable yield.

Mitigation of the potentially significant impact to groundwater resources in the Pine South basin is possible by the PVMWC potentially drilling additional production wells in the Pine North basin and distributing the water to users in the Pine South basin. This could likely be accommodated by one to three additional production wells in the Pine North basin.

The GP Update Environmentally Superior alternative could also be selected (and revised as necessary) to minimize future development potential in the Pine South basin to within the sustainable yield calculated within this study.

5 RECOMMENDATIONS AND LIMITATIONS

5.1 Recommendations to the PVMWC

The majority of Pine Valley is served by the PVMWC, which provides water to 695 service connections from eight existing wells. While groundwater resources appear adequate to meet the current demands of the Pine South and North basins, the following issues should be addressed to maximize availability of groundwater resources for the community as groundwater demand increases:

Water Conservation Measures: Water demand per service connection has increased from 1999 through 2004, which PVMWC attributes to an increase in permanent residences in the valley. Water use has been as high as 0.45 acre-feet per service connection. It is unknown and speculative to predict whether water demand per service connection will continue to increase. DPLU recommends that the PVMWC implement water conservation measures as necessary to maximize the availability of groundwater resources for the community as it continues to grow. If groundwater demand per service connection were to continue to increase unabated, future groundwater problems could develop.

Management of Well Field: In the December 22, 2006 Analysis of Pine Valley Mutual Water Company's Groundwater Resources by Wiedlin & Associates, several recommendations were made to increase the overall efficiency of the PVMWC well field. These recommendations could result in increased production abilities from the existing well field as groundwater demand increases over time.

Maintenance of Well Field: Several of the PVMWC wells were installed between the late 1950s and early 1970s. Water wells over time typically experience decreased well yield from chemical incrustation or bio-fouling of the well screen and the formation materials around the intake portion of the well. Without proper maintenance, individual well performance may be substantially reduced and cause individual wells to fail. As PVMWC wells lose well production capability over time in individual wells, it is recommended that PVMWC provide routine maintenance and rehabilitation of these wells. Additionally, with increased demand and lower production capacity from its existing well field, PVMWC may need to drill additional production wells to keep up with demand.

5.2 Limitations

Hydrogeologic studies are characterized by their uncertainties due to the non-uniformity of geologic formations, the unpredictability of precipitation magnitude and duration, and the extent of groundwater use within and beyond the study area boundaries. No guarantees

regarding the performance of individual water wells and resultant water table drawdown are made herein. This study does not address the infrastructure requirements that may or may not be necessary to distribute water within the PVMWC service area.

Due to data limitations, there were a number of conservative assumptions made in the long-term groundwater availability calculations. The following items that were not possible to implement due to budgetary constraints are presented as future possibilities of better refining the knowledge of groundwater resources within Pine Valley.

- Long-term stream gauging stations in Pine Valley would greatly aid in calculating groundwater recharge from stream flow infiltration and in more accurately estimating the amount of runoff occurring. This would also aid in evaluation of elements of the water balance that were not explicitly quantified (e.g., groundwater evapotranspiration [GWET] from phreatophyte consumption, potential surface water base flow supported by groundwater, and/or groundwater discharge out of the basin). Since the data does not exist in which to more accurately quantify these parameters, runoff calculated is subject to substantial uncertainty and therefore was overestimated to indirectly account for the elements above that were not explicitly quantified.

- Long-term aquifer pumping tests are needed to provide more accurate estimates of the specific yield of the alluvium and residuum. This would likely require the drilling of new wells to evaluate each specific hydrogeologic unit.

- As new wells are drilled in Pine Valley, the well logs may provide new information to explore other valley areas where saturated residuum may be present.

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Tables

Table 1
Yearly and Monthly Precipitation Fractions

Precipitation Year	Yearly Fraction of 30-Year Average Precipitation	Monthly Fraction of Annual Precipitation											
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1971-1972	0.49	0.00	0.03	0.02	0.16	0.03	0.54	0.00	0.03	0.00	0.03	0.05	0.10
1972-1973	1.11	0.00	0.00	0.02	0.07	0.18	0.12	0.15	0.18	0.26	0.01	0.01	0.00
1973-1974	0.62	0.00	0.02	0.00	0.00	0.21	0.02	0.49	0.01	0.20	0.04	0.01	0.00
1974-1975	0.90	0.02	0.00	0.01	0.13	0.02	0.14	0.03	0.11	0.32	0.19	0.01	0.01
1975-1976	0.80	0.00	0.00	0.02	0.02	0.11	0.05	0.01	0.46	0.16	0.14	0.01	0.00
1976-1977	0.88	0.04	0.00	0.20	0.04	0.07	0.09	0.23	0.03	0.12	0.01	0.17	0.00
1977-1978	1.90	0.00	0.08	0.00	0.02	0.01	0.11	0.29	0.19	0.24	0.05	0.01	0.00
1978-1979	1.43	0.00	0.00	0.04	0.01	0.15	0.15	0.28	0.12	0.23	0.00	0.01	0.00
1979-1980	1.78	0.01	0.01	0.00	0.04	0.01	0.01	0.37	0.31	0.15	0.06	0.03	0.00
1980-1981	0.68	0.01	0.00	0.00	0.03	0.00	0.08	0.15	0.23	0.39	0.07	0.04	0.00
1981-1982	1.03	0.00	0.00	0.01	0.02	0.09	0.04	0.31	0.10	0.34	0.06	0.01	0.01
1982-1983	1.74	0.00	0.01	0.03	0.01	0.14	0.10	0.10	0.18	0.34	0.09	0.01	0.00
1983-1984	0.58	0.00	0.10	0.05	0.08	0.31	0.31	0.04	0.01	0.01	0.08	0.00	0.01
1984-1985	0.87	0.07	0.04	0.01	0.03	0.14	0.43	0.07	0.10	0.09	0.03	0.00	0.00
1985-1986	1.17	0.02	0.00	0.02	0.02	0.33	0.09	0.05	0.21	0.23	0.03	0.00	0.00
1986-1987	0.76	0.02	0.01	0.10	0.09	0.09	0.12	0.18	0.16	0.15	0.04	0.01	0.01
1987-1988	1.03	0.00	0.01	0.03	0.18	0.11	0.17	0.15	0.10	0.04	0.19	0.01	0.00
1988-1989	0.50	0.01	0.03	0.01	0.00	0.16	0.34	0.10	0.15	0.17	0.01	0.02	0.00
1989-1990	0.59	0.00	0.01	0.03	0.04	0.02	0.02	0.36	0.18	0.09	0.10	0.06	0.08
1990-1991	0.97	0.00	0.01	0.00	0.00	0.06	0.05	0.07	0.19	0.60	0.01	0.00	0.00
1991-1992	1.05	0.03	0.01	0.02	0.04	0.01	0.13	0.16	0.28	0.28	0.02	0.02	0.00
1992-1993	1.74	0.00	0.02	0.00	0.02	0.00	0.14	0.51	0.22	0.05	0.00	0.01	0.02
1993-1994	0.83	0.00	0.00	0.00	0.01	0.10	0.07	0.09	0.33	0.25	0.12	0.01	0.00
1994-1995	1.53	0.00	0.01	0.00	0.01	0.04	0.05	0.38	0.11	0.29	0.06	0.03	0.02
1995-1996	0.53	0.01	0.01	0.01	0.00	0.02	0.07	0.22	0.34	0.24	0.06	0.01	0.00
1996-1997	0.79	0.01	0.00	0.01	0.09	0.19	0.17	0.42	0.08	0.00	0.02	0.00	0.01
1997-1998	1.79	0.00	0.00	0.06	0.00	0.07	0.09	0.11	0.39	0.13	0.08	0.06	0.00
1998-1999	0.63	0.02	0.02	0.02	0.02	0.15	0.12	0.20	0.09	0.09	0.24	0.00	0.03
1999-2000	0.54	0.04	0.01	0.02	0.00	0.00	0.05	0.10	0.52	0.15	0.10	0.01	0.01
2000-2001	0.75	0.00	0.02	0.02	0.09	0.04	0.00	0.26	0.34	0.10	0.12	0.01	0.00
2001-2002	0.30	0.01	0.02	0.01	0.00	0.23	0.23	0.12	0.04	0.21	0.13	0.00	0.00
2002-2003	0.96	0.00	0.01	0.02	0.01	0.13	0.17	0.01	0.35	0.14	0.12	0.04	0.00
2003-2004	0.58	0.02	0.04	0.01	0.00	0.11	0.14	0.05	0.46	0.08	0.09	0.00	0.00
2004-2005	1.75	0.00	0.00	0.00	0.24	0.04	0.13	0.24	0.24	0.07	0.03	0.01	0.00

Note: Yearly and monthly precipitation fractions are based on data obtained and averaged from 89 government sanctioned precipitation stations in San Diego County west of desert areas. The fractions were applied to the 30-year average precipitation in each 300-foot by 300-foot cell used to calculate recharge within the groundwater study area. The 30-year average precipitation value within each cell is based on the period July 1971 to June 2001 as was calculated in creation of the Groundwater Limitations Map on file with the Clerk of the Board of Supervisors as Document 195172. Applying the fractions produced 408 unique monthly precipitation values (for each cell) from July 1971 to June 2005.

Table 2
Linking Land Uses and Hydrologic Soil Groups to Soil Curve Number

Cover Code	Hydrologic Soil Group and Associated Curve Numbers				SANDAG Land Use Code	SANDAG Land Use Description
	A	B	C	D		
Open space (parks/golf), 50% to 75% cover	49	69	79	84	7204	Golf Course
					7606	Landscape Open Space
Paved parking lots	98	98	98	98	4116	Park and Ride Lot
					4119	Other Transportation
Paved roads (including right-of-way)	83	89	92	93	4112	Freeway
					4104	Airstrip
					4118	Road Right of Way
Commercial	89	92	94	95	1501	Hotel/Motel (Low-Rise)
					1503	Resort
					4113	Communications and Utilities
					5005	Specialty Commercial
					5007	Arterial Commercial
					5009	Other Retail Trade and Strip
					6002	Office (Low-Rise)
					6003	Government Office/Civic Center
					6101	Cemetary
					6102	Religious Facility
					6103	Library
					6104	Post Office
					6105	Fire/Police Station
					6108	Mission
					6109	Other Public Services
					6509	Other Health Care
					6701	Military Use
					6804	Senior High School
					6806	Elementary School
					6807	School District Office
					7205	Golf Course Club House
					7209	Casino
Industrial	81	88	91	93	1401	Jail/Prison
					1409	Other Group Quarters Facility
					2103	Light Industry-General
					2104	Warehousing
					2201	Extractive Industry
					2301	Junkyard/Dump/Landfill
Field Crops	72	81	88	91	8501	Agriculture
					8504	Agriculture
Pasture	68	79	86	89	8003	Field Crops
					9202	Lake/Reservoir/Large Pond
Brush-weed-grass mix	48	67	77	83	6702	Military Training
					7210	Other Recreation-High
					7603	Open Space Park or Preserve
					7607	Residential Recreation
					9101	Vacant and Undeveloped Land
Woods-grass mix	57	73	82	86	8001	Orchard or Vineyard
					8002	Intensive Agriculture
					8502	Agriculture
					8503	Agriculture

Table 2
Linking Land Uses and Hydrologic Soil Groups to Soil Curve Number

Cover Code	Hydrologic Soil Group and Associated Curve Numbers				SANDAG Land Use Code	SANDAG Land Use Description
	A	B	C	D		
Residential: 8 du/ac	77	85	90	92	1000	Spaced Rural Residential
					1100	Residential
					1200	Multi-Family Residential
Residential: 4 du/ac	61	75	83	87	1000	Spaced Rural Residential
					1100	Residential
					1300	Mobile Home Park
Residential: 3 du/ac	57	72	81	86	1000	Spaced Rural Residential
					1100	Residential
Residential: 2 du/ac	54	70	80	85	1000	Spaced Rural Residential
					1100	Residential
Residential: 1 du/ac	51	68	79	84	1000	Spaced Rural Residential
					1100	Residential
Residential: 0.5 du/ac	46	65	77	82	1000	Spaced Rural Residential
					1100	Residential
Residential: 0.2 du/ac	39	60	74	80	1000	Spaced Rural Residential
					1100	Residential

Note: Cover codes, hydrologic soil groups, and associated curve numbers were obtained from the United States Department of Agriculture, Soil Conservation Service,*Urban Hydrology for Small Watersheds, Technical Release No. 55,* June 1986.

SANDAG - San Diego Association of Governments
du - dwelling unit
ac - acre

Table 3
Pine South Basin
Estimated Groundwater Demand

Land Use Scenario	Land Use	Quantity	Water Demand Per Unit (afy)	Total Water Demand (afy)
Existing Conditions	Single-Family Residential	530	0.5	265
	Second Dwelling Units	8	0.25	2
	Commercial Uses	12	0.3	4
	County Park	5.2	3.1	16
	Total Water Demand (Existing Conditions):			**287**
Existing Conditions Plus Discretionary Projects in Process	Sum of Existing Conditions Water Demand	n/a	n/a	287
	Tentative Map 5236	3	0.5	2
	Tentative Map 5318	20	0.5	10
	Tentative Parcel Map 20765	4	0.5	2
	Tentative Parcel Map 20951	4	0.5	2
	Total Water Demand (Existing Conditions Plus Discretionary Projects):			**302**
Current General Plan Buildout	Sum of Existing Conditions Water Demand	n/a	n/a	287
	Additional Single-Family Residences at Theoretical Maximum Buildout	247	0.5	123.5
	Total Water Demand (Current General Plan Buildout)			**410**
General Plan Update Buildout	Sum of Existing Conditions Water Demand	n/a	n/a	287
	Additional Single-Family Residences at Theoretical Maximum Buildout	224	0.5	112
	Total Water Demand (General Plan Update Buildout)			**399**

Notes:
afy - acre feet per year

Table 4
Pine North Basin
Estimated Groundwater Demand

Land Use Scenario	Land Use	Quantity	Water Demand Per Unit (afy)	Total Water Demand (afy)
Existing Conditions	Single-Family Residential	125	0.5	62.5
	Second Dwelling Units	1	0.25	0.25
	Pine Valley Bible Conference Center	1	19.9	20
	Forest Service Cabins	37	0.1	4
	Total Water Demand (Existing Conditions):			**86**
Existing Conditions Plus Discretionary Projects in Process	Sum of Existing Conditions Water Demand	n/a	n/a	86
	Tentative Parcel Map 20857	2	0.5	1
	Total Water Demand (Existing Conditions Plus Discretionary Projects):			**87**
Current General Plan Buildout	Sum of Existing Conditions Water Demand	n/a	n/a	86
	Additional Single-Family Residences at Theoretical Maximum Buildout	52	0.5	26
	Total Water Demand (Current General Plan Buildout)			**112**
General Plan Update Buildout	Sum of Existing Conditions Water Demand	n/a	n/a	86
	Additional Single-Family Residences at Theoretical Maximum Buildout	26	0.5	13
	Total Water Demand (General Plan Update Buildout)			**99**

Notes:
afy - acre feet per year

Table 5
Pine South Basin
Groundwater in Storage Calculations

Size (Acres)	3615
Modeled Maximum GW in Storage (AF)	2138
Modeled Average GW Recharge (AFY)	963

Scenario	Estimated GW Demand (AFY)	Estimated Average GW in Storage	Estimated Minimum GW in Storage
Existing Conditions	287	89%	63%
Existing Conditions Plus Discretionary Permits	302	88%	59%
General Plan Buildout	410	78%	35%
GP Update Buildout - Referral	399	80%	37%
GP Update Buildout - Environmentally Superior	376	82%	43%

Note: Future predicted change in the amount of groundwater in storage for scenarios is based upon historical precipitation from July 1971 to June 2005. Scenarios with estimated groundwater in storage at or below 50% at any time are considered to have a potentially significant impact to groundwater resources.
AF - Acre-Feet
AFY- Acre-Feet Per Year
GW - Groundwater

Change of GW in Storage

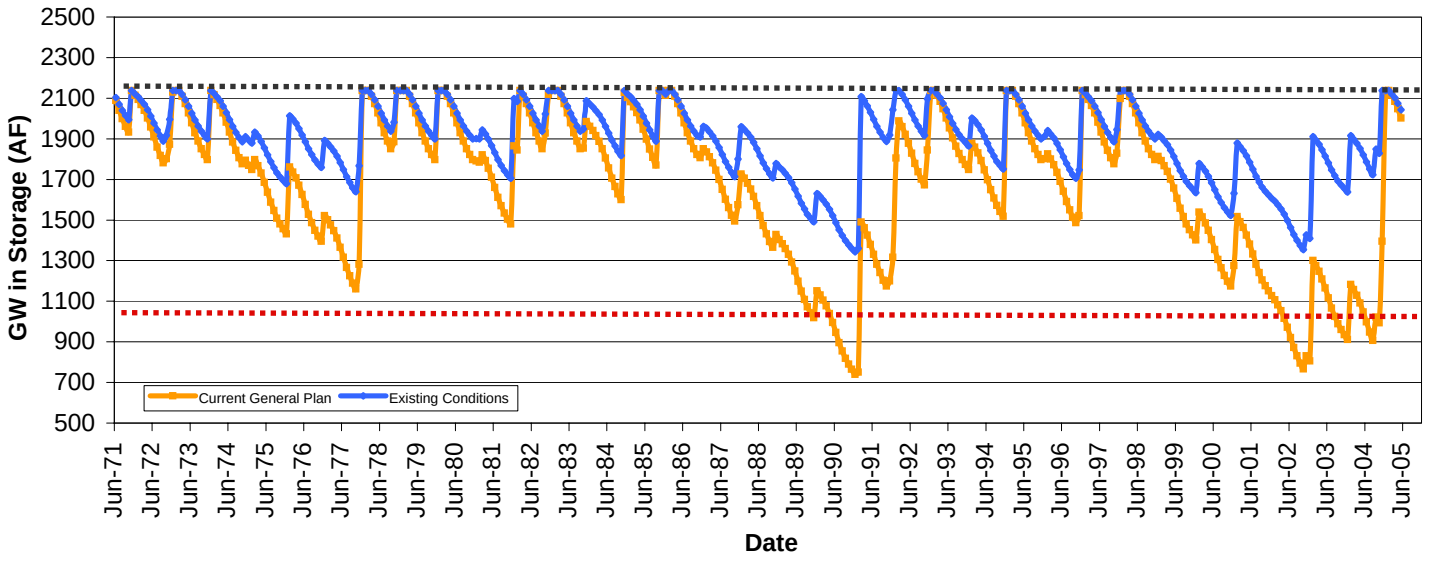


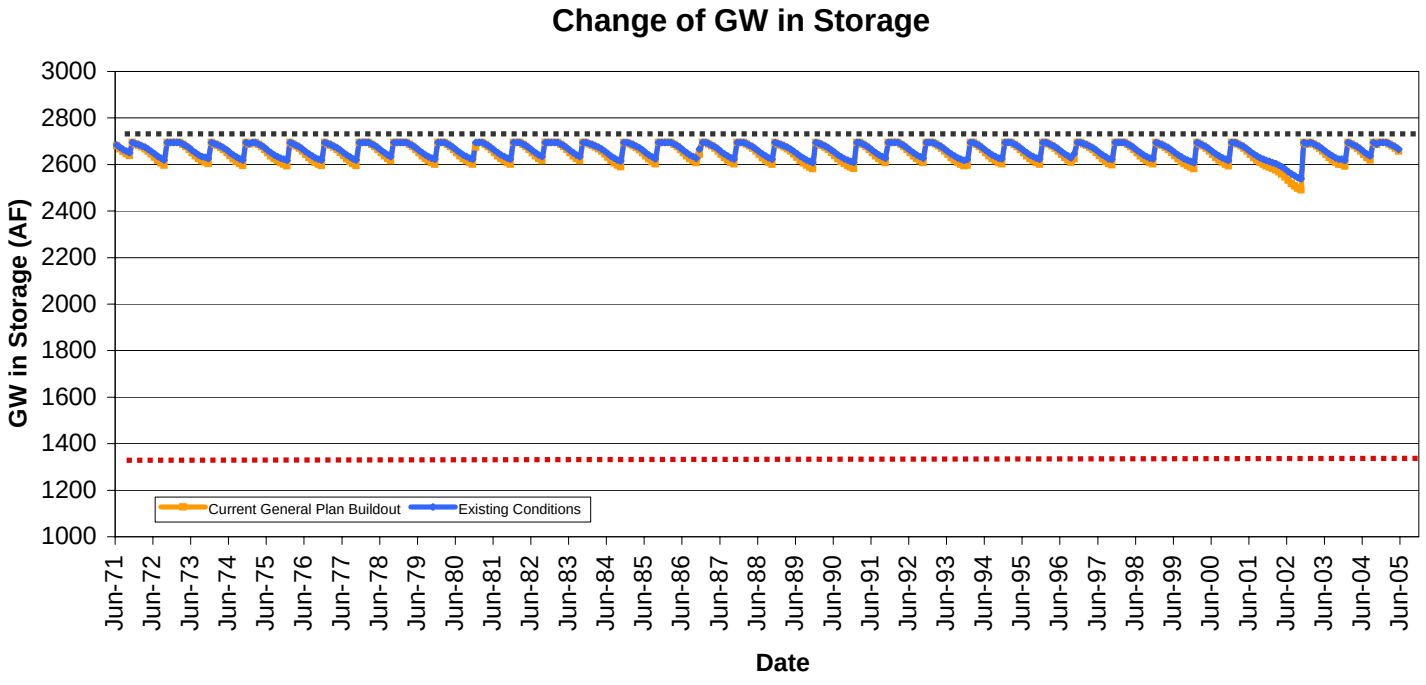
Table 6
Pine North Basin
Groundwater in Storage Calculations

Size (Acres)	15189
Modeled Maximum GW in Storage (AF)	2694
Modeled Average GW Recharge (AFY)	4462

Scenario	Estimated GW Demand (AFY)	Estimated Average GW in Storage	Estimated Minimum GW in Storage
Existing Conditions	86	99%	94%
Existing Conditions Plus Discretionary Projects	87	99%	94%
Current General Plan Buildout	112	98%	92%
Referral Map Buildout	99	99%	93%

Note: Future predicted change in the amount of groundwater in storage for scenarios is based upon historical precipitation from July 1971 to June 2005. Scenarios with estimated groundwater in storage at or below 50% at any time are considered to have a potentially significant impact to groundwater resources.
AF - Acre-Feet
AFY- Acre-Feet Per Year

GW - Groundwater



Figures

Figure 1

Regional Location

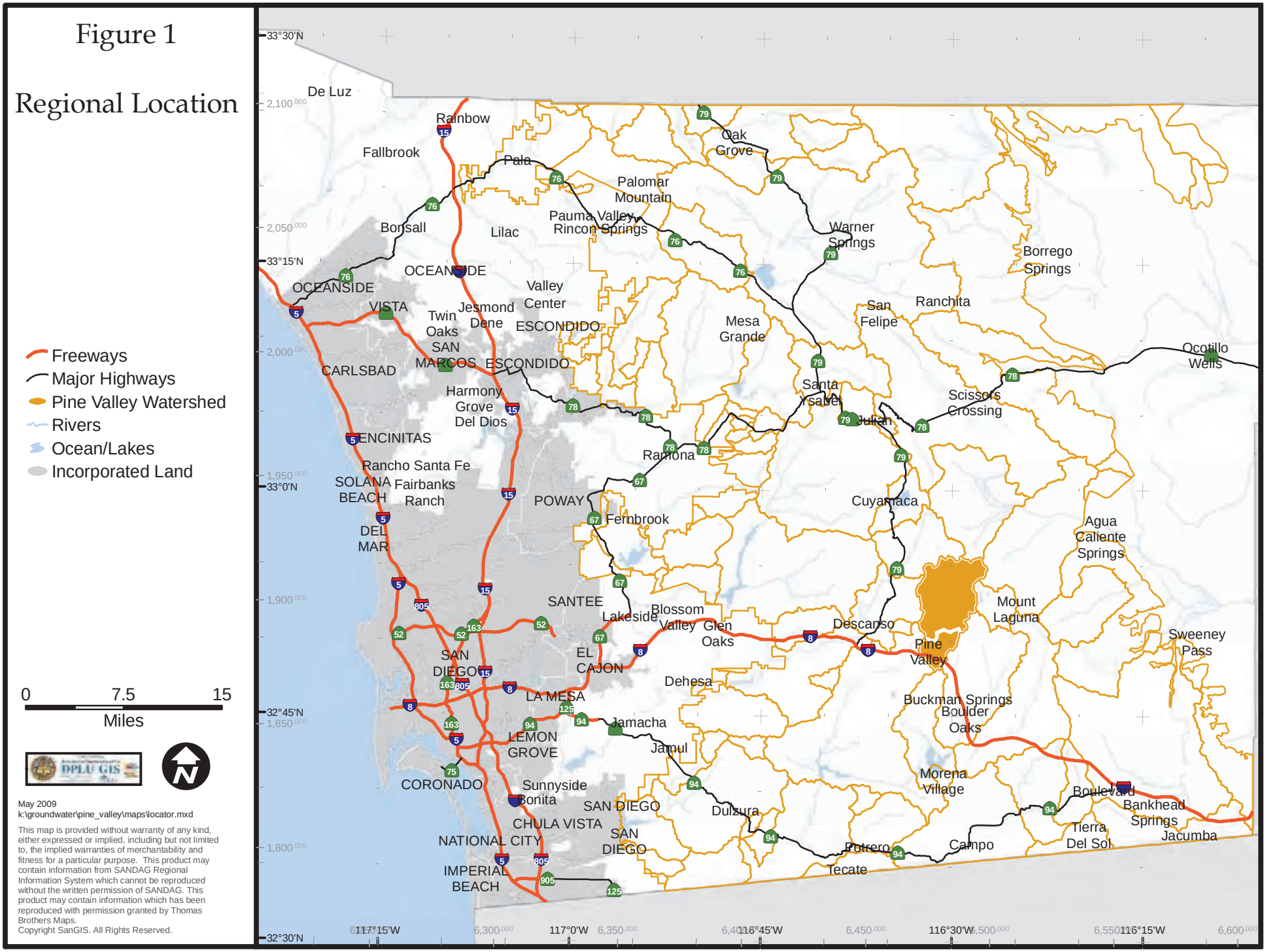
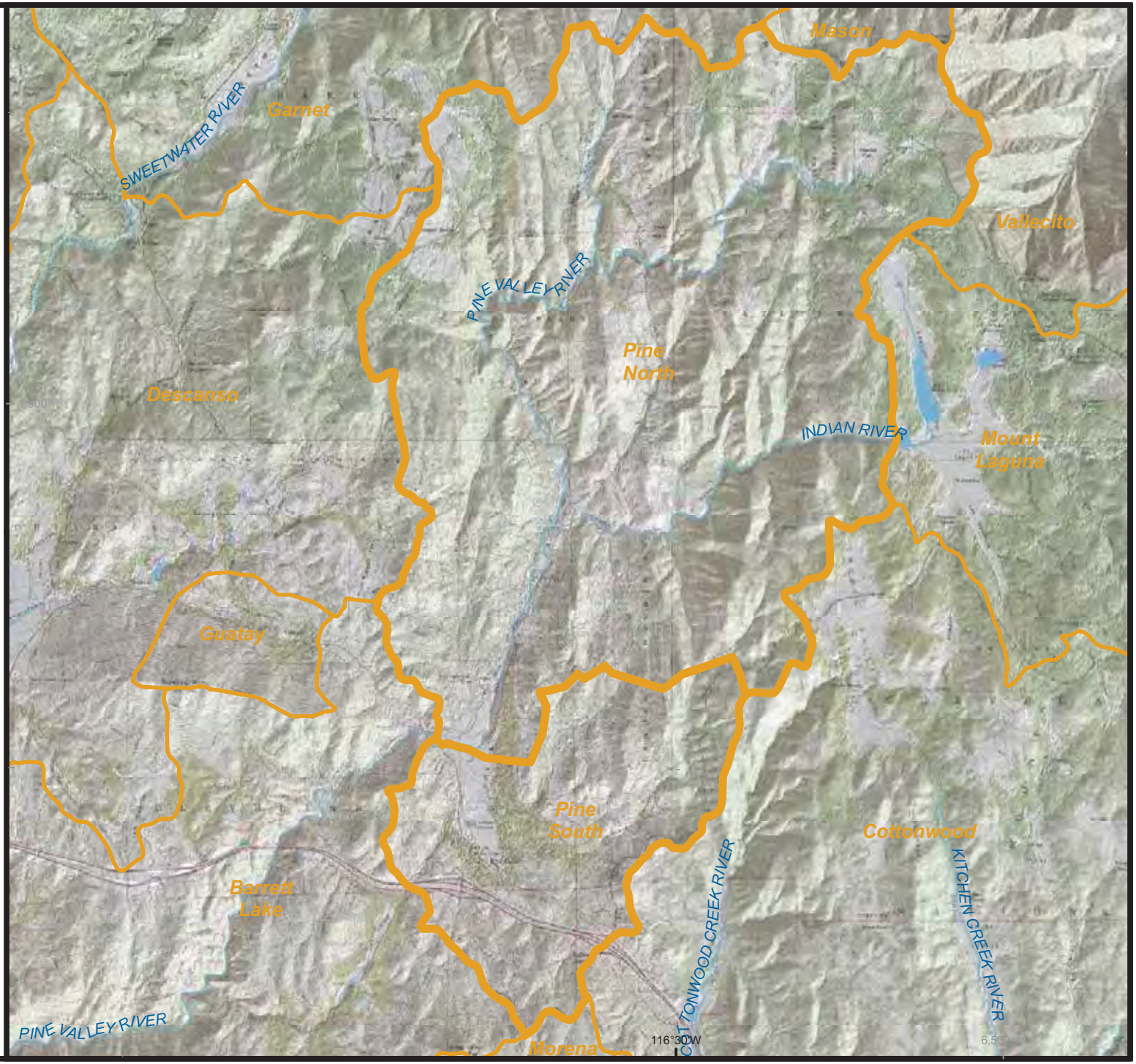


Figure 2

Groundwater Study Boundaries



Watershed Boundary
Rivers
Lakes

0 1 2
Miles

May 2009
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Figure 3

Precipitation

30-Year Average
1971-2001

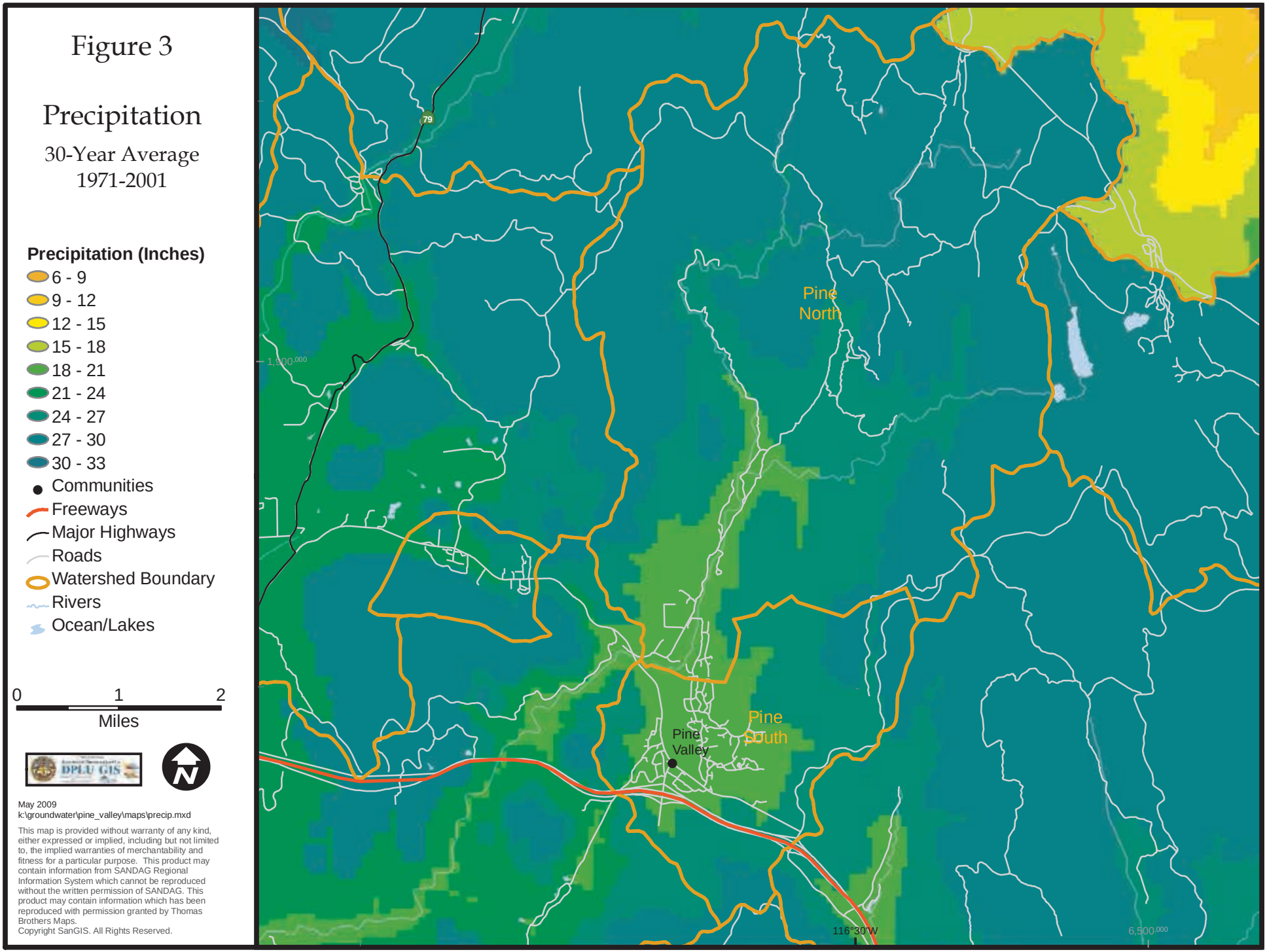

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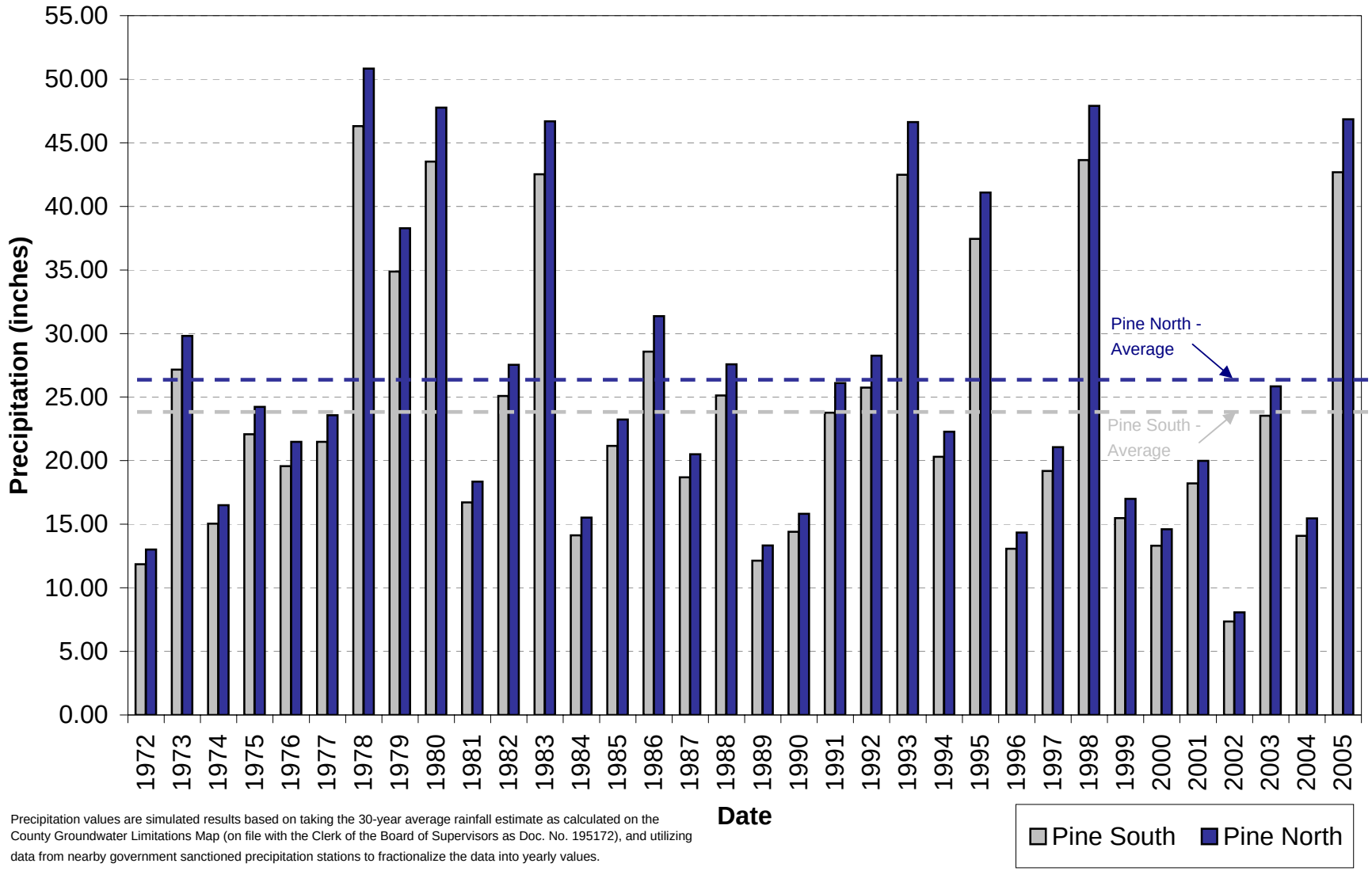
Figure 4: Simulated Annual Precipitation in Pine Valley



Precipitation values are simulated results based on taking the 30-year average rainfall estimate as calculated on the County Groundwater Limitations Map (on file with the Clerk of the Board of Supervisors as Doc. No. 195172), and utilizing data from nearby government sanctioned precipitation stations to fractionalize the data into yearly values.

Figure 5

Generalized Geology

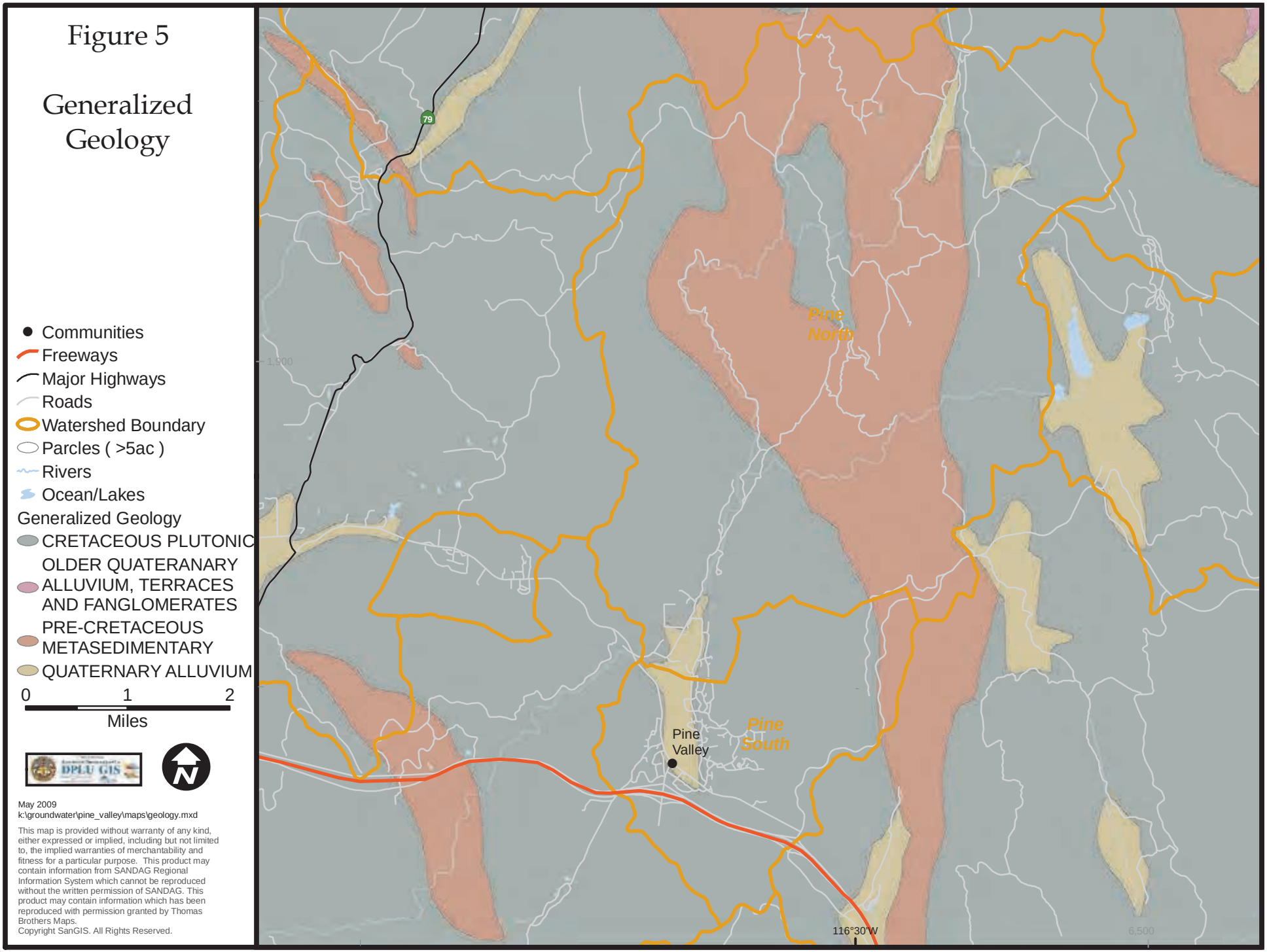


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Figure 6

Soils

- Communities
- Freeways
- Major Highways
- Roads
- Watershed Boundary
- Parcles (>5ac)
- Rivers
- Ocean/Lakes

Soil Moisture Capacity

- 0.10" - 1.00"
- 1.50" - 3.25"
- 3.50" - 5.00"
- 5.50" - 6.75"
- 7.50" - 10.00"

0 1 2

Miles

DPLU GIS

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Title	Description	Soil Moisture Capacity (inches)
AcG	Acid igneous rock land	0.10
BbE	Bancas stony loam, 5-30% slopes	4.75
BbE2	Bancas stony loam, 5-30% slopes, eroded	4.75
BbG	Bancas stony loam, 30-65% slopes	4.25
BbG2	Bancas stony loam, 30-65% slopes, eroded	4.25
BoC	Boomer loam, 2-9% slopes	6.50
BoE	Boomer loam, 9-30% slopes	6.00
BrE	Boomer stony loam, 9-30% slopes	4.75
BrG	Boomer stony loam, 30-65% slopes	4.75
BuC	Bull Trail sandy loam, 5-9% slopes	6.75
CaC	Calpine coarse sandy loam, 5-9% slopes	5.50
CtE	Crouch coarse sandy loam, 5-30% slopes	6.00
CtF	Crouch coarse sandy loam, 30-50% slopes	5.00
CuE	Crouch rocky coarse sandy loam, 5-30% slopes	4.50
CuG	Crouch rocky coarse sandy loam, 30-70% slopes	4.50
GrA	Greenfield sandy loam, 0-2% slopes	6.50
HmD	Holland fine sandy loam, 5-15% slopes	5.00
HmE	Holland fine sandy loam, 15-30% slopes	5.00
HnE	Holland stony fine sandy loam, 5-30% slopes	3.25
LaE2	La Posta loamy coarse sand, 5-30% slopes, eroded	2.50
LcE	La Posta rocky loamy coarse sand, 5-30% slopes	1.75
LcE2	La Posta rocky loamy coarse sand, 5-30% slopes, eroded	1.50
LcF2	La Posta rocky loamy coarse sand, 30-50% slopes, eroded	1.50
LpD2	Las Posas fine sandy loam, 9-15% slopes, eroded	5.00
LrE	Las Posas stony fine sandy loam, 9-15% slopes	5.00
LrE2	Las Posas stony fine sandy loam, 9-30% slopes, eroded	5.00
LrG	Las Posas stony fine sandy loam, 30-65% slopes	5.00
Lu	Loamy alluvial land	7.50
MrG	Metamorphic rock land	1.00
MvC	Mottsville loamy coarse sand, 2-9% slopes	4.50
RkA	Reiff fine sandy loam, 0-2% slopes	8.50
RkB	Reiff fine sandy loam, 2-5% slopes	8.50
RkC	Reiff fine sandy loam, 5-9% slopes	8.50
Rm	Riverwash	2.50
SpE2	Sheephead rocky fine sandy loam, 9-30% slopes, eroded	2.50
SpG2	Sheephead rocky fine sandy loam, 30-65% slopes, eroded	2.50
SrD	Sloping gullied land	1.00
ToE2	Tollhouse rocky coarse sandy loam, 5-30% slopes, eroded	1.50
ToG	Tollhouse rocky coarse sandy loam, 30-65% slopes	1.50
TuB	Tujunga sand, 0-5% slopes	3.50
VaA	Visalia sandy loam, 0-2% slopes	8.75
VaB	Visalia sandy loam, 2-5% slopes	8.75
VaC	Visalia sandy loam, 5-9% slopes	8.75
WmC	Wyman loam, 5-9% slopes	10.00

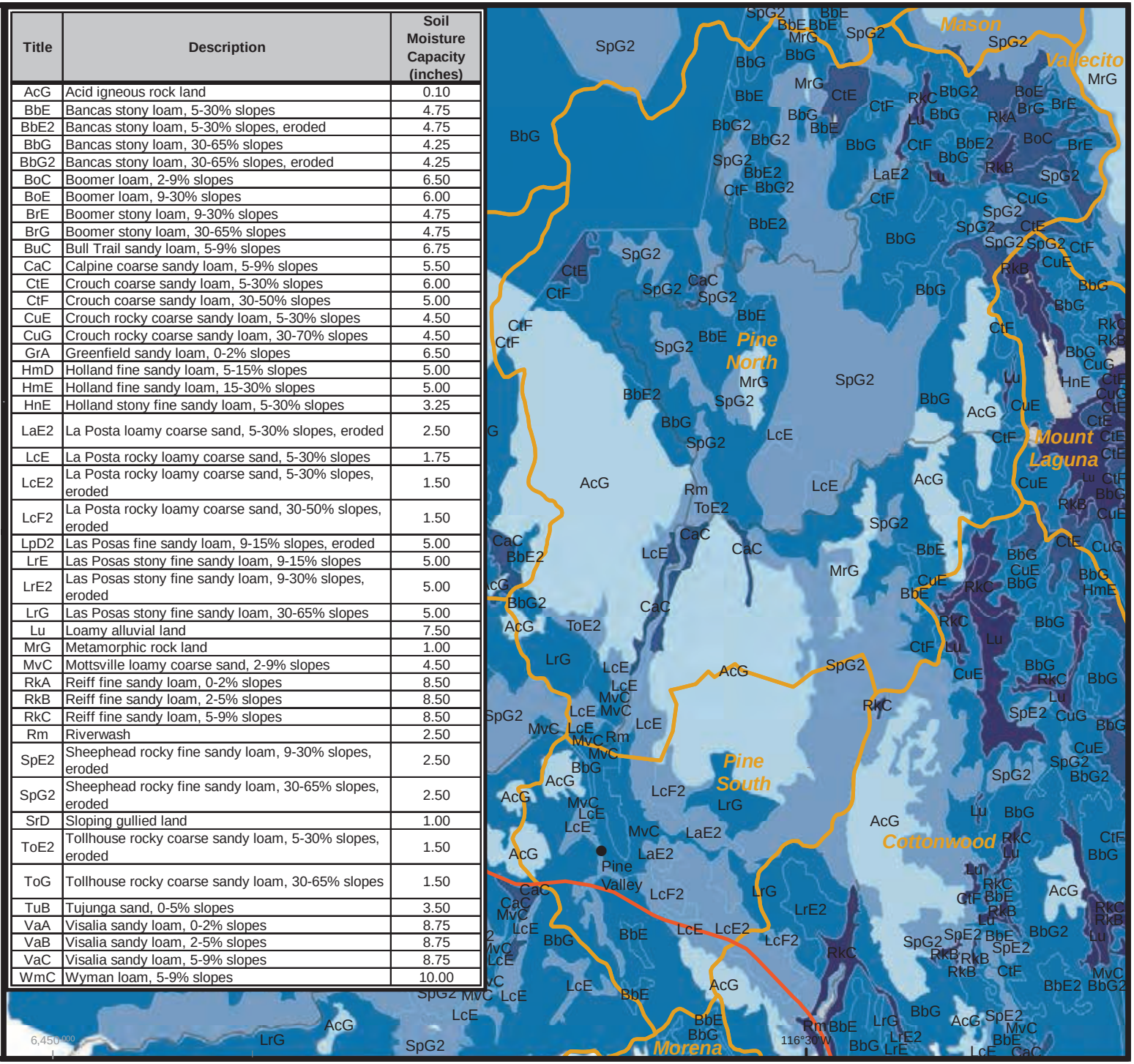

Figure 7

Hydrogeologic Units

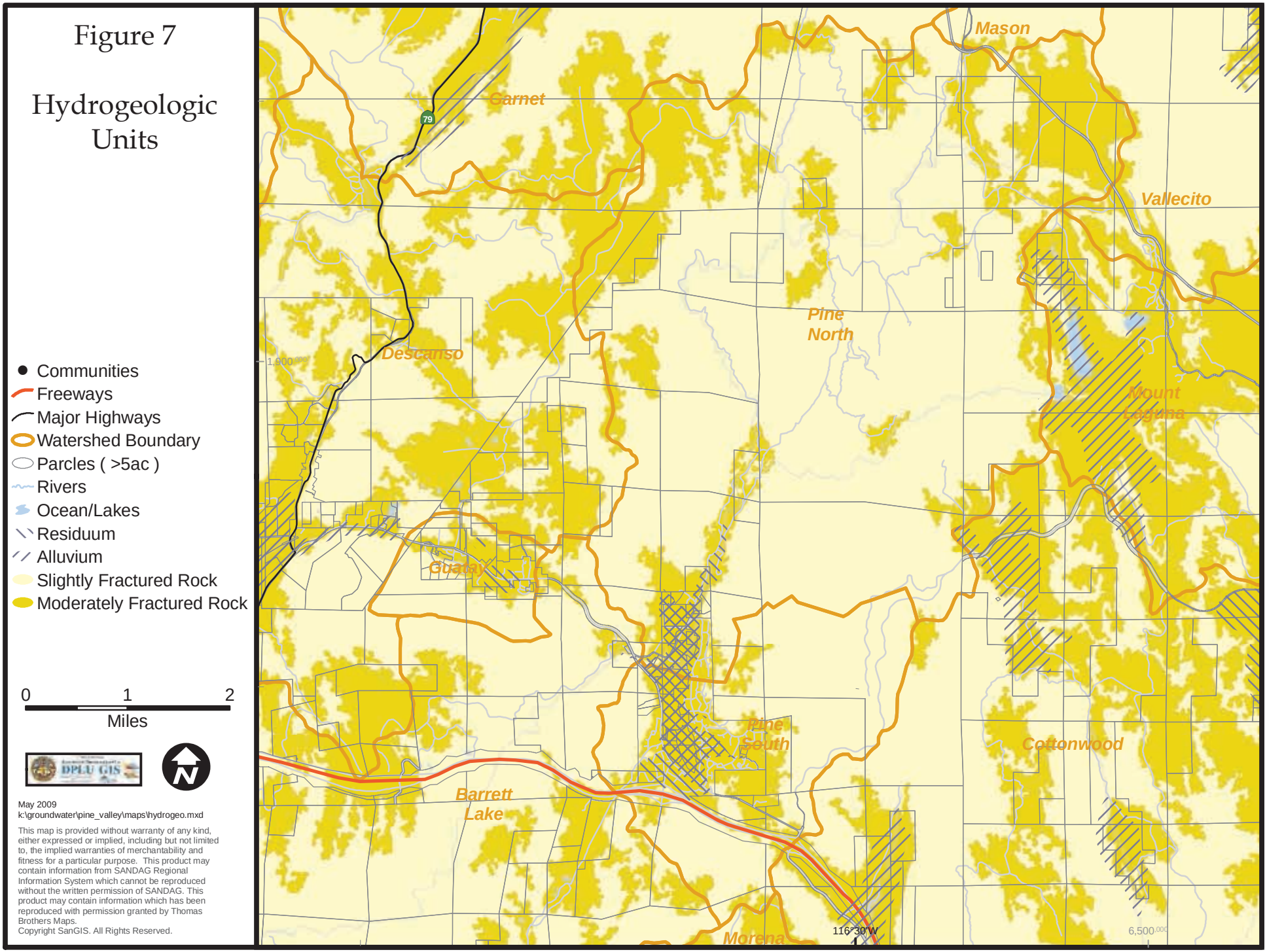

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Figure 8

Groundwater Elevation

Spring 1998

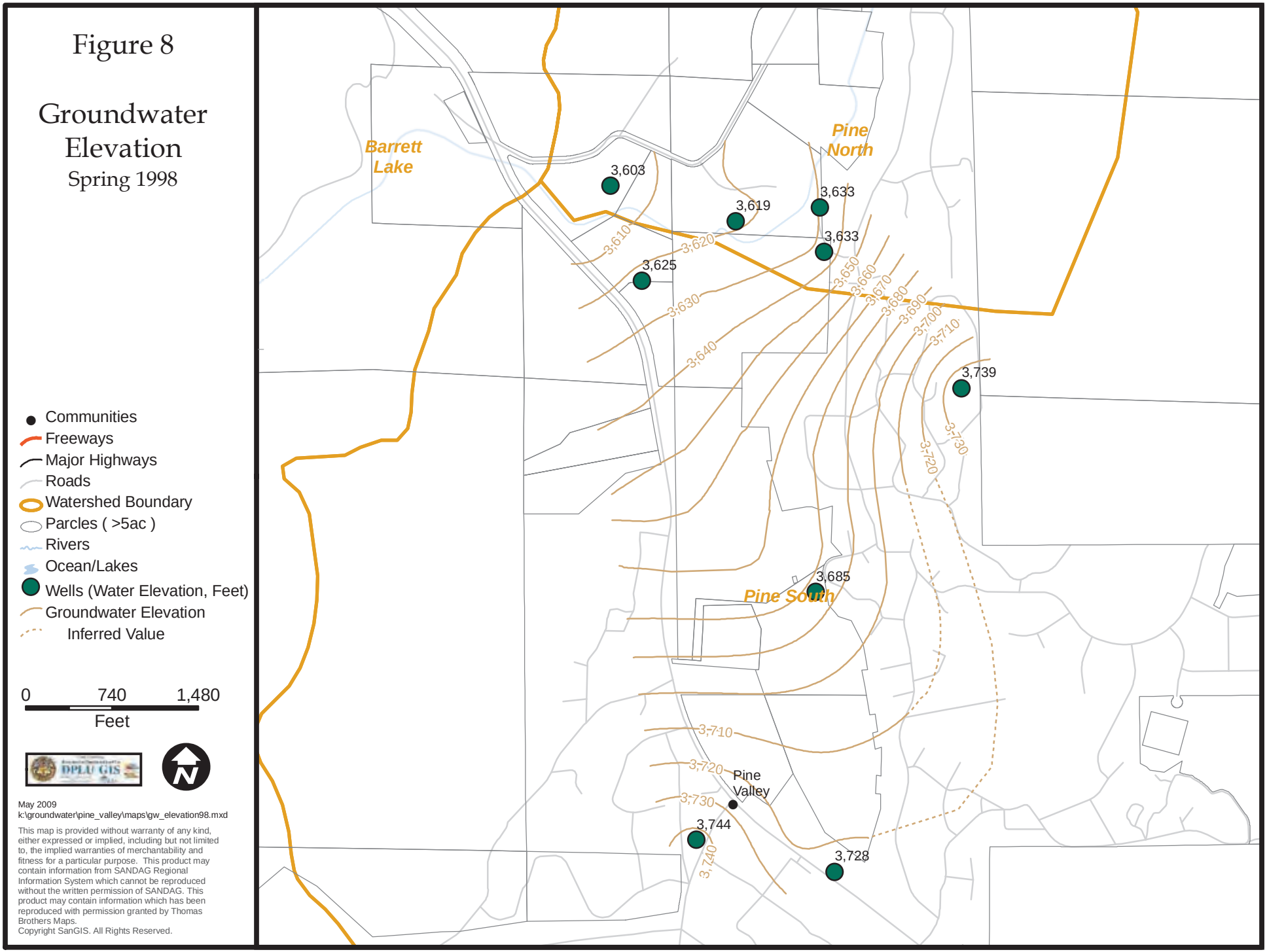

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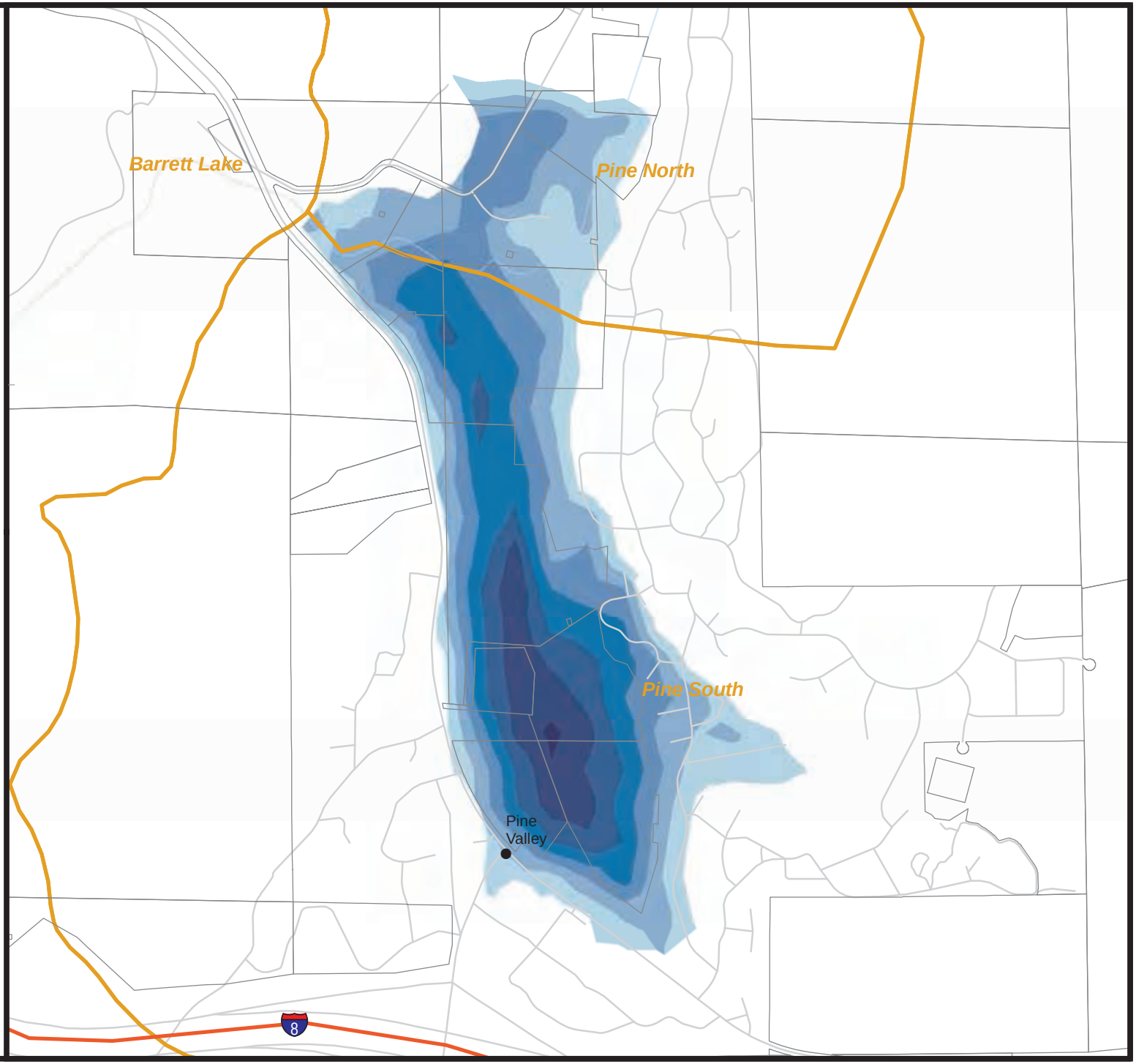
Figure 9

Saturated Alluvium Isopach



- Communities
- Freeways
- Major Highways
- Roads
- Watershed Boundary
- Parcles (>5ac)
- Rivers
- Ocean/Lakes

Saturated Alluvium (Feet)

- 5
- 6 - 15
- 16 - 25
- 26 - 35
- 36 - 45
- 46 - 55
- 56 - 62

0 800 1,600
Feet

DPLU GIS

N

May 2009
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Figure 10

Saturated Residuum Thickness

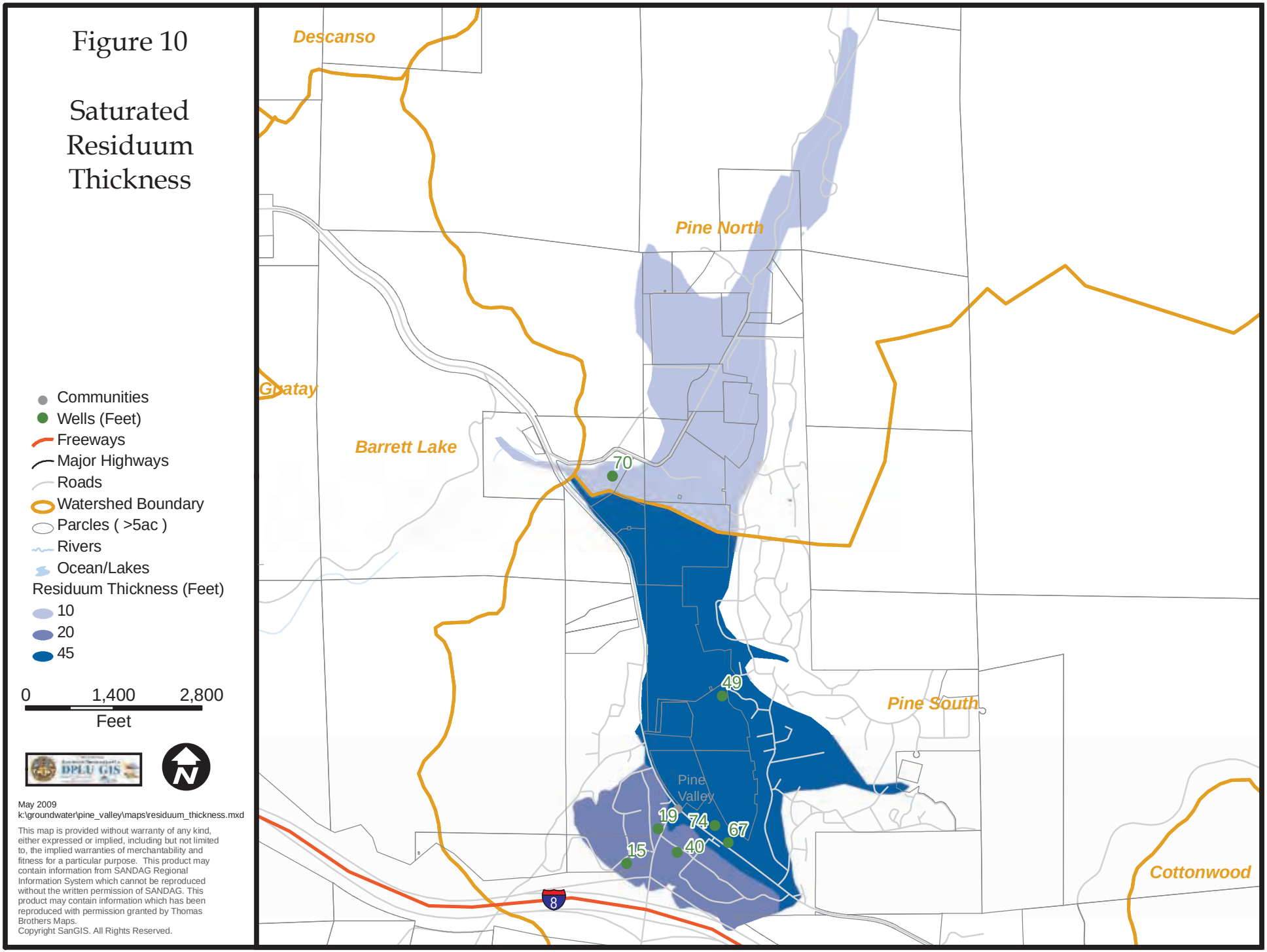

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Figure 11

Well Inventory

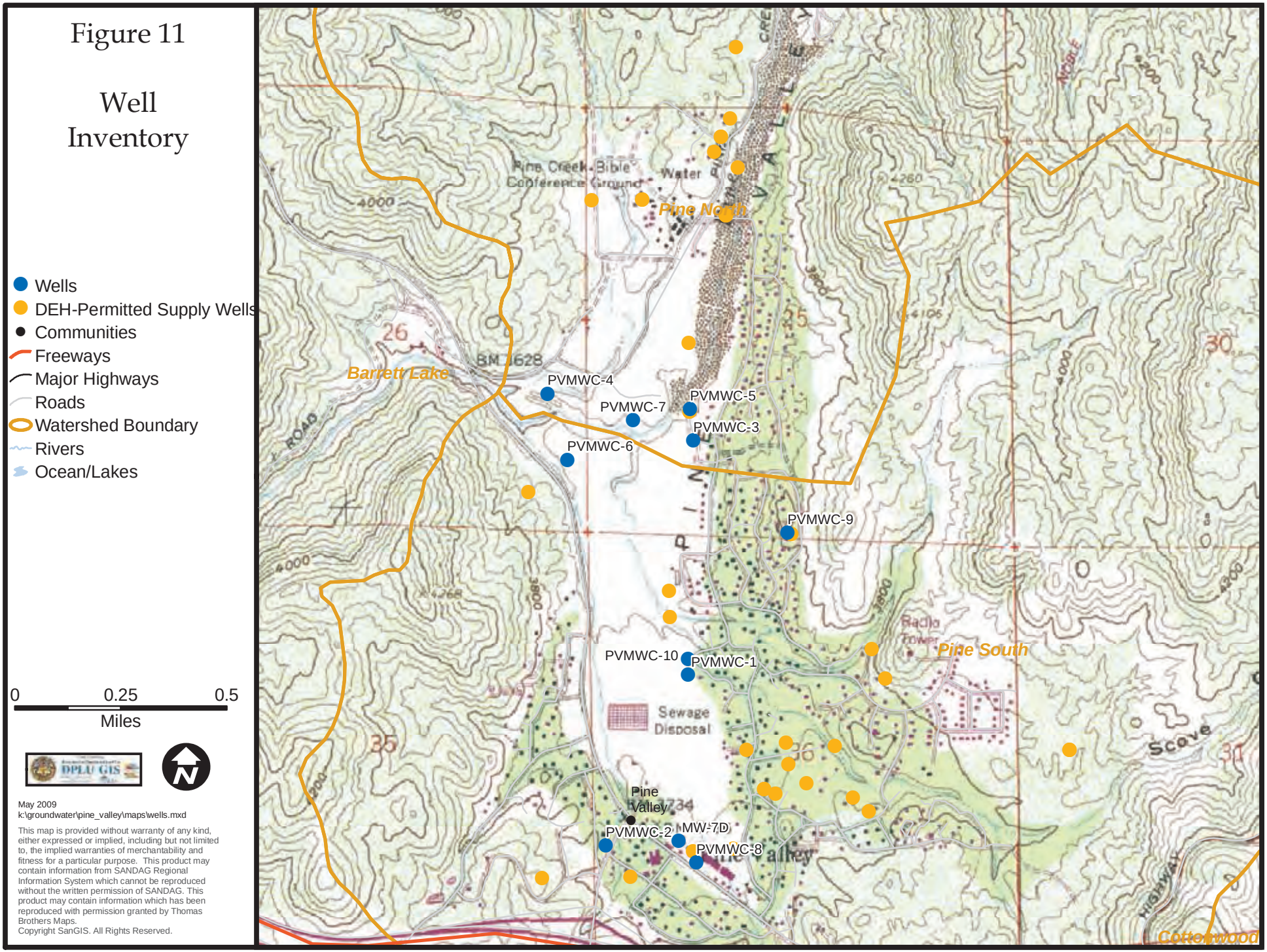

Figure 12: Pine Valley Area 1 Well Hydrographs

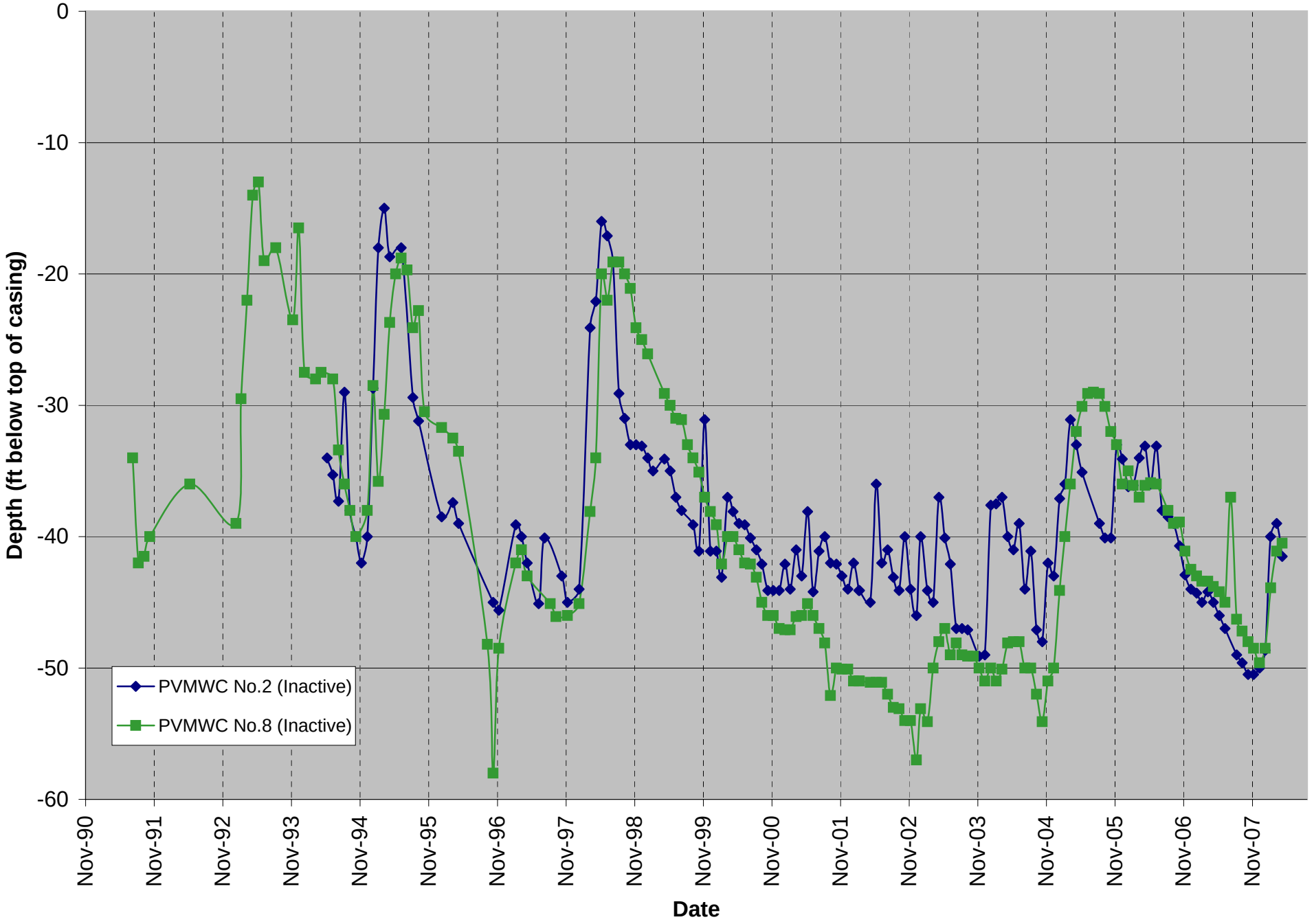

Figure 13: Pine Valley Area 2 Well Hydrographs

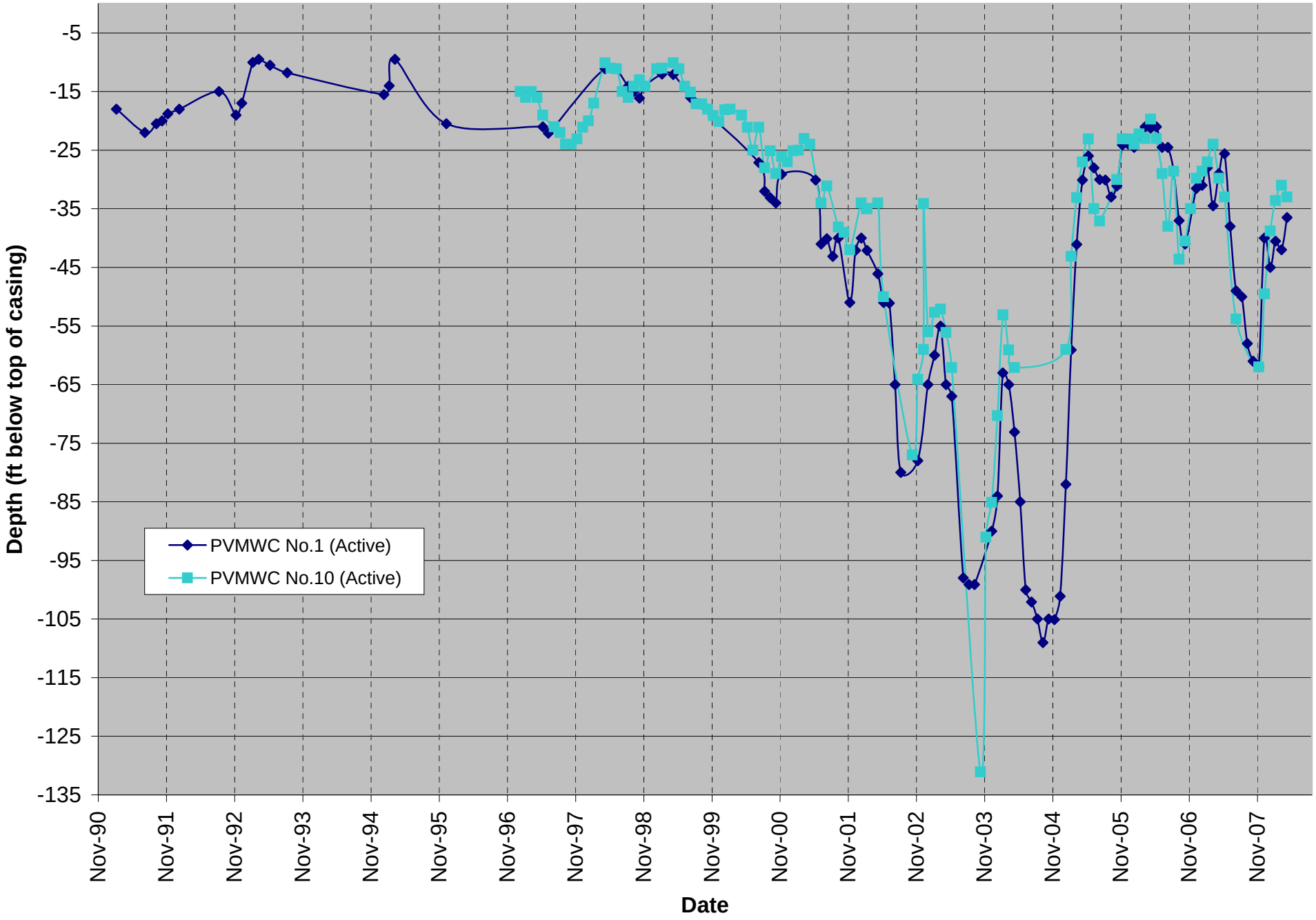

Figure 14: Pine Valley Area 3 Well Hydrographs

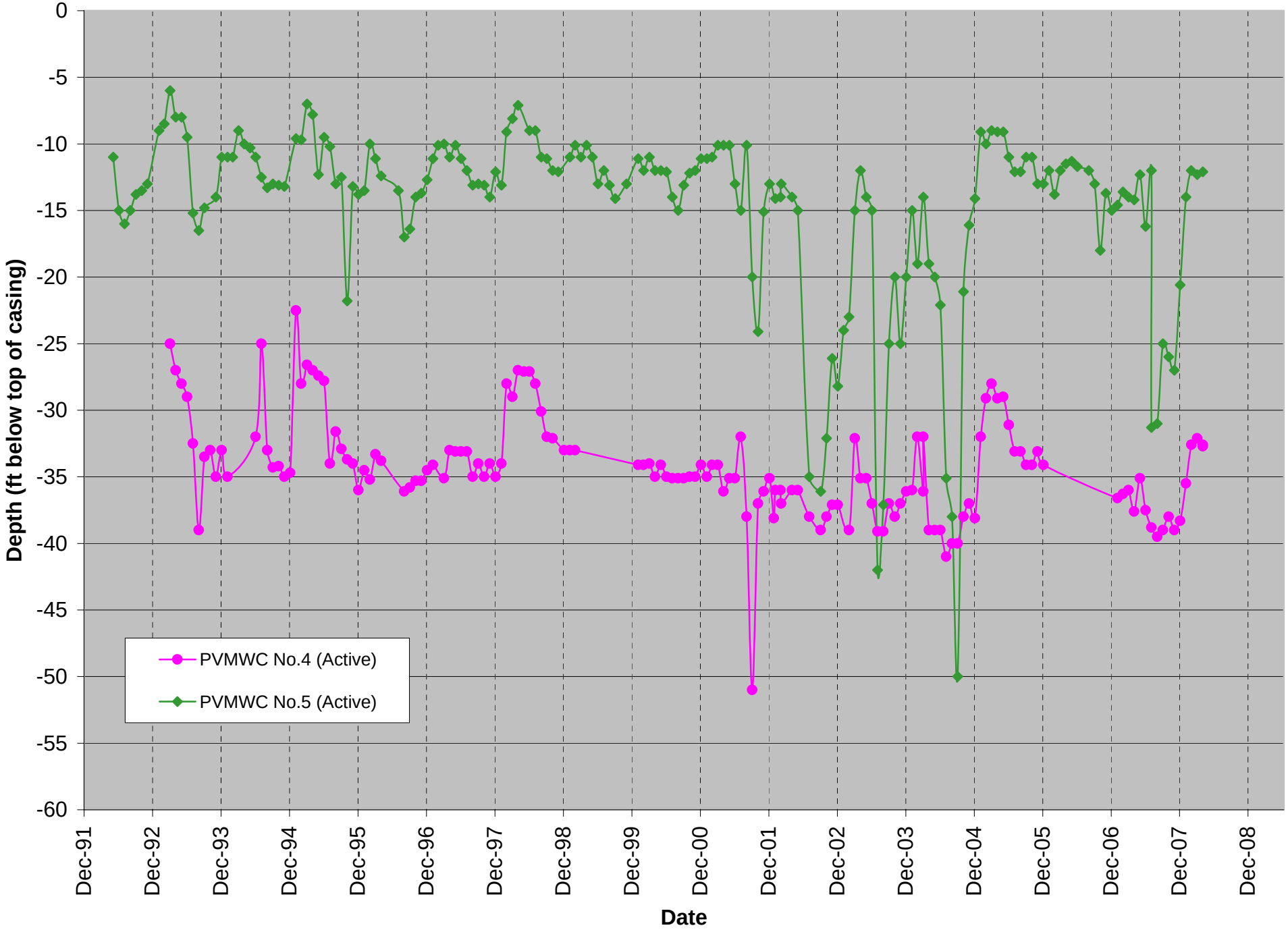

Figure 15: Pine Valley Area 4 Well Hydrographs

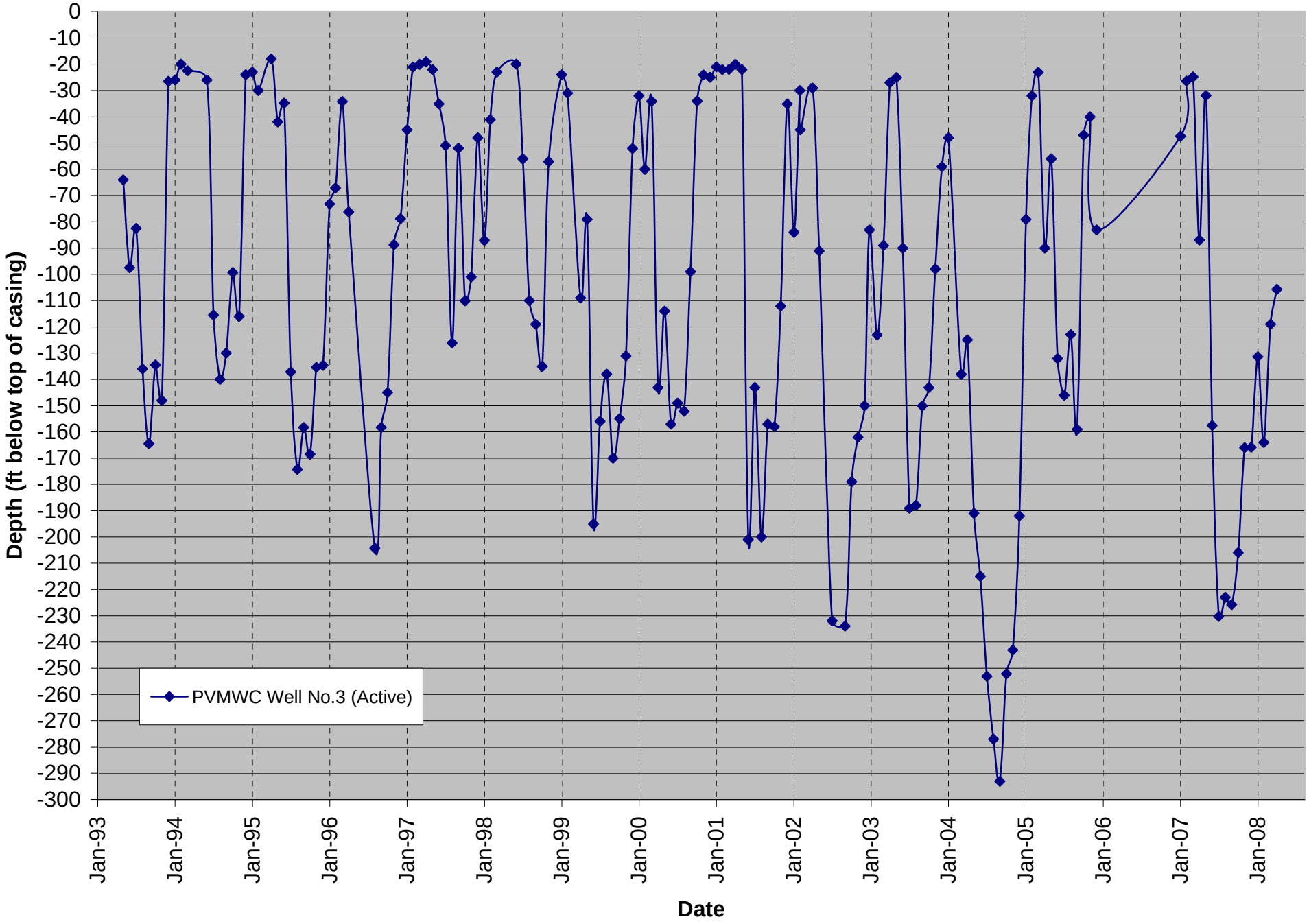

Figure 16: Pine Valley Area 5 Well Hydrographs

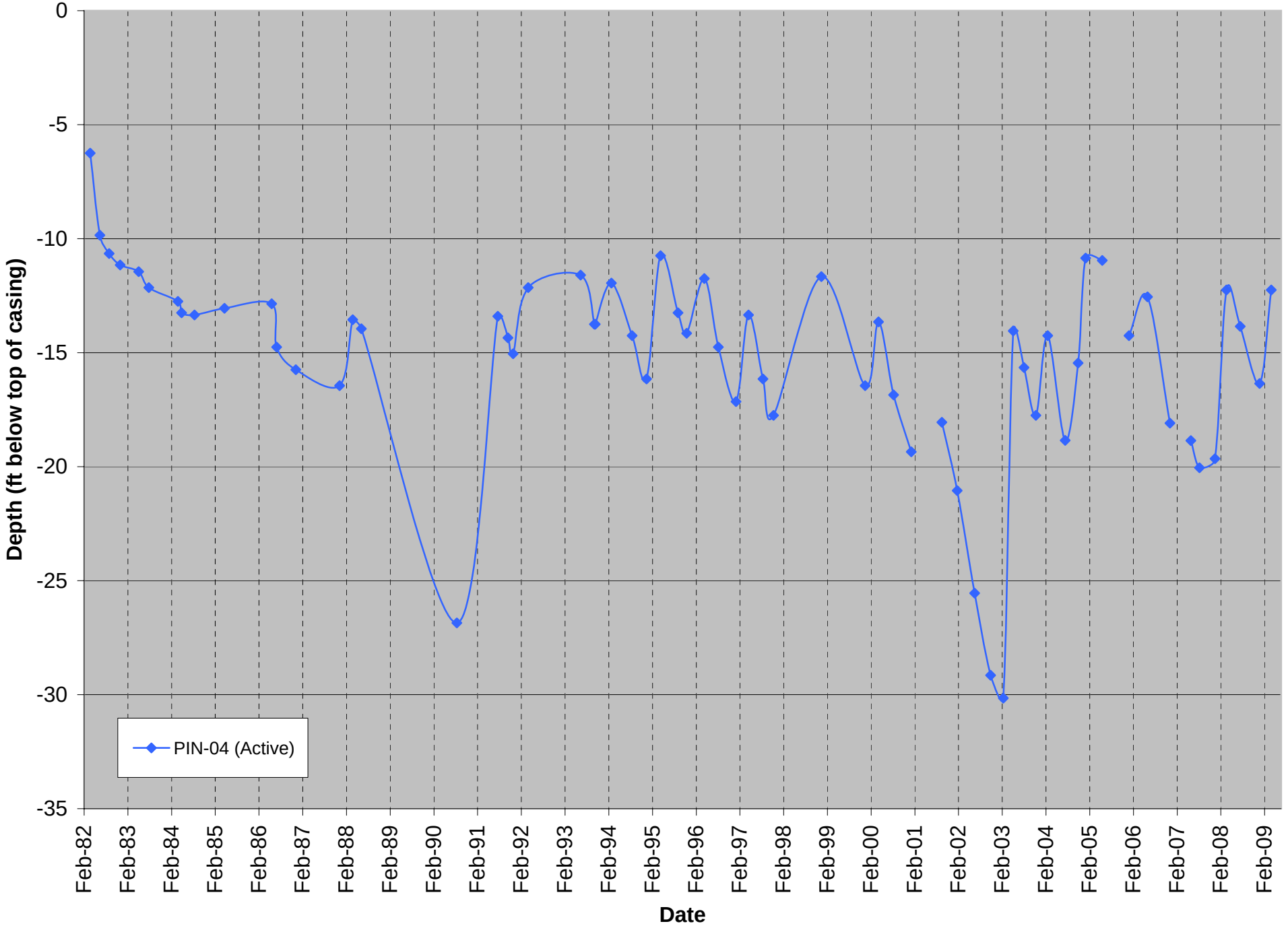

Figure 17

Groundwater Elevation Comparison

Spring 1998 to Summer/Fall 2004

- Communities
- Freeways
- Major Highways
- Roads
- Watershed Boundary
- Parcles (>5ac)
- Rivers
- Ocean/Lakes

Groundwater Drawdown (Feet)

- 0 to -25
- -25 to -50
- -50 to -75
- -75 to -100
- -100 to -125
- -125 to -150
- -150 to -175
- -175 to -200
- -200 to -225
- -225 to -250
- -250 to -275
- -275 to -300

0 800 1,600

Feet

May 2009
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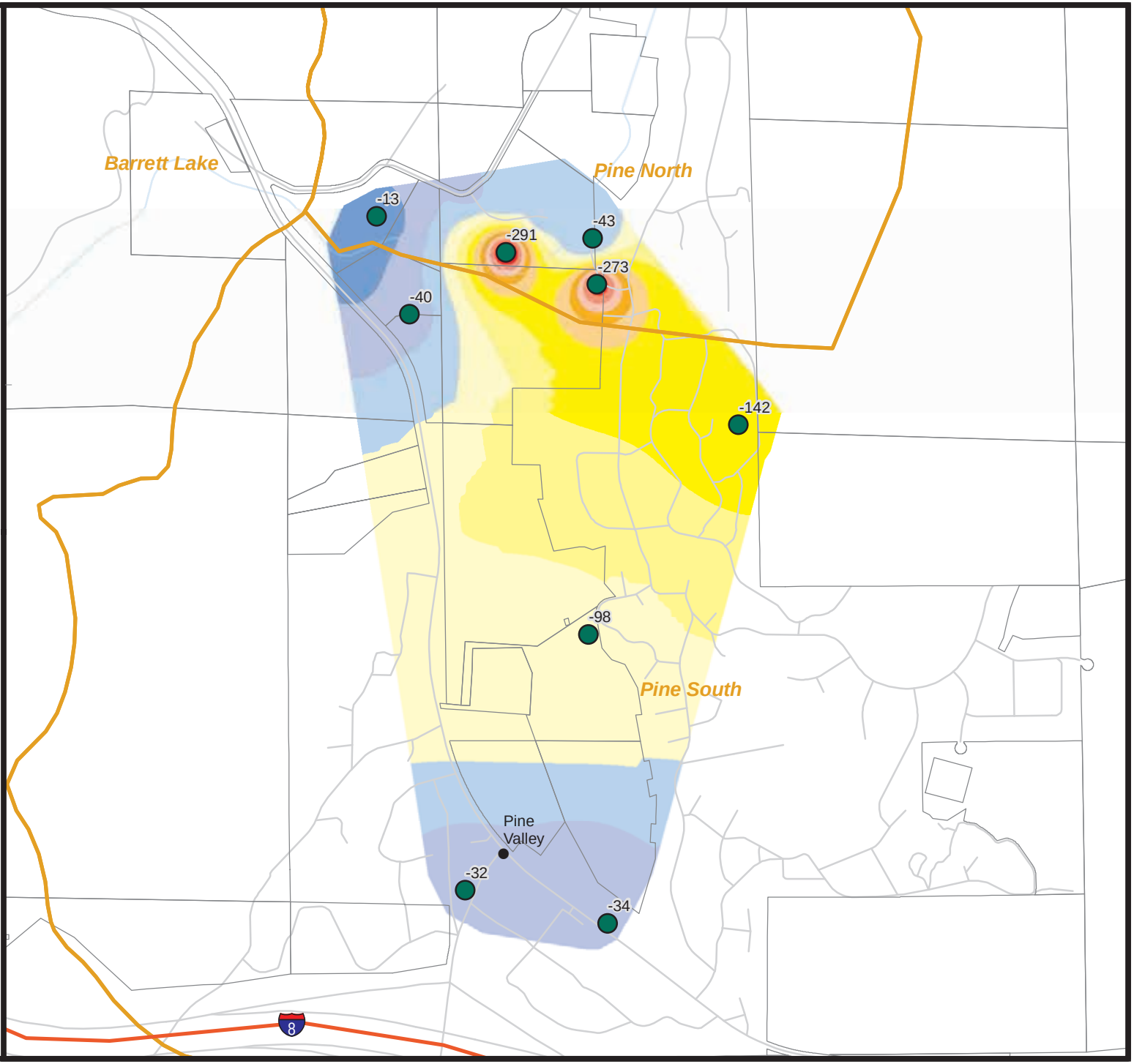
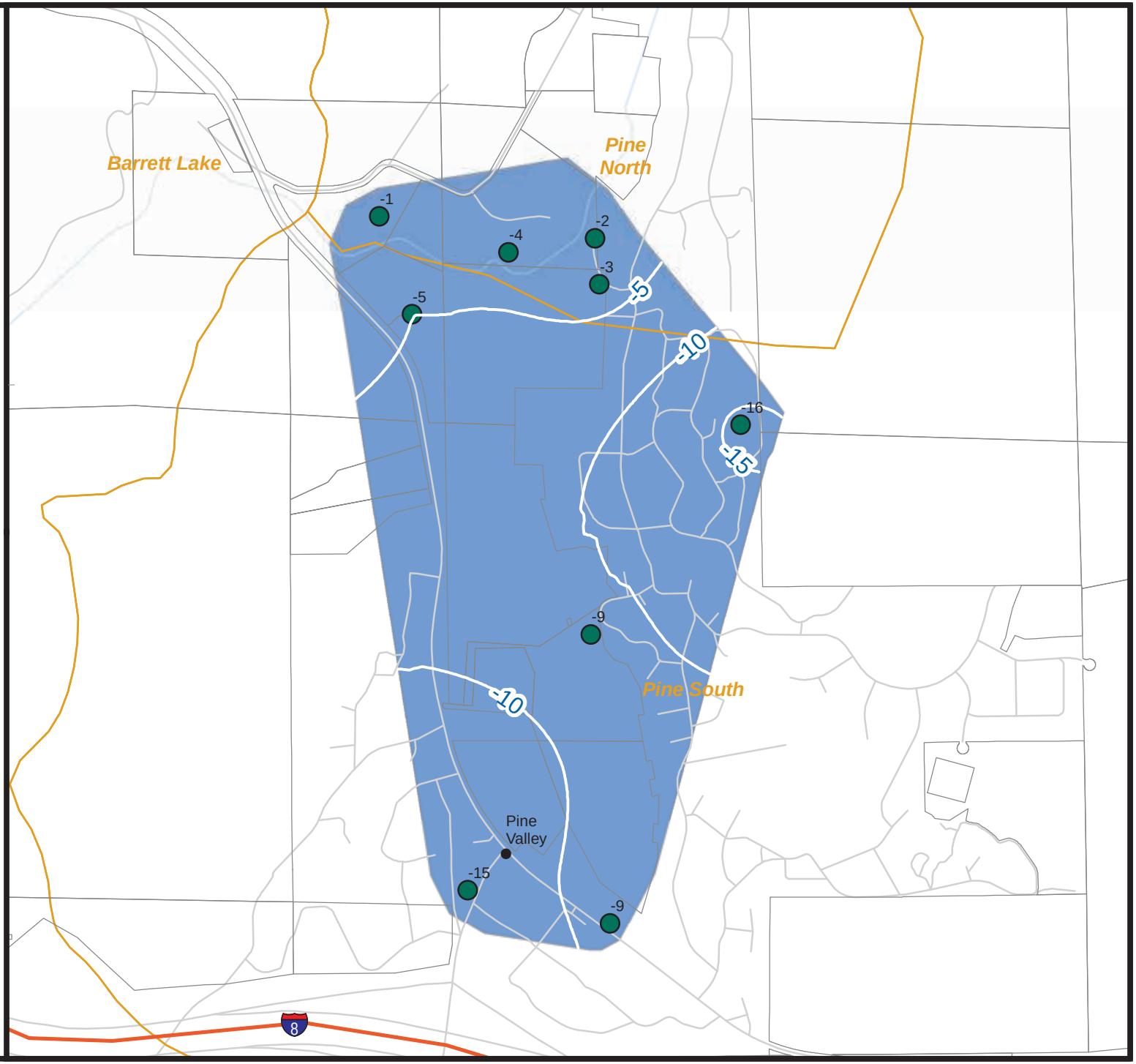


Figure 18

Groundwater Elevation Comparison

Spring 1998 to Spring 2005/2006



- Communities
- Freeways
- Major Highways
- Roads
- Watershed Boundary
- Parcles (>5ac)
- Rivers
- Ocean/Lakes
- Water Elevation Difference (Feet)

Groundwater Drawdown (Feet)

- 0 to -25

0 800 1,600

Feet

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Figure 19

Existing General Plan

- Communities
- Freeways
- Major Highways
- Roads
- Watershed Boundary
- Parcles (>5ac)
- Rivers
- Ocean/Lakes

Existing General Plan

- Residential 1du/1,2,4 ac
- Residential 2du/ac
- Residential 4.3du/ac
- Office Professional
- Neighborhood Professional
- General Commercial
- Service Commercial
- Multiple Rural Use 1du/4,8,20ac
- Public/Semi-Public Land
- National Forest and State Park
- Indian Reservation

0 1 2
Miles

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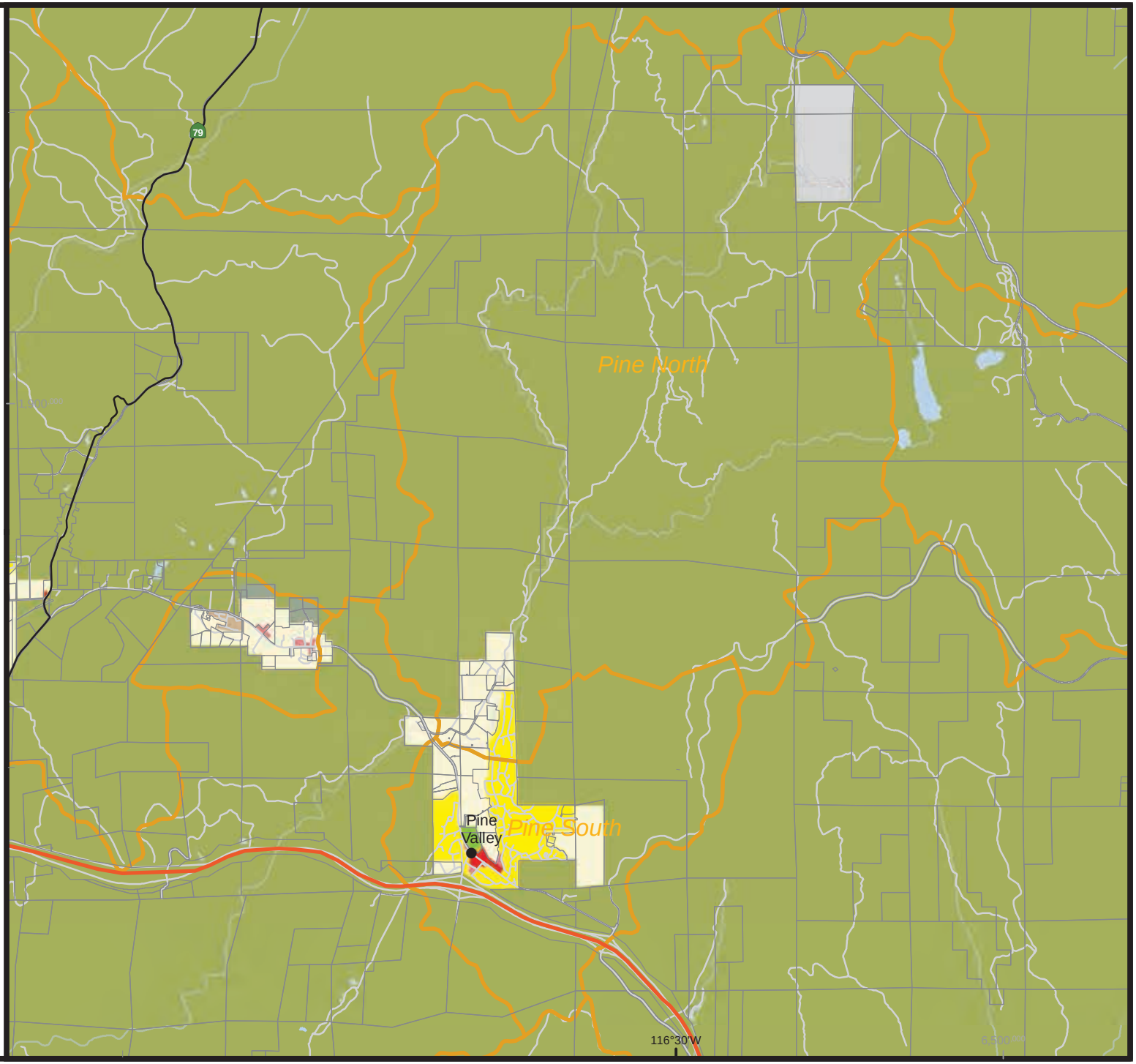

Figure 20

Referral Map (July 2008)

- Communities
- Freeways
- Major Highways
- Roads
- Watershed Boundary
- Parcles (>5ac)
- Rivers
- Ocean/Lakes

Draft Land Use August 2006

- Village Residential (VR-4.3)
- Village Residential (VR-2)
- Semi-rural Residential (SR-1)
- Semi-rural Residential (SR-2)
- Semi-rural Residential (SR-4)
- Semi-rural Residential (SR-10)
- Rural Lands (RL-40)
- Rural Lands (RL-40)
- Office Professional
- Rural Commercial
- Medium Impact Industrial
- Public/Semi-Public Lands
- National Forest & State Parks
- Open Space (Recreation)
- Open Space (Conservation)

0 1 2
Miles

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May 2009
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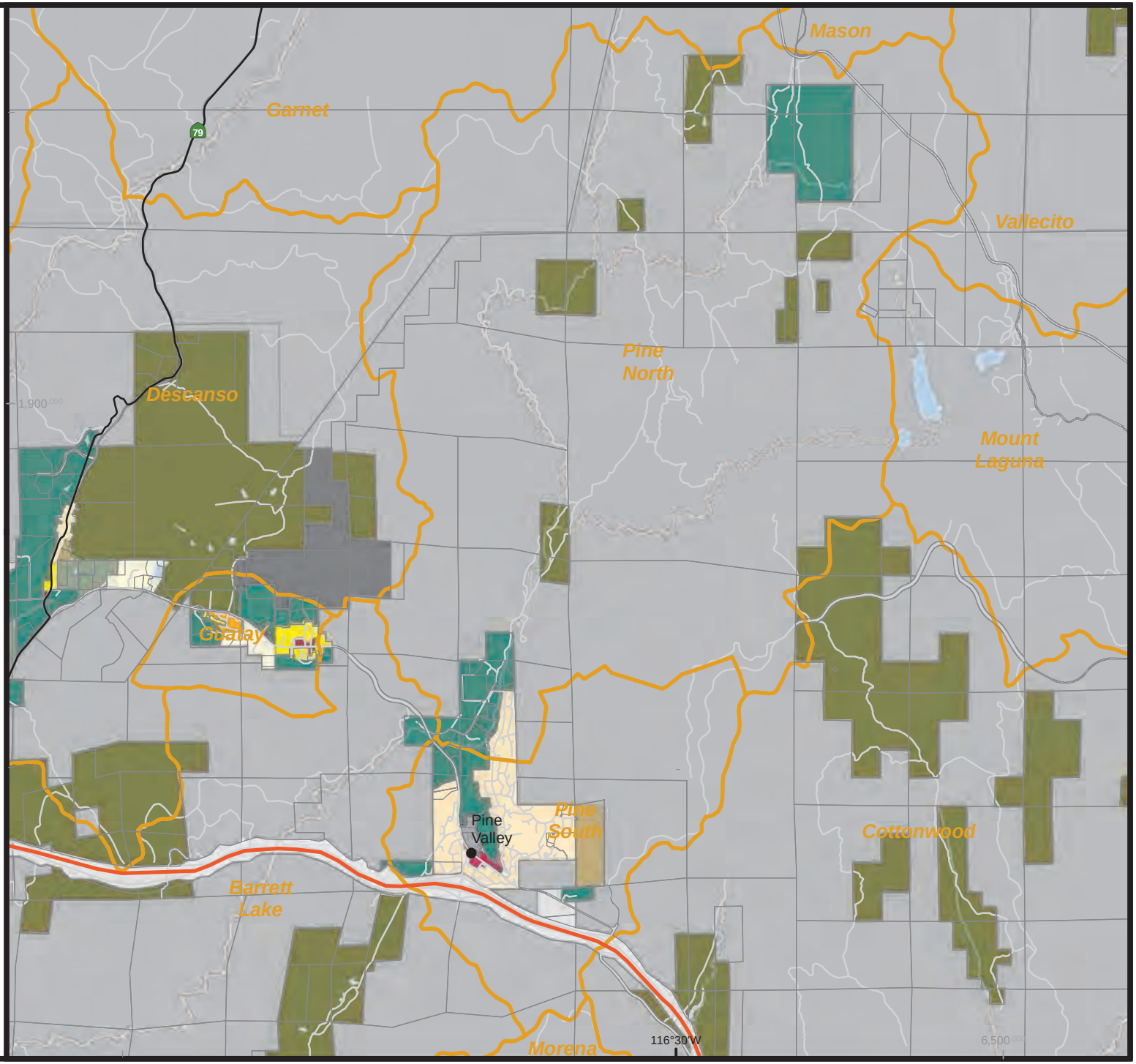
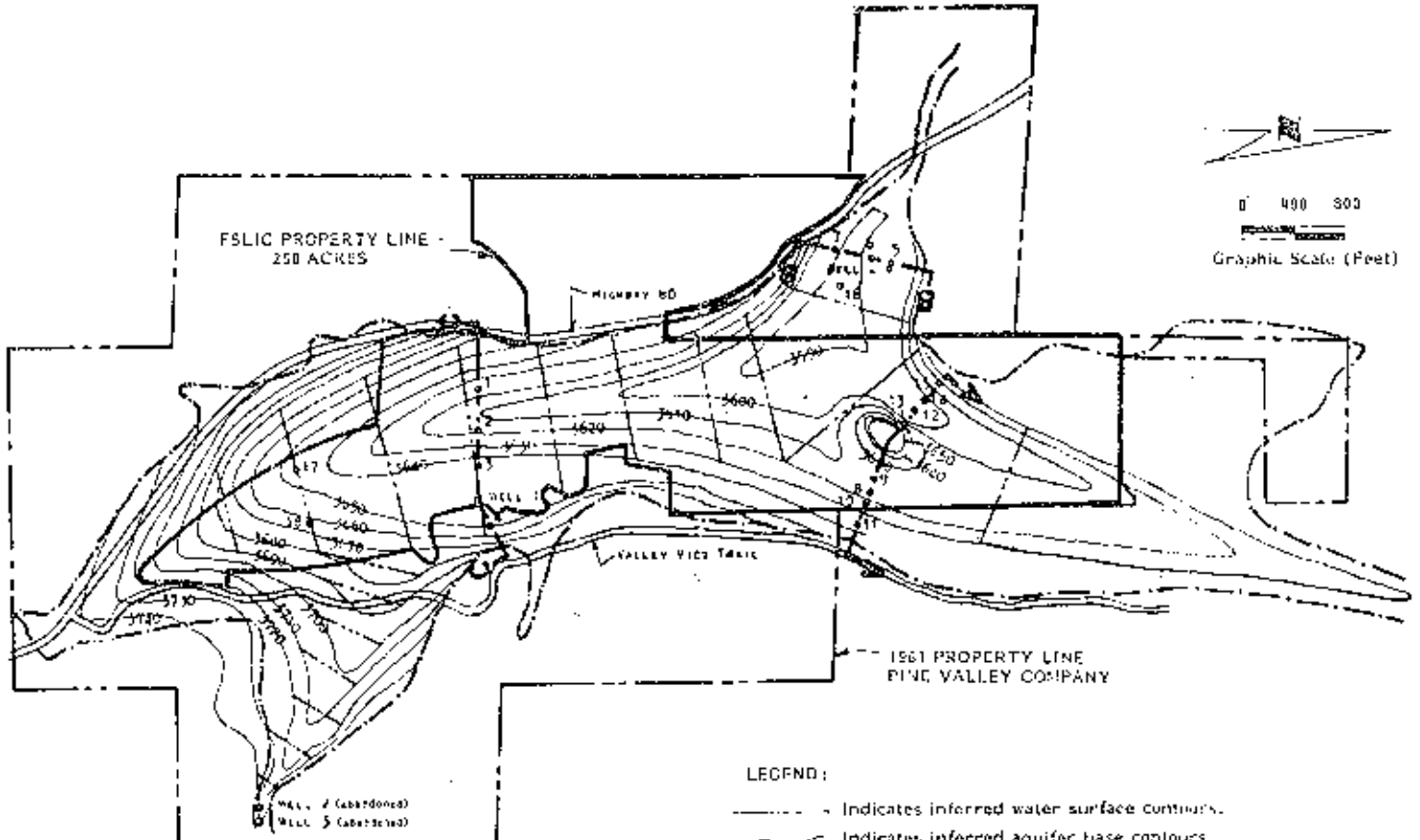


Attachment

Select Data from Woodward, Clyde, Sherard, and Associates, 1961

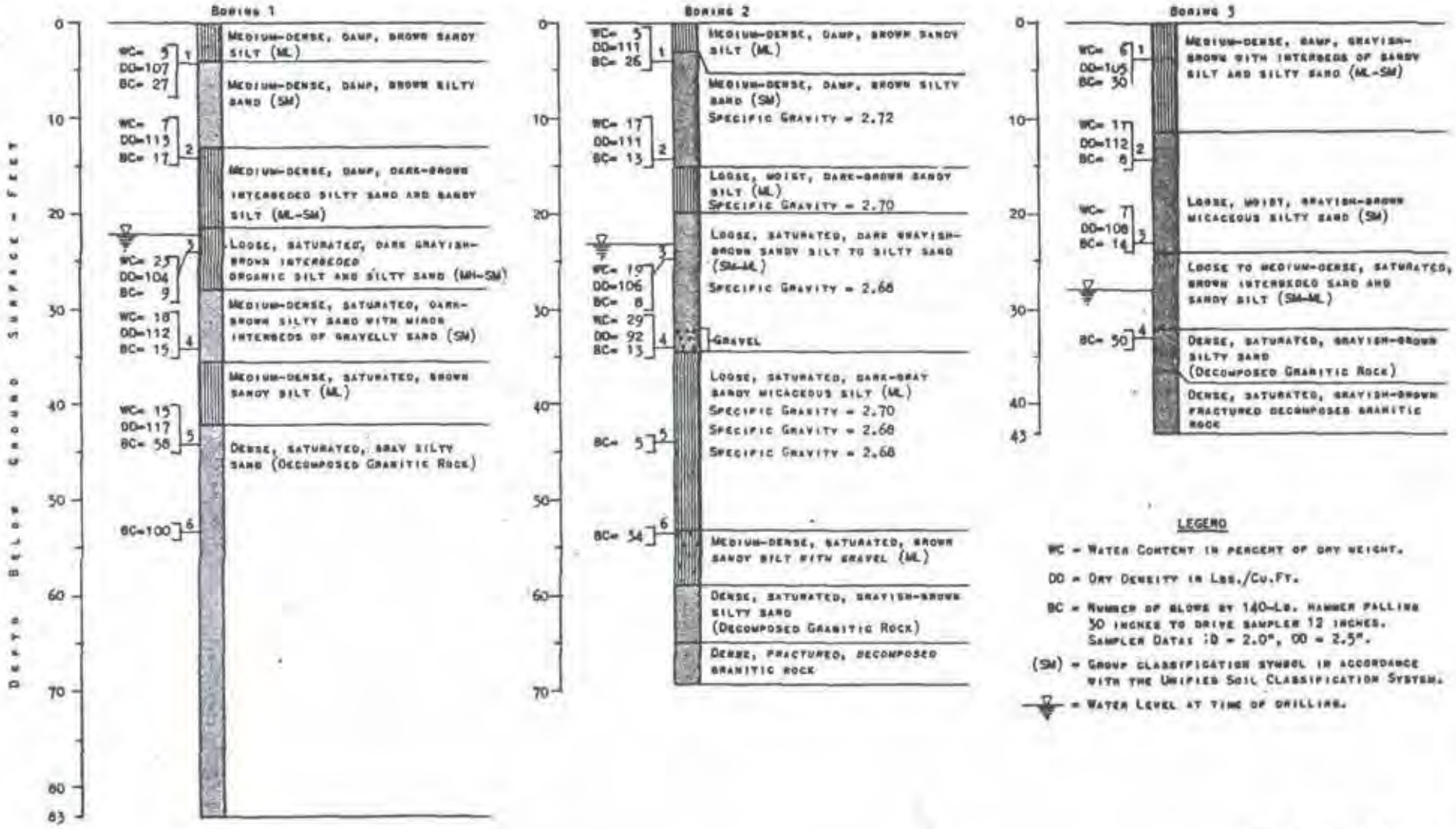


Source: Woodward, Clyde, Sherard and Associates, 1961, Job No. 61-245

PINE VALLEY ALLUVIAL BASIN CONTOUR MAP
PINE VALLEY GROUNDWATER STUDY

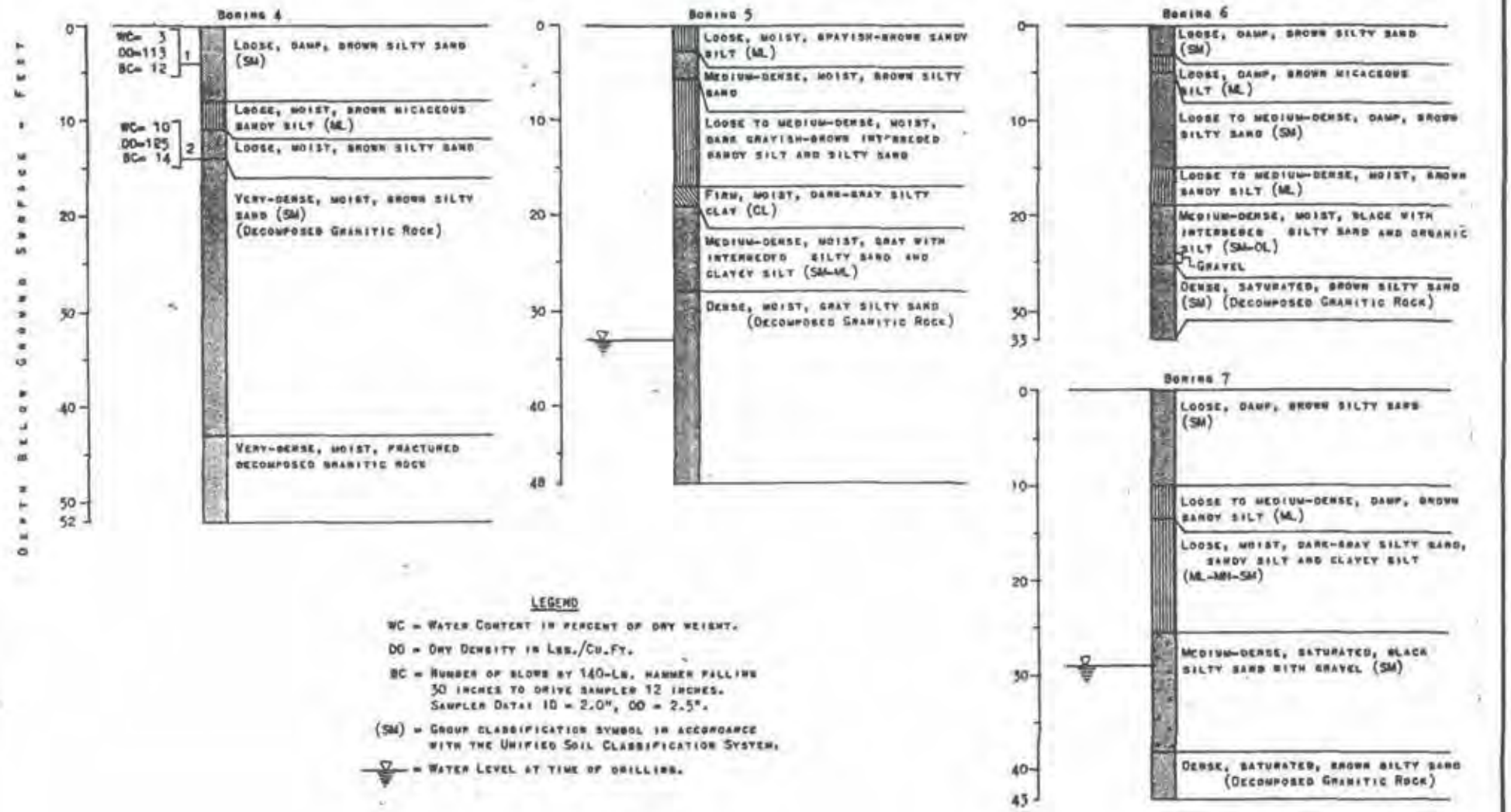
DRAWN BY ch	CHECKED BY KS	FIGURE NO. 4
DATE 3-22-85	PROJECT NO 55105K 0004	

WOODWARD-CLYDE CONSULTANTS



LOGS OF TEST BORINGS 1, 2 & 3
PINE VALLEY BASIN
JOB NO. 61-245

FIG. 4



LEGEND

WC = Water Content in percent of dry weight.

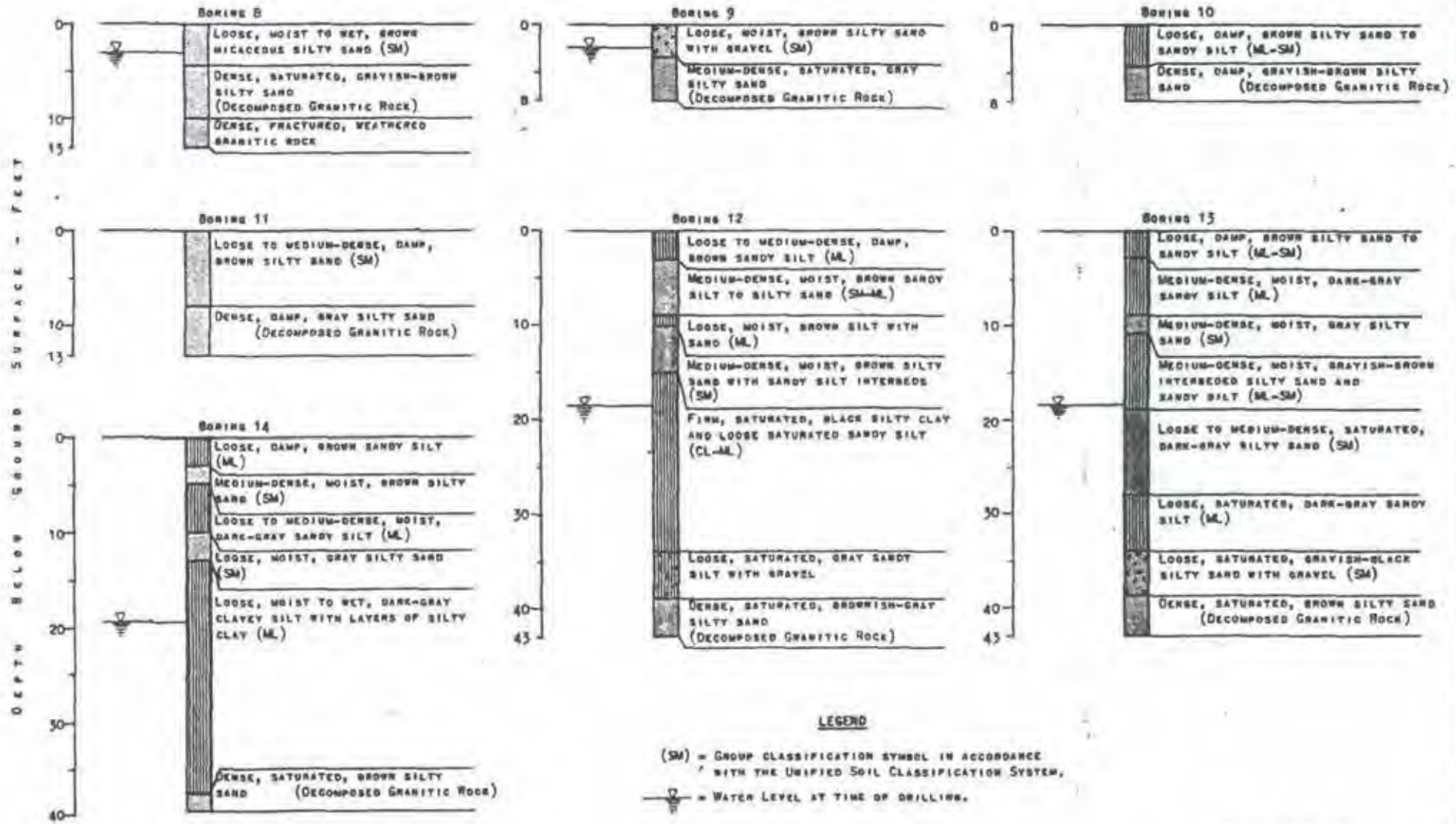
DD = Dry Density in Lbs./Cu.Ft.

BC = Number of blows by 140-lb. hammer falling 30 inches to drive sampler 12 inches. Sampler Data: ID = 2.0", OD = 2.5".

(SM) = Group classification symbol in accordance with the Unified Soil Classification System.

▽ = Water Level at time of drilling.

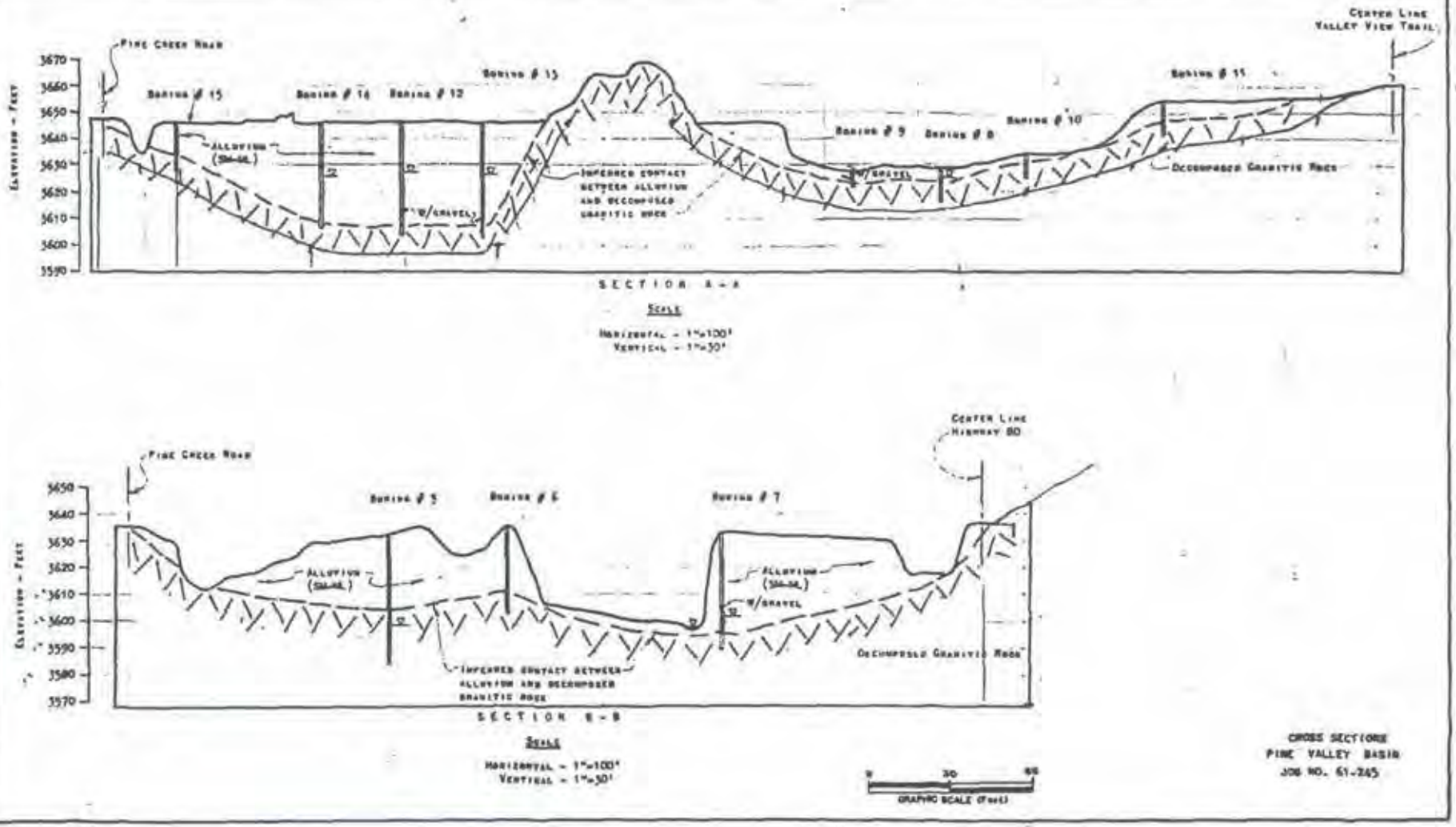
LOGS OF TEST BORINGS 4, 5, 6 & 7
PINE VALLEY BASIN
JOB NO. 61-245



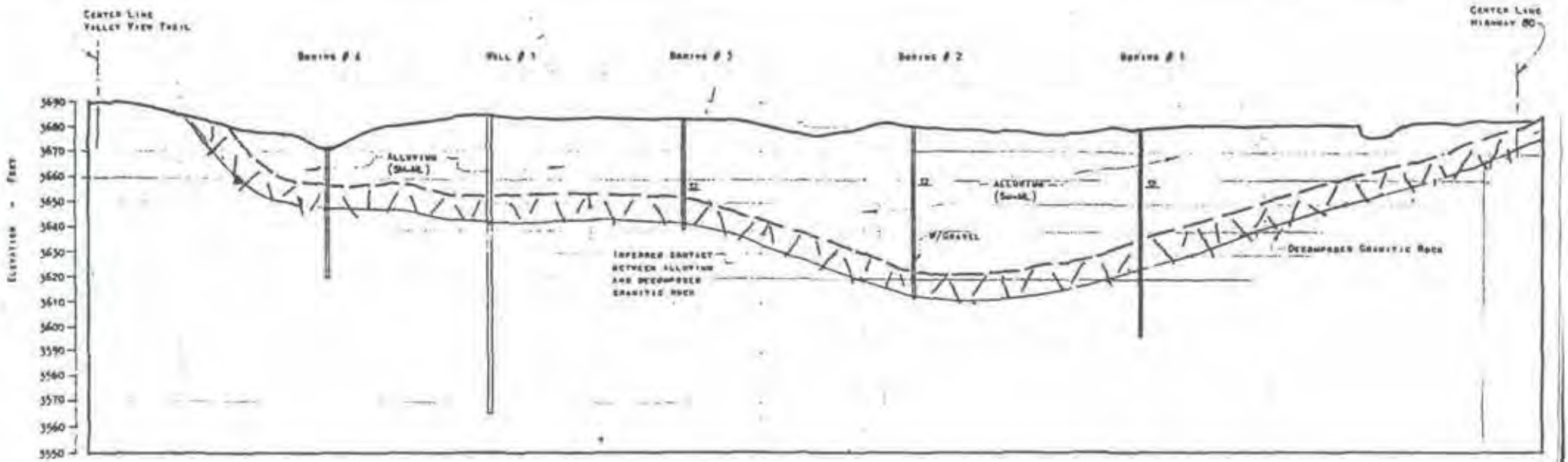
LOGS OF TEST BORINGS 8 THRU 14
PINE VALLEY BASIN
JOB NO. 61-245

LOGS OF TEST BORINGS 15 THRU 18
PINE VALLEY BASIN
JOB NO. 61-245

FIG. 7



CROSS SECTIONS
PINE VALLEY BASIN
JOB NO. 61-245



SECTION C-C

Scale

Horizontal = 1"=100'
Vertical = 1"=30'

0 30 60

Graphic Scale (Feet)

CROSS SECTION
PINE VALLEY BASIN
JOB NO. 61-245

APPENDIX B

Groundwater Recharge Spreadsheet Calculation

YEAR	RECHARGE (AF)	Existing Conditions (Includes Discretionary Permits)	*Existing Conditions (Includes Discretionary Permits) Plus Project	General Plan Buildout	Storage (AF)	delta	Existing Conditions (Includes Discretionary Permits)	Storage (AF)	delta	*Existing Conditions (Includes Discretionary Permits) Plus Project	Storage (AF)	delta	General Plan Buildout	RUNOFF (AF)	PRECIPITATION (AF)
		87.00	87.00	99.00	2694.00	2694.00	2694.00	2694.00	2694.00	2694.00	2694.00	2694.00	2694.00		
7/1/1971	0.00	10.44	10.44	11.88	2683.56	-10.44	2683.56	2683.56	-10.44	2683.56	2682.12	-11.88	2682.12	40354.34	8.74
8/1/1971	0.00	10.44	10.44	11.88	2673.12	-10.44	2673.12	2673.12	-10.44	2673.12	2670.24	-11.88	2670.24	4823.75	123.86
9/1/1971	0.00	8.70	8.70	9.90	2664.42	-8.70	2664.42	2664.42	-8.70	2664.42	2660.34	-9.90	2660.34	4804.99	55.94
10/1/1971	0.00	7.83	7.83	8.91	2656.59	-7.83	2656.59	2656.59	-7.83	2656.59	2651.43	-8.91	2651.43	3991.13	554.02
11/1/1971	0.00	6.09	6.09	6.93	2650.50	-6.09	2650.50	2650.50	-6.09	2650.50	2644.50	-6.93	2644.50	3581.46	96.08
12/1/1971	918.60	5.22	5.22	5.94	3563.88	913.38	2694.00	3563.88	913.38	2694.00	3557.16	912.66	2694.00	2779.19	1943.23
1/1/1972	0.00	5.22	5.22	5.94	3558.66	-5.22	2688.78	3558.66	-5.22	2688.78	3551.22	-5.94	2688.06	3203.07	15.91
2/1/1972	0.00	4.35	4.35	4.95	3554.31	-4.35	2684.43	3554.31	-4.35	2684.43	3546.27	-4.95	2683.11	3198.38	107.59
3/1/1972	0.00	5.22	5.22	5.94	3549.09	-5.22	2679.21	3549.09	-5.22	2679.21	3540.33	-5.94	2677.17	2662.06	11.81
4/1/1972	0.00	6.09	6.09	6.93	3543.00	-6.09	2673.12	3543.00	-6.09	2673.12	3533.40	-6.93	2670.24	3189.78	115.56
5/1/1972	0.00	7.83	7.83	8.91	3535.17	-7.83	2665.29	3535.17	-7.83	2665.29	3524.49	-8.91	2661.33	3715.02	182.91
6/1/1972	0.00	9.57	9.57	10.89	3525.60	-9.57	2655.72	3525.60	-9.57	2655.72	3513.60	-10.89	2650.44	4765.90	350.12
7/1/1972	0.00	10.44	10.44	11.88	3515.16	-10.44	2645.28	3515.16	-10.44	2645.28	3501.72	-11.88	2638.56	5809.22	0.96
8/1/1972	0.00	10.44	10.44	11.88	3504.72	-10.44	2634.84	3504.72	-10.44	2634.84	3489.84	-11.88	2626.68	6318.56	18.06
9/1/1972	0.00	8.70	8.70	9.90	3496.02	-8.70	2626.14	3496.02	-8.70	2626.14	3479.94	-9.90	2616.78	6299.80	156.07
10/1/1972	0.00	7.83	7.83	8.91	3488.19	-7.83	2618.31	3488.19	-7.83	2618.31	3471.03	-8.91	2607.87	5236.80	591.64
11/1/1972	202.82	6.09	6.09	6.93	3684.92	196.73	2694.00	3684.92	196.73	2694.00	3666.92	195.89	2694.00	4702.56	1443.34
12/1/1972	301.16	5.22	5.22	5.94	3980.86	295.94	2694.00	3980.86	295.94	2694.00	3962.14	295.22	2694.00	3863.83	1011.21
1/1/1973	1293.69	5.22	5.22	5.94	5269.33	1288.47	2694.00	5269.33	1288.47	2694.00	5249.89	1287.75	2694.00	3577.84	1194.22
2/1/1973	1225.35	4.35	4.35	4.95	6490.33	1221.00	2694.00	6490.33	1221.00	2694.00	6470.29	1220.40	2694.00	4735.87	1477.37
3/1/1973	1050.32	5.22	5.22	5.94	7535.43	1045.10	2694.00	7535.43	1045.10	2694.00	7514.67	1044.38	2694.00	4861.04	2105.36
4/1/1973	0.00	6.09	6.09	6.93	7529.34	-6.09	2687.91	7529.34	-6.09	2687.91	7507.74	-6.93	2687.07	6772.55	111.45
5/1/1973	0.00	7.83	7.83	8.91	7521.51	-7.83	2680.08	7521.51	-7.83	2680.08	7498.83	-8.91	2678.16	7894.92	44.61
6/1/1973	0.00	9.57	9.57	10.89	7511.94	-9.57	2670.51	7511.94	-9.57	2670.51	7487.94	-10.89	2667.27	10140.05	11.85
7/1/1973	0.00	10.44	10.44	11.88	7501.50	-10.44	2660.07	7501.50	-10.44	2660.07	7476.06	-11.88	2655.39	12377.63	4.41
8/1/1973	0.00	10.44	10.44	11.88	7491.06	-10.44	2649.63	7491.06	-10.44	2649.63	7464.18	-11.88	2643.51	13484.10	79.69
9/1/1973	0.00	8.70	8.70	9.90	7482.36	-8.70	2640.93	7482.36	-8.70	2640.93	7454.28	-9.90	2633.61	13465.34	4.41
10/1/1973	0.00	7.83	7.83	8.91	7474.53	-7.83	2633.10	7474.53	-7.83	2633.10	7445.37	-8.91	2624.70	11208.08	18.10
11/1/1973	3.11	6.09	6.09	6.93	7471.55	-2.98	2630.12	7471.55	-2.98	2630.12	7441.55	-3.82	2620.88	10076.72	944.49
12/1/1973	0.00	5.22	5.22	5.94	7466.33	-5.22	2624.90	7466.33	-5.22	2624.90	7435.61	-5.94	2614.94	7834.32	111.08
1/1/1974	2171.99	5.22	5.22	5.94	9633.10	2166.77	2694.00	9633.10	2166.77	2694.00	9601.66	2166.05	2694.00	6710.44	2199.57
2/1/1974	0.00	4.35	4.35	4.95	9628.75	-4.35	2689.65	9628.75	-4.35	2689.65	9596.71	-4.95	2689.05	8657.85	56.85
3/1/1974	0.00	5.22	5.22	5.94	9623.53	-5.22	2684.43	9623.53	-5.22	2684.43	9590.77	-5.94	2683.11	7211.62	891.31
4/1/1974	0.00	6.09	6.09	6.93	9617.44	-6.09	2678.34	9617.44	-6.09	2678.34	9583.84	-6.93	2676.18	8649.25	173.99
5/1/1974	0.00	7.83	7.83	8.91	9609.61	-7.83	2670.51	9609.61	-7.83	2670.51	9574.93	-8.91	2667.27	10084.41	31.72
6/1/1974	0.00	9.57	9.57	10.89	9600.04	-9.57	2660.94	9600.04	-9.57	2660.94	9564.04	-10.89	2656.38	12955.11	4.96
7/1/1974	0.00	10.44	10.44	11.88	9589.60	-10.44	2650.50	9589.60	-10.44	2650.50	9552.16	-11.88	2644.50	15818.25	163.47
8/1/1974	0.00	10.44	10.44	11.88	9579.16	-10.44	2640.06	9579.16	-10.44	2640.06	9540.28	-11.88	2632.62	17237.51	28.05
9/1/1974	0.00	8.70	8.70	9.90	9570.46	-8.70	2631.36	9570.46	-8.70	2631.36	9530.38	-9.90	2622.72	17218.74	56.68
10/1/1974	0.00	7.83	7.83	8.91	9562.63	-7.83	2623.53	9562.63	-7.83	2623.53	9521.47	-8.91	2613.81	14335.92	860.85
11/1/1974	0.00	6.09	6.09	6.93	9556.54	-6.09	2617.44	9556.54	-6.09	2617.44	9514.54	-6.93	2606.88	12891.77	144.34
12/1/1974	174.27	5.22	5.22	5.94	9725.60	169.05	2694.00	9725.60	169.05	2694.00	9682.88	168.33	2694.00	10020.55	945.84
1/1/1975	0.00	5.22	5.22	5.94	9720.38	-5.22	2688.78	9720.38	-5.22	2688.78	9676.94	-5.94	2688.06	8740.98	182.56
2/1/1975	10.09	4.35	4.35	4.95	9726.12	5.74	2694.00	9726.12	5.74	2694.00	9682.08	5.14	2693.20	8736.29	753.57
3/1/1975	432.48	5.22	5.22	5.94	10153.38	427.26	2694.00	10153.38	427.26	2694.00	10108.62	426.54	2694.00	7284.54	2096.33
4/1/1975	0.00	6.09	6.09	6.93	10147.29	-6.09	2687.91	10147.29	-6.09	2687.91	10101.69	-6.93	2687.07	9125.45	1289.86
5/1/1975	0.00	7.83	7.83	8.91	10139.46	-7.83	2680.08	10139.46	-7.83	2680.08	10092.78	-8.91	2678.16	10639.98	64.47
6/1/1975	0.00	9.57	9.57	10.89	10129.89	-9.57	2670.51	10129.89	-9.57	2670.51	10081.89	-10.89	2667.27	13669.41	50.77
7/1/1975	0.00	10.44	10.44	11.88	10119.45	-10.44	2660.07	10119.45	-10.44	2660.07	10070.01	-11.88	2655.39	16691.29	24.55
8/1/1975	0.00	10.44	10.44	11.88	10109.01	-10.44	2649.63	10109.01	-10.44	2649.63	10058.13	-11.88	2643.51	18189.91	7.96
9/1/1975	0.00	8.70	8.70	9.90	10100.31	-8.70	2640.93	10100.31	-8.70	2640.93	10048.23	-9.90	2633.61	18171.15	128.68
10/1/1975	0.00	7.83	7.83	8.91	10092.48	-7.83	2633.10	10092.48	-7.83	2633.10	10039.32	-8.91	2624.70	15129.59	94.54
11/1/1975	0.00	6.09	6.09	6.93	10086.39	-6.09	2627.01	10086.39	-6.09	2627.01	10032.39	-6.93	2617.77	13606.08	665.03
12/1/1975	0.00	5.22	5.22	5.94	10081.17	-5.22	2621.79	10081.17	-5.22	2621.79	10026.45	-5.94	2611.83	10576.12	309.06
1/1/1976	0.00	5.22	5.22	5.94	10075.95	-5.22	2616.57	10075.95	-5.22	2616.57	10020.51	-5.94	2605.89	9060.55	30.42
2/1/1976	1443.98	4.35	4.35	4.95	11515.58	1439.63	2694.00	11515.58	1439.63	2694.00	11459.54	1439.03	2694.00	9055.86	2721.24
3/1/1976	0.00	5.22	5.22	5.94	11510.36	-5.22	2688.78	11510.36	-5.22	2688.78	11453.60	-5.94	2688.06	8624.79	960.63
4/1/1976	0.00	6.09	6.09	6.93	11504.27	-6.09	2682.69	11504.27	-6.09	2682.69	11446.67	-6.93	2681.13	10345.06	839.23
5/1/1976	0.00	7.83	7.83	8.91	11496.44	-7.83	2674.86	11496.44	-7.83	2674.86	11437.76	-8.91	2672.22	12062.85	88.05
6/1/1976	0.00	9.57	9.57	10.89	11486.87	-9.57	2665.29	11486.87	-9.57	2665.29	11426.87	-10.89	2661.33	15498.82	12.71
7/1/1976	0.00	10.44	10.44	11.88	11476.43	-10.44	2654.85	11476.43	-10.44	2654.85	11414.99	-11.88	2649.45	18927.23	245.97
8/1/1976	0.00	10.44	10.44	11.88	11465.99	-10.44	2644.41	11465.99	-10.44	2644.41	11403.11	-11.88	2637.57	20629.12	16.05
9/1/1976	0.00	8.70	8.70	9.90	11457.29	-8.70	2635.71	11457.29	-8.70	2635.71	11393.21	-9.90	2627.67	20610.35	1279.19
10/1/1976	0.00	7.83	7.83	8.91	11449.46	-7.83	2627.88	11449.46	-7.83	2627.88	11384.30	-8.91	2618.76	17162.26	283.23
11/1/1976	0.00	6.09	6.09	6.93	11443.37	-6.09	2621.79	11443.37	-6.09	2621.79	11377.37	-6.93	2611.83	15435.48	439.50
12/1/1976	1.68	5.22	5.22	5.94	11439.83	-3.54	2618.25	11439.83	-3.54	2618.25	11373.11	-4.26	2607.57	11998.99	561.11
1/1/1977	510.29	5.22	5.22	5.94	11944.90	505.07	2694.00	11944.90	505.07	2694.00	11877.46	504.35	2694.00	10281.66	1504.60
2/1/1977	0.00	4.35	4.35	4.95	11940.55	-4.35	2689.65	11940.55	-4.35	2689.65	11872.51	-4.95	2689.05	10735.60	207.80

YEAR	RECHARGE (AF)	Existing Conditions (Includes Discretionary Permits)	*Existing Conditions (Includes Discretionary Permits) Plus Project	General Plan Buildout	Storage (AF)	delta	Existing Conditions (Includes Discretionary Permits)	Storage (AF)	delta	*Existing Conditions (Includes Discretionary Permits) Plus Project	Storage (AF)	delta	General Plan Buildout	RUNOFF (AF)	PRECIPITATION (AF)
3/1/1977	0.00	5.22	5.22	5.94	11935.33	-5.22	2684.43	11935.33	-5.22	2684.43	11866.57	-5.94	2683.11	8943.08	755.67
4/1/1977	0.00	6.09	6.09	6.93	11929.24	-6.09	2678.34	11929.24	-6.09	2678.34	11859.64	-6.93	2676.18	10727.00	82.77
5/1/1977	0.00	7.83	7.83	8.91	11921.41	-7.83	2670.51	11921.41	-7.83	2670.51	11850.73	-8.91	2667.27	12508.45	1068.84
6/1/1977	0.00	9.57	9.57	10.89	11911.84	-9.57	2660.94	11911.84	-9.57	2660.94	11839.84	-10.89	2656.38	16071.73	12.35
7/1/1977	0.00	10.44	10.44	11.88	11901.40	-10.44	2650.50	11901.40	-10.44	2650.50	11827.96	-11.88	2644.50	19627.46	19.29
8/1/1977	0.00	10.44	10.44	11.88	11890.96	-10.44	2640.06	11890.96	-10.44	2640.06	11816.08	-11.88	2632.62	21393.01	1142.05
9/1/1977	0.00	8.70	8.70	9.90	11882.26	-8.70	2631.36	11882.26	-8.70	2631.36	11806.18	-9.90	2622.72	21374.24	10.42
10/1/1977	0.00	7.83	7.83	8.91	11874.43	-7.83	2623.53	11874.43	-7.83	2623.53	11797.27	-8.91	2613.81	17798.84	257.20
11/1/1977	0.00	6.09	6.09	6.93	11868.34	-6.09	2617.44	11868.34	-6.09	2617.44	11790.34	-6.93	2606.88	16008.40	89.35
12/1/1977	504.03	5.22	5.22	5.94	12367.15	498.81	2694.00	12367.15	498.81	2694.00	12288.43	498.09	2694.00	12444.59	1509.67
1/1/1978	7210.80	5.22	5.22	5.94	19572.73	7205.58	2694.00	19572.73	7205.58	2694.00	19493.29	7204.86	2694.00	11115.10	4066.75
2/1/1978	4310.95	4.35	4.35	4.95	23879.33	4306.60	2694.00	23879.33	4306.60	2694.00	23799.29	4306.00	2694.00	17591.19	2664.21
3/1/1978	4065.50	5.22	5.22	5.94	27939.60	4060.28	2694.00	27939.60	4060.28	2694.00	27858.84	4059.56	2694.00	17884.83	3358.77
4/1/1978	0.00	6.09	6.09	6.93	27933.51	-6.09	2687.91	27933.51	-6.09	2687.91	27851.91	-6.93	2687.07	25111.01	717.67
5/1/1978	0.00	7.83	7.83	8.91	27925.68	-7.83	2680.08	27925.68	-7.83	2680.08	27843.00	-8.91	2678.16	29289.79	84.85
6/1/1978	0.00	9.57	9.57	10.89	27916.11	-9.57	2670.51	27916.11	-9.57	2670.51	27832.11	-10.89	2667.27	37647.75	0.92
7/1/1978	0.00	10.44	10.44	11.88	27905.67	-10.44	2660.07	27905.67	-10.44	2660.07	27820.23	-11.88	2655.39	45998.14	7.24
8/1/1978	0.00	10.44	10.44	11.88	27895.23	-10.44	2649.63	27895.23	-10.44	2649.63	27808.35	-11.88	2643.51	50161.03	17.26
9/1/1978	0.00	8.70	8.70	9.90	27886.53	-8.70	2640.93	27886.53	-8.70	2640.93	27798.45	-9.90	2633.61	50142.26	436.86
10/1/1978	0.00	7.83	7.83	8.91	27878.70	-7.83	2633.10	27878.70	-7.83	2633.10	27789.54	-8.91	2624.70	41772.18	94.26
11/1/1978	255.07	6.09	6.09	6.93	28127.68	248.98	2694.00	28127.68	248.98	2694.00	28037.68	248.14	2694.00	37584.41	1537.94
12/1/1978	1124.12	5.22	5.22	5.94	29246.58	1118.90	2694.00	29246.58	1118.90	2694.00	29155.86	1118.18	2694.00	29493.38	1590.96
1/1/1979	5798.25	5.22	5.22	5.94	35039.61	5793.03	2694.00	35039.61	5793.03	2694.00	34948.17	5792.31	2694.00	26285.66	2963.72
2/1/1979	926.21	4.35	4.35	4.95	35961.47	921.86	2694.00	35961.47	921.86	2694.00	35869.43	921.26	2694.00	31492.21	1295.07
3/1/1979	1738.74	5.22	5.22	5.94	37694.99	1733.52	2694.00	37694.99	1733.52	2694.00	37602.23	1732.80	2694.00	26933.95	2388.70
4/1/1979	0.00	6.09	6.09	6.93	37688.90	-6.09	2687.91	37688.90	-6.09	2687.91	37595.30	-6.93	2687.07	33878.76	29.37
5/1/1979	0.00	7.83	7.83	8.91	37681.07	-7.83	2680.08	37681.07	-7.83	2680.08	37586.39	-8.91	2678.16	39518.83	107.90
6/1/1979	0.00	9.57	9.57	10.89	37671.50	-9.57	2670.51	37671.50	-9.57	2670.51	37575.50	-10.89	2667.27	50799.37	13.86
7/1/1979	0.00	10.44	10.44	11.88	37661.06	-10.44	2660.07	37661.06	-10.44	2660.07	37563.62	-11.88	2655.39	62072.35	157.15
8/1/1979	0.00	10.44	10.44	11.88	37650.62	-10.44	2649.63	37650.62	-10.44	2649.63	37551.74	-11.88	2643.51	67696.53	83.43
9/1/1979	0.00	8.70	8.70	9.90	37641.92	-8.70	2640.93	37641.92	-8.70	2640.93	37541.84	-9.90	2633.61	67677.76	27.13
10/1/1979	0.00	7.83	7.83	8.91	37634.09	-7.83	2633.10	37634.09	-7.83	2633.10	37532.93	-8.91	2624.70	56385.10	511.58
11/1/1979	0.00	6.09	6.09	6.93	37628.00	-6.09	2627.01	37628.00	-6.09	2627.01	37526.00	-6.93	2617.77	50736.04	179.63
12/1/1979	0.00	5.22	5.22	5.94	37622.78	-5.22	2621.79	37622.78	-5.22	2621.79	37520.06	-5.94	2611.83	39454.98	162.49
1/1/1980	6778.27	5.22	5.22	5.94	44395.82	6773.05	2694.00	44395.82	6773.05	2694.00	44292.38	6772.33	2694.00	33813.86	4813.29
2/1/1980	7494.61	4.35	4.35	4.95	51886.08	7490.26	2694.00	51886.08	7490.26	2694.00	51782.04	7489.66	2694.00	39901.21	3999.60
3/1/1980	862.66	5.22	5.22	5.94	52743.52	857.44	2694.00	52743.52	857.44	2694.00	52638.76	856.72	2694.00	38860.96	2018.69
4/1/1980	0.00	6.09	6.09	6.93	52737.43	-6.09	2687.91	52737.43	-6.09	2687.91	52631.83	-6.93	2687.07	47403.79	788.79
5/1/1980	0.00	7.83	7.83	8.91	52729.60	-7.83	2680.08	52729.60	-7.83	2680.08	52622.92	-8.91	2678.16	55298.03	339.64
6/1/1980	0.00	9.57	9.57	10.89	52720.03	-9.57	2670.51	52720.03	-9.57	2670.51	52612.03	-10.89	2667.27	71086.91	2.10
7/1/1980	0.00	10.44	10.44	11.88	52709.59	-10.44	2660.07	52709.59	-10.44	2660.07	52600.15	-11.88	2655.39	86868.24	25.79
8/1/1980	0.00	10.44	10.44	11.88	52699.15	-10.44	2649.63	52699.15	-10.44	2649.63	52588.27	-11.88	2643.51	94746.58	5.30
9/1/1980	0.00	8.70	8.70	9.90	52690.45	-8.70	2640.93	52690.45	-8.70	2640.93	52578.37	-9.90	2633.61	94727.82	0.22
10/1/1980	0.00	7.83	7.83	8.91	52682.62	-7.83	2633.10	52682.62	-7.83	2633.10	52569.46	-8.91	2624.70	78926.82	149.37
11/1/1980	0.00	6.09	6.09	6.93	52676.53	-6.09	2627.01	52676.53	-6.09	2627.01	52562.53	-6.93	2617.77	71023.58	17.49
12/1/1980	0.00	5.22	5.22	5.94	52671.31	-5.22	2621.79	52671.31	-5.22	2621.79	52556.59	-5.94	2611.83	55234.17	389.77
1/1/1981	80.92	5.22	5.22	5.94	52747.01	75.70	2694.00	52747.01	75.70	2694.00	52631.57	74.98	2686.81	47338.89	768.71
2/1/1981	59.69	4.35	4.35	4.95	52802.35	55.34	2694.00	52802.35	55.34	2694.00	52686.31	54.74	2694.00	47406.92	1155.33
3/1/1981	397.64	5.22	5.22	5.94	53194.77	392.42	2694.00	53194.77	392.42	2694.00	53078.01	391.70	2694.00	39547.22	1976.50
4/1/1981	0.00	6.09	6.09	6.93	53188.68	-6.09	2687.91	53188.68	-6.09	2687.91	53071.08	-6.93	2687.07	47809.35	355.51
5/1/1981	0.00	7.83	7.83	8.91	53180.85	-7.83	2680.08	53180.85	-7.83	2680.08	53062.17	-8.91	2678.16	55771.19	179.57
6/1/1981	0.00	9.57	9.57	10.89	53171.28	-9.57	2670.51	53171.28	-9.57	2670.51	53051.28	-10.89	2667.27	71695.26	2.53
7/1/1981	0.00	10.44	10.44	11.88	53160.84	-10.44	2660.07	53160.84	-10.44	2660.07	53039.40	-11.88	2655.39	87611.77	14.59
8/1/1981	0.00	10.44	10.44	11.88	53150.40	-10.44	2649.63	53150.40	-10.44	2649.63	53027.52	-11.88	2643.51	95557.71	30.89
9/1/1981	0.00	8.70	8.70	9.90	53141.70	-8.70	2640.93	53141.70	-8.70	2640.93	53017.62	-9.90	2633.61	95538.94	44.23
10/1/1981	0.00	7.83	7.83	8.91	53133.87	-7.83	2633.10	53133.87	-7.83	2633.10	53008.71	-8.91	2624.70	79602.76	144.23
11/1/1981	0.00	6.09	6.09	6.93	53127.78	-6.09	2627.01	53127.78	-6.09	2627.01	53001.78	-6.93	2617.77	71631.92	708.36
12/1/1981	0.00	5.22	5.22	5.94	53122.56	-5.22	2621.79	53122.56	-5.22	2621.79	52995.84	-5.94	2611.83	55707.33	304.84
1/1/1982	1708.95	5.22	5.22	5.94	54826.29	1703.73	2694.00	54826.29	1703.73	2694.00	54698.85	1703.01	2694.00	47744.45	2361.83
2/1/1982	36.91	4.35	4.35	4.95	54858.85	32.56	2694.00	54858.85	32.56	2694.00	54730.81	31.96	2694.00	49275.70	788.00
3/1/1982	1965.81	5.22	5.22	5.94	56819.45	1960.59	2694.00	56819.45	1960.59	2694.00	56690.69	1959.87	2694.00	41087.47	2571.71
4/1/1982	0.00	6.09	6.09	6.93	56813.36	-6.09	2687.91	56813.36	-6.09	2687.91	56683.76	-6.93	2687.07	51067.06	419.40
5/1/1982	0.00	7.83	7.83	8.91	56805.53	-7.83	2680.08	56805.53	-7.83	2680.08	56674.85	-8.91	2678.16	59571.86	108.63
6/1/1982	0.00	9.57	9.57	10.89	56795.96	-9.57	2670.51	56795.96	-9.57	2670.51	56663.96	-10.89	2667.27	76581.83	44.81
7/1/1982	0.00	10.44	10.44	11.88	56785.52	-10.44	2660.07	56785.52	-10.44	2660.07	56652.08	-11.88	2655.39	93584.25	29.98
8/1/1982	0.00	10.44	10.44	11.88	56775.08	-10.44	2649.63	56775.08	-10.44	2649.63	56640.20	-11.88	2643.51	102073.14	136.34
9/1/1982	0.00	8.70	8.70	9.90	56766.38	-8.70	2640.93	56766.38	-8.70	2640.93	56630.30	-9.90	2633.61	102054.37	383.13
10/1/1982	0.00	7.83	7.83	8.91	56758.55	-7.83	2633.10	56758.55	-7.83	2633.10	56621.39	-8.91	2624.70	85032.28	87.35
11/1/1982	391.72	6.09	6.09	6.93	57144.17	385.63	2694.00	57144.17	385.63	2694.00	57006.17	384.79	2694.00	76518.49	1773.31

YEAR	RECHARGE (AF)	Existing Conditions (Includes Discretionary Permits)	*Existing Conditions (Includes Discretionary Permits) Plus Project	General Plan Buildout	Storage (AF)	delta	Existing Conditions (Includes Discretionary Permits)	Storage (AF)	delta	*Existing Conditions (Includes Discretionary Permits) Plus Project	Storage (AF)	delta	General Plan Buildout	RUNOFF (AF)	PRECIPITATION (AF)
12/1/1982	833.84	5.22	5.22	5.94	57972.80	828.62	2694.00	57972.80	828.62	2694.00	57834.08	827.90	2694.00	59918.74	1254.04
1/1/1983	1555.46	5.22	5.22	5.94	59523.03	1550.24	2694.00	59523.03	1550.24	2694.00	59383.59	1549.52	2694.00	52103.65	1247.64
2/1/1983	3312.87	4.35	4.35	4.95	62831.55	3308.52	2694.00	62831.55	3308.52	2694.00	62691.51	3307.92	2694.00	53496.94	2276.75
3/1/1983	6263.59	5.22	5.22	5.94	69089.91	6258.37	2694.00	69089.91	6258.37	2694.00	68949.15	6257.65	2694.00	47058.75	4289.12
4/1/1983	0.00	6.09	6.09	6.93	69083.82	-6.09	2687.91	69083.82	-6.09	2687.91	68942.22	-6.93	2687.07	62095.27	1193.78
5/1/1983	0.00	7.83	7.83	8.91	69075.99	-7.83	2680.08	69075.99	-7.83	2680.08	68933.31	-8.91	2678.16	72438.10	102.24
6/1/1983	0.00	9.57	9.57	10.89	69066.42	-9.57	2670.51	69066.42	-9.57	2670.51	68922.42	-10.89	2667.27	93124.15	11.38
7/1/1983	0.00	10.44	10.44	11.88	69055.98	-10.44	2660.07	69055.98	-10.44	2660.07	68910.54	-11.88	2655.39	113802.63	16.33
8/1/1983	0.00	10.44	10.44	11.88	69045.54	-10.44	2649.63	69045.54	-10.44	2649.63	68898.66	-11.88	2643.51	124129.56	413.34
9/1/1983	0.00	8.70	8.70	9.90	69036.84	-8.70	2640.93	69036.84	-8.70	2640.93	68888.76	-9.90	2633.61	124110.79	197.36
10/1/1983	0.00	7.83	7.83	8.91	69029.01	-7.83	2633.10	69029.01	-7.83	2633.10	68879.85	-8.91	2624.70	103412.63	340.07
11/1/1983	139.80	6.09	6.09	6.93	69162.73	133.71	2694.00	69162.73	133.71	2694.00	69012.73	132.87	2694.00	93060.81	1315.87
12/1/1983	537.95	5.22	5.22	5.94	69695.45	532.73	2694.00	69695.45	532.73	2694.00	69544.73	532.01	2694.00	72520.83	1310.39
1/1/1984	0.00	5.22	5.22	5.94	69690.23	-5.22	2688.78	69690.23	-5.22	2688.78	69538.79	-5.94	2688.06	62639.51	176.98
2/1/1984	0.00	4.35	4.35	4.95	69685.88	-4.35	2684.43	69685.88	-4.35	2684.43	69533.84	-4.95	2683.11	62634.82	31.36
3/1/1984	0.00	5.22	5.22	5.94	69680.66	-5.22	2679.21	69680.66	-5.22	2679.21	69527.90	-5.94	2677.17	52192.42	44.10
4/1/1984	0.00	6.09	6.09	6.93	69674.57	-6.09	2673.12	69674.57	-6.09	2673.12	69520.97	-6.93	2670.24	62626.21	348.06
5/1/1984	0.00	7.83	7.83	8.91	69666.74	-7.83	2665.29	69666.74	-7.83	2665.29	69512.06	-8.91	2661.33	73057.53	4.18
6/1/1984	0.00	9.57	9.57	10.89	69657.17	-9.57	2655.72	69657.17	-9.57	2655.72	69501.17	-10.89	2650.44	93920.56	50.62
7/1/1984	0.00	10.44	10.44	11.88	69646.73	-10.44	2645.28	69646.73	-10.44	2645.28	69489.29	-11.88	2638.56	114776.02	438.79
8/1/1984	0.00	10.44	10.44	11.88	69636.29	-10.44	2634.84	69636.29	-10.44	2634.84	69477.41	-11.88	2626.68	125191.44	248.70
9/1/1984	0.00	8.70	8.70	9.90	69627.59	-8.70	2626.14	69627.59	-8.70	2626.14	69467.51	-9.90	2616.78	125172.67	55.85
10/1/1984	0.00	7.83	7.83	8.91	69619.76	-7.83	2618.31	69619.76	-7.83	2618.31	69458.60	-8.91	2607.87	104297.53	159.83
11/1/1984	2.05	6.09	6.09	6.93	69615.72	-4.04	2614.27	69615.72	-4.04	2614.27	69453.72	-4.88	2602.99	93857.22	885.06
12/1/1984	2180.48	5.22	5.22	5.94	71790.97	2175.26	2694.00	71790.97	2175.26	2694.00	71628.25	2174.54	2694.00	72995.82	2743.57
1/1/1985	5.88	5.22	5.22	5.94	71791.63	0.66	2694.00	71791.63	0.66	2694.00	71628.19	-0.06	2693.94	64522.88	420.75
2/1/1985	0.11	4.35	4.35	4.95	71787.39	-4.24	2689.76	71787.39	-4.24	2689.76	71623.35	-4.84	2689.10	64523.47	666.91
3/1/1985	0.00	5.22	5.22	5.94	71782.17	-5.22	2684.54	71782.17	-5.22	2684.54	71617.41	-5.94	2683.16	53766.38	553.40
4/1/1985	0.00	6.09	6.09	6.93	71776.08	-6.09	2678.45	71776.08	-6.09	2678.45	71610.48	-6.93	2676.23	64514.97	164.70
5/1/1985	0.00	7.83	7.83	8.91	71768.25	-7.83	2670.62	71768.25	-7.83	2670.62	71601.57	-8.91	2667.32	75261.08	10.78
6/1/1985	0.00	9.57	9.57	10.89	71758.68	-9.57	2661.05	71758.68	-9.57	2661.05	71590.68	-10.89	2656.43	96753.69	14.24
7/1/1985	0.00	10.44	10.44	11.88	71748.24	-10.44	2650.61	71748.24	-10.44	2650.61	71578.80	-11.88	2644.55	118238.74	147.49
8/1/1985	0.00	10.44	10.44	11.88	71737.80	-10.44	2640.17	71737.80	-10.44	2640.17	71566.92	-11.88	2632.67	128968.95	10.04
9/1/1985	0.00	8.70	8.70	9.90	71729.10	-8.70	2631.47	71729.10	-8.70	2631.47	71557.02	-9.90	2622.77	128950.18	180.36
10/1/1985	0.00	7.83	7.83	8.91	71721.27	-7.83	2623.64	71721.27	-7.83	2623.64	71548.11	-8.91	2613.86	107445.45	193.29
11/1/1985	1501.56	6.09	6.09	6.93	73216.74	1495.47	2694.00	73216.74	1495.47	2694.00	73042.74	1494.63	2694.00	96690.35	2810.67
12/1/1985	427.72	5.22	5.22	5.94	73639.24	422.50	2694.00	73639.24	422.50	2694.00	73464.52	421.78	2694.00	76771.69	756.41
1/1/1986	18.32	5.22	5.22	5.94	73652.34	13.10	2694.00	73652.34	13.10	2694.00	73476.90	12.38	2694.00	66184.03	451.29
2/1/1986	2084.31	4.35	4.35	4.95	75732.30	2079.96	2694.00	75732.30	2079.96	2694.00	75556.26	2079.36	2694.00	66195.80	1795.00
3/1/1986	764.29	5.22	5.22	5.94	76491.37	759.07	2694.00	76491.37	759.07	2694.00	76314.61	758.35	2694.00	56720.99	1980.38
4/1/1986	0.00	6.09	6.09	6.93	76485.28	-6.09	2687.91	76485.28	-6.09	2687.91	76307.68	-6.93	2687.07	68747.41	260.05
5/1/1986	0.00	7.83	7.83	8.91	76477.45	-7.83	2680.08	76477.45	-7.83	2680.08	76298.77	-8.91	2678.16	80198.92	6.63
6/1/1986	0.00	9.57	9.57	10.89	76467.88	-9.57	2670.51	76467.88	-9.57	2670.51	76287.88	-10.89	2667.27	103102.35	0.32
7/1/1986	0.00	10.44	10.44	11.88	76457.44	-10.44	2660.07	76457.44	-10.44	2660.07	76276.00	-11.88	2655.39	125998.21	135.24
8/1/1986	0.00	10.44	10.44	11.88	76447.00	-10.44	2649.63	76447.00	-10.44	2649.63	76264.12	-11.88	2643.51	137433.83	65.31
9/1/1986	0.00	8.70	8.70	9.90	76438.30	-8.70	2640.93	76438.30	-8.70	2640.93	76254.22	-9.90	2633.61	137415.06	558.38
10/1/1986	0.00	7.83	7.83	8.91	76430.47	-7.83	2633.10	76430.47	-7.83	2633.10	76245.31	-8.91	2624.70	114499.52	490.35
11/1/1986	0.00	6.09	6.09	6.93	76424.38	-6.09	2627.01	76424.38	-6.09	2627.01	76238.38	-6.93	2617.77	103039.01	511.58
12/1/1986	43.10	5.22	5.22	5.94	76462.26	37.88	2664.89	76462.26	37.88	2664.89	76275.54	37.16	2654.93	80135.07	694.08
1/1/1987	260.26	5.22	5.22	5.94	76717.31	255.04	2694.00	76717.31	255.04	2694.00	76529.87	254.32	2694.00	68721.25	1039.12
2/1/1987	56.98	4.35	4.35	4.95	76769.94	52.63	2694.00	76769.94	52.63	2694.00	76581.90	52.03	2694.00	68950.47	924.04
3/1/1987	0.00	5.22	5.22	5.94	76764.72	-5.22	2688.78	76764.72	-5.22	2688.78	76575.96	-5.94	2688.06	57498.14	853.73
4/1/1987	0.00	6.09	6.09	6.93	76758.63	-6.09	2682.69	76758.63	-6.09	2682.69	76569.03	-6.93	2681.13	68993.08	243.93
5/1/1987	0.00	7.83	7.83	8.91	76750.80	-7.83	2674.86	76750.80	-7.83	2674.86	76560.12	-8.91	2672.22	80485.54	73.21
6/1/1987	0.00	9.57	9.57	10.89	76741.23	-9.57	2665.29	76741.23	-9.57	2665.29	76549.23	-10.89	2661.33	103470.86	28.58
7/1/1987	0.00	10.44	10.44	11.88	76730.79	-10.44	2654.85	76730.79	-10.44	2654.85	76537.35	-11.88	2649.45	126448.61	29.26
8/1/1987	0.00	10.44	10.44	11.88	76720.35	-10.44	2644.41	76720.35	-10.44	2644.41	76525.47	-11.88	2637.57	137925.17	90.29
9/1/1987	0.00	8.70	8.70	9.90	76711.65	-8.70	2635.71	76711.65	-8.70	2635.71	76515.57	-9.90	2627.67	137906.41	203.05
10/1/1987	0.00	7.83	7.83	8.91	76703.82	-7.83	2627.88	76703.82	-7.83	2627.88	76506.66	-8.91	2618.76	114908.97	1368.36
11/1/1987	1.04	6.09	6.09	6.93	76698.77	-5.05	2622.83	76698.77	-5.05	2622.83	76500.77	-5.89	2612.87	103407.52	830.18
12/1/1987	516.87	5.22	5.22	5.94	77210.42	511.65	2694.00	77210.42	511.65	2694.00	77011.70	510.93	2694.00	80422.78	1310.79
1/1/1988	846.11	5.22	5.22	5.94	78051.31	840.89	2694.00	78051.31	840.89	2694.00	77851.87	840.17	2694.00	69393.67	1153.53
2/1/1988	16.76	4.35	4.35	4.95	78063.72	12.41	2694.00	78063.72	12.41	2694.00	77863.68	11.81	2694.00	70149.42	729.74
3/1/1988	0.00	5.22	5.22	5.94	78058.50	-5.22	2688.78	78058.50	-5.22	2688.78	77857.74	-5.94	2688.06	58467.15	312.74
4/1/1988	0.00	6.09	6.09	6.93	78052.41	-6.09	2682.69	78052.41	-6.09	2682.69	77850.81	-6.93	2681.13	70155.88	1465.47
5/1/1988	0.00	7.83	7.83	8.91	78044.58	-7.83	2674.86	78044.58	-7.83	2674.86	77841.90	-8.91	2672.22	81842.14	61.62
6/1/1988	0.00	9.57	9.57	10.89	78035.01	-9.57	2665.29	78035.01	-9.57	2665.29	77831.01	-10.89	2661.33	105215.06	0.15
7/1/1988	0.00	10.44	10.44	11.88	78024.57	-10.44	2654.85	78024.57	-10.44	2654.85	77819.13	-11.88	2649.45	128580.41	22.47
8/1/1988	0.00	10.44	10.44	11.88	78014.13	-10.44	2644.41	78014.13	-10.44	2644.41	77807.25	-11.88	2637.57	140250.78	112.93

YEAR	RECHARGE (AF)	Existing Conditions (Includes Discretionary Permits)	*Existing Conditions (Includes Discretionary Permits) Plus Project	General Plan Buildout	Storage (AF)	delta	Existing Conditions (Includes Discretionary Permits)	Storage (AF)	delta	*Existing Conditions (Includes Discretionary Permits) Plus Project	Storage (AF)	delta	General Plan Buildout	RUNOFF (AF)	PRECIPITATION (AF)
9/1/1988	0.00	8.70	8.70	9.90	78005.43	-8.70	2635.71	78005.43	-8.70	2635.71	77797.35	-9.90	2627.67	140232.01	21.15
10/1/1988	0.00	7.83	7.83	8.91	77997.60	-7.83	2627.88	77997.60	-7.83	2627.88	77788.44	-8.91	2618.76	116846.98	9.74
11/1/1988	0.00	6.09	6.09	6.93	77991.51	-6.09	2621.79	77991.51	-6.09	2621.79	77781.51	-6.93	2611.83	105151.72	570.11
12/1/1988	340.78	5.22	5.22	5.94	78327.07	335.56	2694.00	78327.07	335.56	2694.00	78116.35	334.84	2694.00	81778.29	1240.72
1/1/1989	0.00	5.22	5.22	5.94	78321.85	-5.22	2688.78	78321.85	-5.22	2688.78	78110.41	-5.94	2688.06	70397.26	359.90
2/1/1989	0.00	4.35	4.35	4.95	78317.50	-4.35	2684.43	78317.50	-4.35	2684.43	78105.46	-4.95	2683.11	70392.57	539.68
3/1/1989	0.00	5.22	5.22	5.94	78312.28	-5.22	2679.21	78312.28	-5.22	2679.21	78099.52	-5.94	2677.17	58657.22	625.64
4/1/1989	0.00	6.09	6.09	6.93	78306.19	-6.09	2673.12	78306.19	-6.09	2673.12	78092.59	-6.93	2670.24	70383.97	51.59
5/1/1989	0.00	7.83	7.83	8.91	78298.36	-7.83	2665.29	78298.36	-7.83	2665.29	78083.68	-8.91	2661.33	82108.25	88.53
6/1/1989	0.00	9.57	9.57	10.89	78288.79	-9.57	2655.72	78288.79	-9.57	2655.72	78072.79	-10.89	2650.44	105557.19	7.54
7/1/1989	0.00	10.44	10.44	11.88	78278.35	-10.44	2645.28	78278.35	-10.44	2645.28	78060.91	-11.88	2638.56	128998.57	19.99
8/1/1989	0.00	10.44	10.44	11.88	78267.91	-10.44	2634.84	78267.91	-10.44	2634.84	78049.03	-11.88	2626.68	140706.95	31.07
9/1/1989	0.00	8.70	8.70	9.90	78259.21	-8.70	2626.14	78259.21	-8.70	2626.14	78039.13	-9.90	2616.78	140688.18	150.23
10/1/1989	0.00	7.83	7.83	8.91	78251.38	-7.83	2618.31	78251.38	-7.83	2618.31	78030.22	-8.91	2607.87	117227.12	192.22
11/1/1989	0.00	6.09	6.09	6.93	78245.29	-6.09	2612.22	78245.29	-6.09	2612.22	78023.29	-6.93	2600.94	105493.85	81.22
12/1/1989	0.00	5.22	5.22	5.94	78240.07	-5.22	2607.00	78240.07	-5.22	2607.00	78017.35	-5.94	2595.00	82044.39	107.37
1/1/1990	534.45	5.22	5.22	5.94	78769.30	529.23	2694.00	78769.30	529.23	2694.00	78545.86	528.51	2694.00	70319.07	1558.59
2/1/1990	0.35	4.35	4.35	4.95	78765.30	-4.00	2690.00	78765.30	-4.00	2690.00	78541.26	-4.60	2689.40	70794.72	758.61
3/1/1990	0.00	5.22	5.22	5.94	78760.08	-5.22	2684.78	78760.08	-5.22	2684.78	78535.32	-5.94	2683.46	58992.61	389.13
4/1/1990	0.00	6.09	6.09	6.93	78753.99	-6.09	2678.69	78753.99	-6.09	2678.69	78528.39	-6.93	2676.53	70786.44	436.70
5/1/1990	0.00	7.83	7.83	8.91	78746.16	-7.83	2670.86	78746.16	-7.83	2670.86	78519.48	-8.91	2667.62	82577.79	255.23
6/1/1990	0.00	9.57	9.57	10.89	78736.59	-9.57	2661.29	78736.59	-9.57	2661.29	78508.59	-10.89	2656.73	106160.89	352.77
7/1/1990	0.00	10.44	10.44	11.88	78726.15	-10.44	2650.85	78726.15	-10.44	2650.85	78496.71	-11.88	2644.85	129736.43	22.31
8/1/1990	0.00	10.44	10.44	11.88	78715.71	-10.44	2640.41	78715.71	-10.44	2640.41	78484.83	-11.88	2632.97	141511.88	61.73
9/1/1990	0.00	8.70	8.70	9.90	78707.01	-8.70	2631.71	78707.01	-8.70	2631.71	78474.93	-9.90	2623.07	141493.12	34.68
10/1/1990	0.00	7.83	7.83	8.91	78699.18	-7.83	2623.88	78699.18	-7.83	2623.88	78466.02	-8.91	2614.16	117897.90	16.38
11/1/1990	0.00	6.09	6.09	6.93	78693.09	-6.09	2617.79	78693.09	-6.09	2617.79	78459.09	-6.93	2607.23	106097.55	409.27
12/1/1990	0.00	5.22	5.22	5.94	78687.87	-5.22	2612.57	78687.87	-5.22	2612.57	78453.15	-5.94	2601.29	82513.93	375.77
1/1/1991	0.37	5.22	5.22	5.94	78683.02	-4.85	2607.73	78683.02	-4.85	2607.73	78447.58	-5.57	2595.73	70721.54	498.87
2/1/1991	138.96	4.35	4.35	4.95	78817.63	134.61	2694.00	78817.63	134.61	2694.00	78581.59	134.01	2694.00	70717.18	1372.84
3/1/1991	3848.67	5.22	5.22	5.94	82661.08	3843.45	2694.00	82661.08	3843.45	2694.00	82424.32	3842.73	2694.00	59031.80	4285.52
4/1/1991	0.00	6.09	6.09	6.93	82654.99	-6.09	2687.91	82654.99	-6.09	2687.91	82417.39	-6.93	2687.07	74292.50	63.71
5/1/1991	0.00	7.83	7.83	8.91	82647.16	-7.83	2680.08	82647.16	-7.83	2680.08	82408.48	-8.91	2678.16	86668.19	8.40
6/1/1991	0.00	9.57	9.57	10.89	82637.59	-9.57	2670.51	82637.59	-9.57	2670.51	82397.59	-10.89	2667.27	111419.98	0.10
7/1/1991	0.00	10.44	10.44	11.88	82627.15	-10.44	2660.07	82627.15	-10.44	2660.07	82385.71	-11.88	2655.39	136164.21	210.22
8/1/1991	0.00	10.44	10.44	11.88	82616.71	-10.44	2649.63	82616.71	-10.44	2649.63	82373.83	-11.88	2643.51	148524.00	65.04
9/1/1991	0.00	8.70	8.70	9.90	82608.01	-8.70	2640.93	82608.01	-8.70	2640.93	82363.93	-9.90	2633.61	148505.24	164.48
10/1/1991	0.00	7.83	7.83	8.91	82600.18	-7.83	2633.10	82600.18	-7.83	2633.10	82355.02	-8.91	2624.70	123741.33	328.70
11/1/1991	0.00	6.09	6.09	6.93	82594.09	-6.09	2627.01	82594.09	-6.09	2627.01	82348.09	-6.93	2617.77	111356.64	70.43
12/1/1991	205.56	5.22	5.22	5.94	82794.42	200.34	2694.00	82794.42	200.34	2694.00	82547.70	199.62	2694.00	86604.34	1004.63
1/1/1992	457.45	5.22	5.22	5.94	83246.66	452.23	2694.00	83246.66	452.23	2694.00	82999.22	451.51	2694.00	74412.34	1212.16
2/1/1992	2369.16	4.35	4.35	4.95	85611.47	2364.81	2694.00	85611.47	2364.81	2694.00	85363.43	2364.21	2694.00	74818.79	2183.68
3/1/1992	1270.86	5.22	5.22	5.94	86877.11	1265.64	2694.00	86877.11	1265.64	2694.00	86628.35	1264.92	2694.00	64120.16	2199.74
4/1/1992	0.00	6.09	6.09	6.93	86871.02	-6.09	2687.91	86871.02	-6.09	2687.91	86621.42	-6.93	2687.07	78081.70	142.29
5/1/1992	0.00	7.83	7.83	8.91	86863.19	-7.83	2680.08	86863.19	-7.83	2680.08	86612.51	-8.91	2678.16	91088.93	158.15
6/1/1992	0.00	9.57	9.57	10.89	86853.62	-9.57	2670.51	86853.62	-9.57	2670.51	86601.62	-10.89	2667.27	117103.78	0.54
7/1/1992	0.00	10.44	10.44	11.88	86843.18	-10.44	2660.07	86843.18	-10.44	2660.07	86589.74	-11.88	2655.39	143111.08	47.72
8/1/1992	0.00	10.44	10.44	11.88	86832.74	-10.44	2649.63	86832.74	-10.44	2649.63	86577.86	-11.88	2643.51	156102.41	310.97
9/1/1992	0.00	8.70	8.70	9.90	86824.04	-8.70	2640.93	86824.04	-8.70	2640.93	86567.96	-9.90	2633.61	156083.64	13.24
10/1/1992	0.00	7.83	7.83	8.91	86816.21	-7.83	2633.10	86816.21	-7.83	2633.10	86559.05	-8.91	2624.70	130056.67	315.35
11/1/1992	0.00	6.09	6.09	6.93	86810.12	-6.09	2627.01	86810.12	-6.09	2627.01	86552.12	-6.93	2617.77	117040.45	16.59
12/1/1992	650.96	5.22	5.22	5.94	87455.85	645.74	2694.00	87455.85	645.74	2694.00	87197.13	645.02	2694.00	91025.07	1733.08
1/1/1993	13407.18	5.22	5.22	5.94	100857.82	13401.96	2694.00	100857.82	13401.96	2694.00	100598.38	13401.24	2694.00	78601.85	6532.00
2/1/1993	4574.63	4.35	4.35	4.95	105428.10	4570.28	2694.00	105428.10	4570.28	2694.00	105168.06	4569.68	2694.00	90647.01	2773.68
3/1/1993	0.00	5.22	5.22	5.94	105422.88	-5.22	2688.78	105422.88	-5.22	2688.78	105162.12	-5.94	2688.06	78962.16	684.89
4/1/1993	0.00	6.09	6.09	6.93	105416.79	-6.09	2682.69	105416.79	-6.09	2682.69	105155.19	-6.93	2681.13	94749.90	12.31
5/1/1993	0.00	7.83	7.83	8.91	105408.96	-7.83	2674.86	105408.96	-7.83	2674.86	105146.28	-8.91	2672.22	110535.17	66.37
6/1/1993	0.00	9.57	9.57	10.89	105399.39	-9.57	2665.29	105399.39	-9.57	2665.29	105135.39	-10.89	2661.33	142106.09	265.59
7/1/1993	0.00	10.44	10.44	11.88	105388.95	-10.44	2654.85	105388.95	-10.44	2654.85	105123.51	-11.88	2649.45	173669.45	4.58
8/1/1993	0.00	10.44	10.44	11.88	105378.51	-10.44	2644.41	105378.51	-10.44	2644.41	105111.63	-11.88	2637.57	189438.82	19.32
9/1/1993	0.00	8.70	8.70	9.90	105369.81	-8.70	2635.71	105369.81	-8.70	2635.71	105101.73	-9.90	2627.67	189420.05	5.35
10/1/1993	0.00	7.83	7.83	8.91	105361.98	-7.83	2627.88	105361.98	-7.83	2627.88	105092.82	-8.91	2618.76	157837.01	89.64
11/1/1993	0.00	6.09	6.09	6.93	105355.89	-6.09	2621.79	105355.89	-6.09	2621.79	105085.89	-6.93	2611.83	142042.75	637.38
12/1/1993	0.00	5.22	5.22	5.94	105350.67	-5.22	2616.57	105350.67	-5.22	2616.57	105079.95	-5.94	2605.89	110471.31	447.87
1/1/1994	9.67	5.22	5.22	5.94	105355.12	4.45	2621.02	105355.12	4.45	2621.02	105083.68	3.73	2609.62	94685.00	534.23
2/1/1994	733.98	4.35	4.35	4.95	106084.75	729.63	2694.00	106084.75	729.63	2694.00	105812.71	729.03	2694.00	94689.00	2007.83
3/1/1994	114.28	5.22	5.22	5.94	106193.81	109.06	2694.00	106193.81	109.06	2694.00	105921.05	108.34	2694.00	79453.97	1544.50
4/1/1994	0.00	6.09	6.09	6.93	106187.72	-6.09	2687.91	106187.72	-6.09	2687.91	105914.12	-6.93	2687.07	95442.79	727.23
5/1/1994	0.00	7.83	7.83	8.91	106179.89	-7.83	2680.08	106179.89	-7.83	2680.08	105905.21	-8.91	2678.16	111343.53	82.06

YEAR	RECHARGE (AF)	Existing Conditions (Includes Discretionary Permits)	*Existing Conditions (Includes Discretionary Permits) Plus Project	General Plan Buildout	Storage (AF)	delta	Existing Conditions (Includes Discretionary Permits)	Storage (AF)	delta	*Existing Conditions (Includes Discretionary Permits) Plus Project	Storage (AF)	delta	General Plan Buildout	RUNOFF (AF)	PRECIPITATION (AF)
6/1/1994	0.00	9.57	9.57	10.89	106170.32	-9.57	2670.51	106170.32	-9.57	2670.51	105894.32	-10.89	2667.27	143145.41	1.62
7/1/1994	0.00	10.44	10.44	11.88	106159.88	-10.44	2660.07	106159.88	-10.44	2660.07	105882.44	-11.88	2655.39	174939.74	25.66
8/1/1994	0.00	10.44	10.44	11.88	106149.44	-10.44	2649.63	106149.44	-10.44	2649.63	105870.56	-11.88	2643.51	190824.58	154.24
9/1/1994	0.00	8.70	8.70	9.90	106140.74	-8.70	2640.93	106140.74	-8.70	2640.93	105860.66	-9.90	2633.61	190805.82	4.08
10/1/1994	0.00	7.83	7.83	8.91	106132.91	-7.83	2633.10	106132.91	-7.83	2633.10	105851.75	-8.91	2624.70	158991.81	57.95
11/1/1994	0.00	6.09	6.09	6.93	106126.82	-6.09	2627.01	106126.82	-6.09	2627.01	105844.82	-6.93	2617.77	143082.08	425.90
12/1/1994	1.71	5.22	5.22	5.94	106123.31	-3.51	2623.50	106123.31	-3.51	2623.50	105840.59	-4.23	2613.54	111279.67	562.66
1/1/1995	5763.63	5.22	5.22	5.94	111881.72	5758.41	2694.00	111881.72	5758.41	2694.00	111598.28	5757.69	2694.00	95379.42	4314.05
2/1/1995	720.84	4.35	4.35	4.95	112598.21	716.49	2694.00	112598.21	716.49	2694.00	112314.17	715.89	2694.00	100554.85	1213.89
3/1/1995	3806.75	5.22	5.22	5.94	116399.74	3801.53	2694.00	116399.74	3801.53	2694.00	116114.98	3800.81	2694.00	84332.33	3250.25
4/1/1995	0.00	6.09	6.09	6.93	116393.65	-6.09	2687.91	116393.65	-6.09	2687.91	116108.05	-6.93	2687.07	104615.47	706.26
5/1/1995	0.00	7.83	7.83	8.91	116385.82	-7.83	2680.08	116385.82	-7.83	2680.08	116099.14	-8.91	2678.16	122044.99	334.62
6/1/1995	0.00	9.57	9.57	10.89	116376.25	-9.57	2670.51	116376.25	-9.57	2670.51	116088.25	-10.89	2667.27	156904.44	205.05
7/1/1995	0.00	10.44	10.44	11.88	116365.81	-10.44	2660.07	116365.81	-10.44	2660.07	116076.37	-11.88	2655.39	191756.32	35.77
8/1/1995	0.00	10.44	10.44	11.88	116355.37	-10.44	2649.63	116355.37	-10.44	2649.63	116064.49	-11.88	2643.51	209169.95	38.97
9/1/1995	0.00	8.70	8.70	9.90	116346.67	-8.70	2640.93	116346.67	-8.70	2640.93	116054.59	-9.90	2633.61	209151.18	45.14
10/1/1995	0.00	7.83	7.83	8.91	116338.84	-7.83	2633.10	116338.84	-7.83	2633.10	116045.68	-8.91	2624.70	174279.62	9.64
11/1/1995	0.00	6.09	6.09	6.93	116332.75	-6.09	2627.01	116332.75	-6.09	2627.01	116038.75	-6.93	2617.77	156841.10	87.62
12/1/1995	0.00	5.22	5.22	5.94	116327.53	-5.22	2621.79	116327.53	-5.22	2621.79	116032.81	-5.94	2611.83	121981.14	280.61
1/1/1996	124.21	5.22	5.22	5.94	116446.52	118.99	2694.00	116446.52	118.99	2694.00	116151.08	118.27	2694.00	104550.57	852.67
2/1/1996	158.13	4.35	4.35	4.95	116600.31	153.78	2694.00	116600.31	153.78	2694.00	116304.27	153.18	2694.00	104657.52	1336.22
3/1/1996	0.00	5.22	5.22	5.94	116595.09	-5.22	2688.78	116595.09	-5.22	2688.78	116298.33	-5.94	2688.06	87329.77	955.33
4/1/1996	0.00	6.09	6.09	6.93	116589.00	-6.09	2682.69	116589.00	-6.09	2682.69	116291.40	-6.93	2681.13	104791.04	249.99
5/1/1996	0.00	7.83	7.83	8.91	116581.17	-7.83	2674.86	116581.17	-7.83	2674.86	116282.49	-8.91	2672.22	122249.83	36.47
6/1/1996	0.00	9.57	9.57	10.89	116571.60	-9.57	2665.29	116571.60	-9.57	2665.29	116271.60	-10.89	2661.33	157167.79	0.31
7/1/1996	0.00	10.44	10.44	11.88	116561.16	-10.44	2654.85	116561.16	-10.44	2654.85	116259.72	-11.88	2649.45	192078.20	46.11
8/1/1996	0.00	10.44	10.44	11.88	116550.72	-10.44	2644.41	116550.72	-10.44	2644.41	116247.84	-11.88	2637.57	209521.09	16.98
9/1/1996	0.00	8.70	8.70	9.90	116542.02	-8.70	2635.71	116542.02	-8.70	2635.71	116237.94	-9.90	2627.67	209502.32	33.80
10/1/1996	0.00	7.83	7.83	8.91	116534.19	-7.83	2627.88	116534.19	-7.83	2627.88	116229.03	-8.91	2618.76	174572.23	547.46
11/1/1996	23.80	6.09	6.09	6.93	116551.90	17.71	2645.59	116551.90	17.71	2645.59	116245.90	16.87	2635.63	157104.46	1070.39
12/1/1996	218.22	5.22	5.22	5.94	116764.90	213.00	2694.00	116764.90	213.00	2694.00	116458.18	212.28	2694.00	122210.93	971.14
1/1/1997	3353.14	5.22	5.22	5.94	120112.82	3347.92	2694.00	120112.82	3347.92	2694.00	119805.38	3347.20	2694.00	104943.66	2421.00
2/1/1997	0.00	4.35	4.35	4.95	120108.47	-4.35	2689.65	120108.47	-4.35	2689.65	119800.43	-4.95	2689.05	107952.63	465.00
3/1/1997	0.00	5.22	5.22	5.94	120103.25	-5.22	2684.43	120103.25	-5.22	2684.43	119794.49	-5.94	2683.11	89957.27	24.21
4/1/1997	0.00	6.09	6.09	6.93	120097.16	-6.09	2678.34	120097.16	-6.09	2678.34	119787.56	-6.93	2676.18	107944.03	124.31
5/1/1997	0.00	7.83	7.83	8.91	120089.33	-7.83	2670.51	120089.33	-7.83	2670.51	119778.65	-8.91	2667.27	125928.32	15.89
6/1/1997	0.00	9.57	9.57	10.89	120079.76	-9.57	2660.94	120079.76	-9.57	2660.94	119767.76	-10.89	2656.38	161897.28	31.85
7/1/1997	0.00	10.44	10.44	11.88	120069.32	-10.44	2650.50	120069.32	-10.44	2650.50	119755.88	-11.88	2644.50	197858.69	12.38
8/1/1997	0.00	10.44	10.44	11.88	120058.88	-10.44	2640.06	120058.88	-10.44	2640.06	119744.00	-11.88	2632.62	215827.08	19.87
9/1/1997	0.00	8.70	8.70	9.90	120050.18	-8.70	2631.36	120050.18	-8.70	2631.36	119734.10	-9.90	2622.72	215808.31	774.82
10/1/1997	0.00	7.83	7.83	8.91	120042.35	-7.83	2623.53	120042.35	-7.83	2623.53	119725.19	-8.91	2613.81	179827.23	57.59
11/1/1997	3.24	6.09	6.09	6.93	120039.50	-2.85	2620.68	120039.50	-2.85	2620.68	119721.50	-3.69	2610.12	161833.95	951.73
12/1/1997	287.05	5.22	5.22	5.94	120321.33	281.83	2694.00	120321.33	281.83	2694.00	120002.61	281.11	2694.00	125867.86	1132.83
1/1/1998	1350.81	5.22	5.22	5.94	121666.92	1345.59	2694.00	121666.92	1345.59	2694.00	121347.48	1344.87	2694.00	108140.03	1411.53
2/1/1998	9842.44	4.35	4.35	4.95	131505.01	9838.09	2694.00	131505.01	9838.09	2694.00	131184.97	9837.49	2694.00	109349.40	5177.41
3/1/1998	318.23	5.22	5.22	5.94	131818.01	313.01	2694.00	131818.01	313.01	2694.00	131497.25	312.29	2694.00	98492.90	1770.54
4/1/1998	0.00	6.09	6.09	6.93	131811.92	-6.09	2687.91	131811.92	-6.09	2687.91	131490.32	-6.93	2687.07	118472.80	1014.04
5/1/1998	0.00	7.83	7.83	8.91	131804.09	-7.83	2680.08	131804.09	-7.83	2680.08	131481.41	-8.91	2678.16	138211.88	740.38
6/1/1998	0.00	9.57	9.57	10.89	131794.52	-9.57	2670.51	131794.52	-9.57	2670.51	131470.52	-10.89	2667.27	177690.43	56.85
7/1/1998	0.00	10.44	10.44	11.88	131784.08	-10.44	2660.07	131784.08	-10.44	2660.07	131458.64	-11.88	2655.39	217161.43	88.52
8/1/1998	0.00	10.44	10.44	11.88	131773.64	-10.44	2649.63	131773.64	-10.44	2649.63	131446.76	-11.88	2643.51	236884.61	111.72
9/1/1998	0.00	8.70	8.70	9.90	131764.94	-8.70	2640.93	131764.94	-8.70	2640.93	131436.86	-9.90	2633.61	236865.85	72.86
10/1/1998	0.00	7.83	7.83	8.91	131757.11	-7.83	2633.10	131757.11	-7.83	2633.10	131427.95	-8.91	2624.70	197375.17	69.82
11/1/1998	0.00	6.09	6.09	6.93	131751.02	-6.09	2627.01	131751.02	-6.09	2627.01	131421.02	-6.93	2617.77	177627.10	695.82
12/1/1998	1.79	5.22	5.22	5.94	131747.59	-3.43	2623.58	131747.59	-3.43	2623.58	131416.87	-4.15	2613.62	138148.02	566.61
1/1/1999	248.77	5.22	5.22	5.94	131991.14	243.55	2694.00	131991.14	243.55	2694.00	131659.70	242.83	2694.00	118409.51	919.04
2/1/1999	0.00	4.35	4.35	4.95	131986.79	-4.35	2689.65	131986.79	-4.35	2689.65	131654.75	-4.95	2689.05	118628.40	436.64
3/1/1999	0.00	5.22	5.22	5.94	131981.57	-5.22	2684.43	131981.57	-5.22	2684.43	131648.81	-5.94	2683.11	98853.75	409.67
4/1/1999	0.00	6.09	6.09	6.93	131975.48	-6.09	2678.34	131975.48	-6.09	2678.34	131641.88	-6.93	2676.18	118619.80	1131.76
5/1/1999	0.00	7.83	7.83	8.91	131967.65	-7.83	2670.51	131967.65	-7.83	2670.51	131632.97	-8.91	2667.27	138383.38	16.75
6/1/1999	0.00	9.57	9.57	10.89	131958.08	-9.57	2660.94	131958.08	-9.57	2660.94	131622.08	-10.89	2656.38	177910.94	133.60
7/1/1999	0.00	10.44	10.44	11.88	131947.64	-10.44	2650.50	131947.64	-10.44	2650.50	131610.20	-11.88	2644.50	217430.93	140.22
8/1/1999	0.00	10.44	10.44	11.88	131937.20	-10.44	2640.06	131937.20	-10.44	2640.06	131598.32	-11.88	2632.62	237178.62	33.41
9/1/1999	0.00	8.70	8.70	9.90	131928.50	-8.70	2631.36	131928.50	-8.70	2631.36	131588.42	-9.90	2622.72	237159.85	76.99
10/1/1999	0.00	7.83	7.83	8.91	131920.67	-7.83	2623.53	131920.67	-7.83	2623.53	131579.51	-8.91	2613.81	197620.18	0.00
11/1/1999	0.00	6.09	6.09	6.93	131914.58	-6.09	2617.44	131914.58	-6.09	2617.44	131572.58	-6.93	2606.88	177847.60	9.16
12/1/1999	0.00	5.22	5.22	5.94	131909.36	-5.22	2612.22	131909.36	-5.22	2612.22	131566.64	-5.94	2600.94	138319.53	186.73
1/1/2000	0.00	5.22	5.22	5.94	131904.14	-5.22	2607.00	131904.14	-5.22	2607.00	131560.70	-5.94	2595.00	118554.90	390.45
2/1/2000	536.18	4.35	4.35	4.95	132435.97	531.83	2694.00	132435.97	531.83	2694.00	132091.93	531.23	2694.00	118550.21	2077.36

YEAR	RECHARGE (AF)	Existing Conditions (Includes Discretionary Permits)	*Existing Conditions (Includes Discretionary Permits) Plus Project	General Plan Buildout	Storage (AF)	delta	Existing Conditions (Includes Discretionary Permits)	Storage (AF)	delta	*Existing Conditions (Includes Discretionary Permits) Plus Project	Storage (AF)	delta	General Plan Buildout	RUNOFF (AF)	PRECIPITATION (AF)
3/1/2000	0.00	5.22	5.22	5.94	132430.75	-5.22	2688.78	132430.75	-5.22	2688.78	132085.99	-5.94	2688.06	99190.16	609.79
4/1/2000	0.00	6.09	6.09	6.93	132424.66	-6.09	2682.69	132424.66	-6.09	2682.69	132079.06	-6.93	2681.13	119023.51	409.03
5/1/2000	0.00	7.83	7.83	8.91	132416.83	-7.83	2674.86	132416.83	-7.83	2674.86	132070.15	-8.91	2672.22	138854.37	30.53
6/1/2000	0.00	9.57	9.57	10.89	132407.26	-9.57	2665.29	132407.26	-9.57	2665.29	132059.26	-10.89	2661.33	178516.49	35.12
7/1/2000	0.00	10.44	10.44	11.88	132396.82	-10.44	2654.85	132396.82	-10.44	2654.85	132047.38	-11.88	2649.45	218171.05	0.04
8/1/2000	0.00	10.44	10.44	11.88	132386.38	-10.44	2644.41	132386.38	-10.44	2644.41	132035.50	-11.88	2637.57	237986.02	121.51
9/1/2000	0.00	8.70	8.70	9.90	132377.68	-8.70	2635.71	132377.68	-8.70	2635.71	132025.60	-9.90	2627.67	237967.25	94.09
10/1/2000	0.00	7.83	7.83	8.91	132369.85	-7.83	2627.88	132369.85	-7.83	2627.88	132016.69	-8.91	2618.76	198293.01	484.90
11/1/2000	0.00	6.09	6.09	6.93	132363.76	-6.09	2621.79	132363.76	-6.09	2621.79	132009.76	-6.93	2611.83	178453.16	225.60
12/1/2000	0.00	5.22	5.22	5.94	132358.54	-5.22	2616.57	132358.54	-5.22	2616.57	132003.82	-5.94	2605.89	138790.51	19.71
1/1/2001	451.04	5.22	5.22	5.94	132804.36	445.82	2694.00	132804.36	445.82	2694.00	132448.92	445.10	2694.00	118958.61	1424.58
2/1/2001	1045.09	4.35	4.35	4.95	133845.09	1040.74	2694.00	133845.09	1040.74	2694.00	133489.05	1040.14	2694.00	119359.29	1847.75
3/1/2001	0.00	5.22	5.22	5.94	133839.87	-5.22	2688.78	133839.87	-5.22	2688.78	133483.11	-5.94	2688.06	100245.55	572.55
4/1/2001	0.00	6.09	6.09	6.93	133833.78	-6.09	2682.69	133833.78	-6.09	2682.69	133476.18	-6.93	2681.13	120289.97	642.16
5/1/2001	0.00	7.83	7.83	8.91	133825.95	-7.83	2674.86	133825.95	-7.83	2674.86	133467.27	-8.91	2672.22	140331.91	42.87
6/1/2001	0.00	9.57	9.57	10.89	133816.38	-9.57	2665.29	133816.38	-9.57	2665.29	133456.38	-10.89	2661.33	180416.19	0.09
7/1/2001	0.00	10.44	10.44	11.88	133805.94	-10.44	2654.85	133805.94	-10.44	2654.85	133444.50	-11.88	2649.45	220492.90	14.83
8/1/2001	0.00	10.44	10.44	11.88	133795.50	-10.44	2644.41	133795.50	-10.44	2644.41	133432.62	-11.88	2637.57	240518.95	47.01
9/1/2001	0.00	8.70	8.70	9.90	133786.80	-8.70	2635.71	133786.80	-8.70	2635.71	133422.72	-9.90	2627.67	240500.18	26.72
10/1/2001	0.00	7.83	7.83	8.91	133778.97	-7.83	2627.88	133778.97	-7.83	2627.88	133413.81	-8.91	2618.76	200403.78	0.71
11/1/2001	0.00	6.09	6.09	6.93	133772.88	-6.09	2621.79	133772.88	-6.09	2621.79	133406.88	-6.93	2611.83	180352.85	509.73
12/1/2001	0.56	5.22	5.22	5.94	133768.23	-4.66	2617.13	133768.23	-4.66	2617.13	133401.51	-5.38	2606.45	140268.05	507.90
1/1/2002	0.00	5.22	5.22	5.94	133763.01	-5.22	2611.91	133763.01	-5.22	2611.91	133395.57	-5.94	2600.51	120225.58	275.55
2/1/2002	0.00	4.35	4.35	4.95	133758.66	-4.35	2607.56	133758.66	-4.35	2607.56	133390.62	-4.95	2595.56	120220.88	84.76
3/1/2002	0.00	5.22	5.22	5.94	133753.44	-5.22	2602.34	133753.44	-5.22	2602.34	133384.68	-5.94	2589.62	100180.81	459.47
4/1/2002	0.00	6.09	6.09	6.93	133747.35	-6.09	2596.25	133747.35	-6.09	2596.25	133377.75	-6.93	2582.69	120212.28	283.47
5/1/2002	0.00	7.83	7.83	8.91	133739.52	-7.83	2588.42	133739.52	-7.83	2588.42	133368.84	-8.91	2573.78	140241.28	1.13
6/1/2002	0.00	9.57	9.57	10.89	133729.95	-9.57	2578.85	133729.95	-9.57	2578.85	133357.95	-10.89	2562.89	180299.66	0.50
7/1/2002	0.00	10.44	10.44	11.88	133719.51	-10.44	2568.41	133719.51	-10.44	2568.41	133346.07	-11.88	2551.01	220350.48	0.94
8/1/2002	0.00	10.44	10.44	11.88	133709.07	-10.44	2557.97	133709.07	-10.44	2557.97	133334.19	-11.88	2539.13	240363.58	43.64
9/1/2002	0.00	8.70	8.70	9.90	133700.37	-8.70	2549.27	133700.37	-8.70	2549.27	133324.29	-9.90	2529.23	240344.81	144.44
10/1/2002	0.00	7.83	7.83	8.91	133692.54	-7.83	2541.44	133692.54	-7.83	2541.44	133315.38	-8.91	2520.32	200274.31	35.51
11/1/2002	2.07	6.09	22.09	6.93	133688.52	-4.02	2537.43	133672.52	-20.02	2521.43	133310.52	-4.86	2515.47	180236.32	886.55
12/1/2002	337.70	5.22	5.22	5.94	134020.99	332.48	2694.00	134004.99	332.48	2694.00	133642.27	331.76	2694.00	140162.82	1225.31
1/1/2003	0.00	5.22	5.22	5.94	134015.77	-5.22	2688.78	133999.77	-5.22	2688.78	133636.33	-5.94	2688.06	120438.37	80.76
2/1/2003	2244.26	4.35	4.35	4.95	136255.69	2239.91	2694.00	136239.69	2239.91	2694.00	135875.65	2239.31	2694.00	120433.68	2467.15
3/1/2003	0.00	5.22	5.22	5.94	136250.47	-5.22	2688.78	136234.47	-5.22	2688.78	135869.71	-5.94	2688.06	102039.02	1002.89
4/1/2003	0.00	6.09	6.09	6.93	136244.38	-6.09	2682.69	136228.38	-6.09	2682.69	135862.78	-6.93	2681.13	122442.13	853.33
5/1/2003	0.00	7.83	7.83	8.91	136236.55	-7.83	2674.86	136220.55	-7.83	2674.86	135853.87	-8.91	2672.22	142842.77	301.93
6/1/2003	0.00	9.57	9.57	10.89	136226.98	-9.57	2665.29	136210.98	-9.57	2665.29	135842.98	-10.89	2661.33	183644.44	34.12
7/1/2003	0.00	10.44	10.44	11.88	136216.54	-10.44	2654.85	136200.54	-10.44	2654.85	135831.10	-11.88	2649.45	224438.54	66.80
8/1/2003	0.00	10.44	10.44	11.88	136206.10	-10.44	2644.41	136190.10	-10.44	2644.41	135819.22	-11.88	2637.57	244823.28	173.81
9/1/2003	0.00	8.70	8.70	9.90	136197.40	-8.70	2635.71	136181.40	-8.70	2635.71	135809.32	-9.90	2627.67	244804.51	49.76
10/1/2003	0.00	7.83	7.83	8.91	136189.57	-7.83	2627.88	136173.57	-7.83	2627.88	135800.41	-8.91	2618.76	203990.73	14.09
11/1/2003	0.00	6.09	6.09	6.93	136183.48	-6.09	2621.79	136167.48	-6.09	2621.79	135793.48	-6.93	2611.83	183581.10	465.03
12/1/2003	5.10	5.22	5.22	5.94	136183.36	-0.12	2621.67	136167.36	-0.12	2621.67	135792.64	-0.84	2610.99	142778.91	603.55
1/1/2004	0.00	5.22	5.22	5.94	136178.14	-5.22	2616.45	136162.14	-5.22	2616.45	135786.70	-5.94	2605.05	122381.82	195.58
2/1/2004	1329.97	4.35	4.35	4.95	137503.77	1325.62	2694.00	137487.77	1325.62	2694.00	137111.73	1325.02	2694.00	122377.13	1953.99
3/1/2004	0.00	5.22	5.22	5.94	137498.55	-5.22	2688.78	137482.55	-5.22	2688.78	137105.79	-5.94	2688.06	102973.79	326.54
4/1/2004	0.00	6.09	6.09	6.93	137492.46	-6.09	2682.69	137476.46	-6.09	2682.69	137098.86	-6.93	2681.13	123563.86	382.67
5/1/2004	0.00	7.83	7.83	8.91	137484.63	-7.83	2674.86	137468.63	-7.83	2674.86	137089.95	-8.91	2672.22	144151.45	2.67
6/1/2004	0.00	9.57	9.57	10.89	137475.06	-9.57	2665.29	137459.06	-9.57	2665.29	137079.06	-10.89	2661.33	185327.02	1.12
7/1/2004	0.00	10.44	10.44	11.88	137464.62	-10.44	2654.85	137448.62	-10.44	2654.85	137067.18	-11.88	2649.45	226495.04	14.21
8/1/2004	0.00	10.44	10.44	11.88	137454.18	-10.44	2644.41	137438.18	-10.44	2644.41	137055.30	-11.88	2637.57	247066.73	61.14
9/1/2004	0.00	8.70	8.70	9.90	137445.48	-8.70	2635.71	137429.48	-8.70	2635.71	137045.40	-9.90	2627.67	247047.96	35.93
10/1/2004	548.26	7.83	7.83	8.91	137985.90	540.43	2694.00	137969.90	540.43	2694.00	137584.74	539.35	2694.00	205860.27	3058.06
11/1/2004	0.00	6.09	6.09	6.93	137979.81	-6.09	2687.91	137963.81	-6.09	2687.91	137577.81	-6.93	2687.07	186002.81	554.87
12/1/2004	1932.15	5.22	5.22	5.94	139906.74	1926.93	2694.00	139890.74	1926.93	2694.00	139504.02	1926.21	2694.00	144662.47	1610.18
1/1/2005	6376.85	5.22	5.22	5.94	146278.38	6371.63	2694.00	146262.38	6371.63	2694.00	145874.94	6370.91	2694.00	125728.25	3093.69
2/1/2005	5214.35	4.35	4.35	4.95	151488.38	5210.00	2694.00	151472.38	5210.00	2694.00	151084.34	5209.40	2694.00	131454.82	3040.53
3/1/2005	0.00	5.22	5.22	5.94	151483.16	-5.22	2688.78	151467.16	-5.22	2688.78	151078.40	-5.94	2688.06	113447.80	861.88
4/1/2005	0.00	6.09	6.09	6.93	151477.07	-6.09	2682.69	151461.07	-6.09	2682.69	151071.47	-6.93	2681.13	136132.67	407.53
5/1/2005	0.00	7.83	7.83	8.91	151469.24	-7.83	2674.86	151453.24	-7.83	2674.86	151062.56	-8.91	2672.22	158815.07	91.95
6/1/2005	0.00	9.57	9.57	10.89	151459.67	-9.57	2665.29	151443.67	-9.57	2665.29	151051.67	-10.89	2661.33	204180.24	2.26
							2537.426078			2521.426078			2515.46608		
						Minimum	0.941880504		Minimum	0.93594138		Minimum	0.93372906		Minimum
							2660.395663			2660.356447			2655.69931		
Year	Recharge (in.)	Recharge (AFY)	Precipitation (inches)	% Recharged		Average	0.98752623		Average	0.987511673		Average	0.98578297		Average

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
		323	323	428	2138	2138	2138	2138	2138	2138	2138.00	2138.00	2138.00			
7/1/1971	0.00	38.76	38.76	51.36	2099.24	-38.76	2099.24	2099.24	-38.76	2099.24	2086.64	-51.36	2086.64	0.00	8.74	0.00
8/1/1971	0.00	38.76	38.76	51.36	2060.48	-38.76	2060.48	2060.48	-38.76	2060.48	2035.28	-51.36	2035.28	0.00	123.86	0.00
9/1/1971	0.00	32.30	32.30	42.80	2028.18	-32.30	2028.18	2028.18	-32.30	2028.18	1992.48	-42.80	1992.48	0.00	55.94	0.00
10/1/1971	0.00	29.07	29.07	38.52	1999.11	-29.07	1999.11	1999.11	-29.07	1999.11	1953.96	-38.52	1953.96	100.47	554.02	0.00
11/1/1971	0.00	22.61	22.61	29.96	1976.50	-22.61	1976.50	1976.50	-22.61	1976.50	1924.00	-29.96	1924.00	0.00	96.08	0.00
12/1/1971	265.36	19.38	19.38	25.68	2222.48	245.98	2138.00	2222.48	245.98	2138.00	2163.68	239.68	2138.00	667.74	1943.23	84.48
1/1/1972	0.00	19.38	19.38	25.68	2203.10	-19.38	2118.62	2203.10	-19.38	2118.62	2138.00	-25.68	2112.32	0.00	15.91	0.00
2/1/1972	0.00	16.15	16.15	21.40	2186.95	-16.15	2102.47	2186.95	-16.15	2102.47	2116.60	-21.40	2090.92	0.00	107.59	0.00
3/1/1972	0.00	19.38	19.38	25.68	2167.57	-19.38	2083.09	2167.57	-19.38	2083.09	2090.92	-25.68	2065.24	0.00	11.81	0.00
4/1/1972	0.00	22.61	22.61	29.96	2144.96	-22.61	2060.48	2144.96	-22.61	2060.48	2060.96	-29.96	2035.28	0.00	115.56	0.00
5/1/1972	0.00	29.07	29.07	38.52	2115.89	-29.07	2031.41	2115.89	-29.07	2031.41	2022.44	-38.52	1996.76	11.76	182.91	0.00
6/1/1972	0.00	35.53	35.53	47.08	2080.36	-35.53	1995.88	2080.36	-35.53	1995.88	1975.36	-47.08	1949.68	42.45	350.12	0.00
7/1/1972	0.00	38.76	38.76	51.36	2041.60	-38.76	1957.12	2041.60	-38.76	1957.12	1924.00	-51.36	1898.32	0.00	0.96	0.00
8/1/1972	0.00	38.76	38.76	51.36	2002.84	-38.76	1918.36	2002.84	-38.76	1918.36	1872.64	-51.36	1846.96	0.00	18.06	0.00
9/1/1972	0.00	32.30	32.30	42.80	1970.54	-32.30	1886.06	1970.54	-32.30	1886.06	1829.84	-42.80	1804.16	4.46	156.07	0.00
10/1/1972	0.00	29.07	29.07	38.52	1941.47	-29.07	1856.99	1941.47	-29.07	1856.99	1791.32	-38.52	1765.64	112.69	591.64	0.00
11/1/1972	48.73	22.61	22.61	29.96	1967.59	26.12	1883.11	1967.59	26.12	1883.11	1810.09	18.77	1784.41	447.06	1443.34	0.00
12/1/1972	95.83	19.38	19.38	25.68	2044.03	76.45	1959.55	2044.03	76.45	1959.55	1880.23	70.15	1854.55	267.41	1011.21	0.00
1/1/1973	281.15	19.38	19.38	25.68	2305.81	261.77	2138.00	2305.81	261.77	2138.00	2135.71	255.47	2110.03	341.78	1194.22	83.33
2/1/1973	230.18	16.15	16.15	21.40	2519.83	214.03	2138.00	2519.83	214.03	2138.00	2344.48	208.78	2138.00	461.73	1477.37	214.03
3/1/1973	163.48	19.38	19.38	25.68	2663.93	144.10	2138.00	2663.93	144.10	2138.00	2482.28	137.80	2138.00	741.19	2105.36	144.10
4/1/1973	0.00	22.61	22.61	29.96	2641.32	-22.61	2115.39	2641.32	-22.61	2115.39	2452.32	-29.96	2108.04	0.00	111.45	0.00
5/1/1973	0.00	29.07	29.07	38.52	2612.25	-29.07	2086.32	2612.25	-29.07	2086.32	2413.80	-38.52	2069.52	0.00	44.61	0.00
6/1/1973	0.00	35.53	35.53	47.08	2576.72	-35.53	2050.79	2576.72	-35.53	2050.79	2366.72	-47.08	2022.44	0.00	11.85	0.00
7/1/1973	0.00	38.76	38.76	51.36	2537.96	-38.76	2012.03	2537.96	-38.76	2012.03	2315.36	-51.36	1971.08	0.00	4.41	0.00
8/1/1973	0.00	38.76	38.76	51.36	2499.20	-38.76	1973.27	2499.20	-38.76	1973.27	2264.00	-51.36	1919.72	0.00	79.69	0.00
9/1/1973	0.00	32.30	32.30	42.80	2466.90	-32.30	1940.97	2466.90	-32.30	1940.97	2221.20	-42.80	1876.92	0.00	4.41	0.00
10/1/1973	0.00	29.07	29.07	38.52	2437.83	-29.07	1911.90	2437.83	-29.07	1911.90	2182.68	-38.52	1838.40	0.00	18.10	0.00
11/1/1973	0.00	22.61	22.61	29.96	2415.22	-22.61	1889.29	2415.22	-22.61	1889.29	2152.72	-29.96	1808.44	241.11	944.49	0.00
12/1/1973	0.00	19.38	19.38	25.68	2395.84	-19.38	1869.91	2395.84	-19.38	1869.91	2127.04	-25.68	1782.76	0.00	111.08	0.00
1/1/1974	464.51	19.38	19.38	25.68	2840.97	445.13	2138.00	2840.97	445.13	2138.00	2565.87	438.83	2138.00	784.20	2199.57	177.04
2/1/1974	0.00	16.15	16.15	21.40	2824.82	-16.15	2121.85	2824.82	-16.15	2121.85	2544.47	-21.40	2116.60	0.00	56.85	0.00
3/1/1974	0.00	19.38	19.38	25.68	2805.44	-19.38	2102.47	2805.44	-19.38	2102.47	2518.79	-25.68	2090.92	220.53	891.31	0.00
4/1/1974	0.00	22.61	22.61	29.96	2782.83	-22.61	2079.86	2782.83	-22.61	2079.86	2488.83	-29.96	2060.96	6.27	173.99	0.00
5/1/1974	0.00	29.07	29.07	38.52	2753.76	-29.07	2050.79	2753.76	-29.07	2050.79	2450.31	-38.52	2022.44	0.00	31.72	0.00
6/1/1974	0.00	35.53	35.53	47.08	2718.23	-35.53	2015.26	2718.23	-35.53	2015.26	2403.23	-47.08	1975.36	0.00	4.96	0.00
7/1/1974	0.00	38.76	38.76	51.36	2679.47	-38.76	1976.50	2679.47	-38.76	1976.50	2351.87	-51.36	1924.00	5.17	163.47	0.00
8/1/1974	0.00	38.76	38.76	51.36	2640.71	-38.76	1937.74	2640.71	-38.76	1937.74	2300.51	-51.36	1872.64	0.00	28.05	0.00
9/1/1974	0.00	32.30	32.30	42.80	2608.41	-32.30	1905.44	2608.41	-32.30	1905.44	2257.71	-42.80	1829.84	0.00	56.68	0.00
10/1/1974	0.00	29.07	29.07	38.52	2579.34	-29.07	1876.37	2579.34	-29.07	1876.37	2219.19	-38.52	1791.32	208.89	860.85	0.00
11/1/1974	0.00	22.61	22.61	29.96	2556.73	-22.61	1853.76	2556.73	-22.61	1853.76	2189.23	-29.96	1761.36	3.44	144.34	0.00
12/1/1974	41.38	19.38	19.38	25.68	2578.73	22.00	1875.76	2578.73	22.00	1875.76	2204.93	15.70	1777.06	241.65	945.84	0.00
1/1/1975	0.00	19.38	19.38	25.68	2559.35	-19.38	1856.38	2559.35	-19.38	1856.38	2179.25	-25.68	1751.38	11.72	182.56	0.00
2/1/1975	0.00	16.15	16.15	21.40	2543.20	-16.15	1840.23	2543.20	-16.15	1840.23	2157.85	-21.40	1729.98	168.99	753.57	0.00
3/1/1975	72.14	19.38	19.38	25.68	2595.96	52.76	1892.99	2595.96	52.76	1892.99	2204.31	46.46	1776.44	737.08	2096.33	0.00
4/1/1975	0.00	22.61	22.61	29.96	2573.35	-22.61	1870.38	2573.35	-22.61	1870.38	2174.35	-29.96	1746.48	381.72	1289.86	0.00
5/1/1975	0.00	29.07	29.07	38.52	2544.28	-29.07	1841.31	2544.28	-29.07	1841.31	2135.83	-38.52	1707.96	0.00	64.47	0.00
6/1/1975	0.00	35.53	35.53	47.08	2508.75	-35.53	1805.78	2508.75	-35.53	1805.78	2088.75	-47.08	1660.88	0.00	50.77	0.00
7/1/1975	0.00	38.76	38.76	51.36	2469.99	-38.76	1767.02	2469.99	-38.76	1767.02	2037.39	-51.36	1609.52	0.00	24.55	0.00
8/1/1975	0.00	38.76	38.76	51.36	2431.23	-38.76	1728.26	2431.23	-38.76	1728.26	1986.03	-51.36	1558.16	0.00	7.96	0.00
9/1/1975	0.00	32.30	32.30	42.80	2398.93	-32.30	1695.96	2398.93	-32.30	1695.96	1943.23	-42.80	1515.36	0.00	128.68	0.00
10/1/1975	0.00	29.07	29.07	38.52	2369.86	-29.07	1666.89	2369.86	-29.07	1666.89	1904.71	-38.52	1476.84	0.00	94.54	0.00
11/1/1975	0.00	22.61	22.61	29.96	2347.25	-22.61	1644.28	2347.25	-22.61	1644.28	1874.75	-29.96	1446.88	137.53	665.03	0.00

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
12/1/1975	0.00	19.38	19.38	25.68	2327.87	-19.38	1624.90	2327.87	-19.38	1624.90	1849.07	-25.68	1421.20	33.04	309.06	0.00
1/1/1976	0.00	19.38	19.38	25.68	2308.49	-19.38	1605.52	2308.49	-19.38	1605.52	1823.39	-25.68	1395.52	0.00	30.42	0.00
2/1/1976	349.92	16.15	16.15	21.40	2642.27	333.77	1939.30	2642.27	333.77	1939.30	2151.92	328.52	1724.05	1025.78	2721.24	0.00
3/1/1976	0.00	19.38	19.38	25.68	2622.89	-19.38	1919.92	2622.89	-19.38	1919.92	2126.24	-25.68	1698.37	247.43	960.63	0.00
4/1/1976	0.00	22.61	22.61	29.96	2600.28	-22.61	1897.31	2600.28	-22.61	1897.31	2096.28	-29.96	1668.41	200.71	839.23	0.00
5/1/1976	0.00	29.07	29.07	38.52	2571.21	-29.07	1868.24	2571.21	-29.07	1868.24	2057.76	-38.52	1629.89	0.00	88.05	0.00
6/1/1976	0.00	35.53	35.53	47.08	2535.68	-35.53	1832.71	2535.68	-35.53	1832.71	2010.68	-47.08	1582.81	0.00	12.71	0.00
7/1/1976	0.00	38.76	38.76	51.36	2496.92	-38.76	1793.95	2496.92	-38.76	1793.95	1959.32	-51.36	1531.45	20.73	245.97	0.00
8/1/1976	0.00	38.76	38.76	51.36	2458.16	-38.76	1755.19	2458.16	-38.76	1755.19	1907.96	-51.36	1480.09	0.00	16.05	0.00
9/1/1976	0.00	32.30	32.30	42.80	2425.86	-32.30	1722.89	2425.86	-32.30	1722.89	1865.16	-42.80	1437.29	377.23	1279.19	0.00
10/1/1976	0.00	29.07	29.07	38.52	2396.79	-29.07	1693.82	2396.79	-29.07	1693.82	1826.64	-38.52	1398.77	27.66	283.23	0.00
11/1/1976	0.00	22.61	22.61	29.96	2374.18	-22.61	1671.21	2374.18	-22.61	1671.21	1796.68	-29.96	1368.81	65.90	439.50	0.00
12/1/1976	0.00	19.38	19.38	25.68	2354.80	-19.38	1651.83	2354.80	-19.38	1651.83	1771.00	-25.68	1343.13	102.75	561.11	0.00
1/1/1977	149.82	19.38	19.38	25.68	2485.24	130.44	1782.27	2485.24	130.44	1782.27	1895.14	124.14	1467.27	473.52	1504.60	0.00
2/1/1977	0.00	16.15	16.15	21.40	2469.09	-16.15	1766.12	2469.09	-16.15	1766.12	1873.74	-21.40	1445.87	14.83	207.80	0.00
3/1/1977	0.00	19.38	19.38	25.68	2449.71	-19.38	1746.74	2449.71	-19.38	1746.74	1848.06	-25.68	1420.19	169.76	755.67	0.00
4/1/1977	0.00	22.61	22.61	29.96	2427.10	-22.61	1724.13	2427.10	-22.61	1724.13	1818.10	-29.96	1390.23	0.00	82.77	0.00
5/1/1977	0.00	29.07	29.07	38.52	2398.03	-29.07	1695.06	2398.03	-29.07	1695.06	1779.58	-38.52	1351.71	290.50	1068.84	0.00
6/1/1977	0.00	35.53	35.53	47.08	2362.50	-35.53	1659.53	2362.50	-35.53	1659.53	1732.50	-47.08	1304.63	0.00	12.35	0.00
7/1/1977	0.00	38.76	38.76	51.36	2323.74	-38.76	1620.77	2323.74	-38.76	1620.77	1681.14	-51.36	1253.27	0.00	19.29	0.00
8/1/1977	0.00	38.76	38.76	51.36	2284.98	-38.76	1582.01	2284.98	-38.76	1582.01	1629.78	-51.36	1201.91	320.28	1142.05	0.00
9/1/1977	0.00	32.30	32.30	42.80	2252.68	-32.30	1549.71	2252.68	-32.30	1549.71	1586.98	-42.80	1159.11	0.00	10.42	0.00
10/1/1977	0.00	29.07	29.07	38.52	2223.61	-29.07	1520.64	2223.61	-29.07	1520.64	1548.46	-38.52	1120.59	22.70	257.20	0.00
11/1/1977	0.00	22.61	22.61	29.96	2201.00	-22.61	1498.03	2201.00	-22.61	1498.03	1518.50	-29.96	1090.63	0.00	89.35	0.00
12/1/1977	145.63	19.38	19.38	25.68	2327.25	126.25	1624.28	2327.25	126.25	1624.28	1638.45	119.95	1210.58	475.72	1509.67	0.00
1/1/1978	1592.52	19.38	19.38	25.68	3900.39	1573.14	2138.00	3900.39	1573.14	2138.00	3205.29	1566.84	2138.00	1665.65	4066.75	1059.42
2/1/1978	907.52	16.15	16.15	21.40	4791.76	891.37	2138.00	4791.76	891.37	2138.00	4091.41	886.12	2138.00	999.13	2664.21	891.37
3/1/1978	820.57	19.38	19.38	25.68	5592.95	801.19	2138.00	5592.95	801.19	2138.00	4886.30	794.89	2138.00	1326.71	3358.77	801.19
4/1/1978	0.00	22.61	22.61	29.96	5570.34	-22.61	2115.39	5570.34	-22.61	2115.39	4856.34	-29.96	2108.04	156.06	717.67	0.00
5/1/1978	0.00	29.07	29.07	38.52	5541.27	-29.07	2086.32	5541.27	-29.07	2086.32	4817.82	-38.52	2069.52	0.00	84.85	0.00
6/1/1978	0.00	35.53	35.53	47.08	5505.74	-35.53	2050.79	5505.74	-35.53	2050.79	4770.74	-47.08	2022.44	0.00	0.92	0.00
7/1/1978	0.00	38.76	38.76	51.36	5466.98	-38.76	2012.03	5466.98	-38.76	2012.03	4719.38	-51.36	1971.08	0.00	7.24	0.00
8/1/1978	0.00	38.76	38.76	51.36	5428.22	-38.76	1973.27	5428.22	-38.76	1973.27	4668.02	-51.36	1919.72	0.00	17.26	0.00
9/1/1978	0.00	32.30	32.30	42.80	5395.92	-32.30	1940.97	5395.92	-32.30	1940.97	4625.22	-42.80	1876.92	65.15	436.86	0.00
10/1/1978	0.00	29.07	29.07	38.52	5366.85	-29.07	1911.90	5366.85	-29.07	1911.90	4586.70	-38.52	1838.40	0.00	94.26	0.00
11/1/1978	63.67	22.61	22.61	29.96	5407.92	41.06	1952.96	5407.92	41.06	1952.96	4620.42	33.71	1872.11	488.00	1537.94	0.00
12/1/1978	295.82	19.38	19.38	25.68	5684.35	276.44	2138.00	5684.35	276.44	2138.00	4890.55	270.14	2138.00	511.13	1590.96	91.40
1/1/1979	1218.69	19.38	19.38	25.68	6883.66	1199.31	2138.00	6883.66	1199.31	2138.00	6083.56	1193.01	2138.00	1139.63	2963.72	1199.31
2/1/1979	157.52	16.15	16.15	21.40	7025.03	141.37	2138.00	7025.03	141.37	2138.00	6219.68	136.12	2138.00	383.91	1295.07	141.37
3/1/1979	308.25	19.38	19.38	25.68	7313.90	288.87	2138.00	7313.90	288.87	2138.00	6502.25	282.57	2138.00	871.17	2388.70	288.87
4/1/1979	0.00	22.61	22.61	29.96	7291.29	-22.61	2115.39	7291.29	-22.61	2115.39	6472.29	-29.96	2108.04	0.00	29.37	0.00
5/1/1979	0.00	29.07	29.07	38.52	7262.22	-29.07	2086.32	7262.22	-29.07	2086.32	6433.77	-38.52	2069.52	0.00	107.90	0.00
6/1/1979	0.00	35.53	35.53	47.08	7226.69	-35.53	2050.79	7226.69	-35.53	2050.79	6386.69	-47.08	2022.44	0.00	13.86	0.00
7/1/1979	0.00	38.76	38.76	51.36	7187.93	-38.76	2012.03	7187.93	-38.76	2012.03	6335.33	-51.36	1971.08	4.56	157.15	0.00
8/1/1979	0.00	38.76	38.76	51.36	7149.17	-38.76	1973.27	7149.17	-38.76	1973.27	6283.97	-51.36	1919.72	0.00	83.43	0.00
9/1/1979	0.00	32.30	32.30	42.80	7116.87	-32.30	1940.97	7116.87	-32.30	1940.97	6241.17	-42.80	1876.92	0.00	27.13	0.00
10/1/1979	0.00	29.07	29.07	38.52	7087.80	-29.07	1911.90	7087.80	-29.07	1911.90	6202.65	-38.52	1838.40	87.16	511.58	0.00
11/1/1979	0.00	22.61	22.61	29.96	7065.19	-22.61	1889.29	7065.19	-22.61	1889.29	6172.69	-29.96	1808.44	8.33	179.63	0.00
12/1/1979	0.00	19.38	19.38	25.68	7045.81	-19.38	1869.91	7045.81	-19.38	1869.91	6147.01	-25.68	1782.76	5.07	162.49	0.00
1/1/1980	1555.74	19.38	19.38	25.68	8582.17	1536.36	2138.00	8582.17	1536.36	2138.00	7677.07	1530.06	2138.00	2026.63	4813.29	1268.27
2/1/1980	1608.70	16.15	16.15	21.40	10174.72	1592.55	2138.00	10174.72	1592.55	2138.00	9264.37	1587.30	2138.00	1633.34	3999.60	1592.55
3/1/1980	125.78	19.38	19.38	25.68	10281.12	106.40	2138.00	10281.12	106.40	2138.00	9364.47	100.10	2138.00	701.83	2018.69	106.40
4/1/1980	0.00	22.61	22.61	29.96	10258.51	-22.61	2115.39	10258.51	-22.61	2115.39	9334.51	-29.96	2108.04	181.90	788.79	0.00
5/1/1980	0.00	29.07	29.07	38.52	10229.44	-29.07	2086.32	10229.44	-29.07	2086.32	9295.99	-38.52	2069.52	39.95	339.64	0.00
6/1/1980	0.00	35.53	35.53	47.08	10193.91	-35.53	2050.79	10193.91	-35.53	2050.79	9248.91	-47.08	2022.44	0.00	2.10	0.00

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
7/1/1980	0.00	38.76	38.76	51.36	10155.15	-38.76	2012.03	10155.15	-38.76	2012.03	9197.55	-51.36	1971.08	0.00	25.79	0.00
8/1/1980	0.00	38.76	38.76	51.36	10116.39	-38.76	1973.27	10116.39	-38.76	1973.27	9146.19	-51.36	1919.72	0.00	5.30	0.00
9/1/1980	0.00	32.30	32.30	42.80	10084.09	-32.30	1940.97	10084.09	-32.30	1940.97	9103.39	-42.80	1876.92	0.00	0.22	0.00
10/1/1980	0.00	29.07	29.07	38.52	10055.02	-29.07	1911.90	10055.02	-29.07	1911.90	9064.87	-38.52	1838.40	3.86	149.37	0.00
11/1/1980	0.00	22.61	22.61	29.96	10032.41	-22.61	1889.29	10032.41	-22.61	1889.29	9034.91	-29.96	1808.44	0.00	17.49	0.00
12/1/1980	0.00	19.38	19.38	25.68	10013.03	-19.38	1869.91	10013.03	-19.38	1869.91	9009.23	-25.68	1782.76	52.40	389.77	0.00
1/1/1981	17.69	19.38	19.38	25.68	10011.33	-1.69	1868.22	10011.33	-1.69	1868.22	9001.23	-7.99	1774.77	174.52	768.71	0.00
2/1/1981	13.82	16.15	16.15	21.40	10009.01	-2.33	1865.89	10009.01	-2.33	1865.89	8993.66	-7.58	1767.19	325.73	1155.33	0.00
3/1/1981	61.09	19.38	19.38	25.68	10050.71	41.71	1907.60	10050.71	41.71	1907.60	9029.06	35.41	1802.60	682.75	1976.50	0.00
4/1/1981	0.00	22.61	22.61	29.96	10028.10	-22.61	1884.99	10028.10	-22.61	1884.99	8999.10	-29.96	1772.64	43.75	355.51	0.00
5/1/1981	0.00	29.07	29.07	38.52	9999.03	-29.07	1855.92	9999.03	-29.07	1855.92	8960.58	-38.52	1734.12	8.26	179.57	0.00
6/1/1981	0.00	35.53	35.53	47.08	9963.50	-35.53	1820.39	9963.50	-35.53	1820.39	8913.50	-47.08	1687.04	0.00	2.53	0.00
7/1/1981	0.00	38.76	38.76	51.36	9924.74	-38.76	1781.63	9924.74	-38.76	1781.63	8862.14	-51.36	1635.68	0.00	14.59	0.00
8/1/1981	0.00	38.76	38.76	51.36	9885.98	-38.76	1742.87	9885.98	-38.76	1742.87	8810.78	-51.36	1584.32	0.00	30.89	0.00
9/1/1981	0.00	32.30	32.30	42.80	9853.68	-32.30	1710.57	9853.68	-32.30	1710.57	8767.98	-42.80	1541.52	0.00	44.23	0.00
10/1/1981	0.00	29.07	29.07	38.52	9824.61	-29.07	1681.50	9824.61	-29.07	1681.50	8729.46	-38.52	1503.00	3.43	144.23	0.00
11/1/1981	0.00	22.61	22.61	29.96	9802.00	-22.61	1658.89	9802.00	-22.61	1658.89	8699.50	-29.96	1473.04	152.74	708.36	0.00
12/1/1981	0.00	19.38	19.38	25.68	9782.62	-19.38	1639.51	9782.62	-19.38	1639.51	8673.82	-25.68	1447.36	32.13	304.84	0.00
1/1/1982	408.98	19.38	19.38	25.68	10172.22	389.60	2029.10	10172.22	389.60	2029.10	9057.12	383.30	1830.65	858.77	2361.83	0.00
2/1/1982	0.20	16.15	16.15	21.40	10156.27	-15.95	2013.16	10156.27	-15.95	2013.16	9035.92	-21.20	1809.46	181.60	788.00	0.00
3/1/1982	350.49	19.38	19.38	25.68	10487.38	331.11	2138.00	10487.38	331.11	2138.00	9360.73	324.81	2134.26	956.02	2571.71	206.26
4/1/1982	0.00	22.61	22.61	29.96	10464.77	-22.61	2115.39	10464.77	-22.61	2115.39	9330.77	-29.96	2104.30	60.31	419.40	0.00
5/1/1982	0.00	29.07	29.07	38.52	10435.70	-29.07	2086.32	10435.70	-29.07	2086.32	9292.25	-38.52	2065.78	0.00	108.63	0.00
6/1/1982	0.00	35.53	35.53	47.08	10400.17	-35.53	2050.79	10400.17	-35.53	2050.79	9245.17	-47.08	2018.70	0.00	44.81	0.00
7/1/1982	0.00	38.76	38.76	51.36	10361.41	-38.76	2012.03	10361.41	-38.76	2012.03	9193.81	-51.36	1967.34	0.00	29.98	0.00
8/1/1982	0.00	38.76	38.76	51.36	10322.65	-38.76	1973.27	10322.65	-38.76	1973.27	9142.45	-51.36	1915.98	0.82	136.34	0.00
9/1/1982	0.00	32.30	32.30	42.80	10290.35	-32.30	1940.97	10290.35	-32.30	1940.97	9099.65	-42.80	1873.18	50.68	383.13	0.00
10/1/1982	0.00	29.07	29.07	38.52	10261.28	-29.07	1911.90	10261.28	-29.07	1911.90	9061.13	-38.52	1834.66	0.00	87.35	0.00
11/1/1982	105.28	22.61	22.61	29.96	10343.95	82.67	1994.57	10343.95	82.67	1994.57	9136.45	75.32	1909.98	591.62	1773.31	0.00
12/1/1982	215.68	19.38	19.38	25.68	10540.25	196.30	2138.00	10540.25	196.30	2138.00	9326.45	190.00	2099.99	366.68	1254.04	52.87
1/1/1983	329.03	19.38	19.38	25.68	10849.90	309.65	2138.00	10849.90	309.65	2138.00	9629.80	303.35	2138.00	364.00	1247.64	309.65
2/1/1983	670.22	16.15	16.15	21.40	11503.97	654.07	2138.00	11503.97	654.07	2138.00	10278.62	648.82	2138.00	819.60	2276.75	654.07
3/1/1983	1299.12	19.38	19.38	25.68	12783.71	1279.74	2138.00	12783.71	1279.74	2138.00	11552.06	1273.44	2138.00	1772.85	4289.12	1279.74
4/1/1983	0.00	22.61	22.61	29.96	12761.10	-22.61	2115.39	12761.10	-22.61	2115.39	11522.10	-29.96	2108.04	341.59	1193.78	0.00
5/1/1983	0.00	29.07	29.07	38.52	12732.03	-29.07	2086.32	12732.03	-29.07	2086.32	11483.58	-38.52	2069.52	0.00	102.24	0.00
6/1/1983	0.00	35.53	35.53	47.08	12696.50	-35.53	2050.79	12696.50	-35.53	2050.79	11436.50	-47.08	2022.44	0.00	11.38	0.00
7/1/1983	0.00	38.76	38.76	51.36	12657.74	-38.76	2012.03	12657.74	-38.76	2012.03	11385.14	-51.36	1971.08	0.00	16.33	0.00
8/1/1983	0.00	38.76	38.76	51.36	12618.98	-38.76	1973.27	12618.98	-38.76	1973.27	11333.78	-51.36	1919.72	58.66	413.34	0.00
9/1/1983	0.00	32.30	32.30	42.80	12586.68	-32.30	1940.97	12586.68	-32.30	1940.97	11290.98	-42.80	1876.92	13.46	197.36	0.00
10/1/1983	0.00	29.07	29.07	38.52	12557.61	-29.07	1911.90	12557.61	-29.07	1911.90	11252.46	-38.52	1838.40	40.05	340.07	0.00
11/1/1983	30.93	22.61	22.61	29.96	12565.93	8.32	1920.22	12565.93	8.32	1920.22	11253.43	0.97	1839.37	392.69	1315.87	0.00
12/1/1983	156.77	19.38	19.38	25.68	12703.32	137.39	2057.60	12703.32	137.39	2057.60	11384.52	131.09	1970.45	390.37	1310.39	0.00
1/1/1984	0.00	19.38	19.38	25.68	12683.94	-19.38	2038.22	12683.94	-19.38	2038.22	11358.84	-25.68	1944.77	6.94	176.98	0.00
2/1/1984	0.00	16.15	16.15	21.40	12667.79	-16.15	2022.07	12667.79	-16.15	2022.07	11337.44	-21.40	1923.37	0.00	31.36	0.00
3/1/1984	0.00	19.38	19.38	25.68	12648.41	-19.38	2002.69	12648.41	-19.38	2002.69	11311.76	-25.68	1897.69	0.00	44.10	0.00
4/1/1984	0.00	22.61	22.61	29.96	12625.80	-22.61	1980.08	12625.80	-22.61	1980.08	11281.80	-29.96	1867.73	41.95	348.06	0.00
5/1/1984	0.00	29.07	29.07	38.52	12596.73	-29.07	1951.01	12596.73	-29.07	1951.01	11243.28	-38.52	1829.21	0.00	4.18	0.00
6/1/1984	0.00	35.53	35.53	47.08	12561.20	-35.53	1915.48	12561.20	-35.53	1915.48	11196.20	-47.08	1782.13	0.00	50.62	0.00
7/1/1984	0.00	38.76	38.76	51.36	12522.44	-38.76	1876.72	12522.44	-38.76	1876.72	11144.84	-51.36	1730.77	65.70	438.79	0.00
8/1/1984	0.00	38.76	38.76	51.36	12483.68	-38.76	1837.96	12483.68	-38.76	1837.96	11093.48	-51.36	1679.41	21.20	248.70	0.00
9/1/1984	0.00	32.30	32.30	42.80	12451.38	-32.30	1805.66	12451.38	-32.30	1805.66	11050.68	-42.80	1636.61	0.00	55.85	0.00
10/1/1984	0.00	29.07	29.07	38.52	12422.31	-29.07	1776.59	12422.31	-29.07	1776.59	11012.16	-38.52	1598.09	4.81	159.83	0.00
11/1/1984	0.00	22.61	22.61	29.96	12399.70	-22.61	1753.98	12399.70	-22.61	1753.98	10982.20	-29.96	1568.13	218.13	885.06	0.00
12/1/1984	552.18	19.38	19.38	25.68	12932.50	532.80	2138.00	12932.50	532.80	2138.00	11508.70	526.50	2094.63	1036.23	2743.57	148.78
1/1/1985	0.00	19.38	19.38	25.68	12913.12	-19.38	2118.62	12913.12	-19.38	2118.62	11483.02	-25.68	2068.95	60.68	420.75	0.00

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
2/1/1985	0.00	16.15	16.15	21.40	12896.97	-16.15	2102.47	12896.97	-16.15	2102.47	11461.62	-21.40	2047.55	138.19	666.91	0.00
3/1/1985	0.00	19.38	19.38	25.68	12877.59	-19.38	2083.09	12877.59	-19.38	2083.09	11435.94	-25.68	2021.87	100.27	553.40	0.00
4/1/1985	0.00	22.61	22.61	29.96	12854.98	-22.61	2060.48	12854.98	-22.61	2060.48	11405.98	-29.96	1991.91	5.29	164.70	0.00
5/1/1985	0.00	29.07	29.07	38.52	12825.91	-29.07	2031.41	12825.91	-29.07	2031.41	11367.46	-38.52	1953.39	0.00	10.78	0.00
6/1/1985	0.00	35.53	35.53	47.08	12790.38	-35.53	1995.88	12790.38	-35.53	1995.88	11320.38	-47.08	1906.31	0.00	14.24	0.00
7/1/1985	0.00	38.76	38.76	51.36	12751.62	-38.76	1957.12	12751.62	-38.76	1957.12	11269.02	-51.36	1854.95	3.70	147.49	0.00
8/1/1985	0.00	38.76	38.76	51.36	12712.86	-38.76	1918.36	12712.86	-38.76	1918.36	11217.66	-51.36	1803.59	0.00	10.04	0.00
9/1/1985	0.00	32.30	32.30	42.80	12680.56	-32.30	1886.06	12680.56	-32.30	1886.06	11174.86	-42.80	1760.79	9.60	180.36	0.00
10/1/1985	0.00	29.07	29.07	38.52	12651.49	-29.07	1856.99	12651.49	-29.07	1856.99	11136.34	-38.52	1722.27	12.96	193.29	0.00
11/1/1985	402.50	22.61	22.61	29.96	13031.37	379.89	2138.00	13031.37	379.89	2138.00	11508.87	372.54	2094.81	1067.67	2810.67	98.88
12/1/1985	86.00	19.38	19.38	25.68	13097.99	66.62	2138.00	13097.99	66.62	2138.00	11569.19	60.32	2138.00	170.03	756.41	66.62
1/1/1986	0.15	19.38	19.38	25.68	13078.76	-19.23	2118.77	13078.76	-19.23	2118.77	11543.66	-25.53	2112.47	69.25	451.29	0.00
2/1/1986	394.57	16.15	16.15	21.40	13457.18	378.42	2138.00	13457.18	378.42	2138.00	11916.83	373.17	2138.00	601.29	1795.00	359.19
3/1/1986	106.41	19.38	19.38	25.68	13544.21	87.03	2138.00	13544.21	87.03	2138.00	11997.56	80.73	2138.00	684.50	1980.38	87.03
4/1/1986	0.00	22.61	22.61	29.96	13521.60	-22.61	2115.39	13521.60	-22.61	2115.39	11967.60	-29.96	2108.04	23.22	260.05	0.00
5/1/1986	0.00	29.07	29.07	38.52	13492.53	-29.07	2086.32	13492.53	-29.07	2086.32	11929.08	-38.52	2069.52	0.00	6.63	0.00
6/1/1986	0.00	35.53	35.53	47.08	13457.00	-35.53	2050.79	13457.00	-35.53	2050.79	11882.00	-47.08	2022.44	0.00	0.32	0.00
7/1/1986	0.00	38.76	38.76	51.36	13418.24	-38.76	2012.03	13418.24	-38.76	2012.03	11830.64	-51.36	1971.08	0.59	135.24	0.00
8/1/1986	0.00	38.76	38.76	51.36	13379.48	-38.76	1973.27	13379.48	-38.76	1973.27	11779.28	-51.36	1919.72	0.00	65.31	0.00
9/1/1986	0.00	32.30	32.30	42.80	13347.18	-32.30	1940.97	13347.18	-32.30	1940.97	11736.48	-42.80	1876.92	101.87	558.38	0.00
10/1/1986	0.00	29.07	29.07	38.52	13318.11	-29.07	1911.90	13318.11	-29.07	1911.90	11697.96	-38.52	1838.40	80.71	490.35	0.00
11/1/1986	0.00	22.61	22.61	29.96	13295.50	-22.61	1889.29	13295.50	-22.61	1889.29	11668.00	-29.96	1808.44	87.16	511.58	0.00
12/1/1986	8.22	19.38	19.38	25.68	13284.34	-11.16	1878.13	13284.34	-11.16	1878.13	11650.54	-17.46	1790.98	147.69	694.08	0.00
1/1/1987	69.31	19.38	19.38	25.68	13334.27	49.93	1928.06	13334.27	49.93	1928.06	11694.17	43.63	1834.61	278.56	1039.12	0.00
2/1/1987	5.15	16.15	16.15	21.40	13323.27	-11.00	1917.06	13323.27	-11.00	1917.06	11677.92	-16.25	1818.36	233.16	924.04	0.00
3/1/1987	0.00	19.38	19.38	25.68	13303.89	-19.38	1897.68	13303.89	-19.38	1897.68	11652.24	-25.68	1792.68	206.19	853.73	0.00
4/1/1987	0.00	22.61	22.61	29.96	13281.28	-22.61	1875.07	13281.28	-22.61	1875.07	11622.28	-29.96	1762.72	20.38	243.93	0.00
5/1/1987	0.00	29.07	29.07	38.52	13252.21	-29.07	1846.00	13252.21	-29.07	1846.00	11583.76	-38.52	1724.20	0.00	73.21	0.00
6/1/1987	0.00	35.53	35.53	47.08	13216.68	-35.53	1810.47	13216.68	-35.53	1810.47	11536.68	-47.08	1677.12	0.00	28.58	0.00
7/1/1987	0.00	38.76	38.76	51.36	13177.92	-38.76	1771.71	13177.92	-38.76	1771.71	11485.32	-51.36	1625.76	0.00	29.26	0.00
8/1/1987	0.00	38.76	38.76	51.36	13139.16	-38.76	1732.95	13139.16	-38.76	1732.95	11433.96	-51.36	1574.40	0.00	90.29	0.00
9/1/1987	0.00	32.30	32.30	42.80	13106.86	-32.30	1700.65	13106.86	-32.30	1700.65	11391.16	-42.80	1531.60	14.20	203.05	0.00
10/1/1987	0.00	29.07	29.07	38.52	13077.79	-29.07	1671.58	13077.79	-29.07	1671.58	11352.64	-38.52	1493.08	414.96	1368.36	0.00
11/1/1987	0.00	22.61	22.61	29.96	13055.18	-22.61	1648.97	13055.18	-22.61	1648.97	11322.68	-29.96	1463.12	197.31	830.18	0.00
12/1/1987	104.45	19.38	19.38	25.68	13140.25	85.07	1734.04	13140.25	85.07	1734.04	11401.45	78.77	1541.89	390.54	1310.79	0.00
1/1/1988	176.17	19.38	19.38	25.68	13297.05	156.79	1890.83	13297.05	156.79	1890.83	11551.95	150.49	1692.38	324.99	1153.53	0.00
2/1/1988	0.00	16.15	16.15	21.40	13280.90	-16.15	1874.68	13280.90	-16.15	1874.68	11530.55	-21.40	1670.98	160.38	729.74	0.00
3/1/1988	0.00	19.38	19.38	25.68	13261.52	-19.38	1855.30	13261.52	-19.38	1855.30	11504.87	-25.68	1645.30	33.84	312.74	0.00
4/1/1988	0.00	22.61	22.61	29.96	13238.91	-22.61	1832.69	13238.91	-22.61	1832.69	11474.91	-29.96	1615.34	456.60	1465.47	0.00
5/1/1988	0.00	29.07	29.07	38.52	13209.84	-29.07	1803.62	13209.84	-29.07	1803.62	11436.39	-38.52	1576.82	0.00	61.62	0.00
6/1/1988	0.00	35.53	35.53	47.08	13174.31	-35.53	1768.09	13174.31	-35.53	1768.09	11389.31	-47.08	1529.74	0.00	0.15	0.00
7/1/1988	0.00	38.76	38.76	51.36	13135.55	-38.76	1729.33	13135.55	-38.76	1729.33	11337.95	-51.36	1478.38	0.00	22.47	0.00
8/1/1988	0.00	38.76	38.76	51.36	13096.79	-38.76	1690.57	13096.79	-38.76	1690.57	11286.59	-51.36	1427.02	0.00	112.93	0.00
9/1/1988	0.00	32.30	32.30	42.80	13064.49	-32.30	1658.27	13064.49	-32.30	1658.27	11243.79	-42.80	1384.22	0.00	21.15	0.00
10/1/1988	0.00	29.07	29.07	38.52	13035.42	-29.07	1629.20	13035.42	-29.07	1629.20	11205.27	-38.52	1345.70	0.00	9.74	0.00
11/1/1988	0.00	22.61	22.61	29.96	13012.81	-22.61	1606.59	13012.81	-22.61	1606.59	11175.31	-29.96	1315.74	105.65	570.11	0.00
12/1/1988	87.58	19.38	19.38	25.68	13081.01	68.20	1674.79	13081.01	68.20	1674.79	11237.21	61.90	1377.64	361.11	1240.72	0.00
1/1/1989	0.00	19.38	19.38	25.68	13061.63	-19.38	1655.41	13061.63	-19.38	1655.41	11211.53	-25.68	1351.96	44.83	359.90	0.00
2/1/1989	0.00	16.15	16.15	21.40	13045.48	-16.15	1639.26	13045.48	-16.15	1639.26	11190.13	-21.40	1330.56	95.91	539.68	0.00
3/1/1989	0.00	19.38	19.38	25.68	13026.10	-19.38	1619.88	13026.10	-19.38	1619.88	11164.45	-25.68	1304.88	124.05	625.64	0.00
4/1/1989	0.00	22.61	22.61	29.96	13003.49	-22.61	1597.27	13003.49	-22.61	1597.27	11134.49	-29.96	1274.92	0.00	51.59	0.00
5/1/1989	0.00	29.07	29.07	38.52	12974.42	-29.07	1568.20	12974.42	-29.07	1568.20	11095.97	-38.52	1236.40	0.00	88.53	0.00
6/1/1989	0.00	35.53	35.53	47.08	12938.89	-35.53	1532.67	12938.89	-35.53	1532.67	11048.89	-47.08	1189.32	0.00	7.54	0.00
7/1/1989	0.00	38.76	38.76	51.36	12900.13	-38.76	1493.91	12900.13	-38.76	1493.91	10997.53	-51.36	1137.96	0.00	19.99	0.00
8/1/1989	0.00	38.76	38.76	51.36	12861.37	-38.76	1455.15	12861.37	-38.76	1455.15	10946.17	-51.36	1086.60	0.00	31.07	0.00

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
9/1/1989	0.00	32.30	32.30	42.80	12829.07	-32.30	1422.85	12829.07	-32.30	1422.85	10903.37	-42.80	1043.80	3.93	150.23	0.00
10/1/1989	0.00	29.07	29.07	38.52	12800.00	-29.07	1393.78	12800.00	-29.07	1393.78	10864.85	-38.52	1005.28	12.83	192.22	0.00
11/1/1989	0.00	22.61	22.61	29.96	12777.39	-22.61	1371.17	12777.39	-22.61	1371.17	10834.89	-29.96	975.32	0.00	81.22	0.00
12/1/1989	0.00	19.38	19.38	25.68	12758.01	-19.38	1351.79	12758.01	-19.38	1351.79	10809.21	-25.68	949.64	0.00	107.37	0.00
1/1/1990	156.73	19.38	19.38	25.68	12895.36	137.35	1489.15	12895.36	137.35	1489.15	10940.26	131.05	1080.70	496.99	1558.59	0.00
2/1/1990	0.00	16.15	16.15	21.40	12879.21	-16.15	1473.00	12879.21	-16.15	1473.00	10918.86	-21.40	1059.30	170.83	758.61	0.00
3/1/1990	0.00	19.38	19.38	25.68	12859.83	-19.38	1453.62	12859.83	-19.38	1453.62	10893.18	-25.68	1033.62	52.23	389.13	0.00
4/1/1990	0.00	22.61	22.61	29.96	12837.22	-22.61	1431.01	12837.22	-22.61	1431.01	10863.22	-29.96	1003.66	65.11	436.70	0.00
5/1/1990	0.00	29.07	29.07	38.52	12808.15	-29.07	1401.94	12808.15	-29.07	1401.94	10824.70	-38.52	965.14	22.35	255.23	0.00
6/1/1990	0.00	35.53	35.53	47.08	12772.62	-35.53	1366.41	12772.62	-35.53	1366.41	10777.62	-47.08	918.06	43.09	352.77	0.00
7/1/1990	0.00	38.76	38.76	51.36	12733.86	-38.76	1327.65	12733.86	-38.76	1327.65	10726.26	-51.36	866.70	0.00	22.31	0.00
8/1/1990	0.00	38.76	38.76	51.36	12695.10	-38.76	1288.89	12695.10	-38.76	1288.89	10674.90	-51.36	815.34	0.00	61.73	0.00
9/1/1990	0.00	32.30	32.30	42.80	12662.80	-32.30	1256.59	12662.80	-32.30	1256.59	10632.10	-42.80	772.54	0.00	34.68	0.00
10/1/1990	0.00	29.07	29.07	38.52	12633.73	-29.07	1227.52	12633.73	-29.07	1227.52	10593.58	-38.52	734.02	0.00	16.38	0.00
11/1/1990	0.00	22.61	22.61	29.96	12611.12	-22.61	1204.91	12611.12	-22.61	1204.91	10563.62	-29.96	704.06	57.56	409.27	0.00
12/1/1990	0.00	19.38	19.38	25.68	12591.74	-19.38	1185.53	12591.74	-19.38	1185.53	10537.94	-25.68	678.38	48.79	375.77	0.00
1/1/1991	0.00	19.38	35.38	25.68	12572.36	-19.38	1166.15	12556.36	-35.38	1150.15	10512.26	-25.68	652.70	83.28	498.87	0.00
2/1/1991	30.88	16.15	16.15	21.40	12587.09	14.73	1180.88	12571.09	14.73	1164.88	10521.74	9.48	662.18	416.87	1372.84	0.00
3/1/1991	764.21	19.38	19.38	25.68	13331.92	744.83	1925.71	13315.92	744.83	1909.71	11260.27	738.53	1400.71	1771.11	4285.52	0.00
4/1/1991	0.00	22.61	22.61	29.96	13309.31	-22.61	1903.10	13293.31	-22.61	1887.10	11230.31	-29.96	1370.75	0.00	63.71	0.00
5/1/1991	0.00	29.07	29.07	38.52	13280.24	-29.07	1874.03	13264.24	-29.07	1858.03	11191.79	-38.52	1332.23	0.00	8.40	0.00
6/1/1991	0.00	35.53	35.53	47.08	13244.71	-35.53	1838.50	13228.71	-35.53	1822.50	11144.71	-47.08	1285.15	0.00	0.10	0.00
7/1/1991	0.00	38.76	38.76	51.36	13205.95	-38.76	1799.74	13189.95	-38.76	1783.74	11093.35	-51.36	1233.79	15.17	210.22	0.00
8/1/1991	0.00	38.76	38.76	51.36	13167.19	-38.76	1760.98	13151.19	-38.76	1744.98	11041.99	-51.36	1182.43	0.00	65.04	0.00
9/1/1991	0.00	32.30	32.30	42.80	13134.89	-32.30	1728.68	13118.89	-32.30	1712.68	10999.19	-42.80	1139.63	5.27	164.48	0.00
10/1/1991	0.00	29.07	29.07	38.52	13105.82	-29.07	1699.61	13089.82	-29.07	1683.61	10960.67	-38.52	1101.11	37.42	328.70	0.00
11/1/1991	0.00	22.61	22.61	29.96	13083.21	-22.61	1677.00	13067.21	-22.61	1661.00	10930.71	-29.96	1071.15	0.00	70.43	0.00
12/1/1991	49.59	19.38	19.38	25.68	13113.42	30.21	1707.21	13097.42	30.21	1691.21	10954.62	23.91	1095.06	264.80	1004.63	0.00
1/1/1992	141.82	19.38	19.38	25.68	13235.86	122.44	1829.64	13219.86	122.44	1813.64	11070.76	116.14	1211.19	349.22	1212.16	0.00
2/1/1992	509.51	16.15	16.15	21.40	13729.22	493.36	2138.00	13713.22	493.36	2138.00	11558.87	488.11	1699.31	776.93	2183.68	185.01
3/1/1992	206.82	19.38	19.38	25.68	13916.67	187.44	2138.00	13900.67	187.44	2138.00	11740.02	181.14	1880.45	784.28	2199.74	187.44
4/1/1992	0.00	22.61	22.61	29.96	13894.06	-22.61	2115.39	13878.06	-22.61	2115.39	11710.06	-29.96	1850.49	3.03	142.29	0.00
5/1/1992	0.00	29.07	29.07	38.52	13864.99	-29.07	2086.32	13848.99	-29.07	2086.32	11671.54	-38.52	1811.97	4.65	158.15	0.00
6/1/1992	0.00	35.53	35.53	47.08	13829.46	-35.53	2050.79	13813.46	-35.53	2050.79	11624.46	-47.08	1764.89	0.00	0.54	0.00
7/1/1992	0.00	38.76	38.76	51.36	13790.70	-38.76	2012.03	13774.70	-38.76	2012.03	11573.10	-51.36	1713.53	0.00	47.72	0.00
8/1/1992	0.00	38.76	38.76	51.36	13751.94	-38.76	1973.27	13735.94	-38.76	1973.27	11521.74	-51.36	1662.17	33.45	310.97	0.00
9/1/1992	0.00	32.30	32.30	42.80	13719.64	-32.30	1940.97	13703.64	-32.30	1940.97	11478.94	-42.80	1619.37	0.00	13.24	0.00
10/1/1992	0.00	29.07	29.07	38.52	13690.57	-29.07	1911.90	13674.57	-29.07	1911.90	11440.42	-38.52	1580.85	34.42	315.35	0.00
11/1/1992	0.00	22.61	22.61	29.96	13667.96	-22.61	1889.29	13651.96	-22.61	1889.29	11410.46	-29.96	1550.89	0.00	16.59	0.00
12/1/1992	197.27	19.38	19.38	25.68	13845.84	177.89	2067.18	13829.84	177.89	2067.18	11582.04	171.59	1722.48	573.75	1733.08	0.00
1/1/1993	2931.04	19.38	19.38	25.68	16757.50	2911.66	2138.00	16741.50	2911.66	2138.00	14487.40	2905.36	2138.00	2866.14	6532.00	2840.84
2/1/1993	965.79	16.15	16.15	21.40	17707.14	949.64	2138.00	17691.14	949.64	2138.00	15431.79	944.39	2138.00	1050.33	2773.68	949.64
3/1/1993	0.00	19.38	19.38	25.68	17687.76	-19.38	2118.62	17671.76	-19.38	2118.62	15406.11	-25.68	2112.32	144.46	684.89	0.00
4/1/1993	0.00	22.61	22.61	29.96	17665.15	-22.61	2096.01	17649.15	-22.61	2096.01	15376.15	-29.96	2082.36	0.00	12.31	0.00
5/1/1993	0.00	29.07	29.07	38.52	17636.08	-29.07	2066.94	17620.08	-29.07	2066.94	15337.63	-38.52	2043.84	0.00	66.37	0.00
6/1/1993	0.00	35.53	35.53	47.08	17600.55	-35.53	2031.41	17584.55	-35.53	2031.41	15290.55	-47.08	1996.76	24.25	265.59	0.00
7/1/1993	0.00	38.76	38.76	51.36	17561.79	-38.76	1992.65	17545.79	-38.76	1992.65	15239.19	-51.36	1945.40	0.00	4.58	0.00
8/1/1993	0.00	38.76	38.76	51.36	17523.03	-38.76	1953.89	17507.03	-38.76	1953.89	15187.83	-51.36	1894.04	0.00	19.32	0.00
9/1/1993	0.00	32.30	32.30	42.80	17490.73	-32.30	1921.59	17474.73	-32.30	1921.59	15145.03	-42.80	1851.24	0.00	5.35	0.00
10/1/1993	0.00	29.07	29.07	38.52	17461.66	-29.07	1892.52	17445.66	-29.07	1892.52	15106.51	-38.52	1812.72	0.00	89.64	0.00
11/1/1993	0.00	22.61	22.61	29.96	17439.05	-22.61	1869.91	17423.05	-22.61	1869.91	15076.55	-29.96	1782.76	128.03	637.38	0.00
12/1/1993	0.00	19.38	19.38	25.68	17419.67	-19.38	1850.53	17403.67	-19.38	1850.53	15050.87	-25.68	1757.08	68.27	447.87	0.00
1/1/1994	0.00	19.38	19.38	25.68	17400.29	-19.38	1831.15	17384.29	-19.38	1831.15	15025.19	-25.68	1731.40	94.20	534.23	0.00
2/1/1994	149.92	16.15	16.15	21.40	17534.06	133.77	1964.92	17518.06	133.77	1964.92	15153.71	128.52	1859.92	696.91	2007.83	0.00
3/1/1994	4.92	19.38	19.38	25.68	17519.60	-14.46	1950.45	17503.60	-14.46	1950.45	15132.95	-20.76	1839.15	490.85	1544.50	0.00

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
4/1/1994	0.00	22.61	22.61	29.96	17496.99	-22.61	1927.84	17480.99	-22.61	1927.84	15102.99	-29.96	1809.19	159.48	727.23	0.00
5/1/1994	0.00	29.07	29.07	38.52	17467.92	-29.07	1898.77	17451.92	-29.07	1898.77	15064.47	-38.52	1770.67	0.00	82.06	0.00
6/1/1994	0.00	35.53	35.53	47.08	17432.39	-35.53	1863.24	17416.39	-35.53	1863.24	15017.39	-47.08	1723.59	0.00	1.62	0.00
7/1/1994	0.00	38.76	38.76	51.36	17393.63	-38.76	1824.48	17377.63	-38.76	1824.48	14966.03	-51.36	1672.23	0.00	25.66	0.00
8/1/1994	0.00	38.76	38.76	51.36	17354.87	-38.76	1785.72	17338.87	-38.76	1785.72	14914.67	-51.36	1620.87	4.29	154.24	0.00
9/1/1994	0.00	32.30	32.30	42.80	17322.57	-32.30	1753.42	17306.57	-32.30	1753.42	14871.87	-42.80	1578.07	0.00	4.08	0.00
10/1/1994	0.00	29.07	29.07	38.52	17293.50	-29.07	1724.35	17277.50	-29.07	1724.35	14833.35	-38.52	1539.55	0.00	57.95	0.00
11/1/1994	0.00	22.61	22.61	29.96	17270.89	-22.61	1701.74	17254.89	-22.61	1701.74	14803.39	-29.96	1509.59	62.10	425.90	0.00
12/1/1994	0.00	19.38	19.38	25.68	17251.51	-19.38	1682.36	17235.51	-19.38	1682.36	14777.71	-25.68	1483.91	103.24	562.66	0.00
1/1/1995	1309.55	19.38	19.38	25.68	18541.67	1290.17	2138.00	18525.67	1290.17	2138.00	16061.57	1283.87	2138.00	1784.89	4314.05	834.53
2/1/1995	114.33	16.15	16.15	21.40	18639.86	98.18	2138.00	18623.86	98.18	2138.00	16154.51	92.93	2138.00	349.94	1213.89	98.18
3/1/1995	763.61	19.38	19.38	25.68	19384.09	744.23	2138.00	19368.09	744.23	2138.00	16892.44	737.93	2138.00	1275.15	3250.25	744.23
4/1/1995	0.00	22.61	22.61	29.96	19361.48	-22.61	2115.39	19345.48	-22.61	2115.39	16862.48	-29.96	2108.04	152.00	706.26	0.00
5/1/1995	0.00	29.07	29.07	38.52	19332.41	-29.07	2086.32	19316.41	-29.07	2086.32	16823.96	-38.52	2069.52	38.78	334.62	0.00
6/1/1995	0.00	35.53	35.53	47.08	19296.88	-35.53	2050.79	19280.88	-35.53	2050.79	16776.88	-47.08	2022.44	14.46	205.05	0.00
7/1/1995	0.00	38.76	38.76	51.36	19258.12	-38.76	2012.03	19242.12	-38.76	2012.03	16725.52	-51.36	1971.08	0.00	35.77	0.00
8/1/1995	0.00	38.76	38.76	51.36	19219.36	-38.76	1973.27	19203.36	-38.76	1973.27	16674.16	-51.36	1919.72	0.00	38.97	0.00
9/1/1995	0.00	32.30	32.30	42.80	19187.06	-32.30	1940.97	19171.06	-32.30	1940.97	16631.36	-42.80	1876.92	0.00	45.14	0.00
10/1/1995	0.00	29.07	29.07	38.52	19157.99	-29.07	1911.90	19141.99	-29.07	1911.90	16592.84	-38.52	1838.40	0.00	9.64	0.00
11/1/1995	0.00	22.61	22.61	29.96	19135.38	-22.61	1889.29	19119.38	-22.61	1889.29	16562.88	-29.96	1808.44	0.00	87.62	0.00
12/1/1995	0.00	19.38	19.38	25.68	19116.00	-19.38	1869.91	19100.00	-19.38	1869.91	16537.20	-25.68	1782.76	27.13	280.61	0.00
1/1/1996	28.66	19.38	19.38	25.68	19125.28	9.28	1879.19	19109.28	9.28	1879.19	16540.18	2.98	1785.74	205.79	852.67	0.00
2/1/1996	43.77	16.15	16.15	21.40	19152.90	27.62	1906.81	19136.90	27.62	1906.81	16562.55	22.37	1808.11	401.30	1336.22	0.00
3/1/1996	0.00	19.38	19.38	25.68	19133.52	-19.38	1887.43	19117.52	-19.38	1887.43	16536.87	-25.68	1782.43	245.35	955.33	0.00
4/1/1996	0.00	22.61	22.61	29.96	19110.91	-22.61	1864.82	19094.91	-22.61	1864.82	16506.91	-29.96	1752.47	21.43	249.99	0.00
5/1/1996	0.00	29.07	29.07	38.52	19081.84	-29.07	1835.75	19065.84	-29.07	1835.75	16468.39	-38.52	1713.95	0.00	36.47	0.00
6/1/1996	0.00	35.53	35.53	47.08	19046.31	-35.53	1800.22	19030.31	-35.53	1800.22	16421.31	-47.08	1666.87	0.00	0.31	0.00
7/1/1996	0.00	38.76	38.76	51.36	19007.55	-38.76	1761.46	18991.55	-38.76	1761.46	16369.95	-51.36	1615.51	0.00	46.11	0.00
8/1/1996	0.00	38.76	38.76	51.36	18968.79	-38.76	1722.70	18952.79	-38.76	1722.70	16318.59	-51.36	1564.15	0.00	16.98	0.00
9/1/1996	0.00	32.30	32.30	42.80	18936.49	-32.30	1690.40	18920.49	-32.30	1690.40	16275.79	-42.80	1521.35	0.00	33.80	0.00
10/1/1996	0.00	29.07	29.07	38.52	18907.42	-29.07	1661.33	18891.42	-29.07	1661.33	16237.27	-38.52	1482.83	98.38	547.46	0.00
11/1/1996	2.07	22.61	22.61	29.96	18886.89	-20.54	1640.80	18870.89	-20.54	1640.80	16209.39	-27.89	1454.95	291.13	1070.39	0.00
12/1/1996	59.05	19.38	19.38	25.68	18926.56	39.67	1680.47	18910.56	39.67	1680.47	16242.76	33.37	1488.32	251.56	971.14	0.00
1/1/1997	724.73	19.38	19.38	25.68	19631.91	705.35	2138.00	19615.91	705.35	2138.00	16941.81	699.05	2138.00	886.10	2421.00	247.82
2/1/1997	0.00	16.15	16.15	21.40	19615.76	-16.15	2121.85	19599.76	-16.15	2121.85	16920.41	-21.40	2116.60	73.21	465.00	0.00
3/1/1997	0.00	19.38	19.38	25.68	19596.38	-19.38	2102.47	19580.38	-19.38	2102.47	16894.73	-25.68	2090.92	0.00	24.21	0.00
4/1/1997	0.00	22.61	22.61	29.96	19573.77	-22.61	2079.86	19557.77	-22.61	2079.86	16864.77	-29.96	2060.96	0.00	124.31	0.00
5/1/1997	0.00	29.07	29.07	38.52	19544.70	-29.07	2050.79	19528.70	-29.07	2050.79	16826.25	-38.52	2022.44	0.00	15.89	0.00
6/1/1997	0.00	35.53	35.53	47.08	19509.17	-35.53	2015.26	19493.17	-35.53	2015.26	16779.17	-47.08	1975.36	0.00	31.85	0.00
7/1/1997	0.00	38.76	38.76	51.36	19470.41	-38.76	1976.50	19454.41	-38.76	1976.50	16727.81	-51.36	1924.00	0.00	12.38	0.00
8/1/1997	0.00	38.76	38.76	51.36	19431.65	-38.76	1937.74	19415.65	-38.76	1937.74	16676.45	-51.36	1872.64	0.00	19.87	0.00
9/1/1997	0.00	32.30	32.30	42.80	19399.35	-32.30	1905.44	19383.35	-32.30	1905.44	16633.65	-42.80	1829.84	176.75	774.82	0.00
10/1/1997	0.00	29.07	29.07	38.52	19370.28	-29.07	1876.37	19354.28	-29.07	1876.37	16595.13	-38.52	1791.32	0.00	57.59	0.00
11/1/1997	0.00	22.61	22.61	29.96	19347.67	-22.61	1853.76	19331.67	-22.61	1853.76	16565.17	-29.96	1761.36	243.95	951.73	0.00
12/1/1997	76.47	19.38	19.38	25.68	19404.76	57.09	1910.85	19388.76	57.09	1910.85	16615.96	50.79	1812.15	316.50	1132.83	0.00
1/1/1998	294.34	19.38	19.38	25.68	19679.71	274.96	2138.00	19663.71	274.96	2138.00	16884.61	268.66	2080.81	433.41	1411.53	47.81
2/1/1998	2077.32	16.15	16.15	21.40	21740.88	2061.17	2138.00	21724.88	2061.17	2138.00	18940.53	2055.92	2138.00	2203.67	5177.41	2061.17
3/1/1998	27.21	19.38	19.38	25.68	21748.71	7.83	2138.00	21732.71	7.83	2138.00	18942.06	1.53	2138.00	590.39	1770.54	7.83
4/1/1998	0.00	22.61	22.61	29.96	21726.10	-22.61	2115.39	21710.10	-22.61	2115.39	18912.10	-29.96	2108.04	268.54	1014.04	0.00
5/1/1998	0.00	29.07	29.07	38.52	21697.03	-29.07	2086.32	21681.03	-29.07	2086.32	18873.58	-38.52	2069.52	164.21	740.38	0.00
6/1/1998	0.00	35.53	35.53	47.08	21661.50	-35.53	2050.79	21645.50	-35.53	2050.79	18826.50	-47.08	2022.44	0.00	56.85	0.00
7/1/1998	0.00	38.76	38.76	51.36	21622.74	-38.76	2012.03	21606.74	-38.76	2012.03	18775.14	-51.36	1971.08	0.00	88.52	0.00
8/1/1998	0.00	38.76	38.76	51.36	21583.98	-38.76	1973.27	21567.98	-38.76	1973.27	18723.78	-51.36	1919.72	0.00	111.72	0.00
9/1/1998	0.00	32.30	32.30	42.80	21551.68	-32.30	1940.97	21535.68	-32.30	1940.97	18680.98	-42.80	1876.92	0.00	72.86	0.00
10/1/1998	0.00	29.07	29.07	38.52	21522.61	-29.07	1911.90	21506.61	-29.07	1911.90	18642.46	-38.52	1838.40	0.00	69.82	0.00

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
11/1/1998	0.00	22.61	22.61	29.96	21500.00	-22.61	1889.29	21484.00	-22.61	1889.29	18612.50	-29.96	1808.44	148.31	695.82	0.00
12/1/1998	0.00	19.38	19.38	25.68	21480.62	-19.38	1869.91	21464.62	-19.38	1869.91	18586.82	-25.68	1782.76	104.52	566.61	0.00
1/1/1999	39.14	19.38	19.38	25.68	21500.38	19.76	1889.67	21484.38	19.76	1889.67	18600.28	13.46	1796.22	231.22	919.04	0.00
2/1/1999	0.00	16.15	16.15	21.40	21484.23	-16.15	1873.52	21468.23	-16.15	1873.52	18578.88	-21.40	1774.82	65.09	436.64	0.00
3/1/1999	0.00	19.38	19.38	25.68	21464.85	-19.38	1854.14	21448.85	-19.38	1854.14	18553.20	-25.68	1749.14	57.67	409.67	0.00
4/1/1999	0.00	22.61	22.61	29.96	21442.24	-22.61	1831.53	21426.24	-22.61	1831.53	18523.24	-29.96	1719.18	316.06	1131.76	0.00
5/1/1999	0.00	29.07	29.07	38.52	21413.17	-29.07	1802.46	21397.17	-29.07	1802.46	18484.72	-38.52	1680.66	0.00	16.75	0.00
6/1/1999	0.00	35.53	35.53	47.08	21377.64	-35.53	1766.93	21361.64	-35.53	1766.93	18437.64	-47.08	1633.58	0.29	133.60	0.00
7/1/1999	0.00	38.76	38.76	51.36	21338.88	-38.76	1728.17	21322.88	-38.76	1728.17	18386.28	-51.36	1582.22	2.10	140.22	0.00
8/1/1999	0.00	38.76	38.76	51.36	21300.12	-38.76	1689.41	21284.12	-38.76	1689.41	18334.92	-51.36	1530.86	0.00	33.41	0.00
9/1/1999	0.00	32.30	32.30	42.80	21267.82	-32.30	1657.11	21251.82	-32.30	1657.11	18292.12	-42.80	1488.06	0.00	76.99	0.00
10/1/1999	0.00	29.07	29.07	38.52	21238.75	-29.07	1628.04	21222.75	-29.07	1628.04	18253.60	-38.52	1449.54	0.00	0.00	0.00
11/1/1999	0.00	22.61	22.61	29.96	21216.14	-22.61	1605.43	21200.14	-22.61	1605.43	18223.64	-29.96	1419.58	0.00	9.16	0.00
12/1/1999	0.00	19.38	19.38	25.68	21196.76	-19.38	1586.05	21180.76	-19.38	1586.05	18197.96	-25.68	1393.90	12.18	186.73	0.00
1/1/2000	0.00	19.38	19.38	25.68	21177.38	-19.38	1566.67	21161.38	-19.38	1566.67	18172.28	-25.68	1368.22	52.57	390.45	0.00
2/1/2000	157.33	16.15	16.15	21.40	21318.56	141.18	1707.85	21302.56	141.18	1707.85	18308.21	135.93	1504.15	728.46	2077.36	0.00
3/1/2000	0.00	19.38	19.38	25.68	21299.18	-19.38	1688.47	21283.18	-19.38	1688.47	18282.53	-25.68	1478.47	118.72	609.79	0.00
4/1/2000	0.00	22.61	22.61	29.96	21276.57	-22.61	1665.86	21260.57	-22.61	1665.86	18252.57	-29.96	1448.51	57.50	409.03	0.00
5/1/2000	0.00	29.07	29.07	38.52	21247.50	-29.07	1636.79	21231.50	-29.07	1636.79	18214.05	-38.52	1409.99	0.00	30.53	0.00
6/1/2000	0.00	35.53	35.53	47.08	21211.97	-35.53	1601.26	21195.97	-35.53	1601.26	18166.97	-47.08	1362.91	0.00	35.12	0.00
7/1/2000	0.00	38.76	38.76	51.36	21173.21	-38.76	1562.50	21157.21	-38.76	1562.50	18115.61	-51.36	1311.55	0.00	0.04	0.00
8/1/2000	0.00	38.76	38.76	51.36	21134.45	-38.76	1523.74	21118.45	-38.76	1523.74	18064.25	-51.36	1260.19	0.00	121.51	0.00
9/1/2000	0.00	32.30	32.30	42.80	21102.15	-32.30	1491.44	21086.15	-32.30	1491.44	18021.45	-42.80	1217.39	0.00	94.09	0.00
10/1/2000	0.00	29.07	29.07	38.52	21073.08	-29.07	1462.37	21057.08	-29.07	1462.37	17982.93	-38.52	1178.87	79.08	484.90	0.00
11/1/2000	0.00	22.61	22.61	29.96	21050.47	-22.61	1439.76	21034.47	-22.61	1439.76	17952.97	-29.96	1148.91	17.42	225.60	0.00
12/1/2000	0.00	19.38	19.38	25.68	21031.09	-19.38	1420.38	21015.09	-19.38	1420.38	17927.29	-25.68	1123.23	0.00	19.71	0.00
1/1/2001	126.34	19.38	19.38	25.68	21138.05	106.96	1527.34	21122.05	106.96	1527.34	18027.95	100.66	1223.89	439.00	1424.58	0.00
2/1/2001	260.99	16.15	16.15	21.40	21382.89	244.84	1772.18	21366.89	244.84	1772.18	18267.54	239.59	1463.48	624.85	1847.75	0.00
3/1/2001	0.00	19.38	19.38	25.68	21363.51	-19.38	1752.80	21347.51	-19.38	1752.80	18241.86	-25.68	1437.80	106.45	572.55	0.00
4/1/2001	0.00	22.61	22.61	29.96	21340.90	-22.61	1730.19	21324.90	-22.61	1730.19	18211.90	-29.96	1407.84	129.66	642.16	0.00
5/1/2001	0.00	29.07	29.07	38.52	21311.83	-29.07	1701.12	21295.83	-29.07	1701.12	18173.38	-38.52	1369.32	0.00	42.87	0.00
6/1/2001	0.00	35.53	35.53	47.08	21276.30	-35.53	1665.59	21260.30	-35.53	1665.59	18126.30	-47.08	1322.24	0.00	0.09	0.00
7/1/2001	0.00	38.76	38.76	51.36	21237.54	-38.76	1626.83	21221.54	-38.76	1626.83	18074.94	-51.36	1270.88	0.00	14.83	0.00
8/1/2001	0.00	38.76	38.76	51.36	21198.78	-38.76	1588.07	21182.78	-38.76	1588.07	18023.58	-51.36	1219.52	0.00	47.01	0.00
9/1/2001	0.00	32.30	32.30	42.80	21166.48	-32.30	1555.77	21150.48	-32.30	1555.77	17980.78	-42.80	1176.72	0.00	26.72	0.00
10/1/2001	0.00	29.07	29.07	38.52	21137.41	-29.07	1526.70	21121.41	-29.07	1526.70	17942.26	-38.52	1138.20	0.00	0.71	0.00
11/1/2001	0.00	22.61	22.61	29.96	21114.80	-22.61	1504.09	21098.80	-22.61	1504.09	17912.30	-29.96	1108.24	86.59	509.73	0.00
12/1/2001	0.00	19.38	19.38	25.68	21095.42	-19.38	1484.71	21079.42	-19.38	1484.71	17886.62	-25.68	1082.56	86.03	507.90	0.00
1/1/2002	0.00	19.38	19.38	25.68	21076.04	-19.38	1465.33	21060.04	-19.38	1465.33	17860.94	-25.68	1056.88	26.14	275.55	0.00
2/1/2002	0.00	16.15	16.15	21.40	21059.89	-16.15	1449.18	21043.89	-16.15	1449.18	17839.54	-21.40	1035.48	0.00	84.76	0.00
3/1/2002	0.00	19.38	19.38	25.68	21040.51	-19.38	1429.80	21024.51	-19.38	1429.80	17813.86	-25.68	1009.80	71.60	459.47	0.00
4/1/2002	0.00	22.61	22.61	29.96	21017.90	-22.61	1407.19	21001.90	-22.61	1407.19	17783.90	-29.96	979.84	27.70	283.47	0.00
5/1/2002	0.00	29.07	29.07	38.52	20988.83	-29.07	1378.12	20972.83	-29.07	1378.12	17745.38	-38.52	941.32	0.00	1.13	0.00
6/1/2002	0.00	35.53	35.53	47.08	20953.30	-35.53	1342.59	20937.30	-35.53	1342.59	17698.30	-47.08	894.24	0.00	0.50	0.00
7/1/2002	0.00	38.76	38.76	51.36	20914.54	-38.76	1303.83	20898.54	-38.76	1303.83	17646.94	-51.36	842.88	0.00	0.94	0.00
8/1/2002	0.00	38.76	38.76	51.36	20875.78	-38.76	1265.07	20859.78	-38.76	1265.07	17595.58	-51.36	791.52	0.00	43.64	0.00
9/1/2002	0.00	32.30	32.30	42.80	20843.48	-32.30	1232.77	20827.48	-32.30	1232.77	17552.78	-42.80	748.72	3.45	144.44	0.00
10/1/2002	0.00	29.07	29.07	38.52	20814.41	-29.07	1203.70	20798.41	-29.07	1203.70	17514.26	-38.52	710.20	0.00	35.51	0.00
11/1/2002	0.00	22.61	22.61	29.96	20791.80	-22.61	1181.09	20775.80	-22.61	1181.09	17484.30	-29.96	680.24	218.70	886.55	0.00
12/1/2002	89.58	19.38	19.38	25.68	20862.00	70.20	1251.29	20846.00	70.20	1251.29	17548.20	63.90	744.14	354.69	1225.31	0.00
1/1/2003	0.00	19.38	19.38	25.68	20842.62	-19.38	1231.91	20826.62	-19.38	1231.91	17522.52	-25.68	718.46	0.00	80.76	0.00
2/1/2003	514.69	16.15	16.15	21.40	21341.16	498.54	1730.45	21325.16	498.54	1730.45	18015.81	493.29	1211.75	907.46	2467.15	0.00
3/1/2003	0.00	19.38	19.38	25.68	21321.78	-19.38	1711.07	21305.78	-19.38	1711.07	17990.13	-25.68	1186.07	264.11	1002.89	0.00
4/1/2003	0.00	22.61	22.61	29.96	21299.17	-22.61	1688.46	21283.17	-22.61	1688.46	17960.17	-29.96	1156.11	206.04	853.33	0.00
5/1/2003	0.00	29.07	29.07	38.52	21270.10	-29.07	1659.39	21254.10	-29.07	1659.39	17921.65	-38.52	1117.59	31.51	301.93	0.00

YEAR	RECHARGE (AF)	Existing Demand (includes Discretionary Permits (AF)	Existing Demand Plus Project	General Plan Update Buildout	Storage (AF)	delta	Existing Demand (includes Discretionary Permits (AF)	Storage (AF)	delta	Existing Demand Plus Project	Storage (AF)	delta	General Plan Update Buildout	RUNOFF (AF)	PRECIPITATION (AF)	Excess Recharge Rejected (Existing Conditions) (AF)
6/1/2003	0.00	35.53	35.53	47.08	21234.57	-35.53	1623.86	21218.57	-35.53	1623.86	17874.57	-47.08	1070.51	0.00	34.12	0.00
7/1/2003	0.00	38.76	38.76	51.36	21195.81	-38.76	1585.10	21179.81	-38.76	1585.10	17823.21	-51.36	1019.15	0.00	66.80	0.00
8/1/2003	0.00	38.76	38.76	51.36	21157.05	-38.76	1546.34	21141.05	-38.76	1546.34	17771.85	-51.36	967.79	6.25	173.81	0.00
9/1/2003	0.00	32.30	32.30	42.80	21124.75	-32.30	1514.04	21108.75	-32.30	1514.04	17729.05	-42.80	924.99	0.00	49.76	0.00
10/1/2003	0.00	29.07	29.07	38.52	21095.68	-29.07	1484.97	21079.68	-29.07	1484.97	17690.53	-38.52	886.47	0.00	14.09	0.00
11/1/2003	0.00	22.61	22.61	29.96	21073.07	-22.61	1462.36	21057.07	-22.61	1462.36	17660.57	-29.96	856.51	73.22	465.03	0.00
12/1/2003	0.00	19.38	19.38	25.68	21053.70	-19.38	1442.99	21037.70	-19.38	1442.99	17634.90	-25.68	830.84	116.64	603.55	0.00
1/1/2004	0.00	19.38	19.38	25.68	21034.32	-19.38	1423.61	21018.32	-19.38	1423.61	17609.22	-25.68	805.16	13.24	195.58	0.00
2/1/2004	291.81	16.15	16.15	21.40	21309.98	275.66	1699.27	21293.98	275.66	1699.27	17879.63	270.41	1075.57	672.59	1953.99	0.00
3/1/2004	0.00	19.38	19.38	25.68	21290.60	-19.38	1679.89	21274.60	-19.38	1679.89	17853.95	-25.68	1049.89	36.92	326.54	0.00
4/1/2004	0.00	22.61	22.61	29.96	21267.99	-22.61	1657.28	21251.99	-22.61	1657.28	17823.99	-29.96	1019.93	50.56	382.67	0.00
5/1/2004	0.00	29.07	29.07	38.52	21238.92	-29.07	1628.21	21222.92	-29.07	1628.21	17785.47	-38.52	981.41	0.00	2.67	0.00
6/1/2004	0.00	35.53	35.53	47.08	21203.39	-35.53	1592.68	21187.39	-35.53	1592.68	17738.39	-47.08	934.33	0.00	1.12	0.00
7/1/2004	0.00	38.76	38.76	51.36	21164.63	-38.76	1553.92	21148.63	-38.76	1553.92	17687.03	-51.36	882.97	0.00	14.21	0.00
8/1/2004	0.00	38.76	38.76	51.36	21125.87	-38.76	1515.16	21109.87	-38.76	1515.16	17635.67	-51.36	831.61	0.00	61.14	0.00
9/1/2004	0.00	32.30	32.30	42.80	21093.57	-32.30	1482.86	21077.57	-32.30	1482.86	17592.87	-42.80	788.81	0.00	35.93	0.00
10/1/2004	152.03	29.07	29.07	38.52	21216.53	122.96	1605.82	21200.53	122.96	1605.82	17706.38	113.51	902.32	1184.14	3058.06	0.00
11/1/2004	0.00	22.61	22.61	29.96	21193.92	-22.61	1583.21	21177.92	-22.61	1583.21	17676.42	-29.96	872.36	100.74	554.87	0.00
12/1/2004	427.03	19.38	19.38	25.68	21601.56	407.65	1990.85	21585.56	407.65	1990.85	18077.76	401.35	1273.70	519.55	1610.18	0.00
1/1/2005	1334.50	19.38	19.38	25.68	22916.69	1315.12	2138.00	22900.69	1315.12	2138.00	19386.59	1308.82	2138.00	1200.98	3093.69	1167.98
2/1/2005	1107.11	16.15	16.15	21.40	24007.64	1090.96	2138.00	23991.64	1090.96	2138.00	20472.29	1085.71	2138.00	1175.86	3040.53	1090.96
3/1/2005	0.00	19.38	19.38	25.68	23988.26	-19.38	2118.62	23972.26	-19.38	2118.62	20446.61	-25.68	2112.32	209.28	861.88	0.00
4/1/2005	0.00	22.61	22.61	29.96	23965.65	-22.61	2096.01	23949.65	-22.61	2096.01	20416.65	-29.96	2082.36	57.09	407.53	0.00
5/1/2005	0.00	29.07	29.07	38.52	23936.58	-29.07	2066.94	23920.58	-29.07	2066.94	20378.13	-38.52	2043.84	0.00	91.95	0.00
38504	0	35.53	35.53	47.08	23901.053	-35.53	2031.41	23885.05337	-35.53	2031.41	20331.05	-47.08	1996.76	0.00	2.26	0.00
								1166.147372			1150.15			652.70		
							Minimum	0.545438434		Minimum	0.54		Minimum	0.31		Minimum
								1834.454094			1833.94			1642.89		