Ventura County
Watershed Protection District
Water Resources Division

2020 Annual Report of Groundwater Conditions

Ventura County
Watershed Protection District
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."

2020 Annual Report of Groundwater Conditions

Cover Photo: Irrigation well in the Pleasant Valley Basin

Ventura County Watershed Protection District
Water Resources Division
Groundwater Section

2020 Annual Report of Groundwater Conditions

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Table of Contents

List of Figures

List of Tables

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 2020 saw average rainfall throughout the County. In January, the County was designated as an area of no 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 moderate drought. The continued 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 areas of average precipitation, groundwater elevations were mostly mixed compared with the previous spring. Nine of the key well levels had increased and seven 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 (as of Dec 2020) 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 2020 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 *2020 Annual Report of Groundwater Conditions (Annual Report)* is the 15th 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 eleventh among California counties in total crop value in 2019[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, 2020, the California State Department of Finance estimated Ventura County's population to be 842,886, a decrease of 0.4 percent over the revised 2019 population estimate of 846,050. The City of Port Hueneme had the largest estimated percentage increase in population (0.6) while the City of Moorpark had a decrease of 1.0 percent over the previous year. Ventura County's population is expected to exceed 870,000 by the year 2030.

[1] California Department of Food and Agriculture *California Agricultural Statistics Review 2019-2020*
[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. Permits are issued throughout the County, except within the City of Oxnard which issues well permits within its city boundaries. 107 permits for wells and engineering test holes were conditioned and issued during calendar year 2020.

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. A total of 49 inspections were performed in 2020.

2.3 Well Inventory and Status

At the end of 2020 there were 9,330 well records in the database in the categories listed in **Table 2-1**.

Table 2-1: Well inventory and status

2020 Status	Number
Active	4,122
Abandoned	462
Can’t Locate	1,830
Non-Compliant	55
Non-Compliant Abandoned	118
Destroyed	2,733
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 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 2020 at the National Weather Service Oxnard area office was 64 degrees Fahrenheit (ºF), with an average maximum high of 75.1 ºF and an average minimum low of 53.0 ºF[3]. The average annual rainfall, countywide was approximately 16.8 inches[4] for the 2020 water year[5]. Throughout the County, precipitation for the 2020 water year was less than 100% of normal. Moorpark received 95% of normal, while the Matilija Dam area received 73% of the normal rainfall total. **Figure 3-1** shows water year 2020 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[6]. **Figure 3-2** depicts average rainfall for the periods 2001 to 2020 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 (2019 and 2020).

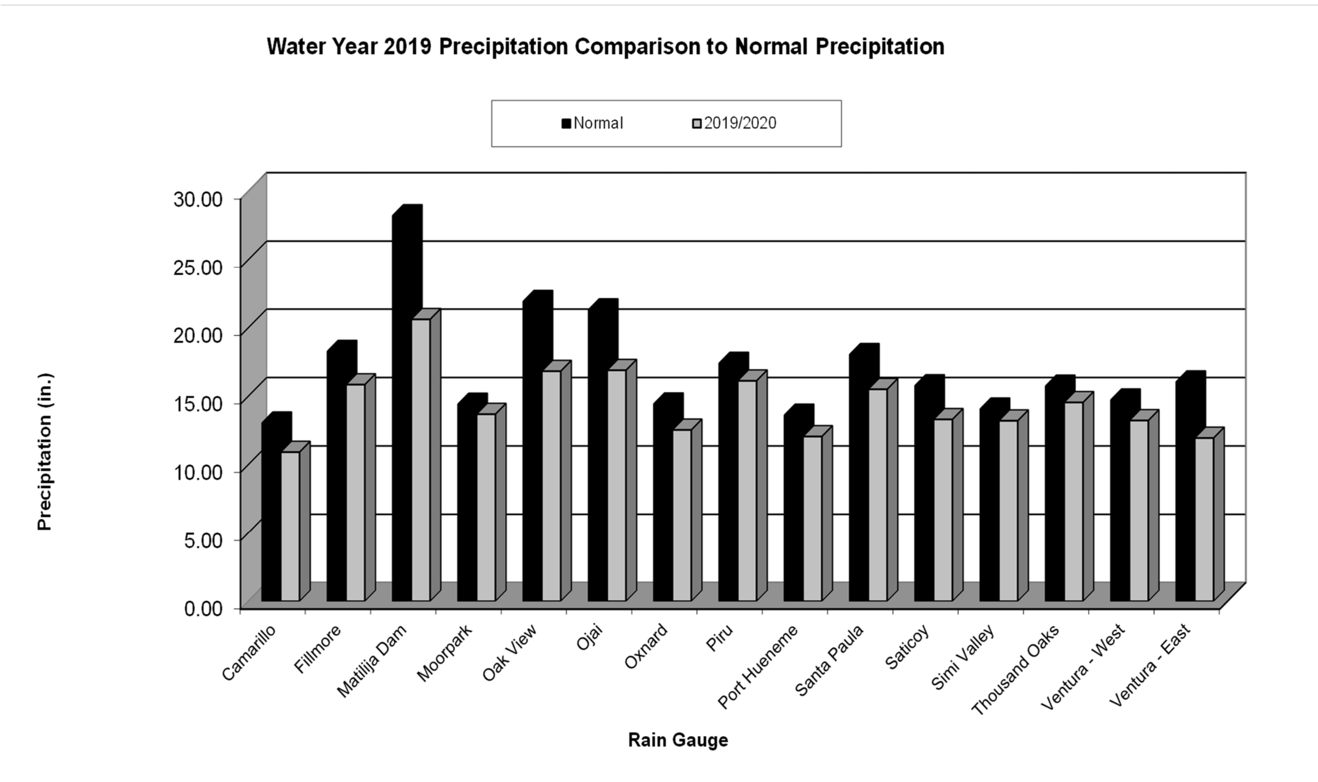


Figure 3-1: Water Year 2020 precipitation and normal precipitation totals

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

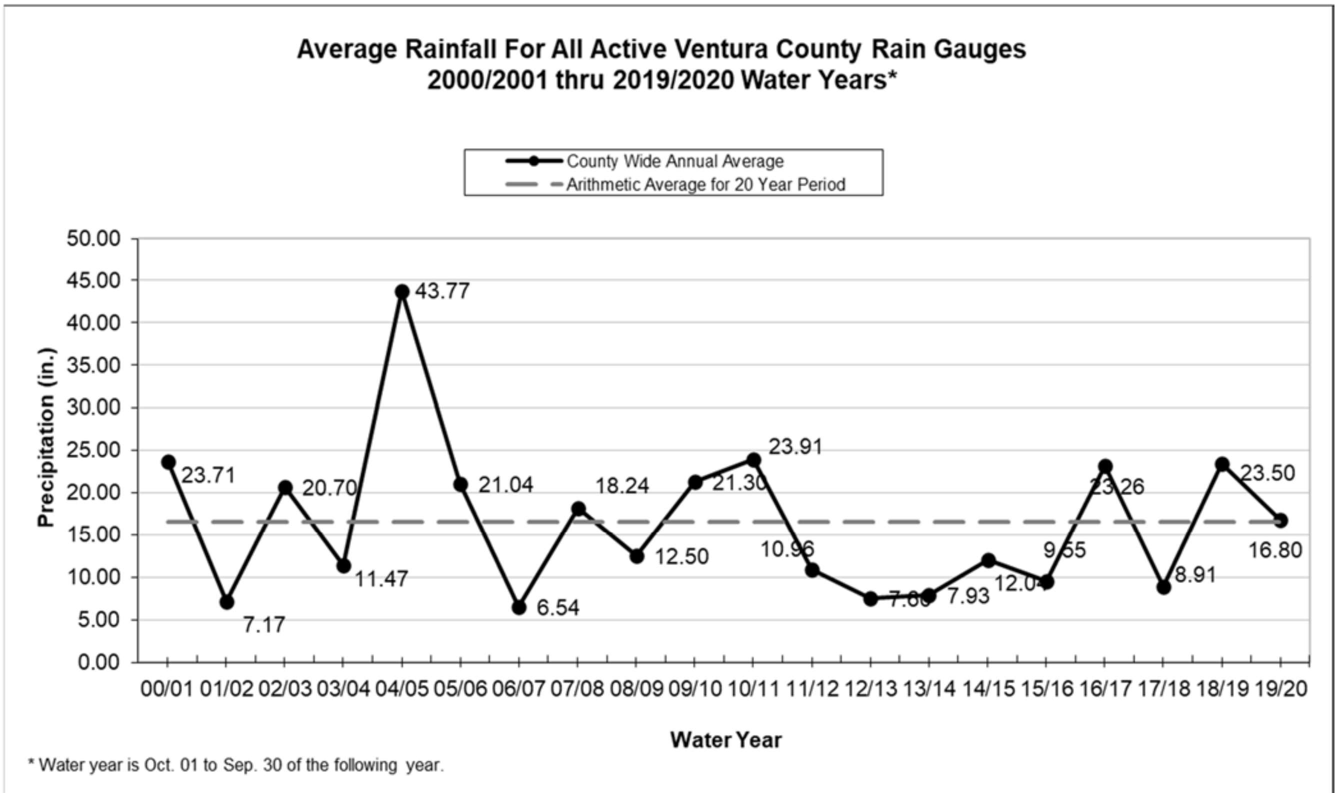


Figure 3-2: Average annual rainfall for Ventura County.

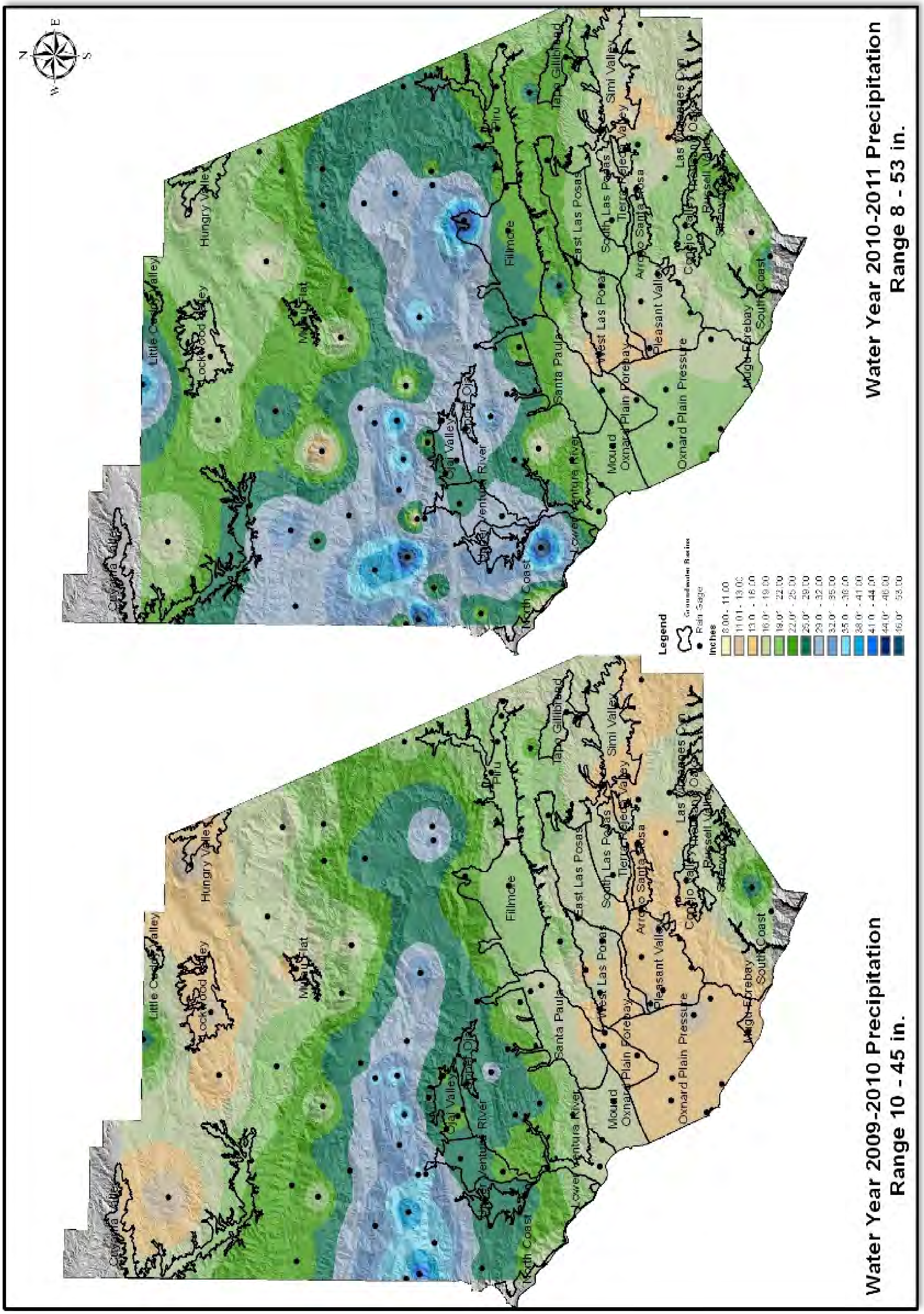


Figure 3-3: Precipitation maps of wet years.

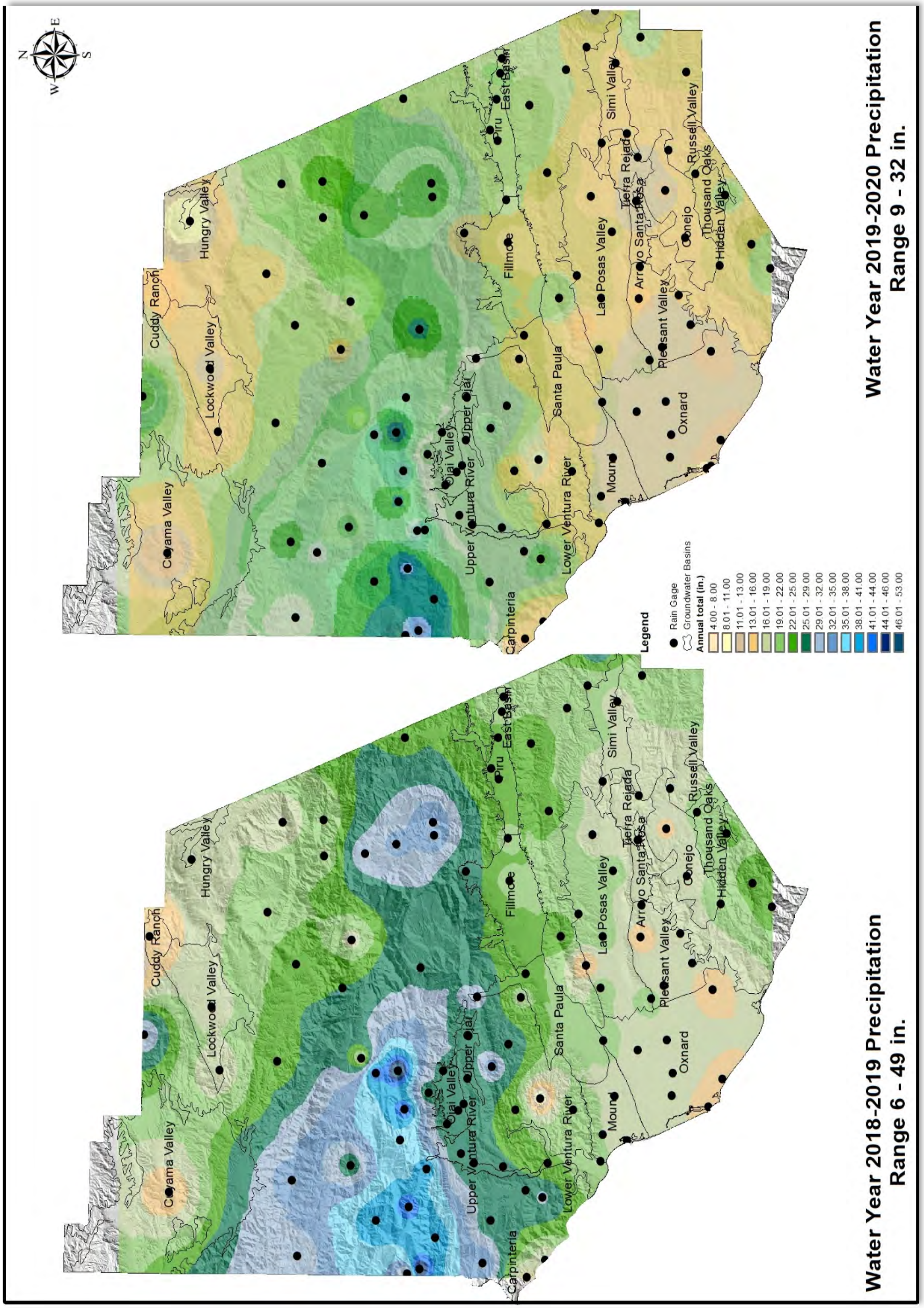


Figure 3-4: Precipitation maps of water years 2019 and 2020

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.

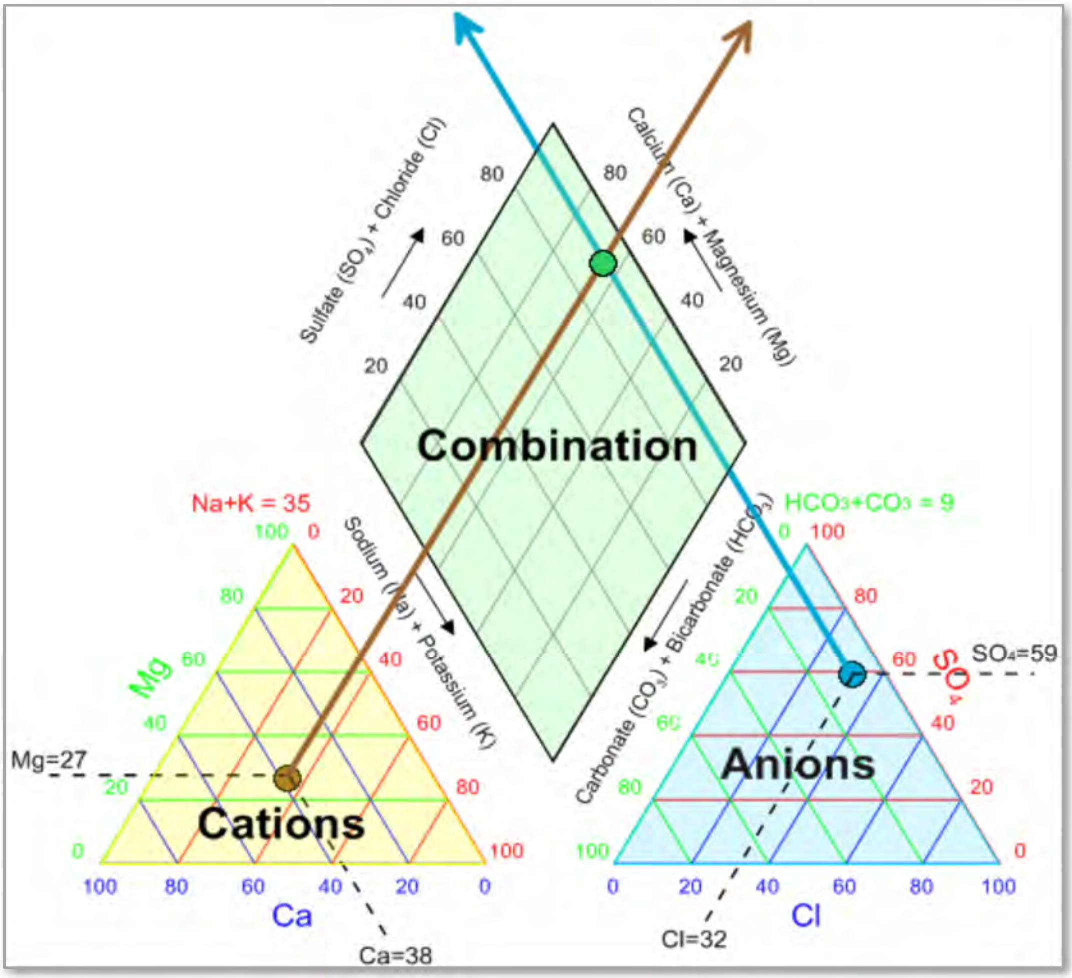


Figure 4-2: Example of a Piper diagram

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

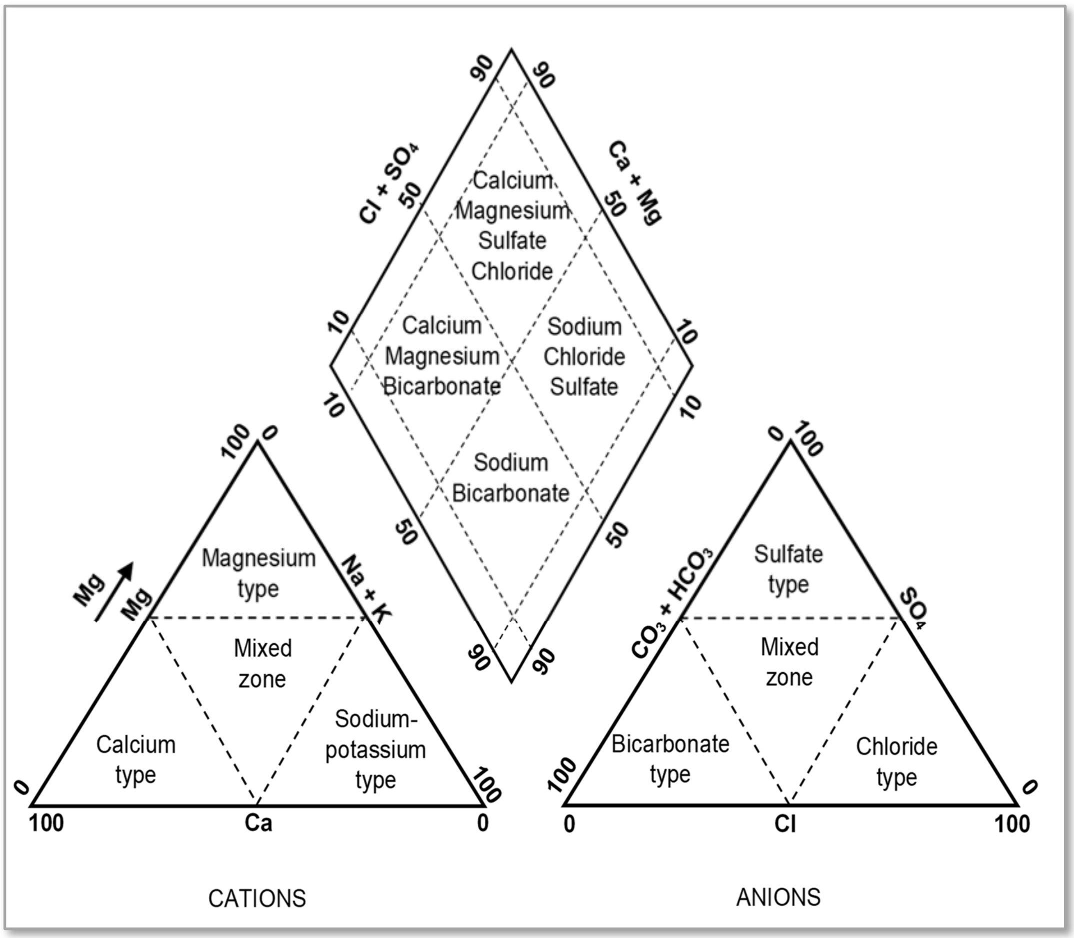


Figure 4-3: Piper diagram with water types.

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 2020 are plotted on their respective basin map.

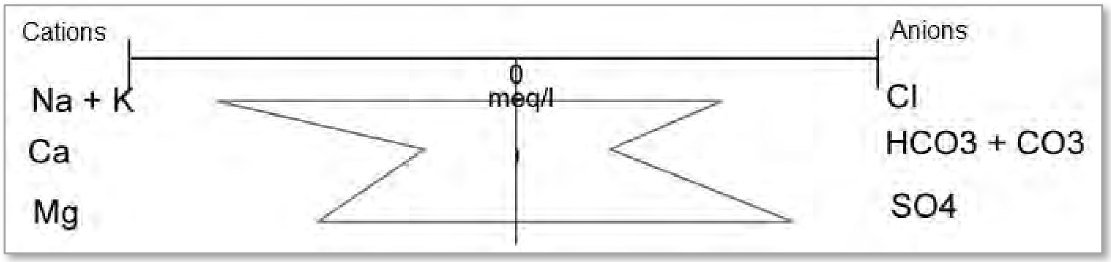


Figure 4-4: Example of Stiff diagram.

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 202 water supply wells were sampled throughout the County in 2020. Well owners are provided with a copy of the laboratory analysis and notified if any of the constituents analyzed exceed the State and 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 58 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 is 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/).

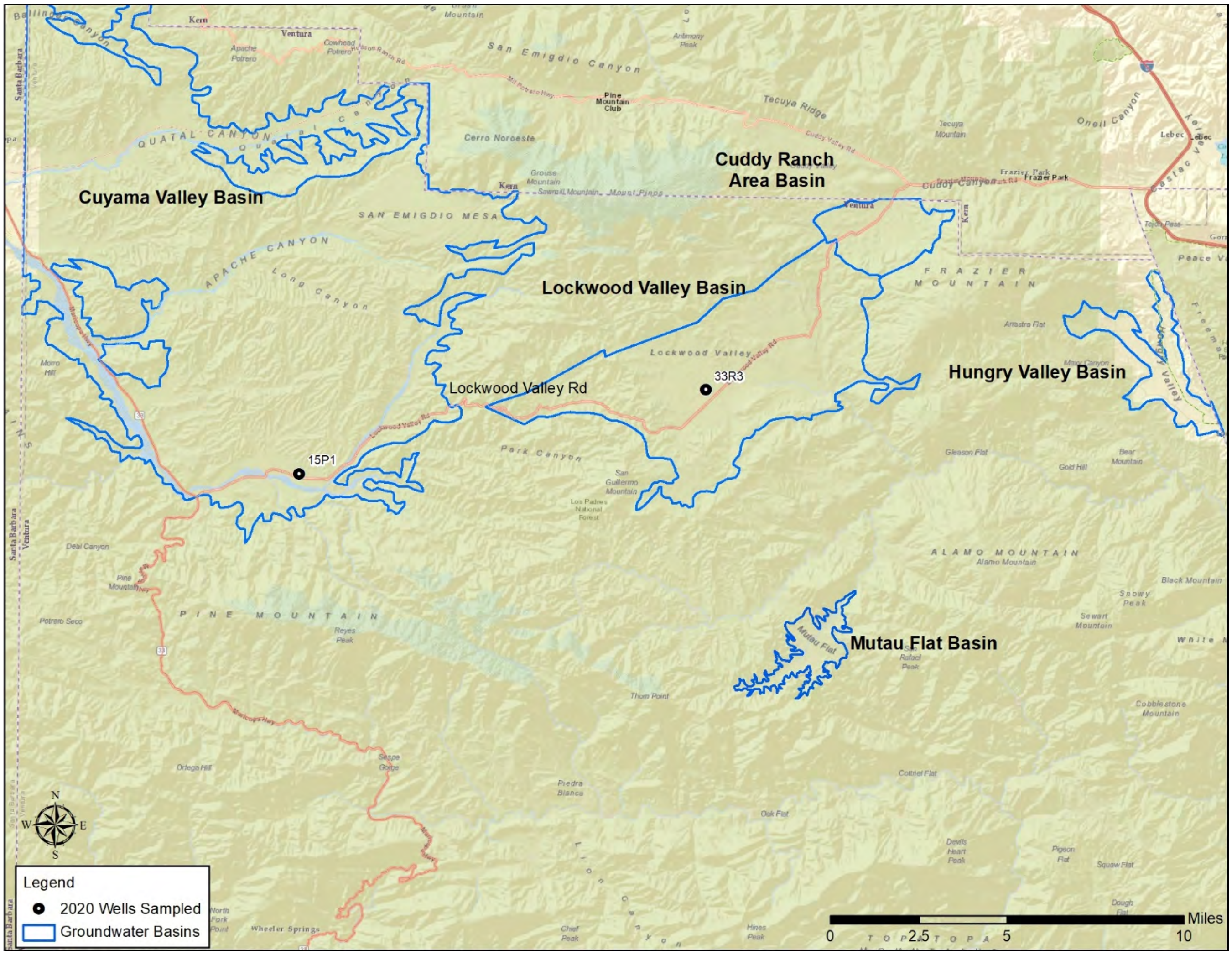


Figure 4-5: Location of wells sampled in North half of the County.

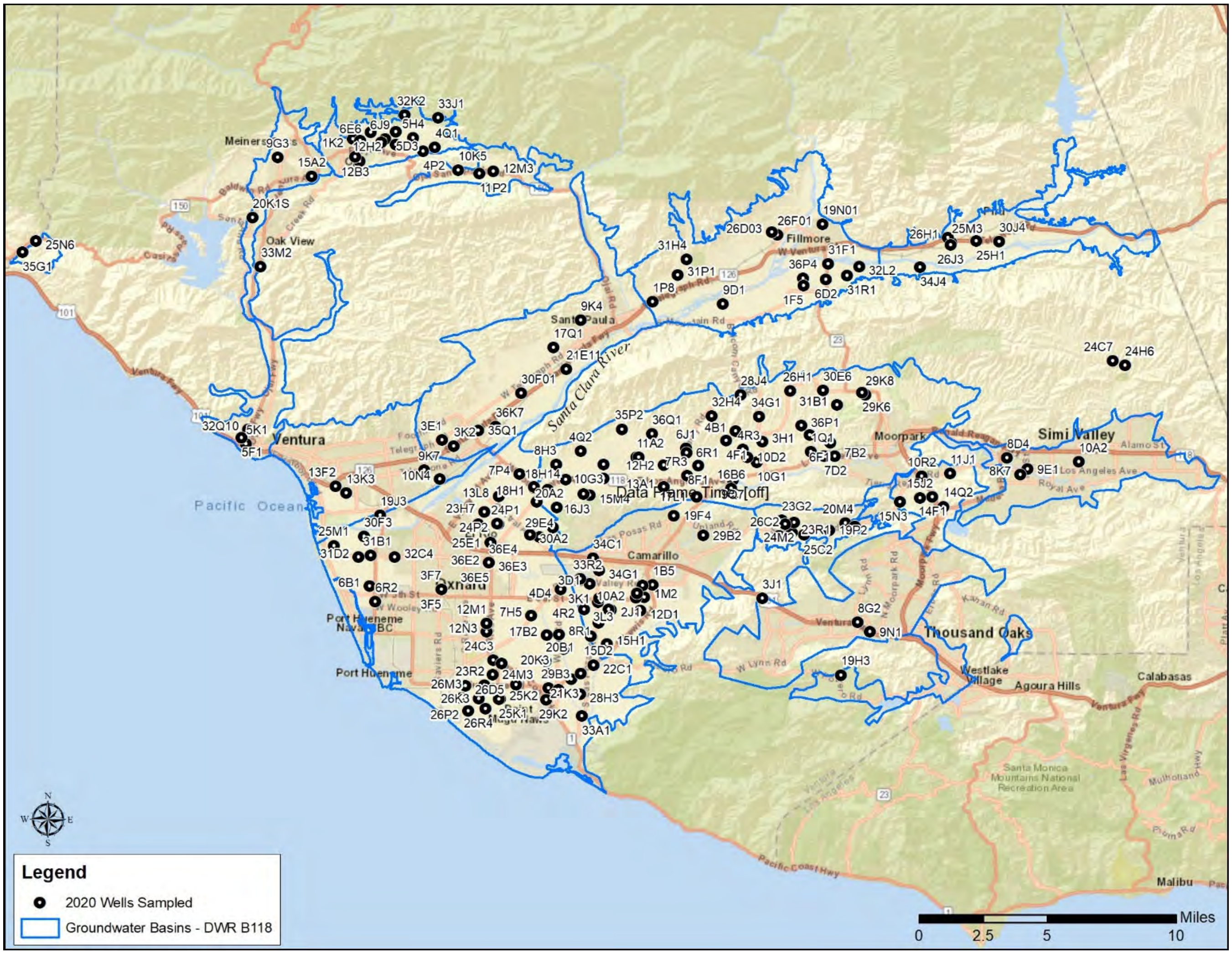


Figure 4-6: Location of wells sampled in South half of the County.

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	Short term exposure: Gastrointestinal distress. Long term exposure: 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	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities. Adults: 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.

5.0 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 5-1** of the Basin Plan.

Table 5-1: 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 (**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.

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 (**Figure E-2**) shows low variation in water quality of wells sampled in 2020. There is no dominant cation, but the samples plot close to the magnesium cation type. The dominant anion for four samples is bicarbonate anion type; the remainder have no dominant anion. All nine water samples are magnesium bicarbonate type.

Selected water quality results are presented in **Table 5-2**. Water from four of the eight wells sampled have nitrate concentrations higher than the primary MCL. All eight wells have TDS concentrations above the secondary MCL ranging from 590 to 990 mg/l. Chloride concentrations in eight wells are above the level that can impair agricultural beneficial uses for sensitive plants. However, they are not above the primary MCL. Three 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 5-1** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-2: 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	11/12/2020	**61.8**	**770**	104	108	0.2
20L1	11/19/2020	**76.4**	**980**	174	116	0.2
20M4	11/12/2020	23.4	**790**	117	130	0.1
23G3	11/12/2020	**77.7**	**800**	91.9	141	0.2
23K1	11/19/2020	17.7	**590**	80	88	0.1
23R1	10/9/2020	**78.2**	**980**	185	171	0.3
24M2	11/19/2020	8.4	**650**	78.1	118	0.1
25C2	11/12/2020	44.7	**850**	166	140	0.3
26C2	11/12/2020	**57.4**	**990**	202	153	0.3

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

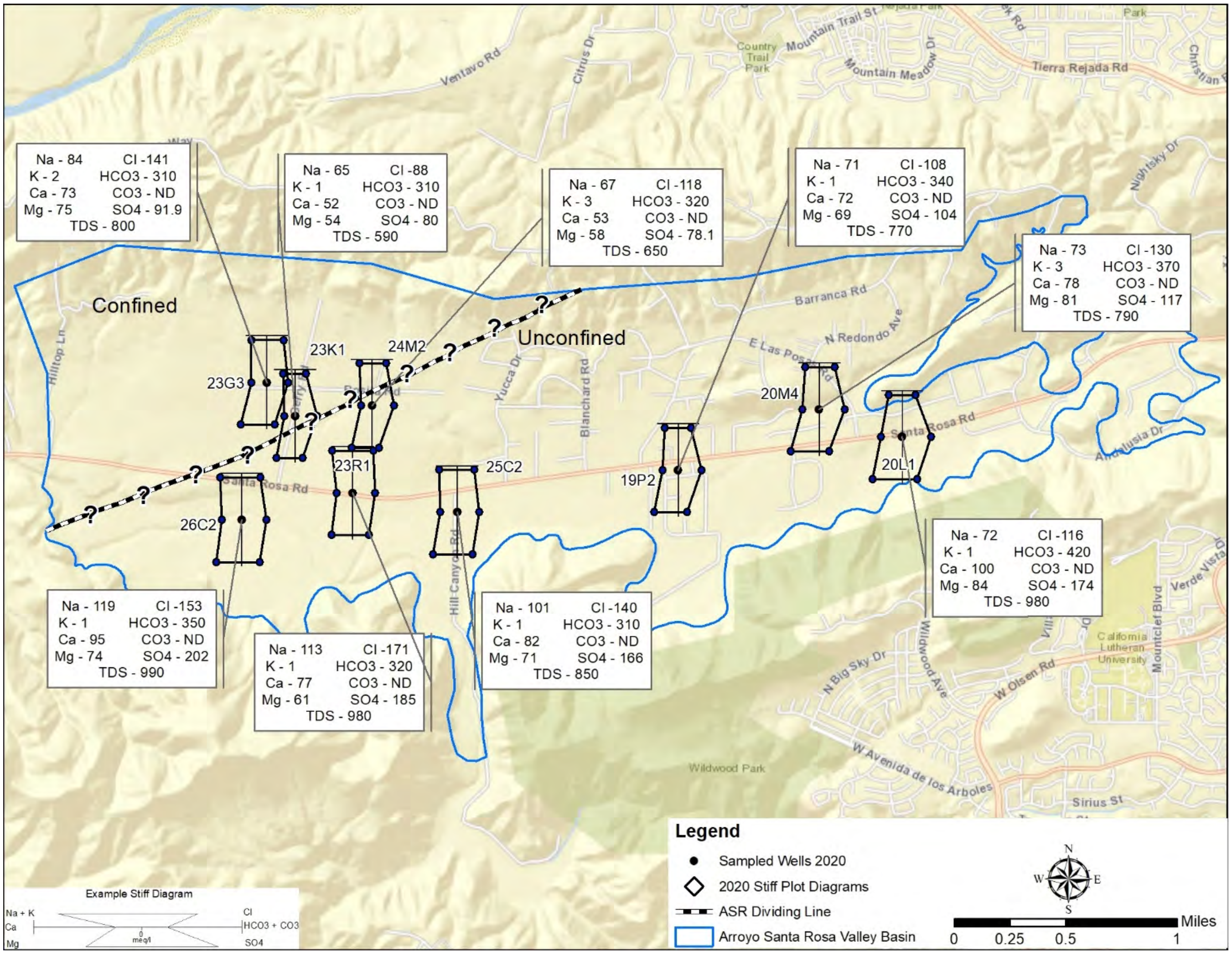


Figure 5-1: Arroyo Santa Rosa Basin wells sampled with Stiff diagrams and selected inorganic constituents.

Figure 5-2 shows the geographic distribution of wells sampled in 2020, with graduated symbols representing nitrate concentrations. **Figure 5-3** shows nitrate results for 2011 through 2020 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 (NCZO) were established to mitigate nitrate impacts. These include limiting the number of large animals kept and restricting on-site 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 nitrate concentrations which were as high as 292 mg/L.

ARROYO SANTA ROSA VALLEY BASIN
2020 Nitrate Concentrations

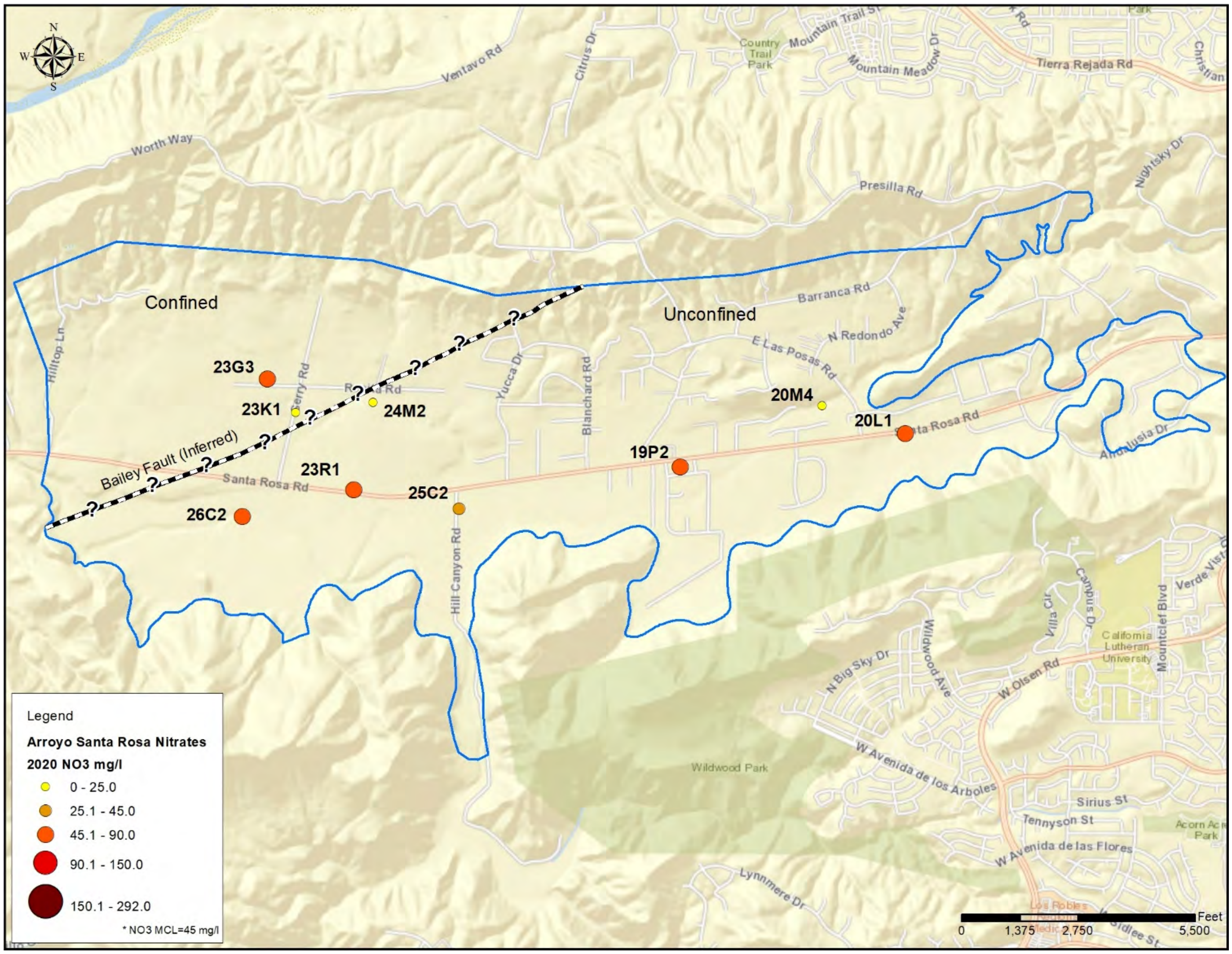


Figure 5-2: Arroyo Santa Rosa Basin nitrate concentrations for 2020.

ARROYO SANTA ROSA VALLEY BASIN
2011 – 2020 Nitrate Concentrations

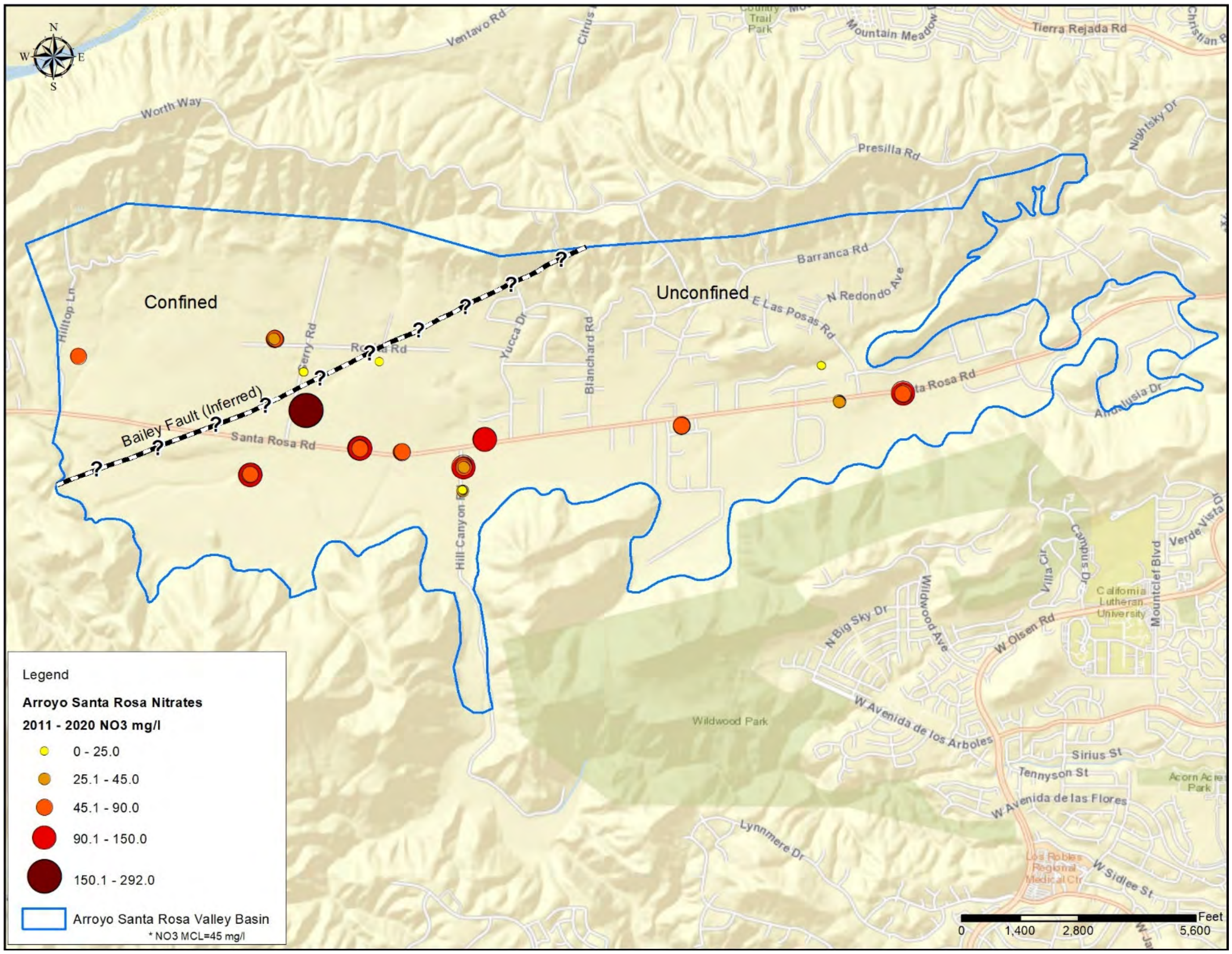


Figure 5-3: Arroyo Santa Rosa nitrate concentrations for 2011 – 2020.

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 in the 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 only 4 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 2020. There is no dominant cation, though both samples plot close to the calcium type. There is no dominant anion. One sample plots close to the sulfate type and one plots close to the bicarbonate type. The water in one sample is calcium bicarbonate and the other is calcium sulfate type.

Both samples had TDS concentrations and one sample had sulfate concentration above the secondary MCL (**Table 5-3**). **Figure 5-4** 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 5-3: 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	9/01/2020	10.5	**1010**	**287**	91	0.3
35G1	9/01/2020	ND	**660**	**244**	28	0.4

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

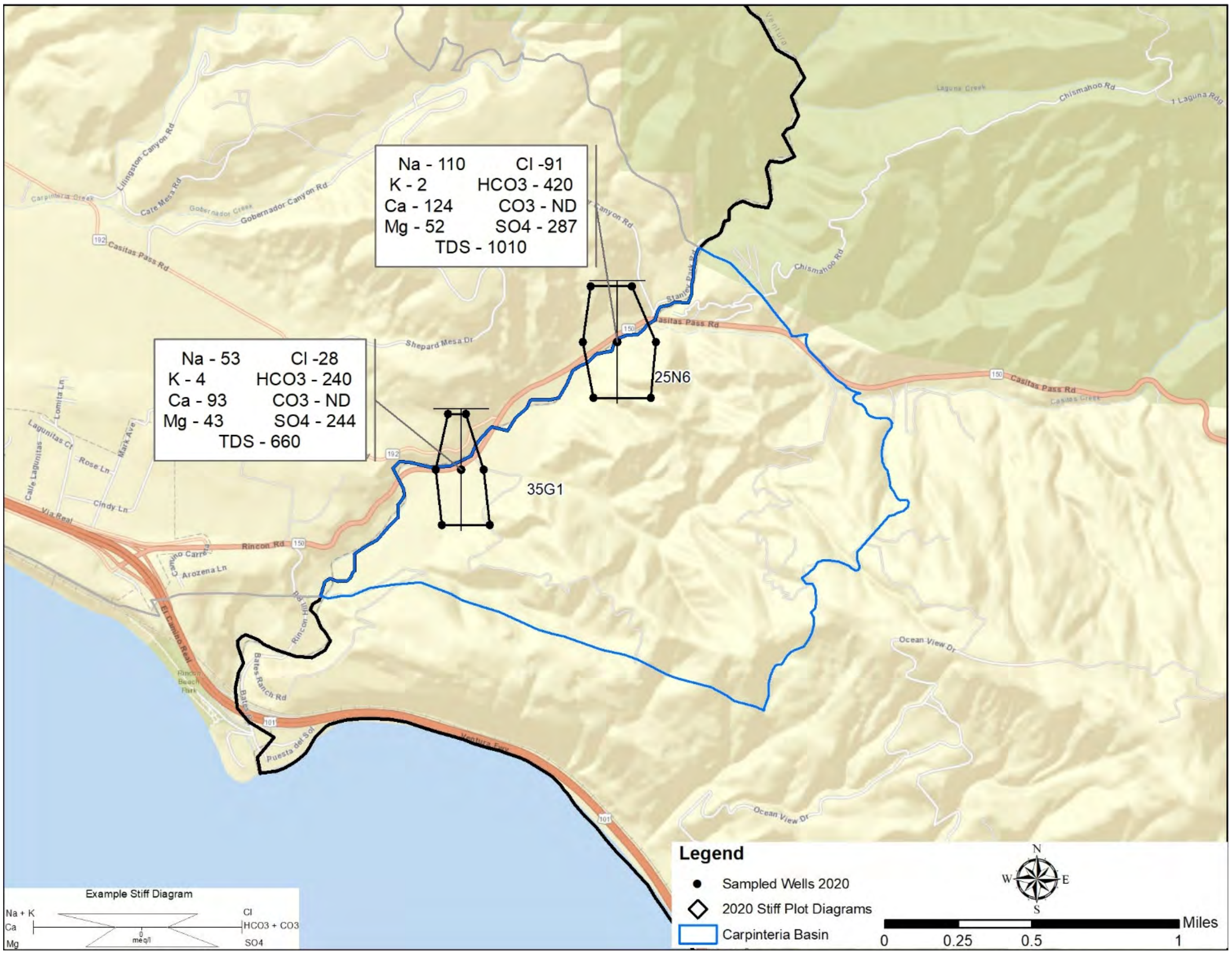


Figure 5-4: Carpinteria Basin sampled wells with Stiff diagrams and selected inorganic constituents.

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 432 wells in the Conejo Basin of which 61 are active water supply wells. Two wells from within the basin and one well from an area just outside the basin were sampled in 2020. The Piper diagram in **Figure E-22** shows little variation in the water quality of wells sampled in 2020. Magnesium is the dominant cation in one sample with no dominant cations in the others, however, they plot close to magnesium. There is no dominant cation in any sample though one plots close to bicarbonate and the other plot close to sulfate. The water in one sample is magnesium bicarbonate type and the others are calcium sulfate type.

All three samples had TDS and two had sulfate concentrations above the secondary MCL (**Table 5-4**). **Figure 5-5** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate. One sample was analyzed for Title 22 metals. None of the constituents were above the primary MCL.

Table 5-4: 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	12/17/2020	ND	**1330**	**433**	119	0.1
9N1	12/17/2020	ND	**1450**	**446**	154	0.2
3J1 (outside basin)	12/17/2020	4	**900**	179	159	0.2

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

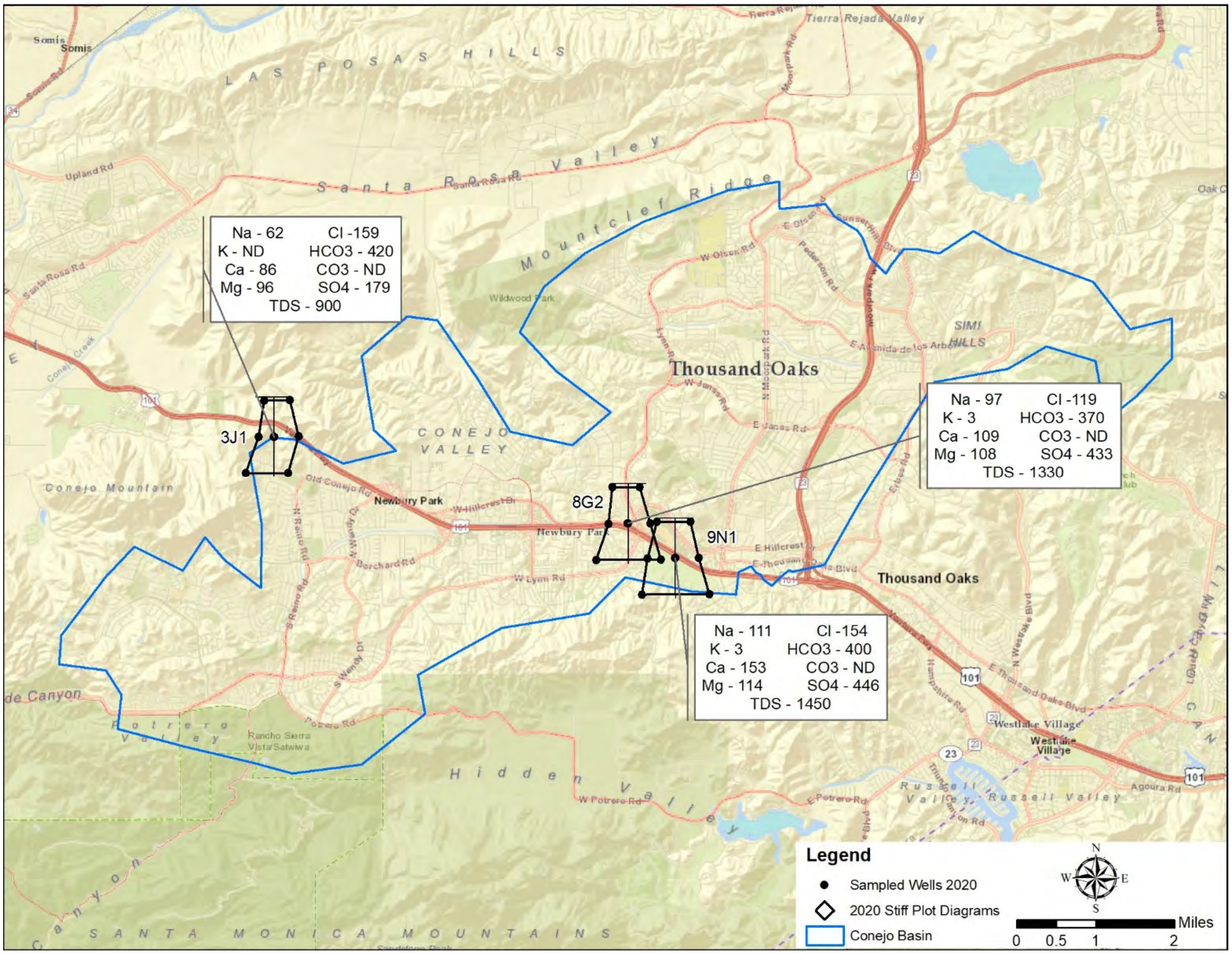


Figure 5-5: Conejo Basin sampled wells with Stiff diagrams and selected inorganic constituents.

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

The Cuddy Ranch Area Basin is in the northeastern part of Ventura County near the boundary of Kern County. 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. Groundwater sampling has been limited to the Little Cuddy Valley portion of the basin. 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. 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. No wells were sampled in this basin in 2020.

Figure 5-6 shows a map of the Cuddy Ranch Area Basin.

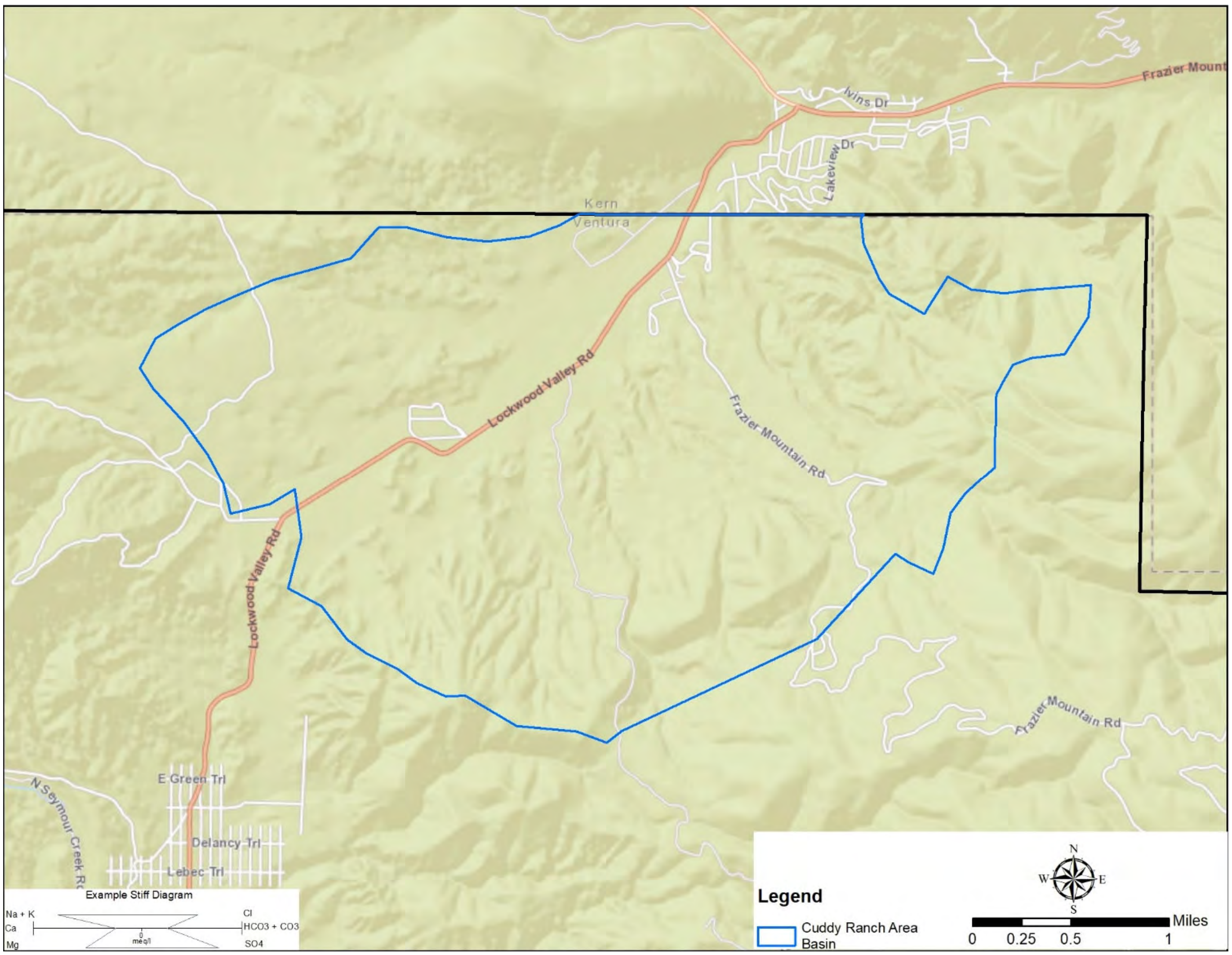


Figure 5-6: Cuddy Ranch Area Basin sampled wells with Stiff diagrams and selected inorganic constituents.

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 5-7** shows only the portion of the basin that is in Ventura County. There are approximately 137 water supply wells in the Basin, of which 102 are active. Depth to the main water-bearing unit varies between 40 to 170 feet bgs. One well was sampled in the basin in 2020. The Piper diagram in **Figure E-24** shows low variability in water quality of the wells sampled in 2020. Calcium is the dominant cation in the sample. Sulfate is the dominant anion in the sample. The water in the sample is calcium sulfate type. One water sample was analyzed for Title 22 metals. No constituents were above the MCL (**Table 5-5**)

The sample had TDS and sulfate concentrations above the secondary MCL (**Table 5-5**). **Figure 5-7** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate. The sample was analyzed for Title 22 metals. None of the constituents were above the primary MCL.

Table 5-5: 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	12/30/2020	2.4	**2030**	**1160**	8	0.2

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

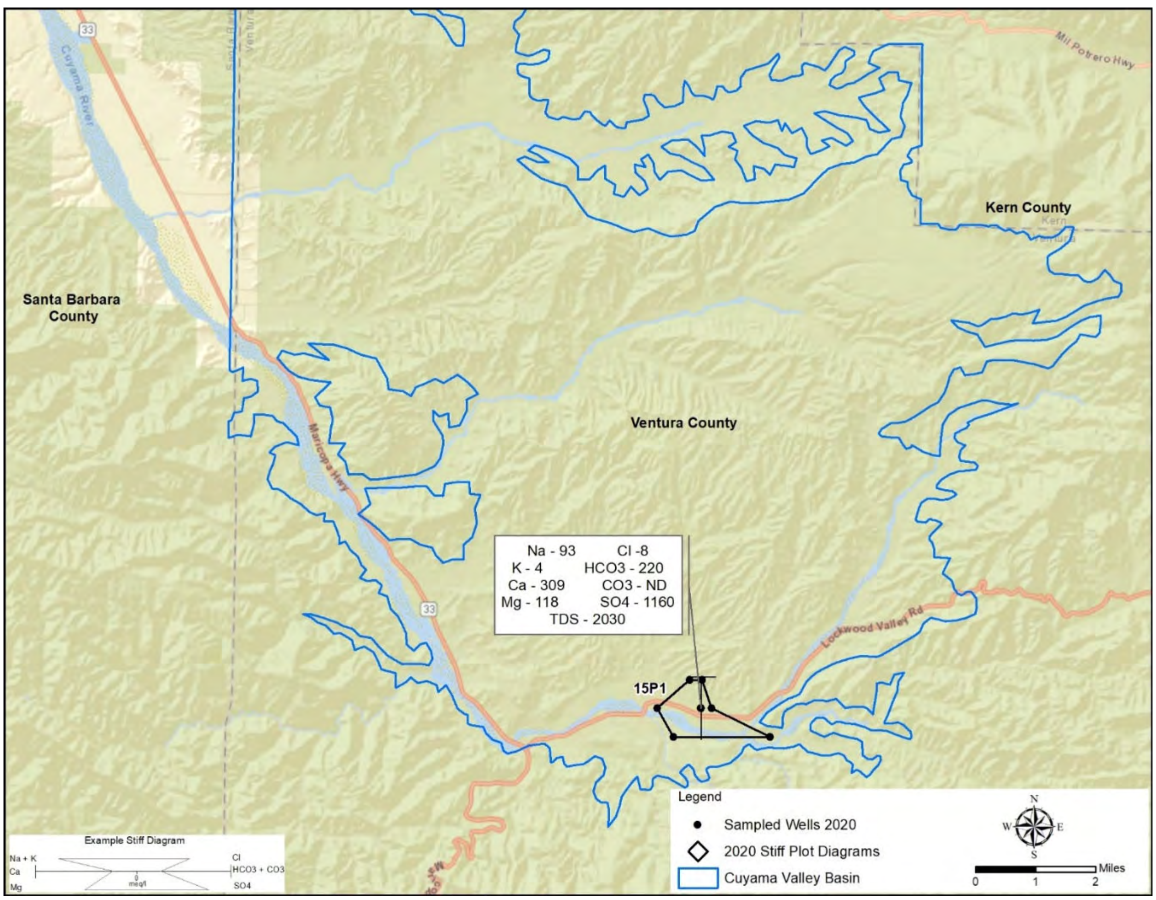


Figure 5-7: Cuyama Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

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 some 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 610 water supply wells in the Fillmore Subbasin, of which 446 are active. Historically, nitrate concentrations have been elevated, but only one of the thirteen wells sampled this year showed elevated nitrate concentration relative to the primary MCL (**Table 5-6**). The Piper diagram in **Figure E-5** shows moderate variability in water quality of wells sampled in 2020. The dominant cation in five 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 eleven samples. One sample has no dominant anion but plots close to sulfate. Two water samples are calcium bicarbonate type and the remaining eleven samples are calcium sulfate type.

TDS concentrations in water from all thirteen wells sampled this season range from 690 to 1,370 mg/L and all thirteen exceeded the secondary MCL. Twelve water samples exceeded the sulfate secondary MCL and water from one well exceeded the manganese secondary MCL. The water in one well had nitrate concentrations greater than the MCL for drinking water. Water from one well was 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. **Figure 5-8** 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 two wells is calcium bicarbonate type and eleven wells are calcium sulfate type.

Table 5-6: 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	8/31/2020	15.4	**1020**	**399**	66	0.5
1F5	08/27/2020	21.1	**1110**	**464**	63	0.6
9D1	8/31/2020	39.4	**1370**	**533**	78	0.8
1P8	8/26/2020	18.5	**1110**	**450**	48	0.6
19N01	9/03/2020	2.7	**1280**	**542**	40	0.4
31F1	8/27/2020	16	**1060**	**395**	71	0.5
31R1	12/01/2020	16.8	**1050**	**369**	67	0.6
32L2	12/01/2020	10.7	**900**	**326**	56	0.6
26D03	9/03/2020	42	**850**	**284**	45	0.2
26F01	8/26/2020	22.6	**880**	**320**	50	0.9
31H04	9/03/2020	17.5	**690**	218	19	0.1

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
31P01	8/26/2020	**75.3**	**1080**	**333**	48	0.1
36P4	08/27/2020	28	**1160**	**444**	60	0.6

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

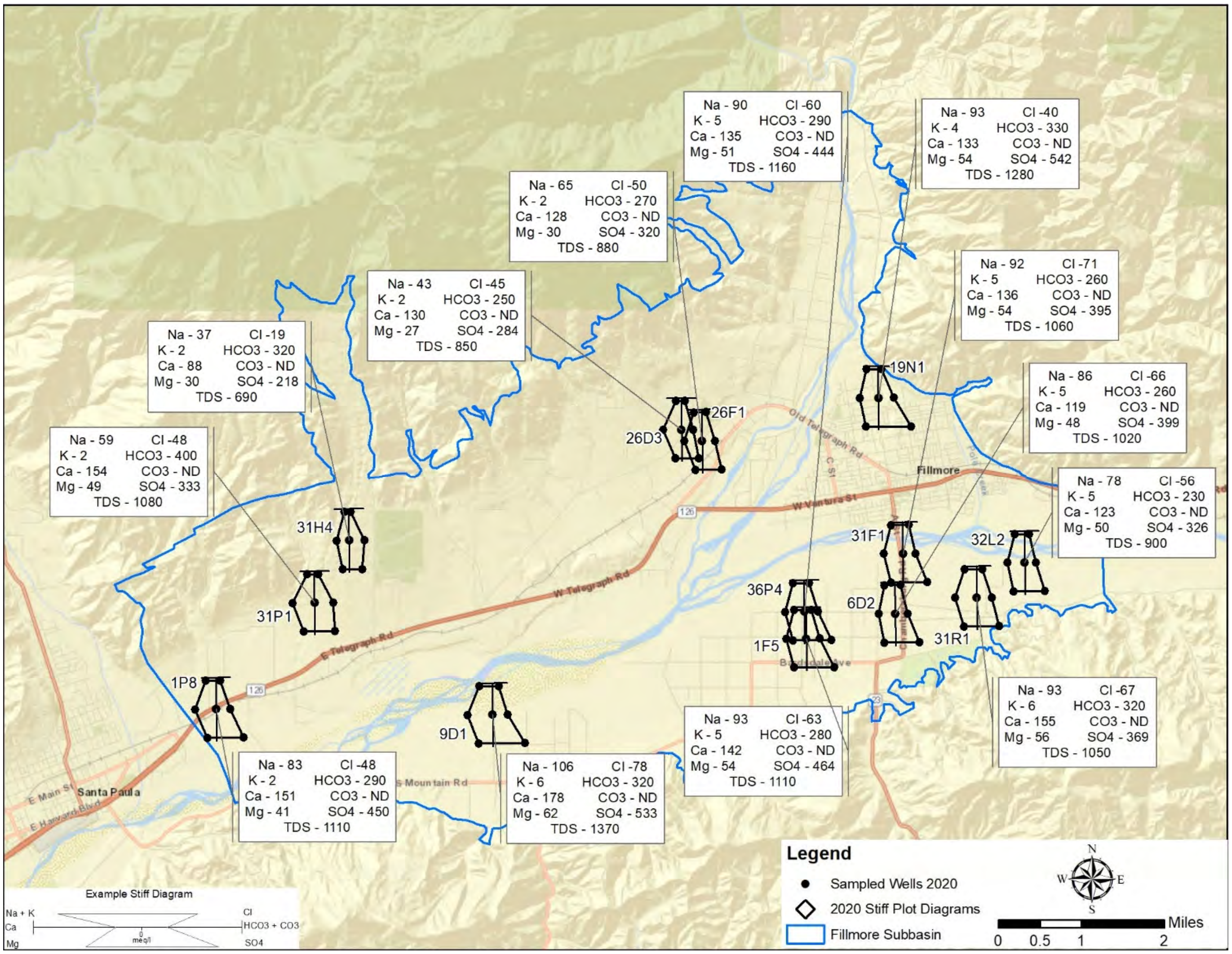


Figure 5-8: Fillmore Subbasin wells sampled with Stiff diagrams and selected inorganic constituents.

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.

Las Posas Valley Basin – East Las Posas 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 402 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 21 wells sampled in 2020. Calcium is the dominant cation in twelve samples and there are no dominant cations in the other samples. Sulfate is the dominant anion in seven samples, bicarbonate is the dominant anion in nine samples and the five remaining samples have no dominant anion. The water in ten wells is calcium bicarbonate type, calcium sulfate in seven wells, sodium bicarbonate in one well, and sodium sulfate in three wells. Chloride concentrations in eight water samples are above the level that may cause impairment of agricultural beneficial uses for sensitive plants. The two southwestern wells have the highest chloride concentration. None of the wells have chloride concentrations that exceed the primary MCL for drinking water. The remainder have good water quality with TDS ranging between 300 and 1,700 mg/L (**Table 5-7**).

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 in two main groups: 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 fairly 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 secondary MCL in ten wells, ranging from 300 to 1,700 mg/L (**Table 5-7**). Water from three wells had nitrate concentrations above the primary MCL. Nine samples had sulfate concentrations above the secondary MCL and four samples had manganese concentrations above the MCL. Water from three wells was analyzed for Title 22 metals and all constituents were below the MCLs. **Figure 5-9** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-7: 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)
4F1	10/28/2020	ND	**1010**	362	89	0.1
36P1	10/27/2020	24.5	310	39.2	19	ND
28J4	10/27/2020	**54.4**	**560**	117	44	0.2
29K8	10/8/2020	16.2	480	130	28	0.1
4B1	10/28/2020	ND	440	147	16	ND
9Q7	9/29/2020	24.5	**1700**	664	194	0.6
16B6	10/21/2020	3.7	**1370**	532	177	0.7
7D2	10/21/2020	18.7	**1140**	405	150	0.7
34G1	10/28/2020	ND	410	126	11	ND
30E6	10/8/2020	5.5	300	67.4	13	ND
29K6	10/8/2020	**72.5**	390	33.6	42	ND
7B2	10/8/2020	6.5	**1270**	461	147	0.8
1Q1	10/8/2020	28.1	**1230**	408	141	0.7
10G1	10/8/2020	**56.8**	**1510**	529	160	0.7
26H1	10/28/2020	6.4	370	85.1	30	ND
4R3	9/29/2020	ND	**1440**	561	160	0.4
10D2	10/23/2020	36.2	450	87.6	48	ND
6F1	10/23/2020	16.7	**1080**	377	128	0.6
31B1	10/28/2020	ND	450	145	27	0.1
3H1	10/30/2020	8.9	370	90.4	27	ND
1B2	10/30/2020	0.6	310	73.1	51	0.2

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

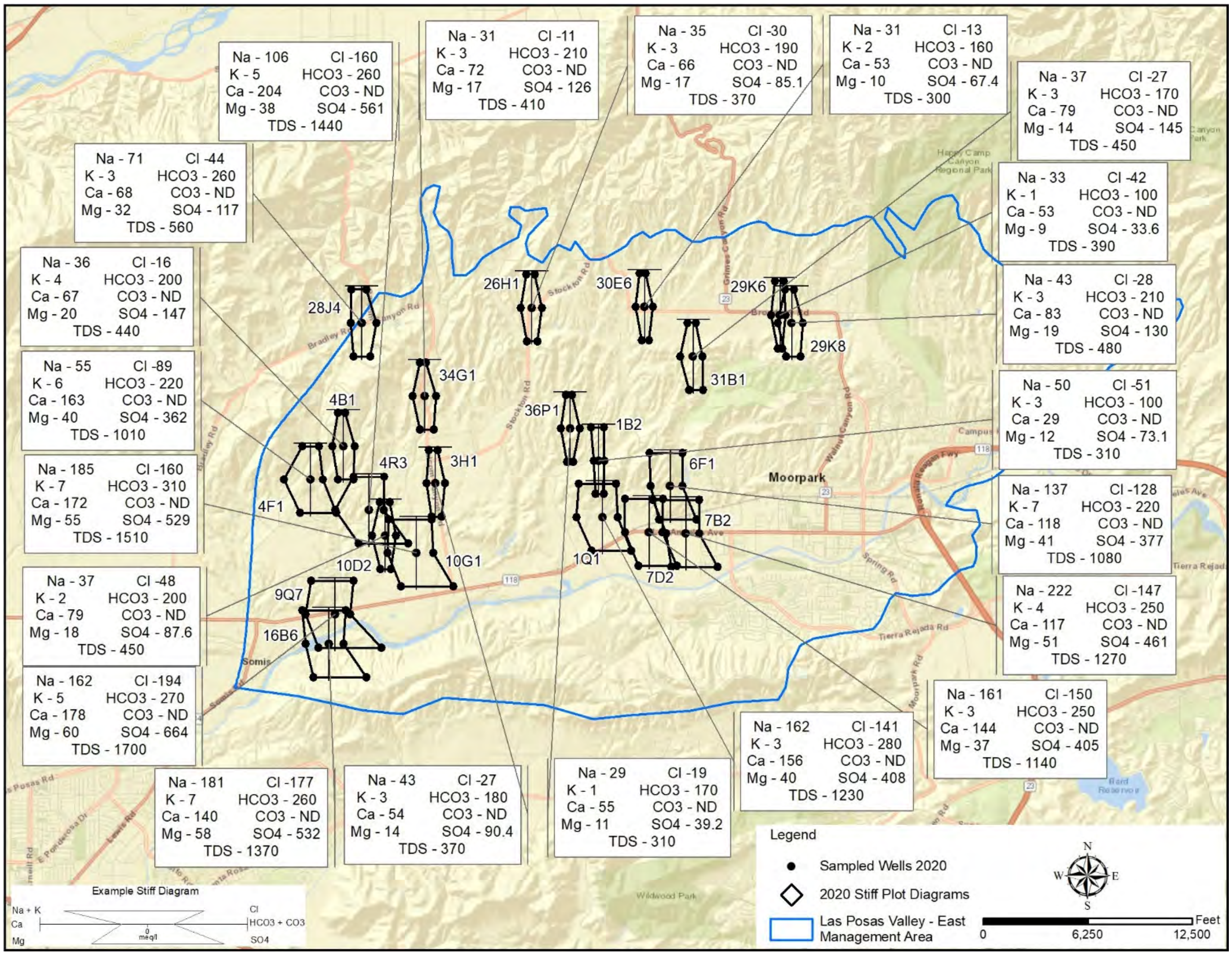


Figure 5-9: Las Posas Valley Basin EMA, sampled wells with Stiff diagrams and selected inorganic constituents.

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. Twenty four wells within the WLPMA were sampled in 2020. The Piper diagram in **Figure E-7** shows moderate variability in water quality. Calcium is the dominant cation in three samples, sodium is the dominant cation in two samples and there is no dominant cation in the remaining samples. Bicarbonate is the dominant anion in six samples, and sulfate is the dominant anion in nine samples. There is no dominant anion in the remaining samples. The water in nine wells is calcium bicarbonate type, three are sodium bicarbonate type, four are sodium sulfate type, and eight are calcium sulfate type.

TDS was above the secondary MCL in 21 wells, ranging from 330 to 2,140 mg/L (**Table 5-8**). Water from four wells had nitrate concentrations above the primary MCL. Eleven samples had sulfate concentrations above the secondary MCL and 17 samples had manganese concentrations above the MCL. Water from eight wells was analyzed for Title 22 metals. Selenium concentration was above the MCL for drinking water in two samples. All other constituents were below the MCLs. **Figure 5-10** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-8: 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	10/30/2020	ND	**620**	209	16	ND
6R1	9/29/2020	ND	**580**	195	17	0.1
7R3	9/29/2020	ND	330	98	16	ND
8F1	9/29/2020	ND	340	96.5	14	ND
17L1	10/1/2020	19.5	**1400**	**524**	151	0.5
4Q2	10/7/2020	44.8	**610**	147	62	0.2
8H3	10/19/2020	14.8	**730**	205	66	0.3
9N1	10/21/2020	2	**890**	**318**	65	0.4
10G3	10/7/2020	3	**560**	143	49	0.3
10Q4	10/23/2020	ND	**780**	**276**	34	0.2
11A2	10/7/2020	**181**	**1440**	**421**	122	0.2
11A3	10/7/2020	0.4	**600**	181	34	0.2
12H2	10/7/2020	13.2	**520**	137	52	0.1
13A1	10/21/2020	ND	430	159	14	0.1
15M4	10/7/2020	29.2	**1230**	**477**	96	0.3
16J3	10/7/2020	ND	**720**	238	52	0.3

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
17F5	10/7/2020	0.9	**1050**	**423**	62	0.6
17N3	9/9/2020	11.2	**970**	**427**	47	0.7
18H1	10/21/2020	**132**	**2140**	**833**	154	0.6
18H14	10/21/2020	ND	**950**	**358**	48	0.4
20A2	11/10/2020	1	**910**	**356**	48	0.6
32H4	10/23/2020	ND	**990**	**388**	24	0.2
35P2	10/7/2020	**64.1**	**790**	188	81	0.2
36Q1	10/8/2020	**73.8**	**690**	145	89	0.2

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

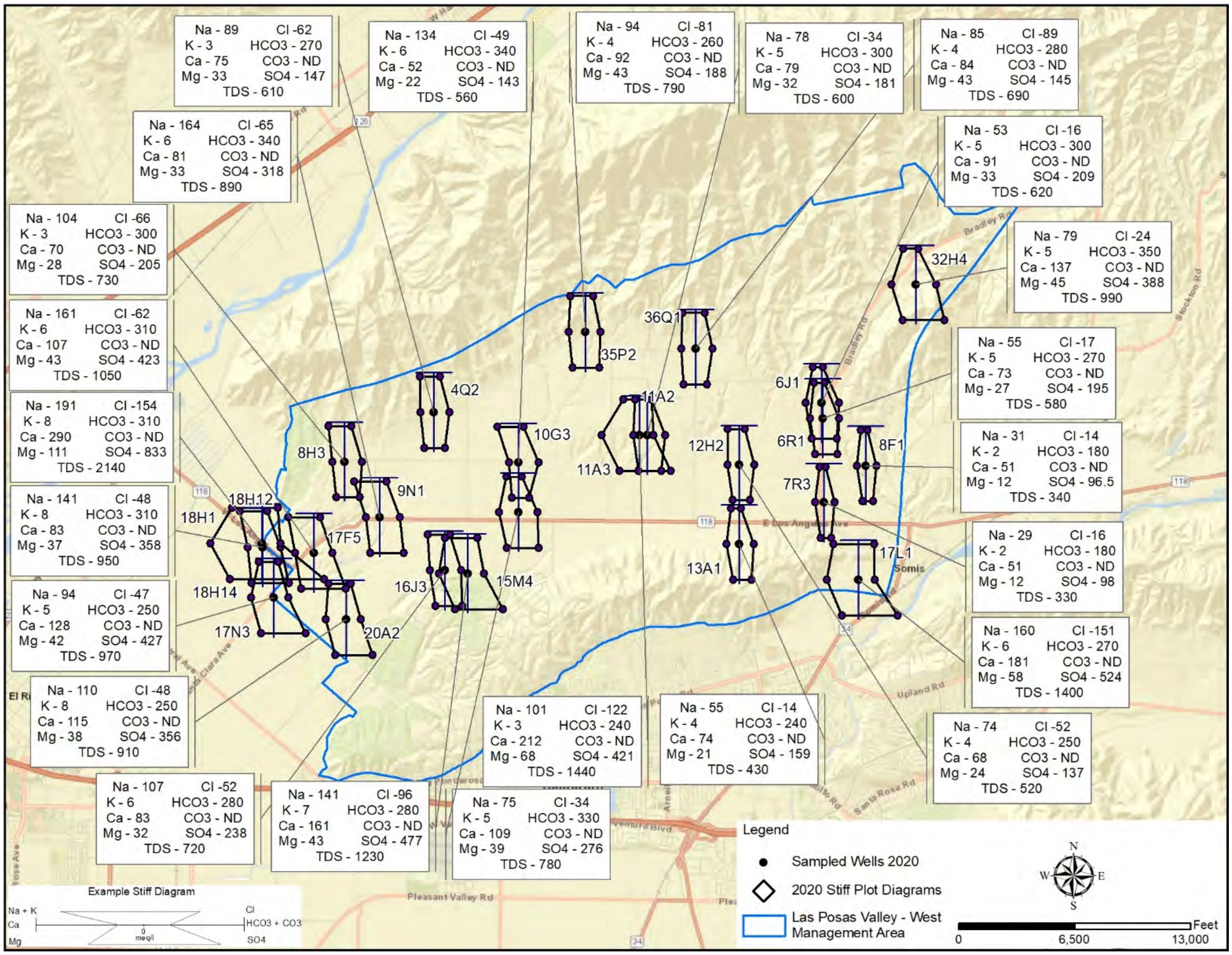


Figure 5-10: Las Posas Valley Basin WMA sampled wells with Stiff diagrams and selected inorganic constituents.

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 248 are active. One well was sampled in the basin in 2020. The Piper diagram in **Figure E-25** shows sodium is the dominant cation and bicarbonate is the dominant anion. The sample is sodium bicarbonate type. One water sample was analyzed for Title 22 metals and gross alpha. All constituents were below the MCL for drinking water.

The sample had TDS concentration above the secondary MCL (**Table 4-9**). **Figure 5-11** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-9: 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)
33R3	12/30/2020	6.4	**560**	178	16	0.7

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

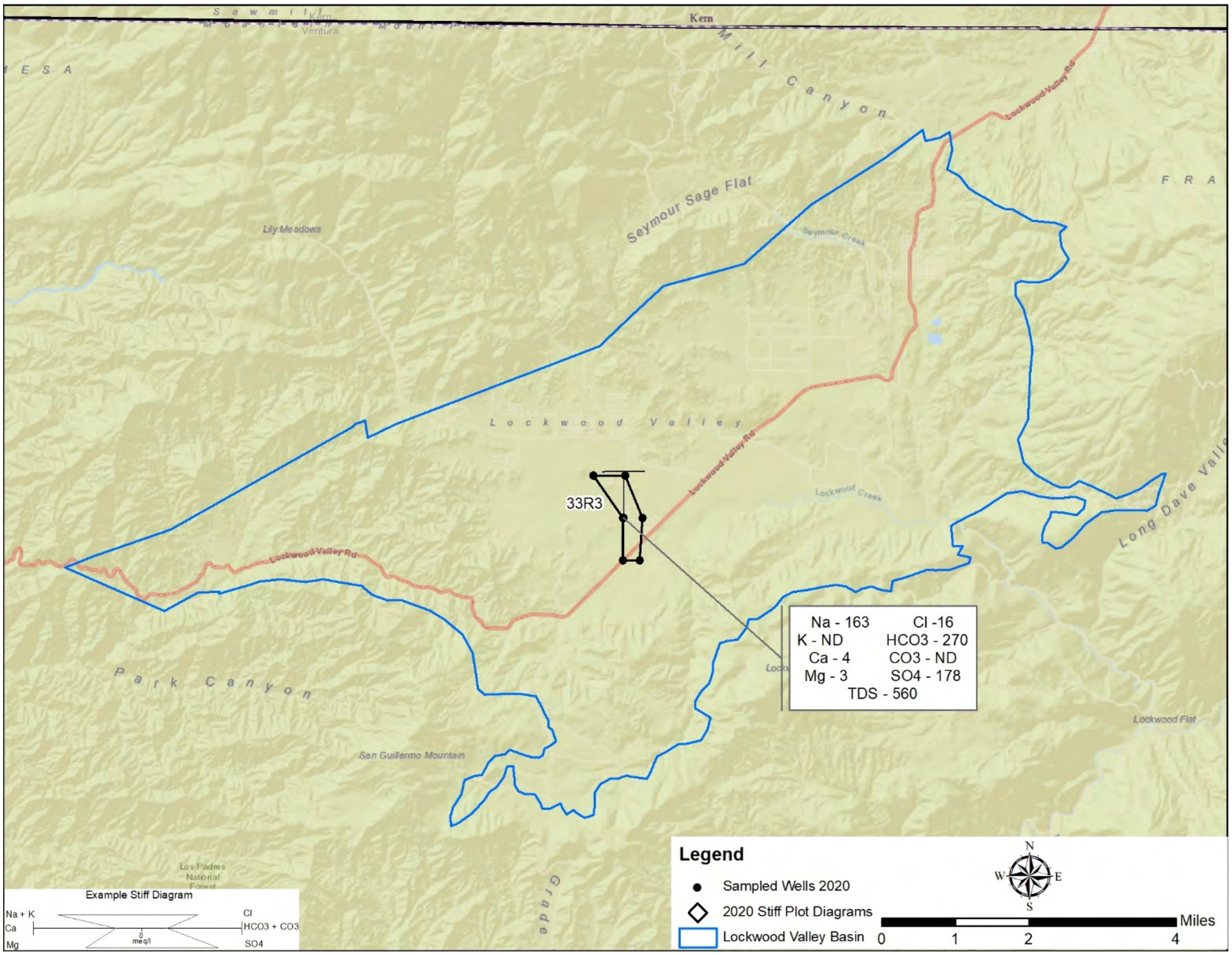


Figure 5-11: Lockwood Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents

Santa Clara River 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 32 are active. Four wells were sampled in the basin in 2020. 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 any of the water samples. Sulfate is the dominant anion for all samples. Three samples are calcium sulfate and one is sodium sulfate type. Two water samples were analyzed for Title 22 metals. All Title 22 constituents were below the MCL for drinking water.

All samples had TDS and sulfate concentrations above the secondary MCL and three samples had elevated manganese. (**Table 5-10**). **Figure 5-12** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-10: 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)
13K3	9/2/2020	2.8	**1250**	**476**	75	0.6
9K7	9/2/2020	ND	**1120**	**470**	68	0.4
13F2	9/2/2020	ND	**1080**	**400**	65	0.6
10N4	9/2/2020	10	**1040**	**428**	48	0.4

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

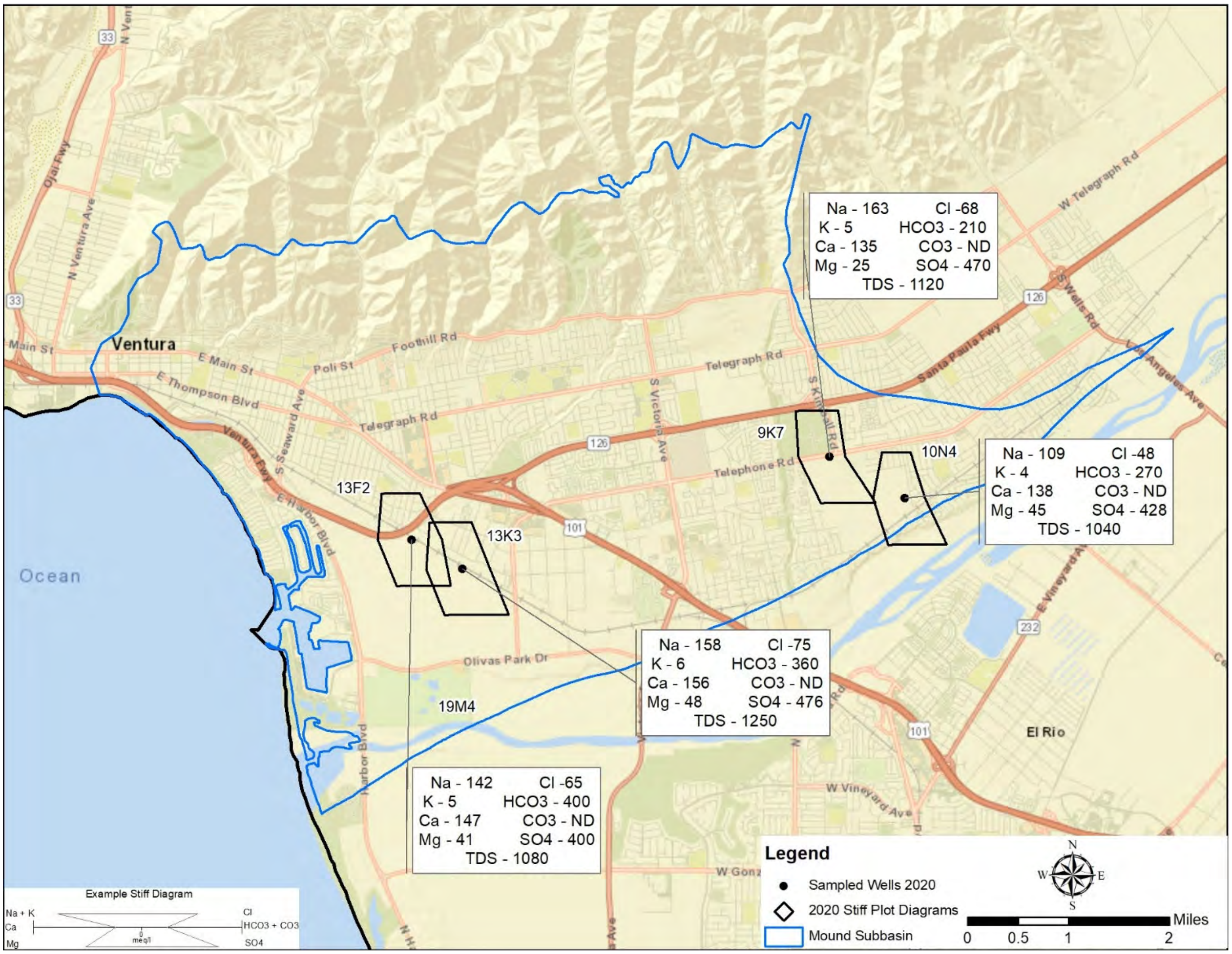


Figure 5-12: Mound Subbasin sampled wells with Stiff diagrams and selected inorganic constituents

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 325 water supply wells in the basin, of which 189 are active. Depth to water-bearing units is generally 25 to 30 feet bgs. Piper diagram **Figure E-8** shows low variation of the water quality for fourteen wells sampled in 2020. Calcium is the dominant cation in eleven samples; sodium is the dominant cation in one sample; and the remaining samples have no dominant cation. Sulfate is the dominant anion in one sample, bicarbonate in two samples, chloride is the dominant anion in one sample and there is no dominant anion in the remaining samples. The water in one well is calcium chloride, one is sodium bicarbonate, five are calcium sulfate, and seven are calcium bicarbonate type.

Water from all fourteen wells had TDS concentrations above the secondary MCL. TDS concentrations range from 590 to 1,360 mg/L. The Sulfate concentration in two wells and the manganese concentration in two wells exceeded the secondary MCL. Water samples from two wells were analyzed for Title 22 metals. None of the constituents were above the primary MCL. **Figure 5-13** 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 5-11: 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)
1J3	11/20/2020	0.4	**590**	162	23	ND
12B3	11/20/2020	ND	**1360**	143	360	ND
6J9	11/20/2020	26.4	**690**	211	31	ND
4Q1	11/20/2020	**48.3**	**640**	211	27	ND
6E6	11/20/2020	39.4	**790**	177	81	ND
4P2	12/10/2020	33.6	**650**	205	26	ND
5D3	12/10/2020	20.2	**720**	236	42	ND
5H4	11/20/2020	20.3	**680**	200	20	ND
5M4	12/10/2020	36.9	**760**	225	27	ND
1K2	11/20/2020	0.8	**690**	188	37	ND
32K2	12/10/2020	5.4	**920**	**308**	47	ND
33J1	11/20/2020	ND	**1010**	**366**	50	ND
6K10	12/10/2020	27.8	**670**	206	30	ND
12H2	9/16/2020	33.7	**720**	206	24	ND

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

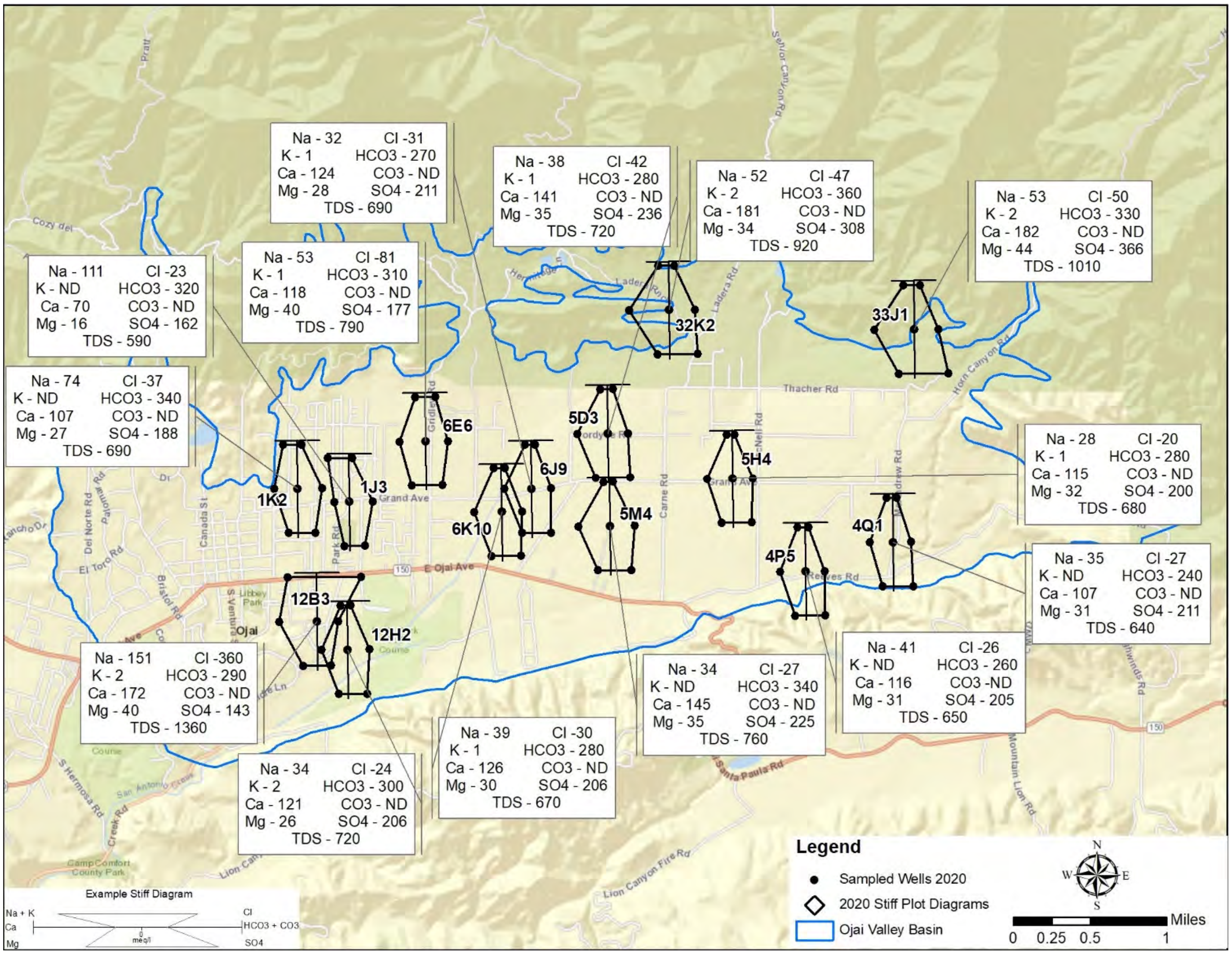


Figure 5-13: Ojai Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

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.

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 281 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. Four wells were sampled in 2020, two in the UAS, one in the LAS, and one screened across both the UAS and LAS. The Piper diagram in **Figure E-28** shows some 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 LAS sample. There is no dominant cation type for the other samples; sulfate is the dominant anion for all samples. The water in all samples is calcium sulfate type. One water sample was analyzed for Title 22 metals

All samples had TDS and sulfate concentrations above the secondary MCL. One sample had a nitrate concentration above the MCL and two samples had manganese concentrations above the secondary MCL. (**Table 5-12**). **Figure 5-14** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-12: 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	10/19/2020	Hueneme / Fox Canyon / Grimes	ND	**1360**	**557**	71	0.6
13L8	11/12/2020	Mugu / Hueneme	ND	**900**	**381**	47	0.6
23Q1	11/20/2020	Oxnard	7.3	**960**	**363**	59	0.7
23H7	11/20/2020	Oxnard / Mugu	45.1	**1390**	**572**	66	0.7

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

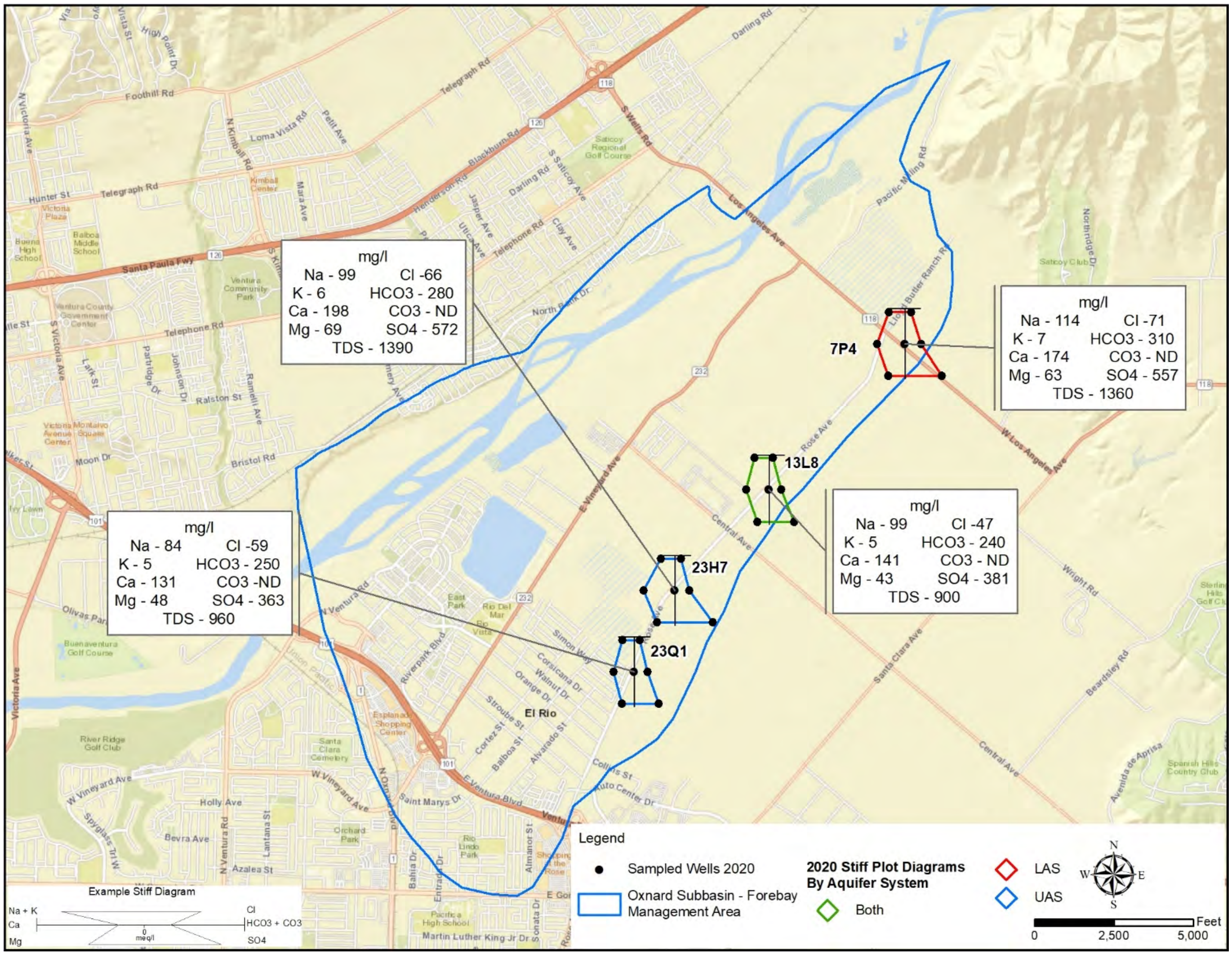


Figure 5-14: Oxnard Subbasin Forebay Management Area sampled wells with Stiff diagrams and selected inorganic constituents.

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.

Eight wells were sampled from the Oxnard Aquifer in 2020. Water from two wells had manganese concentrations above the secondary MCL. Water samples from all eight wells had TDS and sulfate concentrations above the secondary MCL. Sulfate concentrations ranged from 338 to 1090 mg/L. TDS concentrations ranged from 900 to 2,390 mg/L. Water from one well had a nitrate concentration above the primary MCL. Three of the samples were analyzed for Title 22 metals.

Table 5-13: 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	10/1/2020	Oxnard	Upper	ND	**900**	**338**	52	0.6
3F7	9/9/2020	Oxnard	Upper	13.5	**1800**	**788**	87	0.8
6B1	11/19/2020	Oxnard	Upper	5.9	**1530**	**661**	77	0.9
25E1	11/5/2020	Oxnard	Upper	35.8	**2390**	**1090**	107	1
31B1	11/19/2020	Oxnard	Upper	24	**1060**	**460**	55	0.7
32C4	11/25/2020	Oxnard	Upper	33.3	**1090**	**455**	57	0.6
36E5	9/9/2020	Oxnard	Upper	**46.3**	**1620**	**704**	63	0.9
25M1	11/5/2020	Oxnard	Upper	1.7	**1040**	**462**	52	0.6

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 Basin. Sources of nitrate include nitrogen-based fertilizers in agricultural areas and septic systems in residential areas.

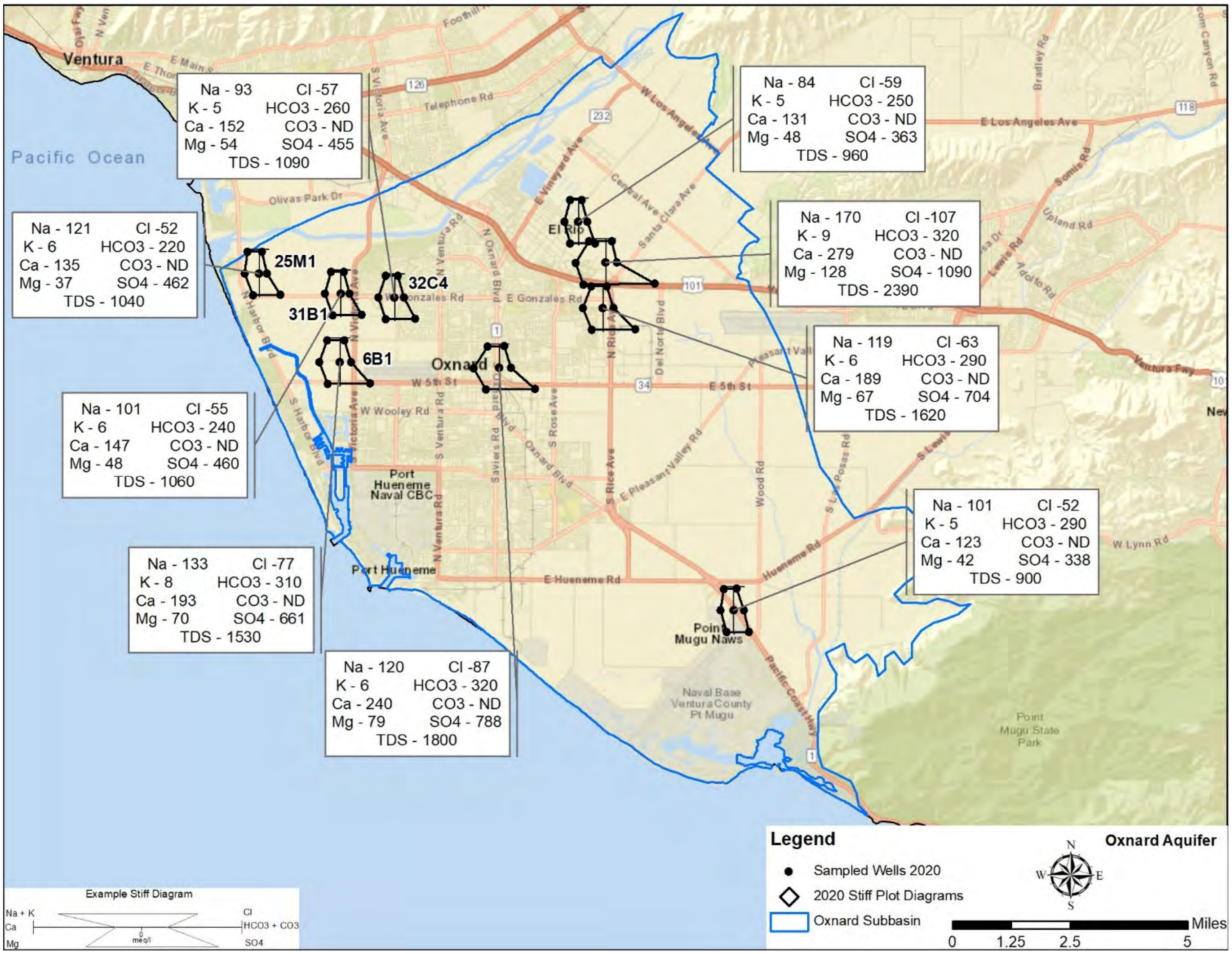


Figure 5-15: Oxnard Subbasin Oxnard Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

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 2020. The water from all wells had sulfate and TDS concentrations above the primary MCL. One well had nitrate above the MCL. One sample was analyzed for Title 22 metals. Three wells had Manganese concentrations above the secondary MCL.

Table 5-14: 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	11/5/2020	Mugu	Upper	4.6	**1480**	**633**	71	0.8
24C3	9/25/2020	Mugu	Upper	ND	**870**	**382**	42	0.6
24M3	9/25/2020	Mugu	Upper	3.4	**1010**	**370**	107	0.6
36E4	9/9/2020	Mugu	Upper	**79.6**	**1670**	**721**	62	0.9

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

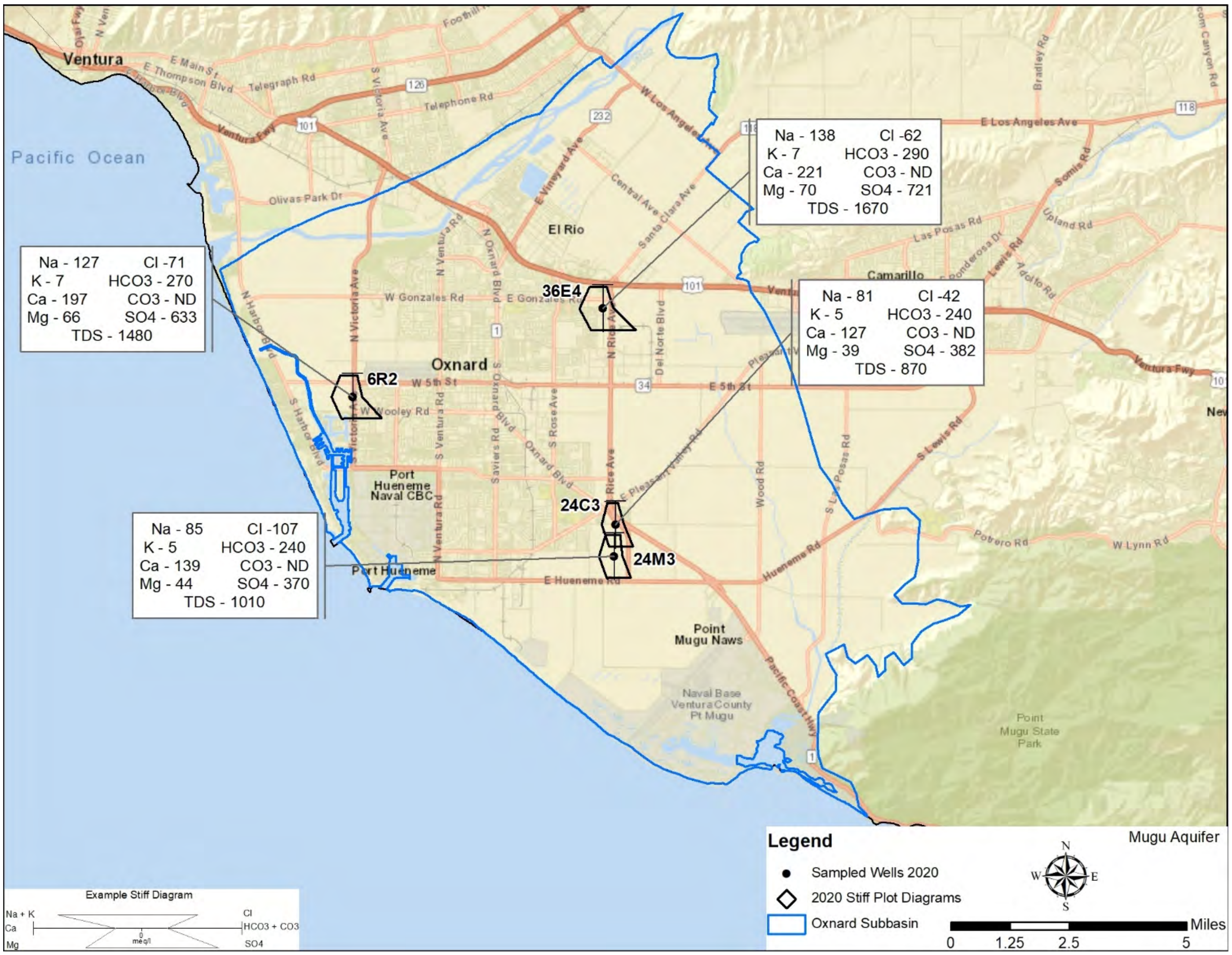


Figure 5-16: Oxnard Subbasin Mugu Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

Oxnard & Mugu Aquifers

Five Oxnard Subbasin wells sampled in 2020 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 of the UAS (**Figure 5-17**). Secondary MCL concentrations were exceeded in four samples for manganese. All five had TDS and sulfate concentrations above the secondary MCL. TDS concentrations varied between 1,020 and 1,670 mg/L. One sample had chloride concentrations above the MCL. Water samples from two Oxnard/Mugu wells were analyzed for Title 22 metals and all constituents were below the primary MCL.

Table 5-15: 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)
7H5	11/25/2020	Oxnard & Mugu	Upper	ND	**1220**	**484**	123	0.6
29B3	11/10/2020	Oxnard & Mugu	Upper	ND	**1020**	**361**	104	0.6
12M1	12/2/2020	Oxnard & Mugu	Upper	ND	**1480**	**717**	67	0.8
25K1	10/1/2020	Oxnard & Mugu	Upper	0.8	**1670**	**619**	**246**	0.7
31D2	9/2/2020	Oxnard & Mugu	Upper	22.3	**1070**	**447**	53	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. One sample has no dominant anion while the dominant anion for the remaining samples is sulfate. One UAS sample is sodium sulfate type and the remaining samples are calcium sulfate type.

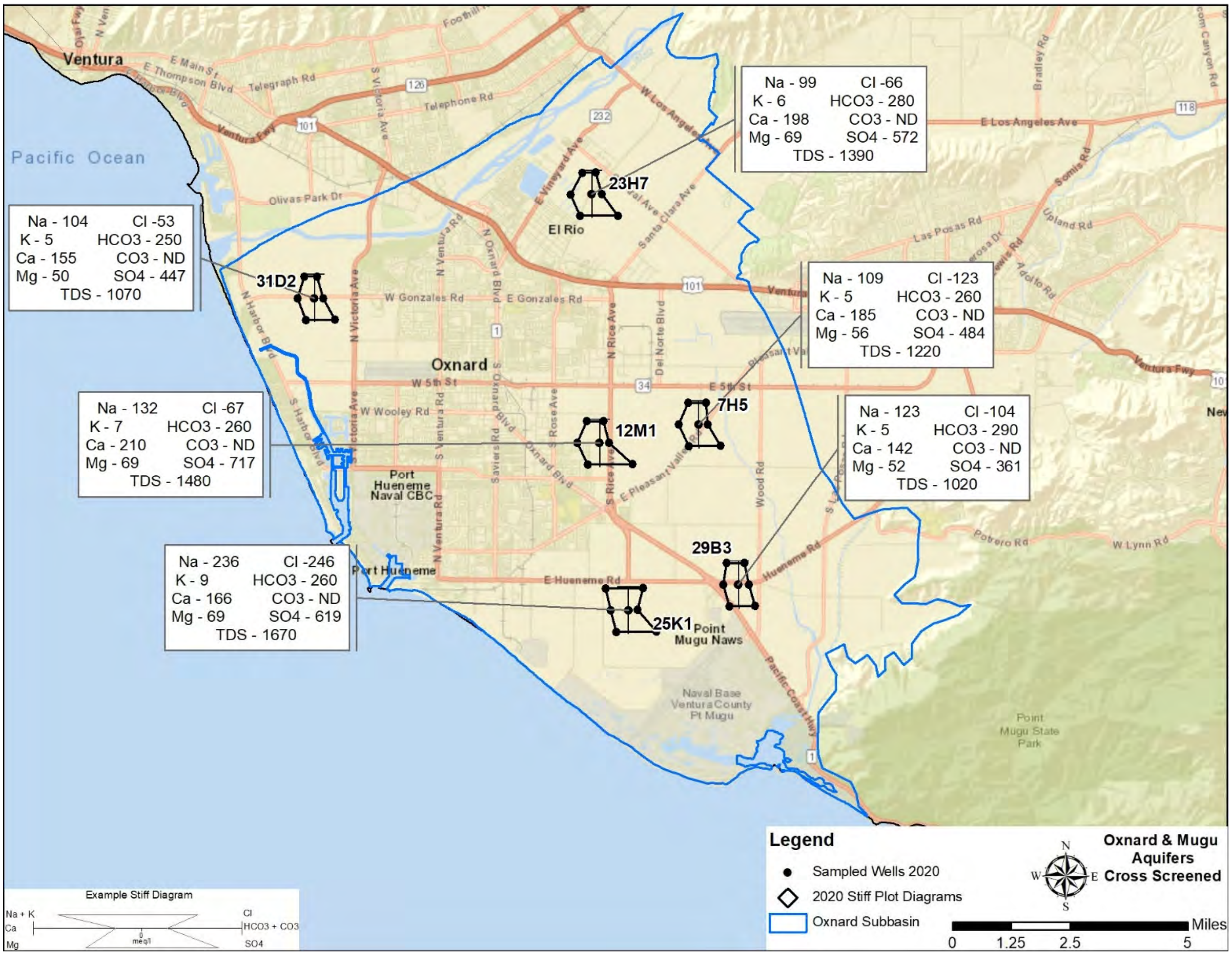


Figure 5-17: Oxnard Subbasin Oxnard & Mugu Aquifers cross screened sampled wells with Stiff diagrams and selected inorganic constituents.

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 2020 (**Figure 5-18**). All had TDS and sulfate concentrations above the secondary MCL. One sample had manganese above the secondary MCL. One sample was analyzed for Title 22 metals.

Table 5-16: 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	11/20/2020	Hueneme	Lower	ND	**970**	**386**	45	0.7
36E2	9/9/2020	Hueneme	Lower	9.2	**990**	**417**	48	0.6
36E3	9/9/2020	Hueneme	Lower	ND	**940**	**386**	47	0.6

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

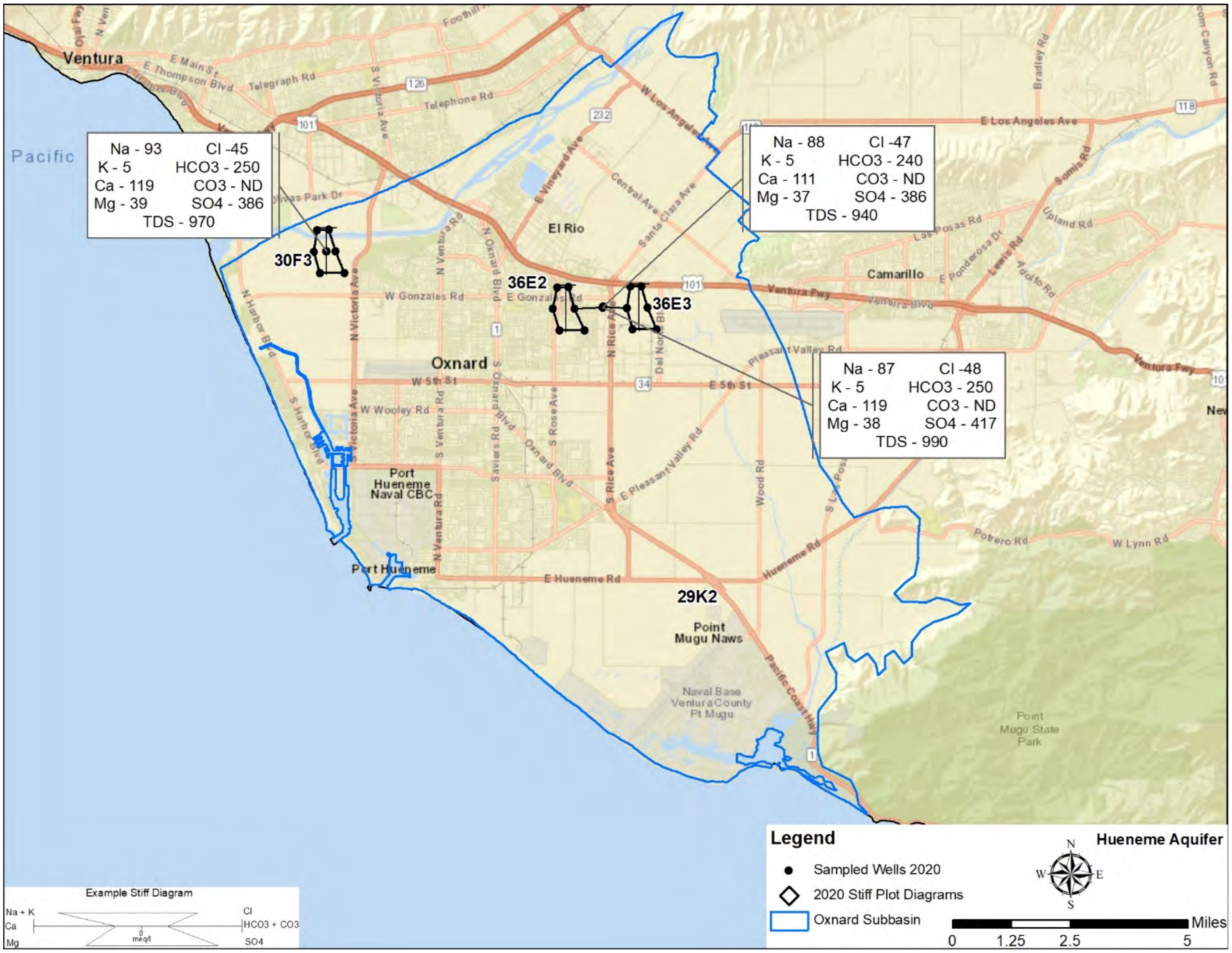


Figure 5-18 Oxnard Subbasin Hueneme Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

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. Ten wells perforated solely in the Fox Canyon Aquifer were sampled in 2020 (**Figure 5-19**). 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.

Nine samples had TDS and sulfate concentrations that exceeded the secondary MCL. Two samples were analyzed for Title 22 metals. Six samples had manganese above the secondary MCL level. One sample had a nitrate concentration above the MCL..

Table 5-17: 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)

19P3	11/23/2020	Fox Canyon	Lower	ND	490	73.3	50	0.2
20B1	11/23/2020	Fox Canyon	Lower	ND	**840**	**305**	37	0.6
20K3	11/5/2020	Fox Canyon	Lower	ND	**770**	**268**	44	0.5
23R2	11/23/2020	Fox Canyon	Lower	ND	**910**	**335**	46	0.6
25K2	10/1/2020	Fox Canyon	Lower	ND	**800**	**305**	37	0.6
26D5	9/25/2020	Fox Canyon	Lower	1680*	**3020**	**386**	55	0.8
26K3	9/25/2020	Fox Canyon	Lower	ND	**820**	**322**	47	0.4
26M3	9/25/2020	Fox Canyon	Lower	ND	**960**	**383**	55	0.5
26P2	9/25/2020	Fox Canyon	Lower	3.2	**780**	**301**	41	0.4
20Q5	9/9/2020	Fox Canyon	Lower	ND	**900**	**334**	66	0.6

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.

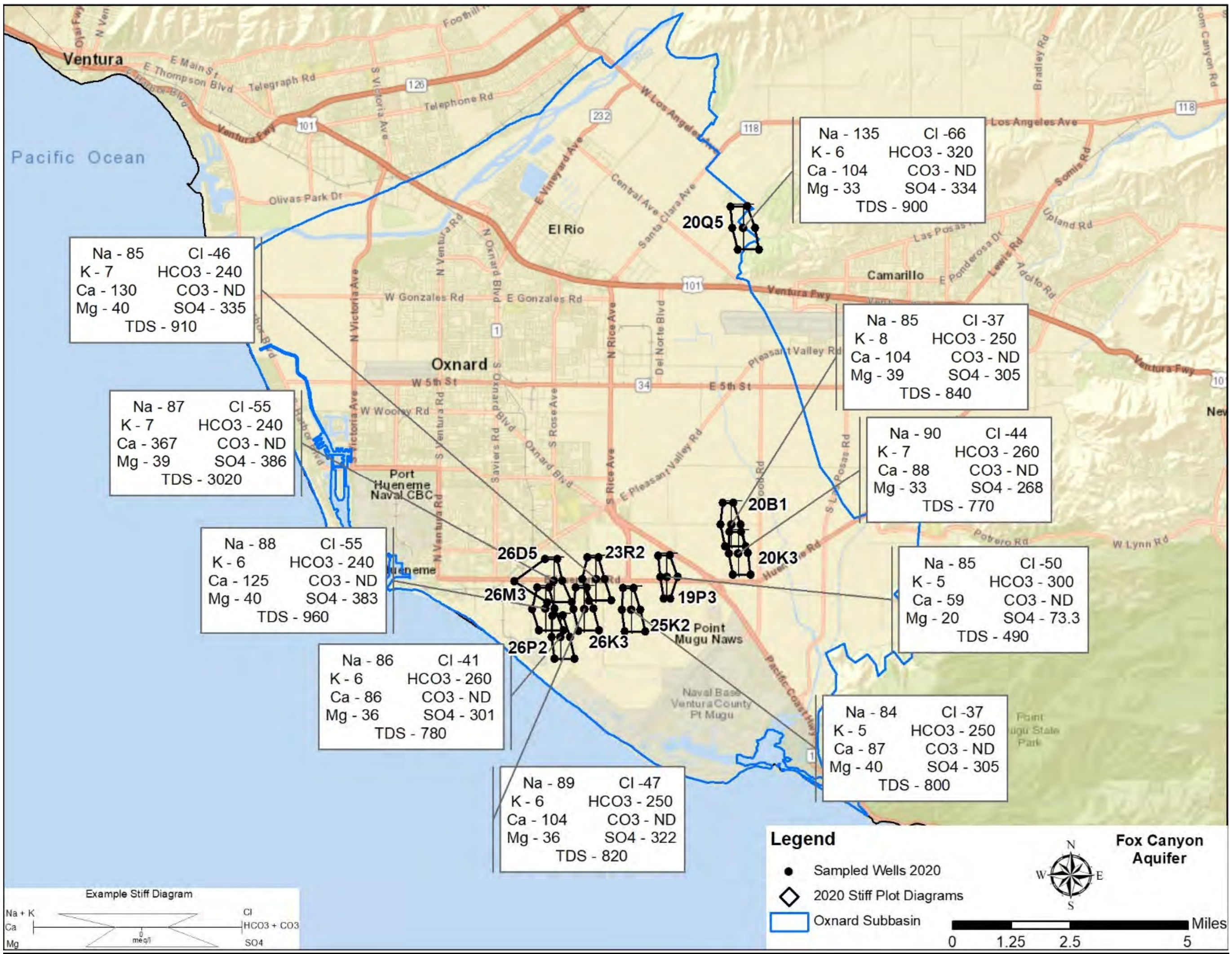


Figure 5-19 Oxnard Subbasin Fox Canyon Aquifer sampled wells with Stiff diagrams and selected inorganic constituents.

Hueneme & Fox Canyon Aquifers

Seven Oxnard Subbasin wells sampled in 2020 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 5-20**). Secondary MCL concentrations were exceeded in three samples for manganese and all five samples for sulfate. All five had TDS concentrations above the secondary MCL. TDS concentrations varied between 810 and 1,050 mg/L. Water samples from one Hueneme/Fox Canyon well was analyzed for Title 22 metals and all constituents were below the primary MCL.

Table 5-18: 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)
17B2	9/25/2020	Hue & Fox	Lower	ND	**810**	**327**	39	0.4
3F5	9/9/2020	Hue & Fox	Lower	11.2	**970**	**427**	47	0.7
21H2	12/2/2020	Hue & Fox	Lower	ND	**770**	216	98	0.4
29E4	11/10/2020	Hue & Fox	Lower	3.5	**820**	**287**	57	0.5
30A2	9/9/2020	Hue & Fox	Lower	3.4	**880**	**363**	52	0.5
19J3	11/5/2020	Hue & Fox	Lower	ND	**1050**	**428**	52	0.6
24P2	9/9/2020	Hue & Fox	Lower	8.2	**920**	**395**	47	0.6

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

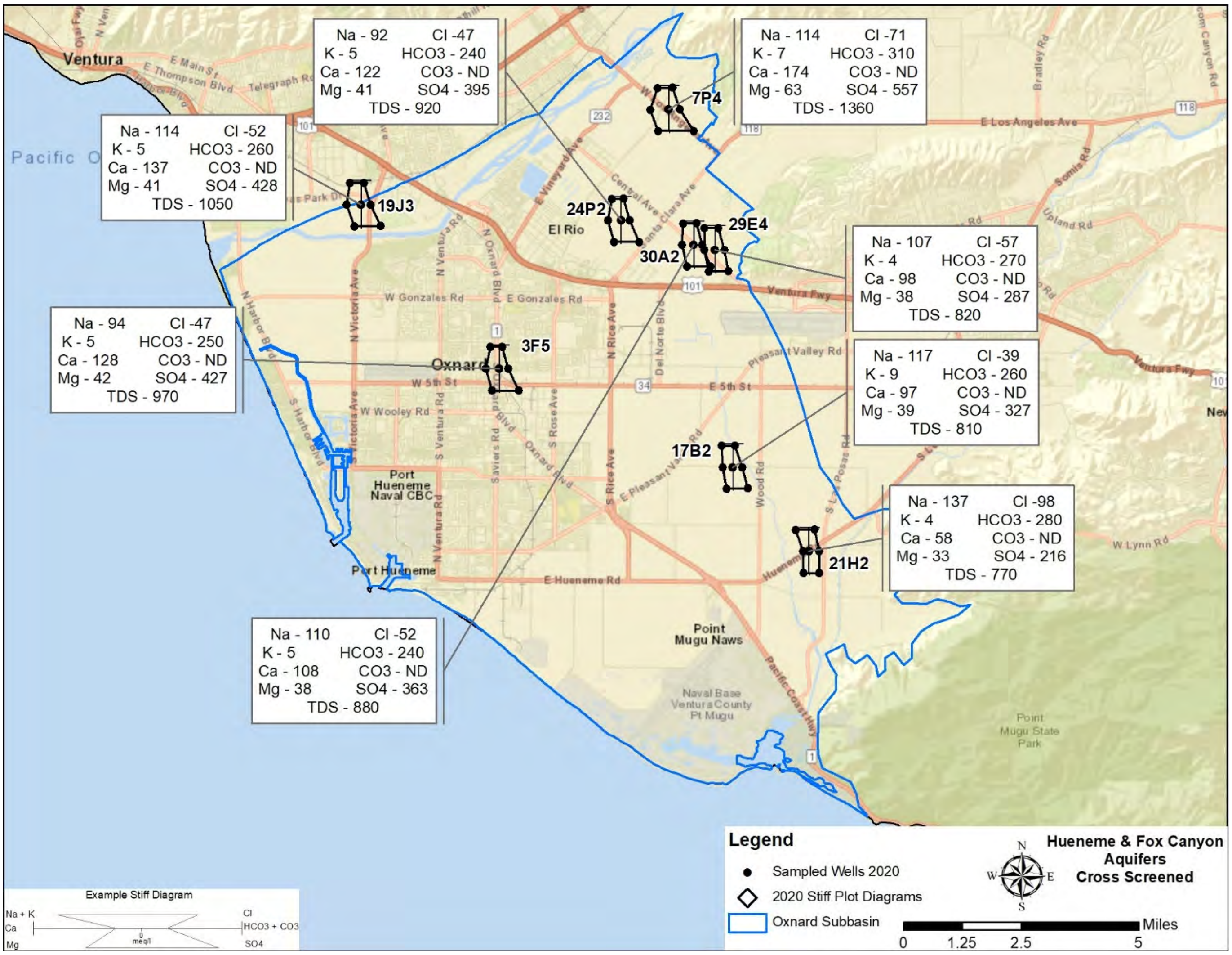


Figure 5-20 Oxnard Subbasin Hueneme and Fox Canyon Aquifers cross screened sampled wells with Stiff diagrams and selected inorganic constituents.

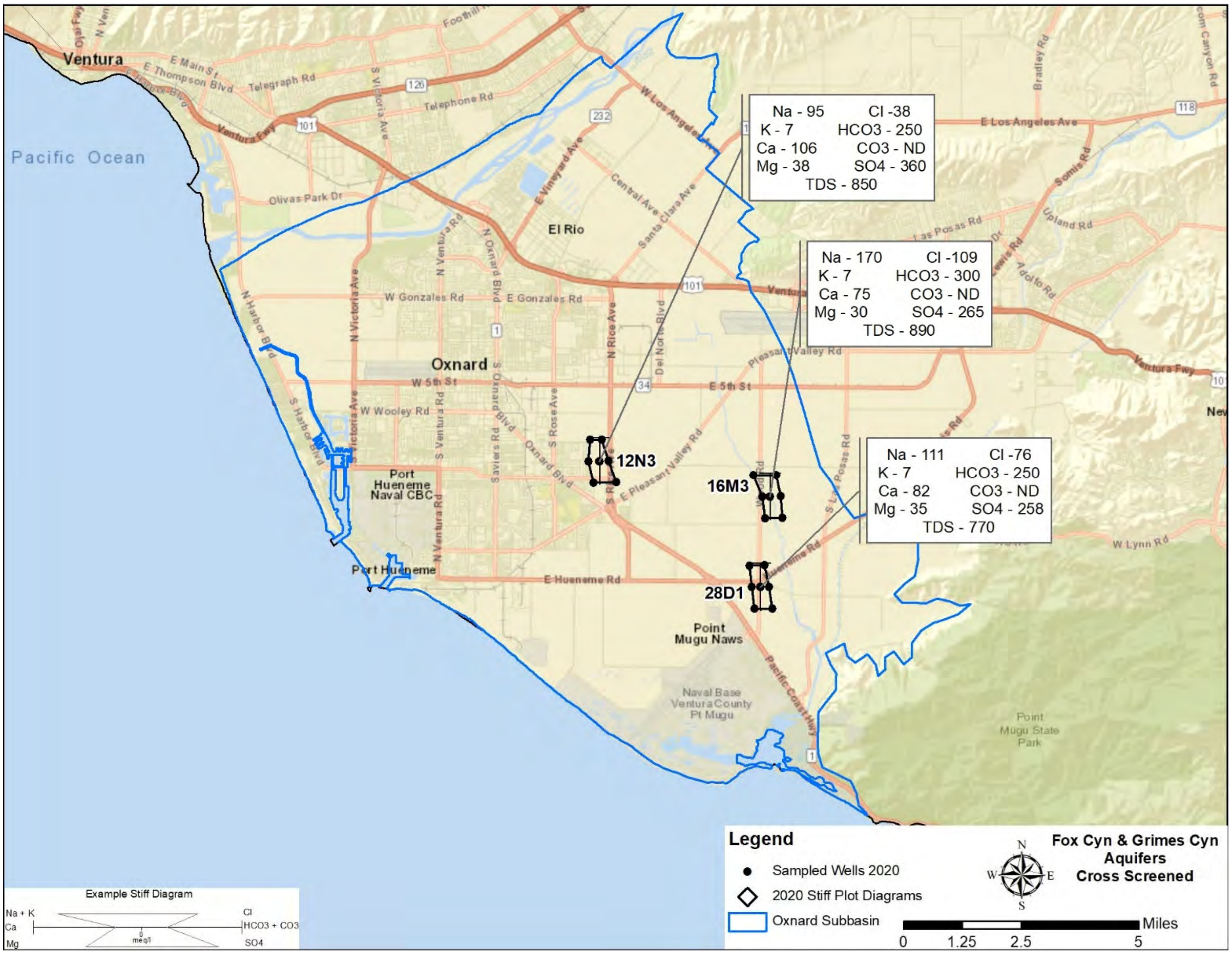
Fox Canyon & Grimes Canyon Aquifers

Three Oxnard Subbasin wells sampled in 2020 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 5-21**. Water from one well exceeded the drinking water secondary MCL concentration for manganese. All three samples had sulfate and TDS concentrations above the secondary MCL.

Table 5-19: 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	12/2/2020	Fox & Grimes	Lower	ND	**770**	**258**	76	0.4
12N3	12/2/2020	Fox & Grimes	Lower	ND	**850**	**360**	38	0.5
16M3	11/25/2020	Fox & Grimes	Lower	ND	**890**	**265**	109	0.5

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



<u>**Figure 5-21**</u> 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 2020 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 5-22**. Water from one well had manganese concentration, one had sulfate and all four had TDS concentrations above the secondary MCL. TDS concentrations from these wells varied between 710 and 910 mg/L. Water samples from three Fox/Hueneme/Grimes wells was analyzed for Title 22 metals with all constituents below the primary MCL.

Table 5-20: Selected water quality results for wells screened across the Hueneme, 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)
4D4	12/2/2020	Hue, Fox & Grimes	Lower	ND	**750**	175	100	0.4
8R1	12/2/2020	Hue, Fox & Grimes	Lower	ND	**710**	234	63	0.3
22C1	12/2/2020	Hue, Fox & Grimes	Lower	ND	**720**	195	102	0.4
24B4	11/5/2020	Hue, Fox & Grimes	Lower	ND	**910**	**347**	40	0.6

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

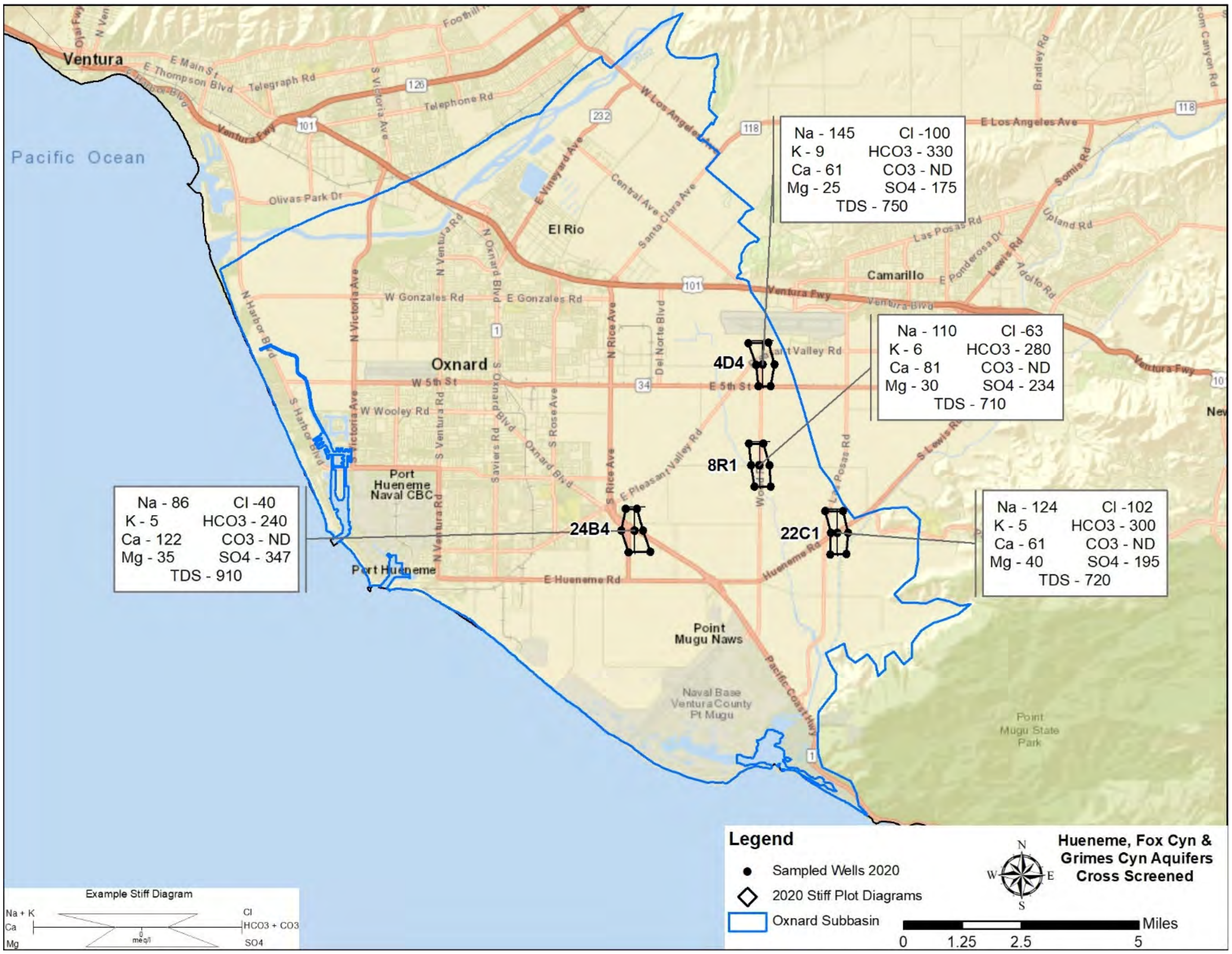


Figure 5-22 Oxnard Subbasin Hueneme, Fox Canyon and Grimes Canyon Aquifers cross screened sampled wells with Stiff diagrams and selected inorganic constituents.

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** shows moderate variation between all wells sampled in the Oxnard Subbasin.

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 190 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 2020. None of the groundwater sampled has a chloride concentration above the TMDL. The Piper diagram, **Figure E-12** shows low variability in water quality. There is no dominant cation for any samples. Sulfate is the dominant anion for three samples with no dominant anion for the remaining samples. Five samples are calcium sulfate type and one sample is sodium sulfate type. The TDS concentrations exceeded the secondary MCL in all samples and varied from 710 to 2,330 mg/L. Sulfate concentrations exceeded the secondary MCL in five samples. One sample had a manganese concentration greater than the secondary MCL and no samples had nitrate concentrations greater than the primary MCL. **Figure 5-23** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Water samples from one well were analyzed for Title 22 metals. The sample had a selenium concentration over the primary MCL. The concentrations for the remaining constituents were below the primary MCL.

Table 5-21: 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)
30J4	8/31/2020	9.6	**710**	216	68	0.5
25H1	8/27/2020	25.6	**1000**	**315**	108	0.5
25M3	8/27/2020	1.8	**2330**	**1090**	60	0.7
26H1	8/27/2020	24.4	**1230**	**429**	106	0.7
26J3	8/31/2020	15.6	**980**	**327**	107	0.5
34J4	8/31/2020	11.1	**1020**	**391**	56	0.5

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

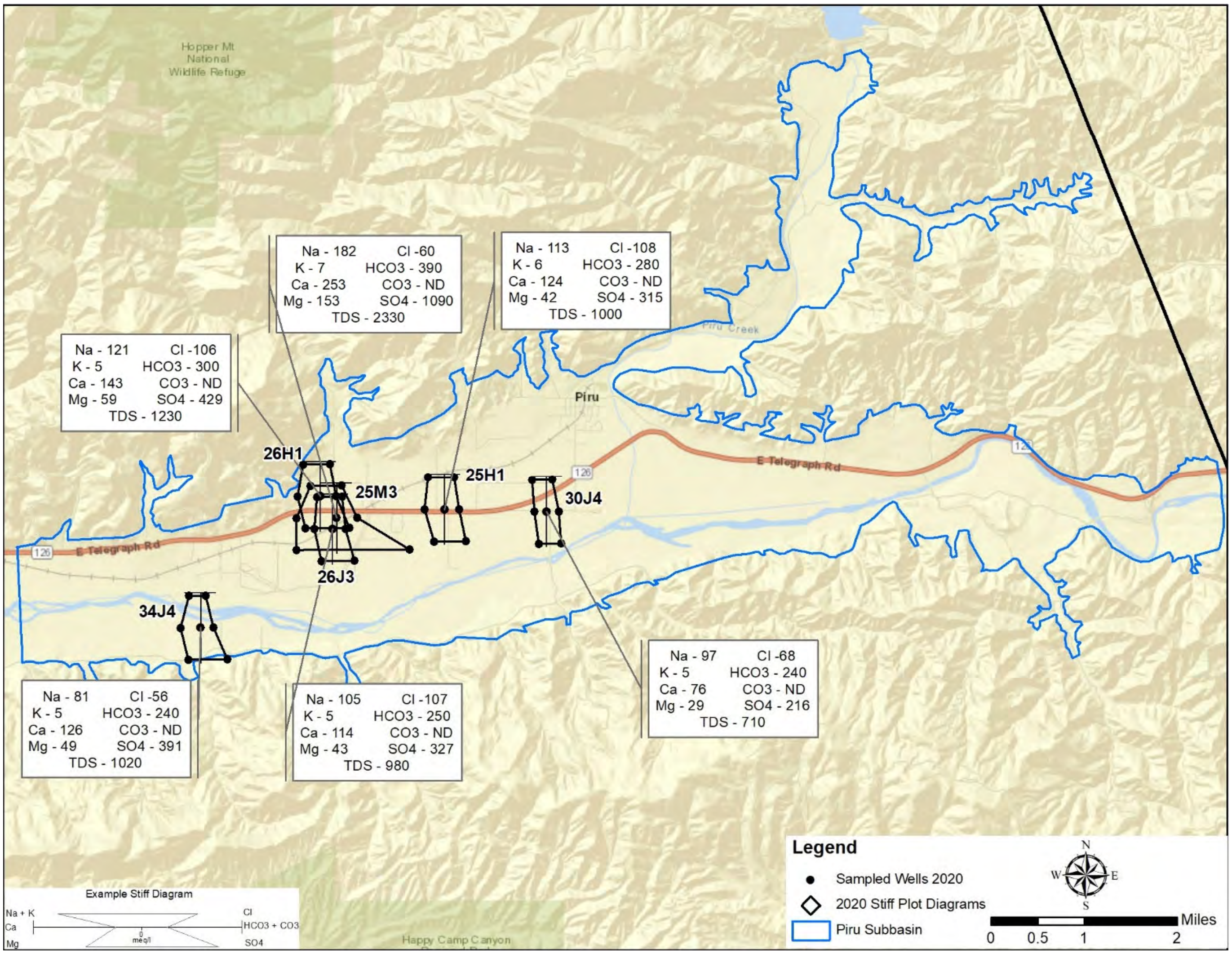


Figure 5-23: Piru Basin sampled wells with Stiff diagrams and selected inorganic constituents.

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 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. Underlying the upper zone are the aquifers of the Lower Aquifer System (LAS). First are the 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 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. Twenty wells were sampled in 2020, with four perforated in the upper zone, one perforated in both upper zone and LAS, and fourteen perforated in the LAS.

The Piper diagram, **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. For wells in the upper zone, calcium is the dominant cation in one sample and the remaining three samples have no dominant cation but plot closely to the calcium type. Three samples are calcium sulfate type and one sample is sodium sulfate. For wells in the LAS, sodium is the dominant cation in one sample. The remainder have no dominant cation. Sulfate is the dominant anion in five samples with no dominant anion for the remainder. The water in one sample is sodium chloride, four samples are sodium sulfate type, three samples are sodium bicarbonate type and the remainder are calcium sulfate type. The water in the well perforated in both the upper zone and LAS is calcium sulfate type.

TDS concentrations in all groundwater samples varied from 670 to 4,770 mg/L. All twenty wells sampled had TDS concentrations above the secondary MCL, with the four highest concentrations in samples collected from the upper zone. Fifteen wells had sulfate concentrations above the secondary MCL; the three highest were in samples collected from the upper zone. Five wells had nitrate concentrations above the drinking water MCL; the highest was from a well in the upper zone. Seven samples had manganese concentrations above the secondary MCL. Chloride concentrations above the secondary MCL were detected in samples collected from three wells, and samples collected from seventeen wells were detected above a concentration that can impair agricultural beneficial uses. Seven water samples were analyzed for Title 22 metals. None of the analyses were above the primary MCL. **Figure 5-24** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-22: 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)
2H4	11/19/2020	Both	**128**	**2200**	**805**	207	0.8
1B5	9/25/2020	Lower	ND	**790**	63.4	195	0.3
1D8	11/19/2020	Lower	ND	**1090**	214	219	0.4
1M2	9/25/2020	Lower	ND	**920**	190	165	0.3
3D1	10/1/2020	Lower	**65.2**	**1290**	**439**	109	0.5
3K1	12/2/2020	Lower	25.7	**1200**	**461**	125	0.5
3L3	11/23/2020	Lower	ND	**970**	**322**	104	0.4
3R1	12/2/2020	Lower	**59.6**	**1860**	**691**	211	0.6
4R2	11/23/2020	Lower	14.3	**790**	**256**	73	0.3
10G1	12/2/2020	Lower	8	**1270**	**464**	173	0.4
15D2	12/2/2020	Lower	2.9	**1490**	**568**	195	0.5
19F4	10/9/2020	Lower	ND	**1450**	**596**	157	0.6
29B2	11/12/2020	Lower	5.3	**790**	154	125	0.3
33R2	10/9/2020	Lower	ND	**670**	217	62	0.2
34C1	10/9/2020	Lower	ND	**790**	**272**	81	0.3
34G1	12/2/2020	Lower	ND	**1150**	**316**	188	0.8
2J1	11/19/2020	Upper	**232**	**4540**	**1850**	**410**	1.9
10A2	9/25/2020	Upper	**77.7**	**2450**	**1010**	217	0.5
12D1	9/25/2020	Upper	ND	**2400**	**846**	**333**	0.7
15H1	9/25/2020	Upper	3	**4770**	**2150**	**660**	1.7

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

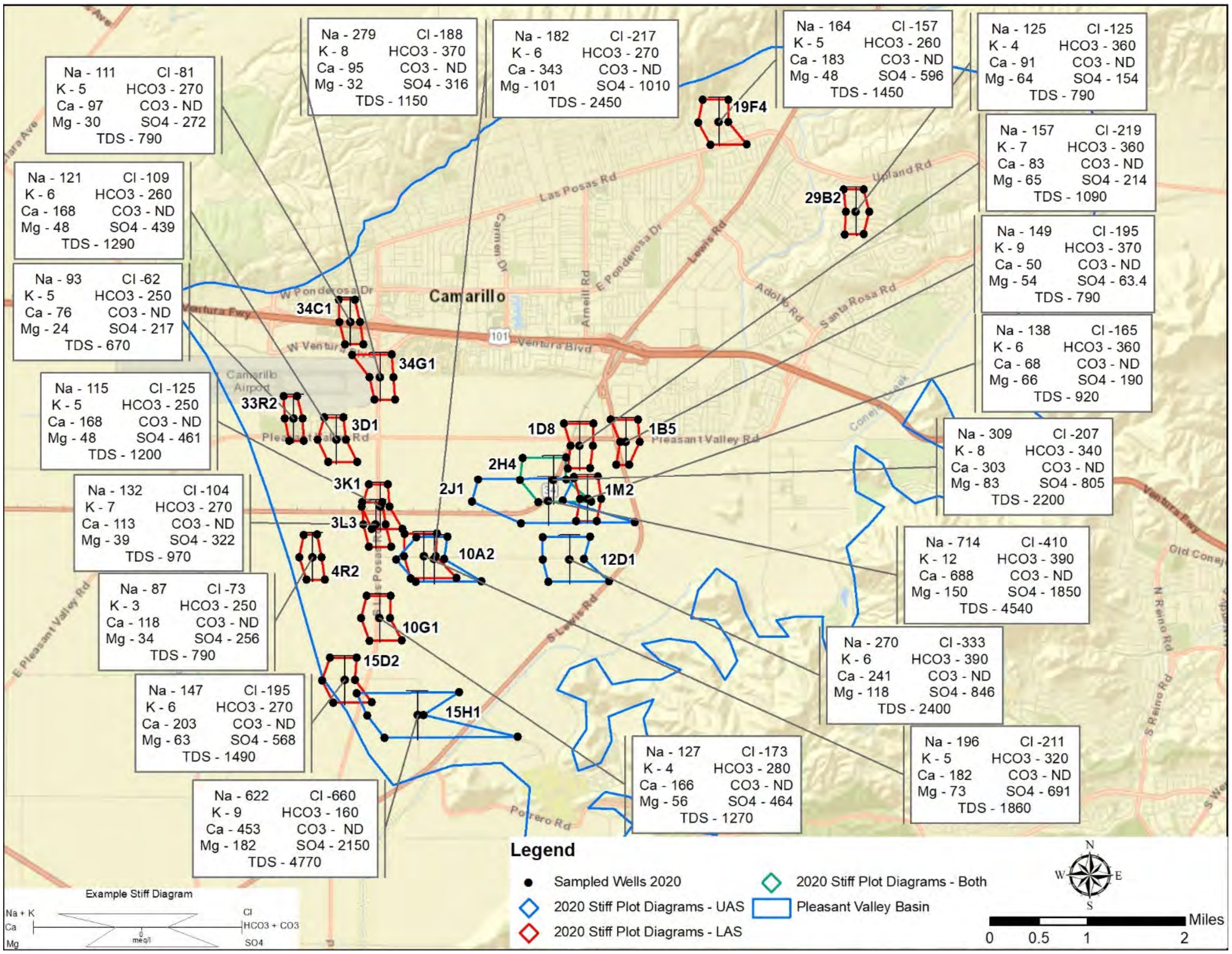


Figure 5-24: Pleasant Valley Basin sampled wells with Stiff diagrams and selected inorganic constituents.

Santa Clara River 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 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 samples from eight wells in the basin were analyzed in 2020. The Piper diagram, **Figure E-14** shows no significant change in the water quality since previous sampling. Calcium is the dominant cation in two samples and there is no dominant cation in the remaining samples. Sulfate is the dominant anion; the water is calcium sulfate type. All eight samples had TDS and sulfate concentrations above the secondary MCL for drinking water. One sample had an iron concentration over the MCl and four have manganese over the MCl. Three samples were analyzed for Title 22 metals. No constituent was above the MCL. **Figure 5-25** 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.

Table 5-23: 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)
3E1	9/9/2020	2.3	**2140**	**1020**	115	0.5
3K2	8/26/2020	3.4	**1200**	**434**	88	0.5
9K4	9/9/2020	ND	**940**	**386**	48	0.4
17Q1	9/3/2020	19.1	**1530**	**617**	77	0.6
21E11	9/3/2020	ND	**1460**	**572**	107	0.7
30F01	8/31/2020	1.3	**1730**	**733**	85	0.7
35Q1	10/19/2020	35.5	**2680**	**1180**	100	0.9
36K7	11/10/2020	ND	**1450**	**603**	74	0.5

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

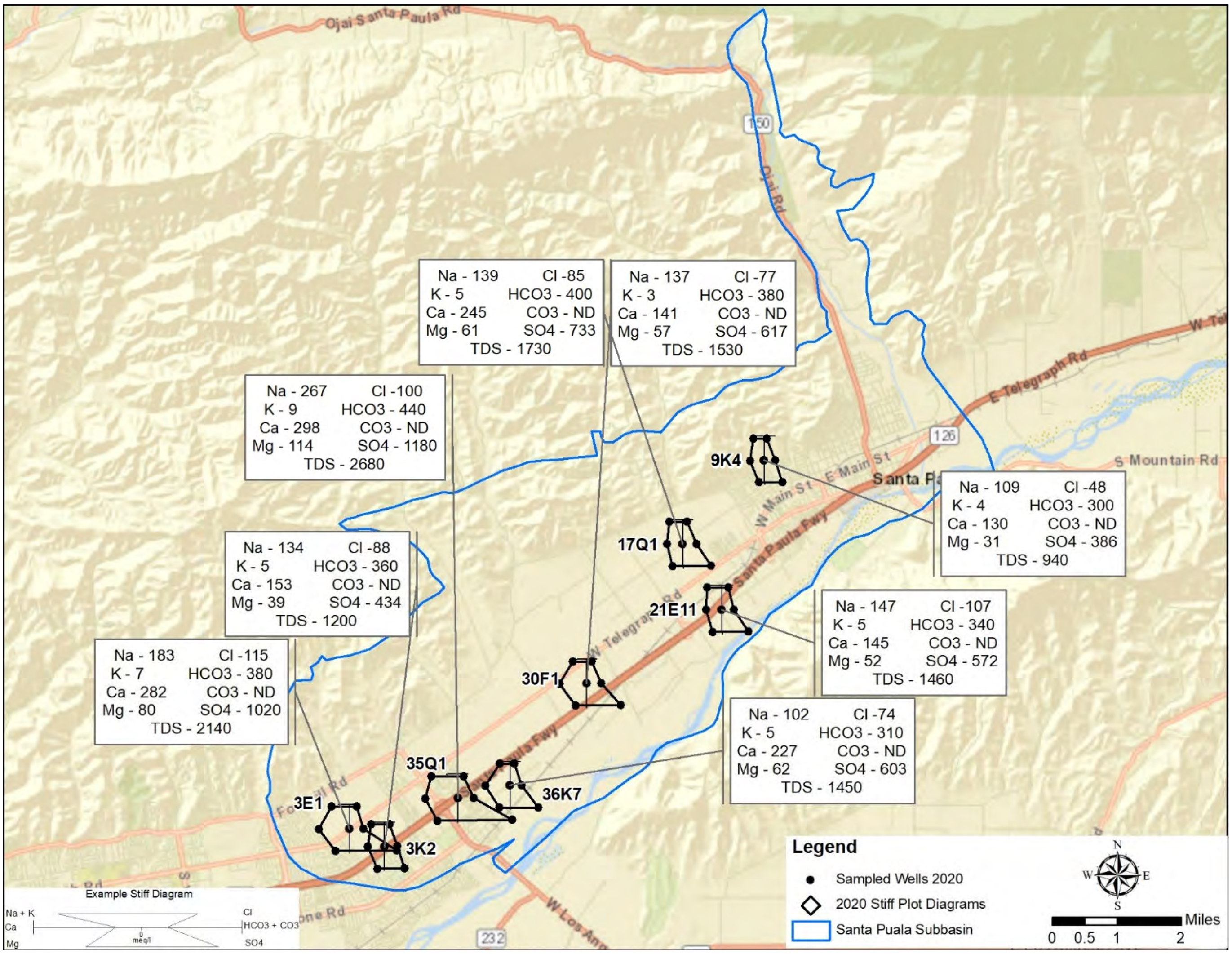


Figure 5-25: Santa Paula Subbasin sampled wells with Stiff diagrams and selected inorganic constituents.

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 one well in 2020. The Piper diagram in **Figure E-27** shows the chemistry of the sample. There is no dominant cation in the sample and bicarbonate is the dominant anion. The water is magnesium bicarbonate type.

TDS concentration was above the secondary MCL (**Table 5-24**). The sample was analyzed for Title 22 metals. All constituents below the MCL for drinking water. **Figure 4-26** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-24: 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)
19H3	12/17/2020	ND	**540**	114	43	0.1

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

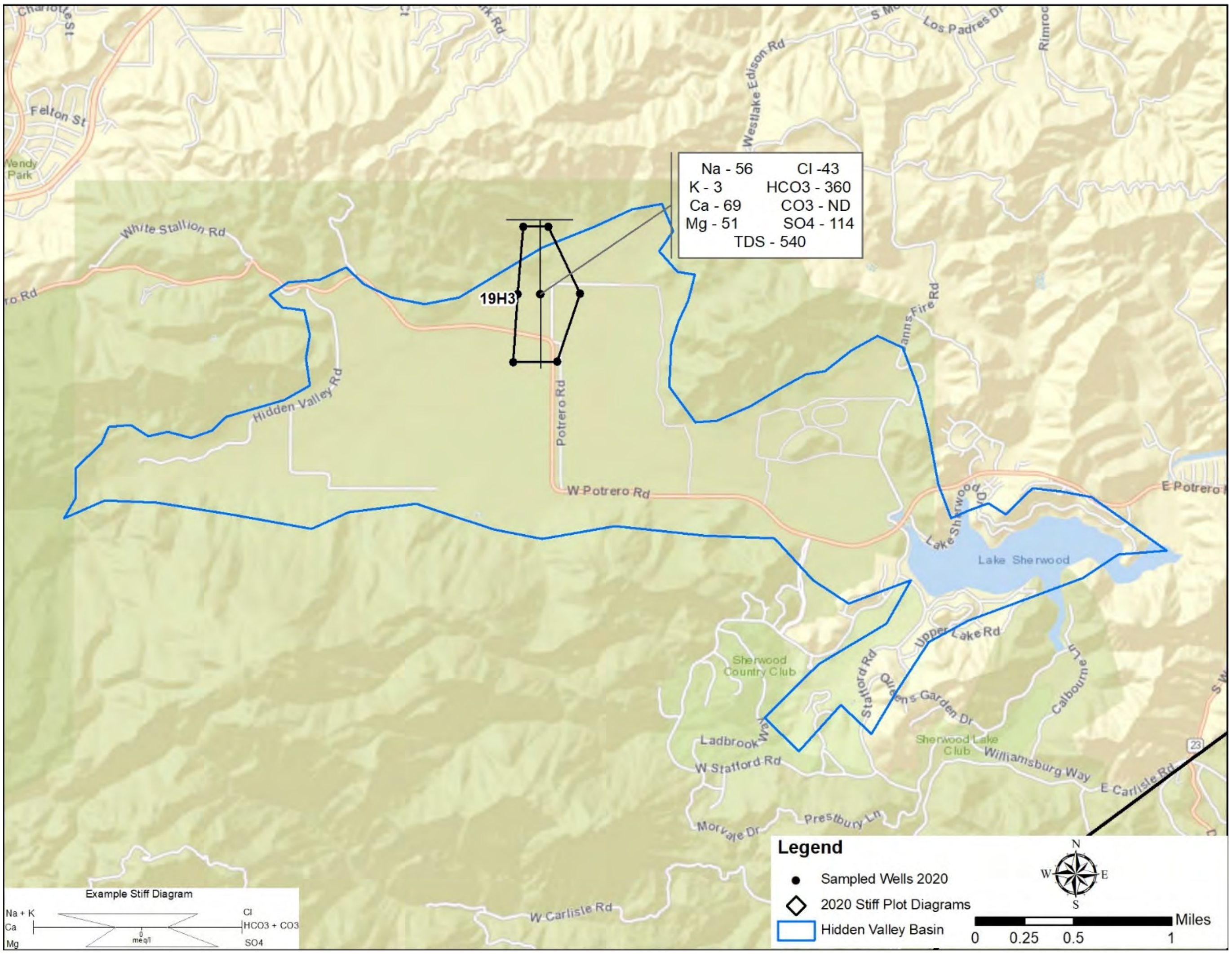


Figure 5-26: Hidden Valley Basin sampled wells with Stiff diagrams and selected inorganic analyses.

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

The Simi Valley Basin drains to the west and historically, water quality becomes more enriched in salts and thus, 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, **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 are above the secondary MCL in all three samples. One sample has nitrate and one has manganese above the MCL. All four samples have 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 are below the MCL. **Figure 4-27** 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 5-25: 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	10/8/2020	21.5	**1760**	**676**	153	1
8K7	10/8/2020	**55.8**	**2070**	**871**	154	0.9
9E1	10/8/2020	29	**1660**	**686**	125	0.8
10A2	10/8/2020	**59.6**	**1980**	**809**	148	1.1

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

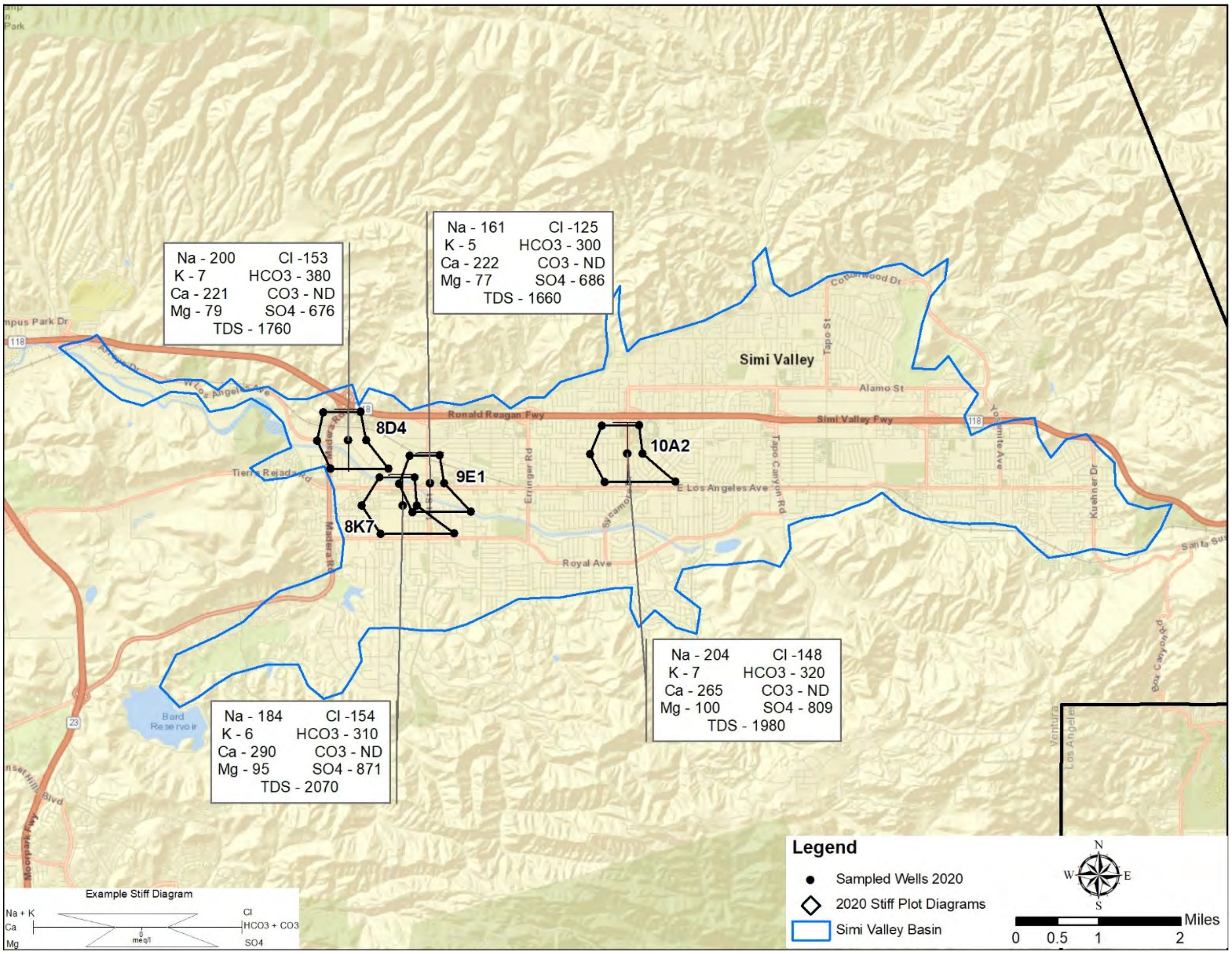


Figure 5-27: Simi Valley Basin sampled wells with Stiff diagrams and selected inorganic analyses.

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. Two wells were sampled in this basin in 2020.

The Piper diagram, **Figure E-29** shows low variability in water quality. Calcium is the dominant cation,. Sulfate is the dominant anion in all both samples. The water is calcium sulfate type. TDS and sulfate concentrations are above the secondary MCL in both samples. One sample has manganese above the MCL. One water sample was analyzed for Title 22 metals; all constituents are below the MCL. **Figure 4-28** 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 5-26: 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)
24C7	10/8/2020	10.3	**860**	**319**	28	0.1
24H6	10/8/2020	2.5	**930**	**336**	31	0.2

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

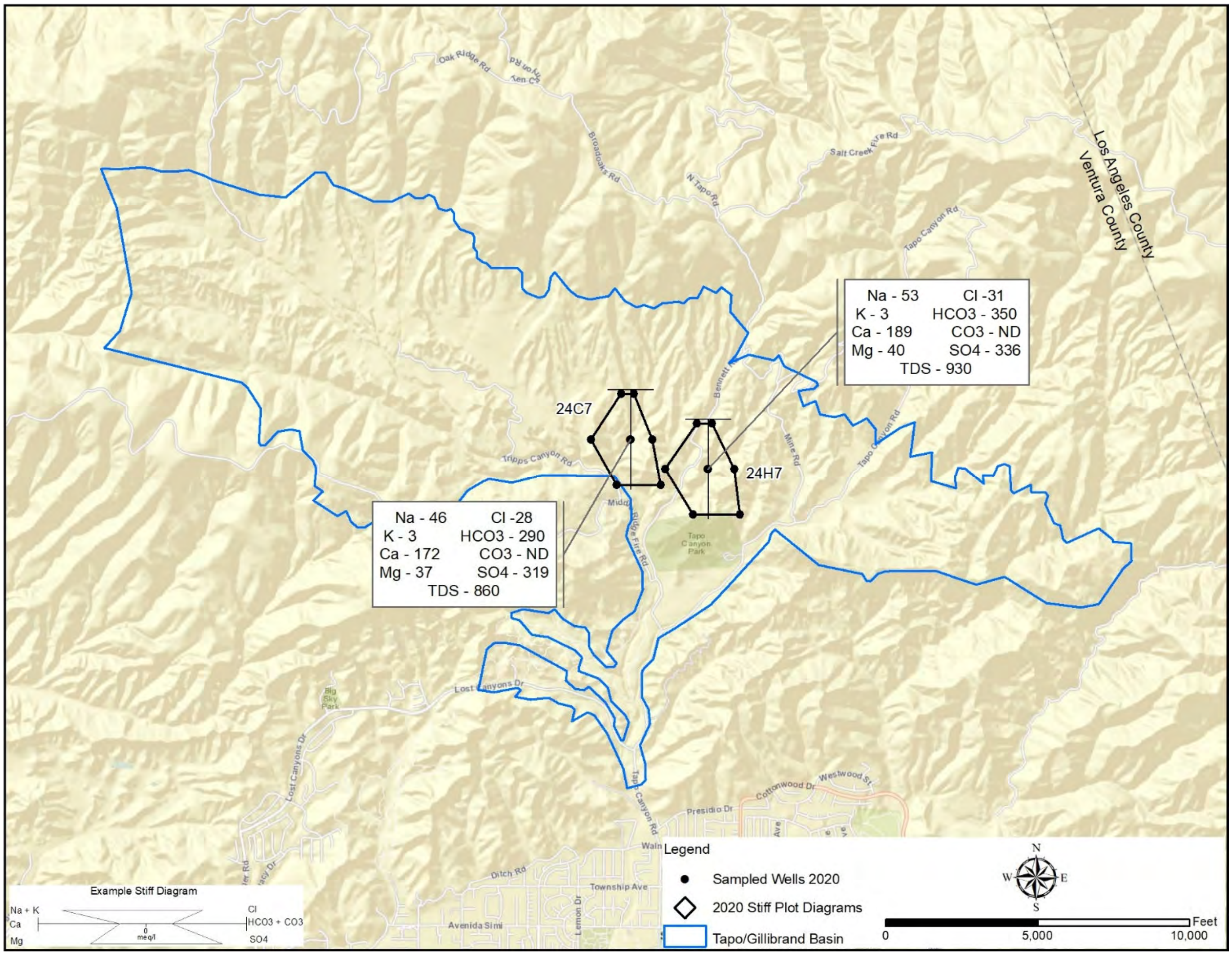


Figure 5-28: Tapo/Gillibrand Basin.

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 2020. **Figure 4-29** shows the extent of the Thousand Oaks Area Basin.

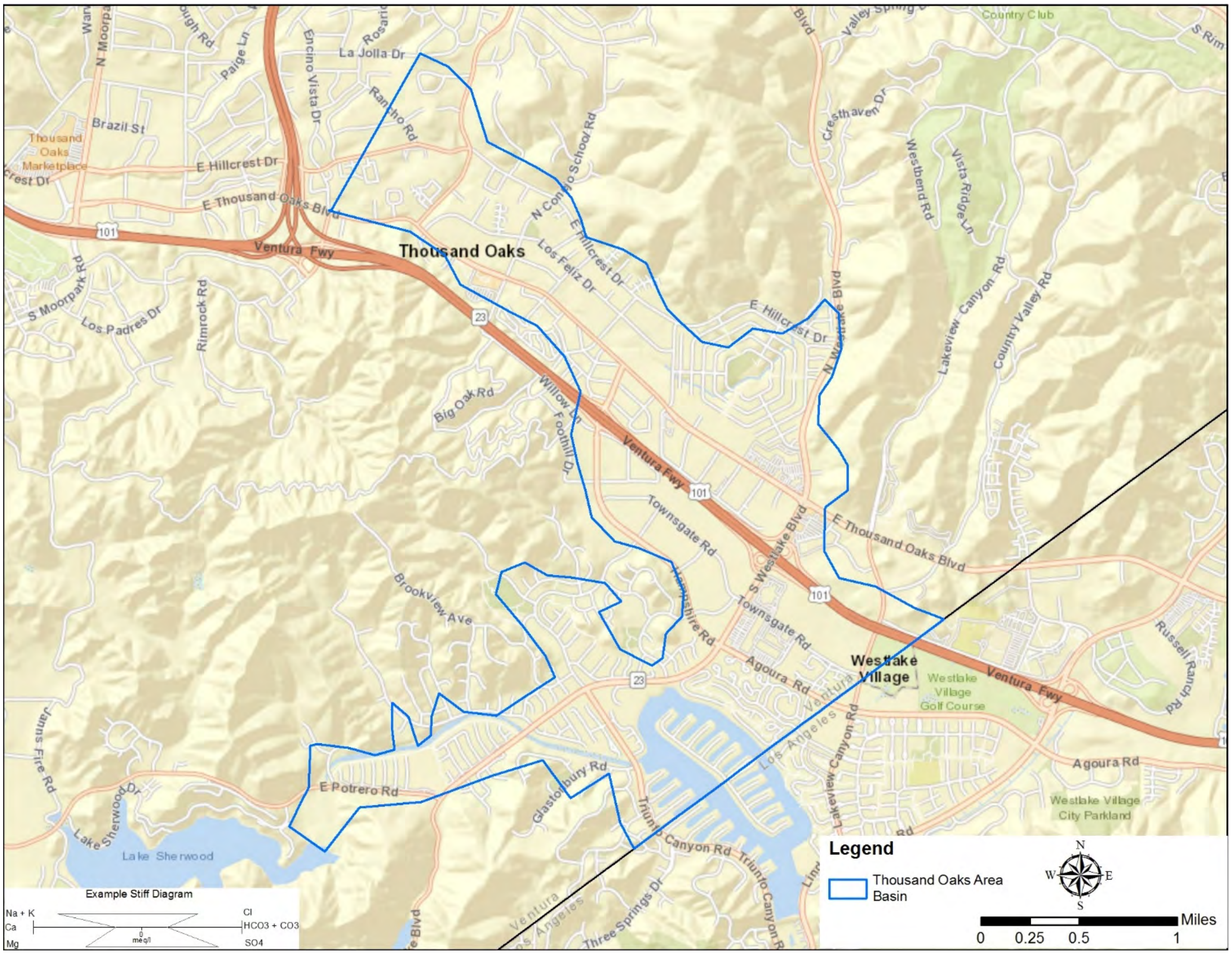


Figure 5-29: Thousand Oaks Area Basin.

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

Depth to water-bearing materials varies between 20 to 80 feet bgs. There are approximately 58 water supply wells in the Tierra Rejada Valley Basin, of which 36 are active. Six wells were sampled in 2020. The Piper diagram, **Figure E-16** shows low variation in water quality. There is no dominant cation. Bicarbonate is the dominant anion for one sample and the remainder have no dominant anion. Water samples from all the wells are magnesium bicarbonate type. One well has a nitrate concentration above the primary MCL. Water from all Six wells has TDS concentrations above the secondary MCL, ranging from 530 to 1,230 mg/L. One well in the basin was analyzed for Title 22 metals and all constituents were below the primary MCL.

The Piper diagram, **Figure E-3** shows a comparison of water chemistry between Tierra Rejada and Arroyo Santa 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 4-30** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-27: Selected water quality results for the Tierra Rejada Valley Basin.

Well No.	Date Sampled	Nitrate as NO3 (mg/L)	TDS (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
10R2	10/9/2020	8.8	**720**	170	75	0.1
11J1	10/9/2020	24.4	**750**	174	70	0.2
14F1	11/12/2020	73.4	**940**	150	117	0.1
14Q2	10/27/2020	ND	**530**	102	50	ND
15J2	11/12/2020	12	**1230**	**315**	169	0.2
15N3	11/12/2020	0.9	**720**	157	80	0.1

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

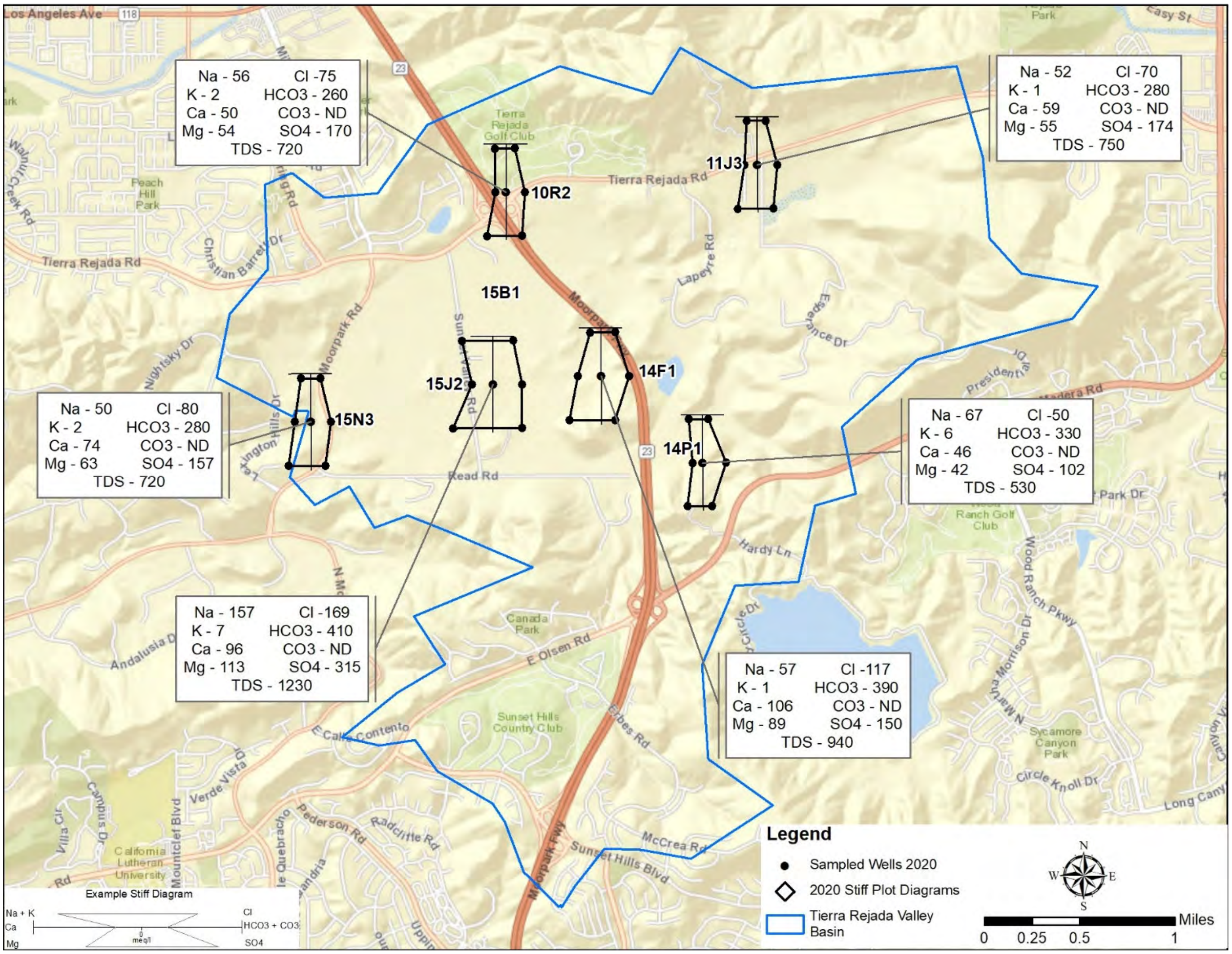


Figure 5-30: Tierra Rejada Basin sampled wells with Stiff diagrams and selected inorganic analyses.

Figure 4-31 shows nitrate concentrations for wells sampled in the Tierra Rejada Valley Basin in 2020. 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 2020.

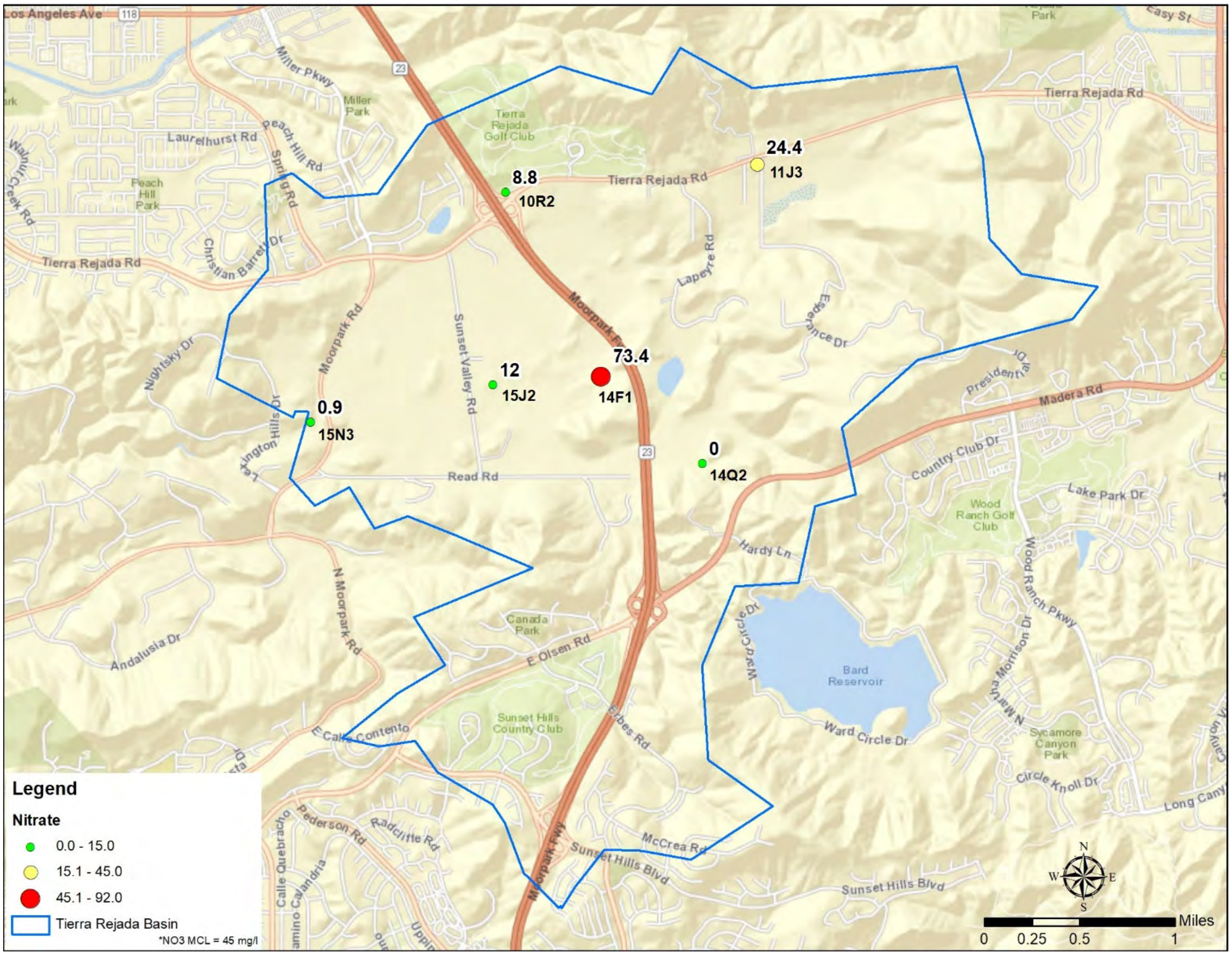


Figure 5-31: Tierra Rejada Basin location of sampled wells and nitrate concentrations.

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 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 170 water supply wells in the Upper Ojai Valley Basin, of which 127 are active wells. Three wells were sampled in 2020. The Piper diagram, **Figure E-17** shows some variation in the water quality of the wells. There is no dominant cation in the samples, but all plot closely to the calcium cation type. Bicarbonate is the dominant anion in two samples with no dominant anion in the remaining sample. The water is calcium bicarbonate type in two samples and calcium sulfate in one sample.

Manganese is above the secondary MCL in one sample. One water sample was analyzed for Title 22 metals and all constituents were below the primary MCL. **Figure 4-32** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-28: 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	9/1/2020	3.2	470	163	23	0.2
11P2	9/10/2020	8.3	310	36.8	23	ND
12M3	9/10/2020	20	460	101	32	0.1

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

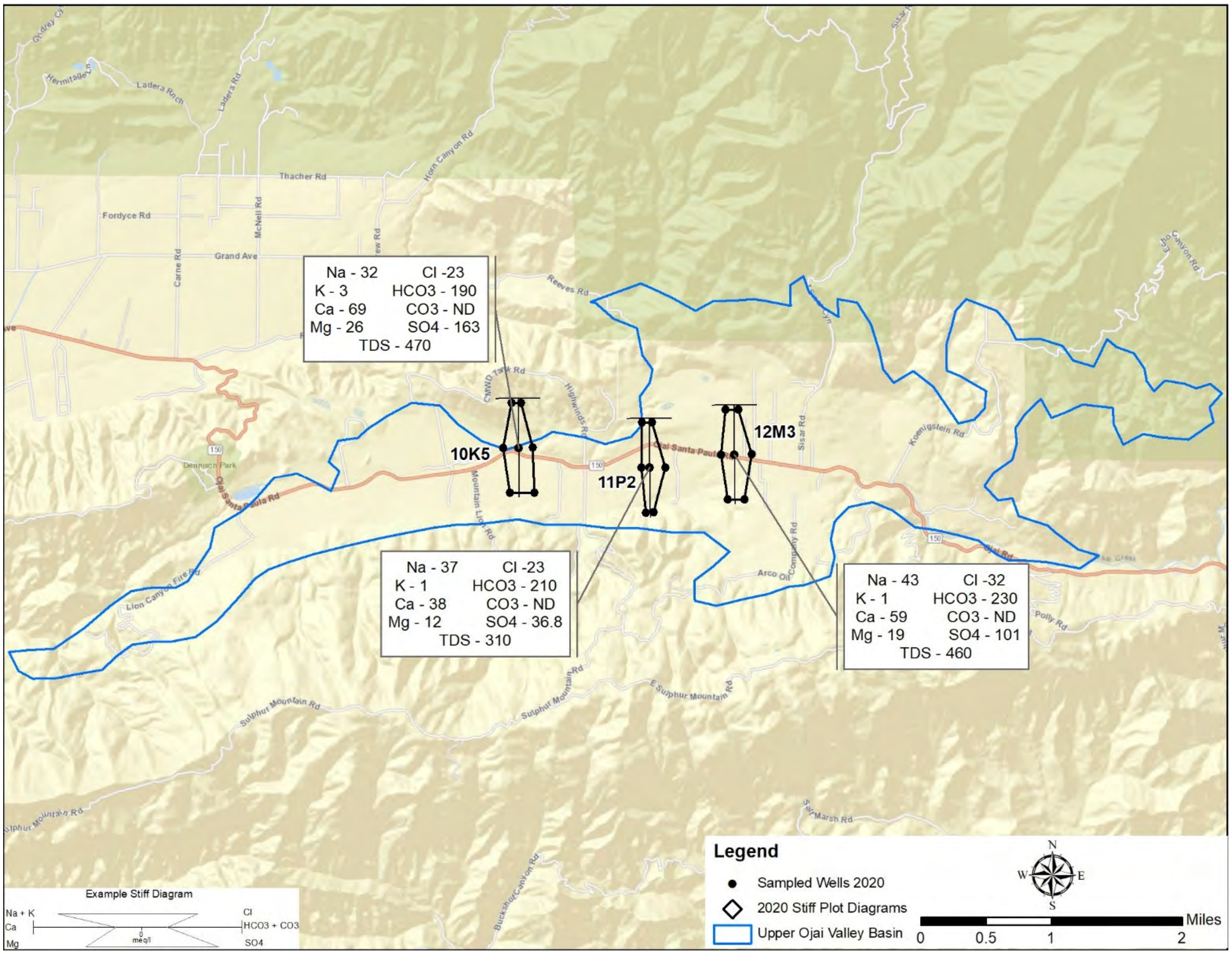


Figure 5-32: Upper Ojai Basin sampled wells with Stiff diagrams and selected inorganic analyses.

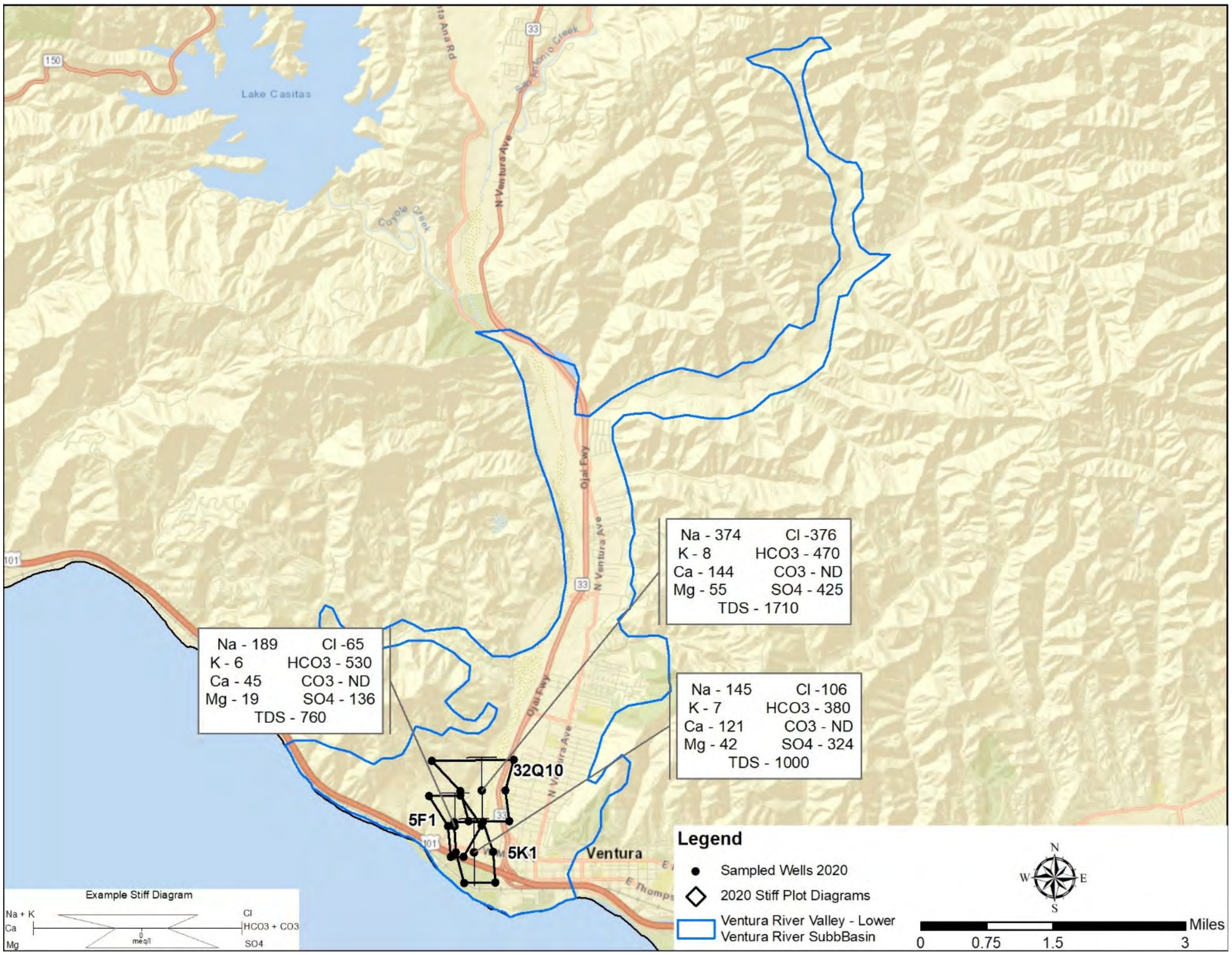
Ventura River Valley – Lower Ventura River Subbasin (DWR Basin No. 4-003.02)

The Lower Ventura River Subbasin is commonly defined at a point coinciding with the City of Ventura's submerged dam at Foster Park and extending 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. The subbasin has few remaining active wells available for sampling. Depth to the water-bearing unit is 3 to 13 feet bgs in the floodplain and deeper as the ground surface elevation increases towards the edges of the subbasin. There are approximately 34 wells in the Lower Ventura River Basin, of which 21 are active. Three wells were sampled in 2020. All three samples have TDS and two samples have sulfate concentrations that exceed the secondary MCL. Two samples have manganese above the MCL and one has chloride above the MCL for drinking water. All three samples have chloride concentrations that are above the level that could cause impairment of agricultural beneficial uses for sensitive plants. Two samples were analyzed for Title 22 metals. No constituents were above the MCL. **Figure 4-43** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate for the well. The Piper diagram, **Figure E-18** shows the water quality of the samples. Sodium is the dominant cation in two samples. There is no dominant cation in the other sample. Bicarbonate is the dominant anion in one sample. There is no dominant anion in the other two samples. One water sample is sodium bicarbonate type, one sample is sodium chloride type, and the remaining sample is sodium sulfate type. **Figure 4-33** shows approximate well locations and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate.

Table 5-29: 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	12/22/2020	ND	**760**	136	65	0.7
5K1	09/01/2020	ND	**1000**	**324**	106	0.7
32Q10	12/22/2020	0.5	**1710**	**425**	**376**	1.3

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



<u>Figure 5-33:</u> Ventura River Valley – Lower Ventura River Subbasin sampled well with Stiff diagram and selected inorganic analyses.

Ventura River Valley – 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 2020. The Piper diagram, **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. The water in one sample is calcium bicarbonate, one sample is sodium bicarbonate and two samples are calcium sulfate type.

All four water samples have TDS concentrations that exceed the secondary MCL; two samples have sulfate concentrations that exceed the secondary MCL and one sample has a manganese concentration that exceeds the secondary MCL. Two wells were analyzed for Title 22 metals. No constituents were above the MCL for drinking water. **Figure 45-34** shows the approximate well location and concentrations of TDS, sodium, potassium, calcium, magnesium, chloride, bicarbonate, carbonate and sulfate for the well.

Table 5-30: 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	9/10/2020	41.8	**830**	192	82	0.4
15A2	9/16/2020	14.6	**530**	115	86	0.3
20K1	9/10/2020	5.8	**750**	**284**	32	0.7
33M2 (outside basin)	9/1/2020	ND	**1240**	**393**	124	0.4

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

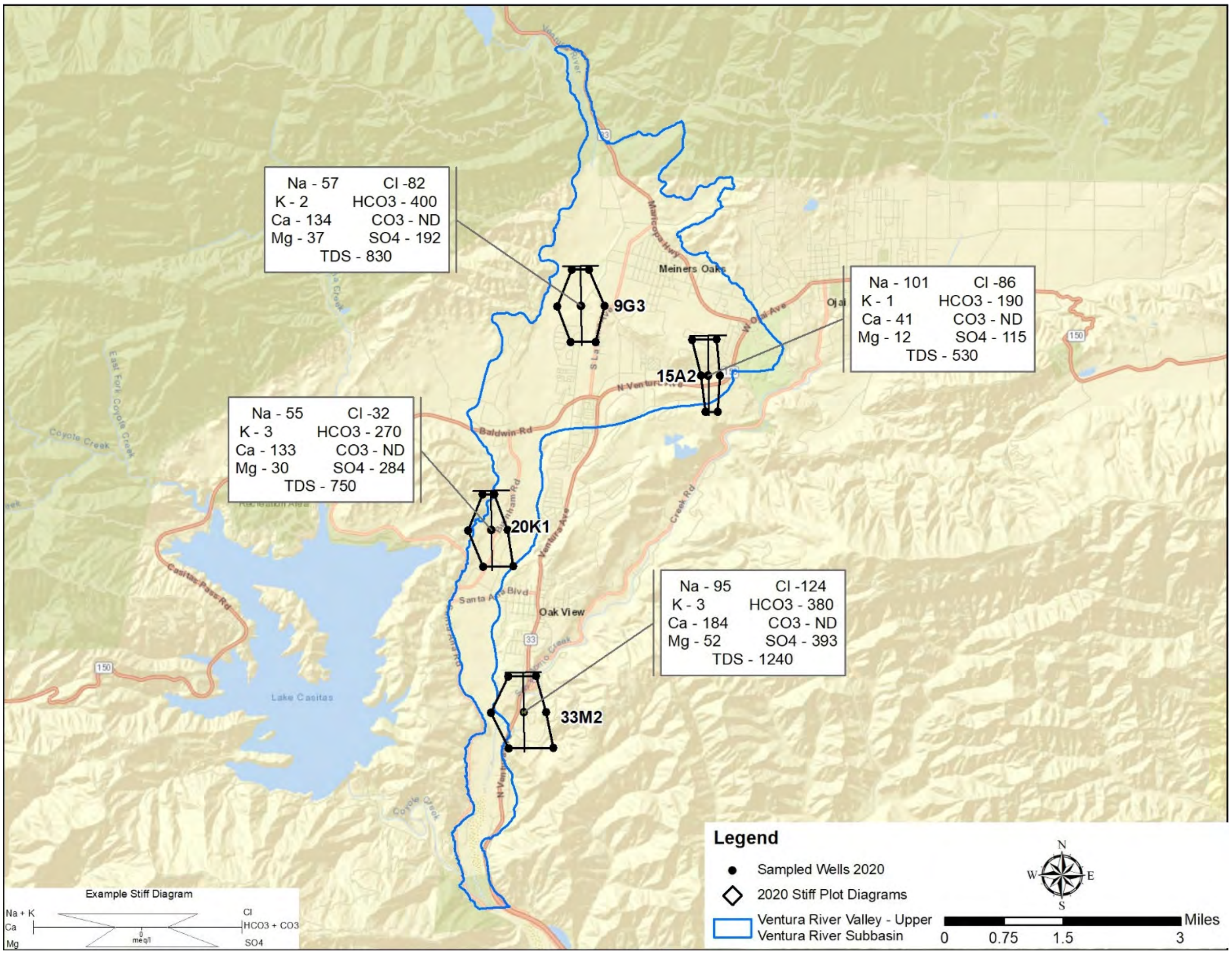


Figure 5-34: Ventura River Valley – Upper Ventura River Subbasin sampled well with Stiff diagram and selected inorganic constituents.

6.0 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 2020 approximately 200 wells throughout the County (**Figures 6-1 and 6-2**) were gauged, including seventeen designated as "key" wells, considered to represent groundwater elevations over a broad area of the groundwater basin. Key wells[7] 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 water levels in the northern half are measured bi-annually.

Gauged wells include abandoned 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 attempted to be gauged each year. Well availability is dependent on owner permissions and times of operation. When a well is not available for gauging, an alternative well is identified. Replacement wells must be nearby, of a similar depth and have the same perforation intervals.

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

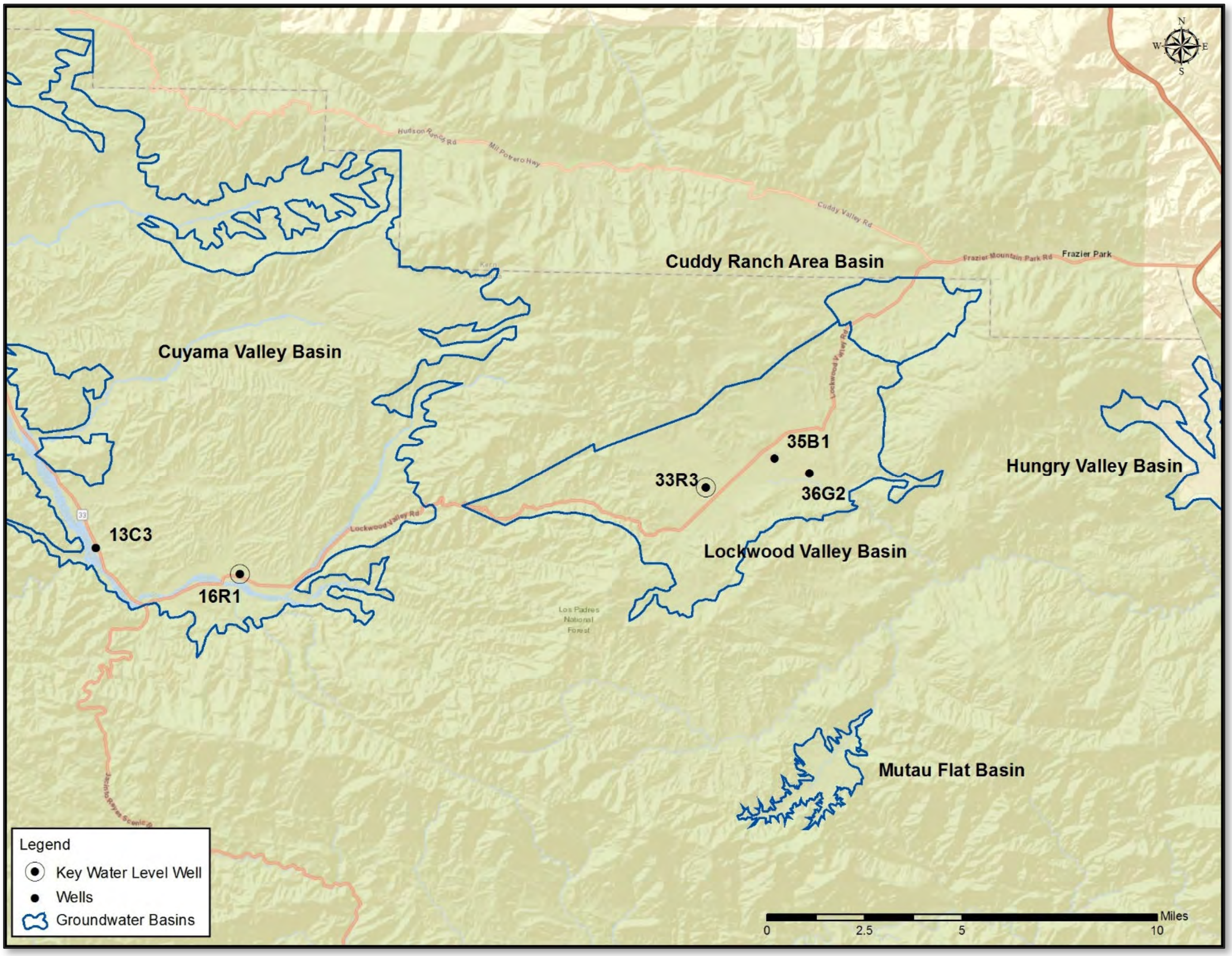


Figure 6-1: Water level wells measured in the northern half of the County.

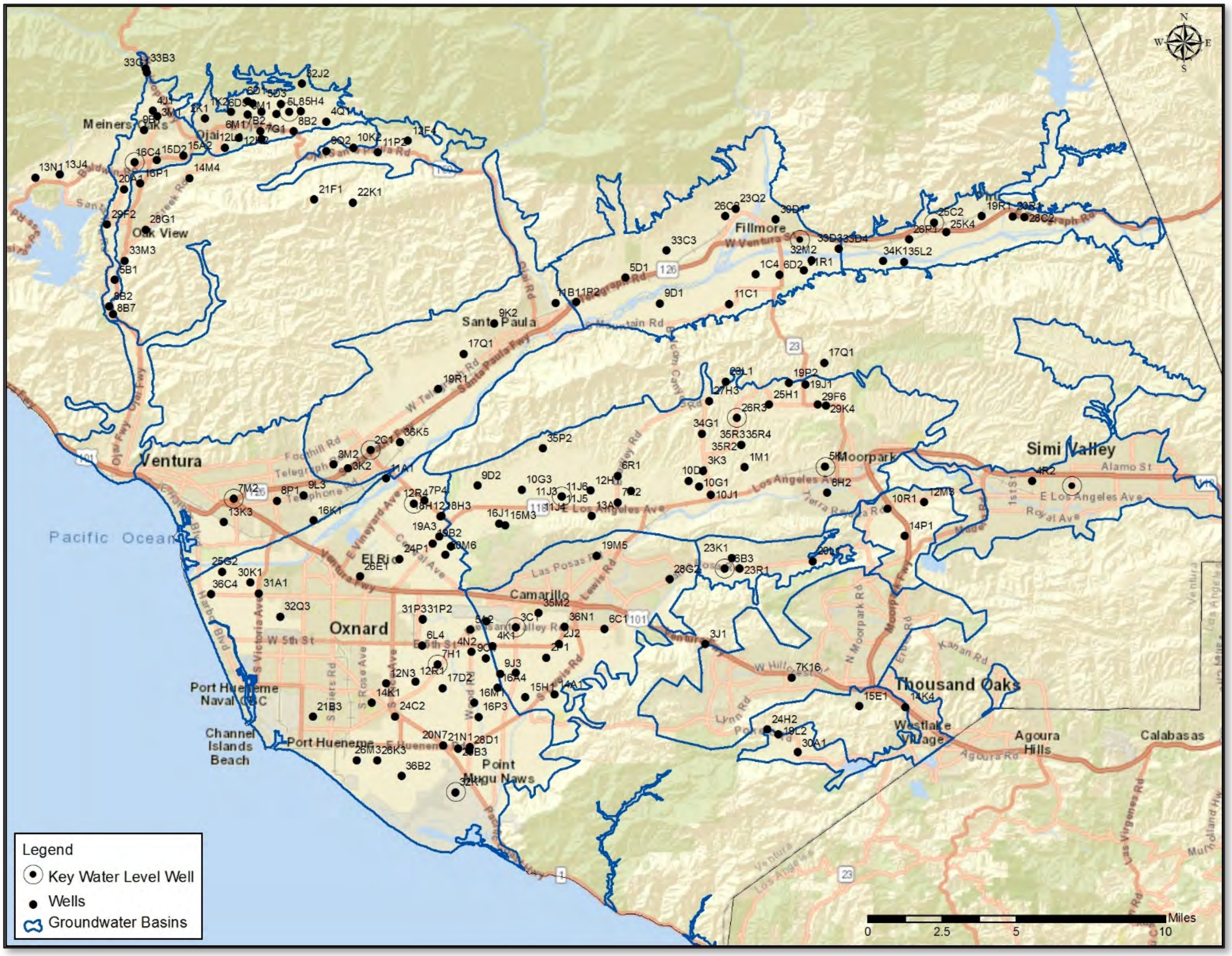


Figure 6-2: Water level wells measured in the southern half of the County.

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**.

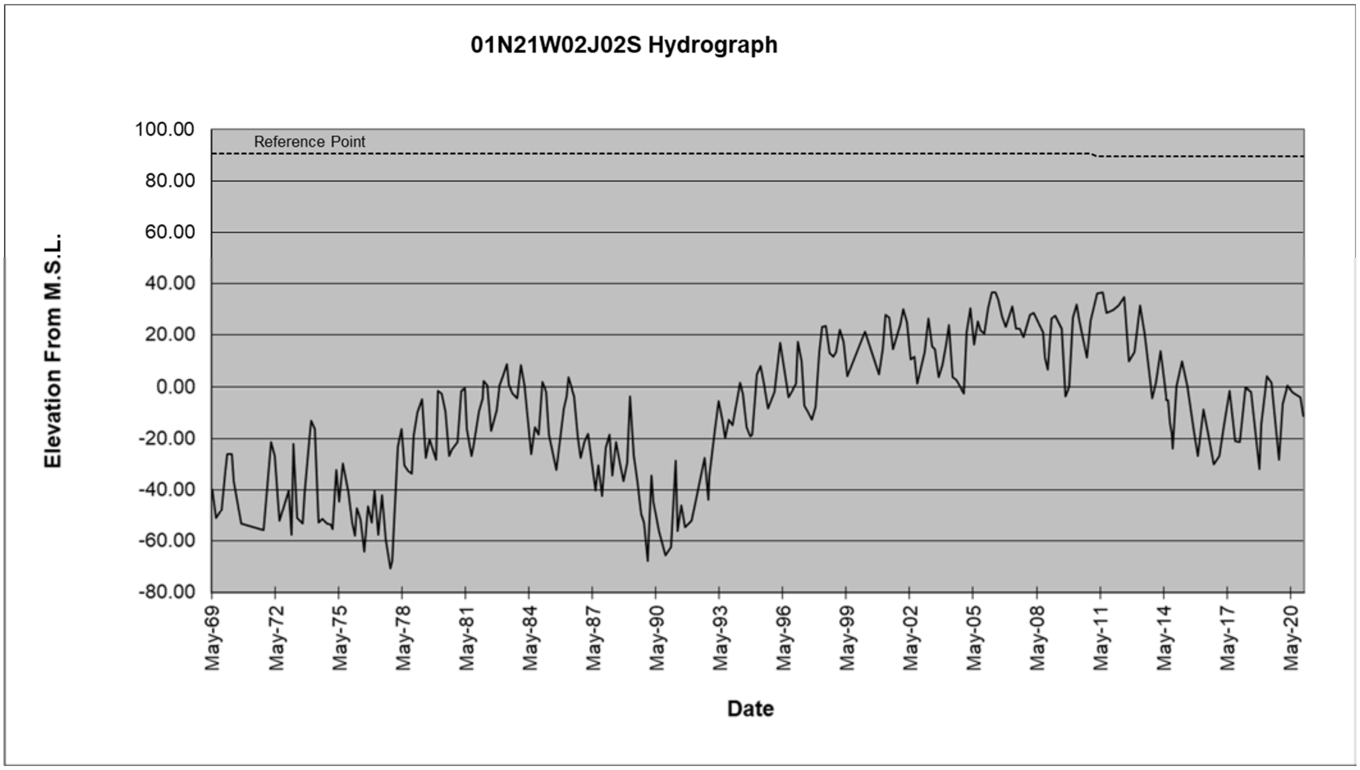


Figure 6-3: Hydrograph showing the groundwater elevation through time for Well No. 01N21W02J02S, located in the Pleasant Valley Basin.

*reference point = the elevation of the measuring point of the well.

Spring Groundwater Elevation Changes in Key Wells

Locations of each key well are shown in **Figure 6-4**. Key water level changes for the largest groundwater basins are summarized in **Table -1**. The information is used to track depth to groundwater trends. Spring season measurements are used for comparison since this time period is typically at the end of the seasonal rainfall year when groundwater basins are typically full. The measurements in the table are static water level measurements, in feet below the reference point, obtained after the water pump has been off for a minimum of 24 hours prior to gauging. In general, recent groundwater levels in Ventura County have shown a downward trend due to exceptional drought conditions and increased extraction of groundwater.

Hydrographs (line graphs) of individual key wells are presented in **Appendix B**. Hydrographs show changes in groundwater elevation relative to mean sea level and are measured in feet bgs or a specific reference point (RP), typically on the magnetic north side at the top of the well casing or the concrete slab at the wellhead. The hydrographs are accompanied by a bar graph to track changes from the previous year.

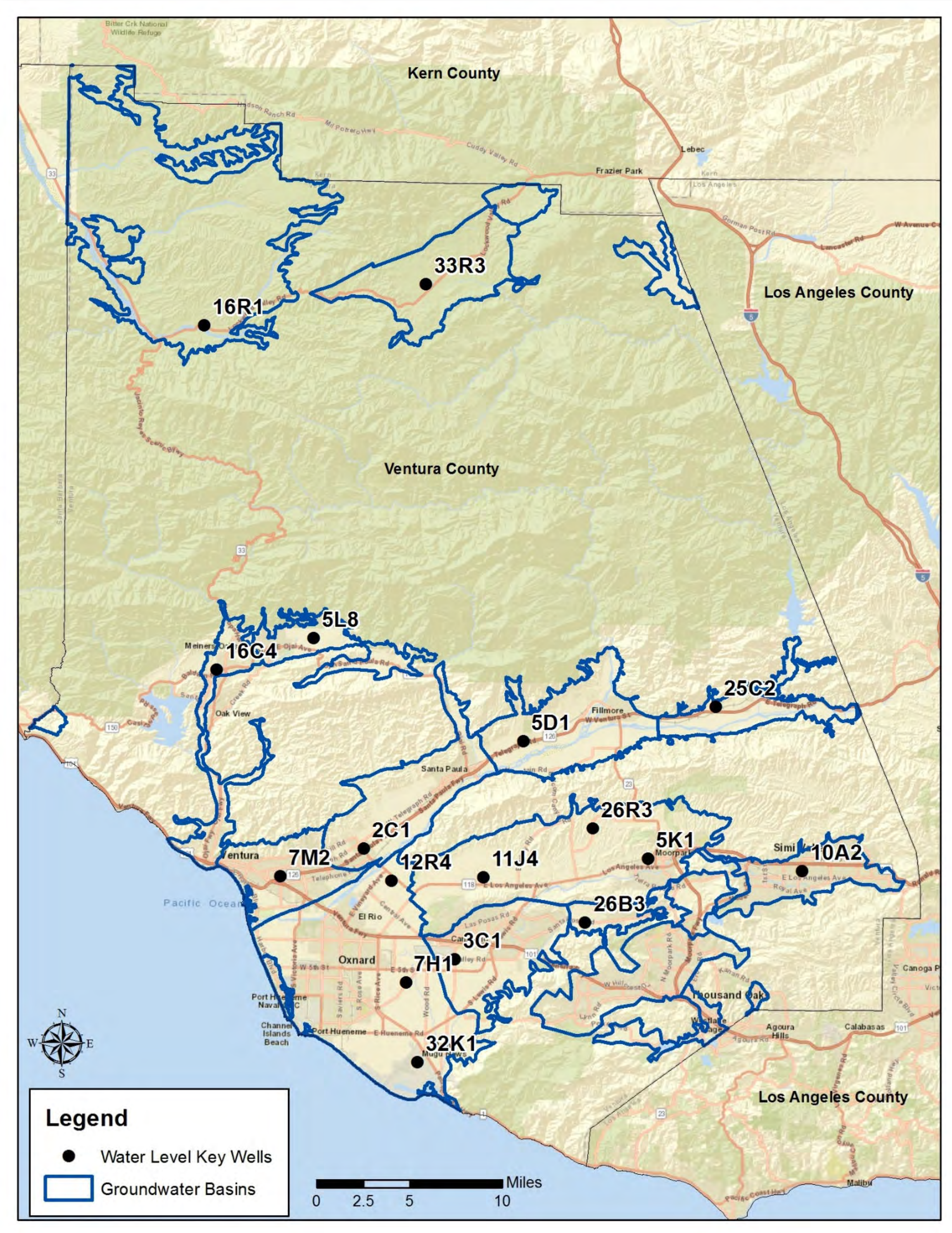


Figure 6-4: Key water level wells in Ventura County.

Table 6-1: Key water level changes in feet below ground surface for 2020.

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 2018)**	**(YEAR 2019)**	**(YEAR 2020)**	**(UP/DOWN)**
Oxnard Plain							
Oxnard Aquifer	01N21W07H01S	3.4	88.4	57.0	56.3	46.4	UP 9.9
	(Jan.1931-present)	(3/1999)	(9/1964)	(3/20)	(3/13)	(3/26)	
Fox Canyon Aquifer	01N21W32K01S	18	129	87.0	60.7	67.4	DOWN 6.7
	(Dec. 1972-present)	(4/1983)	(12/1990)	(3/12)	(3/18)	(3/16)	
Forebay Management Area (Measured By UWCD)	02N22W12R04S	16.2 ft.	Dry	Dry	106.14	108.75	DOWN 2.6
	(Mar 1996-present)	(5/2006)	(7/2014 - ?)	(3/28)	(4/16)	(3/26)	
Pleasant Valley Lower System	01N21W03C01S	87.5	253.9	162.3	153.9	146.5	UP 7.4
	(Feb.1973-present)	(8/1995)	(11/1991)	(3/26)	(3/15)	(3/26)	
West Las Posas	02N21W11J04S	368.4	406.2	405.7	407.7	410.2	DOWN 2.5
	(Jan.1991 - Present)	(6/2006)	(9/2016)	(3/7)	(3/25)	(4/3)	
East Las Posas	03N20W26R03S	503	619.3	564.0	576.7	568.7	UP 8.0
	(1985-present)	(4/1986)	(9/2009)	(3/9)	(3/25)	(6/10)	
Santa Rosa Valley	02N20W26B03S	13.2	60.3	66.2	54.5	52.7	UP 1.8
	(Oct.1972-present)	(4/1979)	(11/2004)	(3/27)	(6/5)	(3/31)	
Simi Valley	02N18W10A02S	45	92	89.1	86.3	85.8	UP 0.5
	(Dec.1984-present)	(2/1998)	(6/1992)	(3/23)	(3/29)	(3/27)	
Ventura River	04N23W16C04S	3.9	101.9	68.9	39.3	44	DOWN 4.7
	(July 1949-present)	(3/1983)	(12/2016)	(3/5)	(3/20)	(3/2)	
Ojai Valley	04N22W05L08S	38.2	312	203.1	160.1	142.9	UP 17.2
	(Oct.1949 - Present)	(4/1978)	(9/1951)	(3/1)	(4/1)	(3/3)	
Mound (Measured by UWCD)	02N22W07M02S	126.6	176.2	166.1	173.7	171.9	UP 1.8
	(Apr.1996-present)	(4/1998)	(4/1996)	(3/15)	(3/6)	(3/12)	
Santa Paula	02N22W02C01S	20.7	51.9	52.7	45.1	46.2	DOWN 1.1
	(Oct.1972-present)	(4/1983)	(12/1991)	(3/19)	(3/12)	(3/6)	
Fillmore	03N20W05D01S	107.8	163.7	143.5	131.8	131.9	DOWN 0.1
	(Oct.1972 - Present)	(2/1979)	(1219/77)	(3/19)	(3/12)	(3/6)	
Piru	04N19W25C02S	43.1	183.2	100.1	94.6	71	UP 23.6
	(Sep.1961-present)	(3/1993)	(10/1965)	(3/19)	(3/11)	(3/9)	
Lockwood Valley	08N21W33R03S	17.5 ft.	59.6 ft.	53.8	52.3	59.6	DOWN 7.3
	(April1966-present)	(9/1998)	(4/2020)	(4/4)	(4/19)	(4/24)	
Cuyama Valley	07N23W16R01S	15.0	47.5	43.8	26.1	24.7	UP 1.4
	(Mar.1972-present)	(4/1993)	(9/1990)	(4/4)	(4/19)	(4/24)	

Data prepared:
3/12/2021

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 down 2.6 feet from the 2019 spring measurement.

The water level in the Oxnard Subbasin, Oxnard Aquifer key well was up 6.7 feet from the previous spring. The water level in the Oxnard Subbasin, Fox Canyon Aquifer key well was down 6.7 feet from the 2019 spring measurement.

In the Pleasant Valley lower aquifer system, the water level in the key well was up 7.4 feet from spring 2019.

In the Las Posas Valley Basin, the EMA key well water level was up 8.0 feet from 2019. The key well for the WMA was down 2.5 feet from 2019.

In the Arroyo Santa Rosa Valley Basin, the water level was up 1.8 feet from 2019. The water level in the Simi Valley Basin key Well was up 0.5 feet from 2019. The water level in the Simi Valley key well has been on a downward trend over the last ten years (2011-2020).

In the northern portion of the Upper Ventura River Subbasin, the water level in key Well No. 04N23W16C04S was down 4.7 feet from 2019. In the Ojai Valley Basin, the water level in key Well No. 04N22W05L08S was up 17.2 feet from 2019. The Ojai Valley Basin responds quickly to rainfall or the lack of rainfall, and it is not uncommon to see large drops in water levels during dry periods and recovery at, or above, normal levels 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 23.6 feet from 2019. The water level in the Fillmore Subbasin key well was down 0.1 feet, and in the Santa Paula Subbasin the water level in the key well was down 1.1 feet from 2019. In the Mound Subbasin the water level in key Well No. 02N22W07M02S was up 1.8 feet from 2019.

In the northern half of the County, the Lockwood Valley Basin key Well No. 08N21W33R03S was down 7.3 feet from 2019. The water level in the Cuyama Valley Basin key Well No. 07N23W16R01S was up 1.4 feet from 2019.

Potentiometric Surface Maps

Potentiometric surface maps, also referred to as groundwater elevation maps, are used to visually represent groundwater elevations over broad areas. Maps are derived from groundwater elevation data for collected in spring and fall periods at County gauged wells and at wells measured by other organizations/agencies.

Generalized potentiometric surface maps created from 2020 groundwater elevation data include:

a) The Santa Clara River Valley Basin,
b) The UAS of the Oxnard Subbasin and Pleasant Valley Basin, and
c) The LAS of the Oxnard Subbasin, Pleasant Valley, and Las Posas Valley Basins.

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

Figures 6-7 and 6-8 depict the UAS of the Oxnard Subbasin and Pleasant Valley Basin area.

In the Pleasant Valley Basin, the UAS is not typically present, but there are areas of shallow alluvial sediments similar to Oxnard and Mugu Aquifer units from which wells are extracting groundwater. Well data from the perched or semi-perched zone of the Oxnard Subbasin was not used to generate these contours. Some water levels represent confined conditions.

Figures 6-9 and 6-10 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.

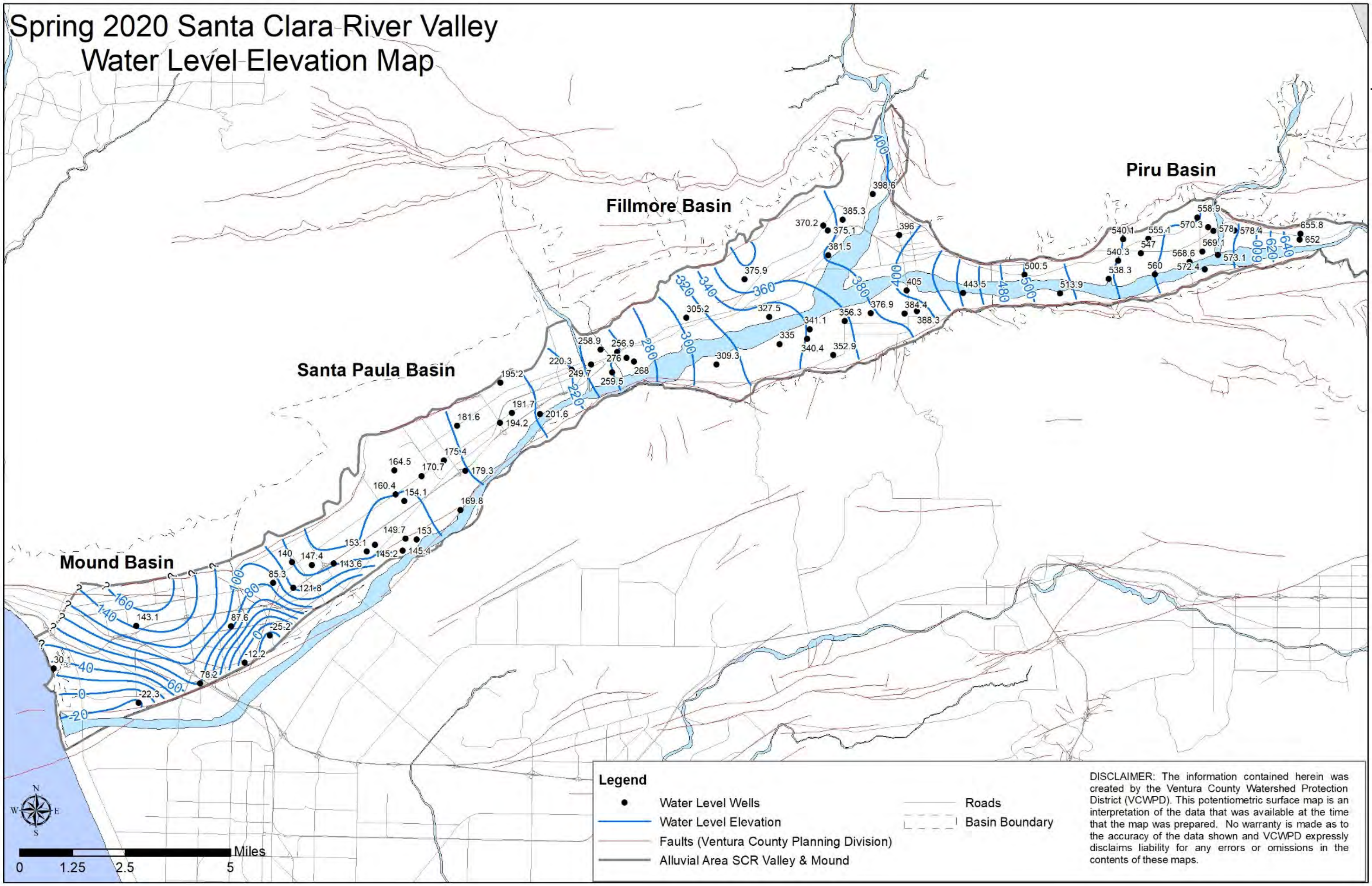


Figure 6-5: Water level surface elevation contours for the Santa Clara River Valley Basin for spring 2020.

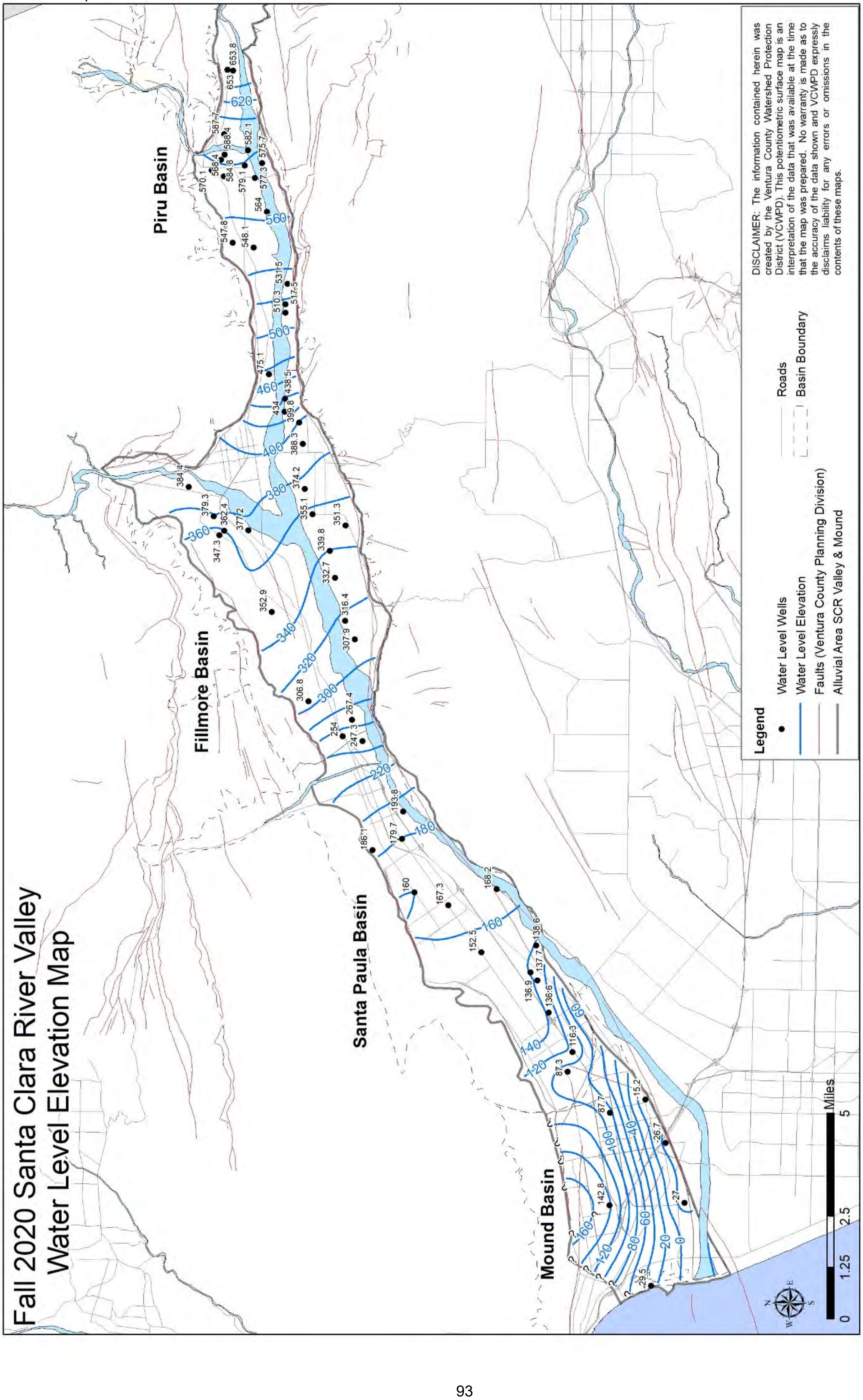


Figure 6-6: Water level surface elevation contours for the Santa Clara River Valley Basin for fall 2020.

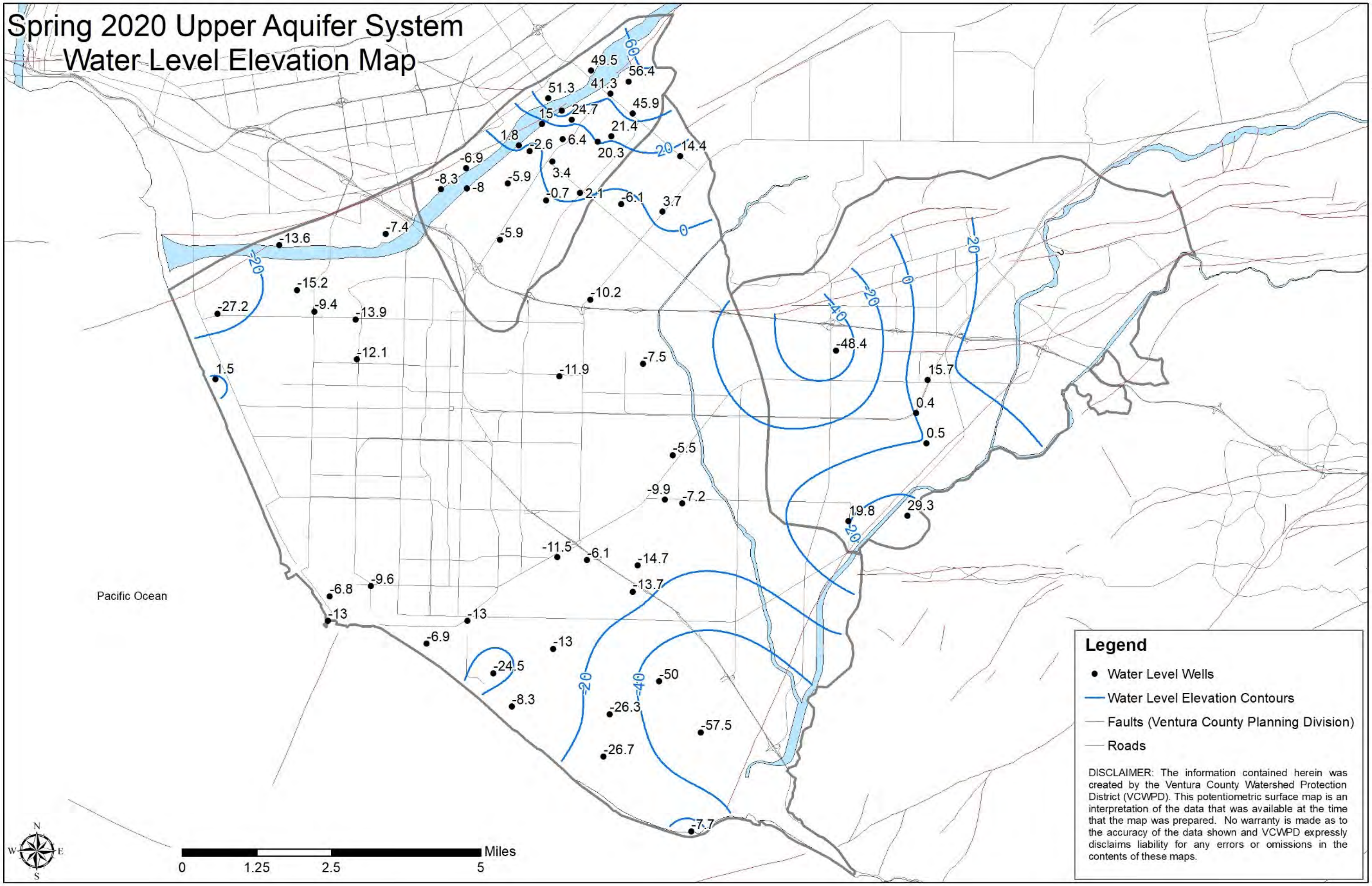


Figure -7: Water level surface elevation contours for the Upper Aquifer System for spring 2020.

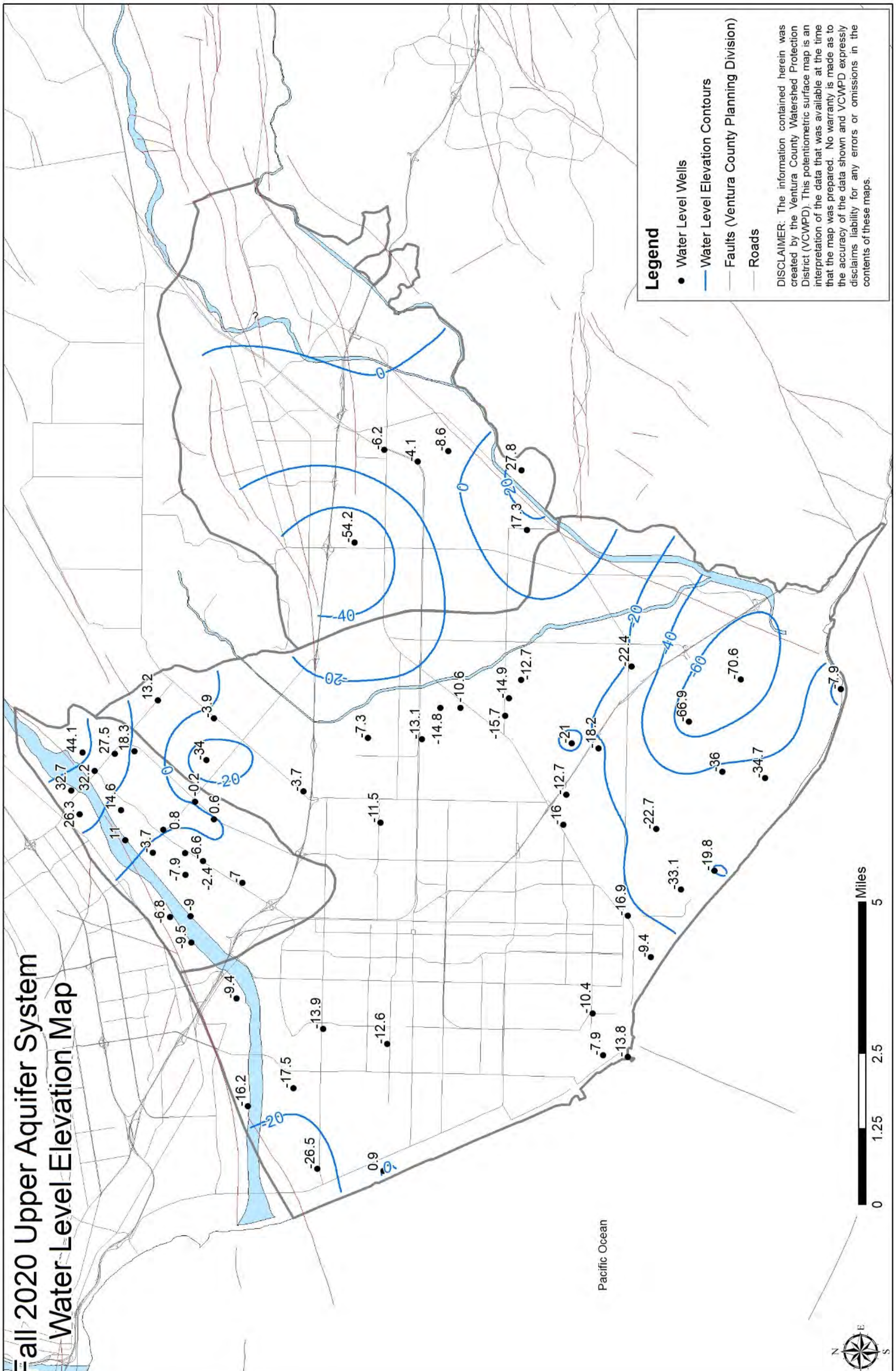


Figure 5-8: Water level surface elevation contours for the Upper Aquifer System for fall 2020.

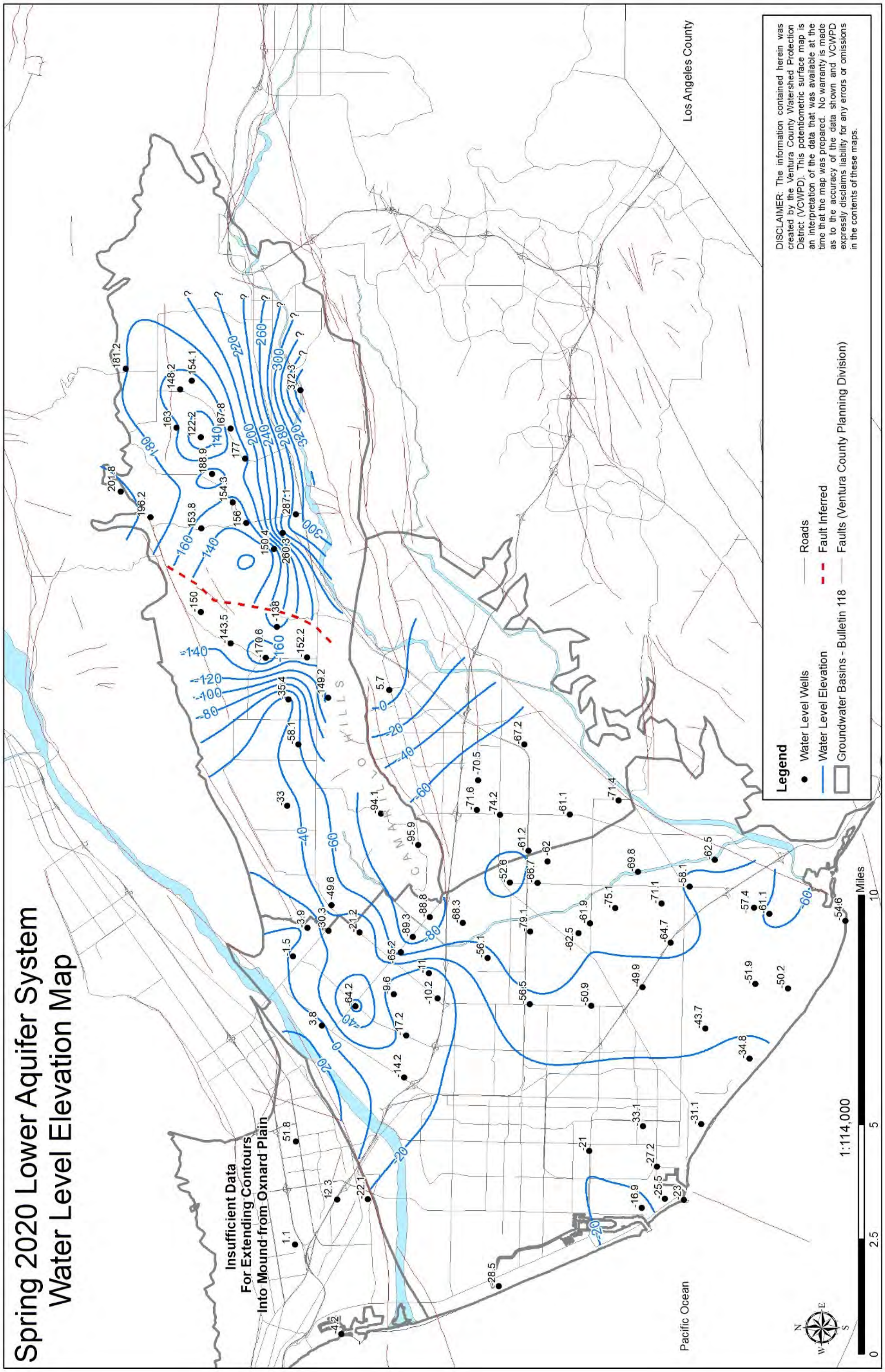


Figure 5-9: Water level surface elevation contours for the Lower Aquifer System for spring 2020.

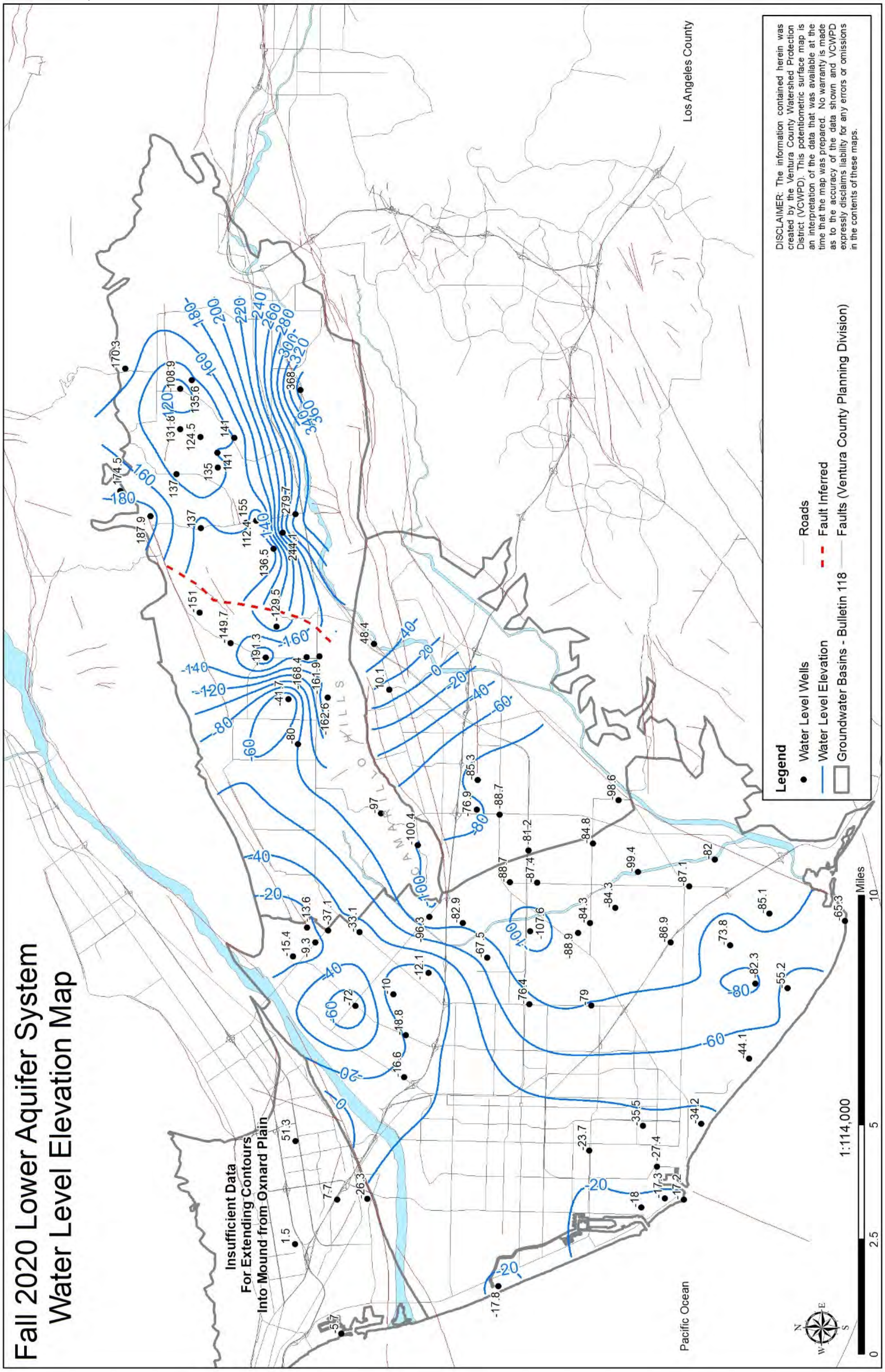


Figure 5-10: Water level surface elevation contours for the Lower Aquifer System for fall 2020.

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 reporting seasonal and long-term trends in groundwater elevations. DWR is directed to make the resulting information available to the public. 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.

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

7.0 Water Supplies

Groundwater Extractions

There are approximately 3,500 active wells in the County that extract groundwater for agricultural, domestic, municipal and industrial uses. Three groundwater management agencies (GMAs) (FCGMA, OBGMA, and UWCD) in Ventura County oversee groundwater extractions within their statutory boundaries (**Figure 7-1**).

Of the total active wells in the County, approximately 2,000 are within one or more of these agency boundaries. Owners and operators within the boundaries of a GMA are required to report groundwater extractions to their respective agency. Owners outside of a groundwater management agency boundary are not required to report extractions but are asked to report well statuses to the County through an *Annual Water Well Usage Statement*.

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 7-1** compares extractions reported to the three agencies for the years 2011 through 2020. Wells located in overlapping agency boundaries must report their extractions to two agencies. This leads to uncertainty in the total volume of groundwater extracted in the County because the reported extractions cannot be combined. **Figure 7-1** shows the overlap area of the FCGMA and UWCD.

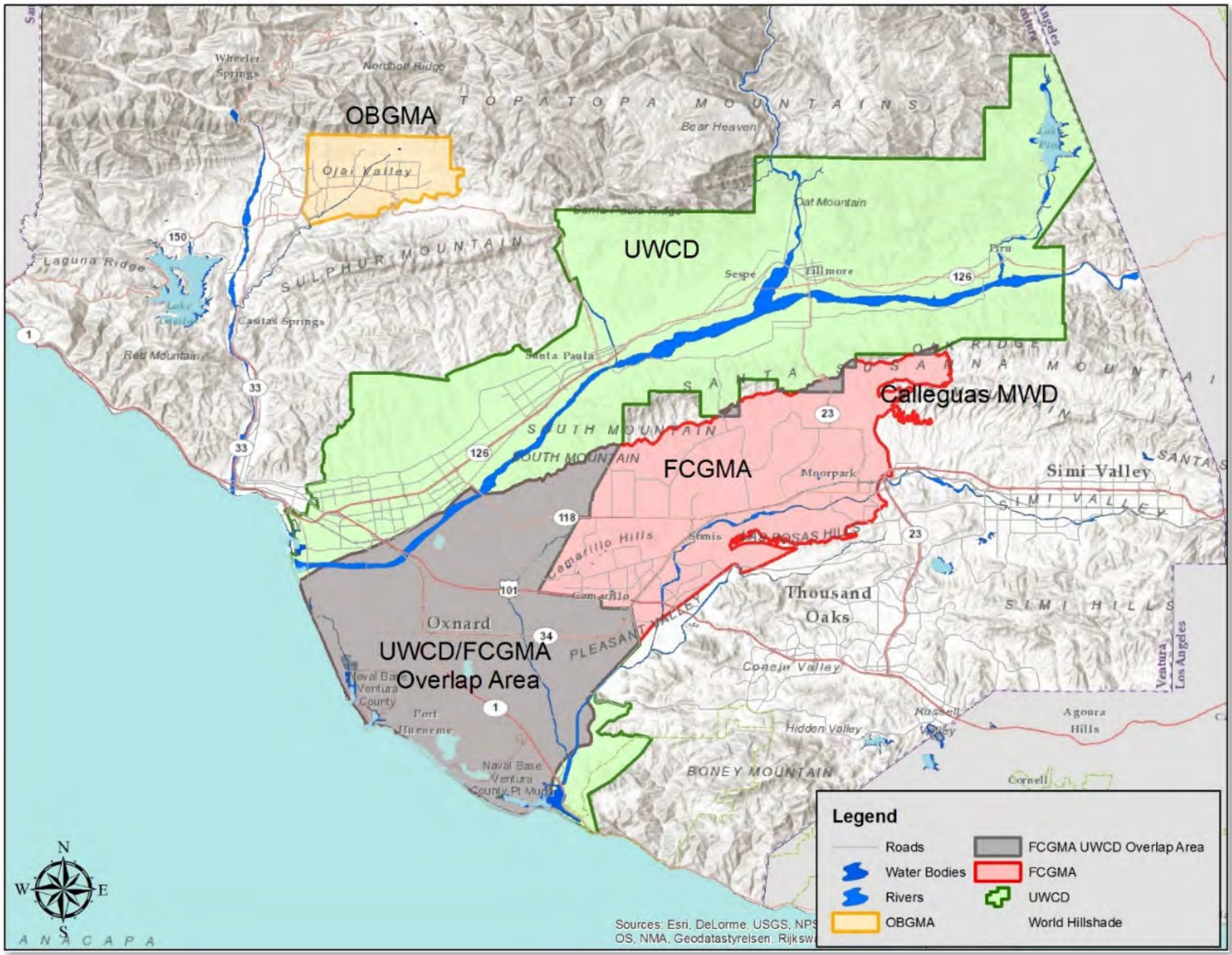


Figure 7-1: Groundwater Management Agencies in Ventura County.

Table 7-1: Groundwater extractions within reporting agencies 2011 through 2020[8,9,12]

	Agency		
Reported Extractions (AF)	UWCD	FCGMA	OBGMA
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	64,063.56	
2018-2	94,195.78	62,312.00	
Annual Total 2018	**169,237.68**	**123,419.79**	**4,224.03**
2019-1**	57,335.53	51,722.44	
2019-2**	91,649.71	61,986.53	
Annual Total 2019**	**148,985.24**	**113,708.97**	**4,465.95**
2020-1**	65,245.38	58,531.81	
2020-2**	99,735.12	38,299.34	
Annual Total 2020**	**164,980.50**	**96,831.14**	**4,637.82**
UWCD as 07/22/2021		FCGMA as of 07/20/2021	

**Values are subject to change. For the most up to date data please contact the respective agency.

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

Wholesale Districts

Surface and imported water is supplied by three wholesale water districts in the County (**Figure 7-2**):

1. Casitas Municipal Water District (Casitas),
2. Calleguas Municipal Water District (Calleguas), and
3. United Water Conservation District (UWCD).

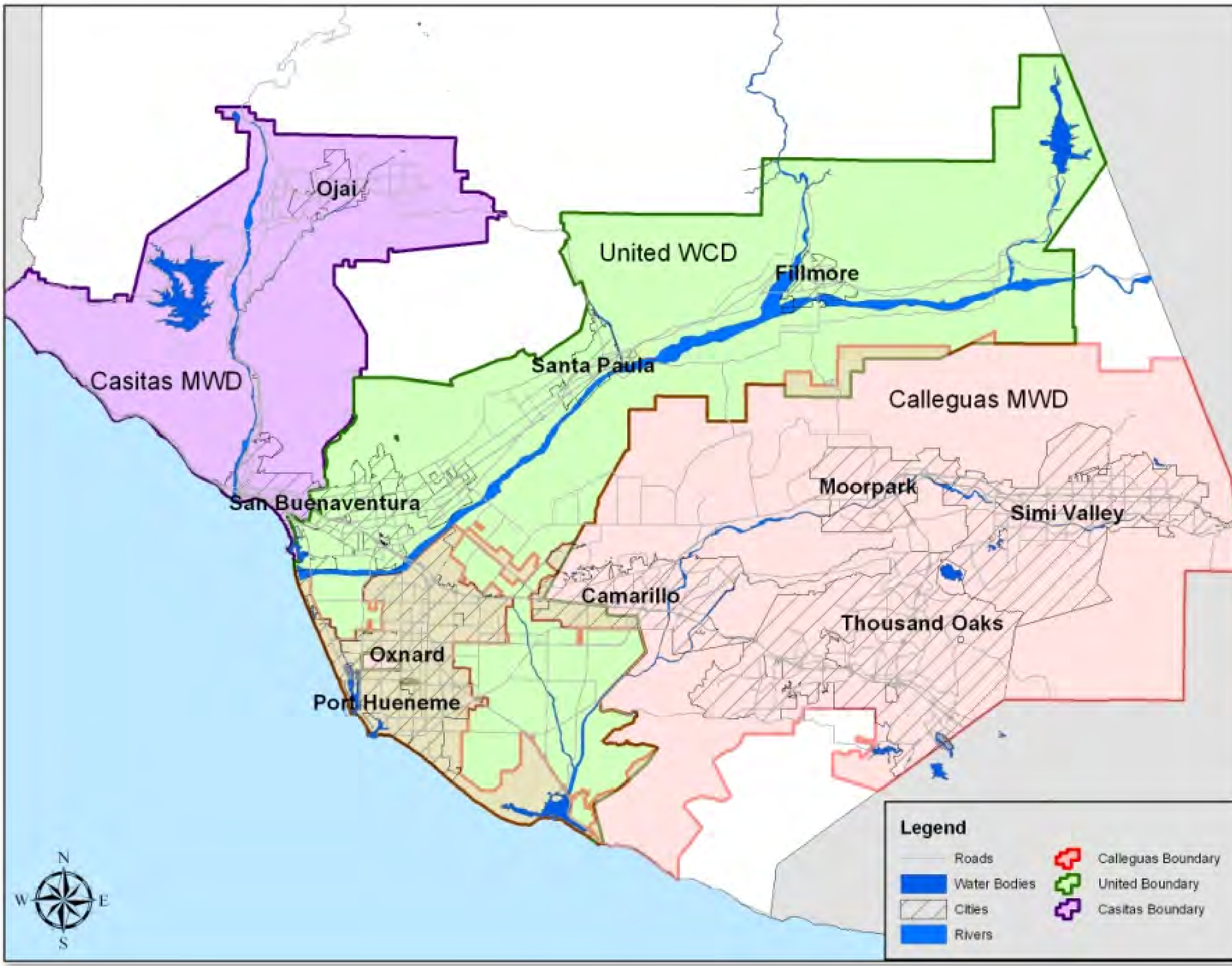


Figure 7-2: Wholesale Water District Boundary Map.

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 by way of an extensive water system owned and operated by the Metropolitan Water District (MWD) of Southern California, a regional wholesaler. MWD supplies imported water to Calleguas. Calleguas imported a total of 90,434.6 AF of treated water in 2020. Calleguas delivered 89,631.5 AF of water to retailers in 2020 compared to 82,237.10 AF in 2019. Production from the District's Aquifer Storage and Recovery (ASR) wellfield was 378.78 AF in 2020. Some imported water is also injected in the East Las Posas Management Area through the Las Posas (ASR) Project. In the ASR wellfield 1,229.65 AF of water was injected in 2020. Up to 11,000 AF of water can be stored by Calleguas in Lake Bard and supply the District's needs for short periods of time.

The end of year water volume in storage in Lake Bard was 10,020 AF[10]. 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).

UWCD delivered 22,635 AF of water to retailers and end-users in 2020, up from 16,689 AF in 2019. UWCD can store up to 87,000 AF of water in Lake Piru. At the end of 2020 there was 15,043 AF of stored water in Lake Piru. UWCD released 48,163 *(preliminary data)* AF of water from the lake in 2020. UWCD imported 6,625 AF of SWP water into Ventura County from Pyramid Lake in 2020. 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 7-2** and **Figure 7-3** compare the volume of water diverted and sent to spreading grounds by UWCD[11]. Annual precipitation for the period of 2011 to 2020 is also shown, however recharge to basins is a function of SWP deliveries and restrictions from other agencies.

Table 7-2: 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	995
2011	10.95	23,435	37,845	10,679
2012	8.79	3,985	16,293	538
2013	2.97	34	2,389	263
2014	9.50	387	1,935	578
2015	5.09	1,231	1,285	0
2016	10.00	1,784	806	59
2017	15.22	3,100	6,043	1,036
2018	9.52	2,301	1,205	212
2019	23.71	16,121	20,976	3,008
2020	6.96	8,847	22,075	0

[10] Data provided courtesy of Calleguas MWD.

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

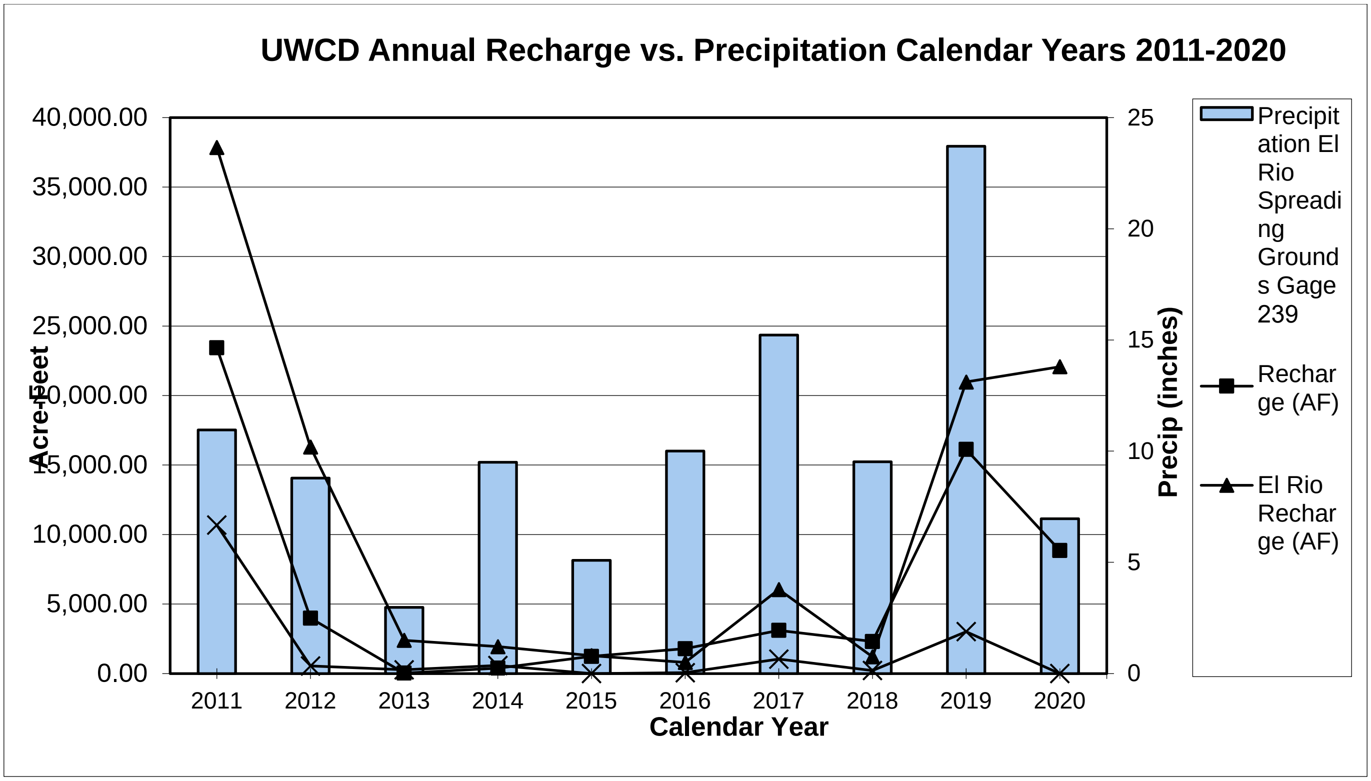


Figure 7-3: Graph depicting precipitation versus recharge for UWCD 2011-2020.

Casitas delivered approximately 11,842 AF in 2020, with 3,095 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 8,000 to 23,000 AF. Casitas 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 2020, 93,464 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. Casitas 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[12].

[12] Data provided courtesy of Casitas MWD.

Table 7-3: Comparison of wholesale district water deliveries 2011-2020.

	Total Water Deliveries in Acre Feet (AF)			
Year	**Casitas MWD**	**Calleguas MWD**	**United WCD**	**Annual Total**
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
2020	11,842	89,632	21,048	122,522
Period Total	**139,045**	**948,360**	**210,709**	**1,298,113**

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 7-4 shows the volume of stored surface water and diverted surface water. In 2020, UWCD released approximately 48,163 AF of water from Lake Piru, including a fish passage requirement of 5 cubic feet per second (cfs) per day. UWCD diverted 30,922 AF from the Santa Clara River at the Freeman Diversion Dam with 8,847 AF sent to the Saticoy Spreading Grounds, 22,075 AF sent to the El Rio Spreading Grounds and 0 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 2020 there was 15,009 AF of water in storage in Lake Piru, 93,464 AF in Lake Casitas and 10,020 AF in Lake Bard. Casitas releases 3,200 AF per year from Lake Casitas for the Robles Diversion Fish Passage.

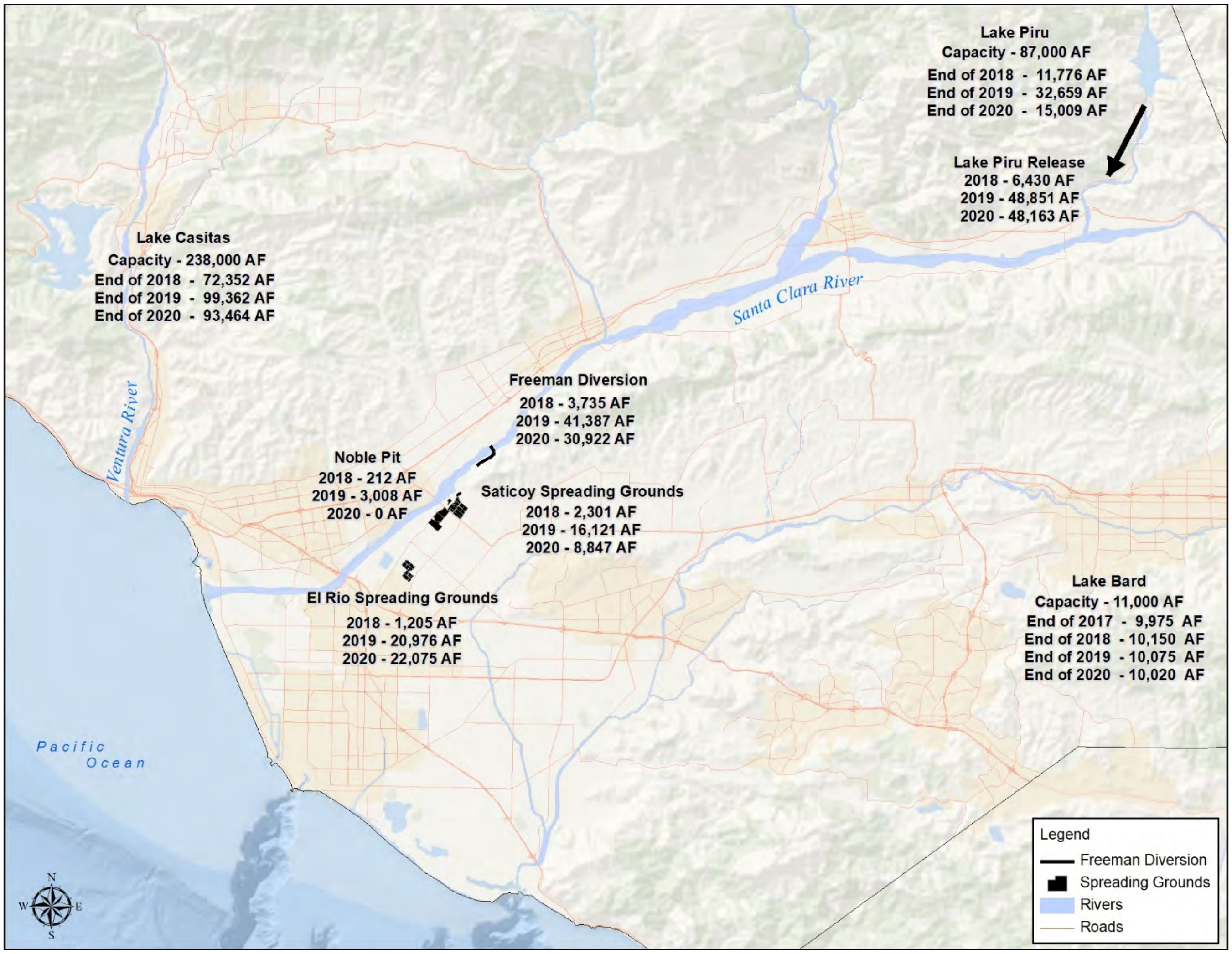


Figure 7-4: Surface water storage and diversion map[11, 12, 13].

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. The City of Ventura's water supply comes from treated water diverted from the Ventura River, groundwater extracted from City wells and surface water from Lake Casitas delivered by Casitas. The City of Oxnard receives water from UWCD, imported water from Calleguas Municipal Water District and groundwater from City well fields.

In the southern half of the County, the cities of Simi Valley, Moorpark and Thousand Oaks as well as the communities of Bell Canyon, Newbury Park, Hidden Valley, Lake Sherwood, Oak Park and part of Westlake Village rely mainly on water imported from 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, a one-million gallon per day (MGD) facility, 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)[13]. VCWWD8 serves 68% of demand or approximately 23,000 AF of water while GSWC serves the remaining 32%, approximately 8,500 AF[14]. In 2020 Calleguas delivered 19,727 AF to VCWWD8 and 5,353 AF to GSWC.

The City of 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 2020, Calleguas delivered 7,355 AF to VCWWD1. The City also extracts groundwater from two wells used for park irrigation.

The City of Thousand Oaks extracts groundwater using it for median irrigation on Hillcrest Ave. 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 2020, these three water purveyors received 32,689 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 2020, Calleguas delivered 4,460 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 receives and treats water from UWCD and blends it with water from Calleguas for the City of Port Hueneme, Channel Islands Beach Services Community District and Naval Base Ventura County.

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

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

In the Ojai Valley, 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 Casitas Municipal Water District to local water purveyors.

In the Santa Clara River Valley area, the City of Santa Paula relies on local groundwater (approximately 5,000 to 7,000 AF/yr based on reporting to UWCD). In addition, some surface water is diverted from Santa Paula Creek (approximately 500 AF/yr)[15] 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 AF/yr based on reporting to UWCD). The community of Piru relies on groundwater delivered by local water purveyors.

Residents of the Lockwood Valley area and the Santa Monica Mountains area, as well as residents living in areas not served by a water company rely on private domestic water wells. Water is extracted from groundwater basins, or from water-bearing units (fractured volcanic rock and bedrock) in areas outside of groundwater basins.

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

8.0 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.

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 8-1**). 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).

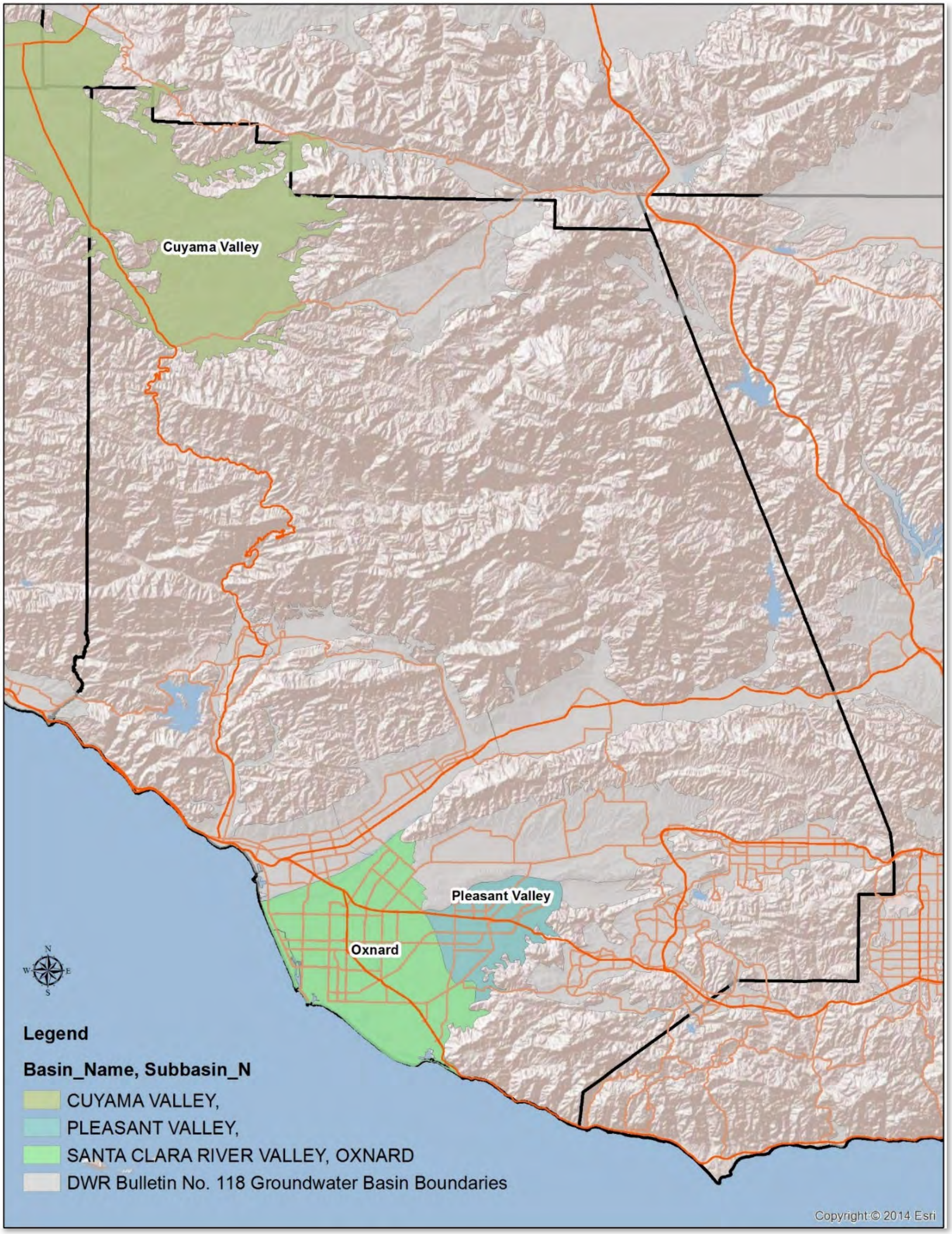


Figure 8-1: Critically overdrafted basins in Ventura County.

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 517 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 (**Figure 8-2**).

New priority rankings were completed by DWR in late 2019.

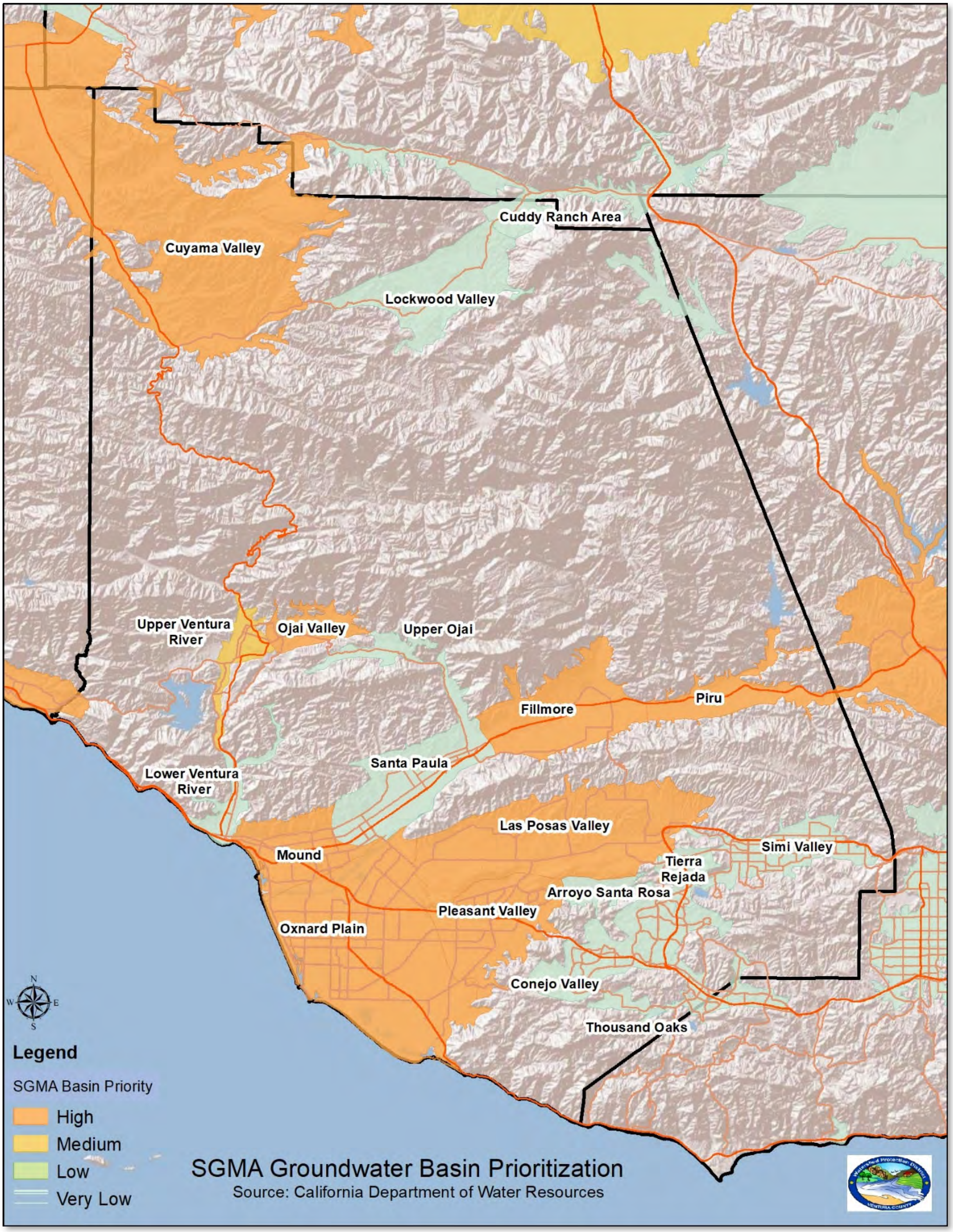


Figure 8-2: 2019 Final SGMA B118 basin prioritization.

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 San Buenaventura. 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.

Groundwater Sustainability Agencies (GSA's)

GSAs are responsible for developing and implementing a GSP to ensure the basin meets its sustainability goal by operating within its sustainable yield without creating undesirable results. Before 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 have been formed and there are no "unmanaged areas.[16]" 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 Valley Basin (DWR Basin No. 4-008) falls under the jurisdiction of the FCGMA. However, 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 portions of three counties, Santa Barbara County, Kern County and Ventura County. 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: 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 Santa Clara River in the eastern portion of Ventura County. 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 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.

[16] 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 Mound Subbasin. UWCD is authorized to replenish groundwater of the basin and does 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, Oxnard Subbasin, Pleasant Valley Basin and the Las Posas Valley Basin. The FCGMA's authority is limited to areas within the portions of the Arroyo Santa Rosa, Oxnard Subbasin, Pleasant Valley and Las Posas Valley Basins 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 on December 6, 2014. The OBGMA submitted an analysis of their basin conditions on December 22, 2016 in lieu of preparing a GSP plan. The basin analysis is under review by the DWR and must demonstrate the basin has operated within its sustainable yield over a 10-year period.

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 on April 21, 2017. The UVRGA is a joint powers authority comprised of five local public agencies: (1) Casitas Municipal Water District, (2) the City of Ventura, (3) Ventura County, (4) Meiners Oaks Water District, and (5) 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

Appendix B – Key Water Level Wells

Figure B-1: Map showing key water level wells in Ventura County.

Appendix B – Key Water Level Wells

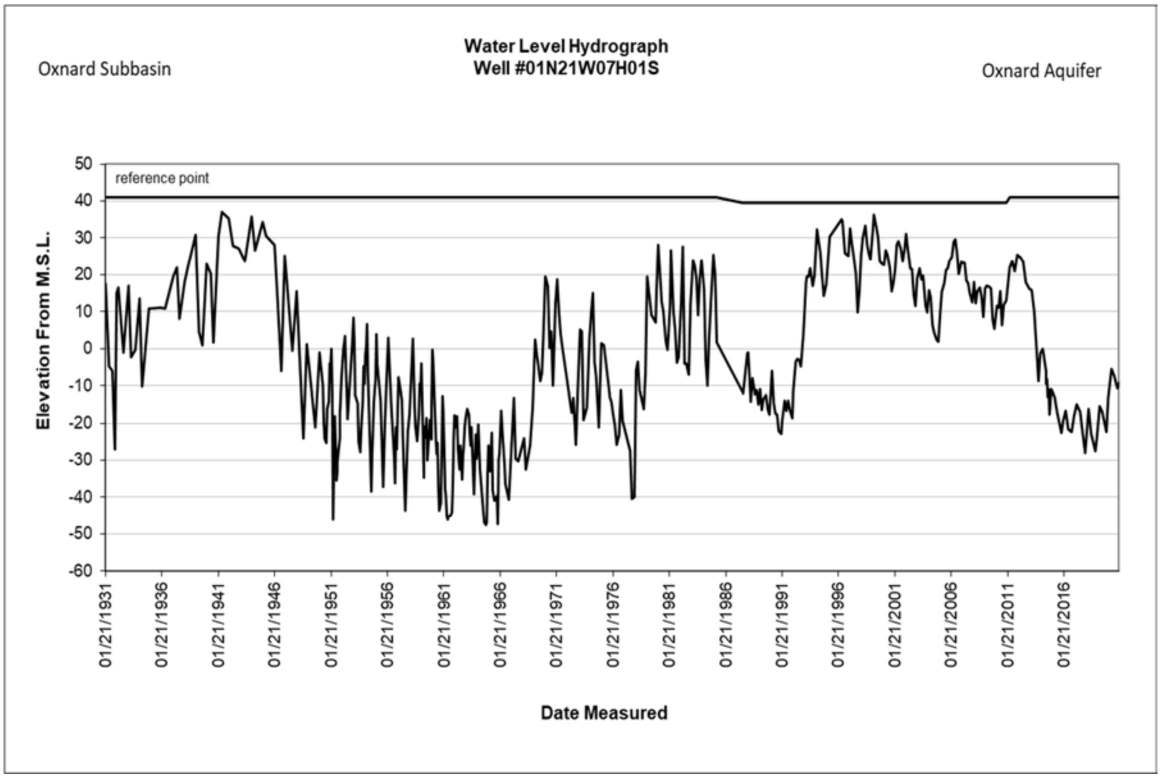

Figure B-2: Oxnard aquifer key well Hydrograph.

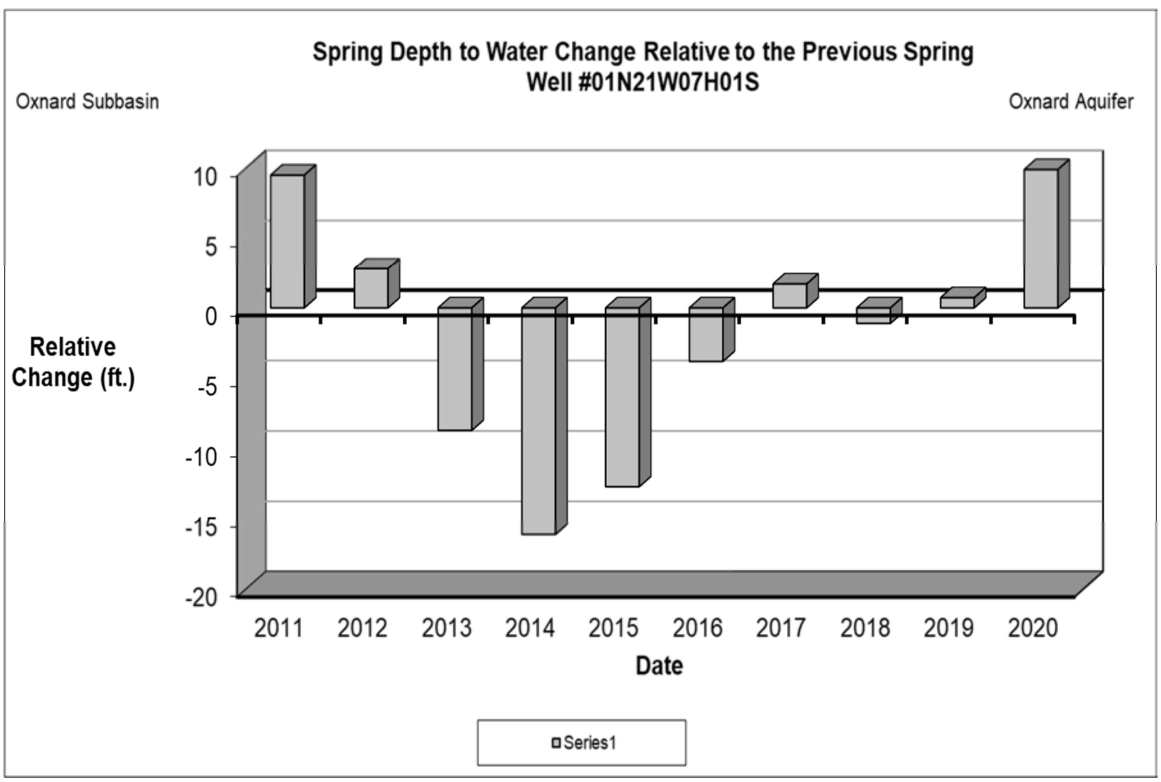

Figure B-3: Oxnard aquifer 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

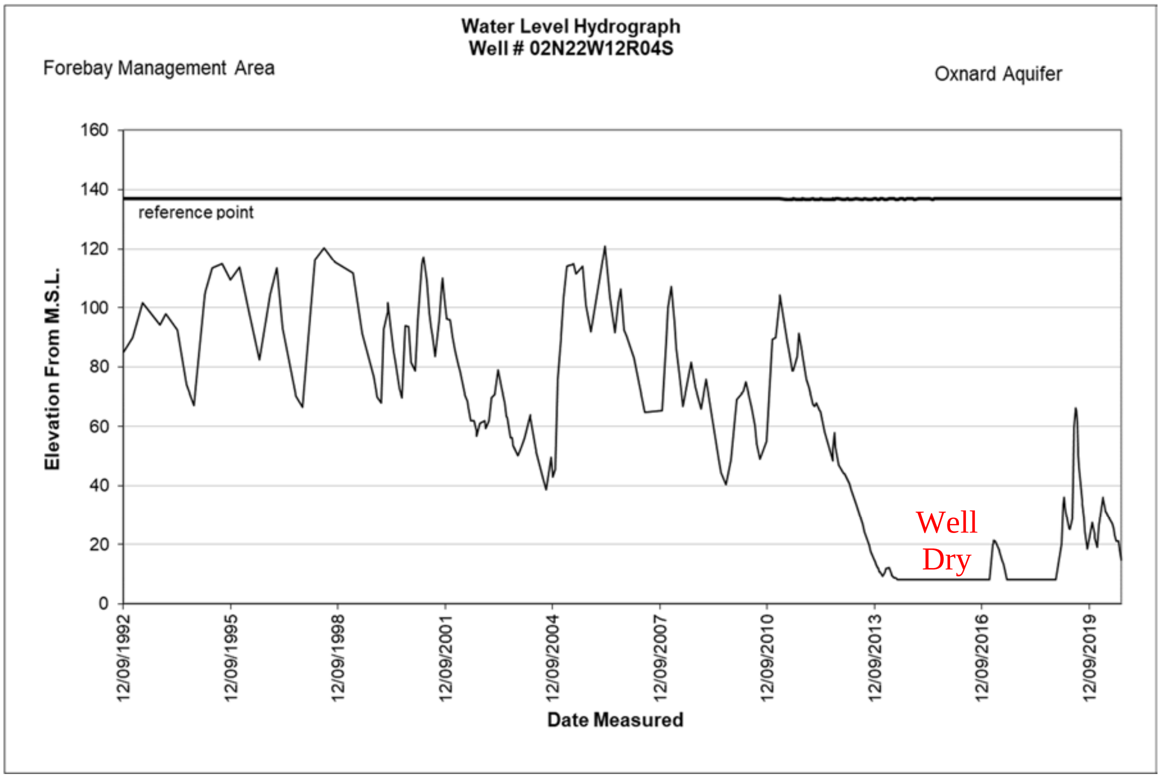

Figure B-4: Forebay Management Area key well Hydrograph.

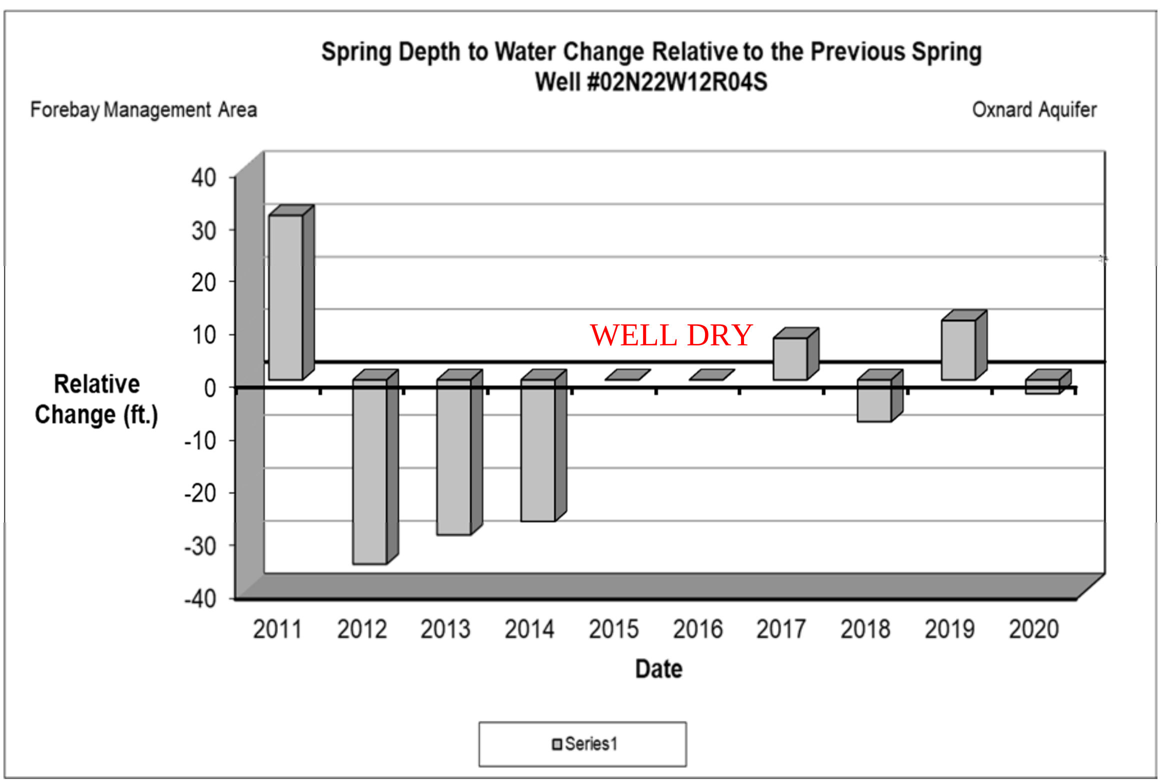

Figure B-5: Forebay Management Area 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

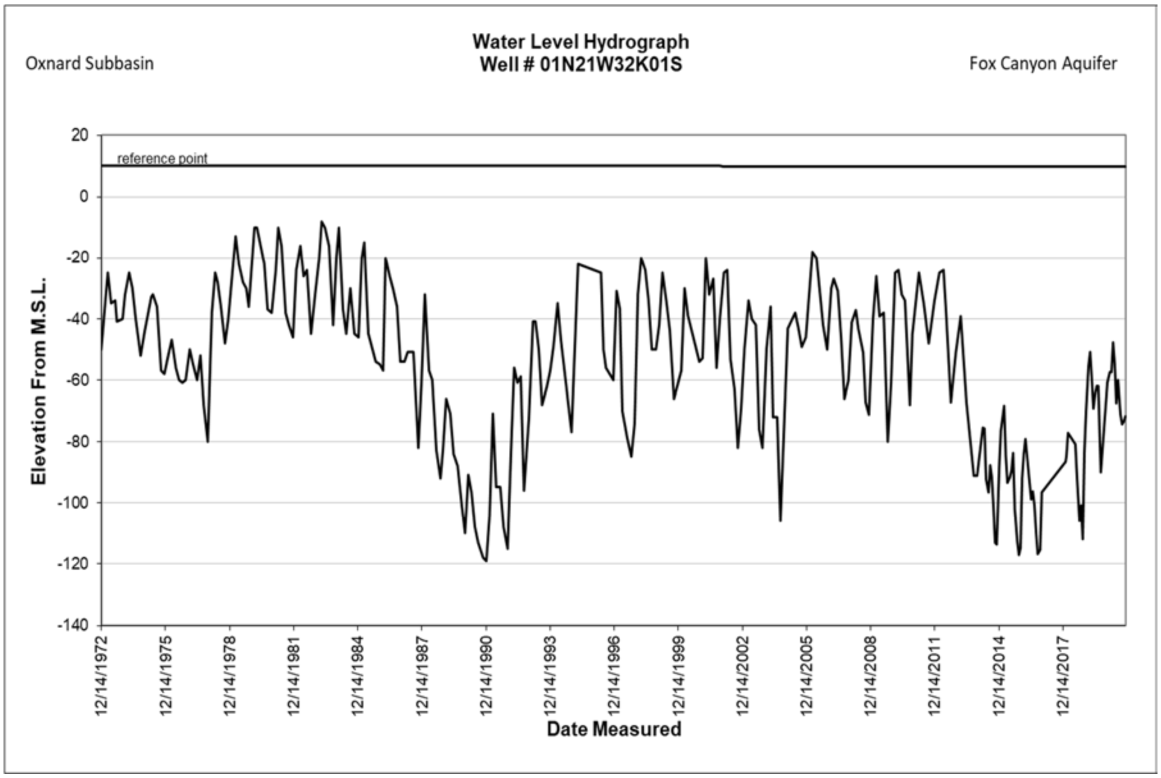

Figure B-6: Oxnard Subbasin Fox Canyon Aquifer Key Well Hydrograph.

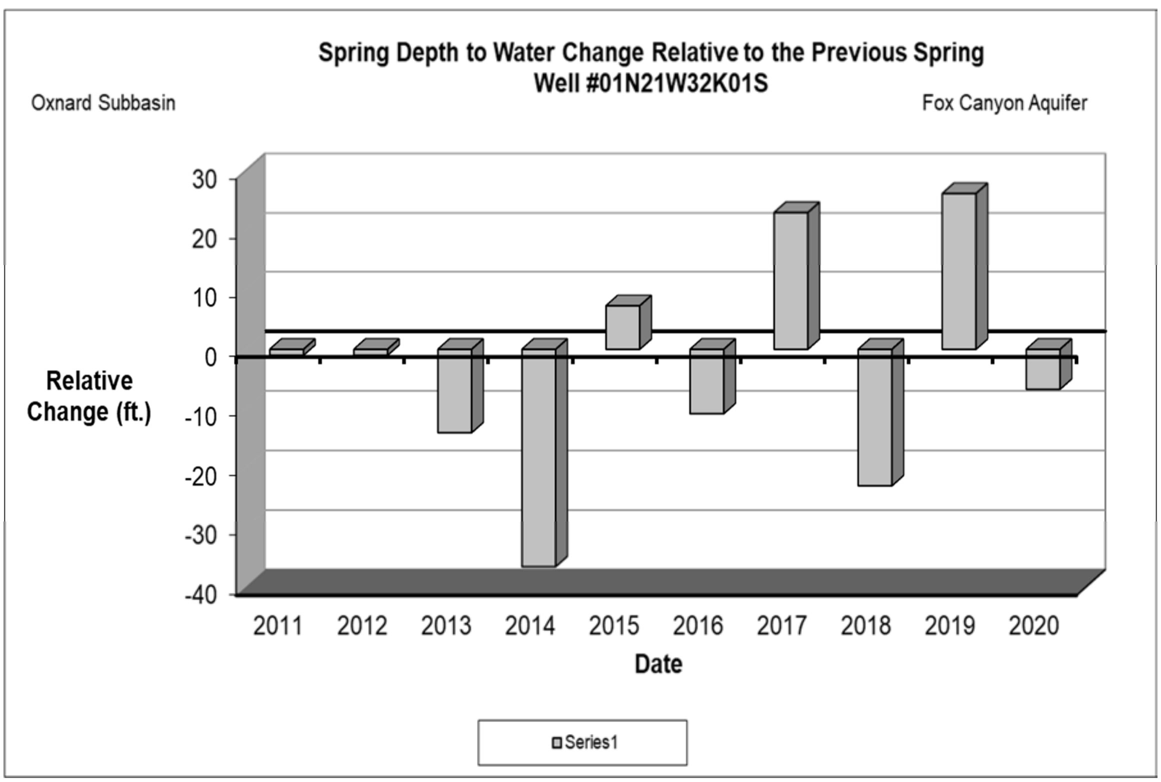

Figure B-7: Oxnard Subbasin Fox Canyon Aquifer 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

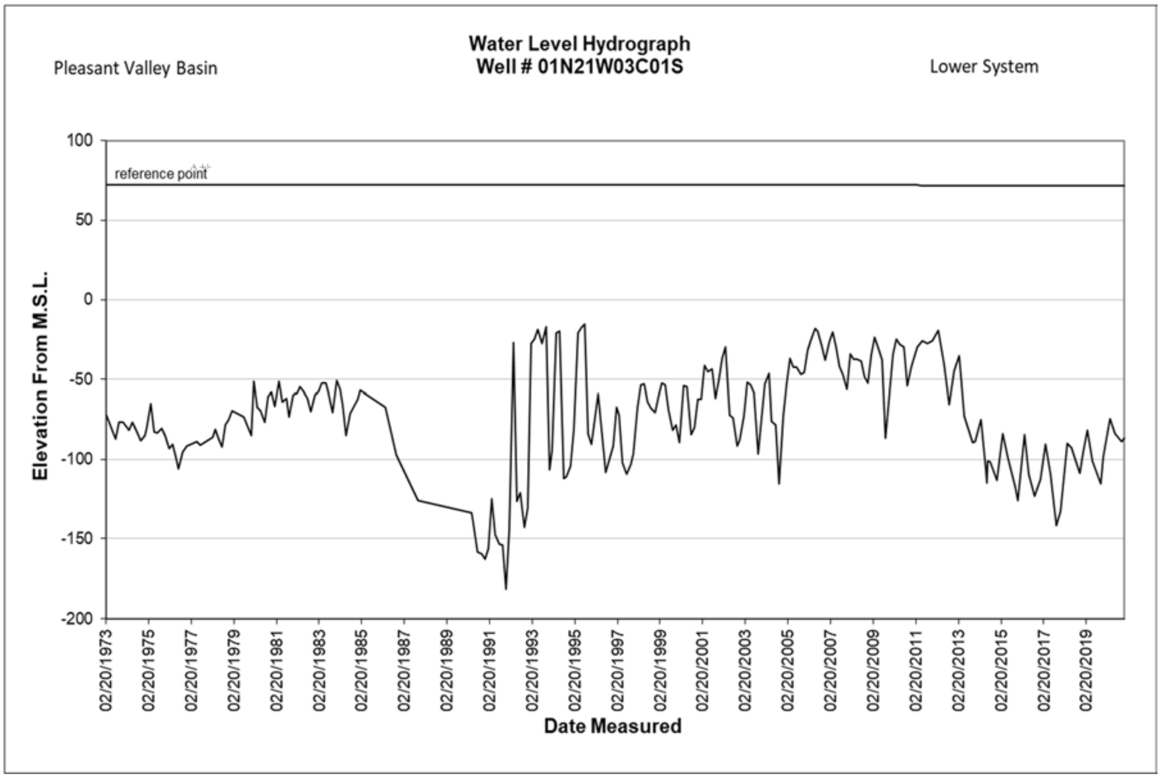

Figure B-8: Pleasant Valley Basin Lower Aquifer System Key Well Hydrograph.

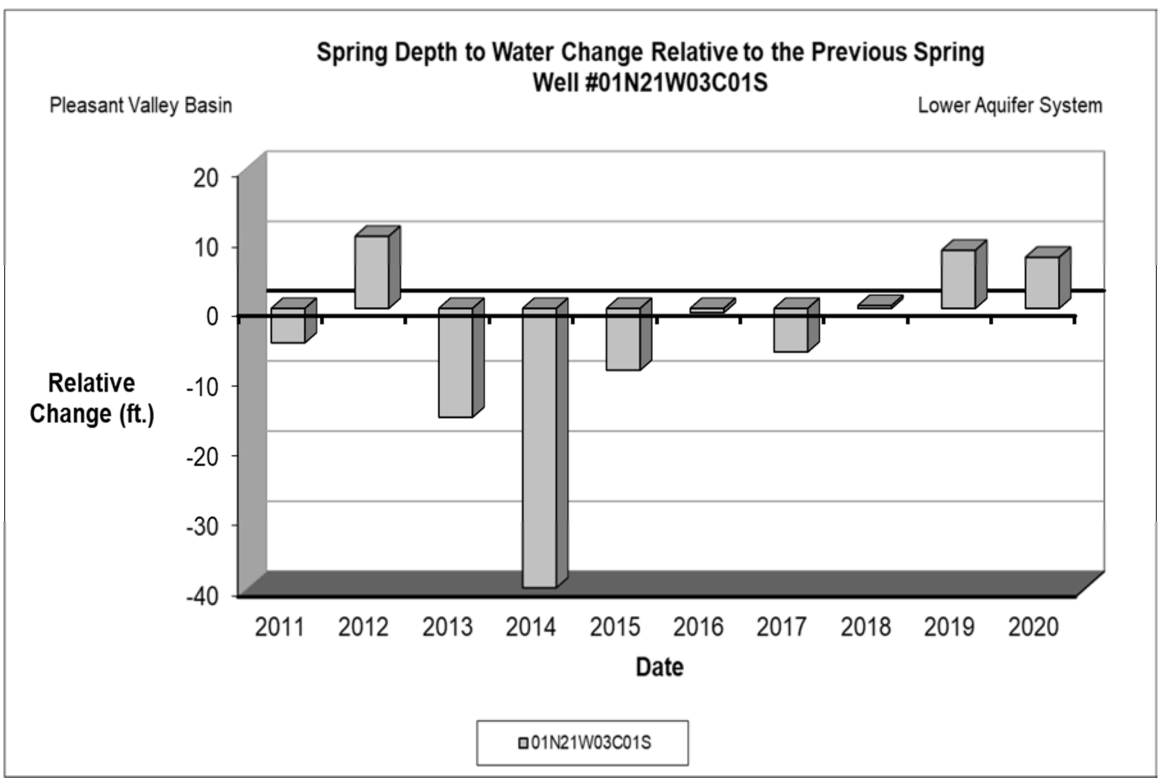

Figure B-9: Pleasant Valley Basin Lower Aquifer System 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

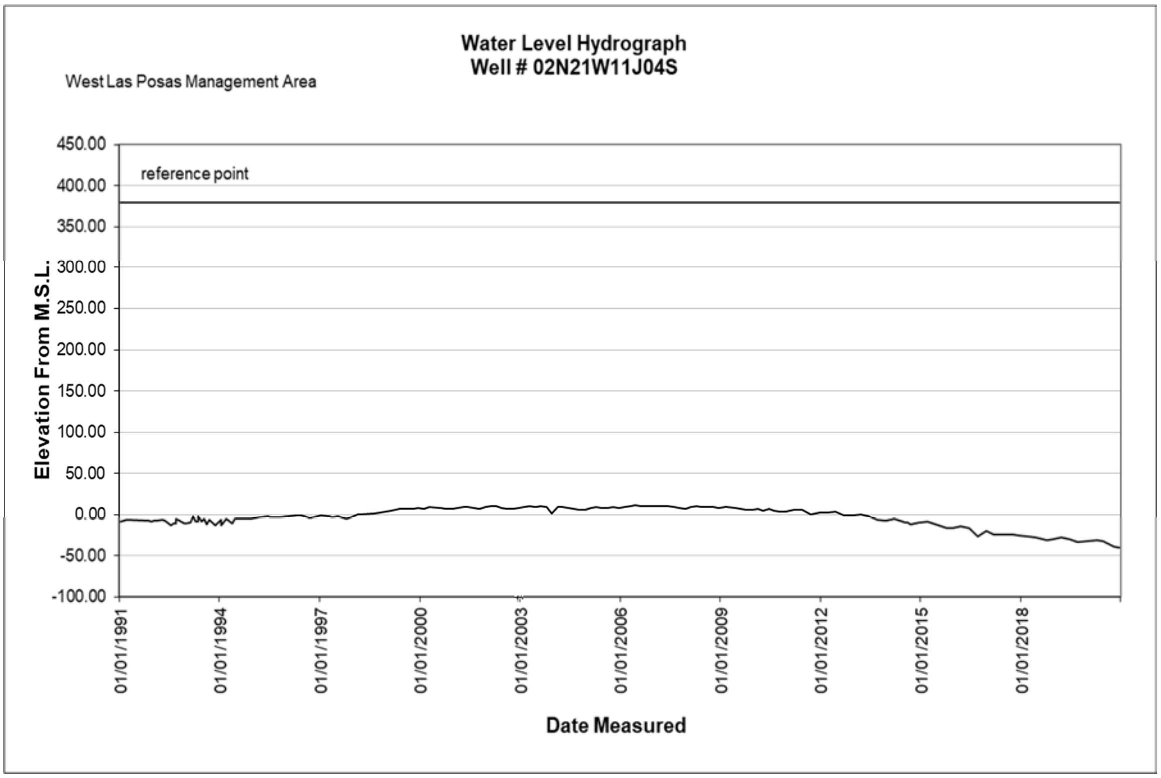

Figure B-10: West Las Posas Management Area Key Well Hydrograph.

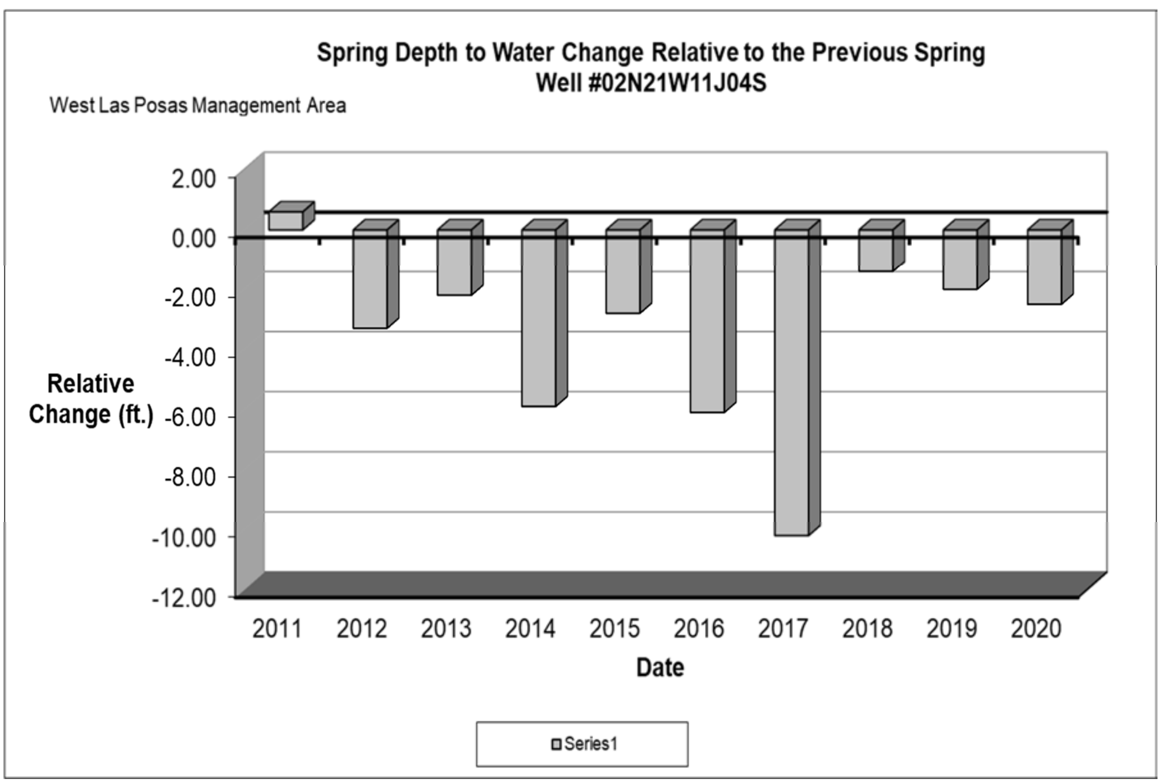

Figure B-11: West Las Posas Management Area 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

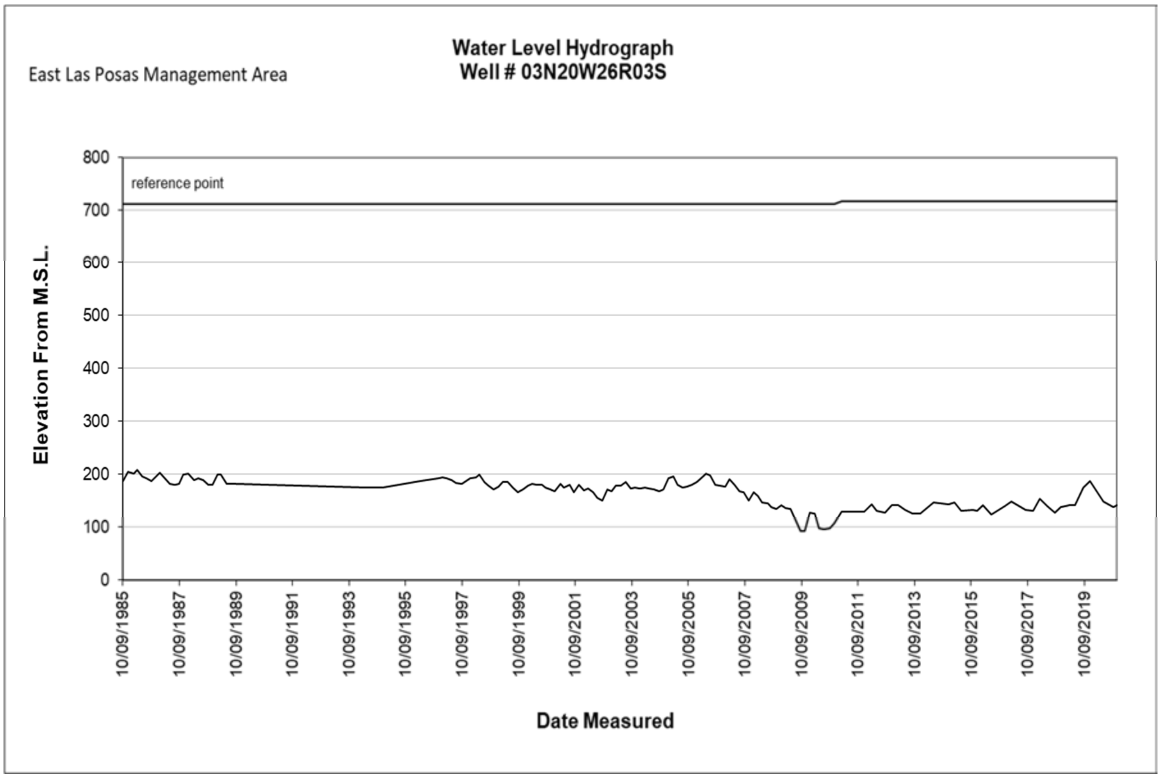

Figure B-12: East Las Posas Management Area Key Well Hydrograph.

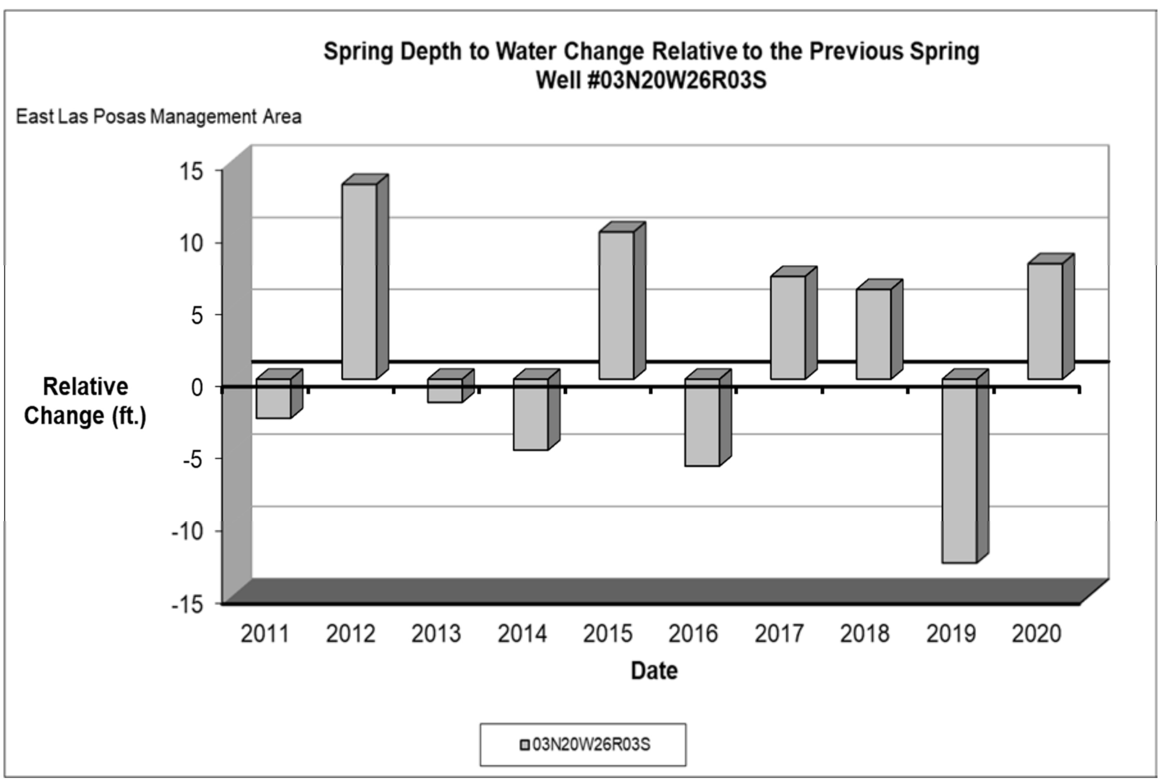

Figure B-13: East Las Posas Management Area 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

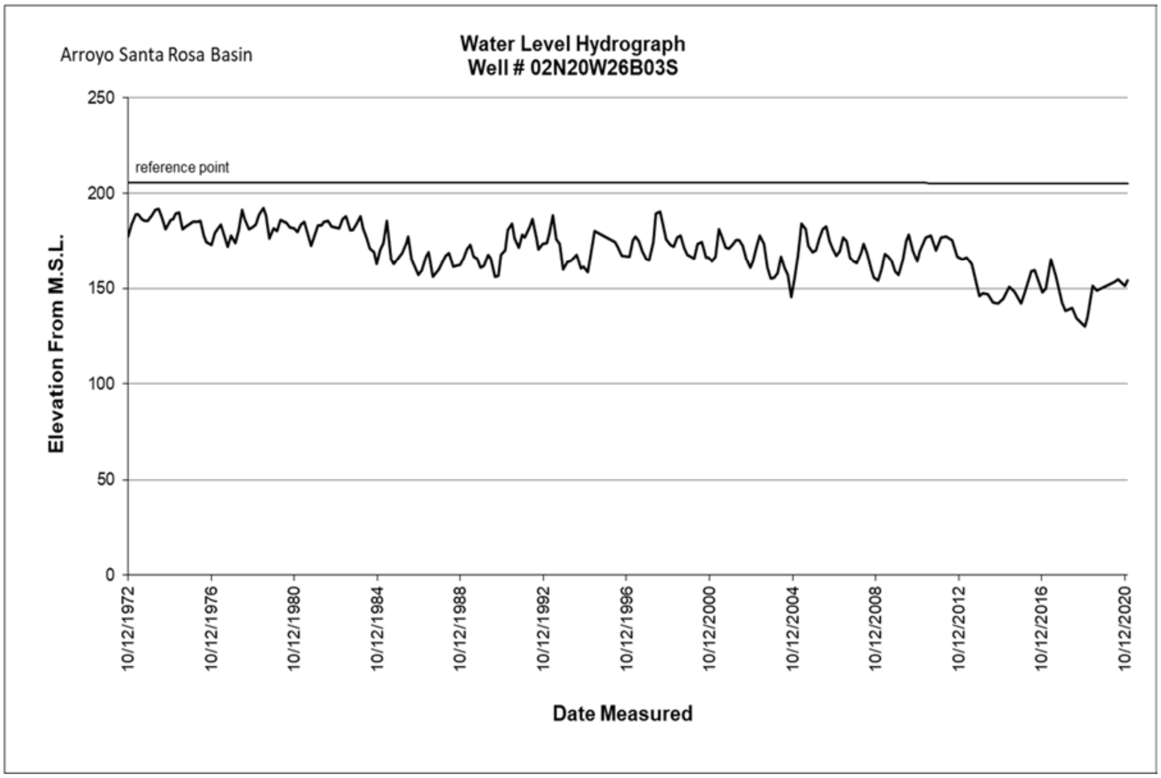

Figure B-14: Arroyo Santa Rosa Basin Key Well Hydrograph.

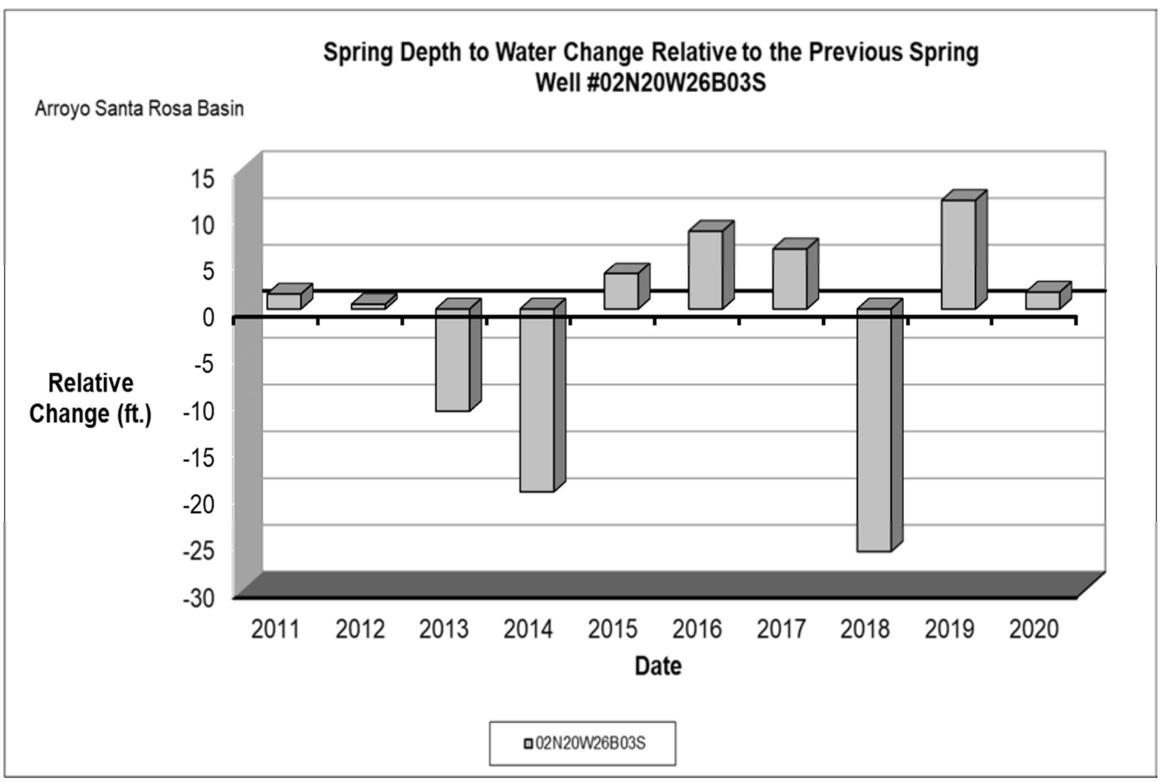

Figure B-15: Arroyo Santa Rosa Basin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

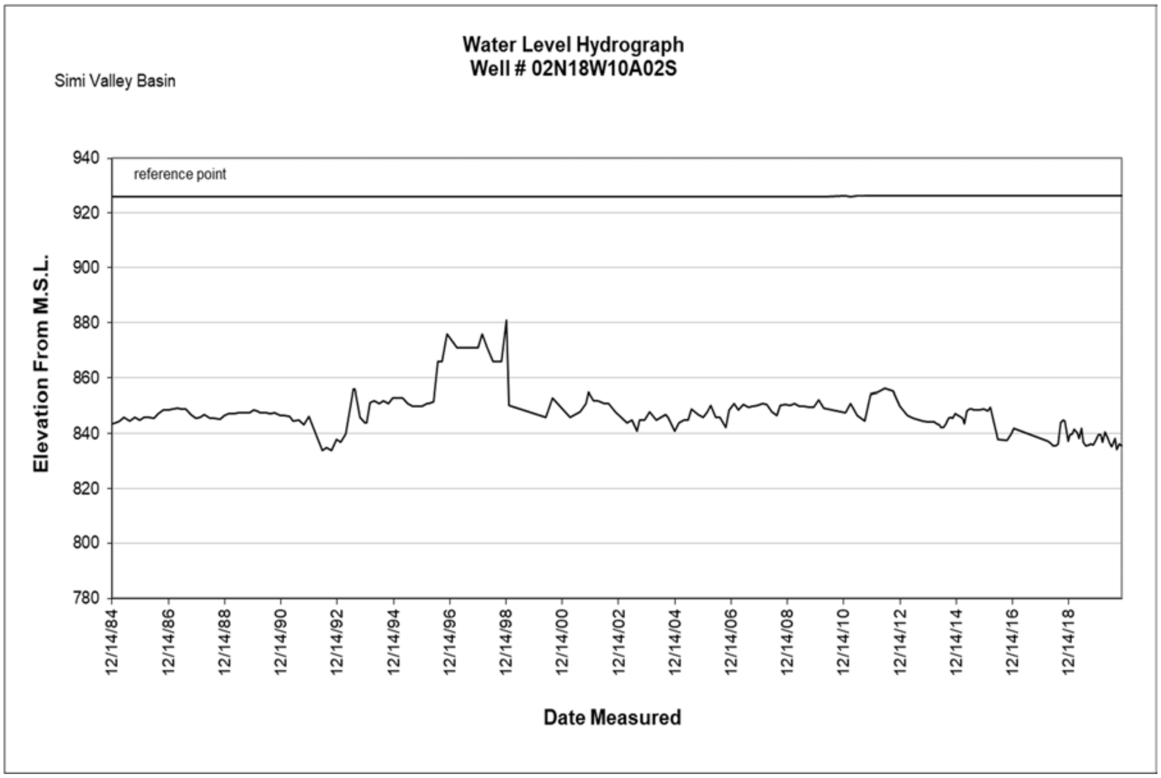

Figure B-16: Simi Valley Basin Key Well Hydrograph.

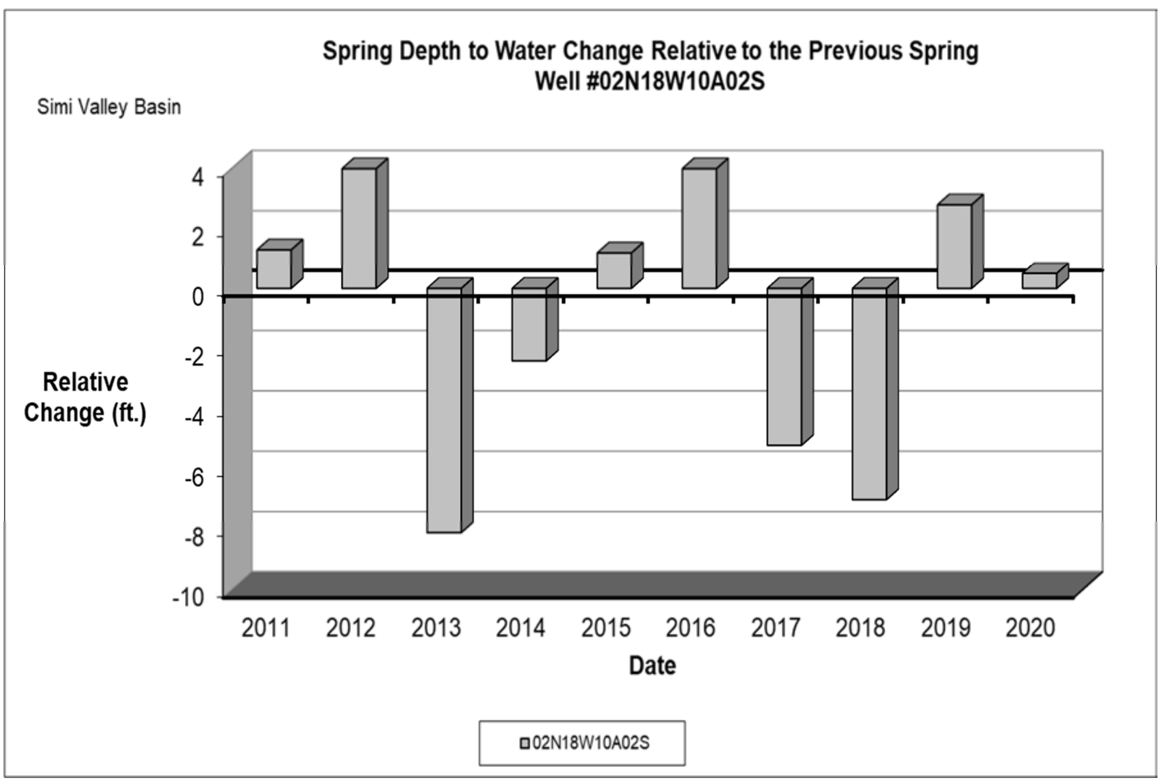

Figure B-17: Simi Valley Basin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

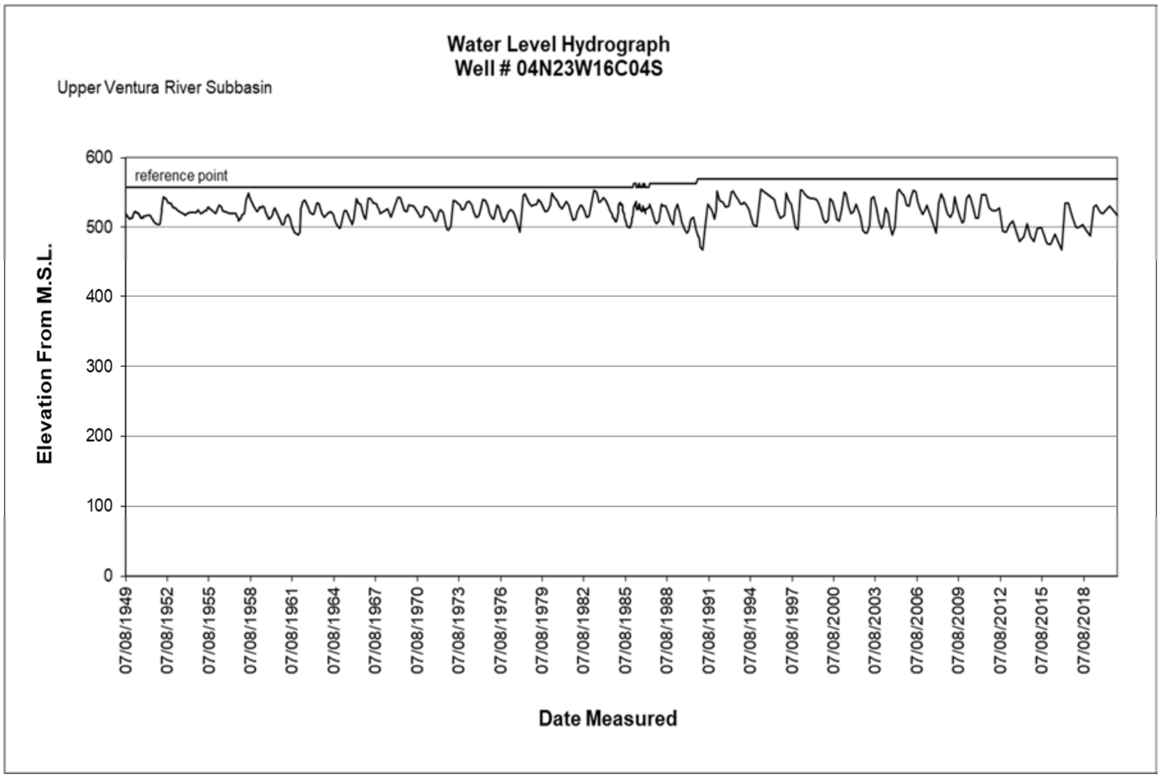

Figure B-18: Upper Ventura River Subbasin Key Well Hydrograph.

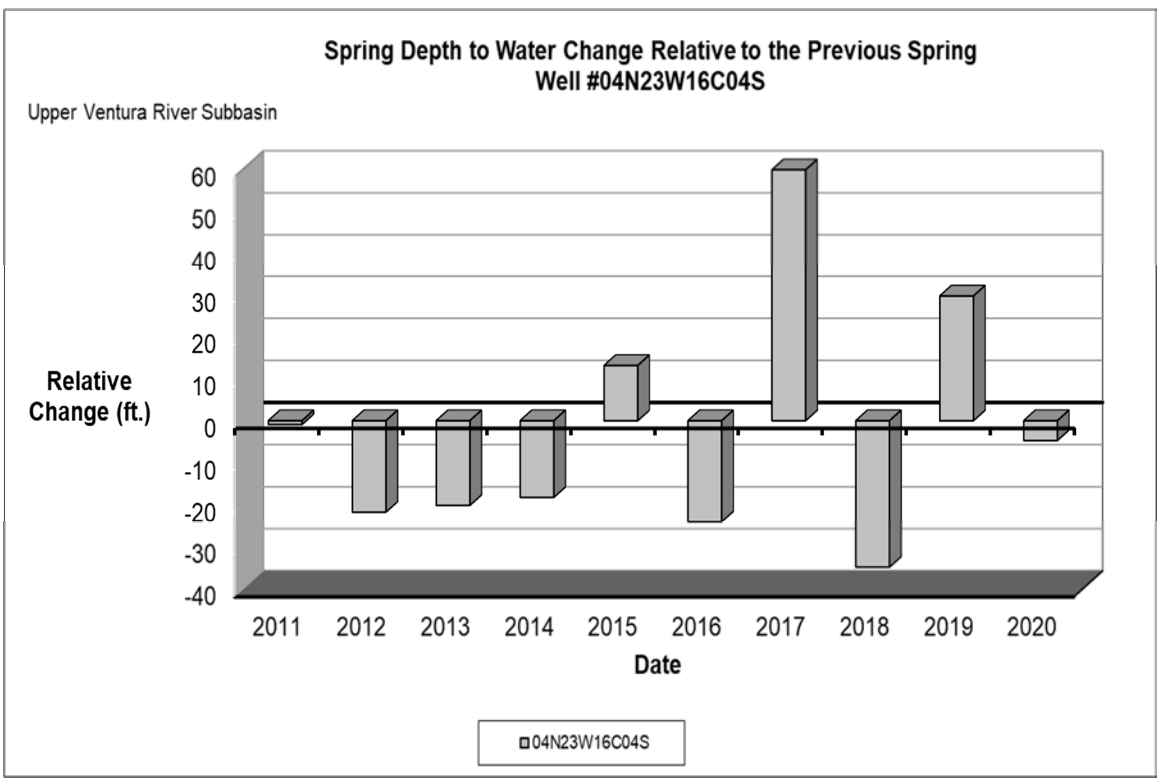

Figure B-19: Upper Ventura River Subbasin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

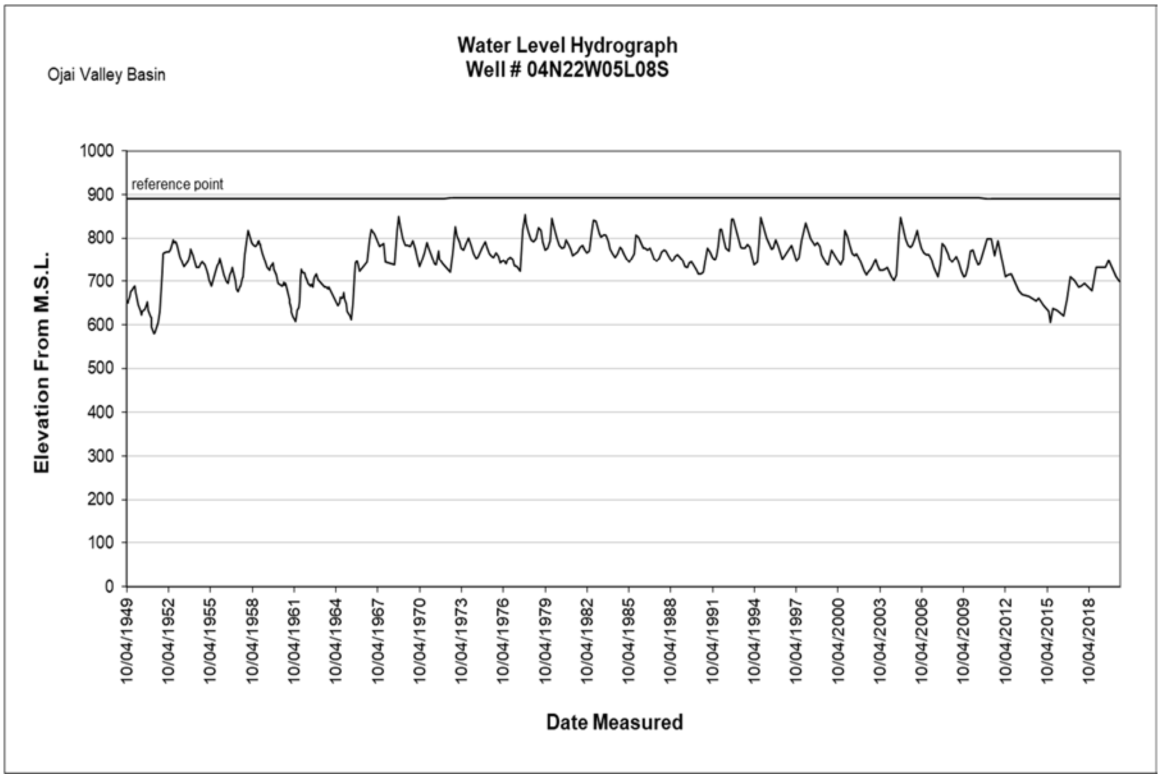

Figure B-20: Ojai Valley Basin Key Well Hydrograph.

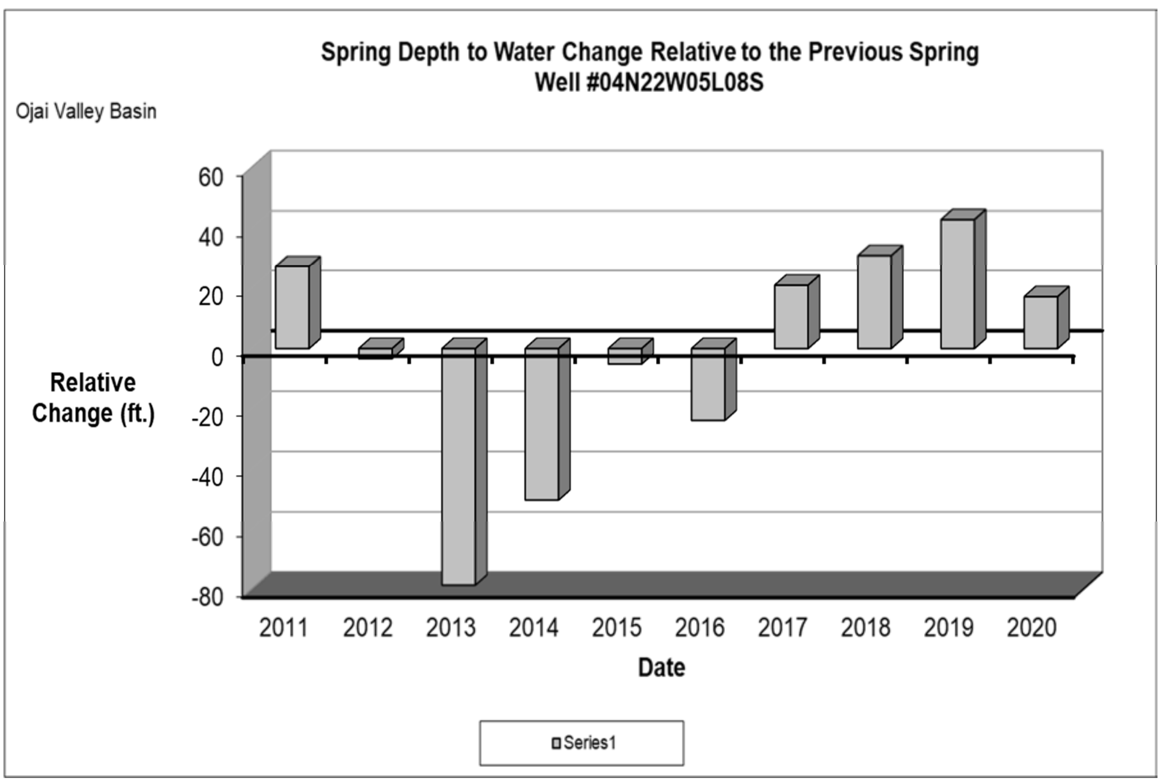

Figure B-21: Ojai Valley Basin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

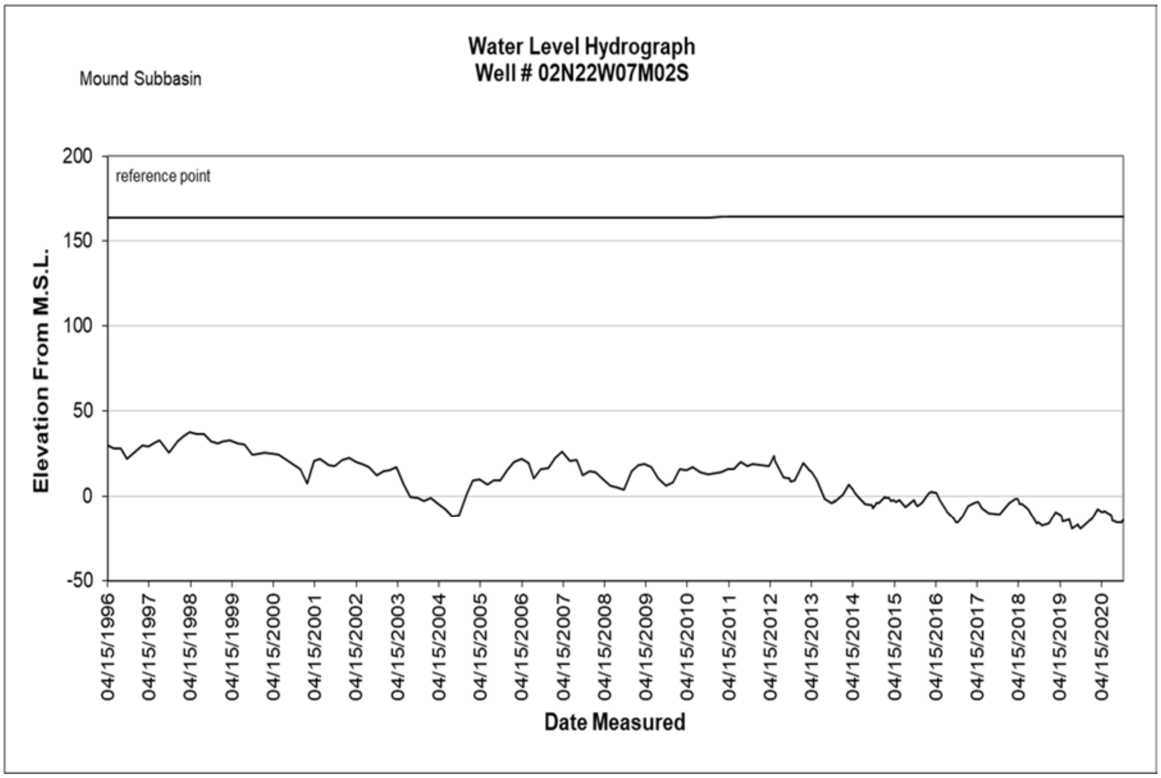

Figure B-22: Mound Subbasin Key Well Hydrograph.

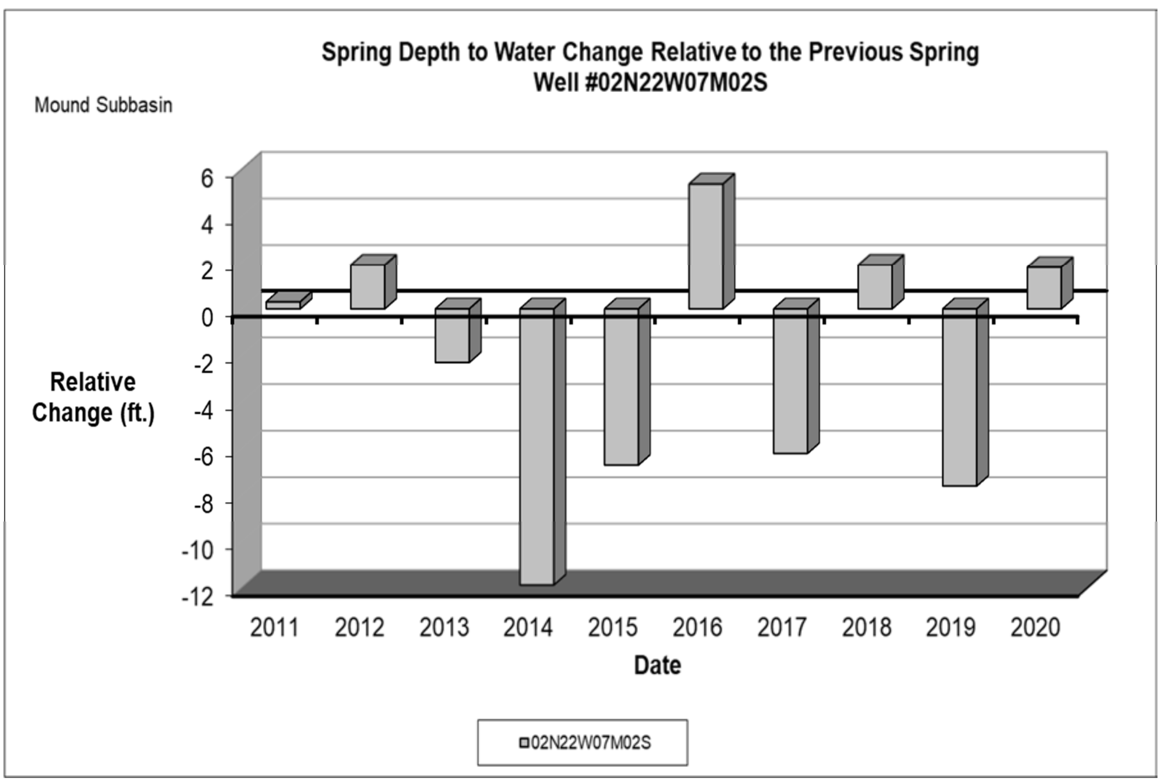

Figure B-23: Mound Subbasin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

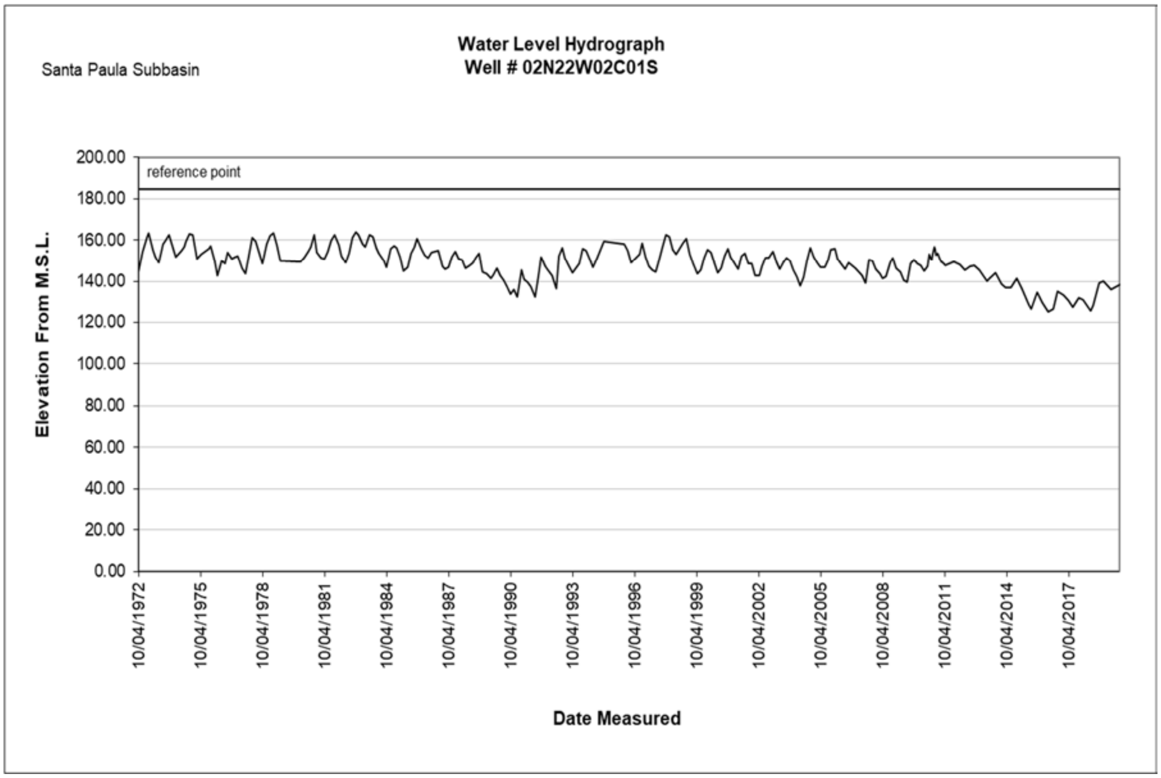

Figure B-24: Santa Paula Subbasin Key Well Hydrograph.

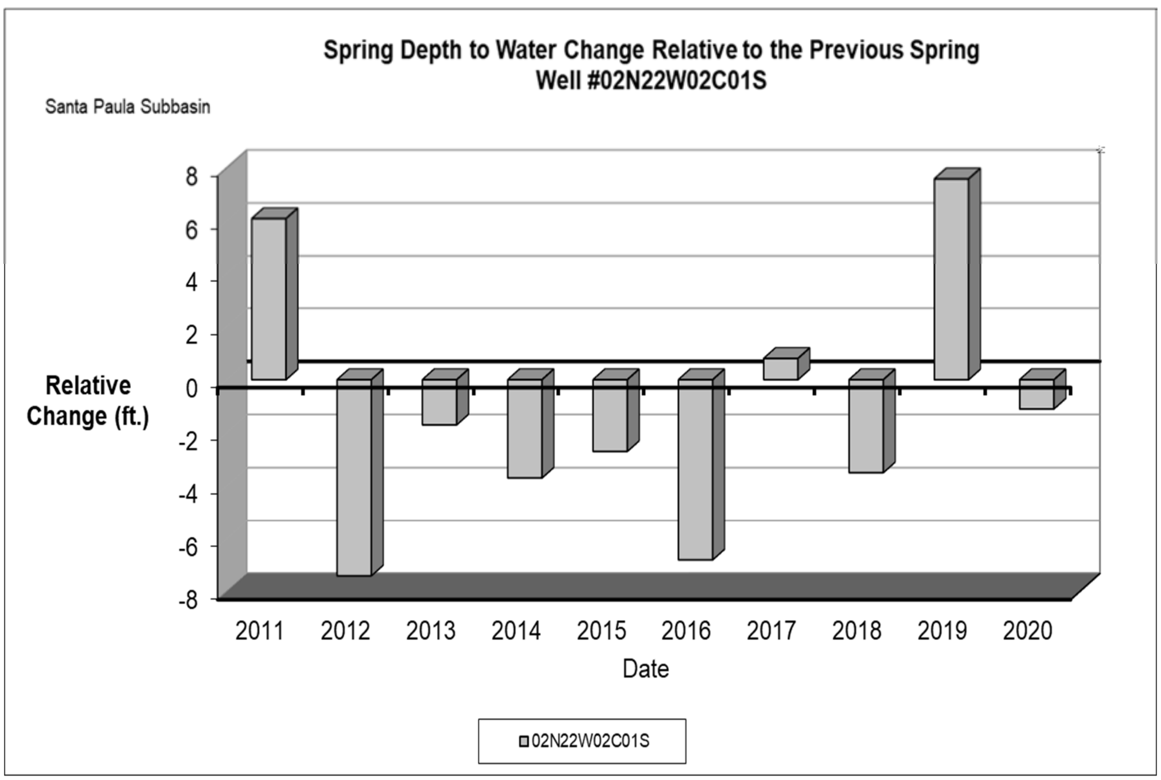

Figure B-25: Santa Paula Subbasin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

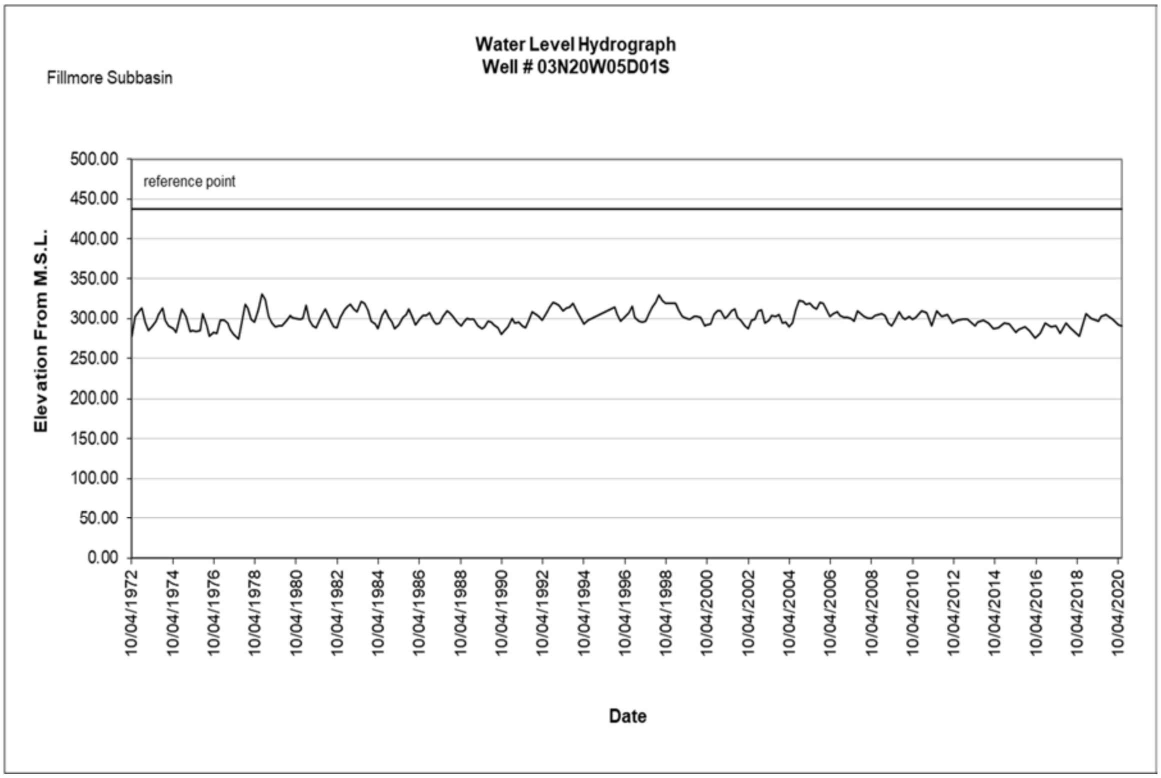

Figure B-26: Fillmore Subbasin Key Well Hydrograph.

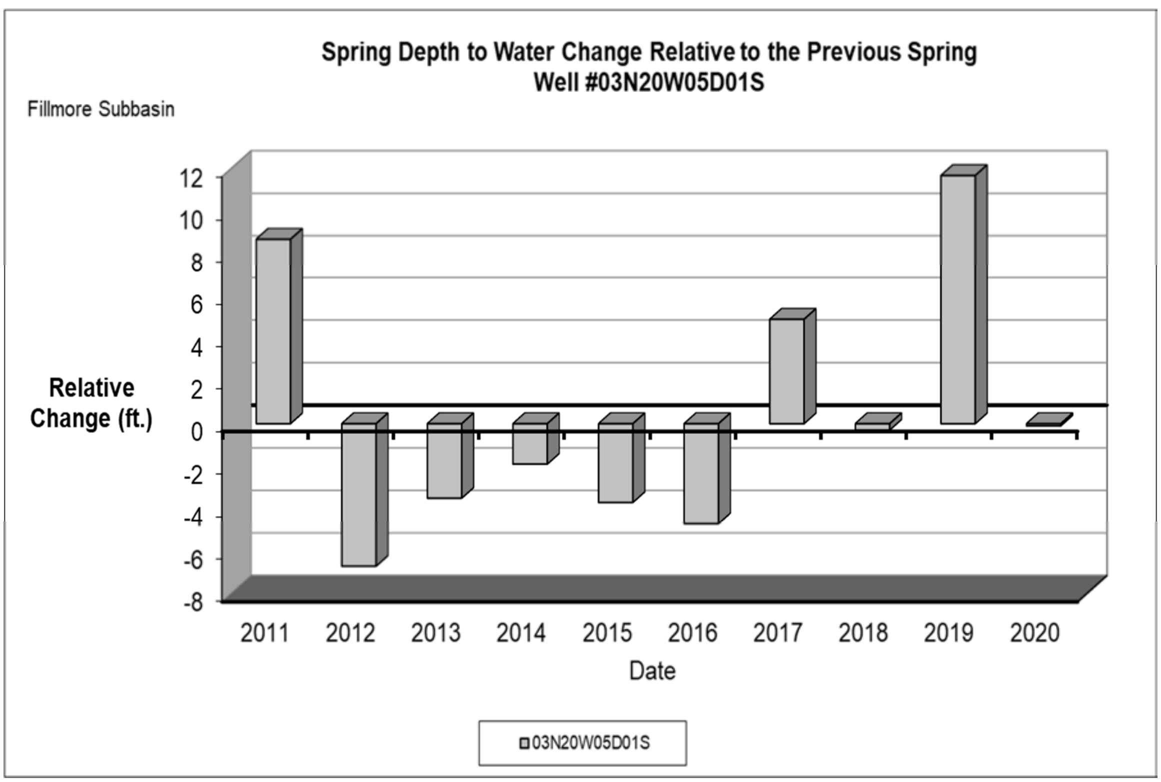

Figure B-27: Fillmore Subbasin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

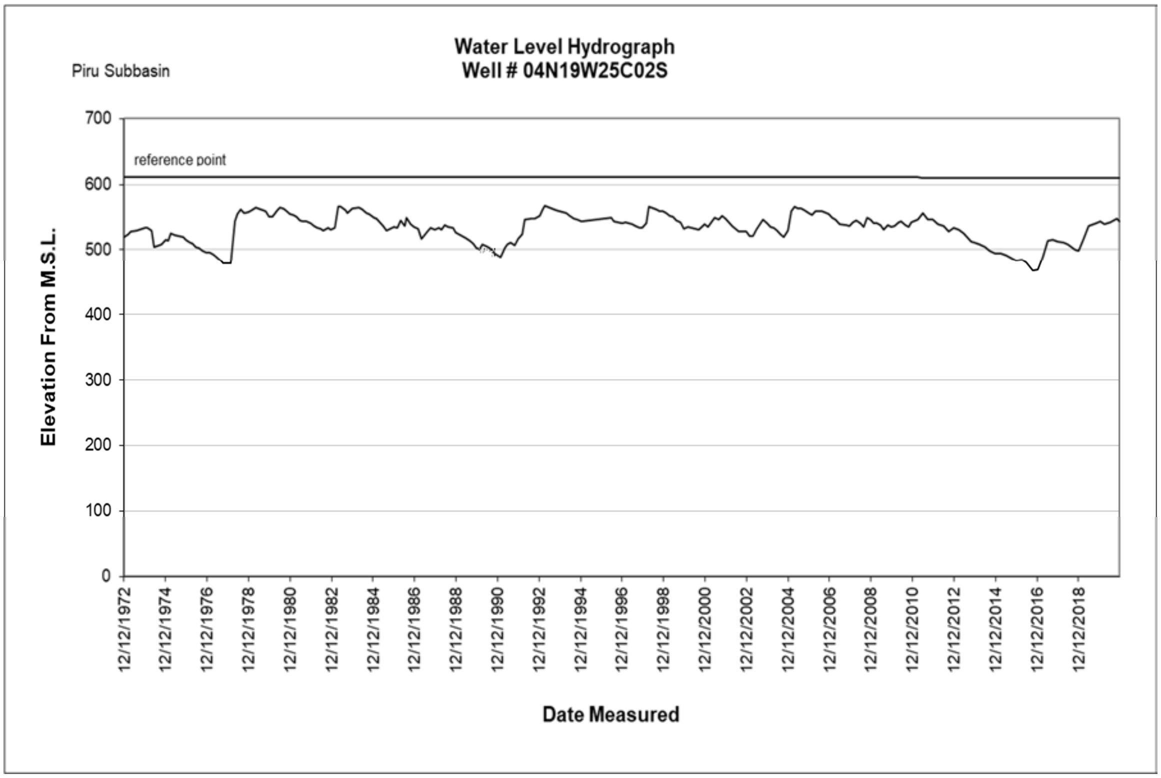

Figure B-28: Piru Subbasin Key Well Hydrograph.

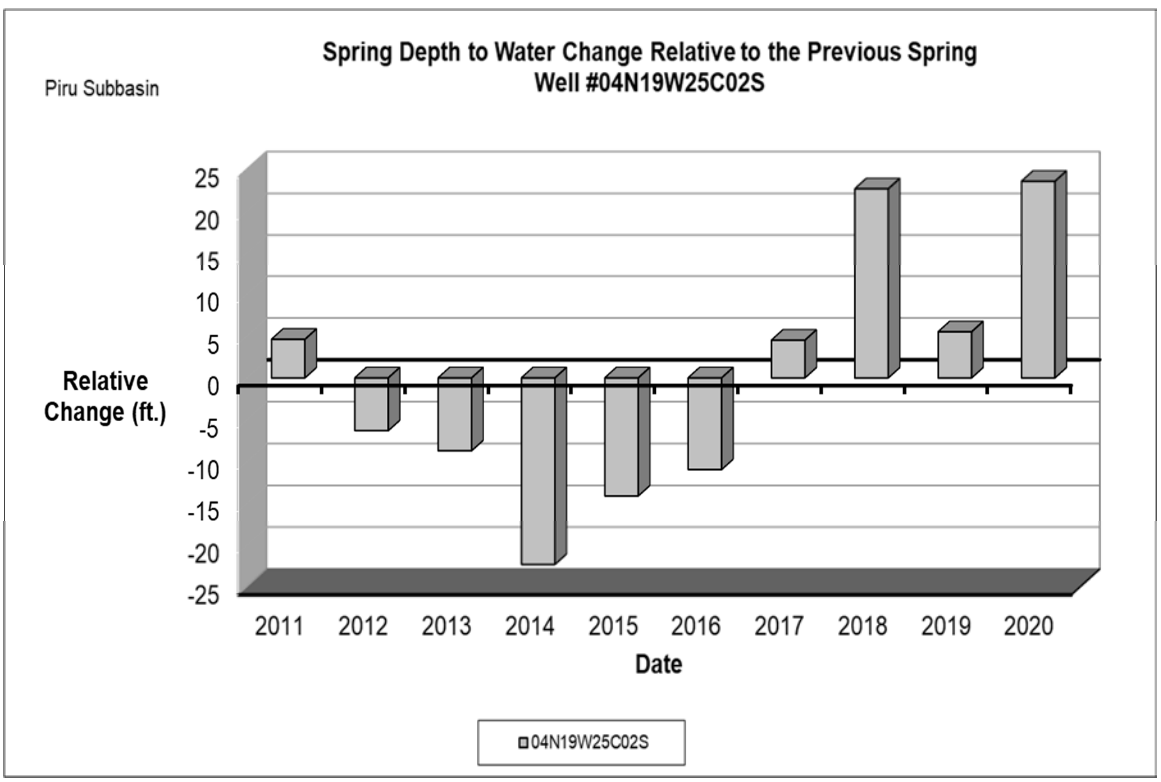

Figure B-29: Piru Subbasin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

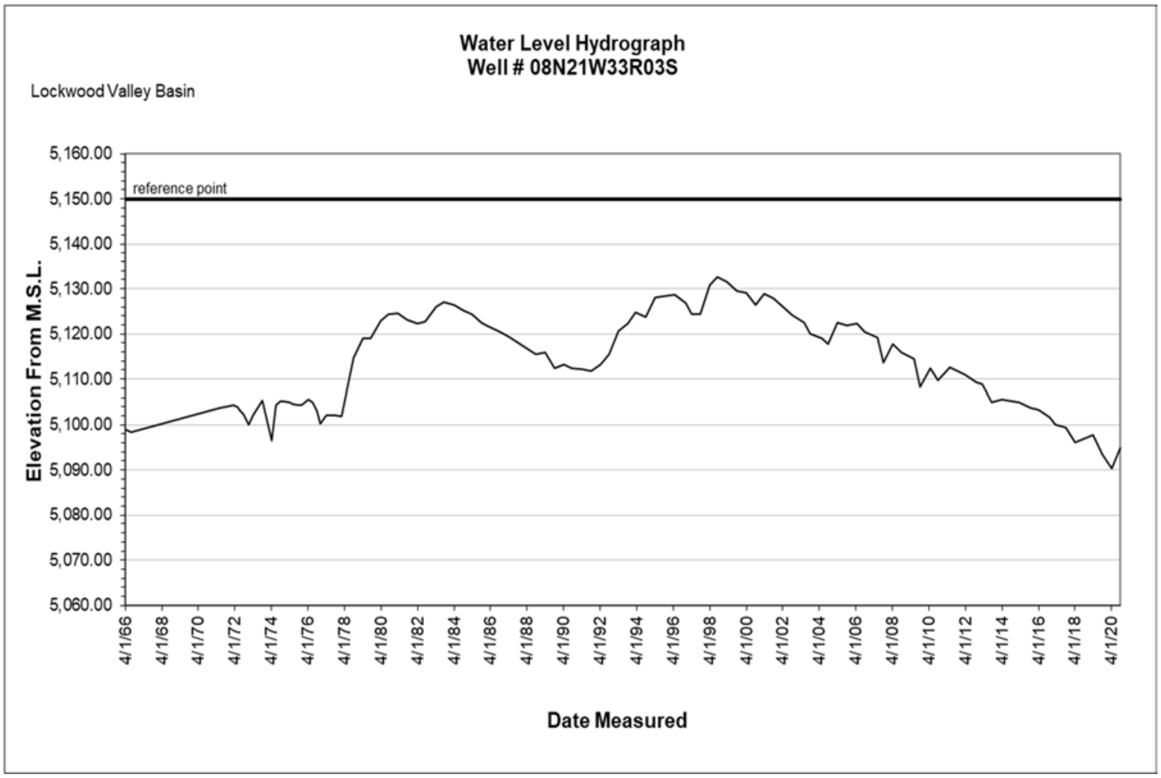

Figure B-30: Lockwood Valley Basin Key Well Hydrograph.

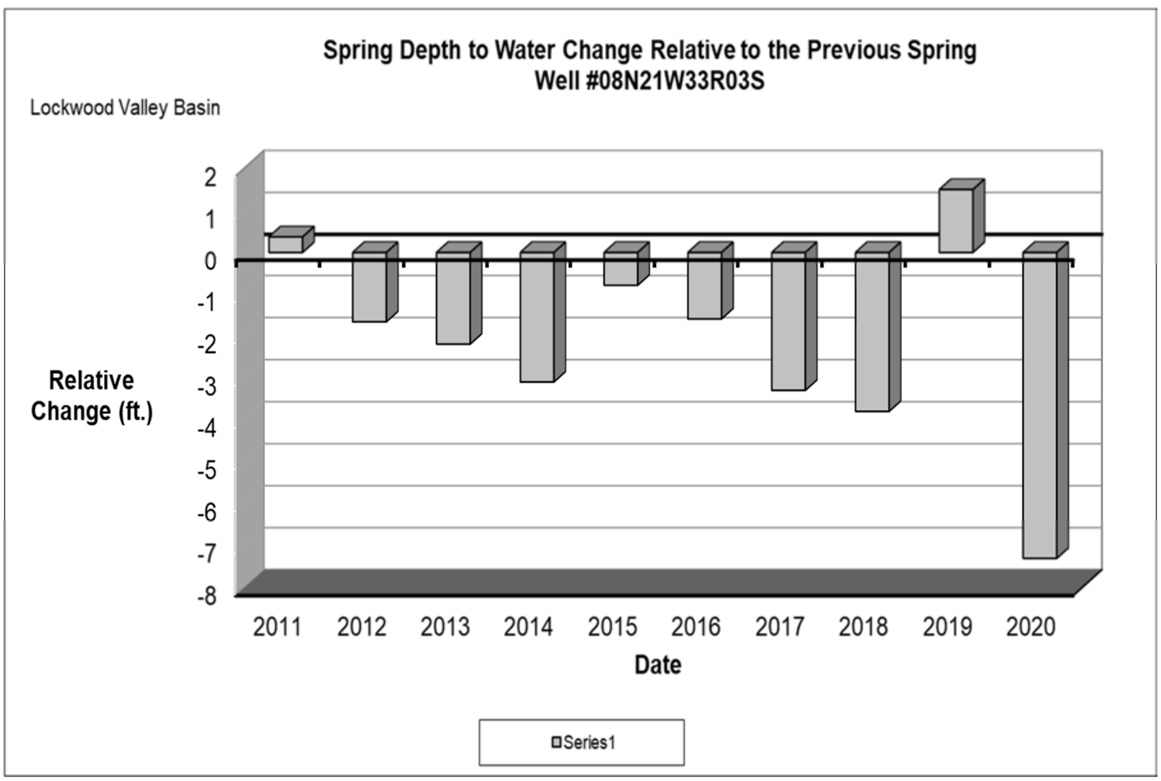

Figure B-31: Lockwood Valley Basin 10 year spring level change depicted on Up/Down graph.

Appendix B – Key Water Level Wells

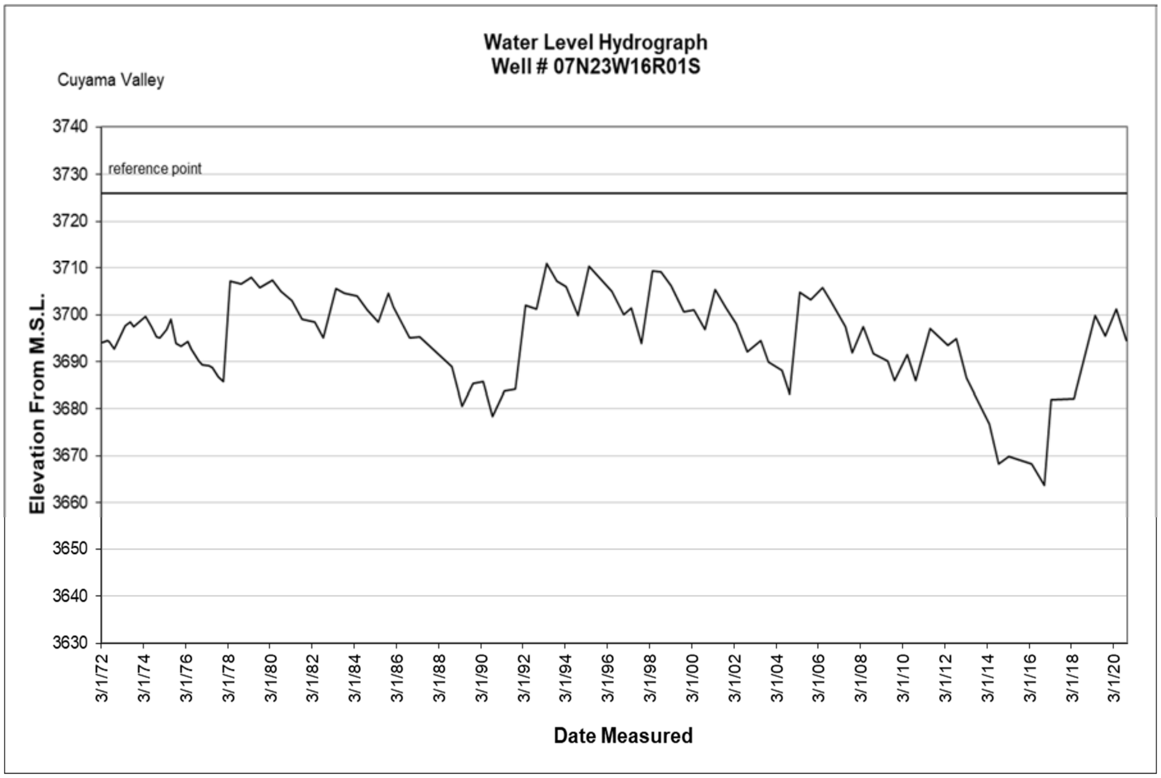

Figure B-32: Cuyama Valley Basin Key Well Hydrograph.

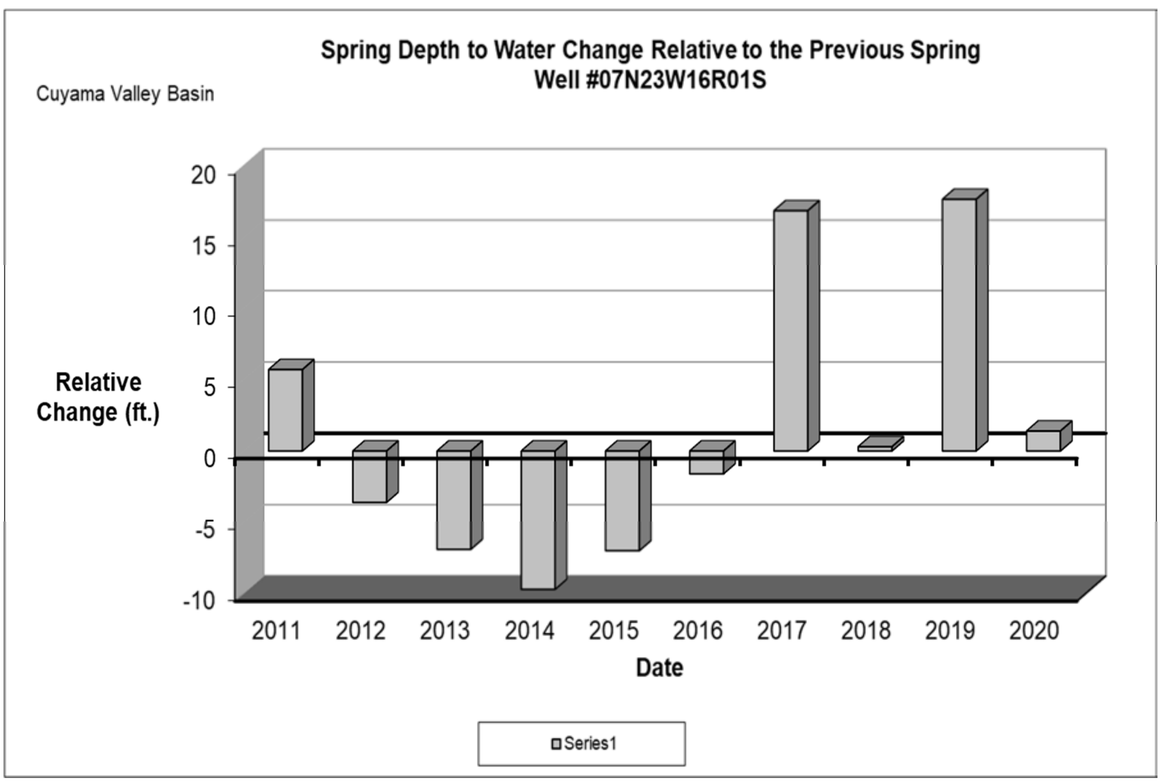

Figure B-33: Cuyama Valley Basin 10 year spring level change depicted on Up/Down graph.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Arroyo Santa Rosa Valley	02N19W20L01S	3/31/2020	307.66	115.26	192.40	
		6/19/2020	307.66	110.60	197.06	
		10/9/2020	307.66	113.00	194.66	
		12/1/2020	307.66	117.60	190.06	
	02N20W23G01S	3/31/2020	370.80	293.20	77.60	
		6/19/2020	370.80	287.90	82.90	
		10/9/2020	370.80	299.00	71.80	
		12/1/2020	370.80	299.81	70.99	
	02N20W23K01S	3/31/2020	274.11	202.20	71.91	
		6/19/2020	274.11	209.50	64.61	
		10/9/2020	274.11	227.10	47.01	
		12/1/2020	274.11	210.42	63.69	
	02N20W23R01S	3/31/2020	235.21	82.50	152.71	
		6/19/2020	235.21	----	----	Pumping
		10/9/2020	235.21	----	----	Pumping
		12/1/2020	235.21	----	----	Pumping
	02N20W26B03S	3/31/2020	205.87	52.70	153.17	
		6/19/2020	205.87	50.95	154.92	
		10/9/2020	205.87	54.47	151.40	
		12/1/2020	205.87	51.67	154.20	
Conejo	01N19W07K16S	3/5/2020	635.46	6.70	628.76	
		6/8/2020	635.46	6.30	629.16	
		9/23/2020	635.46	9.20	626.26	
		12/29/2020	635.46	10.20	625.26	
	01N20W03J01S	3/5/2020	764.40	41.40	723.00	
		6/8/2020	764.40	38.60	725.80	
		9/23/2020	764.40	----	----	Tape Hung Up
		12/29/2020	764.40	41.20	723.20	
Cuddy Ranch Area	08N20W08B01S	4/24/2020	5,300.00	25.90	5,274.10	
		10/6/2020	5,300.00	6.90	5,293.10	
Cuyama Valley	07N23W16R01S*	4/24/2020	3,726.00	24.70	3,701.30	
		10/6/2020	3,726.00	31.50	3,694.50	
	07N23W16R02S	4/24/2020	3,726.00	----	----	Pumping
		10/6/2020	3,726.00	27.50	3,698.50	
	07N24W13C03S	4/24/2020	3,435.00	22.60	3,412.40	
		10/6/2020	3,435.00	29.00	3,406.00	
	09N23W30E05S	4/24/2020	3,544.50	196.30	3,348.20	
		10/6/2020	3,544.50	----	----	Pumping
	09N24W33J03S	4/24/2020	3,130.00	163.40	2,966.60	
		10/6/2020	3,130.00	167.10	2,962.90	
Fillmore	03N19W06D02S	3/6/2020	434.60	50.20	384.40	
		6/22/2020	434.60	50.05	384.55	
		10/14/2020	434.60	----	----	Pumping
		12/1/2020	434.60	----	----	Pumping
	03N20W01C04S	3/6/2020	404.58	27.70	376.88	
		6/22/2020	404.58	30.07	374.51	
		10/14/2020	404.58	30.35	374.23	
		12/1/2020	404.58	30.30	374.28	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Fillmore	03N20W05D01S*	3/6/2020	437.12	131.90	305.22	
		6/22/2020	437.12	138.05	299.07	
		10/14/2020	437.12	145.65	291.47	
		12/1/2020	437.12	146.75	290.37	
	03N20W09D01S	3/9/2020	325.20	----	----	Pumping
		6/22/2020	325.20	----	----	Pumping
		10/14/2020	325.20	8.75	316.45	
		12/1/2020	325.20	----	----	Pumping
	03N20W11C01S	3/6/2020	397.11	44.20	352.91	
		6/22/2020	397.11	45.50	351.61	
		10/14/2020	397.11	45.83	351.28	
		12/1/2020	397.11	45.75	351.36	
	03N21W01P02S	3/6/2020	301.85	44.90	256.95	
		6/22/2020	301.85	41.83	260.02	
		10/14/2020	301.85	47.85	254.00	
		12/1/2020	301.85	47.92	253.93	
	04N19W30D01S	3/6/2020	434.43	43.10	391.33	
		6/22/2020	434.43	----	----	Pumping
		10/14/2020	434.43	----	----	Pumping
		12/1/2020	434.43	----	----	Pumping
	04N19W31R01S	3/6/2020	448.85	0.00	448.85	
		6/22/2020	448.85	47.42	401.43	
		10/14/2020	448.85	49.05	399.80	
		12/1/2020	448.85	----	----	Pumping
	04N19W32M02S	3/6/2020	449.46	----	----	Site Inaccessible
		6/22/2020	449.46	----	----	Pumping
		10/14/2020	449.46	15.48	433.98	
		12/1/2020	449.46	16.75	432.71	
	04N19W33D03S	3/9/2020	477.43	----	----	Pumping
		6/22/2020	477.43	----	----	Pumping
		10/14/2020	477.43	3.50	473.93	
		12/1/2020	477.43	3.50	473.93	
	04N19W33D04S	3/9/2020	477.90	----	----	Flowing
		6/22/2020	477.90	----	----	Flowing
		10/14/2020	477.90	7.00	470.90	
		12/1/2020	477.90	3.10	474.80	
	04N20W23Q02S	3/6/2020	513.88	128.60	385.28	
		6/22/2020	513.88	130.90	382.98	
		10/14/2020	513.88	134.57	379.31	
		12/1/2020	513.88	132.00	381.88	
	04N20W26C02S	3/6/2020	505.35	130.30	375.05	
		6/22/2020	505.35	131.40	373.95	
		10/14/2020	505.35	142.97	362.38	
		12/1/2020	505.35	140.08	365.27	
	04N20W33C03S	3/6/2020	526.87	----	----	No Site Access
		6/22/2020	526.87	----	----	No Site Access
		10/14/2020	526.87	----	----	No Site Access
		12/1/2020	526.87	----	----	No Site Access

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Hidden Valley	01N19W19L02S	3/5/2020	1,082.00	288.30	793.70	
		6/8/2020	1,082.00	281.40	800.60	
		9/21/2020	1,082.00	----	----	Pumping
		12/29/2020	1,082.00	----	----	Pumping
	01N19W30A01S	3/5/2020	999.98	39.10	960.88	
		6/8/2020	999.98	36.60	963.38	
		9/21/2020	999.98	43.10	956.88	
		12/29/2020	999.98	44.40	955.58	
Las Posas Valley – East Management Area	02N19W05K01S*	4/17/2020	497.80	30.70	467.10	
		6/15/2020	497.80	30.40	467.40	
		10/5/2020	497.80	31.10	466.70	
		12/4/2020	497.80	0.00	497.80	
	02N19W08H02S	4/2/2020	494.87	25.10	469.77	
		6/15/2020	494.87	27.70	467.17	
		10/15/2020	494.87	----	----	
		12/4/2020	494.87	----	----	No Site Access
	02N20W10D02S	4/3/2020	459.53	309.10	150.43	
		6/9/2020	459.53	313.20	146.33	
		10/2/2020	459.53	325.70	133.83	
		12/4/2020	459.53	318.10	141.43	
	02N20W10G01S	4/3/2020	415.47	155.20	260.27	
		6/9/2020	415.47	162.20	253.27	
		10/15/2020	415.47	171.33	244.14	
		12/4/2020	415.47	----	----	Pumping
	02N20W10J01S	4/3/2020	406.87	119.80	287.07	
		6/9/2020	406.87	122.50	284.37	
		10/15/2020	406.87	127.15	279.72	
		12/4/2020	406.87	127.65	279.22	
	03N19W17Q01S	4/2/2020	1,311.06	----	----	No Site Access
		6/15/2020	1,311.06	----	----	No Site Access
		10/15/2020	1,311.06	----	----	No Site Access
		12/4/2020	1,311.06	----	----	No Site Access
	03N19W19J01S	4/2/2020	1,026.90	845.70	181.20	
		6/10/2020	1,026.90	845.40	181.50	
		10/15/2020	1,026.90	856.60	170.30	
		12/4/2020	1,026.90	859.60	167.30	
	03N19W29F06S	4/2/2020	855.20	249.00	606.20	
		6/11/2020	855.20	----	----	Pumping
		10/15/2020	855.20	318.00	537.20	
		12/4/2020	855.20	298.61	556.59	
	03N20W23L01S	4/2/2020	970.30	768.50	201.80	
		6/10/2020	970.30	767.80	202.50	
		10/15/2020	970.30	795.80	174.50	
		12/4/2020	970.30	----	----	Meter Would Not Stabilize
	03N20W25H01S	4/2/2020	823.84	----	----	No Site Access
		6/10/2020	823.84	----	----	No Site Access
		10/15/2020	823.84	220.20	603.64	
		12/4/2020	823.84	221.30	602.54	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Las Posas Valley – East Management Area	03N20W26R03S*	4/2/2020	717.81	----	----	Well Work
		6/10/2020	717.81	568.70	149.11	
		10/15/2020	717.81	580.80	137.01	
		12/4/2020	717.81	575.70	142.11	
	03N20W27H03S	4/2/2020	840.25	644.10	196.15	
		6/9/2020	840.25	648.70	191.55	
		10/15/2020	840.25	----	----	Pumping
		12/3/2020	840.25	----	----	Pumping
	03N20W34G01S	4/3/2020	680.48	526.70	153.78	
		6/9/2020	680.48	----	----	Pumping
		10/15/2020	680.48	543.50	136.98	
		12/3/2020	680.48	541.20	139.28	
	03N20W35R02S	4/13/2020	572.67	----	----	No site access
		6/10/2020	572.67	419.50	153.17	
		10/27/2020	572.67	426.50	146.17	
		12/3/2020	572.67	426.90	145.77	
	03N20W35R03S	4/13/2020	572.67	----	----	No site access
		6/10/2020	572.67	419.10	153.57	
		10/27/2020	572.67	426.00	146.67	
		12/3/2020	572.67	427.14	145.53	
	03N20W35R04S	4/13/2020	572.67	----	----	No site access
		6/10/2020	572.67	309.70	262.97	
		10/27/2020	572.67	309.60	263.07	
		12/3/2020	572.67	310.01	262.66	
Las Posas Valley – West Management Area	02N20W05D01S	4/2/2020	569.00	712.50	-143.50	
		6/9/2020	569.00	717.10	-148.10	
		10/15/2020	569.00	718.70	-149.70	
		12/4/2020	569.00	----	----	Meter Would Not Stabilize
	02N20W06R01S	4/13/2020	461.19	611.10	-149.91	
		6/9/2020	461.19	----	----	Meter Would Not Stabilize
		10/15/2020	461.19	----	----	Pumping
		12/3/2020	461.19	----	----	Pumping
	02N20W07R03S	3/30/2020	395.00	547.20	-152.20	
		6/11/2020	395.00	----	----	Pumping
		10/5/2020	395.00	563.40	-168.40	
		12/4/2020	395.00	----	----	Pumping
	02N20W18A01S	4/3/2020	375.60	----	----	No site access
		6/11/2020	375.60	----	----	No site access
		10/21/2020	375.60	537.50	-161.90	
		12/3/2020	375.60	----	----	No site access
	02N21W08H03S	4/3/2020	334.21	----	----	No site access
		6/15/2020	334.21	390.20	-55.99	
		10/19/2020	334.21	----	----	No site access
		12/9/2020	334.21	----	----	No site access

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Las Posas Valley – West Management Area	02N21W09D02S	4/4/2020	323.75	268.50	55.25	
		6/16/2020	323.75	254.10	69.65	
		10/4/2020	323.75	252.20	71.55	
		12/9/2020	323.75	251.98	71.77	
	02N21W10G03S	3/30/2020	381.01	414.00	-32.99	
		6/10/2020	381.01	----	----	Pumping
		10/15/2020	381.01	----	----	Pumping
		12/3/2020	381.01	441.20	-60.19	
	02N21W11J03S*	4/3/2020	379.39	437.50	-58.11	
		6/9/2020	379.39	443.50	-64.11	
		10/15/2020	379.39	459.40	-80.01	
		12/3/2020	379.39	453.80	-74.41	
	02N21W11J04S	4/3/2020	379.39	410.20	-30.81	
		6/9/2020	379.39	411.70	-32.31	
		10/15/2020	379.39	418.90	-39.51	
		12/3/2020	379.39	419.20	-39.81	
	02N21W11J05S	4/3/2020	379.39	216.00	163.39	
		6/9/2020	379.39	216.20	163.19	
		10/15/2020	379.39	222.90	156.49	
		12/3/2020	379.39	223.40	155.99	
	02N21W11J06S	4/3/2020	379.39	184.60	194.79	
		6/9/2020	379.39	183.10	196.29	
		10/15/2020	379.39	185.60	193.79	
		12/3/2020	379.39	186.30	193.09	
	02N21W12H01S	4/2/2020	417.89	453.30	-35.41	
		6/9/2020	417.89	456.50	-38.61	
		10/15/2020	417.89	459.60	-41.71	
		12/3/2020	417.89	461.30	-43.41	
	02N21W13A01S	3/30/2020	440.00	589.20	-149.20	
		6/11/2020	440.00	593.90	-153.90	
		10/21/2020	440.00	602.60	-162.60	
		12/4/2020	440.00	599.87	-159.87	
	02N21W15M03S	3/30/2020	263.87	330.90	-67.03	
		6/10/2020	263.87	326.60	-62.73	
		10/19/2020	263.87	326.90	-63.03	
		12/3/2020	263.87	337.50	-73.63	
	02N21W16J01S	3/30/2020	259.90	16.90	243.00	
		6/10/2020	259.90	17.00	242.90	
		9/30/2020	259.90	17.50	242.40	
		12/3/2020	259.90	17.87	242.03	
	02N21W18H03S	4/1/2020	118.41	104.00	14.41	
		6/29/2020	118.41	101.20	17.21	
		10/19/2020	118.41	105.20	13.21	
		12/4/2020	118.41	105.20	13.21	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Las Posas Valley – West Management Area	02N21W18H12S	4/1/2020	117.88	148.20	-30.32	
		6/29/2020	117.88	146.90	-29.02	
		10/19/2020	117.88	154.95	-37.07	
		12/4/2020	117.88	167.00	-49.12	
	03N20W32H03S	4/2/2020	673.00	----	----	No site access
		6/9/2020	673.00	----	----	No site access
		10/15/2020	673.00	824.00	-151.00	
		12/4/2020	673.00	822.50	-149.50	
	03N21W35P02S	3/30/2020	564.11	----	----	Pumping
		6/15/2020	564.11	508.70	55.41	
		10/22/2020	564.11	523.40	40.71	
		12/3/2020	564.11	519.70	44.41	
Lockwood Valley	08N21W33R03S*	4/24/2020	5,150.00	59.60	5,090.40	
		10/6/2020	5,150.00	55.20	5,094.80	
	08N21W36G02S	4/24/2020	4,922.00	36.60	4,885.40	
		10/6/2020	4,922.00	24.50	4,897.50	
Mound	02N22W09L03S	3/27/2020	251.25	----	----	No site access
		6/22/2020	251.25	----	----	No site access
		10/12/2020	251.25	----	----	No site access
		12/1/2020	251.25	----	----	No site access
	02N22W09L04S	3/27/2020	251.25	----	----	No site access
		6/22/2020	251.25	----	----	No site access
		10/12/2020	251.25	----	----	No site access
		12/1/2020	251.25	----	----	No site access
	02N22W16K01S	3/27/2020	149.37	161.60	-12.23	
		6/22/2020	149.37	161.02	-11.65	
		10/12/2020	149.37	164.60	-15.23	
		12/1/2020	149.37	166.31	-16.94	
	02N23W13K03S	3/27/2020	68.71	----	----	Pumping
		6/23/2020	68.71	78.20	-9.49	
		10/12/2020	68.71	----	----	Pumping
		12/1/2020	68.71	----	----	Pumping
Ojai Valley	04N22W04Q01S	3/4/2020	1,045.50	90.10	955.40	
		6/4/2020	1,045.50	----	----	Pumping
		9/23/2020	1,045.50	96.50	949.00	
		12/18/2020	1,045.50	99.70	945.80	
	04N22W05D03S	3/3/2020	895.97	154.90	741.07	
		6/3/2020	895.97	141.10	754.87	
		9/18/2020	895.97	164.15	731.82	
		12/18/2020	895.97	171.60	724.37	
	04N22W05H04S	3/3/2020	950.22	----	----	Pumping
		6/4/2020	950.22	182.30	767.92	
		9/24/2020	950.22	200.78	749.44	
		12/18/2020	950.22	196.16	754.06	
	04N22W05L08S*	3/3/2020	892.09	142.90	749.19	
		6/3/2020	892.09	----	----	Pumping
		9/18/2020	892.09	182.10	709.99	
		12/18/2020	892.09	191.60	700.49	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Ojai Valley	04N22W05M01S	3/2/2020	843.47	100.80	742.67	
		6/3/2020	843.47	94.80	748.67	
		9/18/2020	843.47	111.00	732.47	
		12/17/2020	843.47	121.40	722.07	
	04N22W06D01S	3/3/2020	846.66	87.10	759.56	
		6/2/2020	846.66	72.80	773.86	
		9/16/2020	846.66	80.00	766.66	
		12/17/2020	846.66	85.10	761.56	
	04N22W06D05S	3/3/2020	853.21	97.30	755.91	
		6/3/2020	853.21	----	----	Pumping
		9/16/2020	853.21	----	----	Pumping
		12/17/2020	853.21	112.20	741.01	
	04N22W06K03S	3/5/2020	801.80	105.60	696.20	
		6/4/2020	801.80	83.90	717.90	
		10/1/2020	801.80	108.60	693.20	
		12/18/2020	801.80	111.80	690.00	
	04N22W06K12S	3/3/2020	812.70	118.00	694.70	
		6/4/2020	812.70	116.60	696.10	
		9/18/2020	812.70	118.00	694.70	
		12/18/2020	812.70	122.40	690.30	
	04N22W06M01S	3/2/2020	794.78	58.70	736.08	
		6/2/2020	794.78	49.10	745.68	
		9/16/2020	794.78	61.80	732.98	
		12/17/2020	794.78	71.00	723.78	
	04N22W07B02S	3/2/2020	773.77	64.40	709.37	
		6/2/2020	773.77	64.80	708.97	
		9/16/2020	773.77	70.10	703.67	
		12/17/2020	773.77	77.90	695.87	
	04N22W07G01S	3/2/2020	771.20	29.60	741.60	
		6/2/2020	771.20	22.50	748.70	
		9/16/2020	771.20	----	----	Tape hangs up
		12/17/2020	771.20	37.80	733.40	
	04N22W08B02S	3/4/2020	870.57	123.00	747.57	
		6/4/2020	870.57	105.00	765.57	
		9/23/2020	870.57	29.50	841.07	
		12/17/2020	870.57	77.10	793.47	
	04N23W01K02S	3/2/2020	786.38	37.60	748.78	
		6/2/2020	786.38	37.40	748.98	
		9/16/2020	786.38	42.60	743.78	
		12/17/2020	786.38	45.40	740.98	
	04N23W02K01S	3/2/2020	869.49	1.50	867.99	
		6/2/2020	869.49	4.00	865.49	
		9/19/2020	869.49	72.10	797.39	
		12/17/2020	869.49	76.70	792.79	
	04N23W12H02S	3/4/2020	716.61	32.00	684.61	
		6/3/2020	716.61	22.50	694.11	
		9/16/2020	716.61	34.00	682.61	
		12/17/2020	716.61	31.30	685.31	
	05N22W32J02S	3/2/2020	1,139.80	55.60	1,084.20	
		6/4/2020	1,139.80	54.40	1,085.40	
		9/18/2020	1,139.80	57.60	1,082.20	
		12/18/2020	1,139.80	59.70	1,080.10	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Oxnard – Forebay Management Area	02N21W07P04S	4/3/2020	138.78	----	----	Pumping
		6/15/2020	138.78	169.90	-31.12	
		10/19/2020	138.78	----	----	Pumping
		12/4/2020	138.78	----	----	No casing access
	02N22W26E01S	3/27/2020	86.96	----	----	No site access
		6/22/2020	86.96	----	----	No site access
		10/12/2020	86.96	----	----	No site access
		12/1/2020	86.96	----	----	No site access
Oxnard	01N21W04N02S	3/26/2020	43.33	110.00	-66.67	
		6/24/2020	43.33	122.05	-78.72	
		10/13/2020	43.33	130.70	-87.37	
		12/3/2020	43.33	136.05	-92.72	
	01N21W06L04S	3/26/2020	47.85	58.40	-10.55	
		6/23/2020	47.85	58.65	-10.80	
		10/12/2020	47.85	60.90	-13.05	
		12/3/2020	47.85	59.29	-11.44	
	01N21W07H01S*	3/26/2020	40.87	46.40	-5.53	
		6/23/2020	40.87	48.05	-7.18	
		10/12/2020	40.87	51.50	-10.63	
		12/3/2020	40.87	50.15	-9.28	
	01N21W08N03S	3/26/2020	31.50	93.40	-61.90	
		6/23/2020	31.50	105.75	-74.25	
		10/12/2020	31.50	115.85	-84.35	
		12/3/2020	31.50	122.07	-90.57	
	01N21W09C04S	3/26/2020	39.96	101.95	-61.99	
		6/24/2020	39.96	113.95	-73.99	
		10/13/2020	39.96	100.33	-60.37	
		12/3/2020	39.96	109.30	-69.34	
	01N21W16A04S	3/26/2020	25.69	80.33	-54.64	
		6/24/2020	25.69	95.35	-69.66	
		10/13/2020	25.69	110.49	-84.80	
		12/3/2020	25.69	117.52	-91.83	
	01N21W16M01S	3/26/2020	22.79	92.60	-69.81	
		6/23/2020	22.79	101.83	-79.04	
		10/12/2020	22.79	116.10	-93.31	
		12/2/2020	22.79	118.45	-95.66	
	01N21W16P03S	3/26/2020	19.39	89.17	-69.78	
		6/23/2020	19.39	103.95	-84.56	
		10/12/2020	19.39	118.75	-99.36	
		12/2/2020	19.39	118.70	-99.31	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Oxnard	01N21W17D02S	3/26/2020	28.21	35.42	-7.21	
		6/23/2020	28.21	37.73	-9.52	
		10/12/2020	28.21	43.10	-14.89	
		12/3/2020	28.21	39.20	-10.99	
	01N21W21N01S	3/26/2020	15.74	----	----	No site access
		6/23/2020	15.74	72.00	-56.26	
		10/12/2020	15.74	82.35	-66.61	
		12/2/2020	15.74	82.00	-66.26	
	01N21W28D01S	3/26/2020	14.75	72.85	-58.10	
		6/23/2020	14.75	86.30	-71.55	
		10/13/2020	14.75	96.67	-81.92	
		11/30/2020	14.75	94.00	-79.25	
	01N21W29B03S	3/26/2020	18.19	25.49	-7.30	
		6/23/2020	18.19	----	----	Pumping
		10/12/2020	18.19	40.60	-22.41	
		12/2/2020	18.19	----	----	Pumping
	01N21W32K01S*	3/16/2020	10.00	67.40	-57.40	
		6/15/2020	10.00	77.50	-67.50	
		10/18/2020	10.00	83.50	-73.50	
		12/14/20	10.00	89.10	-79.10	
	01N22W12N03S	3/27/2020	38.46	----	----	No measure port
		6/23/2020	38.46	----	----	No measure port
		10/12/2020	38.46	----	----	No measure port
		12/2/2020	38.46	----	----	No measure port
	01N22W12R01S	3/26/2020	34.00	83.50	-49.50	
		6/23/2020	34.00	88.25	-54.25	
		10/12/2020	34.00	92.50	-58.50	
		12/3/2020	34.00	91.80	-57.80	
	01N22W14K01S	3/27/2020	33.97	----	----	Tape hangs up
		6/23/2020	33.97	----	----	Tape hangs up
		10/12/2020	33.97	----	----	Tape hangs up
		12/1/2020	33.97	----	----	Tape hangs up
	01N22W21B03S	3/27/2020	15.28	36.80	-21.52	
		6/23/2020	15.28	37.35	-22.07	
		10/12/2020	15.28	40.42	-25.14	
		12/2/2020	15.28	42.80	-27.52	
	01N22W24C02S	3/27/2020	29.10	35.75	-6.65	
		6/23/2020	29.10	38.50	-9.40	
		10/12/2020	29.10	41.50	-12.40	
		12/1/2020	29.10	42.24	-13.14	
	01N22W26K03S	3/27/2020	13.06	56.80	-43.74	
		6/23/2020	13.06	69.75	-56.69	
		10/12/2020	13.06	----	----	Pumping
		12/2/2020	13.06	----	----	Pumping

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Oxnard	01N22W26M03S	3/27/2020	13.00	53.40	-40.40	
		6/23/2020	13.00	----	----	Pumping
		10/12/2020	13.00	----	----	Pumping
		12/2/2020	13.00	73.45	-60.45	
	01N22W36B02S	3/27/2020	11.50	54.20	-42.70	
		6/23/2020	11.50	----	----	Pumping
		10/12/2020	11.50	----	----	Pumping
		12/2/2020	11.50	----	----	Pumping
	02N21W19A03S	4/3/2020	102.70	123.90	-21.20	
		6/9/2020	102.70	134.10	-31.40	
		10/19/2020	102.70	135.80	-33.10	
		12/3/2020	102.70	140.85	-38.15	
	02N21W19B02S	4/1/2020	101.80	98.10	3.70	
		6/24/2020	101.80	98.40	3.40	
		10/13/2020	101.80	105.70	-3.90	
		12/7/2020	101.80	119.90	-18.10	
	02N21W20F02S	4/3/2020	113.36	----	----	No site access
		6/9/2020	113.36	----	----	No site access
		10/19/2020	113.36	----	----	No site access
		12/7/2020	113.36	181.07	-67.71	
	02N21W20M06S	3/27/2020	92.09	151.90	-59.81	
		6/24/2020	92.09	160.30	-68.21	
		10/13/2020	92.09	----	----	Pumping
		12/3/2020	92.09	----	----	Pumping
	02N21W31P02S	3/26/2020	57.75	65.20	-7.45	
		6/23/2020	57.75	64.35	-6.60	
		10/12/2020	57.75	65.10	-7.35	
		12/3/2020	57.75	64.07	-6.32	
	02N21W31P03S	3/26/2020	55.17	111.30	-56.13	
		6/23/2020	55.17	114.25	-59.08	
		10/12/2020	55.17	122.67	-67.50	
		12/3/2020	55.17	125.50	-70.33	
	02N22W24P01S	3/31/2020	94.30	99.55	-5.25	
		6/24/2020	94.30	----	----	Pumping
		10/13/2020	94.30	----	----	Pumping
		12/7/2020	94.30	103.19	-8.89	
	02N22W30K01S	3/27/2020	42.38	54.50	-12.12	
		6/23/2020	42.38	55.10	-12.72	
		10/12/2020	42.38	58.75	-16.37	
		12/2/2020	42.38	57.45	-15.07	
	02N22W31A01S	3/27/2020	42.30	51.70	-9.40	
		6/23/2020	42.30	52.48	-10.18	
		10/12/2020	42.30	55.20	-12.90	
		12/2/2020	42.30	54.20	-11.90	
	02N22W32Q03S	3/27/2020	40.10	52.20	-12.10	
		6/23/2020	40.10	----	----	No site access
		10/12/2020	40.10	----	----	No site access
		12/2/2020	40.10	----	----	Pumping

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Oxnard	02N23W36C04S	3/27/2020	27.73	54.90	-27.17	
		6/23/2020	27.73	54.57	-26.84	
		10/12/2020	27.73	54.27	-26.54	
		12/2/2020	27.73	54.10	-26.37	
Piru	04N18W19R01S	3/9/2020	655.63	101.70	553.93	
		6/22/2020	655.63	88.70	566.93	
		10/14/2020	655.63	87.20	568.43	
		12/1/2020	655.63	91.95	563.68	
	04N18W30J05S	3/9/2020	623.30	54.70	568.60	
		6/22/2020	623.30	50.70	572.60	Pumping
		10/14/2020	623.30	46.00	577.30	
		12/1/2020	623.30	51.85	571.45	
	04N19W25C02S*	3/9/2020	611.09	71.00	540.09	
		6/22/2020	611.09	68.60	542.49	
		10/14/2020	611.09	63.25	547.84	
		12/1/2020	611.09	67.07	544.02	
	04N19W25K04S	3/9/2020	593.97	47.00	546.97	
		6/22/2020	593.97	----	----	Pumping
		10/14/2020	593.97	----	----	Pumping
		12/1/2020	593.97	----	----	Pumping
	04N19W26P01S	3/9/2020	563.00	----	----	Pumping
		6/22/2020	563.00	----	----	Pumping
		10/14/2020	563.00	----	----	Pumping
		12/1/2020	563.00	33.60	529.40	
	04N19W34K01S	3/9/2020	519.51	----	----	No site access
		6/22/2020	519.51	----	----	No site access
		10/14/2020	519.51	9.20	510.31	
		12/1/2020	519.51	10.90	508.61	
	04N19W35L02S	3/9/2020	541.08	----	----	No site access
		6/22/2020	541.08	17.25	523.83	
		10/14/2020	541.08	9.55	531.53	
		12/1/2020	541.08	15.50	525.58	
Pleasant Valley	01N21W01M02S	3/26/2020	96.17	163.40	-67.23	
		6/24/2020	96.17	----	----	Pumping
		10/13/2020	96.17	----	----	Pumping
		12/3/2020	96.17	198.45	-102.28	
	01N21W02J02S	3/26/2020	89.51	89.10	0.41	
		6/24/2020	89.51	91.49	-1.98	
		10/13/2020	89.51	93.60	-4.09	
		12/3/2020	89.51	100.80	-11.29	
	01N21W02P01S	3/26/2020	67.98	----	----	Capped
		6/24/2020	67.98	----	----	Capped
		10/13/2020	67.98	----	----	Capped
		12/3/2020	67.98	----	----	Capped
	01N21W03C01S*	3/26/2020	72.28	146.50	-74.22	
		6/24/2020	72.28	156.10	-83.82	
		10/13/2020	72.28	161.00	-88.72	
		12/2/2020	72.28	158.60	-86.32	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Pleasant Valley	01N21W04K01S	3/26/2020	47.52	108.75	-61.23	
		6/24/2020	47.52	119.17	-71.65	
		10/13/2020	47.52	128.70	-81.18	
		12/3/2020	47.52	140.60	-93.08	
	01N21W09J03S	3/26/2020	30.56	----	----	No site access
		6/24/2020	30.56	----	----	No site access
		10/13/2020	30.56	----	----	No site access
		12/3/2020	30.56	----	----	No site access
	01N21W10G01S	3/26/2020	38.72	99.83	-61.11	
		6/24/2020	38.72	113.60	-74.88	
		10/13/2020	38.72	127.20	-88.48	
		12/3/2020	38.72	142.45	-103.73	
	01N21W14A01S	3/26/2020	50.11	20.80	29.31	
		6/24/2020	50.11	21.19	28.92	
		10/13/2020	50.11	22.35	27.76	
		12/3/2020	50.11	26.48	23.63	
	01N21W15H01S	3/26/2020	33.17	13.42	19.75	
		6/24/2020	33.17	14.52	18.65	
		10/13/2020	33.17	15.83	17.34	
		12/3/2020	33.17	18.37	14.80	
	02N20W19M05S	3/31/2020	200.47	194.80	5.67	
		6/24/2020	200.47	194.45	6.02	
		10/9/2020	200.47	190.40	10.07	
		12/1/2020	200.47	194.52	5.95	
	02N21W35M02S	3/26/2020	90.60	161.10	-70.50	
		6/24/2020	90.60	169.75	-79.15	
		10/13/2020	90.60	175.85	-85.25	
		12/3/2020	90.60	177.75	-87.15	
	02N21W36N01S	3/26/2020	111.18	95.52	15.66	
		6/24/2020	111.18	109.80	1.38	
		10/13/2020	111.18	117.40	-6.22	
		12/3/2020	111.18	116.35	-5.17	
Santa Paula	02N22W02C01S*	3/6/2020	184.38	46.20	138.18	
		6/22/2020	184.38	----	----	Destroyed
	02N22W03K02S	3/9/2020	248.75	127.00	121.75	
		6/22/2020	248.75	126.90	121.85	
		10/12/2020	248.75	131.50	117.25	
		12/1/2020	248.75	132.11	116.64	
	02N22W03M02S	3/9/2020	291.50	211.00	80.50	
		6/25/2020	291.50	201.67	89.83	
		10/12/2020	291.50	201.90	89.60	
		12/1/2020	291.50	202.97	88.53	
	03N21W09K02S	3/6/2020	362.18	167.00	195.18	
		6/22/2020	362.18	166.40	195.78	
		10/14/2020	362.18	176.07	186.11	
		12/1/2020	362.18	171.48	190.70	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Santa Paula	03N21W17Q01S	3/6/2020	283.35	101.80	181.55	
		6/22/2020	283.35	----	----	Pumping
		10/14/2020	283.35	----	----	Pumping
		12/1/2020	283.35	----	----	Pumping
	03N21W19R01S	3/6/2020	235.39	64.70	170.69	
		6/22/2020	235.39	----	----	No site access
		10/14/2020	235.39	----	----	Pumping
		12/1/2020	235.39	80.20	155.19	
	03N21W30F01S	3/6/2020	221.21	67.10	154.11	
		6/22/2020	221.21	----	----	Pumping
		10/14/2020	221.21	----	----	Pumping
		12/1/2020	221.21	----	----	Pumping
	03N22W36K05S	3/9/2020	180.89	27.80	153.09	
		6/22/2020	180.89	41.00	139.89	
		10/14/2020	180.89	49.75	131.14	
		12/1/2020	180.89	43.37	137.52	
	02N18W04R02S	3/31/2020	870.00	52.07	817.93	
		6/19/2020	870.00	53.50	816.50	
		10/9/2020	870.00	55.80	814.20	
		12/1/2020	870.00	56.01	813.99	
	02N18W10A02S	3/27/2020	926.40	85.80	840.60	
		6/26/2020	926.40	91.10	835.30	
		9/25/2020	926.40	90.30	836.10	
		10/25/2020	926.40	92.70	833.70	
Tierra Rejada	02N19W10R01S	3/31/2020	619.29	155.20	464.09	
		6/19/2020	619.29	159.00	460.29	
		10/9/2020	619.29	161.56	457.73	Pumping
		12/1/2020	619.29	162.67	456.62	
	02N19W12M03S	3/31/2020	718.95	101.60	617.35	
		6/19/2020	718.95	103.30	615.65	Pumping
		10/9/2020	718.95	----	----	Pumping
		12/1/2020	718.95	101.40	617.55	
	02N19W14P01S	3/31/2020	678.12	----	----	No site access
		6/19/2020	678.12	----	----	No site access
		10/9/2020	678.12	----	----	No site access
		12/1/2020	678.12	----	----	No site access

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
UNDEFINED	01N19W02L01S	3/5/2020	945.42	----	----	No site access
		6/8/2020	945.42	----	----	No site access
		9/23/2020	945.42	----	----	No site access
		12/29/2020	945.42	----	----	No site access
	01N19W14K04S	3/5/2020	908.79	23.00	885.79	
		6/8/2020	908.79	21.70	887.09	
		9/23/2020	908.79	23.10	885.69	
		12/29/2020	908.79	23.40	885.39	
	01N19W15E01S	3/5/2020	903.53	23.30	880.23	
		6/8/2020	903.53	22.00	881.53	
		9/23/2020	903.53	26.10	877.43	
		12/29/2020	903.53	26.90	876.63	
	01N20W24H02S	3/5/2020	1,126.54	----	----	too much rust
		6/8/2020	1,126.54	----	----	too much rust
		9/23/2020	1,126.54	----	----	too much rust
		12/29/2020	1,126.54	----	----	too much rust
	04N22W10K02S	3/4/2020	1,325.90	22.30	1,303.60	
		6/4/2020	1,325.90	19.20	1,306.70	
		9/14/2020	1,325.90	25.40	1,300.50	
		12/16/2020	1,325.90	28.30	1,297.60	
	04N23W14M04S	3/4/2020	554.50	----	----	Flowing
		6/4/2020	554.50	----	----	Flowing
		9/29/2020	554.50	----	----	Flowing
		12/16/2020	554.50	----	----	Flowing
	04N23W16P01S	3/2/2020	619.89	72.60	547.29	
		6/2/2020	619.89	71.90	547.99	
		9/18/2020	619.89	77.50	542.39	
		12/15/2020	619.89	80.10	539.79	
	04N23W28G01S	3/4/2020	402.37	15.20	387.17	
		6/4/2020	402.37	14.50	387.87	
		9/23/2020	402.37	26.10	376.27	
		12/18/2020	402.37	28.90	373.47	
	04N23W33M03S	3/2/2020	331.80	16.40	315.40	
		6/2/2020	331.80	16.50	315.30	
		9/14/2020	331.80	19.10	312.70	
		12/17/2020	331.80	23.20	308.60	
	04N24W13J04S	3/2/2020	626.45	----	----	No site access
		6/2/2020	626.45	----	----	No site access
		9/29/2020	626.45	----	----	No site access
		12/15/2020	626.45	10.80	615.65	
	04N24W13N01S	3/2/2020	642.12	----	----	No site access
		6/2/2020	642.12	----	----	No site access
		9/29/2020	642.12	----	----	No site access
		12/15/2020	642.12	2.50	639.62	No site access

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Upper Ojai Valley	04N22W09Q02S	3/4/2020	1,278.80	20.00	1,258.80	
		6/4/2020	1,278.80	18.70	1,260.10	
		9/24/2020	1,278.80	----	----	No site access
		12/16/2020	1,278.80	23.50	1,255.30	
	04N22W11P02S	3/4/2020	1,420.60	18.90	1,401.70	
		6/4/2020	1,420.60	----	----	No site access
		9/16/2020	1,420.60	23.00	1,397.60	
		12/16/2020	1,420.60	24.80	1,395.80	
	04N22W12F04S	3/4/2020	1,616.90	156.20	1,460.70	
		6/4/2020	1,616.90	129.40	1,487.50	
		9/29/2020	1,616.90	143.90	1,473.00	
		12/16/2020	1,616.90	144.90	1,472.00	
Ventura River - Lower	03N23W32Q03S	3/4/2020	50.86	----	----	No site access
		6/8/2020	50.86	30.60	20.26	
		9/29/2020	50.86	----	----	No site access
		12/16/2020	50.86	37.60	13.26	
	03N23W32Q07S	3/4/2020	46.10	----	----	No site access
		6/8/2020	46.10	28.10	18.00	
		9/29/2020	46.10	----	----	No site access
		12/16/2020	46.10	37.70	8.40	
Ventura River - Upper	03N23W05B01S	3/2/2020	293.20	47.10	246.10	
		6/2/2020	293.20	44.50	248.70	
		9/14/2020	293.20	46.90	246.30	
		12/15/2020	293.20	47.30	245.90	
	03N23W08B07S	3/2/2020	239.19	15.50	223.69	
		6/2/2020	239.19	15.00	224.19	
		9/14/2020	239.19	16.20	222.99	
		12/15/2020	239.19	14.90	224.29	
	04N23W03M01S	3/3/2020	760.85	101.80	659.05	
		6/3/2020	760.85	----	----	No site access
		9/29/2020	760.85	----	----	No site access
		12/16/2020	760.85	----	----	No site access
	04N23W04J01S	3/3/2020	713.04	66.00	647.04	
		6/3/2020	713.04	61.50	651.54	
		9/4/2020	713.04	67.00	646.04	
		12/16/2020	713.04	10.50	702.54	
	04N23W09B01S	3/3/2020	662.30	----	----	Pumping
		6/3/2020	662.30	36.80	625.50	
		9/24/2020	662.30	----	----	Pumping
		12/16/2020	662.30	44.40	617.90	
	04N23W15A02S	3/2/2020	680.90	93.10	587.80	
		6/2/2020	680.90	91.90	589.00	
		9/16/2020	680.90	92.10	588.80	
		12/18/2020	680.90	94.60	586.30	
	04N23W15D02S	3/2/2020	634.30	128.20	506.10	
		6/2/2020	634.30	115.90	518.40	
		9/18/2020	634.30	123.30	511.00	
		12/16/2020	634.30	130.60	503.70	

* - Denotes basin key water level well.

Appendix C – Groundwater Level Measurement Data

GW Basin/Subbasin	SWN	Date	RP	Depth	Elev.	NMC
Ventura River - Upper	04N23W16C04S	3/2/2020	569.10	44.00	525.10	
		6/2/2020	569.10	37.90	531.20	
		9/18/2020	569.10	----	----	No site access
		12/15/2020	569.10	52.30	516.80	
	04N23W20A01S	3/2/2020	488.89	13.30	475.59	
		6/2/2020	488.89	10.00	478.89	
		9/18/2020	488.89	27.50	461.39	
		12/15/2020	488.89	26.40	462.49	
	04N23W29F02S	3/2/2020	396.58	19.60	376.98	
		6/2/2020	396.58	17.20	379.38	
		9/14/2020	396.58	28.20	368.38	
		12/17/2020	396.58	31.90	364.68	
	05N23W33B03S	3/3/2020	829.00	36.80	792.20	
		6/3/2020	829.00	28.40	800.60	
		9/29/2020	829.00	----	----	No site access
		12/18/2020	829.00	34.80	794.20	
	05N23W33G01S	3/3/2020	816.21	23.20	793.01	
		6/3/2020	816.21	20.60	795.61	
		9/24/2020	816.21	26.60	789.61	
		12/18/2020	816.21	70.30	745.91	

* - Denotes basin key water level well.

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

GW 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	02N19W19P02S	11/12/2020	0.2	340	72	ND	108	ND	1180	0.2	ND	1	69	30	61.8	71	104	770	ND	7.2
	02N19W20L01S	11/19/2020	0.2	420	100	ND	116	ND	1480	0.2	ND	1	84	ND	76.4	72	174	980	ND	7.1
	02N19W20M04S	11/12/2020	0.1	370	78	ND	130	ND	1280	0.3	40	3	81	ND	23.4	73	117	790	ND	7.3
	02N20W23G03S	11/12/2020	0.2	310	73	ND	141	ND	1280	0.2	ND	2	75	ND	77.7	84	91.9	800	ND	7.2
	02N20W23K01S	11/19/2020	0.1	310	52	ND	88	ND	964	0.1	ND	1	54	10	17.7	65	80	590	ND	7.2
	02N20W23R01S	10/9/2020	0.3	320	77	ND	171	ND	1590	0.3	ND	1	61	ND	78.2	113	185	980	ND	7.2
	02N20W24M02S	11/19/2020	0.1	320	53	ND	118	ND	1080	0.3	ND	3	58	ND	8.4	67	78.1	650	ND	7.4
	02N20W25C02S	11/12/2020	0.3	310	82	ND	140	ND	1340	0.2	40	1	71	ND	44.7	101	166	850	ND	7.1
	02N20W26C02S	12/1/2020	0.3	350	95	ND	153	ND	1550	0.3	ND	1	74	ND	57.4	119	202	990	ND	7.2
Carpinteria	04N25W25N06S	9/1/2020	0.3	420	124	ND	91	ND	1540	0.6	ND	2	52	ND	10.5	110	287	1010	ND	7.1
	04N25W35G01S	9/1/2020	0.4	240	93	ND	28	30	989	0.3	ND	4	43	ND	ND	53	244	660	ND	7.6
Conejo	01N19W08G02S	12/17/2020	0.1	370	109	ND	119	ND	1840	0.2	30	3	108	ND	ND	97	433	1330	ND	7.3
	01N19W09N01S	12/17/2020	0.2	400	153	ND	154	ND	2000	0.3	40	3	114	40	ND	111	446	1450	40	7
	01N20W03J01S (Outside Basin)	12/17/2020	0.2	420	86	ND	159	10	1480	0.1	ND	ND	96	ND	4	62	179	900	100	6.6
Cuyama Valley	07N23W15P01S	12/30/2020	0.2	220	309	ND	8	ND	2360	1.1	ND	4	118	ND	2.4	93	1160	2030	ND	8.1
Fillmore	03N19W06D02S	8/31/2020	0.5	260	119	ND	66	ND	1450	0.7	ND	5	48	ND	15.4	86	399	1020	ND	7.3
	03N20W01F05S	8/27/2020	0.6	280	142	ND	63	ND	1550	0.7	ND	5	54	ND	21.1	93	464	1110	ND	7.5
	03N20W09D01S	8/31/2020	0.8	320	178	ND	78	ND	1850	0.6	ND	6	62	ND	39.4	106	533	1370	ND	7.1
	03N21W01P08S	8/26/2020	0.6	290	151	ND	48	ND	1500	0.5	ND	2	41	270	18.5	83	450	1110	ND	7.2
	04N19W19N01S	9/3/2020	0.4	330	133	ND	40	ND	1660	0.7	ND	4	54	40	2.7	93	542	1280	ND	7.1
	04N19W31F01S	8/27/2020	0.5	260	136	ND	71	ND	1470	0.7	ND	5	54	ND	16	92	395	1060	ND	7.3
	04N19W31R01S	12/1/2020	0.6	320	155	ND	67	ND	1510	0.7	ND	6	56	40	16.8	93	369	1050	ND	7.1
	04N19W32L02S	12/1/2020	0.6	230	123	ND	56	ND	1250	0.8	ND	5	50	50	10.7	78	326	900	ND	7.2
	04N20W26D03S	9/3/2020	0.2	250	130	ND	45	ND	1220	0.5	ND	2	27	ND	42	43	284	850	ND	7.1
	04N20W26F01S	8/26/2020	0.9	270	128	ND	50	ND	1260	0.6	ND	2	30	ND	22.6	65	320	880	ND	7
	04N20W31H04S	9/3/2020	0.1	320	88	ND	19	ND	1000	0.4	ND	2	30	ND	17.5	37	218	690	ND	7.1
	04N20W31P01S	8/26/2020	0.1	400	154	ND	48	ND	1530	0.5	ND	2	49	ND	75.3	59	333	1080	ND	6.9
	04N20W36P04S	8/27/2020	0.6	290	135	ND	60	ND	1560	0.6	ND	5	51	ND	28	90	444	1160	30	7.2
Hidden Valley	01N19W19H03S	12/17/2020	0.1	360	69	ND	43	ND	915	0.1	40	3	51	50	ND	56	114	540	150	7.2

Table D-1 General Minerals (cont.)

GW 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
Las Posas Valley – East Las Posas Management Area	02N19W06F01S	10/23/2020	0.6	220	118	ND	128	550	1620	0.4	ND	7	41	40	16.7	137	377	1080	ND	7.3
	02N19W07B02S	10/8/2020	0.8	250	117	ND	147	ND	1880	0.6	ND	4	51	20	6.5	222	461	1270	ND	7.3
	02N19W07D02S	10/21/2020	0.7	250	144	ND	150	ND	1780	0.4	ND	3	37	ND	18.7	161	405	1140	ND	7.2
	02N20W01B02S	10/30/2020	0.2	100	29	ND	51	ND	530	0.5	ND	3	12	10	0.6	50	73.1	310	ND	7.9
	02N20W01Q01S	10/8/2020	0.7	280	156	ND	141	ND	1790	0.3	ND	3	40	ND	28.1	162	408	1230	ND	7.2
	02N20W03H01S	10/30/2020	ND	180	54	ND	27	ND	612	0.2	ND	3	14	10	8.9	43	90.4	370	ND	7.8
	02N20W04B01S	10/28/2020	ND	200	67	ND	16	ND	694	0.3	ND	4	20	130	ND	36	147	440	ND	7.5
	02N20W04F01S	10/28/2020	0.1	220	163	ND	89	ND	1370	0.2	260	6	40	430	ND	55	362	1010	ND	7.3
	02N20W04R03S	9/29/2020	0.4	260	204	ND	160	ND	1910	0.2	ND	5	38	ND	ND	106	561	1440	ND	7.3
	02N20W09Q07S	9/29/2020	0.6	270	178	ND	194	ND	2290	0.3	ND	5	60	220	24.5	162	664	1700	ND	7.3
	02N20W10D02S	10/23/2020	ND	200	79	ND	48	ND	728	0.2	ND	2	18	ND	36.2	37	87.6	450	40	7.4
	02N20W10G01S	10/8/2020	0.7	310	172	ND	160	ND	2150	0.2	ND	7	55	50	56.8	185	529	1510	30	7.3
	02N20W16B06S	10/21/2020	0.7	260	140	ND	177	ND	2040	0.4	ND	7	58	50	3.7	181	532	1370	ND	7.4
	03N19W29K06S	10/8/2020	ND	100	53	ND	42	ND	536	0.2	30	1	9	ND	72.5	33	33.6	390	20	6.7
	03N19W29K08S	10/8/2020	0.1	210	83	ND	28	ND	736	0.3	ND	3	19	ND	16.2	43	130	480	ND	7.2
	03N19W30E06S	10/8/2020	ND	160	53	ND	13	ND	487	0.2	30	2	10	ND	5.5	31	67.4	300	30	7.3
	03N19W31B01S	10/28/2020	0.1	170	79	ND	27	ND	680	0.2	ND	3	14	40	ND	37	145	450	ND	7.5
	03N20W26H01S	10/28/2020	ND	190	66	ND	30	ND	627	0.4	ND	3	17	ND	6.4	35	85.1	370	ND	7.5
	03N20W28J04S	10/27/2020	0.2	260	68	ND	44	ND	919	0.5	ND	3	32	ND	54.4	71	117	560	40	7.3
	03N20W34G01S	10/28/2020	ND	210	72	ND	11	ND	646	0.2	ND	3	17	150	ND	31	126	410	ND	7.5
	03N20W36P01S	10/27/2020	ND	170	55	ND	19	ND	492	0.2	ND	1	11	ND	24.5	29	39.2	310	110	7.6
Las Posas Valley – West Las Posas Management Area	02N20W06J01S	10/30/2020	ND	300	91	ND	16	ND	952	0.3	ND	5	33	160	ND	53	209	620	ND	7.4
	02N20W06R01S	9/29/2020	0.1	270	73	ND	17	ND	864	0.3	ND	5	27	140	ND	55	195	580	ND	7.6
	02N20W07R03S	9/29/2020	ND	180	51	ND	16	ND	550	0.3	ND	2	12	80	ND	29	98	330	ND	7.7
	02N20W08F01S	9/29/2020	ND	180	51	ND	14	ND	536	0.3	ND	2	12	100	ND	31	96.5	340	ND	7.6
	02N20W17L01S	10/1/2020	0.5	270	181	ND	151	ND	1940	0.3	ND	6	58	240	19.5	160	524	1400	50	6.8
	02N21W04Q02S	10/7/2020	0.2	270	75	ND	62	ND	998	0.4	ND	3	33	ND	44.8	89	147	610	ND	7.2
	02N21W08H03S	10/19/2020	0.3	300	70	ND	66	ND	1160	0.3	ND	3	28	60	14.8	104	205	730	ND	7.5
	02N21W09N01S	10/21/2020	0.4	340	81	ND	65	ND	1450	0.2	50	6	33	50	2	164	318	890	ND	7.7
	02N21W10G03S	10/7/2020	0.3	340	52	ND	49	ND	1020	0.2	ND	6	22	50	3	134	143	560	20	7.5
	02N21W10Q04S	10/23/2020	0.2	330	109	ND	34	ND	1190	0.3	ND	5	39	70	ND	75	276	780	ND	7.3
	02N21W11A02S	10/7/2020	0.2	240	212	ND	122	ND	1940	0.3	30	3	68	ND	181	101	421	1440	40	7.1
	02N21W11A03S	10/7/2020	0.2	300	79	ND	34	ND	982	0.2	30	5	32	60	0.4	78	181	600	ND	7.5
	02N21W12H02S	10/7/2020	0.1	250	68	ND	52	ND	881	0.2	ND	4	24	ND	13.2	74	137	520	40	7.4
	02N21W13A01S	10/21/2020	0.1	240	74	ND	14	ND	788	0.3	ND	4	21	70	ND	55	159	430	ND	7.6
	02N21W15M04S	10/7/2020	0.3	280	161	ND	96	ND	1720	0.2	ND	7	43	40	29.2	141	477	1230	ND	7.4
	02N21W16J03S	10/7/2020	0.3	280	83	ND	52	ND	1130	0.2	ND	6	32	50	ND	107	238	720	ND	7.4
	02N21W17F05S	10/7/2020	0.6	310	107	ND	62	ND	1630	0.3	30	6	43	60	0.9	161	423	1050	ND	7.4

Table D-1 General Minerals (cont.)

GW 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
Las Posas Valley – West Las Posas Management Area	02N21W17N03S	9/9/2020	0.7	250	128	ND	47	ND	1380	0.7	ND	5	42	30	11.2	94	427	970	ND	7.3
	02N21W18H01S	10/21/2020	0.6	310	290	ND	154	ND	2620	0.4	ND	8	111	ND	132	191	833	2140	ND	7
	02N21W18H14S	10/21/2020	0.4	310	83	ND	48	ND	1380	0.1	ND	8	37	50	ND	141	358	950	ND	7.6
	02N21W20A02S	11/10/2020	0.6	250	115	ND	48	ND	1300	0.4	90	8	38	20	1	110	356	910	ND	7.3
	03N20W32H04S	10/23/2020	0.2	350	137	ND	24	ND	1370	0.3	30	5	45	140	ND	79	388	990	ND	7
	03N21W35P02S	10/7/2020	0.2	260	92	ND	81	ND	1190	0.4	ND	4	43	ND	64.1	94	188	790	ND	7.1
	03N21W36Q01S	10/8/2020	0.2	280	84	ND	89	ND	1160	0.4	ND	4	43	ND	73.8	85	145	690	ND	7.4
Lockwood Valley	08N21W33R03S	12/30/2020	0.7	270	4	ND	16	10	923	0.5	40	ND	3	ND	6.4	163	178	560	ND	9.2
Mound	02N22W09K07S	9/2/2020	0.4	210	135	ND	68	ND	1580	0.2	ND	5	25	190	ND	163	470	1120	ND	7.4
	02N22W10N04S	9/2/2020	0.4	270	138	ND	48	ND	1460	0.4	ND	4	45	ND	10	109	428	1040	ND	7.2
	02N23W13F02S	9/2/2020	0.6	400	147	ND	65	ND	1630	0.4	ND	5	41	340	ND	142	400	1080	ND	7.2
	02N23W13K03S	9/2/2020	0.6	360	156	ND	75	ND	1760	0.4	ND	6	48	240	2.8	158	476	1250	ND	7.2
Ojai Valley	04N22W04P05S	12/10/2020	ND	260	116	ND	26	ND	955	0.4	ND	ND	31	ND	33.6	41	205	650	ND	6.7
	04N22W04Q01S	11/20/2020	ND	240	107	ND	27	ND	977	0.3	ND	ND	31	ND	48.3	35	211	640	80	7.2
	04N22W05D03S	12/10/2020	ND	280	141	ND	42	ND	1060	0.3	ND	1	35	ND	20.2	38	236	720	ND	6.6
	04N22W05H04S	11/20/2020	ND	280	115	ND	20	ND	940	0.2	ND	1	32	ND	20.3	28	200	680	ND	7.2
	04N22W05M04S	12/10/2020	ND	340	145	ND	27	ND	1110	0.2	ND	ND	35	ND	36.9	34	225	760	ND	6.8
	04N22W06E06S	11/20/2020	ND	310	118	ND	81	ND	1150	0.3	ND	1	40	ND	39.4	53	177	790	ND	6.6
	04N22W06J09S	11/20/2020	ND	270	124	ND	31	ND	977	0.2	ND	1	28	ND	26.4	32	211	690	ND	6.8
	04N22W06K10S	12/10/2020	ND	280	126	ND	30	ND	981	0.2	ND	1	30	ND	27.8	39	206	670	ND	6.8
	04N23W01J03S	11/20/2020	ND	320	70	ND	23	10	941	0.5	ND	ND	16	90	0.4	111	162	590	ND	7.1
	04N23W01K02S	11/20/2020	ND	340	107	ND	37	ND	1020	0.6	ND	ND	27	ND	0.8	74	188	690	ND	7
	04N23W12B03S	11/20/2020	ND	290	172	ND	360	ND	1970	0.4	ND	2	40	740	ND	151	143	1360	ND	7.1
	04N23W12H02S	9/16/2020	ND	300	121	ND	24	ND	982	0.3	ND	2	26	ND	33.7	34	206	720	ND	7.5
	05N22W32K02S	12/10/2020	0.1	360	181	ND	47	ND	1200	0.3	ND	2	34	ND	5.4	52	308	920	ND	6.6
	05N22W33J01S	11/20/2020	ND	330	182	ND	50	ND	1380	0.5	30	2	44	140	ND	53	366	1010	ND	6.8
Oxnard – Forebay Management Area	02N21W07P04S	10/19/2020	0.6	310	174	ND	71	ND	1780	0.4	ND	7	63	140	ND	114	557	1360	ND	7.3
	02N22W13L08S	11/12/2020	0.6	240	141	ND	47	ND	1280	0.5	ND	5	43	150	ND	99	381	900	ND	7.3
	02N22W23H07S	11/20/2020	0.7	280	198	ND	66	ND	1770	0.5	ND	6	69	ND	45.1	99	572	1390	ND	7.1
	02N22W23Q01S	11/20/2020	0.7	250	131	ND	59	ND	1320	0.5	ND	5	48	ND	7.3	84	363	960	20	7.4
Oxnard	01N21W04D04S	12/2/2020	0.4	330	61	ND	100	ND	1220	0.3	40	9	25	50	ND	145	175	750	ND	7.5
	01N21W07H05S	11/25/2020	0.6	260	185	ND	123	ND	1690	0.5	ND	5	56	510	ND	109	484	1220	ND	7.2
	01N21W08R01S	12/2/2020	0.3	280	81	ND	63	ND	1140	0.3	ND	6	30	40	ND	110	234	710	ND	7.6
	01N21W16M03S	11/25/2020	0.5	300	75	ND	109	ND	1390	0.3	30	7	30	30	ND	170	265	890	ND	7.4
	01N21W17B02S	9/25/2020	0.4	260	97	ND	39	ND	1240	0.1	ND	9	39	100	ND	117	327	810	ND	7.5
	01N21W19P03S	11/23/2020	0.2	300	59	ND	50	ND	811	0.3	ND	5	20	ND	ND	85	73.3	490	ND	7.7

Table D-1 General Minerals (cont.)

GW 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	01N21W20B01S	11/23/2020	0.6	250	104	ND	37	ND	1160	0.1	ND	8	39	80	ND	85	305	840	ND	7.5
	01N21W20K03S	11/5/2020	0.5	260	88	ND	44	ND	1130	0.2	40	7	33	50	ND	90	268	770	ND	7.4
	01N21W21H02S	12/2/2020	0.4	280	58	ND	98	ND	1270	0.2	ND	4	33	10	ND	137	216	770	ND	7.5
	01N21W21K03S	10/1/2020	0.3	250	48	ND	53	ND	1060	0.2	ND	6	34	50	ND	99	233	670	ND	7.5
	01N21W22C01S	12/2/2020	0.4	300	61	ND	102	ND	1220	0.2	ND	5	40	50	ND	124	195	720	ND	7.5
	01N21W28D01S	12/2/2020	0.4	250	82	ND	76	ND	1220	0.2	ND	7	35	20	ND	111	258	770	ND	7.5
	01N21W28H03S	11/5/2020	0.5	350	72	ND	163	ND	1470	0.2	40	6	42	40	ND	160	156	870	ND	7.4
	01N21W29B03S	11/10/2020	0.6	290	142	ND	104	ND	1500	0.4	ND	5	52	710	ND	123	361	1020	ND	7.2
	01N21W29K02S	10/1/2020	0.6	290	123	ND	52	ND	1280	0.2	40	5	42	630	ND	101	338	900	ND	7.1
	01N21W33A01S	11/12/2020	0.4	310	145	ND	268	ND	1850	0.2	ND	6	61	300	ND	155	233	1150	ND	7.2
	01N22W03F05S	9/9/2020	0.7	250	128	ND	47	ND	1380	0.7	ND	5	42	30	11.2	94	427	970	ND	7.3
	01N22W03F07S	9/9/2020	0.8	320	240	ND	87	ND	2240	0.6	ND	6	79	20	13.5	120	788	1800	ND	7.1
	01N22W06B01S	11/19/2020	0.9	310	193	ND	77	ND	1970	0.5	ND	8	70	ND	5.9	133	661	1530	ND	7.2
	01N22W06R02S	11/5/2020	0.8	270	197	ND	71	ND	1890	0.6	ND	7	66	20	4.6	127	633	1480	ND	7.1
	01N22W12M01S	12/2/2020	0.8	260	210	ND	67	ND	1960	0.6	30	7	69	370	ND	132	717	1480	ND	7.2
	01N22W12N03S	12/2/2020	0.5	250	106	ND	38	ND	1270	0.2	ND	7	38	130	ND	95	360	850	ND	7.5
	01N22W23R02S	11/23/2020	0.6	240	130	ND	46	ND	1230	0.4	40	7	40	160	ND	85	335	910	ND	7.4
	01N22W24B04S	11/5/2020	0.6	240	122	ND	40	ND	1220	0.4	30	5	35	130	ND	86	347	910	ND	7.3
	01N22W24C03S	9/25/2020	0.6	240	127	ND	42	ND	1250	0.6	30	5	39	190	ND	81	382	870	ND	7.4
	01N22W24M03S	9/25/2020	0.6	240	139	ND	107	ND	1430	0.6	ND	5	44	180	3.4	85	370	1010	ND	7.3
	01N22W25K01S	10/1/2020	0.7	260	166	ND	246	ND	2450	0.3	40	9	69	760	0.8	236	619	1670	20	7
	01N22W25K02S	10/1/2020	0.6	250	87	ND	37	ND	1130	0.4	ND	5	40	30	ND	84	305	800	ND	7.5
	01N22W26D05S	9/25/2020	0.8	240	367	ND	55	ND	4380	ND	50	7	39	180	1680	87	386	3020	ND	7.5
	01N22W26K03S	9/25/2020	0.4	250	104	ND	47	ND	1200	0.2	ND	6	36	90	ND	89	322	820	ND	7.6
	01N22W26M03S	9/25/2020	0.5	240	125	ND	55	ND	1350	0.3	ND	6	40	190	ND	88	383	960	ND	7.5
	01N22W26P02S	9/25/2020	0.4	260	86	ND	41	ND	1150	0.2	ND	6	36	10	3.2	86	301	780	ND	7.7
	01N22W26R04S	10/1/2020	0.6	240	133	ND	159	ND	1570	0.5	ND	5	45	90	ND	88	335	1090	ND	7.3
	02N21W20Q05S	9/9/2020	0.6	320	104	ND	66	ND	1410	0.3	ND	6	33	250	ND	135	334	900	ND	7.5
	02N21W29E04S	11/10/2020	0.5	270	98	ND	57	ND	1200	0.2	ND	4	38	50	3.5	107	287	820	ND	7.3
	02N21W30A02S	9/9/2020	0.5	240	108	ND	52	ND	1310	0.2	ND	5	38	110	3.4	110	363	880	ND	7.5
	02N22W19J03S	11/5/2020	0.6	260	137	ND	52	ND	1460	0.5	ND	5	41	160	ND	114	428	1050	ND	7.3
	02N22W24P01S	9/9/2020	0.5	240	110	ND	44	ND	1270	0.6	ND	4	38	ND	12.7	76	359	890	ND	7.3
	02N22W24P02S	9/9/2020	0.6	240	122	ND	47	ND	1340	0.6	ND	5	41	ND	8.2	92	395	920	ND	7.4
	02N22W25E01S	11/5/2020	1	320	279	ND	107	ND	2790	0.5	ND	9	128	ND	35.8	170	1090	2390	ND	7.1
	02N22W30F03S	11/20/2020	0.7	250	119	ND	45	ND	1320	0.6	ND	5	39	210	ND	93	386	970	30	7.3
	02N22W31B01S	11/19/2020	0.7	240	147	ND	55	ND	1480	0.6	ND	6	48	ND	24	101	460	1060	ND	7.2
	02N22W31D02S	9/2/2020	0.6	250	155	ND	53	ND	1500	0.6	ND	5	50	130	22.3	104	447	1070	ND	7.2
	02N22W32C04S	11/25/2020	0.6	260	152	ND	57	ND	1490	0.6	ND	5	54	ND	33.3	93	455	1090	ND	7.4
	02N22W36E02S	9/9/2020	0.6	250	119	ND	48	ND	1410	0.6	ND	5	38	ND	9.2	87	417	990	ND	7.4
	02N22W36E03S	9/9/2020	0.6	240	111	ND	47	ND	1340	0.6	80	5	37	60	ND	88	386	940	ND	7.2
	02N22W36E04S	9/9/2020	0.9	290	221	ND	62	ND	2170	0.6	ND	7	70	ND	79.6	138	721	1670	ND	7.2
	02N22W36E05S	9/9/2020	0.9	290	189	ND	63	ND	2040	0.6	ND	6	67	50	46.3	119	704	1620	ND	7.2
	02N23W25M01S	11/5/2020	0.6	220	135	ND	52	ND	1490	0.4	30	6	37	110	1.7	121	462	1040	50	6.6

Table D-1 General Minerals (cont.)

GW 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
Piru	04N18W30J04S	8/31/2020	0.5	240	76	ND	68	ND	1120	0.6	ND	5	29	ND	9.6	97	216	710	30	7.5
	04N19W25H01S	8/27/2020	0.5	280	124	ND	108	ND	1490	0.7	ND	6	42	ND	25.6	113	315	1000	ND	7.3
	04N19W25M03S	8/27/2020	0.7	390	253	ND	60	ND	2690	1	ND	7	153	360	1.8	182	1090	2330	ND	7
	04N19W26H01S	8/27/2020	0.7	300	143	ND	106	ND	1720	0.7	ND	5	59	ND	24.4	121	429	1230	ND	7.4
	04N19W26J03S	8/31/2020	0.5	250	114	ND	107	ND	1450	0.7	ND	5	43	ND	15.6	105	327	980	ND	7.5
	04N19W34J04S	8/31/2020	0.5	240	126	ND	56	ND	1390	0.7	ND	5	49	ND	11.1	81	391	1020	ND	7.3
Pleasant Valley	01N21W01B05S	9/25/2020	0.3	370	50	ND	195	ND	1380	0.1	ND	9	54	50	ND	149	63.4	790	ND	7.4
	01N21W01D08S	11/19/2020	0.4	360	83	ND	219	ND	1720	0.2	40	7	65	ND	ND	157	214	1090	ND	7.1
	01N21W01M02S	9/25/2020	0.3	360	68	ND	165	ND	1500	0.2	ND	6	66	40	ND	138	190	920	ND	7.6
	01N21W02H04S	11/19/2020	0.8	340	303	ND	207	ND	2910	0.2	ND	8	83	ND	128	309	805	2200	ND	6.9
	01N21W02J01S	11/19/2020	1.9	390	688	ND	410	20	5380	0.2	ND	12	150	ND	232	714	1850	4540	ND	6.8
	01N21W03D01S	10/1/2020	0.5	260	168	ND	109	ND	1740	0.2	ND	6	48	ND	65.2	121	439	1290	ND	7
	01N21W03K01S	12/2/2020	0.5	250	168	ND	125	ND	1700	0.2	ND	5	48	ND	25.7	115	461	1200	ND	7.3
	01N21W03L03S	11/23/2020	0.4	270	113	ND	104	ND	1440	0.3	ND	7	39	30	ND	132	322	970	ND	7.6
	01N21W03R01S	12/2/2020	0.6	320	182	ND	211	ND	2510	0.2	ND	5	73	ND	59.6	196	691	1860	ND	7.1
	01N21W04R02S	11/23/2020	0.3	250	118	ND	73	ND	1180	0.3	ND	3	34	130	14.3	87	256	790	30	7.5
	01N21W10A02S	9/25/2020	0.5	270	343	ND	217	ND	3020	0.2	ND	6	101	1410	77.7	182	1010	2450	320	7.2
	01N21W10G01S	12/2/2020	0.4	280	166	ND	173	ND	1890	0.2	ND	4	56	110	8	127	464	1270	ND	7.3
	01N21W12D01S	9/25/2020	0.7	390	241	ND	333	ND	3170	0.2	30	6	118	220	ND	270	846	2400	ND	7.2
	01N21W15D02S	12/2/2020	0.5	270	203	ND	195	ND	2110	0.3	ND	6	63	230	2.9	147	568	1490	ND	7.3
	01N21W15H01S	9/25/2020	1.7	160	453	ND	660	ND	5690	ND	620	9	182	1570	3	622	2150	4770	ND	7.2
	02N20W19F04S	10/9/2020	0.6	260	183	ND	157	ND	2050	0.2	40	5	48	110	ND	164	596	1450	ND	7.1
	02N20W29B02S	11/12/2020	0.3	360	91	ND	125	ND	1300	0.3	30	4	64	50	5.3	125	154	790	ND	7.2
	02N21W33R02S	10/9/2020	0.2	250	76	ND	62	ND	1060	0.3	ND	5	24	ND	ND	93	217	670	ND	7.4
	02N21W34C01S	10/9/2020	0.3	270	97	ND	81	ND	1240	0.3	40	5	30	40	ND	111	272	790	ND	7.4
	02N21W34G01S	12/2/2020	0.8	370	95	ND	188	ND	1880	0.3	40	8	32	30	ND	279	316	1150	ND	7.5
Santa Paula	02N22W03E01S	9/9/2020	0.5	380	282	ND	115	ND	2680	0.4	300	7	80	460	2.3	183	1020	2140	ND	7.1
	02N22W03K02S	8/26/2020	0.5	360	153	ND	88	ND	1690	0.3	ND	5	39	ND	3.4	134	434	1200	190	7.4
	03N21W09K04S	9/9/2020	0.4	300	130	ND	48	ND	1480	0.4	ND	4	31	430	ND	109	386	940	ND	7.4
	03N21W17Q01S	9/3/2020	0.6	380	141	ND	77	ND	2000	0.4	ND	3	57	ND	19.1	137	617	1530	ND	7
	03N21W21E11S	9/3/2020	0.7	340	145	ND	107	ND	1980	0.5	ND	5	52	10	ND	147	572	1460	ND	7.2
	03N21W30F01S	8/31/2020	0.7	400	245	ND	85	ND	2270	0.4	ND	5	61	190	1.3	139	733	1730	ND	7.4
	03N22W35Q01S	10/19/2020	0.9	440	298	ND	100	ND	3140	0.4	ND	9	114	730	35.5	267	1180	2680	ND	7
	03N22W36K07S	11/10/2020	0.5	310	227	ND	74	ND	1850	0.4	ND	5	62	40	ND	102	603	1450	ND	7.1
Simi Valley	02N18W08D04S	10/8/2020	1	380	221	ND	153	ND	2380	0.4	40	7	79	320	21.5	200	676	1760	ND	7
	02N18W08K07S	10/8/2020	0.9	310	290	ND	154	ND	2700	0.5	ND	6	95	ND	55.8	184	871	2070	ND	6.9
	02N18W09E01S	10/8/2020	0.8	300	222	ND	125	ND	2180	0.5	ND	5	77	ND	29	161	686	1660	ND	7
	02N18W10A02S	10/8/2020	1.1	320	265	ND	148	ND	2560	0.5	ND	7	100	ND	59.6	204	809	1980	ND	6.9

Table D-1 General Minerals (cont.)

GW 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
Tierra Rejada	02N19W10R02S	10/9/2020	0.1	260	50	ND	75	ND	1020	0.4	ND	2	54	ND	8.8	56	170	720	ND	7.4
	02N19W11J03S	10/9/2020	0.2	280	59	ND	70	ND	1060	0.2	ND	1	55	ND	24.4	52	174	750	30	7.4
	02N19W14F01S	11/12/2020	0.1	390	106	ND	117	ND	1370	0.2	ND	1	89	ND	73.4	57	150	940	30	7.3
	02N19W14Q02S	10/27/2020	ND	330	46	ND	50	ND	896	0.1	ND	6	42	60	ND	67	102	530	ND	7.7
	02N19W15J02S	11/12/2020	0.2	410	96	ND	169	ND	1810	0.1	ND	7	113	ND	12	157	315	1230	30	7.3
	02N19W15N03S	11/12/2020	0.1	280	74	ND	80	ND	1000	0.2	ND	2	63	10	0.9	50	157	720	ND	7.3
Upper Ojai Valley	04N22W10K05S	9/1/2020	0.2	190	69	ND	23	ND	742	0.4	ND	3	26	ND	3.2	32	163	470	ND	7.2
	04N22W11P02S	9/10/2020	ND	210	38	ND	23	ND	511	0.2	40	1	12	120	8.3	37	36.8	310	ND	6.8
	04N22W12M03S	9/10/2020	0.1	230	59	ND	32	ND	719	0.4	ND	1	19	ND	20	43	101	460	ND	6.7
Ventura River – Lower	02N23W05F01S	12/22/2020	0.7	530	45	ND	65	ND	1280	0.2	50	6	19	20	ND	189	136	760	ND	7.8
	02N23W05K01S	9/1/2020	0.7	380	121	ND	106	ND	1600	0.6	30	7	42	150	ND	145	324	1000	ND	7.2
	03N23W32Q10S	12/22/2020	1.3	470	144	ND	376	ND	2780	0.5	ND	8	55	140	0.5	374	425	1710	ND	7
Ventura River – Upper	04N23W09G03S	9/10/2020	0.4	400	134	ND	82	ND	1300	0.3	ND	2	37	ND	41.8	57	192	830	ND	6.9
	04N23W15A02S	9/16/2020	0.3	190	41	ND	86	ND	879	0.8	40	1	12	100	14.6	101	115	530	50	7.4
	04N23W20K01S	9/10/2020	0.7	270	133	ND	32	ND	1080	0.4	ND	3	30	ND	5.8	55	284	750	30	7.1
	04N23W33M02S (Outside Basin)	9/1/2020	0.4	380	184	ND	124	10	1730	0.4	ND	3	52	ND	ND	95	393	1240	ND	7.3
Gillibrand/Tapo	03N18W24C07S	10/8/2020	0.1	290	172	ND	28	ND	1210	0.2	ND	3	37	ND	10.3	46	319	860	ND	7
	03N18W24H07S	10/8/2020	0.2	350	189	ND	31	ND	1320	0.3	ND	3	40	110	2.5	53	336	930	ND	7

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

GW Basin/Subbasin	SWN	Date	Al	Sb	As	Ba	Be	Cd	Cr	Pb	Hg	Ni	Se	Ag	Tl	V
Arroyo Santa Rosa Valley	02N19W20M04S	11/12/2020	ND	ND	3	29.8	ND	ND	13	ND	ND	ND	4	ND	ND	30
	02N20W23R01S	10/9/2020	ND	ND	6	39.1	ND	ND	15	ND	ND	8	7	ND	ND	56
	02N20W25C02S	11/12/2020	ND	ND	4	22.9	ND	ND	8	ND	ND	10	3	ND	ND	65
Conejo	01N19W09N01S	12/17/2020	ND	ND	ND	21	ND	ND	9	ND	ND	ND	1	ND	ND	2
Cuyama Valley	07N23W15P01S	12/30/2020	ND	ND	ND	10.4	ND	ND	3	ND	ND	ND	3	ND	ND	ND
Fillmore	04N20W31H04S	9/3/2020	ND	ND	ND	28.1	ND	ND	5	ND	ND	1	2	ND	ND	ND
Hidden Valley	01N19W19H03S	12/17/2020	ND	2	8	11.7	ND	ND	9	ND	ND	2	ND	ND	0.2	2
Las Posas Valley – East Las Posas Management Area	02N20W03H01S	10/30/2020	ND	ND	3	49.7	ND	ND	4	ND	ND	ND	6	ND	ND	10
	03N19W29K06S	10/8/2020	ND	ND	2	184	ND	ND	6	ND	ND	ND	5	ND	ND	20
	03N19W30E06S	10/8/2020	ND	ND	1	63	ND	ND	5	ND	ND	ND	ND	ND	ND	3
Las Posas Valley – West Las Posas Management Area	02N20W06J01S	10/30/2020	ND	ND	ND	42.1	ND	ND	2	ND	ND	ND	ND	ND	ND	ND
	02N20W17L01S	10/1/2020	ND	ND	1	41.4	ND	ND	12	ND	ND	3	6	ND	ND	3
	02N21W09N01S	10/21/2020	ND	ND	3	46.4	ND	ND	8	ND	ND	ND	4	ND	ND	3
	02N21W11A02S	10/7/2020	ND	ND	3	39.2	ND	ND	16	ND	ND	2	277	ND	ND	8
	02N21W11A03S	10/7/2020	ND	ND	ND	41.5	ND	ND	13	ND	ND	ND	2	ND	ND	4
	02N21W17F05S	10/7/2020	ND	ND	2	31.3	ND	ND	13	ND	ND	1	13	ND	ND	4
	02N21W18H01S	10/21/2020	ND	ND	3	38	ND	ND	8	ND	ND	2	176	ND	ND	4
	02N21W20A02S	11/10/2020	ND	ND	ND	26.8	ND	ND	3	ND	ND	ND	1	ND	ND	ND
Lockwood Valley	08N21W33R03S	12/30/2020	ND	ND	ND	0.3	ND	ND	4	ND	ND	ND	5	ND	ND	3
Mound	02N22W10N04S	9/2/2020	ND	ND	1	16.4	ND	ND	7	ND	ND	ND	24	ND	ND	4
	02N23W13F02S	9/2/2020	ND	ND	10	21.4	ND	ND	9	ND	ND	ND	3	ND	ND	2
Ojai Valley	04N22W04Q01S	11/20/2020	ND	ND	ND	33.3	ND	ND	3	ND	ND	ND	1	ND	ND	ND
	04N22W06J09S	11/20/2020	ND	ND	ND	57.1	ND	ND	3	ND	ND	ND	2	ND	ND	ND
Oxnard – Forebay Management Area	02N21W07P04S	10/19/2020	ND	ND	ND	26.8	ND	ND	7	ND	ND	2	2	ND	ND	ND
Oxnard	01N21W04D04S	12/2/2020	ND	ND	1	76.4	ND	ND	5	ND	ND	ND	2	ND	ND	ND
	01N21W20K03S	11/5/2020	ND	ND	ND	56.7	ND	ND	6	ND	ND	ND	ND	ND	ND	ND
	01N21W22C01S	12/2/2020	ND	ND	1	44.9	ND	ND	4	ND	ND	ND	2	ND	ND	ND
	01N21W28H03S	11/5/2020	ND	ND	2	99.7	ND	ND	8	ND	ND	ND	2	ND	ND	2
	01N21W29K02S	10/1/2020	ND	ND	3	21.1	ND	ND	12	ND	ND	1	2	ND	ND	
	01N22W03F05S	9/9/2020	ND	ND	1	20.5	ND	ND	5	ND	ND	3	13	ND	ND	3
	01N22W03F07S	9/9/2020	ND	ND	2	50.4	ND	ND	6	ND	ND	4	17	ND	ND	4
	01N22W12M01S	12/2/2020	ND	ND	2	31.6	ND	ND	4	ND	ND	ND	3	ND	ND	2
	01N22W24B04S	11/5/2020	ND	ND	ND	40.3	ND	ND	7	ND	ND	ND	ND	ND	ND	ND
	01N22W24C03S	9/25/2020	ND	ND	ND	25.9	ND	ND	10	ND	ND	ND	1	ND	ND	3
	01N22W25K01S	10/1/2020	ND	ND	2	25.4	ND	ND	12	ND	ND	6	20	ND	ND	4
	01N22W26M03S	9/25/2020	ND	ND	ND	39.5	ND	ND	11	ND	ND	ND	2	ND	ND	3

Table D-2 Metals(cont.)

GW Basin/Subbasin	SWN	Date	Al	Sb	As	Ba	Be	Cd	Cr	Pb	Hg	Ni	Se	Ag	Tl	V
Oxnard	02N22W30F03S	11/20/2020	ND	ND	1	17	ND	ND	3	ND	ND	ND	1	ND	ND	ND
	02N23W25M01S	11/5/2020	ND	ND	ND	24.2	ND	ND	7	ND	ND	ND	2	ND	ND	3
Piru	04N19W25M03S	8/27/2020	ND	ND	ND	21.7	ND	0.6	5	ND	ND	5	62	ND	ND	4
Pleasant Valley	01N21W02J01S	11/19/2020	ND	ND	4	23.7	ND	ND	10	ND	ND	ND	36	ND	ND	11
	01N21W04R02S	11/23/2020	ND	ND	1	25.5	ND	ND	4	ND	ND	ND	7	ND	ND	5
	01N21W12D01S	9/25/2020	ND	ND	2	49.3	ND	ND	16	ND	ND	2	9	ND	ND	4
	02N20W19F04S	10/9/2020	ND	ND	1	37.8	ND	ND	9	ND	ND	6	3	ND	ND	3
	02N20W29B02S	11/12/2020	ND	ND	6	54.2	ND	ND	7	ND	ND	ND	3	ND	ND	15
	02N21W34C01S	10/9/2020	ND	ND	1	54.3	ND	ND	9	ND	ND	ND	2	ND	ND	2
	02N21W34G01S	12/2/2020	ND	ND	ND	36.4	ND	ND	6	ND	ND	ND	4	ND	ND	ND
Santa Paula	03N21W09K04S	9/9/2020	ND	ND	5	25	ND	ND	5	ND	ND	2	2	ND	ND	ND
	03N21W21E11S	9/3/2020	ND	ND	ND	30.2	ND	0.6	5	ND	ND	7	2	ND	ND	ND
	03N21W30F01S	8/31/2020	ND	ND	ND	23.1	ND	ND	45	ND	ND	3	13	ND	ND	13
Simi Valley	02N18W09E01S	10/8/2020	ND	ND	2	13.9	ND	ND	11	ND	ND	2	39	ND	ND	6
Tierra Rejada	02N19W14Q02S	10/27/2020	ND	ND	2	4.7	ND	ND	4	ND	ND	ND	ND	ND	ND	7
Upper Ojai Valley	04N22W10K05S	9/1/2020	ND	ND	1	114	ND	ND	3	ND	ND	2	3	ND	ND	ND
Ventura River – Lower Subbasin	02N23W05F01S	12/22/2020	ND	ND	1	226	ND	ND	13	ND	ND	ND	ND	ND	ND	3
	03N23W32Q10S	12/22/2020	ND	ND	4	30.4	ND	ND	12	ND	ND	2	10	ND	ND	4
Ventura River- Upper Subbasin	04N23W15A02S	9/16/2020	ND	ND	ND	46.8	ND	ND	ND	ND	ND	ND	2	ND	ND	ND
	04N23W20K01S	9/10/2020	ND	ND	ND	29.8	ND	ND	ND	ND	ND	3	2	ND	ND	ND
Gillibrand/Tapo	03N18W24H07S	10/8/2020	ND	ND	ND	49.8	ND	ND	11	ND	ND	2	14	ND	ND	3

Table D-3 Radiochemistry

GW Basin	SWN	Date	Alpha pCi/L	CE	Uranium pCi/L	CE
Cuyama Valley	07N23W15P01S	12/30/2020	3.31	1.67		
Lockwood Valley	08N21W33R03S	12/30/2020	3.24	1.41		

* CE – Counting Error

Appendix E – Piper Diagrams

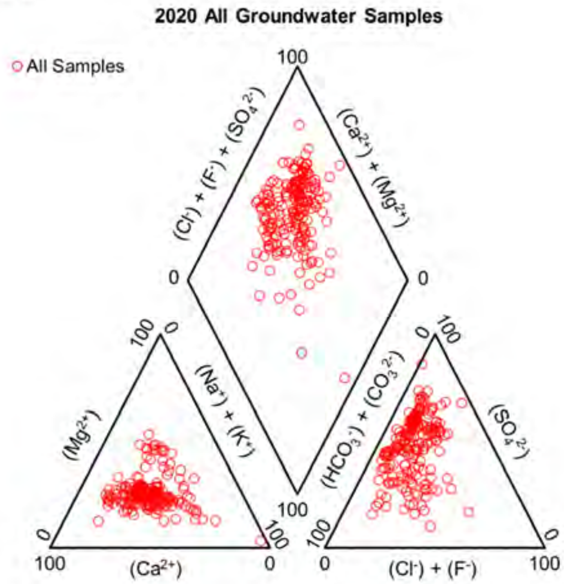

Figure E-1: Piper diagram for All Samples.

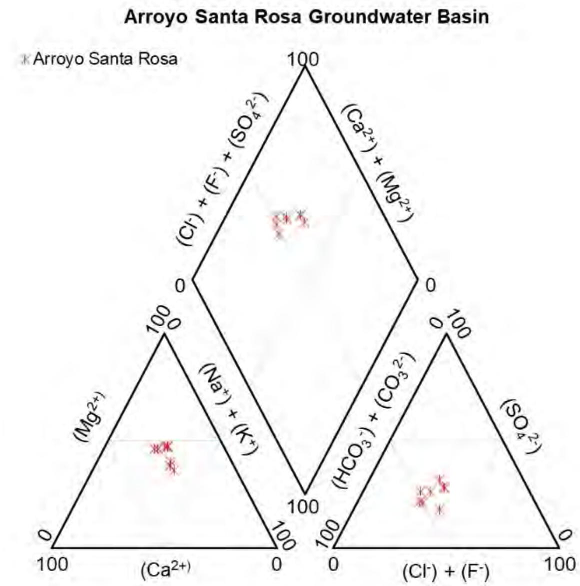

Figure E-2: Arroyo Santa Rosa Basin Piper diagram.

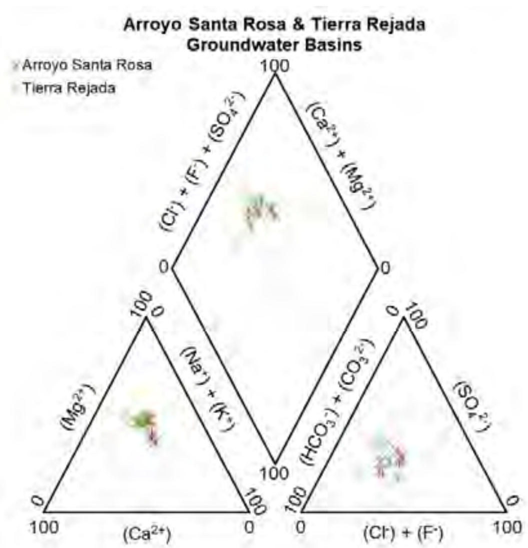

Figure E-3: Arroyo Santa Rosa & Tierra Rejada basins Piper diagram.

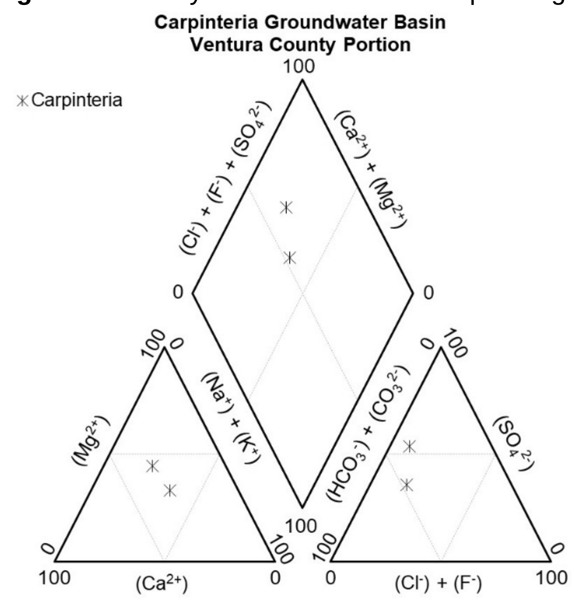

Figure E-4: Carpinteria Basin Piper diagram.

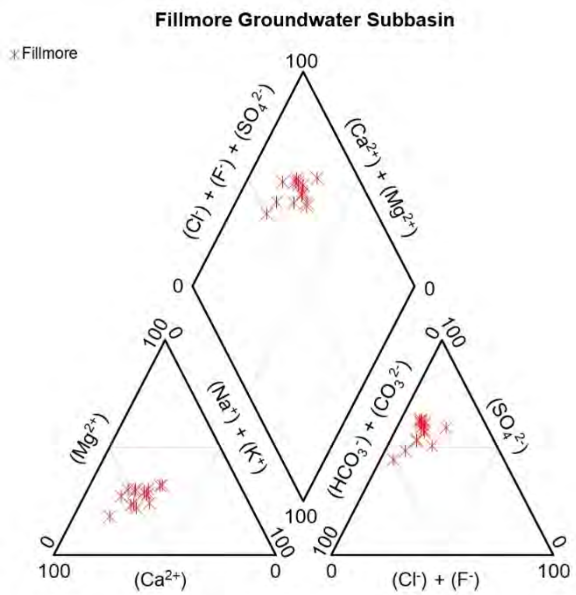

Figure E-5: Fillmore Subbasin Piper diagram.

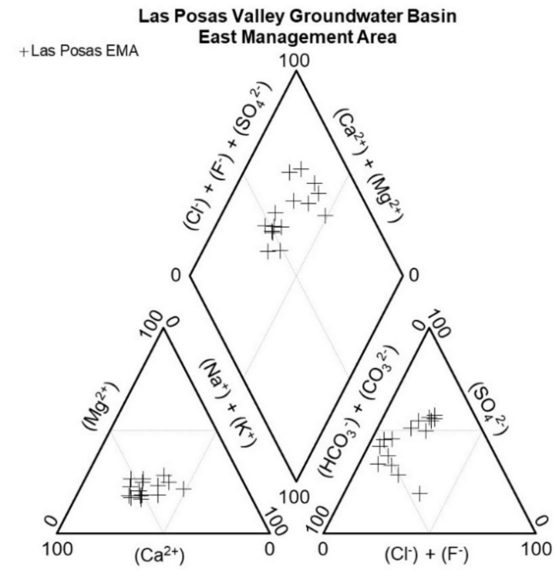

Figure E-6: Las Posas Valley EMA Piper diagram.

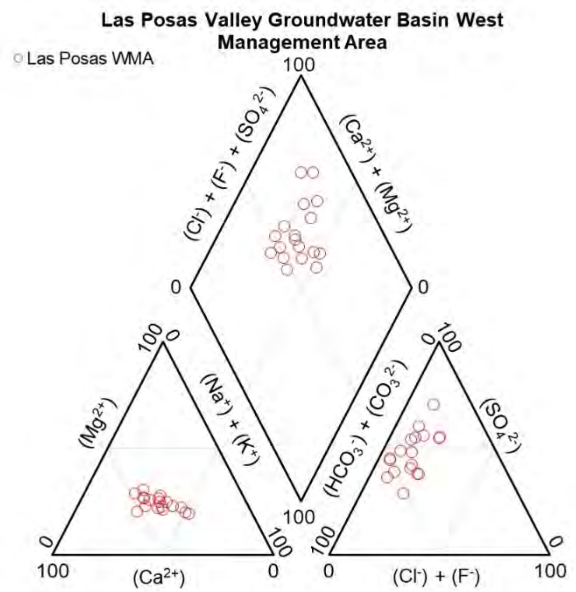

Figure E-7: Las Posas Valley WMA Piper diagram.

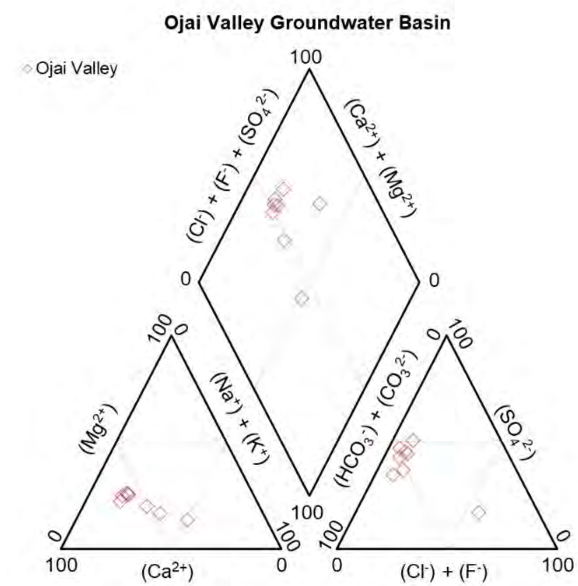

Figure E-8: Ojai Valley Basin Piper diagram.

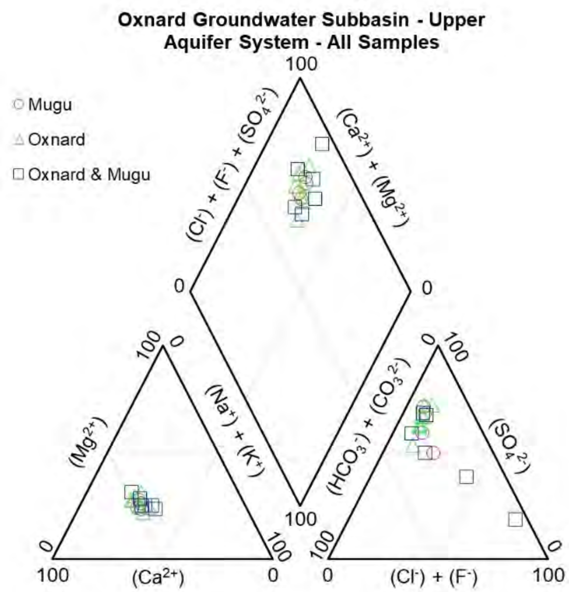

Figure E-9: All Upper Aquifer System Piper diagram.

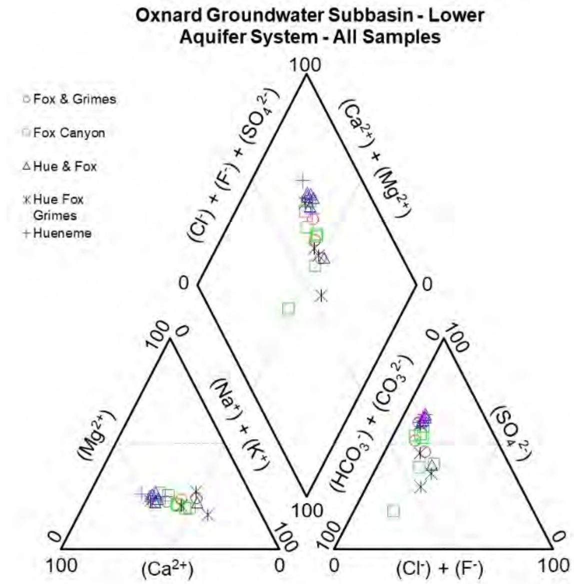

Figure E-10: All Lower Aquifer System Piper diagram.

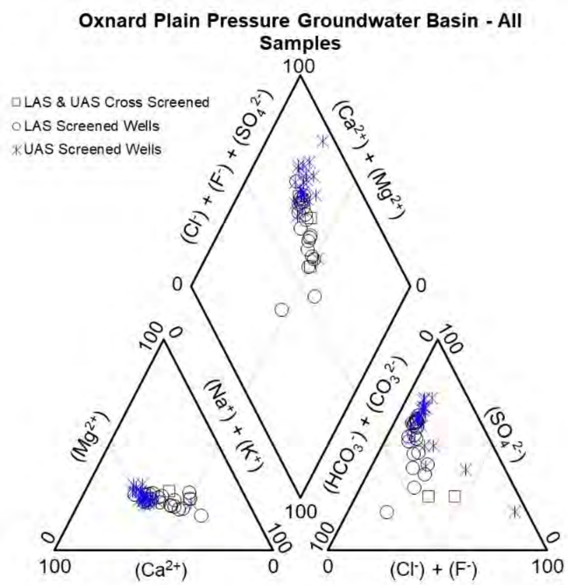

Figure E-11: Oxnard Subbasin Piper diagram All Samples.

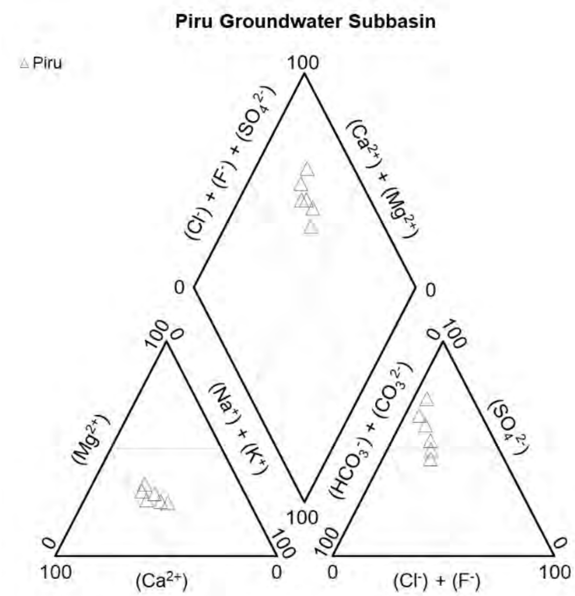

Figure E-12: Piru Subbasin Piper diagram.

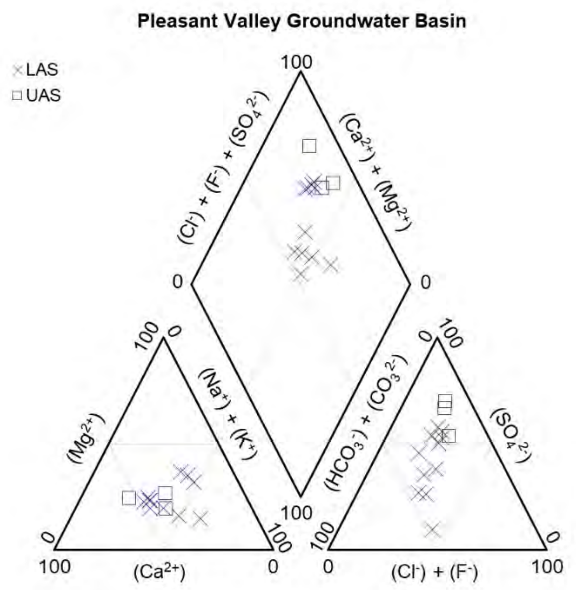

Figure E-13: Pleasant Valley Basin Piper diagram.

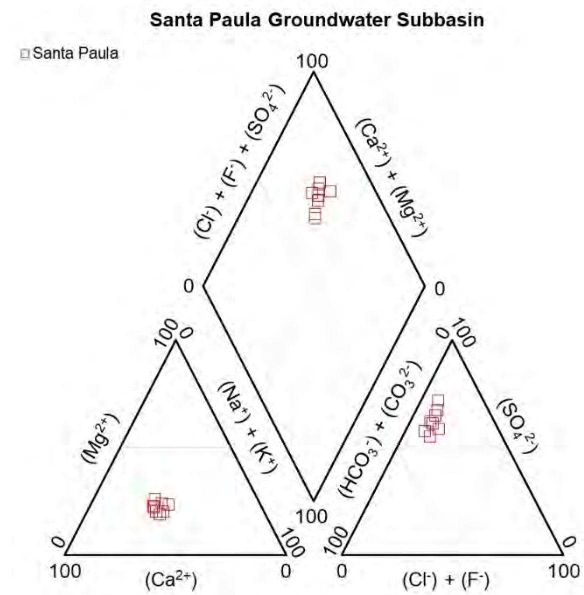

Figure E-14: Santa Paula Subbasin Piper diagram.

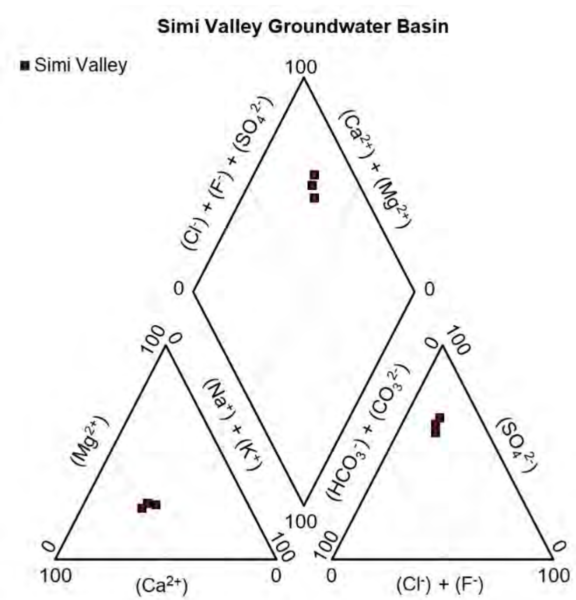

Figure E-15: Simi Valley Basin Piper diagram.

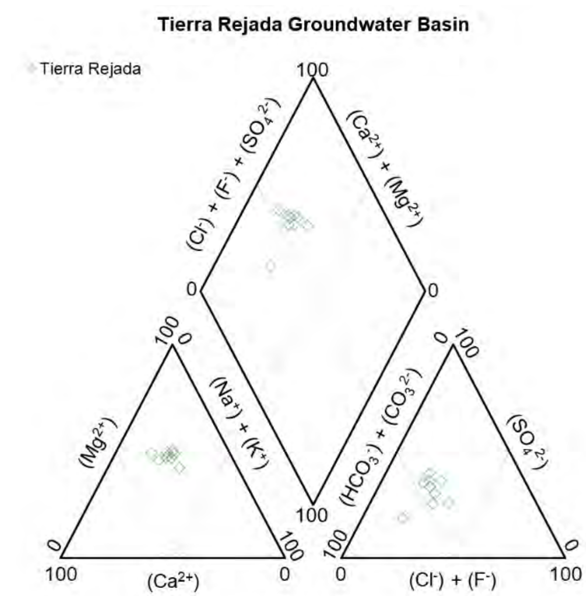

Figure E-16 Tierra Rejada Valley Basin Piper diagram.

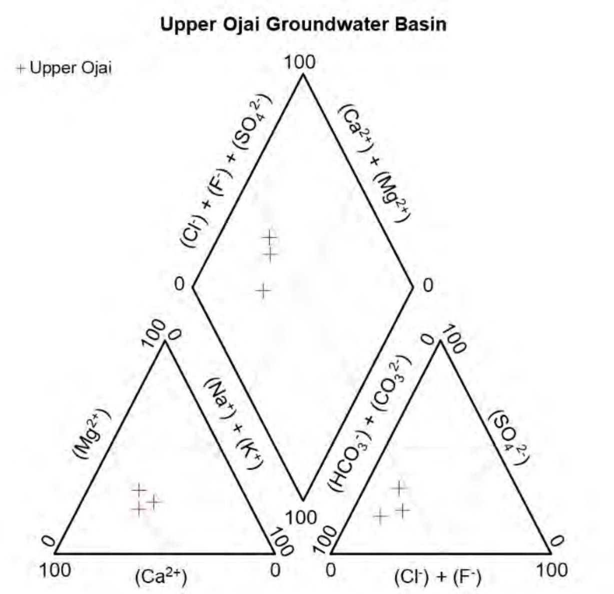

Figure E-17: Upper Ojai Basin Piper diagram.

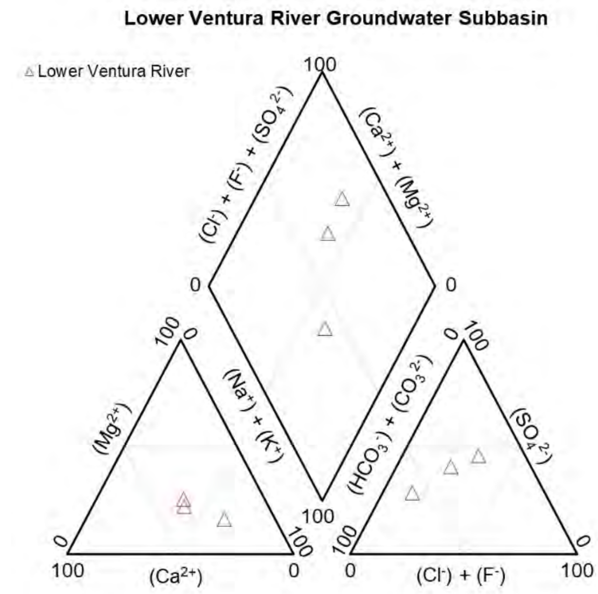

Figure E-18: Ventura River - Lower Subbasin Piper diagram.

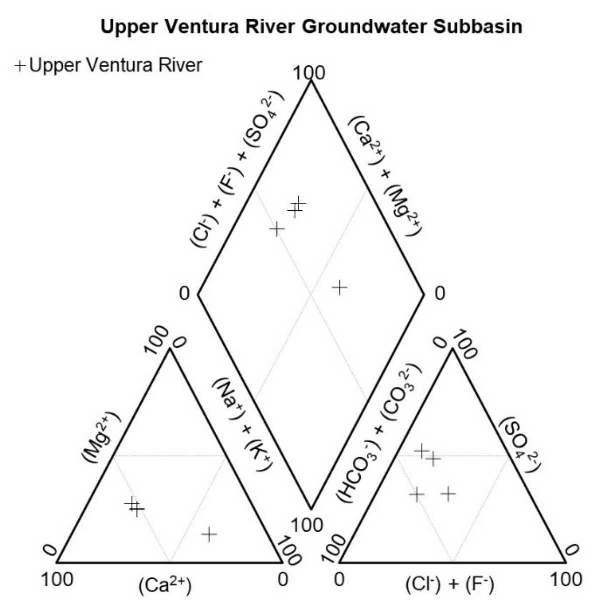

Figure E-19: Ventura River – Upper Subbasin Piper diagram.

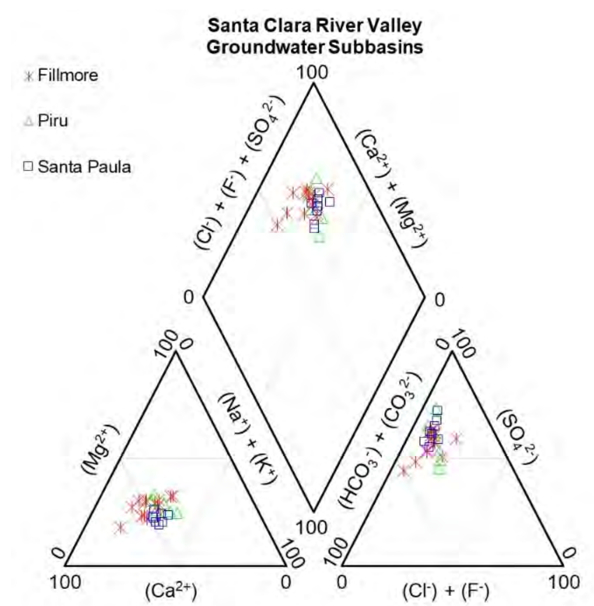

Figure E-20: Fillmore, Piru & Santa Paula subbasins Piper diagram.

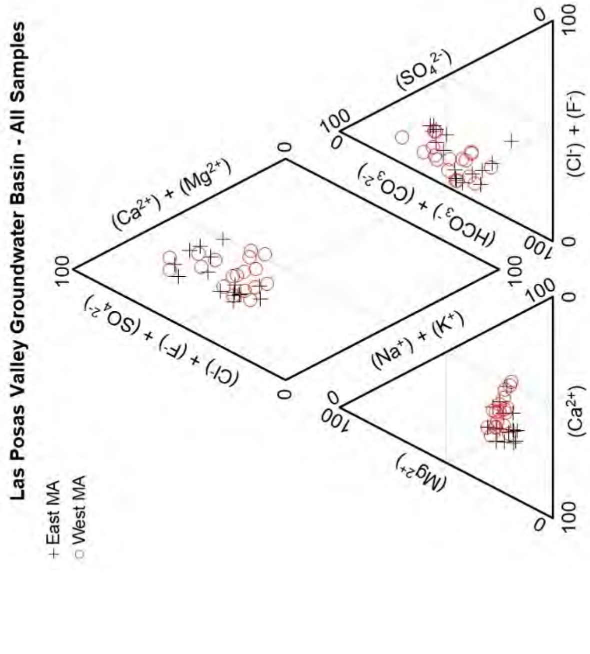

Figure E-21: Las Posas Valley Basin Piper Diagram.

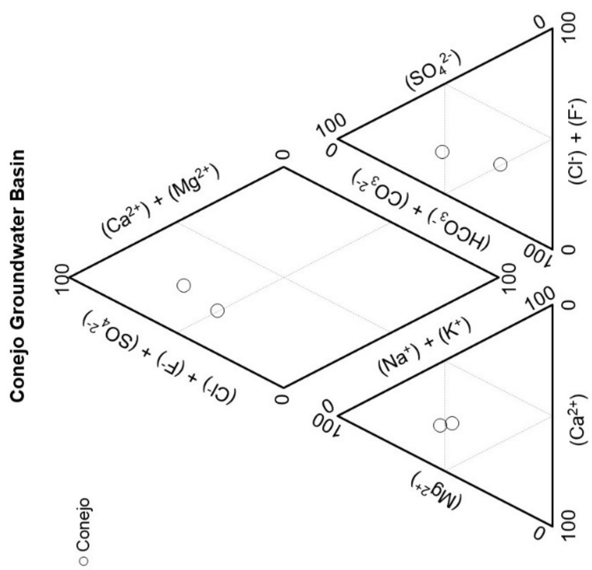

Figure E-22: Conejo Basin Piper Diagram.

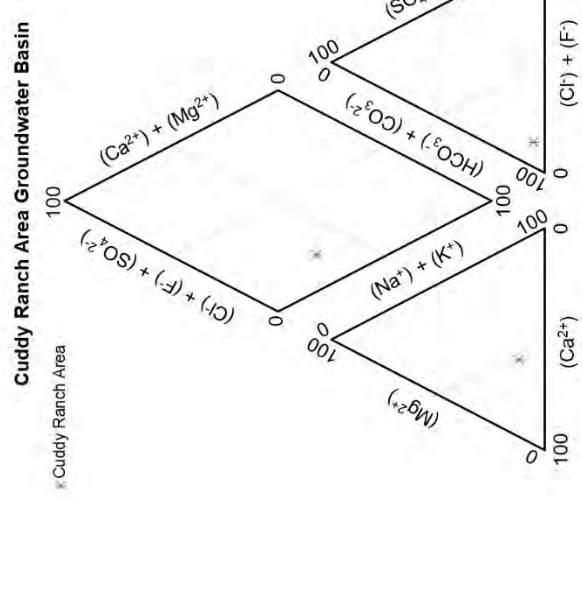

Figure E-23: Cuddy Ranch Area Basin Piper Diagram.

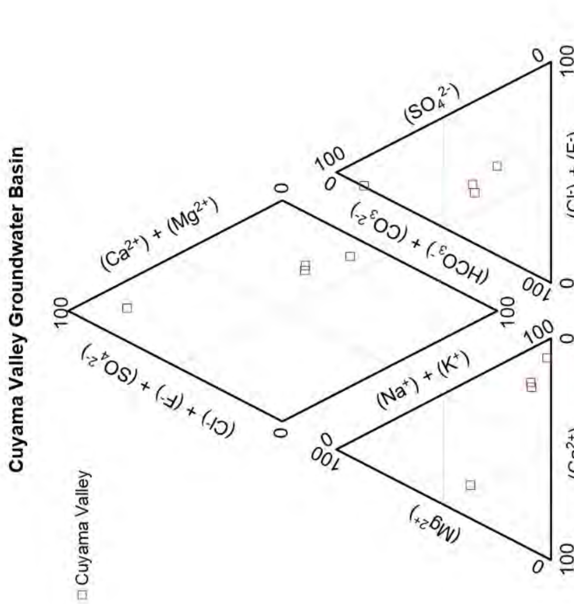

Figure E-24: Cuyama Valley Basin Piper Diagram.

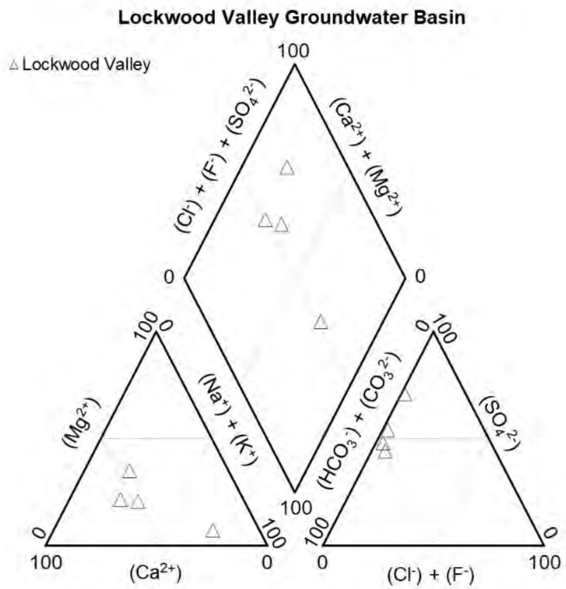

Figure E-25: Lockwood Valley Basin Piper Diagram.

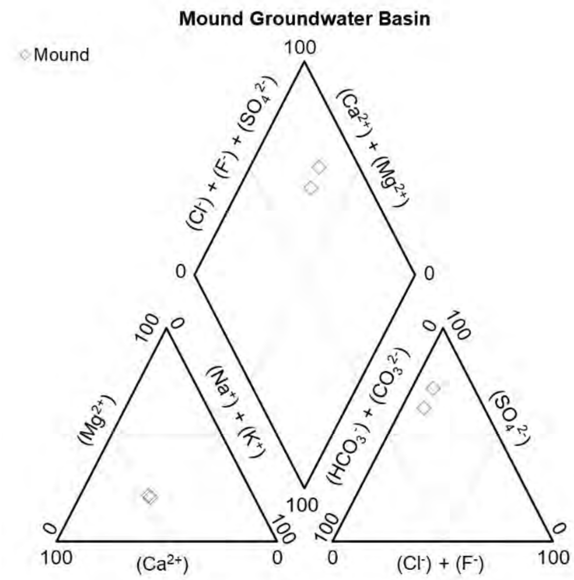

Figure E-26: Mound Subbasin Piper Diagram.

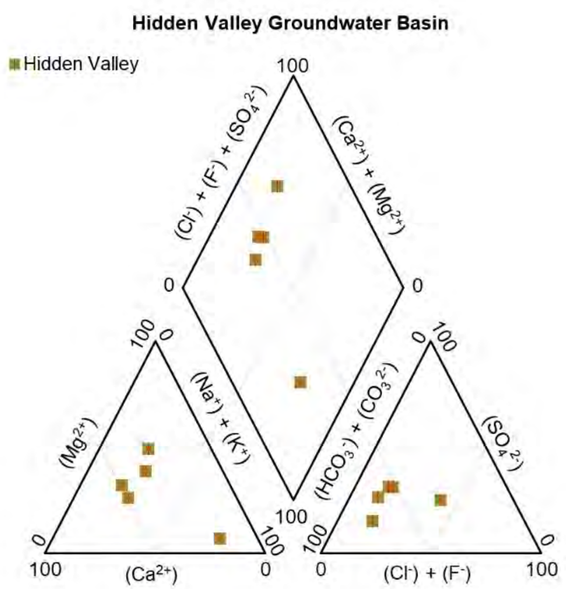

Figure E-27: Hidden Valley Basin Piper Diagram.

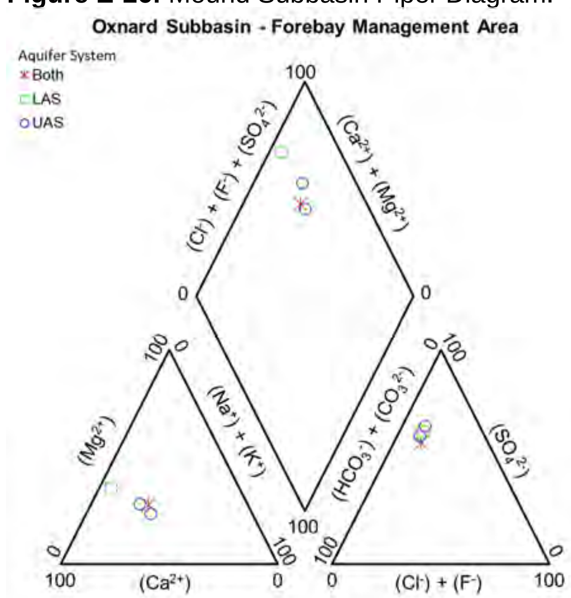

Figure E-28: Oxnard Subbasin Forebay Management Area.

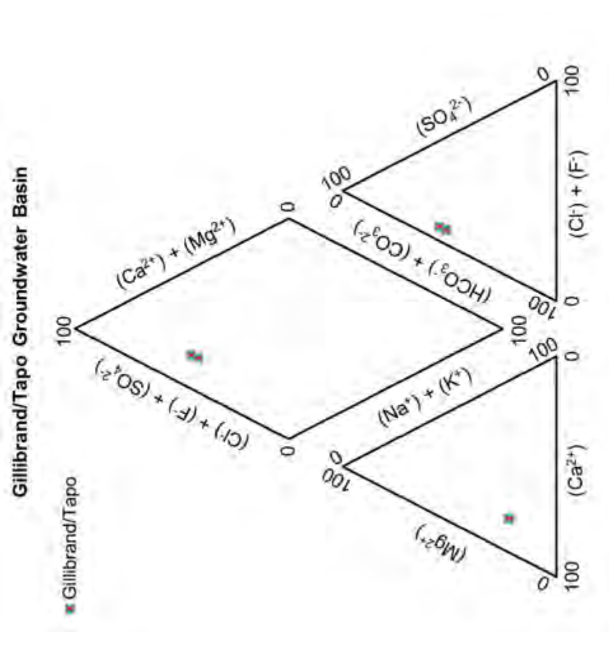

Figure E-29: Gillibrand/Tapo Basin Piper Diagram.

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 2020. 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 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 July 2021)

Number of Wells: 84

Active: 37
Destroyed: 32
Abandoned: 6
Can't Locate: 9

2020 Self Reported Groundwater Extraction to FCGMA (as of August 19, 2021) (West part of basin only)

Agricultural Extractions - 1,539 AF/Yr
Municipal, Industrial and Domestic - 0 AF/Yr

Water Demand Estimate (Whole basin)

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

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 02N20W26B03S - December level was up 1.03 feet from the March measurement..

In general, for 4 wells measured in 2020 in the basin, water levels declined in 3 wells and rose in 1 well over the course of the year from the 1st quarter reading to the last quarter reading.

2020 Groundwater Quality in General for All Wells Sampled by County

(9 wells)
Two water samples are magnesium bicarbonate type and the remainder are magnesium chloride type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 5 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?	No

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 02N20W26B03S: ↓

In general for 4 wells consistently measured: (5 wells) ↓

5 Year Groundwater Quality Trend 2016-2020

SWN	Nitrate	Chloride	TDS	Sulfate
02N19W19P02S	↓	→	↓	→
02N20W23G03S	→	↓	↓	↑
02N19W20L01S	↓	↓	↓	↑

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 ↓

Cuyama Valley Basin

Groundwater Basin Surface Area:	16,560 acres
Irrigated Acreage:	≈1,410 (estimate determined from Ventura County Ag Commissioner's data)
Watershed:	Cuyama River
Aquifers:	Unconfined Aquifer
DWR Groundwater Basin Designation and Size:	Cuyama Valley (3-13) Surface area 242,114 Acres. (DWR, 2014)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	1,259 (2010)

Known Water Supply Wells (as of July 2021)

Number of Wells: 140
Active: 102
Destroyed: 6
Abandoned: 8
Non-Complaiant: 6
Can't Locate: 18

Water Demand Estimate

Irrigation Demand @ 2 AF/Ac: 2,820 AF/Yr

Municipal Demand @ 0.5 AF/person/Yr: 618 AF/Yr
Total Demand Estimate: 3,438 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

Note: Wells are measured twice per year in the Cuyama Valley basin.

"Key" well 07N23W16R01S - Well was dry at the fall measurement.

Both spring and fall measurements were obtained on 3 wells in the basin in 2020. The water level decreased in all 3 wells from the spring measurement to the fall measurement.

2020 Groundwater Quality in General for All Wells Sampled by County

(1 well)

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.

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

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 07N23W16R01S: ↑

In general for 4 wells consistently measured: 1 well ↓ 3 wells ↑

5 Year Groundwater Quality Trend 2016-2020

SWN	Nitrate	Chloride	TDS	Sulfate
07N23W15P01S	↓	→	↑	↓

Well is in the southern portion of the basin.

Sources of Groundwater Recharge

Basin Recharge: Infiltration of precipitation. Seepage from the Cuyama River. (DWR, 2006)

Potable Water Sources

Groundwater from Cuyama Valley groundwater basin.

Subsurface Hydrologic Connection to Other Groundwater Basins

Within Ventura County: None

DWR CASGEM Groundwater Basin Prioritization Level - Medium

Impact Comments:Local salinity and TDS impairments in basin (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 July 2021)

Number of Wells: 611
Active: 447
Destroyed: 78
Abandoned: 29
Can't Locate: 51
Non-Compliant: 6

2020 Self Reported Groundwater Extraction to UWCD (as of July 19, 2021)

Agricultural Extractions: 40,210 AF/Yr

Municipal Extractions: 2,486 AF/Yr

Total Extractions: 42,696 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 03N20W05D01S - December level was down 14.85 feet from the March measurement.

In general, for six wells consistently measured in the basin in 2020, water levels declined in all 6 wells over the course of the year from the 1st quarter reading to the last quarter.

2020 Groundwater Quality in General for All Wells Sampled by County

(13 wells)

Two water samples are calcium bicarbonate type and the remaining eleven samples are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 1 wells
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 13 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 12 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 03N20W05D01S: ↑

The 5 year trend based on 2016 through 2020 groundwater level elevations is upward.

5 Year Groundwater Quality Trend 2016-2020

(*sampled by UWCD)

SWN	Nitrate	Chloride	TDS	Sulfate
04N20W36P04S	↑	↑	↑	↑
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 July 2021)

Number of Wells: 402
Active: 164
Destroyed: 143
Abandoned: 37
Can't Locate: 54
Exempt: 1
Non-Compliant: 3

2020 Self Reported Groundwater Extraction to FCGMA (as of July 30, 2021)

Agricultural Extractions: 21,414 AF/Yr

Municipal, Industrial, and Domestic Extractions: 2,029 AF/Yr

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

Total: 23,443 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 03N20W26R03S - Not measured in 1st quarter. December level was down 7 feet from the June measurement.

In general, for 6 wells measured for the 1st and 4th quarters in 2020 in the basin, water levels declined in all 6 wells over the course of the year.

2020 Groundwater Quality in General for All Wells Sampled by County

(21 wells)

The water in 10 wells is calcium bicarbonate type, calcium sulfate type in 7 wells, sodium bicarbonate type in 1 well, and sodium sulfate type in 3 wells.

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, 10 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 9 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 03N20W26R03S: ↑ (green)

The 5 year trend based on 2016 through 2020 groundwater level elevation maps varies.

Of the 12 measured wells in the basin 6 show a downward trend and 6 of the wells show a rising trend.

5 Year Groundwater Quality Trend 2016-2020

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 → (grey) Level trending up ↑ (red) Level Trending down ↓ (green)

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 July 2021)

Number of Wells: 164
Active: 89
Destroyed: 60
Abandoned: 9
Can't Locate: 5
Non-Compliant: 1

2020 Self Reported Groundwater Extraction to FCGMA (as of July 30, 2021)

Agricultural Extractions: 12,521 AF/Yr

Municipal, Industrial, and Domestic Extractions: 2,350AF/Yr

Values are approximate based on FCGMA West Las Posas basin.

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 02N21W11J04S - Level was down 9 feet in December from the March measurement.

In general, for 12 wells consistently measured in 2020 in the basin, water levels declined in 11 wells and rose in 1 well over the course of the year from the 1st quarter reading to the last quarter reading.

2020 Groundwater Quality in General for All Wells Sampled by County

(24 wells)

The water in nine wells is calcium bicarbonate type, three are sodium bicarbonate type, four are sodium sulfate type, and eight are calcium sulfate type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 4 wells
Secondary MCL Exceedances for Chloride >250mg/L?	No
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 21 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 11 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 02N21W11J04S: ↓

For 17 wells measured, the 5 year trend based on 2016 through 2020 groundwater level elevationis is mixed with 10 wells declining and 7 wells showing an increasing water level elevation trend.

5 Year Groundwater Quality Trend 2016-2020

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 July 2021)	**2020 Self Reported Groundwater Extraction to UWCD (as of July 19, 2021)**
Number of Wells: 86 Active: 32 Destroyed: 41 Abandoned: 5 Can't Locate: 7 Non-Compliant: 1	Agricultural Extractions: 2,976 AF/Yr Municipal & Industrial Extractions: 2,502 AF/Yr Total Extractions: 5,478 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 02N22W07M02S (measured by UWCD) - November level was up 0.82 feet from the January measurement.

In general, for 1 well consistently measured in the basin in 2020, water level declined from the 1st quarter reading to the last quarter reading.

2020 Groundwater Quality in General for All Wells Sampled by County

(4 wells)

Three samples are calcium sulfate type and one sample is sodium 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, 4 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 02N22W07M02S: ↓

The 5 year trend for wells measured by VCWPD based on 2016 through 2020 groundwater level elevations is mixed with one well rising and 2 wells declining.

5 Year Groundwater Quality Trend 2016-2020

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

SWN	Nitrate	Chloride	TDS	Sulfate
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:	6,851 Acres (DWR, 2014)
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:	Ojai Valley Basin (4-2)
SGMA Basin Priority:	High
DWR Groundwater Basin Population:	7,745 (2010)

Known Water Supply Wells (as of July 2021)	2020 Self Reported Groundwater Extractions to OBGMA (as of May 13, 2021)	Water Demand Estimate
Number of Wells: 325 Active: 189 Destroyed: 76 Abandoned: 11 Can't Locate: 48 Non Compliant: 1	Extractions: 4,638 Af/Yr	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

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 04N22W05L08S: - The December reading was down 48.7 feet from the March level.

In general, for 17 wells consistently measured in 2020 in the basin, water levels declined in 14 wells and rose in 3 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2020 Groundwater Quality in General for All Wells Sampled by County

(14 wells)

The water in seven wells are calcium bicarbonate type, five wells are calcium sulfate type, one well is sodium bicarbonate type, and one is calcium chloride type.

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 1 well
Secondary MCL Exceedances for Chloride >250mg/L?	Yes, 1 well
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 14 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 2 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 04N22W05L08S: ↑

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

5 Year Groundwater Quality Trend 2016-2020

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 ↓

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 July 2021)

Number of Wells: 1,182
Active: 461
Destroyed: 541
Abandoned: 77
Exempted: 1
Can't Locate: 98
Non-Compliant: 4

2020 Self Reported Groundwater Extraction to FCGMA (as of August 19, 2021)

Agricultural Extractions: 27,739 AF/Yr

Municipal, Industrial, and Domestic Extractions: 19,936 AF/Yr

Total: 47,675 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

UAS "Key" well 01N21W07H01S - December level was down 3.75 feet from the March measurement.

LAS "Key" well 01N21W32K01S - December level was down 18.3 feet from the January measurement.

In general, for 23 wells consistently measured in 2020 in the basin, water levels declined in 21 wells and rose in 2 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2020 Groundwater Quality in General for All Wells Sampled by County

(53 wells)

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

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 4 wells
Secondary MCL Exceedances for Chloride >250mg/L	Yes, 1 wells
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 52 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 45 wells

5 Year Groundwater Level Trend 2016 - 2020

UAS "Key" well 01N21W07H01S: ↑

LAS "Key" well 01N21W32K01S: ↑

Upper System

The 5 year trend based on 2016 through 2020 groundwater level elevations is mostly upward with only one well trending downward.

Lower System

The 5 year trend based on 2016 through 2020 groundwater level elevations is upward.

5 Year Groundwater Quality Trend 2016-2020

Upper System

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

Lower System

SWN	Nitrate	Chloride	TDS	Sulfate
01N21W08R01S	→	↓	↓	↓
01N21W28D01S	→	↓	↓	↓
01N22W03F05S	↓	→	↓	→
01N22W24B04S	→	→	↑	↓
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 ↓

Oxnard Subbasin 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 July 2021)

Number of Wells: 281
Active: 100
Destroyed: 136
Abandoned: 16
Can't Locate: 28
Non-Compliant: 1

2020 Self Reported Groundwater Extraction to FCGMA (as of August 19, 2021)

Agricultural Extractions: 4,482 AF/Yr

Municipal, Industrial, and Domestic Extractions: 9,528 AF/Yr

Total: 14,010 AF/yr

2020 Groundwater Levels in General for Wells Gauged by County and UWCD

"Key" well 02N22W12R04S - (Oxnard Aquifer) - Note: Measurements from UWCD. Level decreased 16.6 feet from the January measurement to the December measurement.

2020 Groundwater Quality in General for All Wells Sampled by County

(4 wells)

All 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, 4 wells
Secondary MCL Excedances for Sulfate >250mg/l?	Yes, 4 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 02N22W12R04S: ↑

Upper System ↑

The 5 year trend based on 2016 through 2020 groundwater level elevations is upward.

Lower System ↑

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

5 Year Groundwater Quality Trend 2016-2020

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 ↓

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 July 2021)

Number of Wells: 347
Active: 85
Destroyed: 183
Abandoned: 28
Can't Locate: 46
Non-Compliant: 5

2020 Self Reported Groundwater Extraction to FCGMA (as of August 19, 2021)

Agricultural Extractions: 4,553 AF/Yr

Municipal, Industrial, and Domestic Extractions: 3,799 AF/Yr

Total: 8,352 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 01N21W03C01S - December level was down 12.1 feet from the January measurement.

In general, for 10 wells consistently measured in 2020 in the basin, water levels declined in 9 wells and rose in one well over the course of the year from the 1st quarter reading to the last quarter reading.

2020 Groundwater Quality in General for All Wells Sampled by County

(20 wells)

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

Primary MCL Exceedances for Nitrate >45mg/L?	Yes, 5 wells
Secondary MCL Exceedances for Chloride >250mg/L?	Yes, 3 wells
Secondary MCL Exceedances for TDS >500mg/L?	Yes, 20 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 15 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 01N21W03C01S: ↑

Upper System

The 5 year trend is up with 4 wells increasing.

Lower System

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

5 Year Groundwater Quality Trend 2016-2020

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 ↓

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 July 2021)	**2020 Self Reported Groundwater Extraction to UWCD (as of July 19, 2021)**
Number of Wells: 190 Active: 149 Destroyed: 23 Abandoned: 4 Can't Locate: 12 Non-Compliant: 2	Agricultural Extractions: 11,636 AF/Yr Municipal Extractions: 492 AF/Yr Total Extractions: 12,128 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 04N19W25C02S - December level was up 3.9 feet from the March measurement.

In general, for 3 wells consistently measured in 2020 in the basin, water levels rose in all 3 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2020 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, 5 wells

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 04N19W25C02S: ↑

The 5 year trend based on 2016 through 2020 groundwater level elevations is mixed with 6 wells showing an upward trend and 1 well showing a downward trend.

5 Year Groundwater Quality Trend 2016-2020

(* 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 ↓

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 July 2021)

Number of Wells: 294
Active: 153
Destroyed: 81
Abandoned: 10
Exempted: 1
Can't Locate: 49

2020 Self Reported Groundwater Extraction to UWCD (as of July 19, 2021)

Agricultural Extractions: 14,199 AF/Yr

Municipal & Industrial Extractions: 7,084 AF/Yr

Total Extractions: 21,283 AF/Yr

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 03N22W36K05S - December level was down 15.7 feet from the March measurement.

In general, for 5 wells measured in 2020 in the basin, water levels declined in 4 wells and rose in 1 well over the course of the year from the 1st quarter reading to the last quarter reading.

2020 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 2016 - 2020

"Key" well 02N22W02C01S: ↑

The 5 year trend based on 2016 through 2020 groundwater level elevations is mixed with most wells showing an upward trend.

5 Year Groundwater Quality Trend 2016-2020

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

Known Water Supply Wells (as of July 2021)

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

2020 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 2020 in the basin, water levels increased in one well and decreased in one well from the 1st quarter reading to the last quarter reading in one well and declined in the other.

2020 Groundwater Quality in General for All Wells Sampled by County

(6 wells)

All six water samples are magnesium bicarbonate 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, 6 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 1 well

5 Year Groundwater Level Trend 2016 - 2020

In general for 2 wells consistently measured: (2 wells) ↓

5 Year Groundwater Quality Trend 2016-2020

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

Known Water Supply Wells (as of July 2021)

Number of Wells: 202
Active: 117
Destroyed: 35
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

2020 Groundwater Levels in General for All Wells Gauged by County

"Key" well 04N23W16C04S - December level was down 8.3 feet from the March measurement.

In general, for wells measured in 2020 in the basin, water levels declined in 7 wells and rose in 3 wells over the course of the year from the 1st quarter reading to the last quarter reading.

2020 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, 3 wells
Secondary MCL Exceedances for Sulfate >250mg/L?	Yes, 1 well

5 Year Groundwater Level Trend 2016 - 2020

"Key" well 04N23W16C04S: ↑

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

5 Year Groundwater Quality Trend 2016-2020

(*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 ↓