Pleasant Valley Basin Groundwater Sustainability Plan 2023 Annual Report: Covering Water Year 2022

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Fox Canyon Groundwater Management Agency

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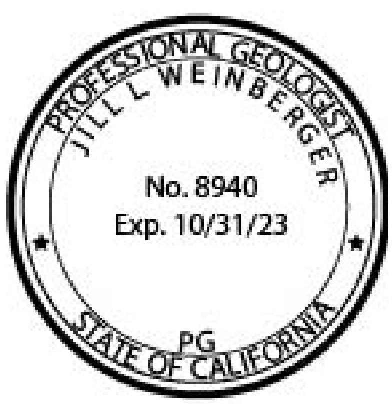

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Executive Summary

The Fox Canyon Groundwater Management Agency (FCGMA), the Groundwater Sustainability Agency (GSA) for the portions of the Pleasant Valley Basin (PVB) (4-006) within its jurisdictional boundaries, in coordination with the other two GSAs in the basin, has prepared this third annual report for the Pleasant Valley Basin Groundwater Sustainability Plan (GSP) in compliance with the 2014 Sustainable Groundwater Management Act (SGMA) (California Water Code, Section 10720 et seq.). This annual report covers the entire PVB. The GSP for the PVB was submitted to the Department of Water Resources (DWR) on January 13, 2020 and was approved by DWR on November 18, 2021. SGMA regulations require that an annual report be submitted to the DWR by April 1 of each year following the adoption of the GSP. The data presented in the PVB GSP ends in water year 2015. This annual report for the PVB provides an update on the groundwater conditions for water year 2022 (October 1, 2020 through September 30, 2021).

Water year 2022 was a below normal water year, in which precipitation was approximately 75% of the historical average precipitation within the PVB. In response to the lower-than-average precipitation received in the 2022 water year, groundwater elevations measured in spring 2022 were lower than spring 2021 in the majority of the representative monitoring points, or key wells, in the PVB. Since spring 2015, seasonal high groundwater elevations have decreased in both the Oxnard age equivalent unit of the Older alluvium and the in the Fox Canyon aquifer. In the Mugu age equivalent unit of the Older alluvium groundwater levels are higher than they were in 2015.

Groundwater in storage in the Older Alluvium decreased by approximately 2,000 acre-feet (AF) during the 2022 water year. Cumulatively, groundwater in storage in the Older Alluvium decreased by approximately 7,000 AF since spring 2015. In the Fox Canyon aquifer, groundwater in storage declined by approximately 100 AF during the 2022 water year. Cumulatively groundwater in storage in the Fox Canyon aquifer decreased by approximately 1,000 AF since 2015. The reduction in storage in both the Older Alluvium and Fox Canyon aquifer reflects the general decline in groundwater elevations across the PVB.

Implementation of the GSP has begun to fill data gaps identified in the GSP. Spatial data gaps were reduced as groundwater elevations from nested groundwater monitoring wells located in north PV, near the boundary between PVB and Las Posas Valley Basin (LPVB), and within the Pumping Depression Management Area in the Oxnard Subbasin were used to assess groundwater conditions at the northern and western boundaries of the PVB. The data gaps identified in the GSP will continue to be addressed as implementation of the GSP progresses.

FCGMA has undertaken several steps toward implementing the GSP. FCGMA is currently preparing the technical specifications for new dedicated monitoring wells that were funded as a component of DWR's Sustainable Groundwater Management Grant Program's SGMA Implementation Round 1 funding opportunity. Additionally, FCGMA is continuing to coordinate between partner agencies that submitted project components that were included in the funded grant. These projects were selected because of their capacity to improve the long-term sustainable use of groundwater resources in the PVB.

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1 Plan Area and Background

1.1 Background

FCGMA, the GSA for the portions of the PVB within its jurisdictional boundaries, in coordination with the other two GSAs in the basin, has prepared this annual report for the GSP in compliance with SGMA (California Water Code, Section 10720 et seq.). SGMA requires that an annual report be submitted to the Department of Water Resources (DWR) by April 1 of each year following the adoption of the GSP. FCGMA adopted a GSP for the PVB in December 2019 and submitted the GSP to DWR on January 13, 2020 (DWR 2020). DWR approved the GSP for the PVB on November 18, 2021. The 2023 annual report is the fourth annual report for the Subbasin since the GSP was submitted.

FCGMA is one of three Groundwater Sustainability Agencies (GSAs) in the PVB. The other two GSAs are the Camrosa Water District (CWD)–Pleasant Valley GSA and the Pleasant Valley Outlying Areas GSA (County of Ventura). This annual report applies to the entirety of the PVB. To coordinate management and reporting in the basin, FCGMA and CWD have executed a Memorandum of Understanding, and FCGMA and the County have formed a Joint Powers Authority.

1.1.1 Fox Canyon Groundwater Management Agency

FCGMA is an independent special district formed by the California Legislature in 1982 to manage and protect the aquifers within its jurisdiction for the common benefit of the public and all agricultural and M&I users (FCGMA et al. 2007). FCGMA's boundaries include all land overlying the Fox Canyon Aquifer (FCA) and includes portions of the following DWR Bulletin 118 groundwater basins: PVB (DWR Basin No. 4-006), Arroyo Santa Rosa Valley Basin (ASRVB, DWR Basin No. 4-007), Las Posas Valley Basin (DWR Basin No. LPVB, 4-008), and Santa Clara River Valley Basin - Oxnard Subbasin (DWR Basin No. 4-004.02).

FCGMA is governed by a Board of Directors (Board) with five members who represent: (1) the County of Ventura (County), (2) the United Water Conservation District (UWCD), (3) seven mutual water companies and water districts within the Agency[1], (4) five incorporated cities which are all or a portion of each is within the FCGMA jurisdictional area[2], and (5) a farmer representative. The Board members representing the County, UWCD, the mutual water companies and water districts, and the incorporated cities are appointed by their respective organizations or groups. The representative for the farmers is appointed by the other four seated Board members from a list of candidates jointly supplied by the Ventura County Farm Bureau and the Ventura County Agricultural Association. An alternate Board member is selected by each appointing agency or group in the same manner as the regular member and acts in place of the regular member in case of absence or inability to act. All members and alternates serve for a 2-

[1] The seven mutual water companies and water districts are: Alta Mutual Water Company, Pleasant Valley County Water District (PVCWD), Berylwood Mutual Water Company, Calleguas Municipal Water District (CMWD), CWD, Zone Mutual Water Company, and Del Norte Mutual Water Company.

[2] The five incorporated cities which are all or in part within the FCGMA jurisdictional area are: Ventura, Oxnard, Camarillo, Port Hueneme, and Moorpark

year term of office, or until the member or alternate is no longer an eligible official of the member agency. Information regarding current FCGMA Board representatives can be found on the FCGMA website.

1.1.2 PVB Groundwater Sustainability Plan

The GSP for the PVB defined the conditions under which the groundwater resources of the entire PVB will be managed sustainably in the future (FCGMA 2019a). Groundwater conditions were evaluated in four hydrostratigraphic units in the PVB. These hydrostratigraphic units are similar to the five principal aquifers in the Oxnard Subbasin, which adjoins the PVB, commonly grouped into an upper and lower aquifer system. In the PVB there are four principal aquifers: (1) the older alluvium, which is the time equivalent stratigraphic unit to the Upper Aquifer System (UAS) in the Oxnard Subbasin, (2) the Upper San Pedro Formation, (3) the Fox Canyon aquifer, and (4) Grimes Canyon aquifer. The Upper San Pedro Formation, Fox Canyon aquifer, and Grimes Canyon aquifer compose the Lower Aquifer System (LAS) in the PVB. The primary sustainability goal for the PVB adopted in the GSP, is “to maintain a sufficient volume of groundwater in storage in the older alluvium and the Lower Aquifer System so that there is no net decline in groundwater elevation or storage over wet and dry climatic cycles.” (FCGMA 2019a). Additionally, “groundwater levels in the PVB should be maintained at elevations that are high enough to not inhibit the ability of the Oxnard Subbasin to prevent net landward migration of the saline water impact front” in the Oxnard Subbasin after 2040 (FCGMA 2019a). These goals were established based on both historical and potential future undesirable results to the groundwater resources of the PVB from six sustainability indicators: chronic lowering of groundwater levels, reduction of groundwater storage, seawater intrusion, degraded water quality, land subsidence, and depletions of interconnected surface water. The PVB was found not to experience direct impacts from seawater intrusion or depletion of interconnected surface water.

The GSP established minimum threshold groundwater elevations, defined for the PVB, as groundwater levels that: allow declines during periods of future drought to be offset by recovery during future periods of above-average rainfall (FCGMA 2019a). These groundwater elevations were also found to limit seawater intrusion in the Oxnard Subbasin (FCGMA 2019a). In addition to minimum threshold groundwater elevations, the GSP also established measurable objective groundwater elevations. Measurable objective groundwater elevations were defined as “the groundwater levels throughout the PVB at which there is neither seawater flow into, nor freshwater flow out of the Upper Aquifer System or Lower Aquifer System in the Oxnard Subbasin” (FCGMA 2019a). Minimum threshold and measurable objective groundwater elevations were established at nine representative monitoring points (or “key wells”) in the PVB (FCGMA 2019a).

The GSP documented conditions throughout the PVB through the fall of 2015. The first, second, and third annual reports evaluated progress toward sustainability based on a review of groundwater elevation data, groundwater extraction data, surface water supply available for use or surface water supply used, total water used, and change in groundwater storage between the fall of 2015 and the end of water year 2021[3]. This fourth annual report for the PVB documents conditions and the progress toward sustainability for water year 2022.

3 A water year begins on October 1 and ends on September 30 of the following year. The convention for naming the water year is to name the water year based on the year in which it ends. For example, the 2022 water year begins on October 1, 2021, and ends on September 30, 2022.

1.2 Plan Area

The PVB (DWR Groundwater Basin 4-006) is bounded to the north by the Springville fault zone and Somis Gap, to the east by the ASRVB (DWR Bulletin 118 Groundwater Basin 4-007) and Conejo Mountain, to the southeast by the Santa Monica Mountains, and to the west and southwest by the Oxnard Subbasin of the Santa Clara River Valley Groundwater Basin (DWR Groundwater Basin 4-004.02; Figure 1-1, Vicinity Map for the Pleasant Valley Basin).

In the west and southwest, the PVB is in hydrogeologic communication with the Oxnard Subbasin. The boundary between the PVB and Oxnard Subbasin is defined by a facies change between the predominantly coarser-grained sand and gravel deposits that compose the UAS in the Oxnard Subbasin and the finer-grained clay and silt-rich deposits of the UAS in the PVB. To the north, in the Camarillo Hills area, the Springville Fault Zone is believed to form a groundwater flow barrier at depth between the aquifers in the LPVB and the PVB, based on historical hydraulic head differences of up to 60 feet across the fault zone (DWR 1975). However, shallow alluvial deposits in the vicinity of Arroyo Las Posas and the Somis Gap are in hydraulic communication with the LPVB (CMWD 2017). The eastern boundary of the PVB is formed by a hydrogeologic constriction in Arroyo Santa Rosa Valley (SWRCB 1956; DWR 2003). The southern boundary of the PVB is delineated by the contact between the alluvial deposits and surface exposures of bedrock in the Santa Monica Mountains (DWR 2003).

The PVB is divided into three management areas that reflect the current understanding of the hydrogeologic characteristics of the Basin (FCGMA 2019a). These three management areas are the East Pleasant Valley Management Area (EPVMA), the North Pleasant Valley Management Area, and the Pleasant Valley (PV) Pumping Depression Management Area (Figure 1-2). These areas are distinguished by differing hydrogeologic and water quality characteristics (FCGMA 2019a).

1.2.1 Climate

The climate of Pleasant Valley is typical of coastal Southern California, with average daily temperatures ranging generally from 43°F to 80°F in summer and from 41°F to 74°F in winter (FCGMA 2019a). Typically, the majority of the precipitation in the Ventura County region falls between November and April. Precipitation is measured at several stations in the PVB (Figure 1-3; Precipitation and Stream Gauges in the Pleasant Valley Basin). Water year precipitation, measured at Stations 003 and 259, in the central PVB is highly variable, ranging from 2.6 inches in 2021 to 34.9 inches in 1998 (Figure 1-4; Pleasant Valley Basin Historical Water Year Precipitation). In the 2022 water year, the PVB received a total of 9.9 inches of precipitation (Figure 1-4). On average, the PVB received approximately 13.2 inches of precipitation per water year between 1957 and 2022.

The GSP for the PVB included precipitation through the 2015 water year (FCGMA 2019a). Since 2015, the PVB has experienced two above normal[4] water years (2017 and 2019), three critical water years (2016, 2018, and 2021), and two below normal water years (2020 and 2022). The average precipitation between 2016 and 2022 was 9.92 inches, which is approximately 25% less than the long-term mean precipitation in the PVB. Overall, the PVB has continued to experience drier than average conditions since 2015.

4 Water years have been classified into five types based on their relationship to the mean water year precipitation. The five types are: critical, dry, below normal, above normal, and wet. Critical water years are < 50% of the mean annual precipitation. Dry water years are ≥ 50% and <75% of the mean annual precipitation. Below normal water years are ≥ 75% and <100% of the mean annual precipitation. Above normal water years are ≥ 100% and <150% of the mean annual precipitation. Wet water years are ≥ 150% of the mean annual precipitation.

1.2.2 Surface Water and Drainage Features

The dominant surface water bodies in Pleasant Valley are the Arroyo Las Posas, Calleguas Creek, and Conejo Creek, which drain watersheds that extend beyond the boundaries of the PVB (Figure 1-2). There is only one active streamflow gauging station in the PVB. This station, maintained by the Ventura County Public Works Agency - Watershed Protection, is located on Calleguas Creek near California State University Channel Islands (Station ID: 805), downstream of the confluence of Arroyo Las Posas and Conejo Creek. Streamflow measured at this gauge for the past 11 water years is presented in Table 1-1 and shown on Figure 1-5.

The highest average daily flows in Calleguas Creek between 2010 and 2020 occurred in 2010 and 2011 (Table 1-1). Water years 2010 and 2011 were above normal and wet water years, respectively, in which annual precipitation was approximately 107% and 160% of the long-term average.

Table 1-1. Streamflow on Calleguas Creek for Water Years 2010 through 2022

Water Year	Average Daily Flow (cfs) at Gauge 805
2010	52.5
2011	67.1
2012	19.1
2013	12.9
2014	9.2
2015	9.1
2016	6.9
2017	44.9
2018	11.4
2019	35.2
2020	42.7
2021	9.49*
2022	9.03*

Notes: cfs = cubic feet per second
*VCWPD notes that data is provisional, subject to revision

1.3 Annual Report Organization

This is the fourth Annual Report prepared since the GSP for the PVB was submitted to DWR. This report is organized according to the GSP Emergency Regulations. Chapter 1 provides the background information on the GSP, the PVB, and the Fox Canyon Groundwater Management Agency. Chapter 2 provides information on the groundwater conditions in the PVB since 2015, including groundwater elevations, groundwater extractions, surface water supply, total water available, and change in groundwater storage. Chapter 3 provides an update on the GSP implementation process.

2 Groundwater Conditions

This chapter presents the change in groundwater conditions in the PVB since water year 2015. Comparison of water year 2022 conditions to water year 2021 conditions characterizes the impact that water year type, groundwater production, imported and recycled water availability, and surface water availability in water year 2022 have had on groundwater conditions in the PVB. Data from water years 2016 through 2021 are provided as context. These data were discussed in detail in the first, second, and third annual reports (FCGMA 2020a, FCGMA 2021, FCGMA 2022).

2.1 Groundwater Elevations

Groundwater elevation contour maps for the older alluvium (Oxnard and Mugu aquifer age-equivalents) and the Fox Canyon aquifer are presented in Figures 2-1 through 2-6. These maps show the seasonal low (fall 2021) and high (spring 2022) groundwater elevations. Fall 2021 groundwater elevations were defined as any groundwater elevation measured between October 2 and October 31, 2021. Spring 2022 groundwater elevations were defined as any groundwater elevation measured within a four-week window between March 2 and March 29, 2022. These four-week windows are approximately the same measurement windows as those used to generate fall and spring groundwater elevation contour maps in the 2020 Annual Report covering water years 2016 through 2019. The 2021 Annual Report covering water year 2020 utilized a six-week measurement window to ensure similar spatial coverage of groundwater elevation measurements for comparison of groundwater contours. The GSP recommended collecting groundwater elevations within a two-week window in the future (FCGMA 2019a). FCGMA has been actively prioritizing recommendations made in the GSP and evaluating the timeframe and feasibility of implementing these recommendations; however, FCGMA relies on other agencies for some groundwater elevation data.

The groundwater elevation contour maps are based on the groundwater elevations measured at wells screened solely within an individual aquifer. The intent of using groundwater elevations from wells screened within a single aquifer is to accurately represent groundwater flow directions within an aquifer, and vertical gradients between aquifers. It is important to note, however, that production wells in the PVB are typically screened across multiple aquifers. Therefore, using wells only screened within an individual aquifer limits the spatial coverage for each contour map. This limitation is particularly apparent in an area of high groundwater production in the PVB and adjoining Oxnard Subbasin that extends south from Highway 101 (FCGMA 2019a). This area was identified as being impacted by groundwater production based on groundwater elevations measured in wells screened in multiple aquifers and was identified in the GSP as a separate management area in the PVB (FCGMA 2019a). By using wells screened only within an individual aquifer, the lateral extent of the pumping depression is not well characterized.

At FCGMA's request, DWR installed a nested monitoring well cluster in close proximity to the PV Pumping Depression Management Area of the PVB, in the contiguous Oxnard Pumping Depression Management Area of the Oxnard Subbasin, through its Technical Support Services (TSS) program. The nested well cluster, which has two separate completions, is located in the Oxnard Subbasin adjacent to the Revolon Slough. The shallow well cluster, which was completed on November 22, 2019, contains three monitoring wells individually screened in the Oxnard, Mugu, and Hueneme aquifers. The Oxnard and Mugu aquifers are age-equivalent to the older alluvium in the PVB and the Hueneme aquifer is age-equivalent to the Upper San Pedro aquifer in the PVB. The deep well cluster, which was completed on March 19, 2020, contains three monitoring wells individually screened within the Fox Canyon-Upper, Fox Canyon-Basal, and Grimes Canyon aquifers. Groundwater elevations measured at the shallow and deep well cluster were used to help constrain groundwater conditions in the PVB and Oxnard Subbasin Pumping Depression Management Areas in the 2021 and 2022 water years (Section 2.1.1).

In addition to the nested well cluster in the Oxnard Subbasin Pumping Depression Management Area, DWR installed a second nested monitoring well cluster located in the northwestern portion of the PVB, adjacent to the Arroyo Las Posas per FCGMA's request and specifications (Figures 2-1 through 2-9). Like the monitoring well cluster installed within the Oxnard Pumping Depression Management Area, the new PVB monitoring well was constructed using two separate well completions. The first well completion contains two monitoring wells, one of which is screened within the older alluvium (in age-equivalent stratigraphic units of the Mugu aquifer in the Oxnard Subbasin) and the second of which is screened in the Upper San Pedro Formation (age-equivalent to the Hueneme aquifer in the Oxnard Subbasin). The second completion contains three monitoring wells individually screened in the older alluvium (in the age-equivalent stratigraphic unit as the Oxnard aquifer in the adjacent Oxnard Subbasin), Fox Canyon-Upper aquifer, and Fox Canyon-Basal aquifer. Construction of the two separate well completions was completed in September 2019. Groundwater elevations measured at the shallow and deep well cluster were used to help constrain groundwater conditions in the northwestern portion of the PVB in the 2021 and 2022 water years (Section 2.1.1).

2.1.1 Groundwater Elevation Contour Maps

2.1.1.1 Older alluvium (Age Equivalent Oxnard and Mugu Aquifers)

There are six wells screened solely within the older alluvium in the PVB (Figures 2-1 through 2-4). Three of these wells were measured in both fall 2021 and spring 2022: 02N21W34G05S, 02N21W34G04S, and 02N20W20D05S (Figures 2-1 through 2-4). Additionally, the spring 2022 groundwater elevation was measured at well 02N20W20D03S; the groundwater elevation at this well was not measured in fall 2021. The two remaining wells were not measured in either the fall of 2021 or the spring of 2022.

In fall 2021, groundwater elevations were highest along the northern boundary of the PVB, adjacent to the LPVB, and declined south towards the PV Pumping Depression Management Area (Figure 2-3). The groundwater elevation measured at well 02N20W20D05S (screened in the age-equivalent stratigraphic unit to the Mugu aquifer) was approximately 55 feet (ft.) above mean sea level (msl) in fall 2021 (Figure 2-3). Downgradient of this well, and within the PV Pumping Depression Management Area, fall 2021 groundwater elevation at well 02N21W34G04S was approximately -67 ft. msl (Figure 2-3).

Wells 02N21W34G04S and 02N21W34G05S are part of a nested well cluster in the PV Pumping Depression Management Area, with well 02N21W34G04S screened in the age-equivalent stratigraphic unit to the Mugu aquifer and well 02N21W34G05S screened in the age-equivalent stratigraphic unit to the Oxnard aquifer. In fall 2021, the groundwater elevation measured at well 02N21W34G05S was approximately -15 ft. msl and the groundwater elevation measured at well 02N21W34G04S was approximately -67 ft. msl, indicating a downward vertical gradient within the older alluvium (Figures 2-1 and 2-3). Fall 2021 groundwater elevations measured in the older alluvium were approximately 2 to 12 feet lower than fall 2020 conditions.

Spring 2022 groundwater elevations measured in the age-equivalent of the Oxnard aquifer in older alluvium ranged from approximately -10 ft. msl in the PV Pumping Depression Management Area to approximately 113 ft msl in the North Pleasant Valley Management Area (Figure 2-2). Spring 2022 groundwater elevations measured in the age-equivalent of the Mugu aquifer in older alluvium ranged from approximately -50 ft. msl in the PV Pumping

Depression Management Area to approximately 54 ft msl in the North Pleasant Valley Management Area (Figures 2-2 and 2-3)

Groundwater elevations declined by approximately 6 feet at well 02N2134G05S and approximately 0.5 feet at 02N21W34G04S between spring 2021 and spring 2022. The spring 2022 groundwater elevation in well 02N21W34G05S was approximately 20 feet lower than it was in the spring of 2015. The spring groundwater elevation in well 02N21W34G04S was approximately 9 feet higher than it was in spring of 2015.

2.1.1.2 Fox Canyon Aquifer

Fall 2021 groundwater elevations in the Fox Canyon aquifer ranged from a low of approximately -113 ft. msl (measured at well 02N21W34G03S; Figure 2-5) to a high of approximately 39 ft. msl (measured at well 02N20W20D01S; Figure 2-5). Fall 2021 groundwater elevations were consistently lower than fall 2020 groundwater elevations. In the northern PVB, groundwater elevations declined between 6 and 9 feet between fall 2020 and fall 2021 (measured at 02N21W20D02S and 02N21W20D01S, respectively). In the PV Pumping Depression Management Area, fall 2021 groundwater elevations were approximately 25 to 34 feet lower than fall 2020 (measured at 02N22W34G03S and 02N22W34G02S, respectively). Fall 2021 groundwater elevations were approximately 3 feet lower than fall 2015 in northern PVB (measured at well 02N21W19M05S) and approximately 7 to 10 feet higher than fall 2015 in the PV Pumping Depression Management Area.

In the PV Pumping Depression Management Area, spring 2022 groundwater elevations ranged from approximately -91 ft msl to -84 ft msl measured at wells 01N21W03C01S and 02N21W34G02S, respectively (Figure 2-6). In this part of the PVB, spring groundwater elevations declined by 6 to 12 feet between 2021 and 2022 (measured at wells 01N21W03C01S and 02N21W34G03S, respectively). South of these wells, the spring groundwater elevation measured at well 01N21W09C04S, which is located within the Oxnard Pumping Depression Management Area, increased by approximately 5 feet between spring 2021 and 2022. Since 2015, spring groundwater elevation changes in western PVB have ranged from declines of approximately 14 feet (measured at well 02N21W34G02S) to recoveries of approximately 8 feet (measured at well 02N21W34G03S). In northern PVB, near the boundary with LPVB, the groundwater elevation changes between spring 2021 and spring 2022 ranged from declines of approximately 5 feet at well 02N20W20D01S to recoveries of approximately 3 feet at well 02N20W19M05S. Since 2015, the spring groundwater elevation measured at 02N20W19M05S has declined by approximately 31 feet. Well 02N20W20D01S (Figure 2-6) did not yet exist in 2015.

2.1.2 Groundwater Elevation Hydrographs

Groundwater elevation hydrographs for each of the key wells identified in the GSP are presented in Figures 2-7 through 2-9. These key wells are the designated representative monitoring points for the PVB (FCGMA 2019a). The fall 2021 and spring 2022 water levels measured at each representative monitoring point are presented in Table 2-1, which also provides a comparison of fall and spring water levels to: (i) water year 2015 and 2021 conditions, (ii) the established minimum threshold groundwater elevations, (iii) the established measurable objective groundwater elevations, and (iv) the interim milestones for dry climate conditions. The GSP dry climate interim milestone is used for comparison in this annual report because the average of the annual precipitation measured in the Basin between water years 2016 and 2022 is below average. However, it should also be noted that the first interim milestone is set for 2025, not 2022, and the groundwater elevations in the representative wells in the PVB have three years to reach this first interim milestone.

Groundwater elevations are monitored at three key wells screened in the older alluvium in the PVB (Table 2-1). In fall 2021, groundwater elevations were measured at two of these wells and were approximately 11 to 13 feet lower than fall 2020 and approximately 20 to 47 feet below the minimum threshold groundwater elevations. In spring 2022, groundwater elevations were approximately 1 to 6 feet lower than spring 2021 conditions and ranged from 2 to 45 feet below the minimum threshold groundwater elevations. In spring 2022, groundwater elevations in the older alluvium ranged from 10 feet below (measured at well 02N21W34G05S) to 22 feet above (measured at well 02N21W34G04S) the 2025 interim milestone for dry climate conditions (Table 2-1). In the age-equivalent stratigraphic unit as the Oxnard aquifer, water year 2022 groundwater elevations were approximately 5 to 17 feet lower than 2015. In the age-equivalent stratigraphic unit as the Mugu aquifer, water year 2022 groundwater elevations were approximately 8 to 13 feet higher than 2015.

Groundwater conditions in the Fox Canyon aquifer are monitored using four representative monitoring points in the PVB (Table 2-1). Between spring 2021 and spring 2022, groundwater elevations in the PV Pumping Depression Management Area declined by approximately 6 to 20 feet (Table 2-1). In northern PVB, spring 2022 groundwater elevations increased by approximately 3 feet. In spring 2022, groundwater elevations in the Fox Canyon aquifer were 29 to 43 feet below the minimum threshold groundwater elevations at all wells except well 02N20W19M05S. The spring 2022 groundwater elevation was approximately 142 feet higher than the minimum threshold groundwater elevation at this well. In the PV Pumping Depression Management Area, spring 2022 groundwater elevations were approximately 3 to 8 feet lower than 2015.

Table 2-1. Water Year 2022 Groundwater Elevations, Minimum Thresholds, Measurable Objectives, and Interim Milestones for Representative Monitoring Points in the PVB

Well Number	Aquifer	Fall Groundwater Conditions			Spring Groundwater Conditions			Minimum Threshold (ft MSL)	Measurable Objective (ft MSL)	2025 Interim Milestone Dry Climate (ft MSL)[c]
		2021 Groundwater Elevation (ft MSL)	Change from 2020 to 2021 (ft)[a]	Change from 2015 to 2021 (ft)[b]	2022 Groundwater Elevation (ft MSL)	Change from 2021 to 2022 (ft)[a]	Change from 2015 to 2022 (ft)[b]			
02N21W34G05S	Older alluvium (Oxnard)	-15.15	**-11.79**	**-4.96**	-10.31	**-5.94**	**-16.8**	32	40	0
01N21W03K01S	Older alluvium (Mugu)	NM	-	-	NM	-	-	-53	5	-73
02N21W34G04S	Older alluvium (Mugu)	-67.69	**-13.6**	12.59	-50.94	**-1.35**	8.31	-48	5	-72
01N21W03C01S	Fox	-107.02	**-18.3**	10.5	-91.32	**-6.3**	**-7.68**	-48	0	-100
02N20W19M05S	Fox	12.32	2.25	**-2.85**	7.02	2.75		-135	65	-
02N21W34G02S	Fox	-110.27	**-33.61**	7.25	-81.86	**-6.3**	**-3.05**	-53	0	-101
02N21W34G03S	Fox	-113.4	**-36.51**	7.21	-95.14	**-19.54**	**-2.61**	-53	0	-104
01N21W02P01S	Multiple	NM	-	-	NM	-	-	-43	5	-80
01N21W04K01S	Multiple	-119.28	**-38.1**	7.2	-86.13	2.25	3.95	-48	0	-112

Notes: NM = *Not Measured*

[a] Data in this column shows the year-to-year difference in groundwater elevation measured at each representative monitoring point. Positive (+) values indicate that groundwater elevations have increased. Negative (-) values indicate that groundwater elevations have decreased. Groundwater elevation declines are presented in **bold** text. Blank cells indicate that water levels were not measured in either the current, or previous, fall and spring measurement window.

[b] Data in this column shows the difference in groundwater elevation measured at each representative monitoring point between water year 2015 and 2022. Positive (+) values indicate that groundwater elevations have increased since 2015. Negative (-) values indicate that groundwater elevations have decreased since 2015. Groundwater elevation declines are presented in **bold** text. Blank cells indicate that water levels were not measured in either the current, or previous, fall and spring measurement window.

[c] There is no interim milestone for well 02N20W19M05S because the water levels in this well were above the minimum threshold when the GSP was prepared.

2.2 Groundwater Extraction

On October 23, 2019, the FCGMA Board of Directors adopted an Ordinance to Establish an Allocation System for the Oxnard and Pleasant Valley Groundwater Basins. The new allocation system went into effect on October 1, 2020 and is designed to “facilitate adoption and implementation of the groundwater sustainability plan and to ensure that the Basins are operated within their sustainable yields” (FCGMA, 2019c). To facilitate implementation and assessment of the new allocation system, FCGMA transitioned the groundwater extraction reporting period from a calendar year to a water year basis. The new reporting period went into effect on October 1, 2020 and requires local groundwater producers to report production from October 1 through March 31, and April 1 through September 30.

Historically, groundwater extractions in the FCGMA have been reported in two periods over the course of a single calendar year. Because groundwater extractions are not reported monthly, groundwater production prior to the 2021 water year cannot be reported on a water year basis. Therefore, the groundwater extractions for 2016 through 2019 reported in Table 2-2, and shown on Figures 2-10 and 2-11, follow the historical precedent and are for calendar years (Table 2-2). Due to the transition from calendar year to water year reporting in 2020, groundwater extractions reported for 2020 represent extractions for the nine-month period from January 1, 2020 through September 30, 2020 (Table 2-2). Water year 2021 groundwater extractions reported in Table 2-2 represent the first complete year of water year reporting to the FCGMA.

Water year 2022 groundwater extractions reported in Table 2-2 represent a combination of reported and estimated extractions. FCGMA has experienced some delay in reporting for the second reporting period of the 2022 water year (April 1, 2022 through September 30, 2022). To estimate groundwater extractions for this period, FCGMA multiplied the groundwater extractions reported during the first half of the water year by the average ratio of validated advanced metering infrastructure (AMI) data for agricultural production wells and assumed that production rates remained constant for domestic and municipal and industrial users. Groundwater extraction values for water year 2022 are preliminary and will be updated as additional data becomes available.

Table 2-2. Groundwater Extractions in the Pleasant Valley Basin by Aquifer System and Water Use Sector

Year	Upper Aquifer System (Acre-Feet)			Lower Aquifer System (Acre-Feet)				Wells Screened in both the UAS and LAS (Acre-Feet)				Wells in Unassigned Aquifer Systems (Acre-Feet)			Total (Acre-Feet)
	AG	Dom	Sub-Total	AG	Dom	M&I	Sub-Total	AG	Dom	M&I	Sub- Total	AG	Dom	Sub-Total	
CY 2016	93	4	97	4,077	2	2,852	6,931	7,268	42	1,625	8,935	-	<1	0	15,963
CY 2017	82	5	87	3,392	2	2,548	5,942	7,668	10	2,008	9,686	-	<1	0	15,715
CY 2018	154	4	158	3,139	2	2,602	5,743	5,180	35	1,707	6,922	510	<1	510	13,333
CY 2019	91	5	96	2,433	2	2,120	4,544	3,314	26	1,607	4,948	876	<1	876	10,473
2020[a]	76	4	79	1,623	2	2,422	4,046	1,947	27	1,253	3,227	777	0	777	8,130
WY 2021[b]	118	6	123	3,329	3	3,127	6,458	5,725	24	1,139	6,888	1,075	0	1,075	14,545
WY 2022[c]	188	2	191	3,544	2	2,922	6,468	8,243	82	476	8,801	954	0	954	16,414

Notes: CY = Calendar Year; WY = Water Year; AG = Agriculture; Dom = domestic; M&I = Municipal and Industrial

a Groundwater extraction reporting is for the period from January 1, 2020 through September 30, 2020 due to transition to water year reporting.

b Groundwater extractions were updated based on receipt of additional extraction reports.

c Groundwater extractions in the second half of the water year (April 1 through September 30) are estimated values and additional reporting is anticipated. Extraction reporting was not available at the time of preparation of the 2023 Annual Report but will be updated in the 2024 Annual Report.

The preliminary water year 2022 groundwater extractions are similar to calendar year 2016 and 2017 extractions, which reflect production during drier-than-average conditions (Table 2-2). Preliminary data for the 2022 water year indicate that the majority of groundwater extractions from the PVB are used to support agricultural operations and occur via wells screened across both the Upper Aquifer System and Lower Aquifer System. However, as previously noted, the extractions for the second half of 2022 will be updated upon receipt of additional data.

2.3 Surface Water Supply

The primary surface water supplies to the PVB are from the Santa Clara River, via the UWCD Freeman Diversion and the Pleasant Valley Pipeline (PVP), and Conejo Creek, via a diversion operated by CWD. Within the PVB, CWD supplies surface water to the Pleasant Valley County Water District (PVCWD) and also distributes a portion of its diversions to other agricultural water users[5] (FCGMA 2019a). Surface water deliveries to the PVB for water years 2016 through 2021 are reported in Table 2-3.

CWD provided historical surface water supply data through calendar year 2022 to support preparation of this 2023 Annual Report for the PVB. To convert these data to water year deliveries, 25% of the surface water deliveries by CWD from a given calendar year was assigned to the following water year, and the 75% of the calendar year surface water deliveries by CWD was assigned to the current water year. This division, while approximate, is based on the monthly split

5 44% of the total CWD deliveries to PVCWD, and 44% of the total PVP surface water deliveries from UWCD, were assigned to the PVB based on an analysis of the size of PVCWD's service area (FCGMA 2019a).

between water year and calendar year, with January through September (75% of the calendar year) belonging to the current water year, and October through December (25% of the calendar year) belonging to the following water year.

Table 2-3. Summary of Surface Water Deliveries to the Pleasant Valley Basin

Water Year	CWD		PVCWD	United Water Conservation District		Total (acre-feet)
				PVP (Pleasant Valley Basin) (acre-feet)		
	Conejo Creek for M&I (acre-feet)	*Conejo Creek for Agriculture (acre-feet)*	*Conejo Creek Flows Delivered to PVCWD for Agriculture (acre-feet)*	*Diversions of Santa Clara River Water Used for Agriculture (PVP)*	*Recharged Spreading Water Pumped and Used for Agriculture (Saticoy Wells)[a]*	
2016	740	2,804	816	0	0	4,361
2017	802	3,207	1,394	0	0	5,404
2018	777	3,107	1,456	0	0	5,341
2019	598	2,389	2,196	243	0	5,426
2020	541	2,099	1,815	759	0	5,214
2021	624	2,401	1,551	824	0	5,400
2022	557	2,199	1,880	334	0	4,970

Notes: CWD = Camrosa Water District, PVCWD = Pleasant Valley County Water District; PVP = Pleasant Valley Pipeline
[a]PVP deliveries of recharged spreading water used for agriculture in the PVB was incorrectly reported for water years 2016 through 2019 in the 2020 Annual Report. This data has been corrected and updated in Table 2-3. A description of the error in the 2020 Annual Report is provided in Appendix A.

2.4 Total Water Available

Total water available was tabulated from the groundwater extractions reported in Table 2-2, the surface water supply reported in Table 2-3, and imported water, and recycled water used in the PVB. The total water available is reported in Table 2-4 by water year. For Table 2-2, in order to convert the reported groundwater production from calendar year to water year prior to water year 2020, 25% of the groundwater production from a given calendar year was assigned to the following water year, and the 75% of the calendar year production was assigned to the current water year. Similar to the division of surface water deliveries, this division, is based on the monthly split between water year and calendar year, with January through September (75% of the calendar year) belonging to the current water year, and October through December (25% of the calendar year) belonging to the following water year. Preliminary AMI data reported to FCGMA indicates that this division is reasonable for M&I and domestic groundwater extractions. AMI data from agricultural users in the PVB indicate that production can be highly variable, but preliminary data suggest the January through September period accounts for 70% of the total calendar year extractions, while the October through December period accounts for the remaining 30% of the total calendar year extraction. Using a 70-30% division based on this AMI data to convert from calendar year to water year results in an estimate of agricultural extractions equal to approximately 6,500 AF in water year 2020. This estimate is approximately 400 AF, or 7%, more than the water year 2020 agricultural extractions estimated using a 75-25% division.

Calleguas Municipal Water District (CMWD) provides imported water to Camrosa Water District, the City of Camarillo and Pleasant Valley Mutual Water Company. CMWD provided monthly delivery volumes to each customer but did not report "imported water use" by sector. Therefore, the total reported CMWD water use was divided among the water use sectors based on the average reported water use, by sector, in the PVB GSP since 2010 (FCGMA 2019a).

Between 2010 and 2015, 99% of the imported water supplied by CMWD was provided to the M&I sector and only 1% was used for agriculture. This ratio was applied to CMWD total imports in Table 2-4.

Table 2-4. Total Water Available in the Pleasant Valley Basin

Water Year	Groundwater[a] (acre-feet)			Surface Water (acre-feet)	Recycled Water (acre-feet)		Imported Water[b] (acre-feet)		Total (acre-feet)
	Ag	Dom	M&I	Ag	Ag	M&I	Ag	M&I	
2016	12,650	88	3,698	816	2,352	577	113	6,334	26,619
2017	11,216	24	4,536	1,394	2,300	651	153	8,275	28,548
2018	9,523	35	4,371	5,341	2,062	602	155	8,326	30,414
2019	7,281	35	3,873	5,426	2,212	412	332	8,337	27,908
2020	6,100	41	4,607	5,214	4,272	494	1,181	8,103	30,011
2021[c]	8,948	24	5,395	5,400	3,477	413	1,284	8,695	33,636
2022[d]	12,930	87	3,398	4,970	3,994	738	118	7,636	33,869

Notes:

[a] Groundwater production by water year (2016 through 2019) is estimated from groundwater production by calendar year. Water Year 2020 extractions represent groundwater extractions reported for the period from January 1, 2020 through September 30, 2020 plus 25% of the Calendar Year 2019 extractions.

[b] Imported water supplied by CMWD to the City of Camarillo and PVMWC was divided into AG and M&I based on the ratio of AG and M&I imported water used between 2010 and 2015. 99% of the total imported water was used for M&I over that time period.

[c] Groundwater production updated based on receipt of additional extraction reporting.

[d] Groundwater production is preliminary and expected to change. Additional extraction reporting is anticipated.

2.5 Change in Groundwater Storage

Change in storage estimates were calculated for the older alluvium[6] and Fox Canyon aquifer by comparing seasonal high groundwater elevations between 2015 and 2022. Annual change in storage was calculated for each of the six water years by comparing seasonal high groundwater elevations between 2015 and 2022. Annual and cumulative change in storage for water years 2016 through 2022 are presented in Tables 2-5a and 2-5b. The change in storage for each aquifer between spring 2021 and spring 2022 is shown on Figures 2-12 through 2-14. Annual and cumulative change in storage for the older alluvium and Fox Canyon aquifer are shown in Figures 2-15 and 2-16.

Change in groundwater in storage was calculated using a series of linear regression models that correlate measured groundwater elevations to simulated storage change values extracted from the Ventura Regional Groundwater Flow Model (UWCD, 2018). These regression models were computed using seasonal high elevations and corresponding model-calculated storage change values for water years 1986 through 2015 (FCGMA 2022).

2.5.1 Older Alluvium

Groundwater in storage decreased by approximately 2,040 AF in the older alluvium between spring 2021 and 2022 (Table 2-5a). The majority of this decline occurred in the age-equivalent stratigraphic unit to the Oxnard aquifer. Storage change within this part of the older alluvium is estimated using a single well, 02N21W34G05S, which is located in the Pumping Depression Management Area, near the boundary with the Oxnard Subbasin.

Since 2015, groundwater in storage in the older alluvium has declined by a total of approximately 7,000 AF (Table 2-5b).

2.5.2 Fox Canyon Aquifer

Groundwater in storage in the Fox Canyon aquifer declined by approximately 70 AF between spring 2021 and 2022 (Table 2-5a). This estimate of groundwater storage decline is based on linear regression models developed using groundwater elevations measured at four wells: 02N20W19M05S, 02N21W34G03S, 01N21W03C01S, and 01N21W09C04S (Figure 2-14). The estimated decline in groundwater in storage reflects groundwater elevation changes in the PV Pumping Depression Management area (Figure 2-14). Groundwater in storage in the northern PVB is estimated to have increased by approximately 150 AF, which reflects the 3 feet increase in groundwater elevation measured at 02M20W19M05S (Figure 2-14).

Since 2015, groundwater in storage has declined by an estimated 1,700 AF in the Fox Canyon aquifer (Table 2-5b). As noted in Section 2.1.1, this decline reflects general declining trends in groundwater elevations across the PVB.

[6] For the older alluvium, storage change was calculated for both the age equivalent stratigraphic units as the Oxnard and Mugu aquifers.

Table 2-5a. Annual Change in Groundwater Storage in the Pleasant Valley Basin

Water Year	Water Year Type	Change in Storage (Acre-Feet)				
		Older Alluvium			*Fox Canyon aquifer*	*Combined Annual*
		Oxnard equivalent	**Mugu equivalent**	**Total**		
2016	Critical	-3,305	-61	**-3,365**	-1,078	**-4,443**
2017	Above Normal	2,762	15	**2,778**	153	**2,931**
2018	Critical	-4,921	-21	**-4,942**	-866	**-5,808**
2019	Above Normal	2,440	25	**2,465**	233	**2,698**
2020	Below Normal	1,156	6	**1,162**	90	**1,252**
2021	Critical	-3,106	-11	**-3,117**	-166	**-3,283**
2022	Below Normal	-2,038	-1	**-2,039**	-73	**-2,112**

Table 2-5b. Cumulative Change in Groundwater Storage in the Pleasant Valley Basin

Water Year	Water Year Type	Change in Storage (Acre-Feet)				
		Older Alluvium			*Fox Canyon aquifer*	*Combined Cumulative*
		Oxnard equivalent	**Mugu equivalent**	**Total**		
2016	Critical	-3,305	-61	**-3,365**	-1,078	**-4,443**
2017	Above Normal	-542	-45	**-588**	-924	**-1,512**
2018	Critical	-5,463	-67	**-5,530**	-1,791	**-7,320**
2019	Above Normal	-3,023	-41	**-3,065**	-1,558	**-4,622**
2020	Below Normal	-1,867	-35	**-1,902**	-1,468	**-3,370**
2021	Critical	-4,972	-47	**-5,019**	-1,634	**-6,653**
2022	Below Normal	-7,010	-48	**-7,058**	-1,707	**-8,765**

2.5.3 Total Change in Storage

Total change in groundwater in storage for the PVB was calculated as the sum of the groundwater storage change in the Fox Canyon aquifer and older alluvium. Groundwater storage change for the age equivalent Hueneme aquifer and Grimes Canyon aquifer were not estimated because groundwater elevations were not historically collected from wells screened solely within these aquifers in the PVB.

Between spring 2021 and spring 2022, groundwater in storage declined by approximately 2,100 AF (Table 2-5a), resulting in a cumulative decline in storage since 2015 of approximately 8,800 AF (Table 2-5b). Approximately 80% of this cumulative reduction occurred in the older alluvium, within the age equivalent stratigraphic unit to the Oxnard aquifer. As noted in Section 2.5.1, groundwater storage change in this stratigraphic unit is estimated using a single well; while this approach does not capture local variations in water levels, there is a good correlation between groundwater elevations measured at this well and simulated storage change extracted from the UWCD numerical model (FCGMA 2022).

Annual and cumulative change in storage from 1985 through 2015 were reported in the GSP (FCGMA 2019a). Annual and cumulative change in storage between 2015 and 2021 are shown in Figures 2-15 and 2-16. The change in storage volumes reported in the GSP were extracted from the UWCD model and represented changes within the older alluvium, lower aquifer system, and semi-perched aquifer in the PVB. Therefore, the results of the long-term change in storage calculations presented in the GSP cannot be directly compared to the change in storage calculations conducted for this GSP annual update.

3 GSP Implementation Progress

The GSP for the PVB was submitted to DWR in January 2020 and approved on November 18, 2021. This is the fourth annual report prepared since the GSP was submitted. The GSP implementation progress reported in this report covers work begun during development of the GSP as well as development of projects and management actions over the three years since the GSP was submitted.

Project Implementation Progress

During development of the GSP, FCGMA identified the northern Pleasant Valley, adjacent to the boundary between the PVB and the LPVB, as a critical area in which aquifer specific groundwater elevations were lacking. This is an area where subsurface flows between the two basins are poorly constrained. In response to FCGMA's request, DWR via the TSS Program installed two new nested monitoring wells in this area in 2019, per FCGMA's technical specifications. Combined, the new nested wells are screened in the older alluvium (one each in the Oxnard aquifer equivalent, and Mugu aquifer equivalent), upper San Pedro Formation (Hueneme aquifer equivalent), and the Fox Canyon aquifer (one each in the upper and basal portions). Groundwater elevation data from these wells was included in the 2022 and 2023 annual reports to characterize groundwater conditions at the boundary between the PVB and LPVB, and vertically between aquifers in the northern PVB.

In addition to northern Pleasant Valley, FCGMA also identified the Oxnard Pumping Depression Management Area, adjacent to the boundary between the PVB and the Oxnard Subbasin, as a critical area in which aquifer specific groundwater elevations were lacking. This is an area of known groundwater production, with wells in the area typically screened in multiple aquifers in the LAS. Similarly, in response to FCGMA's request, DWR via the TSS Program installed two nested monitoring well clusters to monitor water levels in the individual principal aquifers in the Oxnard Subbasin Pumping Depression Management Area which is contiguous with the PV Pumping Depression Management Area. These nested monitoring wells were installed specifically to address the spatial data gap identified in the GSP. Groundwater elevation data from these wells were incorporated into the 2022 and 2023 annual reports to better characterize groundwater conditions in the PVB and the adjacent Oxnard Subbasin.

Since completing the GSP, FCGMA was awarded grant funds through DWR's Sustainable Grant Management Grant Program to support implementation of projects developed during the GSP and subsequent stakeholder discussions. The final contract agreement between DWR and FCGMA was signed on September 23, 2022 and FCGMA, acting as the grant administrator, has coordinated activities with various agencies that are overseeing project component implementation. FCGMA is currently preparing bid specifications to construct additional multi-depth and shallow monitoring wells in the Subbasin. These wells will be used to fill data gaps identified in the GSP.

As demonstrated by the efforts undertaken to identify and solicit grant funding for projects, the FCGMA Board of Directors continues to prioritize stakeholder feedback in the implementation phase of the GSP and recognizes the vital role stakeholders play in ensuring the long-term sustainable use of groundwater resources in the Pleasant Valley Basin. In addition to the projects added to the GSP list for consideration last year, the Agency has been developing a process and criteria for evaluating and prioritizing water-supply and infrastructure projects for consideration of funding and inclusion in GSP future sustainable yield projections. The Board Operations Committee conducted four meetings with good stakeholder participation to develop the process and criteria. The Board of Directors will consider adoption of the Operation Committee's recommendations at its March 22, 2023, meeting.

Management Action Implementation Progress

FCGMA has made progress on several management actions since adoption of the GSP. First, the FCGMA completed the transition from calendar year to water year reporting of groundwater extractions in 2021. Consequently, the 2022 water year is the first year in which groundwater extractions can be directly compared to the previous water year's extractions, consistent with SGMA. This allows for better understanding of the impacts of climate and extraction on groundwater elevations and storage in the Pleasant Valley Basin.

Second, in anticipation of the additional reporting associated with implementing the allocation ordinance adopted in 2021, FCGMA is continuing to conduct an analysis of its data management system needs. The updated data management system will incorporate the new AMI data and will be structured to allow for land-based extraction assignments. Changes to the data management system will target the specific needs of the FCGMA moving toward sustainable management of the PVB and Oxnard Subbasin by 2040.

Third, FCGMA has begun to evaluate implementing a replenishment fee that could be used to purchase water for recharge in the Oxnard Subbasin or to help fund a voluntary temporary fallowing program to reduce groundwater demand in the PVB. These management actions can be implemented over a shorter time period than large capital projects and, while not sufficient on their own to achieve sustainability, play an important role in progressing toward sustainable use of the groundwater resources in the PVB.

Lastly, FCGMA has begun planning, scoping, and budgeting for the first periodic evaluation of the GSP, which is due to DWR in January 2025. This evaluation will provide an assessment of the basin setting and groundwater conditions based on new data collected since submittal of the GSP; an evaluation of the established sustainable management criteria, monitoring network, and data gaps; and a comprehensive description of GSP implementation activities in the Subbasin. FCGMA has initiated discussions with other agencies in the Subbasin to coordinate planning and modeling efforts. FCGMA anticipates beginning preparation of the first periodic evaluation of the Oxnard Subbasin GSP in summer 2023.

The progress made over the past year on projects and management actions applicable to the PVB demonstrates FCGMA's commitment to allocating the necessary time and resources to achieve long-term sustainable management of the groundwater resources of the PVB.

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4 References

DWR (California Department of Water Resources). 2020. DWR SGMA Portal Website: All submitted GSPs. https://sgma.water.ca.gov/portal/gsp/all. Accessed February 17, 2020.

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FCGMA (Fox Canyon Groundwater Management Agency). 2019a. Groundwater Sustainability Plan for the Pleasant Valley Basin.

FCGMA (Fox Canyon Groundwater Management Agency). 2019b. Groundwater Sustainability Plan for the Las Posas Valley Basin: Appendix K.

FCGMA (Fox Canyon Groundwater Management Agency). 2019c. Ordinance to Establish a New Pumping Allocation System for the Oxnard and Pleasant Valley Basins.

FCGMA (Fox Canyon Groundwater Management Agency). 2020a. Pleasant Valley Basin Groundwater Sustainability Plan 2020 Annual Report: Covering Water Years 2016 through 2019.

FCGMA (Fox Canyon Groundwater Management Agency). 2021. Pleasant Valley Basin Groundwater Sustainability Plan 2021 Annual Report: Covering Water Year 2020.

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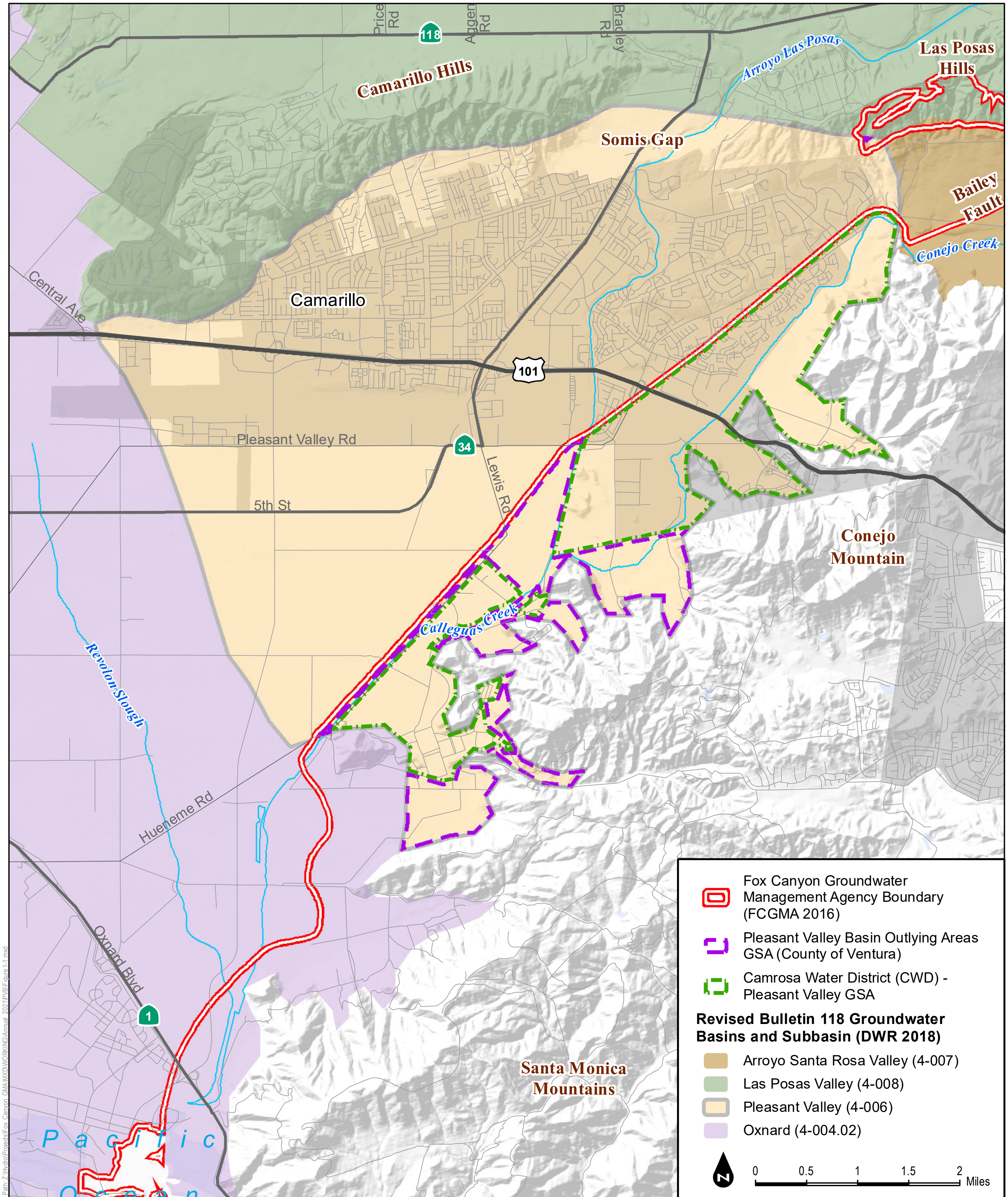
5 Figures



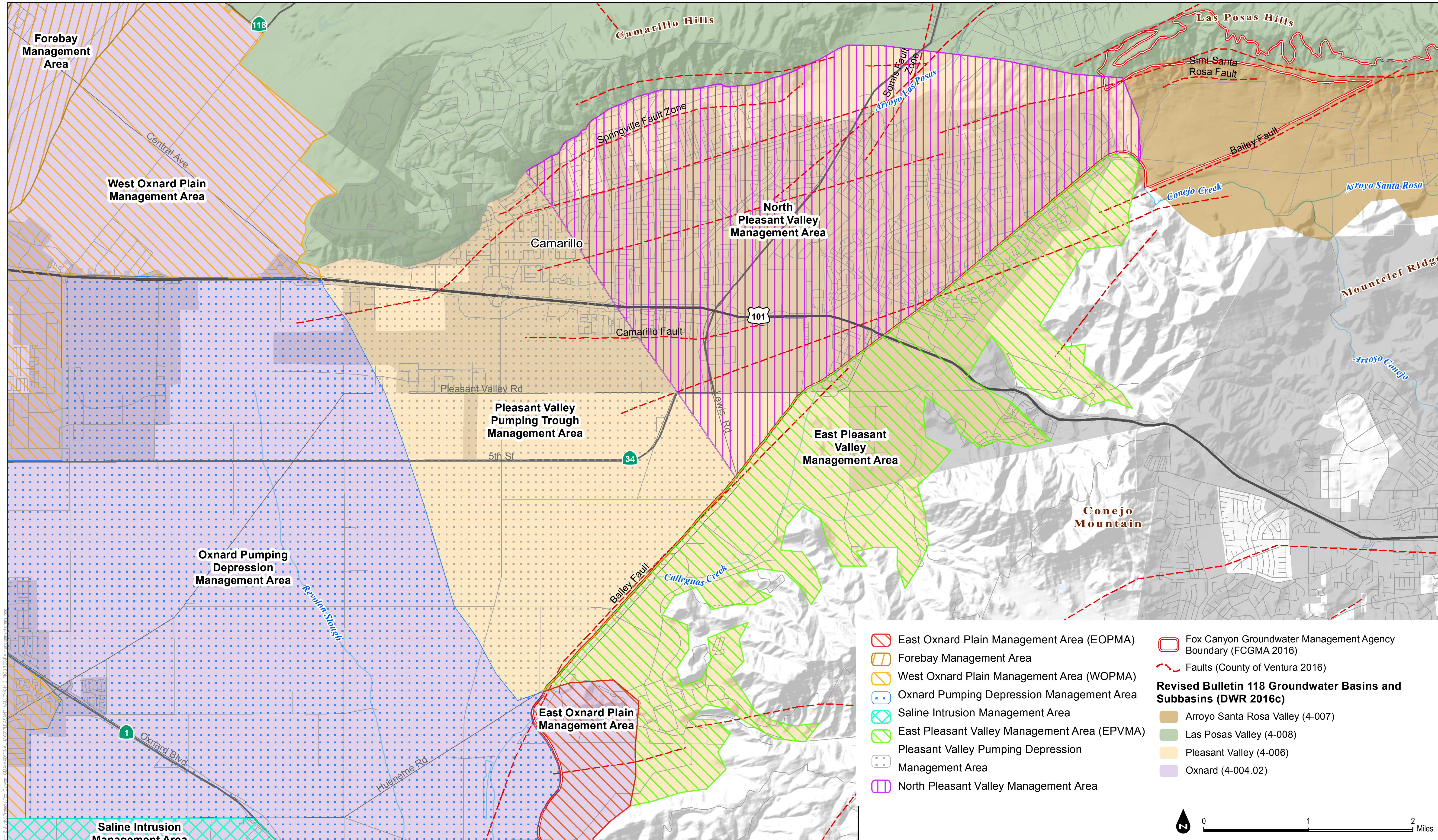
DUDEK

SOURCE: DWR; Ventura County; FCGMA

FIGURE 1-1

Vicinity Map for the Pleasant Valley Basin

Pleasant Valley Basin Groundwater Sustainability Plan 2023 Annual Report



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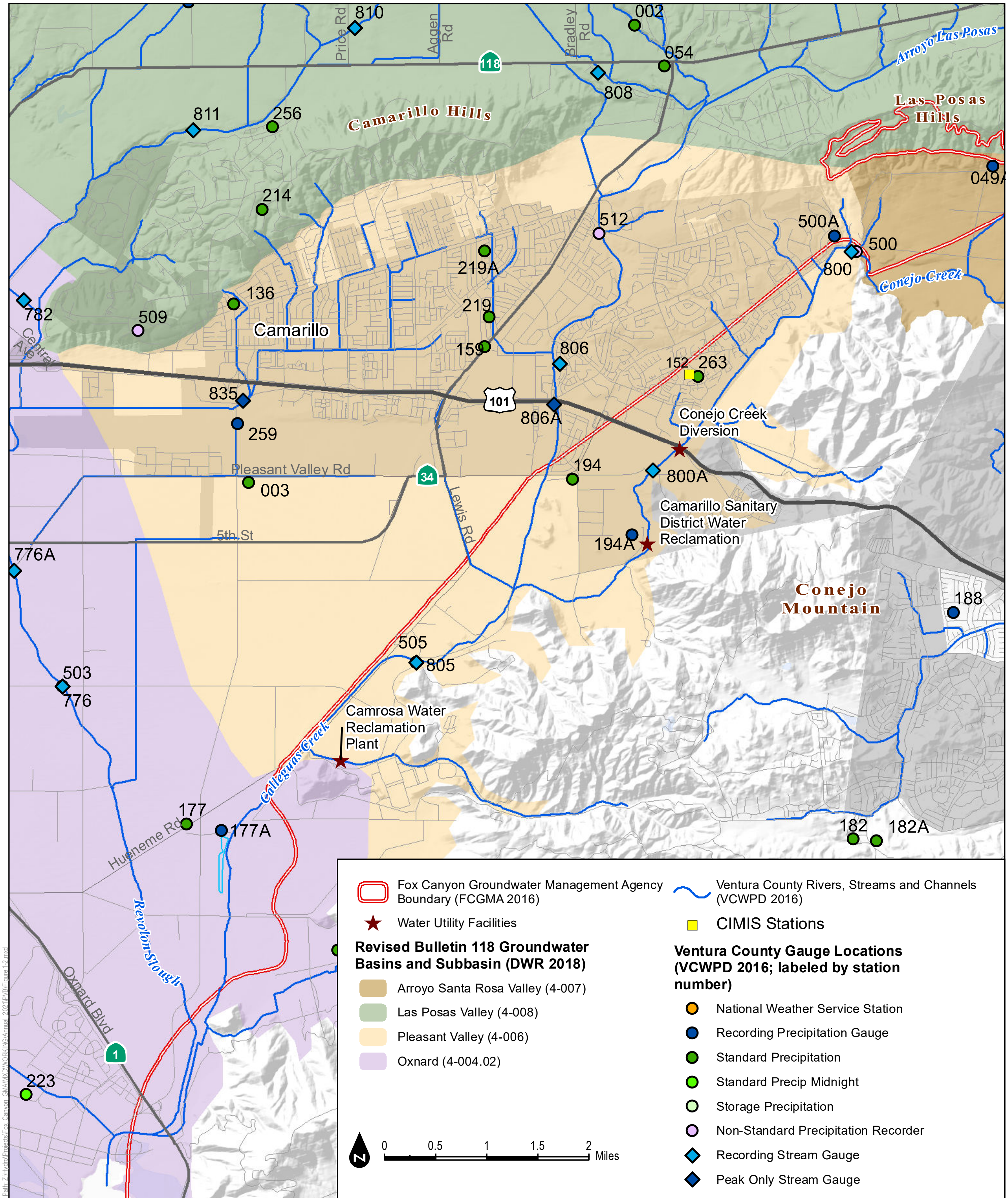
SOURCE: DWR; County of Ventura

FIGURE 1-2

Pleasant Valley Basin Management Areas



SOURCE: DWR; Ventura County; VCWPD

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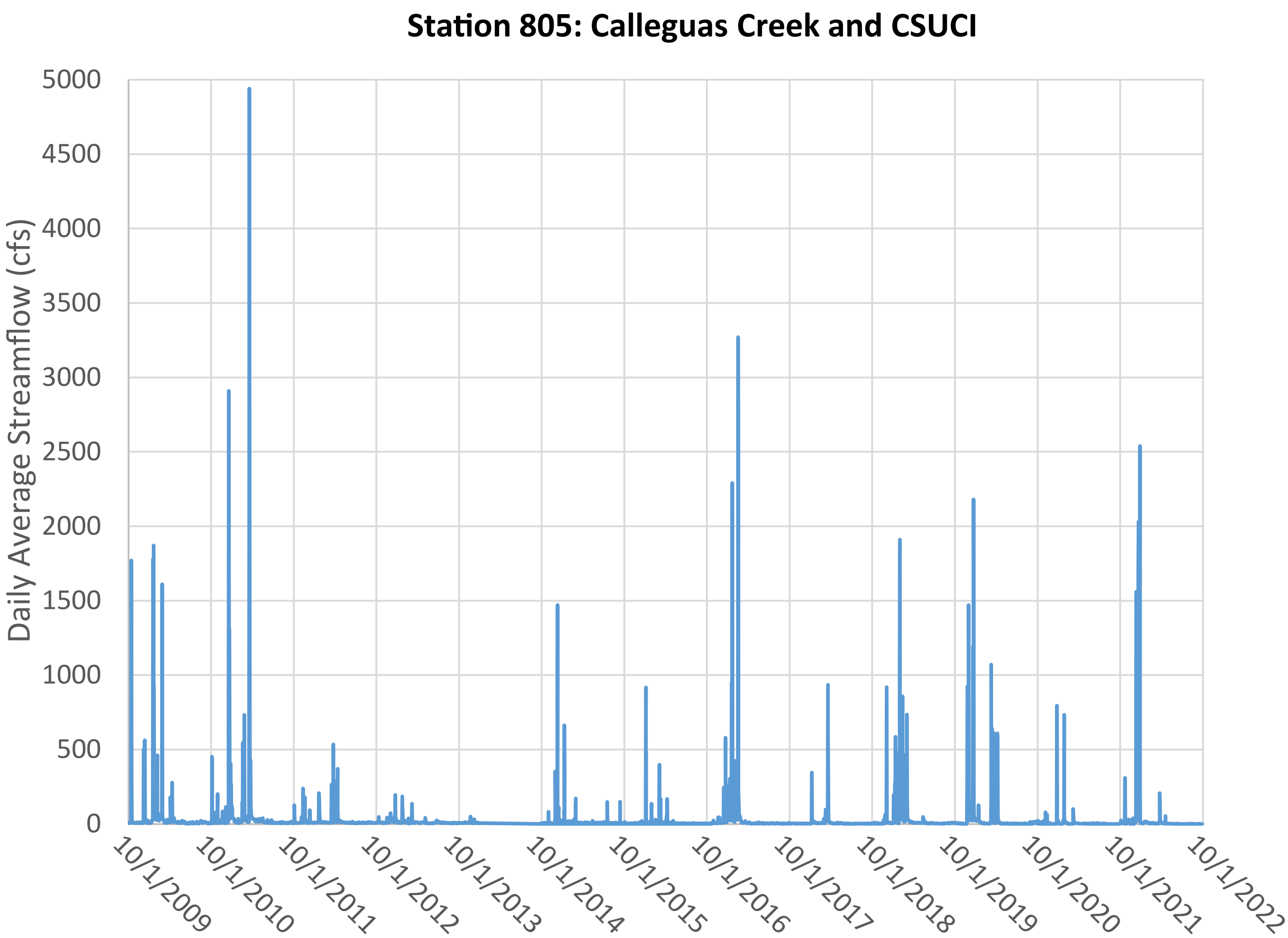
FIGURE 1-3

Pleasant Valley Basin Weather Station and Stream Gauge Locations

Pleasant Valley Basin Groundwater Sustainability Plan 2023 Annual Report



SOURCE: Ventura County Watershed Protection District (VCWPD) Hydrologic Data Server (https://www.vcwatershed.net/hydrodata/)

FIGURE 1-4

Pleasant Valley Basin Stream Gauge Data

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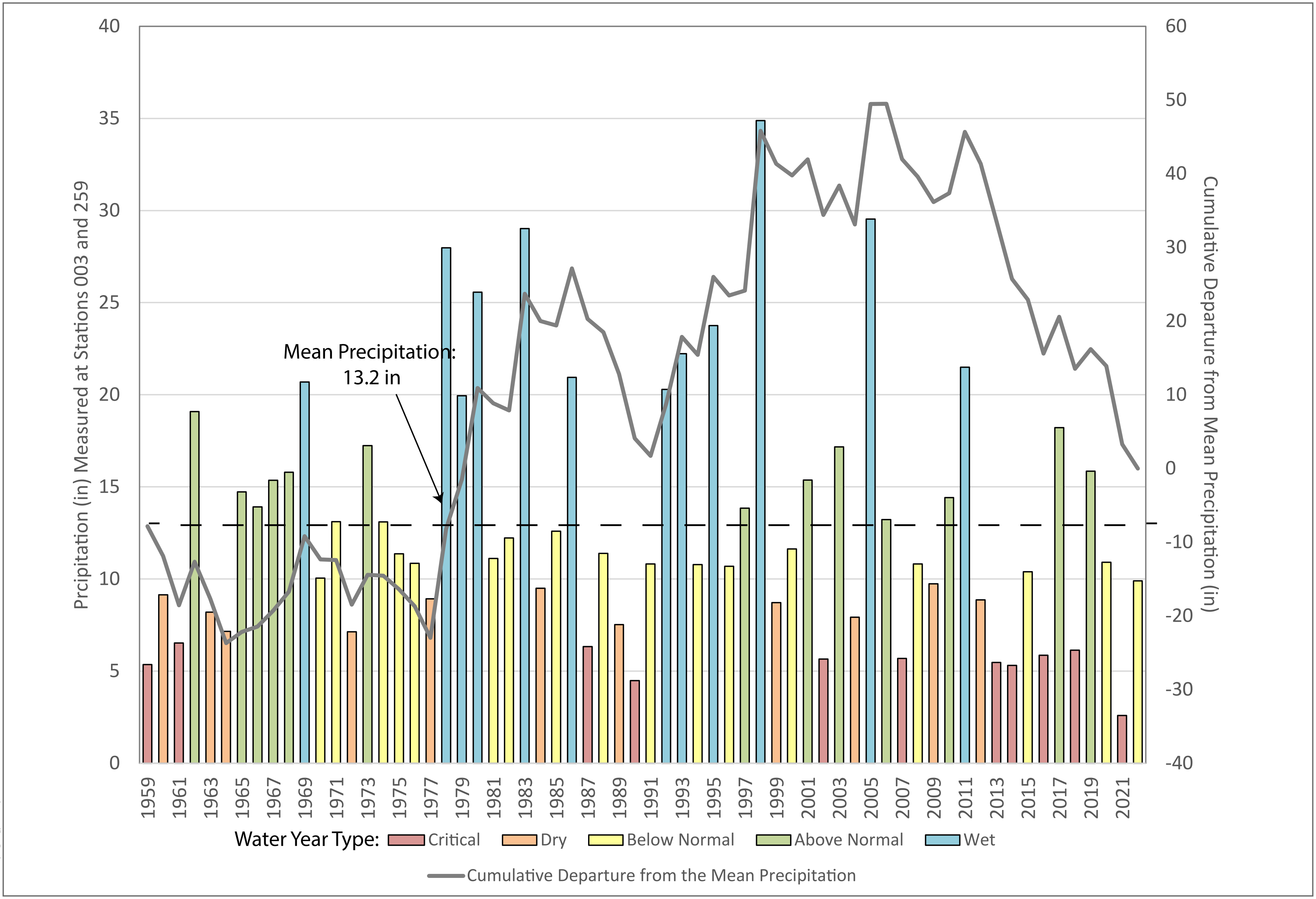

Note: Water year is from October 1 through September 30. Water year type is based on the percentage of the water year precipitation compared to the mean precipitation. Types are defined as: Wet (≥150% of mean), Above Normal (≥100% to <150% of mean), Below Normal (≥75% to <100% of mean), Dry (≥50% to <75% of average), and Critical (<50% of mean)

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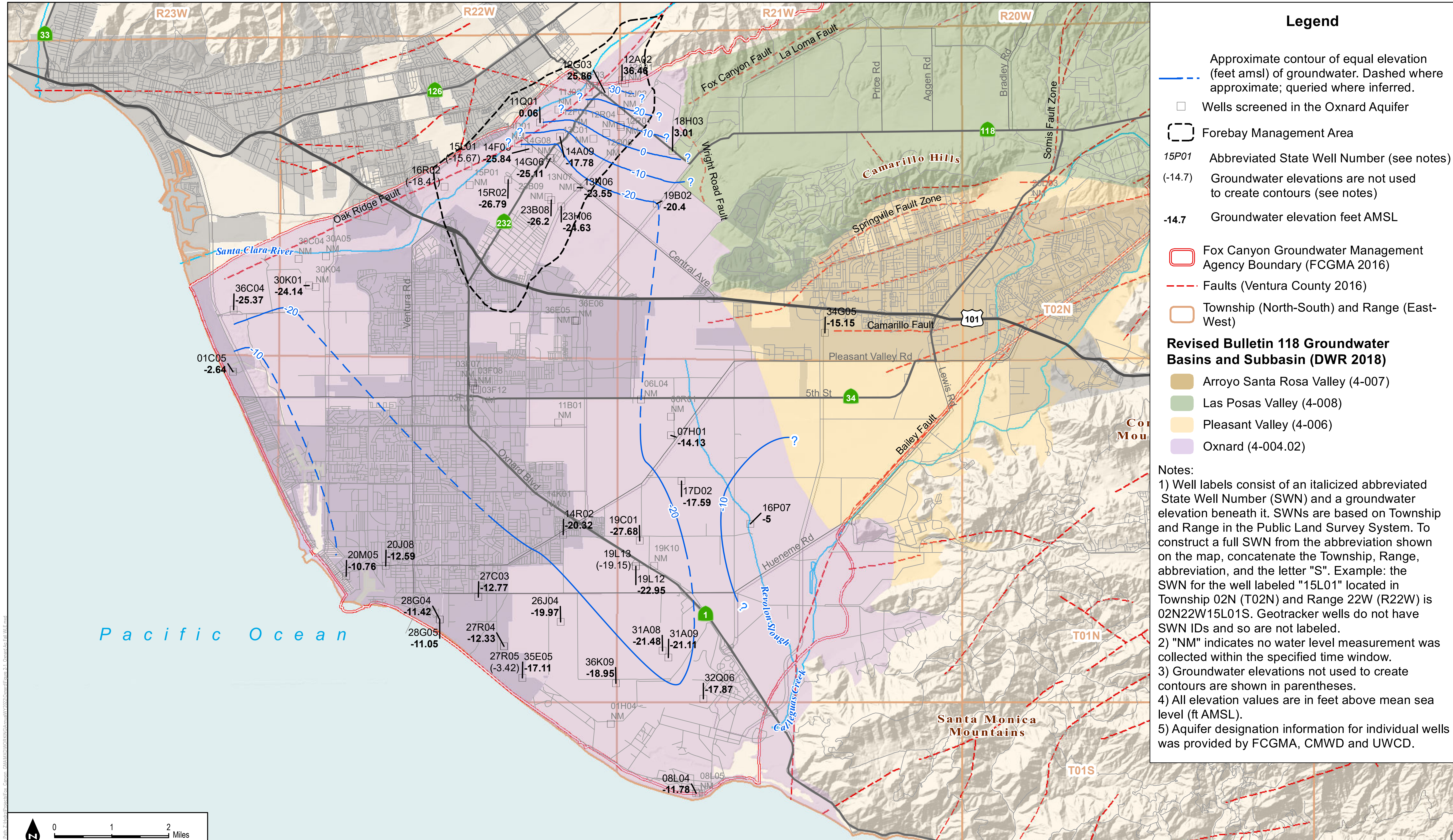
FIGURE 1-4

Pleasant Valley Basin Historical Water Year Precipitation



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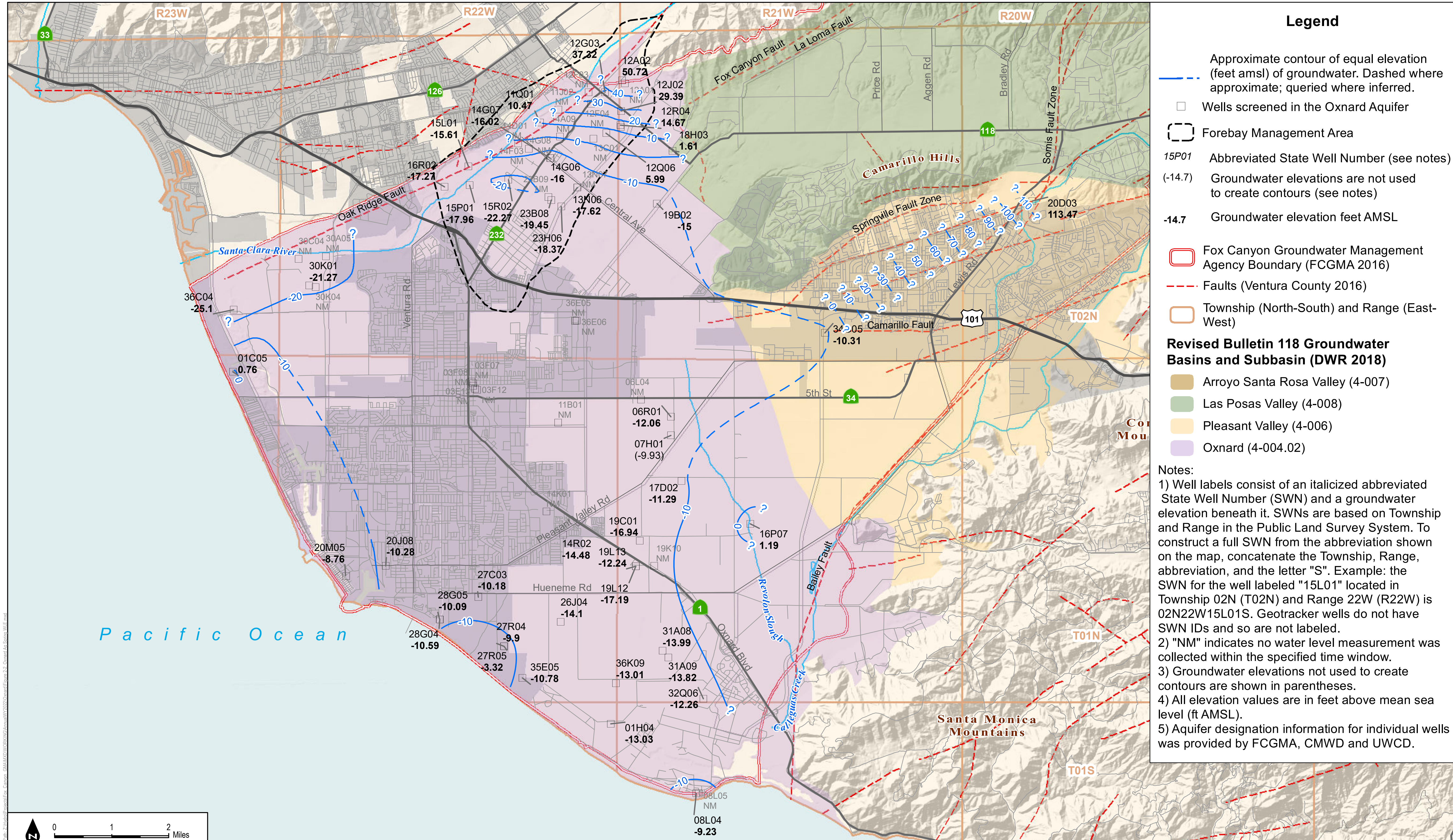
SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-1

Groundwater Elevation Contours in the Oxnard Aquifer, October 2 to October 31, 2021



SOURCE: DWR; Ventura County; UWCD; CMWD

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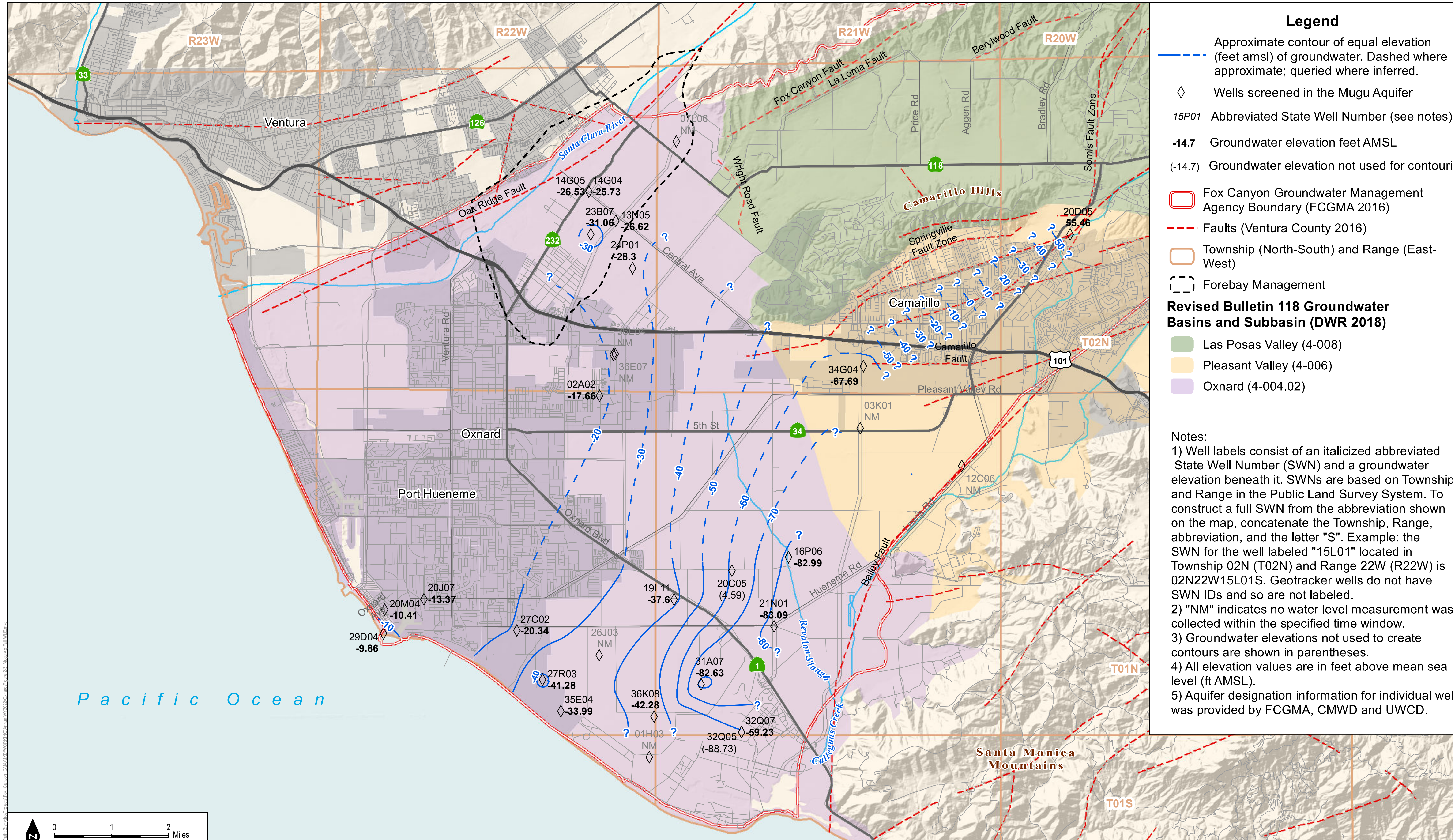
FIGURE 2-2

Groundwater Elevation Contours in the Oxnard Aquifer, March 2 to March 31, 2022



SOURCE: DWR; Ventura County; UWCD; CMWD

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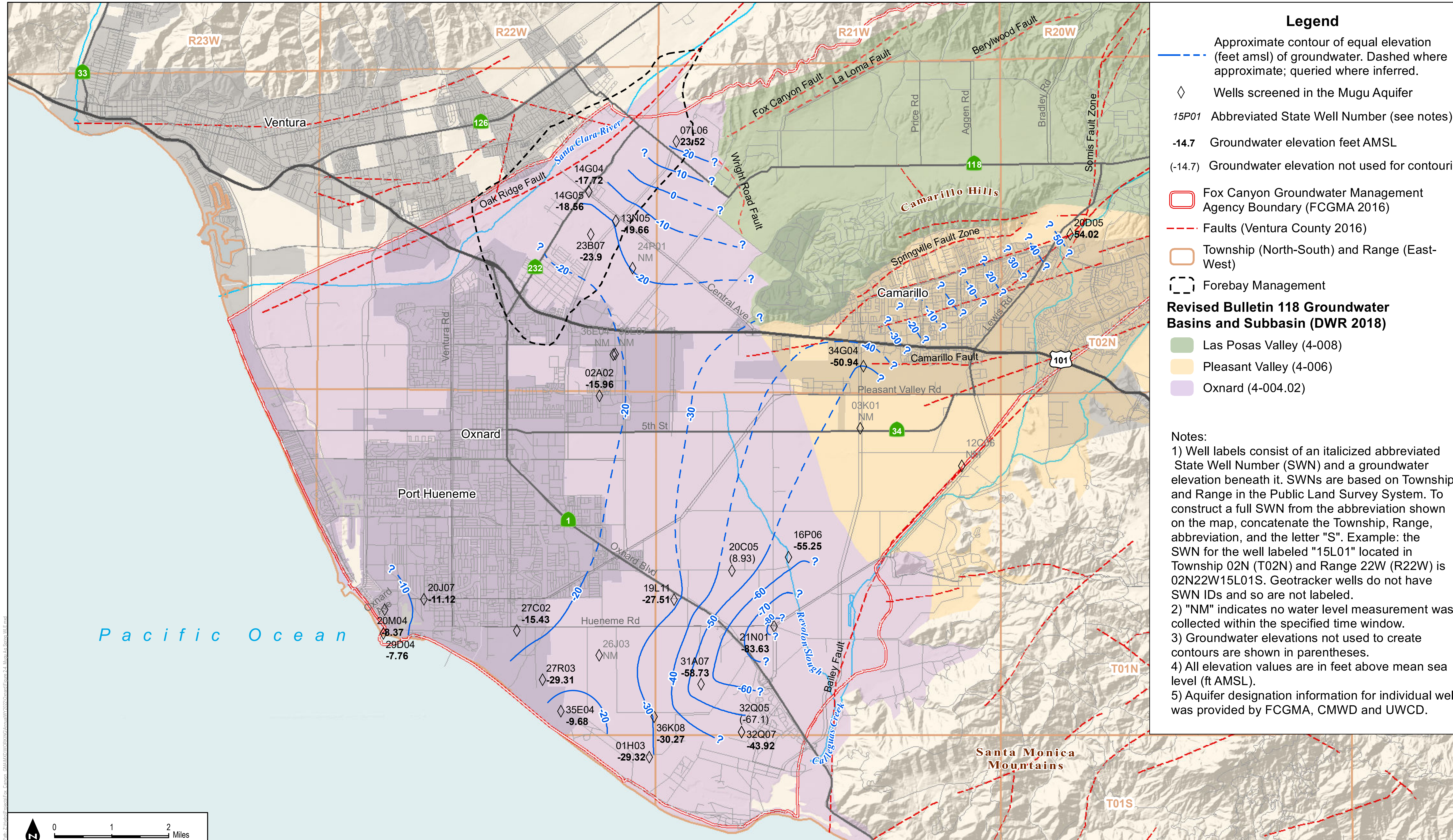
FIGURE 2-3

Groundwater Elevation Contours in the Mugu Aquifer, October 2 to October 31, 2021



SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-4

Groundwater Elevation Contours in the Mugu Aquifer, March 2 to March 31, 2022

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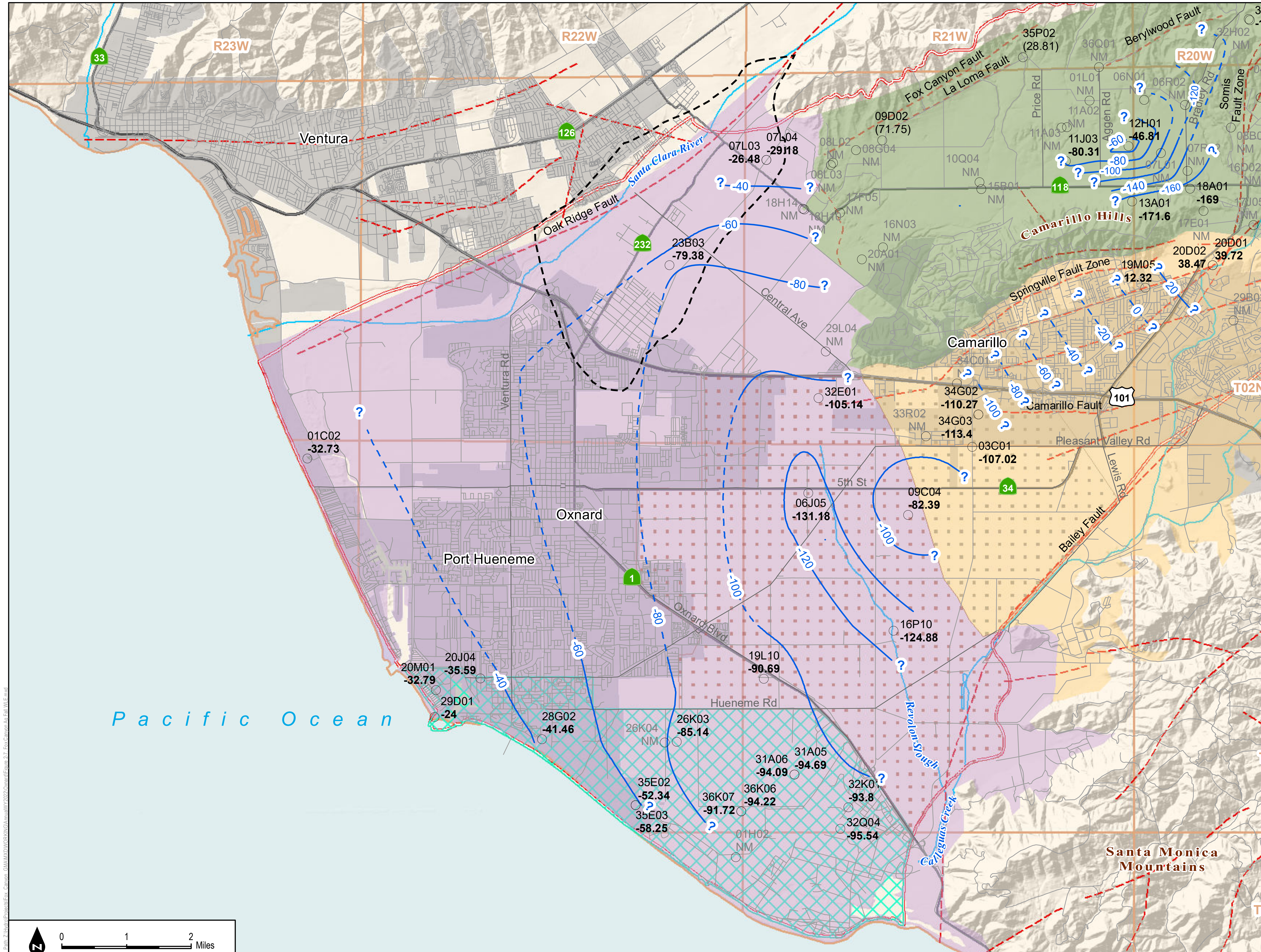


Legend

Approximate contour of equal elevation (feet amsl) of groundwater. Dashed where approximate; queried where inferred.

Wells Screened in the Fox Canyon Aquifer

15P01 Abbreviated State Well Number (see notes)

-14.7 Groundwater elevation feet AMSL

(-14.7) Groundwater elevations are not used to create contours (see notes)

Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)

Faults (Ventura County 2016)

Forebay Management

Oxnard Pumping Depression Management Area

Pleasant Valley Pumping trough Management Area

Saline Intrusion Management

Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2018)

Arroyo Santa Rosa Valley (4-007)

Las Posas Valley (4-008)

Pleasant Valley (4-006)

Oxnard (4-004.02)

Notes:

1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a groundwater elevation beneath it. SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map, concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S. Geotracker wells do not have SWN IDs and so are not labeled.
2) "NM" indicates no water level measurement was collected within the specified time window.
3) Groundwater elevations not used to create contours are shown in parentheses.
4) All elevation values are in feet above mean sea level (ft AMSL).
5) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

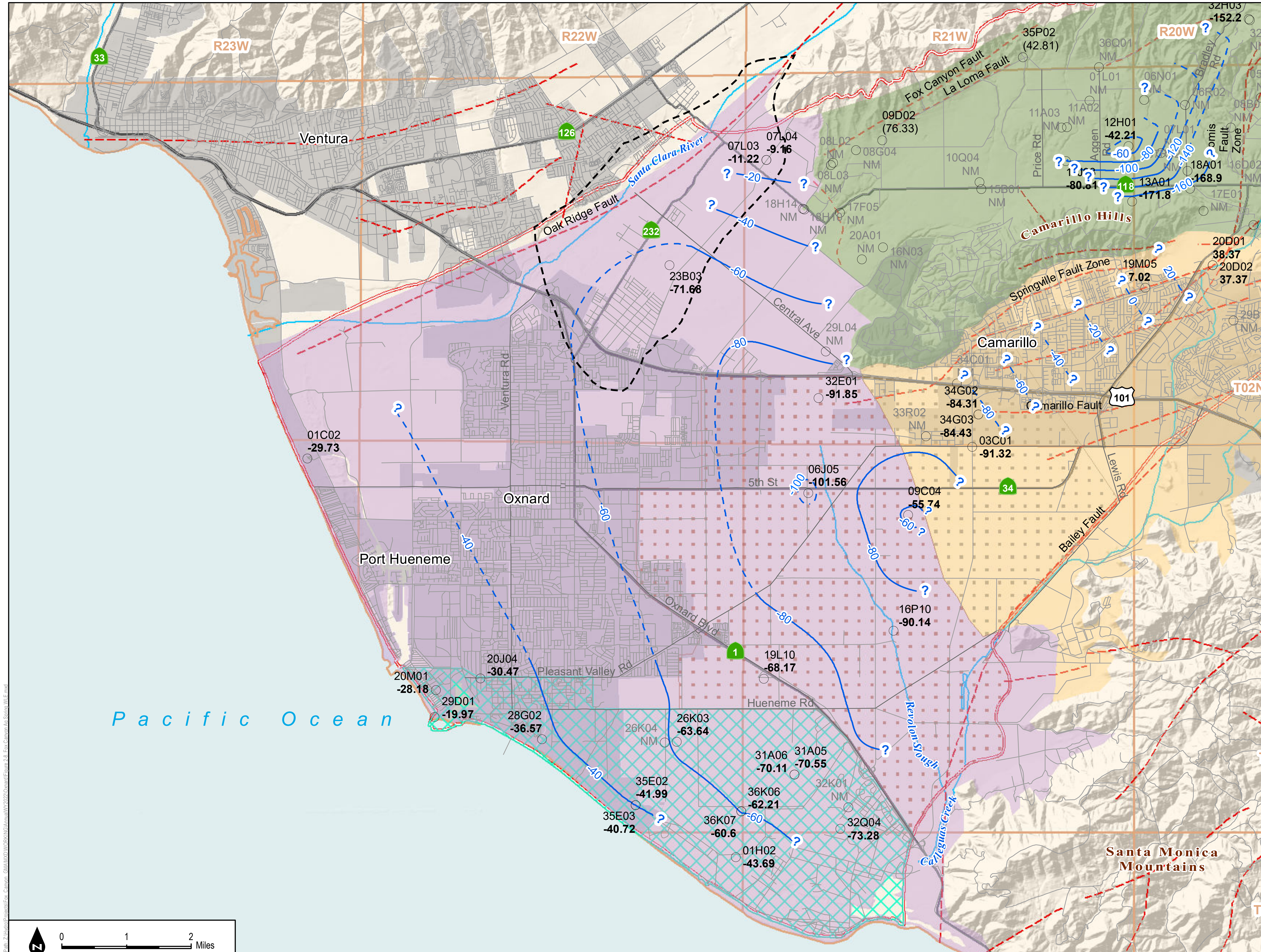
0 1 2 Miles

DUDEK

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-5

Groundwater Elevation Contours in the Fox Canyon Aquifer, October 2 to October 31, 2021



Legend

Approximate contour of equal elevation (feet amsl) of groundwater. Dashed where approximate; queried where inferred.

Wells Screened in the Fox Canyon Aquifer

15P01 Abbreviated State Well Number (see notes)

-14.7 Groundwater elevation feet AMSL

(-14.7) Groundwater elevations are not used to create contours (see notes)

Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)

Faults (Ventura County 2016)

Forebay Management Area

Oxnard Pumping Depression Management Area

Pleasant Valley Pumping trough Management Area

Saline Intrusion Management Area

Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2018)

Arroyo Santa Rosa Valley (4-007)

Las Posas Valley (4-008)

Pleasant Valley (4-006)

Oxnard (4-004.02)

Notes:

1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a groundwater elevation beneath it. SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map, concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S. Geotracker wells do not have SWN IDs and so are not labeled.

2) "NM" indicates no water level measurement was collected within the specified time window.

3) Groundwater elevations not used to create contours are shown in parentheses.

4) All elevation values are in feet above mean sea level (ft AMSL).

5) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-6

Groundwater Elevation Contours in the Fox Canyon Aquifer, March 2 to March 31, 2022

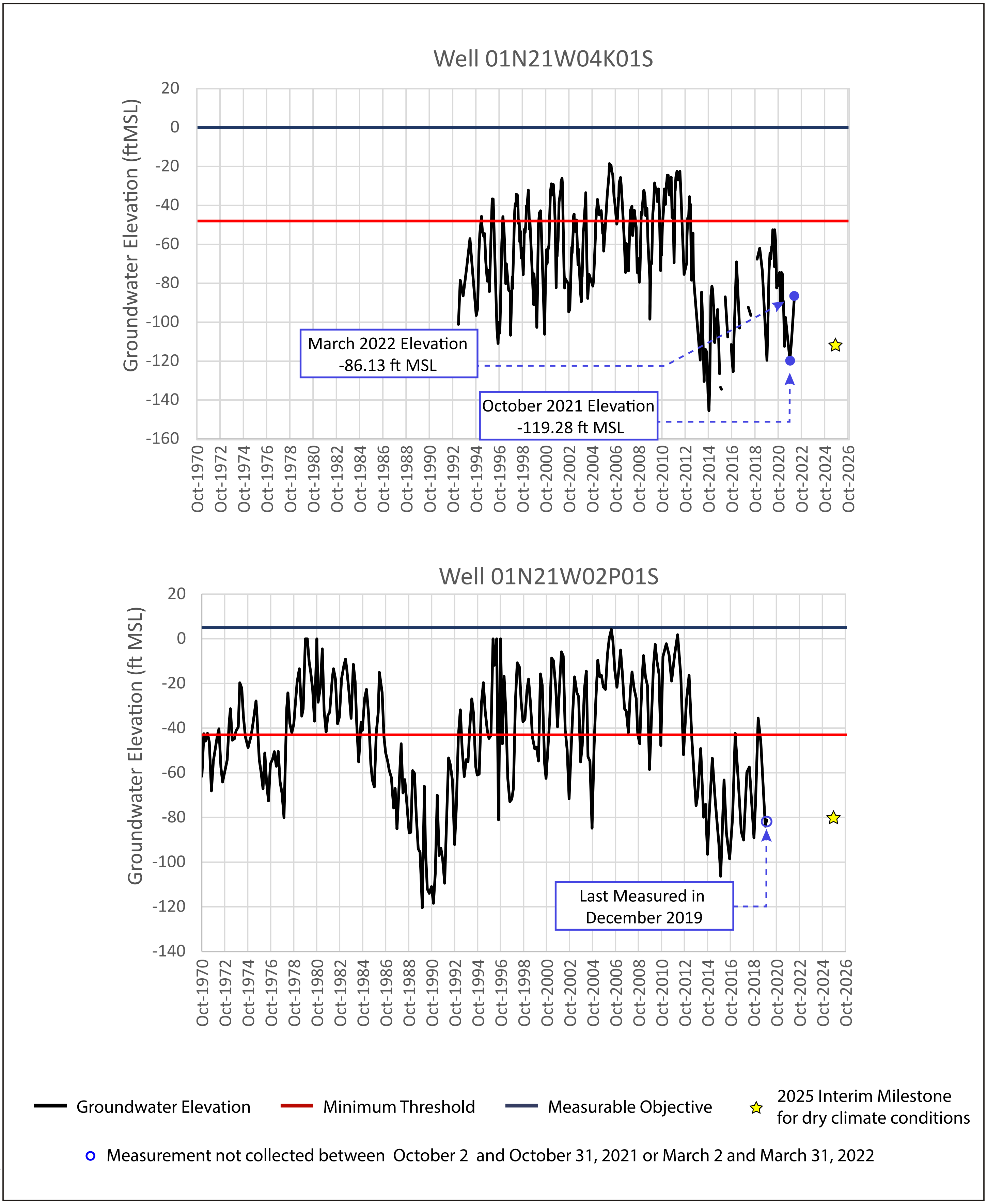


FIGURE 2-7

Groundwater Elevation Hydrographs for Representative Wells Screened in Multiple Aquifers

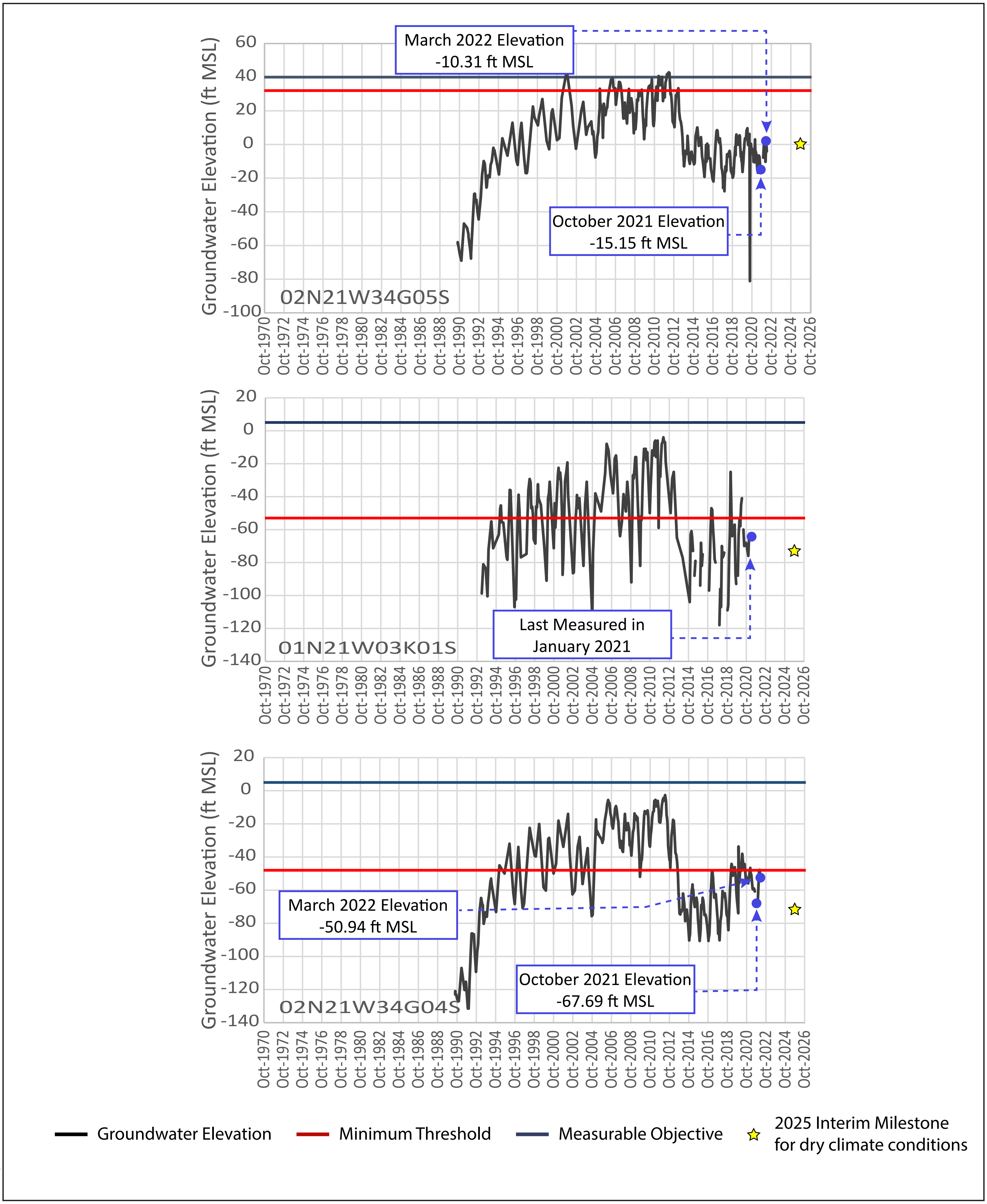
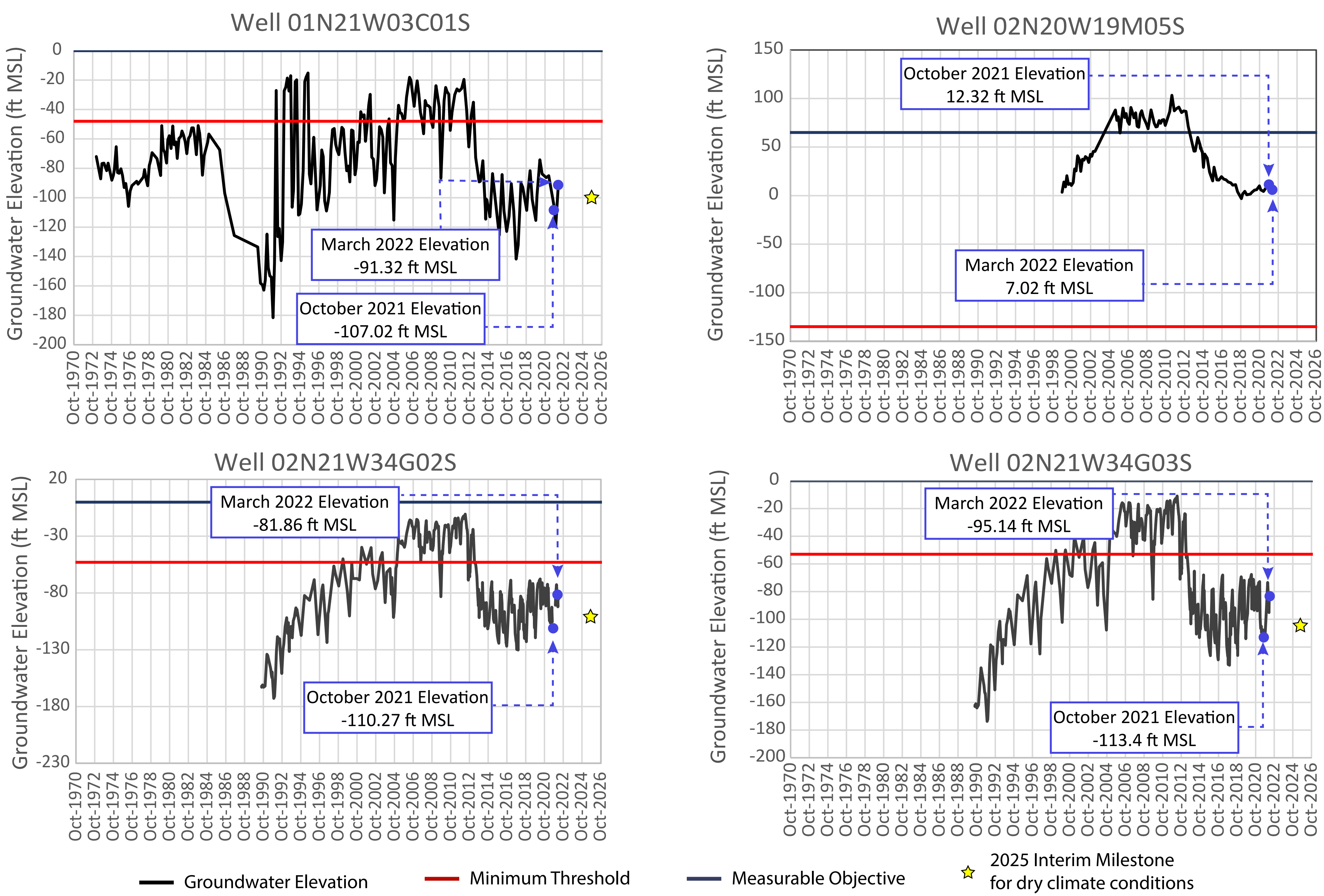


FIGURE 2-8

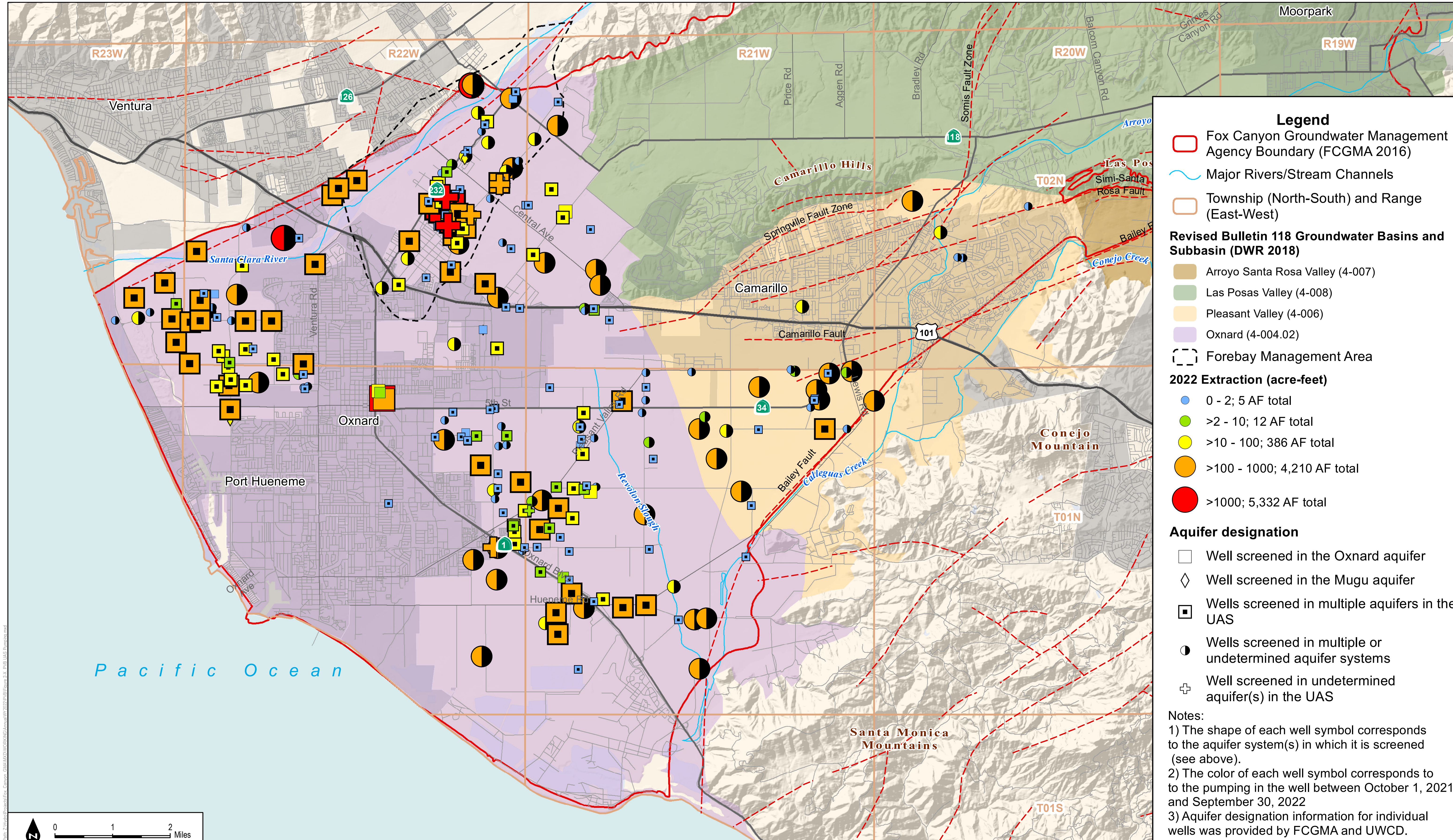
Groundwater Elevation Hydrographs for Representative Wells Screened in the Older Alluvium



Note: 2025 interim milestone groundwater elevation has not been established for 02N20W19M05S because groundwater elevations are more than 100 feet higher than the established minimim threshold groundwater elevation.

FIGURE 2-9

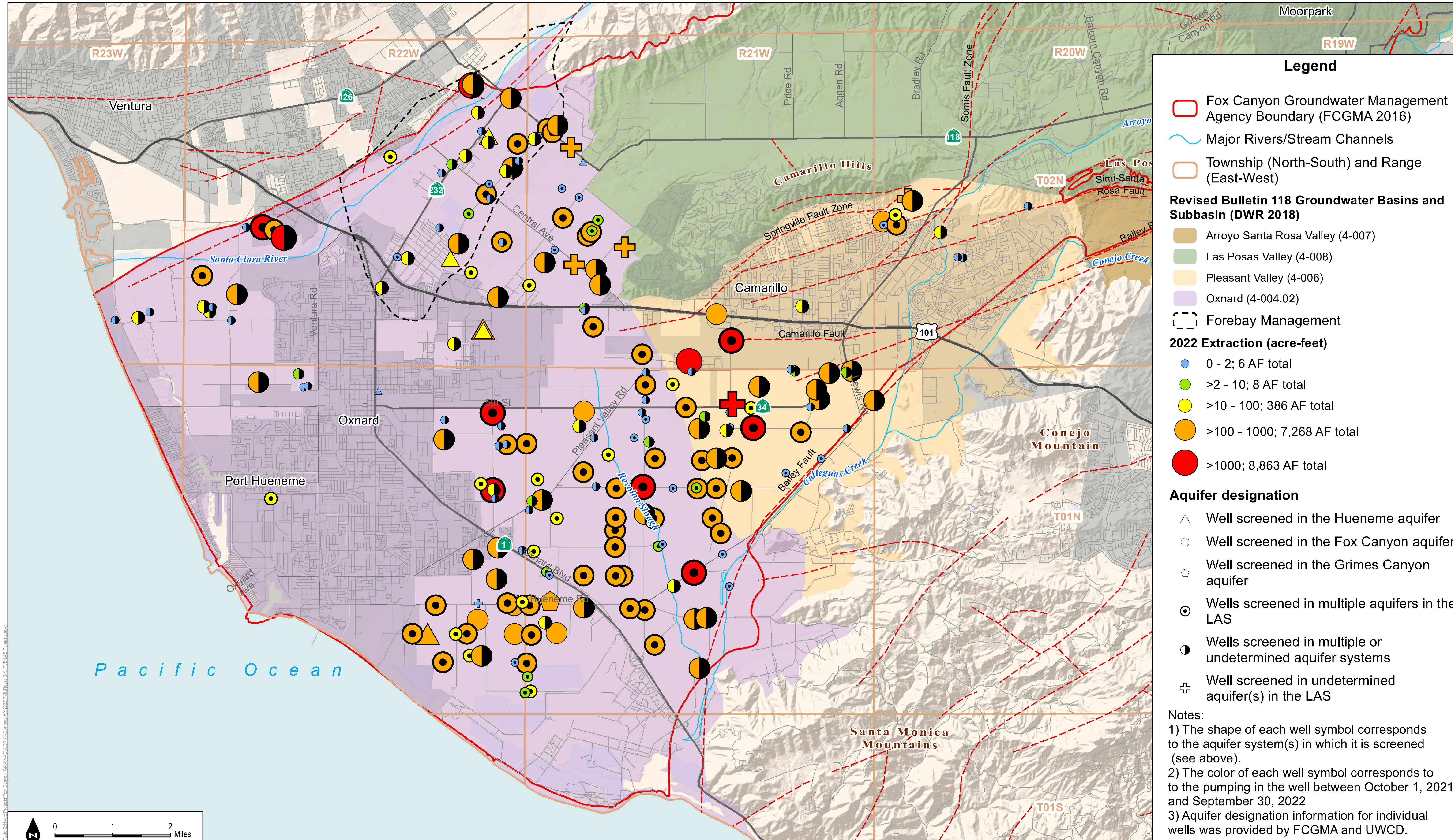
Groundwater Elevation Hydrographs for Representative Wells Screened in the Fox Canyon Aquifer



SOURCE: DWR, FCGMA, VCWPD, UWCD

FIGURE 2-10

Groundwater Production from the UAS between October 1, 2021 and September 30, 2022

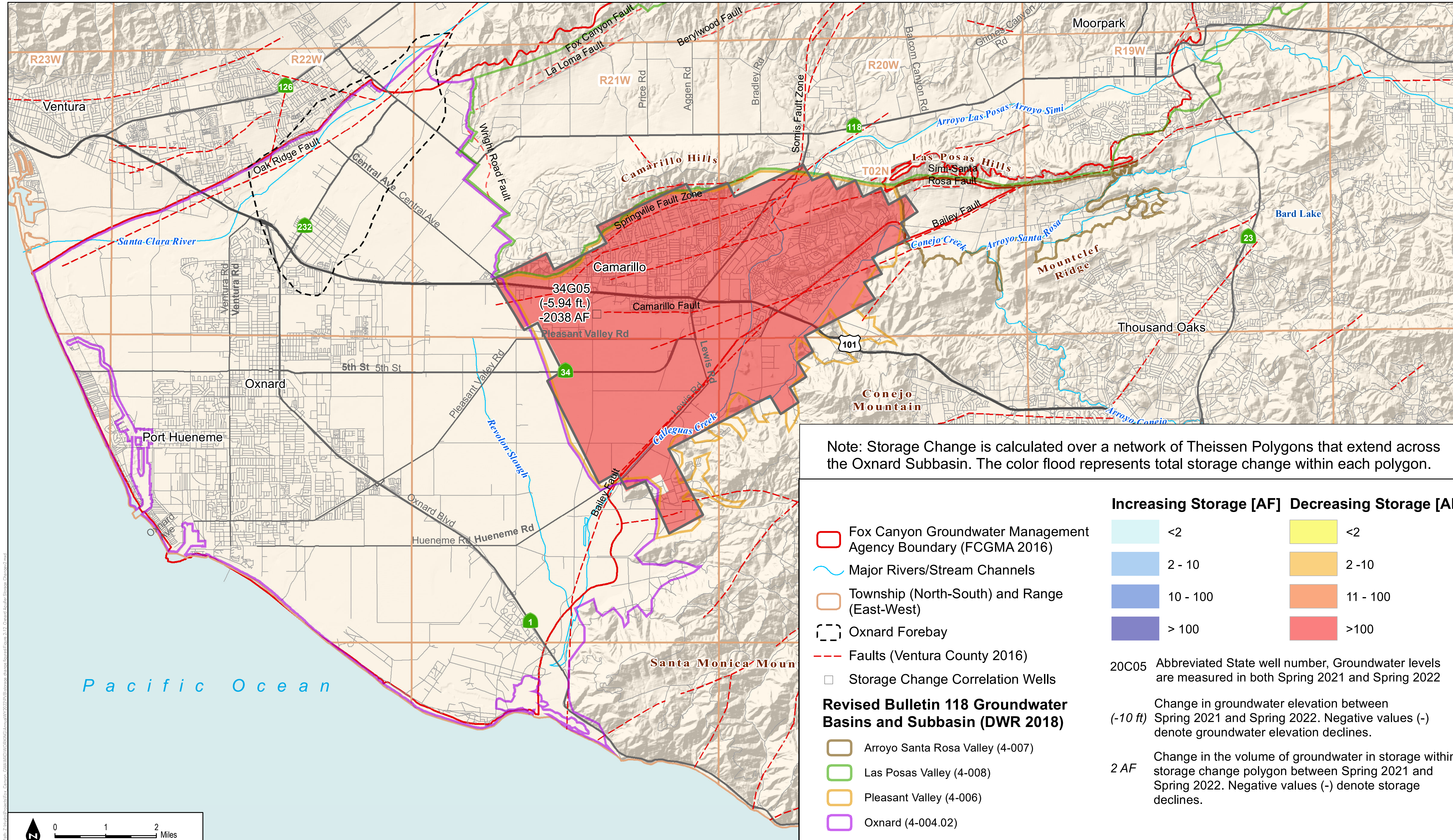


DUDEK

SOURCE: DWR, FCGMA, VCWPD, UWCD

FIGURE 2-11

Groundwater Production from the LAS between October 1, 2021 and September 30, 2022

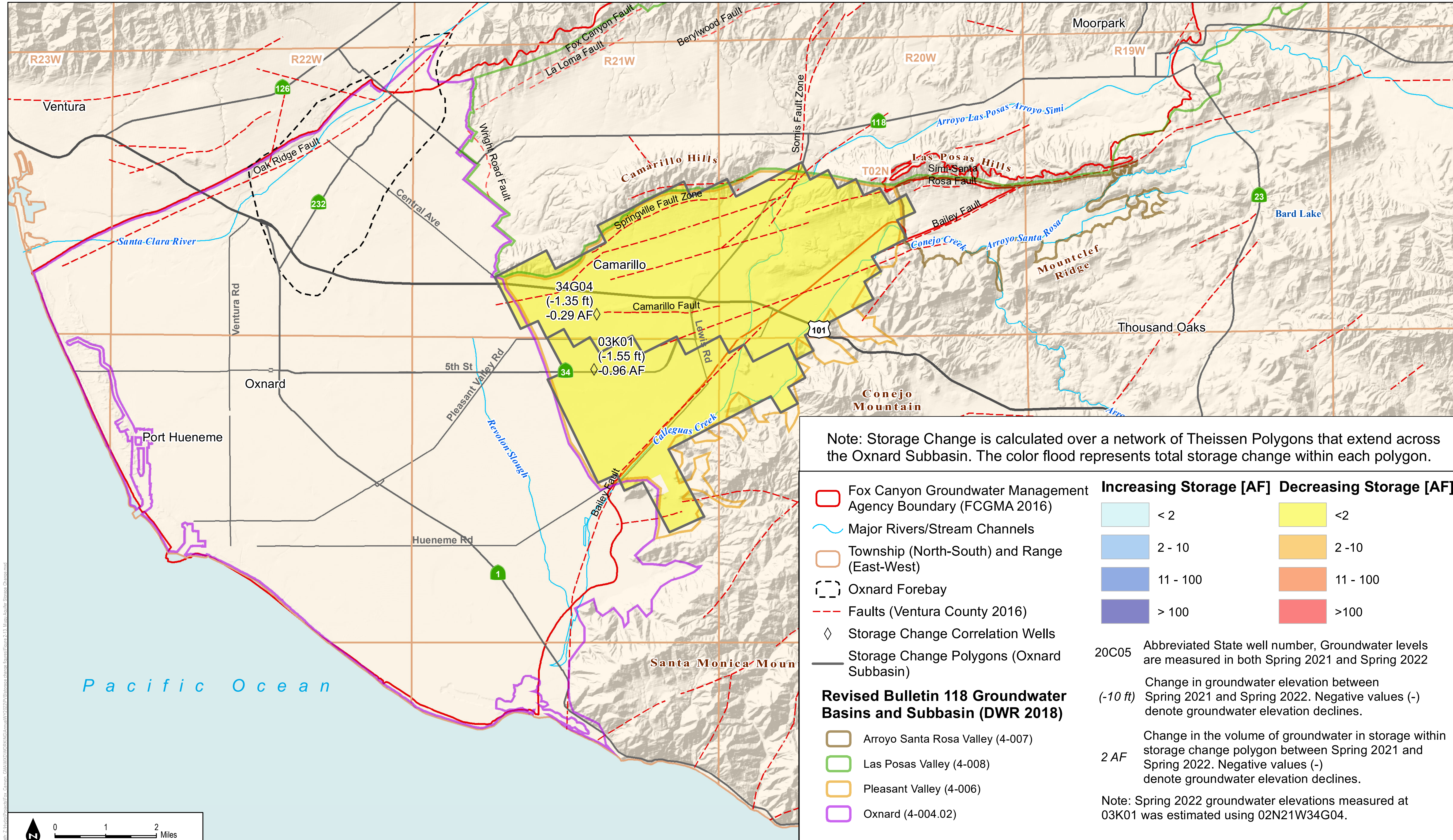


DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-12

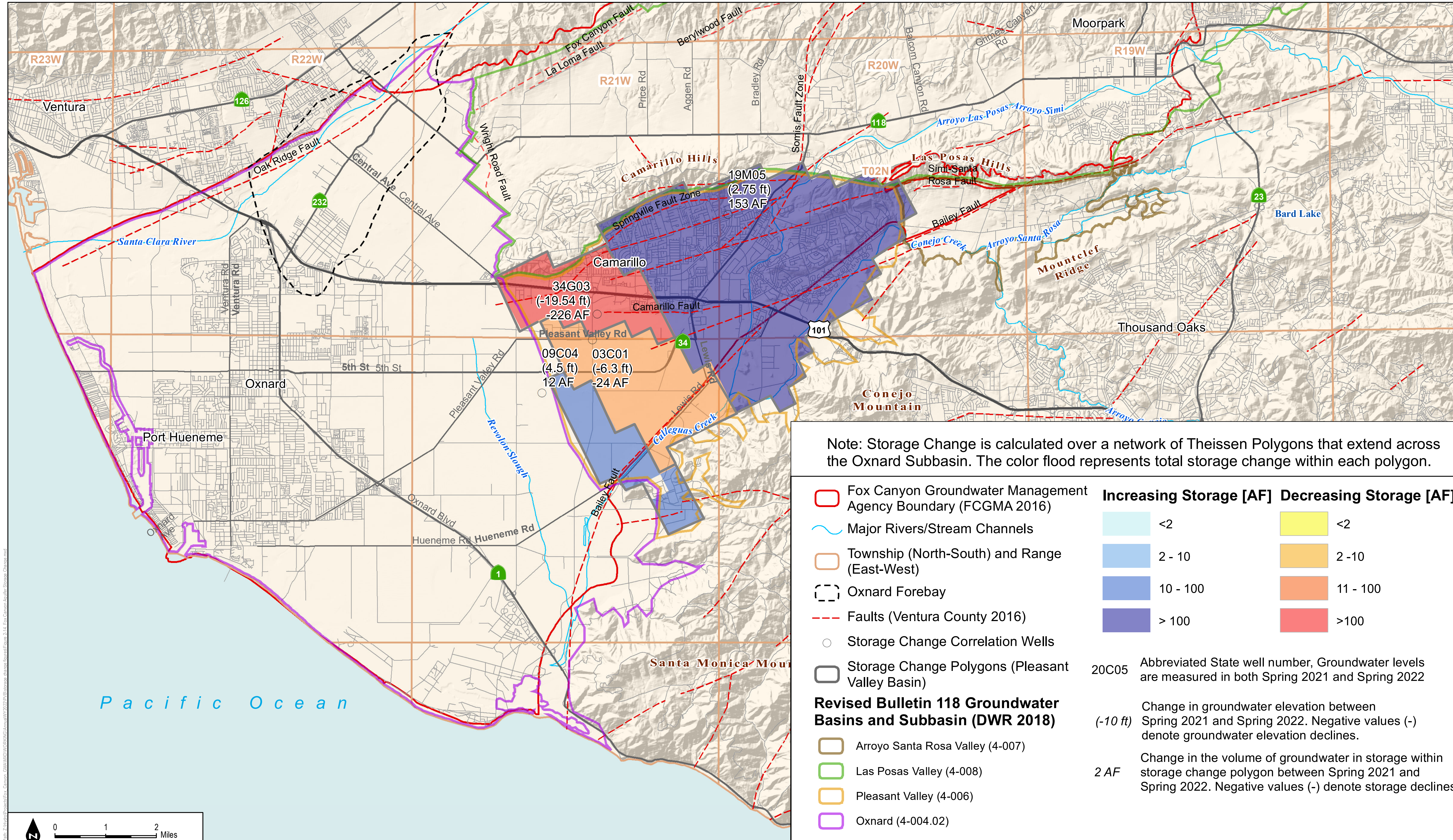
Change in Storage in the Oxnard Aquifer: Spring 2021 to Spring 2022



SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-13

Change in Storage in the Mugu Aquifer: Spring 2021 to Spring 2022

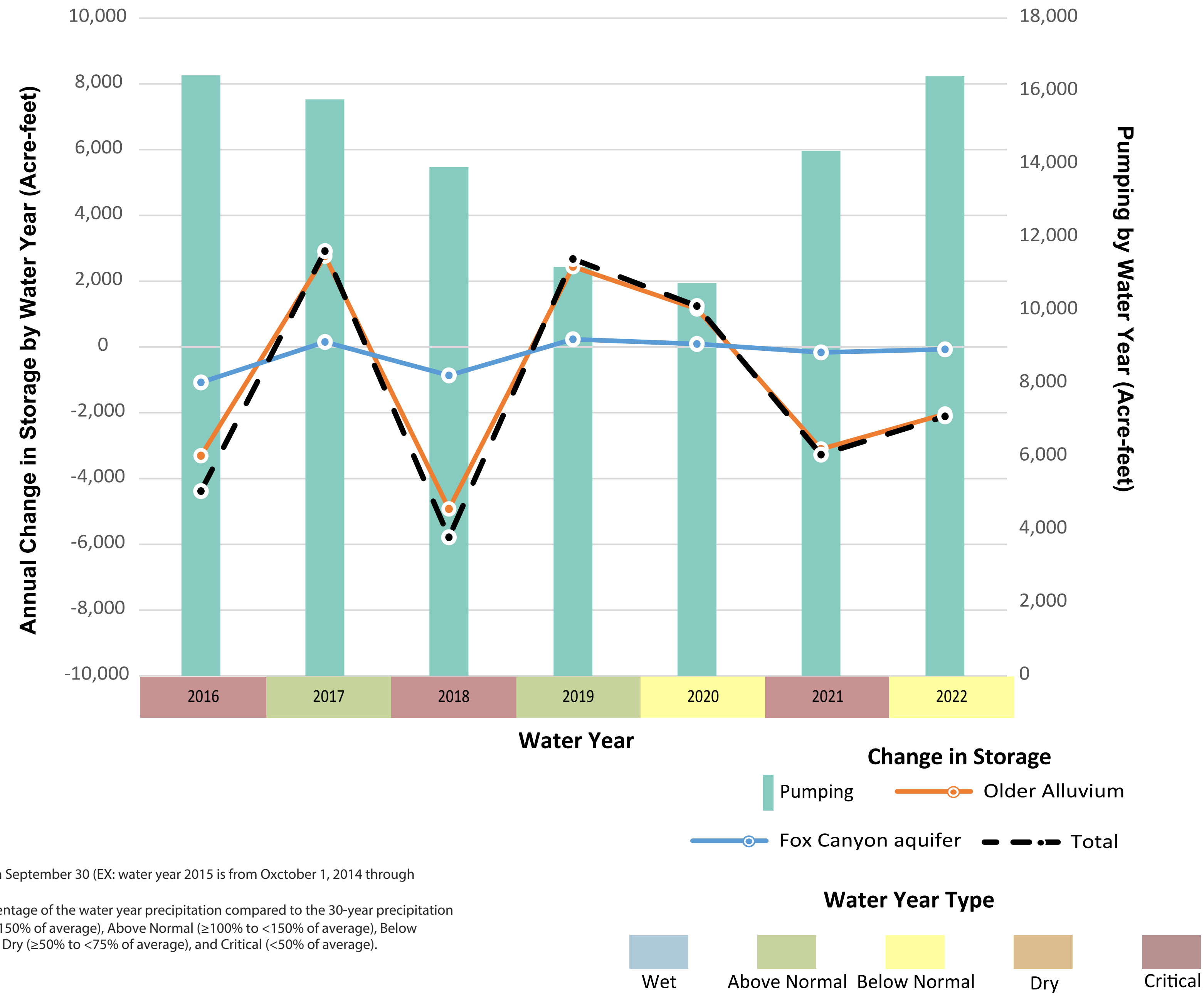


DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-14

Change in Storage in the Fox Canyon Aquifer: Spring 2021 to Spring 2022

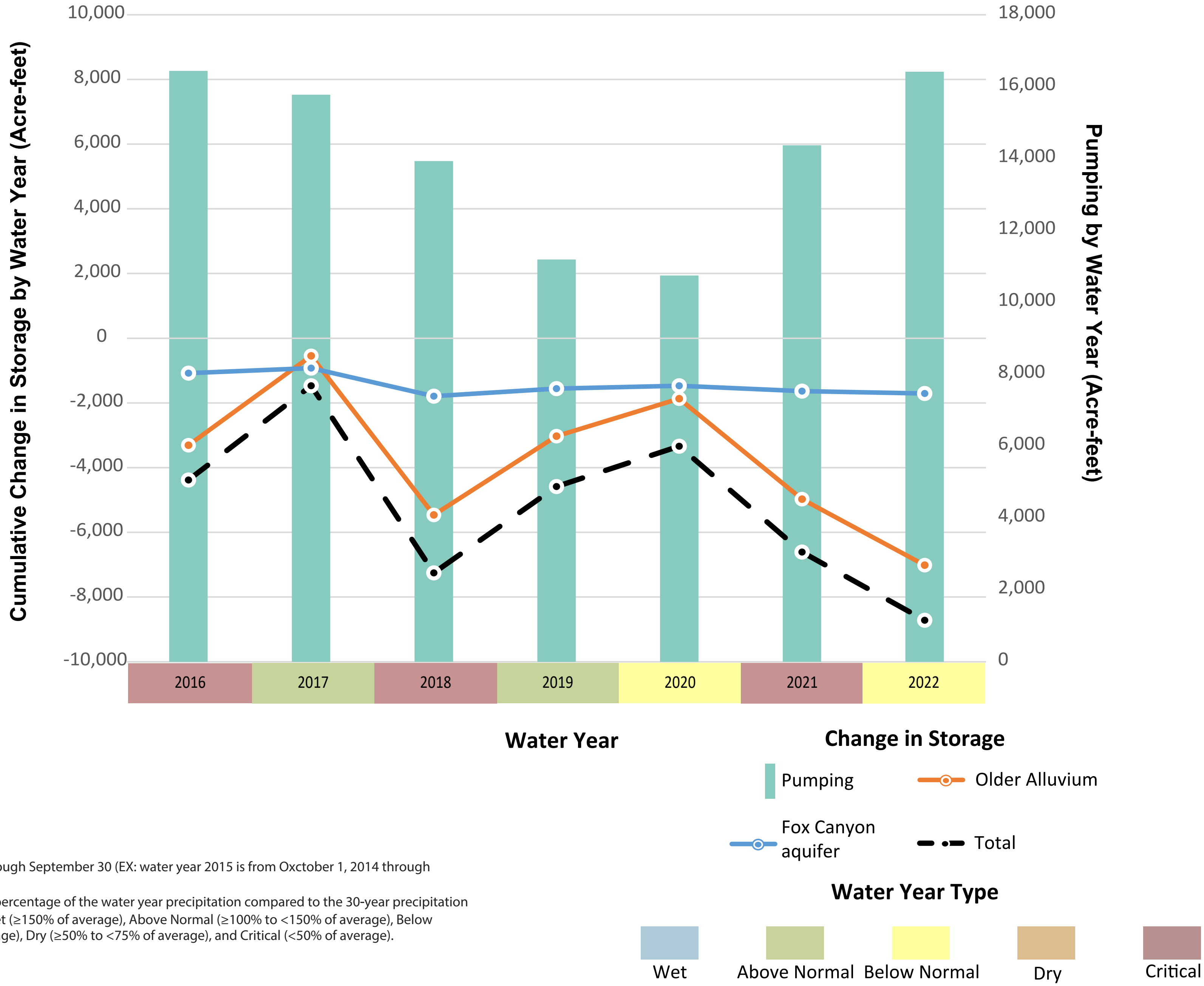


Notes:

1) Water year is from October 1 through September 30 (EX: water year 2015 is from Oxctober 1, 2014 through September 30, 2015).
2) Water year type is based on the percentage of the water year precipitation compared to the 30-year precipitation average. Types are defined as Wet (≥150% of average), Above Normal (≥100% to <150% of average), Below Normal (≥75% to <100% of average), Dry (≥50% to <75% of average), and Critical (<50% of average).

FIGURE 2-13

Water Year Type, Groundwater Use, and Annual Change in Storage in the Pleasant Valley Basin



Notes:

1) Water year is from October 1 through September 30 (EX: water year 2015 is from Oxctober 1, 2014 through September 30, 2015).
2) Water year type is based on the percentage of the water year precipitation compared to the 30-year precipitation average. Types are defined as Wet (≥150% of average), Above Normal (≥100% to <150% of average), Below Normal (≥75% to <100% of average), Dry (≥50% to <75% of average), and Critical (<50% of average).

FIGURE 2-14

Water Year Type, Groundwater Use, and Cumulative Change in Storage in the Pleasant Valley Basin

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