Ventura County
Watershed Protection
Water Resources Division

2019 Annual Report of Groundwater Conditions

Ventura County
Watershed Protection
Water Resources Division

MISSION:

"Protect, sustain, and enhance
Ventura County watersheds now
and into the future for the benefit of
all by applying sound science,
technology, and policy."

2019 Annual Report of Groundwater Conditions

Cover Photo: Irrigation well in the Oxnard Subbasin

Ventura County Watershed Protection
Water Resources Division
Groundwater Resources Section

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Executive Summary

Groundwater is the primary water source in Ventura County, providing approximately 63% of the total water for domestic, agricultural and industrial uses. Agricultural use accounts for the majority of groundwater consumption. The County provides protection for groundwater quality and supply through Well Ordinance No. 4468 by regulating the construction, maintenance, use and destruction of wells and engineering test holes (soil borings) in such a manner that the groundwater of the County will be of beneficial use without jeopardizing the health, safety or welfare of the people of Ventura County.

Water year 2019 saw above-average rainfall throughout the County. In January, the County was designated as an area of extreme drought but by the end of the year the designation had been changed by the U.S. Drought Monitor (http://droughtmonitor.unl.edu) to an area of no drought. The drought along with regulatory constraints led to a decrease in surface water releases and diversions. When less surface water is available, local groundwater demand increases. After continued drought conditions but with some areas of above average precipitation, groundwater elevations were mostly higher than the previous spring. The majority of key well levels had increased and only three showed a continuing decline.

Water quality trends within County basins were generally unchanged from previous years. Key water quality concerns in some basins continue to be high concentrations of total dissolved solids (TDS) and nitrate; both exceeding the maximum contaminant level (MCL) in localized areas within specific basins. Basin summary sheets included in the appendices include analyses of water level and water quality trends over a five-year period.

The County of Ventura does not regulate groundwater extractions. Extractions are regulated by two groundwater management agencies (GMAs) and a water conservation district in specific areas of the County: the Ojai Basin Groundwater Management Agency (OBGMA), the Fox Canyon Groundwater Management Agency (FCGMA), and United Water Conservation District (UWCD). These agencies cover approximately 8% of the land area in Ventura County. Well owners and operators within the statutory boundaries of an agency are required to report extractions to their respective agencies. Groundwater extractions outside of these boundaries are often unreported with total County-wide extractions unknown.

Several basins within the County have been designated as critically-overdrafted by the California State Department of Water Resources (DWR). Legislation passed by the California State Assembly in 2014 aims to change the way groundwater is managed. The Sustainable Groundwater Management Act (SGMA) is a tripartite legislation that requires Groundwater Sustainability Agencies (GSAs) to be formed in all DWR-designated high and medium priority basins. GSAs have been organized in all high and medium priority basins within the County and are working to develop Groundwater Sustainability Plans (GSPs) to manage groundwater supplies. In 2014, the County passed Emergency Ordinance (No. 4466). Section 4826.1 - Water Well and Water Well Permit Prohibitions (known as the Well Moratorium) temporarily bans, with some exceptions, issuance of permits for construction, modification or repair of existing wells. The emergency ordinance was established to protect groundwater after a spike in new well application submittals following SGMA legislation. The Well Moratorium will expire in a basin when its respective GSA submits the required GSP to the DWR.

This report provides a summary of Calendar Year 2019 water quality and groundwater elevations for the groundwater basins of Ventura County.

1.0 Introduction

The Ventura County Watershed Protection District (VCWPD) was formed on September 12, 1944, as the "Ventura County Flood Control District." Since 2003, it has been known as the VCWPD. The Groundwater Resources Section is part of the VCWPD and has collected groundwater data since 1928. Historically, groundwater data was published in Triennial or Quadrennial reports in a collaborative effort with the Flood Control District, Hydrology Section. The last such report was published in December 1986 and covered the years 1981 through 1984. Between 1985 and 2004, Groundwater Resources drafted several unpublished Groundwater Conditions Reports. In 2006, Groundwater Resources published its first *Groundwater Quality Report* for the years 2005 and 2006. The *2019 Annual Report of Groundwater Quality* (Annual Report) is the 14th consecutive publication.

The purpose of this report is to provide information on groundwater conditions in Ventura County and to publish the results of the quarterly groundwater elevation measuring of approximately 200 wells and fall groundwater quality sampling of water supply wells.

This report is prepared annually due to changing groundwater conditions and fluctuating seasonal conditions. Basin summary sheets in **Appendix F** provide a single-page summary of water level and quality trends along with other key data over a five-year period. Detailed water quality and water level data are presented for each basin. Laboratory analytical results and supporting data are included in the appendices.

1.1 Geography and County Information

Ventura County was formed on January 1, 1873, when it separated from Santa Barbara County and became one of 58 counties in the State of California. Geographically, the county includes 42 miles of coastline and the Los Padres National Forest, situated in the northern portion of the County, which accounts for 46% of the County's area. Fertile valleys and plains in the southern half of the County make it a leading agricultural producer. The County was ranked tenth among California counties in total crop value in 2018[1] and eleventh among all Counties in the United States[2]. Together, farming and the Los Padres National Forest occupy half of the County's 1.2 million acres.

1.2 Population

The unincorporated areas, along with the ten incorporated cities of Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Santa Paula, Simi Valley, Thousand Oaks, and San Buenaventura (Ventura), rank Ventura as the 11th most populous county in the State. On May 1, 2019, the California State Department of Finance estimated Ventura County's population to be 856,598, a decrease of 0.1 percent over the revised 2018 population estimate of 857,415. The City of Camarillo had the largest estimated percentage increase in population (2.1) while the City of Ventura had a decrease of 1.8 percent over the previous year. Ventura County's population is expected to exceed 900,000 by the year 2025.

[1] California Department of Food and Agriculture *California Agricultural Statistics Review 2018-2019*
[2] Farm Bureau of Ventura County

2.0 County Well Ordinance

The first County Water Well Ordinance was adopted by the Ventura County Board of Supervisors in 1970 and has since undergone six revisions. The current Well Ordinance was last updated in December 2014 (No. 4468) to better align with SGMA.

The Well Ordinance provides for protection of groundwater quality and supply so that groundwater will be suitable and sustainable for beneficial use and not jeopardize the health of the people of Ventura County. This includes issuing well permits and inspecting the installation and destruction of wells. Quarterly water level measurements, annual water quality sampling, groundwater basins condition reporting, review of development projects, and provision of water quality and well information are carried out to better support the purpose of the Well Ordinance.

2.1 Permits

Permits are required for construction, repair, and destruction of groundwater wells, cathodic protection wells, monitoring wells, and geotechnical borings (engineering test holes). The permits are required to ensure wells and borings are constructed and sealed per California DWR Well Standards[3].Permits are issued throughout the County, except within the City of Oxnard which issues well permits within its city boundaries. 90 permits for wells and engineering test holes were conditioned and issued during calendar year 2019.

2.2 Well Inspections

Per the Well Ordinance, well seals are inspected for each water supply well installation or destruction, cathodic protection well installation or destruction, and major modifications or repairs to existing water supply wells. 35 inspections were performed in 2019.

2.3 Well Inventory and Status

At the end of 2019 there were 9,291 well records in the database in the categories listed in **Table 2-1**.

Table 2-1: Well inventory and status.

2019 Status	Number
Active	4,090
Abandoned	469
Can't Locate	1,855
Non-Compliant	56
Non-Compliant Abandoned	122
Destroyed	2,689
Exempt	10

- Active wells meet or exceed the minimum requirement of 8 hours pumping per calendar year as described in the County of Ventura Well Ordinance No. 4468.
- Abandoned wells do not meet the 8-hour minimum pumping requirement or are in a condition that no longer allows the well to be used.
- Can't Locate wells are usually old rural wells for which the Groundwater Section has historic well location data but the locations may now be in areas that have subsequently been developed. There are several reasons why a well may be listed as "Can't Locate." The current owner of the property

[3]Department of Water Resources *California Well Standards, Bulletin 74-90*

may be unaware of the existence of a well on their property or a County approved search has been conducted and no well has been found.

- Non-Compliant wells are generally active wells for which the responsible party failed to respond to written communication from the Groundwater Section.
- Non-Compliant Abandoned wells are classified as such when a well owner has failed to respond to written communication from the Groundwater Section to take action on an inactive well. The Well Ordinance prohibits anyone from owning an abandoned well. Abandoned wells pose a physical safety risk and may act as a potential conduit for contaminants to reach groundwater.
- Destroyed wells are wells that have been properly destroyed under permit.
- Exempt wells have been found to be in good enough condition to remain inactive for a period of five years before being re-activated or re-inspected. To be listed as exempt, a well inspection report from a licensed professional geologist or civil engineer must be submitted by the well owner to the Groundwater Section for review and approval.

3.0 Climate & Precipitation

The mean annual daily air temperature for 2019 at the National Weather Service Oxnard area office was 62.9 degrees Fahrenheit (ºF), with an average maximum high of 72.9ºF and an average minimum low of 52.8 ºF[4]. The average annual rainfall, countywide was approximately 23.5-inches[5] for the 2019 water year[6]. Throughout the County, precipitation for the 2019 water year was above 100% of normal. Matilija Dam received 140.7% of normal, while the Oak View area received 113% of the normal rainfall total. **Figure 3-1** shows water year 2019 received rainfall totals and normal precipitation totals for that gauge/area. Averages are determined from the 1957-1992 base period, as this is a 35-year period that is representative of the long-term average for multiple sites in Ventura County[7]. **Figure 3-2** depicts average rainfall for the periods from water year 2000 to 2019 for all of Ventura County. **Figure 3-3** shows a generalized distribution of rainfall across the County for water years with more precipitation (2010 and 2011) and **Figure 3-4** shows rainfall distribution for the last two water years (2018 and 2019).

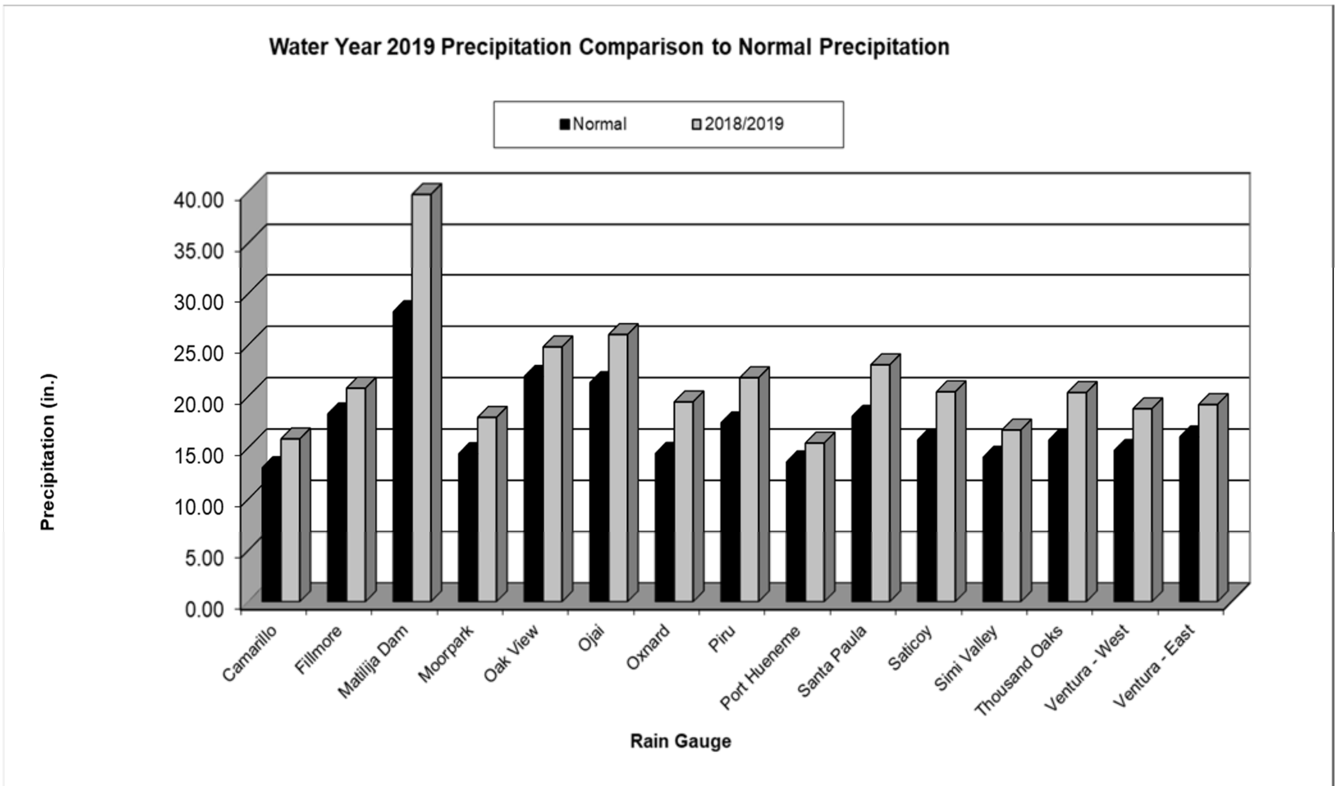

Figure 3-1: Water Year 2019 precipitation and normal precipitation totals

[4] Based on *preliminary* data from the National Climatic Data Center http://www.ncdc.noaa.gov.
[5] Based on *preliminary* data from all active rain gauges.
[6] Water Year defined as: October 1 to September 30 of the following year. VCWPD precipitation data is *preliminary* and subject to change.
[7] According to the Ventura County Hydrology Section's Historic Rainfall webpage.

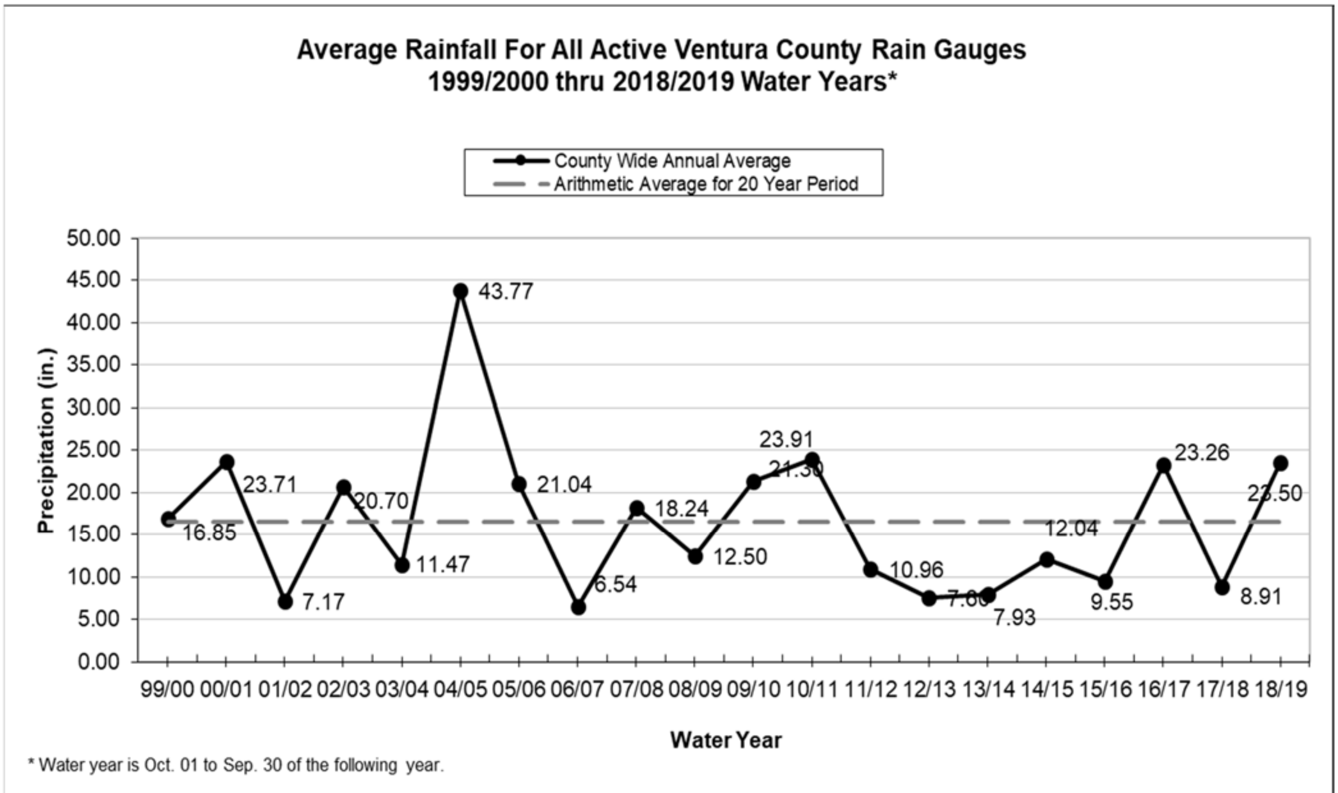

Figure 3-2: Average annual rainfall for Ventura County.

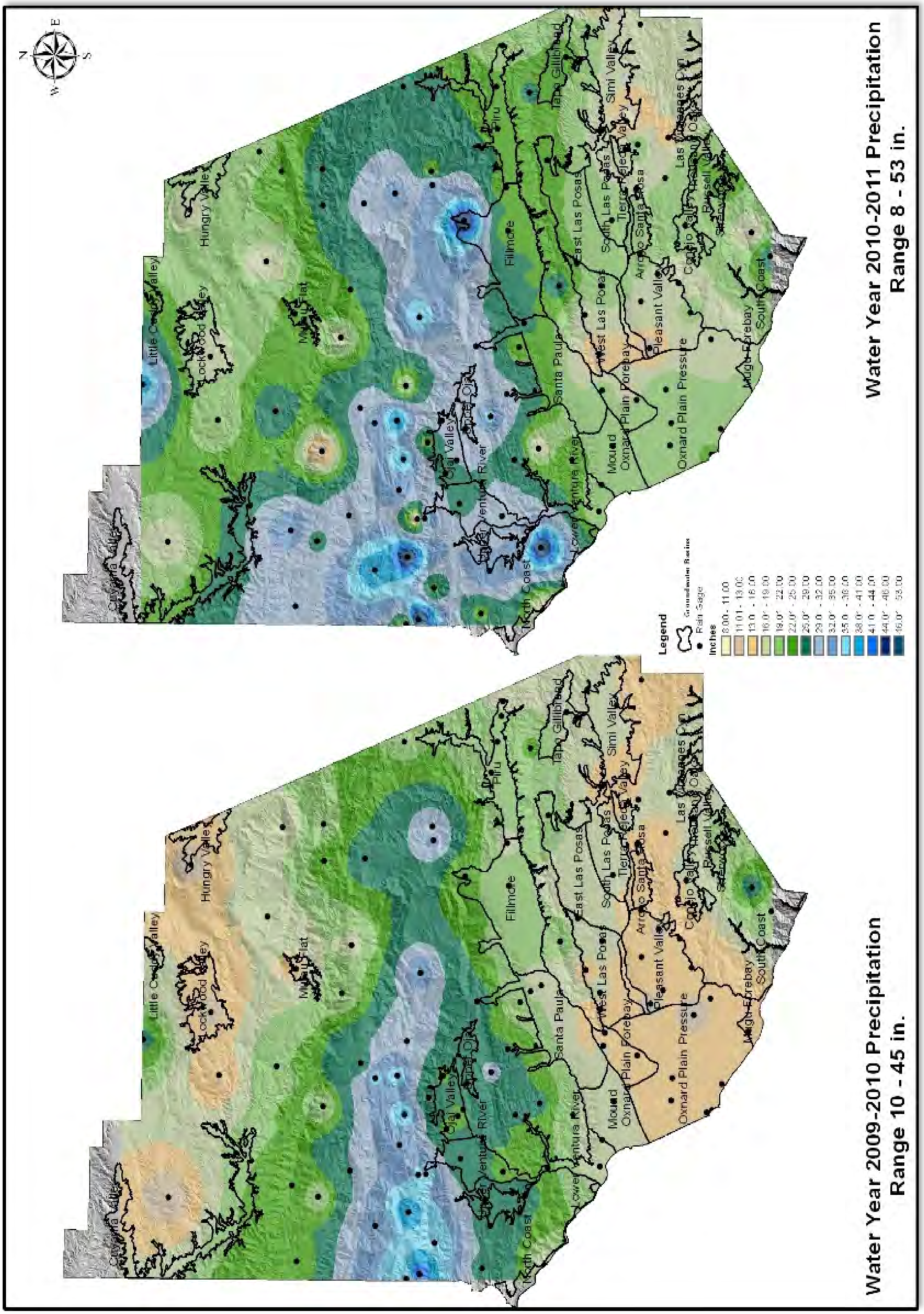

Figure 3-3: Precipitation maps of wet years.

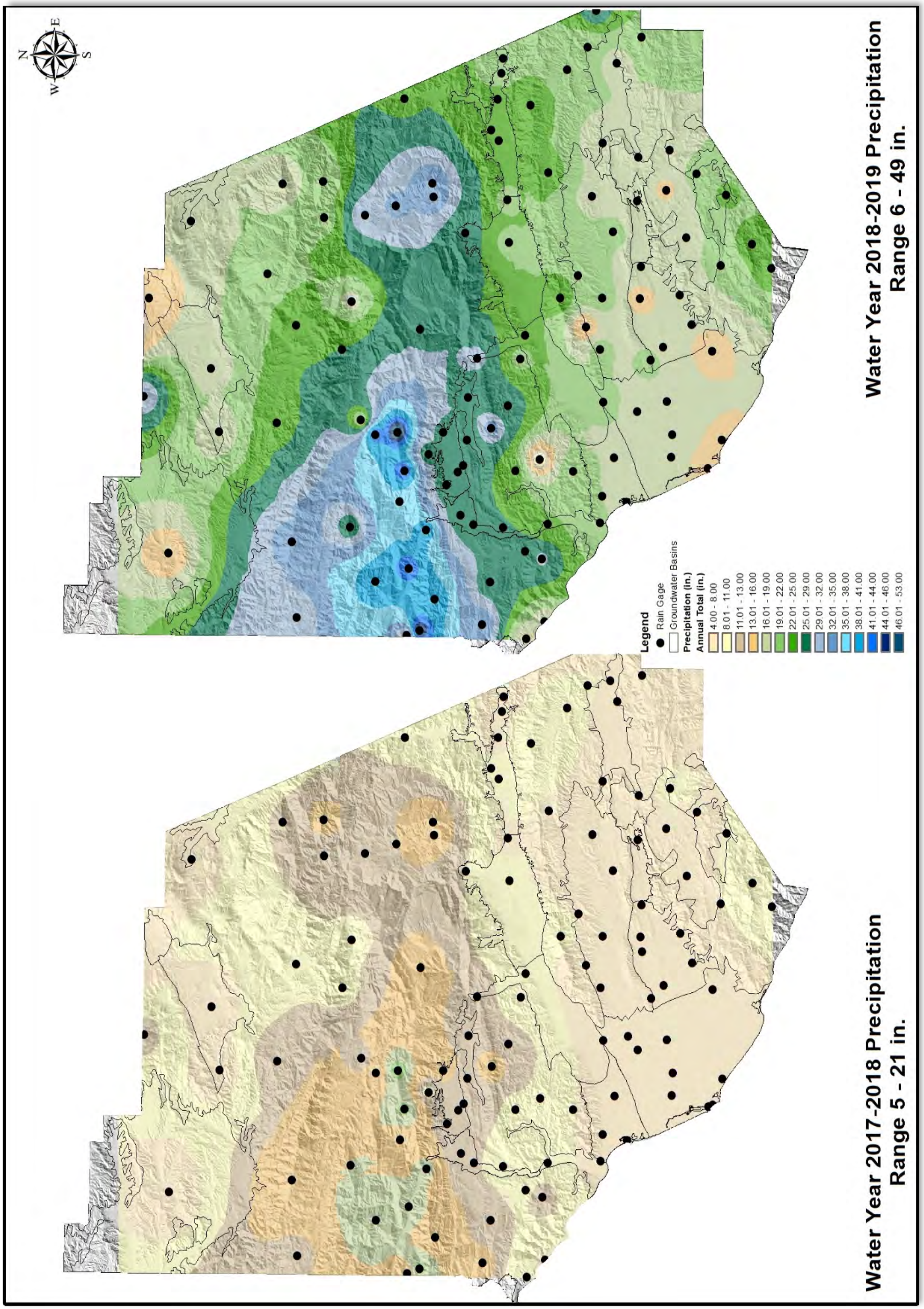

Figure 3-4: Precipitation maps of water years 2018 and 2019

4.0 Groundwater

Groundwater is the primary source of water in Ventura County and accounts for approximately 63% of the total County water demand. Most accessible groundwater is found in 28 groundwater basins and subbasins (**Figure 4-1**). Groundwater basins in the north half of the County do not join directly with other basins, while some groundwater basins in the south half of the County are connected on the surface and in the subsurface to varying degrees. Detailed basin descriptions are provided in their respective section.

The County and local agencies, individual water purveyors, and the USGS all collect groundwater data. Recharge of groundwater occurs naturally from infiltration of rainfall and river/streamflow, artificially through injection of imported water and spreading of diverted river water into recharge basins. Known groundwater extraction data within certain basins is presented later in this report along with extraction estimations from other basins.

Defined groundwater basins as shown in DWR Bulletin 118 (B118) are used for the Annual Report. DWR Bulletin 118 basin boundaries are used to align with other agencies and avoid confusion.

Figure 4-1: Ventura County groundwater basins map

4.1 Groundwater Quality Characterization

Groundwater contains a variety of chemical constituents at different concentrations. Flowing water assumes a diagnostic chemical composition from interactions with surrounding alluvium or bedrock. For most groundwaters, 95% of the ions are represented by positively charged cations sodium (Na+), potassium (K+), calcium (Ca2+), magnesium (Mg2+), and the negatively charged anions chloride (Cl-), carbonate (CO32-), bicarbonate (HCO3-), and sulfate (SO42-). These ionic species when added together account for most of the salinity that is commonly referred to as total dissolved solids (TDS). The Annual Report uses Piper and Stiff diagrams for basic characterization of the chemical composition of groundwater.

Piper Diagram

A piper diagram is a graph to visualize the chemistry of a water sample. The diagram is comprised of a ternary diagram in the lower left representing cations, a ternary diagram in the lower right representing the anions, and a diamond plot in the middle representing a combination of the two (composition) (**Figure 4-2**). The diamond-shaped field between the triangles is used to represent the composition of water with respect to its anions and cations.

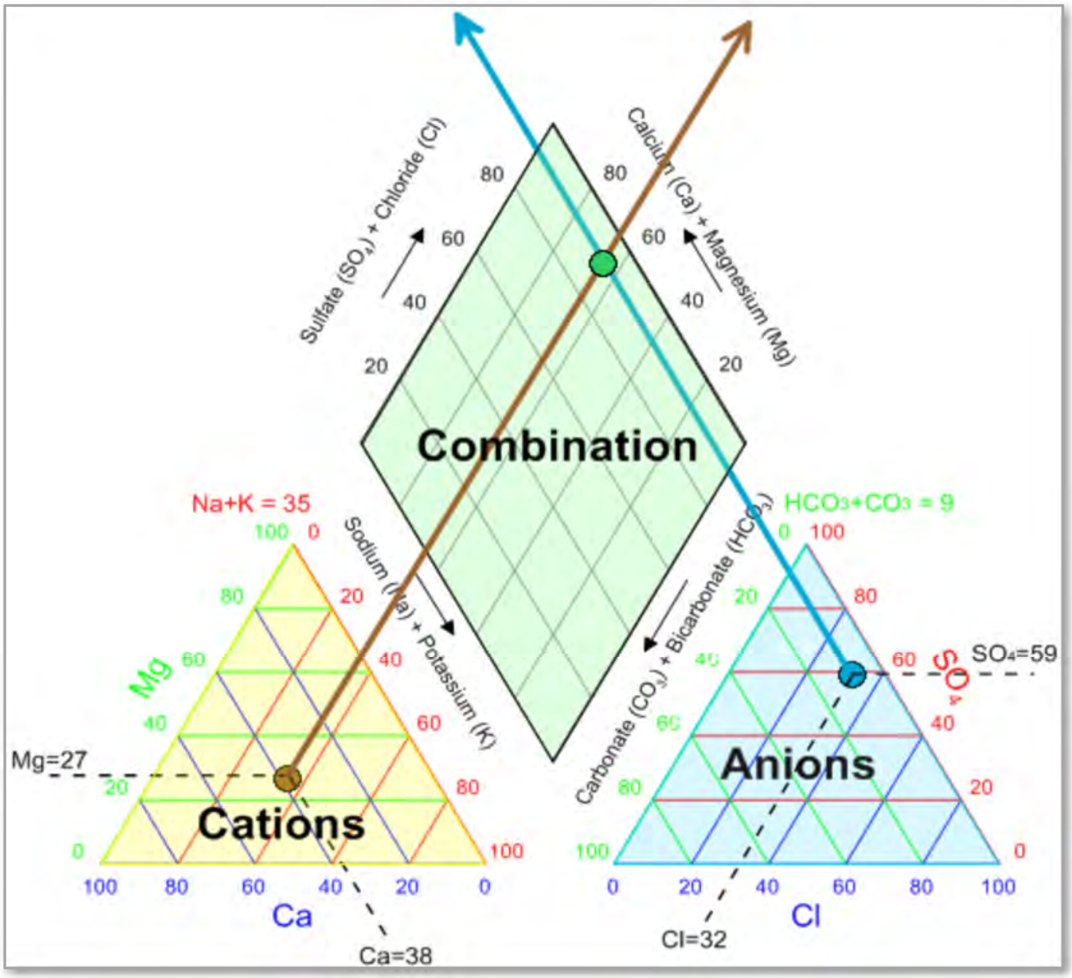

Figure 4-2: Example of a Piper diagram

In the example diagram in **Figure 4-2** the cations plot in the mixed zone in the lower left triangle and the anions plot in the sulfate zone in the lower right triangle. The plotted points are projected onto the diamond-shaped center field and show that the water is calcium sulfate type.

Groundwater samples are interpreted as illustrated in **Figure 4-3**:

- top quadrant: calcium sulfate waters – typically associated with gypsum and mine drainage
- left quadrant: calcium bicarbonate waters – typically shallow, fresh groundwater
- right quadrant: sodium chloride waters – typically marine and ancient groundwater
- bottom quadrant: sodium bicarbonate waters – typically deep groundwater influenced by ion exchange

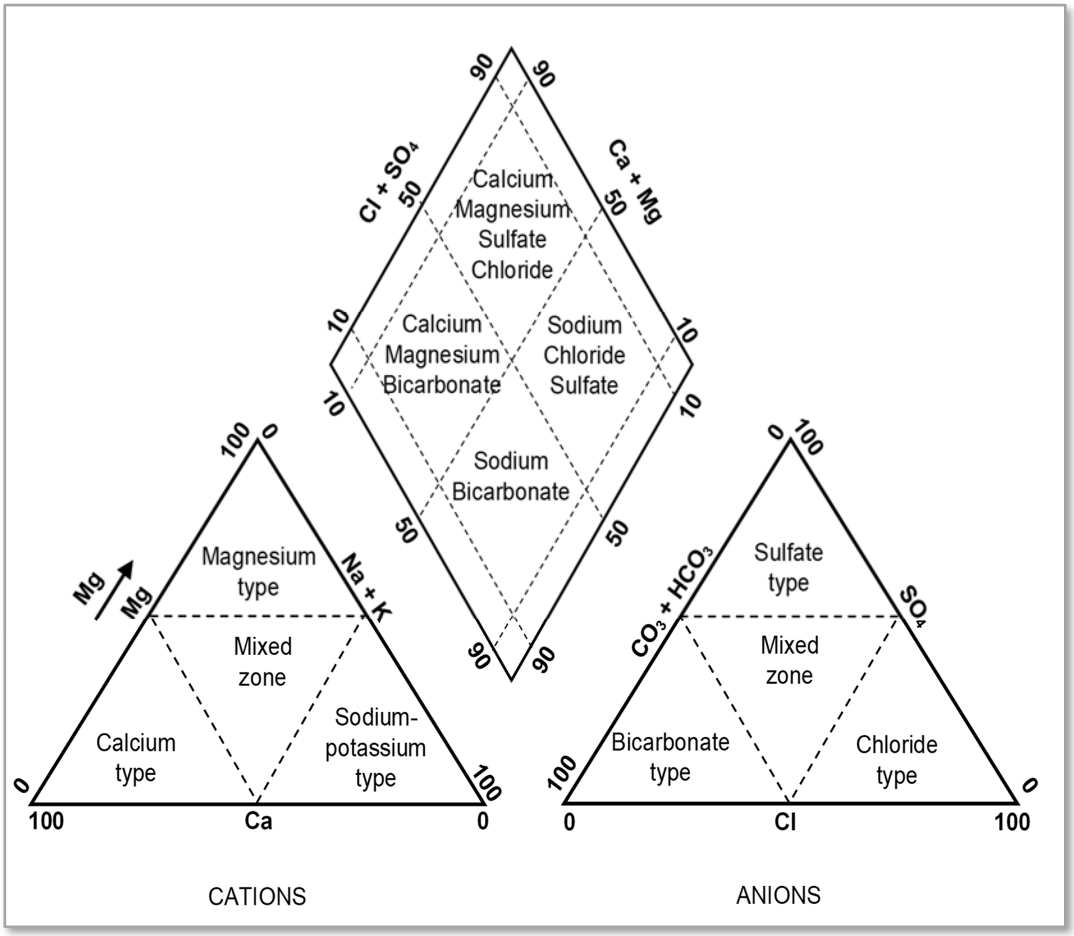

Figure 4-3: Piper diagram with water types.

Figure 4-3 shows how a Piper diagram is used to characterize water quality. By grouping the anions (Cl^-, CO_3^{2-}, HCO_3^-, and SO_4^{2-}) into one group and cations (Na^+, K^+, Ca^{2+}, Mg^{2+}) into another group, the concentration of each anion and cation group can be calculated. The concentration of each anion or cation group in a sample is then converted to milliequivalents/L (meq/L) and then normalized on a percentage scale. The percent concentrations are then plotted on the lower ternary diagrams. The position of the points is projected parallel to the magnesium and sulfate axes, respectively, until they intersect in the center field (Fetter, 1988).

Piper diagrams for each basin are in **Appendix E**.

Stiff Diagram

A second method to present water quality results is through a Stiff diagram (**Figure 4-4**). The same cations and anions that are plotted in the piper diagrams are shown in the Stiff diagrams. The ions are plotted on either side of a vertical axis in milliequivalents per liter (meq/L), cations on the left of the axis and anions on the right. The polygonal shape created is useful in making a quick visual comparison of different water samples as waters with similar characteristics will display a similar shape. Stiff diagrams for wells sampled in 2019 are plotted on their respective basin map.

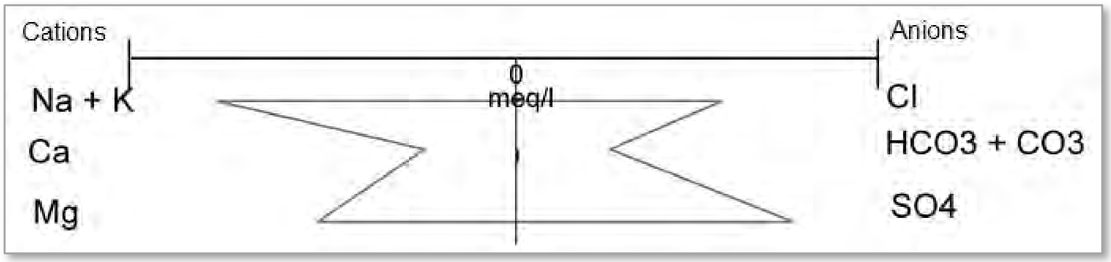

Figure 4-4: Example of Stiff diagram.

4.2 Groundwater Quality Sampling

Water quality data is collected to assess groundwater quality within the County groundwater basins. Data from other organizations in the County is shared. Wells sampled in the north half of the County are shown in **Figure 4-5**. Wells sampled in the south half of the County are shown in **Figure 4-6**.

A total of 180 water supply wells were sampled throughout the County in 2019. Well owners are provided with a copy of the laboratory analysis and notified if any of the constituents analyzed exceed the State and/or Federal established maximum contaminant levels (MCLs) for drinking water.

Laboratory analyses are conducted by Fruit Growers Laboratory in Santa Paula, a laboratory certified under the State Environmental Laboratory Accreditation Program. All samples from wells were analyzed for general minerals with a random subset of 46 wells selected for analysis of California Title 22 metals.

Water quality sampling results are included in **Appendix D**. General interpretations of quality data are detailed in the following subsections.

Additional groundwater quality data are available from other sources, such as water districts and other agencies that collect and analyze groundwater. Organic groundwater chemistry data is also available for some areas of the County through the State Water Quality Control Board's GeoTracker website for environmental cleanup sites (https://geotracker.waterboards.ca.gov/).

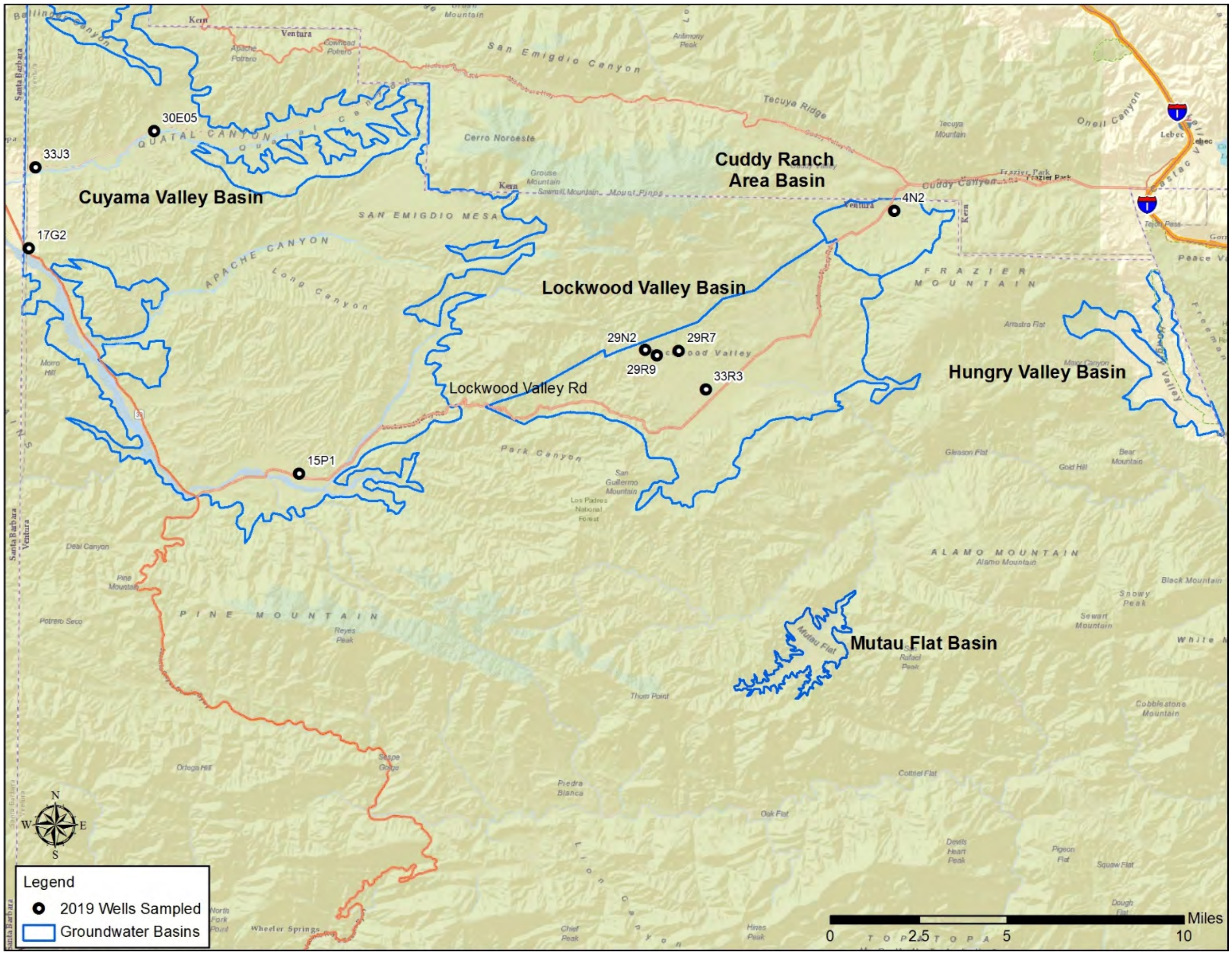

Figure 4-5: Location of wells sampled in north half of the County.

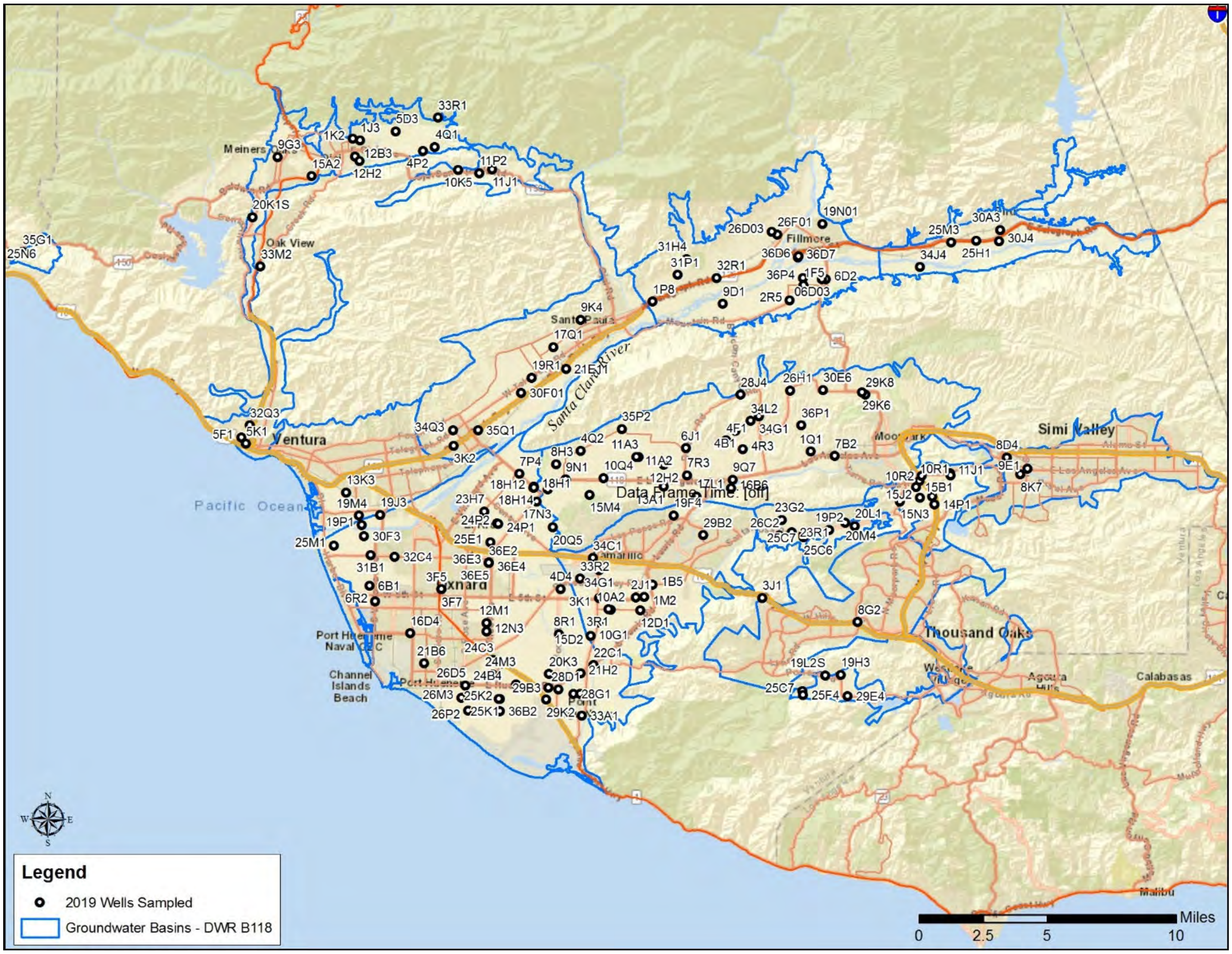

Figure 4-6: Location of wells sampled in south half of the County.

4.3 Water Quality Standards

The Groundwater Resources Section uses Water Quality Standards established by the Los Angeles Regional Water Quality Control Board (LARWQCB) for assessing groundwater quality in Ventura County. Water Quality Standards provide for the reasonable protection and enhancement of surface and groundwater and consist of beneficial use and water quality objectives as mandated by the California Water Code (§13241). LARWQCB developed twenty-four defined beneficial uses, all of which are compiled in the *Basin Plan for the Coastal Watersheds of Los Angeles and Ventura County* (Basin Plan). Water quality objectives protect public health by maintaining or enhancing existing or potential beneficial uses of water. The chart on the following page is an excerpt from the Basin Plan that shows the beneficial uses of groundwater for all basins in Ventura County.

The Basin Plan specifies Ventura County's narrative and numerical Water Quality Standards for groundwater and incorporates Title 22, California Code of Regulations (CCR) standards for groundwater by reference. These are referred to as primary MCLs. A primary MCL is the highest concentration of a contaminant allowed in drinking water that can be present without any adverse health effects. Primary MCLs developed by the State meet or exceed the United States Environmental Protection Agency (EPA) standards and are legally enforceable standards.

Los Angeles Regional Quality Control Board Table of Beneficial Uses of Ground Water by Basin for Ventura County

DWR[ad] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
	PITAS POINT AREA[ae]	E	E	P	E	
4-1	UPPER OJAI VALLEY	E	E	E	E	
4-2	LOWER OJAI VALLEY-OJAI VALLEY	E	E	E	E	
4-3	VENTURA RIVER VALLEY					
4-3.01	Upper Ventura	E	E	E	E	
4-3.02	Lower Ventura	P	E	P	E	
4-4	SANTA CLARA RIVER VALLEY[af]					
4-4.02	Oxnard					
4-4.02	Oxnard Forebay	E	E	E	E	
	Confined aquifers	E	E	E	E	
	Unconfined and perched aquifers	E	P		E	
4-4.03	Mound					
	Confined aquifers	E	E	E	E	
	Unconfined and perched aquifers	E	P		E	
4-4.04	Santa Paula					
	East of Peck Road	E	E	E	E	
	West of Peck Road	E	E	E	E	
4-4.05	Fillmore					
	Pole Creek Fan area	E	E	E	E	
	South side of Santa Clara River	E	E	E	E	
	Remaining Fillmore area	E	E	E	E	E
	Topa Topa (upper Sespe) area	P	E	P	E	
4-4.06	Piru					
	Upper area (above Lake Piru)	P	E	E	E	
	Lower area east of Piru Creek	E	E	E	E	
	Lower area west of Piru Creek	E	E	E	E	

DWR[ad] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
4-6	PLEASANT VALLEY[ag]					
	Confined aquifers	E	E	E	E	
	Unconfined and perched aquifers	P	E	E	E	
4-7	ARROYO SANTA VALLEY[ag]	E	E	E	E	
4-8	LAS POSAS VALLEY[ag]	E	E	E	E	
4-9	SIMI VALLEY					
	Simi Valley Basin					
	Confined aquifers	E	E	E	E	
	Unconfined aquifers	E	E	E	E	
	Gillibrand Basin	E	E	P	E	
4-10	CONEJO VALLEY	E	E	E	E	
4-15	TIERRA REJADA	E	P	P	E	
4-16	HIDDEN VALLEY	E	P		E	
4-17	LOCKWOOD VALLEY	E	E		E	
4-18	HUNGRY VALLEY	E	P	E	E	
4-19	THOUSAND OAKS AREA[aj]	E	E	E	E	
4-20	RUSSELL VALLEY	E	P		E	
4-21	CONEJO-TIERRA REJADA VOLCANIC[ak]	E			E	

Footnotes are consistent for all beneficial use tables.

E: Existing beneficial use.

P: Potential beneficial use.

ac: Beneficial uses for ground waters outside of the major basins listed on this table and outlined in Fig 1-9 have not been specifically listed. However, ground waters outside of the major basins are, in many cases, significant sources of water. Further existing sources of water for downgradient basins, and such, beneficial uses in the downgradient basins shall apply to these areas.

ad: Basins are numbered according to DWR Bulletin No. 118-Update 2003 (DWR, 2003).

ae: Ground waters in the Pitas Point area (between the lower Ventura River and Rincon Point) are not considered to comprise a major basin and, accordingly, have not been designated a basin number by the DWR or outlined on Fig. 1-9.

af: Santa Clara River Valley Basin was formerly Ventura Central Basin and Acton Valley Basin was formerly Upper Santa Clara Basin (DWR, 1980).

ag: Pleasant Valley, Arroyo Santa Rosa Valley, and Las Posas Valley Basins were formerly subbasins of Ventura Central (DWR, 1980).

ah: Nitrite pollution in the groundwater of the Sunland-Tujunga area currently precludes direct MUN uses. Since the ground water in this area can be treated or blended (or both), it retains the MUN designation.

ai: Raymond Basin was formerly a subbasin of San Gabriel Valley and Monk Hill subbasin is now part of San Fernando Valley Basin (DWR, 2003). The Main San Gabriel Basin was formerly separated into Eastern and Western areas. Since these areas had the same beneficial uses as Puente Basin all three areas have been combined into San Gabriel Valley. Any ground water upgradient of these areas is subject to downgradient beneficial uses and objectives, as explained in Footnote ac.

aj: These areas were formerly part of the Russell Valley Basin (DWR, 1980).

ak: Ground water in the Conejo-Tierra Rejada Volcanic Area occurs primarily in fractured volcanic rocks in the western Santa Monica Mountains and Conejo Mountain areas. These areas have not been delineated on Fig. 1-9.

al: With the exception of ground water in Malibu Valley (DWR Basin No. 4-22) ground waters along the southern slopes of the Santa Monica Mountains are not considered to comprise a major basin and accordingly have not been designated a basin number by DWR.

am: DWR has not designated basins for ground waters on the San Pedro Channel Islands.

State MCLs for inorganic chemicals (Title 22 Metals) and their potential health effects are listed in **Table 4-1**. The EPA MCLs are listed for informational purposes but are not used to describe groundwater quality in this report. State and EPA Primary MCLs for radionuclides are listed in **Table 4-2**.

The Basin Plan also states that groundwater shall not contain “taste or odor-producing substances” that “cause nuisance or adversely affect beneficial uses.” These are known as secondary MCLs (SMCLs) (**Table 4-3**). SMCLs do not pose a threat to human health and are set to a level at which most people will physically notice their presence in drinking water. Secondary MCLs assist in managing drinking water for aesthetic considerations (taste, odor and color) and are enforceable standards in California.

Table 4-1: Primary maximum contaminant levels for Title 22 metals.

Primary Contaminants	Chemical Formula	EPA MCL[1] (mg/L)[2]	CCR, Title 22 MCL (mg/L)	Potential Health Effects
Aluminum	Al	not established	1.0	Unknown. Some studies show exposure to high levels may cause Alzheimer's, but other studies show this not to be true.

Primary Contaminants	Chemical Formula	EPA MCL[1] (mg/L)[2]	CCR, Title 22 MCL (mg/L)	Potential Health Effects
Antimony	Sb	0.006	0.006	Increase in blood cholesterol; decrease in blood sugar
Arsenic	As	0.01	0.01	Skin damage or problems with circulatory systems and potential increased risk of developing cancer.
Asbestos	various	7 MFL[3]	7 MFL	Increased risk of developing benign intestinal polyps.
Barium	Ba	2	1	Increase in blood pressure.
Beryllium	Be	0.004	0.004	Intestinal lesions.
Cadmium	Cd	0.005	0.005	Kidney damage.
Chromium	Cr	0.1	0.05	Allergic dermatitis.
Copper	Cu	1.3	1.3	<u>Short term exposure</u>: Gastrointestinal distress. <u>Long term exposure</u>: Liver or kidney damage
Cyanide (as free cyanide)	CN^-	0.2	0.15	Nerve damage or thyroid problems.
Fluoride	F^-	4	2	Bone disease (pain and tenderness of the bones); Children may get mottled teeth.
Lead[4]	Pb	0.015	0.015	<u>Infants and children</u>: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities. <u>Adults</u>: Kidney problems; high blood pressure.
Mercury	Hg	0.002	0.002	Kidney damage.
Nickel	Ni	not established	0.1	Allergic contact dermatitis most common.
Nitrate (as Nitrogen) NO_3^-	N	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.
Nitrate[5]	NO_3^-	Listed as Nitrate-N	45	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.
Nitrite (as Nitrogen) NO_2^-	N	1	1	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

Primary Contaminants	Chemical Formula	EPA MCL[1] (mg/L)[2]	CCR, Title 22 MCL (mg/L)	Potential Health Effects
Selenium	Se	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems.
Thallium	Tl	0.002	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems.

[1]MCL = Maximum Contaminant Level.

[2]mg/L = milligrams per liter.

[3]MFL = Million fibers per liter, with fiber length >10 microns.

[4]Regulatory action level.

[5]CCR, Title 22 standard for Nitrate reported as NO_3

Table 4-2: Primary maximum contaminant levels for radionuclides

Radionuclide	Chemical Formula	CCR, Title 22 MCL[1]	EPA MCL	Potential Health Effects
Gross Alpha particle activity (excluding radon and uranium)	none	15 pCi/L	15 pCi/L[2]	Toxic kidney effects, risk of cancer.
Gross Beta particle activity	none	50 pCi/L 4 millirem/yr	4 millirem/yr[3]	
Radium-226	Ra-226	5 pCi/L	5 pCi/L [4]	
Radium-228	Ra-228	5 pCi/L	combined with Radium-226	
Strontium-90	Sr	8 pCi/L	covered under gross beta	
Tritium	3H	20,000 pCi/L	covered under gross beta	
Uranium	U	20 pCi/L	30 µg/L[5] (~20 pCi/L)	

[1] MCL = Maximum Contaminant Level.

[2] pCi/L = picocurie per liter. One pCi is one trillionth of a Curie, 0.037 disintegrations per second, or 2.22 disintegrations per minute.

[3] Gross beta MCL is 4 millirems/year annual dose equivalent to the total body or any internal organ; Sr-90 MCL = 4 millirem/year to bone marrow; tritium MCL = 4 millirem/year to total body.

[4] EPA MCLs combine radium-226 and radium-228.

[5] µg/L = micrograms per liter, can be converted to pCi/L by multiplying by 0.67

Table 4-3: Secondary Maximum Contaminant Levels

Secondary Contaminants	**Chemical Formula**	**EPA MCL[1] (mg/L)[2]**	**CCR, Title 22 MCL (mg/L)**	**Noticeable Effects**
Aluminum	Al	0.5 to 0.2	0.2	Colored water.
Chloride	Cl^-	250	250	Salty taste.
Color[3]	--	15[3]	15	Visible tint.
Copper	Cu	1.0	15	Metallic taste; blue-green staining.
Corrosivity	--		not established	Metallic taste; corroded pipes/ fixtures staining.
Fluoride	F^-	2.0	not established	Tooth discoloration
Foaming Agents	--	0.5	0.5	Frothy, cloudy; bitter taste; odor.
Iron	Fe	0.3	0.3	Rusty color; sediment; metallic taste; reddish or orange staining.
Manganese	Mn	0.05	0.05	Black to brown color; black staining; bitter metallic taste.
Odor[4]	--	3 TON[4]	3 TON	"Rotten-egg" smell, musty or chemical smell.
pH	--	6.5-8.5	not established	Low pH: bitter metallic taste; corrosion. High pH: slippery feel; soda taste; salt deposits.
Silver	Ag	0.1	0.1	Skin discoloration; graying of the white part of the eye.
Specific Conductance[5]	--	not established	900[5]	Unpleasant taste or odor; gastrointestinal distress.
Sulfate	SO_4^{2-}	250	250	"Rotten-egg" smell, iron and steel corrosion or "black water"; can discolor silver, copper and brass utensils.
Total Dissolved Solids (TDS)	--	500	200	Hardness; deposits; colored water; staining; salty taste.
Zinc	Zn	5.0	5.0	Metallic taste.

[1] MCL = Maximum Contaminant Level.
[2] mg/L = milligrams per liter.
[3] Units are in color numbers.
[4] Units are in TON = Threshold Odor Number
[5] Units are in Siemens per centimeter = S/cm.

4.4 Current Sampling Results by Basin

This section presents general interpretations of the groundwater quality data for each basin sampled this year. Data interpretation is limited to the samples collected by County staff, unless otherwise noted. This annual report includes a summary table of water quality analyses for nitrate, TDS, sulfate, chloride, and boron for each basin. These mineral constituents have specific numerical objectives that vary between each basin and in some cases for localized areas within a basin. Presentation of the data in this format allows for comparison with the numerical mineral quality objectives outlined in Table 3-13 in the Basin Plan.

Table 4-4: Example of summary table.

Criteria	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
Primary MCL	45	none	none	none	none
Secondary MCL	none	500	250	250	none

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL.

The Piper Diagram in **Figure E-1** shows water quality for all wells sampled in the County this year. County-wide there is moderate variation in water quality; calcium is the dominant cation and sulfate is the dominant anion. The most common water type is calcium sulfate.

4.4.1 Arroyo Santa Rosa Valley Basin (DWR Basin No. 4-007)

The water-bearing units of the Arroyo Santa Rosa Basin occupy almost the entire area beneath the Santa Rosa Valley. The area west of the Bailey Fault is generally considered hydrogeologically separate from the area east of the fault, although some leakage across the fault does occur (Camrosa, 2013). The location of the fault is inferred primarily from water well data (Camrosa, 2013). Depth to water-bearing material is approximately 50 feet below ground surface (bgs). The water-bearing units west of the fault are confined and those located east of the fault are unconfined. The degree of groundwater movement across the fault is not clearly understood. The main water-bearing units in the basin consist of alluvium and parts of the San Pedro Formation, which can reach a thickness of up to 700 feet in the eastern portion of the basin. The major hydrologic features are the Conejo Creek and its tributary, Arroyo Santa Rosa, which drain surface waters westward toward the Pacific Ocean.

The basin is dominated by an east-trending syncline that folds the San Pedro and Santa Barbara Formations, directing water into the more permeable San Pedro Formation. The Santa Rosa fault zone places the less permeable Sespe and Topanga Formations against the San Pedro Formation, creating a barrier to groundwater flow into the basin from the north and is likely responsible for the difference in water levels in the western part of the basin (CSWRB, 1956).

Land use in the area overlying the basin consists principally of agriculture and rural residential development on large lots. Most of the area overlying the basin is unsewered with a high number of individual septic systems. Sources of nitrate to groundwater include septic systems, agricultural fertilization, and animal keeping. A large portion of recharge to the basin is discharge from the City of Thousand Oaks' Hill Canyon Wastewater Treatment Plant.

There are 84 water supply wells in the Arroyo Santa Rosa Valley Basin of which 36 are active. The Piper diagram in **Figure E-2** shows low variation in water quality of wells sampled in 2019. There is no dominant cation, but the samples plot closest to the magnesium cation. The dominant anion for two samples is bicarbonate anion type and the remainder plot closest to the chloride anion. Two water samples are magnesium-bicarbonate type and the remainder are magnesium-chloride type.

Selected water quality results are presented in **Table 4-5**. Water from six of the eight wells sampled have nitrate concentrations higher than the primary MCL. All eight wells have TDS concentration above the SMCL ranging from 760 to 1,140 mg/L. One well has sulfate concentrations above the secondary MCL. Chloride concentrations in seven wells are above the level that can impair agricultural beneficial uses for sensitive plants. However, they are not above the primary MCL. Two samples were analyzed for Title 22 metals. None were above the primary MCL. The Piper diagram in **Figure E-3** shows a comparison of groundwater chemistry between Tierra Rejada Basin and the Arroyo Santa Rosa Basin. The water chemistry is similar but with more variation in the Tierra Rejada samples. **Figure 4-7** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-5: Selected water quality results for the Arroyo Santa Rosa Valley Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
19P2	11/12/2019	**64.3**	**760**	113	106	0.2
20L1	11/7/2019	**76.3**	**970**	177	127	0.2
20M4	11/12/2019	23.7	**830**	127	128	0.1
23G2	11/7/2019	**81.1**	**810**	98.3	155	0.1
23R1	11/7/2019	**101**	**1040**	191	179	0.3
25C6	11/12/2019	26.5	**790**	160	141	0.3
25C7	11/12/2019	**69.6**	**950**	171	143	0.2
26C2	11/7/2019	**80.1**	**1140**	**252**	180	0.3

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

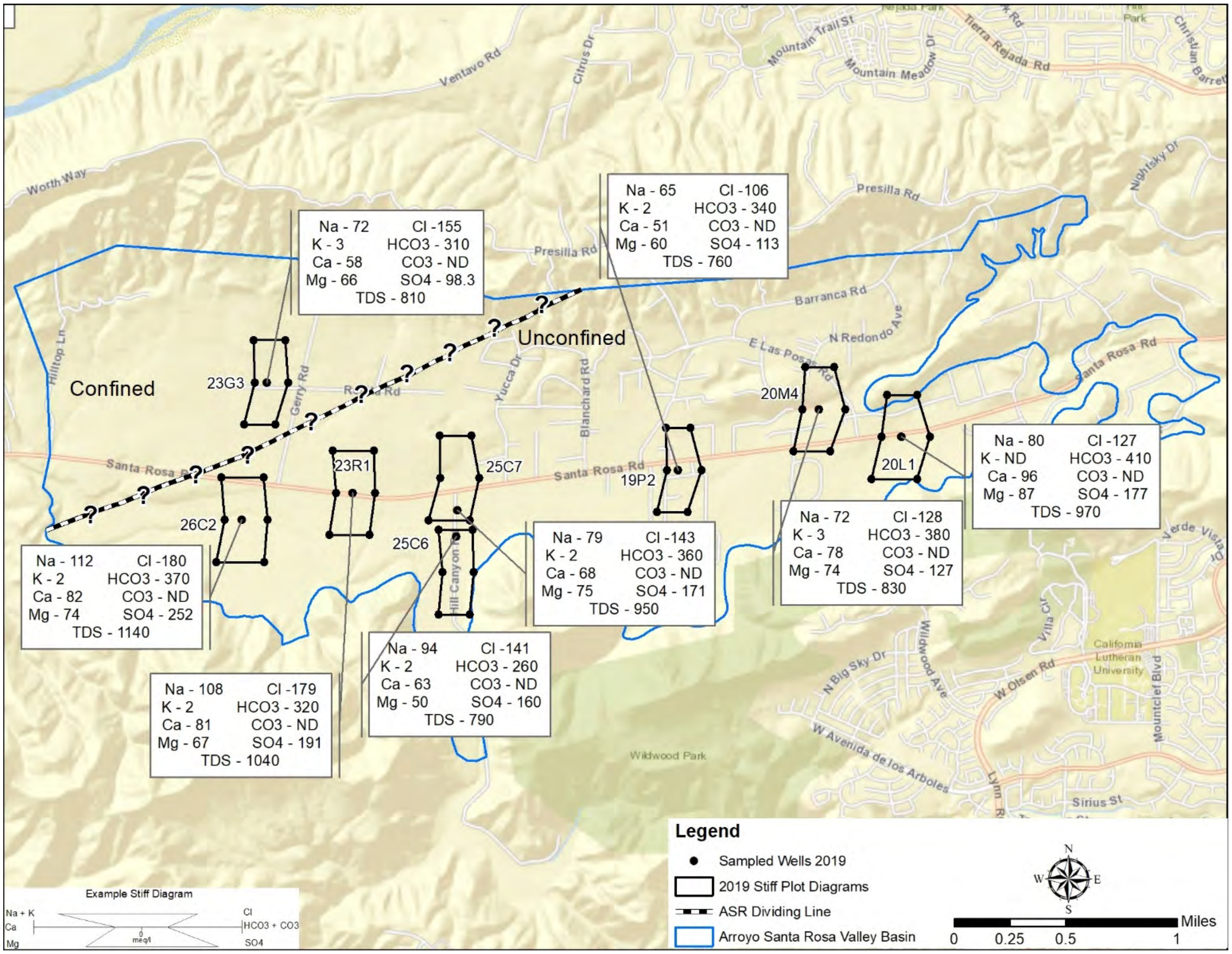

Figure 4-7: Arroyo Santa Rosa Basin wells sampled with Stiff diagrams and selected inorganic constituents.

Figure 4-8 shows the geographic distribution of wells sampled in 2019, with graduated symbols representing nitrate concentrations. **Figure 4-9** shows nitrate results for 2010 through 2019 in the same manner. The Arroyo Santa Rosa Basin has been nitrate-impacted for many years. Current sampling results exceed the state MCL of 45 mg/L in four of five wells. Management practices in the Ventura County Non-Coastal Zoning Ordinance were established to mitigate nitrate impacts. These include limiting the number of large animals kept and restricting septic systems. Camrosa blends well water pumped from the basin with imported water to reduce nitrate concentrations below the MCL. One groundwater sample collected this year had a nitrate (NO_3^-) concentration above 100 mg/L, less than historic concentrations as high as 292 mg/L.

ARROYO SANTA ROSA VALLEY BASIN
2019 Nitrate Concentrations

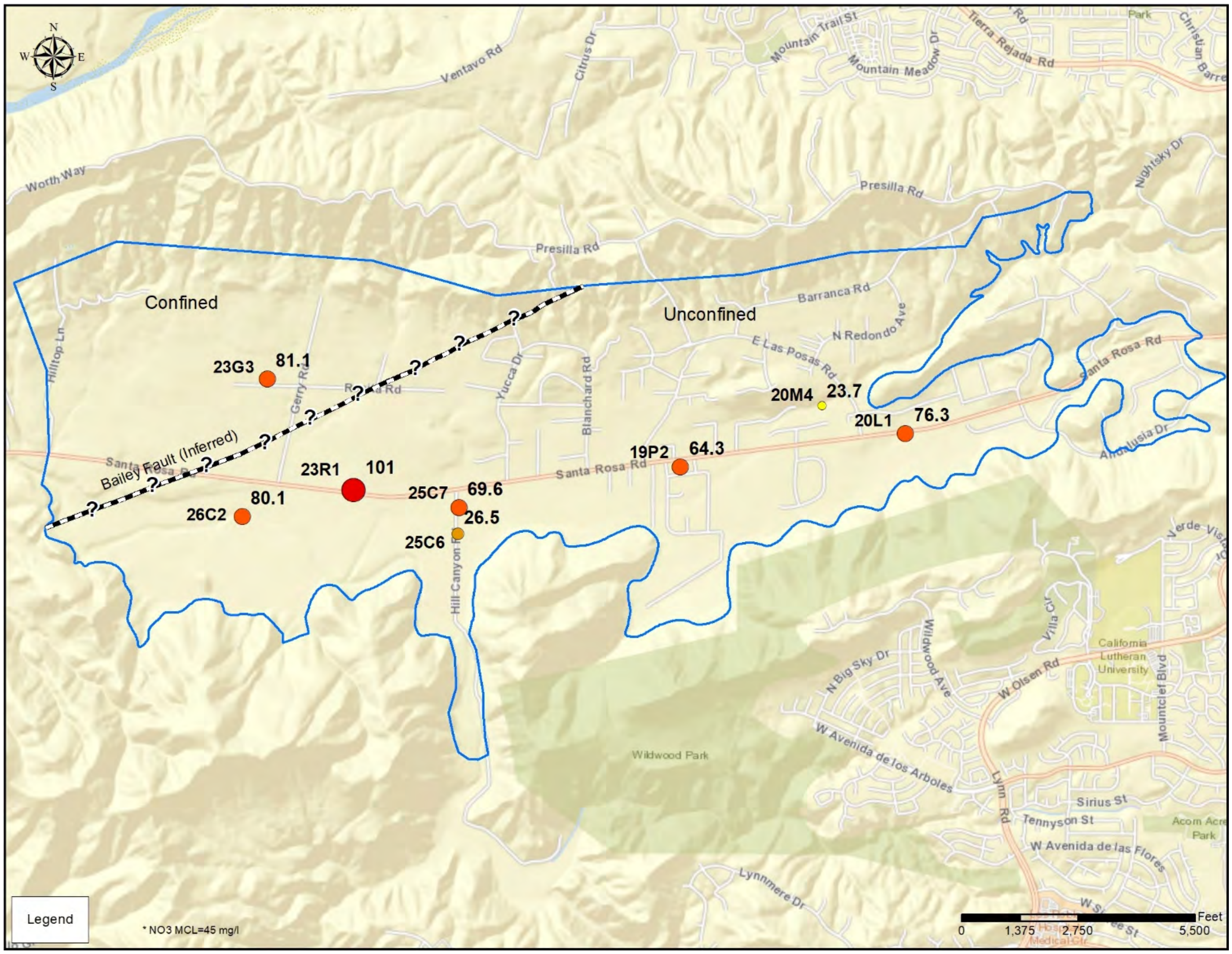

Figure 4-8: Arroyo Santa Rosa Basin nitrate concentrations for 2019.

ARROYO SANTA ROSA VALLEY BASIN
2010 – 2019 Nitrate Concentrations

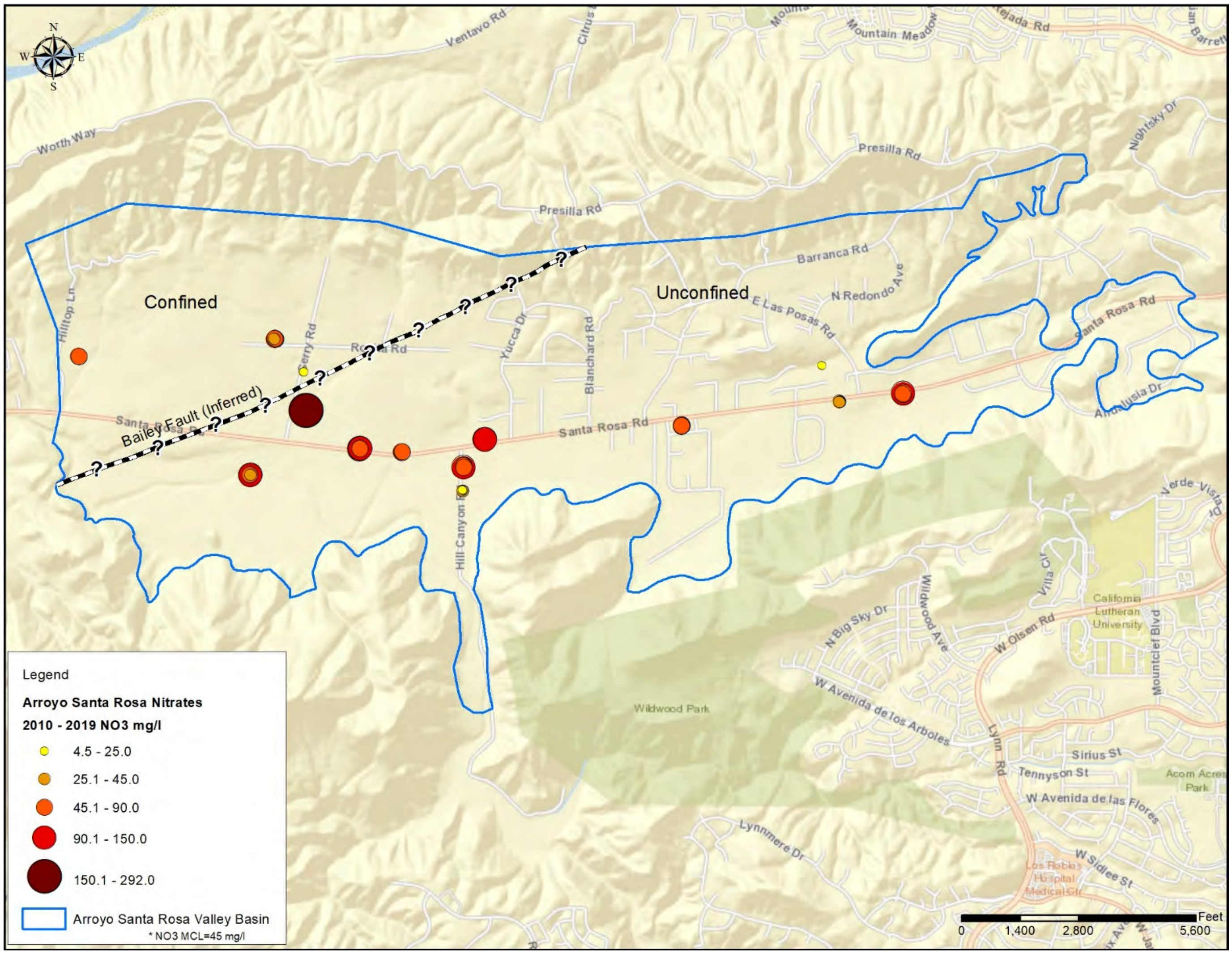

Figure 4-9: Arroyo Santa Rosa nitrate concentrations for 2010 – 2019.

4.4.2 Carpinteria Basin (DWR Basin No. 3-018)

Previous Annual Reports used the North Coast Basin boundary (a County of Ventura-defined area) for wells in the very western extent of the County. DWR Bulletin 118 designates this part of the County as the Carpinteria Basin and DWR designation is used in this Annual Report. The Ventura County portion of the Basin consists of narrow, thin strips of permeable sediments and marine terrace deposits along the coastline from Rincon Creek to just northwest of the Ventura River. There are 18 water supply wells in the Ventura County portion of the basin, of which 5 are active and primarily located in the northwestern area along Rincon Creek. Water samples were collected from two wells at the northwestern end of the Ventura County portion of the basin. The Piper diagram in **Figure E-4** shows little variation in the water quality of wells sampled in 2019. Magnesium is the dominant cation in both samples. Sulfate is the dominant anion in one sample with no dominant anion in the other sample, but this sample plots closely to sulfate. The water in both samples was magnesium-sulfate type.

Both samples had TDS and sulfate concentrations above the SMCL (**Table 4-6**). **Figure 4-10** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate. No samples were analyzed for Title 22 metals.

Table 4-6: Selected water quality results for the Carpinteria Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
25N6	9/10/2019	1	**950**	**260**	31	0.4
35G1	9/10/2019	12.7	**670**	**268**	91	0.4

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

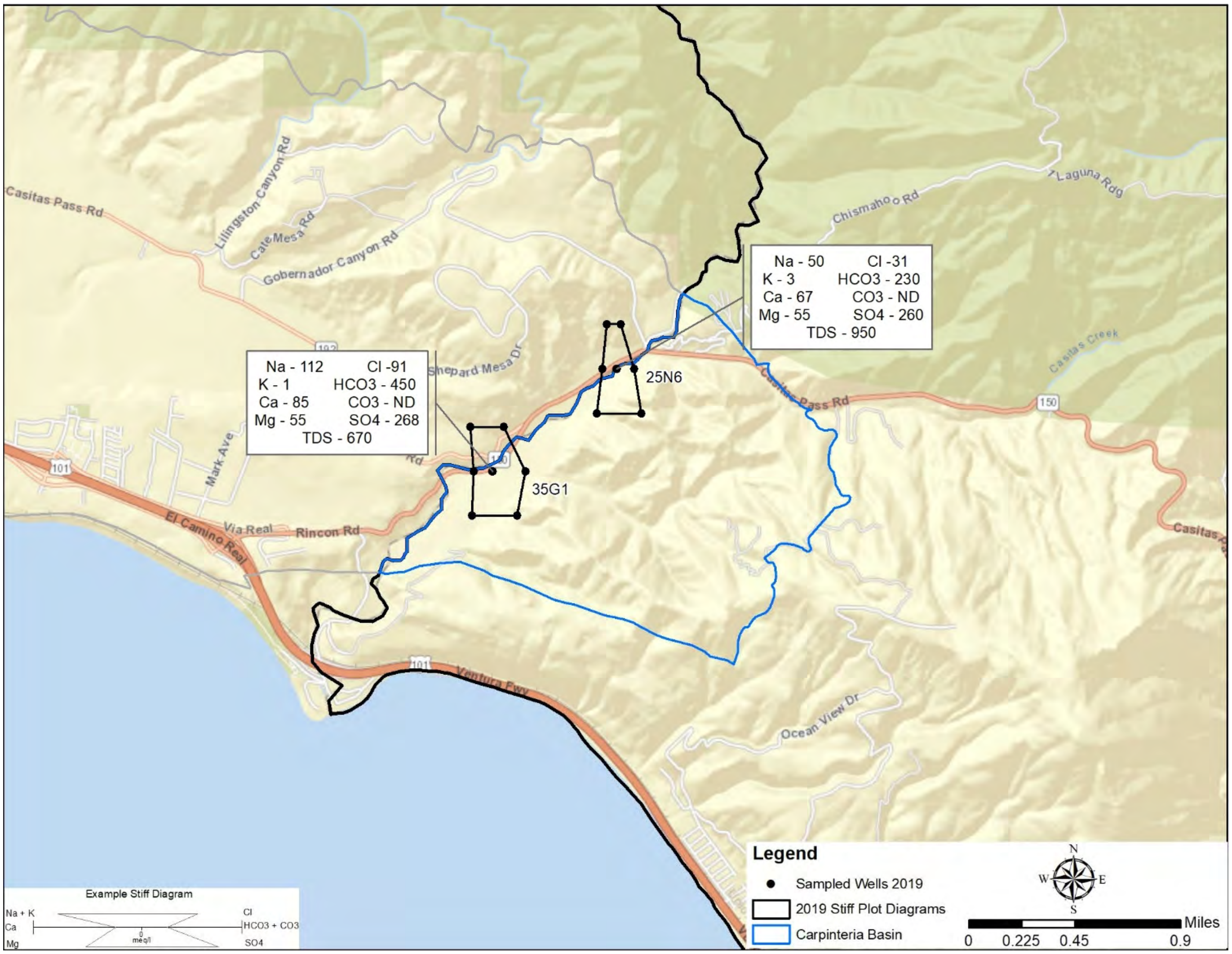

Figure 4-10: Carpinteria Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.3 Conejo Basin (DWR Basin No. 4-010)

The Conejo Basin has few active water wells available for sampling. The depth to groundwater averages about 50 feet bgs. The water-bearing units in the basin are Quaternary alluvium and the Modelo, Topanga and Conejo Formations. The quaternary alluvium is generally only a few feet thick except near Newbury Park and Thousand Oaks where it can reach up to 60 feet in thickness; however, the alluvium is not the main water-bearing unit in the basin. The Miocene age Topanga and Conejo Formations are coeval and intercalated, or the same age and interbedded. Within the Conejo Basin area, the Topanga formation contains sandstone, conglomerate and shale. The Conejo Formation consists of volcanic tuff, debris flow, and basaltic flow and breccia deposits that reach 13,000 feet thick. The high porosity of the fractured basaltic flows allows production from these units. There are approximately 431 wells in the Conejo Basin of which 61 are active. One well from within the basin and one well from an area just outside the basin were sampled in 2019. The Piper diagram in **Figure E-22** shows little variation in the water quality of wells sampled in 2019. Magnesium is the dominant cation in one sample with no dominant cations in the other. The other sample plots closely to magnesium. Bicarbonate is the dominant anion in one sample and sulfate is the dominant anion in the other sample. The water in one sample is magnesium-sulfate type and the other is magnesium-bicarbonate.

Both samples had TDS and one had sulfate concentrations above the SMCL (**Table 4-7**). **Figure 4-11** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-7: Selected water quality results for the Conejo Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
8G2	11/21/2019	ND	**1350**	**494**	135	0.2
3J1 (outside basin)	9/20/2019	11.8	**810**	150	121	0.2

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

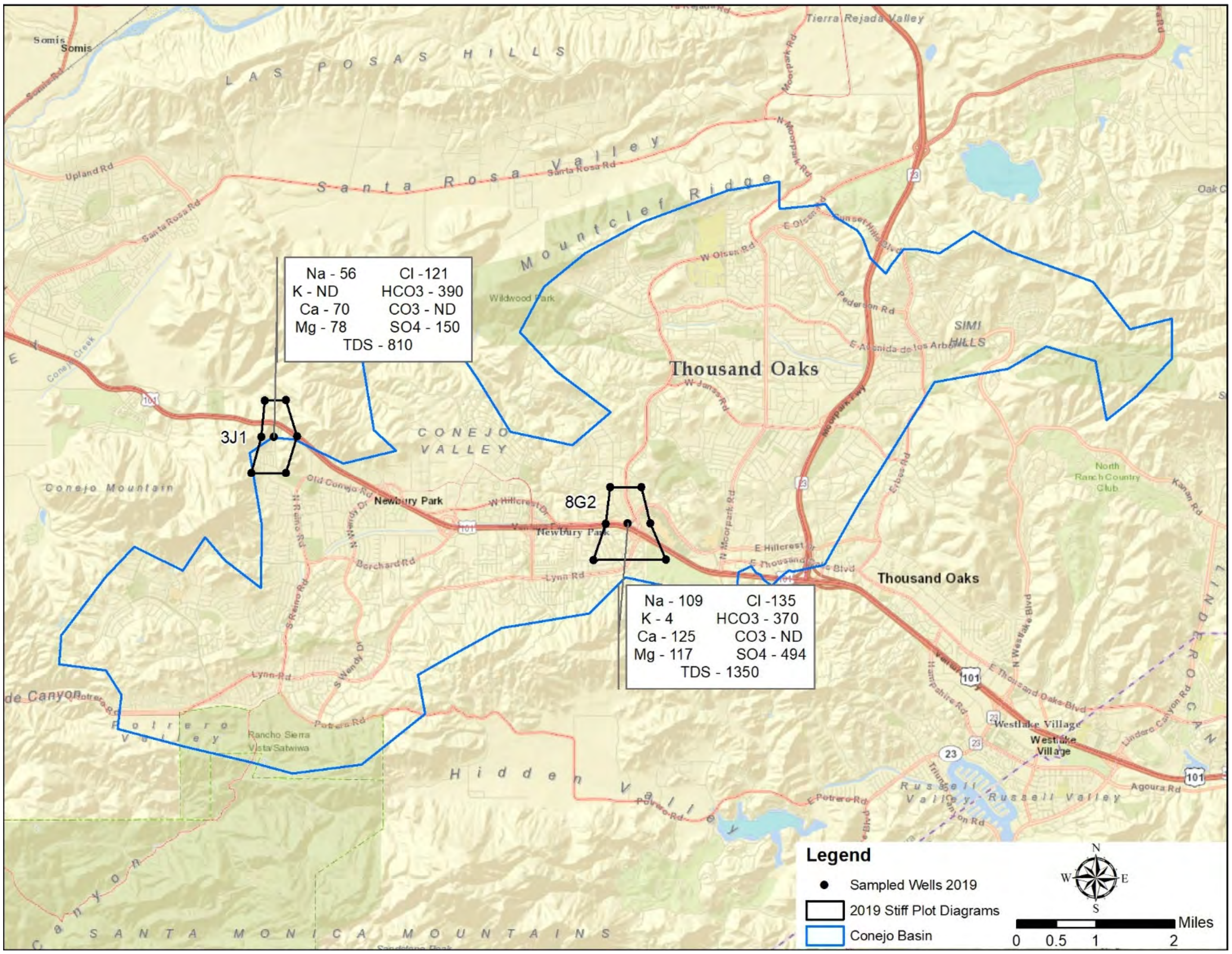

Figure 4-11: Conejo Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.4 Cuddy Ranch Area Basin (DWR Basin No. 5-083)

The Cuddy Ranch Area Basin is in the northeastern part of Ventura County near the Kern County boundary. Two faults contribute to the formation of the basin. The east-west trending San Andreas fault zone and Tecuya Mountain bound the north portion. The southwest trending Big Pine Fault and associated splays bound and underlie the southern portion of the basin. The portion of the basin adjacent to the Big Pine Fault zone is locally known as Little Cuddy Valley. Water-bearing units consist of recent alluvial sand and gravel overlying shallow bedrock, permeable sands and gravels in the Quaternary and Tertiary sandstones, and highly fractured igneous or metamorphic rocks. Depth to water-bearing material is approximately 20 to 30 feet bgs. Historically, groundwater quality has been considered very good. There are approximately 25 water supply wells in the Little Cuddy Valley Basin of which 18 are active. One well was sampled in 2019. The Piper diagram in **Figure E-23** shows little variation in the water quality. Magnesium is the dominant cation in the sample. Sulfate is the dominant anion in the sample. The water in the sample is magnesium-sulfate type.

The sample was analyzed for Title 22 metals and gross alpha. No constituents were above the MCL (**Table 4-8**). **Figure 4-12** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-8: Selected water quality results for the Cuddy Ranch Area Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
4N2	11/19/2019	1.4	360	15.5	25	0.1

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

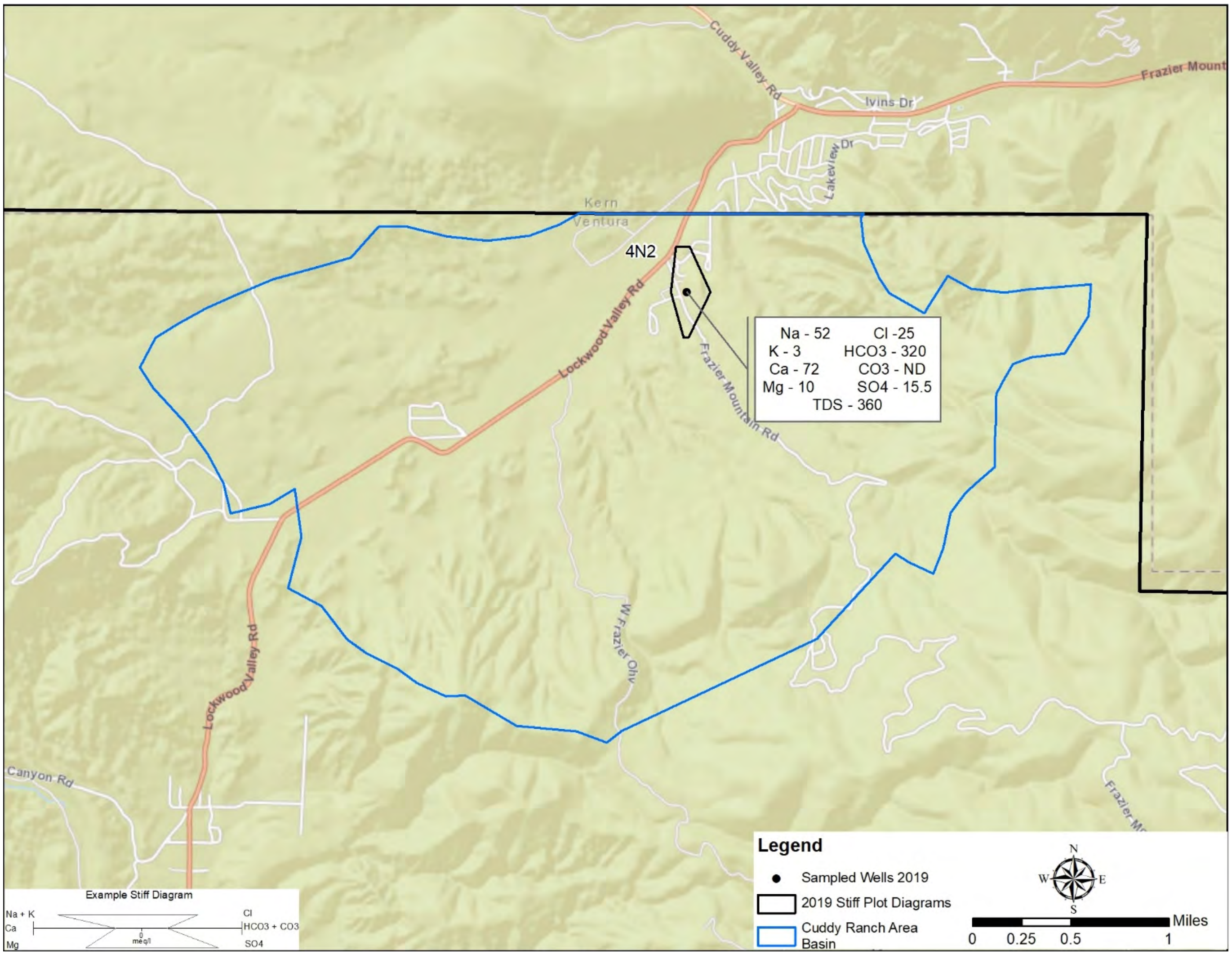

Figure 4-12: Cuddy Ranch Area Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.5 Cuyama Valley Basin (DWR Basin No. 3-013)

The Cuyama Valley Basin is in a remote area in northwestern Ventura County. The map in **Figure 4-13** shows only the portion of the basin that is in Ventura County. There are approximately 137 water supply wells in the Basin, of which 99 are active. Depth to the main water-bearing unit varies between 40 to 170 feet bgs. Four wells were sampled in the basin in 2019. The Piper diagram in **Figure E-24** shows low variability in water quality. Sodium is the dominant cation in three samples and there is no dominant anion in the fourth sample but it plots close to calcium. Sulfate is the dominant anion in one sample. Three samples have no dominant anion but two plot close to sulfate and one plots close to chloride. The water in one sample is calcium sulfate type; the water in one sample is sodium chloride type and the water in two samples is sodium sulfate type. One water sample was analyzed for Title 22 metals. No constituents were above the MCL (**Table 4-9**)

All four samples had TDS and one sample had sulfate concentrations above the SMCL (**Table 4-9**). **Figure 4-13** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 4-9: Selected water quality results for the Cuyama Valley Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
15P1	11/19/2019	2.9	**2000**	**1160**	8	0.2
17G2	11/19/2019	ND	**720**	189	93	0.4
30E05	11/19/2019	5.3	**1050**	196	238	0.7
33J3	11/19/2019	11.8	**880**	232	126	0.5

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

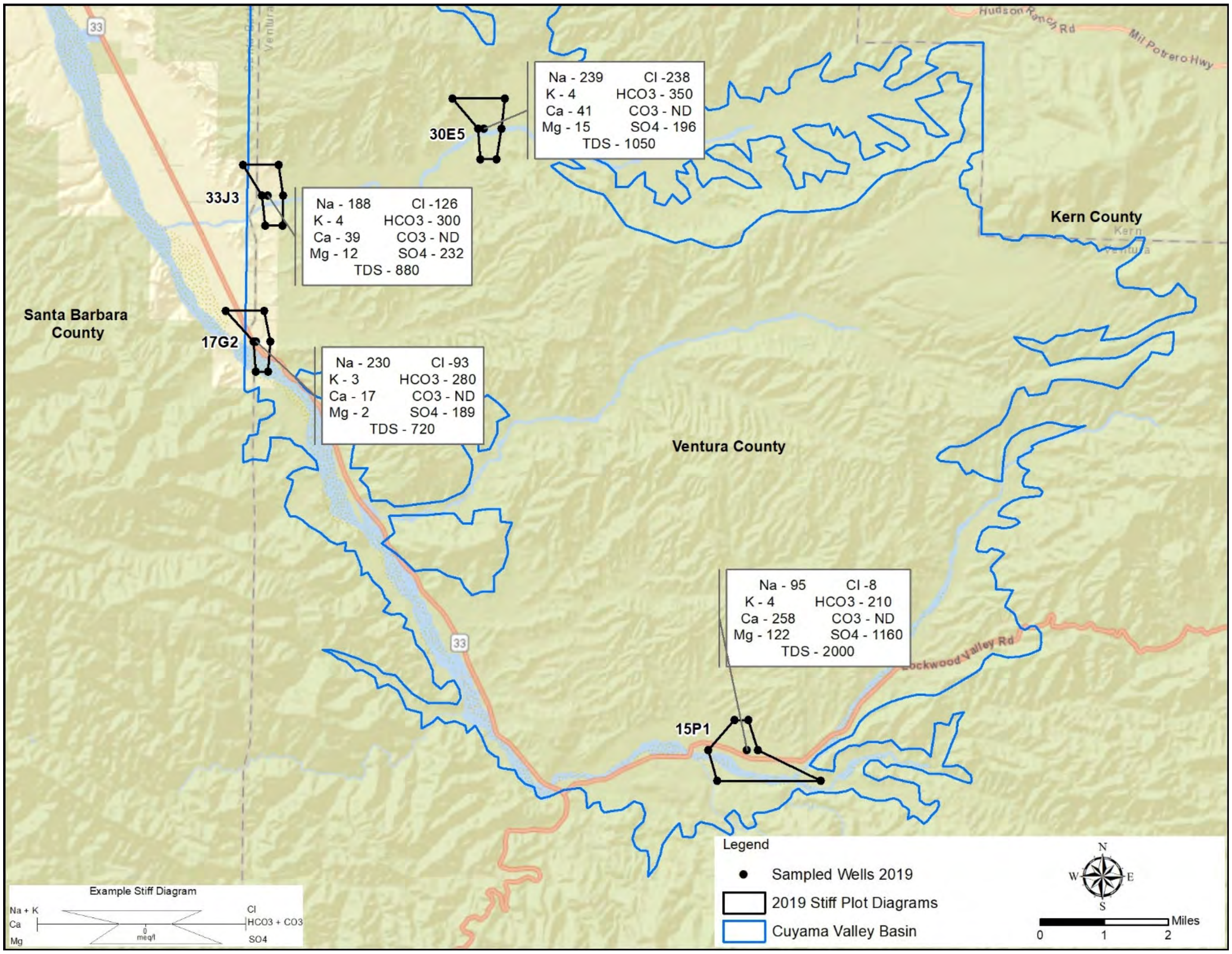

Figure 4-13: Cuyama Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.6 Santa Clara River Valley Basin - Fillmore Subbasin (DWR Basin No. 4-004.05)

The Fillmore Subbasin, though small in geographic area, has a total aquifer thickness of almost 8,000 feet in various locations. Despite the depth of the subbasin, County records indicate that water wells are generally no deeper than 950 feet. Water quality can vary greatly depending on the depth of a well. Shallow groundwater is generally younger and recharged by river flows. Deeper groundwater is older and has acquired its aqueous chemistry through dissolution of constituents from the surrounding lithology. There are approximately 608 water supply wells in the Fillmore Subbasin, of which 443 are active. Historically, nitrate concentrations have been elevated, but only one of the nine wells sampled in 2019 showed elevated nitrate concentration relative to the primary MCL (**Table 4-10**). The Piper diagram in **Figure E-5** shows moderate variability in water quality of wells sampled in 2019. The dominant cation in six samples is calcium with no dominant cation for the remainder of the samples, but the data plots closest to a calcium cation type. Bicarbonate is the dominant anion in one sample. Sulfate is the dominant anion for seven samples. One sample has no dominant anion but plots close to sulfate. One water sample is calcium bicarbonate type, and the remaining fourteen samples are calcium sulfate type.

TDS concentrations in water from all fifteen wells sampled this season range from 740 to 2,400 mg/L and all fifteen exceed the SMCL. Fourteen water samples exceed the sulfate SMCL and water from two wells exceeds the manganese SMCL. The water in three wells has nitrate concentrations greater than the MCL for drinking water. Water samples from four wells were analyzed for Title 22 metals. All Title 22 metals concentrations were below the MCL for drinking water. Water quality tends to degrade in the southeastern portion of the subbasin in the vicinity of the Oak Ridge fault. another agency reported an elevated gross alpha concentration in a well. Four wells were sampled for Gross Alpha; two in the west end of Fillmore and two in Bardsdale. None of the samples analyzed exceeded the MCL for drinking water. **Figure 4-14** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate. Water samples from all wells sampled in the Fillmore, Santa Paula and Piru subbasins were compared in a Piper diagram in **Figure E-14**. The Piper diagram shows moderate variability and the data from the three subbasins show little variation. The water in the Fillmore Subbasin is calcium sulfate type.

Table 4-10: Selected water quality results for the Fillmore Subbasin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
6D2	11/14/2019	13.4	**1030**	**425**	67	0.6
6D3	11/14/2019	7.2	**980**	**405**	54	0.6
2R5	9/12/2019	30.4	**2400**	**1050**	**290**	1.4
9D1	9/12/2019	39.5	**1290**	**587**	79	0.8
1P8	9/12/2019	21.3	**1080**	**497**	49	0.6
19N01	9/17/2019	**51.7**	**1280**	**426**	122	0.5
31F1	9/11/2019	13.7	**970**	**382**	65	0.5
26D03	11/14/2019	43.4	**890**	**311**	51	0.4
26F01	11/4/2019	22	**880**	**331**	51	0.9

31H04	09/17/2019	23.8	**700**	232	22	0.1
31P01	09/17/2019	**75.9**	**1090**	**359**	49	0.1
32R03	11/04/2019	**70.4**	**1310**	**529**	55	0.2
36D06	09/12/2019	23.1	**1360**	**634**	71	0.7
36D07	11/20/2019	13.5	**1170**	**505**	71	0.6
36P04	09/11/2019	23	**1080**	**465**	55	0.5

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

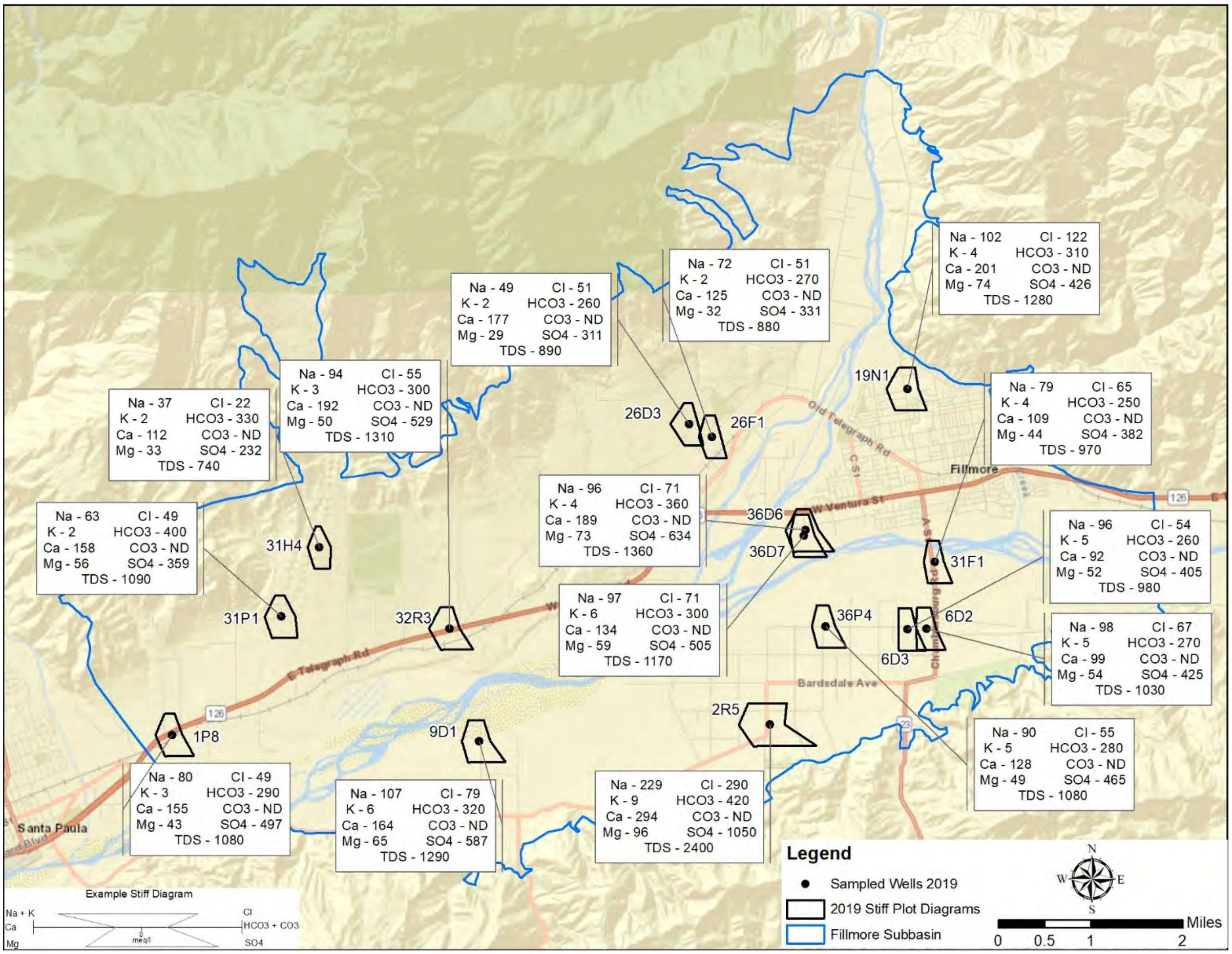

Figure 4-14: Fillmore Subbasin wells sampled with Stiff diagrams and selected inorganic constituents.

4.4.7 Las Posas Valley Basin (DWR Basin No. 4-008)

In previous annual reports the Las Posas Valley area was divided into three basins (east, west and south) using boundaries delineated by the County of Ventura. The California DWR Bulletin 118 basin boundaries designate one basin boundary for the whole valley. The geology of the basin causes differences in water levels and water quality between the east and the west areas of the basin. Because of this and other sustainable management factors, two management areas have been defined in the GSP for the Fox Canyon Groundwater Management Agency (FCGMA). The West Las Posas Management Area (WLPMA) encompasses what was formerly the West Las Posas Basin area and the East Las Posas Management Area (ELPMA) encompasses the area that was formerly the East Las Posas Basin and the South Las Posas Basin. The management area boundaries are defined in the GSP for the FCGMA.

4.4.7.1 Las Posas Valley Basin – East Management Area

Water-bearing units of the ELPMA consist of Quaternary and Pleistocene alluvial deposits of varying thickness. Water-bearing deposits consist primarily of sand, or a mixture of sand and gravel identified as the Fox Canyon Aquifer and is the basal member of the San Pedro Formation (Stokes, 1971). The Fox Canyon Aquifer is generally considered to be confined in the ELPMA. Data indicate the Fox Canyon Aquifer receives recharge from leakage from overlying aquifers (FCGMA 2007 Basin Management Plan) and the exact hydrogeologic continuity is not well understood. The Somis fault acts as a hydrogeologic boundary between the ELPMA and WLPMA. Depth to the upper water-bearing unit is approximately 120 to 150 feet bgs and 530 to 580 feet bgs to the lower water-bearing unit. There are approximately 397 water supply wells in the ELPMA, of which 164 are active wells.

The Piper diagram in **Figure E-6** shows moderate variability in water quality between 15 wells sampled in 2019. Calcium is the dominant cation in seven samples and there are no dominant cations in the other samples, but they plot close to the calcium type. Sulfate is the dominant anion in seven samples, bicarbonate is the dominant anion in five samples and the three remaining samples have no dominant anion. The water in five wells is calcium bicarbonate type and the water in the remaining 10 wells is calcium sulfate type. Of the 15 wells sampled in the ELPMA, two wells located in the southwestern area near the Arroyo Las Posas had different water chemistry. TDS, sulfate, and chloride concentrations were higher than that in the other water samples. Chloride concentrations in five water samples were above the level that can cause impairment of agricultural beneficial uses for sensitive plants. The two southwestern wells have the highest chloride concentration. None of the wells had chloride concentrations that exceed the primary MCL for drinking water. The remainder had good water quality with TDS ranging between 310 and 1,580 mg/L (**Table 4-11**).

The Piper diagram in **Figure E-21** shows a comparison between the ELPMA and WLPMA water chemistry. There is moderate variability in the water quality of the combined areas. Water samples from both management areas are grouped by those with sulfate as the dominant anion and plot as calcium sulfate type, and those with no dominant anion but plot near the bicarbonate type and calcium bicarbonate type. The water chemistry of both management areas is similar, although based on the sharp change in water level between the ELPMA and WLPMA, the degree of hydrogeologic connection appears to be limited.

TDS was above the SMCL in nine wells, ranging from 320 to 1,600 mg/L (**Table 4-11**). Water from two wells had a nitrate concentration above the primary MCL. Nine samples had sulfate concentrations above the SMCL and two samples had manganese concentrations above the MCL. Water from four wells was analyzed for Title 22 metals and all constituents were below the MCLs. **Figure 4-15** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-11: Selected water quality results for the Las Posas Valley Basin – East Las Posas Management Area.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
7B2	9/25/2019	6.2	**1310**	**492**	156	0.9
1Q1	9/25/2019	28.4	**1250**	**426**	147	0.8
4B1	11/8/2019	ND	450	148	14	ND
4F1	11/8/2019	ND	**880**	322	76	0.1
4R3	10/25/2019	ND	**1360**	**528**	151	0.4
9Q7	10/25/2019	22.5	**1600**	**620**	191	0.7
16B6	10/3/2019	0.5	**1370**	**558**	182	0.8
29K6	10/30/2019	**70**	410	30	41	ND
29K8	11/1/2019	18.5	460	128	29	0.1
30E6	11/4/2019	5.8	320	73.6	14	ND
26H1	11/25/2019	32.1	**560**	106	57	0.1
28J4	11/4/2019	**53.6**	**570**	126	43	0.2
34G1	11/6/2019	ND	410	127	12	ND
34L2	11/8/2019	ND	**850**	**304**	69	0.3
36P1	11/8/2019	13.6	490	162	25	0.2

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

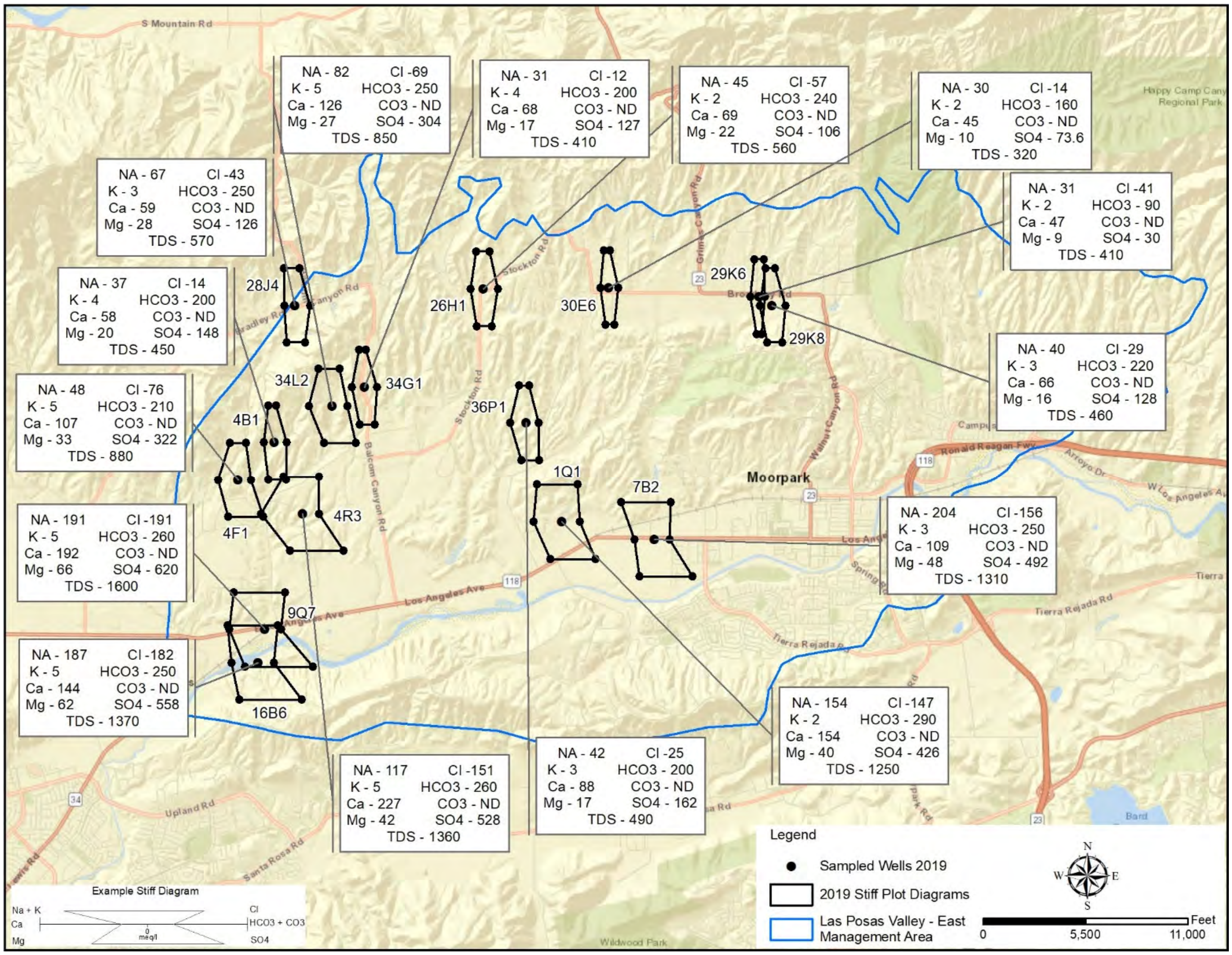

Figure 4-15: Las Posas Valley Basin ELPMA, sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.7.2 Las Posas Valley Basin – West Las Posas Management Area

There are approximately 162 water supply wells in the WLPMA of the Las Posas Valley Basin, of which 88 are active. Eighteen wells within the WLPMA were sampled in 2019. The Piper diagram in **Figure E-7** shows moderate variability in water quality. Calcium is the dominant cation in two samples, sodium is the dominant cation in one sample and there is no dominant cation in the remaining samples. Bicarbonate is the dominant anion in four samples, and sulfate is the dominant anion in six samples. There is no dominant anion in the remaining sample, but it plots closely to the sulfate anion type. The water in three wells is calcium bicarbonate type, one is sodium bicarbonate type, and the remainder are calcium sulfate type.

TDS is above the SMCL in 16 wells, ranging from 320 to 2,340 mg/L (**Table 4-12**). Water from three wells had nitrate concentrations above the primary MCL. Nine samples had sulfate concentrations above the SMCL and eight samples had manganese concentrations above the MCL. Water from three wells was analyzed for Title 22 metals. Selenium concentration was above the MCL for drinking water. All constituents were below the MCLs. **Figure 4-16** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-12: Selected water quality results for the Las Posas Basin - West Las Posas Management Area.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
6J1	11/25/2019	ND	**650**	208	17	ND
7R3	10/25/2019	ND	320	92.9	15	ND
17L1	10/9/2019	19.1	**1360**	**531**	159	0.6
4Q2	11/4/2019	36.4	**600**	117	58	0.2
8H3	10/29/2019	17.3	**730**	222	67	0.4
9N1	10/29/2019	2	**920**	**326**	68	0.5
10Q4	11/4/2019	ND	**770**	**285**	35	0.2
11A2	10/29/2019	**139**	**1500**	**491**	149	0.3
11A3	10/29/2019	ND	**560**	181	35	0.2
12H2	11/13/2019	38.4	**610**	167	68	0.2
13A1	10/3/2019	3.5	470	161	14	ND
15M4	9/25/2019	14.7	**1070**	**425**	83	0.3
17F5	10/29/2019	0.7	**1030**	**413**	65	0.6
17N3	10/25/2019	13.4	**770**	242	69	0.4
18H1	10/29/2019	**162**	**2340**	**1010**	128	0.9

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
18H12	10/29/2019	0.4	**980**	**423**	54	0.6
18H14	10/29/2019	ND	**880**	**354**	49	0.4
35P2	11/4/2019	**63**	**850**	193	80	0.2

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

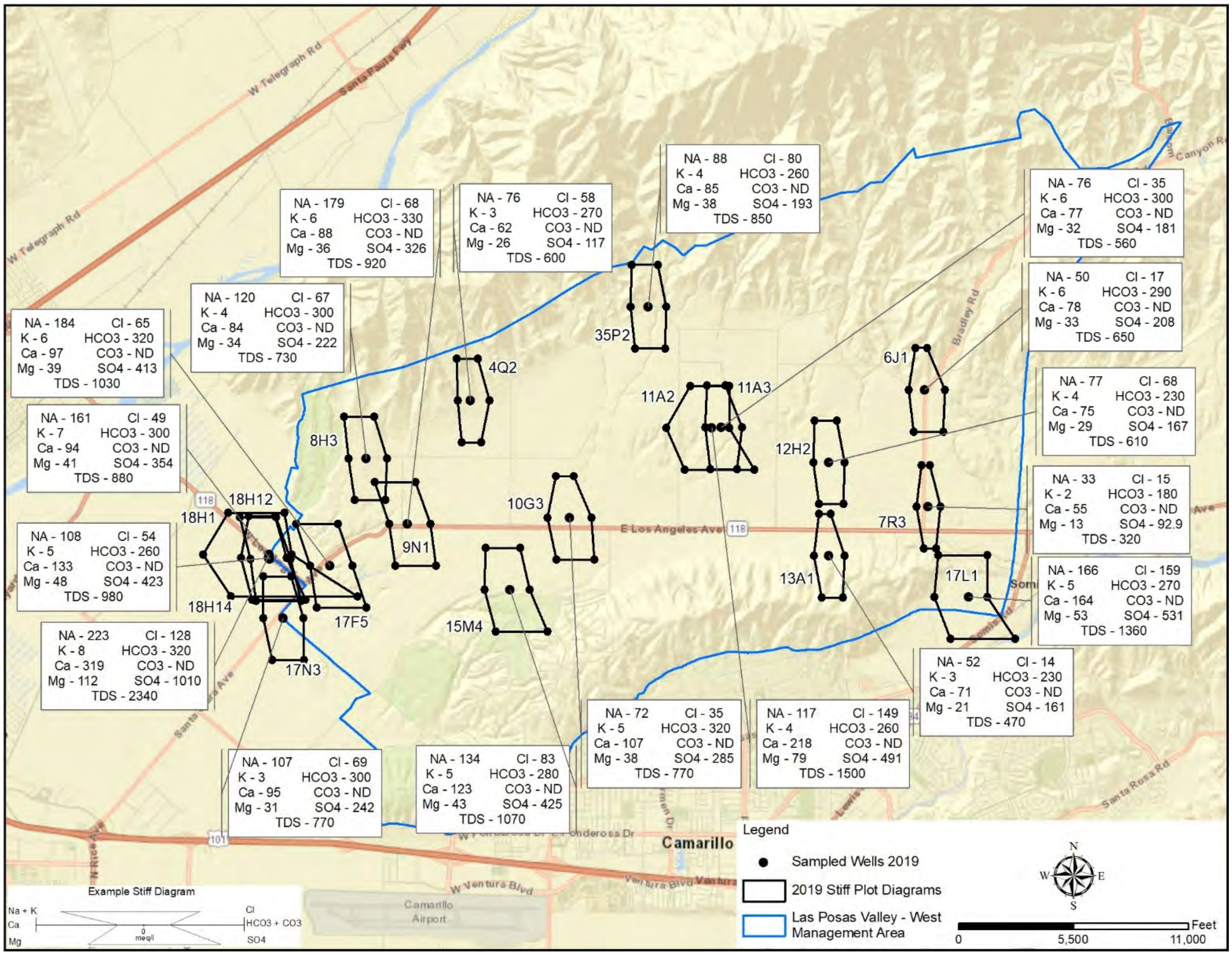

Figure 4-16: Las Posas Valley Basin WLPMA sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.8 Lockwood Valley Basin (DWR Basin No. 4-017)

The Lockwood Valley Basin groundwater quality ranges from good to poor. The Basin covers a geographic area of 34.1-square miles. Water-bearing units consist of Quaternary alluvium, Tertiary sedimentary rocks and Quaternary stream channel alluvium. The Tertiary sedimentary rocks have high silt and clay content, resulting in low permeability. The alluvial material consists primarily of silty and clayey sands, gravels and boulders and has a much higher permeability than the underlying Tertiary sedimentary rocks. The Quaternary stream channel alluvium, prevalent near existing stream channels, contain a smaller percentage of clays and silts and wells penetrating this material tend to be higher yielding producers. Depth to water-bearing units range from 55 to 60 feet bgs. There are approximately 291 water supply wells in the Lockwood Valley Basin, of which 247 are active. Four wells were sampled in the basin in 2019. The Piper diagram in **Figure E-25** shows high variation in groundwater chemistry of the wells sampled this year. Sodium is the dominant cation in one sample and calcium is the dominant cation in one sample with the remaining two samples plotting close to calcium type. Bicarbonate is the dominant anion in two samples and sulfate is the dominant anion in two samples. One sample is calcium bicarbonate, one sample is sodium bicarbonate type and two samples are calcium sulfate. One water sample was analyzed for Title 22 metals and gross alpha. All constituents were below the MCL for drinking water.

All four samples had TDS and two samples had sulfate concentrations above the SMCL (**Table 4-13**). **Figure 4-17** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 4-13: Selected water quality results for the Lockwood Valley Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
29N2	11/19/2019	1.1	**1020**	**505**	6	2.1
29R7	11/19/2019	1.3	**780**	**282**	12	14.1
29R9	11/19/2019	9.6	**580**	224	6	0.9
33R3	11/19/2019	7.1	**510**	175	17	0.9

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

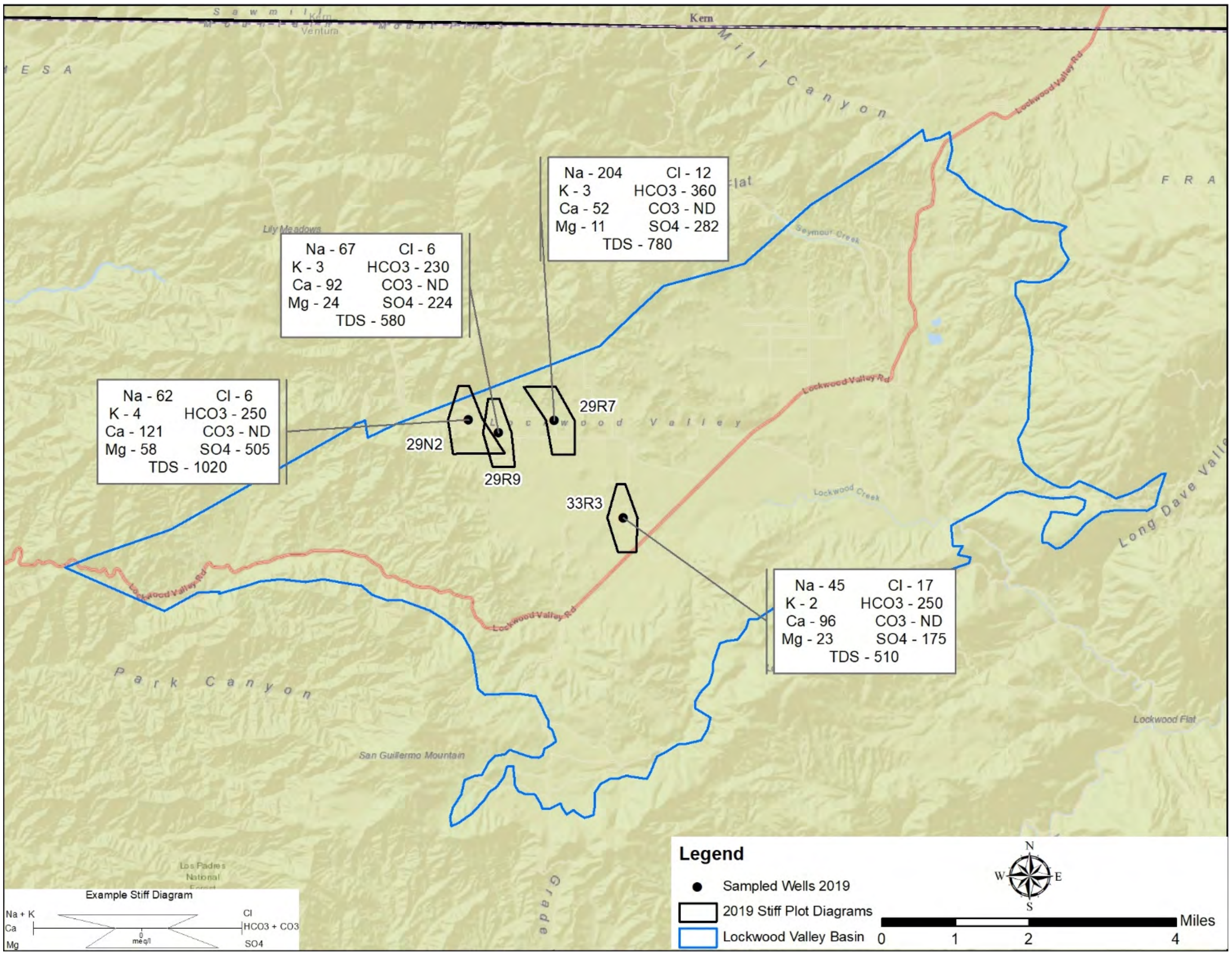

Figure 4-17: Lockwood Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.9 Santa Clara River Valley Basin - Mound Subbasin (DWR Basin No. 4-004.03)

The water-bearing units of the Mound Subbasin consist of Quaternary alluvium and the San Pedro Formation. These formations are divided into the Upper Aquifer System (UAS) and the Lower Aquifer System (LAS). The UAS consists of undifferentiated Holocene alluvium that make up the Oxnard Aquifer and older Pleistocene alluvium that makes up the Mugu Aquifer. The alluvium consists of silts and clays with lenses of sand and gravel, with a maximum thickness of 500 feet. The LAS predominantly consists of fine sands and gravels of the San Pedro Formation and extends as deep as 4,000 feet bgs. The upper part of the San Pedro formation consists of variable amounts of clay, silty clay and sand. A series of inter-bedded water-bearing sands in this unit are time equivalent to the Hueneme Aquifer of the Oxnard Subbasin. The lower part of the San Pedro Formation consists primarily of sand and gravel zones with layers of clay and silt and is equivalent to the Fox Canyon aquifer found in the Oxnard plain. Groundwater is generally unconfined in the alluvium and confined in the San Pedro Formation. Historic water quality data for the basin shows that water quality is generally better in the lower zone.

There are 85 water supply wells in the Mound Subbasin, of which 30 are active. Two wells were sampled in the subbasin in 2019. The Piper diagram in **Figure E-26** shows low variability in water quality of all the wells sampled this year. There is no dominant cation for either of the water samples, but they plot close to the calcium type. Sulfate is the dominant anion for both samples. Both samples are calcium sulfate type. One water sample was analyzed for Title 22 metals. All Title 22 constituents were below the MCL for drinking water.

Both samples had TDS and sulfate concentrations above the SMCL and one sample had elevated manganese. (**Table 4-14**). **Figure 4-18** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-14: Selected water quality results for the Mound Subbasin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
19M4	11/8/2019	16.4	**1200**	**512**	62	0.6
13K3	9/4/2019	40.5	**2240**	**1080**	110	0.6

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

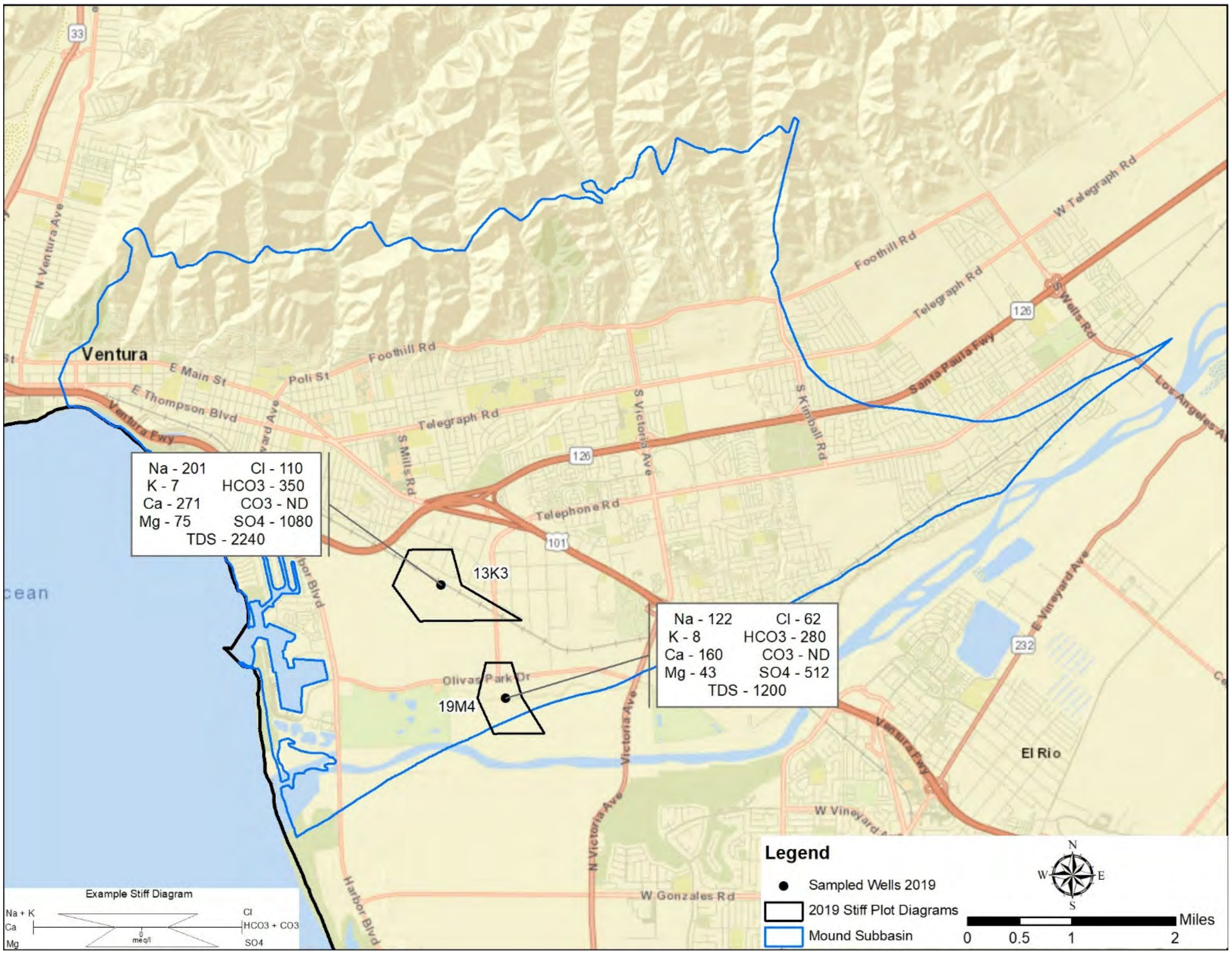

Figure 4-18: Mound Subbasin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.10 Ojai Valley Basin (DWR Basin No. 4-002)

The aquifer system of the Ojai Valley Basin is considered unconfined except in the western end of the basin where a semi-confining to confining clay layer is present. Water quality in the basin is considered good. There are approximately 323 water supply wells in the basin, of which 187 are active. Depth to water-bearing units is generally 25 to 30 feet bgs. The Piper diagram in **Figure E-8** shows low variation of the water quality for eight wells sampled in 2019. Calcium is the dominant cation in six samples; sodium is the dominant cation in one sample; and the remaining sample has no dominant cation but plots close to calcium type. Sulfate is the dominant anion in one sample, bicarbonate in three samples, chloride in one sample with no dominant anion in the remaining three samples but plotting closely to sulfate type. The water in one well is sodium bicarbonate type and the water in two wells is calcium bicarbonate type and the remaining five wells are calcium sulfate type.

Water from all eight wells had TDS concentrations above the SMCL. TDS concentrations range from 550 to 1250 mg/L. The Sulfate concentration in one well and the manganese concentration in one well exceed the SMCL. Water samples from two wells were analyzed for Title 22 metals. None of the constituents were above the primary MCL. **Figure 4-19** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate for wells sampled in the Ojai Valley Basin.

Table 4-15: Selected water quality results for the Ojai Valley Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
4P2	11/6/2019	38.9	**660**	203	27	ND
4Q1	10/10/2019	**48.3**	**660**	241	32	ND
5D3	11/6/2019	18	**670**	214	34	ND
1J3	11/6/2019	1.3	**550**	154	25	ND
1K2	10/10/2019	ND	**670**	210	47	ND
12B3	11/6/2019	ND	**1250**	149	**363**	ND
12H2	11/26/2019	33.5	**700**	203	24	ND
33J1	11/6/2019	ND	**570**	195	15	ND

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

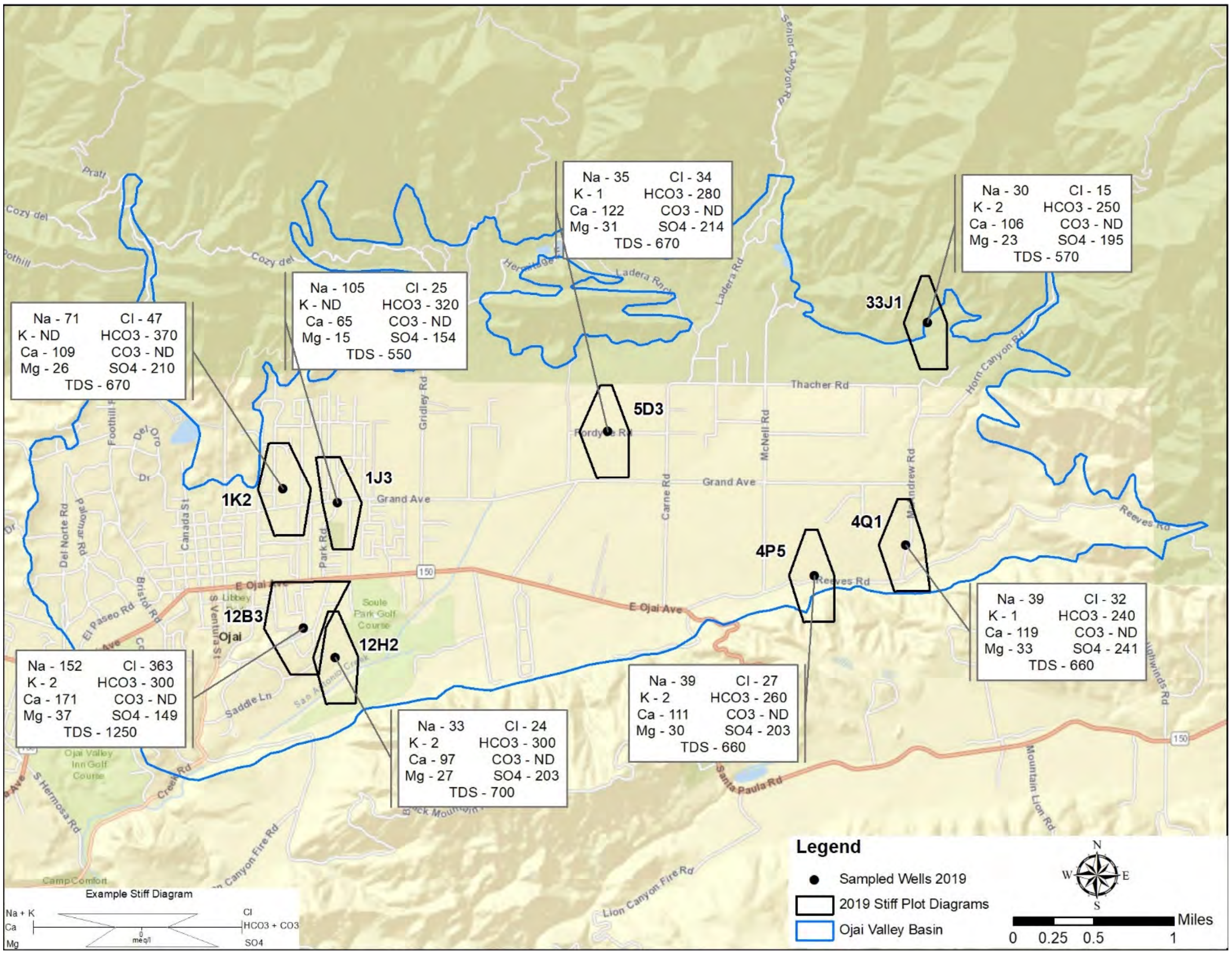

Figure 4-19: Ojai Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.11 Santa Clara River Valley Basin - Oxnard Subbasin (DWR Basin No. 4-004.02)

Previous Annual Reports divided the Oxnard Subbasin into two separate basins, the Oxnard Plain Forebay and the Oxnard Plain Pressure Basin. DWR Bulletin 118 groundwater basin boundaries are used in this Annual Report and the Forebay is included within the boundary of the Oxnard Subbasin. Because of the difference in UAS geology between the Oxnard Plain Forebay and the Oxnard Plain Pressure Basin, the Forebay is separated as a management area within the Oxnard Subbasin. The Oxnard Subbasin is the largest and most complex of the groundwater basins in Ventura County and consists of the UAS and the LAS. There are approximately 1,179 water supply wells in the Oxnard Subbasin, of which 465 are active.

From shallowest to deepest, the UAS consists of the Perched/Semi Perched, Oxnard and Mugu aquifers. Only the Oxnard and Mugu Aquifers are sampled in the UAS. The LAS, from shallowest to deepest, consists of the Hueneme, Fox Canyon and Grimes Canyon aquifers. There are no wells perforated solely in the Grimes Canyon aquifer, therefore it cannot be sampled exclusively.

4.4.11.1 Forebay Management Area

The Forebay Management Area is the principal recharge area for the UAS and LAS of the Oxnard Subbasin. Depth to water-bearing units is generally 25 to 50 feet bgs. There are approximately 280 water supply wells in the Forebay Management Area, of which 101 are active wells. The Forebay Management Area generally has acceptable water quality except in the southern area where high nitrate concentrations are common. The northern area is predominantly agricultural with a few residential areas that still rely on individual septic systems. Two wells were sampled in 2019 including one in the UAS and one in the LAS. The Piper diagram in **Figure E-28** shows low variability in water quality of the wells sampled this year. There is little difference between the upper and lower aquifers. Calcium is the dominant cation for the UAS sample. There is no dominant cation type for the LAS sample, but it plots close to the calcium type. Sulfate is the dominant anion for both. The water in both samples is calcium sulfate type. One water sample was analyzed for Title 22 metals

Both samples had TDS and sulfate concentrations above the SMCL. One sample had nitrate concentration above the MCL. (**Table 4-16**). **Figure 4-20** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-16: Selected water quality results for the Oxnard Subbasin Forebay Management Area.

Well No.	Date Sampled	Aquifer	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
7P4	10/24/2019	Oxnard / Mugu	ND	**1200**	**532**	66	0.5
23H7	10/29/2019	Hueneme / Fox Canyon / Grimes	**98**	**1670**	**712**	72	0.8

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

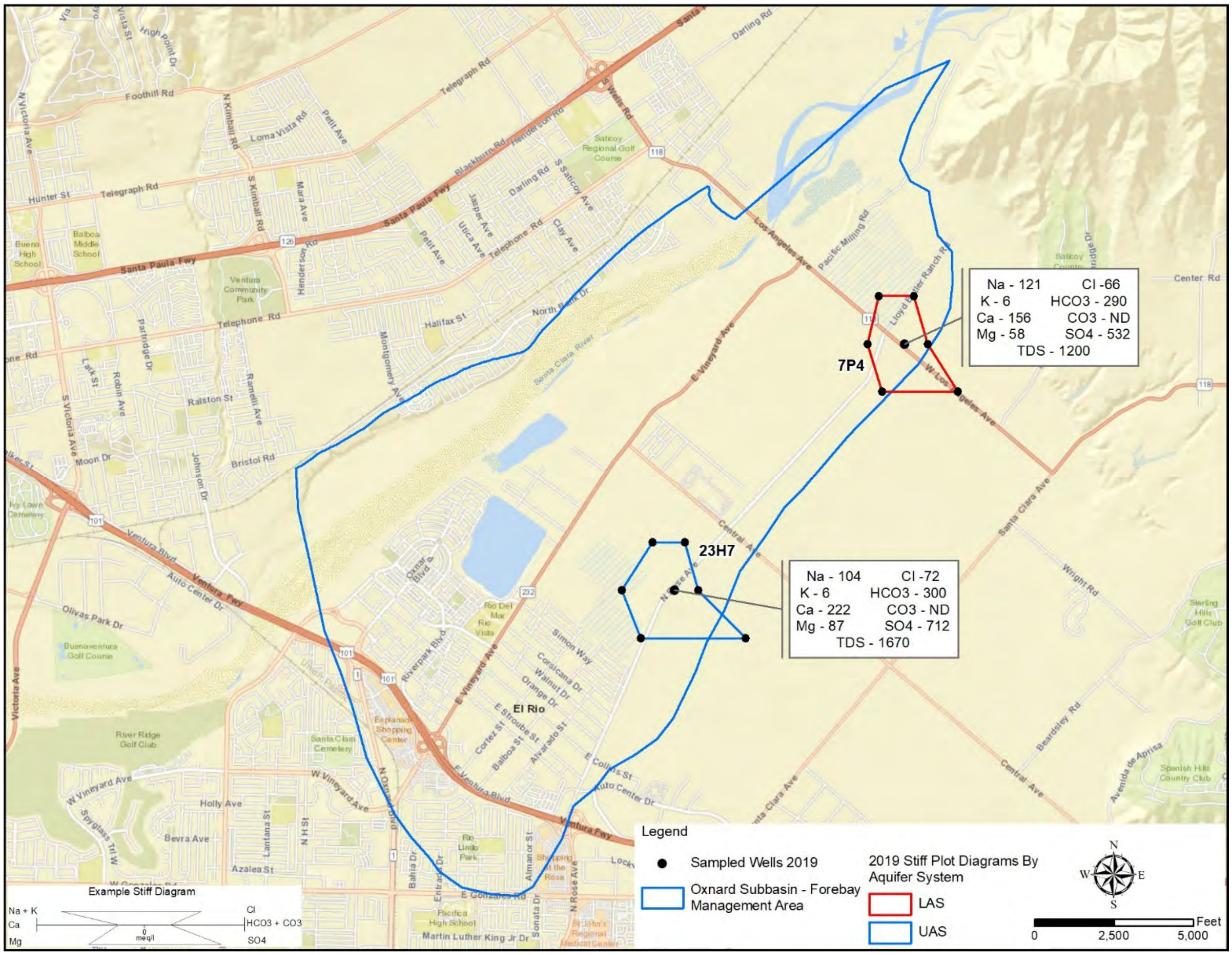

Figure 4-20: Oxnard Subbasin Forebay Management Area sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.11.2 Upper Aquifer System (UAS)

Oxnard Aquifer

The Oxnard Aquifer is the shallowest of the confined aquifers and the most developed, based on the number of wells. Average depth to the main water-bearing unit is 80 feet bgs.

Water from two wells had manganese concentrations above the SMCL. Water samples from all eight wells had TDS and sulfate concentrations above the SMCL. Sulfate concentrations range from 339 to 1030 mg/L. TDS concentrations range from 920 to 2,160 mg/L. Water from one well had a nitrate concentration above the primary MCL. Two of the samples were analyzed for Title 22 metals. **Figure 4-21** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-17: Selected water quality results for wells screened in the Oxnard Aquifer.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
29K2	10/17/2019	Oxnard	Upper	ND	**920**	**339**	54	0.7
3F7	9/4/2019	Oxnard	Upper	14	**1600**	**722**	83	0.7
6B1	9/4/2019	Oxnard	Upper	7.2	**1470**	**682**	70	0.8
25E1	10/29/2019	Oxnard	Upper	26.7	**2160**	**1030**	121	1
31B1	9/4/2019	Oxnard	Upper	20	**1070**	**453**	53	0.7
32C4	9/4/2019	Oxnard	Upper	33.1	**1060**	**439**	56	0.6
36E5	9/4/2019	Oxnard	Upper	**51.2**	**1660**	**795**	65	0.9
25M1	9/4/2019	Oxnard	Upper	2.6	**1040**	**465**	55	0.5

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

Groundwater plumes with elevated nitrate concentrations are common in the northern portion of the Subbasin. Sources of nitrate include nitrogen-based fertilizers in agricultural areas and septic systems in residential areas.

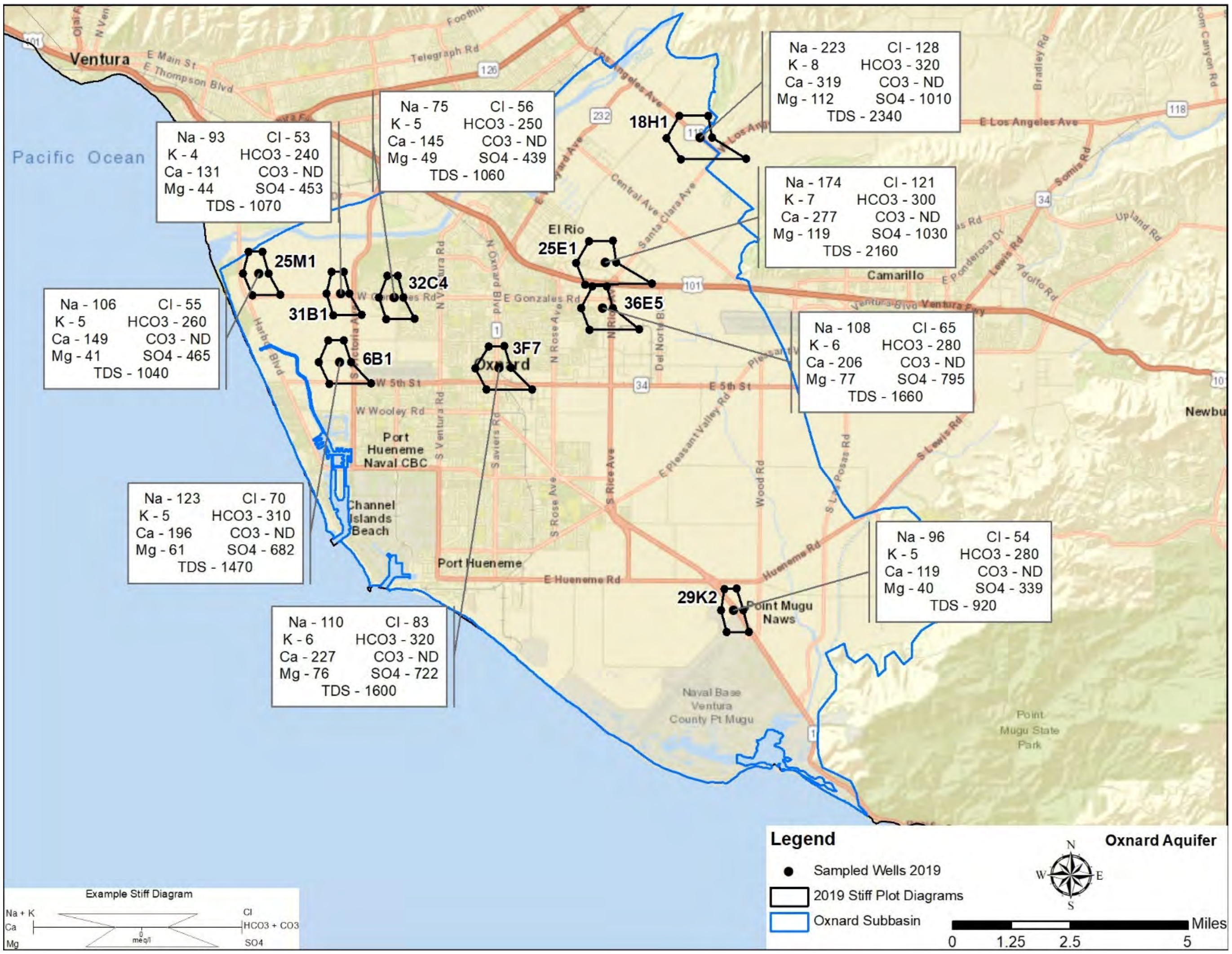

Figure 4-21: Oxnard Subbasin Oxnard Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

Mugu Aquifer

The Mugu Aquifer is the lowest layer of the UAS and has similar physical and chemical characteristics to the Oxnard Aquifer with slightly better water quality. Average depth to the main water-bearing unit is 200 feet bgs. Four wells perforated solely in the Mugu Aquifer were sampled in 2019. The water from all wells had sulfate and TDS concentrations above the primary MCL. One well had nitrate above the MCL. No samples were analyzed for Title 22 metals. Two wells had Manganese concentrations above the SMCL. **Figure 4-22** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-18: Selected water quality results for wells screened in the Mugu Aquifer.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
6R2	9/4/2019	Mugu	Upper	5.1	**1450**	**652**	70	0.8

24C3	10/16/2019	Mugu	Upper	ND	**920**	**402**	67	0.7
24M3	10/16/2019	Mugu	Upper	1.5	**1030**	**342**	119	0.7
36E4	9/4/2019	Mugu	Upper	**69.3**	**1670**	**749**	62	0.9

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

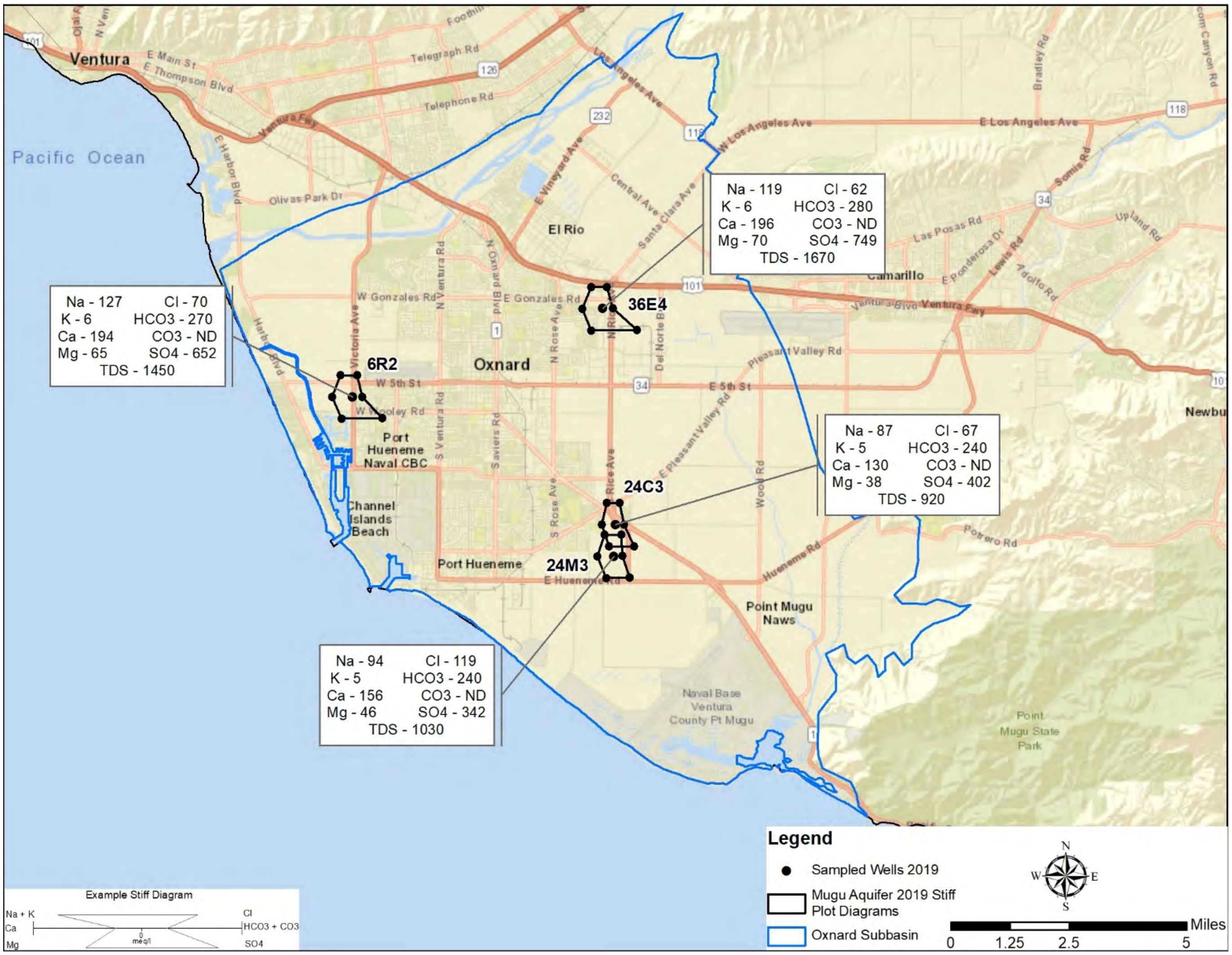

Figure 4-22: Oxnard Subbasin Mugu Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

Oxnard & Mugu Aquifers

Five Oxnard Subbasin wells that were sampled in 2019 are perforated across both the Oxnard and Mugu Aquifers and will be referred to as UAS wells. Results for those wells are included in **Appendix D** and shown on the map in **Figure 4-23**. SMCL concentrations were exceeded in four samples for manganese. All five had TDS and sulfate concentrations above the SMCL. TDS concentrations varied between 1050 and 5,630 mg/L. Two samples had chloride concentrations above the MCL. Water samples from two Oxnard/Mugu wells was analyzed for Title 22 metals and all constituents were below the primary MCL.

Table 4-19: Selected water quality results for wells screened across the Oxnard & Mugu Aquifers.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
28G1	11/6/2019	Oxnard & Mugu	Upper	ND	**2440**	**622**	**527**	0.6
29B3	10/16/2019	Oxnard & Mugu	Upper	ND	**1050**	**362**	105	0.6
12M1	10/16/2019	Oxnard & Mugu	Upper	ND	**1530**	**396**	43	0.9
25K1	10/24/2019	Oxnard & Mugu	Upper	ND	**5630**	**578**	**1770**	0.7
19P1	11/8/2019	Oxnard & Mugu	Upper	24.7	**1570**	**690**	84	0.6

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

The Piper diagram in **Figure E-9** shows a comparison of all wells sampled in the UAS and perforated in the Oxnard, Mugu or across both aquifers. There is no dominant cation, though the data plots closest to a calcium cation type. Four samples have no dominant anion but three plot closely to the sulfate type and one plots closely to the chloride type. Sulfate is the dominant anion for the remaining samples. The water in the UAS is best classified as a calcium sulfate type.

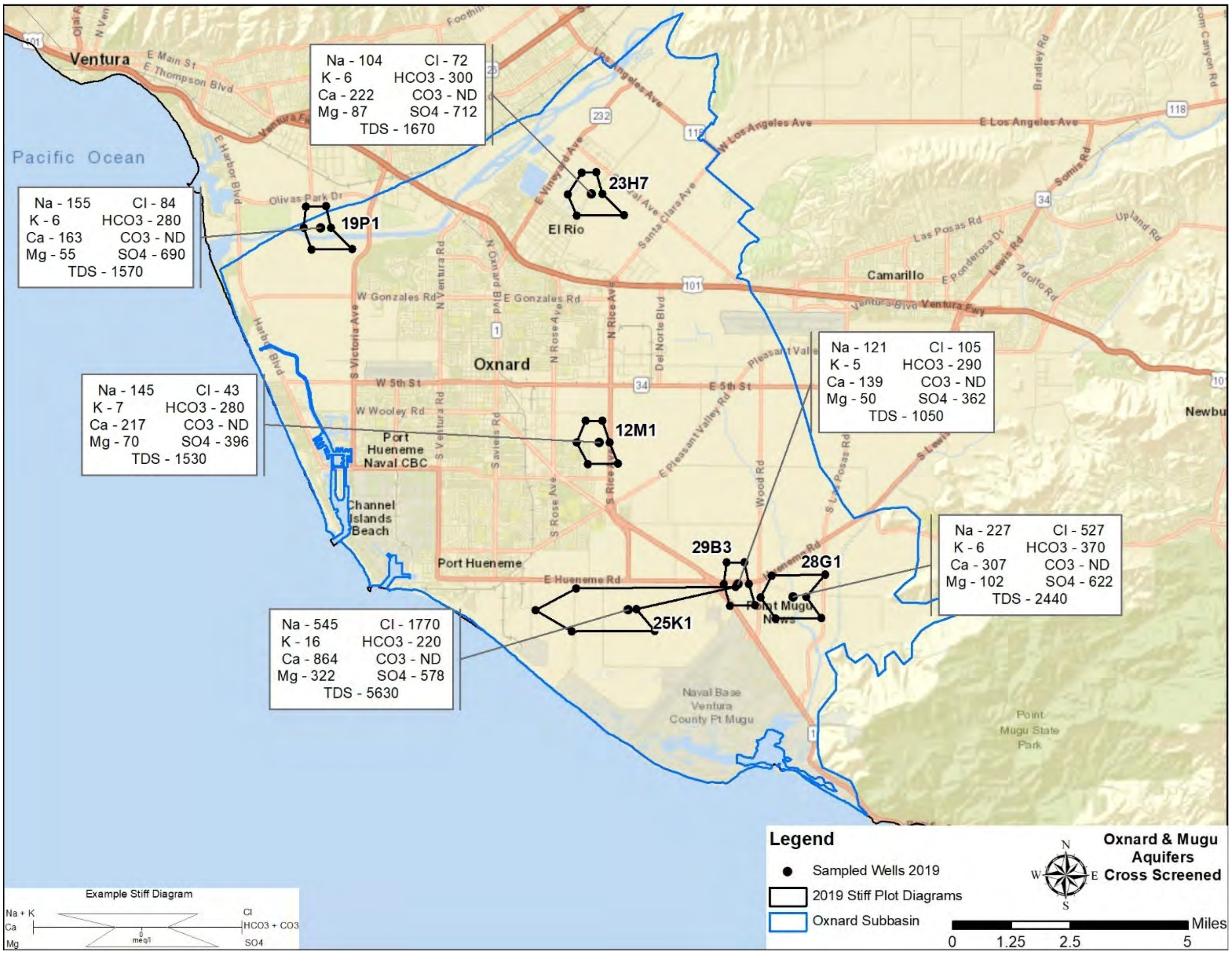

Figure 4-23: Oxnard Subbasin Oxnard & Mugu Aquifers cross-screened sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.11.3 Lower Aquifer System (LAS)

Hueneme Aquifer

The Hueneme Aquifer is the shallowest of the LAS aquifers with the depth to the main water-bearing unit at approximately 375 feet bgs. Few wells are perforated exclusively in the Hueneme Aquifer making water quality determination for the Aquifer difficult. Three wells screened solely in the Hueneme Aquifer were sampled in 2019 (**Figure 4-24**). All had TDS and sulfate concentrations above the SMCL. All three samples were analyzed for Title 22 metals.

Table 4-20: Selected water quality results for wells screened in the Hueneme Aquifer.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
30F3	11/13/2019	Hueneme	Lower	ND	**920**	**388**	44	0.6
36E2	9/4/2019	Hueneme	Lower	9.1	**990**	**449**	49	0.6
36E3	9/4/2019	Hueneme	Lower	ND	**910**	**416**	46	0.6

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

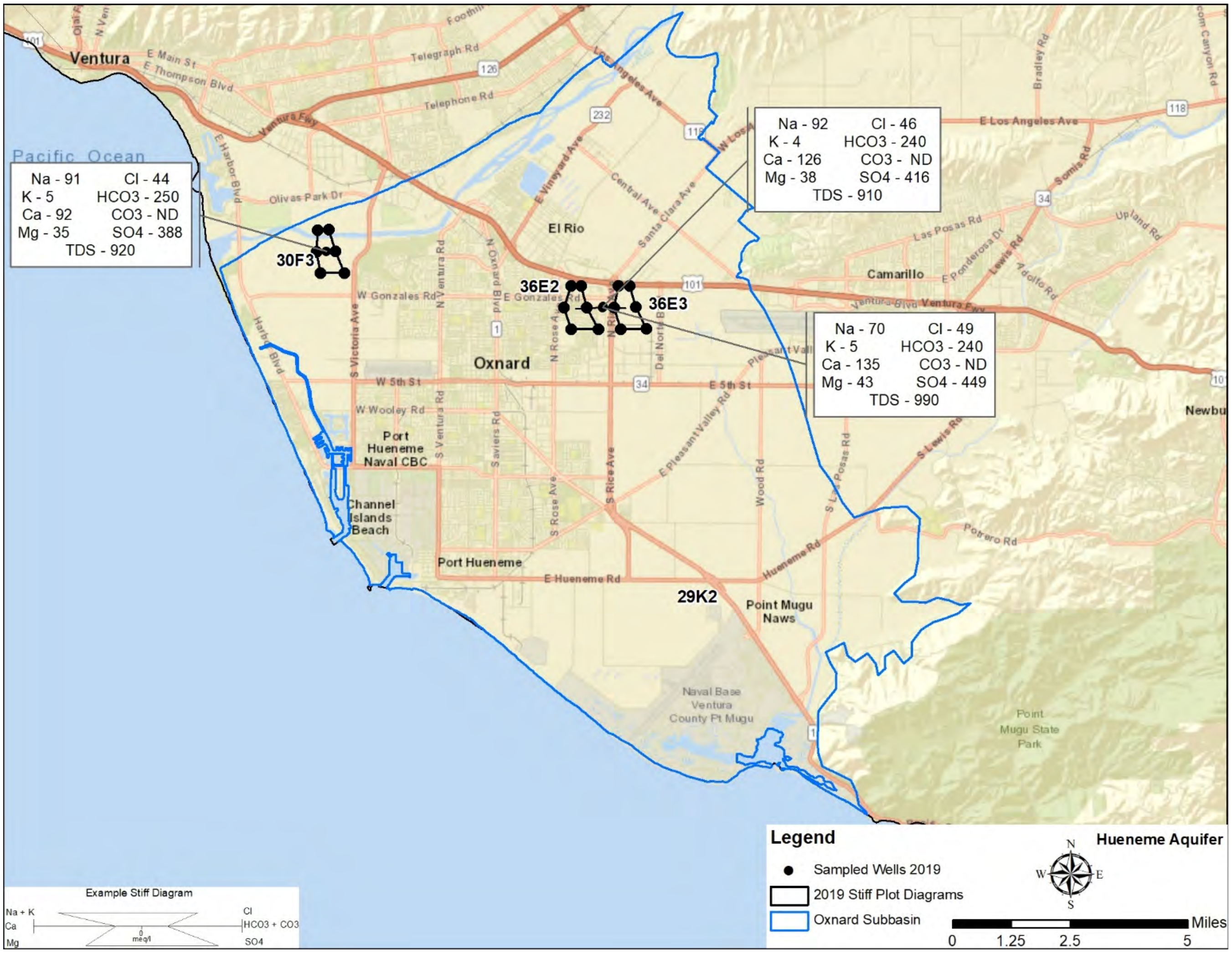

Figure 4-24 Oxnard Subbasin Hueneme Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

Fox Canyon Aquifer

The Fox Canyon Aquifer is the second most-developed production zone in the Oxnard Subbasin, based on the number of wells and depth of perforations. Eight wells perforated solely in the Fox Canyon Aquifer were sampled in 2019 (**Figure 4-25**). Depth to the main water-bearing unit is approximately 580 feet bgs. The Fox Canyon Aquifer generally has excellent water quality and high yield rates but is subject to seawater intrusion near Point Mugu and the Hueneme Submarine Canyon. Extractions are monitored and allocated by the FCGMA to mitigate overdraft and reduce the intrusion of seawater.

Eight samples had TDS and six samples had sulfate concentrations that exceeded the SMCL. One sample was analyzed for Title 22 metals. Four samples had manganese above the SMCL level. One sample had a nitrate concentration above the MCL.

Table 4-21: Selected water quality results for wells screened in the Fox Canyon Aquifer.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
20K3	10/16/2019	Fox Canyon	Lower	ND	**700**	198	73	0.5
25K2	10/24/2019	Fox Canyon	Lower	ND	**770**	**310**	50	0.6
26D5	10/17/2019	Fox Canyon	Lower	3.5	**950**	**366**	55	0.5
26P2	10/17/2019	Fox Canyon	Lower	ND	**770**	**304**	42	0.4
26M3	10/17/2019	Fox Canyon	Lower	**2160***	**1290**	**337**	42	0.5
36B2	10/24/2019	Fox Canyon	Lower	ND	**840**	**262**	120	0.5
20Q5	10/29/2019	Fox Canyon	Lower	1.9	**920**	**351**	68	0.6
19P3	10/16/2019	Fox Canyon	Lower	ND	**500**	71.3	52	0.2

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL
* - High nitrate likely due to well operator injecting fertilizer at time of sampling.

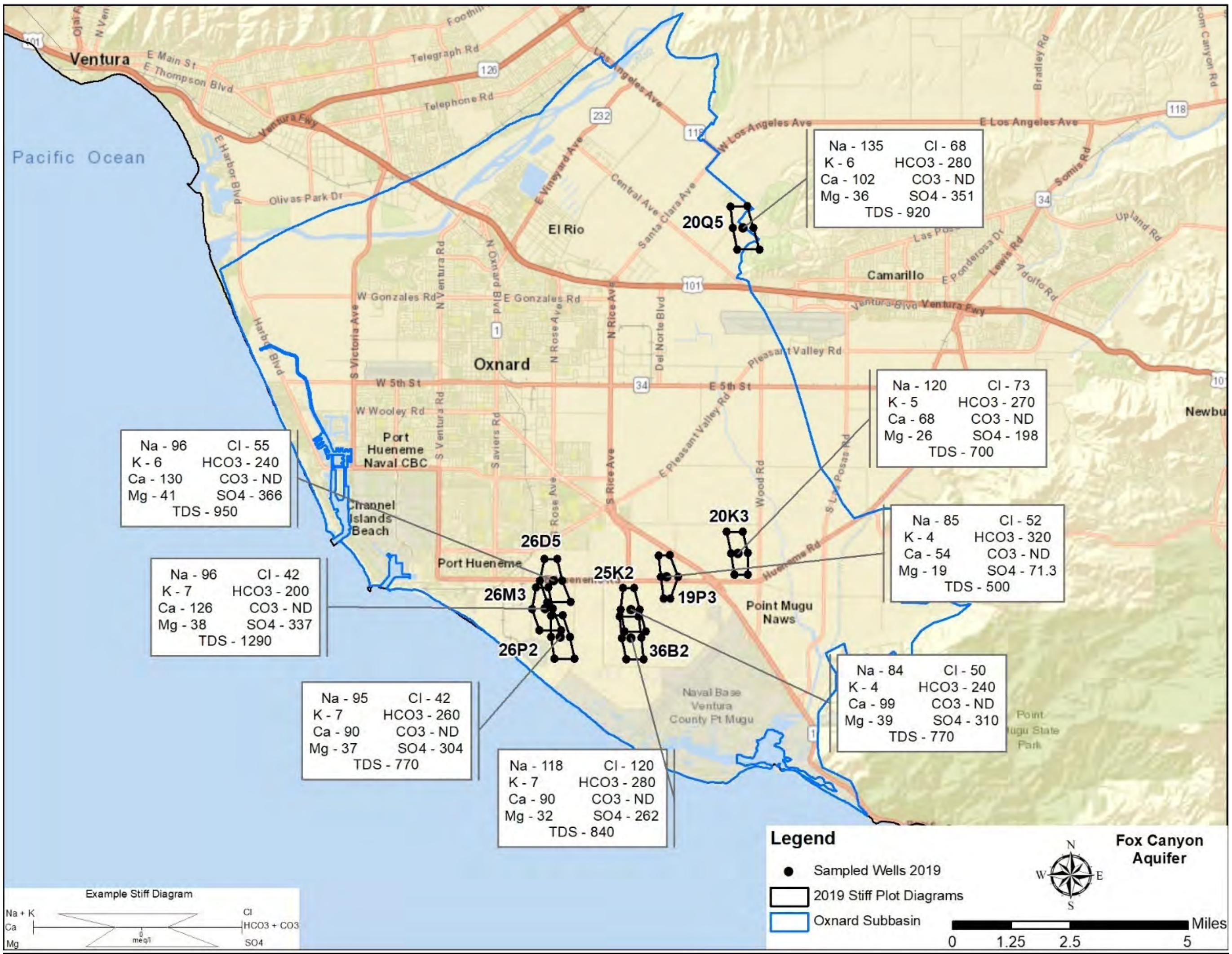

Figure 4-25 Oxnard Subbasin Fox Canyon Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

Hueneme & Fox Canyon Aquifers

Five Oxnard Subbasin wells that were sampled in 2019 are perforated across both the Hueneme and Fox Canyon Aquifers and will be referred to as LAS wells. Results for those wells are included in **Appendix D** and shown on the map of the LAS (**Figure 4-26**). SMCL concentrations were exceeded in one sample for manganese and all five samples for sulfate. All five had TDS concentrations above the SMCL. TDS concentrations varied between 870 and 1,040 mg/L. Water samples from one Hueneme/Fox Canyon well were analyzed for Title 22 metals and all constituents were below the primary MCL.

Table 4-22: Selected water quality results for wells screened across the Hueneme & Fox Canyon Aquifers.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
21H2	10/2/2019	Hue & Fox	Lower	ND	**870**	**258**	117	0.5

3F5	9/4/2019	Hue & Fox	Lower	12.6	**990**	**439**	49	0.7
16D4	10/30/2019	Hue & Fox	Lower	ND	**830**	**366**	41	0.6
19J3	11/13/2019	Hue & Fox	Lower	ND	**1040**	**475**	53	0.6
24P2	10/25/2019	Hue & Fox	Lower	10	**940**	**399**	48	0.6

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

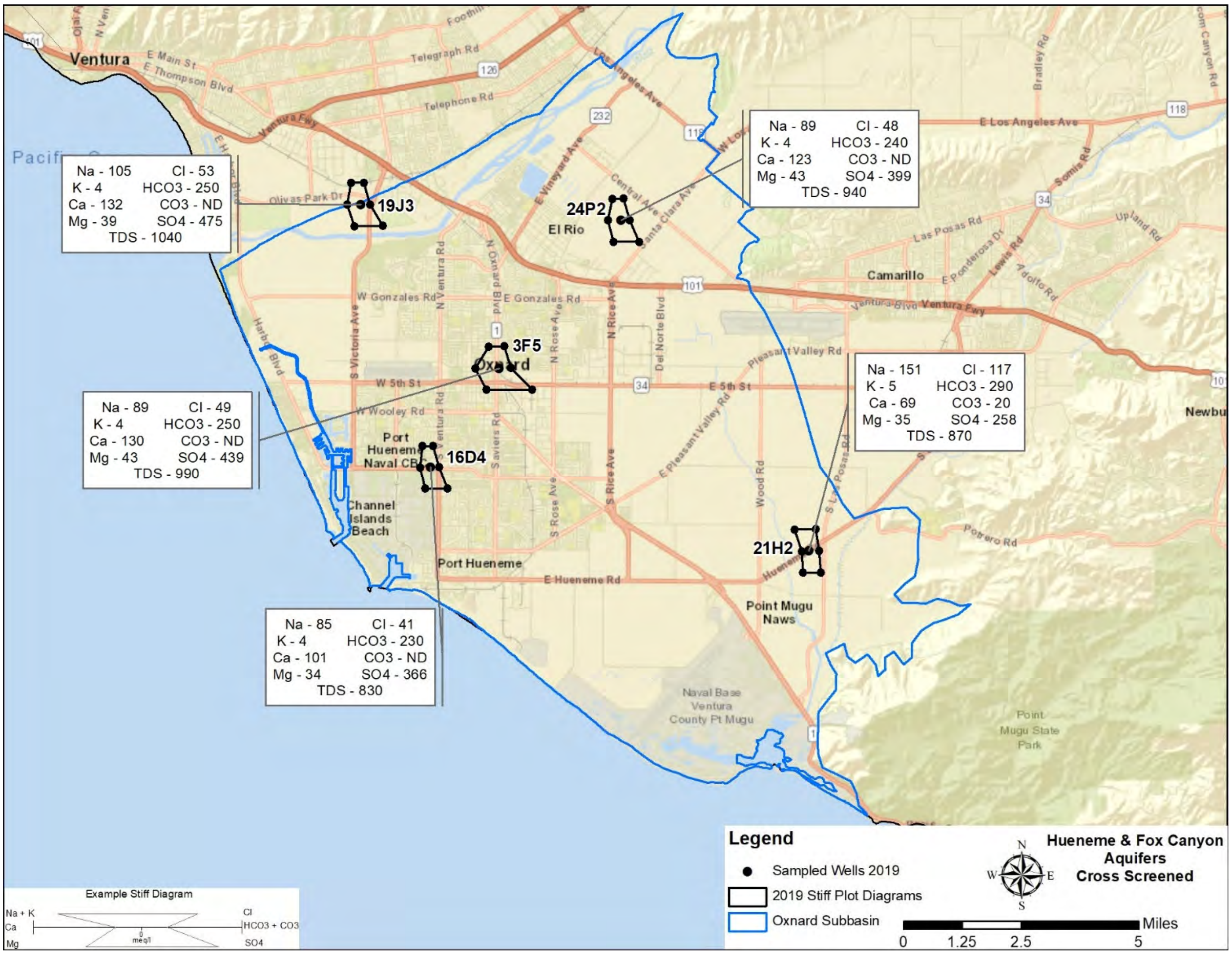

Figure 4-26 Oxnard Subbasin Hueneme and Fox Canyon Aquifers cross-screened sampled wells with Stiff diagrams and selected inorganic constituents.

Fox Canyon & Grimes Canyon Aquifers

Three Oxnard Subbasin wells sampled in 2019 are perforated in the Fox Canyon and the Grimes Canyon Aquifers. They are also referred to as LAS wells. Results for those wells are included in **Appendix D** and shown on the map of the LAS **Figure 4-27**. Sodium is the dominant cation in two samples and sulfate is the dominant anion. Both water samples are sodium sulfate type, and the remaining sample is calcium sulfate type. Water from one well exceeded the drinking water SMCL concentration for manganese. All three samples had sulfate and TDS concentrations above the SMCL.

Table 4-23: Selected water quality results for wells across the Fox Canyon & Grimes Aquifers.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
28D1	10/2/2019	Fox & Grimes	Lower	ND	**810**	**266**	78	0.4
12N3	10/24/2019	Fox & Grimes	Lower	ND	**860**	**376**	39	0.4
21B6	10/30/2019	Fox & Grimes	Lower	ND	**770**	**293**	47	0.4

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

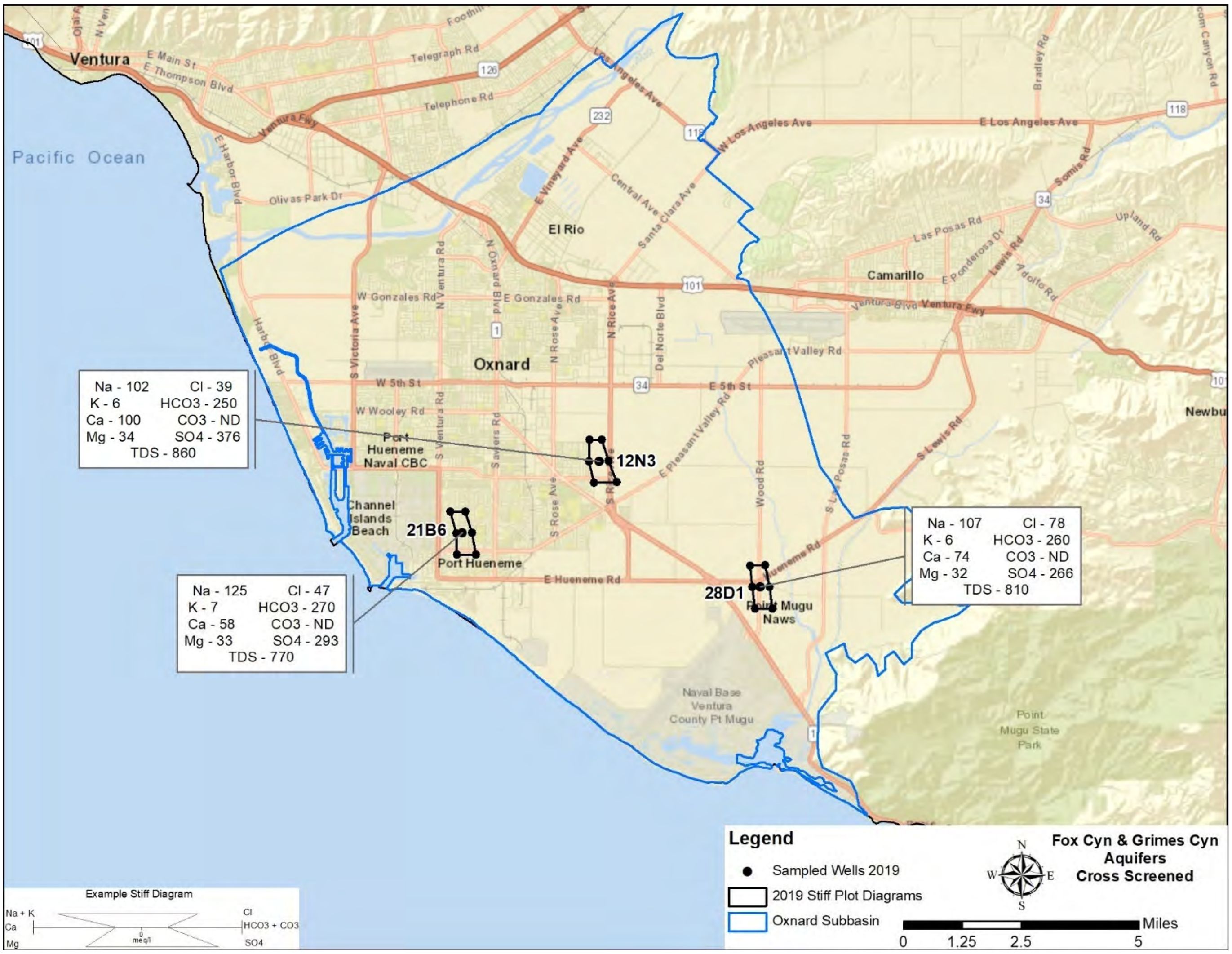

Figure 4-27 Oxnard Subbasin Fox Canyon and Grimes Canyon Aquifers cross-screened sampled wells with Stiff diagrams and selected inorganic constituents.

Hueneme, Fox Canyon & Grimes Canyon Aquifers

Four Oxnard Subbasin wells sampled in 2019 are perforated across the Hueneme, Fox Canyon and Grimes Canyon Aquifers. They are also referred to as LAS wells. Results for those wells are included in **Appendix D** and shown on the map of the LAS in **Figure 4-28**. The Piper diagram **Figure E-10** shows moderate variability in water quality. Calcium is the dominant cation in one sample while sodium is the dominant cation in the remaining three samples. Sulfate is the dominant anion in all samples. One well is calcium sulfate type, two wells are sodium bicarbonate type, and one well is sodium sulfate type.

Water from one well had manganese, one had sulfate, and all four had TDS concentrations above the SMCL. TDS concentrations from these wells varied between 740 and 890 mg/L. Water samples from one Fox/Hueneme/Grimes well was analyzed for Title 22 metals with all constituents below the primary MCL.

Table 4-24: Selected water quality results for wells screened across the Hueneme, Fox Canyon and Grimes Canyon Aquifers.

Well No.	Date Sampled	Aquifer	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
4D4	10/2/2019	Hue, Fox & Grimes	Lower	ND	**790**	174	106	0.4
8R1	10/2/2019	Hue, Fox & Grimes	Lower	ND	**740**	236	63	0.3
22C1	10/2/2019	Hue, Fox & Grimes	Lower	ND	**760**	202	109	0.4
24B4	10/16/2019	Hue, Fox & Grimes	Lower	ND	**890**	**358**	42	0.7

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

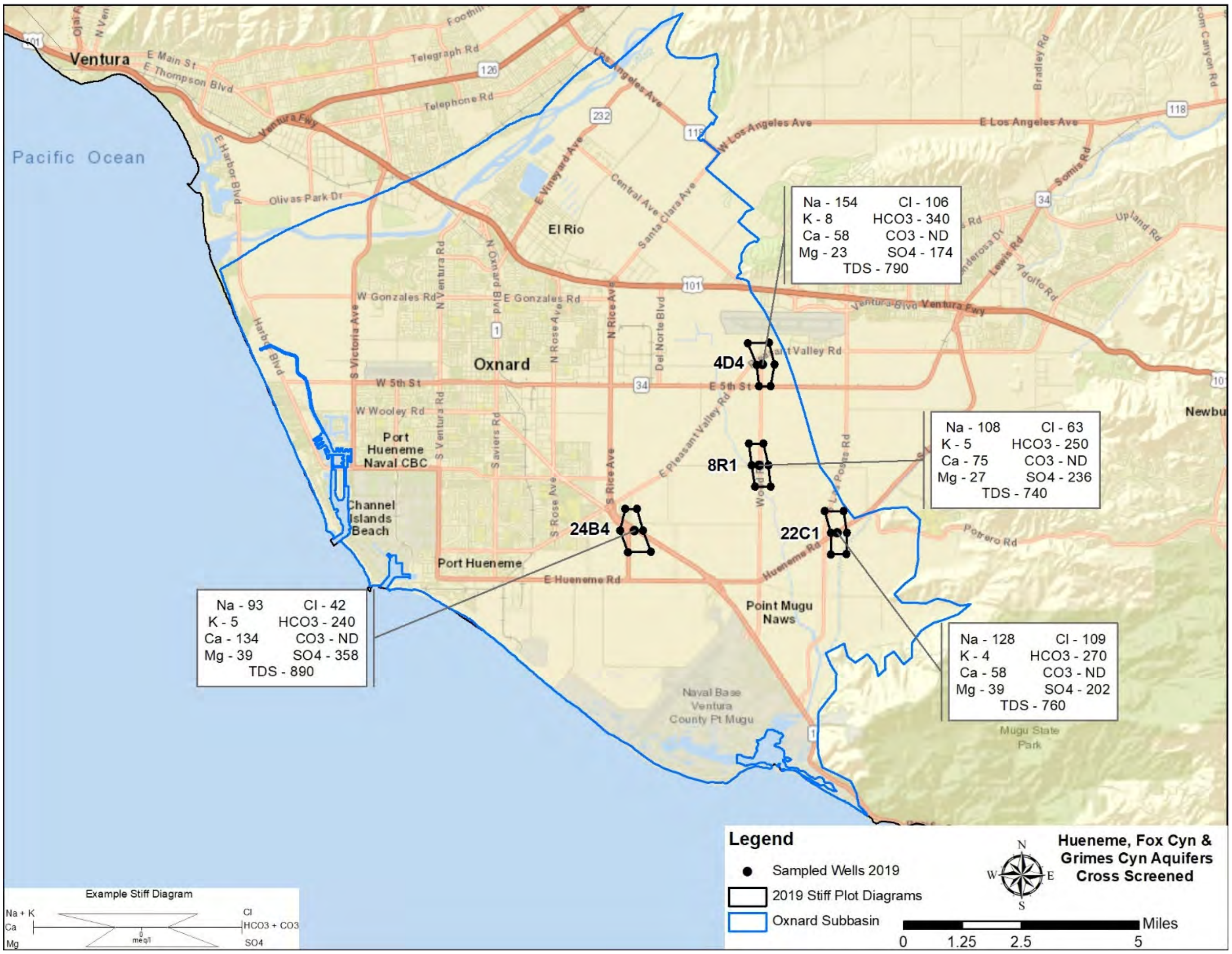

Figure 4-28 Oxnard Subbasin Hueneme, Fox Canyon and Grimes Canyon Aquifers cross-screened sampled wells with Stiff diagrams and selected inorganic constituents.

The Piper diagram **Figure E-10** shows moderate variability in water quality of all wells sampled in the LAS. The Piper diagram **Figure E-11** also shows moderate variation between all wells sampled in the Oxnard Subbasin.

4.4.12 Santa Clara River Valley Basin - Piru Subbasin (DWR Basin No. 4-004.06)

The Piru Subbasin groundwater recharge is principally from precipitation, water releases from Lake Piru by UWCD, and the Santa Clara River. Flow from the Santa Clara River enters the basin from the east and carries discharges from wastewater treatment plants and urban and stormwater runoff from Los Angeles County. There are approximately 188 water supply wells in the Piru Subbasin, of which 147 are active. Depth to the main water-bearing unit is approximately 30 to 90 feet bgs. On April 6, 2010, the LARWQCB adopted a Basin Plan Amendment that includes a Total Maximum Daily Load (TMDL) of 117 mg/L for chloride in surface water and 150 mg/L in groundwater for the stretch of the Santa Clara River in Ventura County east of Piru Creek.

Six wells were sampled in the Piru Subbasin in 2019. None of the groundwater sampled had a chloride concentration above the TMDL. The Piper diagram in **Figure E-12** shows low variability in water quality. There is no dominant cation for any samples but the data plots closest to the calcium cation type. Sulfate is the dominant anion for all samples and the water is calcium sulfate type. The TDS concentrations exceed the SMCL in all samples and vary from 830 to 2,370 mg/L. Sulfate concentrations exceed the SMCL in all samples. One sample had a manganese concentration greater than the SMCL; no samples had nitrate concentrations greater than the primary MCL. **Figure 4-29** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Water samples from two wells were analyzed for Title 22 metals. One well had a selenium concentration over nine times the primary MCL. The concentrations for the remaining constituents were below the primary MCL.

Table 4-25: Selected water quality results for the Piru Subbasin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
30A3	9/17/2019	3.2	**1240**	**591**	42	0.7
30J4	9/11/2019	11.1	**830**	**270**	94	0.5
25H1	9/11/2019	25.1	**1080**	**368**	107	0.5
25M3	9/11/2019	29.5	**2370**	**1130**	66	0.8
26H1	9/11/2019	23.6	**1180**	**441**	104	0.7
34J4	9/11/2019	25.2	**1130**	**471**	65	0.5

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

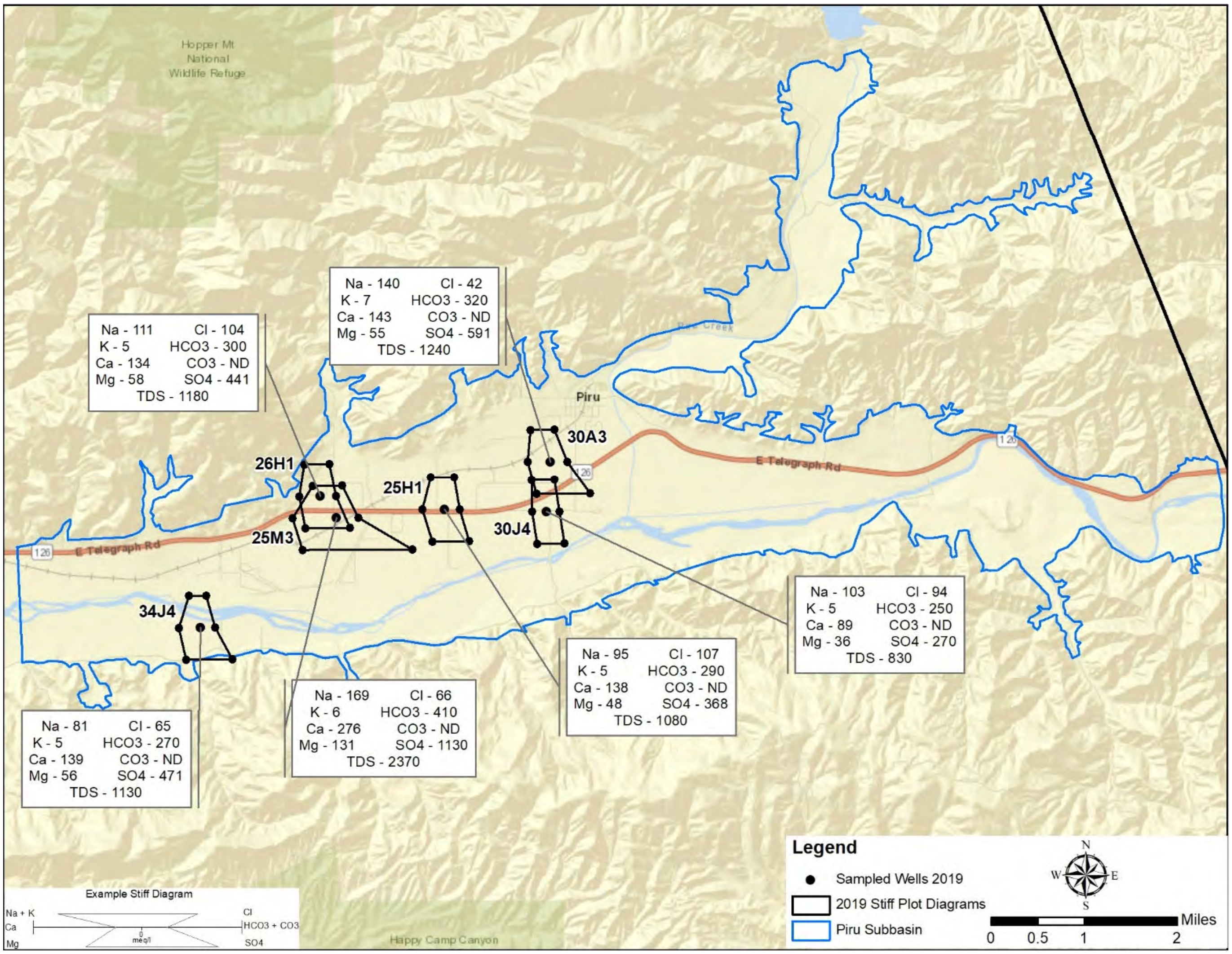

Figure 4-29: Piru Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.13 Pleasant Valley Basin (DWR Basin No. 4-006)

Pleasant Valley Basin groundwater quality varies greatly throughout the basin. The upper-most water-bearing unit at 35 to 60 feet bgs is not used due to very poor water quality. Permeable lenses of alluvial sands, gravels, silts and clays of recent to Upper Pleistocene age that vary in thickness from a few feet to several hundred feet are equivalent to, but not connected with, the Oxnard Aquifer and are referred to as the upper zone in this report. Depth to the main water-bearing unit is approximately 400 to 500 feet bgs. This deeper zone is referred to as the Lower Aquifer System (LAS). It is made up of marine sands and gravels of the lower-most member of the early Pleistocene San Pedro Formation and is known as the Fox Canyon Aquifer. The Grimes Canyon Aquifer underlies the Fox Canyon Aquifer at depths below 1,000 feet bgs and is perforated by only the deepest wells. There are approximately 346 water supply wells in the Pleasant Valley Basin, of which 85 are active. Fourteen wells were sampled in 2019, with three perforated in the upper zone and 11 perforated in the LAS.

The Piper diagram in **Figure E-13** shows a comparison of wells perforated in the upper zone with those perforated in the LAS. Wells perforated in the upper zone tend to have higher concentrations of sulfate than those in the LAS but in general the upper zone and LAS show similar water quality. The Piper diagram shows more variability in the water samples from the LAS. In the upper zone, calcium is the dominant cation in one sample and the remaining two samples have no dominant cation but plot closely to the calcium type. All three samples are calcium sulfate type. In the LAS, sodium is the dominant cation in one sample. The remainder have no dominant cation but four plot close to sodium type and 6 plot closer to calcium type. Sulfate is the dominant anion in five samples with no dominant anion for the remainder. Three samples plot close to chloride type and three plot close to sulfate type. The water in three samples is sodium chloride, two sample are sodium sulfate type, and the remainder are calcium sulfate type.

TDS concentrations in the groundwater samples varied from 760 to 4,350 mg/L. All fourteen wells sampled had TDS concentrations above the SMCL, with the three highest concentrations in the upper zone. Ten wells had sulfate concentrations above the SMCL, with the three highest in the upper zone. Four wells had nitrate concentrations above the drinking water MCL, with the two highest in the upper zone. Five samples had manganese concentrations above the SMCL. Chloride concentrations were above the SMCL in two wells and eleven were above a concentration that can impair agricultural beneficial uses. Three water samples were analyzed for Title 22 metals. None of the analyses were above the primary MCL. **Figure 4-30** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 4-26: Selected water quality results for the Pleasant Valley Basin.

Well No.	Date Sampled	Aquifer System	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
1B5	10/9/2019	Lower	ND	**780**	61.1	200	0.3
1M2	10/30/2019	Lower	ND	**900**	183	163	0.3
3K1	10/2/2019	Lower	**48.4**	**1170**	**429**	119	0.4
3R1	10/2/2019	Lower	**55.1**	**1820**	**702**	224	0.6
10G1	10/2/2019	Lower	13.7	**1460**	**501**	187	0.4
15D2	10/2/2019	Lower	1.9	**1420**	**526**	190	0.4
19F4	10/9/2019	Lower	ND	**1380**	**562**	153	0.7
29B2	11/12/2019	Lower	5.7	**790**	165	124	0.2
33R2	10/9/2019	Lower	ND	**760**	211	113	0.4
34C1	10/9/2019	Lower	ND	**800**	**271**	82	0.3
34G1	10/2/2019	Lower	ND	**1160**	**334**	194	0.7
2J1	10/24/2019	Upper	**202**	**4350**	**2000**	**403**	1.9
10A2	10/9/2019	Upper	**81.6**	**2430**	**1060**	235	0.6
12D1	10/9/2019	Upper	ND	**2400**	**922**	**366**	0.8

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

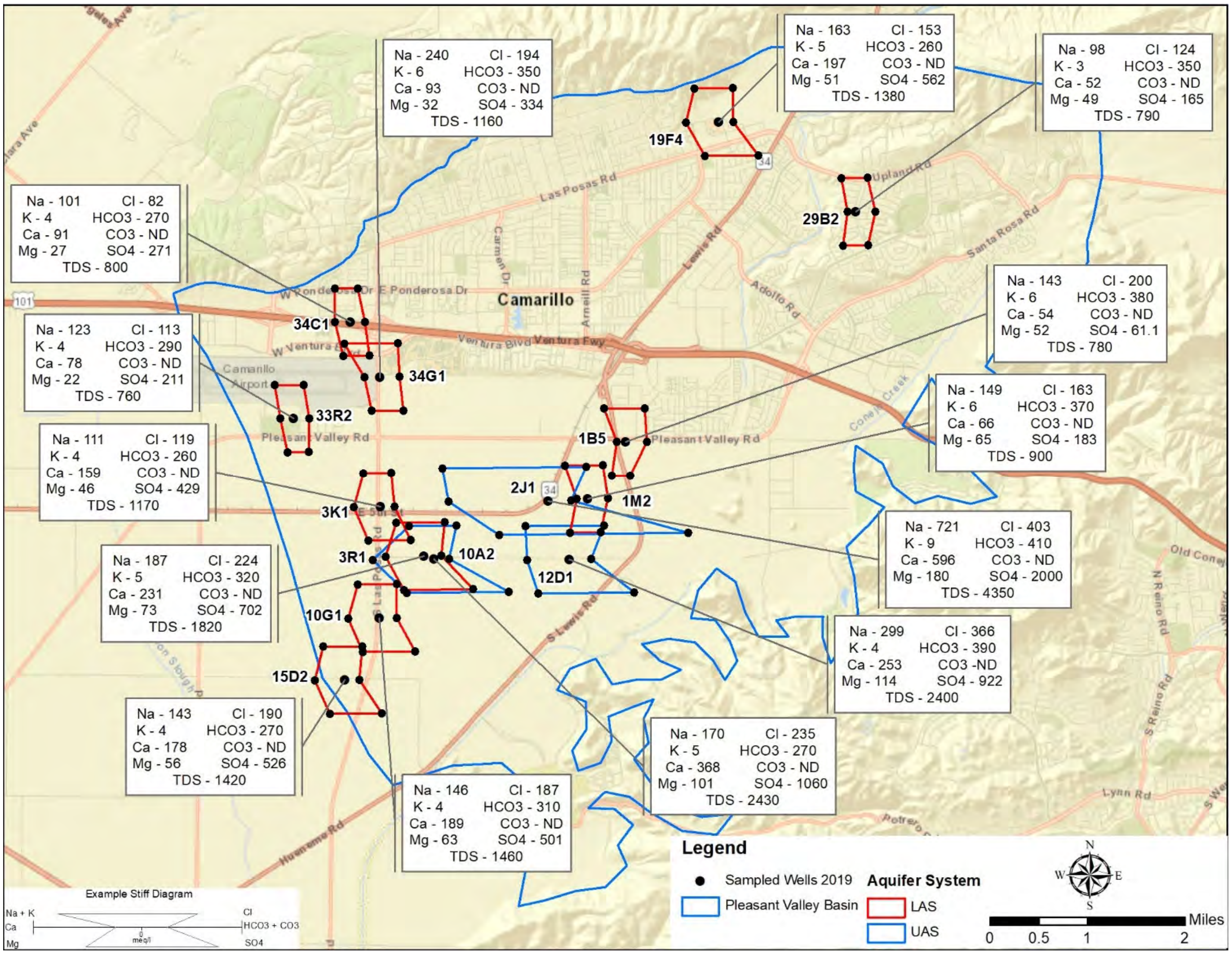

Figure 4-30: Pleasant Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.14 Santa Clara River Valley Basin - Santa Paula Subbasin (DWR Basin No. 4-004.04)

The Santa Paula Subbasin is a court adjudicated groundwater basin. To mitigate overdraft, a June 1991 judgment ordered the creation of the Santa Paula Basin Pumpers Association (SPBPA). The SPBPA regulates extractions in the Santa Paula Subbasin. The judgment stipulated an allotment of 27,000 acre-feet per year (AFY) could be pumped from the Subbasin. Water quality in the Subbasin has not changed substantially since 2007. The depth to the water-bearing unit is 65 to 160 feet bgs. There are approximately 294 water supply wells in the Santa Paula Subbasin, of which 153 are active. Water from eight wells in the basin were analyzed in 2019. The Piper diagram in **Figure E-14** shows no significant change in the water quality since previous sampling. There is no dominant cation, but all samples plot close to calcium type. Sulfate is the dominant anion and the water is calcium sulfate type. All eight samples had TDS and sulfate concentrations above the SMCL for drinking water. One sample had an iron concentration over twice the MCl and four had manganese concentrations exceeding the MCl. Three samples were analyzed for Title 22 metals. No constituent was above the MCL. **Figure 4-31** shows approximate well location and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate for well sampled.

Figure E-20 compares water samples from the up-gradient Piru and Fillmore Subbasins to the Santa Paula Subbasin. The Piper diagram shows moderate variability among the samples. Filmore subbasin has higher variability than the Santa Paula and Piru subbasins, with higher calcium and lower sulfate concentrations but higher bicarbonate. All samples are calcium sulfate water types.

Table 4-27: Selected water quality results for the Santa Paula Subbasin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
3K2	9/19/2019	9.2	**1280**	**491**	79	0.5
9K4	9/19/2019	ND	**940**	**392**	42	0.4
17Q1	11/21/2019	21.5	**1550**	**661**	82	0.7
19R1	11/13/2019	14.2	**1390**	**613**	63	0.7
21E11	11/21/2019	ND	**1360**	**570**	105	0.8
30F01	11/14/2019	ND	**1760**	**788**	87	0.8
34Q3	9/19/2019	ND	**1850**	**856**	88	0.5
35Q1	11/1/2019	36.8	**2670**	**1300**	101	0.9

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

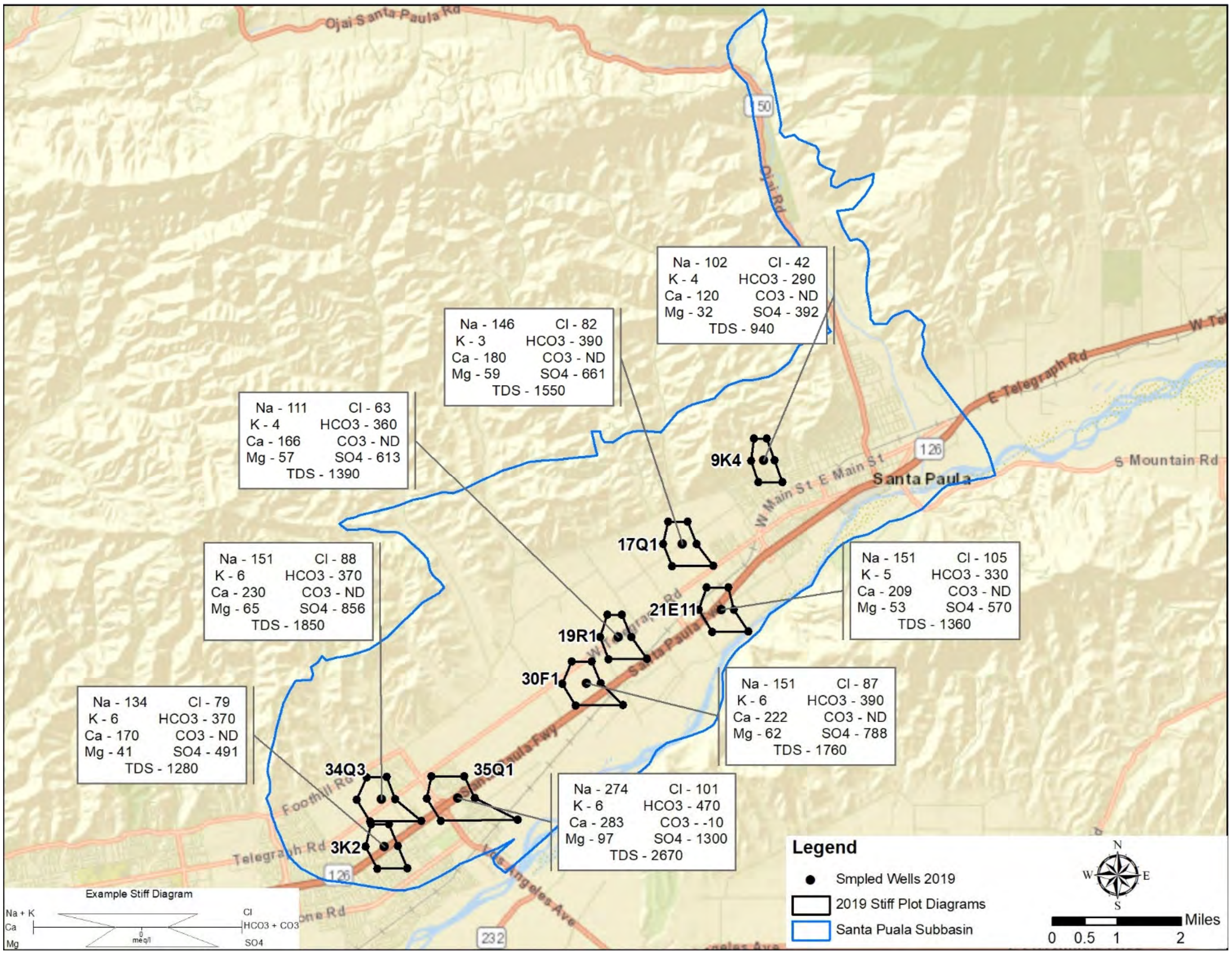

Figure 4-31: Santa Paula Subbasin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.15 Hidden Valley Basin (DWR Basin No. 4-016)

The Hidden Valley Basin consists mainly of fractured volcanic rock providing inconsistent groundwater supply throughout the basin because much of the water is stored in fractures. The water quality varies because of the heterogeneous nature of the aquifer. There are approximately 147 water supply wells in the basin, of which 96 are active. Water samples were collected from five wells in 2019. The Piper diagram in **Figure E-27** shows the chemistry of the samples which is highly variable considering the size of the basin. Calcium is the dominant cation in two samples; sodium is the dominant cation in one sample; and magnesium is the dominant cation in two samples. Bicarbonate is the dominant anion in four samples; there is no dominant anion in one sample, but it plots close to chloride type. The water is calcium bicarbonate type in two sample, sodium bicarbonate in one sample and calcium chloride in the remaining sample.

Chloride concentration was above the primary MCL for drinking water in one sample. Four samples had TDS concentrations above the SMCL (**Table 4-28**). One sample was analyzed for Title 22 metals. All constituents were below the MCL for drinking water. **Figure 4-32** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-28: Selected water quality results for the Hidden Valley Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
19H3	9/20/2019	ND	**540**	120	43	0.1
19L2S	11/21/2019	ND	**600**	151	54	ND
29E5	9/20/2019	2.7	**700**	174	72	ND
25C7	11/21/2019	16	**1360**	237	**292**	0.2
25F4	11/21/2019	0.6	320	39.5	31	0.1

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

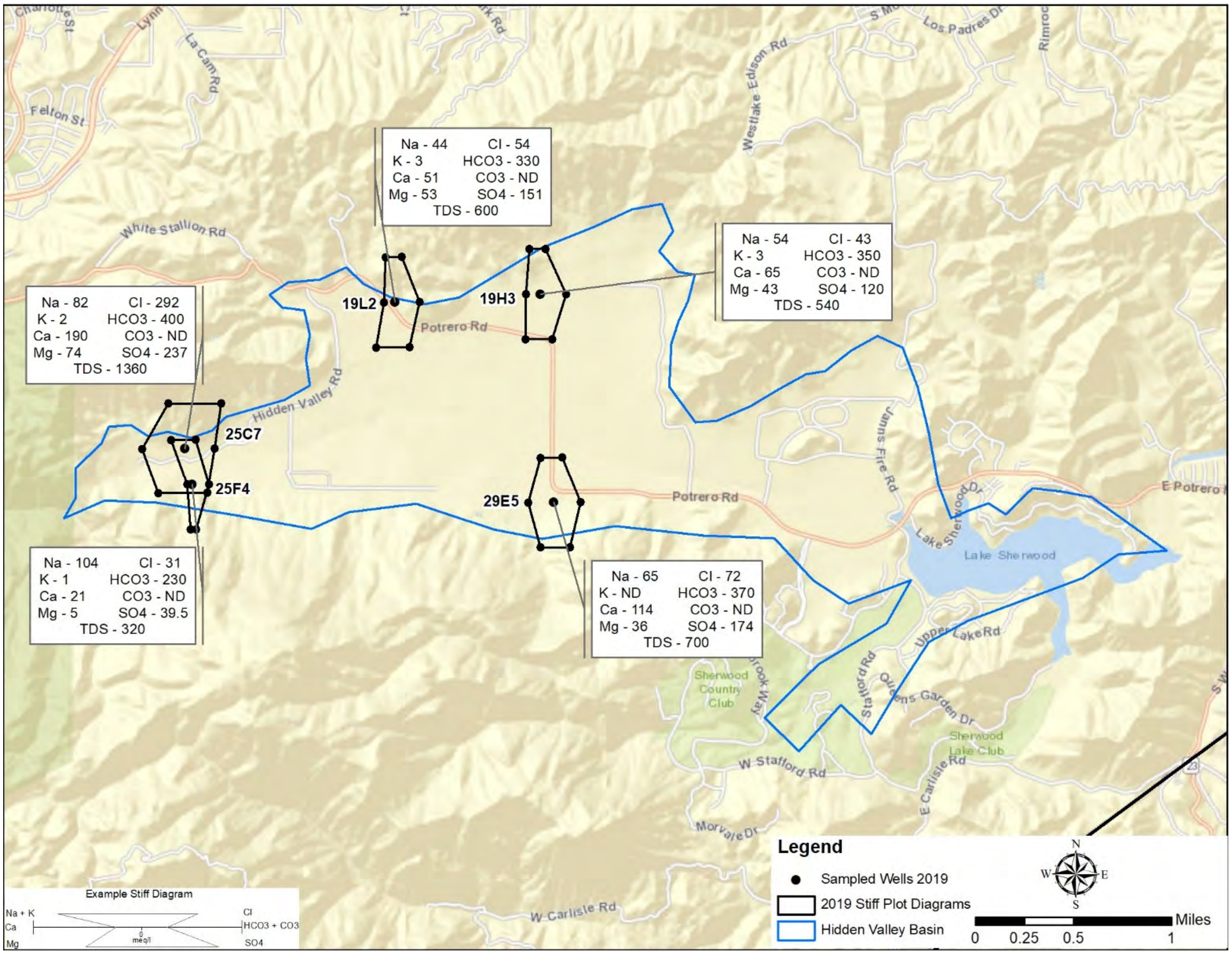

Figure 4-32: Hidden Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.16 Simi Valley Basin (DWR Basin No. 4-009)

The Simi Valley Basin drains to the west and historically water becomes more enriched in salts and therefore is of poorer quality further west in the basin. The three wells sampled are in the western end of the valley. There are approximately 182 water supply wells in the Simi Valley Basin, of which 36 are active wells. Depth to the water-bearing unit is approximately 5 to 25 feet bgs. The City of Simi Valley has a high water-table at the western end of the valley and several dewatering wells have been installed to reduce the water table. The Piper diagram in **Figure E-15** shows low variability in water quality. There is no dominant cation, but the samples plot closely to the calcium type. Sulfate is the dominant anion in all three samples. and the water is calcium sulfate type. TDS and sulfate concentrations were above the SMCL in all three samples. One sample had nitrate and one had manganese concentrations above the MCL. All three samples had chloride concentrations that could cause impairment of agricultural beneficial uses for sensitive plants, but are not above the primary MCL. One water sample was analyzed for Title 22 metals; all constituents were below the MCL. **Figure 4-33** shows approximate well locations and concentrations of TDS, sodium potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate for wells sampled in the Simi Valley Basin.

Table 4-29: Selected water quality results for the Simi Valley Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
8D4	9/25/2019	16.4	**1840**	**733**	158	1.1
8K7	9/25/2019	**55.8**	**2100**	**887**	157	1
9E1	9/25/2019	29.4	**1690**	**700**	125	0.8

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

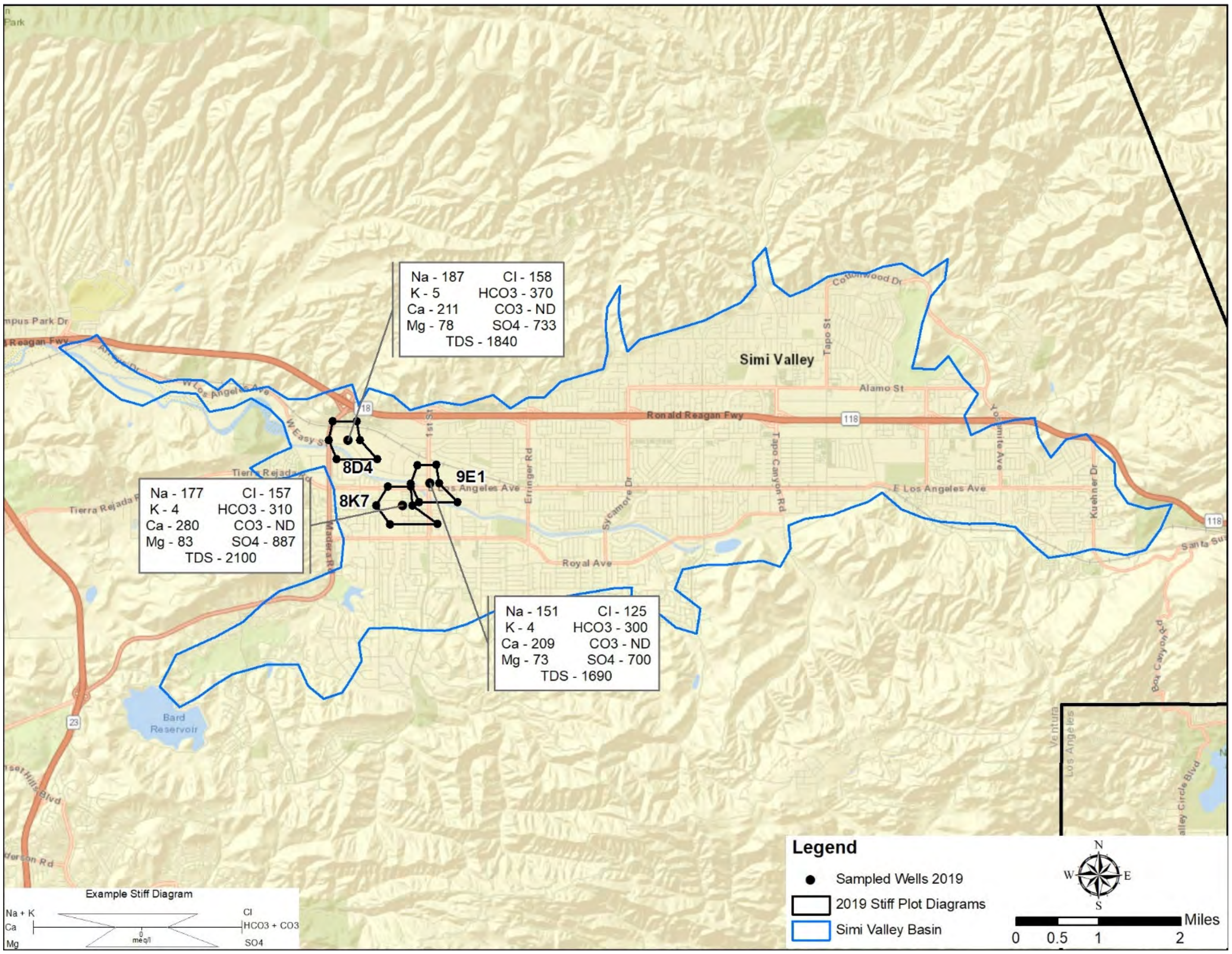

Figure 4-33: Simi Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.17 Tapo/Gillibrand Basin

The Tapo/Gillibrand Basin is located to the north of Simi Valley. The Tapo/Gillibrand Basin is an east-west trending structural basin that consists of permeable sand and gravel that occur near the center of the Happy Camp Syncline. The basin is bounded by the Santa Susana Fault to the north, the Simi Anticline to the south and impermeable sediments of the Sisquoc Formation and Monterey Shale in the remaining areas. There are approximately 46 water supply wells in the Tapo/Gillibrand Basin, of which 14 are active. The City of Simi Valley operates several wells in the basin for backup water supply. No wells were sampled in this basin in 2019. **Figure 4-34** shows the extent of the Basin.

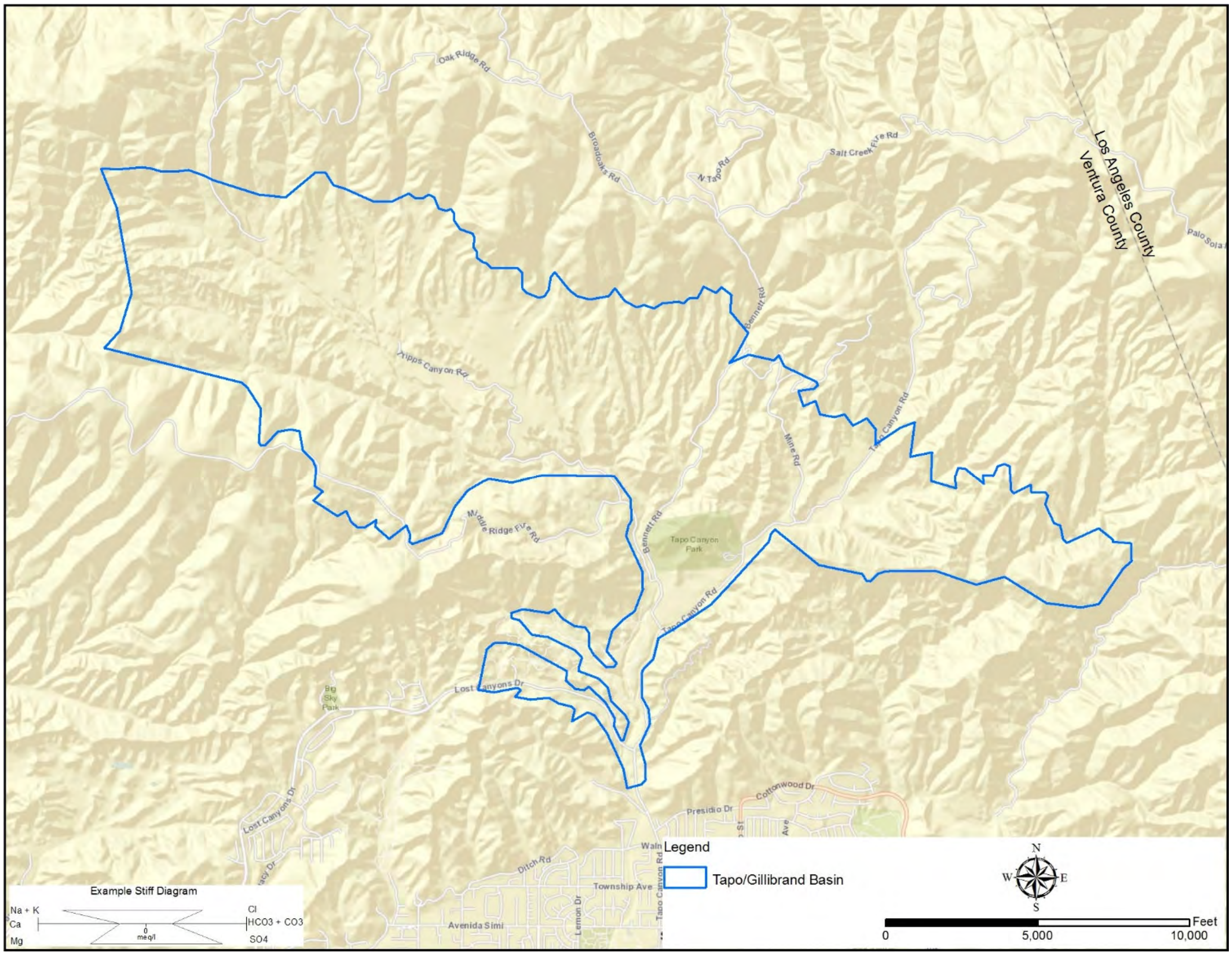

Figure 4-34: Tapo/Gillibrand Basin.

4.4.18 Thousand Oaks Area Basin (DWR No. 4-019)

The Thousand Oaks Area Basin has very few active water wells available for sampling. The depth to the water-bearing unit is approximately 25 to 30 feet bgs. The groundwater basin underlies a small valley between Lake Sherwood and the City of Thousand Oaks, just east of Highway 23. Water-bearing formations are mainly alluvium and fractured Conejo Volcanics. There are approximately 119 water supply wells in the basin, of which 12 are active. No wells were sampled in this basin in 2019. **Figure 4-35** shows the extent of the Thousand Oaks Area Basin.

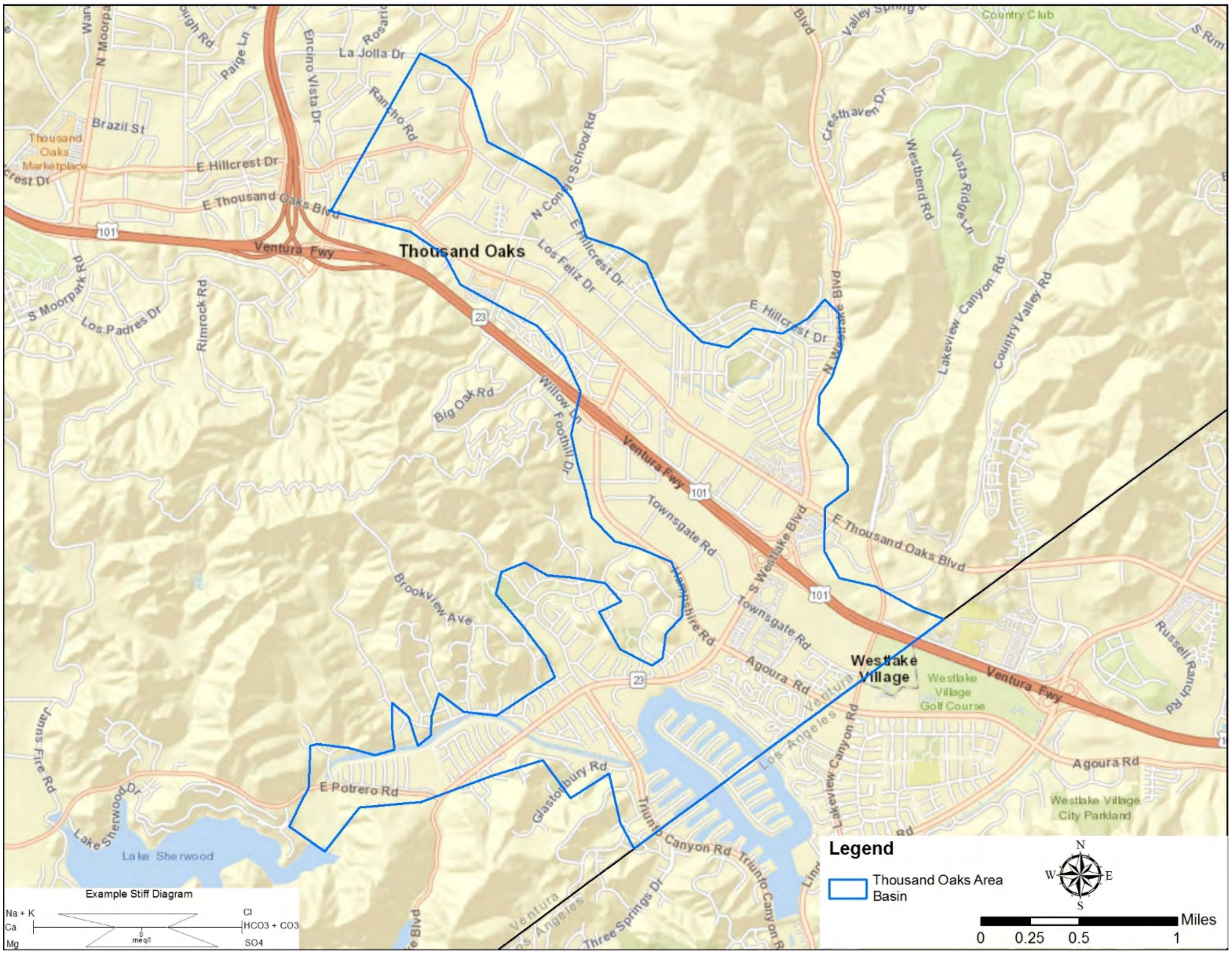

Figure 4-35: Thousand Oaks Area Basin.

4.4.19 Tierra Rejada Basin (DWR Basin No. 4-015)

Depth to water-bearing materials varies between 20 to 80 feet bgs in the Tierra Rejada Basin. There are approximately 58 water supply wells in the Tierra Rejada Basin, of which 36 are active. Nine wells were sampled in 2019. The Piper diagram in **Figure E-16** shows low variation in water quality. The dominant cation for two sample is magnesium and the remainder have no dominant cation but plot closely to the magnesium type. The dominant anion for one sample is bicarbonate and the remainder have no dominant anion but plot close to the sulfate type. All of the samples are magnesium sulfate type. Two wells had nitrate concentrations above the primary MCL. Water from all nine wells had TDS concentrations above the SMCL, ranging from 670 to 1,170 mg/L. Two wells in the basin were analyzed for Title 22 metals and all constituents were below the primary MCL.

The Piper diagram in **Figure E-3** shows a comparison of water chemistry between Tierra Rejada and Arroyo Santa Valley Rosa Basins. Chemistry in the two basins is similar but there is more variation in Tierra Rejada with slightly higher magnesium, bicarbonate, and sulfate. **Figure 4-36** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 4-30: Selected water quality results for the Tierra Rejada Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
10R1	11/7/2019	16.2	**760**	146	143	ND
10R2	11/13/2019	5.1	**670**	174	75	0.2
11J1	11/15/2019	24.8	**690**	174	69	0.2
12M03	11/12/2019	14.9	**670**	194	70	0.2
14F1	11/13/2019	**84.8**	**1040**	179	146	0.1
14P1	11/12/2019	**45.7**	**730**	100	72	0.2
15B1	11/13/2019	20.9	**690**	150	97	0.1
15J2	11/12/2019	20.6	**1170**	**305**	167	0.2
15N3	11/12/2019	1.5	**690**	164	82	0.1

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

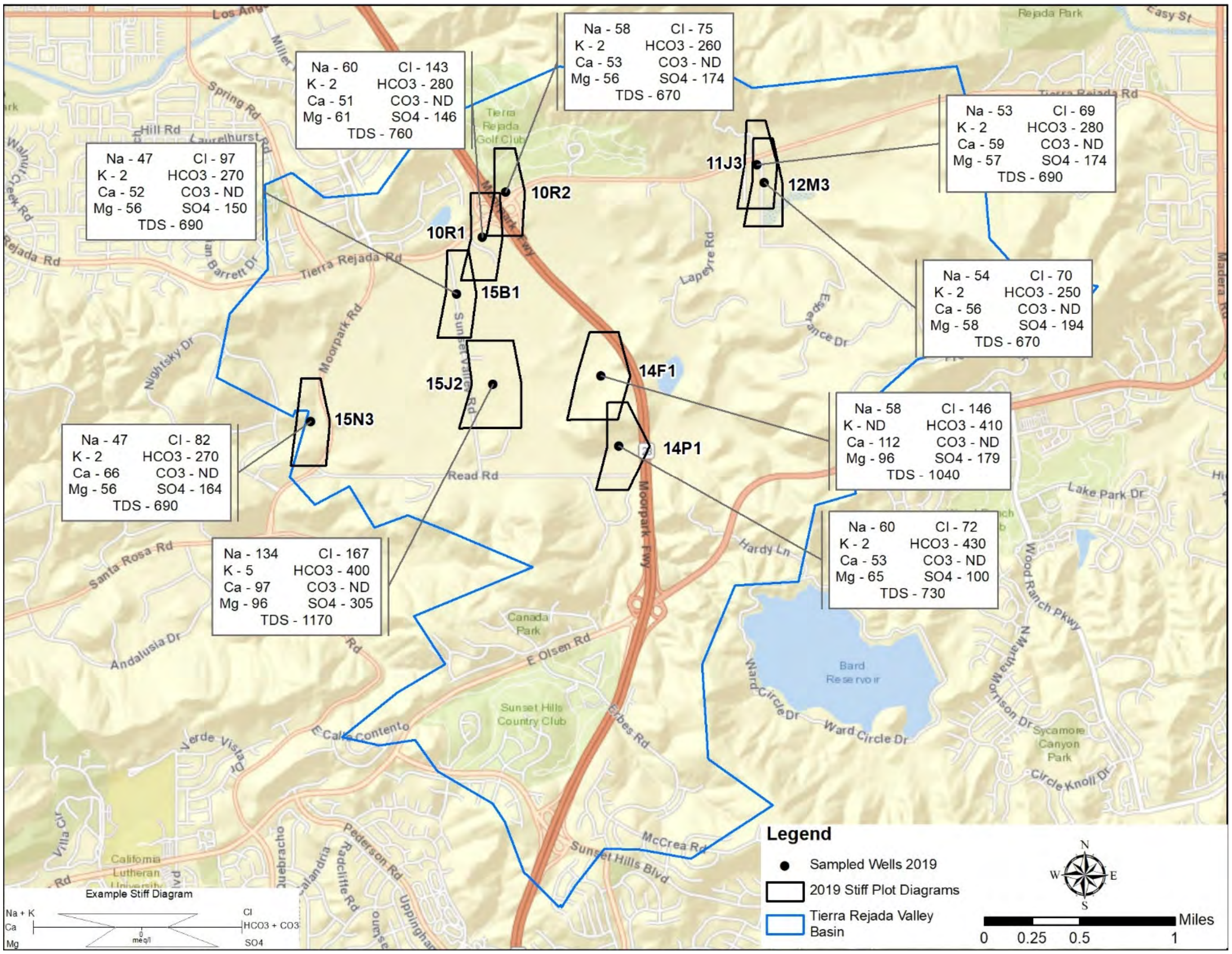

Figure 4-36: Tierra Rejada Basin sampled wells with Stiff diagrams and selected inorganic constituents.

Figure 4-37 shows nitrate concentrations for wells sampled in the Tierra Rejada Basin in 2019. Groundwater from one well sampled has a nitrate concentration that exceeds the primary MCL. Other wells previously sampled with elevated nitrate concentrations were not available for sampling in 2019.

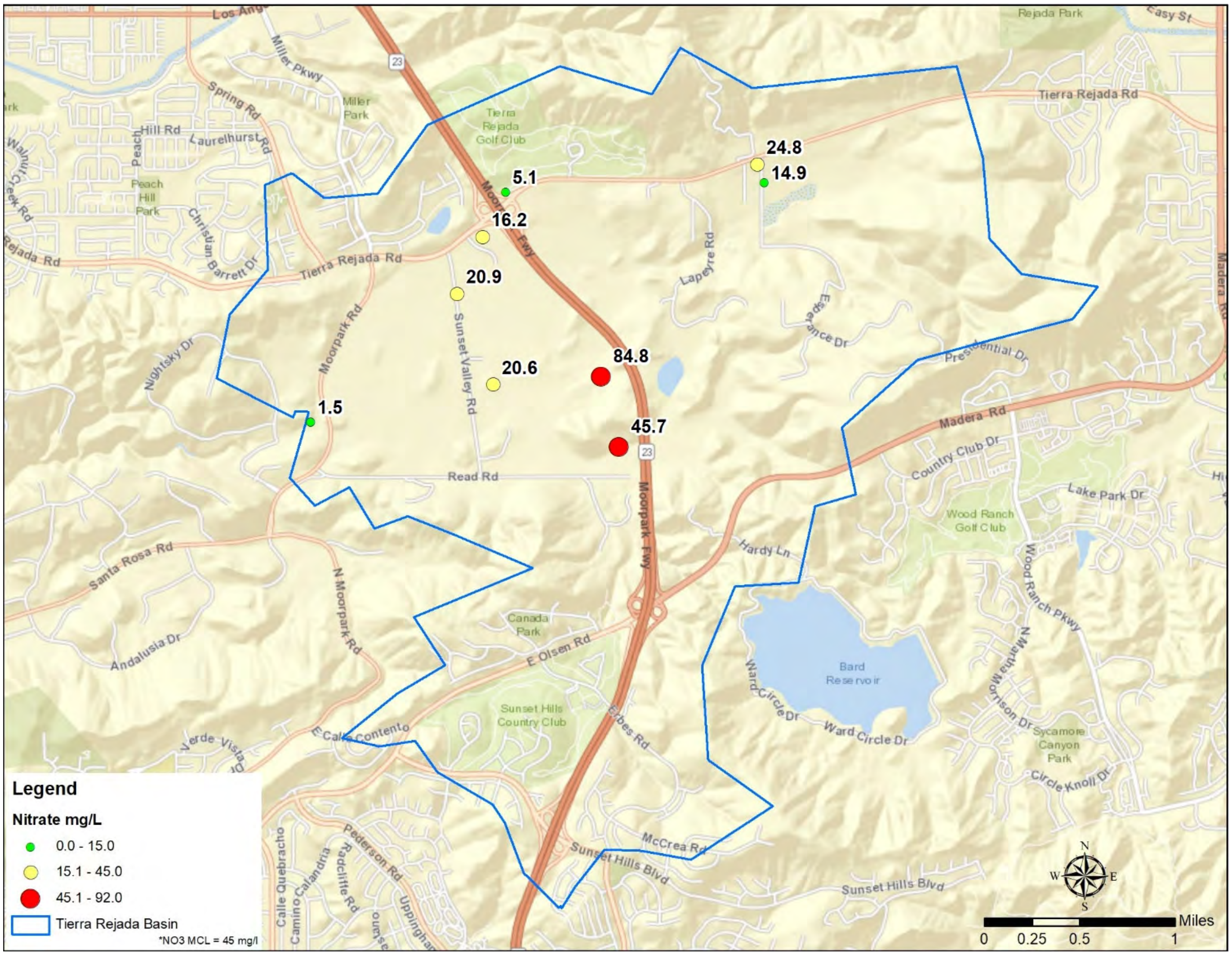

Figure 4-37: Tierra Rejada Basin location of sampled wells and nitrate concentrations.

4.4.20 Upper Ojai Valley Basin (DWR Basin No. 4-001)

The Upper Ojai Valley Basin is a small, linear valley southeast of and at a higher elevation than the Ojai Valley Basin. The average thickness of water-bearing deposits is approximately 60 feet and groundwater is encountered approximately 45 to 60 feet bgs. Groundwater quality is considered good but varies seasonally and usually has better quality during winter months. There are approximately 169 water supply wells in the Upper Ojai Valley Basin, of which 126 are active wells. Three wells were sampled in 2019. The Piper diagram in **Figure E-17** shows little variation in the water quality of wells. Calcium is the dominant cation in one sample; there is no dominant cation in the remaining samples, but all plot closely to the calcium cation type. Bicarbonate is the dominant anion, and the water is calcium bicarbonate type in all three samples.

TDS was above the SMCL in one sample; iron was above the MCL in one sample; and manganese was above the SMCL in two samples. One water sample was analyzed for Title 22 metals and all constituents were below the primary MCL. **Figure 4-38** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate.

Table 4-31: Selected Water Quality Results for the Upper Ojai Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
10K5	9/10/2019	5.4	**750**	124	100	0.2
11J1	9/16/2019	44.7	430	86.4	32	ND
11P2	9/10/2019	6.5	320	44.1	25	ND

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

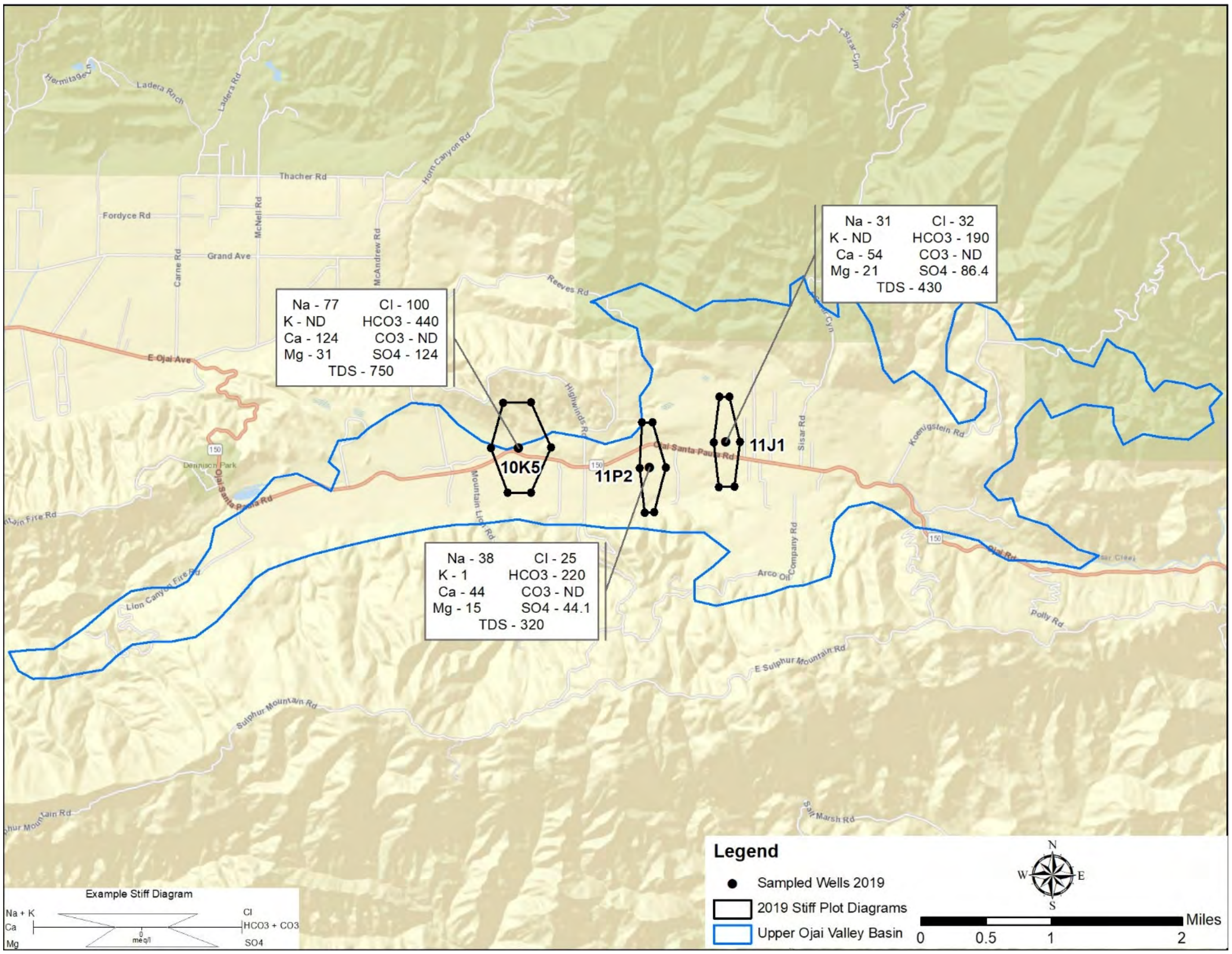

Figure 4-38: Upper Ojai Basin sampled wells with Stiff diagrams and selected inorganic constituents.

4.4.21 Ventura River Valley Basin – Lower Ventura River Subbasin (DWR Basin No. 4-003.02)

The Lower Ventura River Subbasin is bounded on the north by the Upper Ventura River Subbasin and extends south to the Pacific Ocean. The Subbasin shares a common boundary with the Mound Subbasin at its lower reach. Canada Larga and several smaller tributary canyons are also part of the Subbasin. The water-bearing unit consists of alluvial sand and gravel with abundant cobbles and ranges in thickness from 60 to 200 feet and perhaps up to 300 feet at the mouth of the Ventura River. Depth to the water-bearing unit is 3 to 13 feet bgs in the floodplain and deeper as the ground surface elevation increases toward the edges of the Subbasin. There are approximately 33 wells in the Lower Ventura River Basin, of which 20 are active. Three wells were sampled in 2019. All three samples had TDS and two samples had sulfate concentrations that exceed the secondary MCL. One sample had a manganese concentration above the MCL and one had a chloride concentration above the MCL for drinking water. Two samples had chloride concentrations that are above the level that can cause impairment of agricultural beneficial uses for sensitive plants. One sample was analyzed for Title 22 metals. No constituents were above the MCL. **Figure 4-39** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate, and sulfate for the well. The Piper diagram in **Figure E-18** shows the water quality of the samples. Sodium is the dominant cation in one sample. There is no dominant cation in two samples, but they plot close to calcium type. Bicarbonate is the dominant anion in one sample. There is no dominant anion in two samples, but they plot close to sulfate type. One water sample is sodium bicarbonate type and two samples are calcium sulfate type.

Table 4-32: Selected water quality results for the Lower Ventura River Subbasin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
5F1	11/26/2019	ND	**840**	184	62	0.6
5K1	9/10/2019	ND	**1170**	**368**	157	0.8
32Q3	11/26/2019	0.7	**2110**	**666**	**361**	0.8

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

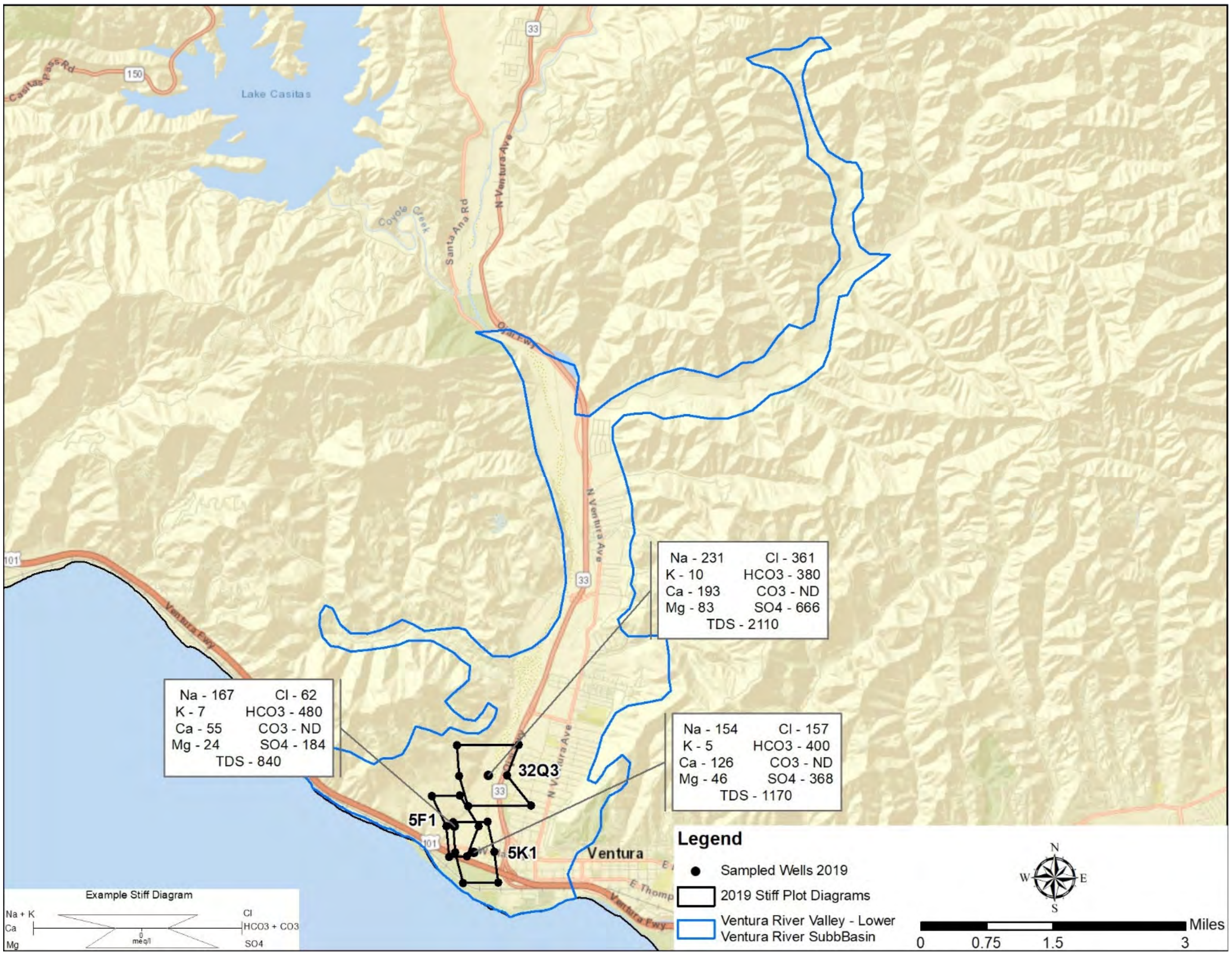

Figure 4-39: Ventura River Valley Basin – Lower Ventura River Subbasin sampled well with Stiff diagram and selected inorganic constituents.

4.4.22 Ventura River Valley Basin – Upper Ventura River Subbasin (DWR Basin No. 4-003.01)

The Upper Ventura River Subbasin is mainly composed of thin alluvial deposits. There are approximately 202 water supply wells in the Upper Ventura River Subbasin, of which 118 are active. Three wells within the basin and one well just outside the basin were sampled in 2019. The Piper diagram in **Figure E-19** shows moderate variation in water quality among the samples. The dominant cation in three samples is calcium and the dominant cation in one sample is sodium. The dominant anion in one sample is bicarbonate and one sample is sulfate type. Two samples have no dominant anion but plot close to sulfate type. The water in one sample is calcium bicarbonate, one sample is sodium sulfate, and two samples are calcium sulfate type.

All four water samples had TDS concentrations that exceed the SMCL; two samples had sulfate concentrations and one sample had a manganese concentration that exceed the SMCL. The well just outside the basin was analyzed for Title 22 metals. No constituents were above the MCL for drinking water. **Figure 4-40** shows the approximate well location and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate for the well.

Table 4-33: Selected water quality results for the Upper Ventura River Subbasin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
9G3	9/16/2019	43.4	**860**	196	82	0.4
15A2	11/26/2019	14	**580**	143	103	0.4
20K1S	11/26/2019	7.6	**750**	**284**	41	0.7
33M2 (outside basin)	9/10/2019	ND	**1200**	**423**	110	0.4

Notes:
1. mg/L = milligrams per liter
2. ND = not detected
3. Bold numbers indicate concentration above primary or secondary MCL

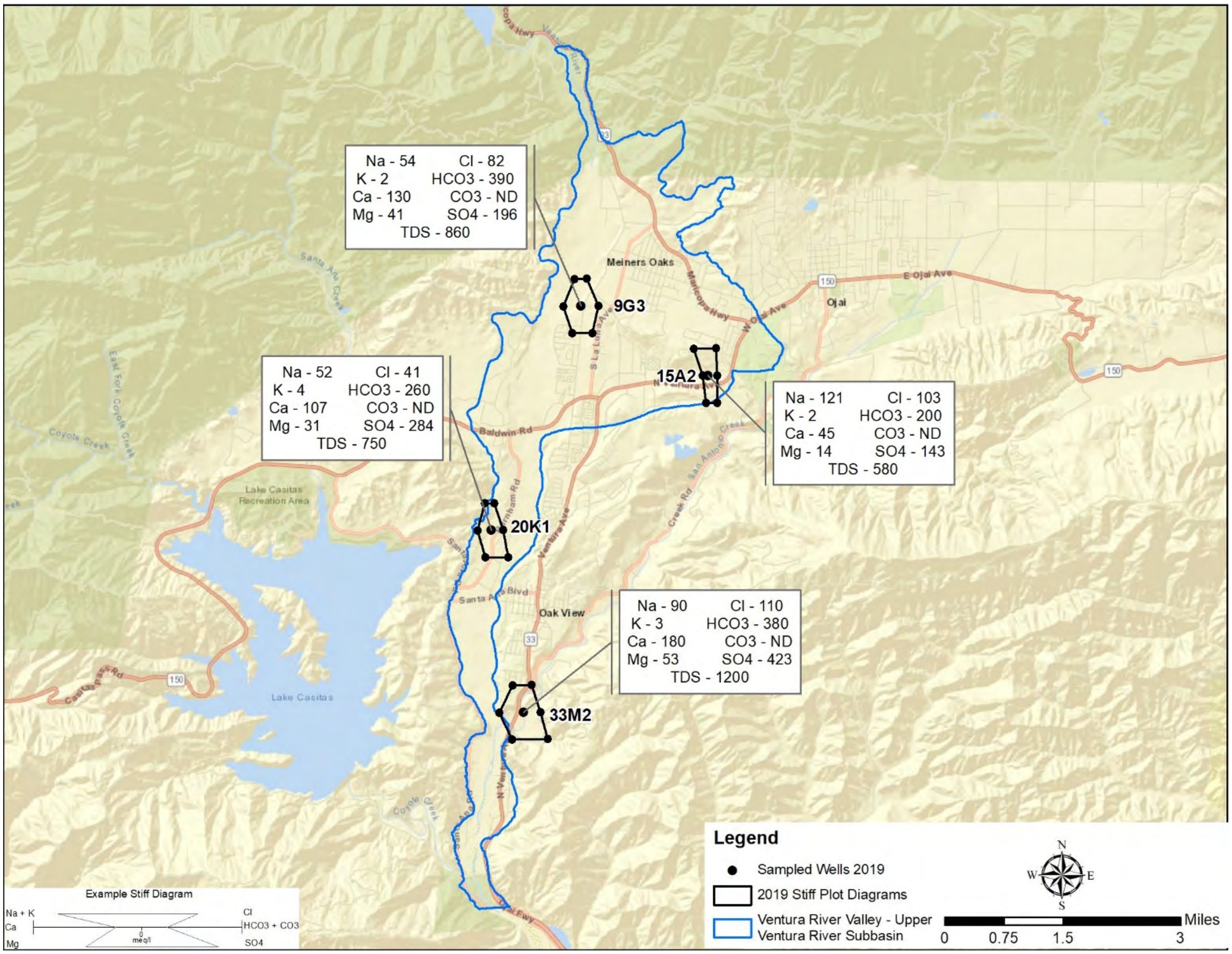

Figure 4-40: Ventura River Valley Basin – Upper Ventura River Subbasin sampled well with Stiff diagram and selected inorganic constituents.

5.0 Groundwater Elevations

Groundwater elevations are measured in production and monitoring wells throughout the County. Water levels are tracked to determine change in storage and trends in groundwater extraction and recharge. Elevation data are shared with and provided by other organizations and agencies. The data are also used to generate groundwater elevation maps to determine the direction of groundwater movement. Collected data are publicly available.

In 2019 approximately 200 wells throughout the County (**Figures 5-1 and 5-2**) were gauged, including seventeen designated as “key” wells, considered to represent groundwater elevations over a broad area of the groundwater basin. Key wells[8] were chosen based on location in a basin, availability of construction information and historical water level data. Water levels are measured quarterly in the southern half of the County and bi-annually in the northern half.

The gauged wells include wells that are not in operation and active wells that were not pumping for at least 24 hours prior to water level gauging. Same wells are consistently gauged. However, alternative wells are substituted when primary wells cannot be gauged.

[8] Appendix B includes the location of key wells, water level changes and hydrographs.

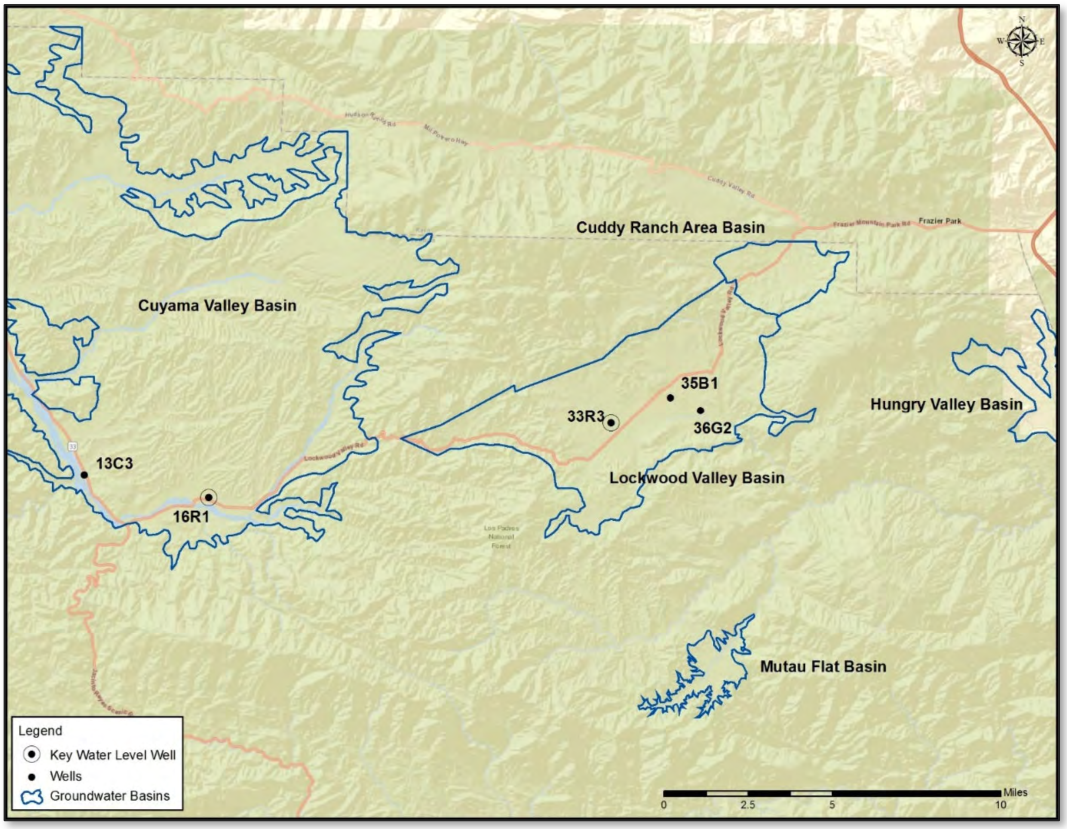

Figure 5-1: Water level wells measured in the northern half of the County.

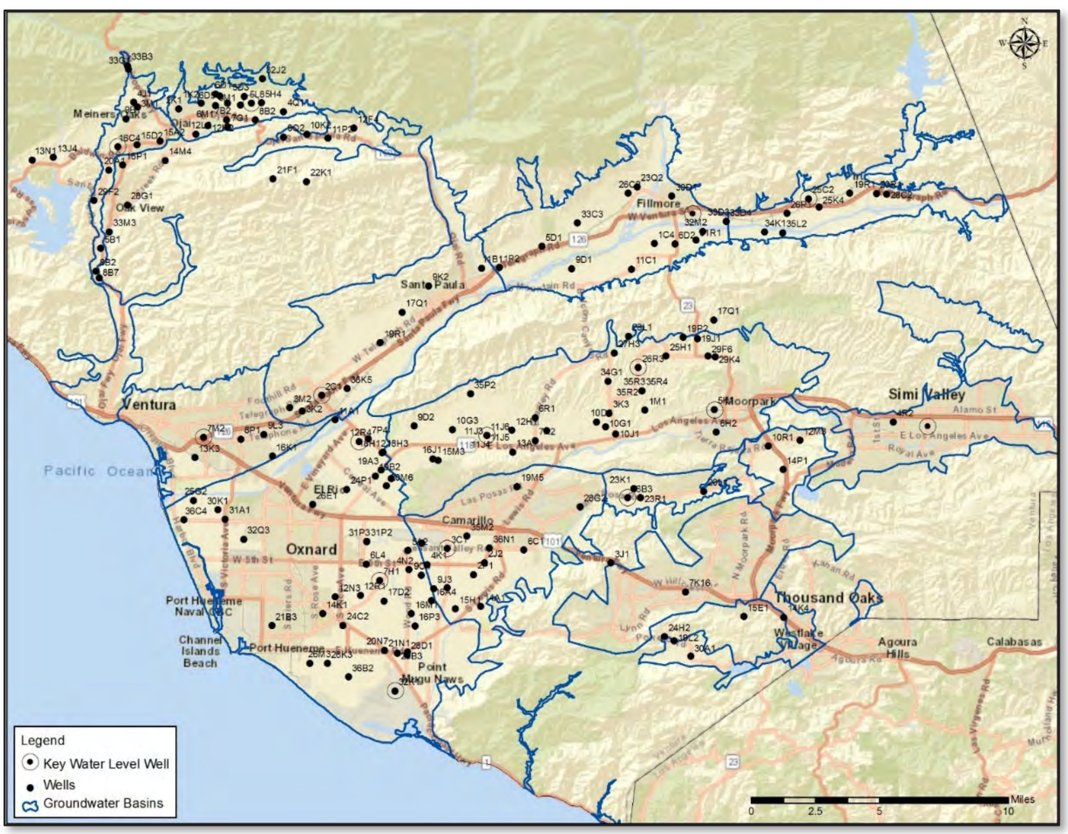

Figure 5-2: Water level wells measured in the southern half of the County.

5.1 Water Level Hydrographs

The gauged wells include wells that are not in operation and active wells that were not pumping for at least 24 hours prior to water level gauging. The same wells are consistently gauged; however, alternative wells are substituted when primary wells cannot be gauged. The data along with climate, stream flow, groundwater recharge, groundwater quality and pumping data are used to evaluate groundwater conditions. Hydrographs for all key wells are shown in **Appendix B**. An example hydrograph for Well No. 01N21W02J02S is shown in **Figure 5-3**.

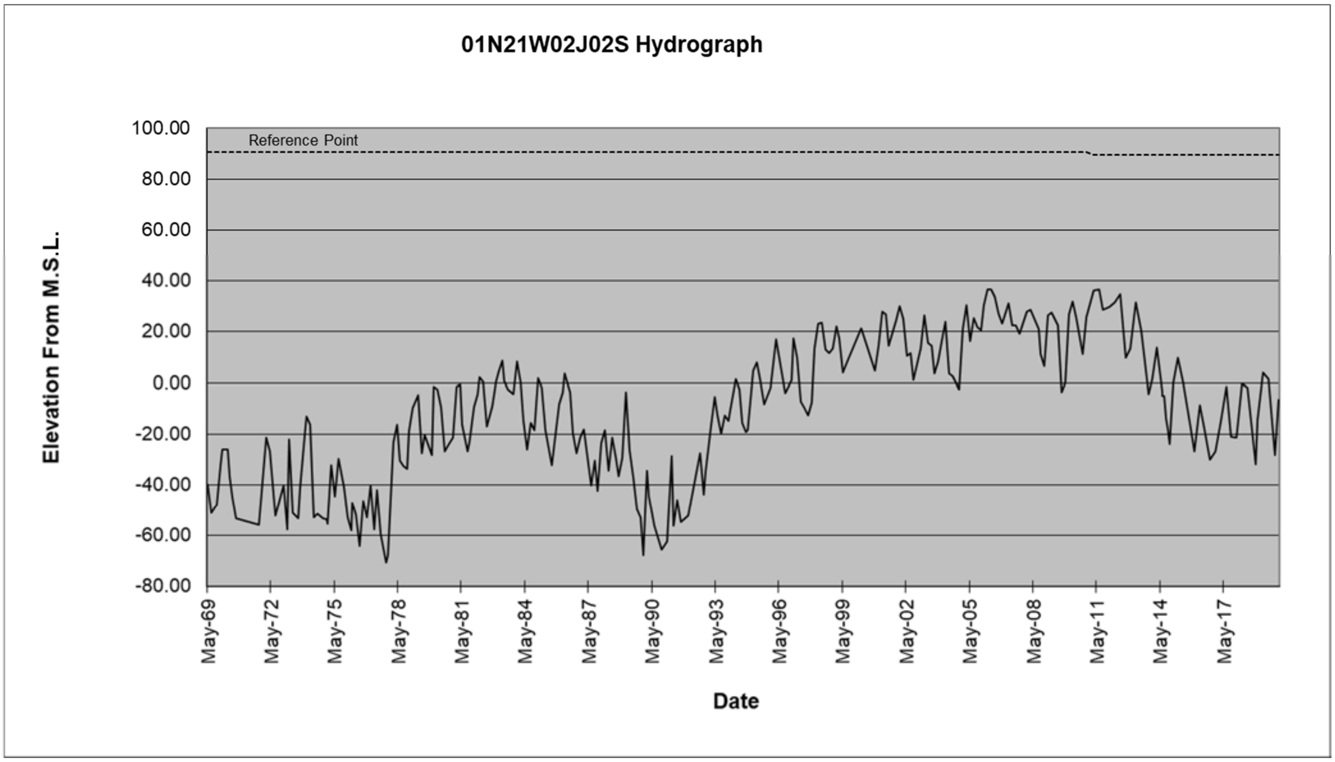

Figure 5-3: Hydrograph for SWN 01N21W02J02S, located in the Pleasant Valley Basin.

5.2 Spring Groundwater Elevation Changes in Key Wells

Locations of each key well are shown in **Figure 5-4**. Key water level changes for the largest groundwater basins are summarized in **Table 5-1**. Spring season measurements are used for comparison since this period is at the end of the seasonal rainfall year when groundwater basins are typically most full. In general, groundwater levels show a downward trend due to exceptional drought conditions and increased reliance on groundwater.

Hydrographs (line graphs) of individual key wells are presented in **Appendix B**. Hydrographs show changes in groundwater levels (WLs) measured in relation to the ground surface or a specific reference point (RP) elevation in feet mean see level (msl), typically the magnetic north top of the well casing or the concrete slab at the wellhead. The hydrographs are accompanied by up/down bar graphs to indicate change from the previous Spring.

Figure 5-4: Key water level wells in Ventura County.

Table 5-1: Key water level changes in feet below ground surface for 2019.

DEPTH TO GROUND WATER LEVEL CHANGES AT KEY WELLS IN VENTURA COUNTY							
		HISTORIC					
Groundwater Basin	**WELL NUMBER**	**RECORD HIGH (ft.)**	**RECORD LOW (ft.)**	**LEVEL (ft.)**	**LEVEL (ft.)**	**LEVEL (ft.)**	**Change From Previous Year (ft.)**
	(Period of RECORD)	**(DATE)**	**(DATE)**	**(YEAR 2017)**	**(YEAR 2018)**	**(YEAR 2019)**	**(UP/DOWN)**
Oxnard Plain							
Oxnard Aquifer	01N21W07H01S	3.4	88.4	55.9	57.0	56.3	UP 0.7
	(Jan.1931-present)	(3/1999)	(9/1964)	(3/16)	(3/20)	(3/13)	
Fox Canyon Aquifer	01N21W32K01S	18	129	64.1	87.0	60.7	UP 26.3
	(Dec. 1972-present)	(4/1983)	(12/1990)	(3/13)	(3/12)	(3/18)	
Forebay Management Area (Measured By UWCD)	02N22W12R04S	16.2 ft.	Dry	117.14	Dry	106.14	UP 11.2
	(Mar 1996-present)	(5/2006)	(7/2014 -?)	(3/28)	(3/28)	(4/16)	
Pleasant Valley Lower System	01N21W03C01S	87.5	253.9	162.7	162.3	153.9	UP 8.4
	(Feb.1973-present)	(8/1995)	(11/1991)	(3/16)	(3/26)	(3/15)	
West Las Posas	02N21W11J04S	368.4	406.2	404.3	405.7	407.7	DOWN 2.0
	(Jan.1991 - Present)	(6/2006)	(9/2016)	(3/9)	(3/7)	(3/25)	
East Las Posas	03N20W26R03S	503	619.3	570.2	564.0	576.7	DOWN 12.7
	(1985-present)	(4/1986)	(9/2009)	(3/10)	(3/9)	(3/25)	
Santa Rosa Valley	02N20W26B03S	13.2	60.3	40.3	66.2	54.5	UP 11.7
	(Oct.1972-present)	(4/1979)	(11/2004)	(3/23)	(3/27)	(6/5)	
Simi Valley	02N18W10A02S	45	92	82.1	89.1	86.3	UP 2.8
	(Dec.1984-present)	(2/1998)	(6/1992)	(3/31)	(3/23)	(3/29)	
Ventura River	04N23W16C04S	3.9	101.9	34.1	68.9	39.3	UP 29.6
	(July 1949-present)	(3/1983)	(12/2016)	(3/6)	(3/5)	(3/20)	
Ojai Valley	04N22W05L08S	38.2	312	234.1	203.1	160.1	UP 43.0
	(Oct.1949 - Present)	(4/1978)	(9/1951)	(3/8)	(3/1)	(4/1)	
Mound (Measured by UWCD)	02N22W07M02S	126.6	176.2	168.04	166.1	173.7	DOWN 7.6
	(Apr.1996-present)	(4/1998)	(4/1996)	(3/21)	(3/15)	(3/6)	
Santa Paula	02N22W02C01S	20.7	51.9	49.2	52.7	45.1	UP 7.6
	(Oct.1972-present)	(4/1983)	(12/1991)	(3/15)	(3/19)	(3/12)	
Fillmore	03N20W05D01S	107.8	163.7	143.2	143.5	131.8	UP 11.7
	(Oct.1972 - Present)	(2/1979)	(1219/77)	(3/15)	(3/19)	(3/12)	
Piru	04N19W25C02S	43.1	183.2	122.8	100.1	94.6	UP 5.5
	(Sep.1961-present)	(3/1993)	(10/1965)	(3/15)	(3/19)	(3/11)	
Lockwood Valley	08N21W33R03S	17.5 ft.	53.5 ft.	50	53.8	52.3	UP 1.5
	(April1966-present)	(9/1998)	(4/1974)	(3/29)	(4/4)	(4/19)	
Cuyama Valley	07N23W16R01S	15.0	47.5	44.1	43.8	26.1	UP 17.7
	(Mar.1972-present)	(4/1993)	(9/1990)	(3/29)	(4/4)	(4/19)	

Data prepared: 4/2/2020

The following summary is based on information gathered from key wells as shown in **Table 5-1**.

The Forebay Management Area of the Oxnard Subbasin responds quickly to seasonal and annual changes in precipitation and recharge. The Forebay Area key well (UWCD monitoring well) was up 11.2 feet after being dry from the 2018 spring measurement.

In the Oxnard Subbasin, the water level in the Oxnard Aquifer key well 01N21W07H01S was up 0.7 feet from the Spring 2018. The water level in the Oxnard Subbasin, Fox Canyon Aquifer key well 01N21W32K01S was up 26.3 feet from Spring 2018.

In the Pleasant Valley lower aquifer system, the water level in key well 01N21W03C01S was up 8.4 feet from Spring 2018.

In the Las Posas Valley Basin, the EMA key well 03N20W26R03S water level was down 12.7 feet from Spring 2018. The water level in the WMA key well 02N21W11J04S was down 2.0 feet from Spring 2018.

In the Arroyo Santa Rosa Valley Basin, the water level in key well 02N20W26B03S was up 11.7 feet from Spring 2018. The water level in the Simi Valley Basin key well 02N18W10A02S was up 2.8 feet from Spring 2018. Fluctuations in depth to water in the Simi Valley Basin key well over the past ten years have been minor (less than ±10 feet).

In the northern portion of the Upper Ventura River Subbasin, the water level in key well 04N23W16C04S was up 29.6 feet from Spring 2018. In the Ojai Valley Basin, the water level in key well 04N22W05L08S was up 43.0 feet from Spring 2018. The Ojai Valley Basin responds quickly to rainfall fluctuations, and it is not uncommon to see large drops in water levels during dry periods and recovery during wet periods (see Hydrograph in **Appendix B**).

The subbasins that underlie the Santa Clara River Valley also respond quickly to fluctuations in annual rainfall. The water level elevation in the Piru Subbasin key well was up 5.5 feet from Spring 2018. The water level in the Fillmore Subbasin key well was up 11.7 feet, and in the Santa Paula Subbasin the water level in the key well was up 7.6 feet from Spring 2018. In the Mound Subbasin the water level in key well 02N22W07M02S was down 7.6 feet from Spring 2018.

In the northern half of the County, the Lockwood Valley Basin key well 08N21W33R03S was up 1.5 feet from Spring 2018. The water level in the Cuyama Valley Basin key well 07N23W16R01S was up 17.7 feet from Spring 2018.

5.3 Potentiometric Surface Maps

Potentiometric surface maps (groundwater elevation maps) are used to visually represent groundwater elevations in specific geographic areas. Potentiometric surface maps are constructed from groundwater elevation data collected in Spring and Fall periods at County-gauged wells and at wells measured by other organizations/agencies. Generalized potentiometric surface maps created from 2019 groundwater elevation data include the Santa Clara River Valley, the UAS of the Oxnard Subbasin and Pleasant Valley Basin, and the LAS of the Oxnard Subbasin, Pleasant Valley and Las Posas Valley Basins.

Figures 5-5 and 5-6 depict the Santa Clara River Valley Basin that encompasses the Mound, Santa Paula, Fillmore and Piru Subbasins. The basin area was truncated to include the alluvial area of the valley instead of the full groundwater basin boundaries.

Figures 5-7 and 5-8 depict the UAS of the Oxnard Subbasin and Pleasant Valley Basin area.

The UAS is not typically present in the Pleasant Valley area. There are areas of shallow alluvial sediments similar to Oxnard and Mugu aquifer units from which groundwater is extracted. Data from the perched or semi-perched zone of the Oxnard Subbasin were not used as some water levels represent confined conditions.

Figures 5-9 and 5-10 depict the LAS of the Oxnard Subbasin, Pleasant Valley and Las Posas Valley Basins. The Moorpark anticline was used in previous Annual Reports as a boundary between the East and South Las Posas Basins. The South Las Posas Basin is no longer recognized and the Las Posas Valley Basin is divided into the East and West Las Posas Management Areas (ELPMA and WLPMA, respectively). The potentiometric surface is mapped to reflect a “no-flow” barrier between the ELPMA and WLPMA. Data from wells perforated in the shallow sand and gravel zones of the Las Posas Valley were not used to generate these contours.

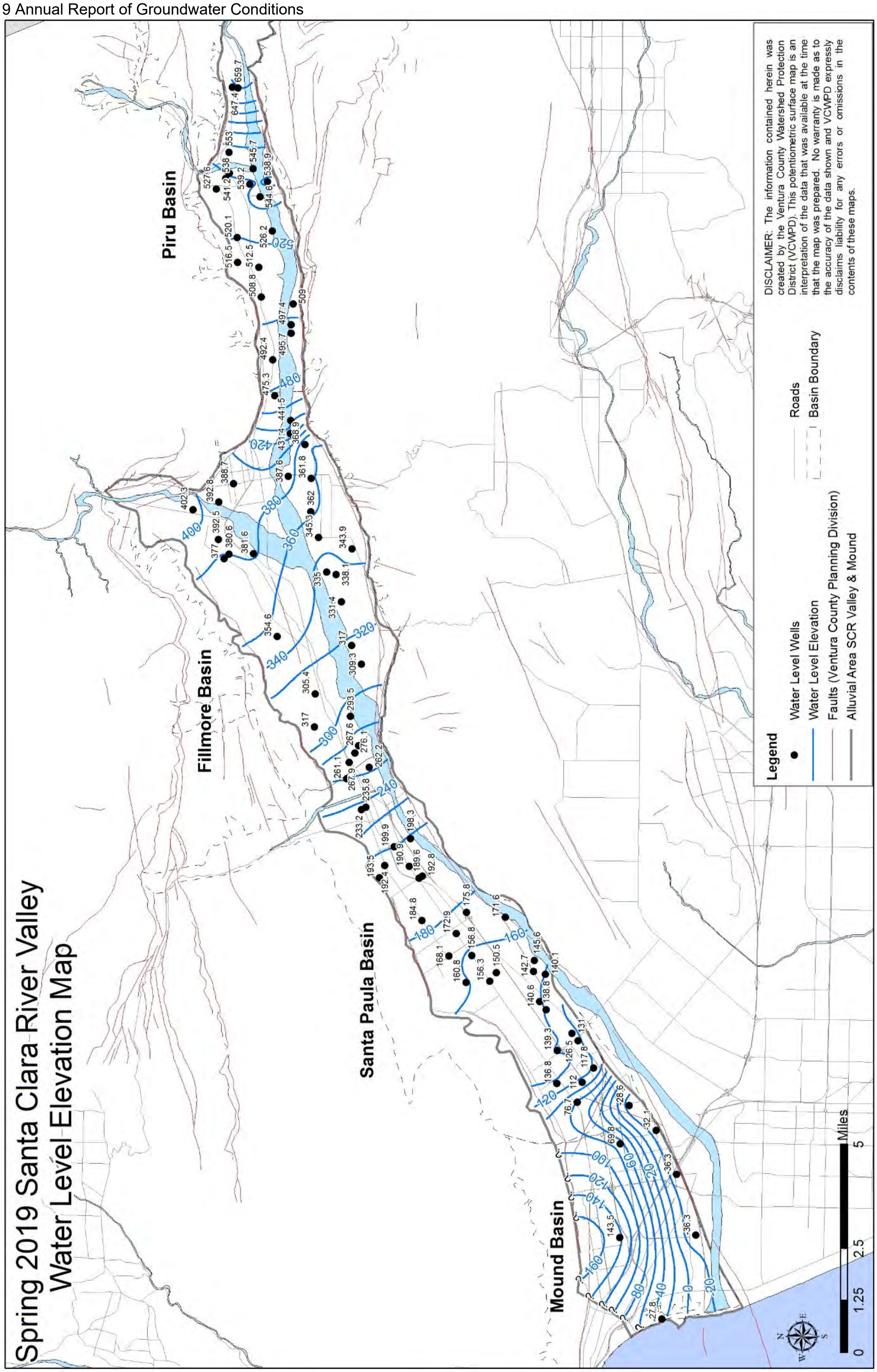

Figure 5-5: Water level surface elevation contours for the Santa Clara River Valley Basin for Spring 2019.

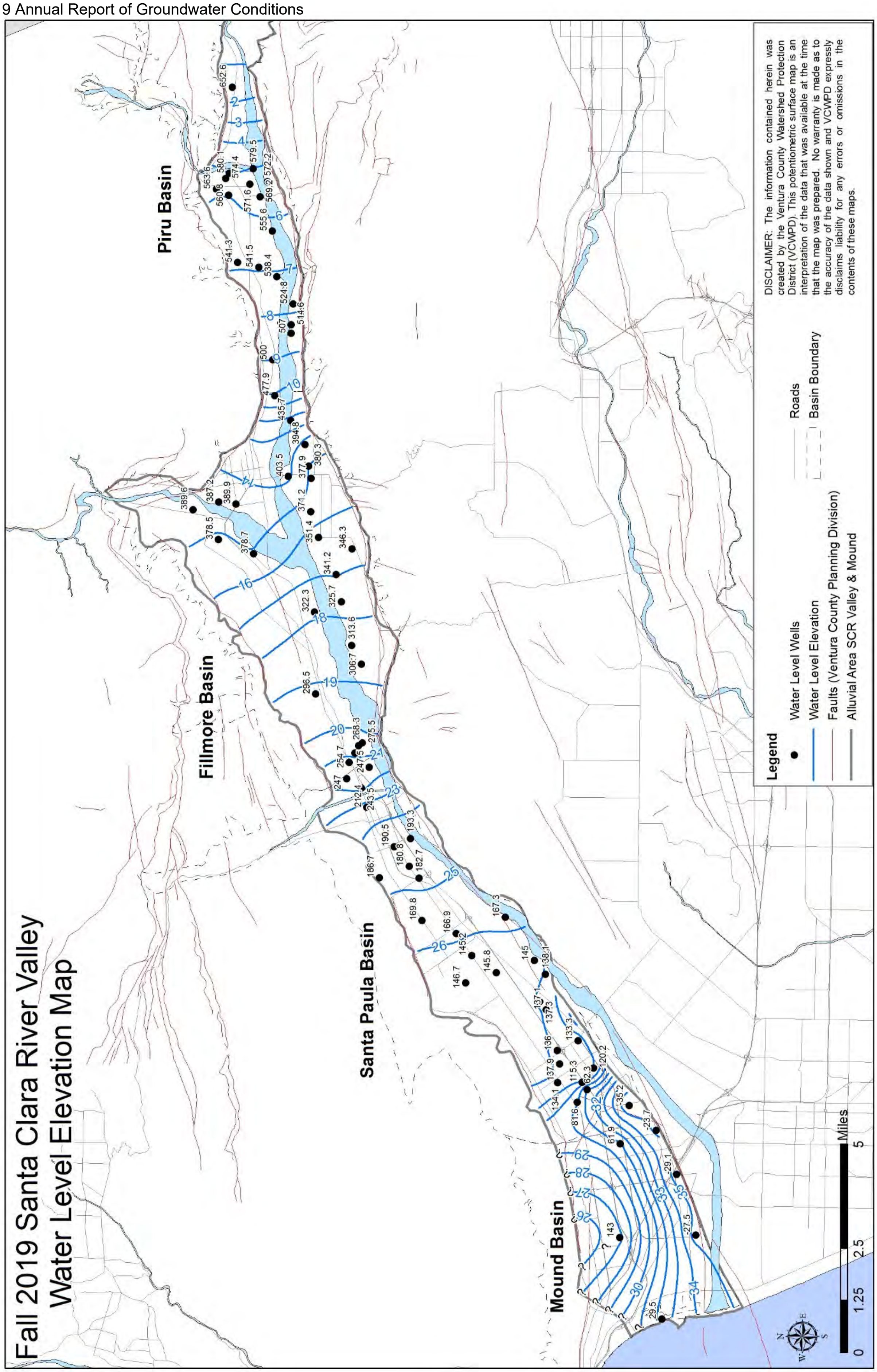

Figure 5-6: Water level surface elevation contours for the Santa Clara River Valley Basin for Fall 2019.

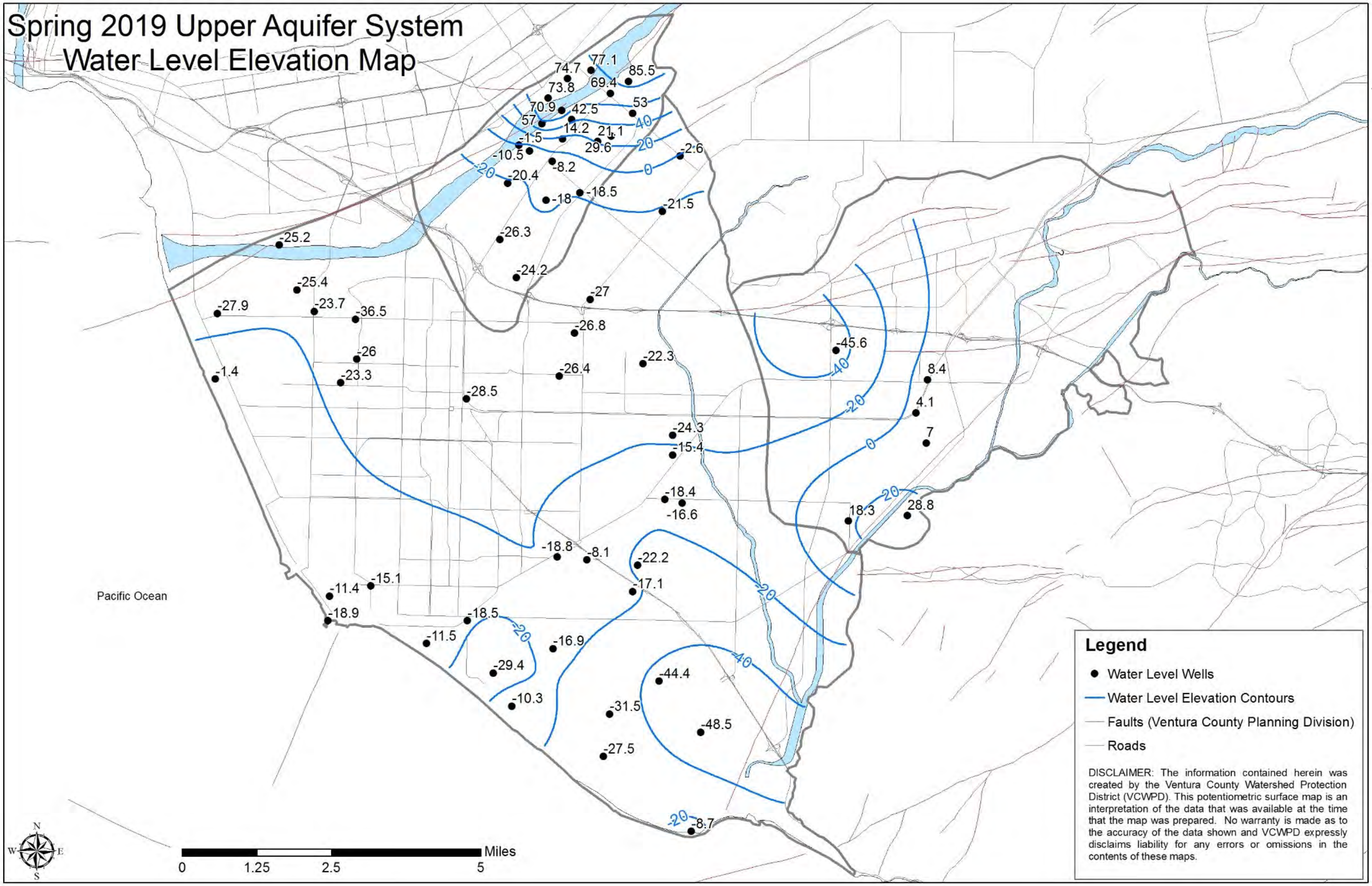

Figure 5-7: Water level surface elevation contours for the Upper Aquifer System for spring 2019.

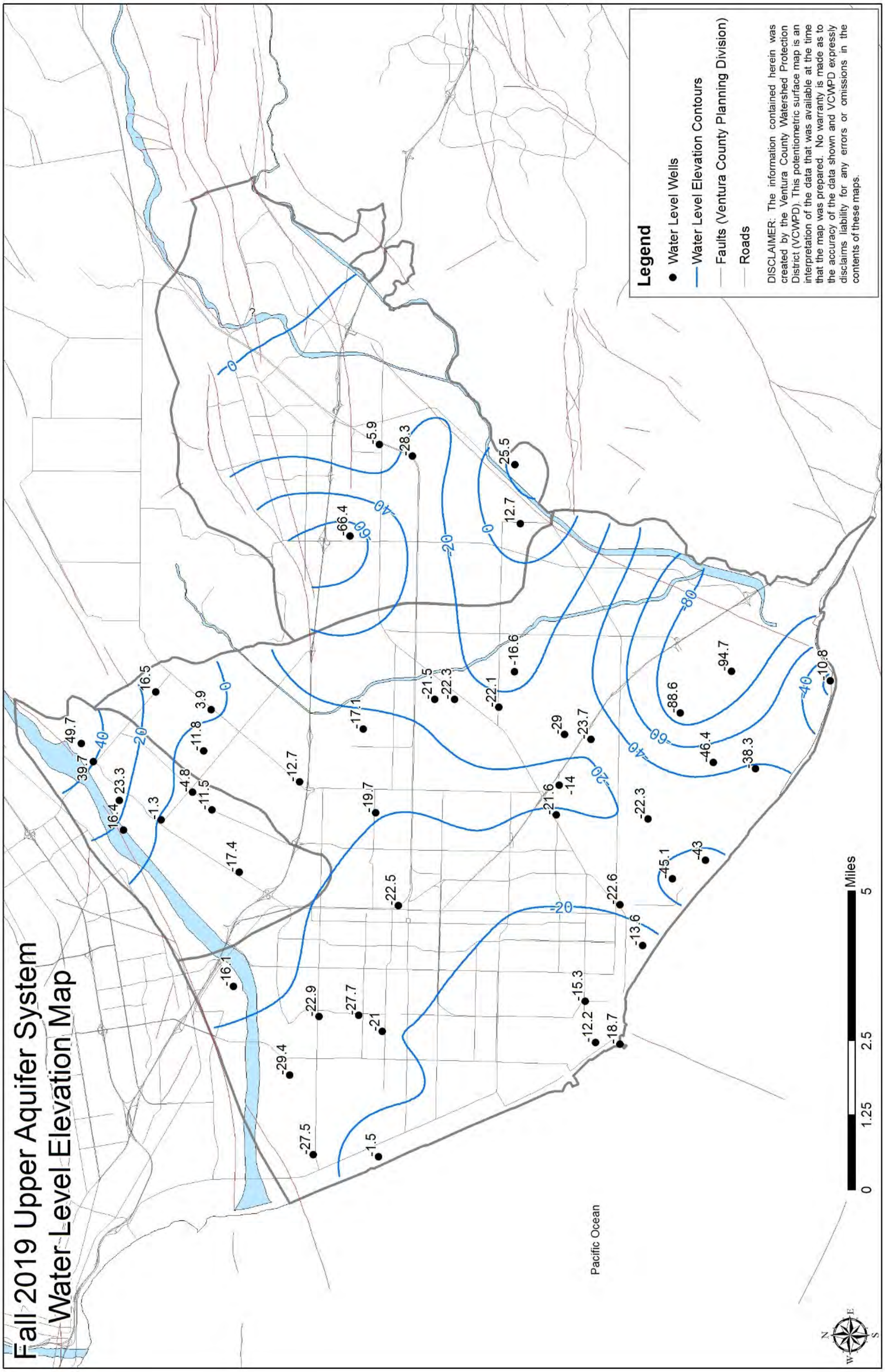

Figure 5-8: Water level surface elevation contours for the Upper Aquifer System for fall 2019.

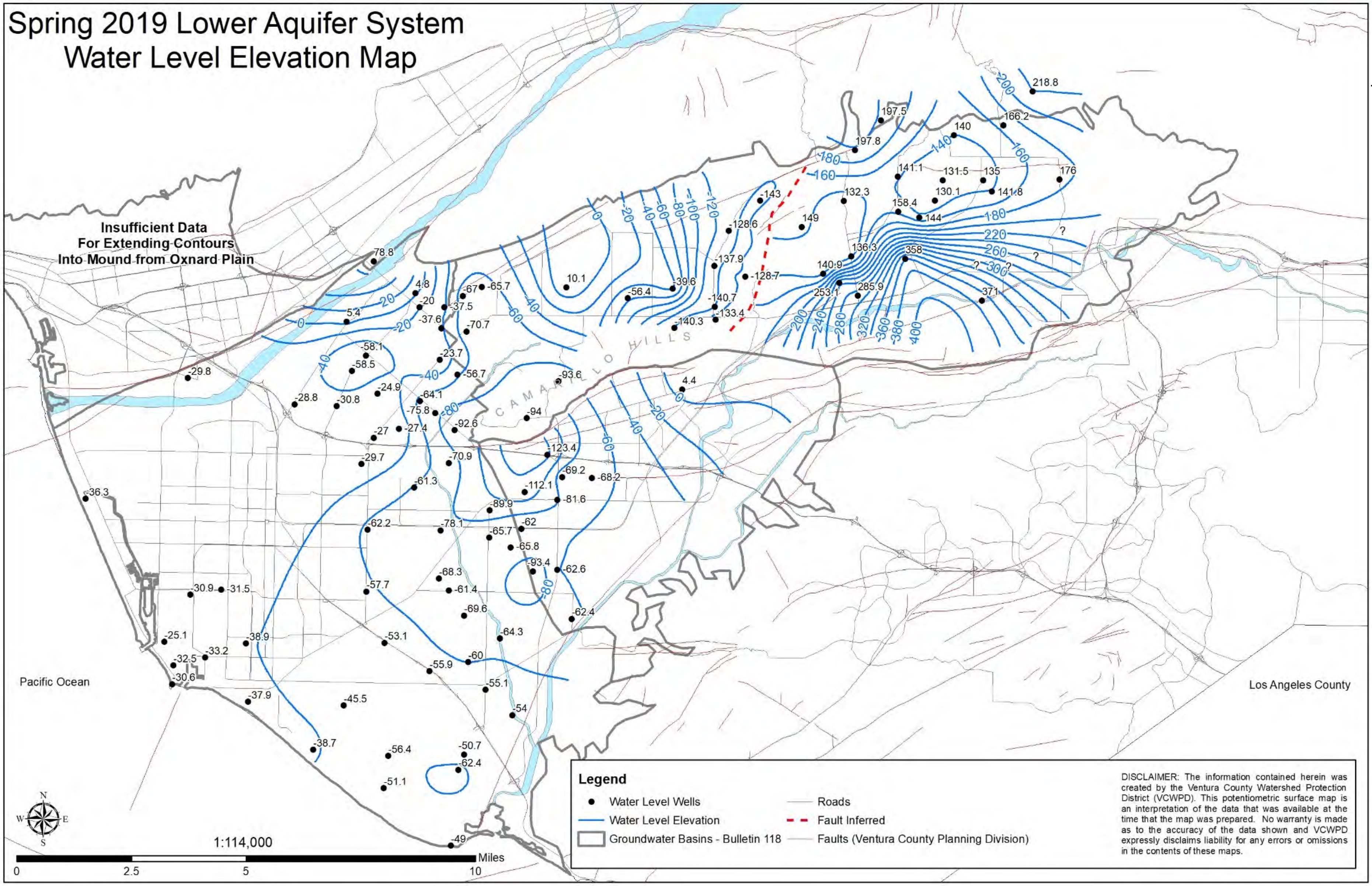

Figure 5-9: Water level surface elevation contours for the Lower Aquifer System for spring 2019.

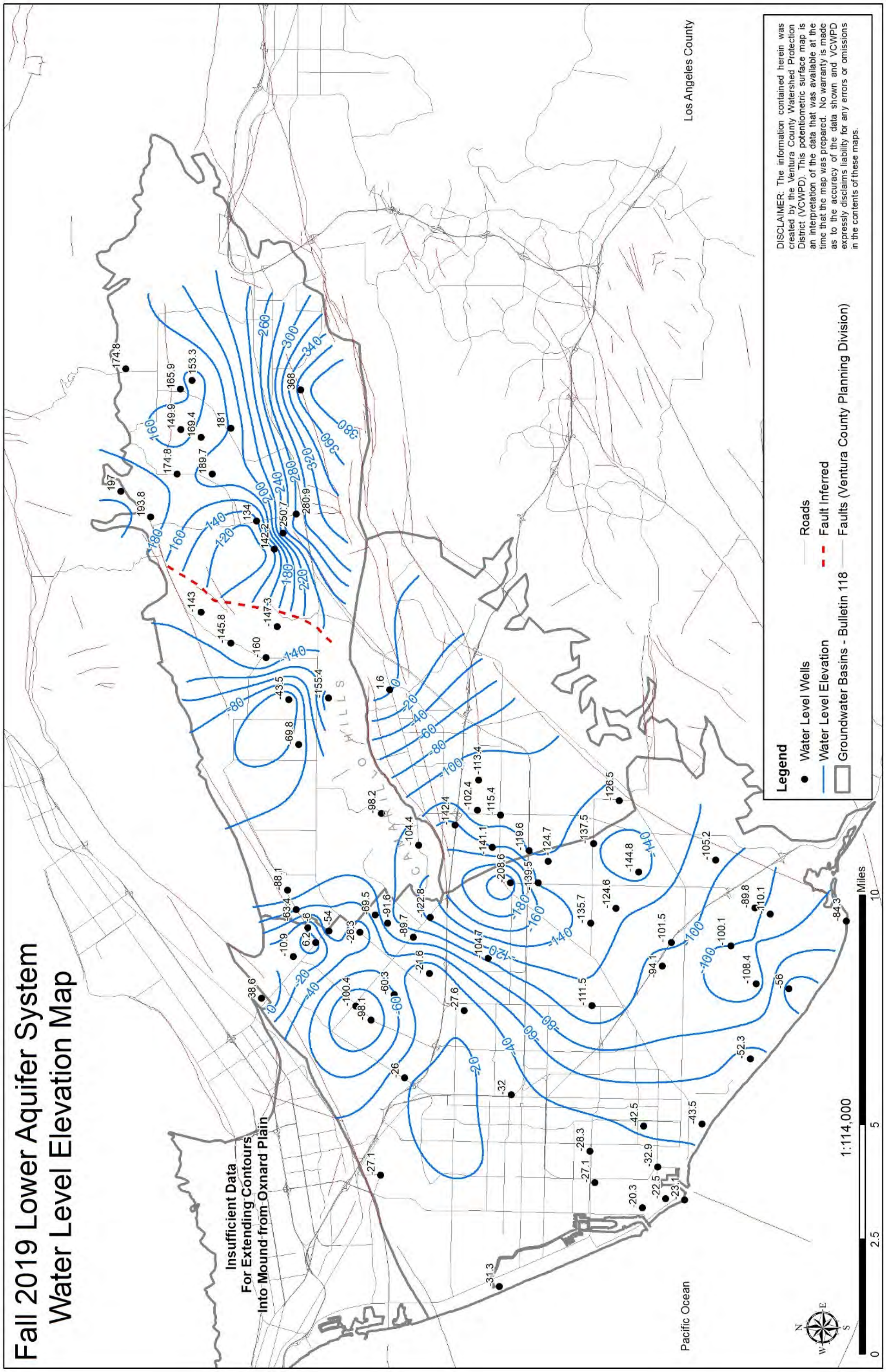

Figure 5-10: Water level surface elevation contours for the Lower Aquifer System for fall 2019.

5.4 California Statewide Elevation Monitoring Program (CASGEM)

The CASGEM Program was developed by the DWR in response to the passing of Senate Bill X7 6 and Assembly Bill 1152 in November 2009. The law directs that groundwater elevations in all basins and subbasins in California be regularly and systematically monitored, preferably by local entities, with the goal of demonstrating seasonal and long-term trends in groundwater elevations. Resulting information is available from the DWR. The CASGEM program established a permanent, locally managed system to monitor groundwater elevation in California's alluvial groundwater basins and subbasins identified in DWR Bulletin No. 118. The CASGEM program relies and builds on locally established, long-term groundwater monitoring and management programs.

The VCWPD acts as the Umbrella Monitoring Entity for Ventura County by coordinating and reporting groundwater elevation data collected by multiple agencies within a basin. Groundwater level data is collected quarterly or semi-annually, depending on location.

6.0 Water Supplies

6.1 Groundwater Extractions

Two groundwater management agencies (GMAs) (FCGMA and OBGMA) and one water conservation district (UWCD) oversee groundwater extractions within their jurisdictional boundaries in Ventura County (**Figure 6-1**). Well owners and operators within the boundaries of a GMA are required to report their extractions to the respective agency. Owners of wells located outside of a GMA boundary are not required to report their extractions but are requested to report annual well usage to the County.

The FCGMA reports that approximately 60% of groundwater extracted within the Agency is used for agricultural purposes with the remaining 40% for municipal, industrial, and domestic uses. **Table 6-1** compares extractions reported to the three agencies for the years 2010 through 2019. Owners of wells located in agency boundary overlap areas must report extractions to all agencies.

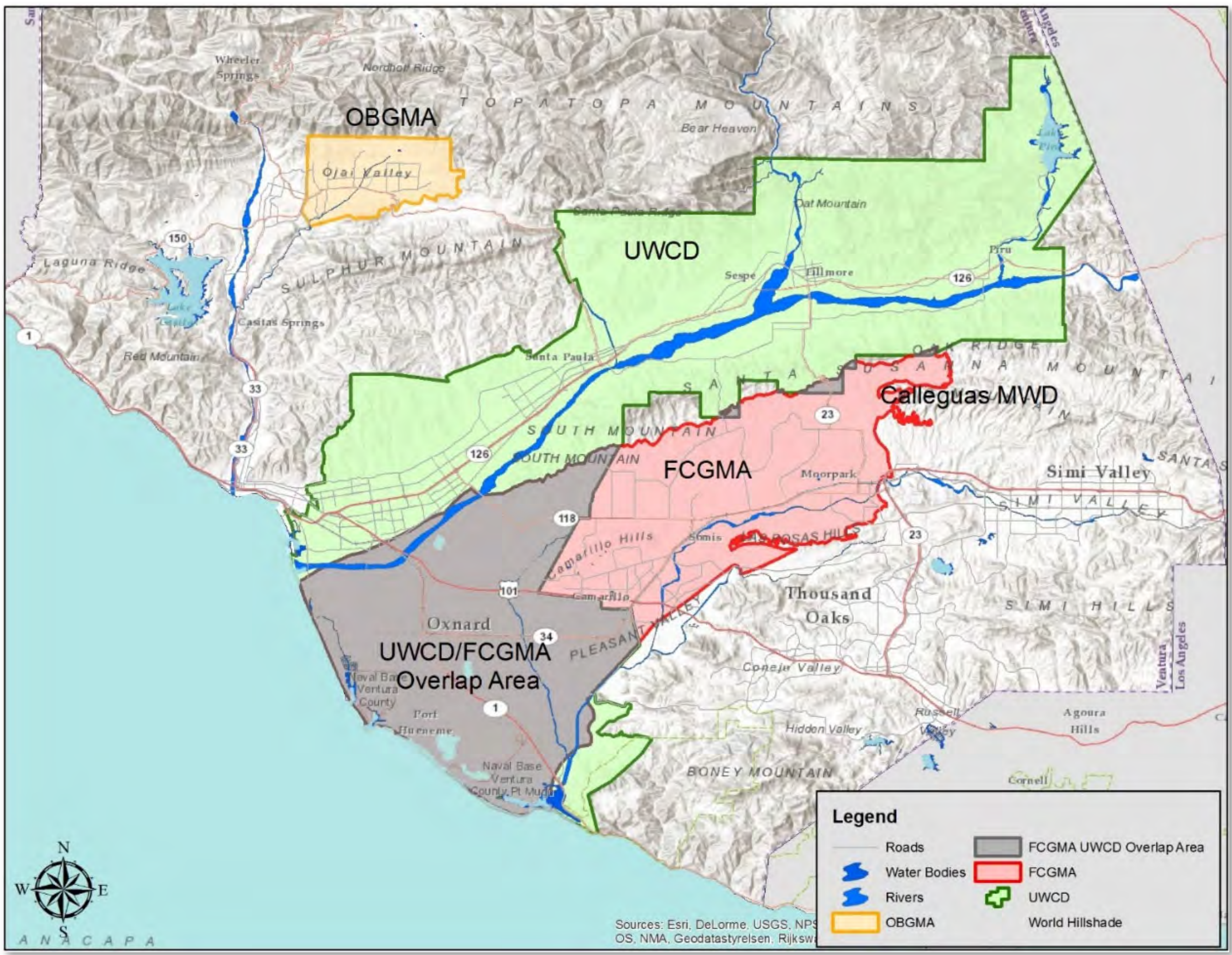

Figure 6-1: Groundwater Management Agencies in Ventura County.

Table 6-1: Agency reported extractions 2010 through 2019[9,10]

	Agency		
Reported Extractions (AF)	UWCD	FCGMA	OBGMA
2010-1	69,541.85	54,188.64	2,004.86
2010-2	89,558.90	69,827.92	3,001.11
Annual Total 2010	**159,100.75**	**124,016.56**	**5,005.97**
2011-1	72,940.07	54,357.81	2,050.00
2011-2	86,560.99	65,877.62	3,099.00
Annual Total 2011	**159,501.06**	**120,235.43**	**5,149.00**
2012-1	78,716.61	59,904.02	2,845.56
2012-2	99,285.26	75,327.91	2,559.40
Annual Total 2012	**178,001.87**	**135,231.94**	**5,404.96**
2013-1	87,336.86	64,751.13	2,805.76
2013-2	116,708.94	88,957.84	2663.216
Annual Total 2013	**204,045.80**	**153,708.97**	**5,468.97**
2014-1	101,577.29	85,233.43	2,232.15
2014-2	101,468.80	65,731.43	2,144.20
Annual Total 2014	**203,046.09**	**150,964.86**	**4,376.35**
2015-1	85,905.46	71,411.15	1,817.92
2015-2	107,590.82	70,810.82	1,901.51
Annual Total 2015	**193,496.28**	**142,221.97**	**3,719.43**
2016-1	82,315.09	69,823.38	1,461.22
2016-2	100,801.24	64,323.08	1,424.93
Annual Total 2016	**183,116.33**	**134,146.46**	**2,886.15**
2017-1	69,854.68	58,467.95	1,659.09
2017-2	113,402.30	72,062.56	2,855.32
Annual Total 2017	**183,256.98**	**130,530.51**	**4,514.41**
2018-1	75,041.90	63,094.51	
2018-2	94,195.78	60,325.28	
Annual Total 2018	**169,237.68**	**123,419.79**	**4,224.03**
2019-1**	57,335.53	47,796.61	
2019-2**	91,649.71	52,096.68	
Annual Total 2019**	**148,985.24**	**99,893.29**	**4,465.95**
UWCD as 05/14/2020		FCGMA as of 05/21/2020	

**Values are subject to change.

[9] Data courtesy of FCGMA.
[10] Data courtesy of OBGMA.

6.2 Wholesale Districts

Surface and imported water are supplied by three wholesale water districts including UWCD, Casitas Municipal Water District (CMWD) and Calleguas Municipal Water District (Calleguas) (**Figure 6-2**)

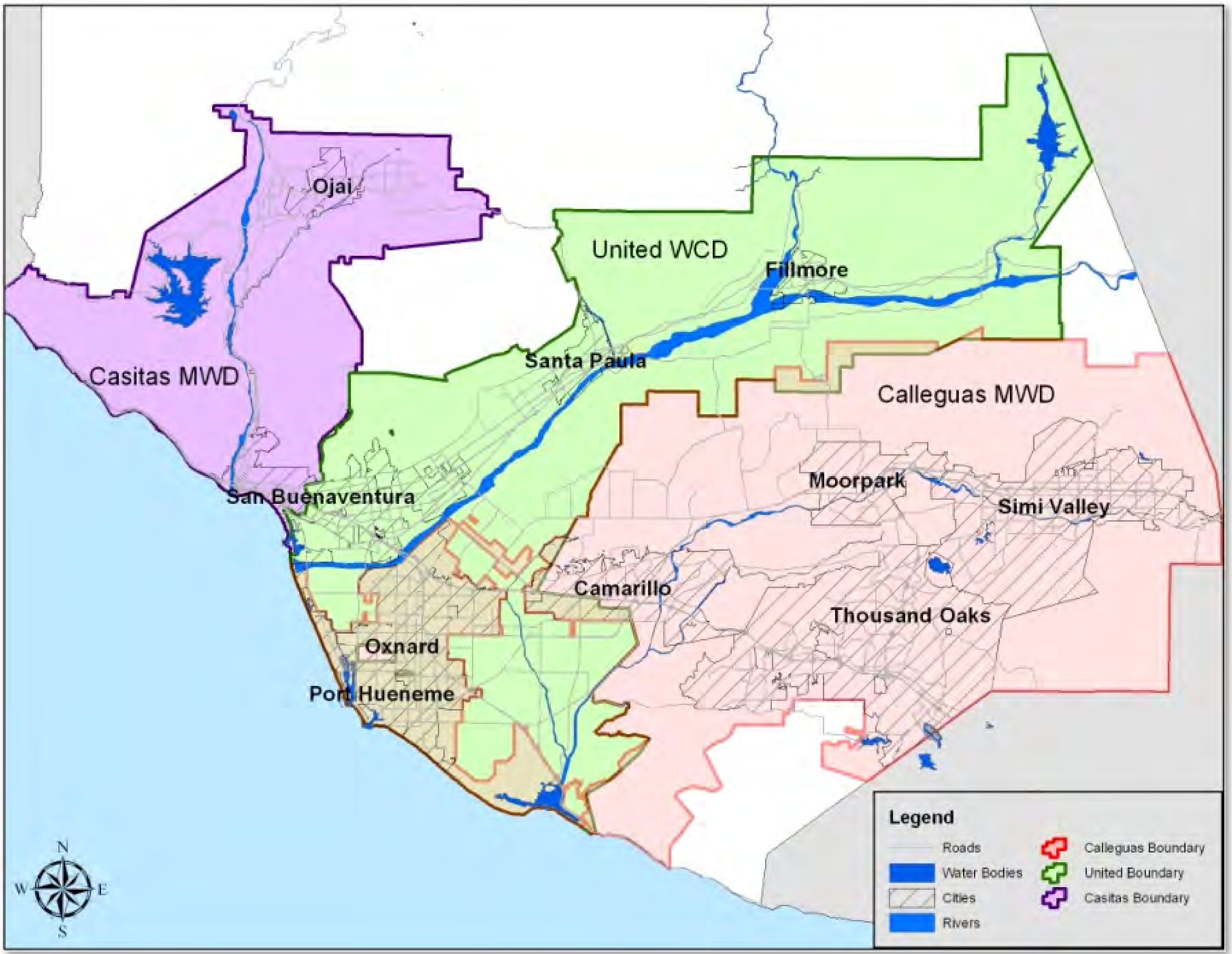

Figure 6-2: Wholesale Water District Boundary Map.

Calleguas delivers the largest volume of water to retailers. Approximately 75% of the population in the County receives a mix of imported State Water Project (SWP) water and Colorado River water from Calleguas. Water from the SWP comes from Northern California via a water system owned and operated by the Metropolitan Water District (MWD) of Southern California, a regional wholesaler that supplies SWP water to Calleguas. MWD supplies imported water to Calleguas. Calleguas imported a total of 90,176.5 AF of treated water in 2019. Calleguas delivered 82,237.10 AF of water to retailers in 2019 compared to 91,340 AF in 2018. Production from the Calleguas Aquifer Storage and Recovery (ASR) wellfield was 217.96 AF in 2019. Some imported water is also injected in the East Las Posas Management Area through the Las Posas ASR Project. In the ASR wellfield 8,322.49 AF of water was injected in 2019. Up to 11,000 AF of water can be stored by Calleguas in Lake Bard and supply demand for short periods of time. The end of year water volume in storage in Lake Bard was 10,075 AF[11]. The Las Posas Basin ASR wellfield currently has 18 wells, operated by Calleguas. The wells are 800 to 1,200 feet deep and perforate the Fox Canyon Aquifer (Calleguas 2007).

[11] Data provided courtesy of Calleguas MWD.

UWCD delivered 16,689 AF of water to retailers and end-users in 2019, down slightly from 16,953 AF in 2018. UWCD can store up to 87,000 AF of water in Lake Piru. At the end of 2018 there was 32,659 AF of stored water in Lake Piru. UWCD released 48,851 *(preliminary data)* AF of water from the lake in 2019. UWCD imported 18,150 AF of SWP water into Ventura County from Pyramid Lake in 2019. Water released from Lake Piru flows down Piru Creek to the Santa Clara River where it is ultimately diverted downstream at the Freeman Diversion Dam. UWCD operates spreading basins in the Oxnard Basin Forebay Management Area for the purpose of groundwater recharge. Some of the water diverted from the Santa Clara River at the Freeman Diversion is sent to the Forebay spreading basins in Saticoy and El Rio, the remainder is sent through the Pleasant Valley Pipeline (PVP) and the Pumping Trough Pipeline (PTP). **Table 6-2** and **Figure 6-4** compare the volume of water diverted and sent to spreading grounds by UWCD[12]. Annual precipitation for the period of 2010 to 2019 is also shown in **Figure 6-3**, however recharge to basins is a function of SWP deliveries and restrictions from other agencies.

Table 6-2: Comparison of precipitation versus recharge water volume by Calendar Year for UWCD.

CY Year	Precipitation El Rio Spreading Grounds Gage 239(in.)	Saticoy Recharge (AF)	El Rio Recharge (AF)	Noble Pit (AF)
2010	22.07	15,108	30,125.00	995.00
2011	10.95	23,435.00	37,845.00	10,679.00
2012	8.79	3,985.00	16,293.00	538.00
2013	2.97	34.00	2,389.00	263
2014	9.50	387.00	1,935.00	578
2015	5.09	1,231.00	1,285.00	0.00
2016	10.00	1,784.20	806.00	59.00
2017	15.22	3,100	6,043.00	1,036
2018	9.52	2,301	1,205	212
2019	23.71	16,121	20,976	3,008

[12] Data provided courtesy of UWCD is preliminary and subject to change per UWCD. Freeman Diversion data from UWCD operations logs.

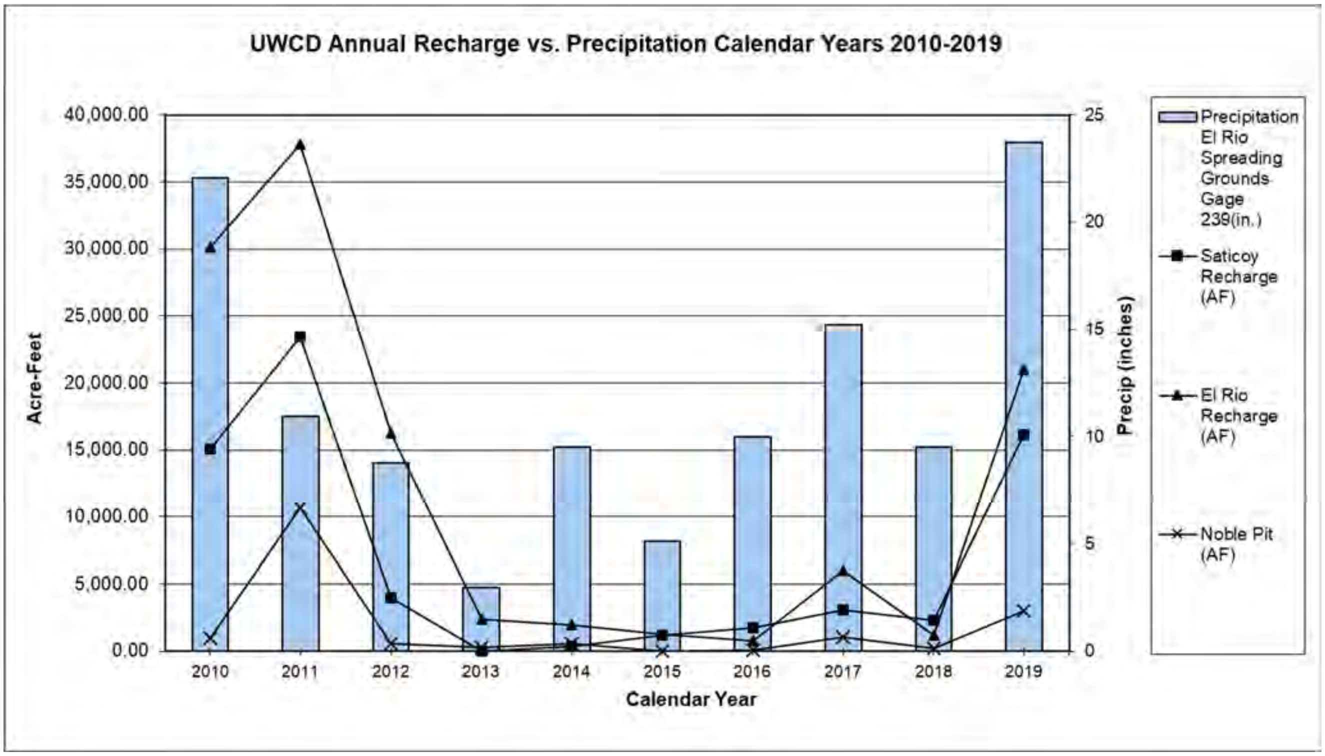

Figure 6-3: Precipitation versus UWCD recharge for 2010-2019.

CMWD delivered approximately 8,490 AF in 2019, with 1,631 AF sold to retail water purveyors. The district provides water to residential and agricultural customers, and some of the 23 water purveyors located within the district's boundaries. Annual water deliveries can vary from 13,000 to 23,000 AF. CMWD provides a blend of groundwater and surface water to its customers. Surface water is stored in Lake Casitas which has an overall capacity of 238,000 AF. At the end of 2019, 99,362 AF of water was stored in the lake. Water from the Ventura River is diverted at the Robles Diversion facility. The facility diverts high flows from rainstorms and operates on average only 53 days per year. CMWD diverts, on average 31% of the Ventura River flow, with 10% of that volume being redirected downstream through the Robles Diversion Fish Passage for the endangered steelhead trout and to enhance recovery of the Ventura River habitat[13].

[13] Data provided courtesy of Casitas MWD.

Table 6-3: Comparison of wholesale district water deliveries 2010-2019.

	Total Water Deliveries in Acre Feet (AF)			
Year	**CMWD**	**Calleguas**	**UWCD**	**Annual Total**
2010	13,497	94,864	34,076	142,437
2011	13,439	97,218	31,868	142,525
2012	15,268	104,104	32,638	152,010
2013	18,270	111,283	24,358	153,911
2014	18,336	106,293	17,492	142,121
2015	16,272	89,045	16,293	121,609
2016	12,793	87,542	16,757	117,092
2017	12,166	89,666	16,613	118,445
2018	12,168	91,340	16,953	120,461
2019	8,490	82,237	16,689	107,416
Period Total	**140,700**	**780,015**	**223,736**	**1,090,151**

6.3 Surface Water

Surface water resources can be hydrologically linked to groundwater resources. The connection between surface water and groundwater is understood by natural recharge of aquifers from surface water (losing streams), and discharge of groundwater to surface water (gaining streams). Surface water diversions allow for use of surface water instead of extracted groundwater. Surface water is used to artificially recharge groundwater.

Figure 6-4 shows the volume of stored surface water and diverted surface water. In 2019, UWCD released approximately 48,851 AF of water from Lake Piru, including a fish passage requirement of 5 cubic feet per second (cfs) per day. UWCD diverted 41,387 AF from the Santa Clara River at the Freeman Diversion Dam with 16,121 AF sent to the Saticoy Spreading Grounds, 20,976 AF sent to the El Rio Spreading Grounds and 3,008 AF sent to the Noble Pit, with some surface water also going to agricultural customers through the PTP and the PVP. At the end of 2019 there was 32,659 AF of water in storage in Lake Piru, 99,362 AF in Lake Casitas and 10,075 AF in Lake Bard. Casitas releases 3,200 AF per year from Lake Casitas for the Robles Diversion Fish Passage.

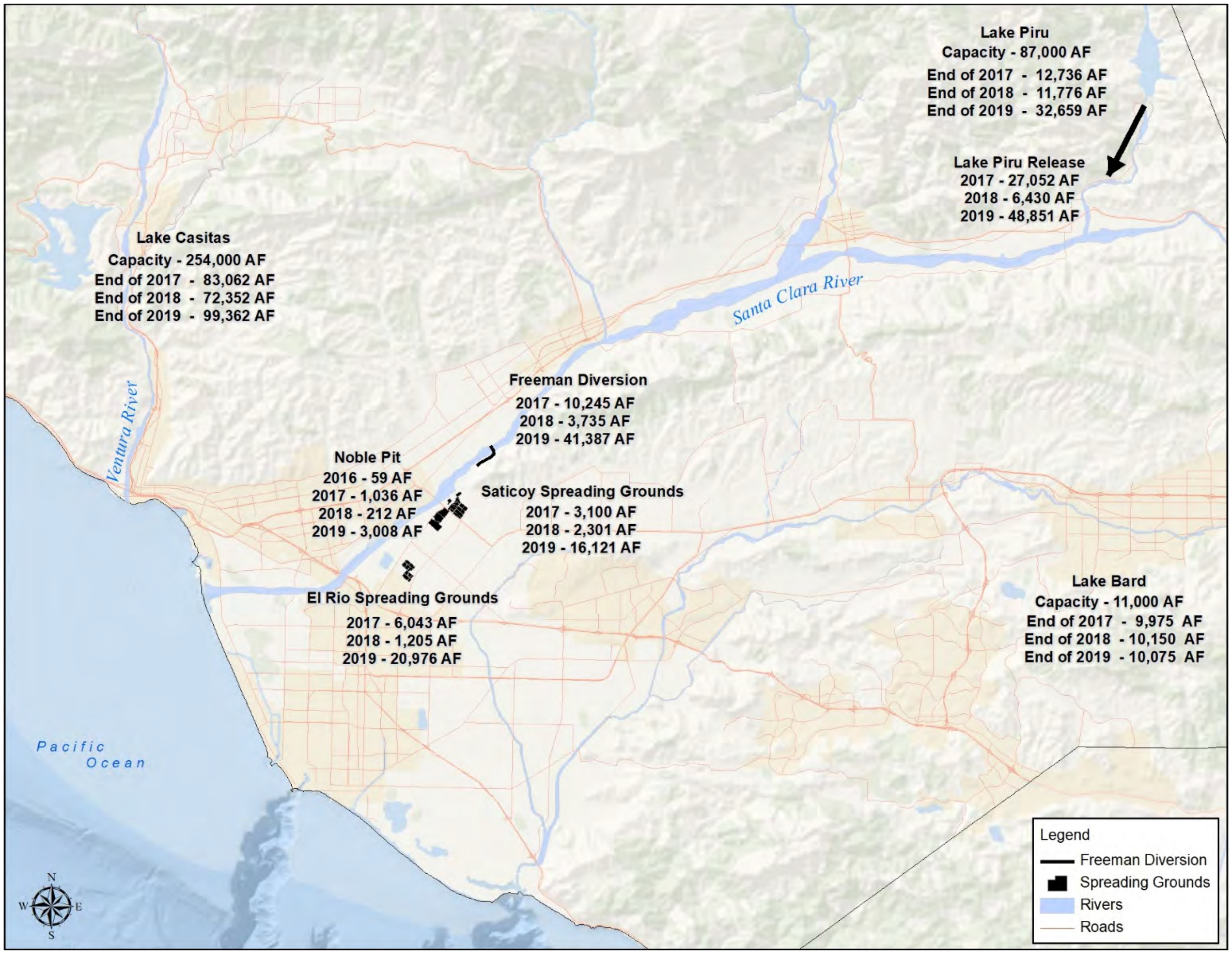

Figure 6-4: Surface water storage and diversion.[11, 12, 13].

6.4 Surface & Imported Water Demands

Of the ten incorporated cities within Ventura County only Santa Paula and Fillmore do not rely on water supplied by the three major wholesale districts.

The cities of Ventura and Oxnard use a blend of imported water, groundwater and treated surface water to meet demands. Ventura receives treated water diverted from the Ventura River, groundwater extracted from City wells and surface water from Lake Casitas delivered by CMWD. Oxnard receives water from UWCD, imported water from Calleguas and groundwater from its own well fields.

The cities of Simi Valley, Moorpark and Thousand Oaks as well as the unincorporated areas of Bell Canyon, Newbury Park, Hidden Valley, Lake Sherwood, Oak Park, and part of Westlake Village rely mainly on water imported by Calleguas.

The City of Simi Valley receives water from Ventura County Water Works District No. 8 (VCWWD8). VCWWD8 extracts groundwater from three wells in the Tapo Canyon area. Groundwater is also extracted from several dewatering wells at the west end of the city which is discharged to the Arroyo Simi. The Tapo Canyon Water Treatment Plant utilizes the three Tapo Canyon wells to provide water to approximately 500 homes. Golden State Water Company (GSWC) in Simi Valley extracts groundwater from one well and blends it with imported water from Calleguas (10% groundwater, 90% imported water)[14]. VCWWD8 serves 68% of demand or approximately 23,000 AF of water while GSWC serves the remaining 32%, approximately 8,500 AF[15]. In 2019 Calleguas delivered 17,616 AF to VCWWD8 and 4,982 AF to GSWC.

Moorpark residents receive water from Ventura County Water Works District No. 1 (VCWWD1). Approximately 75-80% of VCWWD1's water is imported from Calleguas. In 2019, Calleguas delivered 6,717 AF to VCWWD1. Moorpark also extracts groundwater from two wells used for park irrigation.

The City of Thousand Oaks extracts groundwater for median irrigation on Hillcrest Avenue and golf course irrigation at the Los Robles Golf Course. California Water Service and California American Water along with the City of Thousand Oaks Water Department provide water imported from Calleguas in the Thousand Oaks, Newbury Park and Westlake Village area. According to the *City of Thousand Oaks 2015 Urban Water Management Plan*, the City supplies water to approximately 36% of water users, California American Water 48%, and California Water Service Company 16%. In 2019, these three water purveyors received 29,530 AF of water from Calleguas.

The City of Camarillo relies on groundwater and imported water from Calleguas. The city extracts groundwater from four wells, supplying approximately 40-50% of the city's water demand with the remaining demand supplied by imported water. The city must keep its groundwater extraction volume below the groundwater extraction allocation from the FCGMA. In 2019, Calleguas delivered 4,313 AF of water to the City of Camarillo. Water for some residents is supplied by Pleasant Valley Mutual (groundwater and imported water), Crestview Mutual (groundwater and imported water), California American Water Co. (imported water), and Camrosa Water District (groundwater and imported water).

The Port Hueneme Water Agency (PHWA) receives and treats UWCD water and blends it with water from Calleguas for the City of Port Hueneme, Channel Islands Beach Services Community District (CIBSC) and Naval Base Ventura County.

The City of Ojai and the communities of Casitas Springs, Meiners Oaks and Oak View rely on a mixture of groundwater extracted by local purveyors and wholesale water from Lake Casitas delivered by the CMWD.

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[14] Golden State Water Company, 2015 Urban Water Management Plan – Simi Valley.

[15] Ventura County Waterworks District No. 8, City of Simi Valley, 2015 Urban Water Management Plan.

In the Santa Clara River Valley area, the City of Santa Paula relies on local groundwater (approximately 5,000 to 7,000 AFY based on reporting to UWCD). In addition, some surface water is diverted from Santa Paula Creek (approximately 500 AFY)[16] and is sent to Canyon Irrigation Company in exchange for extraction credits for the Santa Paula Basin. The City of Fillmore relies solely on groundwater extracted from City water wells (approximately 2,600 to 2,800 AFY based on reporting to UWCD). The community of Piru relies on groundwater delivered by local water purveyors.

Residents of the Lockwood Valley area, the Santa Monica Mountains area and other areas without water service rely on private water wells. Water is extracted from alluvial groundwater basins or from fractured volcanic rock and bedrock in areas outside of a basin setting.

[16] Data from City of Santa Paula 2015 Urban Water Management Plan

7.0 Sustainable Groundwater Management Act (SGMA)

On January 1, 2015, the Sustainable Groundwater Management Act (SGMA) became effective. SGMA is a comprehensive three-bill package that establishes a new structure for local authorities to sustainably manage their groundwater basins. Sustainable management under the act is defined as the management and use of groundwater in a manner that can be maintained without causing "significant and unreasonable undesirable results."

SGMA requires the formation of local groundwater sustainability agencies (GSAs) in all DWR Bulletin No. 118 basins designated as high or medium priority. GSAs must assess conditions in their respective water basins and adopt a groundwater sustainability plan (GSP) that ensures the basin will be sustainably managed within 20 years, with interim milestones subject to state review every five years. Basins additionally defined as critically-overdrafted must submit a GSP by January 31, 2020; other high and medium priority basins must be managed under a GSP by January 31, 2022. GSAs can be formed in low-priority basins, but SGMA does not require it.

7.1 Critically Overdrafted Basins

SGMA states a basin is subject to critical overdraft "when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts." Undesirable impacts result from conditions of critical overdraft which include seawater intrusion, land subsidence, groundwater depletion, and/or lowering of groundwater levels. SGMA directed the DWR to identify critically-overdrafted groundwater basins and subbasins. DWR identified a statewide base period from 1989 to 2009 for evaluation that included wet and dry periods. A basin is placed in critical overdraft when the basin has one or more undesirable impacts. DWR compiled a list of 21 critically-overdrafted basins and subbasins in January 2016. Three are in Ventura County (**Figure 7-1**). Those basins are the Cuyama Valley Basin (Bulletin 118 No. 3-013), the Pleasant Valley Basin (Bulletin 118 No. 4-006), and the Oxnard Subbasin (Bulletin 118 No. 4-004.02).

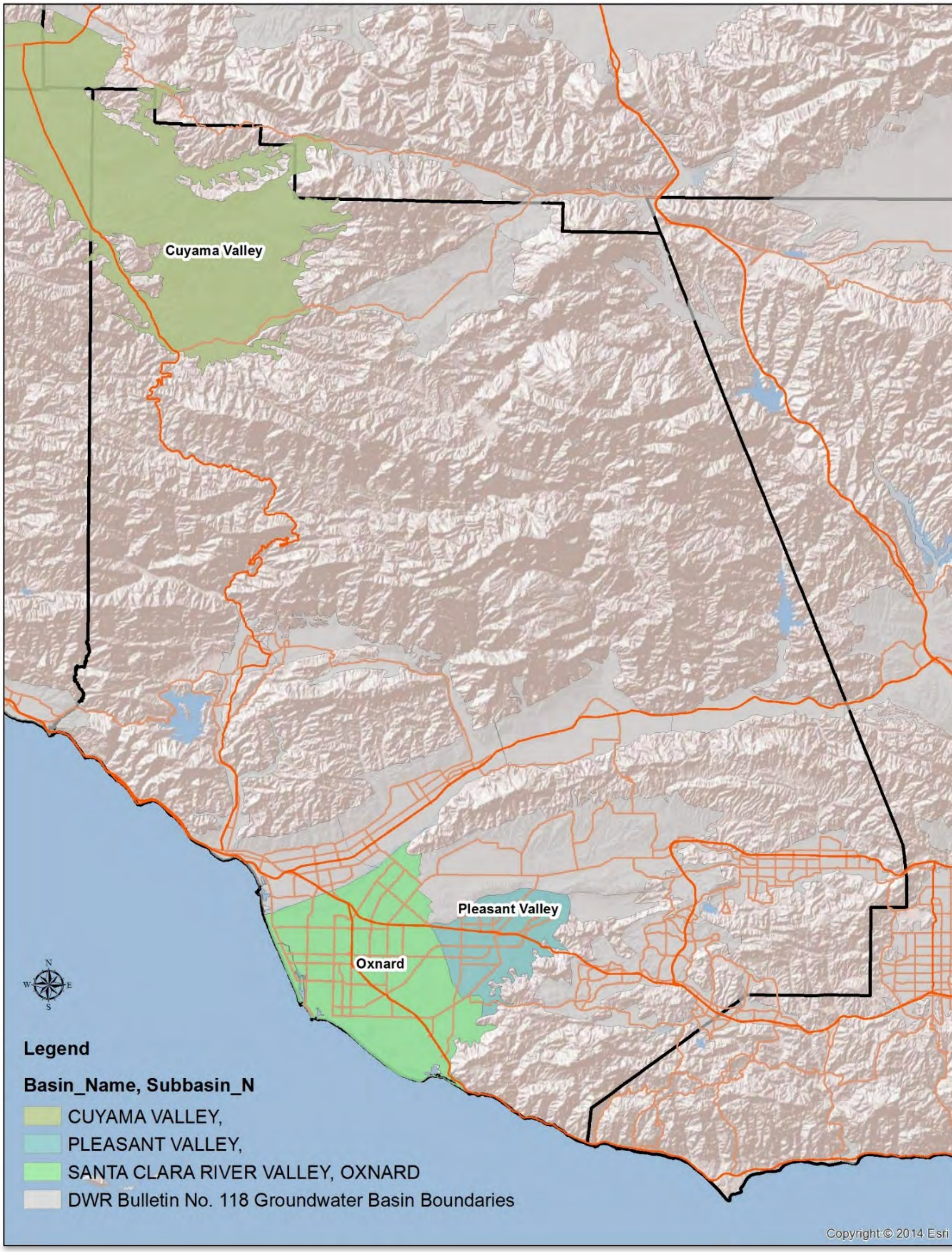

Figure 7-1: Critically-overdrafted basins in Ventura County.

7.2 High & Medium Priority Basins in Ventura County

DWR's Basin Prioritization is a technical process that utilizes the best available data and information to classify California's 515 groundwater basins into one of four categories: high-, medium-, low-, or very-low priority. Each basin's priority determines which provisions of California Statewide Groundwater Elevation Monitoring (CASGEM) and SGMA apply. SGMA requires medium- and high-priority basins to develop GSAs, develop GSPs and manage groundwater for long-term sustainability.

As of May 2014, 127 of the 515 basins were ranked as medium and high priority basins. Those 127 medium and high priority basins account for 96% of California's annual groundwater extraction. Ventura County has a total of four high-priority and seven medium-priority basins shown in **Figure 7-2**.

New priority rankings were completed by DWR in late 2019.

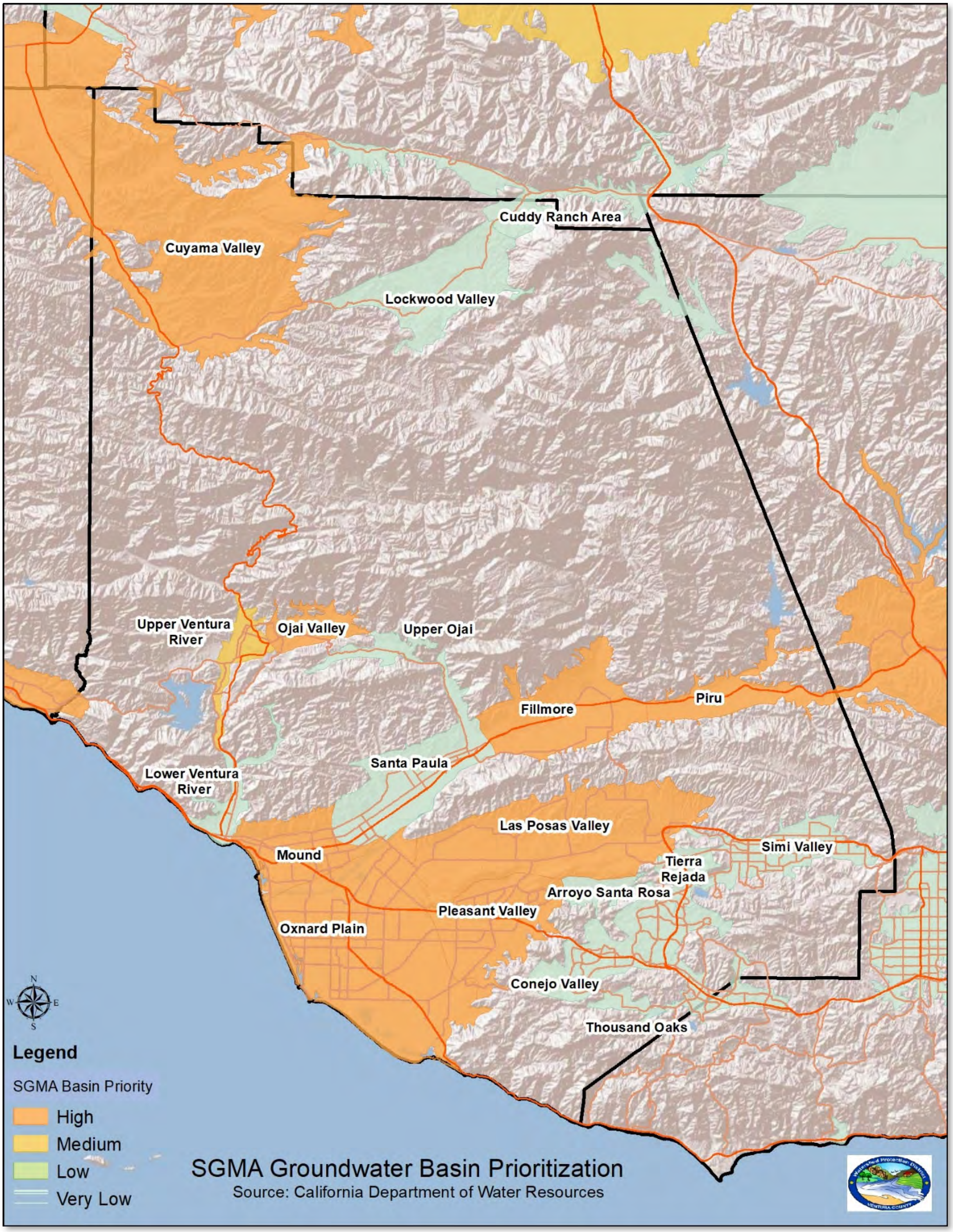

Figure 7-2: 2019 Final SGMA basin prioritization.

7.3 Adjudicated Basins

Santa Paula Basin

The Santa Paula Basin (Bulletin 118 Basin No. 4-004.04) is currently the only adjudicated basin in Ventura County. Adjudicated basins do not need a GSA but must still provide groundwater measurements to DWR.

Santa Paula Basin's groundwater rights were adjudicated in 1996 in a stipulated judgement to establish pumping allocations and a management plan for the basin. The judgment awarded 27,500 acre-feet of groundwater rights to the SPBPA to be held in trust for the benefit of its members. Each member is entitled to an "Individual Party Allocation" (IPA) that establishes a maximum quantity of water that can be extracted from the basin. The judgment also includes cut back provisions that can be implemented as necessary to balance total production within the basin's safe yield.

A Watermaster is usually appointed by the court to ensure the basin is managed in accordance with the court's decree. A Technical Advisory Committee (TAC) acts as the Watermaster for the Santa Paula Basin with equal representation from UWCD, the SPBPA and the City of Ventura. The TAC also determines the safe yield of the basin, along with the development and implementation of a basin management plan. Annual reports of the monitoring program are submitted to the TAC for review and approval. The primary groundwater management objective in the Santa Paula Basin is to ensure that production does not exceed the long-term sustainable yield of quality groundwater for current and future uses.

7.4 Groundwater Sustainability Agencies (GSA's)

GSAs are responsible for developing and implementing a GSP to ensure the basin meets is sustainability goal by operating within its sustainable yield without creating undesirable results. Before the DWR will accept and review submitted GSPs, a basin must be managed under a GSA or multiple GSAs. GSAs for all medium- and high-priority basins in Ventura County are formed and with no "unmanaged areas[17]" Below are all GSA's in Ventura County.

Arroyo Santa Rosa Basin GSA

The County of Ventura and the Camrosa Water District (Camrosa) entered into a Joint Exercise of Powers Agreement (JPA) to manage the portion of the Arroyo Santa Rosa Basin (DWR Basin No. 4-007) outside of the FCGMA boundary. The JPA was approved by the Ventura County Board of Supervisors on October 4, 2016, officially forming the Arroyo Santa Rosa Basin GSA. The western area of the Arroyo Santa Rosa Basin will be managed by the FCGMA and the eastern portion by the Arroyo Santa Rosa Basin GSA.

Camrosa Las Posas Basin GSA

The majority of the Las Posas Basin (DWR Basin No. 4-008) falls under the jurisdiction of the FCGMA. A 4.5-mile section along the southern border is outside of the FCGMA boundaries and will be managed by Camrosa. Camrosa delivers potable and non-potable water to residential and agricultural customers in that area and filed to act as the GSA for that portion of the basin on June 28, 2017.

Camrosa OPV Management Area GSA

Camrosa also filed to act as the GSA for the portions of the Oxnard Subbasin (DWR Basin No. 4-004.02) and the Pleasant Valley Basin (DWR Basin No. 4-006) outside of the FCGMA boundary on June 28, 2017. Camrosa will be the GSA for areas that lie within their service area but are outside of the FCGMA boundaries. The Subbasin and Basin were identified as high-priority basins in 2014 through the CASGEM prioritization process.

Cuyama Basin GSA (CBGSA)

The Cuyama Basin (DWR Basin No. 3-13) underlies Santa Barbara, Kern and Ventura Counties. On June 12, 2017, the CBGSA posted notice to act as the GSA for the entire basin. The CBGSA is a joint powers authority comprised of six local agencies including the Cuyama Basin Water District, Cuyama Community Services District, Santa Barbara County Water Agency, San Luis Obispo County, Ventura County and Kern County. These six agencies collectively carry water management, water supply, and land use responsibilities across the entire basin.

Fillmore and Piru Basins GSA

The Fillmore and Piru Subbasins (DWR Basin Nos. 4-004.05 and 4-004.06) lie along the eastern portion of the Santa Clara River. On June 28, 2017, the Fillmore and Piru Basins GSA posted notice to act as the GSA for both basins. The Fillmore and Piru Basins GSA is a joint powers authority comprised of the UWCD, Ventura County and the City of Fillmore. UWCD is authorized to conduct water resource investigations, acquire water rights, build water storage and recharge facilities, construct wells and pipelines for water deliveries, commence actions involving water rights and water use, and prevent interference with or diminution of stream/river flows. The County exercises water management and land use authority throughout the county, including the Fillmore and Piru Basins. The City of Fillmore is a local municipality that exercises water supply, water management and land use authority within the city's boundaries.

[17] Unmanaged areas are areas in high or medium priority basins in which a local agency has not filed to become a GSA and are not within the service area of another GSA.

Mound Basin GSA (MBGSA)

The MBGSA posted notice with the DWR on June 29, 2017, to be the GSA for the Mound Subbasin (DWR Basin No. 4-004.03). MBGSA is a joint powers authority comprised of three local public agencies: the City of Ventura, Ventura County, and UWCD. The City of Ventura exercises water supply, water management and land use authority within its boundaries. The County exercises water management and land use authority in land overlying the Subbasin. UWCD is authorized to replenish but not extract groundwater.

Fox Canyon Groundwater Management Agency

On February 11, 2015, the FCGMA notified the DWR of their intent to become the exclusive GSA for the Arroyo Santa Rosa Basin (DWR Basin No. 4-007), Oxnard Subbasin, Pleasant Valley Basin and the Las Posas Valley Basin. The FCGMA's authority is limited to basin portions that lie within its boundary. The FCGMA is the exclusive GSA for those basins within the agency's statutory boundaries.

Ojai Basin Groundwater Management Agency (OBGMA)

The OBGMA filed a notice of intent to become the exclusive GSA for the Ojai Valley Groundwater Basin (DWR Basin No. 4-002) on December 6, 2014. The OBGMA submitted an analysis of their basin conditions on December 22, 2016, in lieu of preparing a GSP plan.

Upper Ventura River Groundwater Agency (UVRGA)

The UVRGA filed a notice of intent to become the GSA for the Ventura River Valley Basin, Upper Ventura River Subbasin (DWR Basin No. 4-003.01) on April 21, 2017. The UVRGA is a joint powers authority comprised CMWD, the City of Ventura, Ventura County, Meiners Oaks Water District, and the Ventura River Water District. Prior to GSA formation, the Upper Ventura River Basin boundary was modified, reducing the area.

The County of Ventura

On June 28, 2017, the County notified DWR of their intent to become the GSA for all areas in basins outside of the management of a GSA. The notice was filed to prevent a basin from being designated as a "probationary basin" if unmanaged areas existed after June 30, 2017. There are no unmanaged areas of a basin within the County.

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Appendices

Appendix A – Glossary of Groundwater Terms

Aquifer: A geologic formation or structure that yields water in sufficient quantities to supply pumping wells or springs.

Abandoned Well: Means any of the following:

(1) A water well used less than 8 hours in any twelve-month period. Failure to submit reports of well usage will result in a well being classified as abandoned.
(2) A monitoring well from which no monitoring data has been taken for a period of two years.
(3) A well which is in such a state of disrepair that it cannot be made functional for its original use or any other use.
(4) An open engineering test hole after 24 hours has elapsed after construction and testing work has been completed on the site.
(5) A cathodic protection well which is no longer used for its intended purpose.

Confined Aquifer: An aquifer separated from the surface by an aquiclude or an aquitard to the extent that pressure can be created in the lower reaches of the aquifer.

Contamination: Alteration of waters by waste, salt-water intrusion or other materials to a degree which creates a hazard to the public health through actual or potential poisoning or through actual or potential spreading of disease.

Department of Water Resources: (DWR) operates and maintains the State Water Project, including the California Aqueduct. The department also provides dam safety and flood control services, assists local water districts in water management and conservation activities, promotes recreational opportunities, and plans for future statewide water needs.

Fox Canyon Groundwater Management Agency (FCGMA): The Agency created when the California State Legislature enacted and passed State Assembly Bill No. 2995 on Sept. 13, 1982 creating the *Fox Canyon Groundwater Management Agency (GMA)*. This law, also referred to as AB2995, granted jurisdiction over all lands overlying the Fox Canyon aquifer zone to control seawater intrusion, protect water quality, and manage water resources.

Groundwater: Water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water.

Groundwater Basin: A geologically and hydrologically defined area containing one or more aquifers, which store and transmit water yielding significant quantities of water to extraction facilities.

Lower Aquifer System (LAS): The area underlying the Oxnard Pressure Basin, which contains the Hueneme aquifer, the Fox Canyon Aquifer and the Grimes Canyon aquifer. The LAS is recharged from the Fox Canyon and Grimes Canyon Outcrops, the areas where the aquifers come to the surface exposing the permeable sands and gravels to recharge from rainfall and surface runoff.

Overdraft: The condition of a groundwater basin or aquifer where the average annual amount of water extracted exceeds the average annual supply of water to a basin or aquifer.

Perched or Semi-Perched Aquifer: The water-bearing area that is located between the earth's surface and clay deposits that exist above an Aquifer.

Receiving Waters: All waters that are "Waters of the State" within the scope of the State Water Code, including but not limited to, natural streams, creeks, rivers, reservoirs, lakes, ponds, water in vernal pools, lagoons, estuaries, bays, the Pacific Ocean, and ground water.

Seawater Intrusion: The overdrafting of aquifers, which results in, the depletion of water supplies, lowering of water levels and degradation from seawater intrusion. Seawater intrusion results from the reversal of hydrostatic pressure allowing water flow to be onshore rather than offshore.

Total Dissolved Solids: (TDS) is a term that represents the amount of all of our natural minerals that is dissolved in water.

Total Maximum Daily Load (TMDL) is a number that represents the assimilative capacity of a receiving water to absorb a pollutant. The TMDL is the sum of the individual waste-load allocations for point sources, load allocations for nonpoint sources plus an allotment for natural background loading, and a margin of safety. TMDL's can be expressed in terms of mass per time (the traditional approach) or in other ways such as toxicity or a percentage reduction or other appropriate measure relating to a state water quality objective. A TMDL is implemented by reallocating the total allowable pollution among the different pollutant sources (through the permitting process or other regulatory means) to ensure that the water quality objectives are achieved.

United Water Conservation District (UWCD): The District administers a "basin management" program for the Santa Clara Valley and Oxnard Plain, utilizing the surface flow of the Santa Clara River and its tributaries for replenishment of groundwater. Originally established as the Santa Clara River Water Conservation District in 1927.

Upper Aquifer System (UAS): The area underlying the Oxnard Pressure Basin, which contains the perched and semi-perched zones, the Oxnard aquifer zone, and the Mugu aquifer. The UAS is recharged via the twenty-three square mile unconfined Oxnard Forebay Basin near El Rio.

Water Quality Standards: Defined as the beneficial uses (e.g., swimming, fishing, municipal drinking water supply, etc.) of water and the water quality objectives adopted by the State or the United States Environmental Protection Agency to protect those uses.

Water Well Ordinance No. 4468: The Ventura County Groundwater Conservation Ordinance which was originally adopted by the Board of Supervisors in October 1970 and revised in 1979, 1984, 1985, 1987, 1991, 1999 and most recently in December 2014. The purpose of the ordinance is to ensure that all new or modified water, cathodic protection and monitoring wells are drilled by licensed water well contractors and are properly sealed so that they cannot serve as conduits for the movement of poor quality or polluted waters into useable aquifers or be hazardous to people or animals.

Well Destruction: To fill a well (including both interior and annular spaces if the well is cased) completely in such a manner that it will not produce water or act as a conduit for the transmission of water between any water-bearing formations penetrated.

Well Owner: The owner of the land on which a well is located.

Appendix B – Key Water Level Hydrographs

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Appendix B – Key Water Level Wells

Figure B-1: Key water level wells in Ventura County.

Appendix B – Key Water Level Wells

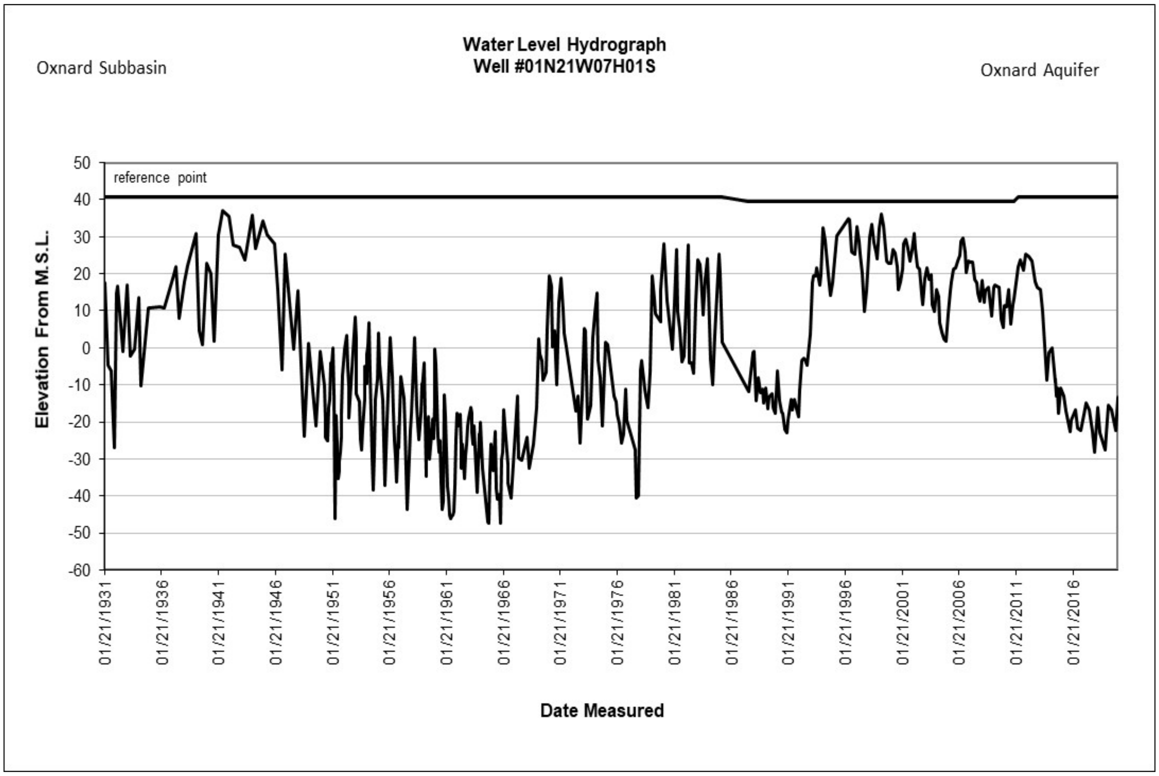

Figure B-2: Oxnard aquifer key well Hydrograph.

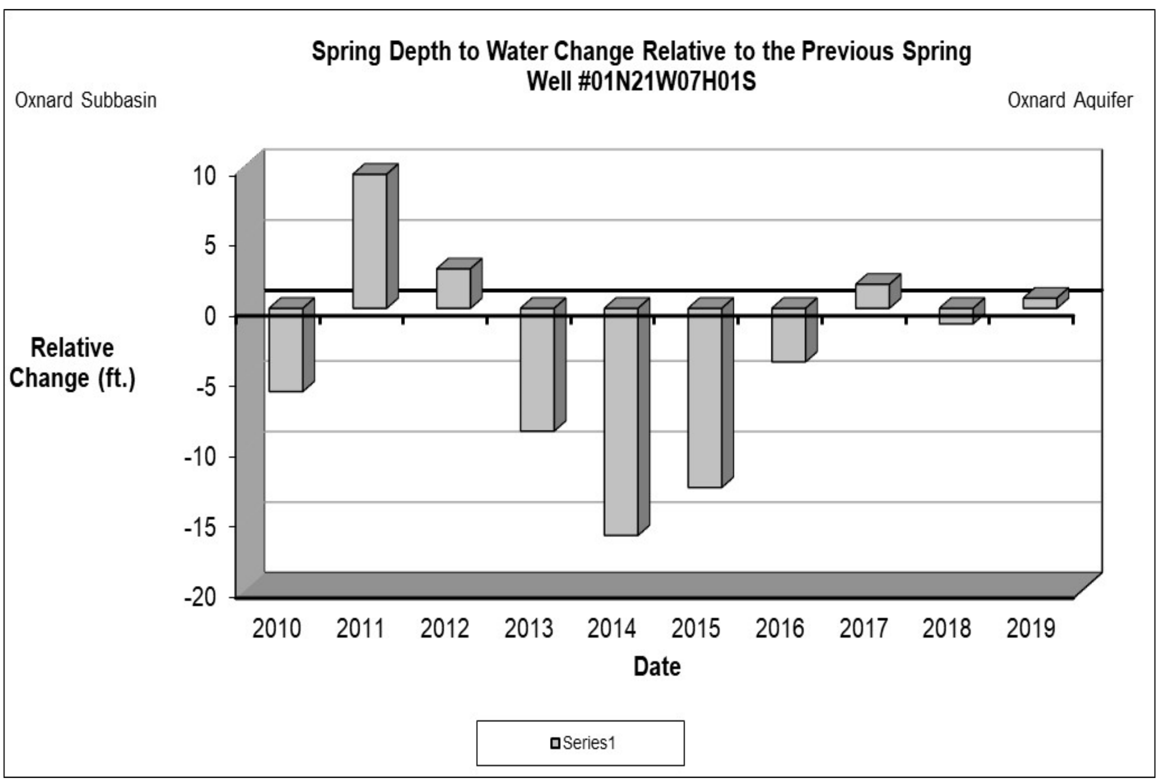

Figure B-3: Oxnard Aquifer 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

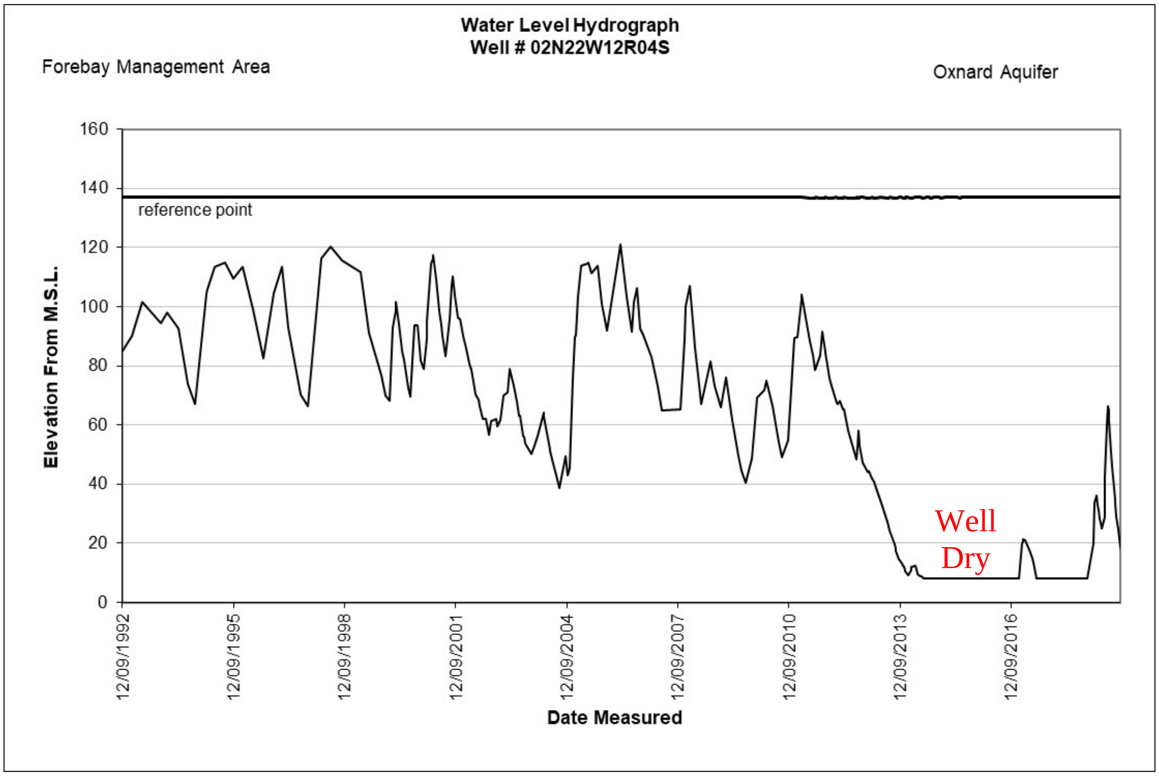

Figure B-4: Forebay Management Area key well Hydrograph.

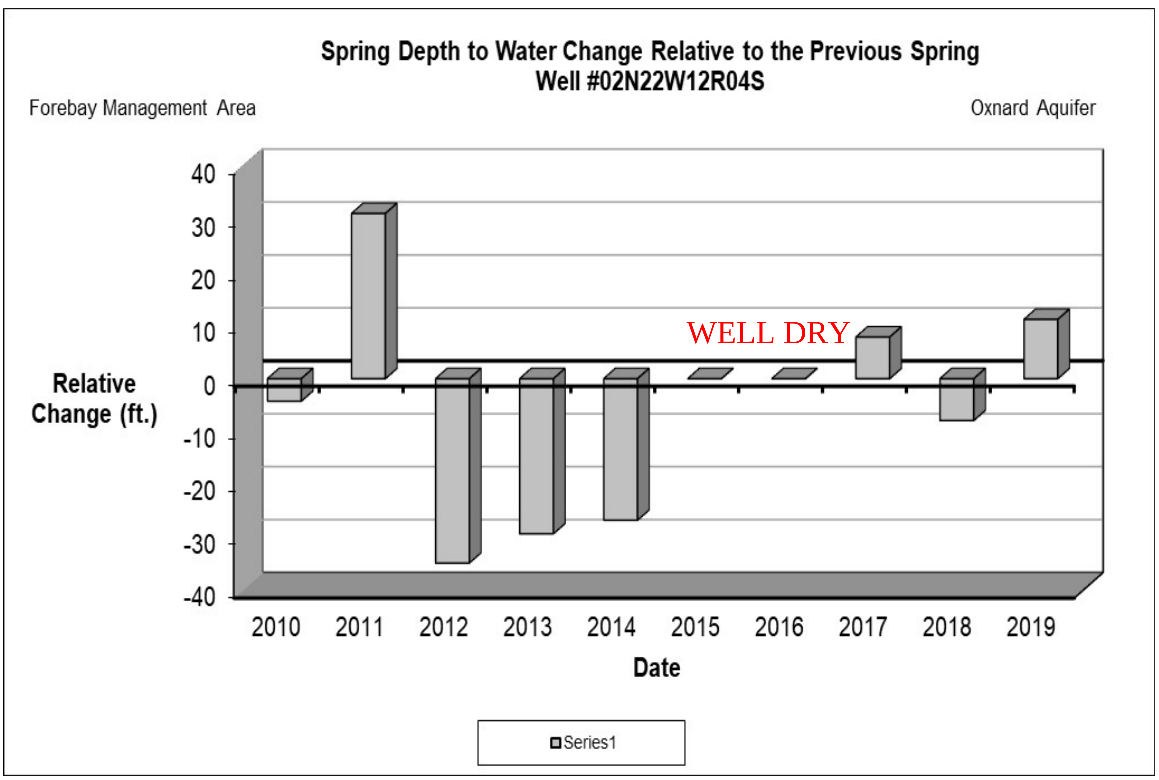

Figure B-5: Forebay Management Area 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

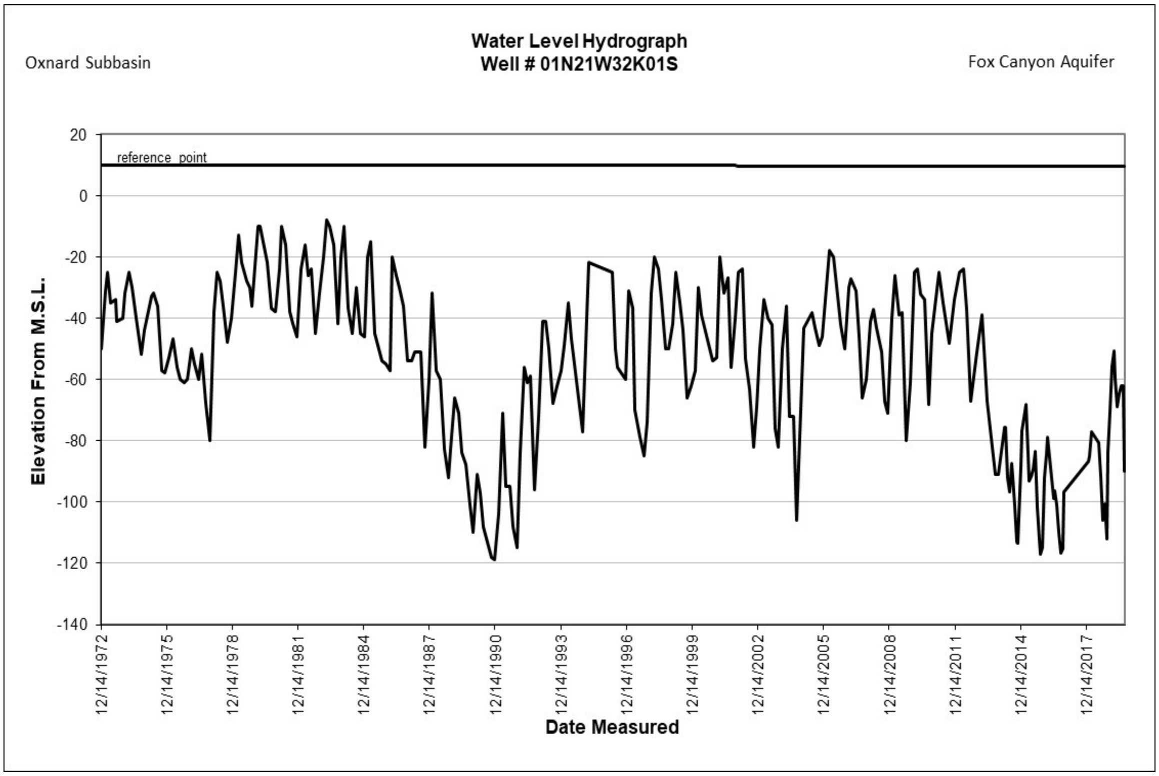

Figure B-6: Oxnard Subbasin Fox Canyon Aquifer Key Well Hydrograph.

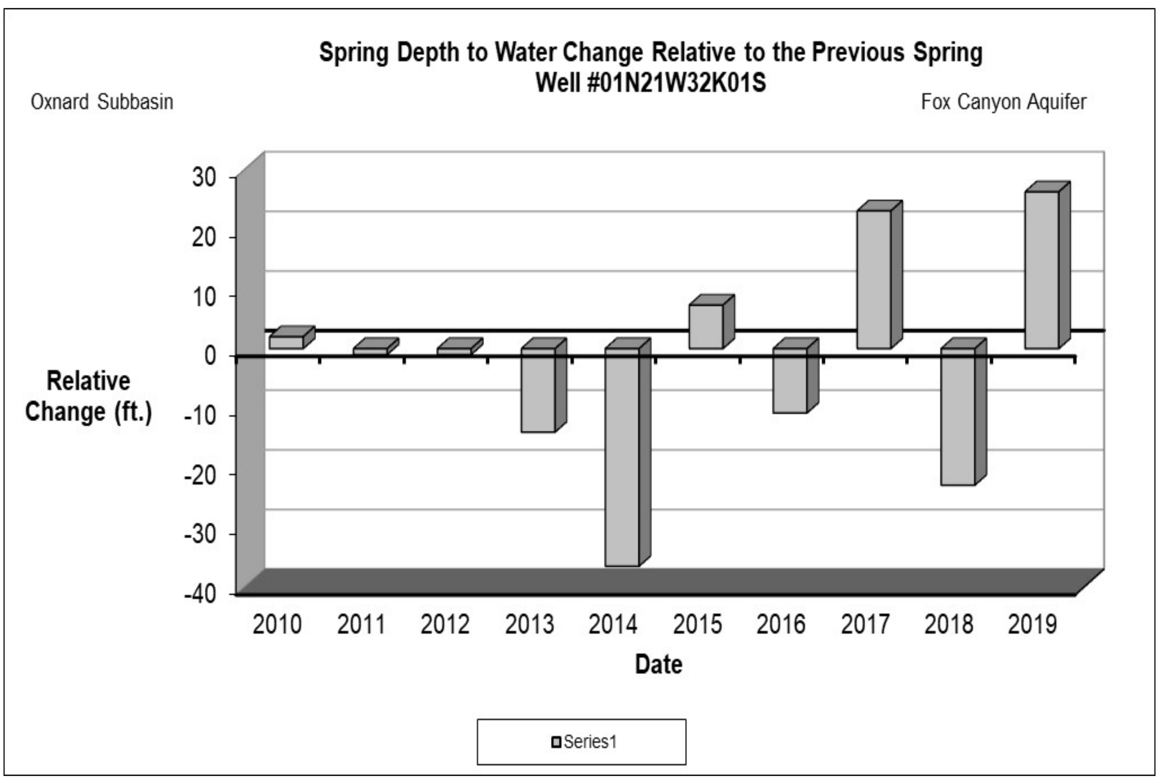

Figure B-7: Oxnard Subbasin Fox Canyon Aquifer 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

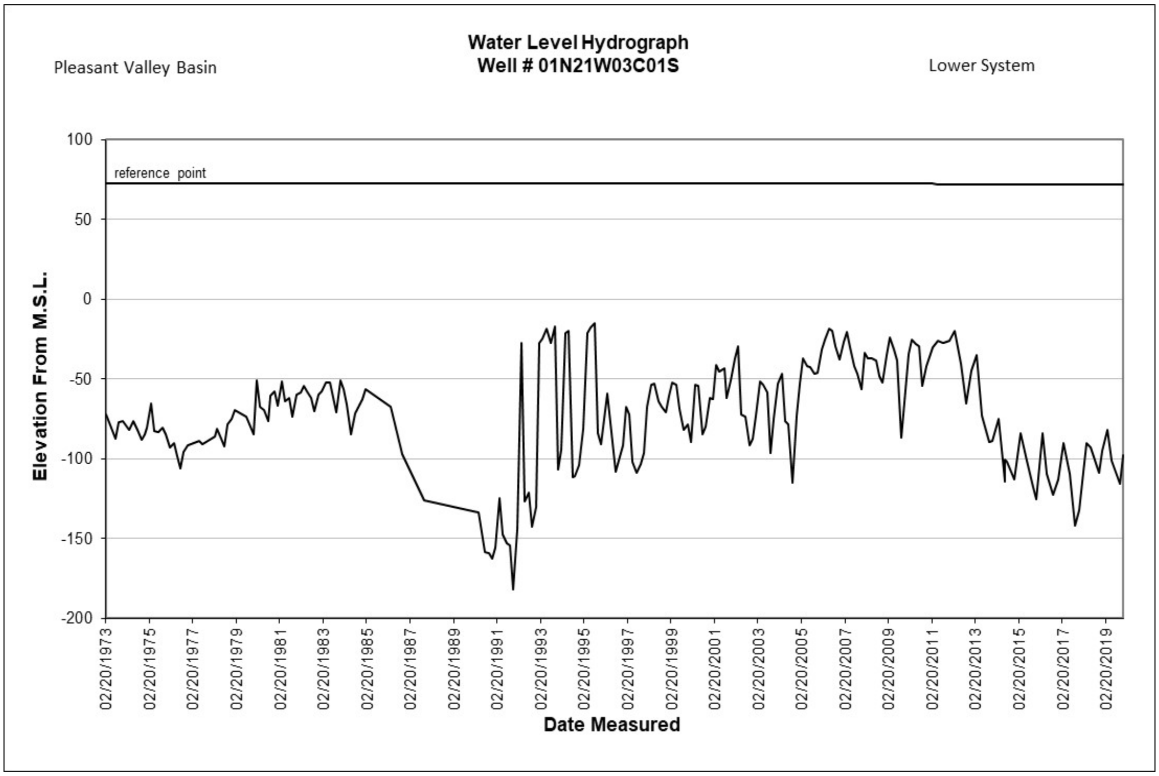

Figure B-8: Pleasant Valley Basin Lower Aquifer System key well Hydrograph.

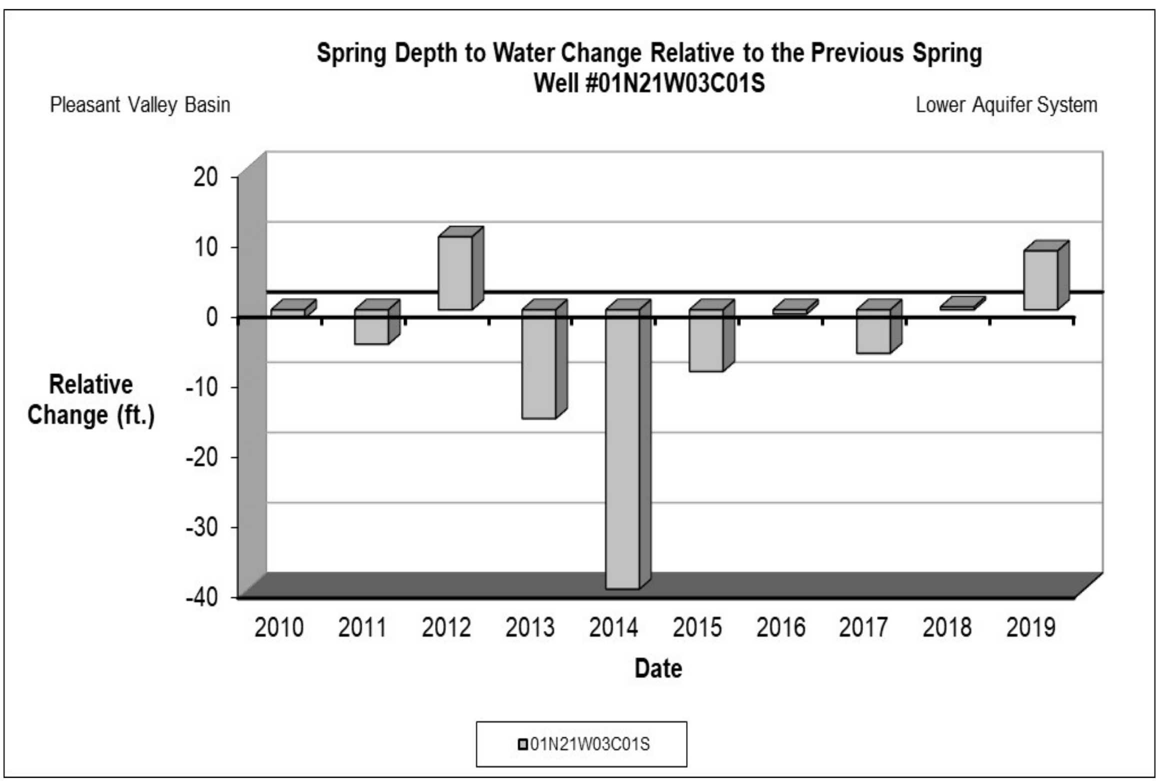

Figure B-9: Pleasant Valley Basin Lower Aquifer System 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

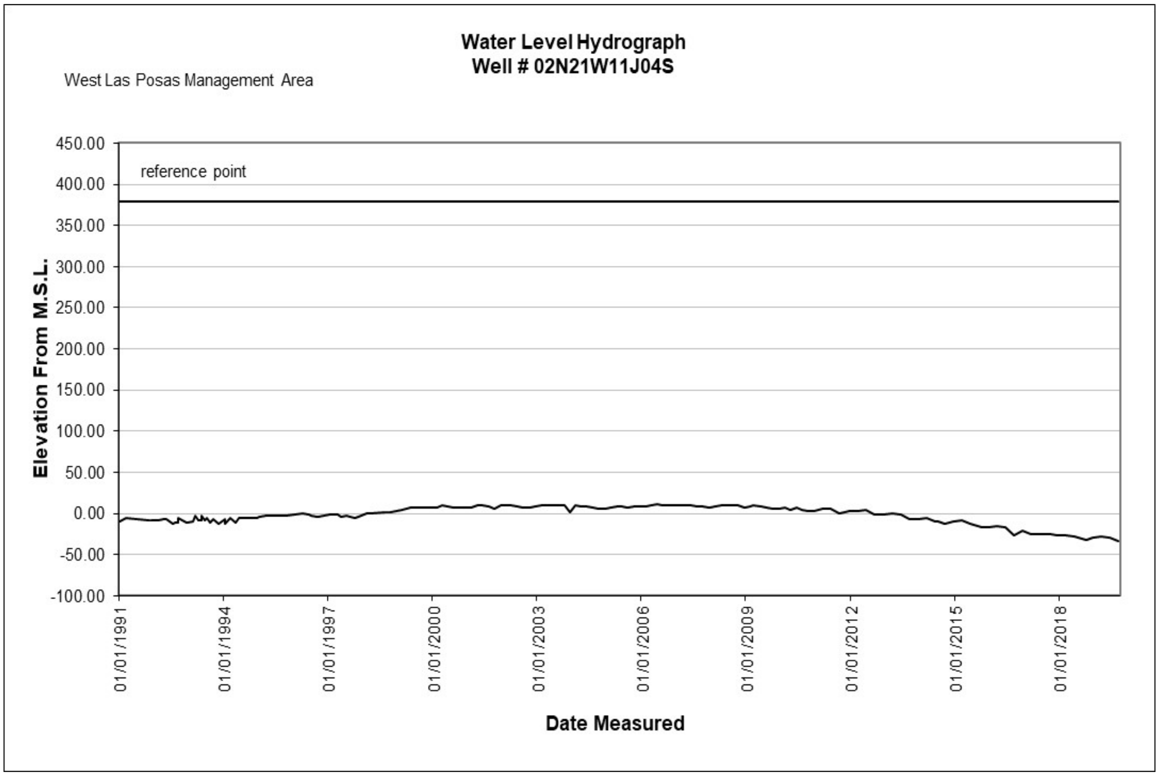

Figure B-10: West Las Posas Management Area key well Hydrograph.

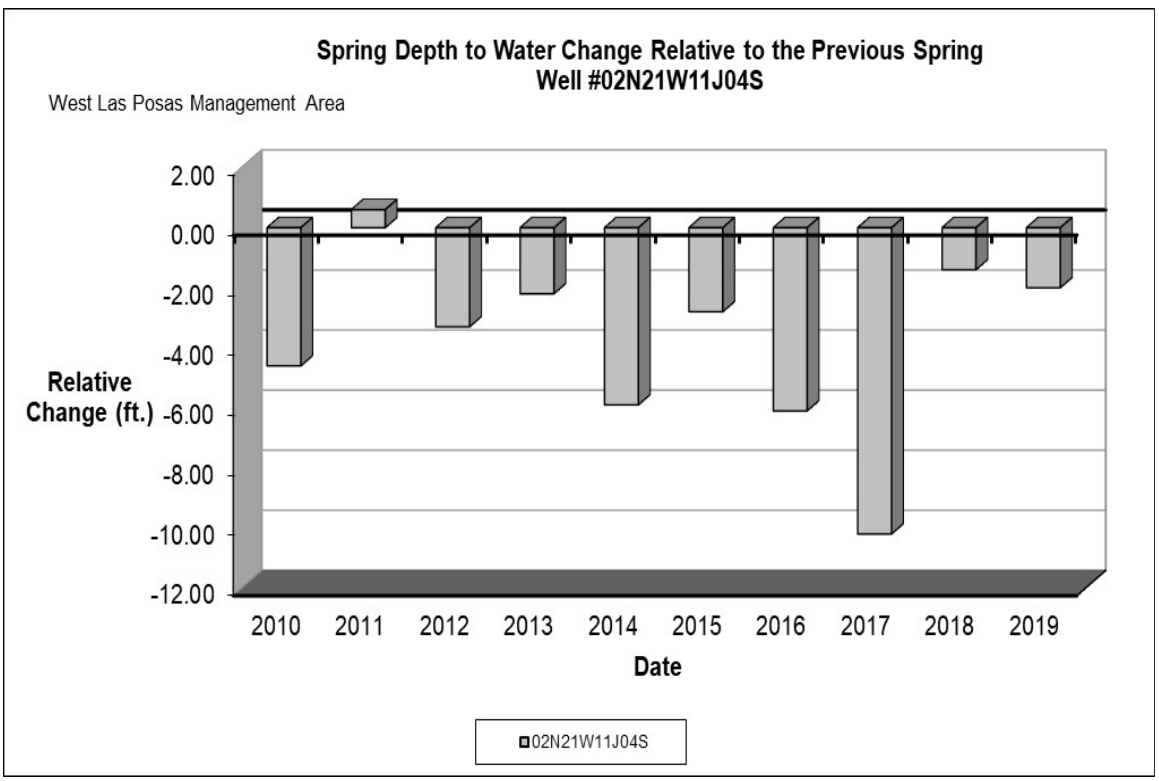

Figure B-11: West Las Posas Management Area 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

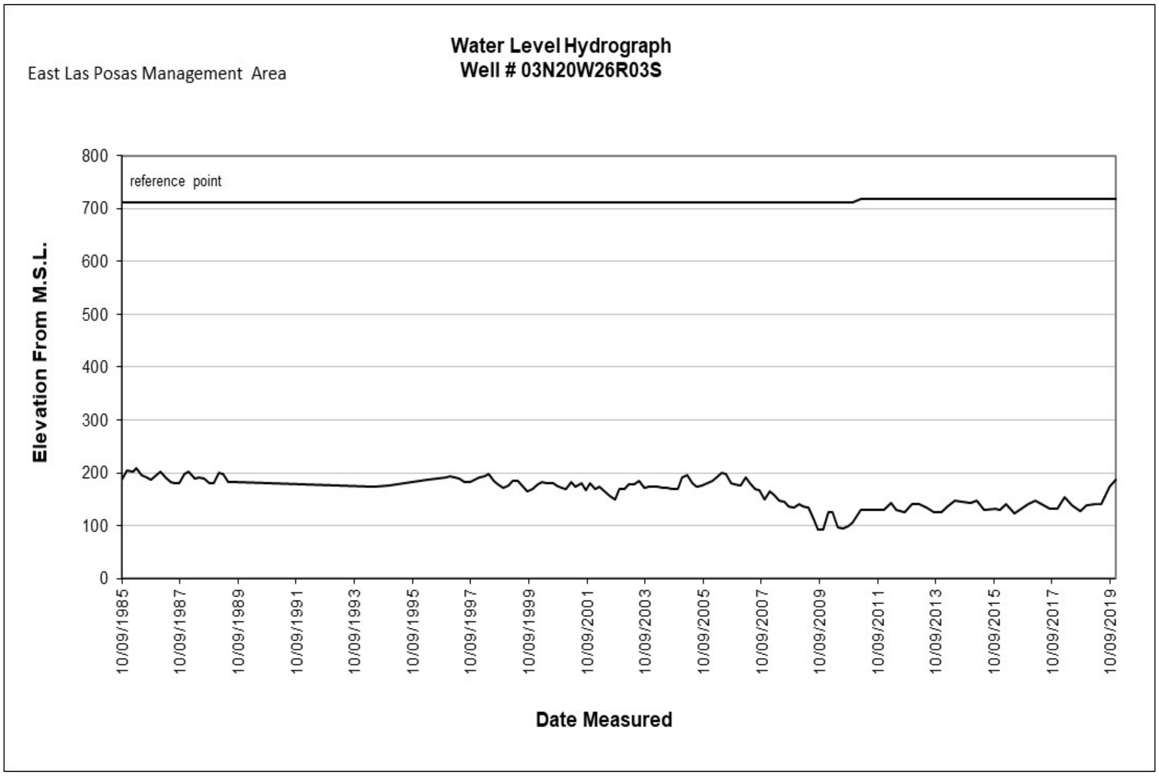

Figure B-12: East Las Posas Management Area key well Hydrograph.

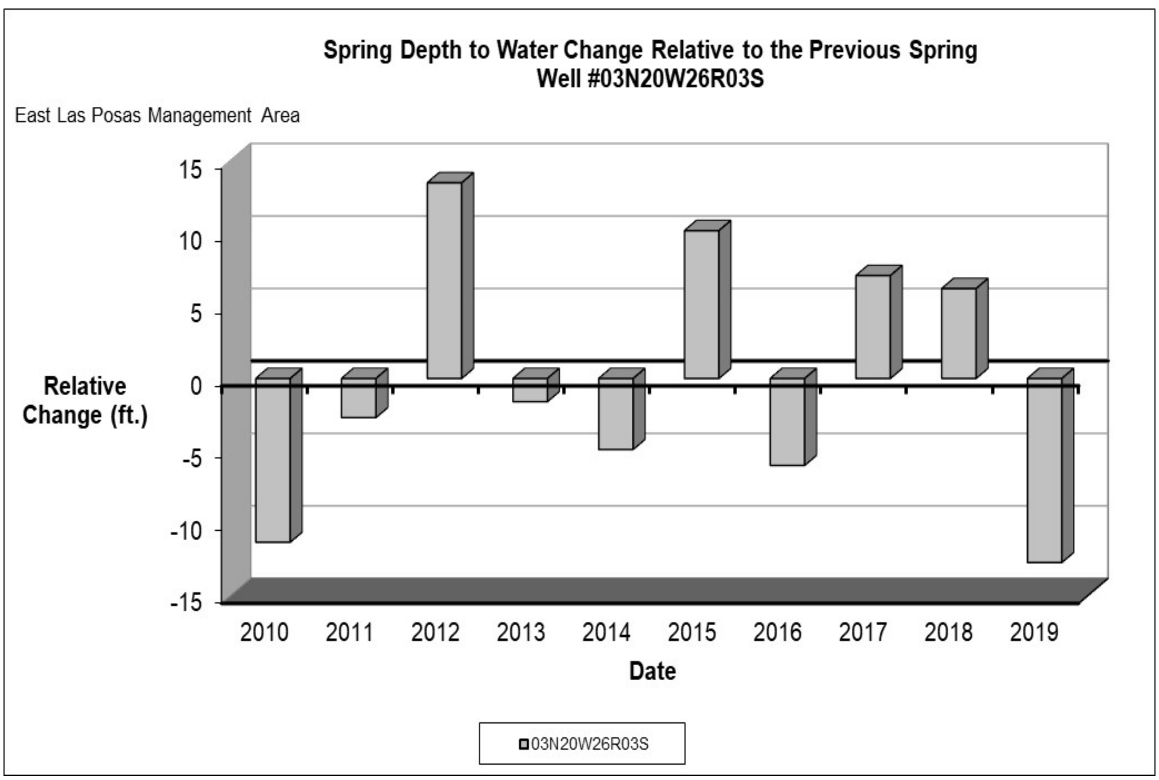

Figure B-13: East Las Posas Management Area 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

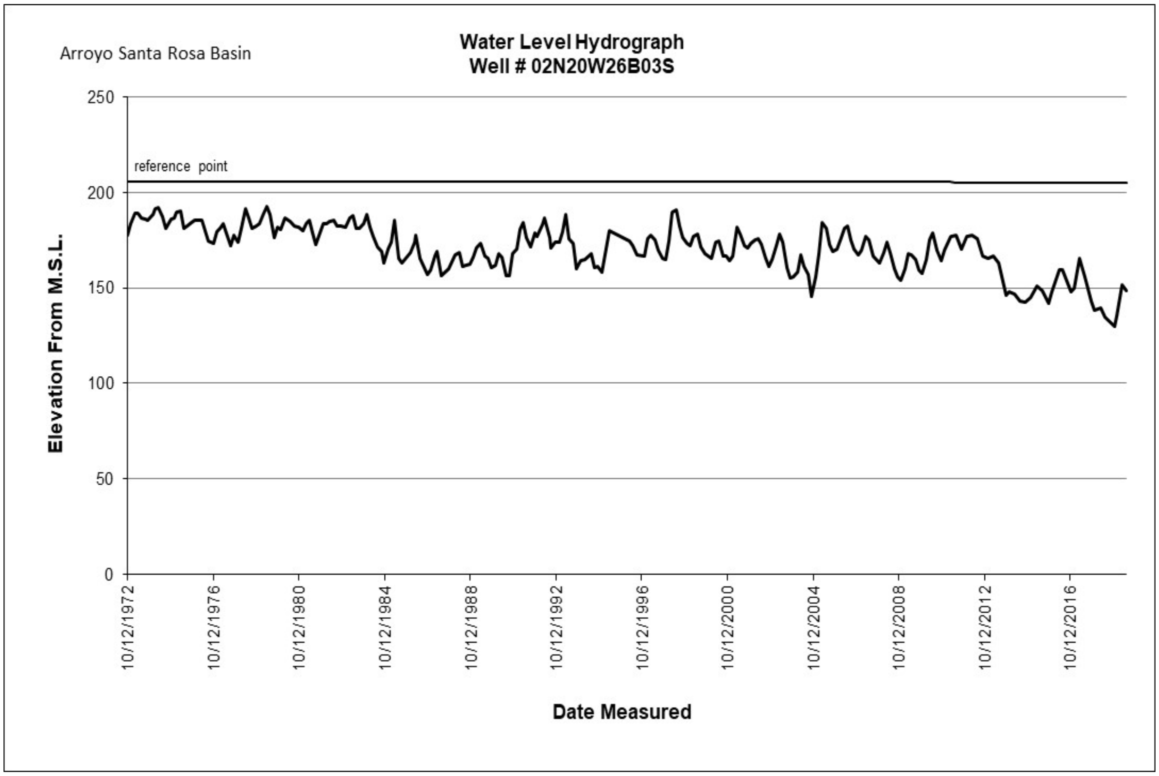

Figure B-14: Arroyo Santa Rosa Basin key well Hydrograph.

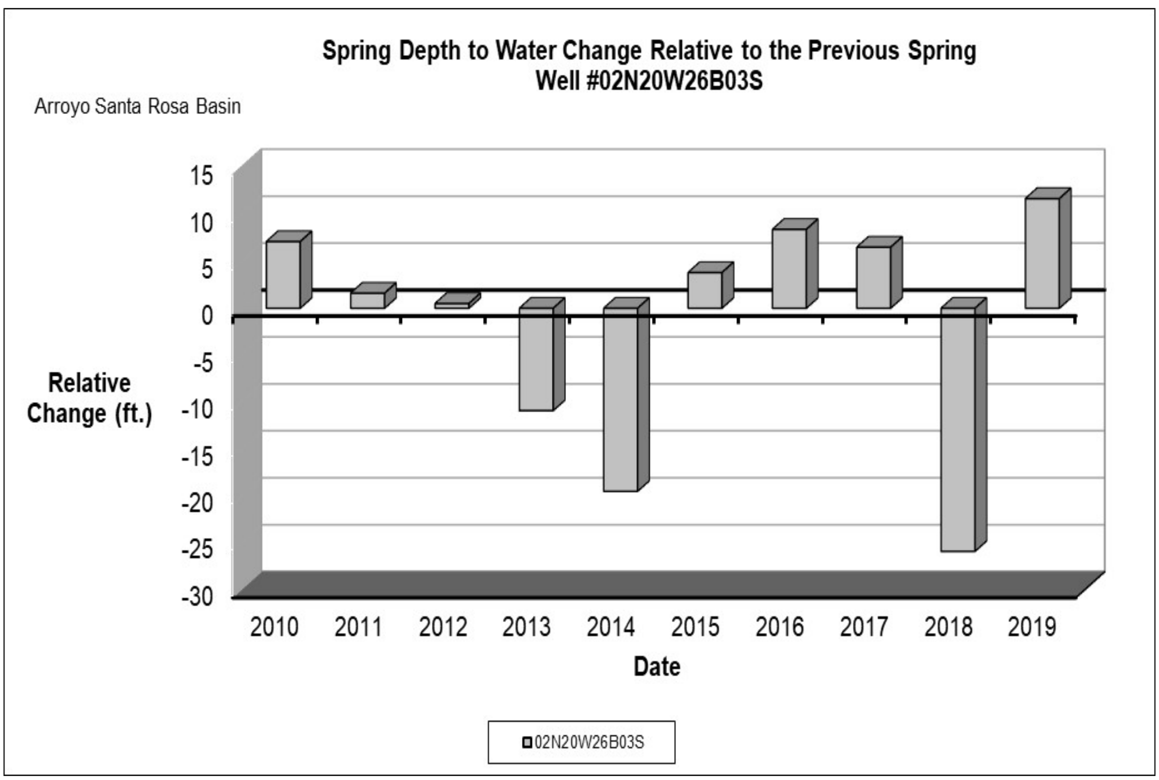

Figure B-15: Arroyo Santa Rosa Basin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

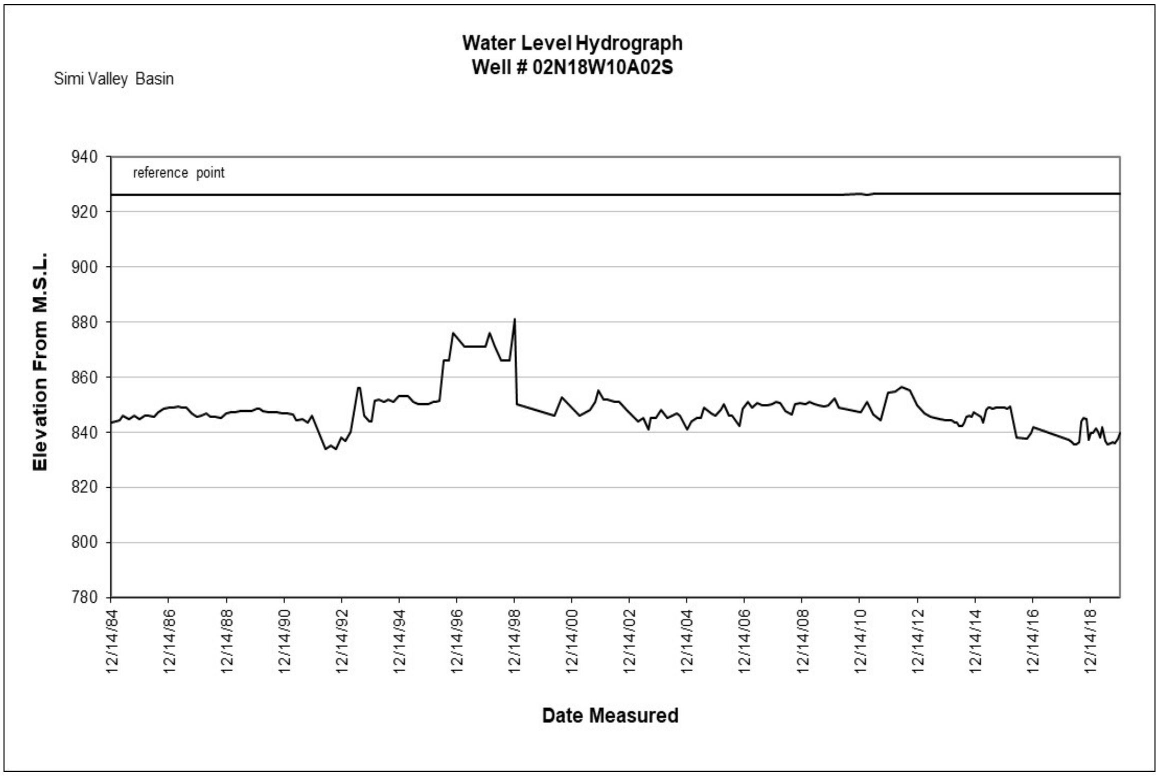

Figure B-16: Simi Valley Basin key well Hydrograph.

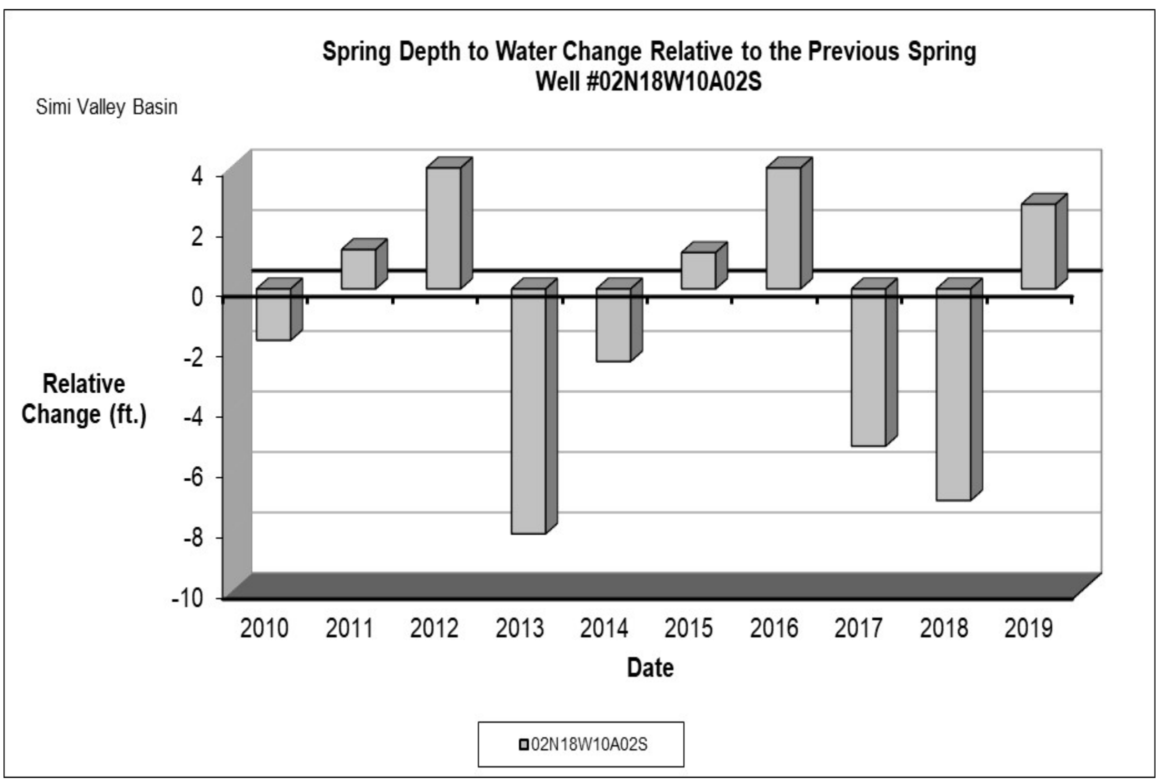

Figure B-17: Simi Valley Basin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

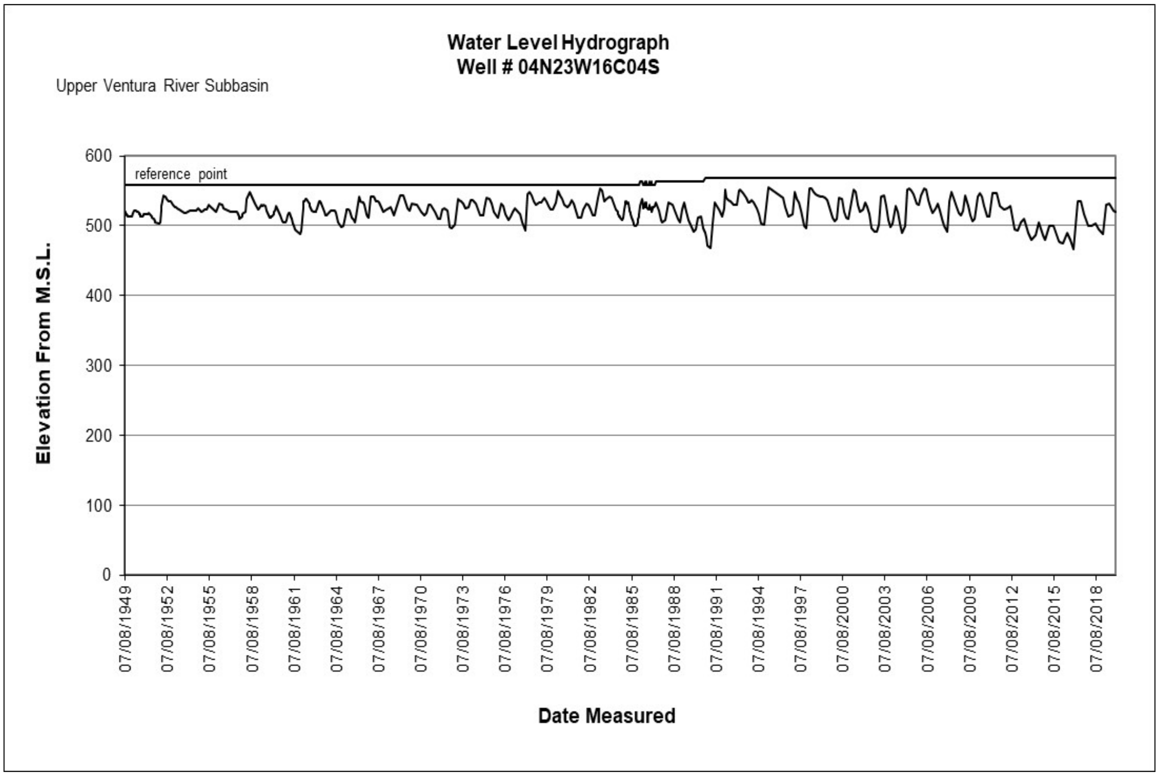

Figure B-18: Upper Ventura River Subbasin key well Hydrograph.

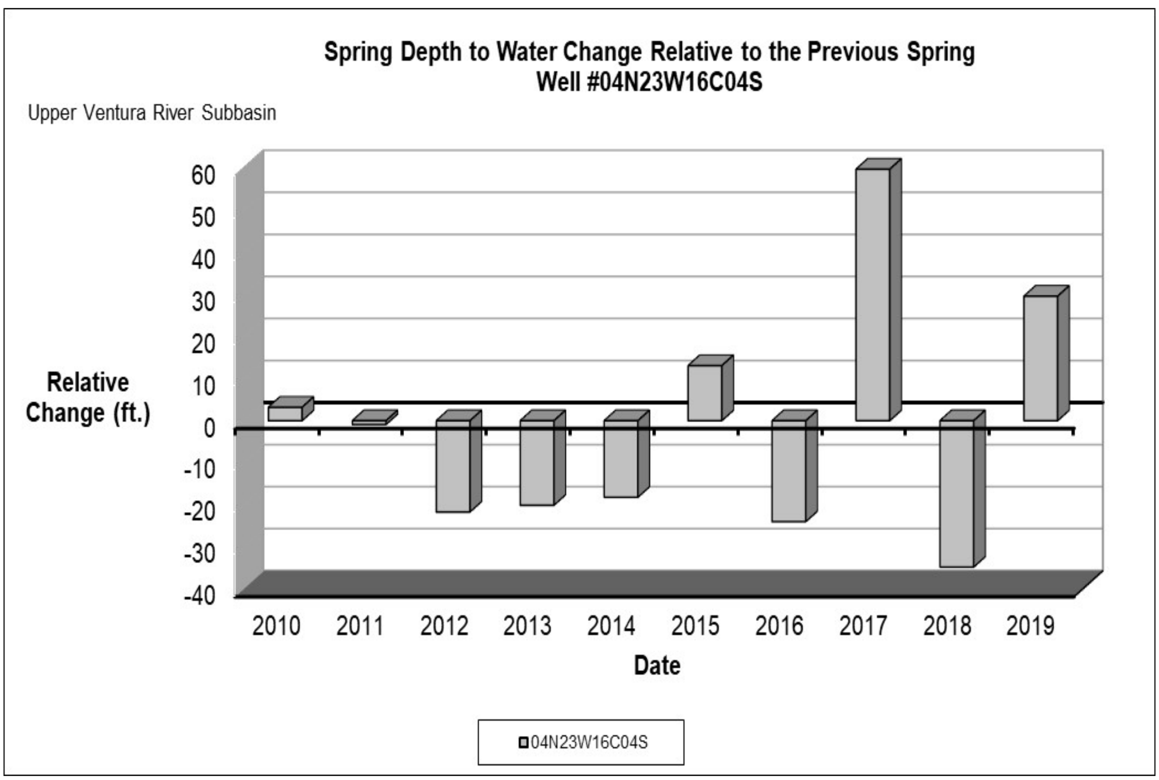

Figure B-19: Upper Ventura River Subbasin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

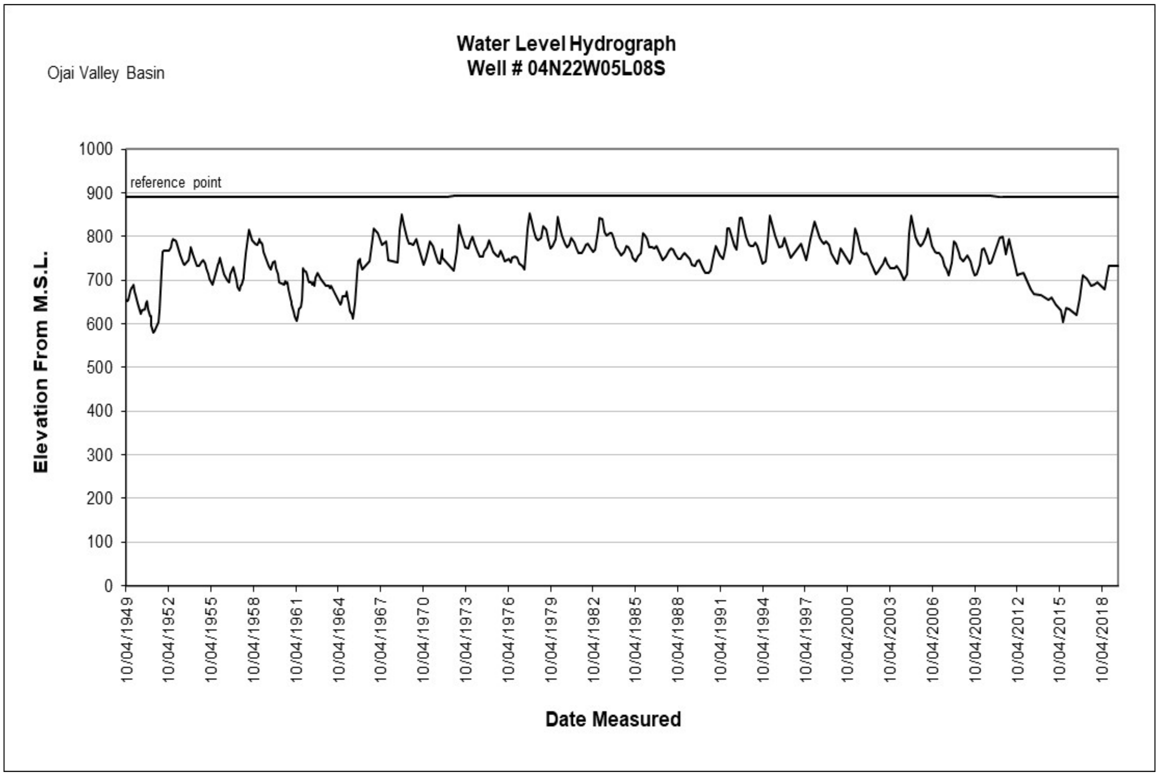

Figure B-20: Ojai Valley Basin key well Hydrograph.

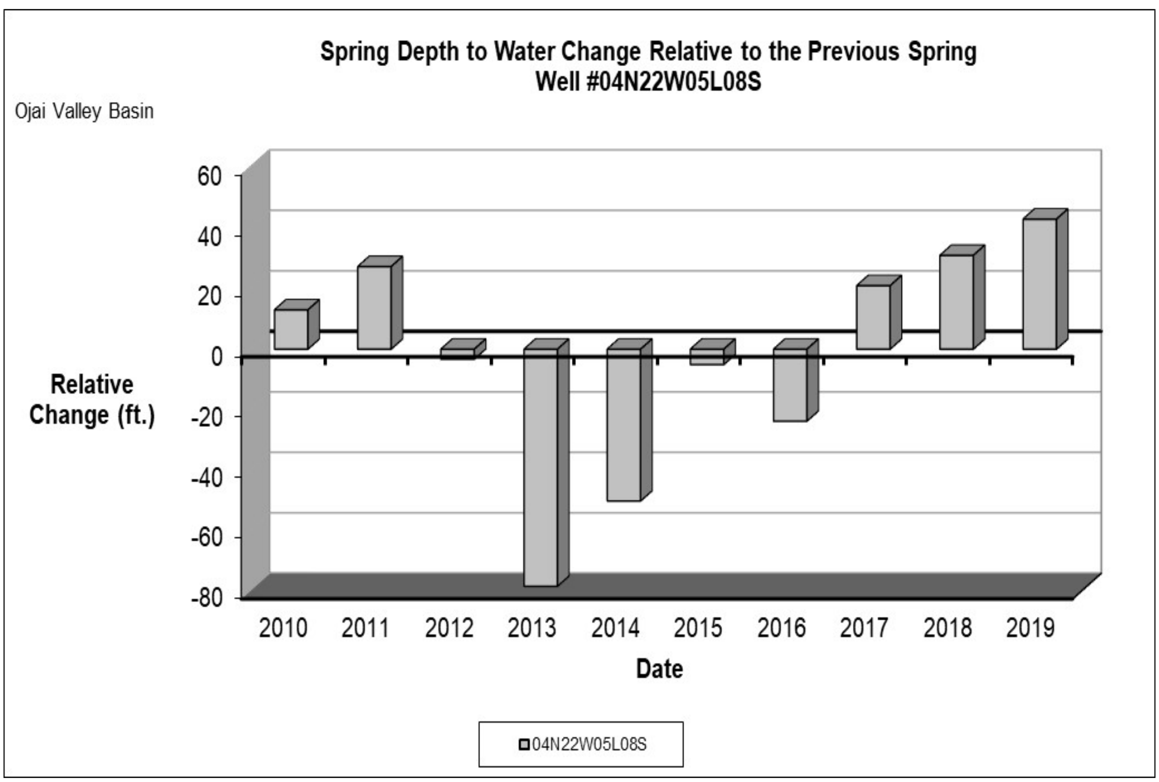

Figure B-21: Ojai Valley Basin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

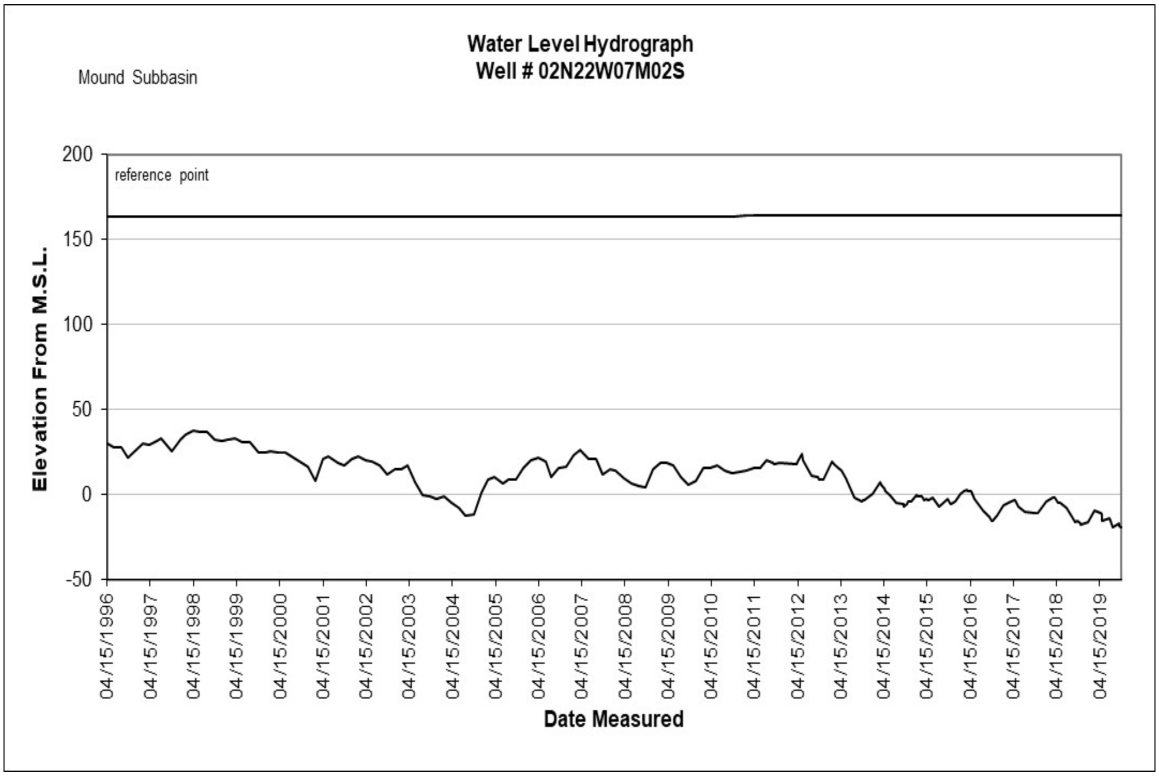

Figure B-22: Mound Subbasin key well Hydrograph.

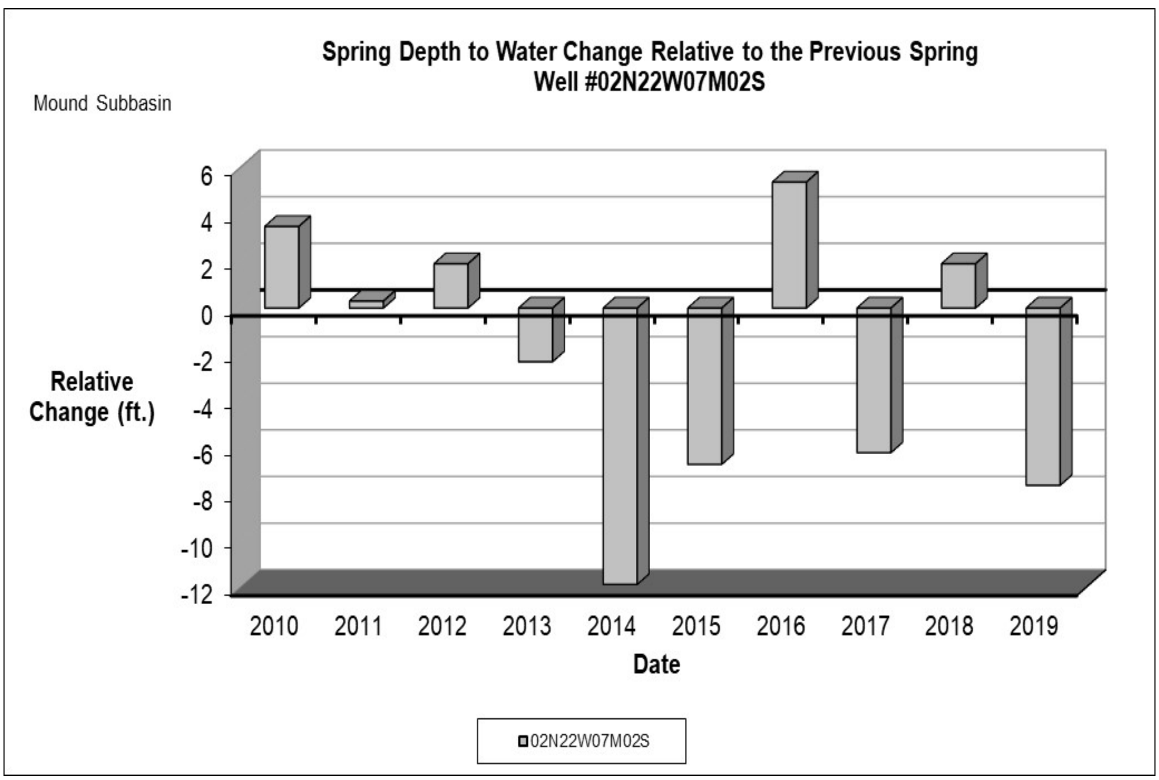

Figure B-23: Mound Subbasin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

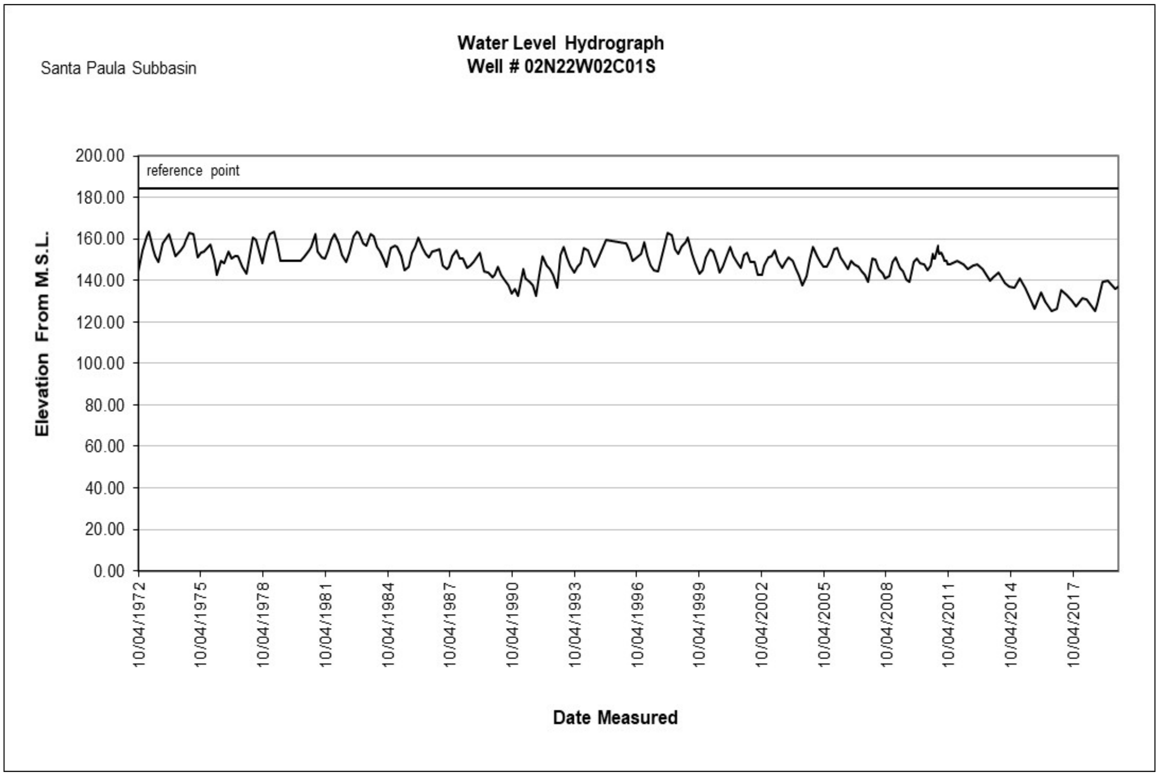

Figure B-24: Santa Paula Subbasin key well Hydrograph.

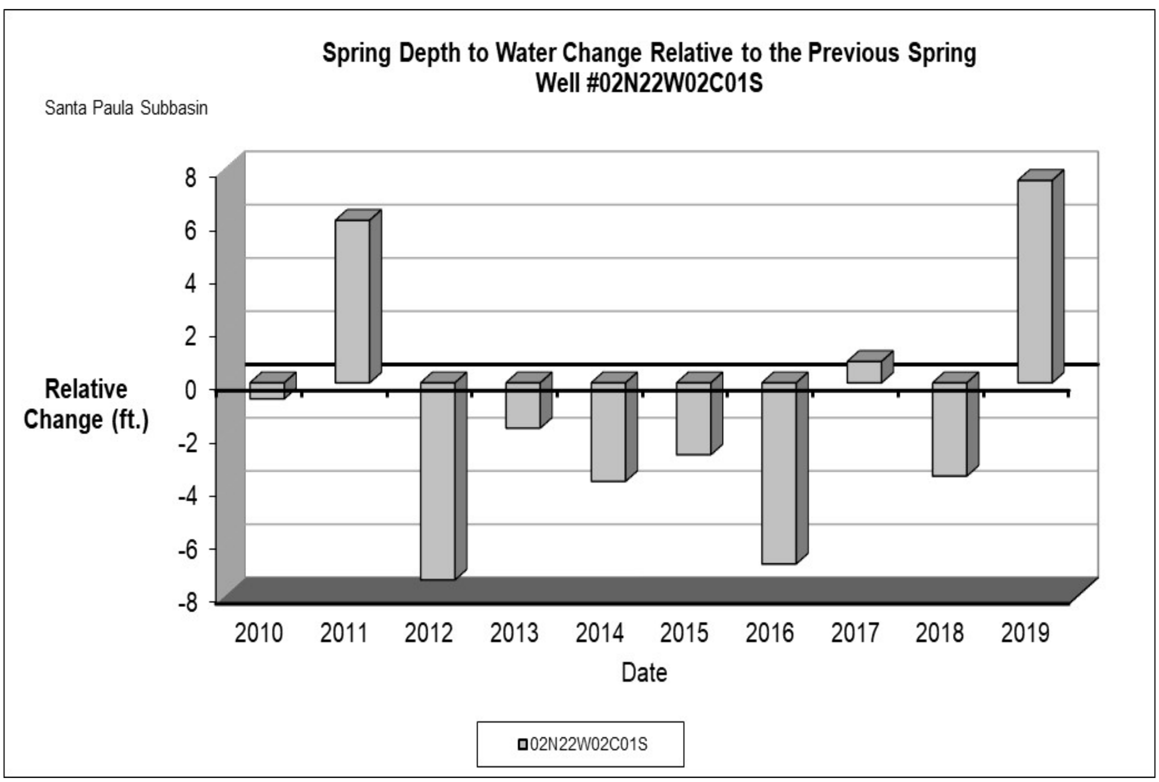

Figure B-25: Santa Paula Subbasin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

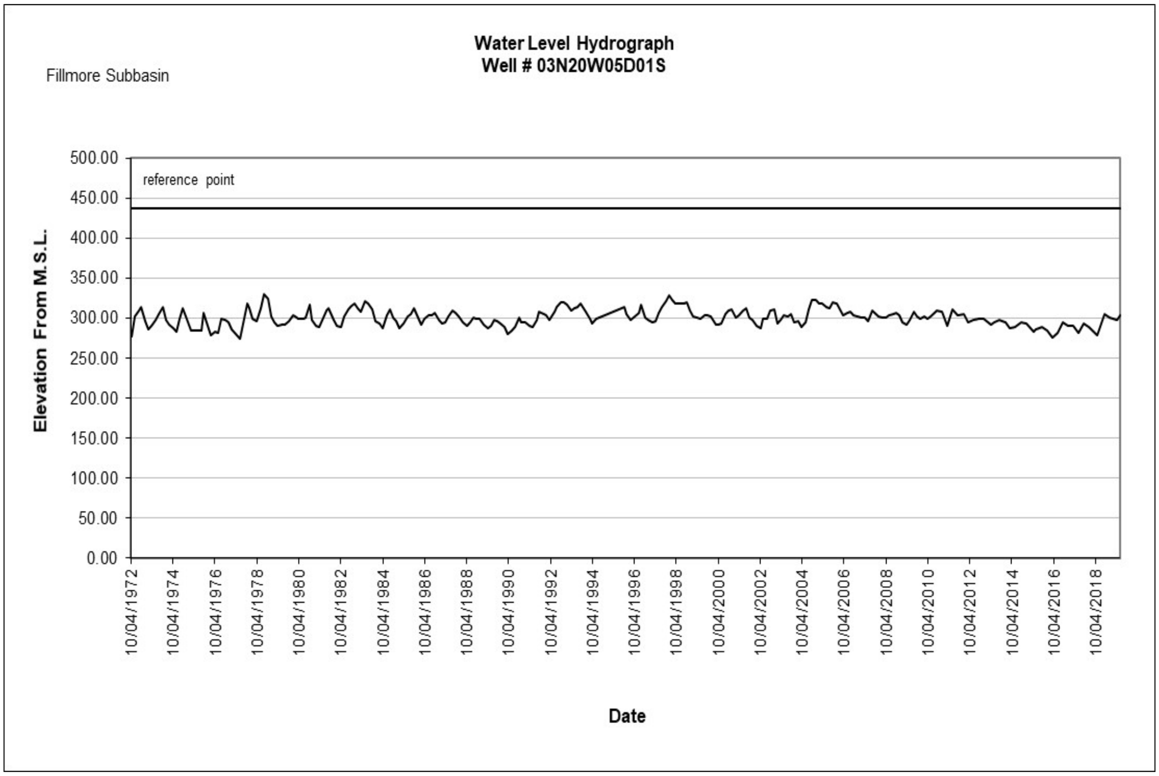

Figure B-26: Fillmore Subbasin key well Hydrograph.

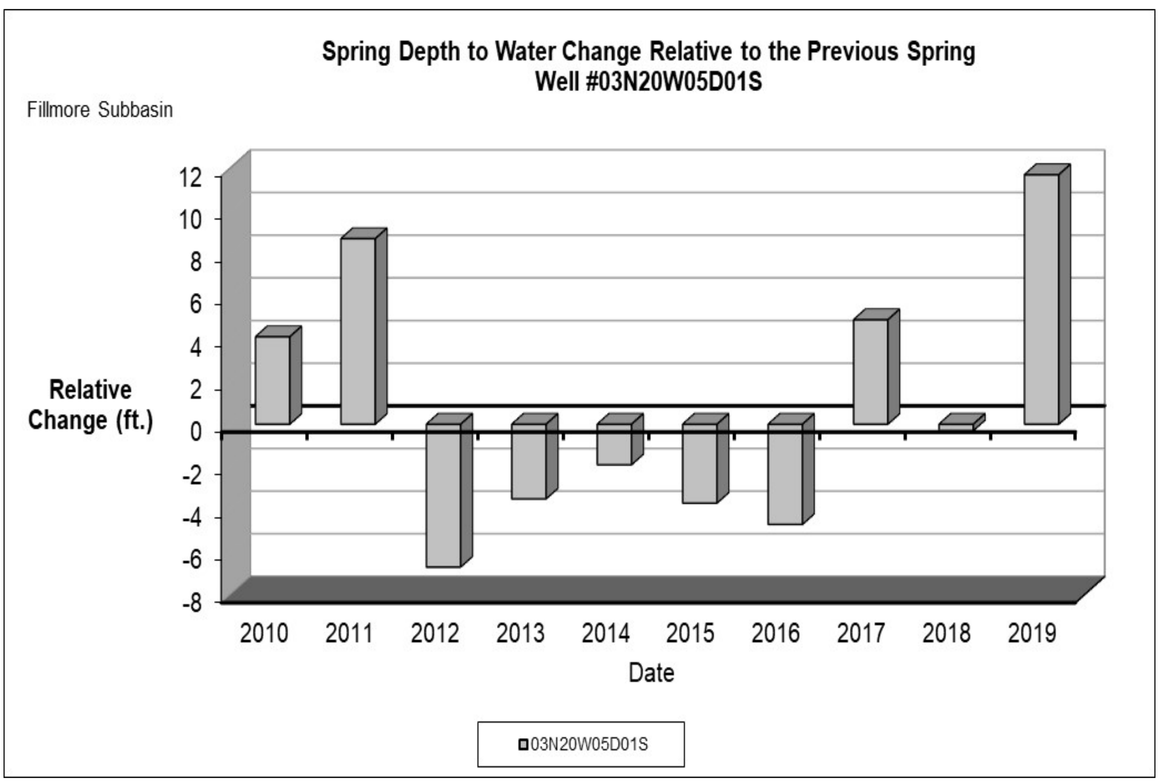

Figure B-27: Fillmore Subbasin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

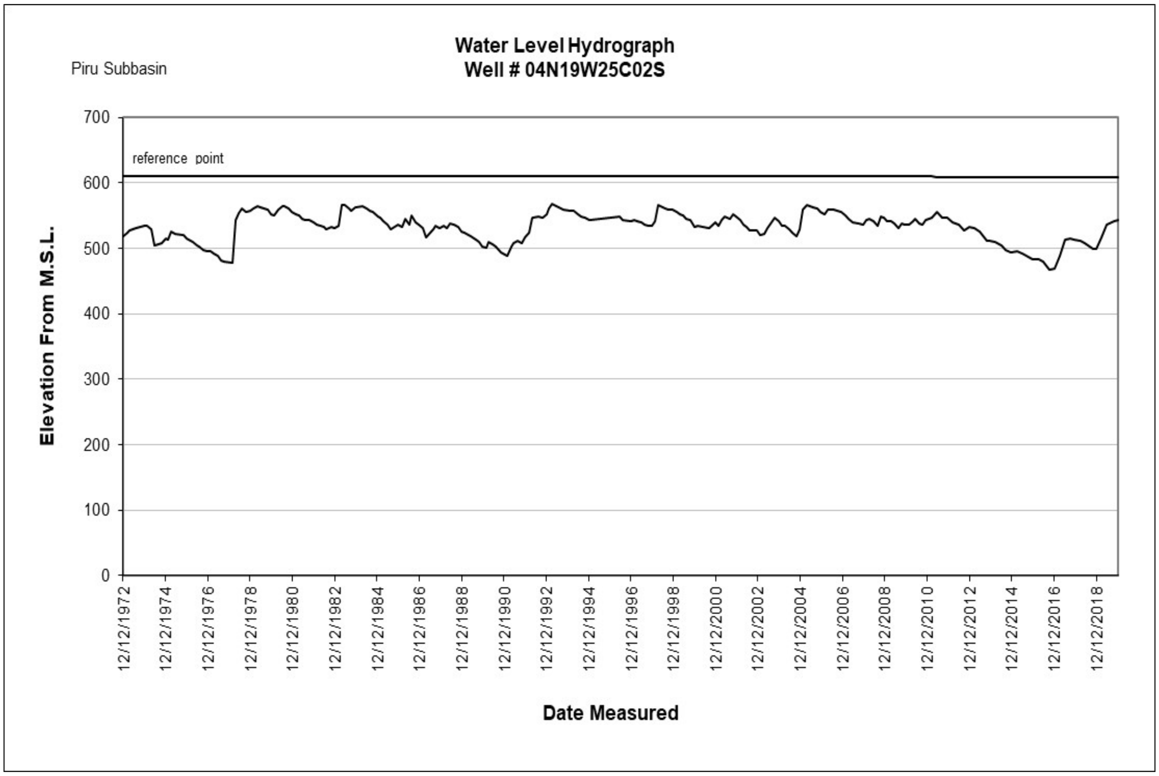

Figure B-28: Piru Subbasin key well Hydrograph.

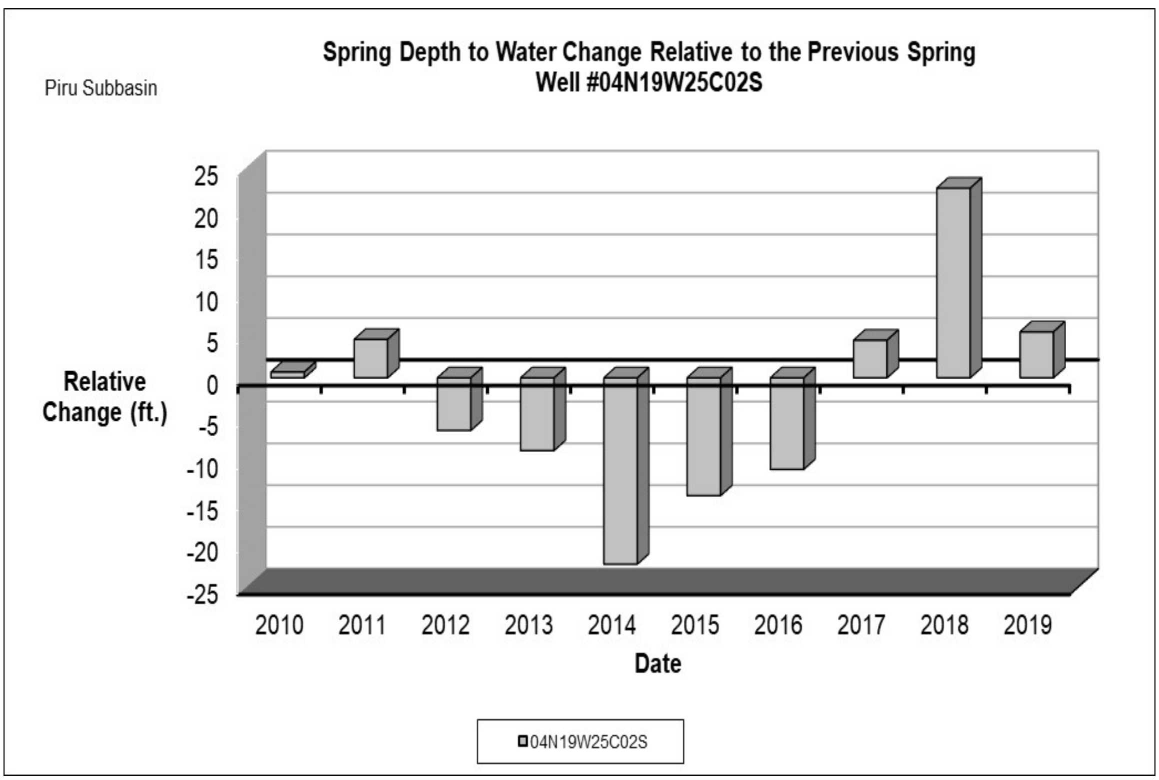

Figure B-29: Piru Subbasin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

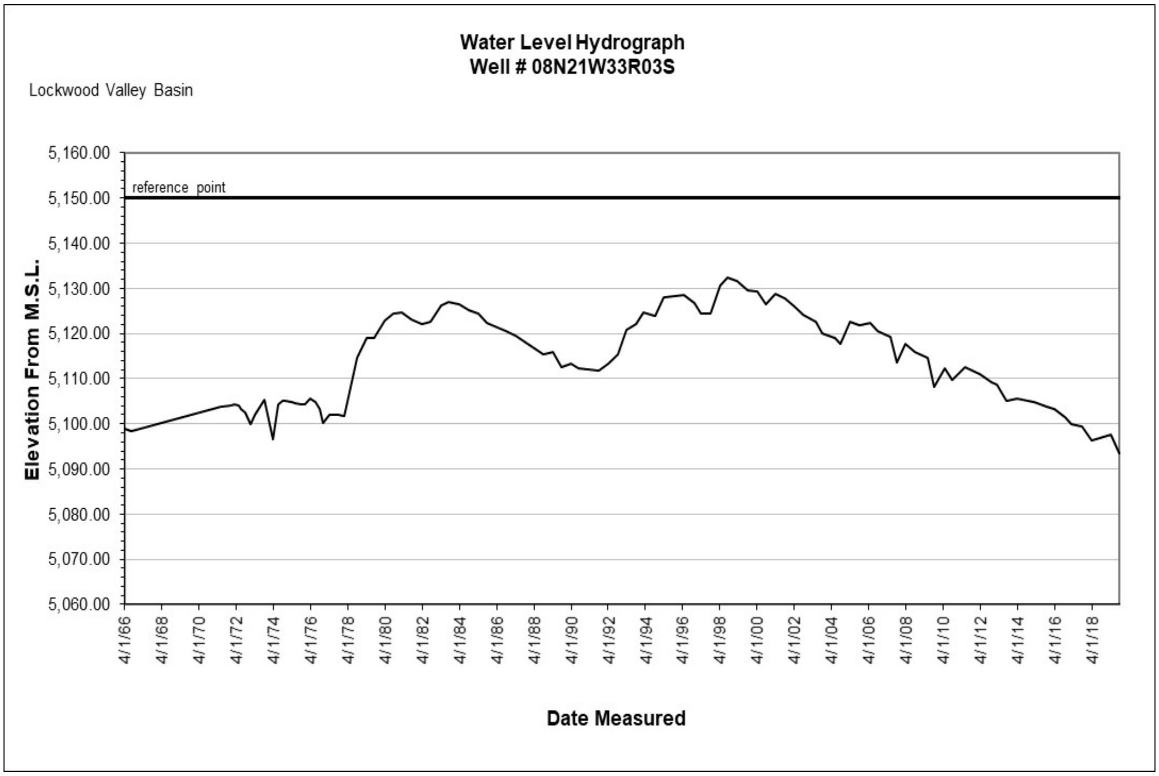

Figure B-30: Lockwood Valley Basin key well Hydrograph.

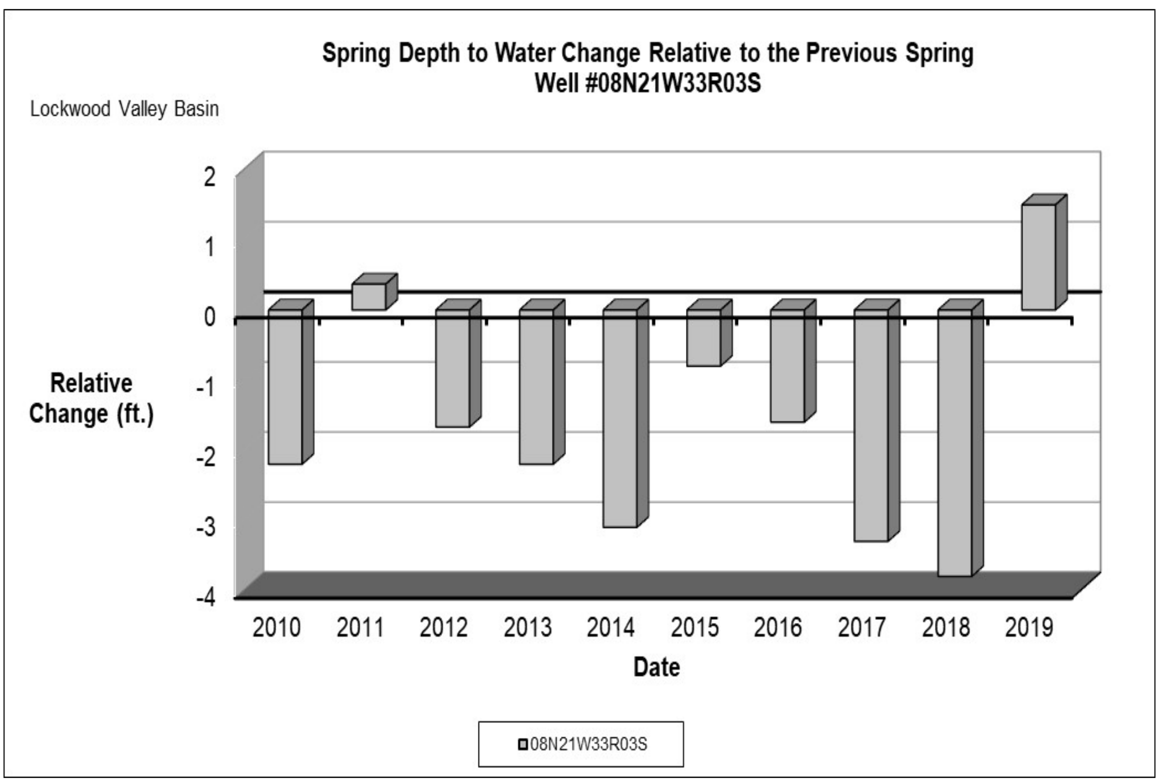

Figure B-31: Lockwood Valley Basin 10-year Spring level change Up/Down graph.

Appendix B – Key Water Level Wells

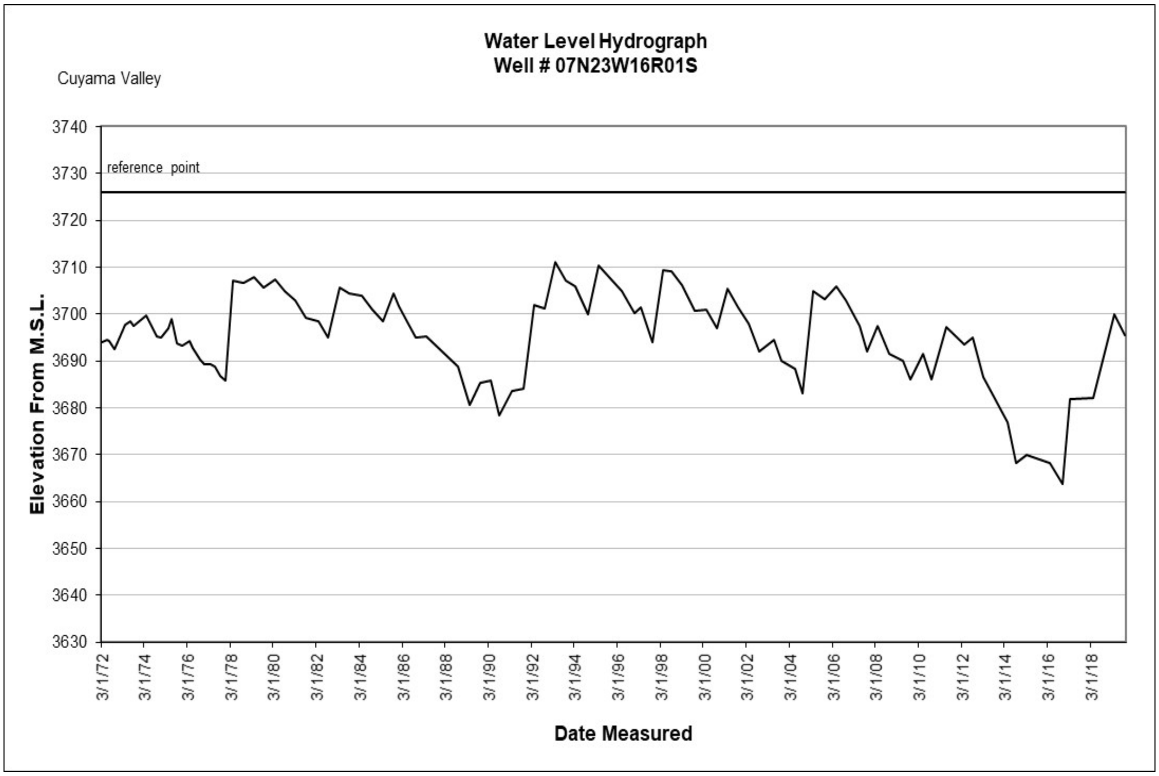

Figure B-32: Cuyama Valley Basin key well Hydrograph.

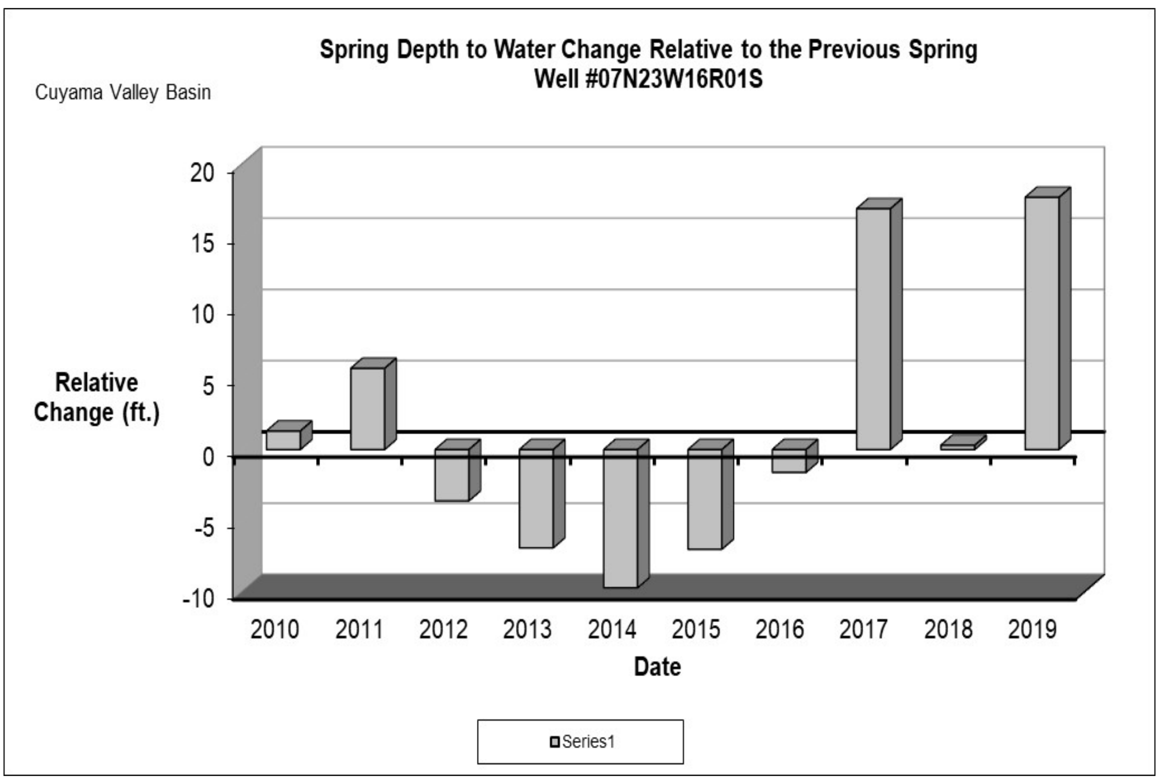

Figure B-33: Cuyama Valley Basin 10-year Spring level change Up/Down graph.

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Arroyo Santa Rosa Valley	02N20W23G01S	3/18/2019	370.80	288.04	82.76	
		6/5/2019	370.80	290.20	80.60	
		10/22/2019	370.80	295.30	75.50	
		12/24/2019	370.80	294.10	76.70	
	02N20W23K01S	3/18/2019	274.11	194.80	79.31	
		6/5/2019	274.11	202.00	72.11	
		10/22/2019	274.11	219.30	54.81	
		12/24/2019	274.11	205.70	68.41	
	02N20W23R01S	3/18/2019	235.21	86.80	148.41	
		6/5/2019	235.21	----	----	Pumping
		10/16/2019	235.21	----	----	Pumping
		12/24/2019	235.21	97.00	138.21	
	02N20W26B03S*	3/18/2019	205.87	54.49	151.38	
		6/5/2019	205.87	57.05	148.82	
		10/22/2019	205.87	----	----	No Site Access
		12/27/2019	205.87	----	----	No Site Access
Conejo	01N19W07K16S	4/2/2019	635.46	3.90	631.56	
		6/10/2019	635.46	5.60	629.86	
		10/4/2019	635.46	8.70	626.76	
		12/9/2019	635.46	8.00	627.46	
	01N20W03J01S	4/2/2019	764.40	19.50	744.90	
		6/10/2019	764.40	30.00	734.40	
		10/4/2019	764.40	48.90	715.50	
		12/9/2019	764.40	43.80	720.60	
Cuddy Ranch Area	08N20W08B01S	4/19/2019	5,300.00	----	----	No Site Access
		10/8/2019	5,300.00	9.40	5,290.60	
Cuyama Valley	07N23W16R01S*	4/19/2019	3,726.00	26.10	3,699.90	
		10/8/2019	3,726.00	30.60	3,695.40	
	07N23W16R02S	4/19/2019	3,726.00	23.00	3,703.00	
		10/8/2019	3,726.00	----	----	Pumping
	07N24W13C03S	4/19/2019	3,435.00	24.30	3,410.70	
		10/8/2019	3,435.00	27.50	3,407.50	
	09N23W30E05S	4/19/2019	3,544.50	193.10	3,351.40	
		10/8/2019	3,544.50	192.20	3,352.30	
	09N24W33J03S	4/19/2019	3,130.00	162.60	2,967.40	
		10/8/2019	3,130.00	----	----	Pumping
Fillmore	03N19W06D02S	3/11/2019	434.60	72.83	361.77	
		6/3/2019	434.60	----	----	Pumping
		10/14/2019	434.60	56.70	377.90	
		12/5/2019	434.60	53.30	381.30	
	03N20W01C04S	3/11/2019	404.58	42.55	362.03	
		6/3/2019	404.58	36.07	368.51	
		10/15/2019	404.58	33.40	371.18	
		12/5/2019	404.58	33.10	371.48	

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Fillmore	03N20W05D01S*	3/11/2019	434.60	72.83	361.77	
		6/3/2019	434.60	----	----	Pumping
		10/14/2019	434.60	56.70	377.90	
		12/5/2019	434.60	53.30	381.30	
	03N20W09D01S	3/11/2019	404.58	42.55	362.03	
		6/3/2019	404.58	36.07	368.51	
		10/15/2019	404.58	33.40	371.18	
		12/5/2019	404.58	33.10	371.48	
	03N20W11C01S	3/12/2019	437.12	131.75	305.37	
		6/3/2019	437.12	137.25	299.87	
		10/18/2019	437.12	140.10	297.02	
		12/5/2019	437.12	134.40	302.72	
	03N21W01P02S	3/11/2019	325.20	8.20	317.00	
		6/3/2019	325.20	9.10	316.10	
		10/15/2019	325.20	11.60	313.60	
		12/5/2019	325.20	----	----	No Site Access
	03N21W11B01S	3/11/2019	397.11	53.17	343.94	
		06/04/2018	434.43	----	----	Pumping
		10/22/2018	434.43	----	----	Pumping
		12/05/2018	434.43	67.10	367.33	
	04N19W30D01S	3/11/2019	434.43	45.75	388.68	
		6/3/2019	434.43	----	----	Pumping
		10/15/2019	434.43	----	----	Pumping
		12/5/2019	434.43	45.30	389.13	
	04N19W31R01S	3/11/2019	448.85	80.00	368.85	
		6/3/2019	448.85	63.90	384.95	
		10/18/2019	448.85	54.10	394.75	
		12/24/2019	448.85	----	----	Site Inaccessible
	04N19W32M02S	3/11/2019	449.46	18.05	431.41	
		6/3/2019	449.46	18.26	431.20	
		10/18/2019	449.46	----	----	Pumping
		12/24/2019	449.46	----	----	Site Inaccessible
	04N19W33D03S	3/11/2019	477.43	----	----	Pumping
		6/3/2019	477.43	----	----	Pumping
		10/15/2019	477.43	----	----	Pumping
		12/24/2019	477.43	----	----	Flowing
	04N20W23Q02S	3/11/2019	513.88	121.42	392.46	
		6/3/2019	513.88	0.00	513.88	Pumping
		10/18/2019	513.88	135.40	378.48	
		12/5/2019	513.88	135.60	378.28	
	04N20W26C02S	3/11/2019	505.35	124.75	380.60	
		6/3/2019	505.35	132.10	373.25	
		10/18/2019	505.35	139.20	366.15	
		12/5/2019	505.35	127.00	378.35	
	04N20W33C03S	3/12/2019	526.87	172.30	354.57	
		6/3/2019	526.87	----	----	Pumping
		10/18/2019	526.87	----	----	Pumping
		12/5/2019	526.87	----	----	No Site Access

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev. **	Depth***	WL Elev.**	Notes
Hidden Valley	01N19W19L02S	4/2/2019	1,082.00	304.50	777.50	
		6/10/2019	1,082.00	----	----	Pumping
		10/4/2019	1,082.00	----	----	Pumping
		12/9/2019	1,082.00	299.80	782.20	
	01N19W30A01S	4/2/2019	999.98	29.20	970.78	
		6/10/2019	999.98	30.20	969.78	
		10/4/2019	999.98	42.60	957.38	
		12/9/2019	999.98	33.60	966.38	
Las Posas Valley – East Management Area	02N19W05K01S*	4/3/2019	497.80	29.60	468.20	
		6/18/2019	497.80	30.10	467.70	
		10/2/2019	497.80	30.20	467.60	
		12/27/2019	497.80	30.50	467.30	
	02N19W08H02S	4/3/2019	494.87	26.10	468.77	
		6/18/2019	494.87	26.30	468.57	
		10/31/2019	494.87	27.50	467.37	
		12/18/2019	494.87	----	----	Did not measure.
	02N20W10D02S	3/26/2019	459.53	318.60	140.93	
		6/19/2019	459.53	314.00	145.53	
		10/1/2019	459.53	317.30	142.23	
		12/13/2019	459.53	318.10	141.43	
	02N20W10G01S	3/26/2019	415.47	162.40	253.07	
		6/18/2019	415.47	169.10	246.37	
		9/30/2019	415.47	164.80	250.67	
		12/13/2019	415.47	161.10	254.37	
	02N20W10J01S	3/25/2019	406.87	121.00	285.87	
		6/24/2019	406.87	123.50	283.37	
		9/30/2019	406.87	126.00	280.87	
		12/13/2019	406.87	124.30	282.57	
	03N19W17Q01S	4/11/2019	1,311.06	1,092.30	218.76	
		6/18/2019	1,311.06	----	----	No Site Access
		10/2/2019	1,311.06	----	----	No Site Access
		12/27/2019	1,311.06	----	----	No Site Access
	03N19W19J01S	3/25/2019	1,026.90	860.70	166.20	
		6/14/2019	1,026.90	856.90	170.00	
		9/30/2019	1,026.90	852.10	174.80	
		12/18/2019	1,026.90	852.50	174.40	
	03N19W29F06S	3/25/2019	855.20	253.10	602.10	
		6/14/2019	855.20	258.00	597.20	
		9/30/2019	855.20	260.90	594.30	
		12/27/2019	855.20	251.50	603.70	
	03N20W23L01S	4/19/2019	970.30	772.80	197.50	
		6/14/2019	970.30	772.10	198.20	
		10/1/2019	970.30	773.30	197.00	
		12/18/2019	970.30	----	----	Site Inaccessible
	03N20W25H01S	3/25/2019	823.84	224.50	599.34	
		6/14/2019	823.84	----	----	Pumping
		9/30/2019	823.84	222.00	601.84	
		12/18/2019	823.84	215.60	608.24	

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Las Posas Valley – East Management Area	03N20W26R03S*	3/25/2019	717.81	576.70	141.11	
		6/14/2019	717.81	576.00	141.81	
		9/30/2019	717.81	543.00	174.81	
		12/17/2019	717.81	530.90	186.91	
	03N20W27H03S	3/25/2019	840.25	642.40	197.85	
		6/17/2019	840.25	644.10	196.15	
		9/30/2019	840.25	646.40	193.85	
		12/16/2019	840.25	645.20	195.10	
	03N20W34G01S	3/25/2019	680.48	548.20	132.28	
		6/18/2019	680.48	----	----	Pumping
		9/30/2019	680.48	----	----	Pumping
		12/16/2019	680.48	----	----	Meter would not stabilize
	03N20W35R02S	3/26/2019	572.67	423.80	148.87	
		6/18/2019	572.67	----	----	Meter would not read
		9/30/2019	572.67	390.90	181.77	
		12/13/2019	572.67	----	----	No site access
	03N20W35R03S	3/26/2019	572.67	----	----	No casing access for meter
		6/18/2019	572.67	416.40	156.27	
		9/30/2019	572.67	389.60	183.07	
		12/13/2019	572.67	----	----	No site access
	03N20W35R04S	3/26/2019	572.67	----	----	No casing access for meter
		6/18/2019	572.67	----	----	No casing access for meter
		9/30/2019	572.67	308.70	263.97	
		12/13/2019	572.67	----	----	No site access
Las Posas Valley – West Management Area	02N20W05D01S	4/19/2019	569.00	697.60	-128.60	
		6/17/2019	569.00	706.10	-137.10	
		9/30/2019	569.00	714.80	-145.80	
		12/16/2019	569.00	717.50	-148.50	
	02N20W06R01S	3/25/2019	461.19	599.10	-137.91	
		6/24/2019	461.19	626.30	-165.11	
		10/2/2019	461.19	621.20	-160.01	
		12/17/2019	461.19	616.50	-155.30	
	02N20W07R03S	3/26/2019	395.00	535.70	-140.70	
		6/17/2019	395.00	----	----	Pumping
		9/30/2019	395.00	----	----	Pumping
		12/18/2019	395.00	551.90	-156.90	
	02N20W18A01S	3/26/2019	375.60	509.00	-133.40	
		6/18/2019	375.60	519.80	-144.20	
		10/1/2019	375.60	----	----	No site access
		12/16/2019	375.60	----	----	No site access
	02N21W08H03S	4/1/2019	334.21	399.90	-65.69	
		6/24/2019	334.21	395.60	-61.39	
		9/30/2019	334.21	422.30	-88.09	
		12/18/2019	334.21	----	----	No site access

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Las Posas Valley – West Management Area	02N21W09D02S	3/26/2019	323.75	247.60	76.15	
		6/24/2019	323.75	249.90	73.85	
		10/21/2019	323.75	257.11	66.64	
		12/18/2019	323.75	----	----	Gage not reading
	02N21W10G03S	3/25/2019	381.01	370.90	10.11	
		6/18/2019	381.01	----	----	No casing access
		9/30/2019	381.01	----	----	No casing access
		12/18/2019	381.01	414.30	-33.29	
	02N21W11J03S*	3/25/2019	379.39	435.80	-56.41	
		6/18/2019	379.39	442.00	-62.61	
		9/30/2019	379.39	449.20	-69.81	
		12/18/2019	379.39	0.00	379.39	
	02N21W11J04S	3/25/2019	379.39	407.70	-28.31	
		6/18/2019	379.39	409.40	-30.01	
		9/30/2019	379.39	412.60	-33.21	
		12/18/2019	379.39	----	----	No site access
	02N21W11J05S	3/25/2019	379.39	215.80	163.59	
		6/18/2019	379.39	217.90	161.49	
		9/30/2019	379.39	222.70	156.69	
		12/18/2019	379.39	----	----	No site access
	02N21W11J06S	3/25/2019	379.39	185.30	194.09	
		6/18/2019	379.39	184.30	195.09	
		9/30/2019	379.39	185.80	193.59	
		12/18/2019	379.39	----	----	No site access
	02N21W12H01S	4/19/2019	417.89	457.50	-39.61	
		6/18/2019	417.89	458.30	-40.41	
		9/30/2019	417.89	461.40	-43.51	
		12/16/2019	417.89	456.10	-38.21	
	02N21W13A01S	4/3/2019	440.00	580.30	-140.30	
		6/17/2019	440.00	----	----	No site access
		9/30/2019	440.00	595.40	-155.40	
		12/16/2019	440.00	592.70	-152.70	
	02N21W15M03S	3/25/2019	263.87	330.00	-66.13	
		6/17/2019	263.87	325.00	-61.13	
		10/7/2019	263.87	338.70	-74.83	
		12/16/2019	263.87	327.00	-63.13	
	02N21W16J01S	3/25/2019	259.90	14.10	245.80	
		6/17/2019	259.90	16.00	243.90	
		9/30/2019	259.90	16.70	243.20	
		12/16/2019	259.90	16.60	243.30	
	02N21W18H03S	3/12/2019	118.41	121.00	-2.59	
		6/10/2019	118.41	124.40	-5.99	
		10/24/2019	118.41	101.90	16.51	
		12/18/2019	118.41	104.20	14.21	

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Las Posas Valley – West Management Area	02N21W18H12S	3/12/2019	117.88	155.50	-37.62	
		6/10/2019	117.88	164.10	-46.22	
		10/24/2019	117.88	171.90	-54.02	
		12/18/2019	117.88	144.70	-26.82	
	03N20W32H03S	3/25/2019	673.00	----	----	Pumping
		6/18/2019	673.00	----	----	Pumping
		9/30/2019	673.00	----	----	No site access
		12/16/2019	673.00	----	----	No site access
	03N21W35P02S	3/25/2019	564.11	506.40	57.71	
		6/14/2019	564.11	483.40	80.71	
		9/30/2019	564.11	516.10	48.01	
		12/13/2019	564.11	510.60	53.50	
Lockwood Valley	08N21W33R03S*	4/19/2019	5,150.00	52.30	5,097.70	
		10/8/2019	5,150.00	56.50	5,093.50	
	08N21W35B01S	4/19/2019	5,029.20	40.40	4,988.80	
		10/8/2019	5,029.20	----	----	No site access
	08N21W36G02S	4/19/2019	4,922.00	24.40	4,897.60	
		10/8/2019	4,922.00	----	----	No site access
Mound	02N22W09L03S	3/12/2019	251.25	199.57	51.68	
		6/4/2019	251.25	201.42	49.83	
		10/21/2019	251.25	198.30	52.95	
		12/5/2019	251.25	----	----	No site access
	02N22W09L04S	3/12/2019	251.25	181.50	69.75	
		6/4/2019	251.25	193.00	58.25	
		10/21/2019	251.25	189.70	61.55	
		12/5/2019	251.25	----	----	No site access
	02N22W16K01S	3/12/2019	149.37	181.50	-32.13	
		6/4/2019	149.37	173.70	-24.33	
		10/21/2019	149.37	173.10	-23.73	
		12/5/2019	149.37	174.00	-24.63	
	02N23W13K03S	3/13/2019	68.71	----	----	Pumping
		6/4/2019	68.71	----	----	Pumping
		10/31/2019	68.71	----	----	Pumping
		12/5/2019	68.71	----	----	No site access
Ojai Valley	04N22W04Q01S	3/28/2019	1,045.50	68.20	977.30	
		6/12/2019	1,045.50	----	----	Pumping
		9/24/2019	1,045.50	----	----	Pumping
		12/3/2019	1,045.50	93.90	951.60	
	04N22W05D03S	3/28/2019	895.97	161.80	734.17	
		6/12/2019	895.97	143.40	752.57	
		9/26/2019	895.97	159.50	736.50	
		12/3/2019	895.97	166.46	729.51	
	04N22W05H04S	3/28/2019	950.22	210.00	740.22	
		6/11/2019	950.22	182.30	767.92	
		9/24/2019	950.22	----	----	Pumping
		12/10/2019	950.22	203.90	746.32	
	04N22W05L08S*	4/1/2019	892.09	160.10	731.99	
		6/12/2019	892.09	----	----	Pumping
		9/26/2019	892.09	----	----	Pumping
		12/2/2019	892.09	160.40	731.69	

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** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Ojai Valley	04N22W05M01S	3/28/2019	843.47	125.40	718.07	
		6/12/2019	843.47	95.80	747.67	
		9/24/2019	843.47	110.10	733.37	
		12/3/2019	843.47	115.70	727.77	
	04N22W06D01S	4/1/2019	846.66	76.30	770.36	
		6/11/2019	846.66	70.30	776.36	
		9/24/2019	846.66	86.60	760.06	
		12/2/2019	846.66	94.40	752.26	
	04N22W06D05S	4/1/2019	853.21	87.40	765.81	
		6/11/2019	853.21	80.10	773.11	
		9/24/2019	853.21	----	----	Pumping
		12/2/2019	853.21	105.20	748.01	
	04N22W06K03S	6/11/2019	801.80	----	----	No site access
		12/6/2019	801.80	99.95	701.85	
	04N22W06K12S	4/1/2019	812.70	88.90	723.80	
		6/11/2019	812.70	116.20	696.50	
		9/26/2019	812.70	137.10	675.60	
		12/2/2019	812.70	105.00	707.70	
	04N22W06M01S	3/20/2019	794.78	67.40	727.38	
		6/11/2019	794.78	57.20	737.58	
		9/24/2019	794.78	62.60	732.18	
		12/2/2019	794.78	70.30	724.48	
	04N22W07B02S	3/28/2019	773.77	71.70	702.07	
		6/11/2019	773.77	71.90	701.87	
		9/23/2019	773.77	76.40	697.37	
		12/2/2019	773.77	59.50	714.27	
	04N22W07G01S	3/26/2019	771.20	40.00	731.20	
		6/11/2019	771.20	26.00	745.20	
		9/23/2019	771.20	29.40	741.80	
		12/2/2019	771.20	29.80	741.40	
	04N22W08B02S	3/28/2019	870.57	153.80	716.77	
		6/12/2019	870.57	104.40	766.17	
		9/24/2019	870.57	119.20	751.37	
		12/3/2019	870.57	126.80	743.77	
	04N23W01K02S	3/26/2019	786.38	9.50	776.88	
		6/11/2019	786.38	51.30	735.08	
		9/23/2019	786.38	44.90	741.48	
		12/2/2019	786.38	43.60	742.78	
	04N23W02K01S	3/28/2019	869.49	0.20	869.29	
		6/11/2019	869.49	0.70	868.79	
		9/23/2019	869.49	134.00	735.49	
		12/2/2019	869.49	5.50	863.99	
	04N23W12H02S	3/28/2019	716.61	36.20	680.41	
		6/12/2019	716.61	31.40	685.21	
		9/26/2019	716.61	32.40	684.21	
		3/26/2019	786.38	9.50	776.88	
	05N22W32J02S	4/1/2019	1,139.80	----	----	Pumping
		6/11/2019	1,139.80	54.50	1,085.30	
		9/25/2019	1,139.80	56.30	1,083.50	
		12/2/2019	1,139.80	44.60	1,095.20	

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** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Oxnard – Forebay Management Area	02N21W07P04S	3/25/2019	138.78	----	----	No casing access
		6/17/2019	138.78	----	----	No casing access
		9/30/2019	138.78	----	----	No casing access
		12/16/2019	138.78	----	----	No casing access
	02N22W26E01S	3/19/2019	86.96	111.20	-24.24	
		6/7/2019	86.96	110.20	-23.24	
		10/21/2019	86.96	----	----	No site access
		12/18/2019	86.96	104.60	-17.64	
Oxnard	01N21W04N02S	3/15/2019	43.33	109.05	-65.72	
		6/6/2019	43.33	127.80	-84.47	
		10/28/2019	43.33	182.80	-139.47	
		12/12/2019	43.33	144.10	-100.77	
	01N21W06L04S	3/13/2019	47.85	70.70	-22.85	
		6/4/2019	47.85	71.00	-23.15	
		10/23/2019	47.85	----	----	No site access
		12/19/2019	47.85	----	----	No site access
	01N21W07H01S*	3/13/2019	40.87	56.32	-15.45	
		6/4/2019	40.87	57.67	-16.80	
		10/23/2019	40.87	63.20	-22.33	
		12/19/2019	40.87	154.20	-113.33	
	01N21W08N03S	3/13/2019	31.50	92.90	-61.40	
		6/4/2019	31.50	116.49	-84.99	
		10/28/2019	31.50	167.20	-135.70	
		12/11/2019	31.50	128.60	-97.10	
	01N21W09C04S	3/15/2019	39.96	105.73	-65.77	
		6/6/2019	39.96	116.75	-76.79	
		10/28/2019	39.96	164.70	-124.74	
		12/12/2019	39.96	----	----	No site access
	01N21W16A04S	3/15/2019	25.69	82.42	-56.73	
		6/4/2019	25.69	98.57	-72.88	
		10/28/2019	25.69	163.20	-137.51	
		12/12/2019	25.69	110.90	-85.21	
	01N21W16M01S	3/13/2019	22.79	90.88	-68.09	
		6/4/2019	22.79	107.17	-84.38	
		10/28/2019	22.79	166.40	-143.61	
		12/11/2019	22.79	118.90	-96.11	
	01N21W16P03S	3/13/2019	19.39	83.65	-64.26	
		6/4/2019	19.39	104.60	-85.21	
		10/28/2019	19.39	164.20	-144.81	
		12/12/2019	19.39	115.50	-96.11	

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Oxnard	01N21W17D02S	3/15/2019	28.21	44.77	-16.56	
		6/4/2019	28.21	46.75	-18.54	
		10/28/2019	28.21	----	----	Pumping
		12/12/2019	28.21	41.90	-13.69	
	01N21W21N01S	3/13/2019	15.74	60.33	-44.59	
		6/6/2019	15.74	72.70	-56.96	
		10/28/2019	15.74	123.70	-107.96	
		12/11/2019	15.74	----	----	No site access
	01N21W28D01S	3/15/2019	14.75	69.85	-55.10	
		6/6/2019	14.75	90.80	-76.05	
		10/28/2019	14.75	----	----	Pumping
		12/12/2019	14.75	100.00	-85.25	
	01N21W29B03S	3/13/2019	18.19	----	----	No site access
		6/6/2019	18.19	31.00	-12.81	
		10/29/2019	18.19	----	----	Pumping
		12/11/2019	18.19	----	----	No site access
	01N21W32K01S*	3/18/2019	10.00	60.70	-50.70	
		6/10/2019	10.00	74.60	-64.60	
		9/16/2019	10.00	99.80	-89.80	
	01N22W12N03S	3/13/2019	38.46	----	----	No site access
		6/4/2019	38.46	107.60	-69.14	
		10/21/2019	38.46	----	----	No site access
		12/12/2019	38.46	----	----	No site access
	01N22W12R01S	3/13/2019	34.00	79.57	-45.57	
		6/4/2019	34.00	92.65	-58.65	
		10/21/2019	34.00	----	----	No site access
		12/12/2019	34.00	----	----	No site access
	01N22W14K01S	3/13/2019	33.97	----	----	Can't get tape past 50 feet
		6/4/2019	33.97	----	----	Can't get tape past 50 feet
		10/29/2019	33.97	----	----	Can't get tape past 50 feet
		12/19/2019	33.97	----	----	Can't get tape past 50 feet
	01N22W21B03S	3/13/2019	15.28	47.05	-31.77	
		6/4/2019	15.28	47.00	-31.72	
		10/29/2019	15.28	49.10	-33.82	
		12/11/2019	15.28	49.20	-33.92	
	01N22W24C02S	3/13/2019	29.10	35.70	-6.60	
		6/4/2019	29.10	42.05	-12.95	
		10/29/2019	29.10	45.10	-16.00	
		12/19/2019	29.10	37.30	-8.20	
	01N22W26K03S	3/13/2019	13.06	58.55	-45.49	
		6/4/2019	13.06	76.08	-63.02	
		10/29/2019	13.06	----	----	Pumping
		12/19/2019	13.06	78.10	-65.04	

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*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Oxnard	01N22W26M03S	3/13/2019	13.00	----	----	Pumping
		6/4/2019	13.00	73.70	-60.70	
		10/29/2019	13.00	100.10	-87.10	
		12/19/2019	13.00	74.00	-61.00	
	01N22W36B02S	3/13/2019	11.50	56.70	-45.20	
		6/4/2019	11.50	----	----	Pumping
		10/29/2019	11.50	----	----	Pumping
		12/19/2019	11.50	----	----	Pumping
	02N21W19A03S	3/25/2019	102.70	126.40	-23.70	
		6/17/2019	102.70	133.40	-30.70	
		10/1/2019	102.70	129.00	-26.30	
		12/13/2019	102.70	121.40	-18.70	
	02N21W19B02S	3/18/2019	101.80	123.27	-21.47	
		6/6/2019	101.80	135.20	-33.40	
		10/22/2019	101.80	97.90	3.90	
		12/13/2019	101.80	49.70	52.10	
	02N21W20F02S	3/25/2019	113.36	170.10	-56.74	
		6/17/2019	113.36	183.60	-70.24	
		10/1/2019	113.36	182.90	-69.54	
		12/16/2019	113.36	173.80	-60.44	
	02N21W20M06S	3/12/2019	92.09	158.30	-66.21	
		6/6/2019	92.09	170.80	-78.71	
		10/21/2019	92.09	183.70	-91.61	
		12/12/2019	92.09	160.90	-68.81	
	02N21W31P02S	3/13/2019	57.75	80.07	-22.32	
		6/4/2019	57.75	78.70	-20.95	
		10/23/2019	57.75	74.90	-17.15	
		12/11/2019	57.75	71.60	-13.85	
	02N21W31P03S	3/13/2019	55.17	116.50	-61.33	
		6/4/2019	55.17	130.20	-75.03	
		10/23/2019	55.17	159.90	-104.73	
		12/11/2019	55.17	123.20	-68.03	
	02N22W24P01S	3/18/2019	94.30	116.00	-21.70	
		6/6/2019	94.30	----	----	Pumping
		10/21/2019	94.30	109.60	-15.30	
		12/12/2019	94.30	112.10	-17.80	
	02N22W30K01S	3/13/2019	42.38	67.75	-25.37	
		6/4/2019	42.38	68.15	-25.77	
		10/29/2019	42.38	74.70	-32.32	
		12/11/2019	42.38	67.70	-25.32	
	02N22W31A01S	3/13/2019	42.30	66.00	-23.70	
		6/4/2019	42.30	65.33	-23.03	
		10/29/2019	42.30	----	----	No site access
		12/11/2019	42.30	----	----	No site access
	02N22W32Q03S	3/13/2019	40.10	66.09	-25.99	
		6/4/2019	40.10	65.05	-24.95	
		10/29/2019	40.10	67.80	-27.70	
		12/11/2019	40.10	62.60	-22.50	

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Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Oxnard	02N23W36C04S	3/13/2019	27.73	55.60	-27.87	
		6/4/2019	27.73	55.33	-27.60	
		10/29/2019	27.73	55.20	-27.47	
		12/11/2019	27.73	55.20	-27.47	
Piru	04N18W19R01S	3/11/2019	655.63	136.00	519.63	
		6/3/2019	655.63	----	----	No site access
		10/14/2019	655.63	94.80	560.83	
		12/27/2019	655.63	100.60	555.03	
	04N18W30J05S	3/11/2019	623.30	78.66	544.64	
		6/3/2019	623.30	----	----	Pumping
		10/15/2019	623.30	54.10	569.20	
		12/24/2019	623.30	60.90	562.40	
	04N19W25C02S*	3/11/2019	611.09	94.57	516.52	
		6/3/2019	611.09	75.00	536.09	
		10/14/2019	611.09	69.80	541.29	
		12/24/2019	611.09	68.00	543.09	
	04N19W25K04S	3/11/2019	593.97	47.75	546.22	
		6/3/2019	593.97	48.60	545.37	
		10/14/2019	593.97	46.90	547.07	
		12/24/2019	593.97	46.70	547.27	
	04N19W26P01S	3/11/2019	563.00	54.25	508.75	
		6/3/2019	563.00	43.50	519.50	
		10/15/2019	563.00	----	----	Pumping
		12/27/2019	563.00	26.10	536.90	
	04N19W34K01S	3/11/2019	519.51	23.85	495.66	
		6/3/2019	519.51	17.67	501.84	
		10/15/2019	519.51	12.50	507.01	
		12/24/2019	519.51	----	----	Owner will not allow access
	04N19W35L02S	3/11/2019	541.08	32.10	508.98	
		6/3/2019	541.08	25.10	515.98	
		10/15/2019	541.08	16.30	524.78	
		12/24/2019	541.08	----	----	Pumping
Pleasant Valley	01N21W01M02S	3/15/2019	96.17	----	----	Pumping
		6/4/2019	96.17	----	----	Pumping
		10/28/2019	96.17	----	----	Pumping
		12/12/2019	96.17	----	----	No site access
	01N21W02J02S	3/15/2019	89.51	85.42	4.09	
		6/5/2019	89.51	88.00	1.51	
		10/24/2019	89.51	117.80	-28.29	
		12/12/2019	89.51	95.90	-6.39	
	01N21W02P01S	3/15/2019	67.98	103.50	-35.52	
		6/4/2019	67.98	114.25	-46.27	
		10/28/2019	67.98	151.90	-83.92	
		12/12/2019	67.98	149.00	-81.02	
	01N21W03C01S*	3/15/2019	72.28	153.90	-81.62	
		6/5/2019	72.28	173.46	-101.18	
		10/24/2019	72.28	187.70	-115.42	
		12/11/2019	72.28	170.20	-97.92	

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Pleasant Valley	01N21W04K01S	3/15/2019	47.52	109.55	-62.03	
		6/6/2019	47.52	121.32	-73.80	
		10/28/2019	47.52	167.10	-119.58	
		12/12/2019	47.52	138.60	-91.08	
	01N21W09J03S	3/9/2019	30.56	105.00	-74.44	
		5/27/2019	30.56	118.00	-87.44	
		10/28/2019	30.56	----	----	Pumping
		12/2/2019	30.56	106.00	-75.44	
	01N21W10G01S	3/15/2019	38.72	101.33	-62.61	
		6/6/2019	38.72	112.08	-73.36	
		10/28/2019	38.72	----	----	Pumping
		12/11/2019	38.72	132.10	-93.38	
	01N21W14A01S	3/15/2019	50.11	21.35	28.76	
		6/4/2019	50.11	20.85	29.26	
		10/28/2019	50.11	24.60	25.51	
		12/19/2019	50.11	25.60	24.51	
	01N21W15H01S	3/15/2019	33.17	14.83	18.34	
		6/4/2019	33.17	14.83	18.34	
		10/28/2019	33.17	20.50	12.67	
		12/11/2019	33.17	17.70	15.47	
	02N20W19M05S	3/18/2019	200.47	196.10	4.37	
		6/5/2019	200.47	199.65	0.82	
		10/22/2019	200.47	198.90	1.57	
		12/13/2019	200.47	197.20	3.27	
	02N21W35M02S	3/15/2019	90.60	158.80	-68.20	
		6/5/2019	90.60	169.40	-78.80	
		10/24/2019	90.60	204.00	-113.40	
		12/11/2019	90.60	----	----	No site access
	02N21W36N01S	3/15/2019	111.18	102.80	8.38	
		6/5/2019	111.18	105.85	5.33	
		10/24/2019	111.18	117.10	-5.92	
		12/11/2019	111.18	121.90	-10.72	
Santa Paula	02N22W02C01S*	3/12/2019	184.38	45.10	139.28	
		6/3/2019	184.38	44.49	139.89	
		10/17/2019	184.38	48.40	135.98	
		12/5/2019	184.38	47.50	136.88	
	02N22W03K02S	3/12/2019	248.75	136.70	112.05	
		6/3/2019	248.75	132.34	116.41	
		10/17/2019	248.75	133.40	115.35	
		12/5/2019	248.75	134.20	114.55	
	02N22W03M02S	3/11/2019	291.50	214.80	76.70	
		6/4/2019	291.50	211.15	80.35	
		10/17/2019	291.50	209.90	81.60	
		12/10/2019	291.50	210.70	80.80	
	03N21W09K02S	3/12/2019	362.18	168.17	194.01	
		6/3/2019	362.18	169.40	192.78	
		10/31/2019	362.18	175.70	186.48	
		12/5/2019	362.18	171.70	190.48	

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** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Santa Paula	03N21W17Q01S	3/12/2019	283.35	98.51	184.84	
		6/3/2019	283.35	100.57	182.78	
		10/31/2019	283.35	113.60	169.75	
		12/5/2019	283.35	100.80	182.55	
	03N21W19R01S	3/11/2019	235.39	78.60	156.79	
		6/4/2019	235.39	78.70	156.69	
		10/31/2019	235.39	90.20	145.19	
		12/5/2019	235.39	73.80	161.59	
	03N21W30F01S	3/12/2019	221.21	70.75	150.46	
		6/3/2019	221.21	71.00	150.21	
		10/18/2019	221.21	75.40	145.81	
		12/5/2019	221.21	70.80	150.41	
	03N22W36K05S	3/12/2019	180.89	42.10	138.79	
		6/3/2019	180.89	39.50	141.39	
		10/17/2019	180.89	43.80	137.09	
		12/10/2019	180.89	39.00	141.89	
	02N18W04R02S	3/18/2019	870.00	52.70	817.30	
		6/5/2019	870.00	53.55	816.45	
		10/16/2019	870.00	56.00	814.00	
		12/24/2019	870.00	53.50	816.50	
	02N18W10A02S					
Tierra Rejada	02N19W10R01S	3/18/2019	619.29	149.20	470.09	
		6/5/2019	619.29	150.50	468.79	
		10/16/2019	619.29	----	----	Pumping
		12/27/2019	619.29	71.90	547.39	
	02N19W12M03S	3/18/2019	718.95	101.33	617.62	
		6/5/2019	718.95	----	----	Pumping
		10/16/2019	718.95	----	----	Pumping
		12/24/2019	718.95	101.80	617.15	
	02N19W14P01S	3/18/2019	678.12	27.50	650.62	
		6/5/2019	678.12	28.20	649.92	
		10/16/2019	678.12	31.60	646.52	
		12/27/2019	678.12	26.10	652.02	

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*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
UNDEFINED	01N19W02L01S	4/2/2019	945.42	102.80	842.62	
		6/10/2019	945.42	43.80	901.62	
		10/4/2019	945.42	----	----	No site access
		12/9/2019	945.42	----	----	No site access
	01N19W14K04S	4/2/2019	908.79	20.30	888.49	
		6/10/2019	908.79	21.10	887.69	
		10/4/2019	908.79	23.90	884.89	
		12/9/2019	908.79	23.80	884.99	
	01N19W15E01S	4/2/2019	903.53	16.10	887.43	
		6/10/2019	903.53	18.50	885.03	
		10/4/2019	903.53	23.60	879.93	
		12/9/2019	903.53	24.50	879.03	
	01N20W24H02S	4/2/2019	1,126.54	----	----	too much rust
		6/10/2019	1,126.54	----	----	too much rust
		10/4/2019	1,126.54	----	----	too much rust
		12/9/2019	1,126.54	----	----	too much rust
	04N22W10K02S	3/26/2019	1,325.90	15.20	1,310.70	
		6/12/2019	1,325.90	20.00	1,305.90	
		9/24/2019	1,325.90	22.80	1,303.10	
		12/3/2019	1,325.90	22.60	1,303.30	
	04N23W14M04S	3/27/2019	554.50	----	----	Flowing
		6/12/2019	554.50	----	----	Flowing
		9/25/2019	554.50	----	----	Flowing
		12/10/2019	554.50	----	----	Flowing
	04N23W16P01S	3/20/2019	619.89	71.00	548.89	
		6/12/2019	619.89	70.30	549.59	
		9/25/2019	619.89	71.10	548.79	
		12/3/2019	619.89	71.90	547.99	
	04N23W28G01S	3/28/2019	402.37	10.10	392.27	
		6/12/2019	402.37	11.40	390.97	
		9/24/2019	402.37	23.70	378.67	
		12/10/2019	402.37	5.50	396.87	
	04N23W33M03S	3/20/2019	331.80	12.80	319.00	
		6/11/2019	331.80	13.70	318.10	
		9/23/2019	331.80	16.60	315.20	
		12/2/2019	331.80	16.90	314.90	
	04N24W13J04S	3/20/2019	626.45	----	----	No site access
		6/20/2019	626.45	6.00	620.45	
		9/26/2019	626.45	6.80	619.65	
		12/2/2019	626.45	----	----	No site access
	04N24W13N01S	3/20/2019	642.12	----	----	No site access
		6/20/2019	642.12	0.00	642.12	
		9/26/2019	642.12	1.60	640.52	
		12/2/2019	642.12	----	----	No site access

*Denotes basin key water level well
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Upper Ojai Valley	04N22W09Q02S	3/27/2019	1,278.80	----	----	measure port blocked
		6/12/2019	1,278.80	----	----	measure port blocked
		9/24/2019	1,278.80	19.50	1,259.30	
		12/3/2019	1,278.80	20.10	1,258.70	
	04N22W11P02S	3/26/2019	1,420.60	6.60	1,414.00	
		6/12/2019	1,420.60	13.40	1,407.20	
		10/31/2019	1,420.60	19.50	1,401.10	
		12/3/2019	1,420.60	19.50	1,401.10	
	04N22W12F04S	3/26/2019	1,616.90	133.20	1,483.70	
		6/12/2019	1,616.90	145.30	1,471.60	
		9/24/2019	1,616.90	138.80	1,478.10	
		12/3/2019	1,616.90	39.80	1,577.10	
Ventura River - Lower	03N23W32Q03S	4/4/2019	50.86	27.60	23.26	
		6/12/2019	50.86	----	----	No site access
		9/24/2019	50.86	30.50	20.36	
		12/3/2019	50.86	----	----	No site access
	03N23W32Q07S	4/4/2019	46.10	24.20	21.90	
		6/12/2019	46.10	----	----	No site access
		9/24/2019	46.10	25.80	20.30	
		12/3/2019	46.10	----	----	No site access
Ventura River - Upper	03N23W05B01S	3/20/2019	293.20	38.60	254.60	
		6/11/2019	293.20	45.40	247.80	
		9/23/2019	293.20	47.30	245.90	
		12/2/2019	293.20	47.90	245.30	
	03N23W08B07S	3/20/2019	239.19	14.00	225.19	
		6/11/2019	239.19	15.20	223.99	
		9/23/2019	239.19	15.70	223.49	
		12/2/2019	239.19	16.10	223.09	
	04N23W03M01S	3/27/2019	760.85	92.60	668.25	
		6/12/2019	760.85	95.60	665.25	
		9/25/2019	760.85	101.50	659.35	
		12/3/2019	760.85	----	----	No site access
	04N23W04J01S	3/27/2019	713.04	54.80	658.24	
		6/12/2019	713.04	58.60	654.44	
		9/25/2019	713.04	64.40	648.64	
		12/10/2019	713.04	64.20	648.84	
	04N23W09B01S	3/27/2019	662.30	24.00	638.30	
		6/12/2019	662.30	36.90	625.40	
		9/25/2019	662.30	----	----	Pumping
		12/3/2019	662.30	49.80	612.50	
	04N23W15A02S	3/28/2019	680.90	96.13	584.77	
		6/11/2019	680.90	99.50	581.40	
		9/23/2019	680.90	93.10	587.80	
		12/2/2019	680.90	93.40	587.50	
	04N23W15D02S	3/27/2019	634.30	132.90	501.40	
		6/11/2019	634.30	116.00	518.30	
		9/23/2019	634.30	120.40	513.90	
		12/2/2019	634.30	128.10	506.20	

* - Denotes basin key water level well.
** - feet msl
*** - feet bgs

Appendix C – Groundwater Level Measurement Data

Basin/Subbasin	SWN	Date	RP Elev.**	Depth***	WL Elev.**	Notes
Ventura River - Upper	04N23W16C04S	3/20/2019	569.10	39.30	529.80	
		6/13/2019	569.10	37.10	532.00	
		9/25/2019	569.10	48.00	521.10	
		12/3/2019	569.10	48.60	520.50	
	04N23W20A01S	3/20/2019	488.89	----	----	Casing wet
		6/13/2019	488.89	9.80	479.09	
		9/23/2019	488.89	21.10	467.79	
		12/2/2019	488.89	21.60	467.29	
	04N23W29F02S	3/20/2019	396.58	14.30	382.28	
		6/13/2019	396.58	16.10	380.48	
		9/23/2019	396.58	23.30	373.28	
		12/2/2019	396.58	32.80	363.78	
	05N23W33B03S	3/27/2019	829.00	21.90	807.10	
		6/12/2019	829.00	26.30	802.70	
		9/25/2019	829.00	34.90	794.10	
		12/10/2019	829.00	26.90	802.10	
	05N23W33G01S	3/27/2019	816.21	18.80	797.41	
		6/12/2019	816.21	20.60	795.61	
		9/25/2019	816.21	23.60	792.61	
		12/3/2019	816.21	22.80	793.41	

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** - feet msl
*** - feet bgs

Appendix D – Water Quality Section

TABLES | Page

General Minerals Table D-1

Mineral	Abbreviation	Reported Units	Laboratory Analytical Method
Boron	B	mg/l	EPA 200.7
Bicarbonate	HCO_3^-	mg/l	SM23320B
Calcium	Ca	mg/l	EPA 200.7
Copper	Cu	µg/l	EPA 200.7
Carbonate	CO_3^{2-}	mg/l	SM23320B
Chloride	Cl^-	mg/l	EPA 300.0
Electrical Conductivity	eC	µmhos/cm	SM2510B
Fluoride	F^-	mg/l	EPA 300.0
Iron	Fe	µg/l	EPA 200.7
Potassium	K	mg/l	EPA 200.7
Magnesium	Mg	mg/l	EPA 200.7
Manganese	Mn	µg/l	EPA 200.7
Nitrate	NO_3^-	mg/l	SM4500NO3F
Sodium	Na	mg/l	EPA 200.7
Sulfate	SO_4^{2-}	mg/l	EPA 300.0
Total Dissolved Solids	TDS	mg/l	EPA 200.7
Zinc	Zn	µg/l	EPA 200.7
pH	pH	units	SM4500-H B

Table D-1 General Minerals

Basin/Subbasin	SWN	Date	B	HCO_3^-	Ca	CO_3^{2-}	Cl^-	Cu	E C	F^-	Fe	K	Mg	Mn	NO_3^-	Na	SO_4^{2-}	TDS	ZN	pH
Arroyo Santa Rosa Valley	02N20W26C02S	11/7/2019	0.3	370	82	ND	180	ND	1740	0.3	ND	2	74	ND	80.1	112	252	1140	ND	7.4
	02N20W25C06S	11/12/2019	0.3	260	63	ND	141	ND	1260	0.3	30	2	50	ND	26.5	94	160	790	ND	7.3
	02N19W19P02S	11/12/2019	0.2	340	51	ND	106	ND	1220	0.2	ND	2	60	ND	64.3	65	113	760	ND	7.8
	02N20W23R01S	11/7/2019	0.3	320	81	ND	179	ND	1620	0.3	ND	2	67	ND	101	108	191	1040	ND	7.8
	02N20W25C07S	11/12/2019	0.2	360	68	ND	143	ND	1470	0.2	ND	2	75	ND	69.6	79	171	950	ND	7.5
	02N19W20M04S	11/12/2019	0.1	380	78	ND	128	ND	1280	0.3	ND	3	74	ND	23.7	72	127	830	ND	7.6
	02N19W20L01S	11/7/2019	0.2	410	96	ND	127	ND	1490	0.2	ND	ND	87	ND	76.3	80	177	970	ND	7.6
	02N20W23G03S	11/7/2019	0.1	310	58	ND	155	ND	1340	0.2	ND	3	66	ND	81.1	72	98.3	810	ND	7.4
Carpinteria	04N25W35G01S	9/10/2019	0.4	450	85	ND	91	ND	950	0.6	ND	1	55	ND	12.7	112	268	670	ND	7.7
	04N25W25N06S	9/10/2019	0.4	230	67	ND	31	40	1460	0.4	ND	3	55	ND	1	50	260	950	20	7.2
Conejo	01N19W08G02S	11/21/2019	0.2	370	125	ND	135	ND	1830	ND	ND	4	117	20	ND	109	494	1350	ND	7.8
	01N20W03J01S (Outside Basin)	9/20/2019	0.2	390	70	ND	121	ND	1290	0.2	ND	ND	78	ND	11.8	56	150	810	70	7
Cuddy Ranch Area	08N20W04N02S	11/19/2019	0.1	320	72	ND	25	10	617	0.2	ND	3	10	ND	1.4	52	15.5	360	ND	7
Cuyama Valley	09N23W30E05S	11/19/2019	0.7	350	41	ND	238	ND	1760	1	ND	4	15	ND	5.3	239	196	1050	ND	7.4
	08N24W17G02S	11/19/2019	0.4	280	17	ND	93	ND	1180	0.4	290	3	2	10	ND	230	189	720	ND	8.2
	09N24W33J03S	11/19/2019	0.5	300	39	ND	126	ND	1420	0.6	ND	4	12	ND	11.8	188	232	880	ND	7.8
	07N23W15P01S	11/19/2019	0.2	210	258	ND	8	ND	2200	1.2	ND	4	122	ND	2.9	95	1160	2000	ND	7.5
Fillmore	03N21W01P08S	9/12/2019	0.6	290	155	ND	49	ND	1500	0.6	ND	3	43	290	21.3	80	497	1080	ND	7.2
	04N20W36D07S	11/20/2019	0.6	300	134	ND	71	ND	1510	0.8	ND	6	59	20	13.5	97	505	1170	ND	7.5
	03N20W02R05S	9/12/2019	1.4	420	294	ND	290	ND	3210	0.6	ND	9	96	30	30.4	229	1050	2400	ND	6.8
	03N20W09D01S	9/12/2019	0.8	320	164	ND	79	ND	1780	0.6	ND	6	65	ND	39.5	107	587	1290	ND	7.1
	03N19W06D02S	11/14/2019	0.6	270	99	ND	67	ND	1420	0.7	ND	5	54	ND	13.4	98	425	1030	ND	7.4
	04N19W31F01S	9/11/2019	0.5	250	109	ND	65	ND	1330	0.7	ND	4	44	ND	13.7	79	382	970	ND	7.5
	04N20W32R03S	11/4/2019	0.2	300	192	ND	55	ND	1690	0.5	ND	3	50	ND	70.4	94	529	1310	ND	7.1
	03N19W06D03S	11/14/2019	0.6	260	92	ND	54	ND	1340	0.7	ND	5	52	ND	7.2	96	405	980	ND	7.5
	04N20W26D03S	11/14/2019	0.4	260	177	ND	51	ND	1230	0.5	ND	2	29	ND	43.4	49	311	890	ND	7.1
	04N19W19N01S	9/17/2019	0.5	310	201	ND	122	ND	1630	0.5	ND	4	74	280	51.7	102	426	1280	ND	7.2
	04N20W26F01S	11/4/2019	0.9	270	125	ND	51	ND	1270	0.7	ND	2	32	ND	22	72	331	880	ND	7.1
	04N20W36D06S	9/12/2019	0.7	360	189	ND	71	ND	1850	0.6	ND	4	73	ND	23.1	96	634	1360	160	7
	04N20W31P01S	9/17/2019	0.1	400	158	ND	49	ND	1520	0.5	ND	2	56	ND	75.9	63	359	1090	ND	7
	04N20W36P04S	9/11/2019	0.5	280	128	ND	55	ND	1460	0.7	ND	5	49	ND	23	90	465	1080	640	7.3
	04N20W31H04S	9/17/2019	0.1	330	112	ND	22	ND	1060	0.4	ND	2	33	ND	23.8	37	232	740	ND	7.4

Table D-1 General Minerals (cont.)

Basin/Subbasin	SWN	Date	B	HCO_3^-	Ca	CO_3^{2-}	Cl^-	Cu	E C	F^-	Fe	K	Mg	Mn	NO_3^-	Na	SO_4^{2-}	TDS	Zn	pH
Hidden Valley	01N20W25C07S	11/21/2019	0.2	400	190	ND	292	ND	2020	ND	ND	2	74	ND	16	82	237	1360	420	7
	01N19W19H03S	9/20/2019	0.1	350	65	ND	43	ND	906	0.1	ND	3	43	40	ND	54	120	540	70	7.5
	01N19W19L02S	11/21/2019	ND	330	51	ND	54	ND	957	0.1	ND	3	53	ND	ND	44	151	600	ND	7.8
	01N19W29E05S	9/20/2019	ND	370	114	ND	72	ND	1140	ND	ND	ND	36	ND	2.7	65	174	700	ND	7
	01N20W25F04S	11/21/2019	0.1	230	21	ND	31	ND	567	ND	ND	1	5	50	0.6	104	39.5	320	280	8
Las Posas Valley – East Las Posas Management Area	02N20W09Q07S	10/25/2019	0.7	260	192	ND	191	ND	2220	0.3	ND	5	66	230	22.5	191	620	1600	ND	7.1
	03N19W29K06S	10/30/2019	ND	90	47	ND	41	ND	485	0.3	ND	2	9	ND	70	31	30	410	ND	6.6
	03N19W30E06S	11/4/2019	ND	160	45	ND	14	ND	471	0.2	ND	2	10	ND	5.8	30	73.6	320	20	7.1
	02N20W04B01S	11/8/2019	ND	200	58	ND	14	ND	676	0.3	ND	4	20	40	ND	37	148	450	ND	7.8
	03N20W26H01S	11/25/2019	0.1	240	69	ND	57	ND	835	0.5	ND	2	22	ND	32.1	45	106	560	ND	7.3
	03N20W34L02S	11/8/2019	0.3	250	126	ND	69	ND	1270	0.3	ND	5	27	10	ND	82	304	850	ND	7.3
	02N20W01Q01S	9/25/2019	0.8	290	154	ND	147	ND	1730	0.3	ND	2	40	ND	28.4	154	426	1250	30	7.3
	02N20W04R03S	10/25/2019	0.4	260	227	ND	151	ND	1870	0.2	ND	5	42	ND	ND	117	528	1360	ND	7.1
	02N20W04F01S	11/8/2019	0.1	210	107	ND	76	ND	1180	0.3	ND	5	33	ND	ND	48	322	880	ND	7.3
	03N20W36P01S	11/8/2019	0.2	200	88	ND	25	ND	746	0.2	ND	3	17	ND	13.6	42	162	490	ND	7.2
	03N20W28J04S	11/4/2019	0.2	250	59	ND	43	ND	869	0.6	ND	3	28	ND	53.6	67	126	570	70	7.1
	03N20W34G01S	11/6/2019	ND	200	68	ND	12	ND	634	0.3	160	4	17	140	ND	31	127	410	ND	7.4
	03N19W29K08S	11/1/2019	0.1	220	66	ND	29	ND	696	0.3	ND	3	16	ND	18.5	40	128	460	50	6.9
	02N19W07B02S	9/25/2019	0.9	250	109	ND	156	ND	1840	0.7	ND	3	48	20	6.2	204	492	1310	ND	7.3
	02N20W16B06S	10/3/2019	0.8	250	144	ND	182	ND	1980	0.4	ND	5	62	30	0.5	187	558	1370	30	7.2
Las Posas Valley – West Las Posas Management Area	02N20W17L01S	10/9/2019	0.6	270	164	ND	159	ND	1930	0.3	ND	5	53	260	19.1	166	531	1360	ND	7.2
	02N21W15M04S	9/25/2019	0.3	280	123	ND	83	ND	1490	0.2	ND	5	43	70	14.7	134	425	1070	ND	7.7
	02N20W06J01S	11/25/2019	ND	290	78	ND	17	ND	918	0.3	ND	6	33	70	ND	50	208	650	ND	7.3
	02N21W10Q04S	11/4/2019	0.2	320	107	ND	35	ND	1150	0.3	ND	5	38	80	ND	72	285	770	20	7.4
	02N21W17F05S	10/29/2019	0.6	320	97	ND	65	ND	1540	0.2	ND	6	39	40	0.7	184	413	1030	ND	7.4
	02N21W18H01S	10/29/2019	0.9	320	319	ND	128	ND	2860	0.4	ND	8	112	ND	162	223	1010	2340	ND	6.8
	02N21W12H02S	11/13/2019	0.2	230	75	ND	68	ND	1030	0.2	ND	4	29	ND	38.4	77	167	610	190	7.5
	02N21W18H14S	10/29/2019	0.4	300	94	ND	49	ND	1380	0.1	ND	7	41	50	ND	161	354	880	ND	7.5
	02N21W11A02S	10/29/2019	0.3	260	218	ND	149	ND	2010	0.3	ND	4	79	ND	139	117	491	1500	ND	7
	02N21W17N03S	10/25/2019	0.4	300	95	ND	69	ND	1190	0.3	ND	3	31	170	13.4	107	242	770	ND	7.2
	02N21W13A01S	10/3/2019	ND	230	71	ND	14	ND	750	0.3	ND	3	21	ND	3.5	52	161	470	ND	7.6
	02N21W04Q02S	11/4/2019	0.2	270	62	ND	58	ND	892	0.4	ND	3	26	ND	36.4	76	117	600	ND	7.2
	02N20W07R03S	10/25/2019	ND	180	55	ND	15	ND	523	0.3	ND	2	13	90	ND	33	92.9	320	ND	7.6
	02N21W09N01S	10/29/2019	0.5	330	88	ND	68	ND	1410	0.2	ND	6	36	50	2	179	326	920	ND	7.3
	02N21W11A03S	10/29/2019	0.2	300	77	ND	35	ND	943	0.2	ND	6	32	60	ND	76	181	560	ND	7.4
	03N21W35P02S	11/4/2019	0.2	260	85	ND	80	ND	1150	0.4	ND	4	38	ND	63	88	193	850	ND	7
	02N21W18H12S	10/29/2019	0.6	260	133	ND	54	ND	1400	0.5	ND	5	48	120	0.4	108	423	980	ND	7.3
	02N21W08H03S	10/29/2019	0.4	300	84	ND	67	ND	1150	0.3	ND	4	34	30	17.3	120	222	730	ND	7.3
	02N20W17L01S	10/9/2019	0.6	270	164	ND	159	ND	1930	0.3	ND	5	53	260	19.1	166	531	1360	ND	7.2

Table D-1 General Minerals (cont.)

Basin/Subbasin	SWN	Date	B	HCO_3^-	Ca	CO_3^{2-}	Cl^-	Cu	E C	F^-	Fe	K	Mg	Mn	NO_3^-	Na	SO_4^{2-}	TDS	Zn	pH
Lockwood Valley	08N21W29R09S	11/19/2019	0.9	230	92	ND	6	ND	859	0.9	ND	3	24	ND	9.6	67	224	580	70	7.8
	08N21W33R03S	11/19/2019	0.9	250	96	ND	17	ND	792	0.5	ND	2	23	ND	7.1	45	175	510	30	7.6
	08N21W29N02S	11/19/2019	2.1	250	121	ND	6	ND	1330	0.9	ND	4	58	ND	1.1	62	505	1020	ND	7.6
	08N21W29R07S	11/19/2019	14.1	360	52	ND	12	ND	1190	1.1	ND	3	11	ND	1.3	204	282	780	60	8
Mound	02N22W19M04S	11/8/2019	0.6	280	160	ND	62	ND	1610	0.4	ND	8	43	ND	16.4	122	512	1200	ND	7.3
	02N23W13K03S	9/4/2019	0.6	350	271	ND	110	ND	2730	0.4	ND	7	75	150	40.5	201	1080	2240	ND	7.2
Ojai Valley	04N22W04P05S	11/6/2019	ND	260	111	ND	27	ND	950	0.4	ND	2	30	ND	38.9	39	203	660	ND	7
	04N22W05D03S	11/6/2019	ND	280	122	ND	34	ND	1010	0.3	30	1	31	20	18	35	214	670	ND	6.9
	04N22W04Q01S	10/10/2019	ND	240	119	ND	32	ND	944	0.4	ND	1	33	ND	48.3	39	241	660	140	7.4
	04N23W01J03S	11/6/2019	ND	320	65	ND	25	ND	919	0.7	ND	ND	15	100	1.3	105	154	550	ND	7.4
	04N23W12B03S	11/6/2019	ND	300	171	ND	363	ND	2050	0.4	ND	2	37	1160	ND	152	149	1250	ND	7.2
	04N23W01K02S	10/10/2019	ND	370	109	ND	47	ND	1030	0.7	ND	ND	26	ND	ND	71	210	670	ND	7.2
	04N23W12H02S	11/26/2019	ND	300	97	ND	24	ND	983	0.3	ND	2	27	ND	33.5	33	203	700	ND	7.4
	05N22W33J01S	11/6/2019	ND	250	106	ND	15	ND	846	0.3	ND	2	23	200	ND	30	195	570	780	8
Oxnard – Forebay Management Area	02N22W23H07S	10/29/2019	0.8	300	222	ND	72	ND	2120	0.6	ND	6	87	ND	98	104	712	1670	ND	7.1
	02N21W07P04S	10/24/2019	0.5	290	156	ND	66	ND	1620	0.4	ND	6	58	130	ND	121	532	1200	ND	7.5
Oxnard	01N21W29B03S	10/16/2019	0.6	290	139	ND	105	10	1490	0.4	50	5	50	970	ND	121	362	1050	30	7.4
	01N21W28G01S	11/6/2019	0.6	370	307	ND	527	ND	3370	0.2	480	6	102	1620	ND	227	622	2440	ND	6.9
	01N21W04D04S	10/2/2019	0.4	340	58	10	106	ND	1240	0.3	ND	8	23	30	ND	154	174	790	ND	7.7
	01N22W24C03S	10/16/2019	0.7	240	130	ND	67	ND	1250	0.6	50	5	38	190	ND	87	402	920	ND	7.5
	01N21W33A01S	11/6/2019	0.4	310	119	ND	278	ND	1860	0.2	70	6	60	260	ND	153	213	1170	ND	7.2
	01N21W08R01S	10/2/2019	0.3	250	75	ND	63	ND	1100	0.3	ND	5	27	20	ND	108	236	740	ND	7.6
	01N22W24B04S	10/16/2019	0.7	240	134	ND	42	ND	1220	0.4	60	5	39	180	ND	93	358	890	ND	7.5
	01N21W20K03S	10/16/2019	0.5	270	68	ND	73	ND	1090	0.3	70	5	26	30	ND	120	198	700	ND	7.7
	01N22W24M03S	10/16/2019	0.7	240	156	ND	119	ND	1460	0.5	ND	5	46	220	1.5	94	342	1030	ND	7.4
	01N22W36B02S	10/24/2019	0.5	280	90	ND	120	ND	1320	0.4	ND	7	32	100	ND	118	262	840	ND	7.6
	01N21W28D01S	10/2/2019	0.4	260	74	ND	78	ND	1170	0.2	ND	6	32	10	ND	107	266	810	ND	7.7
	02N22W31B01S	9/4/2019	0.7	240	131	ND	53	ND	1440	0.7	ND	4	44	ND	20	93	453	1070	ND	7.4
	01N22W12N03S	10/24/2019	0.4	250	100	ND	39	ND	1240	0.2	ND	6	34	130	ND	102	376	860	ND	7.6
	01N21W22C01S	10/2/2019	0.4	270	58	ND	109	ND	1220	0.2	ND	4	39	20	ND	128	202	760	ND	7.7
	02N21W20Q05S	10/29/2019	0.6	280	102	ND	68	ND	1370	0.3	ND	6	36	40	1.9	135	351	920	ND	7.5
	01N21W28H03S	11/6/2019	0.5	340	71	ND	160	ND	1430	0.2	40	5	40	40	ND	151	167	850	ND	7.5
	02N22W32C04S	9/4/2019	0.6	250	145	ND	56	ND	1490	0.6	ND	5	49	ND	33.1	75	439	1060	ND	7.3
	02N22W19J03S	11/13/2019	0.6	250	132	ND	53	ND	1440	0.6	ND	4	39	140	ND	105	475	1040	ND	7.5
	01N22W06R02S	9/4/2019	0.8	270	194	ND	70	ND	1830	0.6	ND	6	65	10	5.1	127	652	1450	ND	7.5

Table D-1 General Minerals (cont.)

Basin/Subbasin	SWN	Date	B	HCO_3^-	Ca	CO_3^{2-}	Cl^-	Cu	E C	F^-	Fe	K	Mg	Mn	NO_3^-	Na	SO_4^{2-}	TDS	Zn	pH
Oxnard	01N21W19P03S	10/16/2019	0.2	320	54	ND	52	ND	805	0.3	ND	4	19	ND	ND	85	71.3	500	ND	7.7
	01N22W03F05S	9/4/2019	0.7	250	130	ND	49	ND	1370	0.6	ND	4	43	20	12.6	89	439	990	ND	7.5
	02N23W25M01S	9/4/2019	0.5	260	149	ND	55	ND	1450	0.4	ND	5	41	290	2.6	106	465	1040	ND	7.2
	01N21W21H02S	10/2/2019	0.5	290	69	20	117	ND	1340	0.2	ND	5	35	10	ND	151	258	870	ND	7.6
	01N22W06B01S	9/4/2019	0.8	310	196	ND	70	ND	1900	0.6	ND	5	61	ND	7.2	123	682	1470	ND	7.2
	01N22W12M01S	10/16/2019	0.9	280	217	ND	43	ND	1920	0.6	60	7	70	380	ND	145	396	1530	40	7.4
	02N22W30F03S	11/13/2019	0.6	250	92	ND	44	ND	1310	0.6	ND	5	35	ND	ND	91	388	920	ND	7.5
	01N21W29K02S	10/17/2019	0.7	280	119	ND	54	ND	1270	0.3	50	5	40	730	ND	96	339	920	ND	7.3
	01N22W26P02S	10/17/2019	0.4	260	90	ND	42	ND	1130	0.2	ND	7	37	ND	ND	95	304	770	ND	7.7
	01N22W26M03S	10/17/2019	0.5	200	126	ND	42	ND	5590	0.2	ND	7	38	160	2160	96	337	1290	ND	7.5
	01N22W26D05S	10/17/2019	0.5	240	130	ND	55	ND	1330	0.3	ND	6	41	210	3.5	96	366	950	ND	7.4
	01N22W25K02S	10/24/2019	0.6	240	99	ND	50	ND	1150	0.4	50	4	39	470	ND	84	310	770	ND	7.6
	01N22W25K01S	10/24/2019	0.7	220	864	ND	1770	ND	6810	0.4	100	16	322	2100	ND	545	578	5630	ND	7.3
	02N22W24P01S	10/25/2019	0.5	240	119	ND	46	ND	1260	0.6	ND	4	43	ND	10.4	82	391	900	40	7.2
	02N22W19P01S	11/8/2019	0.6	280	163	ND	84	ND	1940	0.4	ND	6	55	20	24.7	155	690	1570	ND	7.1
	01N22W21B06S	10/30/2019	0.4	270	58	ND	47	ND	1160	0.3	ND	7	33	20	ND	125	293	770	ND	7.6
	02N22W25E01S	10/29/2019	1	300	277	ND	121	ND	2650	0.6	ND	7	119	ND	26.7	174	1030	2160	ND	6.9
	02N22W24P02S	10/25/2019	0.6	240	123	ND	48	ND	1300	0.7	ND	4	43	ND	10	89	399	940	ND	7.1
	02N22W36E04S	9/4/2019	0.9	280	196	ND	62	ND	2020	0.6	ND	6	70	ND	69.3	119	749	1670	ND	7.3
	01N22W03F07S	9/4/2019	0.7	320	227	ND	83	ND	2010	0.5	ND	6	76	20	14	110	722	1600	ND	7.2
	02N22W36E02S	9/4/2019	0.6	240	135	ND	49	ND	1390	0.6	ND	5	43	ND	9.1	70	449	990	ND	7.4
	02N22W36E03S	9/4/2019	0.6	240	126	ND	46	ND	1300	0.6	120	4	38	50	ND	92	416	910	ND	7.1
	02N22W36E05S	9/4/2019	0.9	280	206	ND	65	ND	2040	0.6	ND	6	77	30	51.2	108	795	1660	ND	7.3
	01N22W16D04S	10/30/2019	0.6	230	101	ND	41	ND	1190	0.8	ND	4	34	20	ND	85	366	830	ND	7.2
Piru	04N19W25H01S	9/11/2019	0.5	290	138	ND	107	ND	1560	0.7	ND	5	48	ND	25.1	95	368	1080	ND	7.2
	04N19W25M03S	9/11/2019	0.8	410	276	ND	66	30	2730	1	ND	6	131	810	29.5	169	1130	2370	ND	7.1
	04N18W30A03S	9/17/2019	0.7	320	143	ND	42	ND	1710	0.7	ND	7	55	ND	3.2	140	591	1240	ND	7.3
	04N18W30J04S	9/11/2019	0.5	250	89	ND	94	ND	1250	0.5	ND	5	36	ND	11.1	103	270	830	180	7.6
	04N19W26H01S	9/11/2019	0.7	300	134	ND	104	ND	1660	0.7	ND	5	58	ND	23.6	111	441	1180	ND	7.5
	04N19W34J04S	9/11/2019	0.5	270	139	ND	65	ND	1520	0.7	ND	5	56	ND	25.2	81	471	1130	ND	7.2

Table D-1 General Minerals (cont.)

Basin/Subbasin	SWN	Date	B	HCO_3^-	Ca	CO_3^{2-}	Cl^-	Cu	E C	F^-	Fe	K	Mg	Mn	NO_3^-	Na	SO_4^{2-}	TDS	ZN	pH
Pleasant Valley	01N21W12D01S	10/9/2019	0.8	390	253	ND	366	ND	3180	0.2	ND	4	114	210	ND	299	922	2400	ND	7.4
	02N21W33R02S	10/9/2019	0.4	290	78	ND	113	ND	1250	0.4	ND	4	22	20	ND	123	211	760	ND	7.8
	02N21W34G01S	10/2/2019	0.7	350	93	ND	194	ND	1850	0.3	ND	6	32	20	ND	240	334	1160	ND	7.5
	02N21W34C01S	10/9/2019	0.3	270	91	ND	82	ND	1220	0.3	ND	4	27	40	ND	101	271	800	ND	7.5
	02N20W29B02S	11/12/2019	0.2	350	52	ND	124	ND	1310	0.4	ND	3	49	ND	5.7	98	165	790	ND	7.5
	02N20W19F04S	10/9/2019	0.7	260	197	ND	153	ND	1950	0.2	ND	5	51	130	ND	163	562	1380	ND	7.2
	01N21W15D02S	10/2/2019	0.4	270	178	ND	190	ND	1980	0.3	ND	4	56	170	1.9	143	526	1420	ND	7.4
	01N21W01M02S	10/30/2019	0.3	370	66	ND	163	ND	1450	0.2	ND	6	65	50	ND	149	183	900	ND	7.3
	01N21W10G01S	10/2/2019	0.4	310	189	ND	187	ND	1950	0.2	ND	4	63	130	13.7	146	501	1460	30	7.3
	01N21W10A02S	10/9/2019	0.6	270	368	ND	235	ND	2960	0.2	ND	5	101	1490	81.6	170	1060	2430	270	7.2
	01N21W03R01S	10/2/2019	0.6	320	231	ND	224	ND	2500	0.2	ND	5	73	20	55.1	187	702	1820	ND	7.2
	01N21W03K01S	10/2/2019	0.4	260	159	ND	119	ND	1610	0.3	ND	4	46	ND	48.4	111	429	1170	ND	7.4
	01N21W01B05S	10/9/2019	0.3	380	54	ND	200	ND	1370	0.1	ND	6	52	50	ND	143	61.1	780	ND	7.6
	01N21W02J01S	10/24/2019	1.9	410	596	ND	403	20	5190	0.2	ND	9	180	ND	202	721	2000	4350	ND	7
Santa Paula	03N21W09K04S	9/19/2019	0.4	290	120	ND	42	ND	1310	0.4	ND	4	32	190	ND	102	392	940	ND	7.4
	03N21W21E11S	11/21/2019	0.8	330	209	ND	105	ND	1900	0.5	ND	5	53	310	ND	151	570	1360	ND	7.3
	03N22W34Q03S	9/19/2019	0.5	370	230	ND	88	ND	2250	0.4	760	6	65	80	ND	151	856	1850	ND	7.1
	03N21W19R01S	11/13/2019	0.7	360	166	ND	63	ND	1930	0.5	ND	4	57	ND	14.2	111	613	1390	ND	7.2
	03N22W35Q01S	11/1/2019	0.9	470	283	ND	101	ND	3140	0.4	ND	6	97	750	36.8	274	1300	2670	ND	7.7
	03N21W17Q01S	11/21/2019	0.7	390	180	ND	82	20	2000	0.5	ND	3	59	ND	21.5	146	661	1550	ND	7.3
	02N22W03K02S	9/19/2019	0.5	370	170	ND	79	ND	1710	0.3	ND	6	41	ND	9.2	134	491	1280	ND	7.4
	03N21W30F01S	11/14/2019	0.8	390	222	ND	87	ND	2210	0.4	ND	6	62	20	ND	151	788	1760	ND	7.1
Simi Valley	02N18W08D04S	9/25/2019	1.1	370	211	ND	158	10	2350	0.4	ND	5	78	260	16.4	187	733	1840	ND	7.1
	02N18W08K07S	9/25/2019	1	310	280	ND	157	20	2620	0.5	ND	4	83	ND	55.8	177	887	2100	60	7.1
	02N18W09E01S	9/25/2019	0.8	300	209	ND	125	40	2140	0.6	ND	4	73	ND	29.4	151	700	1690	20	7.1
Tierra Rejada	02N19W11J03S	11/15/2019	0.2	280	59	ND	69	ND	1020	0.2	60	2	57	ND	24.8	53	174	690	40	7.6
	02N19W14F01S	11/13/2019	0.1	410	112	ND	146	ND	1600	0.3	ND	ND	96	ND	84.8	58	179	1040	ND	7.2
	02N19W15N03S	11/12/2019	0.1	270	66	ND	82	ND	995	0.3	ND	2	56	ND	1.5	47	164	690	ND	7.6
	02N19W10R02S	11/13/2019	0.2	260	53	ND	75	ND	1010	0.4	ND	2	56	ND	5.1	58	174	670	ND	7.4
	02N19W14P01S	11/12/2019	0.2	430	53	ND	72	ND	1180	0.2	ND	2	65	ND	45.7	60	100	730	ND	7.5
	02N19W10R01S	11/7/2019	ND	280	51	ND	143	ND	1180	0.4	ND	2	61	ND	16.2	60	146	760	ND	7.5
	02N19W15J02S	11/12/2019	0.2	400	97	ND	167	ND	1850	0.2	ND	5	96	ND	20.6	134	305	1170	ND	7.6
	02N19W15B01S	11/13/2019	0.1	270	52	ND	97	ND	1100	0.3	ND	2	56	ND	20.9	47	150	690	ND	7.8
	02N19W12M03S	11/12/2019	0.2	250	56	ND	70	ND	1040	0.2	ND	2	58	10	14.9	54	194	670	ND	7.7

Table D-1 General Minerals (cont.)

Basin/Subbasin	SWN	Date	B	HCO_3^-	Ca	CO_3^{2-}	Cl^-	Cu	E C	F^-	Fe	K	Mg	Mn	NO_3^-	Na	SO_4^{2-}	TDS	ZN	pH
Upper Ojai Valley	04N22W10K05S	9/10/2019	0.2	440	124	ND	100	ND	1230	0.5	ND	ND	31	1520	5.4	77	124	750	ND	6.9
	04N22W11J01S	9/16/2019	ND	190	54	ND	32	ND	664	0.4	ND	ND	21	ND	44.7	31	86.4	430	ND	6.4
	04N22W11P02S	9/10/2019	ND	220	44	ND	25	ND	536	0.2	380	1	15	260	6.5	38	44.1	320	150	7
Ventura River – Lower	02N23W05K01S	9/10/2019	0.8	400	126	ND	157	ND	1770	0.6	ND	5	46	220	ND	154	368	1170	ND	7.5
	03N23W32Q03S	11/26/2019	0.8	380	193	ND	361	ND	2970	0.5	ND	10	83	50	0.7	231	666	2110	ND	7.3
	02N23W05F01S	11/26/2019	0.6	480	55	ND	62	ND	1320	0.2	ND	7	24	30	ND	167	184	840	ND	7.7
Ventura River – Upper	04N23W20K01S	11/26/2019	0.7	260	107	ND	41	ND	1110	0.4	ND	4	31	ND	7.6	52	284	750	ND	7.4
	04N23W15A02S	11/26/2019	0.4	200	45	ND	103	ND	993	0.8	ND	2	14	80	14	121	143	580	ND	7.2
	04N23W09G03S	9/16/2019	0.4	390	130	ND	82	10	1290	0.3	ND	2	41	ND	43.4	54	196	860	30	7
	04N23W33M02S (Outside Basin)	9/10/2019	0.4	380	180	ND	110	70	1670	0.4	ND	3	53	ND	ND	90	423	1200	ND	7.3

California Title 22 Metals

Metals Table D-2			
Element Name	Element Symbol	Reported Units	Laboratory Analytical Method
Aluminum	Al	µg/l	EPA 200.8
Antimony	Sb	µg/l	EPA 200.8
Arsenic	As	µg/l	EPA 200.8
Barium	Ba	µg/l	EPA 200.8
Beryllium	Be	µg/l	EPA 200.8
Cadmium	Cd	µg/l	EPA 200.8
Chromium	Cr	µg/l	EPA 200.8
Lead	Pb	µg/l	EPA 200.8
Mercury	Hg	µg/l	EPA 245.1
Nickel	Ni	µg/l	EPA 200.8
Selenium	Se	µg/l	EPA 200.8
Silver	Ag	µg/l	EPA 200.8
Thallium	Tl	µg/l	EPA 200.8
Vanadium	V	µg/l	EPA 200.8

Radio Chemistry

Radio Chemistry Table D-3			
Name	Element Symbol	Reported Units	Laboratory Analytical Method
Gross Alpha		pCi/l	EPA 900.0
Uranium	U	pCi/l	EPA 908.0

Table D-2 Metals

Basin/Subbasin	SWN	Date	Al	Sb	As	Ba	Be	Cd	Cr	Pb	Hg	Ni	Se	Ag	Tl	V
Arroyo Santa Rosa Valley	02N19W20M04S	11/12/2019	ND	ND	3	9.6	ND	ND	15	ND	ND	ND	4	ND	ND	34
	02N19W20L01S	11/7/2019	ND	ND	4	25.9	ND	ND	29	ND	ND	ND	4	ND	ND	90
Cuddy Ranch Area	08N20W04N02S	11/19/2019	ND	ND	2	148	ND	ND	6	ND	ND	ND	6	ND	ND	3
Cuyama Valley	09N23W30E05S	11/19/2019	ND	ND	1	35.6	ND	ND	6	ND	ND	ND	11	ND	ND	3
Fillmore	04N20W32R03S	11/4/2019	ND	ND	ND	56.3	ND	ND	ND	ND	ND	ND	5	ND	ND	ND
	04N19W19N01S	9/17/2019	ND	ND	1	15.1	ND	0.2	4	ND	ND	ND	30	ND	ND	2
	04N20W26D03S	11/14/2019	ND	ND	ND	63.3	ND	ND	6	ND	ND	2	5	ND	ND	2
	03N21W01P08S	9/12/2019	ND	ND	ND	29.9	ND	ND	4	ND	ND	ND	7	ND	ND	ND
Hidden Valley	01N19W29E05S	9/20/2019	ND	4	2	82.6	ND	ND	6	ND	0.02	ND	ND	ND	0.6	3
Las Posas Valley – East Las Posas Management Area	03N19W29K06S	10/30/2019	ND	ND	2	172	ND	ND	5	ND	ND	ND	4	ND	ND	21
	03N19W29K08S	11/1/2019	ND	ND	1	32.9	ND	103	1	ND	ND	ND	6	ND	ND	11
	02N20W16B06S	10/3/2019	ND	ND	1	17.4	ND	ND	3	ND	ND	7	3	ND	ND	2
	03N20W34G01S	11/6/2019	ND	ND	ND	52.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Las Posas Valley – West Las Posas Management Area	02N21W08H03S	10/29/2019	ND	ND	2	50.4	ND	ND	4	ND	-0.01	ND	25	ND	ND	5
	02N21W12H02S	11/13/2019	ND	ND	3	41	ND	ND	4	ND	ND	4	69	ND	ND	4
	03N21W35P02S	11/4/2019	ND	ND	2	48.6	ND	ND	4	ND	ND	ND	56	ND	ND	2
Lockwood Valley	08N21W29R07S	11/19/2019	ND	ND	4	36.8	ND	ND	6	ND	ND	ND	ND	ND	ND	6
Mound	02N23W13K03S	9/4/2019	ND	ND	3	30.5	ND	ND	2	ND	ND	2	28	ND	ND	ND
Ojai Valley	04N23W01K02S	10/10/2019	ND	ND	ND	37.1	ND	ND	4	ND	ND	ND	ND	ND	ND	2
	04N22W04P05S	11/6/2019	ND	ND	ND	33.2	ND	ND	ND	ND	ND	ND	2	ND	ND	ND
Oxnard – Forebay Management Area	02N22W23H07S	10/29/2019	ND	ND	2	36.1	ND	ND	2	ND	ND	1	33	ND	ND	2
Oxnard	02N23W25M01S	9/4/2019	ND	ND	ND	17.5	ND	ND	3	ND	ND	ND	2	ND	ND	3
	01N22W03F07S	9/4/2019	ND	ND	2	52.8	ND	ND	1	ND	ND	1	16	ND	ND	3
	01N21W08R01S	10/2/2019	ND	ND	4	97.4	ND	ND	4	ND	ND	ND	1	ND	ND	ND
	01N21W28D01S	10/2/2019	ND	ND	ND	32.3	ND	ND	3	ND	ND	ND	1	ND	ND	ND
	01N22W12M01S	10/16/2019	ND	ND	3	32.7	ND	ND	ND	ND	ND	ND	3	ND	ND	ND
	01N21W19P03S	10/16/2019	ND	ND	1	208	ND	ND	ND	ND	ND	ND	1	ND	ND	ND
	01N22W26M03S	10/17/2019	ND	ND	1	63.6	ND	ND	4	ND	ND	ND	1	ND	ND	ND
	01N21W29B03S	10/16/2019	ND	ND	3	35.7	ND	ND	ND	ND	ND	ND	2	ND	ND	4
	01N22W03F05S	9/4/2019	ND	ND	1	21.8	ND	ND	3	ND	ND	ND	12	ND	ND	3
Piru	04N19W34J04S	9/11/2019	ND	ND	ND	23.7	ND	ND	ND	ND	ND	ND	7	ND	ND	3
	04N19W25M03S	9/11/2019	ND	ND	6	23.9	ND	0.9	ND	ND	ND	4	354	ND	ND	3

Table D-2 Metals(cont.)

Basin/Subbasin	SWN	Date	Al	Sb	As	Ba	Be	Cd	Cr	Pb	Hg	Ni	Se	Ag	Tl	V
Pleasant Valley	01N21W10A02S	10/9/2019	ND	ND	2	42	ND	ND	4	ND	ND	1	27	ND	ND	3
	02N20W19F04S	10/9/2019	ND	ND	1	37.6	ND	ND	4	ND	ND	5	2	ND	ND	ND
	02N21W34G01S	10/2/2019	ND	ND	ND	37.3	ND	ND	5	1.2	ND	ND	3	ND	ND	ND
Santa Paula	03N21W09K04S	9/19/2019	ND	ND	8	25.8	ND	ND	3	ND	ND	ND	ND	ND	ND	ND
	02N22W03K02S	9/19/2019	ND	ND	2	24.8	ND	ND	4	ND	ND	ND	23	ND	ND	ND
	03N21W21E11S	11/21/2019	ND	ND	ND	28.7	ND	0.4	7	ND	ND	7	2	ND	ND	2
Simi Valley	02N18W09E01S	9/25/2019	ND	ND	2	13.8	ND	ND	2	0.8	ND	ND	28	ND	ND	5
Tierra Rejada	02N19W15J02S	11/12/2019	ND	ND	4	7.8	ND	ND	9	ND	ND	2	16	ND	ND	16
	02N19W14F01S	11/13/2019	ND	ND	3	3.1	ND	ND	10	ND	ND	2	19	ND	ND	78
Upper Ojai Valley	04N22W11J01S	9/16/2019	ND	ND	ND	49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ventura River – Lower Subbasin	02N23W05F01S	11/26/2019	ND	ND	ND	160	ND	ND	13	ND	ND	ND	2	ND	ND	4
Ventura River- Upper Subbasin (outside basin)	04N23W33M02S	9/10/2019	ND	ND	1	79.6	ND	ND	1	0.6	ND	3	3	ND	ND	3

Table D-3 Radiochemistry

Basin	SWN	Date	Alpha pCi/L	CE	Uranium pCi/L	CE
Cuddy Ranch Area	08N20W04N02S	11/19/2019	6.17	2.33		
Fillmore	03N20W01F05S	11/20/2019	7.31	2.43		
	04N20W36D07S	11/20/2019	7.27	1.57		
	03N20W02R05S	9/12/2019	11.8	1.74		
	04N20W36P04S	9/11/2019	8.86	1.33		
Lockwood Valley	08N21W33R03S	11/19/2019	8.27	2.51		
	08N21W29R07S	11/19/2019	13.2	1.32		

* CE – Counting Error

Appendix E – Piper Diagrams

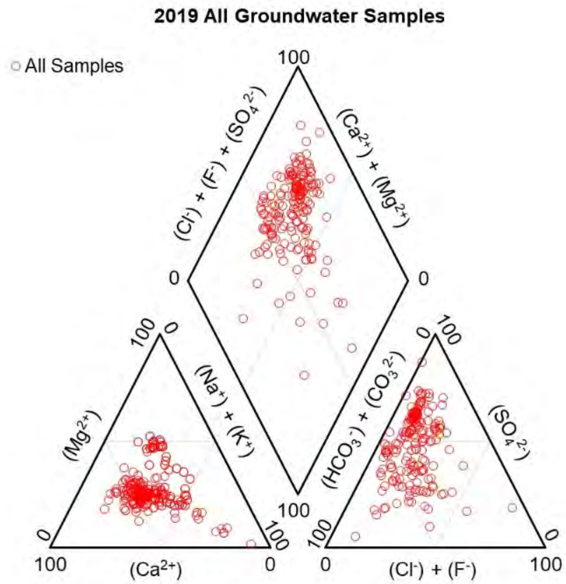

Figure E-1: Piper diagram for All Samples.

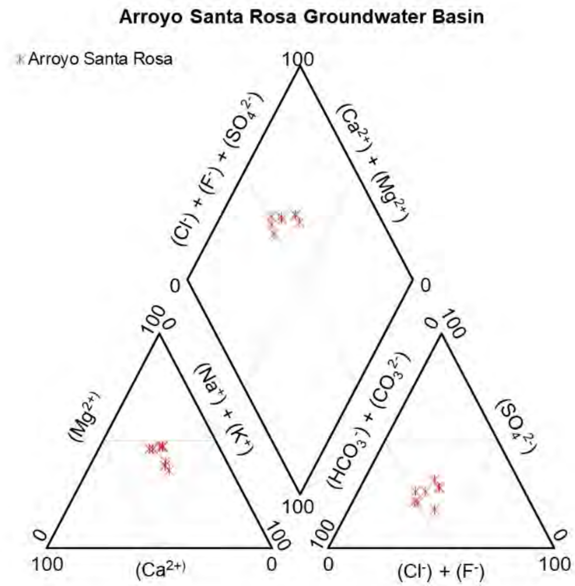

Figure E-2: Arroyo Santa Rosa Basin Piper diagram.

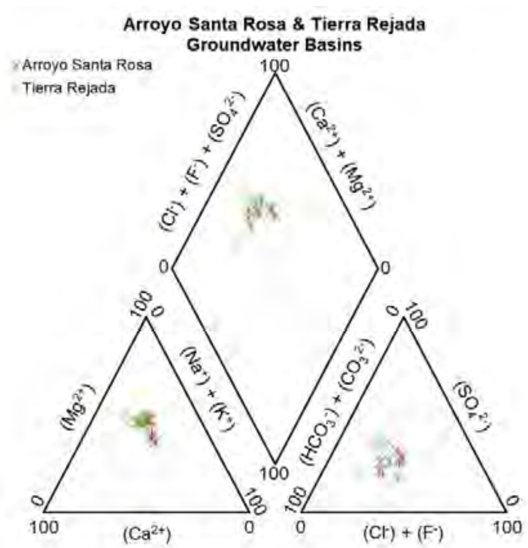

Figure E-3: Arroyo Santa Rosa & Tierra Rejada Basins Piper diagram.

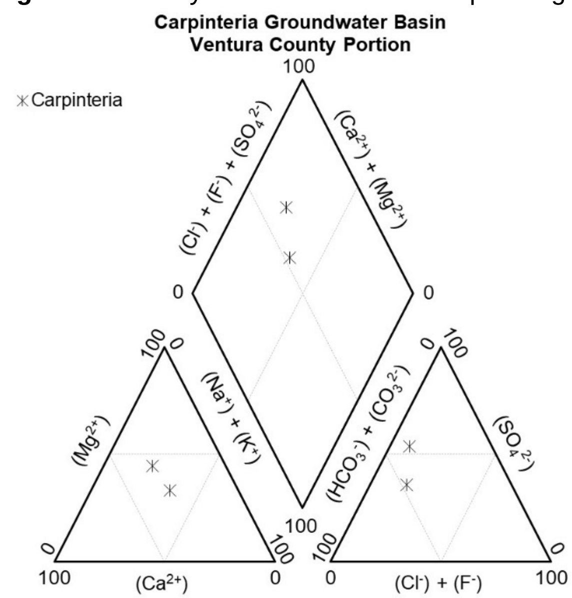

Figure E-4: Carpinteria Basin Piper diagram.

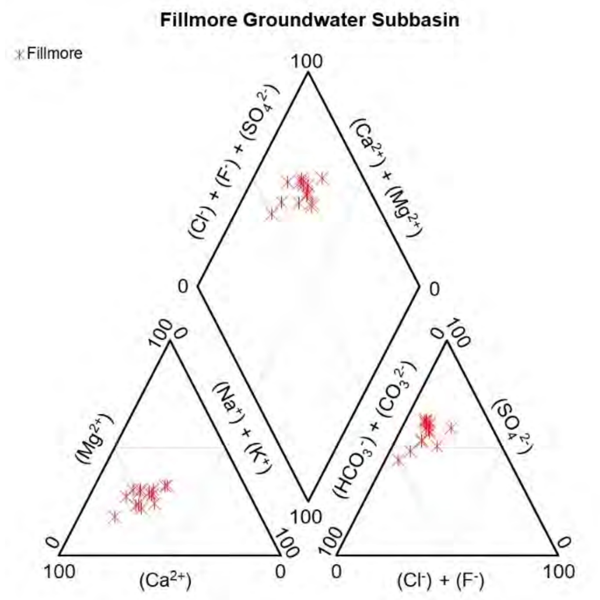

Figure E-5: Fillmore Subbasin Piper diagram.

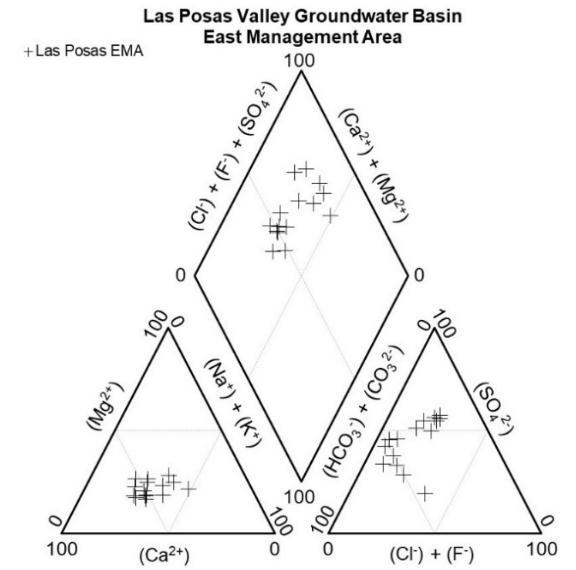

Figure E-6: Las Posas Valley EMA Piper diagram.

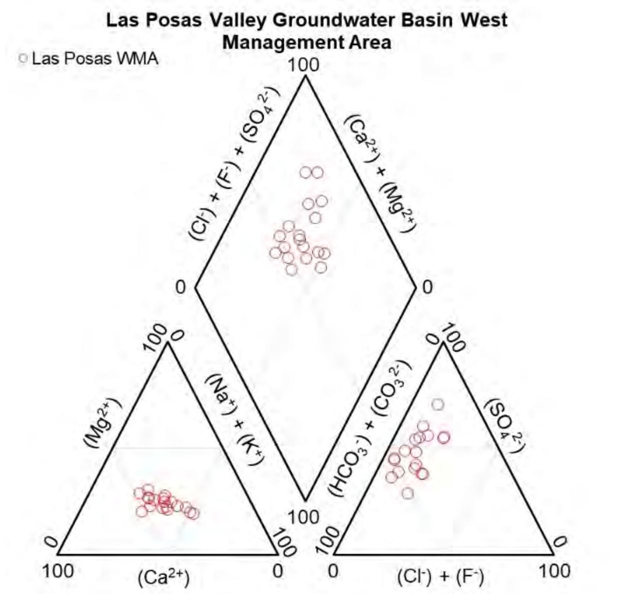

Figure E-7: Las Posas Valley WMA Piper diagram.

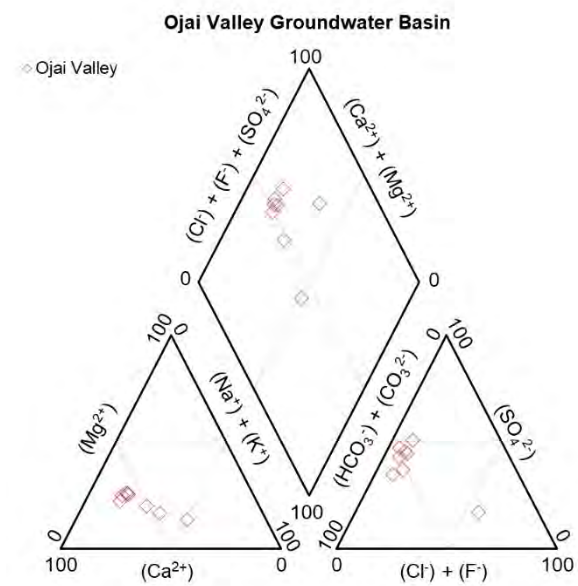

Figure E-8: Ojai Valley Basin Piper diagram.

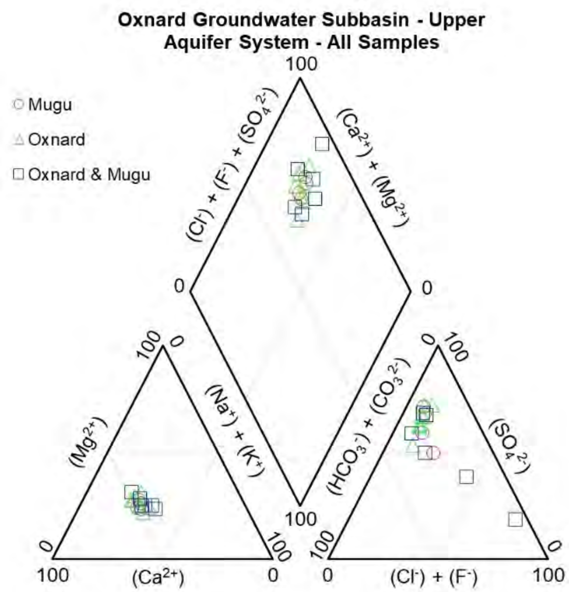

Figure E-9: All Upper Aquifer System Piper diagram.

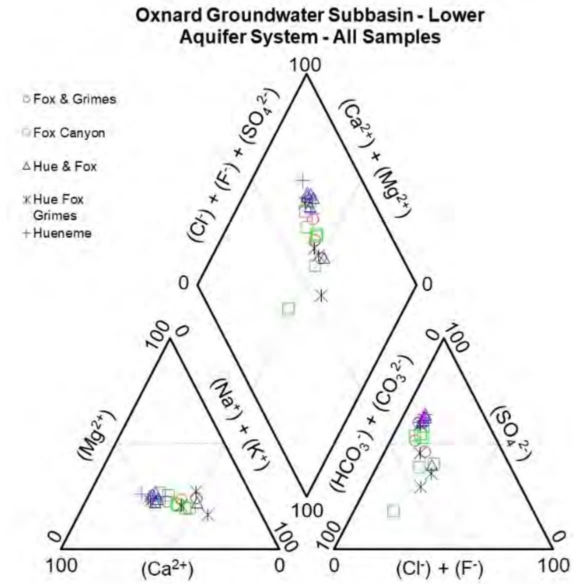

Figure E-10: All Lower Aquifer System Piper diagram.

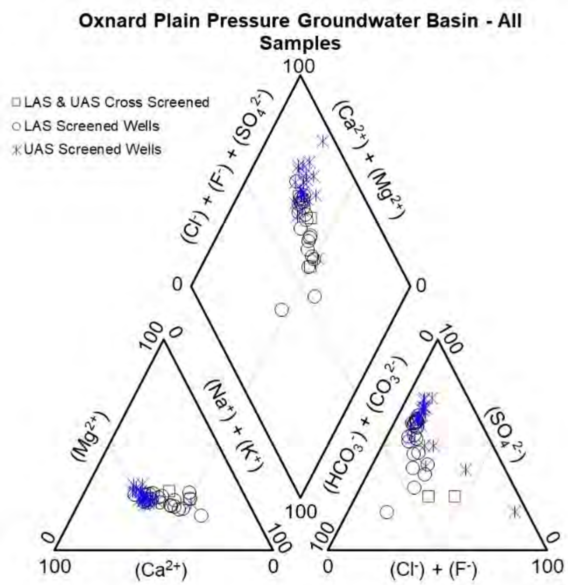

Figure E-11: Oxnard Subbasin Piper diagram all samples.

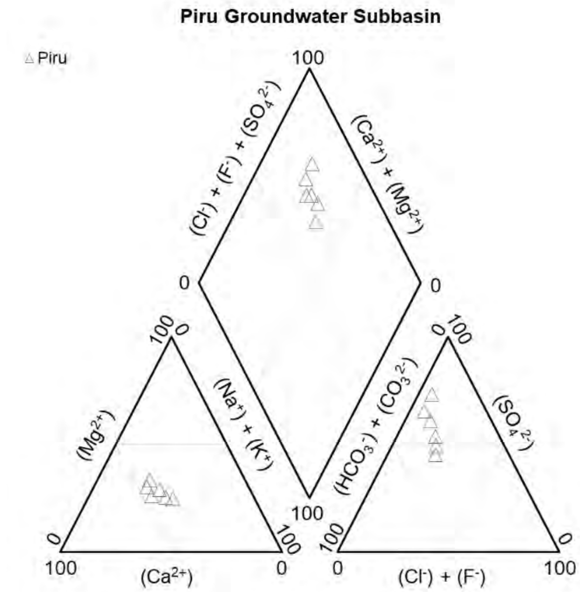

Figure E-12: Piru Subbasin Piper diagram.

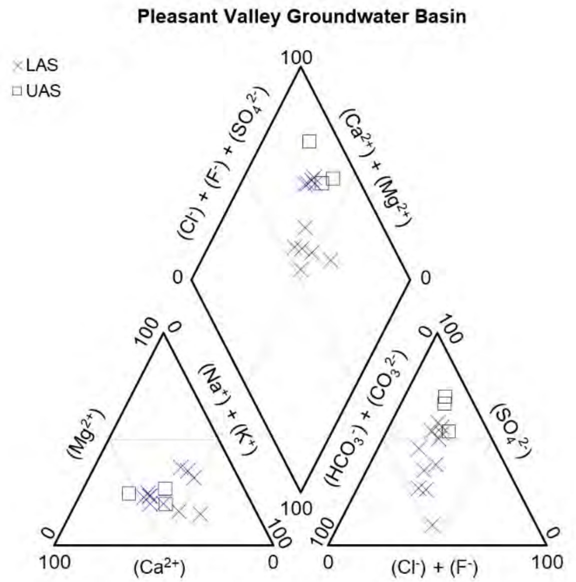

Figure E-13: Pleasant Valley Basin Piper diagram.

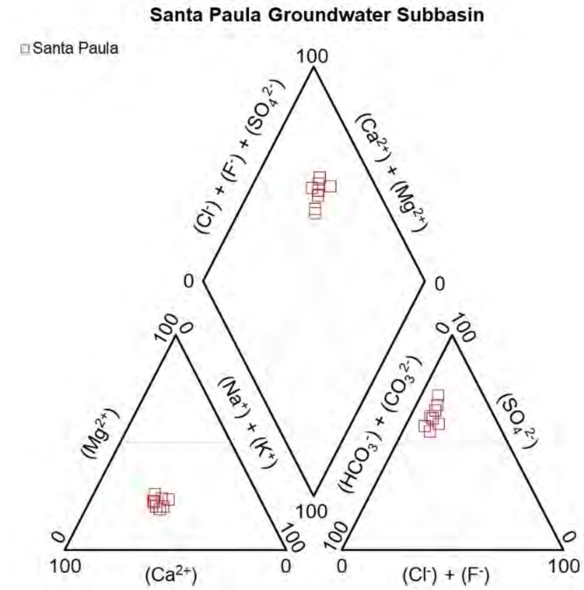

Figure E-14: Santa Paula Subbasin Piper diagram.

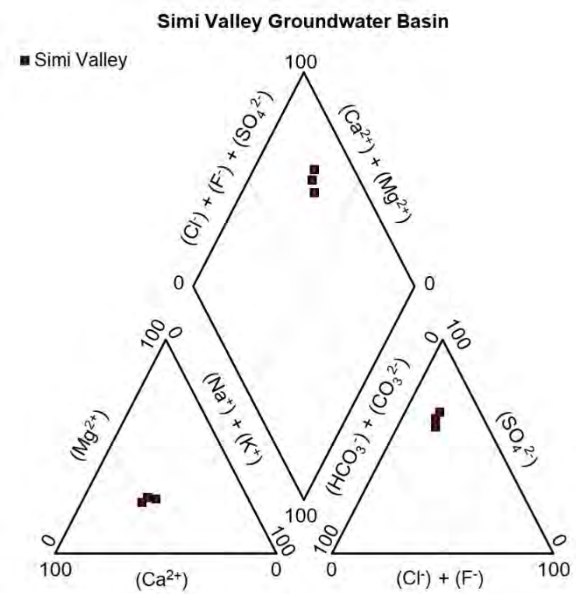

Figure E-15: Simi Valley Basin Piper diagram.

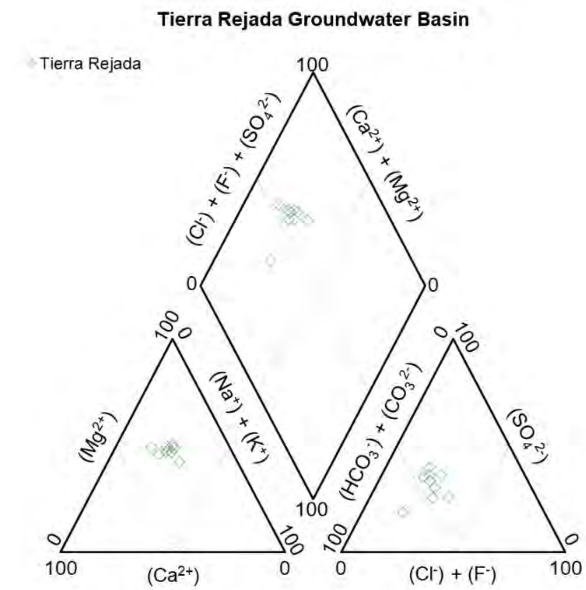

Figure E-16 Tierra Rejada Valley Basin Piper diagram.

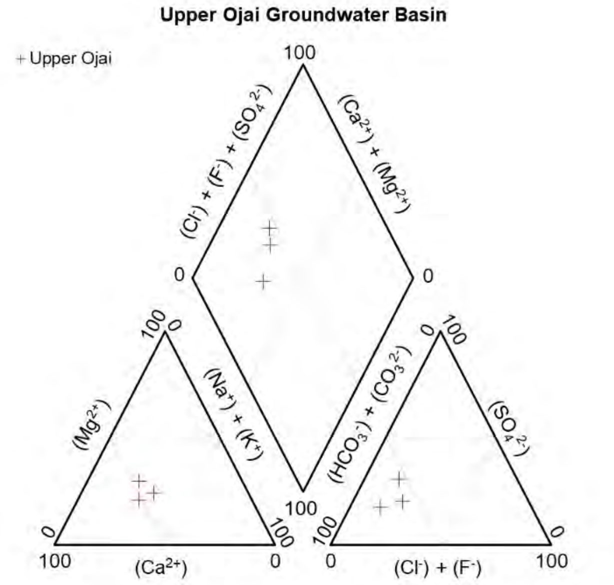

Figure E-17: Upper Ojai Basin Piper diagram.

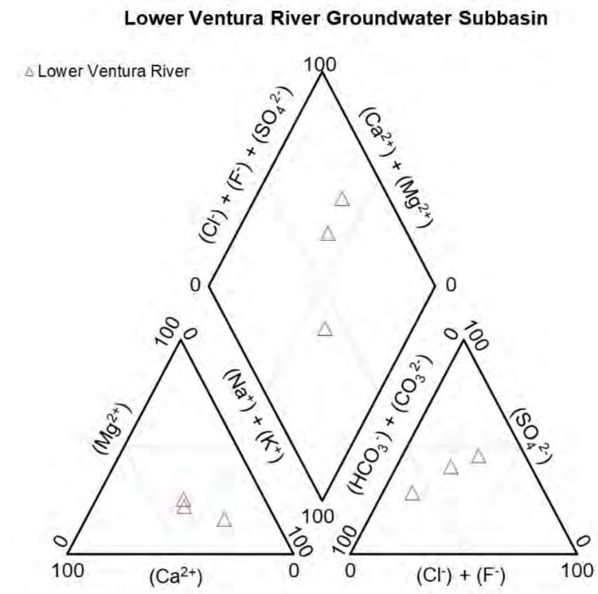

Figure E-18: Ventura River - Lower Subbasin Piper diagram.

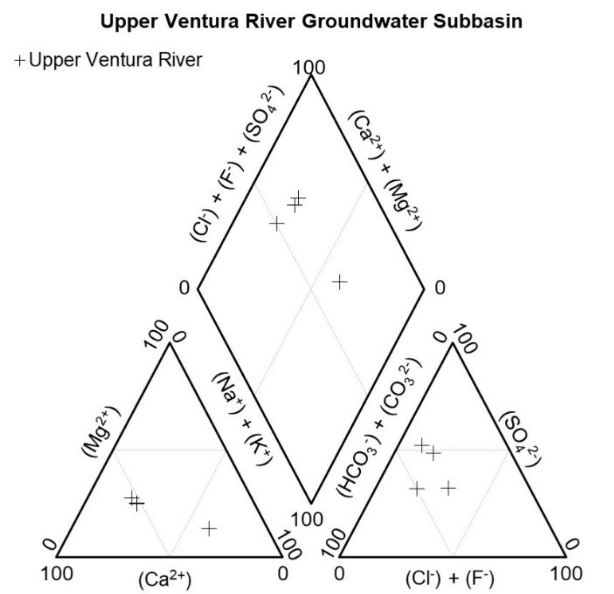

Figure E-19: Ventura River – Upper Subbasin Piper diagram.

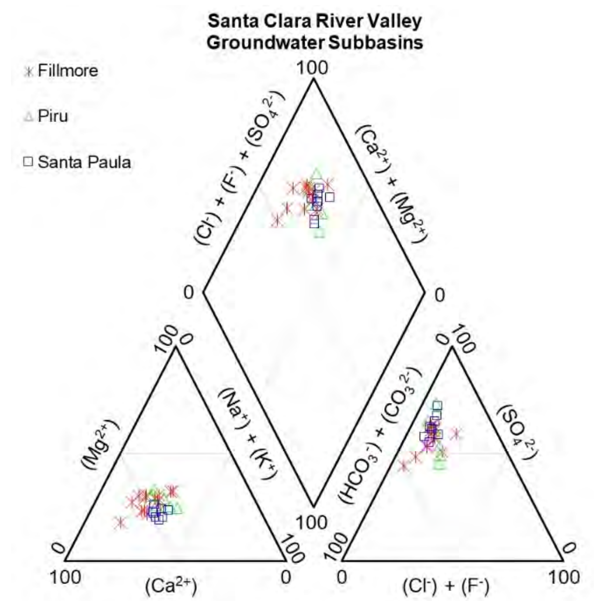

Figure E-20: Fillmore, Piru & Santa Paula Subbasins Piper diagram.

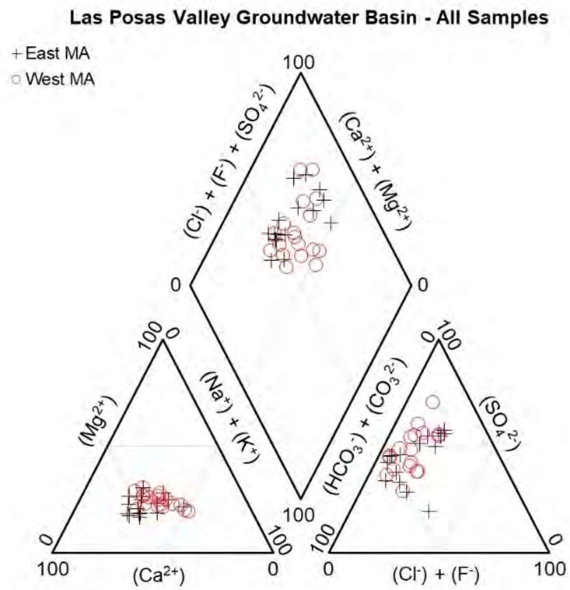

Figure E-21: Las Posas Valley Basin Piper diagram.

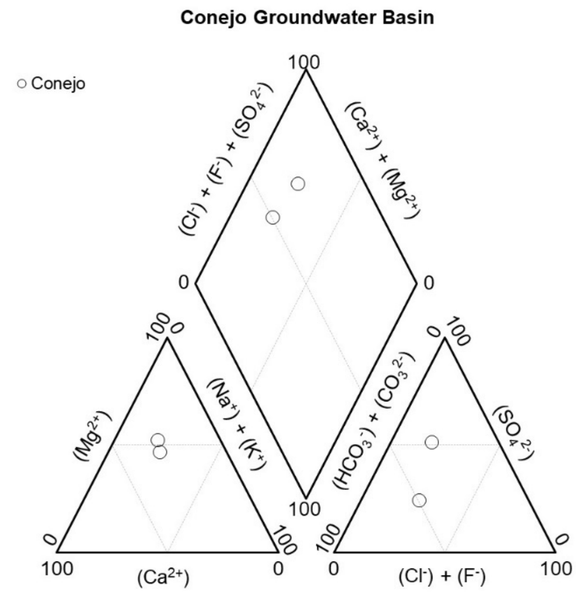

Figure E-22: Conejo Basin Piper diagram.

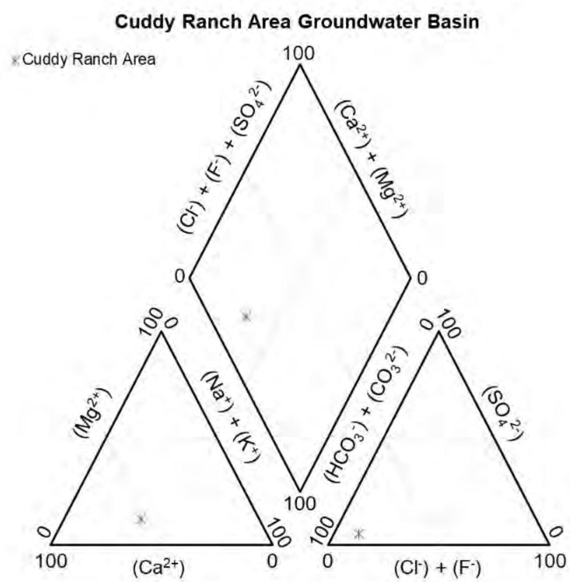

Figure E-23: Cuddy Ranch Area Basin Piper diagram.

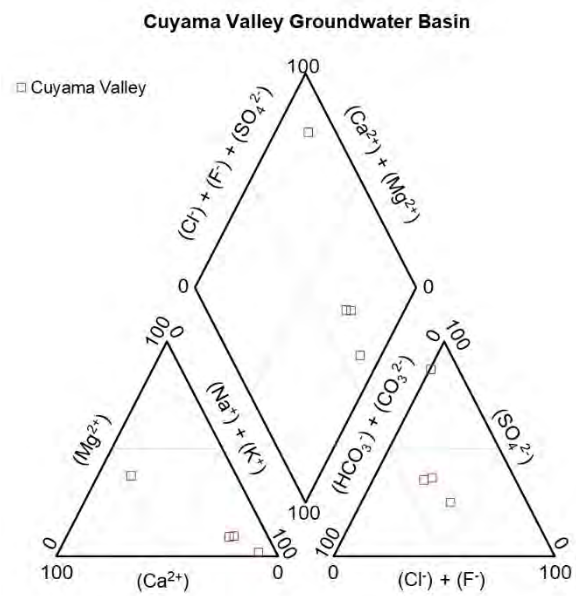

Figure E-24: Cuyama Valley Basin Piper diagram.

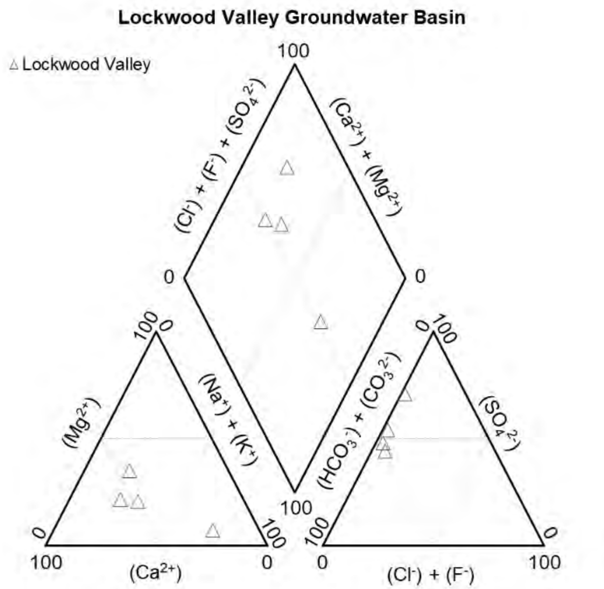

Figure E-25: Lockwood Valley Basin Piper diagram.

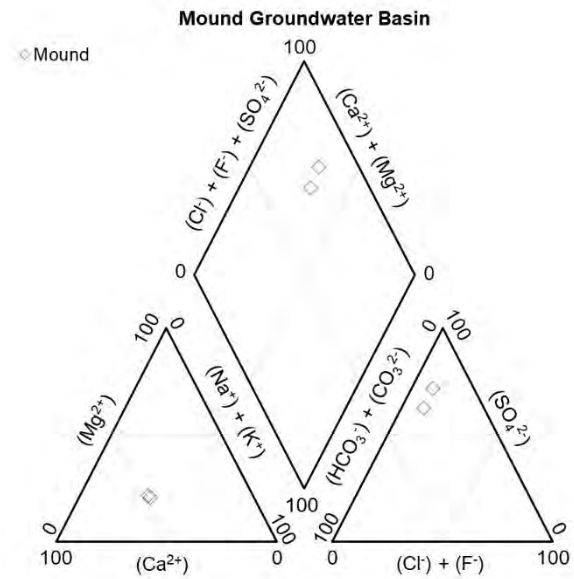

Figure E-26: Mound Subbasin Piper diagram.

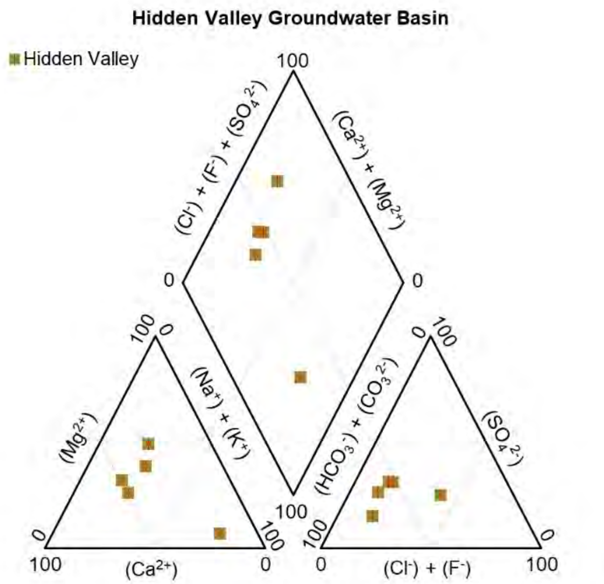

Figure E-27: Hidden Valley Basin Piper diagram.

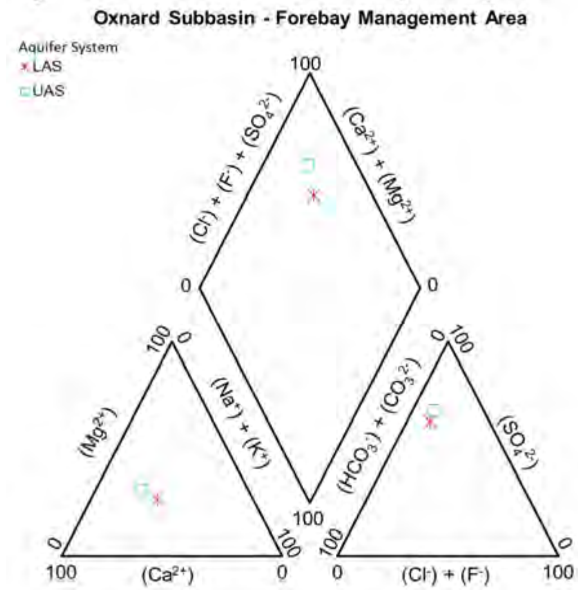

Figure E-28: Forebay Management Area Piper diagram.

Appendix F - Basin Summary Sheets

The following basin summary sheets provide an overview of data, trends, and facts for groundwater basins in the County designated as high and medium priority in June of 2014 by the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. Trends for groundwater levels and groundwater quality were determined over the last five years for 2019. Trend analysis used sample sets with wells that were sampled or measured consistently over the five-year period where available. In some instances this resulted in a small sample set. The spatial distribution of wells may not cover the entire groundwater basin. Data from VCWPD and other agencies was also used in the trend analysis.

Arroyo Santa Rosa Valley Basin

Groundwater Basin Surface Area:	3,270 acres
Irrigated Acreage:	≈1,755 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Calleguas Creek
Aquifers:	Unconfined and confined aquifers
DWR Groundwater Basin Designation and Size:	Arroyo Santa Rosa Valley Basin (4-7). Surface area 3,747 acres. (DWR, 2014)
SGMA Basin Priority:	Very Low
DWR Groundwater Basin Population:	2,434 (2010)

Known Water Supply Wells (as of March 2020)	**2019 Self Reported Groundwater Extraction to FCGMA (as of March 11, 2020) (West part of basin only)**	**Water Demand Estimate (Whole basin)**
Number of Wells: 84 Active: 36 Destroyed: 32 Abandoned: 6 Can't Locate: 10	Agricultural Extractions - 837 AF/Yr Municipal, Industrial and Domestic - 0 AF/Yr	Irrigation Demand @ 2 AF/Ac:3,510 AF/Yr Municipal Demand @ 0.5 AF/person/Yr: 1,105 AF/Yr Total Demand Estimate: 4,615 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 02N20W26B03S - Well was not measured at the end of the year.

In general, for 3 wells measured in 2019 in the basin, water levels declined in all 3 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(8 wells)

Two water samples are magnesium bicarbonate type and the remainder are magnesium chloride type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 6 wells
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 8 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 1 well

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 02N20W26B03S: ↓

In general for 4 wells consistently measured: (4 wells) ↓

5 Year Groundwater Quality Trend 2015-2019

SWN	Nitrate	Chloride	TDS	Sulfate
02N19W19P02S	↓	↑	↓	↑
02N20W23G03S	↑	→	↑	↑
02N20W25C06S	↑	→	↑	→

Wells are generally in the southern central part of the basin.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation. Subsurface flow from Tierra Rejada basin. Surface flow percolation from Arroyo Santa Rosa and Conejo Creek. Waste water returns from residential onsite septic systems. (MWH, 2013)

Potable Water Sources

Groundwater from Arroyo Santa Rosa Basin. Imported State Water Project water from Metropolitan Water District via Calleguas Municipal Water District.

Non-Potable Water Source

Reclaimed water from Hill Canyon Waste Water Treatment Plant via Conejo Creek.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: Arroyo Santa Rosa basin receive some subsurface inflow from Tierra Rejada basin. (MWH, 2013)

Downgradient: No

DWR CASGEM Groundwater Basin Prioritization Level - Medium

Impact Comments: Some primary and secondary inorganic contaminants above the MCL (B-118).

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Fillmore Subbasin

Groundwater Basin Surface Area:	22,583 acres
Irrigated Acreage:	≈12,230 acres (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Santa Clara River
Aquifers:	Unconfined Aquifer
DWR Groundwater Basin Designation and Size:	Santa Clara River Valley Basin, Fillmore Subbasin (4-4.05). Surface area 22,583 acres. (DWR, 2006)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	16,240 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 608
Active: 443
Destroyed: 78
Abandoned: 30
Can't Locate: 51
Non-Compliant: 6

2019 Self Reported Groundwater Extraction to UWCD (as of May 21, 2020)

Agricultural Extractions: 32,360 AF/Yr

Municipal Extractions: 2,282 AF/Yr

Total Extractions: 34,642 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 03N20W05D01S - November level was down 2.65 feet from the March measurement.

In general, for the wells measured in the basin in 2019, water levels declined in 4 wells and rose in 4 wells over the course of the year from the 1st quarter reading to the last quarter.

2019 Groundwater Quality in General for All Wells Sampled by County

(15 wells)

One water sample is calcium bicarbonate type and the remaining fourteen samples are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 3 wells
Secondary MCL Exceedances for Chloride >250mg/L?	Yes, 1 wells
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 15 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 14 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 03N20W05D01S: ↑

The 5 year trend based on 2015 through 2019 groundwater level elevations is upward.

5 Year Groundwater Quality Trend 2015-2019

(*sampled by UWCD)

SWN	Nitrate	Chloride	TDS	Sulfate
03N20W02R05S	↓	↑	↑	↑
03N21W01P08S	↓	→	↓	→
04N19W31F01S	↑	↓	↓	↓
04N19W30D01S*	↑	↓	↓	↓
04N20W33C03S*	→	↓	↑	↑

Wells are distributed throughout the basin.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation. Subsurface flow from Piru basin. Surface flow percolation from Santa Clara River, Sespe Creek, and minor tributaries. (DWR, 2006) Imported State Water Project water via Lake Piru release to Santa Clara River.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: Yes, Piru groundwater basin.
Downgradient: Yes, Santa Paula groundwater basin.

DWR CASGEM Groundwater Basin Prioritization Level - Medium

Impact Comments: Many groundwater quality impairments in the basin; Nitrates problematic during dry periods; High TDS, etc. (B-118). REH - Public comment indicated WQ is localized and being managed

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Las Posas Valley Basin East Management Area

Management Area Name:	East Las Posas Management Area
ELPMA Surface Area:	27,180 acres
Irrigated Acreage:	≈10,000 acres (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Calleguas Creek
Aquifers:	Unconfined and confined aquifers
DWR Groundwater Basin Designation and Size:	Los Posas Valley Basin (4-8). Surface area 42,353 acres. Note: DWR groups three County basins into Las Posas Valley Basin (4-8) (DWR, 2014)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	42,721 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 457
Active: 164
Destroyed: 137
Abandoned: 37
Can't Locate: 56
Exempt: 1
Non-Compliant: 3

2019 Self Reported Groundwater Extraction to FCGMA (as of MArch 16, 2020)

Agricultural Extractions: 14,017 AF/Yr

Municipal, Industrial, and Domestic Extractions: 1,519 AF/Yr

Values are approximate based on FCGMA East and South Las Posas basins.

Total: 15,536 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 03N20W26R03S - December level was up 45.8 feet from the March measurement.

In general, for 9 wells measured in 2019 in the basin, water levels declined in 3 wells and rose in 6 well over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(15 wells)

The water in five wells is calcium bicarbonate type and the water in the remaining 10 wells is calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 1 well
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 9 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 7 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 03N20W26R03S: ↑

The 5 year trend based on 2015 through 2019 groundwater level elevation maps varies.

Of the 14 measured wells in the basin 10 show a downward trend while only 4 of the wells show a rising trend.

5 Year Groundwater Quality Trend 2015-2019

SWN	Nitrate	Chloride	TDS	Sulfate
02N20W09Q07S	↓	↓	↑	↓
02N20W16B06S	↓	↓	↓	↓
03N19W29K08S	↑	↑	↓	↑
03N19W29K06S	↓	↓	↑	↑

Two wells are located in the southwest, two wells are located in the northeast.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation, minor stream flow across outcrops of the Fox Canyon and Grimes Canyon gravels, and percolation from flow in the Arroyo Las Posas. (DWR, 2006) Imported State Water Project water via injection in the Calleguas Municipal Water District ASR well field.

Potable Water Sources

Groundwater from East Las Posas basin. Imported State Project Water from Calleguas MWD to various purveyors.

Subsurface Hydrologic Connection to Other Groundwater Basins

West:Possible connection to West Las Posas basin in NW part of basin.

South/Southeast: South Las Posas Basin.

Southwest: Restrictive subsurface structure between Pleasant Valley basin and East Las Posas basin may cause spillover from East Las Posas to Pleasant Valley when basin is full.

DWR CASGEM Groundwater Basin Prioritization Level - High

Impact Comments: TDS is generally high in this basin. Pubic Comment includes reports of subsidence, overdraft and saline intrusion

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend ⇨ Level trending up ↑ Level Trending down ↓

Las Posas Valley Basin West Management Area

Management Area Name:	West Las Posas Management Area (WLPMA)
WLPMA Surface Area:	17,442 acres
Irrigated Acreage:	≈9,950 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Calleguas Creek
Aquifers:	Unconfined and confined aquifers
DWR Groundwater Basin Designation and Size:	Los Posas Valley Basin (4-8). Surface area 42,353 acres. Note: DWR groups three County basins into Las Posas Valley Basin (4-8) (DWR, 2014)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	42,721 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 162
Active: 88
Destroyed: 58
Abandoned: 10
Can't Locate: 5
Non-Compliant: 1

2019 Self Reported Groundwater Extraction to FCGMA (as of March 16, 2020)

Agricultural Extractions: 9,953 AF/Yr

Municipal, Industrial, and Domestic Extractions: 2,153 AF/Yr

Values are approximate based on FCGMA West Las Posas basin.

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 02N21W11J04S - Well was not measured in December but level was down 4.9 feet in September from the January measurement.

In general, for 11 wells consistently measured in 2019 in the basin, water levels declined in 7 wells and rose in 4 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(18 wells)

The water in three wells is calcium bicarbonate type, one is sodium bicarbonate type and the remainder are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 3 wells
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 16 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 9 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 02N21W11J04S: ↓

For 17 wells measured, the 5 year trend based on 2015 through 2019 groundwater level elevationis is mixed with 13 wells declining and 4 wells showing an increasing water level elevation trend.

5 Year Groundwater Quality Trend 2015-2019

SWN	Nitrate	Chloride	TDS	Sulfate
02N21W15M04S	↓	→	↓	→
02N21W17F05S	↓	→	↓	↓
02N21W11A03S	↓	↑	↓	→
02N21W13A01S	↑	↑	↓	↑

Wells are in various locations in the basin.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation, minor stream flow across outcrops of the Fox Canyon and Grimes Canyon gravels, and percolation from flow in the Arroyo Las Posas. (DWR, 2006)

Potable Water Sources

Groundwater from West Las Posas basin. State Water Project water from Calleguas MWD to various water purveyors.

Subsurface Hydrologic Connection to Other Groundwater Basins

East: Possible connection to East Las Posas basin in NW part of basin.

Southwest: Yes, Oxnard Plain Pressure basin.

DWR CASGEM Groundwater Basin Prioritization Level - High

Impact Comments: TDS is generally high in this basin. Pubic Comment includes reports of subsidence, overdraft and saline intrusion

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Mound Subbasin

Groundwater Basin Surface Area:	13,864 acres
Irrigated Acreage:	≈2,075 acres (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Santa Clara River
Aquifers:	Unconfined and confined aquifers
DWR Groundwater Basin Designation and Size:	Santa Clara River Valley Basin, Mound Subbasin (4-4.03) Surface area 13,864 Acres. (DWR, 2014)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	75,298 (2010)

Known Water Supply Wells (as of March 20120)

Number of Wells: 85
Active: 30
Destroyed: 41
Abandoned: 6
Can't Locate: 7
Non-Compliant: 1

2019 Self Reported Groundwater Extraction to UWCD (as of May 21, 2020)

Agricultural Extractions: 2,961 AF/Yr

Municipal & Industrial Extractions: 3,446 AF/Yr

Total Extractions: 6,407 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 02N22W07M02S (measured by UWCD) - November level was down 1.8 feet from the January measurement.

In general, for 1 well consistently measured in the basin in 2019, water levels increased from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(2 wells)

Both samples are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	No
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 2 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 2 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 02N22W07M02S: ↓

The 5 year trend for wells measured by VCWPD based on 2015 through 2019 groundwater level elevations is mixed with one well rising and 3 wells declining.

5 Year Groundwater Quality Trend 2015-2019

(Based on wells sampled by other agencies)(D=Deep aquifer S=Shallow aquifer)

SWN	Nitrate	Chloride	TDS	Sulfate
02N22W08F01S (D)	→	↑	↑	↑
02N22W08G01S (D)	↓	→	↑	→
02N22W07M03S (S)	→	→	↑	↓
02N22W09L04S (S)	↓	↓	↑	↑

Wells are generally in the center of the basin along a east to west line.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation. Subsurface flow from Santa Paula basin. Surface flow percolation from Santa Clara River and, percolation of direct precipitation into the San Pedro Formation which crops out along the northern edge of the subbasin. (DWR, 2006) Imported State Project Water via Lake Piru release to Santa Clara River.

Potable Water Sources

Groundwater from Mound Basin, Ventura River Basin, Oxnard Plain Pressure Basin via Ventura Water System. Surface water from Ventura River diversion via Ventura Water System. Surface water from Lake Casitas via Casitas Municipal Water District to Ventura Water System.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: Yes, Santa Paula groundwater basin.

East/Southeast: Yes, Oxnard Plain Forebay and Oxnard Plain Pressure groundwater basins. Flow into and out of basin dependent on groundwater levels.

DWR CASGEM Groundwater Basin Prioritization Level - Medium

Impact Comments: Some primary and secondary inorganic contaminants above the MCL (B-118).

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Ojai Valley Basin

Groundwater Basin Surface Area:	6,470 acres
Irrigated Acreage:	≈2,135 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Ventura River
Aquifers:	Unconfined and confined aquifers
DWR Groundwater Basin Designation and Size:	Ojai Valley Basin (4-2). Surface area 6,851 acres. (DWR, 2014)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	7,745 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 323
Active: 187
Destroyed: 76
Abandoned: 9
Can't Locate: 48
Non Compliant: 1

2019 Self Reported Groundwater Extractions to OBGMA (as of April 30, 2020)

Extractions: 4,466 Af/Yr

Water Demand Estimate

Irrigation Demand @ 2 AF/Ac:4,270 AF/Yr

Municipal Demand @ 0.5AF/person/Yr: 4,134 AF/Yr

Total Demand Estimate: 8,404 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 04N22W05L08S: - The December reading was down 0.3 feet from the March level.

In general, for 15 wells consistently measured in 2019 in the basin, water levels declined in 9 wells and rose in 6 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(8 wells)

The water in one well is sodium bicarbonate, two wells are calcium bicarbonate type and the remaining five wells are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	1 well
Secondary MCL Exceedances for Chloride >250mg/L?	1 well
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 8 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	No

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 04N22W05L08S: ↑

In general, for 15 wells consistently measured: (15 wells) ↑

5 Year Groundwater Quality Trend 2014-2018

SWN	Nitrate	Chloride	TDS	Sulfate
04N23W01K02S	↓	↓	↓	↑
05N22W33J01S	→	↓	↓	↓
04N22W04Q01S	↑	↑	↓	↑
04N23W12B03S	→	↑	↑	↑

Wells are located in various areas of the basin.

Sources of Groundwater Recharge

Basin Recharge:infiltration of precipitation on the valley floor, and percolation of surface waters through alluvial channels. (DWR, 2006)

Potable Water Sources

Groundwater from Ojai Valley Basin. Surface water from Lake Casitas via Casitas Municipal Water District to various water purveyors.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: No

Downgradient: No. The basin is drained by Thacher and San Antonio Creeks to the Ventura River. (DWR, 2006)

DWR CASGEM Groundwater Basin Prioritization Level - Medium

Impact Comments: High nitrates and sulfates reported in the basin. Medium to high levels of nitrates reported in the basin

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Forebay Management Area

Manaegment Area Name:	Forebay Management Area
Forebay Management Area Surface Area:	5,811 acres
Irrigated Acreage:	≈1,797 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Santa Clara River
Aquifers:	Unconfined and confined
DWR Groundwater Basin Designation and Size:	Santa Clara River Valley Basin, Oxnard Subbasin (4-4.02) Surface area 57,642 Acres. Note: DWR groups two County basins into Oxnard Subbasin (4-4.02) (DWR, 2014)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	237,466 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 280
Active: 101
Destroyed: 134
Abandoned: 16
Can't Locate: 28
Non-Compliant: 1

2019 Self Reported Groundwater Extraction to FCGMA (as of March 16, 2020)

Agricultural Extractions: 5,297 AF/Yr

Municipal, Industrial, and Domestic Extractions: 4,500 AF/Yr

Total: 9,797 AF/yr

2019 Groundwater Levels in General for Wells Gauged by County and UWCD

"Key" well 02N22W12R04S - (Oxnard Aquifer) - Note: Measurements from UWCD. Well was dry at the beginning of 2019 but increased approximately 10 feet by the end of the year.

The water level in the one well measured in 2019 increased from the first quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County
(2 wells)

Both samples are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/l?	Yes, 1 well
Secondary MCL Excedances for Chloride >250mg/l?	No
Secondary MCL Excedances for TDS >500mg/l?	Yes, 2 wells
Secondary MCL Excedances for Sulfate >250mg/l?	Yes, 2 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 02N22W12R04S: ↑

Upper System ↓

The 5 year trend based on 2015 through 2019 groundwater level elevations is mixed with some wells decling and some rising over the period.

Lower System ↓

The 5 year trend based on 2015 through 2019 groundwater level elevations is mixed with some wells decling and some rising over the period.

5 Year Groundwater Quality Trend 2015-2019

Upper System (Includes wells sampled by other agencies)

SWN	Nitrate	Chloride	TDS	Sulfate
02N22W23B02S	↓	↓	↓	↓
02N22W23G03S	↓	→	→	↓
02N22W11J01S	↓	→	↓	↓

Lower System

SWN	Nitrate	Chloride	TDS	Sulfate
02N22W13N02S	→	↓	↑	↓
02N22W23H04S	→	↓	↑	↓
02N22W26B03S	↑	↓	↓	↓

Wells are located in the southeast portion of the basin.

Sources of Groundwater Recharge

Basin Recharge: percolation of surface flow from the Santa Clara River and, some subsurface flow from Santa Paula Subbasin makes its way over or across the Oak Ridge fault. Some amount of irrigation return also occurs (DWR, 2006) Imported State Project Water via Lake Piru release to Santa Clara River.

Potable Water Sources

Groundwater from Oxnard Plain Forebay basin. Surface water from Santa Clara River diversion via United Water Conservation District. Groundwater from Oxnard Plain Pressure basin via Oxnard Water System. Imported State Project Water from Calleguas MWD via Oxnard Water System.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: Yes, Santa Paula groundwater basin to the northwest and Oxnard Plain groundwater basin to the east and south.

Downgradient: Yes, Mound groundwater basin to the southwest. Oxnard Plain Pressure groundwater basin to the south and southwest. Flow into and out of Mound

DWR CASGEM Groundwater Basin Prioritization Level - High

Impact Comments: Saline intrusion, nitrates, pesticides, and PCBs have impacted some water wells per (B-118)

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Oxnard Subbasin

DWR Groundwater Basin Designation and Size:	Santa Clara River Valley Basin, Oxnard Subbasin (4-4.02) Surface area 57,642 Acres. Note: DWR groups two County basins into Oxnard Subbasin (4-4.02) (DWR, 2014)
Irrigated Acreage:	≈21,540 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Santa Clara River and Calleguas Creek
Aquifers:	Unconfined and confined aquifers
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	237,466 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 1,179
Active: 465
Destroyed: 534
Abandoned: 78
Exempted: 1
Can't Locate: 98
Non-Compliant: 4

2019 Self Reported Groundwater Extraction to FCGMA (as of March 16, 2020)

Agricultural Extractions: 27,886 AF/Yr

Municipal, Industrial, and Domestic Extractions: 17,208 AF/Yr

Total: 45,094 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

UAS "Key" well 01N21W07H01S - December level was up 2.12 feet from the March measurement.

LAS "Key" well 01N21W32K01S - September level was down 19.5 feet from the January measurement.

In general, for 24 wells consistently measured in 2019 in the basin, water levels declined in 14 wells and rose in 10 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(46 wells)

UAS - The water in the UAS is best classified as a calcium sulfate type.
LAS - Three water samples are sodium sulfate type and the remainder are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 3 wells
Secondary MCL Exceedances for Chloride >250mg/L?	Yes, 3 wells
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 46 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 38 wells

5 Year Groundwater Level Trend 2015 - 2019

UAS "Key" well 01N21W07H01S: ↓

LAS "Key" well 01N21W32K01S: ↑

Upper System

The 5 year trend based on 2015 through 2019 groundwater level elevations is mixed with most wells trending downward.

Lower System

The 5 year trend based on 2015 through 2019 groundwater level elevations is mixed with most wells trending upward.

5 Year Groundwater Quality Trend 2015-2019

Upper System

SWN	Nitrate	Chloride	TDS	Sulfate
01N22W03F07S	↓	↑	↑	↑
01N22W06R02S	↓	↑	↑	↑

Lower System

SWN	Nitrate	Chloride	TDS	Sulfate
01N21W08R01S	→	→	↓	→
01N21W28D01S	→	↓	↓	↑
01N22W03F05S	↓	→	↑	↓
01N22W16D04S	↓	↑	↓	↓
02N21W20Q05S	↑	↑	↓	↓
02N22W36E02S	→	→	↑	↓

For upper system, both wells are in the northwest. For lower system the wells are generally in the center of the basin along a northeast to southwest line, and a small group in the southeast.

Sources of Groundwater Recharge

Basin Recharge:percolation of surface flow from the Santa Clara River, into the Oxnard Forebay; precipitation and floodwater from the Calleguas Creek drainage percolate into the unconfined gravels near Mugu Lagoon. Some underflow may come from the Las Posas and Pleasant Valley Basins on the east. Flow into and out of Mound basin dependent on water levels. (DWR, 2006). Imported State Water Project water via Lake Piru release to Santa Clara River

Potable Water Sources

Groundwater from Oxnard Plain Pressure Basin via various purveyors. Groundwater from Oxnard Forebay basin via United Water system. Surface water from Santa Clara River via United Water System. Imported State Water Project water from Calleguas MWD to various water purveyors.

Subsurface Hydrologic Connection to Other Groundwater Basins

North: Oxnard Forebay basin, Mound basin

East/Northeast: Pleasant Valley basin, West Las Posas basin

DWR CASGEM Groundwater Basin Prioritization Level - High

Impact Comments: Saline intrusion, nitrates, pesticides, and PCBs have impacted some water wells per (B-118)

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Piru Subbasin

Groundwater Basin Surface Area:	10,896 acres
Irrigated Acreage:	≈5,600 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Santa Clara River
Aquifers:	Unconfined Aquifer
DWR Groundwater Basin Designation and Size:	Santa Clara River Valley Basin, Piru Subbasin (4-4.06). Surface area 10,896 acres. (DWR, 2014)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	2,744 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 188
Active: 147
Destroyed: 23
Abandoned: 4
Can't Locate: 12
Non-Compliant: 2

2019 Self Reported Groundwater Extraction to UWCD (as of May 21, 2020)

Agricultural Extractions: 9,265 AF/Yr

Municipal Extractions: 487 AF/Yr

Total Extractions: 9,752 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 04N19W25C02S - December level was up 26.6 feet from the March measurement.

In general, for 5 wells consistently measured in 2019 in the basin, water levels rose in all 5 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(6 wells)

Piru basin groundwater is mainly calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	No
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 6 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 6 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 04N19W25C02S: ↑

The 5 year trend based on 2015 through 2019 groundwater level elevations is mixed with 6 wells showing an upward trend and 1 well showing a downward trend.

5 Year Groundwater Quality Trend 2015-2019

(* sampled by UWCD)

SWN	Nitrate	Chloride	TDS	Sulfate
04N18W30J04S	↓	→	↓	↓
04N19W26H01S	→	→	↓	↓
04N19W34J04S	→	↑	↑	↑
04N19W25M03S	→	↓	↓	↓
04N18W20R01S*	↑	↓	→	↓
04N18W27B01S*	↓	→	→	↓
04N18W20M03S*	↑	↑	↑	↑

The wells are in the north central portion of the basin.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation. Subsurface flow from East basin. Surface flow percolation from Santa Clara River, Piru Creek and Hopper Creek. (DWR, 2006) Imported State Water Project water via Lake Piru release to Santa Clara River and percolation ponds.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: Yes, East groundwater basin.
Downgradient: Yes, Fillmore groundwater basin.

DWR CASGEM Groundwater Basin Prioritization Level - High

DWR Impact Comments:GW Quality impacts: nitrates, storm runoff, leaking tanks, etc. (B-118). High Selenium and other inorganics, average TDS was 1450 mg/l (Ventura Co 2011 annual gw report)

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Pleasant Valley Basin

DWR Groundwater Basin Designation and Size:	Pleasant Valley Basin (4-6). Surface area 19,838 acres. (DWR, 2014)
Groundwater Basin Surface Area:	20,267 acres
Irrigated Acreage:	≈7,980 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Calleguas Creek
Aquifers:	Unconfined and confined aquifers
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	66,391 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 346
Active: 85
Destroyed: 182
Abandoned: 29
Can't Locate: 45
Non-Compliant: 5

2019 Self Reported Groundwater Extraction to FCGMA (as of March 13, 2020)

Agricultural Extractions: 3,945 AF/Yr

Municipal, Industrial, and Domestic Extractions: 3,450 AF/Yr

Total: 7,395 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 01N21W03C01S - December level was down 16.3 feet from the January measurement.

In general, for 11 wells consistently measured in 2019 in the basin, water levels declined in 10 wells and rose in one well over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(14 wells)

The water in three samples is sodium chloride, two sample are sodium sulfate type and the remainder are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 3 wells
Secondary MCL Exceedances for Chloride >250mg/L?	Yes, 2 wells
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 14 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 10 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 01N21W03C01S: ↓

Upper System

The 5 year trend is mixed with 2 wells declining and 2 wells showing little to no trend.

Lower System

The 5 year trend is mixed with 1 well declining and 5 wells showingan increasing trend.

5 Year Groundwater Quality Trend 2015-2019

Upper System

SWN	Nitrate	Chloride	TDS	Sulfate
01N21W12D01S	↓	↑	↑	↑
01N21W10A02S	↑	↓	↑	↑

Lower System

SWN	Nitrate	Chloride	TDS	Sulfate
01N21W03K01S	↑	↓	↓	↑
01N21W03R01S	↑	↑	↑	↑
01N21W10G01S	↑	↑	↑	↑
01N21W15D02S	↑	↓	↑	↑
02N21W34G01S	→	↓	↓	↓

One well is in the north central portion, the remaining are in the southwest.

Sources of Groundwater Recharge

Basin Recharge: dominantly from subsurface flow across the Springville fault zone. A modest amount of irrigation water and septic system effluent also contribute to basin recharge. (DWR, 2006)

Potable Water Sources

Groundwater from Pleasant Valley Basin, groundwater from Arroyo Santa Rosa basin via Camrosa Water District. Imported State Water Project water from Calleguas Municipal Water District to various water purveyors.

Subsurface Hydrologic Connection to Other Groundwater Basins

West: Yes, Oxnard Plain Pressure Basin.

East: No.

DWR CASGEM Groundwater Basin Prioritization Level - High

Impact Comments: PC - Discharge of poor quality GW from dewatering wells and effluent discharge from the wastewater treatment facility into the Arroyo Simi have led to rising water levels in the basin along with higher TDS and Chloride levels.

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Santa Paula Subbasin

Groundwater Basin Surface Area:	22,110 acres
Irrigated Acreage:	≈9,100 acres (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Santa Clara River
Aquifers:	Unconfined Aquifer
DWR Groundwater Basin Designation and Size:	Santa Clara River Valley Basin, Santa Paula Subbasin (4-4.04) Surface area 22,110 Acres. (DWR, 2014)
SGMA Basin Priority:	Very Low
DWR Groundwater Basin Population:	47,755 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 294
Active: 153
Destroyed: 80
Abandoned: 11
Exempted: 1
Can't Locate: 49

2019 Self Reported Groundwater Extraction to UWCD (as of May 21, 2020)

Agricultural Extractions: 10,825 AF/Yr

Municipal & Industrial Extractions: 6,754 AF/Yr

Total Extractions: 17,579 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 02N22W02C01S - December level was down 2.4 feet from the March measurement.

In general, for 8 wells measured in 2019 in the basin, water levels declined in 4 wells and rose in 4 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(8 wells)

The water type for all samples is calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	No
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 8 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 8 wells

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 02N22W02C01S: ↑

The 5 year trend based on 2015 through 2019 groundwater level elevations is mixed with most wells showing a upward trend.

5 Year Groundwater Quality Trend 2015-2019

(Based on 3 wells sampled by VCWPD and 2 wells sampled by other agencies*)

SWN	Nitrate	Chloride	TDS	Sulfate
03N21W09K04S	→	↓	↓	↑
03N21W17Q01S	↓	↑	↓	→
03N22W35Q01S	↑	↑	→	↓
03N21W15G03S*	↑	↓	↑	↑
03N21W16H06S*	↑	↑	↑	↓

One well is in the southwest portion of the basin and 4 wells are in the northeast end of the basin.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation. Subsurface flow from Fillmore basin. Surface flow percolation from Santa Clara River, and Santa Paula Creek (DWR, 2006) Imported State Water Project water via Lake Piru release to Santa Clara River.

Potable Water Sources

Groundwater from Santa Paula Basin

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: Yes, Fillmore groundwater basin.
Downgradient: Yes, Mound and Oxnard Plain Forebay groundwater basins

DWR CASGEM Groundwater Basin Prioritization Level - Medium

Impact Comments: Nitrates can fluctuate significantly in the basin, and above MCL. Other inorganics present above MCL.TDS is known to be high.

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Tierra Rejada Basin

Groundwater Basin Surface Area:	1,774 acres
Irrigated Acreage:	≈450 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Calleguas Creek
Aquifers:	Unconfined Aquifer
DWR Groundwater Basin Designation and Size:	Tierra Rejada (4-15) Surface area 4,611 Acres. (DWR, 2014)
SGMA Basin Priority:	Very Low
DWR Groundwater Basin Population:	3,758 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 58
Active: 36
Destroyed: 9
Abandoned: 1
Can't Locate: 12

Water Demand Estimate

Irrigation Demand @ 2 AF/Ac: 900 AF/Yr

Municipal Demand @ 0.5AF/person/Yr: 1,834 AF/Yr

Total Demand Estimate: 2,734 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

No key well is in this basin.

In general, for 2 wells measured in each quarter of 2019 in the basin, water levels increased over the course of the year from the 1st quarter reading to the last quarter reading in one well and declined in the other.

2019 Groundwater Quality in General for All Wells Sampled by County

(9 wells)

One well is magnesium bicarbonate type and the remaining eight are magnesium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 2 wells
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 9 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 1 wells

5 Year Groundwater Level Trend 2015 - 2019

In general for 3 wells consistently measured: (2 wells) ↓ (1 well) ↑

5 Year Groundwater Quality Trend 2015-2019

SWN	Nitrate	Chloride	TDS	Sulfate
02N19W10R02S	↓	↑	↑	↑
02N19W11J03S	↑	↑	→	↑
02N19W14F01S	↑	↑	→	↑
02N19W15J02S	↓	↑	↑	↑

Wells are in various locations in the basin.

Sources of Groundwater Recharge

Basin Recharge: Percolation of rainfall to the valley floor, stream flow, and irrigation return.(DWR, 2006)

Potable Water Sources

Groundwater from Tierra Rejada Basin, Arroyo Santa Rosa Basin via Camrosa Water District. State Water Project water from Calleguas Municipal Water District via Camrosa Water District.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: No

Downgradient: Yes, some subsurface flow into Arroyo Santa Rosa basin.

DWR CASGEM Groundwater Basin Prioritization Level - Very Low

Impact Comments: Locally high nitrates documented in the basin (B-118).

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓

Upper Ventura River Subbasin

Groundwater Basin Surface Area:	9,360 acres
Irrigated Acreage:	≈1,206 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Ventura River
Aquifers:	Unconfined Aquifer
DWR Groundwater Basin Designation and Size:	Ventura River Valley Basin, Upper Ventura River Subbasin (4-3.01) Surface area 7,430 acres. (DWR, 2014)
SGMA Basin Priority:	Medium
DWR Groundwater Basin Population:	10,307 (2010)

Known Water Supply Wells (as of March 2020)

Number of Wells: 202
Active: 118
Destroyed: 34
Abandoned: 16
Can't Locate: 31
Non-Compliant: 3

Water Demand Estimate

Irrigation Demand @ 2 AF/Ac: 2,412 AF/Yr

Municipal Demand @ 0.5AF/person/Yr: 7,980 AF/Yr

Total Demand Estimate: 10,392 AF/Yr

2019 Groundwater Levels in General for All Wells Gauged by County

"Key" well 04N23W16C04S - December level was down 9.3 feet from the March measurement.

In general, for wells measured in 2018 in the basin, water levels declined in 8 wells and rose in 2 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2019 Groundwater Quality in General for All Wells Sampled by County

(3 wells)

The water in one sample is calcium bicarbonate, and two samples are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/l?	No
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 4 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 1 well

5 Year Groundwater Level Trend 2015 - 2019

"Key" well 04N23W16C04S: ↑

In general for 12 wells consistently measured: (3 wells) ↓ (8 wells) ↑ (1 well) →

5 Year Groundwater Quality Trend 2015-2019

(*sampled by other agency)

SWN	Nitrate	Chloride	TDS	Sulfate
04N23W09G03S	↑	→	↑	↑
03N23W05P02S*	↑	↓	→	↑
03N23W08C02S*	→	↓	↑	↑

1 wells is in the north and 2 wells are in the south portion of the basin.

Sources of Groundwater Recharge

Basin Recharge: percolation of flow in the Ventura River and, to a lesser extent, by percolation of rainfall to the valley floor and excess irrigation water. (DWR, 2006)

Potable Water Sources

Groundwater from Lower Ventura River basin. Surface water from Lake Casitas via Casitas MWD to various water purveyors.

Subsurface Hydrologic Connection to Other Groundwater Basins

Upgradient: No.
Downgradient: Lower Ventura River basin.

DWR CASGEM Groundwater Basin Prioritization Level - Medium

Impact Comments: TDS is known to be high in some parts of the basin (B-118)

Groundwater Quality Trend Notes: Trend is relatively flat, or no clear trend → Level trending up ↑ Level Trending down ↓