USLRGMA

Location: Yuima MWD Board Room
34928 Valley Center Rd.
Pauma Valley, CA 92061
Date: February 25, 2025
Time: 3:30 p.m.

SPECIAL MEETING

Upper San Luis Rey Groundwater Management Authority

Greg Kamin – Chairman	Tim Lyall – Vice Chairman	Michael Perricone- Secretary
Roland Simpson – Treasurer	Rich Stehly – Director	Chuck Bandy – Director
Steve Wehr - Director	Bill Pankey – Director	Eric Steinlicht - Director

I. Call to order

II. Pledge of Allegiance

III. Roll Call

IV. Approval of the Agenda

V. Public Comment

VI. Consent Calendar – No Consent Calendar

VII. Action Discussion

a) Presentation / Discussion – Preliminary Draft Annual Water Report.

Background: Geoscience Support Services was contracted to complete the Authority's Annual Water Report that is due to DWR by April 1, 2025. Geoscience will present the draft report for review and comments. The Board will not be approving the report at this time. Geoscience will be accepting comments until March 4, 2025, and a final report will be brought back to the Board in March for approval for submission to the State by April 1, 2025.

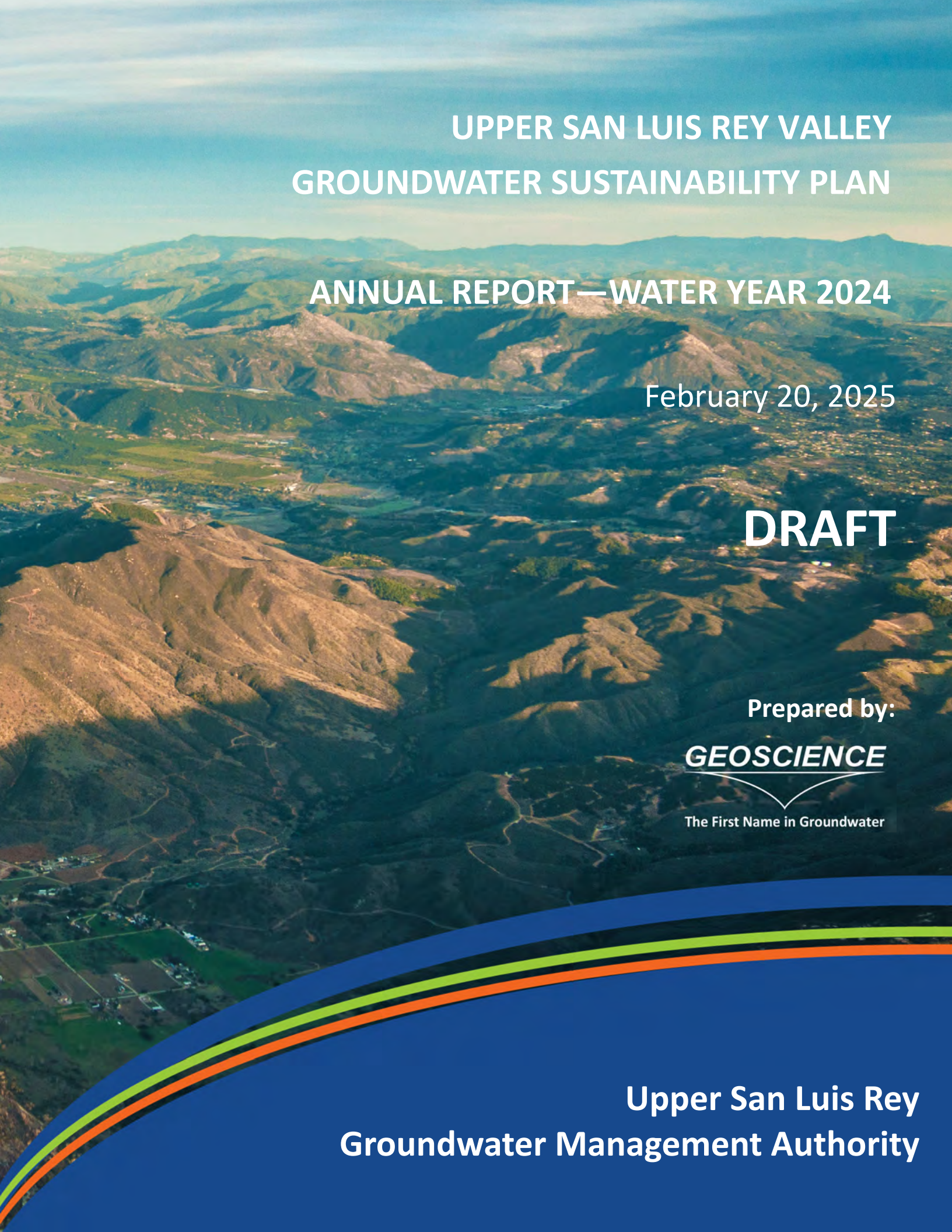
VIII. Closed Session - None

IX. Other Business

Next Regular Meeting, Tuesday, March 18, 2025

X. Adjournment

Posted: February 20, 2024 – 3:30 p.m.



UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN

ANNUAL REPORT—WATER YEAR 2024

February 20, 2025

DRAFT

Prepared by:

GEOSCIENCE

The First Name in Groundwater

Upper San Luis Rey Groundwater Management Authority

THIS REPORT IS RENDERED TO UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY AS OF THE DATE HEREOF, SOLELY FOR THEIR BENEFIT IN CONNECTION WITH ITS STATED PURPOSE AND MAY NOT BE RELIED ON BY ANY OTHER PERSON OR ENTITY OR BY THEM IN ANY OTHER CONTEXT. ALL CALCULATIONS WERE PERFORMED USING ACCEPTED PROFESSIONAL STANDARDS.

AS DATA IS UPDATED FROM TIME TO TIME, ANY RELIANCE ON THIS REPORT AT A FUTURE DATE SHOULD TAKE INTO ACCOUNT UPDATED DATA.

_____
Brian Villalobos, PG, CHG, CEG
Principal Geohydrologist

_____
Lauren Wicks, PG
Project Geohydrologist

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT – WATER YEAR 2024

(October 2023 through September 2024)

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Acronyms, Abbreviations, and Initialisms

Abbrev.	Description
acre-ft/yr	acre-feet per year
amsl	above mean sea level
Authority	Upper San Luis Rey Groundwater Management Authority (aka "USLRGMA" or "GMA")
Basin Plan	Water Quality Control Plan for the San Diego Basin
bgs	below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring
CCR	California Code of Regulations
CIMIS	California Irrigation Management Information System
CLIP	California Laboratory Intake Portal
County	County of San Diego
CSD	Community Services District
DDW	Division of Drinking Water
DTW	depth to water
DWR	California Department of Water Resources
ET	evapotranspiration
ft	foot, or feet
GDE	groundwater dependent ecosystem
GMA	Upper San Luis Rey Groundwater Management Authority (aka "USLRGMA" or "Authority")
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
InSAR	Interferometric Synthetic Aperture Radar
MCL	maximum contaminant level
Metropolitan	Metropolitan Water District of Southern California
mg/L	milligrams per liter
MNM	Monitoring Network Module
MO	Measurable Objective
MT	Minimum Threshold
MWD	Municipal Water District
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resources Conservation District
NWCC	National Water and Climate Center
PRISM	Parameter-elevation Regression on Independent Slopes Model

PVGSA	Pauma Valley Groundwater Sustainability Agency
RCA	Recommended Corrective Action
RMS	Representative Monitoring Site
SGMA	Sustainable Groundwater Management Act
SLRMWD	San Luis Rey Municipal Water District
SMC	sustainable management criteria
SWP	State Water Project
TDS	total dissolved solids
USLR	Upper San Luis Rey
USLRGM	Upper San Luis Rey Groundwater Model
USLRGMA	Upper San Luis Rey Groundwater Management Authority (aka “GMA” or “Authority”)
USLRRCD	Upper San Luis Rey Resource Conservation District
Water Authority	San Diego County Water Authority
WY	Water Year
YMWD	Yuima Municipal Water District

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT – WATER YEAR 2024

(October 2023 through September 2024)

1.0 Executive Summary

The Upper San Luis Rey Groundwater Management Authority (USLRGMA, or Authority), successor to the Pauma Valley Groundwater Sustainability Agency (PVGSA), has prepared this annual report for the Upper San Luis Rey (USLR) Valley Groundwater Subbasin Groundwater Sustainability Plan (GSP) to be submitted to the Department of Water Resources (DWR) in accordance with the Sustainable Groundwater Management Act (SGMA). This annual report presents required data Water Year (WY) 2024 (i.e., October 2023 through September 2024).

The Upper San Luis Rey (USLR) Valley Groundwater Subbasin (DWR subbasin 9-007.01) includes the Pauma and Pala Subbasins and encompasses approximately 19,200 acres in San Diego County. Valley areas are separated by narrow, steep-walled canyons and underlain by unconsolidated alluvial fill that serves as storage for groundwater. Land use within Pauma subbasin is predominantly irrigated agriculture. Likewise, the majority of water use within the subbasin (over 90%) is for agricultural purposes. Sources of water within the USLR Subbasin include groundwater, surface water, and imported water.

The USLR Valley Groundwater Subbasin was categorized as a medium-priority basin, resulting in the development of a GSP for the Subbasin which was submitted to DWR in January 2022. The goal of the GSP is to ensure that groundwater continues to be available to everyone who uses it far into the future. Sustainable Management Criteria (SMC) were developed for identifying undesirable results and measuring sustainability. DWR issued approval of the GSP for the USLR Valley Groundwater Subbasin on January 18, 2024, and provided recommended corrective actions (RCAs) to enhance the GSP and facilitate future evaluations.

Information provided in this annual report of the USLR Groundwater Subbasin indicate the following conditions:

- Precipitation during WY 2024 is classified as above normal based on recorded precipitation of 25.79 inches at Henshaw Dam. Long-term average precipitation at this station is approximately 24.4 inches.
- Groundwater elevations in fall 2024 were higher in almost every monitored well than measured elevations in fall 2023 due to the above average precipitation experienced in the groundwater basin during WYs 2023 and 2024. The greatest increases in groundwater elevations are seen in wells in the upper and lower Pauma Subbasin areas. The average fall water level increase throughout Pauma Subbasin was approximately 7 ft
- Groundwater storage was estimated to increase by approximately 11,400 acre-ft during WY 2024.

- Groundwater levels and groundwater in storage for WY 2024 in all RMSs are above MTs – indicating the absence of undesirable results related to chronic declines in groundwater levels or groundwater storage. Water levels in at least 86% of the RMSs are also above MOs under both spring and fall conditions.
- WY 2024 average TDS concentrations for available water quality measurements range from 220 mg/L to 1,100 mg/L while nitrate (NO_3) concentrations range from 3 mg/L to 148 mg/L. Historical water quality data from downgradient subbasins (i.e., Bonsall and Mission Subbasins) indicates that TDS tends to increase downgradient. Increased levels of TDS in WY 2024 are found in the lower Pauma subbasin area (vicinity of MW-21 through MW-24). The highest nitrate (NO_3) concentrations from WY 2024 are located in the upper portions of Pauma Subbasin, above Sycamore Canyon.
- Current ambient water quality in Pauma Subbasin (WY 2019-2024) is approximately 630 mg/L and 33.3 mg/L for TDS and nitrate as NO_3, respectively. This represents an increase from the previous year of approximately 12 mg/L for TDS and 1.5 mg/L for nitrate as NO_3. However, changes in calculated ambient water quality could be a product of uncertainty associated with the current methodology and may not be reflective of actual changing conditions. Per DWR recommendations, SMCs for water quality and the evaluation of changes in water quality will be clarified and redefined as necessary in the next plan amendment.
- While land subsidence is not considered a concern for the USLR Groundwater Subbasin, available InSAR data confirmed that no significant land subsidence occurred during WY 2024.
- Total water use in the subbasin in WY 2024 was estimated to be approximately 15,600 acre-ft, approximately 3,800 acre-ft more than what was estimated for the previous wet year but still less than water use in WYs 2015 through 2022. This includes 10,800 acre-ft of groundwater pumping, 4,100 acre-ft of imported water, and 800 acre-ft of local surface water. The reduced water usage can be attributed to the above average rainfall conditions experienced during WY 2024; continued utilization of local surface water supplies and the ability of precipitation to satisfy a portion of agricultural water requirements lead to reduced reliance on groundwater pumping.
- WY 2024 groundwater pumping is below the estimated safe yield for the USLR Groundwater Subbasin of between 12,700 acre-ft/yr (calculated for long-term historical conditions from 1991 through 2020) to 20,300 acre-ft/yr (calculated for current conditions from 2016 through 2020).

The Authority continued efforts to maintain sustainability in the USLR Valley Groundwater Subbasin throughout WY 2024, including ongoing development and implementation of projects and management actions. These efforts included:

- Continued incorporation of a new monitoring locations to address certain data gap areas.
- Completion of a Cost-of-Service Study outlining a fee schedule for funding the Authority's operational expenses for the next five years of GSP implementation.
- Adoption of groundwater extraction fees and associated charges to create a local and permanent funding source for continued basin management and sustainability monitoring.
- Ongoing water conservation and agricultural irrigation best management practices.

Progress towards GSP implementation and sustainability will continue. New information will be used to assess, clarify, and refine RMSs and SMCs as needed during the next periodic assessment and plan amendment (due to DWR in January 2027), following DWR guidance identified in their RCAs. Results of basin monitoring efforts and investigations performed this coming water year will be presented in the next annual report (WY 2025), to be submitted to DWR by April 1, 2026.

2.0 Introduction and General Information

2.1 Background

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package, composed of AB 1739, SB 1168, and SB 1319, collectively known as the Sustainable Groundwater Management Act (SGMA), providing California with a framework for sustainable groundwater management. In accordance with SGMA, the Pauma Valley Groundwater Sustainability Agency (PVGSA[1]) was formed to prepare a Groundwater Sustainability Plan (GSP) for the Upper San Luis Rey (USLR) Valley Groundwater Subbasin, which was submitted to the Department of Water Resources (DWR) in January 2022[2]. DWR issued an approval of the plan, with recommended corrective actions, on January 18, 2024. The goal of the GSP is to ensure that groundwater continues to be available to everyone who uses it far into the future. The Plan describes basin conditions, including the geology of the basin and groundwater levels within it, establishes sustainability goals for the basin, and outlines steps and potential management actions to ensure sustainability.

Article 7 of the Emergency Groundwater Sustainability Plan Regulations (23 CCR §356.2) establishes the requirements for Groundwater Sustainability Agencies (GSAs) to submit annual reports to DWR by April 1 each year following adoption of a GSP. This report represents the fourth annual report of the USLR Groundwater Subbasin and covers the period for Water Year (WY) 2024 (i.e., October 2023 through September 2024).

2.2 Plan Area

The San Luis Rey Valley Groundwater Basin, located in San Diego County, extends from the confluence of the San Luis Rey River and Paradise Creek, continuing downstream through four valleys (Pauma, Pala, Bonsall, and Mission) and ending at the Pacific Ocean in the City of Oceanside (Figure 1). Assembly Bill No. 1944, Chapter 255 (AB 1944, 2018), an act to amend Section 10721 of and to add Section 10722.5 to the Water Code, defines the boundary that divides the Upper and Lower San Luis Rey Valley Groundwater Subbasins. The USLR Valley Groundwater Subbasin (DWR subbasin 9-007.01) includes the Pauma and Pala Subbasins and encompasses approximately 19,200 acres. The valley areas are separated by narrow, steep-walled canyons and underlain by unconsolidated alluvial fill that serves as storage for groundwater. Elevation ranges from approximately 250 ft above mean sea level (amsl) in valley areas to over 5,700 ft amsl in the surrounding watershed area.

The USLR Valley Groundwater Subbasin can be further subdivided into two subbasins: the Pauma Subbasin and the Pala Subbasin (Figure 1). The Pauma Subbasin extends from the confluence of the San Luis Rey River and Paradise Creek to the Agua Tibia Narrows near the confluence of the San Luis Rey River

[1] The PVGSA consists of Yuima Municipal Water District (YMWD), Pauma Municipal Water District (Pauma MWD), Pauma Valley Community Services District (CSD), San Luis Rey Municipal Water District (SLRMWD), and the Upper San Luis Rey Resource Conservation District (USLRRCD). Since development of the GSP, the PVGSA has transitioned to the Upper San Luis Rey Groundwater Management Authority (USLRGMA, or Authority).

[2] The USLR Valley GSP is available through the DWR SGMA Portal website at: https://sgma.water.ca.gov/portal/gsp/preview/76

and Frey Creek. The Pala Subbasin extends from the Agua Tibia Narrows to Monserate Narrows. Based on prior decisions by the State of California, groundwater in Pala Subbasin, located downstream of Frey Creek, has been determined to be a subterranean stream flowing through known and definite channels (SWRCB, 2002). While subterranean streams are generally excluded from SGMA, Assembly Bill 1944 was put forth to include the area of the subbasin downstream from Frey Creek (i.e., Pala Subbasin) as part of SGMA for the purposes of groundwater sustainability. AB 1944 does not alter any existing water right. Therefore, the GSP components addressed both the Pauma and Pala Subbasins.

The general climate of the area is Mediterranean, with warm, dry summers and mild winters, although temperatures do occasionally fall below freezing. Most precipitation falls between the months of November and April with infrequent rain the rest of the year (particularly in summer months). Precipitation is also two to three times greater in the surrounding hills and mountain areas than in the valley areas (Ellis and Lee, 1919). Cyclic hydrologic patterns are common, including wet periods of above-average rainfall and dry periods (drought) with below-average rainfall. Therefore, year-to-year rainfall – as well as groundwater recharge – can be highly variable.

Land use within Pauma subbasin is predominantly irrigated agriculture/parks/golf (52%), followed by 27% open space/ water, 17% residential, and 4% commercial/ industrial/ public facilities. In Pala Subbasin, land use is approximately 42% open space/ water, 38% irrigated agriculture/ parks, 12% residential, and 8% commercial/ industrial/ public facilities. Likewise, the majority of water use within the subbasin is for agricultural purposes, consisting primarily of citrus, avocados, and sub-tropical fruits (within the YMWD service area, approximately 91% of the water goes to agricultural use). Sources of water within the USLR Subbasin include groundwater, surface water, and imported water.

The majority of groundwater in the USLR Valley Groundwater Subbasin is produced from the porous flood plain and alluvial material representing valley fill. Productivity generally decreases with decreasing thickness of unconsolidated material. Alluvial sediments in valleys are generally thickest under the San Luis Rey River. In Pauma Valley, sediments may be up to 600 ft thick in localized areas of the northeast portion of the subbasin (Layne, 2010). However, these locations with greater sediment depth typically coincide with alluvial fan deposits, which tend to be less productive. The Pauma and Pala Subbasins are hydraulically connected, with groundwater from the upgradient Pauma Subbasin flowing into Pala Subbasin.

3.0 Hydrologic Conditions

The younger alluvium in the subbasin represents particularly productive aquifer units while the alluvial fans tend to be less productive due to their poorly sorted nature and the presence of significant amounts of fine-grained material. The alluvial aquifer system in the groundwater subbasin is largely unconfined in nature, though localized semi-confined and confined conditions may exist where substantial lacustrine deposits are present (i.e., areas underlying fine-grained lakebed deposits from paleo Lake Pauma) (Howes, 1955; Moreland, 1974). Available water level information generally has not indicated the presence of separate, distinct aquifer systems, though the majority of data are for wells with deeper completions. Water levels for new clustered monitoring wells constructed in Pauma Subbasin in 2023 (including one shallow and one deep completion) indicate that there may be perched groundwater above the clay layer. However, since data on the shallow system are extremely limited, the discussion of hydrologic conditions in the subbasin considers one aquifer body, representative of the source for the majority of groundwater pumping.

3.1 Water Year Type

Historical annual rainfall is available at the National Oceanic and Atmospheric Administration (NOAA) precipitation station at Henshaw Dam (shown on Figure 1 inset). Annual water year precipitation here averages 24.4 inches per year from 1943 through 2024 (Figure 2). This gage is located at higher elevation, so precipitation in the USLR Valley Groundwater Subbasin is lower than the amounts shown on Figure 2. However, the Henshaw gage has the most complete and extensive precipitation record of nearby gages. For the groundwater budget presented in the GSP, precipitation in the groundwater subbasin was determined based on records from Henshaw Dam, Palomar Mountain Observatory, and Vista stations. Daily precipitation values were distributed in the watershed model using adjustment factors based on 30-year (1981 through 2010) gridded PRISM (Parameter-elevation Regression on Independent Slopes Model) precipitation data developed by the National Resources Conservation Service (NRCS) National Water and Climate Center (NWCC) and the PRISM Climate Group at Oregon State University.

Precipitation trends (illustrated by the cumulative departure from mean precipitation curve shown in Figure 2) at the Henshaw Dam station are indicative of precipitation and recharge experienced in the USLR Groundwater Subbasin and provide information on WY type. WY type (i.e., wet, above normal, below normal, dry, or critical) was determined from recorded precipitation at Henshaw Dam using the categories presented in Table 3-1 below. These classifications are based on the thresholds outlined in DWR Water Year Type Dataset Development Report (2021). WY 2024 is classified as above normal based on recorded precipitation of 25.79 inches at Henshaw Dam (Table 3-2).

Table 3-1. Percent Exceedance Ranges and Precipitation Thresholds for Water Year Type

Water Year Type	Percent Exceedance[1] Range [%]	Threshold Between Year Type [in/yr]	Number of Years in Historical Record (WY 1943-2024)
Wet	0% - 30%	28.24	24
Above Normal	>30% - 50%	21.14	17
Below Normal	>50% - 70%	17.66	16
Dry	>70% - 85%	15.14	12
Critical	>85% - 100%	-	13

[1] Percent exceedance refers to the percentage of precipitation values that are greater than a given threshold for the entire period of record. For example, for a year classified as wet hydrology type, that year's precipitation falls in the upper 30% of precipitation values observed at Henshaw Dam. For the Henshaw period of record (1943 through 2024), the highest 30% of annual precipitation records is represented by values greater than 28.24 inches.

Table 3-2. Water Year Type Based on Precipitation at Henshaw Dam Station

Water Year	Precipitation [inches]	Water Year Type
2015	18.03	Below Normal
2016	19.28	Below Normal
2017	35.44	Wet
2018	10.29	Critical
2019	35.21	Wet
2020	28.24	Wet
2021	15.78	Dry
2022	15.70	Dry
2023	47.84	Wet
2024	25.79	Above Normal

3.2 Monitoring Network

The current USLR GSP monitoring network consists of 30 wells owned and operated by various water agencies and private agricultural operations. However, three new monitoring points were added to the monitoring events during WY 2023: MW-31, MW-32, and MW-33. These points will be officially added to the GSP monitoring network as part of a planned refinement of the network which will accompany the

five-year review. Areas of potential network refinement include enhancing spatial coverage of the network by incorporating other existing wells through stakeholder cooperation and enhancing understanding of selected monitoring well completion details to ensure measured elevations are reflective of groundwater subbasin conditions. This second consideration is of particular importance since additional information collected since GSP development has indicated that many wells in the basin have a bedrock component to them (i.e., the wells are completed, at least in part, below the bottom of the alluvial materials representing the groundwater basin). Water level signatures for these wells can look significantly different than surrounding alluvial wells depending on hydrologic and groundwater pumping conditions. Stakeholders that have wells in areas of the basin not currently adequately covered by the GSP monitoring network and who would like to participate in the sustainability effort are encouraged to contact the GMA. Figure 3 shows the locations of the monitoring network wells, including new monitoring points at MW-31, -32, and -33.

Representative monitoring sites (RMSs), a subset of the monitoring network, were chosen to provide sufficient distribution throughout the subbasin, have known well construction details, are operational/pumping wells that may be impacted by undesirable results, and have screened intervals representative of alluvial material (see Figure 4). At the moment, RMSs are largely represented by municipal and agricultural supply wells since selection was limited to available information collected or supplied during the GSP development process. As mentioned above, the Authority plans to refine the monitoring network in the future to incorporate wells in data gap areas, if available, including shallow and/or domestic wells. Additional RMSs may also be needed to monitor sustainability management criteria for groundwater dependent ecosystems (GDEs) and interconnected surface water if additional data collection and analyses indicate these are present in the subbasin. It may also be necessary at the five-year review to adjust sustainability management criteria to accommodate new information collected through annual reporting and data collection efforts.

Static groundwater levels are measured twice per year: once in the spring and once in the fall, to represent seasonal high and seasonal low, respectively. Measured depth to water (DTW) data, land surface elevations, and measured groundwater elevations in feet above mean sea level (ft amsl) for WY 2024 are provided in Table 1. These data were also uploaded to DWR's SGMA Portal Monitoring Network Module (MNM). Groundwater elevation data were used to produce equipotential contour maps and hydrographs for this annual report. Water quality data from wells in the basin are summarized in Table 2.

3.3 Groundwater Elevations

During development of the GSP, water level data were received from basin stakeholders or obtained through State databases, such as the California Statewide Groundwater Elevation Monitoring (CASGEM) Program database. Information received from various entities was reviewed to identify any anomalies. Water level measurements were also taken at wells in the GSP Monitoring Network (see Section 3.2). Very few water level measurements are available in Pala Subbasin. This is a data gap area that the Authority would like to address in the near future.

3.3.1 Elevation Contours

Contours of groundwater elevation were developed based on observed water level data. Water level contours for fall 2023, which were presented in the previous annual report, are shown in Figure 5. Water

level contours for spring 2024 and fall 2024 (Figures 6 and 7, respectively) show the seasonal high and low groundwater elevations for WY 2024. Anomalous water level measurements reflecting bedrock signatures or pumping conditions were disregarded. The groundwater elevation contours represent lines of equal elevation on the groundwater surface and groundwater flow occurs perpendicular (i.e., at 90°) to the contours. Contours are also dashed where there is little control, requiring inference of elevations.

Contours from both spring and fall show localized pumping depressions along the San Luis Rey River and mid-basin in Pauma Subbasin, where higher rates of pumping occur. A mound in groundwater elevations is also distinguishable near the Pauma Valley CSD percolation ponds (vicinity of MW-15, MW-16, and MW-17), which recharged approximately 50 acre-ft of treated wastewater during WY 2024. Water elevations in fall 2024 were higher in almost every monitored well than measured elevations in fall 2023 due to the above average precipitation experienced in the groundwater basin during WYs 2023 and 2024. The greatest increases in groundwater elevations are seen in wells in the upper and lower Pauma Subbasin areas. The average fall water level increase throughout Pauma Subbasin was approximately 7 ft. Water levels at the CASGEM well located near the Monserate Narrows, at the downstream end of the USLR Subbasin, remained fairly constant, likely due to its proximity to the San Luis Rey River[3]. Trends and changes in groundwater levels are better displayed in the hydrographs provided in the following section.

3.3.2 Hydrographs

Groundwater elevation hydrographs at key wells identified in the GSP (RMSs – see Section 3.2) are presented in Figures 8 and 9. Water level measurements from these key wells are also summarized in the following table, which provides a comparison of WY 2024 levels to measurements from the previous year. Evaluation of water levels relative to sustainable management criteria (SMC) is provided in Section 5.1.1.

[3] Due to the extreme consistency in groundwater level measurements at this location, this well may not be representative of water level changes in the basin. The consistency may be caused by the well's proximity to the river and/or construction, which is unknown. Additionally, there are no stream flow gages to provide information on changes in surface flow. At this downgradient location, there may be significant increases in streamflow due to high water level conditions that would not show up in a nearby groundwater signature.

Table 3-3. Fall and Spring Groundwater Elevations at Representative Monitoring Sites (RMSs)

RMS	Spring Groundwater Conditions			Fall Groundwater Conditions		
	WY 2023 [ft amsl]	WY 2024 [ft amsl]	Change from WY 2023 to 2024 [ft]	WY 2023 [ft amsl]	WY 2024 [ft amsl]	Change from WY 2023 to 2024 [ft]
MW-1	1,461	1,470	9	1,465	1,477	12
MW-2	1,274	1,287	13	1,280	1,293	13
MW-5	785[P]	839	-	812	812	0
MW-9	731	745	14	727	718	-9
MW-10	691	721	30	699	706	7
MW-12	672	692	20	661[P]	680	-
MW-13	634	652	18	641	649	8
MW-19	605	640	35	590	604	14
MW-20	602	636	34	586	594	8
MW-23	598[P]	628	-	610	619	9
MW-24	580	611	31	593	602	9
MW-25	536	571	35	550	553	3
MW-26	574	595	21	572	592	20
MW-27	570	590	20	570	590	20

[R] = Recovering water level
[P] = Pumping water level (note: change in water level not calculated if a pumping water level was reported for WY 2023 or WY 2024)

3.4 Change in Groundwater Storage

Change in groundwater storage was estimated for WY 2024 using the water level contours developed in Figure 5 (Fall 2023) and Figure 7 (Fall 2024) and aquifer parameters values from the calibrated groundwater flow model. Using this information, the change in groundwater storage (in acre-ft) was calculated for each model cell using the following equation:

$$Change\ in\ Groundwater\ Storage = (WL_{2024} - WL_{2023}) \times SY \times A$$

Where:

WL_{2024} = Groundwater elevation from fall 2024 (spatially interpolated between water level contours), ft

WL_{2023} = Groundwater elevation from fall 2023 (spatially interpolated between water level contours), ft

SY = Specific yield of model cell from calibrated groundwater model, unitless

A = Model cell area (100 ft x 100 ft = 1,000 ft^2 or 0.02 acres), acres

The individual changes in groundwater storage were then summed over the model area for the entire USLR Valley Groundwater Subbasin. A map of WY 2024 groundwater storage change is provided as Figure 10 while annual change in storage since WY 2015 is summarized in the following table. Cumulative change in storage is shown on Figure 11. As shown, groundwater storage was estimated to increase by approximately 11,400 acre-ft during WY 2024. This change occurred throughout the basin, as evidenced by increases in observed water levels. Increases in fall 2024 water levels, compared to fall 2023 water levels, averaged approximately 7 feet in GSP monitoring wells. The cumulative change in groundwater storage is nearly 80,000 acre-ft higher than storage in 2015 with an average annual change in groundwater storage of 7,800 acre-ft/yr. The general increase in groundwater storage in the last few years is also consistent with observed water level trends at many of the RMSs showing a recent increase in water levels and the response to above average rainfall conditions in WY 2023 and WY 2024.

Table 3-4. Annual Change in Groundwater Storage (WY 2015 – 2024)

Water Year	Water Year Type	Change in Groundwater Storage* [acre-ft]
2015	Below Normal	-5,594
2016	Below Normal	-25
2017	Wet	18,694
2018	Critical	-9,505
2019	Wet	20,413
2020	Wet	11,041
2021	Dry	4,195
2022	Dry	-575
2023	Wet	27,727
2024	Above Normal	11,396
Average (2015-2024)	-	7,777

* Change in groundwater storage from WY 2015 through 2020 calculated from calibrated groundwater model. WY 2021 through 2024 change in groundwater storage calculated from the difference in groundwater elevation contours.

It is important to note that the groundwater storage change illustrated in Figure 10 is a direct product of the groundwater elevation contours used to calculate change in water level, which were generated using

limited data in portions of the basin. Therefore, estimated change in groundwater storage has increased uncertainty in these data gap areas (e.g., upgradient areas and throughout Pala Subbasin). In addition, slight changes in contour placement may cause apparent changes in groundwater storage. Revised estimates of change in groundwater storage will be conducted following future model updates and recalibration.

3.5 Water Quality

The water quality contaminants of most concern in the USLR Groundwater Subbasin are total dissolved solids (TDS) and nitrate (NO_3). The most common sources of these constituents include gradual accumulation through natural processes (which are especially pronounced in the absence of very wet precipitation years), agricultural applications, irrigation and septic return flows, recycled water use or spreading, use of imported water, and evapotranspiration. The Water Quality Control Plan for the San Diego Basin (Basin Plan) sets water quality objectives to protect the beneficial uses designated for the water body (surface or groundwater). TDS and nitrate (NO_3) groundwater objectives for the USLR Valley Groundwater Subbasin are summarized below.

Table 3-5. Groundwater Quality Objectives in the Upper San Luis Rey Valley Groundwater Subbasin

Hydrologic Subarea	TDS [mg/L]	Nitrate (NO_3) [mg/L]
Pauma Subbasin	800	45
Pala Subbasin	900	45
National and State Maximum Contaminant Levels (MCLs)		
Primary Drinking Water Standard	1,000	45
Secondary Drinking Water Standard	500	-

Notes:
[1] Concentrations not to be exceeded more than 10% of the time during any one-year period.
[2] The Basin Plan allows for measurable degradation of groundwater in this basin to permit continued agricultural land use. Point sources, however, would be controlled to achieve effluent quality corresponding to the tabulated numerical values. In future years demineralization may be used to treat groundwater to the desired quality prior to use.

Historical water quality data in the USLR Valley Groundwater Subbasin is generally very limited. Recent water quality data for public water systems are available from the Division of Drinking Water (DDW). Supplemental water quality samples were taken at select wells in the basin as part of the on-going GSP monitoring efforts. Average TDS and nitrate concentrations from available water quality data for WY 2024 are shown on Figures 12 and 13, respectively. Water quality samples from WY 2024 indicate average TDS concentrations ranging from 220 mg/L to 1,100 mg/L (Figure 12) while average nitrate (NO_3) concentrations range from 3 mg/L to 148 mg/L (Figure 13). Changes in the range of average TDS and nitrate concentrations include differences in wells with available information and are not necessarily related to changes in overall basin water quality. Changes in water quality are discussed in Section 5.1.3.

Historical water quality data from downgradient subbasins (i.e., Bonsall and Mission Subbasins) indicates that TDS tends to increase downgradient. Increased levels of TDS in WY 2024 are found in the lower Pauma subbasin area (vicinity of MW-21 through MW-24). The highest nitrate (NO_3) concentrations from WY 2024 are located in the upper portions of Pauma Subbasin, above Sycamore Canyon. WY 2024 water quality measurements are provided in attached Table 2.

3.6 Interconnected Surface Water

Given the depth to groundwater in much of the basin, percolation from streamflow is thought to be largely in free fall conditions; that is, the streams are not in direct hydraulic connection with the underlying water table and aquifer system so that surface recharge must percolate through the unsaturated zone before becoming accessible to groundwater pumping. This is especially true for tributaries to the San Luis Rey River (e.g., stream channels crossing alluvial fans). While there are areas within the basin where groundwater has been known to enter the San Luis Rey River (such as in the downgradient Pala Subbasin area where there is standing water), not enough stream flow or groundwater level information near stream channels is available to definitively delineate gaining or losing stream reaches – that is, where streams are interconnected or disconnected from underlying groundwater. This has been identified as a data gap area and additional data collection following GSP implementation will help to develop a better understanding of interconnected surface waters in the basin.

3.7 Land Subsidence

Land subsidence is not considered a concern for the USLR Groundwater Subbasin due to a lack of observed evidence of subsidence, absence of significant thickness of compressible fine-grained sediments, and overall shallow character of the alluvial basin. Furthermore, available Interferometric Synthetic Aperture Radar (InSAR) data, which measures vertical displacement, has not recorded any subsidence in the USLR Subbasin in the past. Despite this, updated information on potential subsidence from DWR was evaluated. Updated InSAR data, available on the SGMA Data Viewer, indicates that the USLR Subbasin experienced displacement between -0.1 and 0.1 feet in WY 2024 (DWR, 2025). Therefore, no significant land subsidence has occurred during the last year.

3.8 Seawater Intrusion

Given the distance of the downgradient boundary from the ocean, seawater intrusion is also not of concern for the USLR Groundwater Subbasin. In addition, while seawater intrusion has historically occurred in the downgradient Lower San Luis Rey Groundwater Subbasin, minimum threshold groundwater elevations designed to maintain a seaward groundwater gradient are currently being implemented in the Mission Subbasin to protect inland areas from further seawater intrusion. No recent data indicate the presence of seawater intrusion.

4.0 Water Use and Supply

The aquifers in the Pauma and Pala Subbasins are used for domestic, agricultural, commercial, and municipal water supply purposes. The majority of urban areas are supplied water by water agencies but there are some private wells that provide water for domestic use. Residential water uses include household consumption, irrigation of landscape and/or agricultural crops, watering horses or other livestock, and pumping water to fill swimming pools or ponds. Commercial uses include store front and retail trade strip malls, low-rise office buildings, libraries, post offices, and fire and police stations. Industrial uses include extractive industry (mining), light industrial, and warehousing/public storage. The majority of private pumping in the subbasin is used for agricultural irrigation.

4.1 Groundwater Extractions

Groundwater pumping was estimated during development of the USLR GSP based on historical pumping records, where available. Estimates of unrecorded pumping for those areas not served by a water service entity were primarily based on land use and published associated water use (including the demand estimates provided in Table 3-6 of the County of San Diego's (County's) General Plan Update Groundwater Study; County, 2010) and other estimates of water use from previous studies. Since agricultural irrigation represents such a large portion of groundwater pumping in the basin, estimates of agricultural water use were based on crop type using available crop mapping data. Multi-year coverage was available from DWR at https://data.cnra.ca.gov/dataset/statewide-crop-mapping, as well as from the San Diego Association of Governments (SANDAG). Crop-specific agricultural demand estimates from the County's Table 3-6 were then applied to the areas identified by the crop mapping. Pumping estimations were also made for tribal areas, including casino usage, based on available reports (Geo-Logic Associates, 2009; Pala Band of Mission Indians, 2019; Stetson, 1984; Tierra Environmental Services, 2007). Estimated pumping rates were simulated in the groundwater model at locations of known or estimated pumping and adjusted during model calibration.

Groundwater pumping during WY 2024 was estimated using available reported pumping volumes from water agencies and private or agricultural pumpers in the groundwater subbasin, broken down by water use sector (i.e., agricultural versus residential and commercial use). Unreported pumping for WY 2024 was estimated based on an analysis of the relationship between previous model pumping estimates and precipitation, less any pumping from new reporting entities. Groundwater extraction volumes may be updated in subsequent annual reports as additional data becomes available, including updated land use and agricultural coverage maps as well as resources to estimate evapotranspiration and general water use. Reported and unreported groundwater pumping is summarized below for agricultural and residential/commercial use. For WY 2024, groundwater pumping in the subbasin was estimated to be approximately 10,800 acre-ft. This includes approximately 8,500 acre-ft of water for agricultural applications and 2,300 acre-ft for residential and commercial use. While higher than groundwater pumping during the wet year of WY 2023, groundwater pumping is still lower than that from 2015 through 2022, reflecting the influence of above average rainfall conditions experienced during WY 2024; agricultural operations were able to rely on direct recharge from precipitation and available surface water to supplement irrigation requirements, allowing decreased reliance on groundwater.

Table 4-1. Groundwater Extractions in the Upper San Luis Rey Valley Groundwater Subbasin by Water Use Sector

Water Year	Reported		Unreported		Total
	Agricultural	Residential & Commercial	Agricultural[3]	Residential &[4] Commercial	
	[acre-ft]				
2015	4,075[1]	404[2]	6,341	1,199	**12,019**
2016	4,685[1]	380[2]	6,394	1,223	**12,681**
2017	5,316[1]	511[2]	5,308	1,082	**12,218**
2018	6,418[1]	626[2]	4,542	1,029	**12,614**
2019	5,551[1]	519[2]	4,877	1,052	**11,999**
2020	3,952[1]	347[2]	6,710	1,239	**12,248**
2021	2,735[1]	211[2]	7,518[5]	1,412[6]	**11,876**
2022	6,813	945	3,416	1,050	**12,225**
2023	4,366	1,219	663	1,050	**7,298**
2024	6,486	1,269	1,967	1,050	**10,772**

[1] Reported pumping for water agencies did not specify agricultural vs. residential/commercial use. Agricultural use assumed to be 90% of reported pumping for these agencies.
[2] Reported pumping for water agencies did not specify agricultural vs. residential/commercial use. Residential and commercial use assumed to be 10% of reported pumping for these agencies.
[3] Unreported agricultural pumping was estimated for the development of groundwater budgets in the USLR GSP based primarily on land use and crop type, then adjusted during model calibration.
[4] Unreported residential and commercial pumping was estimated for the development of groundwater budgets in the USLR GSP based primarily on water consumption reports for tribal areas.
[5] The model calibration period covered January 1990 through December 2020. Therefore, agricultural groundwater pumping from January 2021 through September 2021 was estimated based on the relationship between precipitation and estimated agricultural groundwater pumping for previous years. Unreported agricultural pumping for WY 2021 that was reported for previous WYs was assumed to be the same as WY 2020 pumping.
[6] Unreported residential and commercial pumping for WY 2021 that was reported for previous WYs was assumed to be the same as WY 2020 pumping.

4.2 Surface Water Supply

Surface water supply in the USLR Valley Groundwater Subbasin includes imported water and local surface water diversion. Within the subbasin, YMWD receives imported water through Metropolitan Water District of Southern California (Metropolitan) and the San Diego County Water Authority (Water Authority). This imported water includes Colorado River supplies (transported from Lake Havasu through the Colorado River Aqueduct to Diamond Valley Lake and then to Lake Mathews in Riverside County via Lake Skinner) and State Water Project (SWP) supplies (delivered to Lake Perris, the terminus of the 444-mile California Aqueduct). The use of imported water in the basin has increased since imported water deliveries began in 1947 with the completion of the first San Diego Aqueduct (Recon, 1996). The increased

use of imported water in the subbasin has allowed for a reduction in groundwater pumping, contributing to the increase in groundwater levels within the last five to ten years.

Reported surface water diversions include diversions by Improvement District "A" to catchment basins and other diversions by surface water diversion permit holders. However, not all diverted surface water is reported. Therefore, actual local surface water diversions are likely underestimated – particularly during wet years when surface water is more abundant. Surface water diversion volumes will continue to be updated in subsequent annual reports as additional data become available.

Surface water deliveries are summarized below. Total surface water use in the USLR Valley Groundwater Subbasin for WY 2024 is estimated to be approximately 4,900 acre-ft. This includes 4,100 acre-ft of imported water and 800 acre-ft of local surface water. The above average rainfall during WY 2024 continued to allow utilization of local surface water supplies to satisfy a portion of agricultural water requirements, though to a lesser extent than estimated for the wet year of WY 2023.

Table 4-2. Surface Water Deliveries in the Upper San Luis Rey Valley Groundwater Subbasin

Water Year	Imported Water	Diversions from San Luis Rey and Tributaries[2] [acre-ft]	Total
2015	4,468[1]	455	**4,923**
2016	3,621[1]	467	**4,088**
2017	4,494[1]	742	**5,236**
2018	6,088[1]	368	**6,456**
2019	4,756[1]	678	**5,434**
2020	4,685[1]	466	**5,151**
2021	5,611[1]	406	**6,017**
2022	5,064	274	**5,338**
2023	3,239	1,268	**4,507**
2024	4,063	797	**4,860**

[1] Values reported by Fiscal Year (July 1 through June 30)
[2] WY 2015-2020 and 2022-2024 values based on reported diversions. WY 2021 estimated based on previous values and diversion correlation to precipitation at Henshaw Dam Station.

4.3 Total Water Use

Total water use in the subbasin using the estimates developed above is summarized in Table 4-3 and Figure 14. As shown, water use in the subbasin in WY 2024 was estimated to be approximately 15,600 acre-ft.

Table 4-3. Total Water Use in Upper San Luis Rey Valley Groundwater Subbasin

Water Year	Groundwater	Imported Water	Surface Water Diversions	Total
	[acre-ft]			
2015	12,019	4,468[1]	455	**16,942**
2016	12,681	3,621[1]	467	**16,769**
2017	12,218	4,494[1]	742	**17,454**
2018	12,614	6,088[1]	368	**19,070**
2019	11,999	4,756[1]	678	**17,433**
2020	12,248	4,685[1]	466	**17,399**
2021	11,876	5,611[1]	406	**17,893**
2022	12,225	5,064	274	**17,563**
2023	7,298	3,239	1,268	**11,805**
2024	10,772	4,063	797	**15,632**

[1] Values reported by Fiscal Year (July 1 through June 30)

5.0 Progress Towards GSP Implementation and Sustainability

The USLR Valley Groundwater Subbasin has been classified by DWR as a medium-priority basin. Pauma and Pala Subbasins were considered to be at or near hydrologic balance in the 1984 study by Stetson. Following this study, groundwater elevations – particularly in Pauma Subbasin – showed declines from the 1990s through the early 2000s. Over the last ten years or so, water levels have recently stabilized and have started to show recovery. This seems to be due in large part to the use of imported water to augment groundwater supplies, allowing for a reduction in groundwater pumping. The sustainability goal for the USLR Subbasin is to manage and preserve its groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve historic operations of beneficial use in the basin as well as allow for future planned uses as conceived by the GSA and basin stakeholders. One of the main ways to accomplish this goal is to operate the subbasin within the sustainable yield.

Sustainable yield is defined by SGMA (Water Code, section 10721(w)) as the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result. Preliminary estimates of the sustainable yield of the subbasin range from approximately 12,700 acre-ft/yr under historical conditions (1991 through 2020) to 20,300 acre-ft/yr under current (2016 through 2020) conditions. Projections of future water budgets assuming similar land use, groundwater pumping, and imported water use indicate a sustainable yield of approximately 13,600 acre-ft/yr. As indicated in Section 4.1, groundwater pumping during WY 2024 was estimated to be 10,800 acre-ft.

The USLR GSP outlines sustainability criteria to allow the Authority to define, measure, and track sustainable management for different sustainability indicators in the subbasin. The GSP also proposed several potential management actions and projects that could be implemented to further ensure that undesirable results do not occur in the subbasin going forward. Progress towards implementing the Plan is discussed in the following sections.

5.1 Sustainable Management Criteria (SMC)

Sustainable groundwater management involves the use and management of groundwater without causing undesirable results. SGMA identified six sustainability indicators which refer to effects caused by groundwater conditions occurring throughout a basin that, when significant and unreasonable, cause undesirable results (Water Code Section 10721(x)). These are:

- Reduction of Groundwater in Storage
- Chronic Lowering of Groundwater Levels
- Degraded Water Quality
- Depletion of Interconnected Surface Water
- Land Subsidence (not considered applicable in the USLR Valley Groundwater Subbasin)
- Seawater Intrusion (also not considered applicable in the USLR Valley Groundwater Subbasin)

For these sustainability indicators, the USLR GSP developed quantitative sustainable management criteria (SMCs) that allow the GSA to define, measure, and track sustainable management. These include minimum thresholds (MTs) to define undesirable results for each sustainability indicator and measurable

objectives (MOs) to track the performance of sustainable management. The development of these sustainable management criteria relied upon information about the USLR Subbasin developed in the hydrogeologic conceptual model, the description of current and historical groundwater conditions, and the water budget. Additional information on the sustainability criteria can be found in Section 4.0 (Sustainable Management Criteria) in the USLR GSP.

Progress towards implementing sustainable management regarding the six sustainability indicators is described in the following subsections.

5.1.1 Chronic Lowering of Groundwater Levels

SMCs for groundwater levels in the USLR Groundwater Subbasin were developed based on input from local pumpers participating in the GSP process and monitoring network. Currently, these sites include municipal, private, and agricultural wells located almost exclusively in the Pauma Valley portion of the USLR Groundwater Subbasin. Participating pumpers provided the minimum depth for each of their wells to operate successfully based on their past experiences during drought conditions. Groundwater levels falling below these elevations (defined as the MT for each well) represent an undesirable result at the specific well location. Undesirable results for the subbasin are indicated when two consecutive exceedances occur in each of two consecutive years, in 25 percent or more of the Key Wells.

The MO for the USLR Subbasin is set at a groundwater elevation that coincides with three years of operational storage for the basin, where a minimum of 18,000 acre-ft/year is required to meet the water demands of the basin. Three years of groundwater storage is therefore equivalent to 54,000 acre-ft. This value is conservative because it allows three years of groundwater reserves to meet water demand, even though much of that demand is currently satisfied through imported water. Therefore, this approach for defining MOs against the lowering of groundwater levels (as well as groundwater storage) also allows protection against periods of prolonged drought or below average precipitation years. The calibrated USLR Groundwater Model (USLRGM) was used to calculate these elevations at the RMSs. In general, this corresponds to approximately 50 ft of groundwater elevation over MTs.

WY 2024 groundwater elevations (both spring and fall), MTs, and MOs at RMSs are summarized in Table 5-1 below. SMCs are also shown in relationship to historical groundwater levels and known well screen intervals for each key well on Figures 8 and 9.

Table 5-1. Water Year 2024 Groundwater Elevations and Sustainable Management Criteria for Representative Monitoring Sites

RMS	Groundwater Elevation		Sustainable Management Criteria	
	Spring 2024	Fall 2024	Minimum Threshold	Measurable Objective
	[ft amsl]		[ft amsl]	
MW-1	1,470	1,477	1,291	1,350
MW-2	1,287	1,293	1,108	1,168
MW-5	839	812	730	789
MW-9	745	718	623	682

RMS	Groundwater Elevation		Sustainable Management Criteria	
	Spring 2024	Fall 2024	Minimum Threshold	Measurable Objective
	[ft amsl]		[ft amsl]	
MW-10	721	706	629	688
MW-12	692	680	596	655
MW-13	652	649	566	625
MW-19	640	*604*	549	609
MW-20	636	*594*	545	604
MW-23	628	619	506	565
MW-24	611	602	385	444
MW-25	571	553	157	216
MW-26	595	592	502	561
MW-27	590	590	497	557

Italicized values are above MTs but below MOs

Currently (WY 2024), groundwater levels at the RMSs indicate:

- All representative wells (100%) are above measurable objectives under spring groundwater conditions, with 12 representative wells (86%) also above measurable objectives under fall groundwater conditions.
- The 2 representative wells (14%) with fall groundwater elevations lower than their respective measurable objectives are within the operating range, between the measurable objective and the minimum threshold.
- Zero representative wells (0%) are below the minimum threshold under both spring and fall groundwater conditions.
- No undesirable results have been observed.

With ongoing monitoring, changes in individual wells status relative to MOs and MTs will be able to be identified and discussed in future annual reports and periodic reviews of the GSP. One of the ongoing management actions is to continue to evaluate current RMSs, improve coverage of RMSs to include sites in data gap areas (particularly Pala Subbasin) and incorporate information from private and/or shallow groundwater wells, and revise SMCs as needed to protect beneficial use in the subbasin.

5.1.2 Reduction of Groundwater Storage

Based on historical and current pumping and groundwater trends, managing groundwater levels in the future above the MTs set for groundwater levels will result in an appropriate amount of groundwater in reserve to sustain pumping during drought periods. Therefore, groundwater elevation is used as a proxy

for groundwater storage and SMCs for the reduction of groundwater storage are the same as those presented for groundwater levels above.

5.1.3 Degraded Water Quality

Ambient TDS and nitrate groundwater quality in the basin was evaluated by taking median concentration of average water quality in wells with at least three water quality readings from WY 2019 through 2024. Well locations with available datasets during this period are shown in Figure 15. The median was chosen as a representative value of overall basin water quality because medians can be reliably calculated for datasets with mixed censored and non-censored data (detects and non-detects), allow for the use of an entire water quality dataset while minimizing the skewing effect of potential data outliers, and do not rely on parametric statistical methods that assume normal data distribution to remove potential outliers. Results are summarized in the following table. However, it is important to note that changes in available water quality samples year-to-year, frequency of reported samples, and the spatial distribution of available measurements can still introduce bias and produce changes in calculated ambient values that may not be representative of overall basin water quality. Methodology for assessing basin water quality will be reassessed and refined during the next review period (five-year reporting period).

Table 5-2. Ambient Water Quality (WY 2019 – 2024)

Hydrologic Subarea	WY 2019-2024 Ambient Groundwater Quality (and Change in Ambient[1])		Minimum Threshold	
	TDS	Nitrate (NO_3)	TDS	Nitrate (NO_3)
	[mg/L]		[mg/L]	
Pauma Subbasin	630 (+12)	33.27 (+1.51)	800	45
Pala Subbasin	NA[2]	NA[2]	900	45

[1] Change in ambient quality from that calculated from WY 2018 through 2023 shown in parentheses
[2] Insufficient data to characterize ambient groundwater quality in Pala Subbasin

In Pala Subbasin, only one well met the criteria of having at least three water quality readings in the last six years (sampled as part of the GSP monitoring program). Since one data point would not be representative of the entire subbasin, ambient concentrations in this area were not able to be determined. The Pauma Subbasin current ambient values are approximately 630 mg/L and 33.3 mg/L for TDS and nitrate as NO_3, respectively. This represents an increase from the previous year of approximately 12 mg/L for TDS and 1.5 mg/L for nitrate as NO_3. However, as acknowledged above, changes in calculated ambient water quality could be a product of uncertainty associated with the current methodology and may not be reflective of actual changing conditions. Per DWR recommendations, SMCs for water quality and the evaluation of changes in water quality will be clarified and redefined as necessary in the next plan amendment. Furthermore, continued use of imported water and loss of natural recharge from Henshaw Dam diversions will produce a tendency for the accumulation of TDS and nitrate in the basin. This will need to be considered for future management.

5.1.4 Depletion of Interconnected Surface Water

Very few measurements of surface flow are available in Pauma and Pala Valleys. Therefore, current understanding of surface water and groundwater interactions in the USLR Subbasin are informed by reported observations, groundwater levels (where data are available), and model-calculated streamflow and groundwater elevations using the USLRGM (what limited gaged measurements of surface flow were available were used to calibrate the surface water model component). Since surface water is not a significant source of water supply in the USLR Subbasin, undesirable effects from depletions in interconnected surface water primarily relate to potentially groundwater dependent ecosystems (GDEs). Areas of potentially dependent vegetation were identified in the USLR GSP, but these areas need to be verified through field investigation and additional data collection. RMSs and SMCs will then be refined as necessary to avoid significant and unreasonable effects to GDEs.

5.1.5 Land Subsidence

Land subsidence as a sustainability indicator is not considered applicable to the USLR Groundwater Subbasin and no sustainability management criteria were developed. However, the GSA has determined that any land subsidence caused by the lowering of groundwater levels in the subbasin would be considered significant and unreasonable. Evidence of or potential for land subsidence will be reevaluated in the five-year report.

5.1.6 Seawater Intrusion

Seawater intrusion as a sustainability indicator is not applicable to the USLR Groundwater Subbasin and no sustainability management criteria were developed. The absence of seawater intrusion will be verified in the five-year report.

5.2 Projects and Management Actions

As outlined in the USLR GSP, the Authority intends to avoid future undesirable results through active monitoring and adaptive basin management. Frequent assessment of progress towards maintaining sustainability will allow the Authority to proactively enact management actions and/or projects as needed to curb any potential issues before they lead to undesirable results. If basin monitoring indicates that additional action is necessary, the Authority will research the feasibility of implementing supplementary management actions and/or projects. Proposed projects will be prioritized by considering potential cost, available funding, and anticipated benefits to groundwater levels, storage, water quality, and/or interconnected surface water. Section 6.3 of the USLR GSP describes potential projects and management actions.

During this last year, the Authority has worked towards actions that will result in additional data collection to refine understanding of basin conditions and water demand. Groundwater level and water quality monitoring programs are essential for effective management of groundwater resources and evaluating sustainability. Understanding the amount of groundwater pumping in the basin is also crucial for basin management and evaluating whether the subbasin is being operated within the conceptual sustainable yield. As discussed in the USLR GSP, significant data gaps exist in the subbasin. The Authority was able to obtain/extend grant funding to cover additional studies and the installation of monitoring sites.

Studies and management actions conducted during WY 2024 include:

- **Continued incorporation of a new monitoring locations:** A previously existing well in the southern Pauma Subbasin and two dedicated monitoring wells near the San Luis Rey River were incorporated into GSP monitoring efforts in May 2023 (see MW-31, MW-32, and MW-33 on Figure 3). Monitoring at these three locations continued through WY 2024. Water level information from the wells provide important upgradient and near-river groundwater information, including information on shallow groundwater conditions and potential groundwater/surface water interactions. Groundwater monitoring will continue to occur at these locations at least twice a year, during routine GSP monitoring events, and the Authority plans to officially add these points to the GSP monitoring network during a planned refinement of the network associated with the five-year (periodic) review.
- **Completion of Cost-of-Service Study:** Part of the GSP development process indicated that the Authority should develop a pumping rate or other type of funding mechanism to create a permanent funding source for basin management and sustainability monitoring. Therefore, the Authority engaged a consultant in 2023 to perform a Cost-of-Service Study to develop a funding mechanism for ongoing and future expenses related to GSP implementation. The Cost-of-Service Study was completed in May of 2024 and is included here as Appendix A.
- **Adoption of groundwater extraction fees and associated charges to create a local source of funding for ongoing GSP implementation:** Based on results from the Cost-of-Service Study, the Authority adopted groundwater extraction fees and a policy to implement those fees on July 16, 2024. Basin pumpers, excluding those on tribal lands, will be charged an annual wellhead fee of $300 per well and a pumping fee of $24.59 per acre-ft of water pumped from the basin. These fees will establish a reliable, local revenue source to fund ongoing GSP implementation in the Upper San Luis Rey Valley Subbasin. The fees became effective for the 2024-25 fiscal year, with the first payment due by December 15, 2024. Pumpers are provided a self-certification form to document their groundwater pumping or are charged per best-estimate assumptions outlined in the Cost-of-Service Study.
- **Ongoing water conservation and agricultural irrigation best management practices:** In addition to progressing with data collection management actions and projects, The San Diego Regional Agricultural Water Management Plan drought response conservation program (Ordinance No. 100-08), and agricultural irrigation best management practices continue to be enacted within the USLR Subbasin. Additional details on these current management actions can be found in Sections 6.2.1.1 and 6.2.1.2 in the USLR GSP.

The Authority continues to seek funding support for critical projects and management actions to advance basin understanding and track sustainability. Near-term work slated to be covered by potential future grant funding includes:

- **Well registration and meter installation program:** Mandatory metering of all pumping entities and pumping, as allowable under SGMA (excepting de minimis domestic users), would allow the

GSA to definitively understand the amount of groundwater pumping occurring in the subbasin, refine estimates of sustainable yield, and assist with sustainable management.

- **Installation of surface flow gage(s) in the subbasin**: Streamflow data is important to evaluate long-term and seasonal changes in surface flow and potential depletions of interconnected surface water and impacts on verified groundwater dependent ecosystems (GDEs). However, there are no current streamflow gages in the subbasin. The Authority is currently exploring siting and teaming options for the installation of at least one surface flow gage, which would provide more resolution and understanding of groundwater and surface water interactions.
- **Installation of CIMIS station**: A local California Irrigation Management Information System (CIMIS) station would provide more accurate evapotranspiration (ET) estimates and other climatic data for the USLR Subbasin microclimate. This would allow agricultural users in the subbasin to adjust their irrigation system timing – leading to increased efficiency and reduced water demand, as encompassed within the agricultural management plan and best management practices. The Authority has already completed substantial research related to the installation of the stage, including identifying a suitable site location and developing general costs associated with installation.
- **Five-Year Review and Plan Amendment:** SGMA regulations require GSAs to periodically evaluate an approved GSP, at least every five years, to assess whether the GSP is performing and whether modifications are necessary. In addition, the review will evaluate progress towards meeting sustainability goals and addressing recommended corrective actions and will include an assessment of the monitoring networks. The first periodic review for the USLR Groundwater Subbasin GSP is due in January 2027. It is anticipated that this review will be accompanied by a Plan Amendment incorporating new information, revised water budgets, refinements to the monitoring network, and clarified SMC definitions.

Additionally, as noted in the GSP, the current DWR-defined basin boundaries do not adequately represent the true extent of the groundwater subbasin based on geologic contacts and topographic changes indicating the presence of crystalline bedrock. The difference between the current DWR groundwater subbasin and proposed subbasin is shown on Figure 1. The Authority plans to request a scientific basin modification for the refinement of the USLR Groundwater Subbasin boundaries when the next modification period begins. The DWR website indicates that the next basin modification period is not expected “before 2022,” but no additional information is provided.

5.3 Stakeholder Outreach and Engagement

The Authority conducts regular monthly Board meetings to support ongoing basin management activities in support of the GSP, discuss implementation of potential projects and management actions to further sustainability in the Subbasin, and receive input from the public. These meetings have typically been held on the third Tuesday of each month at 3:00 p.m., at the Offices of Yuima Municipal Water District. As of December 3, 2024, the Authority moved to quarterly meetings which will take place on the third Tuesday of the specific quarterly month (March, June, September, and December) at 3:30 p.m. Special meetings

may be called at any time, if necessary, to address any immediate issues. Meeting agendas, supporting materials, and meeting minutes are posted on the Authority's website at https://uslrgma.com/.

During WY 2024, the Authority issued a Notice of Public Hearing to adopt the proposed groundwater pumping fee (May 30, 2024). Several public meetings were also held to present results of the Cost-of-Service Study, which was used to determine the groundwater pumping fee (including June 18 and July 16, 2024).

During development of this annual report, the Authority sent out a data request letter to basin stakeholders requesting additional information on groundwater pumping in the subbasin and inviting stakeholders to participate in basin monitoring efforts. This information will facilitate understanding of hydrologic conditions and water use in the subbasin and be used in future annual reports and model updates to refine groundwater pumping estimates, generate groundwater elevation contours, and calculate change in groundwater storage. Stakeholder outreach will continue into WY 2025.

5.4 Progress on Addressing Recommended Corrective Actions

DWR issued approval of the GSP for the USLR Groundwater Subbasin on January 18, 2024, and provided recommended corrective actions (RCAs) to enhance the GSP and facilitate future evaluations (DWR, 2023a). DWR strongly encourages the Authority to address these RCAs prior to the first periodic evaluation (five-year review), which is due to DWR in January 2027. Table 5-3 below summarizes each RCA and current progress and plan to address each of DWR's recommendations.

Table 5-3. Summary of Recommended Corrective Actions

Recommended Corrective Action Summary	Current Progress and Next Steps
RCA 1 – Administrative Information • Update the GMA's administrative information. • Update GSA spatial coverage to clearly show area covered by GSP. • Describe how groundwater management considers tribal interests and fully respects existing federal water rights.	• Updated administrative information for the GMA, including the governance structure and decision-making (provided in WY 2023 annual report as Appendix A). This information will also be included in the next GSP amendment (January 2027). • Agency information was also updated for the online SGMA Portal, though the updated coverage map submitted to DWR is not yet showing.

Recommended Corrective Action Summary	Current Progress and Next Steps
RCA 2 – Water Budget • Provide water budgets for both groundwater and surface water systems. • Continue stakeholder outreach. • Update estimates of water budget and develop management approach to achieve sustainability notwithstanding lack of data or jurisdiction over federally reserved lands.	• Data gaps continue to be filled with new information as data become available. An updated discussion of data gaps will be provided in the next GSP amendment (January 2027). • Ongoing communication occurs as needed with basin stakeholders regarding important GSP notifications and implementation topics. Information is also posted to the GMA's website for public information. • Updated surface water and groundwater budgets will be provided in the next GSP amendment following incorporation of new data and model update.
RCA 3 – Sustainability Indicators for Groundwater Levels • Refine SMC for groundwater levels and clarify definition of undesirable results. • Conduct well impact analysis to evaluate if selected MTs are protective of domestic wells. • Describe how development of MTs for groundwater levels considered potential impacts to beneficial users and use, including tribal interests. • Describe how MTs for groundwater levels will avoid undesirable results for other sustainability indicators.	• SMC for groundwater level and groundwater storage will be reevaluated at the 5-year report and revised, as necessary, to protect beneficial use and users. Any updated SMC will be provided in the next GSP amendment (January 2027). • A well impact analysis will be conducted as part of the next GSP amendment.
RCA 4 – Sustainability Indicators for Degraded Water Quality • Define significant and undesirable effects related to groundwater quality and define undesirable results based on MT exceedance.	• Groundwater quality continues to be collected and evaluated annually. • Groundwater quality conditions will be re-evaluated and updated in the next GSP amendment (January 2027). • Undesirable effects from degraded groundwater quality will be clarified/redefined in the next GSP amendment.

Recommended Corrective Action Summary	Current Progress and Next Steps
RCA 5 – Sustainability Indicators for Land Subsidence • Establish SMC for land subsidence, incorporating review of InSAR data.	• Current annual reporting incorporates review of InSar data to verify no land subsidence is occurring in the Subbasin. • SMC for land subsidence will be redefined in the next GSP amendment after re-evaluation of SMC for groundwater levels (January 2027).
RCA 6 – Sustainability Indicators for Interconnected Surface Water • Establish specific SMC for depletions of interconnected surface water. • Continue to address data gaps related to interconnected surface water, including location and timing. • Collaborate/coordinate with local, state, and federal regulatory agencies and interested parties to understand beneficial uses and users that may be impacted by pumping induced surface water depletion.	• Two new monitoring wells were drilled in WY 2023 (USLR MW-1S and USLR MW-1D) near the San Luis Rey River in the Pauma Subbasin. The GSA will continue to evaluate monitoring data from these wells to see if they provide additional clarity on interconnected surface water. As part of the ongoing management action to address data gaps, the GSA intends to install transducers in these wells to improve water level measurement timing resolution and is currently exploring potential funding. • The GSA is currently exploring potential partnership opportunities, technical assistance, and funding options for establishing at least one surface water monitoring gage in the Subbasin. • SMC for interconnected surface water will be defined in the next GSP amendment (January 2027).

6.0 Conclusions

Information provided in this third annual report of the USLR Groundwater Subbasin, which covers the period for WY 2024 (i.e., October 2023 through September 2024), indicate the following conditions:

- Precipitation during WY 2024 is classified as above normal based on recorded precipitation of 25.79 inches at Henshaw Dam. Long-term average precipitation at this station is approximately 24.4 inches.
- Groundwater elevations in fall 2024 were higher in almost every monitored well than measured elevations in fall 2023 due to the above average precipitation experienced in the groundwater basin during WYs 2023 and 2024. The greatest increases in groundwater elevations are seen in wells in the upper and lower Pauma Subbasin areas. The average fall water level increase throughout Pauma Subbasin was approximately 7 ft
- Groundwater storage was estimated to increase by approximately 11,400 acre-ft during WY 2024.
- Groundwater levels and groundwater in storage for WY 2024 in all RMSs are above MTs – indicating the absence of undesirable results related to chronic declines in groundwater levels or groundwater storage. Water levels in at least 86% of the RMSs are also above MOs under both spring and fall conditions.
- WY 2024 average TDS concentrations for available water quality measurements range from 220 mg/L to 1,100 mg/L while nitrate (NO_3) concentrations range from 3 mg/L to 148 mg/L. Historical water quality data from downgradient subbasins (i.e., Bonsall and Mission Subbasins) indicates that TDS tends to increase downgradient. Increased levels of TDS in WY 2024 are found in the lower Pauma subbasin area (vicinity of MW-21 through MW-24). The highest nitrate (NO_3) concentrations from WY 2024 are located in the upper portions of Pauma Subbasin, above Sycamore Canyon.
- Current ambient water quality in Pauma Subbasin (WY 2019-2024) is approximately 630 mg/L and 33.3 mg/L for TDS and nitrate as NO_3, respectively. This represents an increase from the previous year of approximately 12 mg/L for TDS and 1.5 mg/L for nitrate as NO_3. However, changes in calculated ambient water quality could be a product of uncertainty associated with the current methodology and may not be reflective of actual changing conditions. Per DWR recommendations, SMCs for water quality and the evaluation of changes in water quality will be clarified and redefined as necessary in the next plan amendment.
- While land subsidence is not considered a concern for the USLR Groundwater Subbasin, available InSAR data confirmed that no significant land subsidence occurred during WY 2024.
- Total water use in the subbasin in WY 2024 was estimated to be approximately 15,600 acre-ft, approximately 3,800 acre-ft more than what was estimated for the previous wet year but still less than water use in WYs 2015 through 2022. This includes 10,800 acre-ft of groundwater pumping, 4,100 acre-ft of imported water, and 800 acre-ft of local surface water. The reduced water usage can be attributed to the above average rainfall conditions experienced during WY 2024; continued utilization of local surface water supplies and the ability of precipitation to satisfy a portion of agricultural water requirements lead to reduced reliance on groundwater pumping.

- WY 2024 groundwater pumping is below the estimated safe yield for the USLR Groundwater Subbasin of between 12,700 acre-ft/yr (calculated for long-term historical conditions from 1991 through 2020) to 20,300 acre-ft/yr (calculated for current conditions from 2016 through 2020).

6.1 Next Steps

Progress towards GSP implementation and sustainability will continue. New information will be used to assess, clarify, and refine RMSs and SMCs as needed during the next periodic assessment and plan amendment (due to DWR in January 2027), following DWR guidance identified in their RCAs. Results of basin monitoring efforts and investigations performed this coming water year will be presented in the next annual report (WY 2025), to be submitted to DWR by April 1, 2026. Next steps and recommendations include:

- Continued stakeholder outreach and data collection.
- Spring 2025 and fall 2025 monitoring events for water level and water quality at GSP Monitoring Network and other wells.
- Continue to refine estimates of groundwater pumping and water use in the Subbasin as information becomes available.
- Refine monitoring network by incorporating new wells.
- Develop a better understanding of interconnected surface waters and potential GDEs in the subbasin through additional data collection.
- Continue pursuing Interactive Tribal and Drought Resilience Work Groups
- Continue pursuing funding opportunities to support identified projects and management actions.
- Pursue scientific basin modification for the refinement of the USLR Groundwater Subbasin boundaries.

7.0 References

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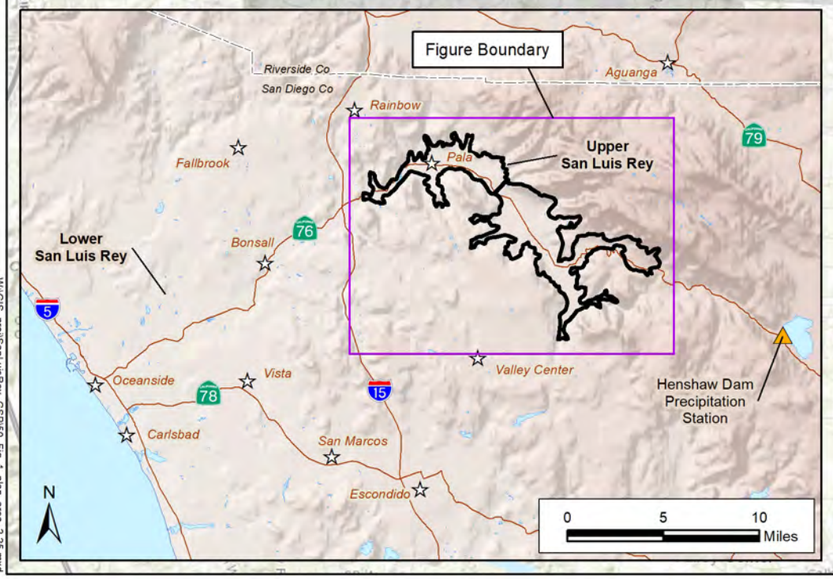
FIGURES

Upper San Luis Rey Valley Groundwater Subbasin - Pala Subbasin

Upper San Luis Rey Valley Groundwater Subbasin - Pauma Subbasin



EXPLANATION

Groundwater Basins/Subbasins

- San Luis Rey Valley Groundwater Basin (DWR Bulletin 118, 2016)
- Upper San Luis Rey Valley Groundwater Subbasins - Pala and Pauma (AB1944, 2018)
- Pala/Pauma Subbasin Boundary at Frey Creek (SWRCB D1649, 2002)
- Proposed Pala/Pauma Subbasin Boundary

Upper San Luis Rey Groundwater Management Authority (formerly Pauma Valley GSA)

- Pauma Municipal Water District
- Pauma Valley Community Services District
- San Luis Rey Municipal Water District
- Upper San Luis Rey Resource Conservation District
- Yuima Municipal Water District

NOTE: The proposed Upper San Luis Rey Valley Groundwater Basin boundaries are based on geology but have not yet been approved by DWR

N

0 1.5 3 Miles

Mar-24

PLAN AREA

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

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FIGURE 1

GEOSCIENCE

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Cumulative Departure from Mean Annual Precipitation
Henshaw Dam Station (1943-2024)

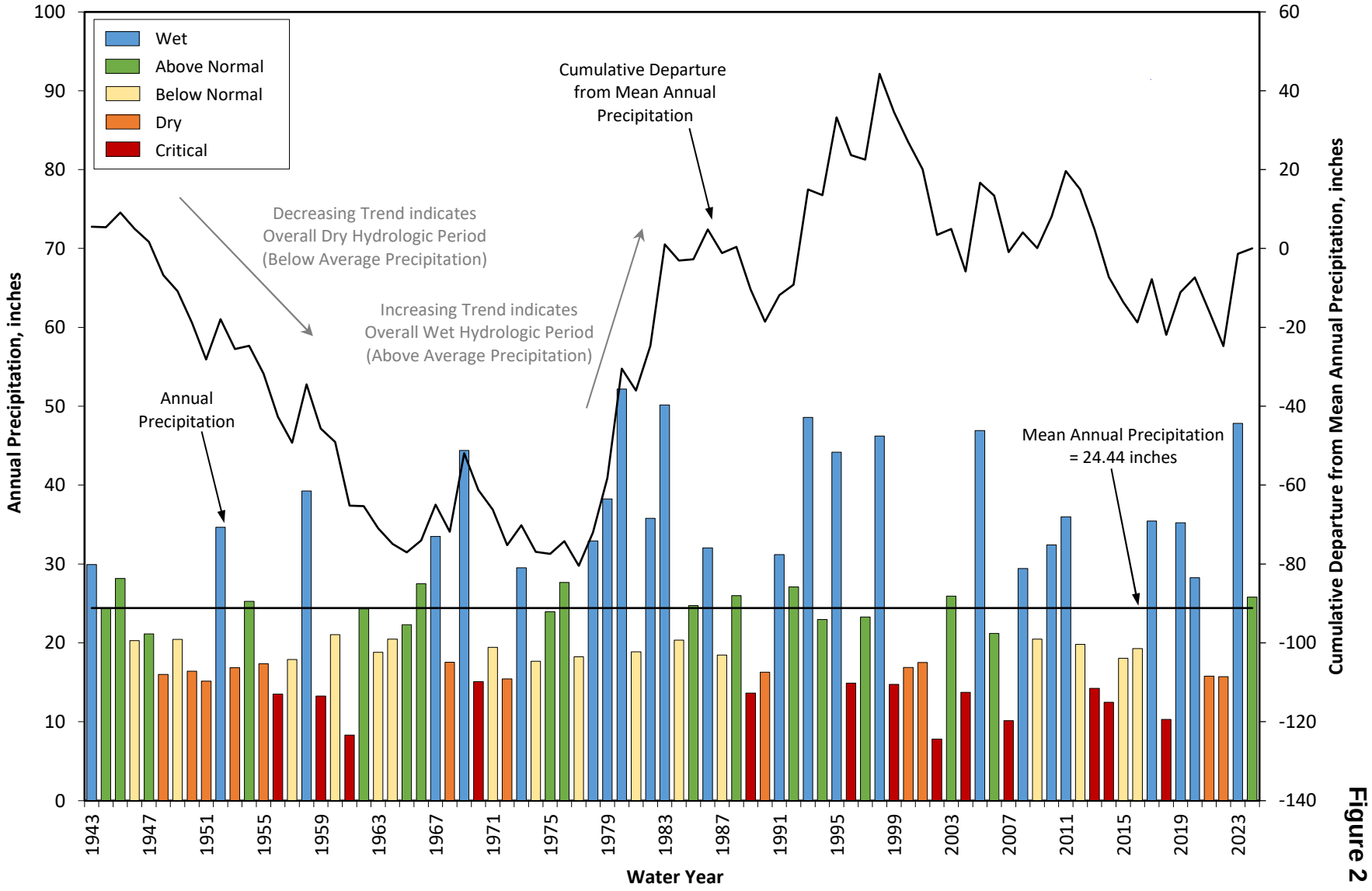
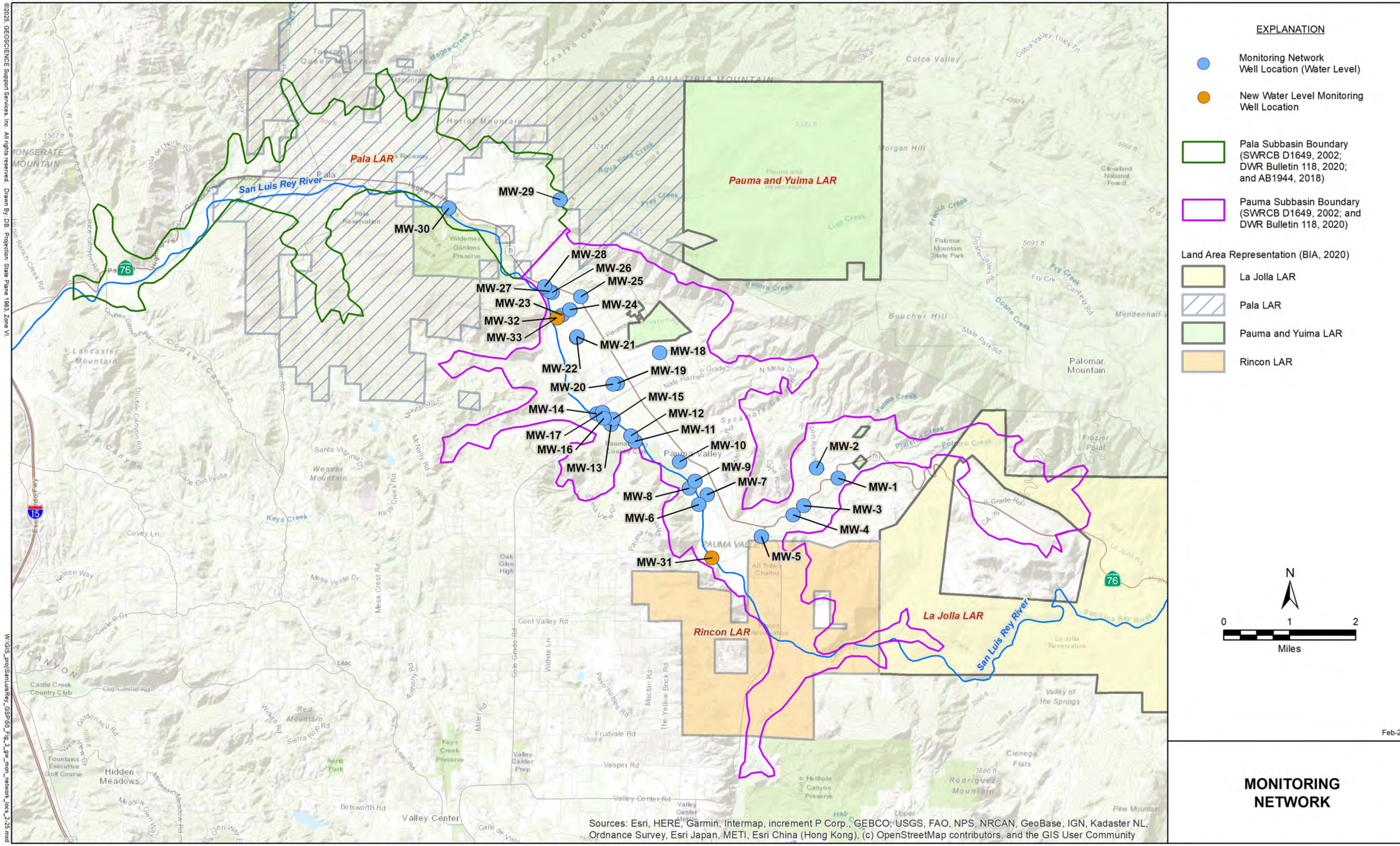


Figure 2



UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

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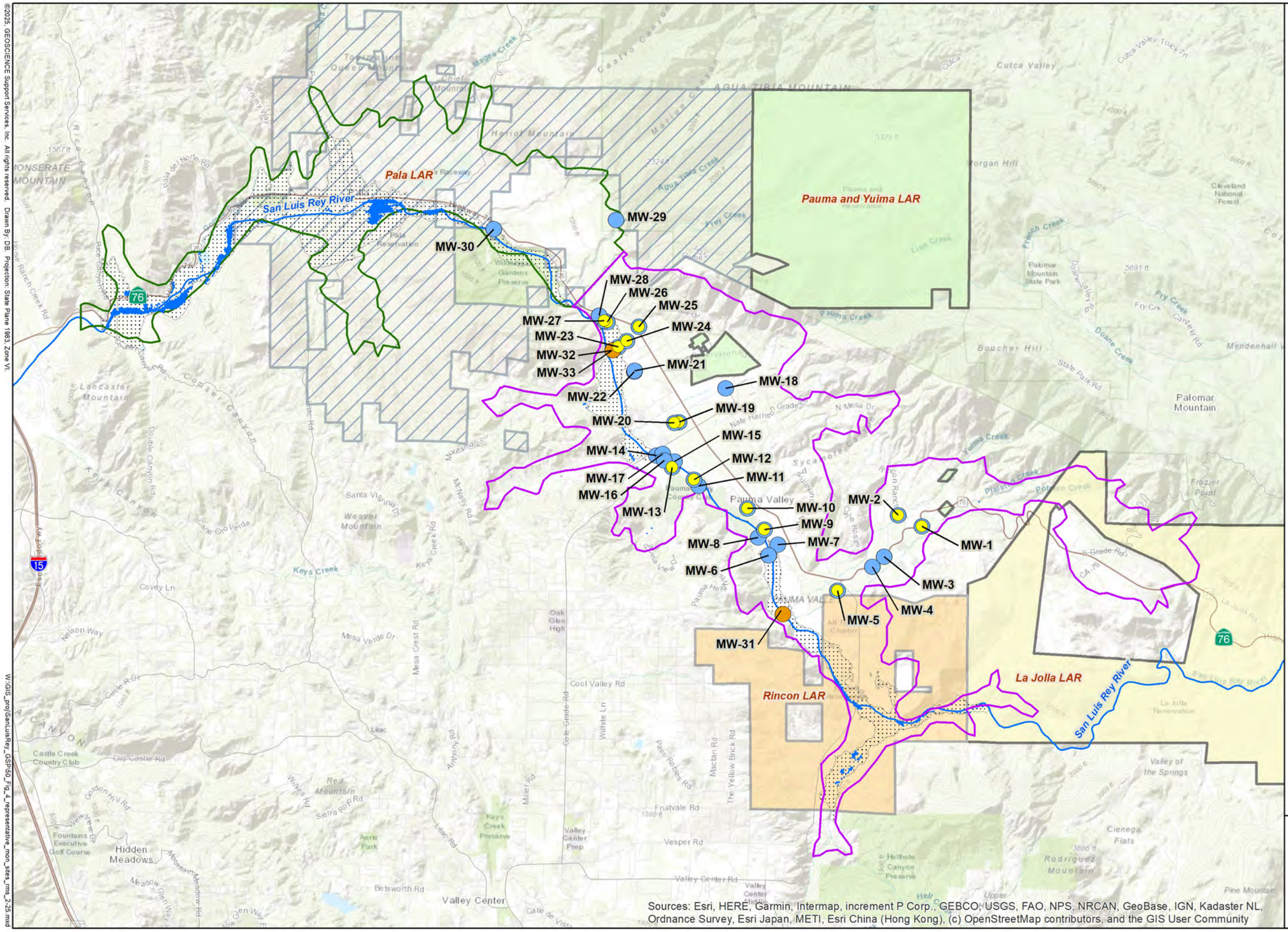
FIGURE 3

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

GEOSCIENCE



EXPLANATION

- Representative Monitoring Site with Minimum Threshold (MT) and Measurable Objective (MO) for Groundwater Elevation
- Monitoring Network Well Site
- New Water Level Monitoring Well Location
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)
- Model-Estimated Depth to Groundwater Less Than 50 ft (2020) (represents location for potential interconnected surface waters, as suggested by the Nature Conservancy. Additional information needs to be collected to verify actual areas of interconnected groundwater / surface water)
- Model-Estimated Depth to Water 20 - 30 ft (2020) (30 ft represents the depth suggested by the Nature Conservancy to be used in identification of potential GDEs. Additional information needs to be collected to verify actual extent of GDEs)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

N

0 1 2

Miles

Feb-25

REPRESENTATIVE MONITORING SITES (RMSs)

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UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

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FIGURE 4

GEOSCIENCE

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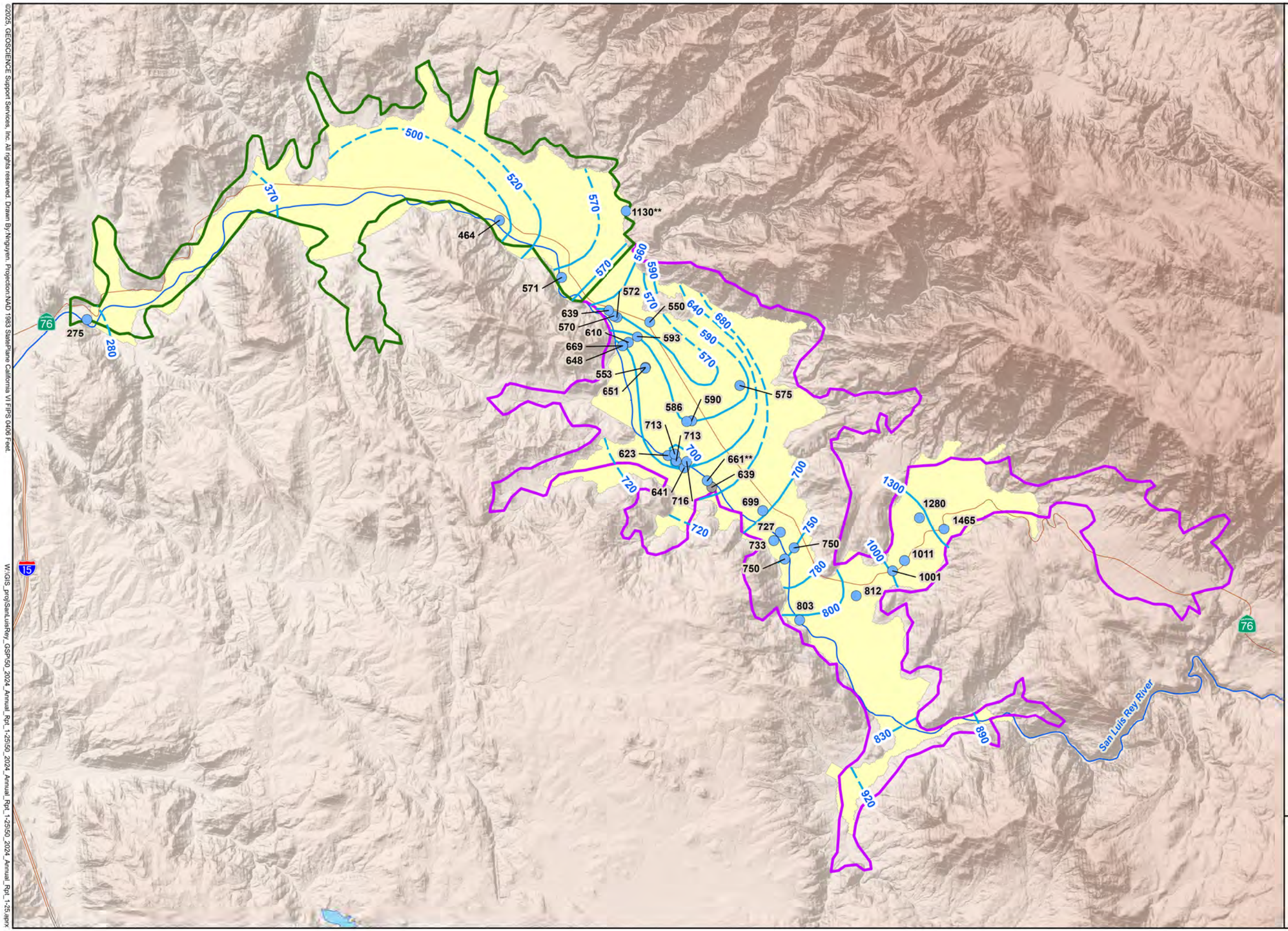

EXPLANATION

Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)

Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

610 — Fall 2023 Groundwater Elevations (ft amsl) (dashed where inferred)

579 — Well with Fall 2023 Water Level Measurement (ft amsl)
* Recovering Water Level
** Pumping Water Level
Note: Gray color indicates bedrock/suspected bedrock
Well with anomalous level – measurement not used

Active Model Area (representative of alluvial aquifer area)

N

0 1.25 2.5
Miles

Jan-25

GROUNDWATER ELEVATIONS FALL 2023

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

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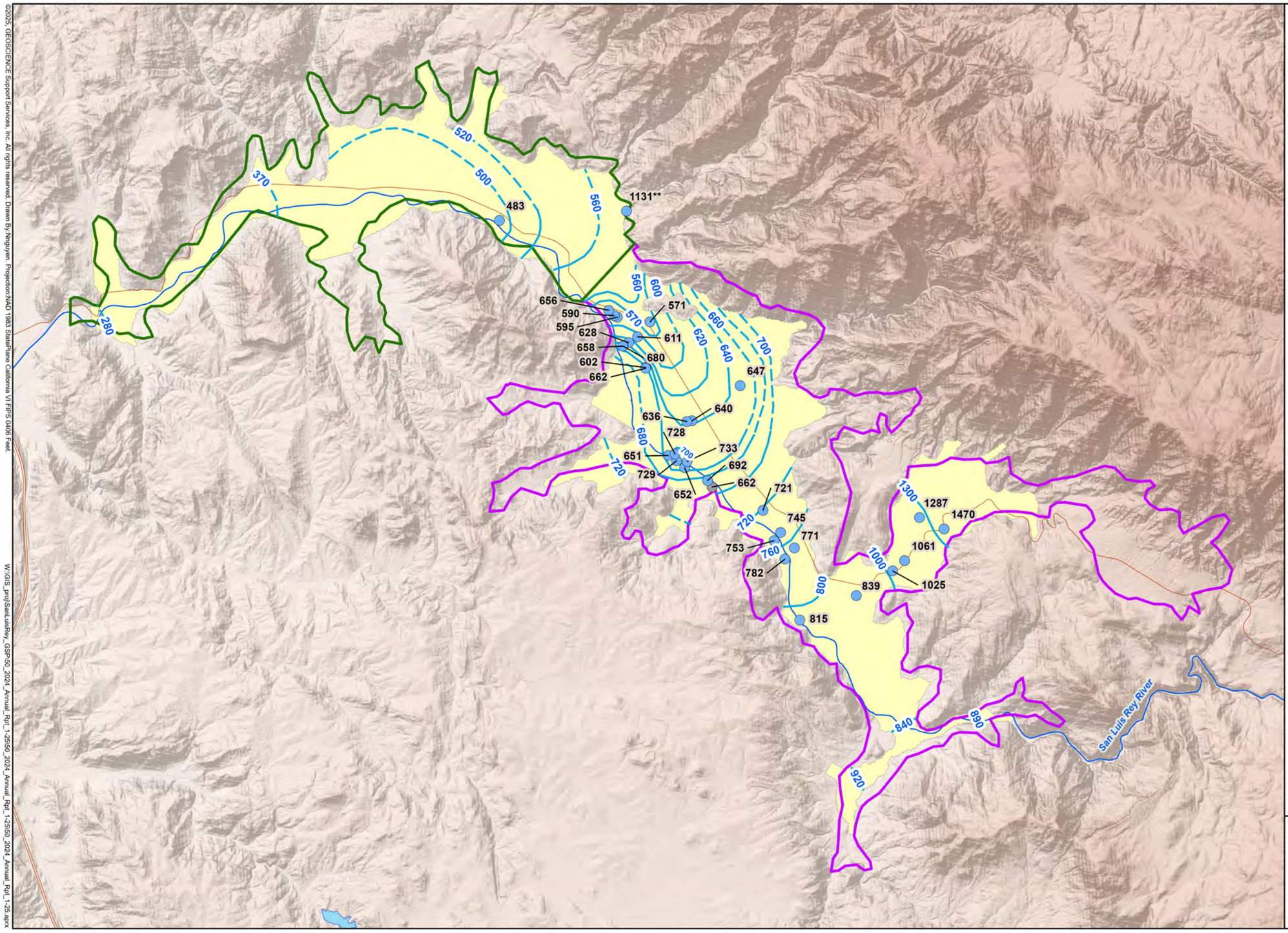
FIGURE 5

GEOSCIENCE



EXPLANATION

Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)

Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

610 — Spring 2024 Groundwater Elevations (ft amsl) (dashed where inferred)

579 — Well with Spring 2024 Water Level Measurement (ft amsl)
** Pumping Water Level
Note: Gray color indicates bedrock/suspected bedrock
Well with anomalous level - measurement not used

Active Model Area (representative of alluvial aquifer area)

N

0 1.25 2.5
Miles

Jan-25

GROUNDWATER ELEVATIONS SPRING 2024

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

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FIGURE 6

GEOSCIENCE

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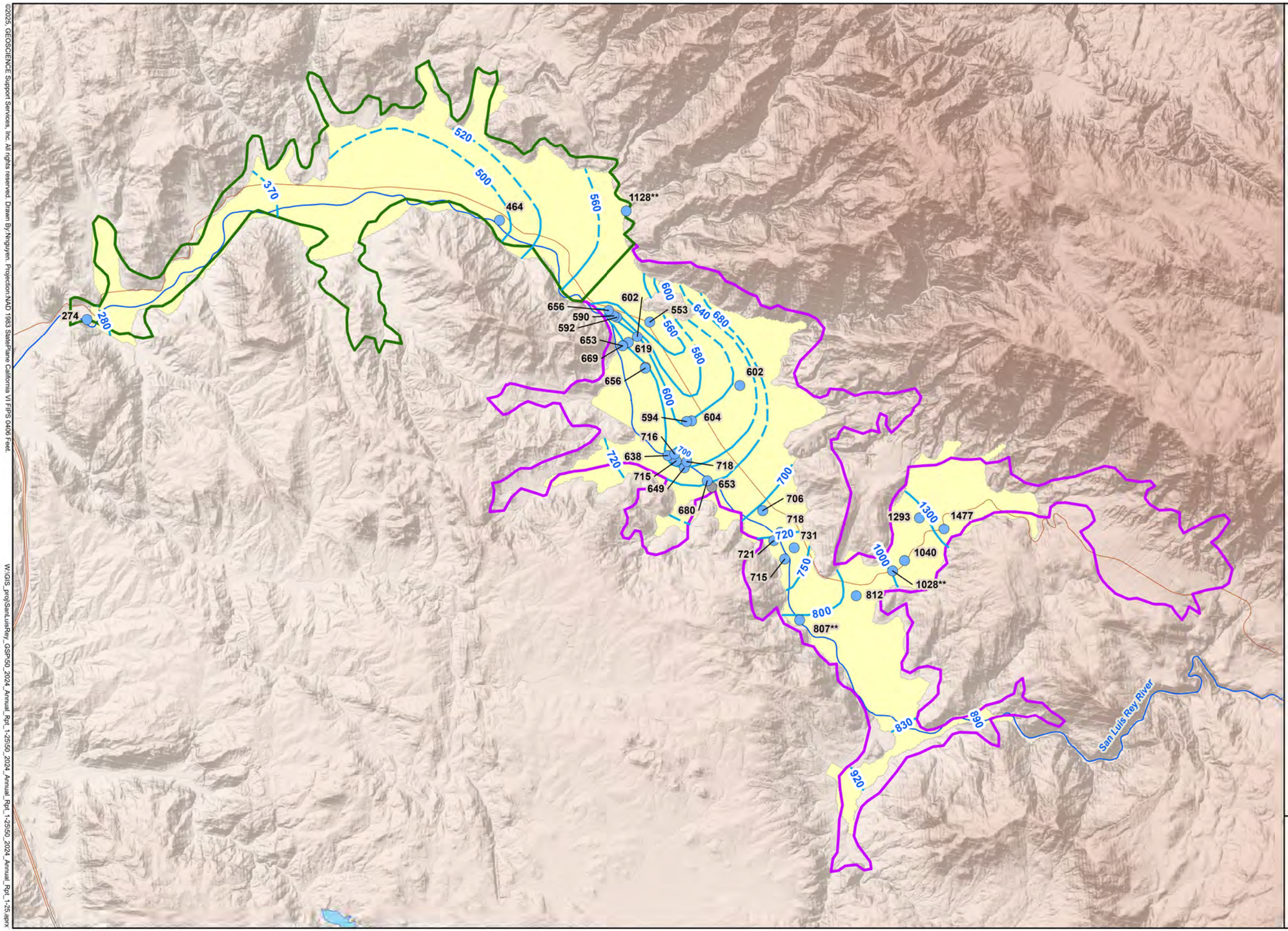

EXPLANATION

- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)
- 610 — Fall 2024 Groundwater Elevations (ft amsl) (dashed where inferred)
- 579 — Well with Fall 2024 Water Level Measurement (ft amsl)
  ** Pumping Water Level
  Note: Gray color indicates bedrock/suspected bedrock
  Well with anomalous level - measurement not used
- Active Model Area (representative of alluvial aquifer area)

Jan-25

GROUNDWATER ELEVATIONS FALL 2024

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

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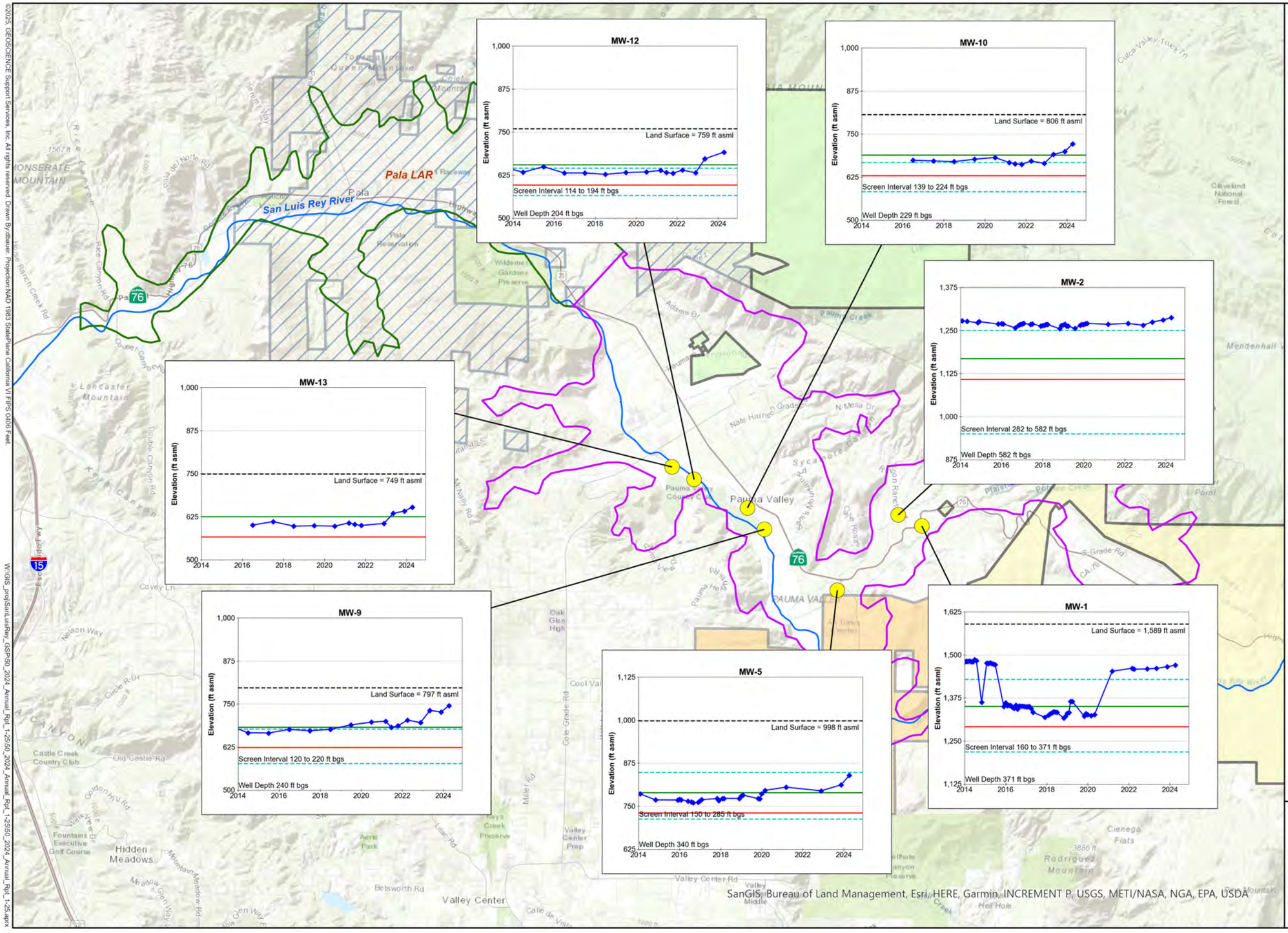
FIGURE 7

GEOSCIENCE



EXPLANATION

- Representative Monitoring Site with Minimum Threshold (MT) and Measurable Objective (MO) for Groundwater Elevation
- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Land Area Representation (BIA, 2020)

- La Jolla LAR
- Pala LAR
- Pauma and Yuima LAR
- Rincon LAR

- Minimum Threshold
- Measurable Objective
- Screen (top and bottom)
- Land Surface
- Measured Groundwater Level

N

0 1 2

Miles

Feb-25

GROUNDWATER HYDROGRAPHS FOR REPRESENTATIVE MONITORING SITES 1 of 2

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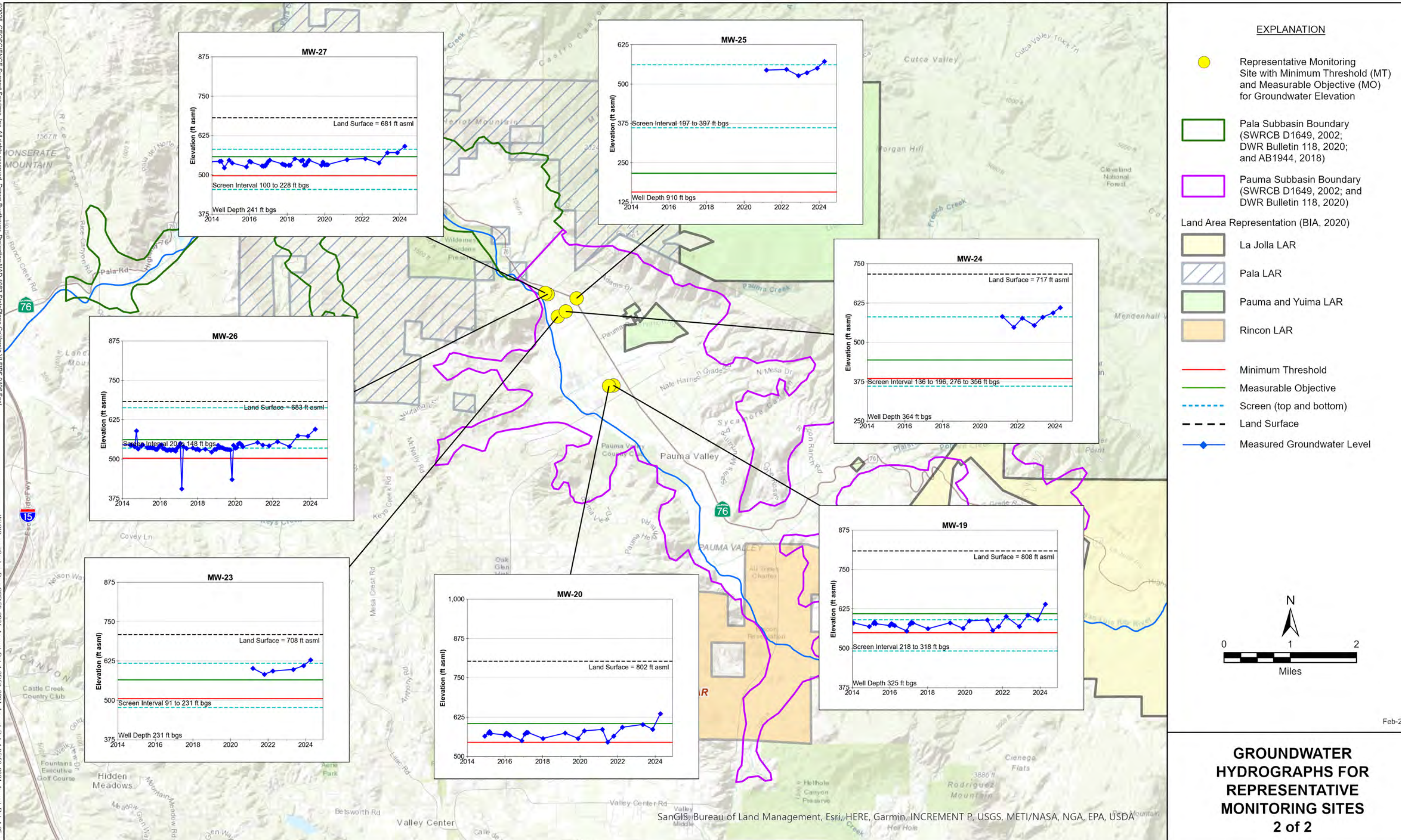

GROUNDWATER HYDROGRAPHS FOR REPRESENTATIVE MONITORING SITES 2 of 2

DRAFT

FIGURE 9

EXPLANATION

- Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)
- Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)
- Active Model Area (representative of alluvial aquifer area)

Change in Groundwater Storage

Fall 2024 minus Fall 2023
(Total storage change calculated for each colored area)

Increasing Storage
- 16,180 acre-ft
- 306 acre-ft

Decreasing Storage
- -81 acre-ft
- -5,009 acre-ft

- Area with limited water level control and therefore increased uncertainty for change in groundwater storage calculation

N

0 1.25 2.5
Miles

Feb-25

CHANGE IN GROUNDWATER STORAGE WATER YEAR 2024

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UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

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FIGURE 10

GEOSCIENCE

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Cumulative Change in Groundwater Storage

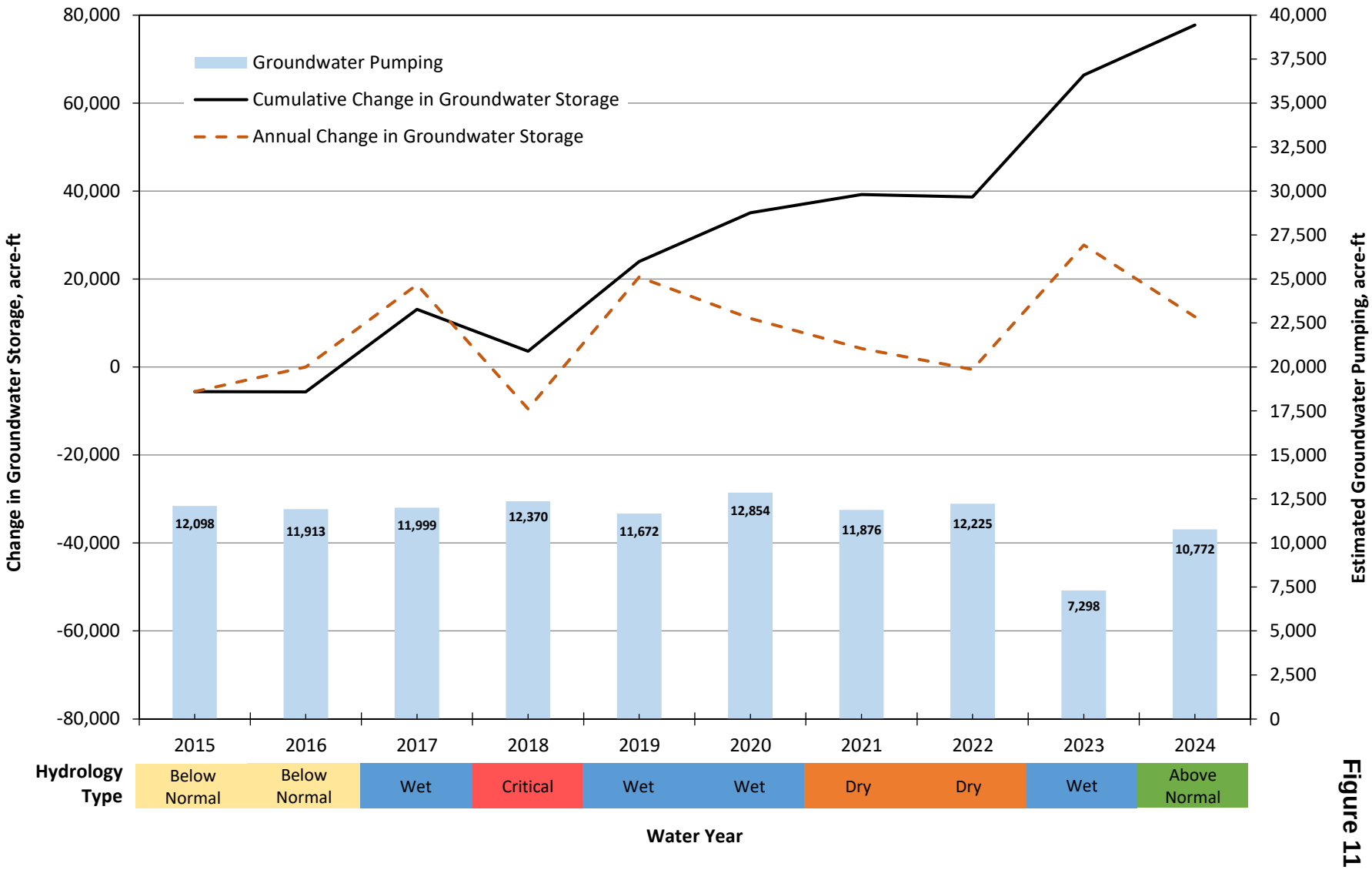
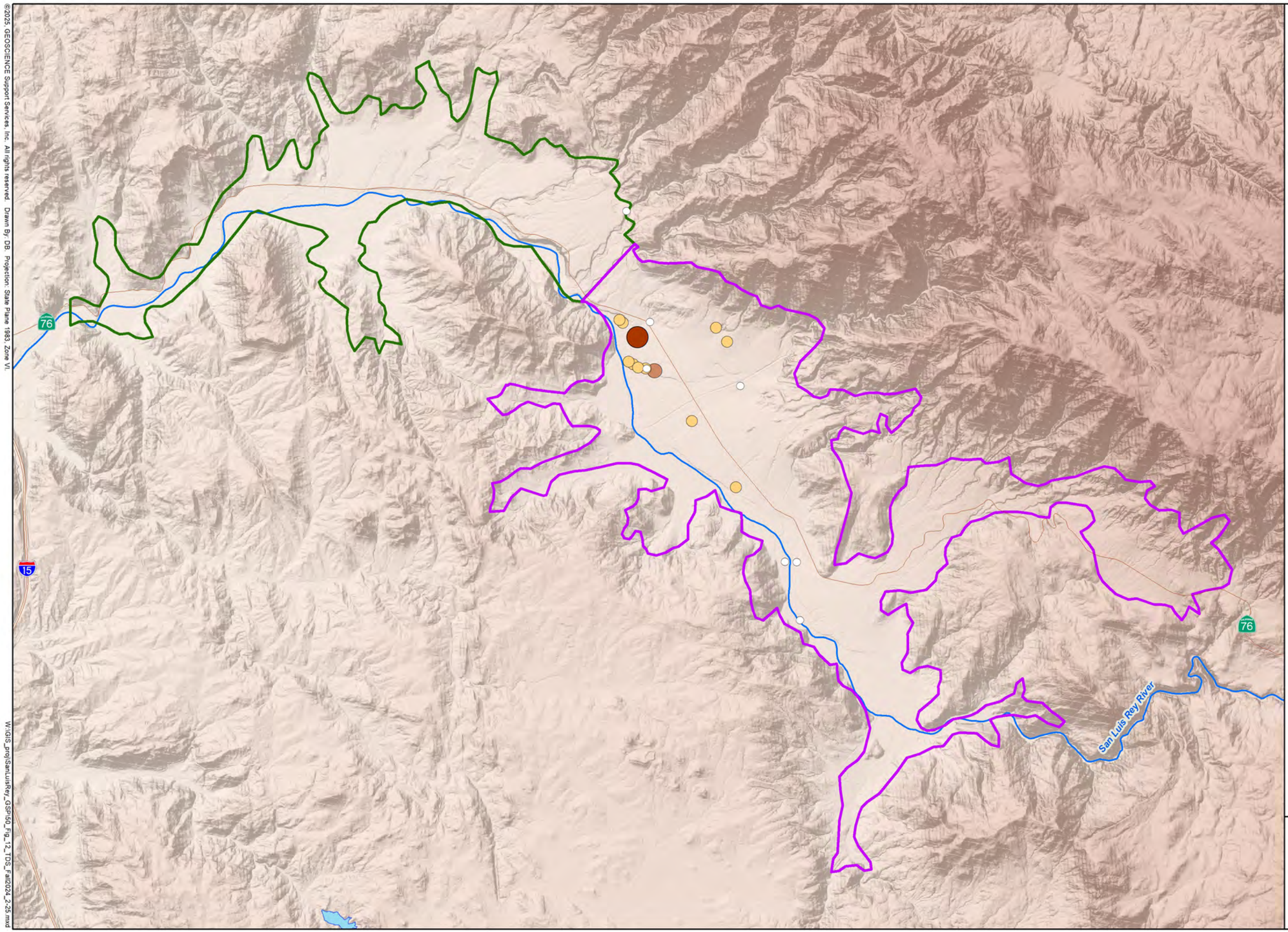


Figure 11



EXPLANATION

Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)

Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

TDS Concentration, mg/L
(Source: DDW CLIP and Supplemental Water Quality Sampling, 2024)

- 0 - 500
- 500 - 800
- 800 - 1,000
- > 1,000

Primary Maximum Contaminant Level for TDS = 1,000 mg/L

N

0 1.25 2.5

Miles

Feb-25

TOTAL DISSOLVED SOLIDS WATER YEAR 2024

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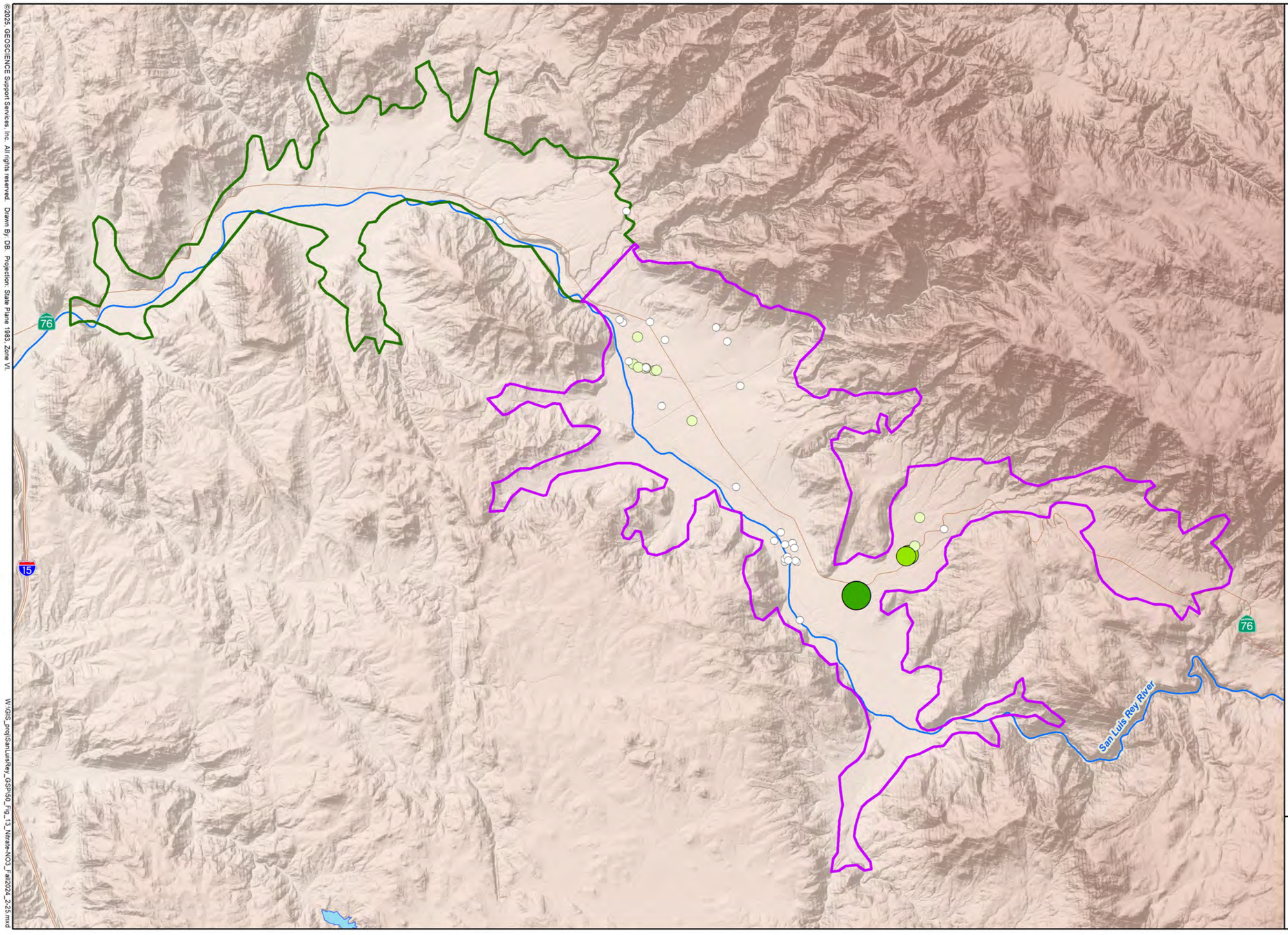
UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

DRAFT

FIGURE 12

GEOSCIENCE



EXPLANATION

Pala Subbasin Boundary (SWRCB D1649, 2002; DWR Bulletin 118, 2020; and AB1944, 2018)

Pauma Subbasin Boundary (SWRCB D1649, 2002; and DWR Bulletin 118, 2020)

Nitrate (as NO3), mg/L
(Source: DDW CLIP and Supplemental Water Quality Sampling, 2024)

- 0 - 45
- 45 -90
- 90 - 135
- > 135

Primary Maximum Contaminant Level for Nitrate (as NO3) = 45 mg/L

N

0 1.25 2.5

Miles

Feb-25

NITRATE (as NO3) CONCENTRATIONS - WATER YEAR 2024

W:\GIS_proj\SanLuisRey_GSP50_Fig_13_Nitrate-NO3_Fall2024_2-25.mxd

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

DRAFT

FIGURE 13

GEOSCIENCE

DRAFT

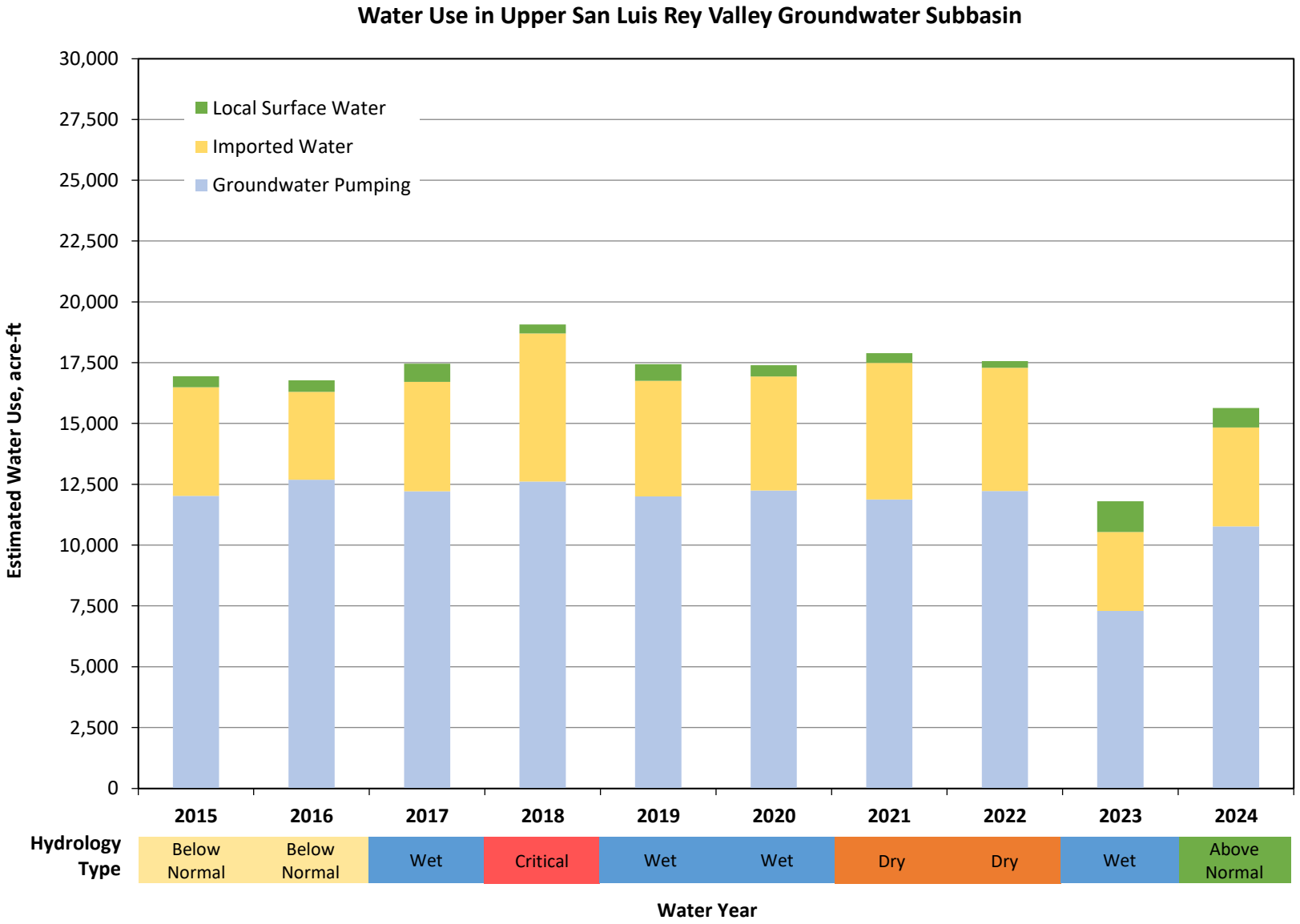
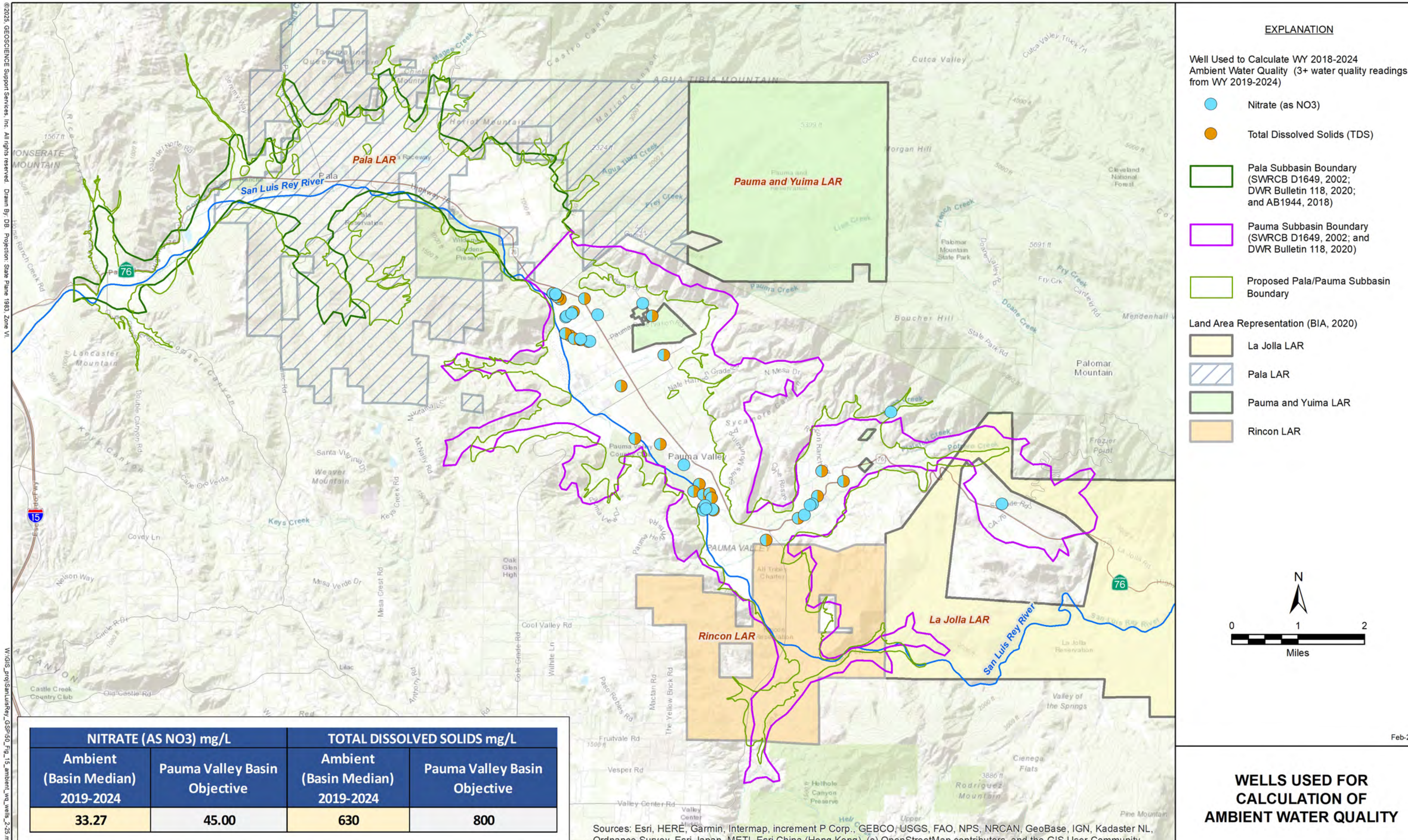


Figure 14



NITRATE (AS NO3) mg/L		TOTAL DISSOLVED SOLIDS mg/L	
Ambient (Basin Median) 2019-2024	Pauma Valley Basin Objective	Ambient (Basin Median) 2019-2024	Pauma Valley Basin Objective
33.27	45.00	630	800

WELLS USED FOR CALCULATION OF AMBIENT WATER QUALITY

UPPER SAN LUIS REY GROUNDWATER MANAGEMENT AUTHORITY

DRAFT

FIGURE 15

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN ANNUAL REPORT - WATER YEAR 2024

GEOSCIENCE

TABLES

Table 1. Water Year 2024 Water Level Measurements from Monitoring Network Wells

ID	Date	Time	Depth to Water	Reference Point Elevation	Water Level Elevation	Notes
			(ft)	(ft amsl)	(ft amsl)	
MW-1	11/13/23	10:29	125.67	1,590.91	1,465.24	
MW-1	04/08/24	8:05	120.90	1,590.91	1,470.01	
MW-1	10/15/24	10:19	113.90	1,590.91	1,477.01	
MW-2	11/13/23	10:20	253.28	1,533.45	1,280.17	
MW-2	04/08/24	8:18	246.20	1,533.45	1,287.25	
MW-2	10/15/24	10:28	240.10	1,533.45	1,293.35	
MW-3	11/13/23	10:11	266.85	1,278.20	1,011.35	
MW-3	04/08/24	7:57	216.80	1,278.20	1,061.40	
MW-3	10/15/24	10:11	238.30	1,278.20	1,039.90	
MW-4	11/13/23	9:52	198.86	1,199.66	1,000.80	
MW-4	04/08/24	7:44	174.60	1,199.66	1,025.06	
MW-4	10/15/24	10:02	171.30	1,199.66	1,028.36	Pumping
MW-5	11/13/23	9:17	188.55	1,000.24	811.69	
MW-5	04/08/24	7:32	160.80	1,000.24	839.44	
MW-5	10/15/24	9:53	187.80	1,000.24	812.44	
MW-6	11/13/23	9:41	55.32	805.36	750.04	
MW-6	04/08/24	8:34	23.80	805.36	781.56	
MW-6	10/15/24	10:42	90.40	805.36	714.96	
MW-7	11/21/23	8:21	52.23	801.90	749.67	
MW-7	04/10/24	9:57	31.20	801.90	770.70	
MW-7	10/16/24	8:35	71.30	801.90	730.60	
MW-8	11/21/23	8:30	66.89	799.70	732.81	
MW-8	04/10/24	10:08	46.30	799.70	753.40	
MW-8	10/16/24	8:22	78.70	799.70	721.00	
MW-9	11/21/23	8:19	71.44	798.24	726.80	
MW-9	04/10/24	9:59	53.10	798.24	745.14	
MW-9	10/16/24	8:30	79.80	798.24	718.44	
MW-10	11/21/23	8:08	109.95	808.66	698.71	
MW-10	04/10/24	10:24	87.50	808.66	721.16	
MW-10	10/16/24	8:51	103.10	808.66	705.56	
MW-11	11/21/23	8:14	129.04	768.07	639.03	
MW-11	04/10/24	10:17	106.00	768.07	662.07	
MW-11	10/16/24	8:43	115.50	768.07	652.57	
MW-12	11/21/23	9:09	101.25	762.18	660.93	Pumping
MW-12	04/10/24	10:36	70.50	762.18	691.68	
MW-12	10/16/24	8:06	81.70	762.18	680.48	
MW-13	11/21/23	8:46	109.42	750.26	640.84	Under repair. Temporary RP
MW-13	04/10/24	10:45	98.10	750.26	652.16	Under repair. Temporary RP
MW-13	10/16/24	7:58	101.10	750.26	649.16	Under repair. Temporary RP
MW-14	11/21/23	8:53	122.14	744.83	622.69	
MW-14	04/10/24	10:51	93.70	744.83	651.13	
MW-14	10/16/24	7:54	106.90	744.83	637.93	
MW-15	11/21/23	9:01	41.08	756.69	715.61	
MW-15	04/10/24	11:10	23.20	756.69	733.49	
MW-15	10/15/24	9:20	39.10	756.69	717.59	
MW-16	11/21/23	8:51	35.67	748.59	712.92	
MW-16	04/10/24	11:19	19.20	748.59	729.39	
MW-16	10/15/24	9:35	33.10	748.59	715.49	
MW-17	11/21/23	8:59	34.15	747.31	713.16	
MW-17	04/10/24	11:14	19.10	747.31	728.21	
MW-17	10/15/24	9:30	31.10	747.31	716.21	
MW-18	11/14/23	9:00	380.17	954.96	574.79	
MW-18	04/10/24	8:00	308.40	954.96	646.56	
MW-18	10/15/24	7:45	352.80	954.96	602.16	
MW-19	11/14/23	9:09	221.86	811.47	589.61	
MW-19	04/10/24	8:38	171.80	811.47	639.67	

Table 1. Water Year 2024 Water Level Measurements from Monitoring Network Wells

ID	Date	Time	Depth to Water	Reference Point Elevation	Water Level Elevation	Notes
			(ft)	(ft amsl)	(ft amsl)	
MW-19	10/15/24	8:10	207.80	811.47	603.67	
MW-20	11/14/23	9:16	217.95	804.18	586.23	
MW-20	04/10/24	8:30	168.50	804.18	635.68	
MW-20	10/15/24	8:05	210.30	804.18	593.88	
MW-21	11/13/23	8:45	188.40	741.04	552.64	
MW-21	04/08/24	11:20	139.20	741.04	601.84	
MW-21	10/15/24	8:50	495.00	741.04	246.04	Questionable read. Sonic water level reader read 130 ft
MW-22	11/13/23	8:40	89.99	741.34	651.35	
MW-22	04/08/24	11:24	79.40	741.34	661.94	
MW-22	10/15/24	9:00	84.90	741.34	656.44	
MW-23	11/21/23	9:45	100.85	710.57	609.72	
MW-23	04/08/24	10:00	82.60	710.57	627.97	
MW-23	10/16/24	10:15	91.20	710.57	619.37	
MW-24	11/21/23	9:38	126.42	719.66	593.24	
MW-24	04/10/24	7:00	109.10	719.66	610.56	
MW-24	10/16/24	10:06	117.50	719.66	602.16	
MW-25	11/21/23	9:25	210.69	760.77	550.08	
MW-25	04/10/24	7:20	189.30	760.77	571.47	
MW-25	10/16/24	10:30	208.20	760.77	552.57	
MW-26	11/13/23	10:52	114.69	687.18	572.49	
MW-26	04/08/24	9:12	92.30	687.18	594.88	
MW-26	10/15/24	11:03	94.80	687.18	592.38	
MW-27	11/13/23	10:57	112.49	682.37	569.88	
MW-27	04/08/24	9:15	91.90	682.37	590.47	
MW-27	10/15/24	11:12	92.20	682.37	590.17	
MW-28	11/13/23	11:07	110.50	749.92	639.42	
MW-28	04/08/24	9:20	93.50	749.92	656.42	
MW-28	10/15/24	11:18	93.50	749.92	656.42	
MW-29	11/14/23	7:55	119.04	1,248.98	1,129.94	Pumping
MW-29	04/10/24	9:24	117.80	1,248.98	1,131.18	
MW-29	10/16/24	9:17	121.30	1,248.98	1,127.68	Pumping
MW-30	11/14/23	8:12	37.21	501.05	463.84	
MW-30	04/10/24	9:01	18.20	501.05	482.85	
MW-30	10/16/24	9:36	36.60	501.05	464.45	
MW-31	11/14/23	9:37	19.27	822.08	802.81	
MW-31	04/10/24	11:50	7.50	822.08	814.58	
MW-31	11/14/24	9:30	15.28	822.08	806.80	Pumping
MW-32	11/13/23	11:22	33.02	701.82	668.80	
MW-32	11/21/23	9:52	33.22	701.82	668.60	
MW-32	04/10/24	12:57	21.70	701.82	680.12	
MW-32	10/16/24	10:20	33.20	701.82	668.62	
MW-33	11/13/23	11:22	52.83	701.17	648.34	
MW-33	11/21/23	9:52	52.71	701.17	648.46	
MW-33	04/10/24	13:05	43.60	701.17	657.57	
MW-33	10/16/24	10:21	48.60	701.17	652.57	

Table 2: Water Year 2024 Water Quality Measurements

DDW[1] Code	SAMPLING POINT	SYSTEM	CHEMICAL[2]	SAMPLE DATE	FINDING (ND[3] = 0)	UNIT
CA3700934_001_001	WELL 01	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	75.26	MG/L
CA3700934_001_001	WELL 01	PAUMA VALLEY WATER COMPANY	NITRATE	01/10/24	110.67	MG/L
CA3700934_001_001	WELL 01	PAUMA VALLEY WATER COMPANY	NITRATE	04/03/24	57.55	MG/L
CA3700934_001_001	WELL 01	PAUMA VALLEY WATER COMPANY	TDS	07/10/24	960	MG/L
CA3700934_001_001	WELL 01	PAUMA VALLEY WATER COMPANY	NITRATE	07/10/24	61.98	MG/L
CA3700934_003_003	WELL 03	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	48.69	MG/L
CA3700934_003_003	WELL 03	PAUMA VALLEY WATER COMPANY	NITRATE	01/10/24	53.12	MG/L
CA3700934_003_003	WELL 03	PAUMA VALLEY WATER COMPANY	NITRATE	04/03/24	42.50	MG/L
CA3700934_003_003	WELL 03	PAUMA VALLEY WATER COMPANY	TDS	07/10/24	800	MG/L
CA3700934_003_003	WELL 03	PAUMA VALLEY WATER COMPANY	NITRATE	07/10/24	42.50	MG/L
CA3700934_004_004	WELL 04	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	43.83	MG/L
CA3700934_004_004	WELL 04	PAUMA VALLEY WATER COMPANY	NITRATE	01/10/24	48.69	MG/L
CA3700934_004_004	WELL 04	PAUMA VALLEY WATER COMPANY	NITRATE	04/03/24	40.28	MG/L
CA3700934_004_004	WELL 04	PAUMA VALLEY WATER COMPANY	TDS	07/10/24	790	MG/L
CA3700934_004_004	WELL 04	PAUMA VALLEY WATER COMPANY	NITRATE	07/10/24	44.27	MG/L
CA3700934_005_005	WELL 05	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	61.98	MG/L
CA3700934_005_005	WELL 05	PAUMA VALLEY WATER COMPANY	NITRATE	01/10/24	88.54	MG/L
CA3700934_005_005	WELL 05	PAUMA VALLEY WATER COMPANY	NITRATE	04/03/24	84.11	MG/L
CA3700934_005_005	WELL 05	PAUMA VALLEY WATER COMPANY	NITRATE	07/10/24	70.83	MG/L
CA3700934_005_005	WELL 05	PAUMA VALLEY WATER COMPANY	TDS	09/03/24	760	MG/L
CA3700934_006_006	WELL 06	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	61.98	MG/L
CA3700934_006_006	WELL 06	PAUMA VALLEY WATER COMPANY	NITRATE	01/10/24	66.40	MG/L
CA3700934_006_006	WELL 06	PAUMA VALLEY WATER COMPANY	NITRATE	04/03/24	43.38	MG/L
CA3700934_006_006	WELL 06	PAUMA VALLEY WATER COMPANY	TDS	07/10/24	660	MG/L
CA3700934_006_006	WELL 06	PAUMA VALLEY WATER COMPANY	NITRATE	07/10/24	38.51	MG/L
CA3700934_007_007	WELL 07	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	57.55	MG/L
CA3700934_007_007	WELL 07	PAUMA VALLEY WATER COMPANY	NITRATE	01/10/24	84.11	MG/L
CA3700934_007_007	WELL 07	PAUMA VALLEY WATER COMPANY	NITRATE	04/03/24	75.26	MG/L
CA3700934_007_007	WELL 07	PAUMA VALLEY WATER COMPANY	NITRATE	07/10/24	32.76	MG/L
CA3700934_008_008	WELL 08	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	18.15	MG/L
CA3700934_009_009	WELL 09	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	19.04	MG/L
CA3700934_009_009	WELL 09	PAUMA VALLEY WATER COMPANY	NITRATE	01/10/24	75.26	MG/L
CA3700934_009_009	WELL 09	PAUMA VALLEY WATER COMPANY	NITRATE	04/03/24	70.83	MG/L
CA3700934_009_009	WELL 09	PAUMA VALLEY WATER COMPANY	TDS	07/10/24	310	MG/L
CA3700934_009_009	WELL 09	PAUMA VALLEY WATER COMPANY	NITRATE	07/10/24	9.30	MG/L
CA3700934_010_010	WELL 10	PAUMA VALLEY WATER COMPANY	NITRATE	12/13/23	13.28	MG/L
CA3700936_008_008	WELL 08	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	10/03/23	48.69	MG/L
CA3700936_008_008	WELL 08	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	01/24/24	48.69	MG/L
CA3700936_008_008	WELL 08	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	05/01/24	66.40	MG/L
CA3700936_008_008	WELL 08	RANCHO ESTATES MUTUAL WATER CO.	TDS	05/03/24	1100	MG/L
CA3700936_008_008	WELL 08	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	05/03/24	61.98	MG/L
CA3700936_008_008	WELL 08	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	08/28/24	53.12	MG/L
CA3700936_010_010	WELL 10	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	10/03/23	24.79	MG/L
CA3700936_010_010	WELL 10	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	01/24/24	10.18	MG/L
CA3700936_010_010	WELL 10	RANCHO ESTATES MUTUAL WATER CO.	TDS	05/01/24	420	MG/L
CA3700936_010_010	WELL 10	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	05/01/24	11.29	MG/L
CA3700936_010_010	WELL 10	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	08/28/24	11.95	MG/L
CA3700936_011_011	WELL 11	RANCHO ESTATES MUTUAL WATER CO.	TDS	05/01/24	520	MG/L
CA3700936_011_011	WELL 11	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	05/01/24	6.64	MG/L
CA3700936_012_012	WELL 12	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	12/19/23	4.43	MG/L
CA3700936_012_012	WELL 12	RANCHO ESTATES MUTUAL WATER CO.	TDS	05/01/24	770	MG/L
CA3700936_012_012	WELL 12	RANCHO ESTATES MUTUAL WATER CO.	NITRATE	05/01/24	2.61	MG/L
CA3700937_001_001	WELL 01	LAZY H MUTUAL WATER COMPANY	NITRATE	02/05/24	15.05	MG/L
CA3700937_001_001	WELL 01	LAZY H MUTUAL WATER COMPANY	TDS	03/18/24	380	MG/L

Table 2: Water Year 2024 Water Quality Measurements

DDW[1] Code	SAMPLING POINT	SYSTEM	CHEMICAL[2]	SAMPLE DATE	FINDING (ND[3] = 0)	UNIT
CA3700937_004_004	WELL 04	LAZY H MUTUAL WATER COMPANY	NITRATE	03/04/24	12.40	MG/L
CA3700937_004_004	WELL 04	LAZY H MUTUAL WATER COMPANY	NITRATE	08/05/24	5.31	MG/L
CA3700938_004_004	WELL 12	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	10/02/23	4.87	MG/L
CA3700938_004_004	WELL 12	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	01/02/24	6.20	MG/L
CA3700938_004_004	WELL 12	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	04/01/24	4.87	MG/L
CA3700938_004_004	WELL 12	YUIMA MUNICIPAL WATER DISTRICT IDA	TDS	07/01/24	440	MG/L
CA3700938_004_004	WELL 12	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	07/01/24	5.31	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	10/02/23	92.96	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	02/05/24	101.82	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	03/04/24	97.39	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	04/01/24	97.39	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	05/06/24	101.82	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	06/03/24	106.24	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	07/01/24	110.67	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	08/05/24	123.95	MG/L
CA3700938_005_005	WELL 14	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	09/03/24	106.24	MG/L
CA3700938_006_006	WELL 17	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	10/02/23	48.69	MG/L
CA3700938_006_006	WELL 17	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	01/02/24	57.55	MG/L
CA3700938_006_006	WELL 17	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	04/01/24	66.40	MG/L
CA3700938_006_006	WELL 17	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	07/01/24	70.83	MG/L
CA3700938_011_011	WELL 23	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	05/06/24	41.61	MG/L
CA3700938_012_012	WELL 24	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	05/06/24	53.12	MG/L
CA3700938_020_020	WELL 25	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	07/01/24	7.08	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	10/02/23	123.95	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	11/06/23	123.95	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	12/04/23	128.38	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	01/02/24	110.67	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	02/05/24	106.24	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	03/04/24	106.24	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	04/01/24	106.24	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	05/06/24	115.10	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	06/03/24	115.10	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	07/01/24	110.67	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	08/05/24	128.38	MG/L
CA3700938_031_031	WELL 29	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	09/03/24	146.08	MG/L
CA3700938_037_037	WELL 19A	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	01/02/24	7.08	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	10/02/23	146.08	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	11/06/23	150.51	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	01/02/24	137.23	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	03/04/24	150.51	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	04/01/24	132.80	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	05/06/24	137.23	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	06/03/24	146.08	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	07/01/24	150.51	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	08/05/24	163.79	MG/L
CA3700938_047_047	WELL 22	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	09/03/24	168.22	MG/L
CA3700938_048_048	WELL 20A	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	10/02/23	6.64	MG/L
CA3700938_048_048	WELL 20A	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	01/02/24	6.64	MG/L
CA3700938_048_048	WELL 20A	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	04/01/24	7.53	MG/L
CA3700938_048_048	WELL 20A	YUIMA MUNICIPAL WATER DISTRICT IDA	NITRATE	07/01/24	6.20	MG/L
CA3701408_016_016	TY WELL	YUIMA MUNICIPAL WATER DISTRICT	NITRATE	08/05/24	28.33	MG/L
CA3702754_001_001	WELL 01	RANCHO CORRIDO RV RESORT	TDS	02/15/24	550	MG/L
CA3702754_001_001	WELL 01	RANCHO CORRIDO RV RESORT	NITRATE	02/15/24	16.82	MG/L
CA3702754_004_004	WELL 04	RANCHO CORRIDO RV RESORT	TDS	02/15/24	610	MG/L

Table 2: Water Year 2024 Water Quality Measurements

DDW[1] Code	SAMPLING POINT	SYSTEM	CHEMICAL[2]	SAMPLE DATE	FINDING (ND[3] = 0)	UNIT
CA3702754_004_004	WELL 04	RANCHO CORRIDO RV RESORT	NITRATE	02/15/24	13.28	MG/L
CA3710012_004_004	WELL 14R	RANCHO PAUMA MUTUAL WC	NITRATE	10/03/23	5.31	MG/L
CA3710012_004_004	WELL 14R	RANCHO PAUMA MUTUAL WC	NITRATE	01/02/24	13.28	MG/L
CA3710012_004_004	WELL 14R	RANCHO PAUMA MUTUAL WC	NITRATE	04/09/24	8.41	MG/L
CA3710012_004_004	WELL 14R	RANCHO PAUMA MUTUAL WC	NITRATE	07/16/24	6.20	MG/L
CA3710012_010_010	WELL 36	RANCHO PAUMA MUTUAL WC	NITRATE	01/02/24	3.81	MG/L
CA3710012_019_019	WELL 39	RANCHO PAUMA MUTUAL WC	NITRATE	01/02/24	11.07	MG/L
CA3710012_024_024	WELL 38	RANCHO PAUMA MUTUAL WC	NITRATE	01/02/24	18.59	MG/L
CA3710012_031_031	WELL 42	RANCHO PAUMA MUTUAL WC	NITRATE	01/02/24	7.53	MG/L
CA3710012_033_033	WELL 7R2	RANCHO PAUMA MUTUAL WC	NITRATE	01/02/24	8.41	MG/L
CA3710012_033_033	WELL 7R2	RANCHO PAUMA MUTUAL WC	TDS	09/17/24	740	MG/L
CA3710012_033_033	WELL 7R2	RANCHO PAUMA MUTUAL WC	NITRATE	09/17/24	11.07	MG/L
	MW-18	GSP Supplementary	TDS	11/20/23	220	MG/L
	MW-18	GSP Supplementary	NITRATE	11/20/23	1.20	MG/L
	MW-18	GSP Supplementary	TDS	05/14/24	330	MG/L
	MW-18	GSP Supplementary	NITRATE	05/14/24	8.41	MG/L
	MW-19	GSP Supplementary	TDS	11/20/23	600	MG/L
	MW-19	GSP Supplementary	NITRATE	11/20/23	48.69	MG/L
	MW-19	GSP Supplementary	TDS	05/14/24	620	MG/L
	MW-19	GSP Supplementary	NITRATE	05/14/24	48.69	MG/L
	MW-29	GSP Supplementary	TDS	05/14/24	270	MG/L
	MW-29	GSP Supplementary	NITRATE	05/14/24	11.51	MG/L
	MW-30	GSP Supplementary	TDS	11/20/23	260	MG/L
	MW-30	GSP Supplementary	NITRATE	11/20/23	14.17	MG/L
	MW-30	GSP Supplementary	TDS	05/14/24	180	MG/L
	MW-30	GSP Supplementary	NITRATE	05/14/24	0.00	MG/L
	MW-31	GSP Supplementary	TDS	11/20/23	330	MG/L
	MW-31	GSP Supplementary	NITRATE	11/20/23	2.21	MG/L
	MW-31	GSP Supplementary	TDS	05/14/24	330	MG/L
	MW-31	GSP Supplementary	NITRATE	05/14/24	3.76	MG/L

[1] DDW = Division of Drinking Water. Water quality for public water suppliers is available from the California Laboratory Intake Portal (CLIP)

[2] Nitrate reported for Nitrate (as NO3). Value may be converted to Nitrate (as N) by dividing by 4.4268

[3] ND = Non-Detect

APPENDIX A

Upper San Luis Rey Groundwater Management Authority –

Cost of Service Study

(SCI Consulting Group and Larry Walker Associates, 2024)

Upper San Luis Rey Valley Groundwater Management Authority

Cost of Service Study

May 2024

Pursuant to California Water Code § 10730.2 and Articles XIIIC and XIIID of the California Constitution.

SCIConsultingGroup
Public Finance Consulting Services

LWA LARRY WALKER ASSOCIATES
science | policy | solutions

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I. Executive Summary

Background

The California Legislature enacted the Sustainable Groundwater Management Act ("SGMA") in 2014, marking the first Statewide effort to manage its groundwater basins. The goal of this historic legislation is to ensure that groundwater is sustainably managed and protected for all beneficial users, both now and in the future. Although it was enacted at the State level, SGMA was envisioned to be implemented locally. As such, it mandates that local Groundwater Sustainability Agencies ("GSAs") be formed in medium and high-priority basins to develop and implement Groundwater Sustainability Plans ("GSPs").

The Upper San Luis Rey Groundwater Management Authority is a joint powers authority ("JPA") created in May 2022 to manage the Upper San Luis Rey Valley Subbasin, located in rural northern San Diego County, pursuant to SGMA. The Authority consists of member agencies Pauma Valley Community Services District ("PVCSD"), Upper San Luis Rey Resource Conservation District ("USLRRCD"), Yuima Municipal Water District ("YMWD"), and the Upper San Luis Rey Indian Water Authority ("USLRIWA"). The Authority is responsible for the implementation of the GSP, and associated monitoring and reporting activities required by the State.

The Upper San Luis Rey Valley Groundwater Sustainability Plan was adopted in January of 2022 and submitted to the California Department of Water Resources ("DWR"). On January 18, 2024, DWR approved the GSP. The Authority is tasked with implementing the Plan and achieving Subbasin sustainability by 2042.

In January 2023, the Authority engaged a consultant team led by SCI Consulting Group ("SCI Team") to develop a Cost of Service Study for the Subbasin, with the ultimate intention of developing a sustainable funding source to support GSP implementation. This effort has included comprehensive data analysis, review of funding options, evaluation of rate structure approaches, and the development of rate and fee schedules. The GSA Board and staff have provided input as well as data related to groundwater use. The scope of work also includes a community meeting, to be held in the Spring of 2024 to incorporate the community perspective into the Rate and Fee Study process. If successfully adopted, the Authority plans to implement the fee program in the Spring of 2024.

This Study outlines the fee schedule for funding the Authority's operational expenses through the next five years of GSP implementation. It summarizes the efforts of the GSA, Member Agencies, and consultants in determining the financial, legal, and policy decisions best suited to funding groundwater management in the Subbasin. This summary includes considerations of legal authority, funding structure, and fee methodology.

Objectives

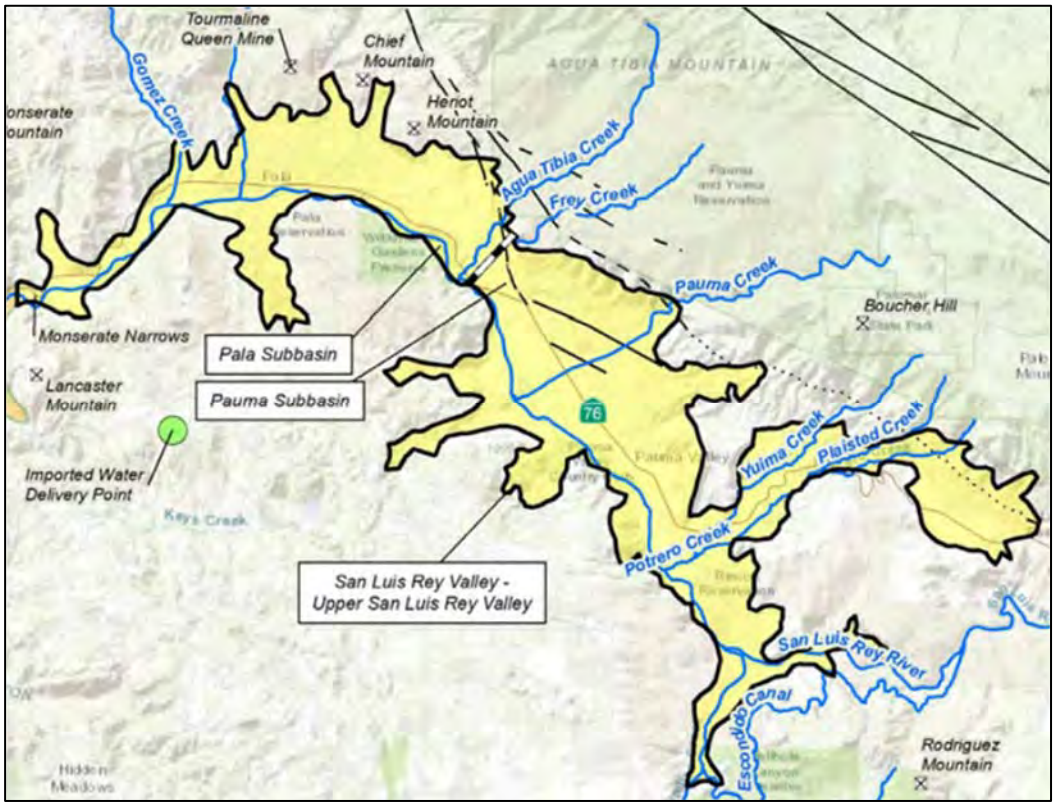
The objectives of this Cost of Service Study include the following:

- Development of a GSP implementation budget
- Development and refinement of parcel-scale groundwater-use data
- Development of fee methodology and rates

Subbasin Characteristics

The Upper San Luis Rey Valley Subbasin includes both the Pauma and Pala Subbasins and underlies approximately 19,200 acres in northern San Diego County.[1] In whole, the Subbasin extends from the confluence of the San Luis Rey River and Paradise Creek in the east, to the Monserate Narrows in the west. The Subbasin is shown below in Figure 1, as shown in the GSP (GSP, 0-3).

Figure 1 – Upper San Luis Rey Valley Subbasin Boundary



[1]Upper San Luis Rey Valley GSP, 0-6, https://sgma.water.ca.gov/portal/service/gspdocument/download/7813.

The Subbasin is primarily comprised of irrigated agricultural lands, but also contains significant open space/rangeland, limited residential land use, and a small amount of commercial/industrial land use (GSP, 0-3). A combination of groundwater, surface water, and imported water are utilized within the Subbasin for these different land uses.

The Subbasin is also home to several federally recognized tribes. The La Jolla Band of Luiseno Mission Indians, the Rincon Band of Luiseno Mission Indians, the Pauma Band of Luiseno Mission Indians, and the Pala Band of Luiseno Mission Indians exercise federally reserved water rights within their respective reservations. Pursuant to Water Code § 10720.3, participation of federally recognized tribes in SGMA activities is voluntary. Specifically, this Section notes that "any exercise of regulatory authority, enforcement, or imposition and collection of fees is pursuant to the tribe's independent authority and not pursuant to authority granted to a groundwater sustainability agency under this part." For this reason, the sovereignty of tribal lands will be respected, and they shall not be included in the fee schedule outlined by this Study, or it's associated methodology.

Basin Prioritization

The Department of Water Resources assigns each of California's 515 groundwater basins a prioritization rating. The Basin Prioritization rating dictates whether a basin is designated very low, low, medium, or high priority as shown in Table 1.

Table 1 - SGMA Priority Ranking Criteria

Priority	Total Priority Point Ranges			
Very Low	*over*	zero	*up to*	7
Low	*over*	7	*up to*	14
Medium	*over*	14	*up to*	21
High	*over*	21	*up to*	42

Medium and high priority basins are required to establish a groundwater sustainability agency and develop a groundwater sustainability plan. With a priority ranking score of 19, the Upper San Luis Rey Valley Subbasin is classified by DWR as a medium-priority basin. The Subbasin's priority point allocation is illustrated in Table 2.

Table 2 – Upper San Luis Rey Valley Subbasin Priority Points

Criteria	Priority Points
1 Population	1
2 Population Growth	3
3 Public Supply Wells	5
4 Total Wells	3
5 Irrigated Acres	3
6 Groundwater Reliance	4
7 Impacts	0
8 Habitat and Other Information	0
Total Priority Points	19

Subbasin Conditions

The conditions of the Upper San Luis Rey Valley Subbasin are discussed in detail in the GSP. Land use in the Subbasin is predominantly characterized by agricultural activities, with major crop varieties including avocados, citrus crops, and pasture grass.

Per Water Code § 10721(x), SGMA identifies six sustainability indicators, which are the effects caused by groundwater conditions occurring throughout the Subbasin that, when significant and unreasonable, become undesirable results. These include 1.) chronic lowering of groundwater levels, 2.) groundwater storage, 3.) land subsidence, 4.) water quality, 5.) depletion of interconnected surface water, and 6.) seawater intrusion.

As detailed in the Upper San Luis Rey Valley Subbasin's GSP, it was determined that three out of the six sustainability indicators are potentially applicable to the Upper San Luis Rey Valley Subbasin:

- Reduction on groundwater storage levels
- Chronic lowering of groundwater levels
- Degraded water quality

Land subsidence, depletion of interconnected surface water, and seawater intrusion were found not to be applicable in the Subbasin (GSP, 4-1). However, these indicators are expected to be evaluated going forward for any potential change in these findings. The GSP elaborates on the technical considerations associated with each applicable sustainability indicator in the Subbasin, and these considerations served as the foundation for establishing the criteria for sustainable management.

Chronic lowering of groundwater levels is defined in the GSP as "significant and unreasonable depletion of supply, causing undesirable results to domestic, agricultural, or municipal groundwater users if continued over the planning and implementation horizon" (GSP, 4-5). Undesirable results stemming from this indicator can be defined as "lowering of groundwater levels to a depth where the wells cannot be operated. (GSP, 4-6). This result would affect groundwater users within the Subbasin who rely heavily, and in many cases exclusively, on groundwater resources. If significant and unreasonable groundwater level declines were to occur, groundwater would be less available or unavailable to groundwater users. Ensuring sustainable groundwater levels represents a core effort of the GSP implementation services provided by the Authority.

Reduction of groundwater storage is defined in the GSP as "Groundwater in storage is the volume of groundwater in the basin that is available for groundwater production" (GSP, 4-6). This presents the possibility of undesirable results in the form of "the inability of the groundwater basin to meet water supply demands during drought periods." (GSP, 4-6.) This result would have lasting negative effects on Subbasin parcel owners' ability to obtain necessary water resources during times of drought. If a significant and unreasonable reduction of groundwater storage were to occur, groundwater would be less available or potentially unavailable during dry years. As a part of the service provided by the Authority, efforts to address this undesirable result are integral to GSP implementation.

Degraded water quality has the potential to "impair water supply and affect human health and the environment" (GSP, 4-7). Potential undesirable results include impacts to groundwater users ranging from increased sampling and monitoring, increased treatment cost, loss of wells, and negative effects on agriculture (GSP, 4-7). The GSP notes that further data is required to properly characterize water quality in the Subbasin (GSP, 4-8). Accordingly, further data collection and analysis is planned in accordance with GSP implementation in the coming years.

The sustainability indicators described as relevant to the Subbasin with the GSP relate to the service provided to property owners by the Authority to all groundwater users within the Subbasin. Avoidance of the potential undesirable results stemming from these indicators is an essential aspect of GSP implementation and SGMA compliance; and hence, a sustainable funding source is needed. In order to apportion these costs equitably and relative to the service provided, this Study proposes a charge per wellhead and a charge per acre foot ("AF") of groundwater extracted.

Upper San Luis Rey Valley Subbasin Sustainability Goal

The intent of this Cost of Service Study is to appropriately and equitably allocate the cost of the authority's service related to GSP implementation and SGMA compliance across groundwater users within the Subbasin. As such, these services relate to the larger sustainability goal of the Subbasin. As stated in the GSP, this goal is as follows (GSP, 4-3):

The sustainability goal for the USLR Subbasin is to manage and preserve its groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve historic operations of beneficial use in the basin as well as allow for future planned uses as conceived by the GSA and basin stakeholders. The sustainability goal will be accomplished by achieving the following objectives:

- *Operate the USLR Subbasin groundwater resource within the sustainable yield.*
- *Implement projects and management actions to reduce USLR Subbasin groundwater demands, increase efficient use of current supplies, maximize use of supplemental water supplies, and mitigate undesirable results.*
- *Actively monitor the USLR Subbasin and adaptively manage projects and management actions to ensure the GSP is effective and that undesirable results are avoided.*

Agency Characteristics

The Pauma Valley Groundwater Sustainability Agency ("GSA," "PVGSA," or "Agency") was formed in June 2017 through a Memorandum of Understanding ("2017 MOU"), between the Pauma Valley Community Services District ("PVCSD"), Upper San Luis Rey Resource Conservation District ("USLRRCD"), Yuima Municipal Water District ("YMWD"), and the County of San Diego (the "County"), collectively referred to the "parties," for the purpose of developing a single GSP for the Upper San Luis Rey Valley Subbasin ("Subbasin") pursuant to SGMA. In November 2018, the County withdrew from the MOU. The remaining parties continued to function as the GSA and subsequently submitted the Upper San Luis Rey Valley GSP to DWR.

In January 2022, the 2017 MOU was amended to add two new parties to the agreement: Pauma Municipal Water District ("Pauma MWD") and San Luis Rey Municipal Water District ("SLR MWD").

In May 2022, the remaining parties amended the MOU to create the Upper San Luis Rey Groundwater Management Authority, a joint powers authority with the same members as Pauma Valley GSA. This amendment also created two voting Board seats for the Upper San Luis Rey Indian Water Authority ("USLRIWA"). The Authority succeeds all of the obligations of Pauma Valley GSA, including GSP implementation. The Authority is governed by a Board of Directors ("Board"), consisting of representatives of the parties to the JPA.

Groundwater Fees

Just as SGMA envisions groundwater basins being locally governed, it also envisions GSAs to be locally funded. The intent of this Fee Study is to establish the rate and fee schedule for the Upper San Luis Rey Valley Subbasin, providing a reliable stand-alone revenue source to ensure the Authority's ability to implement its GSP.

As noted above, the GSA has been funded to this point through direct member agency contributions and grant awards, as is common amongst newer GSAs throughout the State. These direct contributions have provided the Authority with the ability to develop the GSP and comply with State requirements. While the member agencies will continue to support the efforts to implement the GSP, it is assumed that direct member contribution with eventually cease. The Authority will continue to actively pursue future grant solicitations and seek to maintain sustainable funding sources.

A Fee Program for the Upper San Luis Rey Valley Subbasin

Through research and numerous discussions with staff, legal counsel, and the SCI Team, a groundwater management fee as described by Water Code § 10730.2 and consistent with Propositions 26 and 218 is selected as the optimal funding mechanism for the Authority. Per § 10730.2, this fee must be adopted pursuant to the procedural requirements described in the California Constitution, Article XIII D, Section 6, subdivisions (a) and (b). These requirements pertain to property related fees and involve mailing notices and holding a protest hearing (as described in more detail below).

Furthermore, a fee based primarily on groundwater extraction, whether actual or estimated, ensures an equitable cost distribution among groundwater users. Water Code § 10730.2 provides guidance for this type of fee to be used to fund a range of groundwater management activities that align with the Authority's revenue needs and sustainability goals.

As such, the methodology of the fee program established by this Study is based on apportioning costs according to the amount of groundwater extraction for each property. Several factors make this the optimal basis on which to allocate the costs of a groundwater sustainability program in the Upper San Luis Rey Valley Subbasin:

- Proportional: The fee is equitable in that properties that extract more groundwater (and have more at stake in ensuring a sustainable groundwater supply) would pay more while properties that extract less would pay less.
- Easy to Administer: Once extraction amounts are estimated, there will be limited changes from year to year making the fee calculation and implementation easier. Property owners who wish to submit metered data to be used in place of their estimated use can do so as they see fit.
- Easy to Understand: Proportionality based on estimated groundwater extraction is easy to understand and clearly allocates the cost of service across Subbasin property owners.
- Legally Compliant: This type of fee conforms with the California Water Code as well as Proposition 218, which SGMA makes applicable to certain groundwater extraction fees.

Rate Components: Groundwater Extraction Estimates and Revenue Requirements

Precise groundwater extraction data for many properties is largely unavailable within the Subbasin. Public water agencies operating wells are required to report extraction data to the California Department of Drinking Water, and this data is publicly available to the Agency. However, the majority of groundwater extraction comes from wells whose extraction data is either not public or is not metered. Thus, precise measurement of extraction across the Subbasin is impossible at this time. The process of installing meters on all Subbasin wells introduces financial, legal, and policy complexities that will be considered in the coming years, but this will not be achieved at the time of this Study. Therefore, this Study will estimate extraction for those non-public wells through a process that is described herein. The total groundwater extraction within the Authority's jurisdiction is estimated to be 13,470 AF per year.

Utilizing groundwater extraction as the basis for a fee allows a GSA to equitably allocate the cost managing groundwater based on the demands of groundwater extractors on the Subbasin.

The other primary component of the fee program outlined in this Study is the projected budget of the Authority related to SGMA compliance and GSP implementation. Ensuring the revenue needs of the Authority is paramount to the success of these efforts. This budget was scrutinized by Agency staff and the SCI Team, producing an annual revenue requirement applied to the groundwater extraction fees of $421,246.

In an effort to apportion costs appropriately across groundwater users, the Authority has identified a portion of its costs as those that should be shared by all well owners within the Subbasin. These costs stem from the preparation of the annual report submitted to DWR ($75,000) and the management contract that facilitates Subbasin management by Yuima MWD ($15,000). Because these costs are static and likely to remain in place in the future regardless of the amount of groundwater used in the Subbasin, they are considered optimal costs to allocate to a wellhead fee (a charge per well).

The estimated number of wells in the Subbasin is around 300, based on estimates derived from the Authority and its member agencies. While further research may be required to continue to make this number more exact, 300 wells will be used by this Cost of Service Study to determine an appropriate rate. By dividing the cost of the annual report and the management contract by this estimated total of wells, the rate per well is determined:

$$\frac{\$90{,}000}{300 \text{ Wells}} = \$300 \text{ Per Well}$$

The remaining costs are then allocated to the extraction fee portion of the proposed fee program. By subtracting the $90,000 allocated to the wellhead fee, the updated revenue need is determined to be $331,246. The final calculation of the cost of service extraction fee is a simple equation producing a rate per acre foot ("AF") of groundwater extracted, as shown below.

$$\frac{\text{Revenue Requirement (\$\$)}}{\text{Acre Feet Pumped}} = \text{Rate (\$ per AF)}$$

By applying the estimated extraction and remaining revenue requirement, the recommended rate is $24.59, as shown below.

$$\frac{\$331,246}{13,470} = \$24.59 \text{ Per Acre Foot}$$

This Rate and Fee Study provides a detailed outline of the efforts to establish a reliable revenue source to fund GSP implementation in the Upper San Luis Rey Valley Subbasin and represents the culmination of efforts by the Upper San Luis Rey Groundwater Management Authority Board, staff, and consultants.

II. Context

Many factors contribute to an effective fee methodology and a successful fee implementation. Staff and legal counsel worked with the SCI Team to establish a comprehensive understanding of the applicable legislative and legal factors and the viability of various funding mechanisms.

Legislative and Legal Understanding

Water Code § 10730.2

Groundwater Sustainability Fees

Within SGMA, two revenue mechanism opportunities are specifically described to fund GSAs:

- Water Code § 10730 is intended to fund general GSA administration and GSP implementation but excludes major capital investments for improvements.
- Water Code § 10730.2 governs groundwater extraction fees imposed to fund the full spectrum of GSA costs, including GSA administration, GSP implementation, and any major capital investments and facility operations. Note that Section 10730.2 requires more rigorous and lengthy adoption procedures.

Since the allowable use of funds generated from a Water Code § 10730.2 fee is more comprehensive (including capital costs), and necessitates more rigorous community input (a mailed noticing to all affected property owners and a public hearing), the Authority has chosen to implement the (albeit more onerous to implement) Water Code § 10730.2 fee, as described below:

> *A groundwater sustainability agency that adopts a groundwater sustainability plan pursuant to this part may impose fees on the extraction of groundwater from the basin to fund costs of groundwater management, including, but not limited to, the costs of the following:*
>
> *(1) Administration, operation, and maintenance, including a prudent reserve.*
> *(2) Acquisition of lands or other property, facilities, and services.*
> *(3) Supply, production, treatment, or distribution of water.*
> *(4) Other activities necessary or convenient to implement the plan.*

Furthermore, Section 10730.2 also states that fees may be imposed based on fixed fees and fees charged on a volumetric basis. The fees developed for this Study utilize both a volumetric basis (extraction fee) and a fixed fee (wellhead fee) and are intended to fund implementation of the GSP, and as such falls within the categories described by this code section. Nonetheless, any fee imposed by a government agency must comply with the California Constitution. Further discussion of compliance with Propositions 26 and 218 is included below.

Fee Implementation Requirements

As noted above, Water Code § 10730.2 provides guidance for fee implementation requirements, stating that: "Fees imposed pursuant to this section shall be adopted in accordance with subdivisions (a) and (b) of Section 6 of Article XIII D of the California Constitution." Article XIII D Section 6 was codified by the passage of Proposition 218 and refers to the procedural requirements of property related fees, which are discussed in more detail below. However, Proposition 218 is best understood in the context of Proposition 26.

Proposition 26

Proposition 26 was passed by voters in 2010, providing a broad constitutional definition of the term "tax", which was necessary in the wake of Proposition 218's limitations on local taxes. Public agencies implementing funding mechanisms must identify and adhere to the appropriate legal framework for the charge they are imposing. In this sense, Proposition 26 provides guidance regarding whether a charge is a tax (and thus subject to a more strenuous approval process), or whether a charge is a fee or assessment.

Proposition 218 was passed by California voters in 1996, adding Articles XIII C and XIII D to the State Constitution. The purpose of this legislation was primarily to address the effects of Proposition 13, passed in 1978, which limited the ability of local governments to impose taxes. While Proposition 218 outlined substantive and procedural guidelines for the imposition of taxes, benefit assessments, and property related fees, the definition of the term "tax" was not succinctly defined.

Proposition 26, as included in Article XIII C of the California Constitution, defines a tax as "any levy, charge, or exaction of any kind imposed by a local government," with certain exceptions. Among these exceptions are:

- *(1) A charge imposed for a specific benefit conferred or privilege granted directly to the payor that is not provided to those not charged, and which does not exceed the reasonable costs to the local government of conferring the benefit or granting the privilege to the payor.*

- *(2) A charge imposed for a specific government service or product provided directly to the payor that is not provided to those not charged, and which does not exceed the reasonable costs to the local government of providing the service or product to the payor.*

- *(7) Assessments and property-related fees imposed in accordance with the provisions of Article XIII D.*

In Identifying which of these exceptions is the appropriate constitutional definition of the proposed fee program, recent case law must be considered. In City of Buenaventura v. United Water Conservation District, the California Supreme Court held that Proposition 26, not Proposition 218, provides the appropriate framework for groundwater extraction fees.[2] While the proposed fee program described in this study must adhere to the procedural and substantive requirements of property related fees (as referenced in exception (7), above), it also satisfies exceptions (1) and (2). Exception (2), "a charge imposed for a specific government service," is likely the most appropriate exception.

Article XIII C goes on to stipulate that the governing agency must establish that any charges imposed by a government agency are not taxes:

> *The local government bears the burden of proving by a preponderance of the evidence that a levy, charge, or other exaction is not a tax, that the amount is no more than necessary to cover the reasonable costs of the governmental activity, and that the manner in which those costs are allocated to a payor bear a fair or reasonable relationship to the payor's burdens on, or benefits received from, the governmental activity.*

Proposition 218

Procedural Requirements of Property Related Fees

The procedural requirements of property related fees, as referenced in Water Code § 10730.2, are described in 1996's Proposition 218 (which is manifested as Section 6 of Article XIII D of the California Constitution). There are two distinct steps: 1.) a mailed noticing of all affected property owners (well owners in this case) and 2.) a mailed balloting on all affected property owners requiring a 50% approval for adoption.

However, Proposition 218 goes on to exempt charges for water service from step 2, the balloting requirement:

> *Except for fees or charges for sewer, water, and refuse collection services, no property related fee or charge shall be imposed or increased unless and until that fee or charge is submitted and approved by a majority vote of the property owners of the property subject to the fee or charge or, at the option of the agency.*

[2] https://www.courts.ca.gov/opinions/archive/B312471.DOC

Section 6 of Article XIII D of the California Constitution describes the specific requirements of the implementation of a property related fee and refers to subdivision (a) as the noticing requirement, (b) as the limitations on fees and services, and (c) as the balloting requirement. As noted above, Water Code § 10730.2 states that fees pursuant to section 6 shall be adopted in accordance with subdivisions (a) and (b) of this section. Hence, by omission of (c) in Section 10730.2, and by the exemption of water-related service provided by Proposition 218, balloting is not required for property related fees for groundwater sustainability.

As described above, only the first step of the two-step process applies to property related fees in this context. That step is the noticed public hearing. Once the Agency has determined the fees they wish to impose, they must mail a written notice to each affected property owner at least 45 days prior to the public hearing. During that time, and up until the conclusion of the hearing, any affected property owner may file a written protest opposing the proposed fees. If the owners of a majority of the affected parcels file a written protest, the agency cannot impose the fee (known as a "majority protest"). If a majority protest is not formed, the agency may impose the fees.

Section 6 also specifies several important requirements surrounding property related fees:

- *Revenues derived from the fee or charge shall not exceed the funds required to provide the property related service.*
- *Revenues derived from the fee or charge shall not be used for any purpose other than that for which the fee or charge was imposed.*
- *The amount of a fee or charge imposed upon any parcel or person as an incident of property ownership shall not exceed the proportional cost of the service attributable to the parcel.*
- *No fee or charge may be imposed for a service unless that service is actually used by, or immediately available to, the owner of the property in question.*

It is the intent of this Cost of Service Study to establish compliance with these requirements as they relate to the proposed cost of service fee program.

Public Meeting Requirements

As noted above, a public hearing is required in order to impose property related fees pursuant to Article XIII D. This public hearing is expected to be held in the Spring of 2024, at which point property owners will be provided with an opportunity for public comment and written protests submitted by affected property owners will be tabulated.

To further engage the public, provide an explanation of the fee program's approach, and address any questions the public may have, the Authority will hold an additional public meeting in the Spring of 2024 prior to the mailing of notice of the public hearing.

Financial Context

Past Revenue Sources

To date, the Authority (and PVGSA prior to the establishment of the JPA), has primarily been funded by member agency contributions and grant awards. In fiscal year 2022-23, member agency contributions totaled $437,379 – the entirety of the year's budget, which included local cost share funding related to grant awards. Additionally, member agencies have facilitated GSP implementation and SGMA compliance by providing staffing resources.

While the Authority has received grant funding in the past, no current grant award is held for fiscal year 2023-24 or beyond. The Authority will continue to monitor available grant programs in an effort to secure outside funding, which would bolster the financial outlook in the Subbasin and contribute to more effective GSP implementation efforts.

III. Fee Determination

The Board made clear its goal of achieving financial independence for the GSA in its management of the Subbasin, placing priority on fairness, efficient administration, and compliance with California law in developing a funding method. The Board concluded that a property related fee based on groundwater use would be the optimal approach to establishing a fee program for the Subbasin.

Due to the unavailability of metered groundwater use data for most properties in the Subbasin, it is often necessary to estimate this usage. Consequently, this Cost of Service Study partially relies on groundwater use estimations derived either from the type and amount of agricultural crops cultivated or from reasonable assumptions tied to land use.

The rate calculation is primarily dependent on two major factors: revenue requirements and groundwater extraction estimates. The development of these two factors is outlined below.

Revenue Requirements

The GSA administrative and technical staff developed a budget of expenditures based on past years and the findings and projections found in the GSP. This budget serves as the Authority's fiscal year 2023-24 budget as it relates to this Cost of Service Study and represents revenue needs in the coming years. This budget indicates a total annual revenue requirement of $421,246.

The intent of this Cost of Service Study is to establish a reliable, stand-alone funding source that will support the Authority's GSP implementation service going forward. To ensure fiscal solvency now and in the future, two changes are shown in the budget included in this Study. First, a five percent contingency has been put in place to generate a prudent reserve that may be used for unforeseen expenses related to existing or additional line items. Second, an inflationary mechanism will be utilized to adjust the budget (and corresponding rates) in future years.

As noted above, USLRGMA member agencies have contributed financially to the Authority's efforts to implement the GSP and maintain compliance with SGMA. Consideration of repayment of these contributions has been included in the budget. Contributions provided as local cost share pf past grant awards are not reimbursable and are thus removed from the repayment calculation. In Table 3 below, a summary of these contributions and an annual repayment amount is shown as $20,513, with the intent of spreading this cost over a ten-year period.

Table 3 – USLRGMA Member Agency Contributions and Repayment

Member Agency		Funding Contribution
Pauma Valley Community Services District	$	160,824
Pauma Mutual Water District	$	160,824
Upper San Luis Rey Resource Conservation District	$	25,000
Yuima Municipal Water District	$	160,824
Subtotal	$	507,472
Local Cost Share Towards Past Grant Funding	$	302,340
(Not Reimbursable to Member Agencies)		
Total Repayment Amount	$	205,133
Annual Repayment (Ten-Year Period)	$	20,513

The Authority's budget for GSP implementation and SGMA compliance costs is shown below in Table 4. A more detailed budget is also included in Appendix A.

Table 4 – Annual Costs and Revenue Requirement

Item		FY 2023-24
Professional Services - Administration	$	30,000
Office Expenses	$	192
Insurance	$	1,500
General & Admin Expenses	$	107,151
Professional Services - GSP	$	243,890
Subtotal	$	382,733
5% Contingency - rounded to nearest $1,000	$	19,000
Member Agency Contribution Repayment	$	20,513
Total Expenses	$	422,246
Offsetting Revenues		
Member Contributions	$	-
(To be replaced by fee in future years)		
Grants	$	-
Other	$	1,000
Offsetting Revenue Totals	$	1,000
Net Revenue Requirement	$	421,246

Note that a five percent contingency has been added to the budget in order to develop a prudent reserve, as described in Water Code § 10730.2. The Authority may elect to reduce the need for this contingency in future years as the Board sees fit.

Annual costs may increase as time goes on. For this reason, the fee program for the Upper San Luis Rey Valley Subbasin will utilize an inflationary mechanism to adjust the budget, and corresponding rate, over the course of the next five years. Due to regional proximity, the San Diego-Carlsbad Consumer Price Index for all urban consumers (CPI-U), may be applied to the budget and rate each year. To avoid large increases due to years which produce exceptionally high inflation rates, a 5% cap is recommended. As such, the budget (and rate) may be increased each year by the San Diego-Carlsbad CPI or 5%, whichever is lower.

Groundwater Extraction

As noted above, the methodology of the fee program for the Upper San Luis Rey Valley Subbasin is based, in part, on estimated groundwater extraction. This is necessitated by the lack of data available for groundwater extraction across most user classes. There are numerous parcels within the Subbasin that do not make their extraction data public (and many of which may not be metered).

There are several factors that inhibit the improvement of data by increasing metering of the Subbasin's wells. While California Water Code § 10725.8 authorizes the GSA to require meters for non-de minimis users, it specifically prohibits it from requiring meters on de minimis users.[3] Additionally, timing is a key issue, as any effort to increase the number of meters in the Subbasin would likely prevent the Authority from securing funding for fiscal years 2023-24 and 2024-25.

Public water systems are the exception to this approach of estimation, as they are required to document groundwater extraction. All public water systems in the Subbasin will be charged according to average known groundwater use. This is discussed in more detail below.

As a first step in estimating groundwater on a parcel scale, an overall water budget was developed that includes all water sources. This water budget pertains to all Subbasin parcels. In order to identify estimated groundwater use for parcels directly using groundwater, public water system extraction was removed from this water budget, leaving only parcel-scale groundwater use. More details related to these efforts are provided below.

[3] De minimis users are defined in the SGMA as properties using, for domestic purposes, less than 2 acre feet of groundwater per year. Most users in this classification are rural residential users.

Data Sources

The estimates used in this Fee Study rely on data from the State, technical studies, and available local data. At this time, using the best available sources to guide estimation of groundwater use is the most optimal path forward for funding the Agency's efforts to implement its GSP. Elements of GSP implementation may contribute to a better understanding of groundwater use in the Subbasin. As better data becomes available, fee calculations may be altered to incorporate any potential improvements to groundwater use data. The maximum rate, however, will only be allowed to increase annually as much as the San Diego-Carlsbad CPI or 5%, whichever is lower.

A variety of data sources were used to develop the parcel-scale groundwater use estimates. Below is a complete list of data used, followed by the source of the data in parenthesis, and a short description of the data.

- San Diego County parcel spatial database (San Diego County): GIS-based spatial database of polygons that delineate parcel boundaries in San Diego County as of June 2023. This dataset also includes County use codes, which relate to the land use of a given parcel.[4]
- County of San Diego Department of Planning and Land Use General Plan Update Study (San Diego County): land use study published in 2010 that provides estimates of groundwater use by parcel type or land use designation.[5]
- Upper San Luis Rey Valley Groundwater Subbasin boundaries (Bulletin 118 Groundwater Basin Boundary Assessment Tool): Basin boundary spatial polygons that delineate boundaries of the Authority's jurisdiction as of June 2023.[6]
- Federally recognized tribal lands spatial database (California Natural Resources Agency Open Data): GIS-based spatial database of polygons that delineate tribal land boundaries as of June 2023.[7]
- Parcel-scale crop data (USLRGMA member agencies): crop type and amount grown on agricultural parcels within the Subbasin.
- Water provider parcel data (USLRGMA member agencies): list of parcels served by various water providers within the Subbasin.
- Public Water System Use (California Division of Drinking Water): reported groundwater extraction per PWSID, for years 2021 and 2022.[8]

[4] https://sdgis-sandag.opendata.arcgis.com/datasets/SANDAG::parcels-6/explore
[5] https://www.sandiegocounty.gov/content/dam/sdc/pds/gpupdate/docs/BOS_Aug2011/EIR/Appn_D_GW.pdf
[6] https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#boundaries
[7] https://data.cnra.ca.gov/dataset/federally-recognized-tribal-lands
[8] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/ear.html

Administrative Data

The database includes general parcel characteristics including parcel area (acres), County Assessor information (i.e., Use Code Description, Use Code Category), and owner information (i.e., Current Owner's Name and Mailing Address). These administrative datasets are associated with each parcel and were obtained from the County of San Diego.

GSA Jurisdiction and Subbasin Parcels

Parcels included in this fee program are parcels that intersect the Subbasin boundary. Parcels that intersect the Subbasin are included in the Fee Study and subject to regulation by the Agency; however, a subset of Subbasin parcels intersect tribal lands. As noted above, the Authority does not have jurisdiction over these parcels in regard to assessing fees, and these parcels are not subject to the fee program.

In determining whether a parcel lies on tribal lands, a threshold of 10% was utilized. Parcels with greater than 10% of their area intersecting tribal land were excluded from fee calculations. Parcels with 10% or less of their area intersecting tribal land were included. This approach may be refined if it is found that a parcel only partially on tribal land maintains a well that lies on tribal land.

Ultimately, the Authority's regulation is based on the location of the groundwater well(s) on the parcel. If a boundary parcel does not have a water well within the Authority's jurisdiction, then the parcel will not be subject to Authority regulation, or the property related fee for groundwater extracted from a well outside the Authority's jurisdiction. Any parcels that were inaccurately included in the fee calculation due to operating a well on a portion of their property that lies outside of the Authority's jurisdiction may request further consideration of the Board.

Water Sources

Water source data are composed of the following:

- Groundwater from the Subbasin. This is estimated according to the methodology described herein.
- Surface water diversions. The vast majority of surface water diversions are managed by water providers within the Subbasin.
- Public water systems often provide water from a mix of groundwater and surface water sources, unique to each system. Authority member agencies provided a list of parcels with a connection to their system. Groundwater extraction amounts per system were obtained through California Division of Drinking Water ("DDW") data.

Future Data Updates

Throughout this process, the Authority has maintained an openness to improve data whenever and wherever possible. This approach provides ample opportunities in the future to adjust estimates, and whenever possible, better estimate groundwater use. Property owners are encouraged to submit verified meter data in order to adjust their fees at the discretion of the Board.

Development of a Parcel Scale Water Budget

As noted above, the first step in determining groundwater use on a parcel scale is to estimate overall water use within the Authority's jurisdiction. A Technical Memorandum detailing this process is included in Appendix C. A summary of the approach is provided below.

In order to optimally organize groundwater use estimation, groundwater users are grouped into three primary "user classes" in the Subbasin. Different approaches were used to calculate water use for each rate class to achieve the most accurate estimation possible as discussed below.

1. Agricultural and other Irrigation Users

Crop irrigation use represents a substantial portion of the total groundwater extraction in the Subbasin. Determination of water use by agricultural properties relies on data provided by the Authority that associates parcels (designated by APN) with specific crop types and acreages. This data was utilized to identify type of crop and amount of crop grown per parcel.

A summary of crop types and their corresponding acreage within the Subbasin is provided in Table 5, below.

Table 5 – Upper San Luis Rey Valley Crop Types and Acreage

Agricultural Crop or Land Use	Acreage
Citrus Acres	2,511
Avo Acres	2,234
Grape Acres	77
Blueberry Ac	174
Pomegranate	12
Nursery Ac	814
Pasture Grass	626
Vegetable	12
Other Acres	156
Total	**6,615**

The quantity of water applied to each agricultural crop annually was estimated with OpenET[9]. This is a method adopted in many SGMA basins that provides accessible satellite-based evapotranspiration (ET) data for crops in a specific basin. Crop consumptive demand parameters are based on agricultural practices specific to San Diego County. Water demand for crops was used as a baseline; estimated precipitation was subtracted, and a seventy-five percent irrigation efficiency was assumed. Using this approach, applied water estimates for each crop type were developed for the Subbasin. These applied water estimates were then multiplied by the amount of crop on a given parcel, producing the estimated amount of water use.

Crop-specific consumption rates are shown in Table 6. These consumption rates are multiplied by the acreage of each crop to arrive at the annual applied water demand per parcel per crop (in AF/year). Note that citrus and avocado crops are most prevalent in the Subbasin.

Table 6 – Upper San Luis Rey Valley Crop Types and Applied Water per Acre

Land Use	**OpenET Applied Water**
Crop Type	*AF /Acre*
Citrus	3.7
Avocado	4.3
Grape	2.0
Blueberry	1.5
Pomegranate	3.2
Nursery	3.1
Pasture / Grass	2.1
Vegetable	2.0
Golf	3.8

In Table 7 below, the amount of water use for each crop type within the Subbasin is calculated by multiplying the crop acreage by the appropriate applied water amount. The total agricultural water use is estimated at 21,518 acre feet per year ("AFY"). Note that this amount represents total water use, not groundwater use specifically.

[9] https://etdata.org/about/

Table 7 – Agricultural Water Use by Crop Type

Agricultural Crop	Acres*	Applied Water (OpenET)	Water Use
Citrus	2,206	3.7	8,191
Avocado	2,084	4.3	8,935
Grape / Vine	70	2.0	137
Blueberry	174	1.5	262
Pomegranate	12	3.2	38
Nursery Ac	814	3.1	2,487
Pasture / Grass	411	2.1	869
Golf	152	3.8	576
Vegetable	12	2.0	23
Other Acres	156	NA	NA
Total	6,091	NA	21,518

Note: Approximately 524 acres of crops were removed from this calculation due to acreage being identified as being on tribal land.

2. Public Water Service Providers

Public water supply systems are the only user class in the Subbasin for which reported data is available regarding groundwater extraction. Each water provider has provided extraction data for calendar years 2021 and 2022 for use in this Cost of Service Study. This data, summarized in Table 8, was obtained and analyzed to identify groundwater extraction from the period from 2021-2022 per water system.

Importantly, reported public water system uses are not typically captured at the parcel scale, and are hence added to overall basin extraction estimates in the results. This two-step process (i.e., calculate parcel-based groundwater use, then add reported public system extraction) is preferred for two reasons: (1) there is not a sensible approach to spatially disaggregate water system extraction to individual parcels, and (2) within a fee and rate billing structure, public water systems will be directly charged for groundwater use rather than the parcels connected to those systems, which in turn pay the water purveyor.

Water system extraction can vary greatly over time in the Subbasin, depending on rainfall, surface water availability, and other factors. Ultimately, a two-year average was selected as the optimal method for allocating charges in this case. There are several benefits to this approach. First, using an average has the effect of smoothing out charges so that public water service suppliers do not incur large charges relative to previous years. Second, this contributes to revenue stability for the GSA, as changes in the cost allocation for this user class would not change as drastically from year to year as they would if a single year was used. As shown below in Table 8, the average groundwater extraction for public water systems is 5,572 AF per year.

Table 8 – Water System Groundwater Extraction

Water Provider Extraction Data				Average Extraction (AF)	Revenue	
Name	PWS ID	2021	2022	2-Year Rolling Average	Rate Per AF	Revenue
Lazy H Mutual Water Company	CA3700937	37.7	37.3	37.5	$24.59	$922.74
Pauma Valley Mutual Water Company	CA3700934	574.0	565.0	569.5	$24.59	$14,004.01
Rainbow Municipal Water District	CA3710016	0.0	0.0	0.0	$24.59	$0.00
Rancho Estates Mutual Water Company	CA3700936	660.0	569.0	614.5	$24.59	$15,110.56
Rancho Pauma Mutual Water Company	CA3710012	1,965.2	2,043.0	2,004.1	$24.59	$49,281.19
Valley Center MWD	CA3710026	0.0	0.0	0.0	$24.59	$0.00
Yuima Municipal Water District	CA3701408	93.0	56.0	74.5	$24.59	$1,831.96
Yuima Municipal Water District IDA	CA3700938	2,125.3	2,184.9	2,155.1	$24.59	$52,993.91
Pauma Ridge Mutual Water Company	NA	174.4	59.0	116.7	$24.59	$2,870.64
PUBLIC SYSTEM TOTAL				5,572	NA	$137,015

3. Rural Residential and Commercial Users

Residential and Commercial water demand was determined by analyzing all unique Assessor Use Codes in the San Diego County parcel database and assigning water uses stemming from the County of San Diego Department of Planning and Land Use General Plan Update Groundwater Study, published in 2010. This Study developed its groundwater use estimates by analyzing estimations of water demand derived from reported average quantities of water use for the variety of land uses in the study area (largely interior San Diego County).

For residential uses, the primary assumption is that a single residence has a demand of 0.5 AF/year. For parcels containing more than one residential unit, additional units were assigned 0.25 AF/year. Multi-family residential units were assigned 0.3 AF/year for each unit.

For light commercial and light industrial, such as a storefront, retail, or warehouse, the primary assumption is that a single operation has a demand of 0.3 AF/year. For heavier commercial or industrial, such as a large office, civic center, or health care facility, the primary assumption is that a single operation has a demand of 1.0 AF/year.

Residential and commercial extraction within the Subbasin is estimated to be relatively minor compared to agricultural and water system extraction. The total residential and commercial water use utilized for this Cost of Service Study is 371 AFY. Of this total, 61 AFY can be attributed to direct groundwater use.

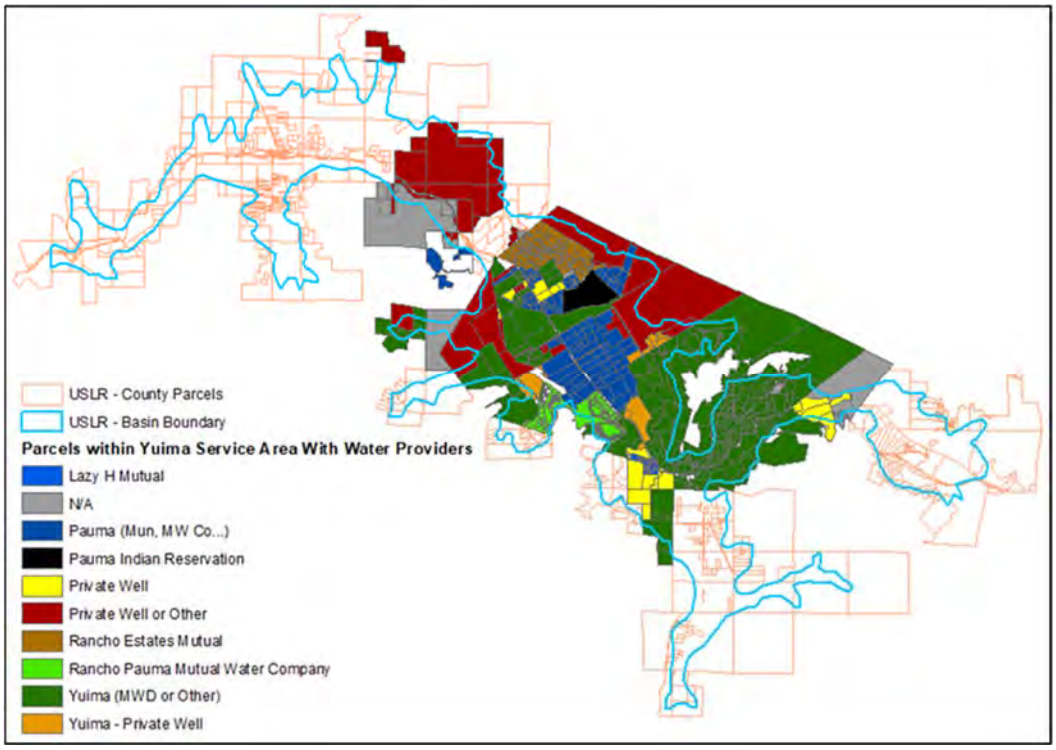
Groundwater Use Estimation

Using the data provided by the Authority that associated Subbasin parcels with specific water providers or with the use of private wells, groundwater use was separated from other sources based on water provider service.

Water Service Areas

Designation of a parcel's status as within a water provider's service area was determined by the parcel service list provided by Authority member agencies. It is assumed that water use demand determined from Assessor codes are met by the parcel's water system connection if one is present, otherwise, it is assumed this water demand is met by groundwater. In other words, it is assumed that parcels outside of a water system and/or without an explicit water system connection use groundwater to meet agricultural, residential, and commercial water demand. In cases where groundwater is used by a water provider and delivered to parcels, the water provider is charged for this groundwater use. A map of water source designations, including private wells and water providers, is shown below in Figure 2.

Figure 2 – Public Water Service Areas



Note that parcels not associated with any water provider, but also not categorized as 'Private Well' in this data, were assumed to be reliant on groundwater. This is illustrated in by the orange outline of County parcels that do not have a color-coded fill associated with them.

In Table 9 below, water source categories for agricultural, residential, or commercial parcels directly using groundwater are shown along with their associated estimated groundwater use. As noted above, the Authority has provided documentation of all parcels served by water systems, as well as those known to be served by private wells. Any other parcels known to require water use (based on County use code or crop acreage) but not served by water systems are assumed to be direct groundwater users. The total estimated direct groundwater use by parcels within the Subbasin is 7,898 AFY.

Table 9 – Summary of Parcel Categories and Estimated Direct Groundwater Use

Parcel Category for Direct Groundwater Users (As provided by USLRGMA)	**Total Groundwater Use Estimate** (AFY)
Private Well	2,614
Water Provider Not Provided, Likely Private Well	4,470
Parcel On Tribal Land (<10% of Parcel Overlies Tribal Land)	187
Yuima MWD / Private Well	627
Total Groundwater Use:	**7,898**

Summary of Estimated Groundwater Extraction

In order to identify the total estimated groundwater extraction in the Authority's jurisdiction, the public water system extraction average is combined with the total estimated groundwater use for agricultural, residential, and commercial parcels.

Table 10 shows a summary of estimated groundwater extraction from the Subbasin by user class. Note that the relatively low estimate for residential and commercial use is partly due to the exclusion of tribal lands from the fee calculation.

Table 10 – Summary of Estimated Subbasin Extraction

User Class	**AF Extracted**
Water Providers	5,572
Agricultural	7,837
Residential and Commercial	61
Total	**13,470**

Fee Calculation

The final rate calculations are twofold, identifying the wellhead fee and the extraction fee. As noted above, the wellhead fee allocates a portion of annual costs to a charge per well. The remaining costs are then allocated to the extraction fee.

The revenue allocated to the wellhead fee stems from the cost of the Authority's management contract with Yuima MWD in the amount of $15,000, and the cost of the annual report required by the State in the amount of $75,000. Dividing the sum of these costs ($90,000) by the estimated number of wells in the Subbasin, produces the rate per wellhead:

$$\frac{\$90{,}000}{300 \text{ Wells}} = \$300 \text{ Per Well}$$

The remaining cost is calculated by subtracting $90,000 from the total revenue need of $421,246. Dividing the remaining revenue requirement ($331,246) by the total estimated extraction produces a rate of $24.59 per acre-foot per year, as shown below.

$$\frac{\$331{,}246}{13{,}470} = \$24.59 \text{ Per Acre Foot}$$

A rate per AF of groundwater extracted represents an equitable approach to apportioning the cost of the service provided by the Authority's GSP implementation and SGMA compliance efforts. In the described methodology, property owners are charged in accordance with their reliance on groundwater resources within the Authority's jurisdiction. Under this approach, the charge per parcel is primarily dependent on the amount of groundwater extraction.

The sustainable management of the Upper San Luis Rey Subbasin holds implications for all groundwater users' ability to rely on this resource now and in the future. As established by the Upper San Luis Rey Valley GSP, and further supported by this Cost of Service Study, the costs incurred by the Authority are directly related to groundwater user's ability to rely on the Subbasin for agricultural, residential, or other purposes. As noted previously, the budget (and subsequently the rate), may be increased each year during the five-year period by the San Diego-Carlsbad CPI or 5%, whichever is lower.

Fee Impacts

Some examples of how this fee will impact property owners are shown in Table 11. Note that the wellhead fee is not included in this table and would be in addition to any additional charges related to this portion of the fee program.

Table 11 – Annual Rate Examples

Property Example	Estimated Water Use	Annual Charge
Rural Residence	0.5 AF	$12.30
25-Acre Citrus Field	92.5 AF	$2,274.71
25-Acre Avocado Field	107.5 AF	$2,643.58
10-Acre Vineyard	20 AF	$491.83
25-Acre Pasture	52.5 AF	$1,291.05

Appendices

Appendices include the following:

A. Detailed USLRGMA Budget.

B. County use codes and associated water use estimates as published in the 2010 County of San Diego Department of Planning and Land Use General Plan Update Groundwater Study.

C. Technical Memorandum: Parcel Scale Water Budget developed by Larry Walker Associates.

Appendix A – Detailed Budget

A more detailed budget, including specific line items within each cost category, is provided below for reference.

Table 12 – Detailed Budget

Item		FY 2023-24
Professional Services - Administration		
Management Contract	$	15,000
Non-Contract Management Services	$	15,000
Office Expenses		
Bank Service Charges	$	192
Insurance		
Error & Ommisions Directors	$	1,500
General & Admin Expenses		
Legal Fees	$	100,000
Audit	$	3,500
Website & Email Subscriptions	$	2,376
Memberships	$	1,275
Professional Services - GSP		
GSP Annual Report	$	75,000
GSP Update Reserve	$	117,590
Cost of Service Study	$	39,500
Grant Consultant	$	10,800
Engineering Review	$	1,000
Subtotal	$	382,733
5% Contingency - rounded to nearest $1,000	$	19,000
Member Agency Contribution Repayment	$	20,513
Total Expenses	$	422,246
Offsetting Revenues		
Member Contributions	$	-
(To be replaced by fee in future years)		
Other	$	1,000
Offsetting Revenue Totals	$	1,000
Net Revenue Requirement	$	421,246

Appendix B – County Use Codes and Groundwater Use Assumptions

The groundwater use assumptions provided by the County of San Diego Department of Planning and Land Use General Plan Update Study are included below for refence.

Table 3-5
Residential, Commerical, Industrial, and Other Land Uses Groundwater Demand Estimates

Water Demand Category	Water Demand Per Parcel or Unit (afy)	SANDAG Land Use Code	SANDAG Land Use Description	Assumptions
Single-Family Residential	0.5	1000	Spaced Rural Residential	450 gpd per residence
	0.5	1100	Single Family Residential	
Second Dwelling Units - Residential	0.25	None	Second Dwelling Units	Half the use of a single-family residence
Multi-Family Residential	0.3	1200	Multi-Family Residential	300 gpd per residence
Lower Water Use Service Related Commercial and Light Industrial	0.3	2103	Light Industry-General	300 gpd per entity or parcel
		2301	Junkyard/Dump/Landfill	
		5007	Store-Front Commercial	
		5009	Other Retail Trade And Strip Commercial	
		6104	Post Offices	
		6103	Libraries	
		2104	Warehousing & Public Storage	
Higher Water Use Offices, Religious Facilities, Heavy Industrial, and Public Facilities	1	2201	Extractive Industry	1,000 gpd per entity or parcel
		6002	Office-Low Rise	
		6003	Gov'T Office/Civic Centers	
		6101	Cemetery	
		6102	Religious Facilities	
		6509	Other Health Care	
		6105	Fire/Police Stations	
Military Facilities	3	6701	Military Use	Only one parcel with water use, Warner Springs Naval Training Facility. Approximately 1,500 people per year come in for training. Assumed 50 gpd per person with a stay of 14 days
Small Water Systems	-	1300	Mobile Home Parks	Small water systems demand estimated separately in Table 3-8
		1401	Jails/Prisons	
		1409	Other Group Quarters Facilities	
		1501	Hotel/Motel (Lo-Rise)	
		1503	Resort	
		6109	Other Public Services	
		6804	Senior High Schools	
		6806	Elementary Schools	
		6807	School District Offices	
		7207	Marinas	
		7210	Other Recreation	
		7601	Parks - Active	
Indian Reservations	-	5005	Specialty Commercial	Indian Reservations demand estimated separately in Table 3-9
		6108	Missions	
		7209	Casinos	
Agriculture	-	8001	Orchards And Vineyards	Agricultural water demand estimated separately in Table 3-6
		8002	Intensive Agriculture	
		8003	Field Crops	
Golf Courses	-	7204	Golf Courses	Golf course demand estimated separately in Table 3-7
		7205	Golf Course Clubhouses	

Table 3-5
Residential, Commerical, Industrial, and Other Land Uses Groundwater Demand Estimates

Water Demand Category	Water Demand Per Parcel or Unit (afy)	SANDAG Land Use Code	SANDAG Land Use Description	Assumptions
No Water Use	-	4104	Airstrips	No water use associated with land use
		4112	Freeways	
		4113	Communications And Utilities	
		4116	Park And Ride Lots	
		4117	Railroad Right Of Ways	
		4118	Road Right Of Ways	
		4119	Other Transportation	
		7603	Open Space Reserves, Preserves	
		7606	Landscape Open Space	
		7607	Residential Recreation	
		9101	Vacant Land	
		9202	Lakes, Reservoirs, Large Ponds	
		6702	Military Training	

Note: Water demand assumptions for commercial/industrial uses are based on typical wastewater flow rates from commercial sources within the EPA Onsite Wastewater Treatment Systems Manual, February 2002, pages 3-7 to 3-9. Additional water from outdoor use/andscaping is also assumed to produce a generalized estimate of water demand.
- no water demand estimated
afy - acre-feet per year
gpd - gallons per day
NA - Not Applicable, second dwelling units are located on spaced rural residential and single family residential parcels
SANDAG - San Diego Association of Governments

Appendix C – Technical Memorandum: Parcel Scale Water Budget

A technical memorandum prepared by Larry Walker Associates, detailing the parcel-scale water budget is provided below for reference.

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Technical Memorandum: Parcel Scale Water Budget

For the Upper San Luis Rey Valley Groundwater Subbasin

Prepared for the Upper San Luis Rey Groundwater Management Authority

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This technical memorandum documents the methodology and approach used to estimate water use at the parcel scale in the Upper San Luis Rey Valley Groundwater Subbasin (Subbasin) for the Upper San Luis Rey Groundwater Management Authority. Estimated water use at the parcel scale is provided as a spreadsheet ("USLR_Parcel_Water_Budget_simplified_updated_Feb_9_2024.xlsx"), and also summarized by water provider in **Table 1.** Descriptions of the spreadsheet and table are provided below, followed by supporting data sources and methodology.

Table 1. Summary of Water Use by Category of Water Provider

Table 1, provides a summary of total water use for each category of water provider. The water provider for parcels in the subbasin was included in the spreadsheet provided from Amy Reeh to Ryan Aston on October 16, 2023 (spreadsheet name: "Parcels within Yuima Service Area with Water Providers.xlsx"; referred to as *Water Provider Spreadsheet*). This information was updated February 9, 2024 with information from Amy Reeh. The water provider information includes 22 categories of water provider for 1,279 parcels. 826 parcels in the *County's Parcel Dataset* are not included in the *Water Provider Spreadsheet.* Spatial evaluation concluded that 586 of these parcels are within or partially within tribal land (parcels with <10% of their land area within tribal lands are differentiated from parcels with >11% of their land area within tribal lands to identify parcels with little tribal land overlap; the threshold for this classification may be revised at a later date). 240 parcels were initially not categorized in the *Water Provider Spreadsheet*. These parcels are likely supplied by a private well and are categorized as "Water Provider Not Provided, Likely Private Well".

Table 1. Summary of Water Use by Category of Water Provider

Water Provider or Category (From *Water Provider Spreadsheet*)	**Total Water Use Estimate (AFY)**
Lazy H Mutual	21
Parcel On Tribal Land (<10% of Parcel Overlies Tribal Land)[1]	187
Parcel On Tribal Land (>11% of Parcel Overlies Tribal Land)[2]	

Water Provider or Category (From *Water Provider Spreadsheet*)	Total Water Use Estimate (AFY)
Pauma Indian Reservation	
Pauma Mutual Water Co	357
Pauma MWD	2,821
Pauma Ridge Mutual	193
Pauma Valley Municipal Water District	165
Pauma Valley Water Co	43
Private	268
Private Well	417
Private Well or other	1,627
Private Well or other - Rancho Estates	68
Private Wells	234
Rancho Estates Mutual	540
Rancho Pauma Mutual Water Company	732
Water Provider Not Provided, Likely Private Well[3]	4,470
Yuima	4,629
Yuima MWD	4,490
Yuima MWD - Private well	262
Yuima MWD / Gells	0
Yuima MWD / Mells	0
Yuima MWD / Private Wells	0
Yuima MWD / Wells	44
YuimaMWD - Private well	321
Total Water Use (Parcels with >11% of land area overlying tribal land not included)	**21,889**

1. Parcel not initially categorized in *Water Provider Spreadsheet*. 10% or less of the parcel area is located on tribal land. Water use estimate is provided for these parcels.
2. Parcel not initially categorized in *Water Provider Spreadsheet*. 11% or more of the parcel area is located on tribal land. Water use estimate is not provided for these parcels.
3. Parcel not initially categorized in *Water Provider Spreadsheet* and parcel does not overlap tribal land. Parcel likely supplied by a private well.

Spreadsheet "USLR_Parcel_Water_Budget_simplified_updated_Feb_9_2024.xlsx"

The estimated water use for each parcel within, or partially within, the subbasin is included in the spreadsheet "USLR_Parcel_Water_Budget_simplified_updated_Feb_9_2024.xlsx". Water use information for parcels with greater than 11% of their area within tribal land is not included. The columns in the spreadsheet include:

- "APN" – The APN of parcels that are within, or partially within, the subbasin. The source of this information is the County's shapefile of parcels (described below in subsection **Parcel Shapefile**).

- "%_Parcel__In_Subbasin" – The percentage of the parcel's land area that is within the subbasin. The source of this information is the County's shapefile of parcels, and the shapefile of the subbasin boundary (described below in subsection **Parcel Shapefile** and **Upper San Luis Rey Valley Groundwater Subbasin Shapefile**).
- "Parcel_Water_Use_AFY" – The estimated quantity of annual water use per parcel in acre feet per year (AFY). This information calculated as follows:
    - Agricultural applied water use was estimated from two sources of information: the agricultural crop and associated acreage per parcel provided in the spreadsheet "parcels_within_PalaPauma_gwbasins_CLIP_9-20.xlsx" (detailed below in subsection **Agricultural Crop and Acreage by Parcel**); and the estimated agricultural applied water for each of these crops (detailed below in subsection **Agricultural Applied Water Estimate**). Water use estimates calculated by this methodology are noted as "Water use estimate based on applied water estimate to the crop/acreage as provided in "PW_AG_Parcel_Water_Use_AFY.xlsx".
    - For non-agricultural parcels (residential and commercial), water use was determined based on land use as reported by the County use code and associated water use estimate as provided in Table 3-5 and Table 3-8 of the County's General Plan Update Groundwater Study[1]. Water use estimates calculated by this methodology are noted as: "Water use estimated based on land use as reported by the County use code and associated water use estimate as provided in Table 3-5 and Table 3-8 of the County's General Plan Update Groundwater Study"
    - Parcels with greater than 11% of their area within tribal lands do not have an estimated quantity of water use.
- "Parcel_Water_Use_Note" – Methodology of the water use estimate. There are four categories:
    - 1 - "Water use estimate based on applied water estimate to the crop/acreage as provided in "PW_AG_Parcel_Water_Use_AFY.xlsx""
        - Further information is provided in below subsections **Agricultural Crop and Acreage by Parcel** and **Agricultural Applied Water Estimate**
    - 2 - "Water use not estimated, parcel located on tribal land (11% or greater of the parcel area overlies tribal land)"
        - Note – the percentage (11%) is arbitrary; however, a threshold percentage will need to be decided as the tribal boundary can overlap small portions of parcels, but these parcels may not necessarily be associated with the tribe.
    - 3 - "Water use estimated based on land use as reported by the County use code and associated water use estimate as provided in Table 3-5 and Table 3-8 of the County's General Plan Update Groundwater Study"
        - Link to County General Plan[1]
    - 4 – "Water use estimate based on applied water estimate to crop/acreage as provided in "PW_AG_Parcel_Water_Use_AFY.xlsx" and County Use Code"
        - Denotes parcels with both Ag water use (described as "1" above), and water use estimated rom the County's General Plan (described as "3" above).

[1] https://www.sandiegocounty.gov/content/dam/sdc/pds/gpupdate/docs/BOS_Aug2011/EIR/Appn_D_GW.pdf

- "Parcel_on_Tribal_Land" – If the parcel land area overlaps any portion of tribal land, the tribe is listed. Additional information is provided below in subsection **Federally Recognized Tribal Lands**.
- "%_Parcel_on_Tribal_Land" – Provides the percentage of parcel land area that is within tribal land.
- "PR_Water_Provider_Original" - The source of water supply to each parcel within Yuima's service area was provided in a spreadsheet sent from Amy Reeh to Ryan Aston on October 16, 2023 and updated February 9, 2024. Additional information is provided below in subsection **Water Provider for Each Parcel**.
- "Irr_Acres_from_AmyR" – The agricultural irrigated acres and crop as provided by Amy Reeh. Described in below subsection "Agricultural Crop and Acreage by Parcel"
- "Ag_Applied_Water_AcreFt_OpenET" – Estimated applied water per parcel as calculated by the "Agricultural Applied Water Estimate" (detailed in below subsection). Note, this column lists agricultural applied water for parcels on >11% of tribal land. These will need to be removed when presenting ag applied water associated with the fee study estimates.

Supporting Data and Methodology

Additional information on methodology and sources of information to estimate water use is included in the following subsections:

Upper San Luis Rey Valley Groundwater Subbasin Boundary

The Department of Water Resources (DWR) Bulletin 118 shapefile boundary of the Upper San Luis Rey Valley Groundwater Subbasin was downloaded from the SGMA Data Viewer in June of 2023. The website for download can be found at: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#boundaries.

Parcel Shapefile

Parcel information for San Diego County was downloaded from the SANDAG/SanGIS Regional GIS Data Warehouse Open Data Portal in June 2023 (referred to as the 'County parcel dataset'). The website for download can be found at: https://sdgis-sandag.opendata.arcgis.com/datasets/SANDAG::parcels-6/explore. 1,897 parcels with an APN are located within, or partially within, the boundaries of the subbasin (it is noted 10 parcels did not have an APN and were removed, these were associated with rights of way).

It is noted that the parcel shapefile is "stacked", meaning that for any piece of ground there may be multiple parcels stacked on top of each other. For example, a condominium building may have 4 individual condos. Each condo is a separate taxable parcel, but all 4 condos will be associated with the same physical lot on the ground. In this example, there will be 4 polygons stacked on top of each other. The implication is that if the acreage of all SANDAG parcels within the subbasin are summed, the sum will be greater than the total acreage of the subbasin.

Agricultural Crop and Acreage by Parcel

Amy Reeh provided the spreadsheet "parcels_within_PalaPauma_gwbasins_CLIP_9-20.xlsx" to Ryan Aston on May 30, 2023 via email. The spreadsheet included data such as parcel APN, agricultural status ('yes' or 'no'), and if the parcel was a golf course, nursery, or on a reservation. Nine categories of agricultural crop or land use and their associated acreage were included. A summary of the crop type or land use, and the associated acreage is provided in **Table 2**. The spreadsheet contains 1,890 parcels, 4 parcels in the spreadsheet do not exist in the *County parcel dataset*; however, these parcels are not

associated with agricultural acreage (parcels in the agricultural crop spreadsheet but not in the County parcel dataset include: 1101502400, 1323608500, 1323605400, 1323607100).

Table 2. Summary of Agricultural Crop and Land Use and Associated Acreage

Agricultural Crop or Land Use	Acreage
Citrus Acres	2,510.74
Avo Acres	2234.4
Grape Acres	76.55
Blueberry Ac	173.5
Pomegranate	11.8
Nursery Ac	813.8
Pasture	474.7
Golf	151.7
Vegetable	11.5
Other Acres	156
Total	**6,615**

Agricultural Applied Water Estimate

The quantity of water applied to each agricultural crop annually was estimated with OpenET.[2] This is a method adopted in many SGMA basins that provides accessible satellite-based evapotranspiration (ET) data for crops in a specific basin.

Based on this information, the applied water for each category of agricultural crop provided in the spreadsheet "parcels_within_PalaPauma_gwbasins_CLIP_9-20.xlsx" was estimated (**Table 3**).

Table 3. Applied Water Estimate for Agricultural Crops (acre-feet/acre)

Land Use	ITRC AW, AF/acre
Citrus	3.7
Avocado	4.3
Grape	2.0
Blueberry	1.5
Pomegranate	3.2
Nursery	3.1
Pasture / Grass	2.1
Golf	3.8
Vegetable	2.0

[2] https://etdata.org/about/

Federally Recognized Tribal Lands

The shapefile of federally recognized tribal lands, updated September 15, 2023, was download in December 2023 from the California Natural Resources Agency Open Data at the following link: https://data.cnra.ca.gov/dataset/federally-recognized-tribal-lands/resource/b70512b8-6a36-4031-9245-b2405a69c2d1

Water Provider for Each Parcel

The source of water supply to each parcel within Yuima's service area was provided in a spreadsheet sent from Amy Reeh to Ryan Aston on October 16, 2023 ("Parcels within Yuima Service Area with Water Providers.xlsx"; referred to as the *Water Provider Spreadsheet*), and updated February 9, 2024. It is noted in the email that if the parcel is outside of Yuima's service area, the parcel is likely on a reservation or served by a private well. The spreadsheet contains water provider information for 1,279 parcels and includes 22 categories of water provider. 1,071 of the 1,279 parcels in the spreadsheet matched parcels overlying the subbasin from the County parcel dataset. It is noted that some parcels in the spreadsheet matched parcels that do not overlay the subbasin. The categories of water provider were grouped into simplified categories, provided in **Table 4**, and then mapped, provided in **Figure 1**. In the figure, the subbasin boundary is provided, as well as parcels in the County parcel dataset that are not included in the water provider spreadsheet (indicated as yellow/orange parcel boundaries with no fill). Important notes regarding linking the *Water Provider Spreadsheet* to the *County Parcel Dataset* include:

- 1,071 parcels in the *Water Provider Spreadsheet* match those in the *County Parcel Dataset*
- 208 parcels in the *Water Provider Spreadsheet* are not included in the *County Parcel Dataset*
- 826 parcels in the *County Parcel Dataset* are not included in the *Water Provider Spreadsheet*

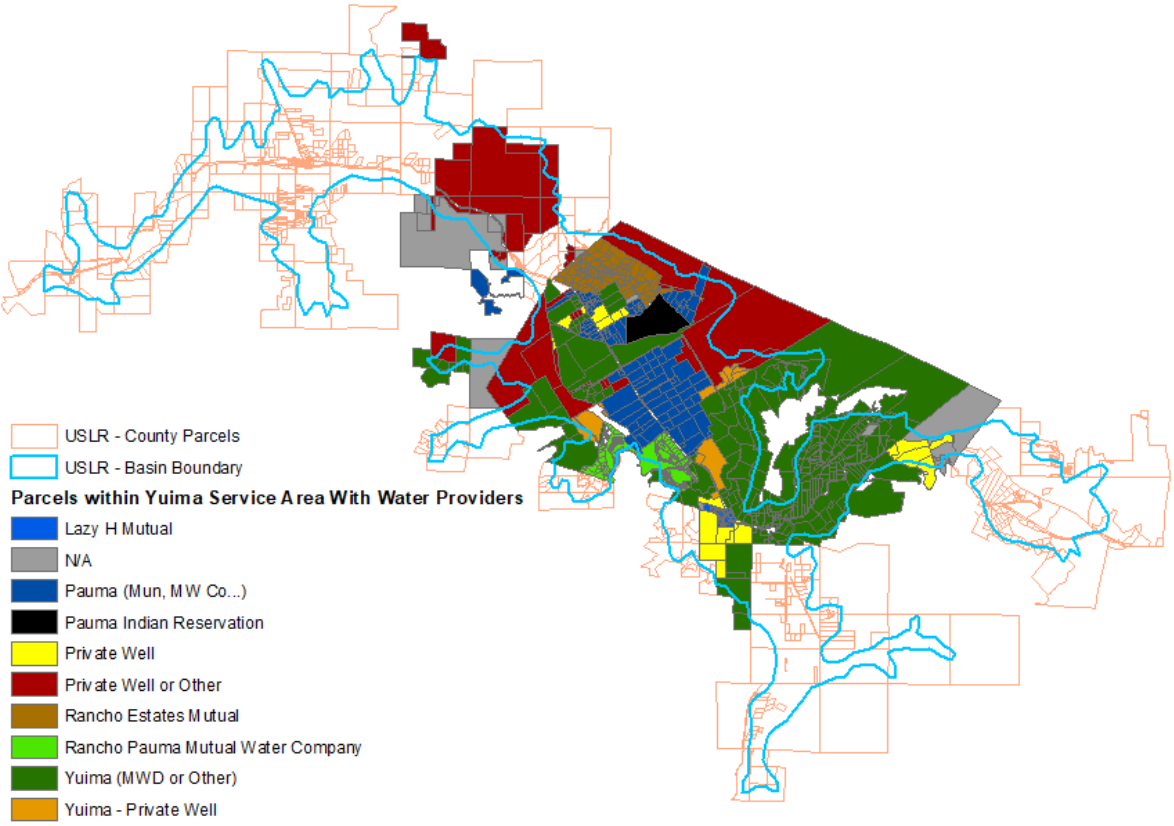

Figure 1. Water Provider by Parcel, as listed in Spreadsheet: Parcels within Yuima Service Area with Water Providers.xlsx (note parcels not overlaying the subbasin that are included in the spreadsheet)

Table 4 Categories of Water Provider, Simplified and Original

Water Provider (Simplified)	Water Provider (Original)
Lazy H Mutual	Lazy H Mutual
N/A	N/A
Pauma Indian Reservation	Pauma Indian Reservation
Pauma (Mun, MW Co...)	Pauma Mutual Water Co
	Pauma MWD
	Pauma Ridge Mutual
	Pauma Valley Municipal Water District
	Pauma Valley Water Co
Private Well	Private
	Private Well

	Private Wells
Private Well or Other	Private Well or other
	Private Well or other - Rancho Estates
	Private Well or Other -Rancho Estates
Rancho Estates Mutual	Rancho Estates Mutual
Rancho Pauma Mutual Water Company	Rancho Pauma Mutual Water Company
Yuima (MWD or Other)	Yuima
	Yuima MWD
Yuima - Private Well	Yuima MWD / Gells
	Yuima MWD / Mells
	Yuima MWD / Wells
	Yuima MWD / Private Wells
	YuimaMWD - Private well