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BACKGROUND DATA

TECHNICAL MEMORANDUM NO. 2 (TM-2)
FOR THE
SALT & NUTRIENT MANAGEMENT PLAN
FOR THE
UPPER LOS ANGELES RIVER AREA
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:
The California Regional Water Quality Control Board
Los Angeles Region

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ACRONYMS AND ABBREVIATIONS

AF	Acre-feet
AFY	Acre-feet per year
AL	Action Level
bgs	below ground surface
BP	Basin Plan = RWQCB-LA Water Quality Control Plan
BSPO	Basin Specific Plan Objective
BMP	Best Management Practice
BOU	Burbank Operable Unit
BWP	Burbank Department of Water and Power
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CCR	Consumer Confidence Report
CDPR	California Department of Pesticide Regulation
CEQA	California Environmental Quality Act
Cl	Chloride
CWA	Clean Water Act
CECs	Constituent of Emerging Concern
COCs	Constituents of Concern
CWH	Council for Watershed Health
Cr^6	Hexavalent Chromium
CVWD	Crescenta Valley Water District
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
ERB	Eagle Rock Groundwater Basin
EAG	Eagle Rock Subarea, Eagle Rock Basin, for Mixing Model
ft bgs	feet below ground surface
GOU	Glendale Operable Unit

GAMA	Groundwater Ambient Monitoring and Assessment Program
GRIP	Groundwater Reliability Improvement Project
GWPA	Groundwater Protection Agency
GWP	Glendale Water and Power
LAA	Los Angeles Aqueduct
LABOS	City of Los Angeles Bureau of Sanitation
LACDPW	Los Angeles County Department of Public Works
LACFD	Los Angeles County Flood Control District
LADWP	Los Angeles Department of Water and Power
LAG	Los Angeles-Glendale WRP
LAWPD	City of Los Angeles, Bureau of Sanitation Watershed Protection Division
LUST	Leaking Underground Storage Tank
LID	Low Impact Development
MCL	Maximum Contaminant Level
MF	Microfiltration
mg/L	milligrams per liter
µg/L	micrograms per liter
MTBE	methyl-tertiary-butyl-ether
MWD	Metropolitan Water District of Southern California
NAR	Narrows Subarea, San Fernando Basin, for Mixing Model
NHOU	North Hollywood Operable Unit
NL	Notification Level
NO_3	Nitrate
NO_3-N	Nitrate as nitrogen
NDMA	n-Nitrosodimethylamine
NPDES	National Pollutant Discharge Elimination System
O&M	Operation & Maintenance

OWTS	Onsite Wastewater Treatment System
OU	Operable Unit
PCA	Potentially Contaminating Activity
PCE	Tetrachloroethylene
PMCL	Primary Maximum Contaminant Level
PRPs	Potentially Responsible Parties
QA/QC	Quality Assurance/Quality Control
RWP	Recycled Water Policy
RO	Reverse Osmosis
RWQCB-LA	Regional Water Quality Control Board – Los Angeles Region
SB	Sylmar Groundwater Basin
SFB	San Fernando Groundwater Basin
SFE	San Fernando East Subarea, San Fernando Basin, for Mixing Model
SFW	San Fernando West Subarea, San Fernando Basin, for Mixing Model
SNMP	Salt and Nutrient Management Plan
S/Ns	Salts/Nutrients
SDLAC	Sanitation Districts of Los Angeles County
SMCL	Secondary Maximum Contaminant Level
SO_4	Sulfate
SRWQCB	California State Regional Water Quality Control Board
SWRCB-DDW	California State Water Resources Control Board – Division of Drinking Water
SYL	Sylmar Subarea, Sylmar Basin, for Mixing Model
TCE	Trichloroethylene
TDS	Total Dissolved Solids
TM	Technical Memorandum
TMDLs	Total Maximum Daily Loads
TON	Threshold Odor Number

ULARA	Upper Los Angeles River Area
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VB	Verdugo Groundwater Basin
VER	Verdugo Subarea, Verdugo Basin, for Mixing Model
VOCs	Volatile Organic Compounds
WMA	Watershed Management Area
WRCC	Western Regional Climate Center
WRP	Water Reclamation Plant
WY	Water Year (October 1 of one year to September 30 of the following year)

I. INTRODUCTION

This document, Technical Memorandum No. 2 (TM-2), represents a portion of the ongoing work by the court-appointed Watermaster for the adjudicated Upper Los Angeles River Area (ULARA) to meet the requirements for developing a Salt and Nutrient Management Plan (SNMP) for the four distinct groundwater basins within ULARA. These four groundwater basins, from largest to smallest in surface area, include the San Fernando, Sylmar, Verdugo, and Eagle Rock basins. In general, the data described in this TM-2 were used to develop the 10-year "baseline data" period for the SNMP that was needed as part of the development and calibration of a groundwater mixing model. This baseline data period was initially defined as the period of time from Water Year (WY) 2002-03 through WY2011-2012. However, because some of the water quality datasets were available only on a calendar year time frame, the beginning of the baseline period was extended one year to include WY2001-02 so that the dataset captured a full 10-year period. Note that a detailed discussion of each of the sources of water supply within ULARA is provided in TM-1 of the SNMP, whereas a discussion of the mixing model is documented in TM-5.

Specifically provided in this TM-2 for the ULARA groundwater basins are the following:

- A discussion of the basic hydrogeologic framework of the ULARA groundwater basins and its Basin Plan subareas (as defined by the RWQCB-LA) that relate to the analysis of salt and nutrients and recycled water use in ULARA.
- An estimate of the volume of groundwater in storage used for considering the potential effect of salt and nutrient loading on each of the four groundwater basins (and their Basin Plan subareas) in ULARA.
- A definition of available data for the baseline period.
- A description of historic groundwater extractions from the ULARA groundwater basins.
- A summary of the historic water quality in the ULARA groundwater basins with a focus on salt and nutrient sources, including water quality test data for groundwater, surface water, and potable water delivered to customers in ULARA.
- A summary of water supply and demand within ULARA, including groundwater extractions and deliveries, imported water deliveries, water percolated in spreading grounds, and recycled water deliveries.

II. Hydrogeology of the ULARA Groundwater Basin Subareas

A. Groundwater Basin Subarea Definitions

The terminology and locations of the groundwater basins in ULARA have evolved over time. Within the four, Court-defined groundwater basins in ULARA, a total of seven separate groundwater subareas have been identified by the Regional Water Quality Control Board – Los Angeles (RWQCB-LA). These seven basin subareas evaluated for this SNMP are considered part of a single groundwater basin (San Fernando Valley Basin) by the California Department of Water Resources in its Bulletin 118, and in the current Basin Plan of the RWQCB-LA. Prior to 1994, the Sylmar, Verdugo and Eagle Rock subareas were considered separate groundwater basins in the Basin Plan. In any event, the subareas are hydraulically connected, but the current Basin Plan continues to have separate groundwater quality objectives for each subarea. The general geology of the ULARA groundwater basins is described in TM-1. In summary, groundwater basins contain water-bearing sediments (known as "younger" and "older" alluvial sediments), along with the underlying Saugus Formation (in certain subareas). It is from the alluvial deposits and/or the Saugus Formation that the vast majority of the wells within the ULARA groundwater basins extract their groundwater. While these two geologic units may have somewhat different geologic properties at locations throughout ULARA, for the purposes of this TM-2 and the groundwater mixing model described in TM-5, no distinction will be made between these potentially water-bearing materials. Thus, all water-bearing materials in each of the ULARA groundwater basins are being considered as a single homogenous unit[1]. The Report of Referee (1962) and each Annual Watermaster Report for ULARA have typically referred to these water-bearing materials as "valley fill," and distinguish those water-bearing materials from the essentially non-water bearing, geologically older, sedimentary and/or crystalline rocks known to occur in "hill and mountain areas." These older sedimentary and/or crystalline rocks are also known to directly underlie all potentially water-bearing deposits in each ULARA groundwater basin.

Specific water quality objectives (Basin Plan Objectives, or BPOs) are described in the "Basin

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[1] Refer to TM-1, "Introduction to the ULARA Groundwater Basins", for a discussion of ULARA hydrogeology, geologic maps, and cross sections of the ULARA basins.

Plan for the Coastal Watersheds of Los Angeles and Ventura Counties" (Basin Plan) prepared by the RWQCB-LA. **Table 1**, "California Regional Water Quality Control Board, Selected Basin Water Quality Objectives, Upper Los Angeles River Area," lists the targeted salts and nutrients for the existing Basin Plan, along with their respective BPOs, as shown on Table 3-10 of that Basin Plan.

As shown on **Table 1**, the Basin Plan provided discrete BPOs for several smaller areas (called subareas) within the SFB, as identified by the RWQCB-LA. Basic descriptions of those subareas are provided on **Table 1**, and a map showing approximate boundaries of the subareas in this basin were originally shown on Figure 2-16 of the Basin Plan (not reproduced herein). Definitive boundaries and descriptions for each of these subareas were not available in the Basin Plan documentation; that is, specific coordinates, streets, lengths and orientations of boundary lines, and/or specific hydrogeologic conditions that defined each BPO area were not specifically defined in the Basin Plan. Therefore, for the purposes of this ULARA SNMP, the subareas (as defined by the RWQCB-LA) of the ULARA groundwater basins are defined below. The approximate locations and boundaries of each of the groundwater basin subareas are shown on **Figure 1.** Four of the seven SNMP subareas are sub-regions of the San Fernando Basin (as defined by the ULARA Judgment), and three are small groundwater basins that adjoin and are connected to the San Fernando Basin[2]. Provided below are brief descriptions of key items within each subarea.

1. San Fernando Basin West Subarea (SFW)

The SFW subarea extends from Interstate 405 on the east to the western boundary of the San Fernando Basin along the front of the Chatsworth Hills and Simi Hills; the northern and southern limits of SFW are the Santa Susana Mountains and the Santa Monica Mountains, respectively. Water deliveries in this subarea are provided by the Los Angeles Department of Water and Power (LADWP). No groundwater extractions for municipal-supply purposes occur in this subarea because of the overall fine-grained nature of the local valley fill materials, and because of the generally poor water quality (elevated TDS concentrations) of the local groundwater. In general, the fine-grained nature of the geologic materials in this area causes wells constructed in this

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[2] In some instances, the subarea constitutes an entire basin. As an example, the "VER" subarea encompasses the entire Verdugo Basin (VB). To remain consistent with ongoing modeling efforts, the subarea designations described in this section will be used throughout TM-2.

region to yield groundwater at rates that are generally considered low compared to other municipal-supply wells in the ULARA region. There are several private wells used for groundwater remediation and/or local dewatering in this subarea. Recycled water from the Tillman Water Reclamation Plant (WRP) and the Tapia WRP is delivered in this subarea.

2. San Fernando Basin East Subarea (SFE)

The SFE subarea, which is the largest of the RWQCB-LA-identified subareas in the San Fernando Basin, lies in the eastern portion of the San Fernando Valley. The SFE subarea is generally bounded by Interstate 405 on the west and the Verdugo Mountains on the east. The Sylmar Basin and the San Gabriel Mountains form the northern boundary; the Santa Monica Mountains form the southern boundary. This subarea contains nearly all of the municipal-supply wells, and supplies most of the groundwater extracted by the municipal-supply water wells within the San Fernando Basin. Municipal wells are owned by the Los Angeles Department of Water and Power (LADWP), and the cities of Burbank and Glendale. Water deliveries in this subarea are provided by LADWP, Burbank Water and Power (BWP), Glendale Water and Power (GWP), and, to a lesser extent, by the City of San Fernando. There are also some groundwater extractions by private parties for groundwater remediation and/or dewatering activities. The northeastern portion of the SFE subarea is also the location of the only five spreading grounds within all of ULARA; both stormwater and imported water are percolated at those facilities to increase total groundwater recharge. Deliveries of recycled water are provided in the SFE subarea from the Tillman Water Reclamation Plant (WRP), the Los Angeles-Glendale (LAG) WRP, and the Burbank WRP.

3. San Fernando Basin Narrows Subarea (NAR)

The Narrows (NAR) subarea, as defined by the RWQCB-LA, is located along the Los Angeles River in the southeastern portion of ULARA. Key boundaries include the southern boundary of the SFE subarea on the north, the Santa Monica Mountains on the west, and the Repetto Hills on the east. At the southern end of the Narrows, the Los Angeles River passes through a gap incised in bedrock hills composed of the Puente Formation, a cemented sandstone of Miocene age. Alluvial deposits beneath the river are thin and narrow in this gap, and most groundwater basin outflow emerges as surface flow in the river. The Los Angeles County Department of Public Works (LACDPW) stream gage F57-C is located in the gap and measures surface water outflow from ULARA. Both LADWP and the city of Glendale extract groundwater for municipal-supply purposes from their respective water wells in this subarea. Recycled water in NAR is delivered from the LAG WRP (equally owned by cities of Glendale and Los Angeles).

4. San Fernando Basin Foothill/Tujunga Subarea (TUJ)

Due to the historic lack of local groundwater extractions and/or recycled water deliveries to the subarea termed the "Foothill Subarea" in the Basin Plan by the RWQCB-LA, and for the purposes of this SNMP, descriptions of the adjoining Foothill and Sunland/Tujunga subareas of the Basin Plan are combined herein as the TUJ subarea. Specifically, the TUJ subarea adjoins the northeast corner of the SFE subarea. The TUJ subarea is bounded by the San Gabriel Mountains on the north and east, and by the Verdugo Mountains on the south. The TUJ subarea is connected by a narrow strip of alluvium to the Verdugo Groundwater Basin (VER subarea) on the southeast. Water deliveries in TUJ are provided by LADWP. There are no municipal-supply groundwater extractions in this subarea, and no recycled water is delivered here from any WRP in ULARA. There is only a limited amount of historical groundwater information (including groundwater quality data) available for the TUJ subarea.

5. Sylmar Subarea (SYL), Verdugo Subarea (VER), and Eagle Rock Subarea (EAG)

Each of these three subareas are considered separate groundwater basins by the ULARA Judgment, as described in TM-1. Water deliveries in each of these subareas are described as follows:

- SYL – Water is delivered by LADWP and the City of San Fernando, and groundwater is extracted by wells owned by each of these agencies for municipal supply purposes.
- VER – Glendale and the Crescenta Valley Water District (CVWD) both deliver water to this subarea, and both utilize their own water wells to extract groundwater for local municipal-supply use. Recycled water is delivered by Glendale to this area from the LAG WRP.
- EAG – Water deliveries in this subarea (groundwater basin) are provided solely by LADWP. There is only one private-party groundwater extractor and no municipal-supply water wells in EAG. No recycled water is delivered in EAG.

B. Volume of Saturated Sediments

For the purposes of creating the mixing model, it was necessary to estimate the volume of saturated sediments in each of the ULARA subareas. For this study, saturated sediments are essentially that portion of water-bearing strata in each groundwater basin that lies below the current groundwater table and that are accessible to wells in the region; this volume includes both the groundwater and earth materials in each subarea. The volume of saturated sediments is used during the modeling work as a basis from which to determine the volume of groundwater in each subarea. Historically, other documents prepared by previous Watermasters have reported the volume of sediments in the ULARA groundwater basins, but those calculations have focused on changes in the volumes of groundwater stored in the various basins. As such, the calculated volumes of sediments were typically that within a specific range of water levels defined at the time of those previous studies. Further, it is difficult to understand the derivation of those calculations from the historical Watermaster and Court documents. Therefore, for this ULARA SNMP effort, the volumes of saturated sediments in each subarea was estimated using GIS software and current basin boundary files, as available. In addition, water level data used for the calculations were selected according to the most complete, available dataset at that time. Therefore, the calculations vary between the years 2011 and 2012. Further, in each subarea, the estimated volume of saturated sediments was limited to the depth of the deepest known water wells in the particular subarea. This methodology represents a conservative estimation because the purpose of this limitation was to consider only the groundwater that is actually perforated by existing water wells. Hence, these saturated sediment volume estimates should be considered conservative, as there are likely deeper saturated sediments into which future wells could be constructed and, thus, future groundwater could be extracted from greater depths than is represented by the volumes presented herein.

1. SFW, SFE, NAR and TUJ Subareas

These four subareas are included in an existing groundwater flow model developed for previous Watermasters (and that is maintained and operated by LADWP). The bottom of the lowest model layer was based on what was then considered to be the lowest level of water-bearing strata in these four subareas. The existing model is comprised of four layers, and the model layer data are the same as those represented in each annual ULARA Watermaster report. These model layer data were adapted from Plate 6 of the ULARA Report of Referee (1962); that plate provided contour lines of the equal elevation on the base of the valley fill deposits in the San Fernando Groundwater Basin.

To better represent the portion of the groundwater basin in which pumping is occurring or has historically occurred, this "bottom of basin" (i.e., base of the valley fill deposits) dataset was then further constrained using the known perforation data for the wells located in the various subareas. **Figure 2,** "Saturated Thickness Contours, Fall 2011, San Fernando Basin," shows the locations of wells with perforation data that were used to constrain the sediment thickness dataset. The bottom surface was therefore adjusted to a shallower depth using the well data. For the SFE and NAR subareas, the deepest perforations in the active wells within the major wellfields were selected. Because no currently active wells exist in the SFW and TUJ subareas, limited perforation data for historic wells that are no longer active and/or destroyed were used.

In order to create a smooth surface from the constrained data set, in portions of the groundwater basin where closely-spaced wells have varied perforation depths, only one well having the deepest perforated interval within a one-mile radius of each grid point was honored as a data point. Finally, geostatistical methods[3] were applied to the constrained dataset to generate a smooth surface to represent the bottom (base) of the water-bearing sediments (i.e., the valley fill deposits) in each groundwater basin. In some areas, such as in the area of the Tujunga wellfield owned by LADWP, these geostatistical methods may have resulted in an underestimation of the volume of saturated geologic materials; such an underestimation would result in a more conservative analysis overall. Further, modeling work has shown that the model is not particularly sensitive to changes in estimates of groundwater volume (this is discussed in detail in TM-5).

To determine the saturated thickness of the sediments in the dataset, simulated groundwater contours published in Plate 9 of the WY2011-12 Watermaster Report were provided by LADWP. This simulated water level surface, in conjunction with the bottom-surface data set described above, was used to determine the thickness of saturated earth materials in the San Fernando Basin subareas. **Figure 2** shows a contour map of the calculated thickness of water-bearing sediments in each subarea. **Table 2, "Saturated Sediment Volume in SFW, SFE, TUJ and NAR"** tabulates the volume of saturated sediments calculated for each of the four subareas included in the groundwater model. Note, this is the volume of saturated sediments that occur above the lowest perforated intervals in existing wells in each subarea only; that is, this volume

[3] For this work, kriging (a geostatistical methodology) was used to estimate values in the analysis area where no actual data points existed.

includes both the earth materials and the groundwater, not just the volume of groundwater within those sediments. Actual groundwater volumes are derived from the saturated sediment estimates, and are described in TM-5.

2. SYL Subarea

As discussed in TM-1, the water-bearing sediments in the SYL subarea are considered to extend to greater depths than the known perforations in wells. Therefore, because only a few active wells exist in SYL, a combination of data on bottom perforations for both active and historic water wells was used to achieve greater data-point distribution for the purposes of creating the bottom surface of this subarea. To determine the upper saturated surface in this subarea, the basin-wide water level throughout the basin was assumed to be at a depth of 101.5 feet below ground surface (ft bgs). This is based on the average of two water level measurements from the Fall of 2012 for the wells monitored in the Sylmar Basin, as published in the Annual ULARA Watermaster report. **Figure 3**, "Saturated Thickness Contours, Fall 2012, Sylmar Basin," shows a contour map that illustrates the estimated thickness of saturated sediments throughout the subarea. **Figure 3** also shows the locations of the wells used to constrain the "basin bottom" surface. Using the total surface area in this basin of 6,045 acres, an approximate saturated volume of sediments of 1,110,000 acre-feet (AF) was calculated. Once again, this volume is not the volume of groundwater in storage in this basin.

3. VER Subarea

For the VER subarea, a bottom surface of the water-bearing sediments was defined by GeoMatrix Consultants, Inc. (May 2005). The Watermaster obtained a GIS shapefile of contours for the bottom of the VER subarea from that previous work effort. In addition, simulated groundwater levels for July 2011 from a preliminary groundwater model of the VER subarea were obtained from AMEC Foster Wheeler, a consultant for CVWD. That model is still undergoing calibration, and that simulated water surface data should be considered preliminary.

Combining the "basin-bottom" dataset and the water surface dataset, a saturated thickness of sediments in the VER subarea was estimated. In certain areas, the simulated groundwater surface appears to be within the bedrock that underlies the local alluvial sediments (i.e., the alluvium appears to be dewatered). Those possibly "dewatered" areas were therefore excluded from the saturated thickness calculation. With the available data, and using the methodology described above, the calculated values likely result in a conservative estimate of the thickness of saturated sediments in the VER subarea. The resultant calculated volume of saturated sediments (not the volume of groundwater in storage) for Summer 2011 water levels in the VER subarea is 235,000 AF; the total surface area of VER is 4,830 acres. A contour map showing the thickness of saturated sediments in VER is shown on **Figure 4.**

4. EAG Subarea

It is difficult to determine the thickness of saturated sediments in the EAG subarea because there is only one cluster of wells with water-level information in close proximity. Thus, current and historical well data were used to estimate the thickness of saturated sediments. The locations of wells used for this determination are shown on **Figure 5**, "Saturated Sediment Volume, Fall 2012". A "basin bottom" surface was derived using geostatistical methods[4] from the well depth data points mentioned above.

A water level surface was constructed from a water level measurement obtained from a single monitoring well in the center of the basin in October 2011. Assuming the water table was at a constant depth below ground surface throughout the EAG subarea at that time, a saturated volume of sediments of 86,400 AF was estimated (given a basin surface area of 850 acres). **Figure 5** shows a contour map of the estimated thickness of saturated sediments.

III. GROUNDWATER LEVEL TRENDS

The occurrence and flow of groundwater within the potentially water-bearing deposits that comprise each of the ULARA groundwater basins (i.e., the valley fill areas) are described in TM-1 of this SNMP.

Groundwater exits in the ULARA groundwater basins in three ways: (1) it is pumped via water wells for potable supply, dewatering, or groundwater cleanup operations; (2) it moves as underflow in the subsurface between the subareas and groundwater basins, ultimately exiting ULARA as groundwater underflow through the shallow alluvium of the Los Angeles River near gage F57-C at the distal end of ULARA; and (3) it enters the unlined portions of the Los Angeles

[4] For this work, kriging (a geostatistical methodology) was used to estimate values in the analysis area where no actual data points existed

River as "rising groundwater" and exits the ULARA as surface water outflow.

Seasonal and year-to-year changes in non-pumping (static) water levels in wells in the ULARA groundwater basins have been reported over the years in each Annual Watermaster Report. The locations of 18 key wells[5] for which hydrographs (graphs of water levels versus time) have been generated by the Watermaster are shown on **Figure 6-A** as yellow-colored circles; the LAFCD well number for each of these wells is listed beside each respective circle. Also illustrated on this plate are the locations and names of each respective subarea/basin in ULARA.

To illustrate and describe basic water level trends for each subarea/basin in ULARA, a series of hydrographs have been adapted from a recent Annual Watermaster Report and then updated to incorporate the most recently-available water level data from each well/monitoring well.

For ULARA, water level trends shown on the hydrographs are described below.

A. SFW Subarea

From west to east across the SFW subarea, **Figure 6-B** provides graphs of water levels versus time for LAFCD Well Nos. 3610A, 4759D, and 4817, respectively. The horizontal and vertical scales on each hydrograph are the same to facilitate comparison of the plotted water level data. Well Nos. 3610A and 4759D, which lie in the western and central portions of this subarea, reveal: very shallow water level depths (typically from near ground surface to depths of ±20 ft bgs, and from ±10 to ±25 ft bgs in the two wells, respectively); and very limited water level fluctuations over time (on the order of only ±20 ft since 1930 in No. 3610A and only ±15 ft in No. 4759D). For Well No. 4817 in the eastern portion of this SFW subarea, water level fluctuations (for a water level database beginning in 1965) have been much less stable than those mentioned above. In Well No. 4817, maximum water level fluctuations have been ±90 ft, and the depths to the static water level in this well have shown a general decline over time. Current water levels in this well are at depths of approximately 280 ft and tend to reflect the influence of pumping by the numerous active, municipal-supply wells in the SFE subarea to the east, and the reduced recharge in the area induced by the recent, several-year-long drought in the region. Note, the graph for Well No. 3610A is a composite of the available water level data for nearby Well Nos. 3610 and 3610A, as

[5] The 18 key wells are comprised of a set of production wells and dedicated monitoring wells

seen on **Figure 6-C**.

B. SFE SUBAREA

In a general west to east/southeast direction across this subarea, hydrographs for Well Nos. 3740A, 4896A, 3841H and 3914H are provided on **Figure 6-C**. The graphs for Well Nos. 3740A and 3841H are composites of available water level data for Well Nos. 3700A and 3740A, and for Nos. 3830C and 3841H, respectively. Once again, these hydrographs all have the same horizontal and vertical scales to facilitate comparison.

As seen on **Figure 6-C**, the historic water level highs for these wells date from the early- to mid-1940s, when groundwater production by all parties was very low, and when there had been a preceding period of excess precipitation (i.e., a “wet” period in terms of average annual rainfall). Following that time period, water levels in all four wells are seen to have steadily declined until the late-1960s. This long-term decline in water levels helped to induce the groundwater litigation within the region that ultimately led to basin adjudication and the Final ULARA Judgment dated January 26, 1979.

Following the late-1960s, static water levels in Well Nos. 3740A and 4896A show a slightly declining trend through the present, whereas water levels in Well No. 3841H show relatively stable depths to water levels over this period, albeit one that has displayed numerous “ups” and “downs”. Such “up” and “down” water level fluctuations in all three of these wells since the late-1960s occur during similar time periods in each well; these fluctuations have been on the order of ±60 ft in Well No. 3740A, ±180 ft in Well No. 4896A, and ±15 ft in Well No. 3841H. These fluctuations result from differences in annual/seasonal groundwater extraction volumes by municipal-supply wells in the SFE and differences in annual rainfall totals (and resulting recharge) in the region. Thus, these static water levels respond to variations in rainfall and its resulting recharge on both a seasonal and an annual basis. Static water levels in Well No. 3914H, which lies at the downstream end of the SFE subarea, show a rather rapid water level rise up through the mid-1980s following the water level lows of the late-1960s; thereafter, water levels in this well have fluctuated by only ±5 to 10 ft.

C. NAR SUBAREA

Water level graphs are provided for these wells herein on Figure 6-D. These include from north to south across the NAR subarea, Well Nos. 3937G, 3949B, and 2771I, respectively; note that the graph for 3949B is a composite of water levels available for Well Nos. 3949 and 3949B (see **Figure 6-D**). Static water levels in Well No. 3937G display only relatively limited water level fluctuations over time (a maximum of ±40 to 45 ft) and, since the mid-1970s, its water levels have been stable (at/near a depth of approximately 25 ft bgs).

In contrast, and possibly as a result of active pumping by LADWP's nearby Pollock wellfield in the 1960s and 1970s, static water levels in Well No. 3949B have fluctuated by as much as ±115 ft during that period. Since 1980, those static levels have been nearly stable (at depths of on the order of 30 to 45 ft bgs), and at similar depths to those monitored prior to the late-1950s in this well. The possible very slight decline in static water levels in this well (No. 3949B) in roughly the past 5 years has likely resulted from the recent drought and lack of recharge because only limited volumes of groundwater have been pumped by the Pollock wellfield in the past several years. The slight seasonal rises in the static levels in this same monitoring well, since about 1980, appear to result from periods of excess rainfall/recharge.

The hydrograph for Well No. 2771I (which lies at the downstream end of the NAR subarea, and hence at/near the terminus of all of ULARA) displays a very stable record throughout the entire approximately 85-year period of available data. Water levels are and have been at typical depths on the order of 50 ft bgs over time in this water level observation well.

D. SYL SUBAREA (SYLMAR BASIN)

Hydrographs for Well Nos. 4840B and 5958B are presented on **Figure 6-E**. These wells lie in the southwestern and central portions of the Sylmar subarea (i.e., the Sylmar Basin), as seen on **Figure 6A**, "Hydrograph Well Location Map". The hydrograph for Well No. 4840B is a composite of available water levels for Well Nos. 5939, 4840B, and 4840J, whereas the hydrograph for Well No. 5958B is a composite of water levels available for Well Nos. 5969 and 5958B.

Following the decline in water levels from the mid-1940s through the mid-1960s in both hydrographed wells, the water levels in both wells have either risen slightly (in Well No. 4840B) or remained relatively stable (in Well No. 5958B) up through the present. Since the mid-1960s, water level fluctuations of ±40 ft and ±10 ft have occurred in Well Nos. 4840B and 5958B, respectively. Current static (non-pumping) water levels in these two wells are at approximate depths of 50 ft and 155 ft, respectively.

E. VER Subarea

These hydrographs (see **Figure 6-F**) have been prepared to represent water level fluctuations over time in a general northwest to southwest direction across this subarea. These graphs, which are for Well Nos. 5047B, 5058, and 3970, are for wells only in VER (and not TUJ) because there are no known wells with water level data in the TUJ subarea itself. As with all prior hydrographs discussed above, static water levels in these three wells have fluctuated in response to variations in seasonal/annual volumes of groundwater pumped and from variations in rainfall/recharge over time. In each case, however, an overall slight decline is apparent in static water level depths in each well since the early-1980s. That time period corresponds to the approximate date at which a wastewater collection system (i.e., a sanitary sewer) was constructed in the subarea, thereby causing the end of virtually all recharge formerly induced by the use of individual subsurface sewage disposal systems throughout most of this basin. The maximum amplitudes of the water level changes over time in these wells are on the order of ±110 ft in Well No. 5047B, ±100 ft in Well No. 5058, and ±80 ft in Well No. 3970. Current depths to water in these three wells are approximately 115 ft, 120 ft, and 110 ft, respectively.

F. EAG Subarea

For the lone well in this subarea/basin for which a hydrograph can be prepared (privately-owned Well No. 3986B; see **Figure 6-G**), the water level record is available from the mid-1960s to the present. In this period, static water levels have been very stable and at shallow depths (i.e., at/near ground surface to a current depth of on the order of 20 ft bgs).

IV. Groundwater Extraction, Outflow and Recharge

A. Groundwater Extraction and Outflow

1. Groundwater Pumping

Groundwater is pumped from each of the subareas for various purposes. Nearly all of the groundwater extracted from ULARA is used for municipal- supply purposes; only minor amounts of groundwater are pumped for dewatering and/or other purposes. **Table 3**, "Groundwater

Extraction Volumes," summarizes the total groundwater extractions from each of the ULARA subareas. This table was derived from the volumes of water extracted, as listed in each Annual ULARA Watermaster Report, for WY2001-02 through WY2011-12. Extractions by each of the five major Parties to the ULARA Judgment (the cities of Burbank, Glendale, Los Angeles, and San Fernando, as well as the Crescenta Valley Water District) are listed separately. In addition, for each subarea, a column is included that shows "Other Extractions". The "Other Extractions" category includes pumping by wells used for dewatering, groundwater cleanup efforts, and extractions by other parties that have extraction rights under the ULARA Judgment.

The majority of groundwater extractions in ULARA occur from the SFE and NAR subareas (at combined totals of approximately 55,000 to 93,000 acre-feet per year (AFY), depending on year). The primary use of this groundwater is for potable water delivery within the cities of Burbank, Glendale, and Los Angeles. Pumping from the SFW subarea has been much smaller (less than 400 AFY), and these extractions are primarily for groundwater remediation, dewatering, and other non-consumptive or minimally-consumptive uses[6]. No groundwater extractions are known to have occurred in the TUJ subarea during the baseline period for this SNMP.

Groundwater extractions from the SYL have averaged approximately 5,500 AFY. Almost all groundwater in the SYL subarea is extracted from two wellfields: the Mission wellfield operated by LADWP, and the San Fernando wellfield operated by the City of San Fernando.

An average combined pumping volume of approximately 5,300 AFY was calculated for wells in the VER subarea owned by CVWD and the City of Glendale. The only groundwater extraction in the EAG subarea is by the well(s) operated by DS Waters (formerly Sparkletts); approximately 200 AFY are extracted by this private company.

Not all groundwater pumped from a particular ULARA subarea is delivered to the same ULARA subarea, and in fact some groundwater is exported from ULARA entirely. **Table 4**, "Groundwater Exports," shows those groundwater volumes exported from each subarea and the reported destination of those exports. It is noteworthy that, for the SFB, a majority of the groundwater extracted is exported from ULARA to other portions of the City of Los Angeles that lie outside of

[6] In general, "non-consumptive uses" in ULARA are groundwater extractions that are considered to return to the basin via infiltration without significant loss.

ULARA. As shown on **Table 3**, the average total extractions from the SFB (the sum of extractions from SFE, NAR, and SFW) have been 77,300 AFY. From **Table 4**, average groundwater exports from the SFB have been 52,700 AFY; this represents about 68% of the total average groundwater extractions.

2. Groundwater Underflow and Rising Groundwater

Groundwater moves via the subsurface between the SNMP subareas. **Table 5**, "Subsurface Flow and Rising Groundwater," provides a summary of the volumes of subsurface flow between subareas that are reported in each Annual ULARA Watermaster Report. These estimates were supplemented by estimates obtained from the existing LADWP model of the San Fernando Groundwater Basin. The model estimates were used for flows from SFW to SFE, TUJ to SFE, and SFE to NAR. Also shown on **Table 5** are the estimated volumes of groundwater that leave the VER subarea via underflow to the adjoining Monk Hill Basin (which is not a part of the ULARA adjudication).

Rising groundwater within ULARA occurs where there are constrictions in the valley fill materials caused by bedrock highs and/or by changes in sediment permeability; such conditions forces upgradient groundwater levels to rise to the point that seepage into local creek and river channels is initiated. This occurs along the lower ends of Verdugo Wash and the Los Angeles River, in SFE and NAR. A discussion of the calculations and the division of surface water flow volumes and the determination of rising water volumes is provided in TM-1. **Table 5** shows those rising water data compiled from each Annual ULARA Watermaster Report.

B. Groundwater Recharge

Groundwater recharge to each subarea is derived from a number of sources, including rainfall, deep percolation of irrigation water (including recycled water), leaky water and sewer pipes, unlined creeks and rivers, and artificial recharge at spreading basins. Basic data sources documented in various Watermaster Reports that were used to estimate recharge are described herein. Additional data sources and calculation steps for the mixing model are described in TM-5.

1. Rainfall

Rain gages and contours of average annual rainfall in and near ULARA are shown on **Figures 7A** and **7B.** The data are compiled and reported to the Watermaster by Los Angeles County on an annual basis and are included in each Annual Watermaster Report. It should be noted that over time, the specific rain gage used may change due to mechanical malfunction, damage by fire, etc. However, in each case, a suitable, nearby alternative rain gage was chosen as a substitute by Los Angeles County to continue long-term data collection.

As shown on **Figure 7A**, two rainfall totals are shown for each data point: the 100-year mean average of rainfall for the ULARA region for the data between 1881 and 1981 (these data were derived from the 1962-dated Report of Referee for the ULARA adjudication) and the average for the SNMP baseline period, which utilizes WY 2001-02 through 2011-12.

2. Recharge at Spreading Basins

Stormwater and imported water are spread in the artificial recharge spreading basins located in the SFE subarea. Descriptions of and locations for these spreading basins are provided in TM-1. Stormwater is currently derived from water captured behind Big Tujunga Dam and Pacoima Dam. Imported water that is spread artificially is supplied by the Metropolitan Water District of Southern California (MWD) and from the Los Angeles Aqueduct (LAA). Annual spreading volume data are reported in each Annual Watermaster Report. **Table 6**, "Annual Spreading Volumes", summarizes the recharge volumes that occurred during the baseline period at each of the ULARA spreading basins.

3. Water Deliveries that Contribute to Recharge

As stated above, a portion of the water delivered to each ULARA basin is able to percolate back into the groundwater basin. Specific assumptions related to the return flow irrigation water, leaking pipes, etc., will be covered in the forthcoming TM-5, which will discuss the development of the ULARA mixing model.

a) Potable Water Delivered

Potable water deliveries made by the water purveyors within the ULARA region are a blend of groundwater and imported water. **Table 7**, "Delivered Potable Water Volumes", lists the volume of groundwater delivered to each subarea, subtotaled by water purveyor. Subtotaling is necessary to accommodate the differences in delivered water quality between each source; these differences in water quality are due to differences in the water quality blend between groundwater and imported water and differences in the source of imported water available to each purveyor.

b) Recycled Water Delivered

Recycled water is delivered to four of the ULARA subareas from three main WRPs, as follows: deliveries from the Tillman WRP are to the SFE and SFW subareas; the LAG WRP delivers recycled water to the SFE, NAR, and VER subareas; and the Burbank WRP delivers recycled water to the SFE subarea. A relatively small volume of recycled water is delivered to the SFW subarea from the Tapia WRP. A summary of the volumes of recycled water delivered to each subarea is shown on **Table 8** "Delivered Recycled Water Volumes." **Table 8** subtotals the recycled water delivery data by water purveyor and lists the source of the recycled water delivered by each purveyor.

c) Onsite Waste Water Treatment.

Various dwellings and buildings throughout the subareas remain unsewered, but these are serviced by Onsite Wastewater Treatment Systems (OWTS). The cities of Burbank and Glendale, and the Crescenta Valley Water District report virtually no unsewered connections within their service areas. Areas of the City of Los Angeles within the ULARA groundwater basins are known to contain a number of OWTS, which direct stormwater into onsite treatment systems and ultimately represent a source of recharge to the groundwater basins. The City of Los Angeles maintains a database of these sites, and their locations are shown on **Figure 8**, "Unsewered Connections, ULARA Groundwater Basins." Three types of OWTS are mapped: residential; multi-family; and commercial. **Table 9,** "Unsewered Connections, ULARA Groundwater Basins", lists the number of each type of OWTS in each subarea.

The City of Los Angeles is continuously looking to identify areas to add sewer lines and encourage owners of unsewered properties to abandon their OWTS and connect to the public sewer. Additionally, the City is seeking grant funding opportunities to implement septic-to-sewer projects.

V. WATER QUALITY

A. GROUNDWATER QUALITY

Historically, the natural groundwater quality within ULARA groundwater basins has been acceptable for potable supply with respect to the general mineral and inorganic concentrations set forth by regulating agencies. Total hardness in the groundwater in ULARA is considered to be moderately hard to very hard. The character of groundwater from the major water-bearing formations is of two general types, each reflecting the composition of the sediments and the surface runoff in each area. In the SFW subarea, the groundwater is generally calcium sulfate-bicarbonate in character, whereas in the SFE, NAR, SYL, and VER subareas, groundwater generally displays a calcium bicarbonate character.

The overall quality of the groundwater in ULARA is generally within the recommended limits of the California Title 22 Drinking Water Standards, except for:

- areas in the SFE and NAR subareas which display high concentrations of certain volatile organic compounds (VOCs) such as trichloroethylene (TCE), and tetrachloroethylene (PCE), and hexavalent chromium, nitrate as NO_3, and 1,4-dioxane;
- areas in the SFW subarea which tend to have high concentrations of naturally-occurring TDS;[7]
- areas within VER that have shown elevated concentrations of the gasoline additive, methyl-tertiary-butyl-ether (MTBE), and nitrate as NO_3;[8]
- areas within SYL that have elevated concentrations of nitrate as NO_3 and certain VOCs.

In each impacted subarea (except for SFW, which has no municipal-supply wells), the pumped groundwater is being treated or blended to meet State Drinking Water Standards, or the impacted wells in each specific groundwater basin have been temporarily removed from active service.

A few areas within the San Fernando Valley have been designated as Superfund Sites by the US Environmental Protection Agency (USEPA). The USEPA is proceeding with enforcement actions against Potentially Responsible Parties (PRPs) as part of their overall, long-term groundwater remediation activities in the SFB. Also, as part of that effort, a number of EPA Operable Units (OU's) have been established within certain ULARA groundwater basins. Additional information

[7] Marine sediments with naturally occurring salts flank the western side of SFW. More details related to historic, naturally occurring elevated TDS concentrations are discussed in TM-5.

[8] A sanitary sewer system was constructed in the region in the early 1980s, thereby causing the end of virtually all recharge formerly induced by the use of OWTS in VER; elevated NO_3 concentrations are considered to be primarily caused by the historic use of OWTS.

regarding those ongoing groundwater cleanup efforts can be found at the USEPA Region 9 Superfund website (http://www.epa.gov/region9/superfund/superfundsites.html).

There are numerous ongoing groundwater quality investigations in ULARA being conducted by the RWQCB-LA and Department of Toxic Substances Control (DTSC). The reader can obtain current information for the sites which are regulated by those agencies via their respective websites, as follows:

http://geotracker.waterboards.ca.gov/ and http://www.envirostor.dtsc.ca.gov/public/.

For the purposes of this SNMP, groundwater quality data for the ULARA region were almost exclusively derived from the five major parties to the ULARA Judgment. Groundwater quality data for this study focused on constituents of concern for the SNMP related to the use of recycled water in the four local groundwater basins; those constituents are TDS, chloride, and nitrate.

1. Baseline Period Groundwater Quality Data

In order to establish a baseline of the key groundwater quality constituents for this SNMP, data were compiled for the following baseline monitoring period for this SNMP: WY 2001-2002 through WY 2011-2012. Each Party to the ULARA Judgment provided the ULARA Watermaster with a database of the water quality data for its currently-active water wells for which data were available for the baseline period being used for this SNMP. In addition to these data, the ULARA Watermaster supplemented the database with additional water quality data obtained directly from the website of the California Division of Drinking Water. The data were then reviewed to remove any obvious duplicate entries, and to remove from the database any results that occurred outside of the 11-water year baseline period for this SNMP.

For these calculations, both average values and median values were derived for each of the various constituents to obtain a more representative estimate of water quality for each subarea. Median values are considered representative for the existing dataset, and are used for the modeling work described in TM-5. Medians provide a more robust estimate of typical water quality because they are less influenced by skewed spatial or temporal distributions of the data. Some constituents, such as nitrate, for example, commonly exhibit occasional high concentrations in a time series of otherwise low values. Spatially, sampling may be limited by the availability of wells, or areas with water quality problems may be sampled more frequently than areas with low concentrations. Medians are less sensitive than averages to outliers and were selected as an appropriate measure of “central tendency” in the datasets.

From this more organized and combined dataset, median and average concentrations of TDS, chloride, and nitrate were calculated for each of over 100 wells for which data were available. Wells were grouped by subarea, and the median and average concentrations of each constituent were calculated for each subarea. This established the baseline data for water quality by subarea within ULARA, and the results are summarized in **Table 10**, “Baseline Period Water Quality.” Data for individual wells can be seen in Appendix I. The SFW subarea and the TUJ subarea do not have any wells currently used for water supply, and hence no water quality data are available for the baseline period. To address this data gap, additional data were collected and analyzed for an extended date range; see section 5.2.

Review of Table 10 reveals that calculated concentrations of key constituents were substantially less than the BPO for that same constituent in all subareas, whether calculated using the average or the median. In the EAG subarea, the median concentrations slightly exceeded the BPO for TDS and chloride, whereas the average concentration exceeded the BPO for TDS but not for chloride. The only extraction wells in Eagle Rock Basin (EAG subarea) are operated by a private party (DS Waters, Inc.). Within the 11-year baseline water year period for this SNMP, only three water quality sample results were available for the well(s) operated by this private party. Hence, the calculated baseline period medians and averages may not be representative of this subarea as a whole.

2. “Extended Period” Groundwater Quality Data

Many wells in the study area have groundwater quality sample dates that lie outside of the 11-year baseline period for this SNMP. Whereas some of these data were provided by the Parties to the ULARA Judgment, a majority of data were derived from the groundwater quality database maintained by the SWRCB Division of Drinking Water. This “extended period” dataset included data from 1989 to 2014. The method of calculating a median water quality concentration for key SNMP constituents for this extended date range was the same as that used for the WY 2001-02 to WY 2011-12 (the main baseline data range being used for this SNMP). **Table 11**, “Extended Period Water Quality (1989-2014)”, summarizes the data calculated for the extended dataset. Data for individual wells can be seen in Appendix II.

In regions where major groundwater extractions occur (SYL, VER, and the SFE and NAR subareas), the median and average concentrations of TDS, nitrate, and chloride are less than the respective BPO concentrations (see **Table 11**), with the exception of nitrate in the VER subarea. In the VER subarea, the median nitrate concentration for Verdugo Basin just slightly exceeds the BPO, whereas the calculated average is just less than the BPO. Note that nitrate treatment for groundwater pumped by wells in the Verdugo Basin occurs at the CVWD's Glenwood Nitrate Treatment Plant.

Water quality data from the February 2014 sampling of groundwater for three wells within the former LADWP-owned Reseda wellfield are included in the "extended range" dataset; these Reseda wells are located in the SFW subarea and represent the only recent data available for this entire subarea. The SFW subarea has median and average concentrations of TDS, chloride, and nitrate that are less than the BPO concentrations established for this subarea by the RWQCB-LA; however, these data are based solely on test data from three tightly-grouped wells in the former Reseda wellfield.

Similar to the baseline period dataset, the only extraction wells in the EAG subarea with data during the extended period are operated by DS Waters, Inc, and data are limited. In the EAG subarea, the median concentrations slightly exceeded the BPO for TDS and chloride, whereas the average concentration exceeds the BPO for TDS but not for chloride. .

3. Water Quality Data Gaps

Of the seven subareas defined by the RWQCB-LA in the four ULARA groundwater basins, and discussed herein, three have substantial data gaps with respect to water quality. Representative current groundwater quality data are not available for the TUJ subarea, because no known existing wells extract groundwater from the subarea. Data for EAG depends on only one water well, and therefore may not be completely representative of this entire, albeit small, groundwater basin. For the SFW, available water quality data are from only one sampling event in 2014, and only for three, closely spaced wells in this subarea.

Due to the lack of groundwater quality data for the SFW and TUJ subareas, historical groundwater quality data were downloaded from the California SWRQCB Groundwater Ambient Monitoring and Assessment Program (GAMA) website (http:// http://www.swrcb.ca.gov/gama/). The GAMA Groundwater Information System makes available data from a variety of databases maintained by various agencies in the State of California and by the United States Geological Survey (USGS).

Data available for the TUJ and SFW subareas date from 1950 to 1980, and hence are not as recent as the selected baseline period for this SNMP. **Table 12**, "GAMA Dataset Water Quality,", shows the median concentrations determined using the GAMA dataset. Data for individual wells are provided in Appendix III.

As shown on Table 12, the median and average concentrations for each of the three key constituents are below the respective BPOs for each constituent, with the exception of the calculated average for TDS, which exceeds the BPO. In the SFW subarea, the average for the GAMA-derived median and average TDS concentrations exceed the BPO for this subarea. The median and average concentrations of chloride and nitrate do not exceed the BPO for either calculation.

4. Groundwater Quality Trends

To help assess trends in water quality, a Mann-Kendall analysis was performed. For this SNMP, the Mann-Kendall test was implemented based on the methodology used in the MAROS Software (Aziz et al., 2003, AFCEE 2004). The Mann-Kendall test was calculated with a "p-value". A small p-value (less than 0.05) indicates strong evidence that the null hypothesis can be rejected (i.e., that there is no trend). If the p-value is small, the trend direction for the plotted data can be labeled as "Increasing" or "Decreasing." If the p-value is marginal (between 0.05 and 0.10), a trend will be labeled as "Probably Increasing" or "Probably Decreasing." Note that trend analyses were only performed for the "baseline" and "extended period" datasets due to the number of data records available; no trend analysis was performed for the "GAMA" dataset. Trend information for individual wells is shown in Appendices I and II.

A visual representation of the trend analyses for TDS, chloride, and nitrate (as NO_3) for the baseline period data are shown on **Figures 9A** through **11A**, and the trend data for these constituents for the "extended period" dataset are shown on **Figures 9B** through **11B.** As shown on the legend for each figure, the calculated increase or decrease trend is represented by a circle with a green color if the trend is decreasing, a red color if the trend has been determined to be increasing, or a blue color if the trend is stable. Further, the diameter of the circle corresponds to the magnitude of the increasing or decreasing trend, as defined in the legend for each figure. Key observations obtained from review of the figures are presented below.

a) TDS Trends (Figures 9A and 9B)

TDS trends are varied throughout the subareas. In the SFE subarea, a preponderance of the data suggests a stable trend, with some data points showing a relatively large decrease in concentration over time, whereas others show an increase. Increasing trends tend to be focused on the eastern side of the SFE subarea. The "extended period" dataset is similar, although there are more increasing trends than in the baseline dataset.

For SYL, trends during the baseline period are shown to be stable in four of the six wells with available data in this SYL; two of the wells do not have sufficient data during the baseline period to determine a trend. However, in the "extended period" data set, trends in four of the six wells show a small trend of increasing concentration.

In the VER subarea, both data sets show roughly the same pattern, with increases in TDS concentration over time in the central portion of the subarea, but decreasing or stable concentrations in the southern end of the subarea.

In NAR, all wells show a stable trend during the baseline period, with a single well showing an increase during the "extended period;" the majority of the wells show a stable trend. The sole well in the EAG subarea shows a stable trend for the "extended period" dataset, but no trend for the baseline period due to a lack of available data.

b) Chloride Trends (Figures 10A and 10B)

Chloride trends for both the "baseline" and "extended period" datasets (**Figures 10A** and **10B**, respectively) are similar for each subarea, but the "extended period" dataset does contain more increasing trend points than does the baseline period. In SFE, the trends are predominantly stable or decreasing, with certain locations showing increasing trends. In SYL, trends during both periods are generally increasing, with some stable trends in the "extended period" dataset. In NAR, both data sets reveal predominantly increasing trends, with a few wells showing stability over the given period.

c) Nitrate Trends (Figures 11A and 11B)

In both the data sets represented on **Figures 11A** and **11B**, the dominant trend for nitrate (as NO_3) concentrations is shown to be stable to decreasing in each of the subareas shown, with the exception of SYL, which shows a generally increasing trend. The City of San Fernando is in the final stages of placing online a new nitrate removal plant to treat groundwater pumped from their municipal-supply wells. Note also that CVWD's Glenwood Nitrate Treatment Plant has been in operation for a number of years.

B. Delivered Water Quality

Potable water delivered by each purveyor within ULARA varies in water quality due to the fact that each purveyor delivers a different blend of source waters. As described in TM-1, these source waters include groundwater and imported water from various sources. Further, the proportion of each source in the final blend depends on, in some cases, the availability of the source water. As an example, the proportion of the LAA water delivered within ULARA is highly dependent on the volume of water received from the aqueduct in a given year.

Each water purveyor provides an annual Consumer Confidence Report (CCR) to its customers, as required by law. Concentration data for the three key SNMP constituents were compiled from these CCRs for the baseline period by each purveyor for each ULARA subarea. The compiled data are shown on **Table 13** – "Delivered Water Quality".

The cities of Burbank and San Fernando, and the CVWD provide a direct estimate of the water quality of the water delivered to the end users in their respective CCRs. Hence, the data in **Table 13** were obtained directly from the CCR reports for these purveyors. The cities of Glendale and Los Angeles do not provide an estimate of the end user water quality blend, but instead provide water quality information for each of the sources that contribute to the water delivered to those end users. Hence, to determine the values presented on **Table 13**, data for each source presented in the CCR was compiled for each year of the baseline period. Delivered water data available in each ULARA Annual Watermaster Report for each baseline period year were then used to determine the relative portions of source waters in the delivered water for each baseline year. Then a calculation was performed using the proportion data from each ULARA Watermaster Report to determine the estimated concentration of each of the three constituents. Therefore, for the cities of Glendale and Los Angeles, the data presented in **Table 13** are calculated values using delivered water volumes presented in the ULARA Annual Watermaster Report on a yearly basis and source quality data presented in the annual CCRs prepared by each city. As shown on **Table 13**, imported water is delivered by the La Canada Irrigation District within the VER subarea.

C. Recycled Water Quality

Recycled water quality data collected during the SNMP baseline period were provided by the purveyors for each of the WRPs that provide recycled water to the ULARA groundwater basins. **Table 14**, “Recycled Water Quality,” provides a summary of the concentration data for the three key SNMP constituents over the baseline period. It is noteworthy that the concentrations of the three constituents are relatively similar for each of the four sources of recycled water delivered for use within ULARA.

VI. References

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TABLE 1
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - LOS ANGELES
SELECTED BASIN WATER QUALITY OBJECTIVES
UPPER LOS ANGELES RIVER AREA

GROUNDWATER BASIN	TDS	Cl	SO_4	NO_3-N
Sylmar Basin	600	100	150	10
Verdugo Basin	600	100	150	
San Fernando Basin				
West of Highway	800	100	300	10
East of Highway 405 (overall)	700	100	300	
Sunland-Tujunga area	400	50	50	
Foothill area	400	50	100	
Area encompassing Rinaldi Toluca-Tujunga-Erwin-No. Hollywood-Whitnall-LA-Verdugo-Crystal Springs-Headworks-Glendale/Burbank Wellfields	600	100	250	
Narrows Area (below confluence of Verdugo Wash with the LA River)	900	150	300	
Eagle Rock Basin	800	100	150	10

Notes:

Water quality units are mg/L

TDS = total dissolved solids; Cl = chloride; SO_4 = sulfate; NO_3 - N = nitrate as nitrogen

Table 2 – SATURATED SEDIMENT VOLUME in SFW, SFE, TUJ and NAR

Subarea	Approximate Surface Area of Basin (acres)	Approximate Saturated Volume of Sediments from Basin Bottom Constrained by Deepest Perforation Intervals (AF)
	(acres)	**(acre feet [AF])**
SFW	48,200	5,410,000
SFE	54,400	12,310,000
TUJ	4,300	412,000
NAR	6,500	701,000

Table 3 - Groundwater Extraction Volumes

All units reported in acre-feet (AF)

GW Basin	San Fernando Basin										Sylmar Basin			Verdugo Basin				Eagle Rock
Subarea	SFE					NAR				SFW	SYL			VER				EAG
Entity	Los Angeles	Burbank	Glendale	Other Extractions[1]	Subarea Total	LADWP	Glendale	Other Extractions[1]	Subarea Total	Other Extractions[1]	Los Angeles	San Fernando	Subarea Total	CVWD	Glendale	Other Extractions[1]	Subarea Total	Other Extractions[1]
Water Year 2001-2002	65,179.97	10,539.52	5,034.54	3,065.50	83,819.53	1,642.55	1,803.53	415.37	3,861.45	310.86	1,239.63	3,765.70	5,005.33	3,266.49	2,129.35	11.07	5,406.91	231.56
2002-2003	71,655.53	9,169.86	5,926.41	3,660.41	90,412.21	1,720.41	2,580.48	430.74	4,731.63	287.10	3,548.86	3,357.48	6,906.34	2,835.85	1,613.29	8.12	4,457.26	216.72
2003-2004	67,488.75	9,660.38	4,955.46	2,757.26	84,861.85	1,137.16	2,555.07	457.35	4,149.58	312.02	3,032.63	3,454.10	6,486.73	2,567.65	2,117.31	8.08	4,693.04	230.59
2004-2005	47,332.18	6,398.67	5,125.78	3,899.36	62,755.99	1,752.44	2,666.69	311.90	4,731.03	376.78	1,110.23	3,143.04	4,253.27	3,302.22	2,356.89	9.41	5,668.52	208.23
2005-2006	35,600.00	10,108.11	5,054.34	3,038.36	53,800.81	2,441.63	2,319.19	442.88	5,203.70	308.18	2,174.66	2,856.96	5,031.62	3,342.71	2,389.79	11.31	5,743.81	189.87
2006-2007	74,019.84	9,780.32	4,922.69	3,834.47	92,557.32	59.45	2,697.20	393.12	3,149.77	341.79	3,919.40	2,894.09	6,813.49	3,294.25	2,567.97	12.24	5,874.46	189.32
2007-2008	47,435.57	6,816.14	4,847.13	2,339.43	61,438.27	2,573.44	2,563.92	390.52	5,527.88	259.33	2,997.34	3,669.60	6,666.94	3,269.89	2,687.00	10.49	5,967.38	180.07
2008-2009	51,198.36	9,965.53	4,522.11	1,459.07	67,145.07	1,697.64	2,528.97	267.16	4,493.77	505.31	867.74	3,472.83	4,340.57	2,956.54	2,086.83	9.32	5,052.69	169.06
2009-2010	57,438.22	10,048.01	5,283.42	1,673.90	74,443.55	3,119.88	2,651.32	397.09	6,168.29	477.24	2,544.33	3,142.71	5,687.04	2,645.07	2,135.14	8.24	4,788.45	165.73
2010-2011	40,823.79	10,398.25	4,901.38	1,600.88	57,724.30	3,127.27	2,574.78	323.22	6,025.27	561.38	963.92	3,081.99	4,045.91	2,917.42	1,826.58	9.62	4,753.62	185.30
2011-2012	46,315.32	9,997.28	5,146.59	1,661.99	63,121.18	2,957.18	2,729.10	420.93	6,107.21	503.60	1,092.84	3,202.22	4,295.06	3,090.39	1,982.43	9.52	5,082.34	169.14
Baseline Period Average	**54,953.41**	**9,352.92**	**5,065.44**	**2,635.51**	**72,007.28**	**2,020.82**	**2,515.48**	**386.39**	**4,922.69**	**385.78**	**2,135.60**	**3,276.43**	**5,412.03**	**3,044.41**	**2,172.05**	**9.77**	**5,226.23**	**194.14**

[1] "Other Extractions" includes dewatering, groundwater cleanup efforts, and extractions by other third parties to the ULARA judgement

GW = groundwater

Table 4 - Groundwater Exports

All units reported in acre-feet (AF)

	Export from GW Basin	San Fernando Basin	Verdugo Basin	Sylmar Basin	
	Export To	Out of ULARA by LADWP	SFB by Glendale	SFB by LADWP	SFB by City of San Fernando
Water Year	2001-2002	60,019.00	569	1,240	3,389
	2002-2003	67,759.00	632	3,549	3,055
	2003-2004	64,801.00	656	3,033	3,143
	2004-2005	44,586.00	700	1,110	2,860
	2005-2006	35,789.00	0	2,175	2,600
	2006-2007	71,416.00	461	3,919	2,634
	2007-2008	48,209.00	706	2,996	3,339
	2008-2009	49,938.00	531	868	3,160
	2009-2010	56,814.00	507	2,544	2,860
	2010-2011	37,238.00	390	964	2,805
	2011-2012	43,724.00	316	1,093	2,914
	Baseline Period Average	**52,753.91**	**497.09**	**2,135.55**	**2,978.09**

GW = groundwater

Table 5 - Subsurface Flow

All units reported in acre-feet (AF)

GW Basin	San Fernando Basin					Verdugo Basin			Sylmar Basin	Eagle Rock Basin
Subarea	**SFW**	**TUJ**	**SFE**	**NAR**		**VER**			**SYL**	**EAG**
Outflow to	**SFE***	**SFE***	**NAR***	**Underflow Out of ULARA**	**Rising GW Out of ULARA**	**SFE**	**Rising GW to SFE**	**Monk Hill Basin (Out of ULARA)**	**SFE**	**NAR**
Water Year										
2001-2002	17,428	1,946.50	6,715	390	2,126	70	1,819	300	460	0
2002-2003	17,428	1,946.50	6,715	390	3,869	80	3,167	300	460	50
2003-2004	17,428	1,946.50	6,715	402	3,330	80	2,468	300	460	50
2004-2005	17,428	1,946.50	6,715	407	6,309	80	5,198	300	560	50
2005-2006	17,428	1,946.50	6,715	399	5,441	80	1,414	300	560	50
2006-2007	17,428	1,946.50	6,715	396	1,720	80	1,272	300	560	50
2007-2008	17,428	1,946.50	6,715	391	3,905	80	1,212	300	560	50
2008-2009	17,428	1,946.50	6,715	391	2,698	80	2,097	300	560	50
2009-2010	17,428	1,946.50	6,715	391	5,814	80	2,394	300	560	50
2010-2011	17,428	1,946.50	6,715	391	6,588	80	2,397	300	540	50
2011-2012	17,428	1,946.50	6,715	391	3,121	80	2,068	300	250	50
Baseline Period Average	**17,428**	**1,947**	**6,715**	**394**	**4,084**	**79**	**2,319**	**300**	**503**	**45**

GW = groundwater

* These values were dervied via the LADWP groundwater model for the San Fernando Groundwater Basin

Table 6 - Annual Spreading Volumes

All units reported in acre-feet (AF)

	GW Basin	San Fernando Basin								
	Subarea	SFE								
	Spreading Basin or Entity	Branford	Hansen	Lopez	Pacoima	Pacoima (Burbank, Imported)	Tujunga (LACDPW)	Tujunga (LA City)	Headworks	Total Spread
Water Year	2001-2002	460	1,342	0	761	0	101	0	0	2,664
	2002-2003	932	9,427	518	3,539	0	1,914	0	0	16,330
	2003-2004	444	6,424	144	1,731	0	1,322	0	0	10,065
	2004-2005	1,448	33,301	940	17,394	0	21,115	0	0	74,198
	2005-2006	576	20,840	958	7,346	0	14,895	0	0	44,615
	2006-2007	532	5,762	44	436	0	1,200	0	0	7,974
	2007-2008	570	10,517	634	5,025	0	4,892	0	0	21,638
	2008-2009	706	0	1	2,000	0	7,233	0	0	9,940
	2009-2010	535	16,766	274	9,046	34	12,849	7,509	0	47,013
	2010-2011	690	19,064	3,922	12,977	11,187	31,476	4	0	79,320
	2011-2012	529	9,357	104	2,111	1,371	101	4	0	13,577
	Baseline Period Average	**674.73**	**12,072.73**	**685.36**	**5,669.64**	**1,144.73**	**8,827.09**	**683.36**	**0.00**	**29,757.64**

GW = groundwater

Table 7 - Delivered Potable Water Volumes

All units reported in acre-feet (AF)

	GW Basin	San Fernando Basin										Sylmar Basin			Verdugo Basin					Eagle Rock
	Subarea	SFE					NAR			SFW	TUJ	SYL			VER					EAG
	Entity	Los Angeles	Burbank	Glendale	San Fernando	Subarea Total	LADWP	Glendale	Subarea Total	LADWP	LADWP	Los Angeles	San Fernando	Subarea Total	LADWP	CVWD	Glendale	La Canada ID	Subarea Total	LADWP
Water Year	2001-2002	95,132	24,937	14,940	3,389	138,398	10,582	12,985	23,568	106,727	7,121	10,397	377	10,774	848	5,500	5,823	1,324	13,495	4,414
	2002-2003	92,508	23,108	15,529	3,292	134,438	5,576	13,498	19,074	102,165	6,850	10,125	328	10,453	766	4,873	5,704	1,277	12,620	4,363
	2003-2004	95,788	24,235	16,066	3,606	139,695	7,895	13,964	21,859	105,932	7,652	10,927	357	11,284	810	5,372	5,865	1,408	13,455	4,267
	2004-2005	92,156	21,749	14,838	3,315	132,058	7,548	12,897	20,445	100,952	7,408	10,225	328	10,553	734	4,754	5,212	1,197	11,897	4,080
	2005-2006	91,382	24,084	15,260	3,330	134,055	7,337	13,263	20,600	100,778	7,193	9,983	329	10,312	770	4,677	5,422	1,244	12,113	3,907
	2006-2007	96,670	25,288	15,788	3,454	141,200	7,897	13,723	21,620	109,628	7,737	10,994	342	11,336	820	4,765	5,588	1,354	12,527	4,136
	2007-2008	92,730	24,277	15,477	3,339	135,823	7,540	13,452	20,992	104,596	7,298	10,329	330	10,659	775	4,048	5,344	1,275	11,442	4,010
	2008-2009	85,614	22,160	13,939	3,160	124,874	6,803	12,116	18,918	94,021	6,590	9,756	313	10,069	698	4,248	4,845	1,158	10,949	3,617
	2009-2010	76,633	20,513	13,030	2,907	113,084	6,164	11,326	17,490	84,760	5,823	8,524	287	8,811	592	3,493	4,399	1,027	9,511	3,343
	2010-2011	75,353	19,322	12,615	2,821	110,111	6,070	10,965	17,035	85,097	5,571	8,291	279	8,570	574	3,724	4,354	994	9,646	3,309
	2011-2012	84,218	20,584	13,103	3,010	120,914	6,602	11,388	17,990	97,990	6,254	9,316	298	9,614	637	3,893	4,624	1,090	10,244	3,481
	Baseline Period Average	**88,926**	**22,751**	**14,599**	**3,238**	**129,514**	**7,274**	**12,689**	**19,963**	**99,331**	**6,863**	**9,897**	**324**	**10,221**	**729**	**4,486**	**5,198**	**1,213**	**11,627**	**3,902**

Data excludes Hill and Mountain Deliveries
GW = groundwater

Table 8 - Delivered Recycled Water Volumes

All units reported in acre-feet (AF)

	GW Basin	San Fernando Basin										Verdugo Basin
	Subarea	SFE				NAR			SFW			VER
	Entity	Los Angeles	Burbank	Glendale	Subarea Total	LADWP	Glendale	Subarea Total	LADWP	LVMWD	Subarea Total	Glendale
	WRD Source	Tillman LAG	Burbank	LAG		LAG	LAG		Tillman	Tapia		LAG
Water Year	2001-2002	57.00	2,087.00	29.92	2,173.92	392.20	461.80	854.00	0	144	144.40	0.00
	2002-2003	70.00	488.00	36.74	594.74	247.80	429.49	677.29	0	179	178.76	417.00
	2003-2004	65.00	549.00	34.12	648.12	303.80	624.76	928.56	0	177	176.96	383.00
	2004-2005	23.00	681.00	12.07	716.07	284.30	446.12	730.42	0	198	197.90	180.00
	2005-2006	22.00	1,692.00	11.55	1,725.55	368.00	456.57	824.57	0	187	186.74	153.00
	2006-2007	7.00	2,082.00	3.67	2,092.67	397.00	611.93	1,008.93	0	206	205.65	327.00
	2007-2008	9.00	2,192.00	4.72	2,205.72	292.00	606.23	898.23	193	195	387.62	277.00
	2008-2009	14.00	2,011.00	7.35	2,032.35	159.90	684.62	844.52	1,203	178	1,381.16	255.00
	2009-2010	200.60	2,080.00	105.29	2,385.89	254.90	638.06	892.96	1,275	153	1,428.17	297.00
	2010-2011	179.00	1,568.00	93.96	1,840.96	424.00	562.52	986.52	905	138	1,042.88	242.00
	2011-2012	350.00	2,000.00	183.72	2,533.72	615.00	521.66	1,136.66	1,476	118	1,593.55	261.00
	Baseline Period Average	**90.60**	**1,584.55**	**47.56**	**1,722.70**	**339.90**	**549.43**	**889.33**	**459.34**	**170.10**	**629.43**	**253.82**

Data excludes Hill and Mountain Deliveries
GW = groundwater

TABLE 9
UNSEWERED CONNECTIONS
ULARA GROUNDWATER BASINS

Basin Subarea		Residential	Multifamily	Commercial	Total
Sylmar, SYL		679	3	20	**702**
Verdugo, VER		215	0	1	**216**
Eagle Rock, EAG		1	1	5	**7**
San Fernando	SFW	2,220	18	162	**2,400**
	SFE	2,033	27	303	**2,363**
	TUJ	1,908	35	39	**1,982**
	NAR	12	1	18	**31**
	SFB Total	*6,173*	*81*	*522*	***6,776***
ULARA Total		**7,068**	**85**	**548**	**7,701**

TABLE 10
BASELINE PERIOD WATER QUALITY (WY 2001-2002 to 2011-2012)

Basin Subarea		Median TDS (mg/L)	Average TDS (mg/L)	[Objective]	Median Chloride (mg/L)	Average Chloride (mg/L)	[Objective]	Median Nitrate (NO_3) (mg/L)	Average Nitrate (NO_3) (mg/L)	[Objective]
Sylmar, SYL		367	375	[600]	28	28	[100]	29	28	[45]
Verdugo, VER		550	564	[600]	86	88	[100]	45	42	[45]
Eagle Rock, EAG***		836	835	[800]	108	72	[100]	24	23	[45]
San Fernando Basin	SFW	*N/A*	*N/A*	[800]	*N/A*	*N/A*	[100]	*N/A*	*N/A*	[45]
	TUJ**	*N/A*	*N/A*	[400]	*N/A*	*N/A*	[50]	*N/A*	*N/A*	[45]
	SFE	473	534	[600]	33	34	[100]	20	22	[45]
	NAR	554	568	[900]	71	72	[150]	32	28	[45]

Notes:
*Only available data point for the Reseda Wells is from 2/19/2014, which is outside of our 10 year range
**Major parties to the Judgement (namely LADWP) do not pump from this area. There are a few private party pumpers in the hill and mountain region, but none from the valley fill. A limited amount of historic (ca. 1970's) data is avalible
***Data is based solely off of Sparkletts wells (DS Waters).

TABLE 11
EXTENDED PERIOD WATER QUALITY (1984-2014)

Basin Subarea		Median TDS (mg/L)	Average TDS (mg/L)	TDS [Objective]	Median Chloride (mg/L)	Average Chloride (mg/L)	Chloride [Objective]	Median Nitrate (NO_3) (mg/L)	Average Nitrate (NO_3) (mg/L)	Nitrate (NO_3) [Objective]
Sylmar, SYL		365	360	[600]	28	28	[100]	28	27	[45]
Verdugo, VER		535	551	[600]	82	86	[100]	46	44	[45]
Eagle Rock, EAG		838	836	[800]	106	80	[100]	23	23	[45]
San Fernando Basin	SFW	684	655	[800]	31	31	[100]	10	21	[45]
	TUJ	*N/A*	*N/A*	[400]	*N/A*	*N/A*	[50]	*N/A*	*N/A*	[45]
	SFE	455	524	[600]	29	34	[100]	20	29	[45]
	NAR	538	557	[900]	68	69	[150]	33	28	[45]

TABLE 12
GAMA DATASET WATER QUALITY

Basin Subarea	Median TDS (mg/L)	Average TDS (mg/L)	[Objective]	Median Chloride (mg/L)	Average Chloride (mg/L)	[Objective]	Median Nitrate (NO_3) (mg/L)	Average Nitrate (NO_3) (mg/L)	[Objective]
San Fernando Basin									
SFW	1063	1096	[800]	52	64	[100]	19	17	[45]
TUJ[1]	359	445	[400]	19	23	[50]	18	25	[45]

Notes:

[1]Due to the limited amount of data, and the fact that the BPOs for the subabsins are the same, the Sunland-Tujunga and Foothill subbasins have been combined when calculating the median concentration.

Table 13 - Delivered Water Quality

All units reported in acre-feet (AF)

	GW Basin	San Fernando Basin																							
	Subarea	SFE												SFW			TUJ			NAR					
	Entity	LADWP			Burbank			Glendale			City of San Fernando			LADWP			LADWP			LADWP			Glendale		
	Year	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L
Water Year	2001-2002	314	74	0.58	500	85	4.4	519	84	1.49	335	24	6.02	314	74	0.58	314	74	0.58	314	74	0.58	519	84	1.49
	2002-2003	308	70	0.58	361	64	4.15	432	75	1.22	349	22	6.83	308	70	0.58	308	70	0.58	308	70	0.58	432	75	1.22
	2003-2004	393	62	0.56	358	66	4.43	N/A	N/A	N/A	N/A	N/A	5.54	393	62	0.56	393	62	0.56	393	62	0.56	N/A	N/A	N/A
	2004-2005	235	42	0.47	358	47.9	3.5	493	73	1.82	N/A	N/A	6.66	235	42	0.47	235	42	0.47	235	42	0.47	493	73	1.82
	2005-2006	220	35	0.44	351	45.7	4.4	362	60	1.96	N/A	24	7.08	220	35	0.44	220	35	0.44	220	35	0.44	362	60	1.96
	2006-2007	269	59	0.60	390	72	2.2	479	87	2.12	N/A	N/A	7.26	269	59	0.60	269	59	0.60	269	59	0.60	479	87	2.12
	2007-2008	294	68	0.47	421	67	3.3	565	87	2.09	N/A	N/A	6.8	294	68	0.47	294	68	0.47	294	68	0.47	565	87	2.09
	2008-2009	318	74	2.77	450	60	4.5	609	88	2.11	373	25	7.04	318	74	2.77	318	74	2.77	318	74	2.77	609	88	2.11
	2009-2010	270	56	0.50	410	60	4.7	570	83	2.31	N/A	N/A	8.14	270	56	0.50	270	56	0.50	270	56	0.50	570	83	2.31
	2010-2011	191	33	0.43	420	56	4.5	488	70	2.04	330	22	6.16	191	33	0.43	191	33	0.43	191	33	0.43	488	70	2.04
	2011-2012	250	53	0.43	410	54	4.4	509	83	2.24	280	26	6.6	250	53	0.43	250	53	0.43	250	53	0.43	509	83	2.24
	Average:	**278**	**57**	**0.71**	**403**	**61.6**	**4.04**	**457**	**72**	**1.76**	**152**	**13**	**6.74**	**278**	**57**	**1**	**278**	**57**	**1**	**278**	**57**	**1**	**457**	**72**	**1.76**

	GW Basin	Sylmar Basin						Verdugo Basin												Eagle Rock Basin		
	Subarea	SYL						VER												EAG		
	Entity	LADWP			City of San Fernando			LADWP			Glendale			La Canada Irrigation District**			Crescenta Valley Water District			EAG		
	Year	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L	TDS mg/L	Chloride mg/L	Nitrate (as N) mg/L
Water Year	2001-2002	311	75	0.53	335	24	6.02	311	75	0.53	518.54	83.92	1.49	500	85	0	498	77	29	318	83	0.60
	2002-2003	303	70	0.51	349	22	6.83	303	70	0.51	431.88	74.59	1.22	387	79	0.5	405	69	27	301	82	0.60
	2003-2004	393	63	0.52	N/A	N/A	5.54	393	63	0.52	N/A	N/A	N/A	N/A	N/A	N/A	480	77.5	24	488	70	0.60
	2004-2005	226	41	0.44	N/A	N/A	6.66	226	41	0.44	493.16	72.78	1.82	452	75	0.54	474	78	28	294	51	0.52
	2005-2006	216	35	0.42	N/A	24	7.08	216	35	0.42	362.25	59.66	1.96	273	54	0.47	503	77	28	273	61	0.46
	2006-2007	263	59	0.55	N/A	N/A	7.26	263	59	0.55	478.84	87.06	2.12	437	86	0.484	480	82	29.5	263	59	0.55
	2007-2008	293	69	0.46	N/A	N/A	6.8	293	69	0.46	564.94	87.24	2.09	565	96	0.484	586	88	28.4	307	75	0.48
	2008-2009	317	74	2.78	373	25	7.04	317	74	2.78	608.54	87.92	2.11	620	98	0.374	566	77.3	27.9	327	78	3.35
	2009-2010	267	56	0.47	N/A	N/A	8.14	267	57	0.47	569.94	83.22	2.31	570	93	0.3	538	76	27	326	78	0.57
	2010-2011	188	33	0.40	330	22	6.16	188	33	0.40	487.84	70.21	2.04	440	70	0.4	551	78	29.3	188	33	0.40
	2011-2012	245	53	0.40	280	26	6.6	245	53	0.40	509.40	83.38	2.24	470	90	0.3	535	80	29	257	55	0.40
	Average:	**275**	**57**	**0.68**	**152**	**13**	**6.74**	**275**	**57**	**0.68**	**457**	**72**	**1.76**	**429**	**75**	**0.35**	**511**	**78**	**27.92**	**304**	**66**	**0.78**

**Uses exclusively MWD water. The water quality shown here is from Glendale's Annual WQ Report for MWD

ULARA

Table 14 - Recycled Water Quality

All units reported in mg/L

	WRP	Donald C. Tillman			LA-Glendale			Burbank			Tapia		
	RW Constituent	TDS	Chloride	Nitrate as N	TDS	Chloride	Nitrate as N	TDS	Chloride	Nitrate as N	TDS	Chloride	Nitrate as N
Year	2002	598	139	0.8	676	152	2.9	---	---	---	769	149	13.2
	2003	527	129	0.4	626	145	2.7	---	---	---	847	155	13.7
	2004	518	124	0.8	618	137	1.9	---	---	---	774	147	11.5
	2005	614	112	0.8	659	143	1.6	---	---	---	861	137	10.6
	2006	552	102	0.5	611	132	0.3	---	---	---	767	132	10.9
	2007	556	128	4.0	632	146	3.9	---	---	---	720	142	10.1
	2008	594	135	5.9	726	163	5.8	654	134	4.5	816	158	9.4
	2009	567	138	5.4	692	153	5.5	680	130	4.7	770	159	8.4
	2010	551	133	5.3	653	145	5.3	645	128	5.0	764	155	8.3
	2011	494	109	5.6	564	123	5.3	609	118	5.9	790	150	6.2
	2012	536	103	5.8	620	131	5.6	593	113	5.9	698	140	7.0
	Baseline Period Average	**555**	**123**	**3.2**	**643**	**143**	**3.7**	**636**	**125**	**5.2**	**779**	**148**	**9.9**

Data is the average (mean) for each year
RW = Recycled Water

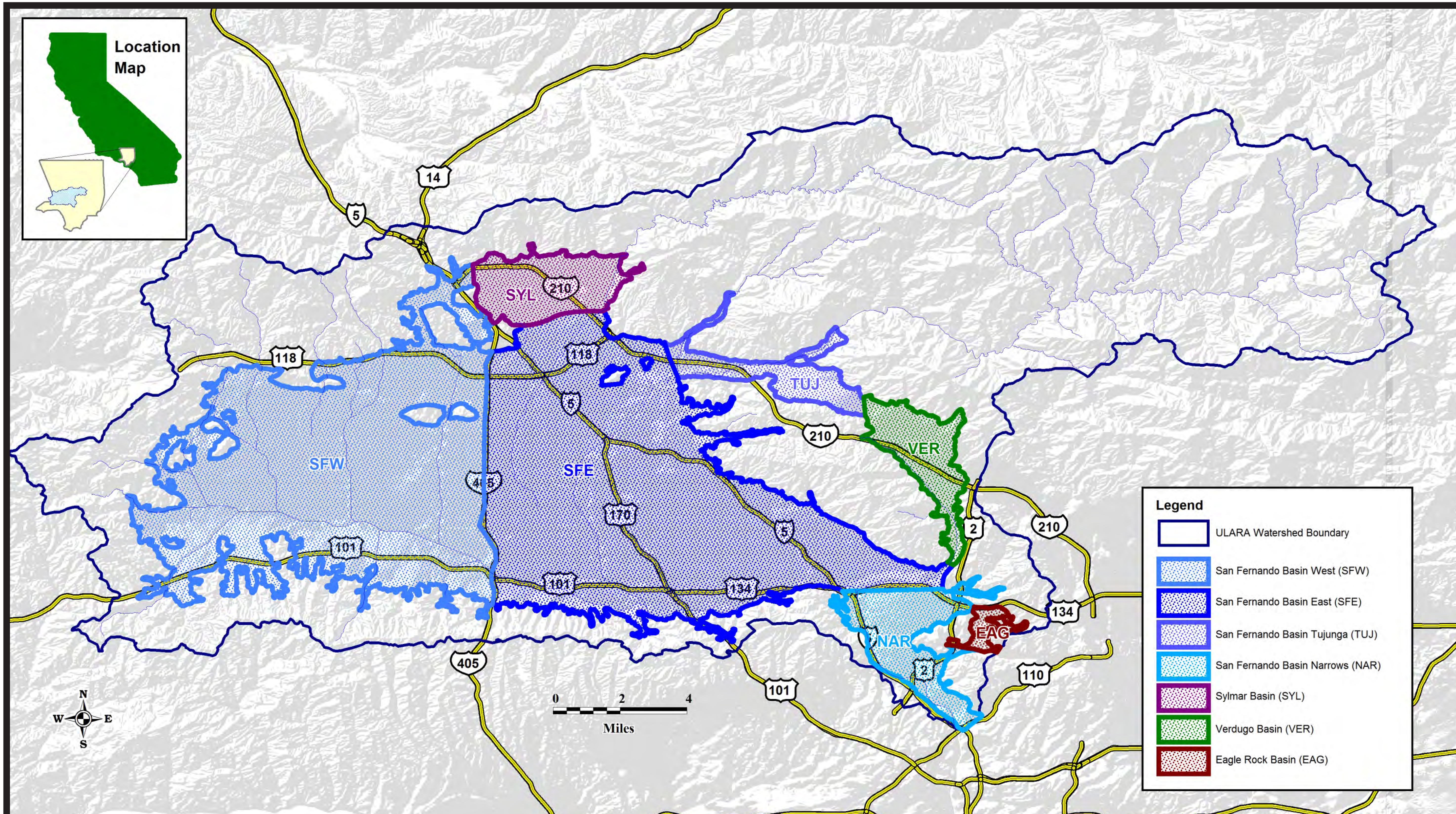

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FIGURE 1
ULARA GROUNDWATER BASIN
SUBAREA DEFINITION MAP

SNMP TM-2 **June 2017**

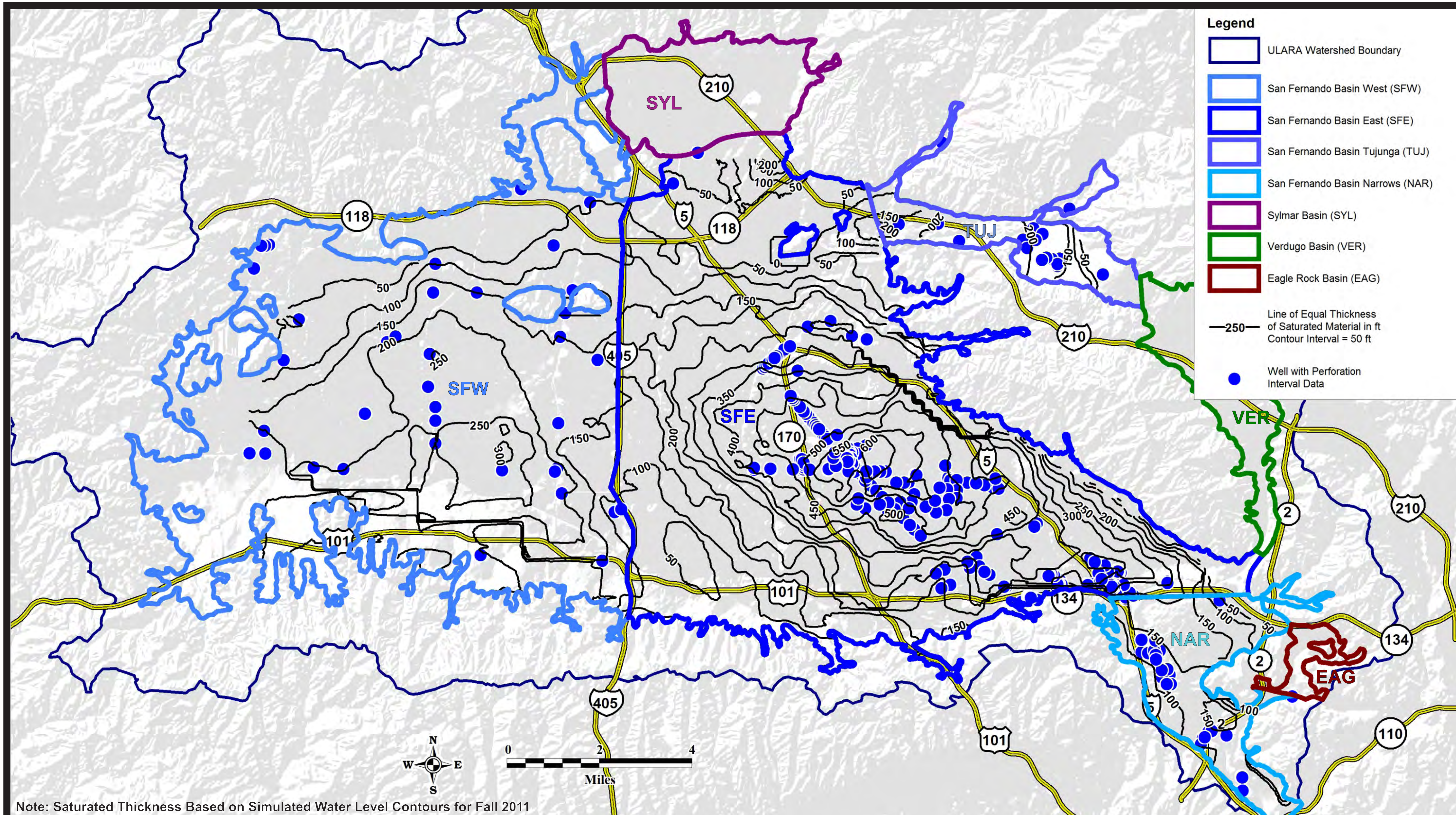

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FIGURE 2
SATURATED THICKNESS CONTOURS
FALL 2011 - SAN FERNANDO BASIN

SNMP TM-2

June 2017

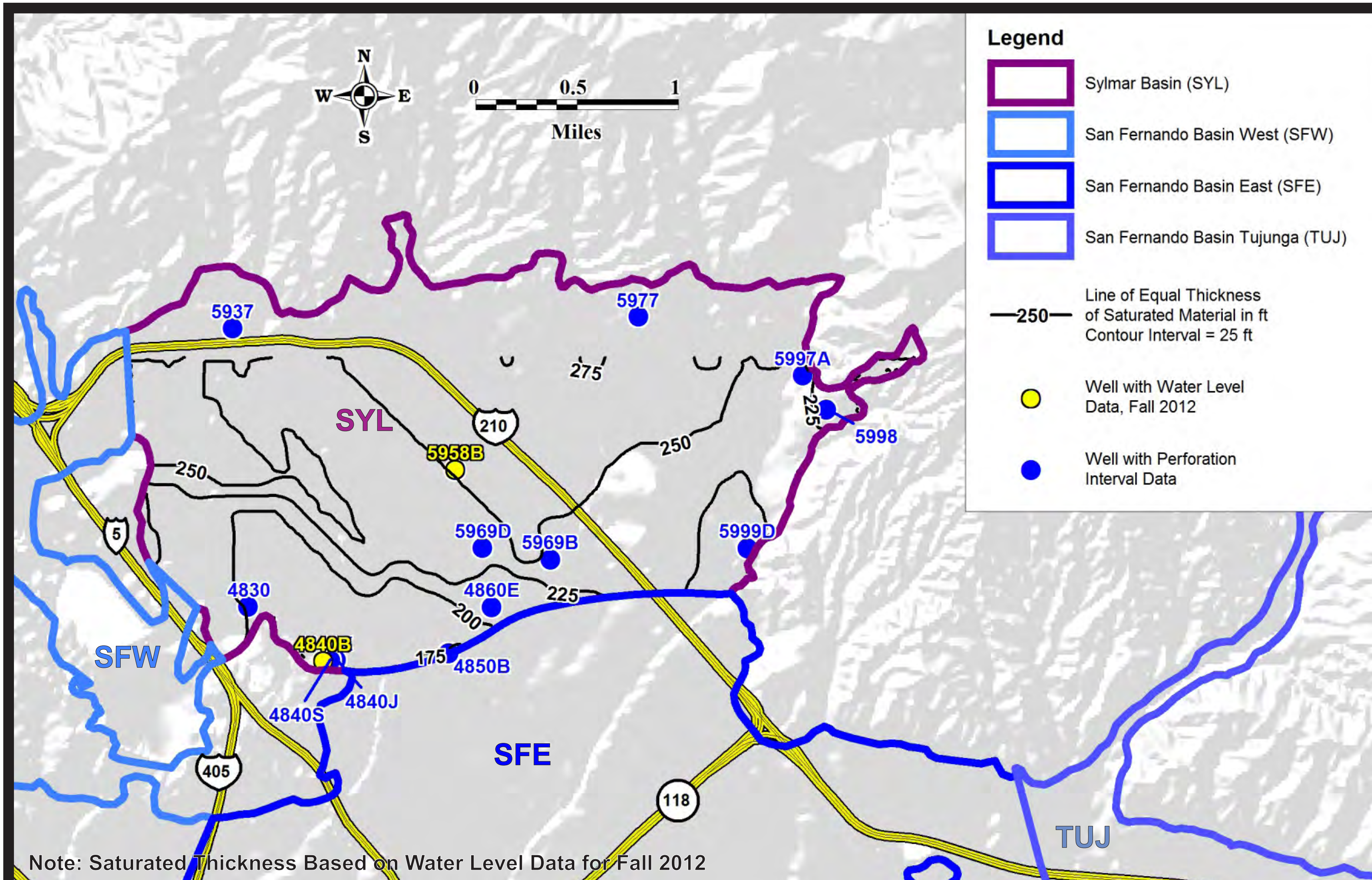

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FIGURE 3
SATURATED THICKNESS CONTOURS
FALL 2012 - SYLMAR BASIN

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June 2017

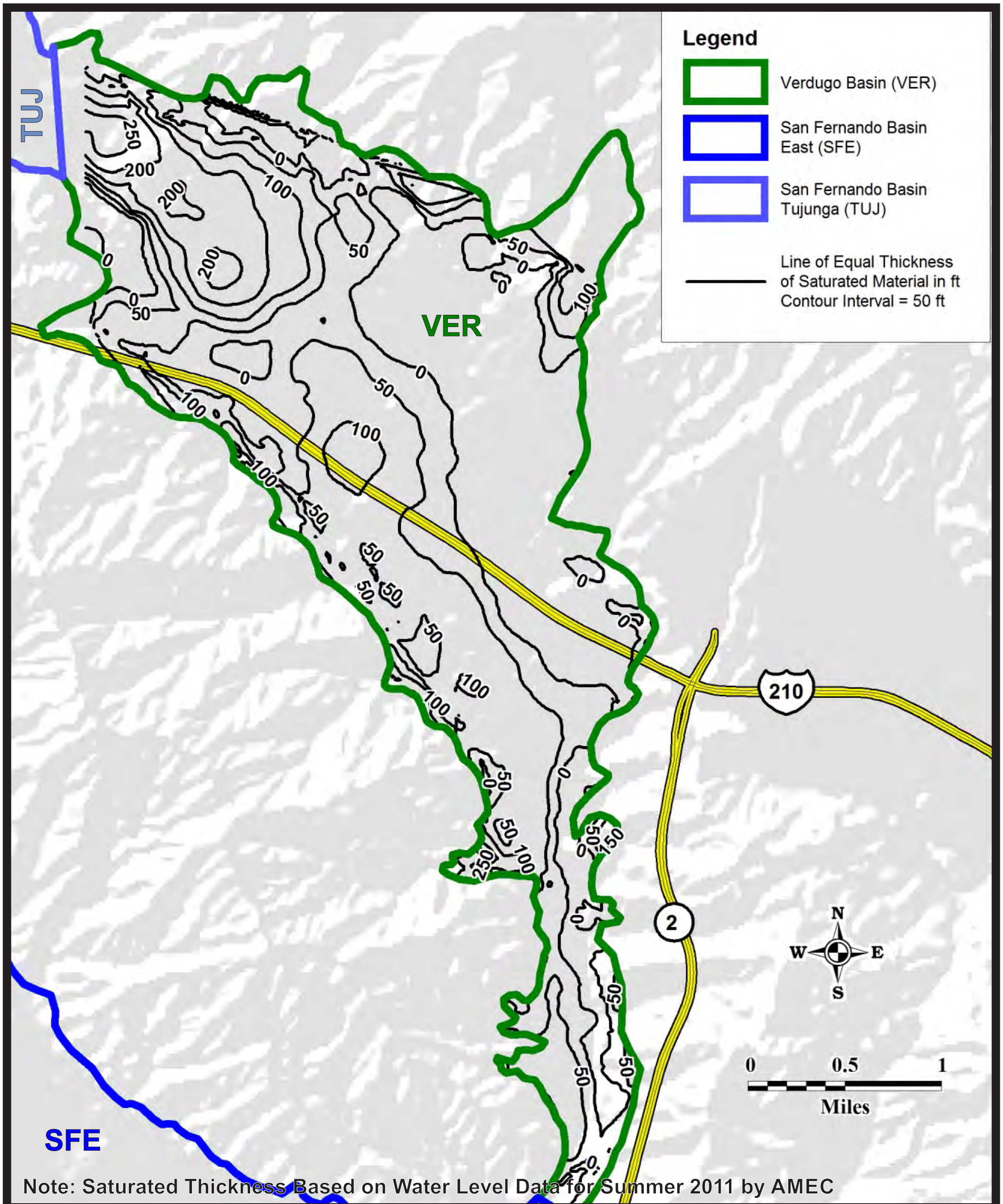

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FIGURE 4
SATURATED THICKNESS CONTOURS
SUMMER 2011 - VERDUGO BASIN

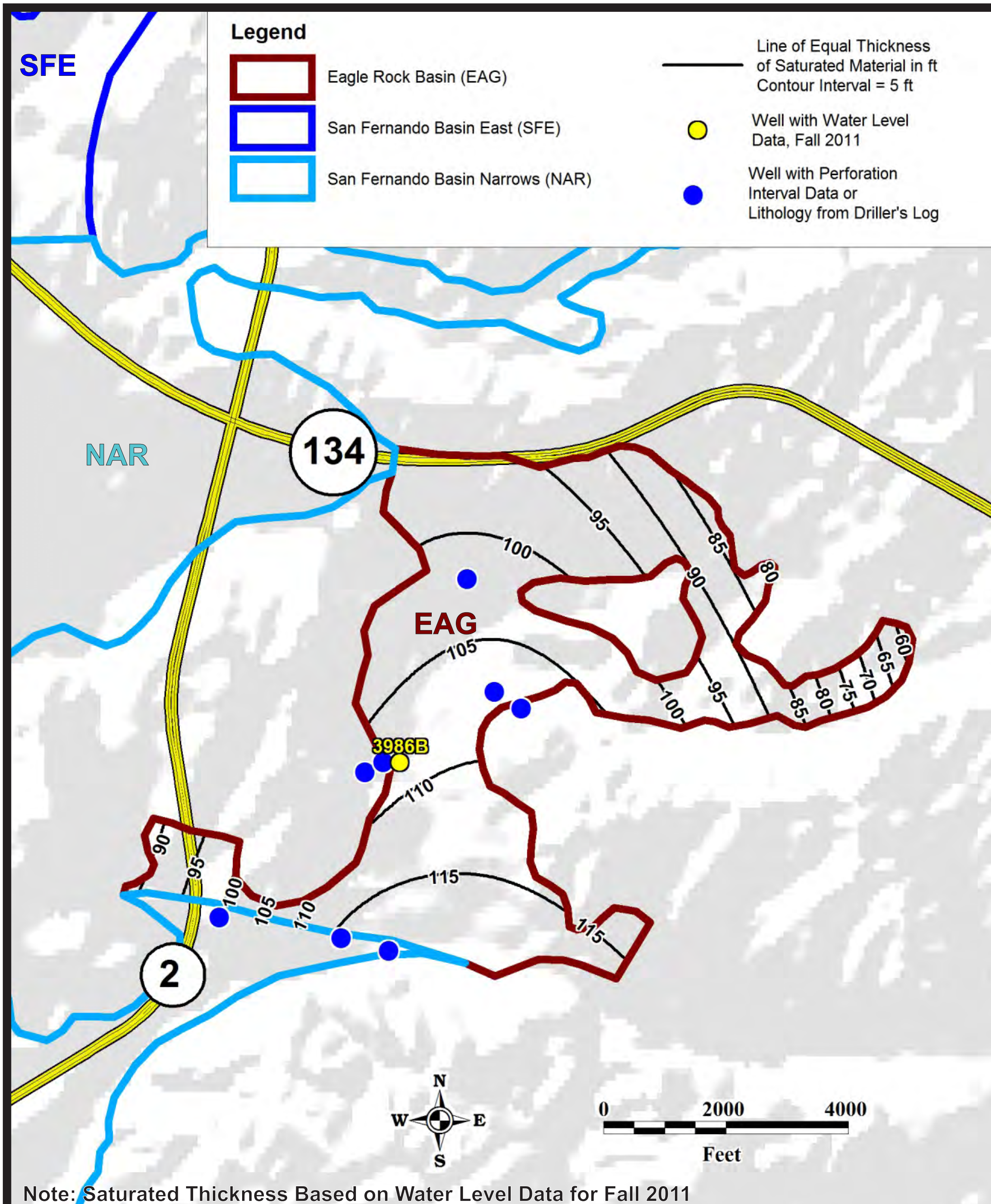

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FIGURE 5
SATURATED THICKNESS CONTOURS
FALL 2011, EAGLE ROCK BASIN

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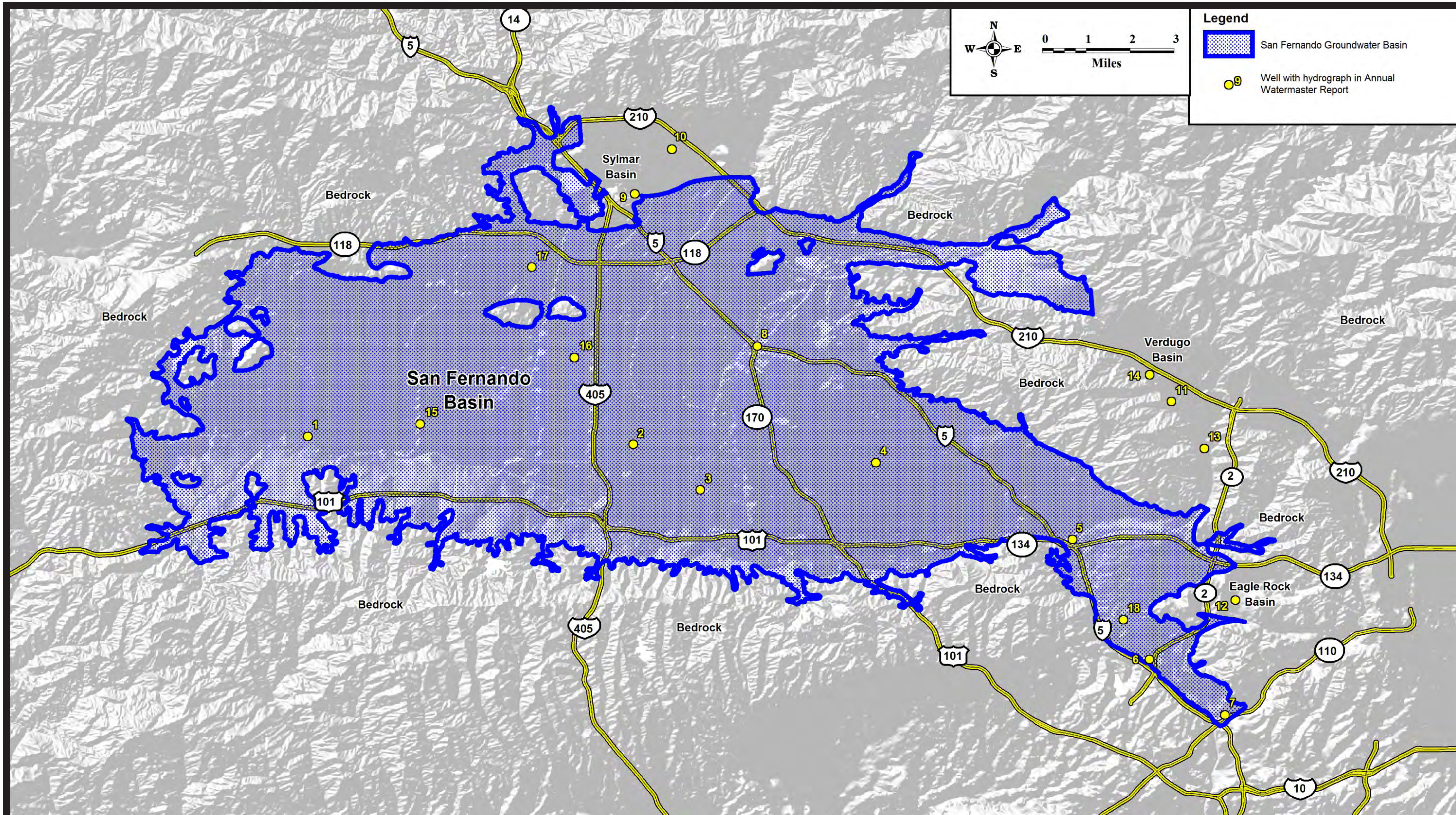

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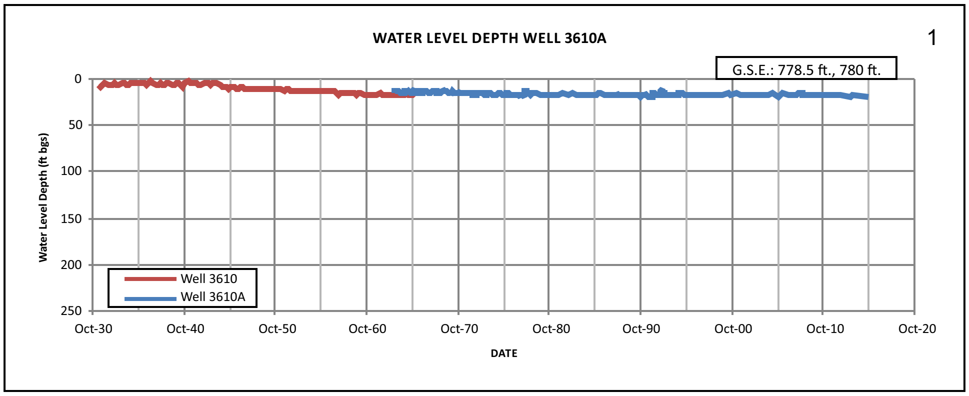
FIGURE 6A
HYDROGRAPH WELL LOCATION MAP

SNMP TM-2

June 2017



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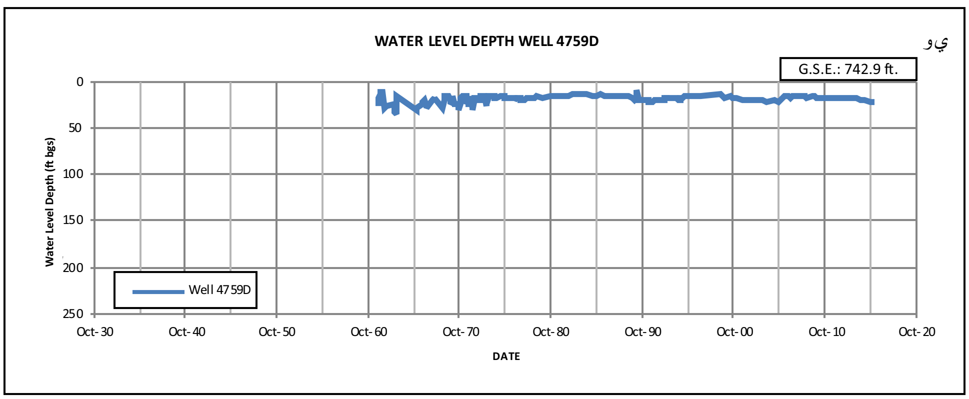

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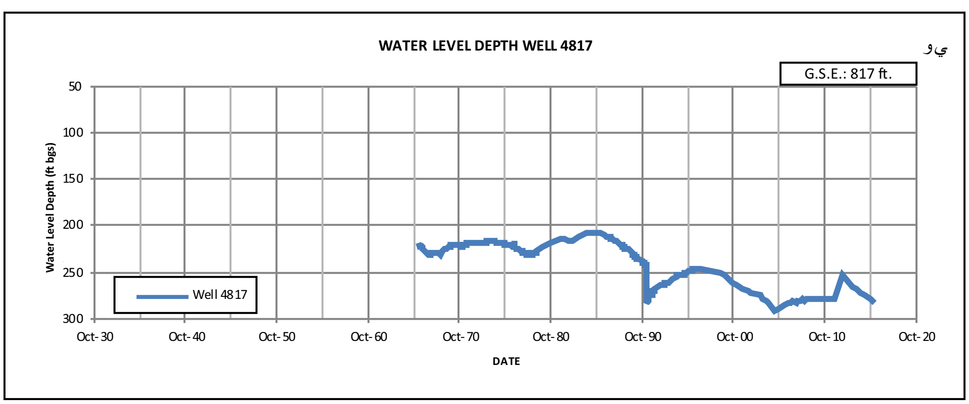

Well No. 4817

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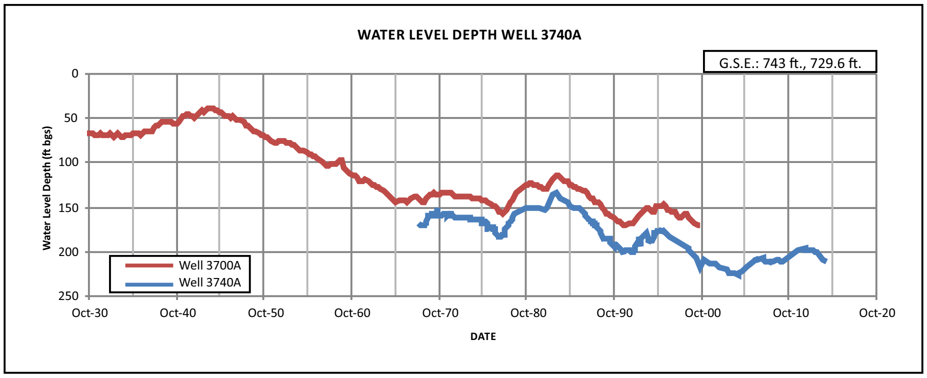
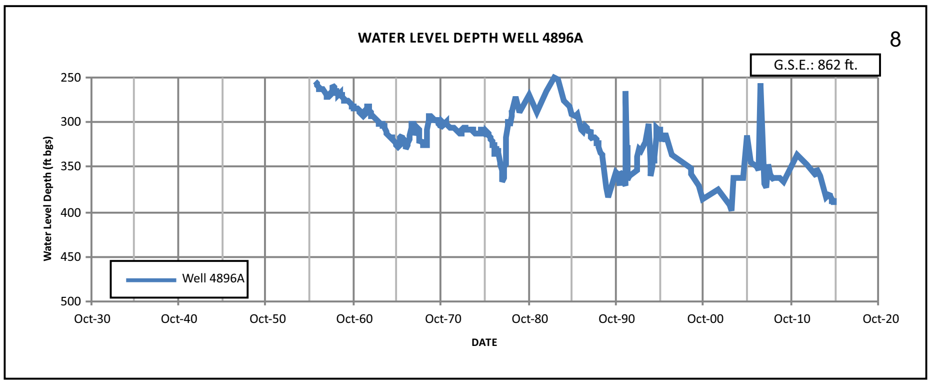
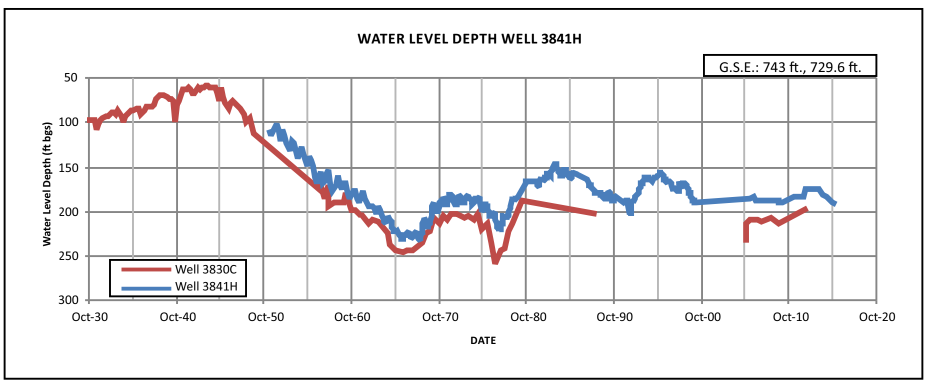
FIGURE 6B
HYDROGRAPHS - SFW SUBAREA



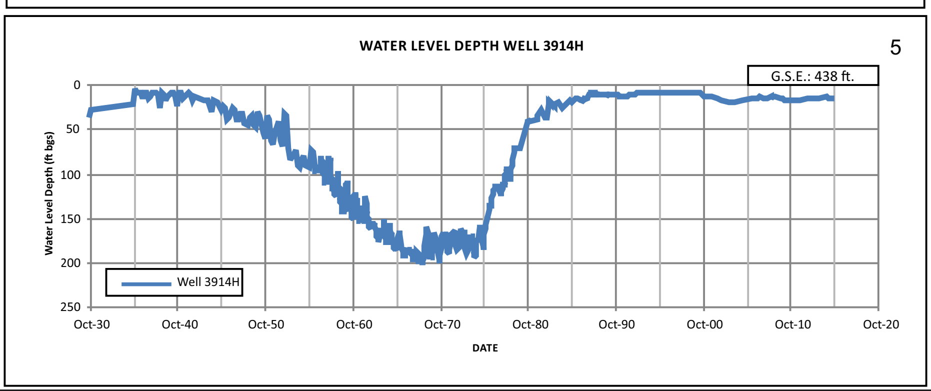
Well No. 3740A



Well No. 4896A



Well No. 3841H



Well No. 3914H

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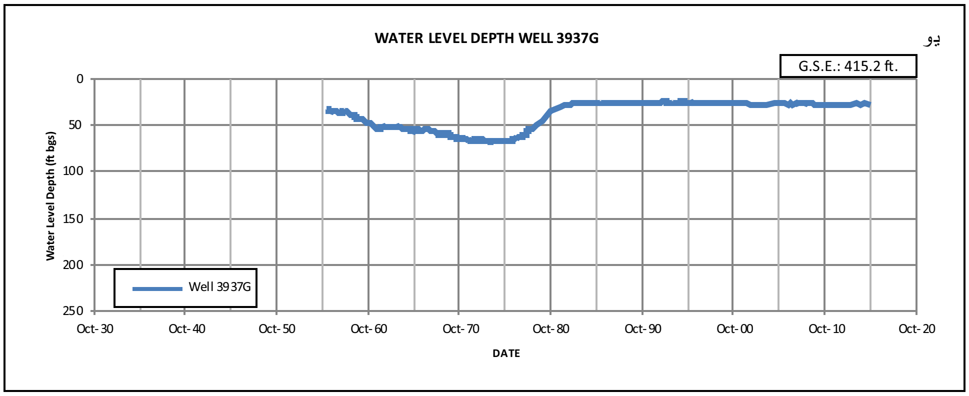
FIGURE 6C
HYDROGRAPHS - SFE SUBAREA



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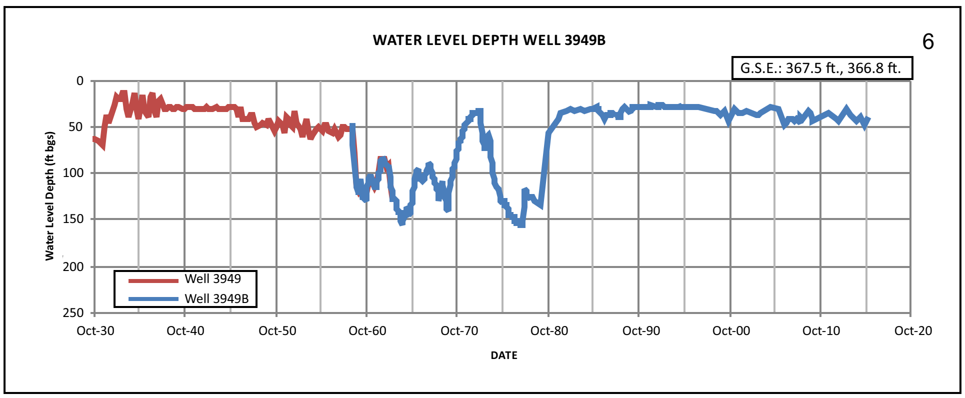
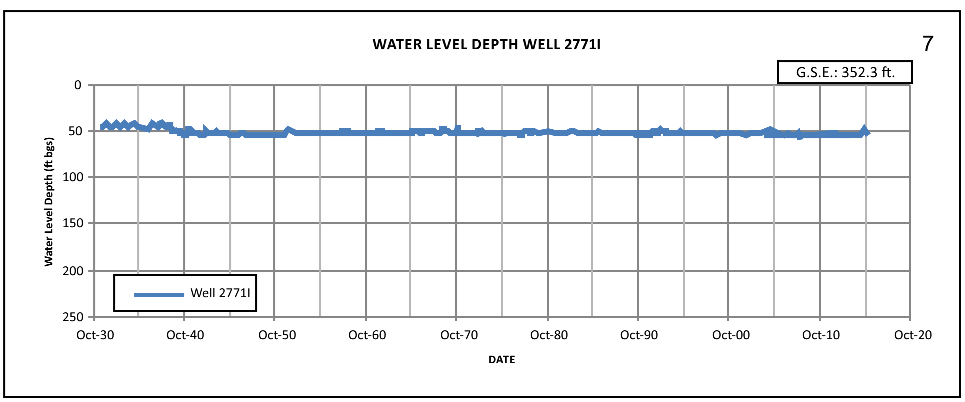


Well No. 3949B



Well No. 2771I

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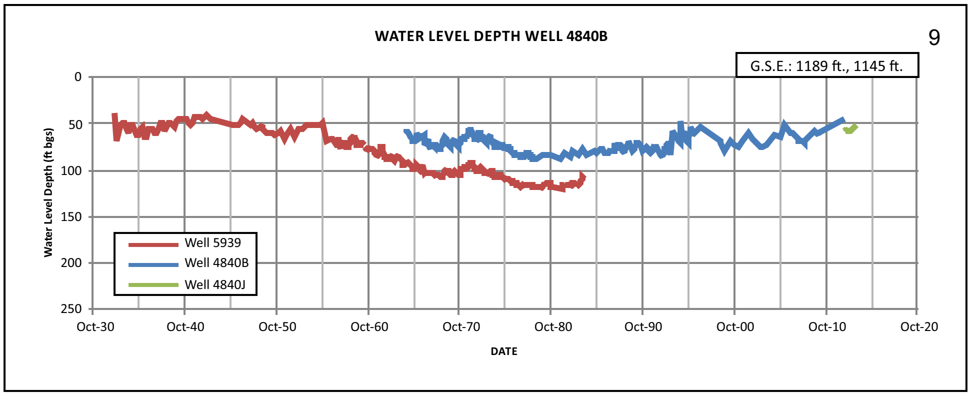
FIGURE 6D
HYDROGRAPHS - NAR SUBAREA



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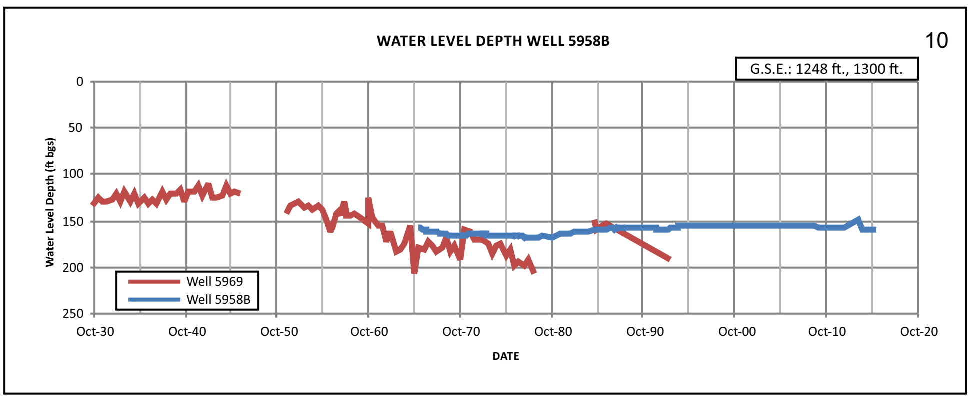

Well No. 5958B

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FIGURE 6E
HYDROGRAPHS - SYL SUBAREA (BASIN)

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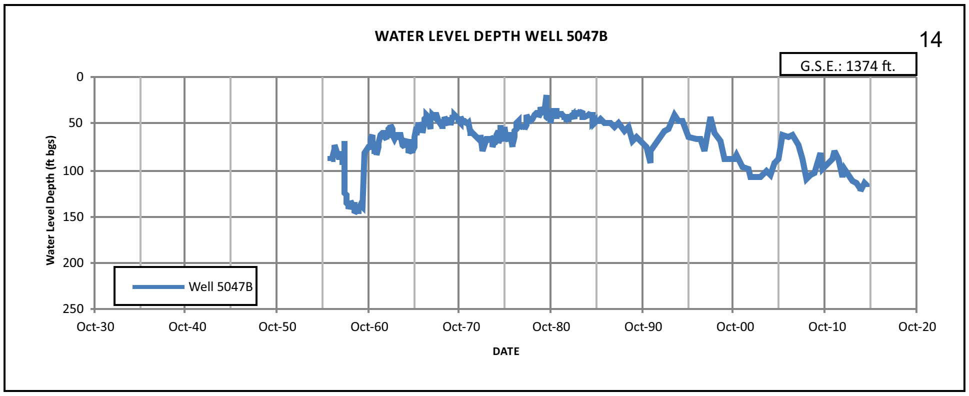

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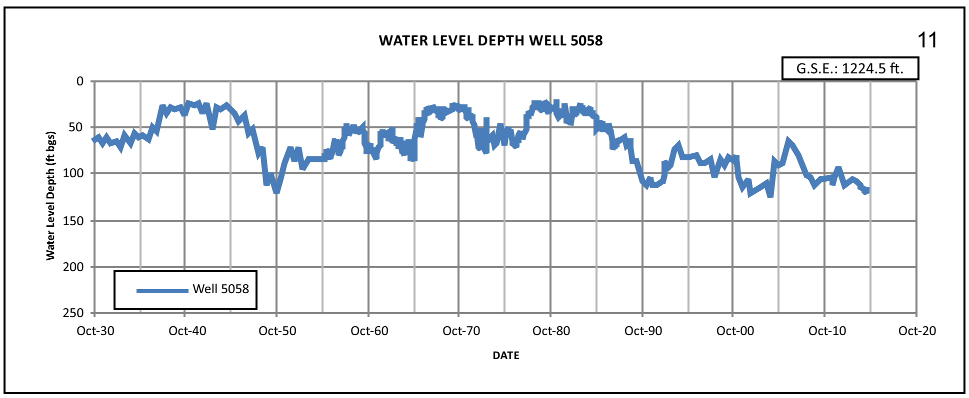

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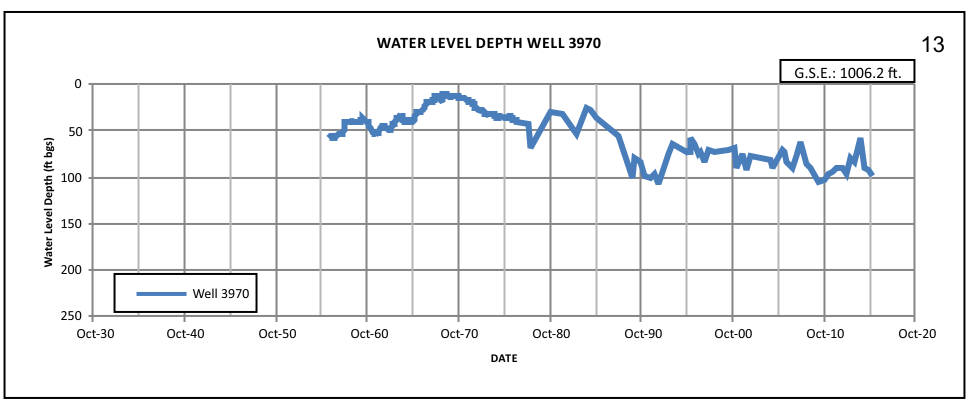

Well No. 3970

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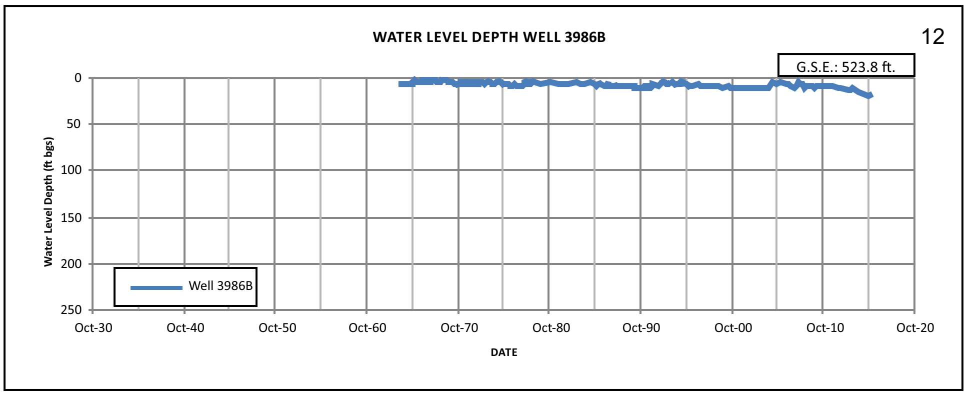
FIGURE 6F
HYDROGRAPHS - VER SUBAREA



Well No. 3986B

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FIGURE 6G
HYDROGRAPHS - EAG SUBAREA (BASIN)

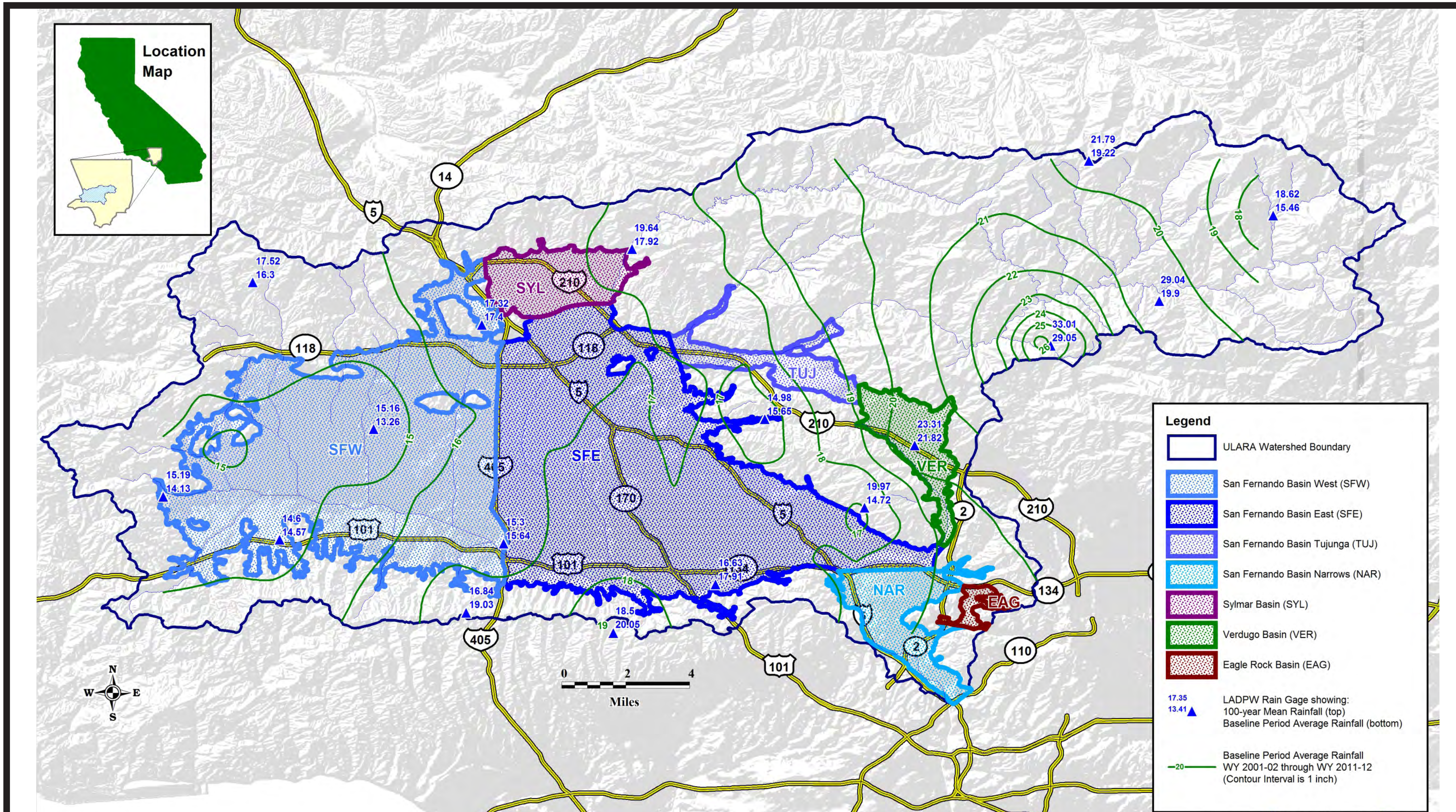

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FIGURE 7A
ULARA RAIN GAGE DATA
BASELINE PERIOD AVERAGE

SNMP-2

June 2017

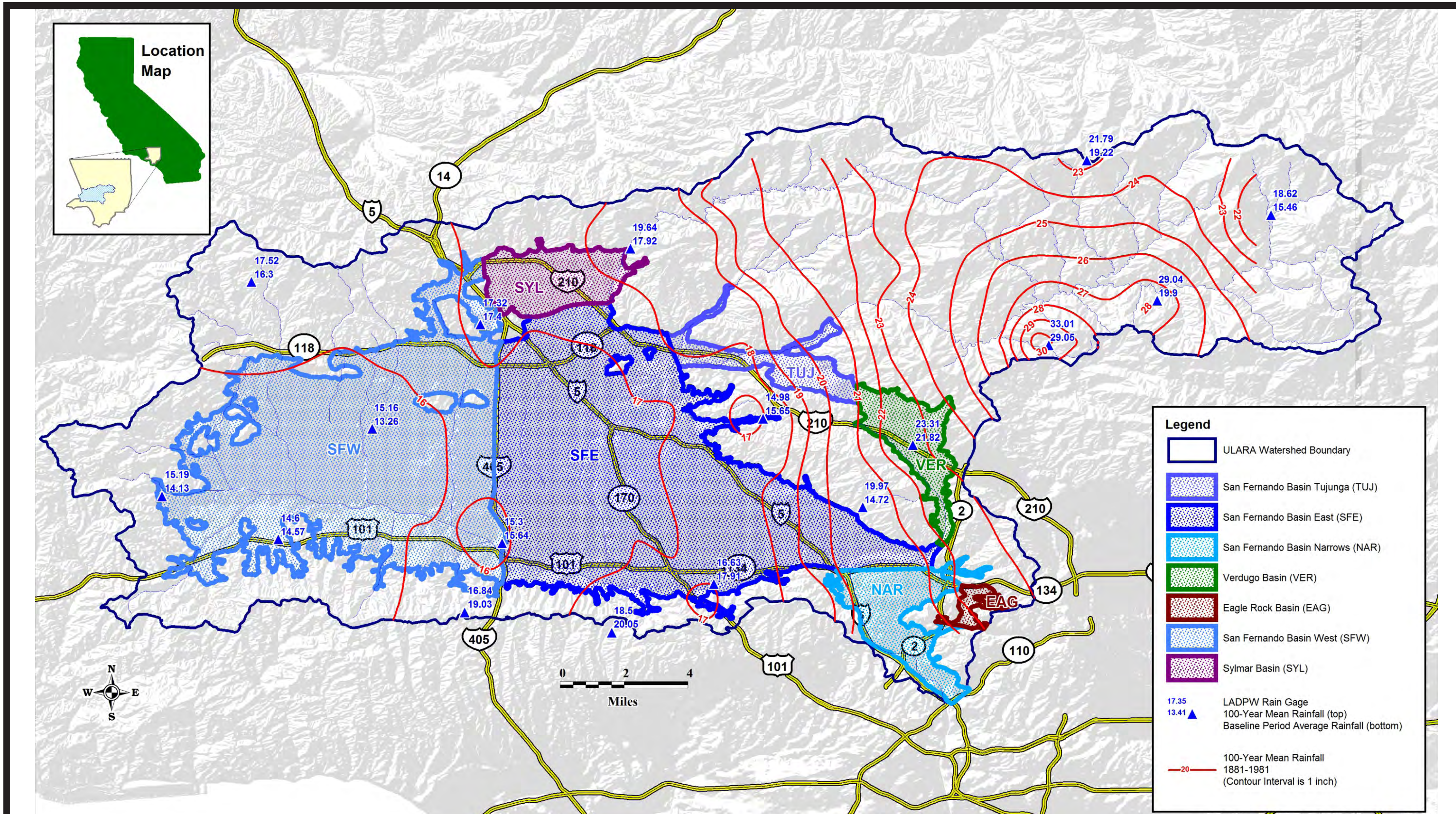

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FIGURE 7B
ULARA RAIN GAGE DATA
100-YEAR MEAN RAINFALL

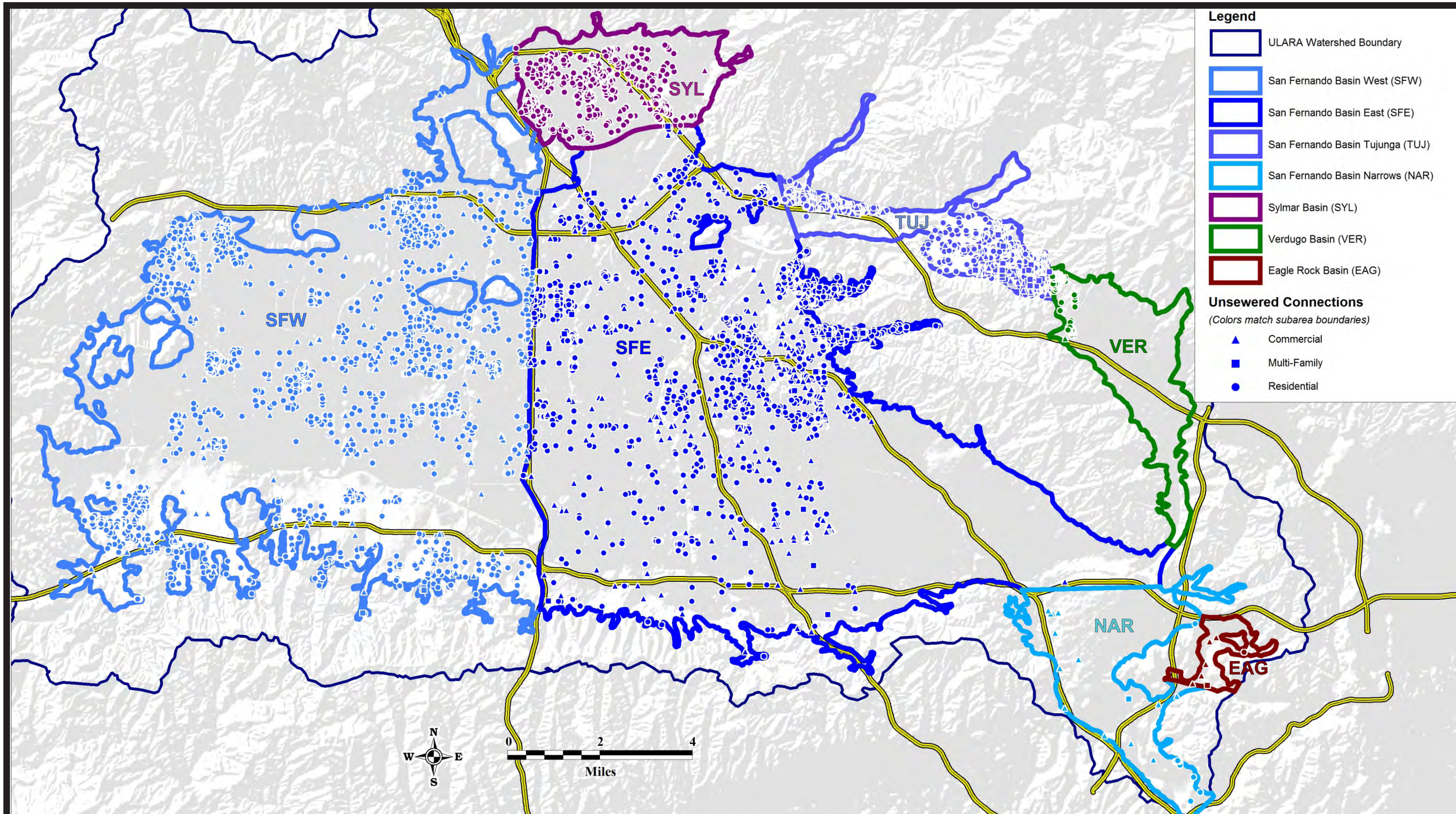

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FIGURE 8
UNSEWERED CONNECTIONS
ULARA GROUNDWATER BASINS

SNMP TM-2

June 2017

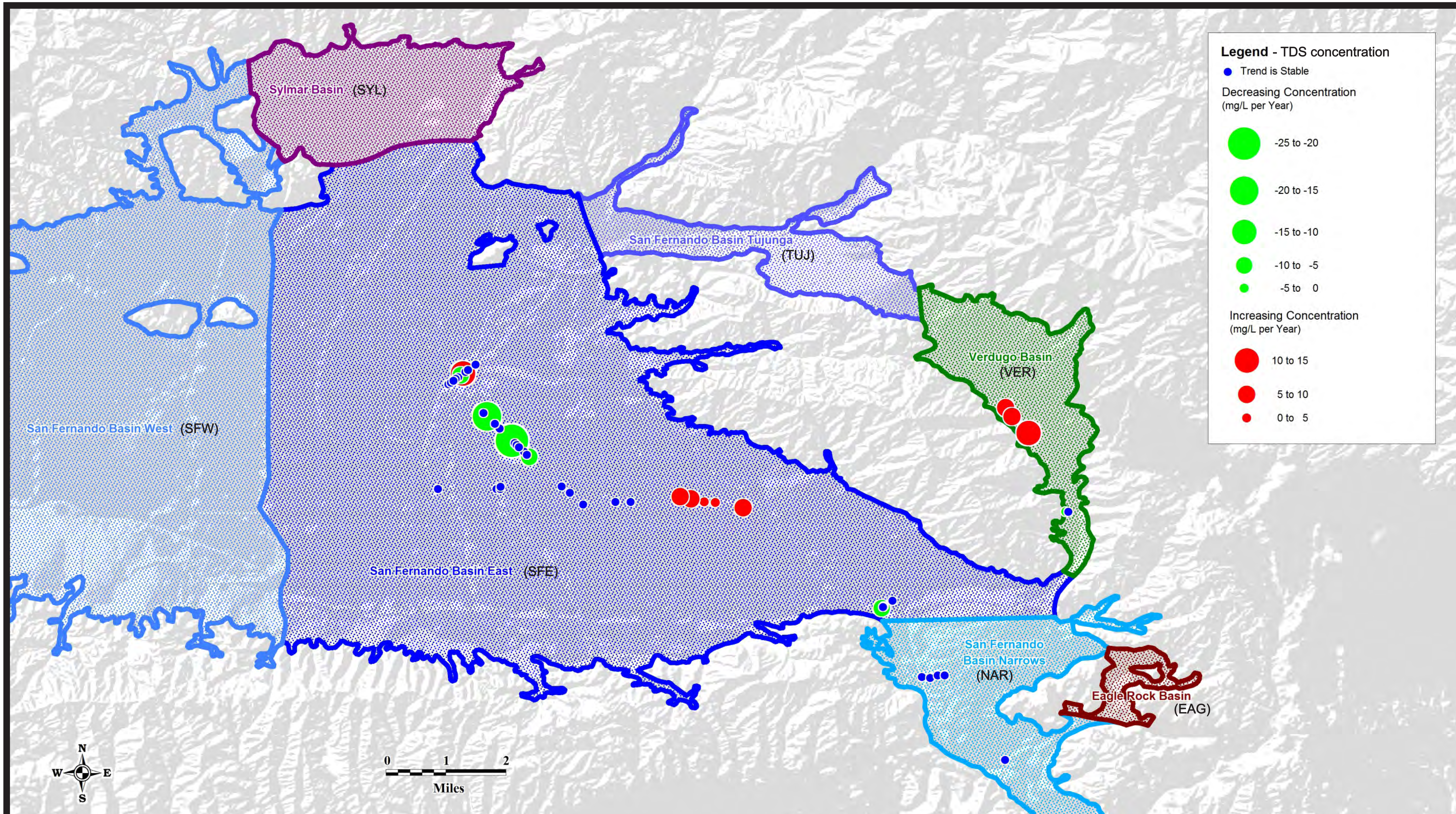

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FIGURE 9A
MANN-KENDALL TREND ANALYSIS
TDS, BASELINE PERIOD

SNMP TM-2 **June 2017**

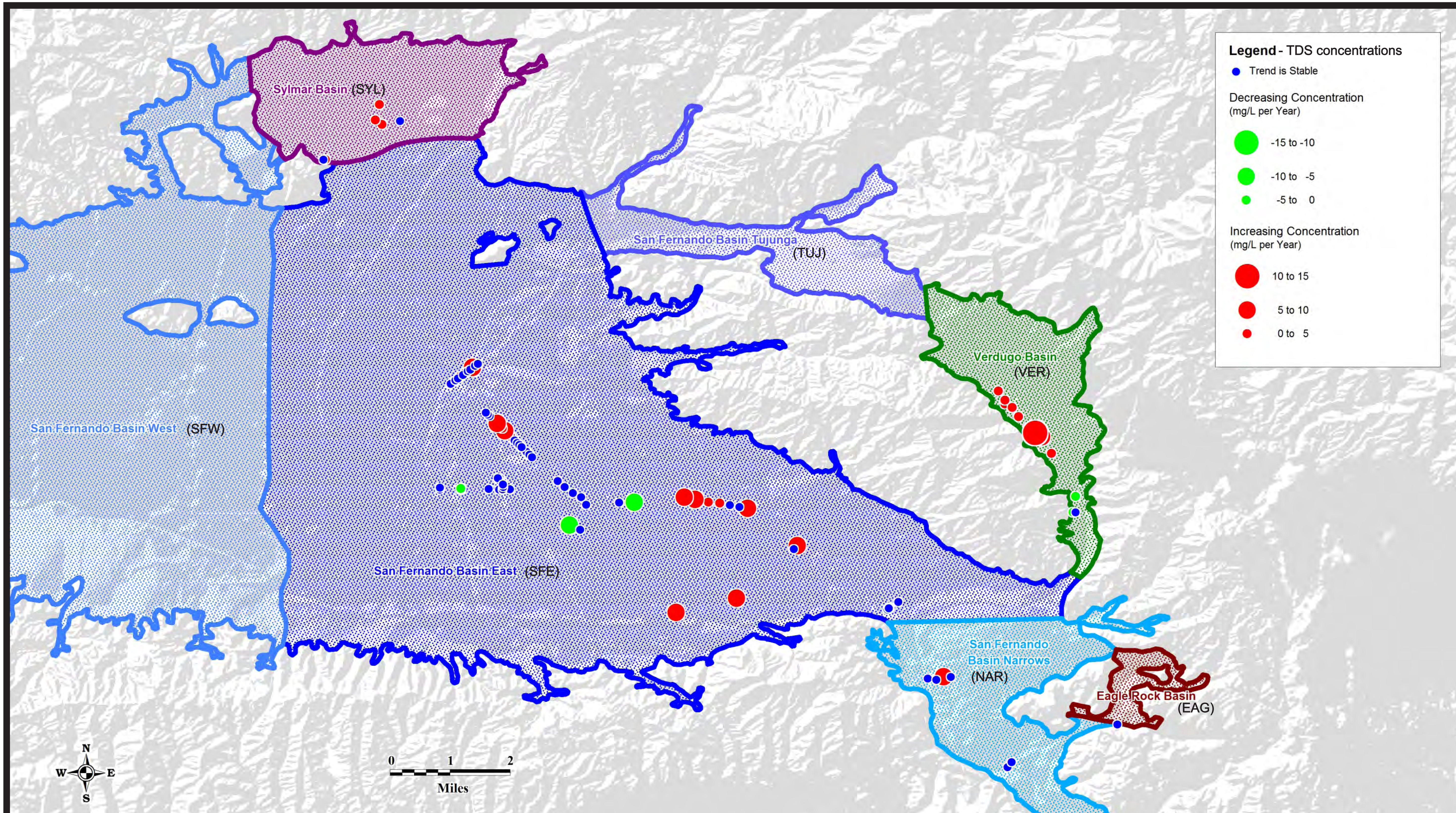

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FIGURE 9B
MANN-KENDALL TREND ANALYSIS
TDS, EXTENDED PERIOD

SNMP TM-2

June 2017

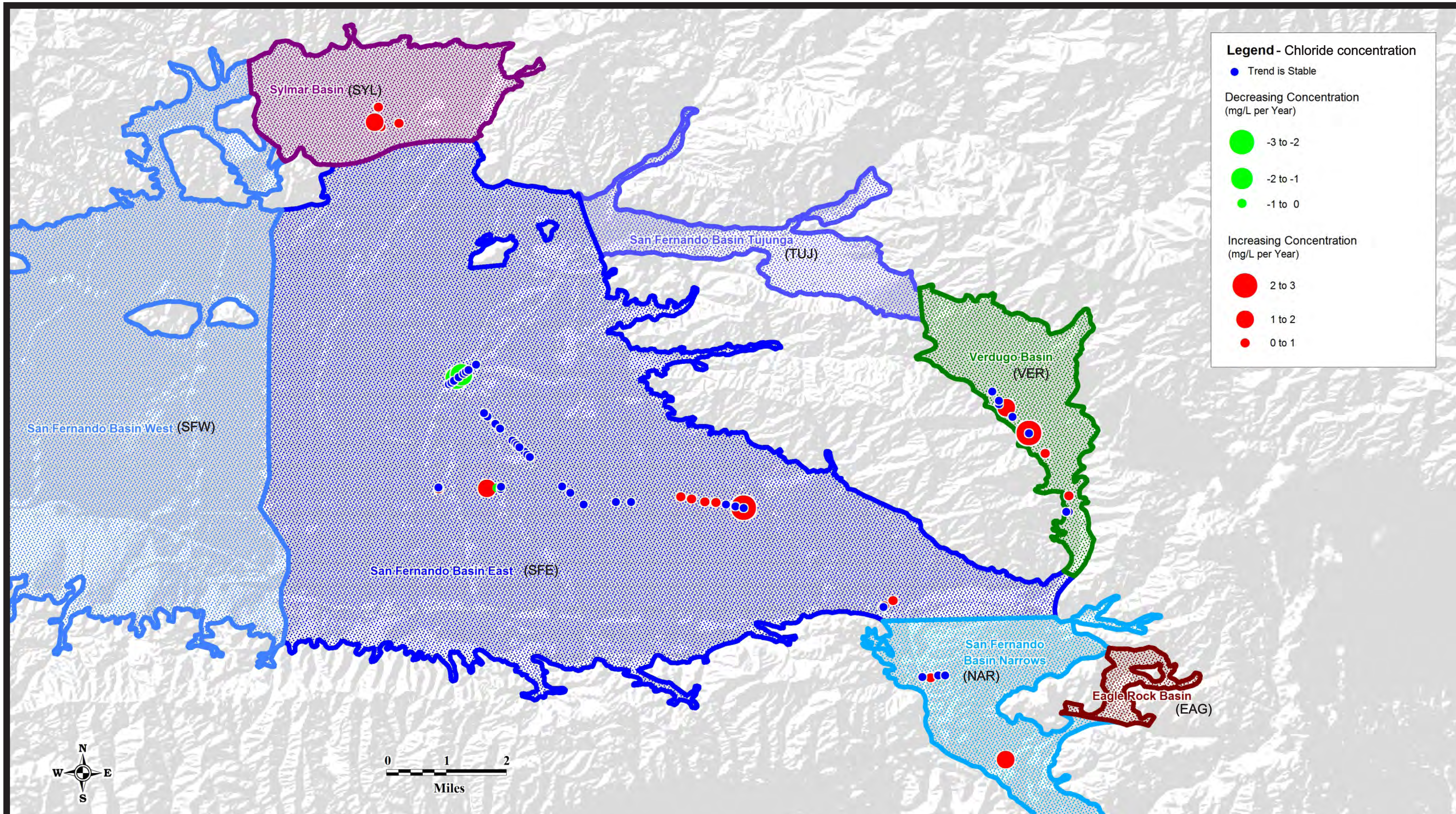

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FIGURE 10A
MANN-KENDALL TREND ANALYSIS
CHLORIDE, BASELINE PERIOD

SNMP TM-2

June 2017

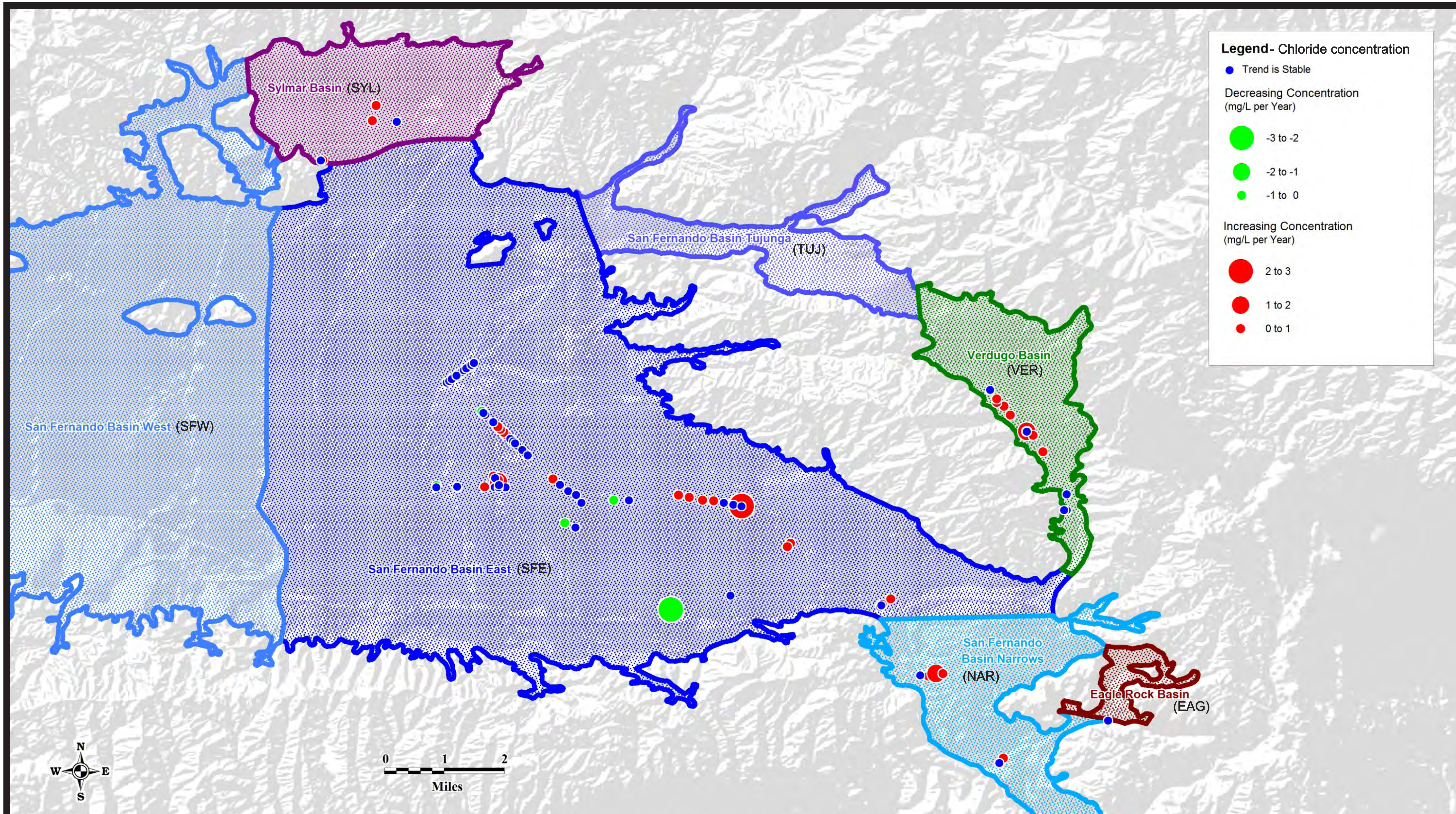

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FIGURE 10B
MANN-KENDALL TREND ANALYSIS
CHLORIDE, EXTENDED PERIOD

SNMP TM-2

June 2017

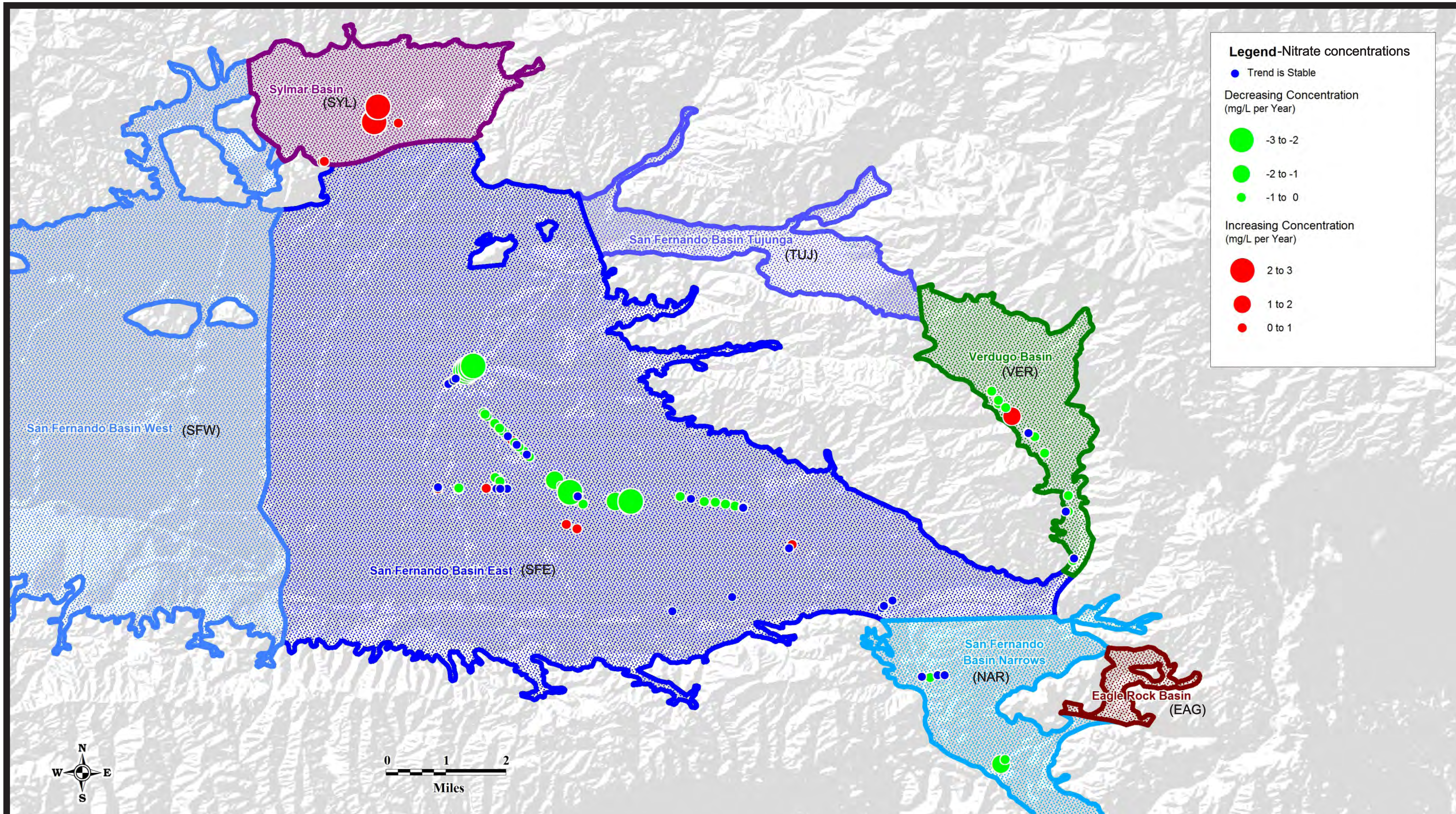

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FIGURE 11A
MANN-KENDALL TREND ANALYSIS
NITRATE, BASELINE PERIOD

SNMP TM-2

June 2017

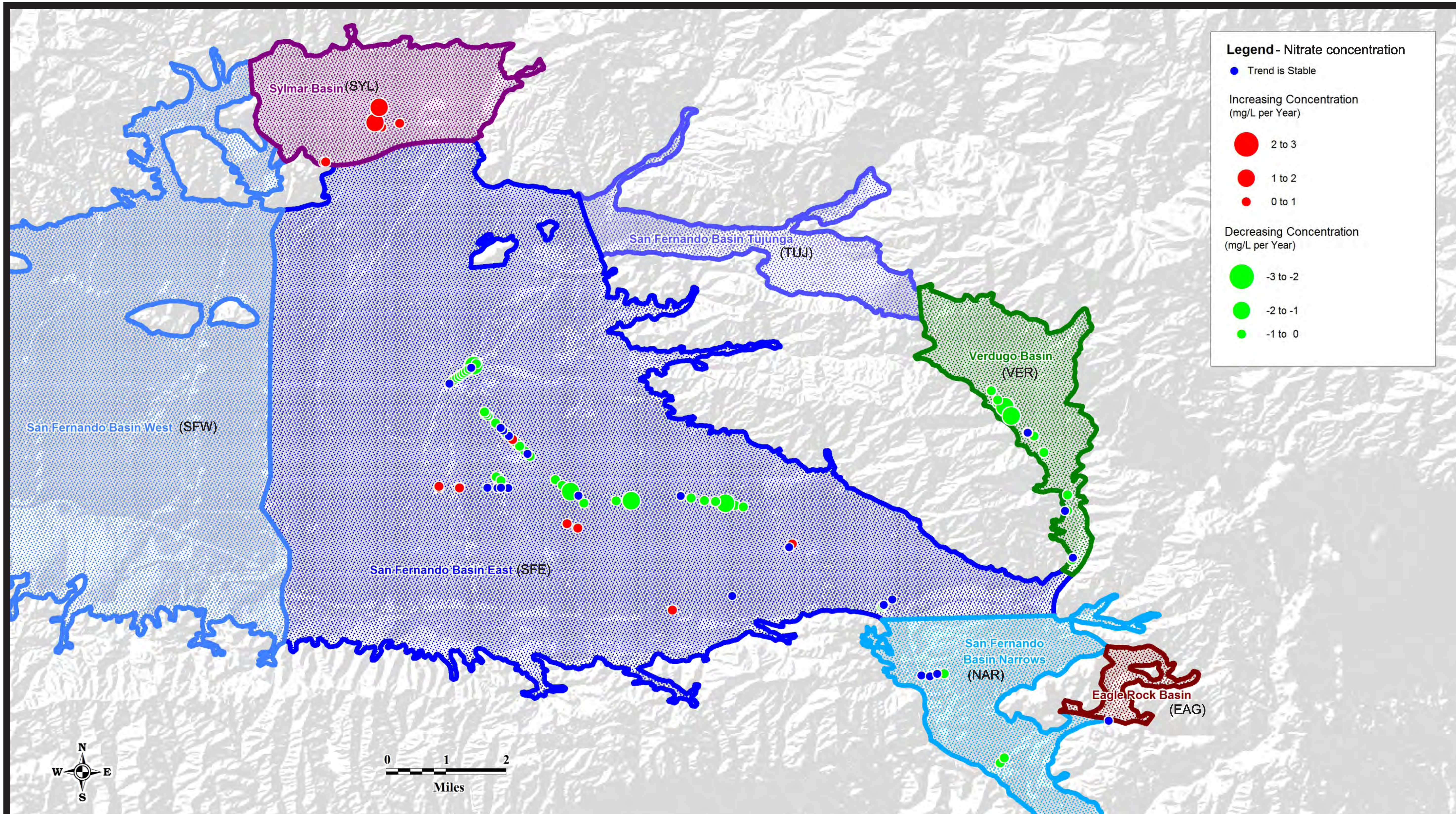

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FIGURE 11B
MANN-KENDALL TREND ANALYSIS
NITRATE, EXTENDED PERIOD

SNMP TM-2

June 2017

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APPENDIX I

ULARA SNMP BASELINE PERIOD

HISTORIC WATER QUALITY

APPENDIX I
ULARA SNMP BASELINE PERIOD HISTORIC WATER QUALITY
WY 2001/02 TO WY 2011/12

			Median			Average									Mann-Kendall/Sen's Slope Analysis		
Well Name	Well Owner	Subarea	TDS (mg/L)	Chloride (mg/L)	Nitrate (NO3) (mg/L)	TDS (mg/L)	Chloride (mg/L)	Nitrate (NO3) (mg/L)	TDS Range	Chloride Range	Nitrate Range	Samples TDS	Samples Chloride	Samples Nitrate	TDS (mg/L)	Chloride (mg/L)	Nitrate (NO3) (mg/L)
Sparkletts	DS Waters	EAG	835.9	108.0	23.9	834.6	72.3	23.3	Sep 2010-Oct 2012	Sep 2010-Oct 2012	Sep 2010-Oct 2012	3	3	3	Not Enough Data	Not Enough Data	Not Enough Data
GS-1	Glendale	NAR	615.0	86.0	9.9	606.0	82.2	12.0	Jun 2002-Apr 2010	Jun 2002-Apr 2010	Jul 2002-Oct 2010	6	5	34	Stable	Stable	Stable
GS-2	Glendale	NAR	525.0	57.0	13.4	515.0	57.4	13.5	Sep 2003-Mar 2011	Sep 2003-Mar 2011	Mar 2002-Oct 2010	6	5	38	Stable	Increasing (0.32/year)	Decreasing (0.05/year)
GS-3	Glendale	NAR	530.0	64.5	37.0	530.0	67.3	37.3	Sep 2003-Jun 2012	Sep 2003-Jun 2012	Mar 2002-Dec 2010	9	8	42	Stable	Stable	Increasing (0/year)
GS-4	Glendale	NAR	540.0	69.0	35.0	542.0	68.8	34.6	Sep 2003-Apr 2010	Sep 2003-Apr 2010	Mar 2002-Dec 2010	5	4	43	Stable	Stable	Stable
PL004	LADWP	NAR	568.0	73.4	29.6	561.7	73.7	31.0	Apr 2005-Apr 2011	Apr 2005-Apr 2011	Jan 2002-Oct 2012	3	3	76	Not Enough Data	Not Enough Data	Decreasing (1.11/year)
PL006	LADWP	NAR	664.0	82.8	37.1	651.1	82.6	38.0	Nov 2004-Jul 2012	Nov 2004-Jul 2012	Jan 2002-Oct 2012	19	19	89	Stable	Probably Increasing (1.11/year)	Decreasing (0.32/year)
VO-1	Burbank	SFE	523	62	38	527.0	60.6	37.9	Jan 2002-Dec 2012	Mar 2002-Apr 2012	Jan 2002-Dec 2012	40	11	118	Increasing (5.21/year)	Increasing (2.12/year)	Stable
VO-2	Burbank	SFE	490	49	42	506.1	48.1	40.9	Jan 2002-Oct 2012	Mar 2002-Apr 2012	Jan 2002-Dec 2012	40	11	115	Stable	Stable	Decreasing (0.25/year)
VO-3	Burbank	SFE	463	38.5	35	466.0	37.9	32.0	Jan 2002-Oct 2012	Apr 2002-Apr 2012	Jan 2002-Dec 2012	43	11	120	Stable	Stable	Decreasing (0.36/year)
VO-4	Burbank	SFE	490	41	43	481.8	42.0	43.4	Feb 2002-Oct 2012	Mar 2002-Apr 2012	Feb 2002-Dec 2012	41	11	121	Increasing (2.54/year)	Increasing (0.93/year)	Decreasing (0.74/year)
VO-5	Burbank	SFE	500	41	41	497.6	40.8	41.3	Jan 2002-Oct 2012	Mar 2002-Apr 2012	Jan 2002-Dec 2012	38	11	104	Increasing (2.77/year)	Increasing (0.85/year)	Decreasing (0.5/year)
VO-6	Burbank	SFE	451	31.9	32	446.8	31.4	31.6	Jan 2002-Oct 2012	Mar 2002-May 2012	Jan 2002-Dec 2012	39	11	109	Increasing (7.46/year)	Increasing (0.8/year)	Stable
VO-7	Burbank	SFE	466	34	31	458.4	33.2	31.9	Jan 2002-Oct 2012	Mar 2002-Apr 2012	Jan 2002-Dec 2012	42	11	125	Increasing (6.45/year)	Increasing (0.99/year)	Decreasing (0.2/year)
VO-8	Burbank	SFE	448	32	27	452.1	31.3	26.7	Jan 2002-Oct 2012	Mar 2002-Apr 2012	Jan 2002-Dec 2012	43	11	121	Stable	Stable	Decreasing (0.33/year)
Well 15	Burbank	SFE	317	30	10.5	317.0	30.0	10.4	Nov 2008-May 2011	Nov 2008-May 2011	Nov 2008-Sep 2012	2	2	16	Not Enough Data	Not Enough Data	Stable
Well 7	Burbank	SFE	405	41.5	26	405.0	41.5	26.5	Dec 2008-May 2011	Dec 2008-May 2011	Dec 2008-Sep 2012	2	2	16	Not Enough Data	Not Enough Data	Increasing (0.57/year)
GN-1	Glendale	SFE	614.0	58.0	41.0	606.8	50.2	40.9	Sep 2003-Apr 2010	Sep 2003-Dec 2010	Jan 2002-Dec 2010	5	5	100	Probably Decreasing (7.1/year)	Stable	Stable
GN-2	Glendale	SFE	600.0	57.0	35.0	597.6	57.3	35.1	Sep 2003-Apr 2010	Sep 2003-Apr 2010	Mar 2002-Dec 2010	5	4	42	Stable	Increasing (0.72/year)	Stable
GN-3	Glendale	SFE	551.0	56.5	37.0	552.0	56.8	36.9	Sep 2003-Jun 2012	Sep 2003-Jun 2012	Mar 2002-Dec 2010	6	6	39	Stable	Probably Increasing (0.6/year)	Stable
GN-4	Glendale	SFE	472.0	46.0	12.0	474.4	45.5	12.4	Sep 2003-Apr 2010	Sep 2003-Apr 2010	Mar 2002-Oct 2010	5	4	38	Stable	Stable	Probably Decreasing (0.14/year)
AT002	LADWP	SFE	516.0	34.0	41.7	516.0	35.6	43.6	Sep 2004-Sep 2010	Sep 2004-Sep 2010	Jan 2002-Oct 2012	3	3	94	Not Enough Data	Not Enough Data	Decreasing (1.47/year)
AT003	LADWP	SFE	414.5	29.5	35.7	454.3	29.0	34.1	Jan 2002-Dec 2010	Jan 2002-Dec 2010	Jan 2002-Oct 2012	4	4	101	Stable	Stable	Decreasing (0.89/year)
AT004	LADWP	SFE	475.5	29.5	40.5	397.3	22.4	36.0	Jan 2002-May 2011	Jan 2002-Apr 2012	Jan 2002-Oct 2012	4	5	71	Stable	Stable	Decreasing (2.39/year)
AT005	LADWP	SFE	562.5	51.5	47.0	562.5	51.5	47.3	Jan 2002-Sep 2004	Jan 2002-Sep 2004	Jan 2002-Oct 2005	2	2	39	Not Enough Data	Not Enough Data	Stable
AT006	LADWP	SFE	389.0	24.6	22.3	405.8	27.1	22.8	Jan 2002-Sep 2010	Jan 2002-Sep 2010	Jan 2002-Oct 2012	4	4	92	Stable	Stable	Decreasing (0.84/year)
AT007	LADWP	SFE	508.0	30.8	32.2	511.8	30.1	33.1	Jan 2002-Sep 2010	Jan 2002-May 2012	Jan 2002-Oct 2012	4	5	95	Stable	Stable	Decreasing (1.34/year)
AT008	LADWP	SFE	489.5	33.4	32.5	483.3	33.7	35.2	Jan 2002-Sep 2010	Jan 2002-Sep 2010	Jan 2002-Oct 2012	4	4	100	Stable	Stable	Decreasing (2.29/year)
ER006	LADWP	SFE	646.0	38.6	26.5	634.0	44.9	26.2	Jul 2003-Jan 2012	Jul 2003-Jan 2012	Jul 2003-Nov 2012	3	3	87	Not Enough Data	Not Enough Data	Increasing (0.3/year)
ER010	LADWP	SFE	589.0	45.3	8.6	616.0	45.4	8.7	Dec 2004-Feb 2011	Dec 2004-Feb 2011	Jan 2002-Nov 2012	3	3	87	Not Enough Data	Not Enough Data	Increasing (0.3/year)
NH004	LADWP	SFE	997.0	53.0	8.5	985.3	51.4	8.1	Aug 2003-Dec 2009	Aug 2003-Dec 2009	Jan 2002-Dec 2012	3	3	48	Not Enough Data	Not Enough Data	Increasing (0.11/year)
NH007	LADWP	SFE	979.0	48.7	13.6	968.9	49.1	13.3	Jan 2002-Oct 2011	Jan 2002-Oct 2011	Jan 2002-Oct 2011	15	15	100	Stable	Increasing (0.48/year)	Increasing (0.09/year)
NH022	LADWP	SFE	983.5	46.8	21.6	1010.8	46.7	21.5	Mar 2002-Jun 2011	Mar 2002-Jun 2011	Jan 2002-Oct 2012	4	4	55	Stable	Decreasing (0.64/year)	Stable
NH023	LADWP	SFE	642.0	48.7	30.5	741.7	44.8	27.4	Jun 2004-Jul 2012	Jun 2004-Jul 2012	Jun 2004-Jul 2012	3	3	39	Not Enough Data	Not Enough Data	Stable
NH025	LADWP	SFE	948.0	44.7	18.3	909.0	45.2	17.4	Sep 2004-Sep 2010	Sep 2004-Apr 2012	Jan 2004-Sep 2012	3	4	40	Not Enough Data	Increasing (1.37/year)	Probably Increasing (0.35/year)
NH026	LADWP	SFE	897.0	49.4	24.9	894.0	49.5	23.2	Nov 2002-Nov 2012	Nov 2002-Nov 2012	Nov 2002-Nov 2012	4	4	56	Stable	Stable	Stable
NH032	LADWP	SFE	774.0	61.5	4.6	756.3	60.6	4.3	May 2004-Jun 2010	May 2004-Jun 2010	Jan 2002-Aug 2012	3	4	56	Not Enough Data	Stable	Stable
NH033	LADWP	SFE	776.0	66.0	4.2	762.0	66.3	4.2	May 2004-Jun 2010	May 2004-Jun 2010	Jan 2002-Sep 2011	3	3	57	Not Enough Data	Not Enough Data	Decreasing (0.08/year)
NH034	LADWP	SFE	834.0	33.3	15.2	834.0	33.3	15.7	Mar 2003-Nov 2009	Mar 2003-Nov 2009	Jan 2002-Jul 2012	2	2	82	Not Enough Data	Not Enough Data	Decreasing (0.31/year)
NH036	LADWP	SFE	872.0	38.4	16.8	883.0	40.0	14.3	Sep 2004-Oct 2010	Sep 2004-Oct 2010	Jan 2002-Mar 2012	3	3	62	Not Enough Data	Not Enough Data	Decreasing (0.54/year)
NH037	LADWP	SFE	735.0	38.2	10.0	730.3	38.5	13.0	Dec 2004-Dec 2010	Dec 2004-Dec 2010	Jan 2002-Oct 2012	3	3	52	Not Enough Data	Not Enough Data	Decreasing (0.26/year)
NH043A	LADWP	SFE	760.0	47.4	11.5	730.3	46.5	16.4	Aug 2003-Sep 2012	Aug 2003-Sep 2012	Aug 2003-Nov 2012	4	4	55	Stable	Stable	Decreasing (0.81/year)
NH044	LADWP	SFE	791.5	62.1	9.2	791.5	62.1	8.3	Mar 2003-Apr 2012	Mar 2003-Apr 2012	Jan 2002-Apr 2012	2	2	64	Not Enough Data	Not Enough Data	Decreasing (0.85/year)
NH045	LADWP	SFE	721.0	34.9	12.7	731.3	36.3	11.9	Sep 2004-Sep 2010	Sep 2004-Sep 2010	Jan 2002-Jun 2011	3	3	68	Not Enough Data	Not Enough Data	Decreasing (0.81/year)
RT001	LADWP	SFE	384.0	17.9	10.4	380.0	17.8	13.0	Sep 2003-Oct 2012	Sep 2003-Oct 2012	Sep 2003-Oct 2012	4	4	83	Stable	Stable	Decreasing (0.31/year)
RT002	LADWP	SFE	400.0	18.6	15.1	406.0	18.8	16.6	Aug 2002-Apr 2010	Aug 2002-Apr 2010	Aug 2002-Aug 2012	3	3	61	Not Enough Data	Not Enough Data	Stable
RT003	LADWP	SFE	412.0	20.5	15.9	411.7	19.3	17.6	Aug 2002-Feb 2012	Aug 2002-Feb 2012	Jun 2002-Aug 2012	3	3	55	Not Enough Data	Not Enough Data	Decreasing (0.71/year)
RT004	LADWP	SFE	484.0	18.6	20.4	526.3	19.6	19.5	Aug 2002-Jun 2011	Aug 2002-Jun 2011	Aug 2002-Aug 2012	3	3	70	Not Enough Data	Not Enough Data	Decreasing (0.3/year)
RT005	LADWP	SFE	473.5	23.3	19.9	470.9	22.2	19.2	Aug 2002-Aug 2012	Aug 2002-Aug 2012	Aug 2002-Oct 2012	18	18	87	Stable	Stable	Probably Decreasing (0.22/year)
RT006	LADWP	SFE	423.0	18.9	14.9	419.0	19.5	15.4	Aug 2002-Jun 2011	Aug 2002-Jun 2011	Jan 2002-Oct 2012	4	4	76	Stable	Stable	Decreasing (0.6/year)
RT007	LADWP	SFE	396.0	20.0	17.2	394.0	20.1	16.7	Sep 2002-Oct 2011	Sep 2002-Oct 2011	Jan 2002-Oct 2012	4	4	81	Decreasing (18.42/year)	Stable	Decreasing (0.3/year)
RT008	LADWP	SFE	392.0	18.3	14.1	377.7	18.2	14.0	Aug 2004-Aug 2010	Aug 2004-Aug 2010	Jun 2002-Oct 2012	3	3	63	Not Enough Data	Not Enough Data	Decreasing (0.9/year)
RT009	LADWP	SFE	363.0	15.6	12.3	349.8	15.4	13.3	Sep 2002-Oct 2011	Sep 2002-Oct 2011	Jan 2002-Oct 2012	4	4	71	Stable	Stable	Decreasing (0.81/year)
RT010	LADWP	SFE	394.0	17.2	18.9	444.8	17.4	19.5	Sep 2002-Oct 2011	Sep 2002-Oct 2011	Jun 2002-Oct 2012	4	4	96	Decreasing (23.97/year)	Stable	Probably Increasing (0.41/year)
RT011	LADWP	SFE	380.0	17.3	9.5	378.5	17.3	11.3	Sep 2003-Oct 2012	Sep 2003-Oct 2012	Sep 2003-Oct 2012	4	4	87	Stable	Stable	Decreasing (0.25/year)
RT012	LADWP	SFE	344.5	14.3	8.5	344.0	14.8	9.7	Oct 2002-Oct 2011	Oct 2002-Oct 2011	Aug 2002-Oct 2012	4	4	90	Stable	Stable	Stable
RT013	LADWP	SFE	337.0	14.1	8.7	334.0	14.3	10.0	Oct 2002-Oct 2011	Oct 2002-Oct 2011	Aug 2002-Oct 2012	4	4	88	Stable	Stable	Decreasing (0.2/year)
RT014	LADWP	SFE	345.0	14.2	9.8	361.0	15.4	10.7	Nov 2002-Oct 2011	Nov 2002-Oct 2011	Aug 2002-Oct 2012	4	4	69	Stable	Stable	Stable
RT015	LADWP	SFE	344.5	13.2	8.1	358.8	14.6	9.7	Nov 2002-Oct 2011	Nov 2002-Oct 2011	Aug 2002-Oct 2012	4	4	85	Decreasing (6.22/year)	Stable	Decreasing (0.14/year)
TJ001	LADWP	SFE	377.0	18.3	19.9	359.8	17.4	20.2	Jun 2003-Jun 2012	Jun 2003-Jun 2012	Jan 2002-Dec 2012	4	4	77	Stable	Stable	Stable
TJ002	LADWP	SFE	363.0	17.6	18.5	377.3	17.9	18.4	May 2002-Jul 2011	May 2002-Jul 2011	Jan 2002-Jun 2012	4	4	81	Stable	Stable	Decreasing (0.36/year)
TJ003	LADWP	SFE	328.0	16.4	19.5	315.2	16.5	21.0	Jun 2002-Nov 2011	Jun 2002-Nov 2011	Apr 2002-Dec 2012	5	5	85	Stable	Stable	Stable
TJ004	LADWP	SFE	356.0	19.3	23.0	358.8	19.3	22.3	May 2002-May 2011	May 2002-Nov 2011	Feb 2002-Dec 2012	4	5	104	Stable	Probably Decreasing (1.01/year)	Stable
TJ005	LADWP	SFE	384.0	26.9	26.7	376.0	24.8	26.4	Jan 2003-Nov 2012	Jan 2003-Nov 2012	Jan 2002-Dec 2012	5	5	114	Stable	Stable	Decreasing (0.91/year)
TJ006	LADWP	SFE	360.0	23.2	30.7	366.4	24.5	29.7	Jan 2003-Nov 2012	Jan 2003-Nov 2012	Jan 2002-Dec 2012	15	16	105	Probably Decreasing (7.97/year)	Decreasing (1.65/year)	Decreasing (0.81/year)
TJ007	LADWP	SFE	396.0	28.4	37.6	405.6	28.9	36.0	Jan 2003-Nov 2012	Jan 2003-Nov 2012	Jan 2002-Dec 2012	5	5	97	Increasing (14.16/year)	Stable	Decreasing (0.99/year)
TJ008	LADWP	SFE	357.0	21.2	32.9	357.3	20.7	30.3	Jun 2003-Nov 2012	Jun 2003-Nov 2012	Jan 2002-Dec 2012	6	6	115	Stable	Stable	Decreasing (2.19/year)
TJ009	LADWP	SFE	377.5	21.3	29.6	375.8	21.7	27.6	Jun 2003-Jun 2012	Jun 2003-Jun 2012	Jan 2002-Dec 2012	4	4	101	Stable	Stable	Decreasing (2.62/year)
TJ010	LADWP	SFE	515.0	34.3	32.1	535.7	33.6	29.5	Jul 2003-Sep 2012	Jul 2003-Sep 2012	Jan 2002-Dec 2012	3	3	83	Not Enough Data	Not Enough Data	Decreasing (2.26/year)
TJ011	LADWP	SFE	339.5	16.4	20.4	339.5	16.4	22.7	Nov 2006-Jun 2010	Nov 2006-Jun 2010	Jan 2002-Aug 2012	2	2	90	Not Enough Data	Not Enough Data	Decreasing (2.89/year)
TJ012	LADWP	SFE	412.5	18.2	13.4	408.0	18.6	14.3	Jul 2003-Aug 2012	Jul 2003-Nov 2012	May 2002-Dec 2012	4	5	98	Stable	Stable	Decreasing (0.7/year)
Verdugo 11	LADWP	SFE	730.0	56.1	13.6	720.7	57.4	13.6	Jan 2003-Aug 2010	Jan 2003-Aug 2010	Jan 2002-Dec 2011	3	3	43	Not Enough Data	Not Enough Data	Stable
Verdugo 24	LADWP	SFE	911.5	85.9	7.3	911.5	85.9	7.3	Dec 2006-Dec 2009	Dec 2006-Dec 2009	Jan 2002-Jun 2011	2	2	52	Not Enough Data	Not Enough Data	Stable
RE005	LADWP	SFW	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**0**	**0**	**0**	Not Enough Data	Not Enough Data	Not Enough Data
RE006	LADWP	SFW	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**0**	**0**	**0**	Not Enough Data	Not Enough Data	Not Enough Data
RE009	LADWP	SFW	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**NO DATA**	**0**	**0**	**0**	Not Enough Data	Not Enough Data	Not Enough Data
MW006	LADWP	SYL	358.0	30.1	10.2	361.0	25.6	10.8	Jun 2002-Jun 2011	Jun 2002-Jun 2011	Feb 2002-Oct 2012	3	3	40	Not Enough Data	Not Enough Data	Increasing (0.63/year)
MW007	LADWP	SYL	416.0	40.4	23.1	433.0	40.2	23.4	Jun 2002-Jul 2011	Jun 2002-Jul 2011	Feb 2002-Dec 2012	3	3	64	Not Enough Data	Not Enough Data	Increasing (0.54/year)
Sylmar 2A	San Fernando	SYL	375	25.5	35	374.0	26.2	34.8	Mar 2003-Jan 2012	Mar 2003-Jan 2012	Mar 2002-Dec 2012	6	6	472	Stable	Increasing (0.68/year)	Increasing (0.48/year)
Sylmar 3	San Fernando	SYL	420	34.5	38	423.0	36.5	39.6	Mar 2003-Jan 2012	Mar 2003-Jan 2012	Mar 2002-Oct 2012	6	6	76	Stable	Probably Increasing (1.19/year)	Increasing (2.23/year)
Sylmar 4A	San Fernando	SYL	280	15	20	295.6	16.0	19.7	May 2003-Jan 2012	May 2003-Jan 2012	May 2002-Oct 2012	5	5	65	Stable	Probably Increasing (0.82/year)	Increasing (0.71/year)
Sylmar 7A	San Fernando	SYL	344	20	37.48	366.0	21.0	39.4	Mar 2003-Apr 2012	Mar 2003-Apr 2012	Mar 2002-May 2012	4	4	26	Stable	Probably Increasing (0.67/year)	Increasing (2.87/year)

APPENDIX I
ULARA SNMP BASELINE PERIOD HISTORIC WATER QUALITY
WY 2001/02 TO WY 2011/12

			Median			Average									Mann-Kendall/Sen's Slope Analysis		
Well Name	**Well Owner**	**Subarea**	**TDS (mg/L)**	**Chloride (mg/L)**	**Nitrate (NO3) (mg/L)**	**TDS (mg/L)**	**Chloride (mg/L)**	**Nitrate (NO3) (mg/L)**	**TDS Range**	**Chloride Range**	**Nitrate Range**	**Samples TDS**	**Samples Chloride**	**Samples Nitrate**	**TDS (mg/L)**	**Chloride (mg/L)**	**Nitrate (NO3) (mg/L)**
Well 1	CVWD	VER	540.0	85.5	50.0	541.0	83.9	48.7	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Feb 2002-Dec 2012	10	10	126	Stable	Stable	Decreasing (0.46/year)
Well 10	CVWD	VER	550.0	70.0	54.0	536.2	70.8	53.8	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Dec 2012	13	13	129	Stable	Increasing (1.76/year)	Decreasing (0.4/year)
Well 11	CVWD	VER	560.0	87.0	47.0	565.8	84.3	47.5	Mar 2002-Aug 2012	Mar 2002-Aug 2012	Jan 2002-Dec 2012	12	12	129	Probably Increasing (5.78/year)	Stable	Increasing (1.09/year)
Well 12	CVWD	VER	550	82	56	550.0	80.2	55.2	Feb 2002-Dec 2012	Feb 2002-Dec 2012	Jan 2002-Dec 2012	14	14	122	Stable	Increasing (1.08/year)	Decreasing (0.43/year)
Well 14	CVWD	VER	530	68	46	524.3	67.9	45.7	Feb 2002-Sep 2012	Feb 2002-Sep 2012	Jan 2002-Dec 2012	13	13	123	Increasing (4.49/year)	Increasing (0.82/year)	Decreasing (0.38/year)
Well 15	CVWD	VER	560	89.5	42	563.0	88.7	40.2	Feb 2003-Aug 2012	Feb 2003-Aug 2012	Oct 2002-Dec 2012	10	10	117	Increasing (13.29/year)	Probably Increasing (2/year)	Decreasing (0.51/year)
Well 5	CVWD	VER	540.0	79.0	60.0	555.0	76.4	59.4	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Dec 2012	12	12	129	Probably Increasing (9.96/year)	Increasing (1.18/year)	Decreasing (0.57/year)
Well 6	CVWD	VER	575.0	90.5	41.0	565.0	93.2	42.1	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Dec 2012	12	12	119	Increasing (9.5/year)	Stable	Stable
Well 7	CVWD	VER	525.0	79.0	48.0	527.1	80.6	49.0	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Dec 2012	14	14	130	Stable	Stable	Decreasing (0.8/year)
Well 8	CVWD	VER	550.0	77.0	39.0	538.2	76.7	38.4	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Dec 2012	11	11	126	Stable	Probably Increasing (0.96/year)	Probably Decreasing (0.2/year)
Well 9	CVWD	VER	510.0	72.0	48.0	496.4	72.6	48.8	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Dec 2012	11	11	113	Stable	Stable	Decreasing (0.58/year)
Foothill Well Raw Water	Glendale	VER	460.0	59.0	48.0	460.0	58.6	47.4	Feb 2011-Aug 2012	Feb 2011-Aug 2012	Feb 2011-Sep 2012	5	5	20	Stable	Increasing (7.87/year)	Stable
Glorietta 3 Raw Water	Glendale	VER	652.0	99.2	38.1	644.1	102.6	36.9	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Sep 2012	29	26	142	Stable	Stable	Decreasing (0.09/year)
Glorietta 4 Raw Water	Glendale	VER	610.0	98.0	29.0	623.1	102.3	29.4	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Sep 2012	31	29	150	Decreasing (3.15/year)	Stable	Stable
Glorietta 6 Raw Water	Glendale	VER	600.0	90.0	43.0	596.5	92.6	42.4	Feb 2002-Aug 2012	Feb 2002-Aug 2012	Jan 2002-Sep 2012	31	30	152	Stable	Probably Increasing (0.23/year)	Probably Decreasing (0.57/year)
Verdugo Influent	Glendale	VER	752.0	120.0	19.0	739.3	116.0	20.6	Apr 2003-Aug 2012	Apr 2003-Aug 2012	Jan 2002-Aug 2012	26	25	55	Stable	Increasing (0.96/year)	Increasing (0.18/year)
Verdugo Well A	Glendale	VER	**NO DATA**	121.0	23.4	**NO DATA**	123.7	23.8	**NO DATA**	Dec 2007-Mar 2008	Dec 2007-Jul 2011	**0**	3	4	Not Enough Data	Not Enough Data	Stable
Verdugo Well B	Glendale	VER	**NO DATA**	120.0	23.1	**NO DATA**	121.0	22.8	**NO DATA**	Dec 2007-Mar 2008	Dec 2007-Jul 2011	**0**	3	4	Not Enough Data	Not Enough Data	Decreasing (0.55/year)

ULARA

APPENDIX II

ULARA HISTORICAL WELL QUALITY DATA,

EXTENDED PERIOD

					Median			Average			Mann-Kendall/Sen's Slope Analysis														
Well Name	Owner City	Subarea	Latitude	Longitude	TDS (mg/L)	Chloride (mg/L)	Nitrate (NO3) (mg/L)	TDS (mg/L)	Chloride (mg/L)	Nitrate (NO3) (mg/L)	TDS (mg/L)	Chloride (mg/L)	Nitrate (NO3) (mg/L)	Boron (ug/L)	Sulfate (mg/L)	TDS Range	Chloride Range	Nitrate Range	Boron Range	Sulfate Range	Samples TDS	Samples Chloride	Samples Nitrate	Samples Boron	Samples Sulfate
Sparkletts	DS Waters	EAG	34.122911	-118.217091	837.6	106.0	22.8	836.25	80.25	22.68	Stable	Stable	Stable	#VALUE!	Stable	Sep 2010-Sep 2013	Sep 2010-Sep 2013	Sep 2010-Sep 2013	Sep 2010-Sep 2013	Sep 2010-Sep 2013	4	4	4	4	4
GS-1	Glendale	NAR	34.136793	-118.274487	610.0	82.1	9.9	598.44	80.26	12.79	Stable	Stable	Stable	Stable	Stable	Jan 1999-May 2013	Jan 1999-May 2013	Feb 2000-Oct 2010	Feb 2000-May 2014	Feb 2000-May 2013	9	8	36	134	6
GS-2	Glendale	NAR	34.136486	-118.271888	520.0	57.0	13.6	508.00	57.22	14.25	Stable	Increasing (0.35/year)	Decreasing (0/year)	Increasing (4.32/year)	Probably Increasing (1.61/year)	Jan 1999-May 2013	Jan 1999-May 2013	Feb 2000-Oct 2010	Feb 2000-Apr 2014	Feb 2000-May 2013	10	9	46	154	7
GS-3	Glendale	NAR	34.137294	-118.269646	524.0	64.0	37.2	519.23	66.28	37.32	Probably Increasing (8.39/year)	Increasing (1.26/year)	Increasing (0/year)	Increasing (0/year)	Increasing (1.71/year)	Dec 1998-May 2013	Dec 1998-May 2013	Feb 2000-Dec 2010	Feb 2000-May 2014	Feb 2000-May 2013	13	12	48	153	8
GS-4	Glendale	NAR	34.137271	-118.267517	540	67	35.2	533.33	68.21	34.95	Stable	Increasing (0.84/year)	Decreasing (0.31/year)	Increasing (0/year)	Increasing (1.92/year)	Jan 1999-May 2013	Jan 1999-May 2013	Feb 2000-Dec 2010	Feb 2000-May 2014	Feb 2000-May 2013	9	8	50	158	7
PL004	LADWP	NAR	34.10997	-118.250295	536.5	69.0	31.5	543.25	65.05	31.95	Stable	Stable	Decreasing (0.88/year)	Decreasing (17.71/year)	Stable	Jul 1989-Apr 2011	Oct 1987-Apr 2011	Oct 1987-Feb 2014	Oct 1987-Apr 2011	Oct 1987-Apr 2011	8	10	99	20	9
PL006	LADWP	NAR	34.111506	-118.249041	653.5	81.3	37.3	642.42	79.01	38.45	Stable	Increasing (0.67/year)	Decreasing (0.16/year)	Decreasing (28.18/year)	Stable	Nov 1989-Nov 2013	Nov 1989-Nov 2013	Nov 1989-Feb 2014	Jan 1993-Nov 2013	Nov 1989-Nov 2013	26	26	120	20	10
VO-1	Burbank	SFE	34.188328	-118.32899	520	56.8	38	514.27	54.17	37.27	Increasing (6.2/year)	Increasing (2.32/year)	Probably Decreasing (0.13/year)	Stable	Increasing (1.87/year)	Nov 1995-Apr 2014	Nov 1995-Apr 2014	Nov 1995-May 2014	Sep 2002-Apr 2014	Nov 1995-Apr 2014	55	19	180	10	13
VO-2	Burbank	SFE	34.1888059	-118.331485	490.0	43.6	42.6	503.85	45.43	42.23	Stable	Stable	Decreasing (0.65/year)	Stable	Increasing (1.74/year)	Nov 1995-Apr 2014	Nov 1995-Apr 2014	Nov 1995-May 2014	Sep 2002-Apr 2014	Nov 1995-Apr 2014	55	19	177	9	13
VO-3	Burbank	SFE	34.1894015	-118.334448	477.0	40.0	36.0	476.91	41.74	36.56	Stable	Stable	Decreasing (1.01/year)	Stable	Stable	Nov 1995-Apr 2014	Nov 1995-Apr 2014	Nov 1995-May 2014	Sep 2002-Apr 2014	Nov 1995-Apr 2014	56	17	174	12	12
VO-4	Burbank	SFE	34.1899755	-118.33751	500.0	40.0	44.0	489.54	39.96	44.74	Probably Increasing (1.38/year)	Increasing (0.58/year)	Decreasing (0.77/year)	Stable	Probably Increasing (0.5/year)	Nov 1995-Apr 2014	Nov 1995-Apr 2014	Nov 1995-May 2014	Sep 2002-Apr 2014	Nov 1995-Apr 2014	56	19	185	11	10
VO-5	Burbank	SFE	34.1902166	-118.340899	498	40	42	495.56	38.16	41.40	Increasing (2.66/year)	Increasing (0.84/year)	Decreasing (0.49/year)	Stable	Stable	Nov 1995-Apr 2014	Nov 1995-Apr 2014	Nov 1995-May 2014	Sep 2002-Apr 2014	Nov 1995-Apr 2014	52	18	161	10	10
VO-6	Burbank	SFE	34.1910415	-118.344982	442	29.1	32	443.64	29.89	31.88	Increasing (5.96/year)	Increasing (0.49/year)	Decreasing (0.23/year)	Stable	Increasing (1.34/year)	Nov 1995-Apr 2014	Nov 1995-Apr 2014	Nov 1995-May 2014	Sep 2002-Apr 2014	Nov 1995-Apr 2014	56	21	171	11	13
VO-7	Burbank	SFE	34.1916764	-118.348192	460.0	33.3	30.4	453.84	31.53	30.76	Increasing (6.28/year)	Increasing (0.89/year)	Stable	Stable	Increasing (1.53/year)	Nov 1995-Apr 2014	Nov 1995-Apr 2014	Nov 1995-May 2014	Sep 2002-Apr 2014	Nov 1995-Apr 2014	55	17	182	11	12
VO-8	Burbank	SFE	34.188328	-118.32899	450.0	29.5	27.0	450.77	30.75	26.07	Increasing (2.3/year)	Stable	Decreasing (0.39/year)	Stable	Increasing (0.63/year)	Feb 2001-Apr 2014	May 2001-Apr 2014	Feb 2001-May 2014	Sep 2002-Apr 2014	May 2001-Apr 2014	53	14	148	12	10
Well 15	Burbank	SFE	34.176	-118.315	330	24.5	11	348.67	26.17	11.74	Stable	Increasing (0.51/year)	Stable	Not Enough Data	Increasing (0.85/year)	May 1991-May 2011	May 1991-May 2011	May 1991-Sep 2012	**NO DATA**	May 1991-May 2011	9	9	48	**0**	9
Well 7	Burbank	SFE	34.177	-118.314	321.0	27.2	18.2	341.13	30.20	19.25	Increasing (6.63/year)	Increasing (0.96/year)	Increasing (0.72/year)	Not Enough Data	Increasing (1.68/year)	May 1991-May 2011	May 1991-May 2011	May 1991-Sep 2012	**NO DATA**	May 1991-May 2011	8	8	47	**0**	8
GN-1	Glendale	SFE	34.157723	-118.286677	590	57	42	576.00	49.59	41.25	Stable	Stable	Decreasing (0.31/year)	Probably Decreasing (0/year)	Stable	Jan 1998-May 2013	Jan 1998-May 2013	Feb 2000-Dec 2010	Feb 2000-Apr 2014	Feb 2000-May 2013	9	9	113	151	7
GN-2	Glendale	SFE	34.15837	-118.286	588	55.5	35	574.22	54.95	35.18	Stable	Probably Increasing (0.74/year)	Stable	Stable	Stable	Dec 1997-May 2013	Dec 1997-May 2013	Feb 2000-Dec 2010	Feb 2000-May 2014	Feb 2000-May 2013	9	8	48	153	7
GN-3	Glendale	SFE	34.160057	-118.283385	550	56	37	540.20	55.06	36.78	Stable	Increasing (0.56/year)	Stable	Stable	Stable	Dec 1998-May 2013	Dec 1998-May 2013	Feb 2000-Dec 2010	Feb 2000-Apr 2014	Feb 2000-May 2013	10	10	45	138	7
GN-4	Glendale	SFE	34.158078	-118.286303	480.0	46.0	12.5	483.56	45.83	12.47	Stable	Stable	Decreasing (0.17/year)	Stable	Probably Decreasing (0.56/year)	Jan 1998-Aug 2013	Jan 1998-Aug 2013	Feb 2000-Oct 2010	Feb 2000-May 2014	Feb 2000-Aug 2013	9	8	44	153	7
AT002	LADWP	SFE	34.196637	-118.38659	517.0	33.8	43.1	514.53	33.82	44.97	Stable	Increasing (0.53/year)	Decreasing (0.88/year)	Stable	Increasing (1.93/year)	Jun 1992-Sep 2013	Jun 1995-Sep 2013	Jun 1995-Mar 2014	Jun 1995-Sep 2013	Jun 1995-Sep 2013	8	6	143	6	6
AT003	LADWP	SFE	34.194866	-118.384466	412.5	29.5	37.3	402.90	31.29	36.85	Stable	Stable	Decreasing (0.87/year)	Stable	Probably Increasing (0.51/year)	Jun 1989-Feb 2014	Jun 1989-Feb 2014	Jun 1989-Mar 2014	Jun 1995-Feb 2014	Jun 1989-Feb 2014	10	8	146	6	8
AT004	LADWP	SFE	34.192974	-118.381915	435	26	40.05	408.30	23.16	36.99	Stable	Stable	Decreasing (1.38/year)	Stable	Stable	Jun 1989-May 2011	Jun 1989-Apr 2012	Jun 1989-Mar 2014	Jun 1995-May 2011	Jun 1989-Jun 2013	10	8	112	5	8
AT005	LADWP	SFE	34.191802	-118.379493	448	35	47	486.60	39.80	47.78	Stable	Stable	Stable	Not Enough Data	Stable	Jun 1989-Sep 2004	Jun 1989-Sep 2004	Jun 1989-Mar 2013	Mar 1995-Sep 2004	Jun 1989-Sep 2004	5	5	76	3	5
AT006	LADWP	SFE	34.189448	-118.377885	394	23.9	24.75	389.35	23.84	24.15	Stable	Stable	Decreasing (0.69/year)	Probably Decreasing (6.01/year)	Stable	Jun 1989-Feb 2014	Jun 1989-Feb 2014	Jun 1989-Mar 2014	Mar 1995-Feb 2014	Jun 1989-Feb 2014	11	8	132	6	8
AT007	LADWP	SFE	34.190136	-118.367993	528.5	30.9	32.6	511.12	33.98	34.06	Stable	Decreasing (0.65/year)	Decreasing (0.84/year)	Stable	Stable	Jun 1989-Feb 2014	Jun 1989-Feb 2014	Jun 1989-Mar 2014	Mar 1995-Feb 2014	Jun 1989-Feb 2014	10	9	144	6	9
AT008	LADWP	SFE	34.19017	-118.363353	520.0	33.9	37.7	525.04	35.74	460.30	Decreasing (5.04/year)	Stable	Decreasing (1.86/year)	Stable	Stable	Jun 1989-Feb 2014	Jun 1989-Feb 2014	Jun 1989-Mar 2014	Mar 1995-Feb 2014	Jun 1989-Feb 2014	11	8	146	6	9
ER006	LADWP	SFE	34.181853	-118.379731	646.0	38.6	27.0	649.86	41.84	26.66	Stable	Stable	Increasing (0.35/year)	Stable	Stable	Jun 1990-Jan 2012	Jun 1990-Jan 2012	Jun 1990-Mar 2014	Sep 1993-Jan 2012	Jun 1990-Jan 2012	7	7	122	6	7
ER010	LADWP	SFE	34.183196	-118.382988	674.0	46.0	10.5	612.11	45.30	11.63	Decreasing (9.95/year)	Probably Decreasing (0.27/year)	Increasing (0.35/year)	Probably Decreasing (7.18/year)	Decreasing (4.56/year)	Sep 1989-Feb 2014	Sep 1989-Feb 2014	Sep 1989-Mar 2014	Sep 1993-Feb 2014	Sep 1989-Feb 2014	9	9	122	8	10
NH004	LADWP	SFE	34.194084	-118.415892	997.0	52.0	8.4	993.83	51.37	7.89	Decreasing (4.52/year)	Stable	Increasing (0.19/year)	Stable	Probably Decreasing (3.16/year)	Feb 1990-Feb 2013	Feb 1990-Feb 2013	Feb 1990-Feb 2013	Feb 2000-Feb 2013	Feb 1990-Feb 2013	6	6	59	5	6
NH007	LADWP	SFE	34.194091	-118.422218	980.0	48.7	13.6	981.38	49.09	13.25	Stable	Stable	Increasing (0.06/year)	Decreasing (14.62/year)	Probably Decreasing (3.01/year)	Apr 1989-Oct 2011	Apr 1989-Oct 2011	Apr 1989-Oct 2011	Dec 1992-Apr 2011	Apr 1989-Apr 2011	19	19	118	7	9
NH022	LADWP	SFE	34.194117	-118.404346	1030.0	44.7	22.0	1019.43	45.96	21.59	Stable	Stable	Stable	Stable	Stable	Nov 1989-Jun 2011	Nov 1989-Jun 2011	Nov 1989-Feb 2014	Aug 1995-Jun 2011	Nov 1989-Jun 2011	7	7	72	6	14
NH023	LADWP	SFE	34.194137	-118.401041	794.5	41.9	28.9	788.00	39.27	27.69	Stable	Stable	Stable	Stable	Probably Decreasing (12.06/year)	Aug 1995-Jul 2012	Aug 1995-Jul 2012	Aug 1995-Feb 2014	Aug 1995-Jul 2012	Aug 1995-Jul 2012	6	6	57	6	6
NH025	LADWP	SFE	34.194253	-118.407441	955.5	44.3	18.3	930.67	43.06	17.49	Stable	Increasing (0.57/year)	Stable	Stable	Stable	Jun 1989-Sep 2010	Jun 1989-Apr 2012	Jun 1989-Feb 2014	Sep 1997-Sep 2010	Jun 1989-Sep 2010	6	7	52	4	10
NH026	LADWP	SFE	34.194184	-118.403235	841.0	48.1	25.0	866.29	46.71	23.39	Stable	Stable	Stable	Stable	Stable	Sep 1989-Nov 2012	Sep 1989-Nov 2012	Sep 1989-Nov 2012	Aug 1995-Nov 2012	Sep 1989-Nov 2012	7	7	70	5	7
NH032	LADWP	SFE	34.194624	-118.422183	764.0	61.7	4.5	666.33	61.41	4.23	Stable	Probably Decreasing (0.25/year)	Increasing (0.04/year)	Decreasing (15.16/year)	Stable	Mar 1990-Jun 2010	Mar 1990-Jun 2010	Mar 1990-Feb 2013	Jul 1996-Jun 2010	Mar 1990-Jun 2010	6	7	77	5	6
NH033	LADWP	SFE	34.194346	-118.415883	781.0	66.6	4.3	803.29	67.21	4.35	Probably Decreasing (4.93/year)	Stable	Decreasing (0.06/year)	Probably Decreasing (5.93/year)	Decreasing (2.47/year)	May 1990-Jun 2013	Oct 1987-Jun 2013	Oct 1987-Feb 2014	Aug 1997-Jun 2013	Oct 1987-Jun 2013	7	8	80	6	15
NH034	LADWP	SFE	34.197466	-118.404052	802.0	31.9	18.9	732.71	30.83	17.09	Stable	Increasing (0.34/year)	Decreasing (0.55/year)	Stable	Stable	May 1989-Jan 2014	May 1989-Jan 2014	May 1989-Jan 2014	Aug 1995-Jan 2014	May 1989-Jan 2014	7	7	108	6	13
NH036	LADWP	SFE	34.196968	-118.404272	893.5	38.7	17.2	864.88	37.18	15.72	Stable	Stable	Decreasing (0.6/year)	Decreasing (16.67/year)	Stable	May 1989-Sep 2013	May 1989-Sep 2013	May 1989-Sep 2013	Sep 1996-Sep 2013	May 1989-Sep 2013	8	8	79	7	14
NH037	LADWP	SFE	34.197486	-118.404692	740.0	37.2	15.3	706.22	35.38	16.37	Stable	Increasing (0.49/year)	Decreasing (0.66/year)	Stable	Stable	May 1989-Dec 2013	May 1989-Dec 2013	May 1989-Feb 2014	Aug 1995-Dec 2013	May 1989-Dec 2013	9	9	101	8	15
NH043A	LADWP	SFE	34.194799	-118.403099	800	45.8	12.15	771.83	45.07	16.67	Stable	Stable	Decreasing (0.68/year)	Stable	Stable	Apr 1989-Sep 2012	Apr 1989-Sep 2012	Apr 1989-Dec 2013	Jan 1997-Sep 2012	Apr 1989-Sep 2012	6	7	60	5	7
NH044	LADWP	SFE	34.195637	-118.40319	825.0	51.0	9.6	779.00	49.31	8.68	Stable	Increasing (1.55/year)	Decreasing (0.36/year)	Stable	Stable	Mar 1988-Apr 2012	Mar 1988-Apr 2012	Mar 1988-May 2013	Aug 1995-Apr 2012	Mar 1988-Apr 2012	6	7	82	5	14
NH045	LADWP	SFE	34.196339	-118.403273	743.0	36.0	13.7	742.67	35.53	12.28	Stable	Probably Increasing (0.51/year)	Decreasing (0.49/year)	Stable	Stable	Apr 1989-Sep 2013	Apr 1989-Sep 2013	Apr 1989-Sep 2013	Aug 1995-Sep 2013	Apr 1989-Sep 2013	9	10	86	8	10
RT001	LADWP	SFE	34.205493	-118.395995	358.0	16.8	10.5	378.50	16.78	13.16	Stable	Stable	Decreasing (0.25/year)	Probably Decreasing (3.2/year)	Stable	Apr 1989-Oct 2012	Apr 1989-Oct 2012	Apr 1989-Oct 2013	Feb 1994-Oct 2012	Apr 1989-Oct 2012	8	8	91	7	8
RT002	LADWP	SFE	34.210145	-118.400845	376.0	17.1	16.0	380.20	17.34	16.95	Increasing (1.32/year)	Increasing (0.24/year)	Stable	Stable	Probably Increasing (2.6/year)	Apr 1989-Mar 2013	Apr 1989-Mar 2013	Apr 1989-Oct 2013	Feb 1994-Mar 2013	Apr 1989-Mar 2013	10	10	76	6	10
RT003	LADWP	SFE	34.210832	-118.40155	380.5	16.6	16.1	387.75	17.45	17.38	Increasing (2.3/year)	Increasing (0.14/year)	Probably Decreasing (0.22/year)	Stable	Stable	May 1989-Feb 2012	May 1989-Feb 2012	May 1989-Feb 2014	Jun 1994-Feb 2012	May 1989-Feb 2012	8	8	75	4	8
RT004	LADWP	SFE	34.211812	-118.402585	376.0	17.4	19.6	418.63	17.81	18.99	Increasing (6.77/year)	Increasing (0.13/year)	Stable	Stable	Increasing (3.74/year)	May 1989-Jun 2011	May 1989-Jun 2011	May 1989-Feb 2014	Jun 1994-Jun 2011	May 1989-May 2012	8	8	82	4	9
RT005	LADWP	SFE	34.21256	-118.403357	467.5	22.4	19.8	445.42	21.09	19.07	Increasing (4.62/year)	Increasing (0.25/year)	Stable	Stable	Increasing (3.8/year)	May 1989-Aug 2012	May 1989-Aug 2012	May 1989-Feb 2014	Jun 1994-Oct 2011	May 1989-Oct 2011	24	24	112	6	10
RT006	LADWP	SFE	34.213987	-118.40484	382.0	18.5	14.5	376.89	19.13	15.16	Increasing (5.44/year)	Stable	Decreasing (0.23/year)	Stable	Increasing (2.88/year)	May 1989-Jun 2011	May 1989-Jun 2011	May 1989-Feb 2014	Jun 1994-Jun 2011	May 1989-Jun 2011	9	9	100	5	9
RT007	LADWP	SFE	34.216268	-118.407209	357.0	19.7	16.9	354.00	19.44	16.77	Stable	Stable	Decreasing (0.21/year)	Stable	Increasing (2.57/year)	May 1989-Oct 2011	May 1989-Oct 2011	May 1989-Feb 2014	Jun 1994-Oct 2011	May 1989-Oct 2011	8	8	102	6	8
RT008	LADWP	SFE	34.216829	-118.407794	348.0	18.7	13.6	358.86	17.95	13.89	Stable	Stable	Decreasing (0.37/year)	Stable	Increasing (2.69/year)	May 1989-Aug 2013	May 1989-Aug 2013	May 1989-Oct 2013	Mar 1998-Aug 2013	May 1989-Aug 2013	7	8	73	6	8
RT009	LADWP	SFE	34.217355	-118.408314	342	16.1	12.4	343.88	17.83	13.69	Stable	Decreasing (0.27/year)	Decreasing (0.43/year)	Stable	Stable	May 1989-Oct 2011	May 1989-Oct 2011	May 1989-Feb 2014	Jun 1994-Oct 2011	May 1989-Oct 2011	8	8	95	6	8
RT010	LADWP	SFE	34.20896	-118.399607	362.2	17.6	19	388.17	20.16	19.44	Stable	Stable	Increasing (0.45/year)	Probably Decreasing (14.18/year)	Stable	Jun 1989-Oct 2011	Jun 1989-Oct 2011	Jun 1989-Feb 2014	Mar 2000-Oct 2011	Jun 1989-Oct 2011	7	7	114	4	7
RT011	LADWP	SFE	34.208176	-118.398789	379.5	16.3	9.8	388.13	16.50	11.50	Stable	Stable	Decreasing (0.24/year)	Stable	Stable	Jun 1989-Oct 2012	Jun 1989-Oct 2012	Jun 1989-Oct 2013	Feb 1994-Oct 2012	Jun 1989-Oct 2012	8	8	95	7	8
RT012	LADWP	SFE	34.207588	-118.398184	353.0	17.0	8.8	369.20	16.34	10.52	Stable	Stable	Decreasing (0.12/year)	Stable	Stable	Jun 1989-Oct 2011	Jun 1989-Oct 2011	Jun 1989-Jan 2014	Feb 1994-Oct 2011	Jun 1989-Oct 2011	9	9	103	6	11
RT013	LADWP	SFE	34.206928	-118.397487	354.0	14.5	9.1	357.86	15.23	10.56	Stable	Stable	Decreasing (0.24/year)	Stable	Stable	Jun 1989-Oct 2011	Jun 1989-Oct 2011	Jun 1989-Jan 2014	Feb 1994-Oct 2011	Jun 1989-Oct 2011	7	7	99	4	6
RT014	LADWP	SFE	34.204584	-118.39506	339.5	14.8	9.8	368.50	15.51	11.04	Stable	Stable	Stable	Probably Decreasing (5.43/year)	Stable	Apr 1989-Oct 2011	Apr 1989-Oct 2011	Apr 1989-Oct 2013	Feb 1994-Oct 2011	Apr 1989-Oct 2011	8	8	78	6	8
RT015	LADWP	SFE	34.203862	-118.394319	342.0	13.2	8.1	355.00	14.94	10.04	Stable	Stable	Decreasing (0.13/year)	Probably Decreasing (5.81/year)	Stable	Jun 1989-Oct 2011	Jun 1989-Oct 2011	Jun 1989-Oct 2013	Jun 1997-Oct 2011	Jun 1989-Oct 2011	7	7	93	5	7
TJ001	LADWP	SFE	34.226069	-118.419012	341.2	18.3	21.4	340.80	17.98	21.29	Stable	Stable	Stable	Probably Decreasing (5.56/year)	Stable	Sep 1992-Jun 2012	Sep 1992-Jun 2012	Sep 1992-Mar 2014	Sep 1992-Jun 2012	Sep 1992-Jun 2012	8	8	119	8	8
TJ002	LADWP	SFE	34.226619	-118.418263	355.5	17.4	19.7	346.25	17.74	19.29	Stable	Stable	Decreasing (0.3/year)	Probably Decreasing (6.31/year)	Probably Increasing (3.51/year)	Sep 1992-Jul 2011	Sep 1992-Jul 2011	Sep 1992-Jun 2012	Sep 1992-Jul 2011	Sep 1992-Jul 2011	8	8	113	7	7
TJ003	LADWP	SFE	34.227186	-118.417536	318.0	17.4	20.1	316.91	17.57	21.56	Stable	Stable	Decreasing (0.23/year)	Stable	Stable	Sep 1992-Nov 2011	Sep 1992-Feb 2013	Sep 1992-Apr 2013	Sep 1992-Nov 2011	Sep 1992-Nov 2011	9	10	122	6	8
TJ004	LADWP	SFE	34.227709	-118.416778	350.5	20.3	24.8	354.13	20.76	24.33	Stable	Probably Decreasing (0.4/year)	Decreasing (0.52/year)	Stable	Stable	Oct 1992-May 2011	Oct 1992-Nov 2011	Oct 1992-Mar 2014	Oct 1992-May 2011	Oct 1992-May 2011	8	9	156	7	7
TJ005	LADWP	SFE	34.228267	-118.416047	360.0	25.1	29.9	366.31	25.30	28.52	Probably Increasing (2.77/year)	Stable	Decreasing (0.99/year)	Probably Decreasing (4.29/year)	Increasing (0.77/year)	Sep 1992-Nov 2012	Sep 1992-Dec 2013	Sep 1992-Mar 2014	Sep 1992-Nov 2012	Sep 1992-Dec 2013	9	10	164	9	10
TJ006	LADWP	SFE	34.228799	-118.415273	372.0	24.1	33.3	367.85	24.55	32.37	Stable	Decreasing (0.34/year)	Decreasing (0.83/year)	Decreasing (3.4/year)	Stable	Sep 1992-Jan 2014	Sep 1992-Jan 2014	Sep 1992-Mar 2014	Sep 1992-Nov 2012	Sep 1992-Nov 2012	23	24	183	9	10
TJ007	LADWP	SFE	34.22934	-118.414543	384.0	26.5	36.8	393.20	27.26	36.64	Increasing (2.73/year)	Stable	Decreasing (0.35/year)	Probably Decreasing (5.82/year)	Stable	Sep 1992-Nov 2012	Sep 1992-Nov 2012	Sep 1992-Mar 2014	Sep 1992-Nov 2012	Sep 1992-Nov 2012	9	9	174	7	8
TJ008	LADWP	SFE	34.22989	-118.413784	391.0	22.4	32.9	370.58	22.14	31.45	Stable	Stable	Decreasing (0.54/year)	Decreasing (5.28/year)	Stable	Sep 1992-Nov 2012	Sep 1992-Nov 2012	Sep 1992-Mar 2014	Sep 1992-Nov 2012	Sep 1992-Nov 2012	10	10	189	10	10
TJ009	LADWP	SFE	34.230421	-118.413052	416.5	22.9	29.8	406.70	23.97	28.19	Stable	Stable	Decreasing (0.57/year)	Decreasing (6.07/year)	Stable	Sep 1992-Jun 2012	Sep 1992-Jun 2012	Sep 1992-Feb 2014	Sep 1992-Jun 2012	Sep 1992-Jun 2012	8	8	169	8	8
TJ010	LADWP	SFE	34.230962	-118.412307	492.0	29.2	28.6	489.54	28.41	27.67	Increasing (7.64/year)	Probably Increasing (0.57/year)	Stable	Stable	Probably Increasing (4.82/year)	Sep 1992-Sep 2012	Sep 1992-Sep 2012	Sep 1992-Mar 2014	Sep 1992-Sep 2012	Sep 1992-Sep 2012	7	7	126	7	7
TJ011	LADWP	SFE	34.23152	-118.411546	380.3	24.3	24.0	385.60	26.99	22.69	Stable	Stable	Decreasing (1.03/year)	Probably Decreasing (3.12/year)	Stable	Sep 1992-Jun 2013	Sep 1992-Jun 2013	Sep 1992-Jan 2014	Sep 1992-Jun 2013	Sep 1992-Jun 2013	6	6	111	7	6
TJ012	LADWP	SFE	34.232089	-118.410764	423.5	18.2	12.6	418.38	18.41	14.04	Stable	Stable	Decreasing (0.26/year)	Stable	Stable	Sep 1992-Aug 2012	Sep 1992-Jul 2013	Sep 1992-Feb 2014	Sep 1992-Aug 2012	Sep 1992-Aug 2012	8	11	131	8	8
Verdugo 11	LADWP	SFE	34.161131	-118.332369	700.0	59.8	13.2	661.53	58.18	13.59	Probably Increasing (5.76/year)	Stable	Stable	Probably Decreasing (5.56/year)	Stable	Feb 1990-Aug 2013	Feb 1990-Aug 2013	Feb 1990-Aug 2013	May 1993-Aug 2013	Feb 1990-Aug 2013	9	9	64	7	9
Verdugo 24	LADWP	SFE	34.156747	-118.350668	883.0	110.4	6.8	865.71	112.83	7.02	Increasing (8.19/year)	Decreasing (2.24/year)	Increasing (0.18/year)	Stable	Increasing (5.17/year)	Feb 1990-Jan 2014	Oct 1987-Jan 2014	Oct 1987-Jan 2014	Oct 1987-Jan 2014	Oct 1987-Jan 2014	7	8	72	7	9
RE005	LADWP	SFW	34.192033	-118.596883	706.0	33.2	44.7	706.00	33.20	44.70	Not Enough Data	Not Enough Data	Not Enough Data	Not Enough Data	Not Enough Data	Feb 2014	Feb 2014	Feb 2014	Feb 2014	Feb 2014	1	1	1	1	1
RE006	LADWP	SFW	34.191522	-118.596623	684.0	35.3	50.9	684.00	35.30	50.90	Not Enough Data	Not Enough Data	Not Enough Data	Not Enough Data	Not Enough Data	Feb 2014	Feb 2014	Feb 2014	Feb 2014	Feb 2014	1	1	1	1	1
RE009	LADWP	SFW	34.190209	-118.595659	915.0	28.5	0.0	915.00	28.50	0.00	Not Enough Data	Not Enough Data	Not Enough Data	Not Enough Data	Not Enough Data	Feb 2014	Feb 2014	Feb 2014	Feb 2014	Feb 2014	1	1	1	1	1
MW006	LADWP	SYL	34.293952	-118.457515	365.5	31.0	10.0	367.00	28.77	11.02	Stable	Stable	Increasing (0.5/year)	Stable	Stable	Nov 1994-Jun 2011	Nov 1994-Jun 2011	Nov 1994-Mar 2014	Nov 1994-Jun 2011	Nov 1994-Jun 2011	6	6	54	5	6
MW007	LADWP	SYL	34.293977	-118.456895	407.0	30.7	23.1	418.43	33.85	23.04	Probably Increasing (1.81/year)	Increasing (0.9/year)	Increasing (0.63/year)	Stable	Stable	Jun 1990-Jul 2011	Sep 1987-Jul 2011	Sep 1987-Mar 2014	Nov 1994-Jul 2011	Sep 1987-Jul 2011	7	8	84	5	10
Sylmar 2A	San Fernando	SYL	34.304583	-118.439794	364.0	25.4	36.0	350.73	37.95	34.87	Increasing (3.31/year)	No Trend	Increasing (0.52/year)	Not Enough Data	Increasing (0.29/year)	Feb 1988-Jan 2012	Feb 1988-Jan 2012	Feb 1988-May 2014	Jun 2002-Mar 2003	Feb 1988-Jan 2012	11	11	719	3	12
Sylmar 3	San Fernando	SYL	34.305992	-118.441761	402.0	31.0	37.0	398.55	32.41	37.91	Increasing (3.84/year)	Increasing (0.67/year)	Increasing (1.23/year)	Not Enough Data	Stable	Feb 1988-Jan 2012	Feb 1988-Jan 2012	Feb 1988-Apr 2014	Jun 2002-Mar 2003	Feb 1988-Jan 2012	11	11	110	3	13
Sylmar 4A	San Fernando	SYL	34.305711	-118.434269	280.0	14.5	19.0	287.67	15.42	18.31	Stable	Stable	Increasing (0.63/year)	Not Enough Data	Stable	Mar 1988-Jan 2012	Mar 1988-Jan 2012	Mar 1988-Apr 2014	Jun 2002-Oct 2003	Mar 1988-Jan 2012	12	12	99	3	14
Sylmar 7A	San Fernando	SYL	34.310647	-118.440567	323.0	19.0	33.0	338.50	19.03	35.14	Increasing (2.88/year)	Increasing (0.36/year)	Increasing (1.18/year)	Not Enough Data	Probably Increasing (0.42/year)	Feb 1988-Apr 2012	Feb 1988-Apr 2012	Feb 1988-May 2012	Jun 2002-Mar 2003	Feb 1988-Apr 2012	8	8	51	3	8
Well 1	CVWD	VER	34.22	-118.251111	520.0	81.5	50.0	522.94	80.27	50.63	Increasing (3.08/year)	Increasing (0.81/year)	Decreasing (0.57/year)	No Trend	Stable	May 1993-Feb 2013	May 1993-Feb 2013	May 1993-Jun 2014	Feb 2001-Feb 2013	May 1993-Feb 2013	16	16	213	12	14
Well 10	CVWD	VER	34.2111111	-118.241944	518	68.95	55	517.15	69.13	56.54	Increasing (4.82/year)	Increasing (0.67/year)	Decreasing (0.75/year)	Increasing (4.17/year)	Increasing (1.43/year)	Jan 1988-Feb 2013	Jan 1988-Feb 2013	Jan 1988-Jun 2014	Feb 2001-Feb 2013	Jan 1988-Feb 2013	20	20	214	16	18
Well 11	CVWD	VER	34.2161111	-118.246944	559.0	83.2	51.0	550.37	81.80	53.30	Increasing (4.48/year)	Increasing (0.72/year)	Decreasing (1.26/year)	Increasing (0/year)	Stable	Jun 1990-Feb 2013	Jun 1990-Feb 2013	Jun 1990-Jun 2014	Feb 2001-Feb 2013	Jun 1990-Feb 2013	19	19	217	14	17
Well 12	CVWD	VER	34.2111111	-118.241944	534.0	80.5	57.0	534.60	78.45	57.27	Increasing (5.01/year)	Increasing (0.92/year)	Decreasing (0.61/year)	Increasing (0/year)	Increasing (1.67/year)	Feb 1993-Feb 2013	Feb 1993-Feb 2013	Feb 1993-Jun 2014	Feb 2001-Feb 2013	Feb 1993-Feb 2013	20	20	203	14	16
Well 14	CVWD	VER	34.21	-118.24	510	64	47	503.16	65.29	47.24	Increasing (6.24/year)	Increasing (0.91/year)	Decreasing (0.7/year)	Increasing (0/year)	Increasing (1.6/year)	Feb 1993-Feb 2013	Feb 1993-Feb 2013	Feb 1993-Jun 2014	Feb 2001-Feb 2013	Feb 1993-Feb 2013	19	19	197	13	15
Well 15	CVWD	VER	34.2111111	-118.241944	570.0	88.0	42.0	563.64	88.45	40.29	Increasing (11.86/year)	Stable	Decreasing (0.44/year)	Increasing (10.78/year)	Probably Increasing (2.56/year)	Feb 2003-Feb 2013	Feb 2003-Feb 2013	Oct 2002-May 2013	Feb 2003-Feb 2013	Feb 2003-Feb 2013	11	11	122	9	9
Well 5	CVWD	VER	34.2188888	-118.248889	536.0	76.0	61.0	543.37	74.75	63.96	Increasing (4.57/year)	Increasing (0.6/year)	Decreasing (1.09/year)	Increasing (0/year)	Increasing (1.35/year)	Jan 1991-Feb 2013	Jan 1991-Feb 2013	Jan 1991-Apr 2014	Feb 2001-Feb 2013	Jan 1991-Feb 2013	19	19	217	14	17
Well 6	CVWD	VER	34.2111111	-118.241944	550.0	89.0	43.0	538.50	87.15	43.01	Increasing (7.7/year)	Increasing (1.43/year)	Stable	Increasing (0/year)	Increasing (1.12/year)	Feb 1993-Feb 2013	Feb 1993-Feb 2013	Feb 1993-Jun 2014	Feb 2001-Feb 2013	Feb 1993-Feb 2013	18	18	208	14	16
Well 7	CVWD	VER	34.2211111	-118.251111	515	77.85	51	519.35	79.21	52.23	Probably Increasing (2.55/year)	Probably Increasing (0.43/year)	Decreasing (0.98/year)	Increasing (8.5/year)	Stable	Feb 1993-Feb 2013	Feb 1993-Feb 2013	Feb 1993-Jun 2014	Feb 2001-Feb 2013	Feb 1993-Feb 2013	20	20	215	15	18
Well 8	CVWD	VER	34.205	-118.236944	520.0	76.0	40.4	526.41	75.00	41.49	Increasing (3.93/year)	Increasing (0.77/year)	Decreasing (0.84/year)	Increasing (8.34/year)	Increasing (0.57/year)	Feb 1993-Feb 2013	Feb 1993-Feb 2013	Feb 1993-Jun 2014	Feb 2001-Feb 2013	Feb 1993-Feb 2013	17	17	212	14	15
Well 9	CVWD	VER	34.2238889	-118.253056	492.0	71.0	50.0	486.47	71.47	51.24	Increasing (3.44/year)	Stable	Decreasing (0.74/year)	Increasing (8.65/year)	Stable	Feb 1993-Feb 2013	Feb 1993-Feb 2013	Feb 1993-Jun 2014	Feb 2001-Feb 2013	Feb 1993-Feb 2013	17	17	202	14	16
Foothill Well Raw Water	Glendale	VER			460.0	59.0	48.0	460.00	58.60	47.40	Stable	Increasing (7.87/year)	Stable	Not Enough Data	Increasing (9.02/year)	Feb 2011-Aug 2012	Feb 2011-Aug 2012	Feb 2011-Sep 2012	Feb 2011	Feb 2011-Apr 2013	5	5	20	1	6
Glorietta 3 Raw Water	Glendale	VER	34.187146	-118.229736	642.0	97.0	39.0	628.75	97.95	38.19	Stable	Stable	Decreasing (0.29/year)	Stable	Stable	Jun 1987-Aug 2012	Jun 1987-Aug 2012	Jun 1987-Sep 2012	Jan 2002-Dec 2004	Jun 1987-Apr 2013	36	33	229	4	28
Glorietta 4 Raw Water	Glendale	VER	34.187192	-118.230507	608.0	97.0	29.0	611.68	99.43	29.65	Decreasing (1.59/year)	Stable	Stable	Stable	Stable	Jun 1992-Aug 2012	Jun 1992-Aug 2012	Nov 1989-Sep 2012	Jan 2002-Oct 2004	Jun 1992-Apr 2013	37	34	242	4	25
Glorietta 6 Raw Water	Glendale	VER	34.192007	-118.22968	590.0	89.6	45.8	581.81	89.28	44.87	Decreasing (3.52/year)	Stable	Probably Decreasing (0.63/year)	Stable	Stable	May 1989-Aug 2012	May 1989-Aug 2012	May 1989-Sep 2012	Jan 2002-Oct 2004	Jun 1992-Apr 2013	37	35	246	4	25
Verdugo Influent	Glendale	VER			740.0	117.0	19.0	723.94	112.33	20.78	Probably Increasing (6.85/year)	Increasing (2.05/year)	Stable	Stable	Stable	Oct 1997-Apr 2013	Oct 1997-Aug 2012	Dec 1997-Aug 2012	Jan 2002-Oct 2004	Oct 1997-Feb 2012	31	29	68	7	25
Verdugo Well A	Glendale	VER	34.172843	-118.228017	**NO DATA**	121.0	23.4	**NO DATA**	123.67	23.78	Not Enough Data	Not Enough Data	Stable	Not Enough Data	Not Enough Data	**NO DATA**	Dec 2007-Mar 2008	Dec 2007-Jul 2011	**NO DATA**	**NO DATA**	**0**	3	4	**0**	**0**
Verdugo Well B	Glendale	VER	34.172182	-118.228272	**NO DATA**	120.0	23.1	**NO DATA**	121.00	22.83	Not Enough Data	Not Enough Data	Decreasing (0.55/year)	Not Enough Data	Not Enough Data	**NO DATA**	Dec 2007-Mar 2008	Dec 2007-Jul 2011	**NO DATA**	**NO DATA**	**0**	3	4	**0**	**0**

APPENDIX III

GAMA DATABASE WELLS

GAMA DATABASE WELLS

				Median			Average								
Well Name	**Subarea**	**Latitude**	**Longitude**	**TDS (mg/L)**	**Chloride (mg/L)**	**Nitrate (NO3) (mg/L)**	**TDS (mg/L)**	**Chloride (mg/L)**	**Nitrate (NO3) (mg/L)**	**TDS Range**	**Chloride Range**	**Nitrate Range**	**Samples TDS**	**Samples Chloride**	**Samples Nitrate**
02N16W12A001S	SFW	34.279571	-118.503028	327.0	23.0	0.0	327.00	23.00	0.00	Aug 1964	Aug 1964	Aug 1964	1	1	1
02N16W07H001S	SFW	34.274619	-118.590672	**NO DATA**	71.5	1.5	**NO DATA**	71.50	1.50	**NO DATA**	Nov 1972-Oct 1973	Nov 1972-Oct 1973	**0**	2	2
02N16W07R001S	SFW	34.268364	-118.58903	196.0	21.4	0.0	187.00	31.25	6.35	Oct 1975-Oct 1977	Oct 1973-Oct 1977	Oct 1973-Oct 1977	3	4	6
02N17W12J001S	SFW	34.272075	-118.607484	1315.0	249.0	18.5	1389.00	266.60	32.18	Dec 1954-Jun 1961	Dec 1954-Jun 1961	Dec 1954-Jun 1961	5	5	5
02N17W13J001S	SFW	34.257169	-118.607215	569.0	62.0	34.4	569.00	62.00	34.40	Jul 1958	Jul 1958	Jul 1958	1	1	1
02N16W21L001S	SFW	34.242381	-118.564375	650.0	15.0	22.0	650.00	15.00	22.00	Dec 1956	Dec 1956	Dec 1956	1	1	1
02N16W27F002S	SFW	34.231488	-118.547037	**NO DATA**	43.0	19.5	**NO DATA**	44.33	19.79	**NO DATA**	Jun 1965-Sep 1973	Jun 1965-Sep 1973	**0**	9	14
02N16W27P002S	SFW	34.224618	-118.546425	660.0	29.0	27.5	660.00	29.25	27.26	Aug 1959	Aug 1959-Sep 1973	Aug 1959-Sep 1973	1	4	8
02N16W34G001S	SFW	34.217215	-118.542466	**NO DATA**	29.0	31.0	**NO DATA**	29.00	31.00	**NO DATA**	Nov 1971	Nov 1971	**0**	1	1
02N16W34G002S	SFW	34.217215	-118.542466	810.0	31.0	19.0	810.00	31.00	19.00	Jul 1961	Jul 1961	Jul 1961	1	1	1
02N16W34K001S	SFW	34.21281	-118.542048	795.0	32.0	16.0	795.00	32.00	16.00	Aug 1959	Aug 1959	Aug 1959	1	1	1
02N16W34K002S	SFW	34.21281	-118.542048	**NO DATA**	28.5	21.0	**NO DATA**	27.75	19.98	**NO DATA**	Oct 1970-Sep 1973	Oct 1970-Sep 1973	**0**	4	7
01N16W03Q003S	SFW	34.194684	-118.542026	1316.5	66.0	21.0	1316.50	70.29	21.60	Nov 1969-Jun 1972	Nov 1969-Sep 1973	Nov 1969-Sep 1973	2	7	15
01N15W07Q001S	SFW	34.181208	-118.489694	1327.5	61.5	35.0	1327.50	61.50	35.00	Sep 1953-Jun 1959	Sep 1953-Jun 1959	Sep 1953-Jun 1959	2	2	2
01N16W14K001S	SFW	34.170543	-118.524563	1700.0	150.0	1.1	1698.14	145.20	5.26	Mar 1954-Apr 1965	Mar 1954-Apr 1965	Mar 1954-Apr 1965	7	10	7
01N17W10D002S	SFW	34.191005	-118.655584	1750.5	63.5	6.8	1750.50	63.50	6.75	Aug 1963-Apr 1965	Aug 1963-Apr 1965	Aug 1963-Apr 1965	2	2	2
01N17W26A001S	SFW	34.147792	-118.624992	1855.0	68.0	3.0	1794.14	68.00	3.01	Sep 1953-Apr 1965	Mar 1953-Apr 1965	Mar 1953-Apr 1965	7	9	8
01N17W26A002S	SFW	34.147792	-118.624992	2110.0	86.0	3.6	2066.50	87.75	4.90	Sep 1953-Jun 1962	Sep 1953-Jun 1962	Sep 1953-Jun 1962	4	4	4
02N14W08G001S	TUJ	34.274725	-118.366927	640.0	19.0	16.7	640.00	19.00	16.70	Sep 1953	Sep 1953	Sep 1953	1	1	1
02N14W10N001S	TUJ	34.267007	-118.340169	**NO DATA**	28.5	20.1	**NO DATA**	28.50	20.05	**NO DATA**	Sep 1970-Sep 1971	Sep 1970-Sep 1971	**0**	2	2
02N14W11N001S	TUJ	34.267345	-118.324485	611.5	56.0	37.0	649.50	59.07	53.92	Sep 1953-Apr 1965	Sep 1953-Apr 1965	Sep 1953-Jun 1977	12	14	13
02N14W12C001S	TUJ	34.278476	-118.300882	314.0	14.5	0.6	320.75	13.67	1.87	Sep 1953-Oct 1963	Feb 1949-Oct 1963	Feb 1949-Oct 1963	4	12	11
02N14W12C002S	TUJ	34.278476	-118.300882	358.5	17.0	3.9	332.50	16.38	5.79	Nov 1958-Nov 1969	Nov 1958-Nov 1969	Nov 1958-Nov 1969	8	8	8
02N14W11K004S	TUJ	34.270803	-118.315302	**NO DATA**	12.0	6.5	**NO DATA**	8.57	6.12	**NO DATA**	Sep 1970-Oct 1973	Sep 1970-Oct 1973	**0**	3	9
02N14W11Q001S	TUJ	34.267146	-118.315495	**NO DATA**	30.0	16.7	**NO DATA**	29.67	34.76	**NO DATA**	Sep 1970-Oct 1973	Sep 1970-Oct 1973	**0**	3	5
02N14W14A001S	TUJ	34.263852	-118.310839	**NO DATA**	15.5	18.9	**NO DATA**	15.50	18.90	**NO DATA**	Sep 1947-Sep 1951	Sep 1947-Sep 1951	**0**	2	2
02N14W14H001S	TUJ	34.259795	-118.311054	290.5	21.5	44.0	284.25	20.50	46.13	Sep 1953-Mar 1964	Sep 1953-Mar 1964	Sep 1953-Mar 1964	4	4	4
02N14W13E004S	TUJ	34.259746	-118.30614	**NO DATA**	19.5	47.0	**NO DATA**	19.25	48.36	**NO DATA**	Jun 1968-Oct 1973	Jun 1968-Oct 1973	**0**	8	11