Agenda	**Upper San Luis Rey Groundwater Subbasin G.S.A** **Executive Team** **Wednesday, April 7, 2021 3:00 P.M.** **34928 Valley Center Road, Pauma Valley, California**

This meeting will be held via Zoom.

AGENDA TOPICS

1. **Call to Order**

Roll Call - Executive Team

2. **Approval of Minutes**

Approval of mintues from the March 3, 2021 GSA Executive Team Meeting

3. **ACTION DISCUSSION**

1. GSP Development Update

A. Draft Water Monitoring Program

B. Change Order - No Cost Change to Scope of Work

Task 7.1: Groundwater Dependent Eco-System Assessment

Sub-consultant HELIX will provide a desktop analysis to identify groundwater-dependent vegetation communities within the San Luis Rey Groundwater Basin. HELIX will rely on a combination of datasets to compile a dataset for the anticipated areas where groundwater vegetation occurs. The anticipated data layers and information to be used includes vegetation mapping compiled as part of regional management efforts, National Wetlands Inventory mapping, modelled vegetation mapping, and recent aerial photographs. A HELIX biologist will work closely with HELIX Geographic Information Systems (GIS) staff to compile a GIS layer that identifies what is expected to be the groundwater-dependent vegetation within the groundwater basin. HELIX will provide the GIS layer (shapefile and/or AutoCAD file) to the project team, along with a written summary of the methods employed and expected vegetation that occurs within the basin. HELIX will not complete any fieldwork as part of this evaluation and will not provide figures or exhibits as part of this scope of services. HELIX will attend up to 2 conference calls/video calls with the project team to review and discuss the results of the evaluation.

2. LAFCO

A. Recent LAFCO Decisions regarding Active and Latent Powers

II. **OTHER BUSINESS**

Next GSA Meeting: May 5, 2021 at 3:00 p.m.

III. **ADJORNMENT**

Minutes of the Regular Meeting
of the
Upper San Luis Rey Groundwater Subbasin G.S.A.
March 3, 2021

1. **Call to Order:**
   a. The meeting was called to order by Manager Reeh at 3:01 p.m. The meeting was held both at the Yuima Municipal Water District and virtually via Zoom.
      i. Team Members Present:

Roland Simpson	Steve Wehr
Mike Perricone	Greg Kamin
Chuck Bandy	Bobby Graziano
Warren Lyall	Amy Reeh

      ii. Guests in Attendance

Anita Regmi	Commissioner Barry Willis
Jim Bennett	Leanne Crowe
Jack Hoagland (3:36)	Steve Anderson

2. **Approval of Minutes**:
   Upon Motion offered by Mr. Warren Lyall, seconded by Mr. Chuck Bandy the Minutes of the December 9, 2020 GSA Executive Meeting were approved unanimously.

3. **Action Discussion**

   A. **GSP Development:**
   Lauren Wicks from Geoscience presented the draft Plan Area Chapter for review to the team. The consultant requested comments from the group for any changes or clarifications. A comment was received in relation to section 2.4.7 “Relationships with State and Federal Regulatory Agencies” indicating that perhaps we might want to limit the agencies mentioned to those that have regulatory control over water. The final list of agencies selected to list under Section 2.4.7 are as follows:
      i. United States Geological Survey (USGS)
      ii. Department of Public Health (CDPH)
      iii. Department of Water Resources (DWR)

iv. State Water Resources Control Board (SWRCB)

B. Stakeholder Outreach Meeting

Manager Reeh gave a brief run through of what would be covered at the March 24, 2021. The Consultant team will review the Plan Area Chapter with the interested stakeholder group and hold a question and answer after in relation to the presented chapter.

4. Other Business:

a. Manager Reeh requested to move the GSA Executive Team to the first Wednesday of each month so that the consultant has time to complete the information, for review and approval, that will be presented to the stakeholder group.

5. Adjournment:

The meeting was adjourned at 3:46 p.m.

Approval Date___________________

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN

Monitoring Program

DRAFT

March 19, 2021

Prepared For:

Pauma Valley Groundwater Sustainability Agency

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GEOSCIENCE

The First Name in Groundwater

THIS REPORT IS RENDERED TO PAUMA VALLEY GROUNDWATER SUSTAINABILITY AGENCY 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 MONITORING PROGRAM

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Appendices

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A	Water Level Measurement Field Form
B	Water Quality Sampling Field Form

Acronyms, Abbreviations, and Initialisms

Abbrev.	Description
amsl	above mean sea level
CCR	California Code of Regulations
COC	chain-of-custody
CSD	Community Services District
DI	deionized
DO	dissolved oxygen
EB	equipment blank
EPA	United States Environmental Protection Agency (also USEPA)
ft	feet
gal/ft	gallons per foot
Geoscience	Geoscience Support Services, Inc.
GIS	Global Information System
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
meq/L	milliequivalents per liter
µg/L	micrograms per liter
mg/L	milligrams per liter
mL	milliliter
mV	millivolts
NTU	nephelometric turbidity units
ORP	redox potential
PPE	personal protective equipment
QA/QC	quality assurance and quality control
RMS	representative monitoring sites
RP	reference point

SAP	Sampling and Analysis Plan
SCS	SCS Engineers
SEC	Specific electrical conductance
SGMA	Sustainable Groundwater Management Act
USEPA	United States Environmental Protection Agency (also EPA)
USLRRCD	Upper San Luis Rey Resource Conservation District
VOCs	volatile organic compounds
YMWD	Yuima Municipal Water District

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN MONITORING PROGRAM

1.0 Introduction

In accordance with the Sustainable Groundwater Management Act (SGMA), the Pauma Valley Groundwater Sustainability Agency (GSA) - consisting of the Yuima Municipal Water District (YMWD), Pauma Valley Community Services District (CSD), and Upper San Luis Rey Resource Conservation District (USLRRCD) – is developing a Groundwater Sustainability Plan (GSP) for achieving long-term groundwater sustainability in the Upper San Luis Rey Valley Groundwater Basin. The GSP will provide a vehicle for local water agencies, groundwater users, and the local community to work together to ensure the sustainable use of groundwater resources in the basin.

Groundwater monitoring is key to SGMA compliance as it provides the basis to evaluate groundwater level trends for sustainability and can be used to demonstrate measured progress toward achieving sustainability goals through implementation of the GSP. As part of the GSP effort, Geoscience Support Services, Inc. (Geoscience) has reviewed available well information to identify wells in the groundwater basin that would provide a good foundation for characterizing current groundwater conditions and which could be used for future, on-going monitoring after GSP implementation. Quarterly groundwater level measurements will be taken from the proposed monitoring network as well as semi-annual water quality samples to provide a representation of ambient groundwater conditions in the basin. Monitoring events will be conducted by Geoscience or team member SCS Engineers (SCS). This technical memorandum summarizes the proposed monitoring sites, sampling/monitoring protocols, and Sampling and Analysis Plan (SAP).

2.0 Monitoring Well Network

The monitoring program specified in this document was focused on existing wells in the Upper San Luis Rey Valley Groundwater Basin. This includes pumping wells owned and operated by various water agencies or private agricultural operations. Using existing wells reduces GSP implementation costs by avoiding costs associated with drilling new monitoring wells. In addition, many of the wells proposed for the GSP monitoring well network have the benefit of previous groundwater level measurements and water quality results, providing a record of previous hydrologic conditions that can be used to evaluate trends.

2.1 Monitoring Network Objectives

The monitoring network for the Upper San Luis Rey Valley GSP was designed to provide sufficient data from the basin to establish current (ambient) conditions for basin characterization and demonstrate short-term, seasonal, and long-term trends in groundwater and related surface water conditions. After implementation of the GSP, the monitoring network will also provide representative data to evaluate GSP sustainability indicators and objectives, including groundwater levels, groundwater storage, water quality, land subsidence, and depletions in interconnected surface water, in accordance with the specific sustainability goals established by the GSA. Future monitoring of these sustainability indicators will be discussed further in the monitoring network chapter of the GSP. A periodic re-evaluation of the representative monitoring sites (RMS) will be conducted as data are collected and analyzed. Additional discussion and recommendations will be made in the monitoring network chapter of the GSP.

The current document is prepared to facilitate the initial collection of groundwater information throughout the basin. Historical groundwater conditions will be described in the Basin Setting chapter of the GSP.

2.2 Monitoring Locations

The wells selected to be monitored during the GSP development process are shown on Figure 1 for water level and Figure 2 for water quality. Well information is also summarized in Table 1. These wells were selected based on available data, geographic and vertical distribution, and willingness of owner to participate in GSP monitoring effort. Where good well coverage was available, selected monitoring locations were determined based primarily on available data (wells with greater historical data coverage were prioritized over wells with less or no available information) in order to take advantage of the historical data record.

In order to maintain confidentiality of the well locations and well owners, wells selected for GSP monitoring have been given a unique ID. The GSA will be provided with a master list of the wells with pertinent information so that monitoring data can be tracked.

2.3 Data Gaps

For the Pala Subbasin, which includes a large proportion of tribal land, no information for wells on tribal land was provided. Historical water quality and water level data will be used to fill in data gap areas between known measurements and/or monitoring well locations. Depending on tribal involvement in the future, additional potential monitoring locations could be added to the monitoring network to provide control in current data gap locations. As data are collected and reviewed, future recommendations may be made to add new monitoring locations or revise the selected monitoring locations.

3.0 Sampling and Analysis Plan (SAP)

The groundwater monitoring program outlined in this SAP presents a standard methodology for the collection of data in sufficient quantities and of adequate quality to enable informed decisions regarding basin conditions. As the development of the GSP progresses, the monitoring network plan will be refined and recommendations will be made in the draft GSP regarding on-going monitoring once the GSP is implemented. The data collected from that monitoring effort will allow the GSA to demonstrate measured progress toward achieving the sustainability goals set forth in the GSP and inform management decisions.

This SAP outlines all field sampling procedures (groundwater level measurement and water quality sample collection methodology), Quality Assurance and Quality Control (QA/QC), and reporting procedures to be used for the initial groundwater monitoring program. The data gathered during this investigation will be reviewed and analyzed to serve the purpose of characterizing hydrologic conditions in the Upper San Luis Rey Valley Groundwater Basin, and to establish baseline spatial and temporal trends in groundwater levels and quality for sustainable groundwater resource management.

3.1 Monitoring Frequency

The scale and frequency of the monitoring effort was considered so that monitoring events would provide a cost-effective means to characterize groundwater conditions (i.e., groundwater elevation and water quality) during the development of the GSP. Three monitoring events are planned for the GSP development period:

- March 2021: reflective of end of winter conditions (water level and water quality)
- May 2021: reflective of spring conditions (water level only)
- September 2021: reflective of summer conditions (water level and water quality)

Groundwater monitoring frequency following GSP implementation will be discussed in the monitoring network chapter of the GSP.

3.2 Monitoring Protocols

Per SGMA, a GSP must contain monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin. For the initial monitoring effort conducted during development of the GSP to characterize ambient conditions and provide a baseline for future GSP monitoring, water levels and water quality samples from existing wells will collected. Monitoring protocols discussed below have been developed to ensure efficient, accurate, and consistent data collection through the course of the monitoring program.

3.2.1 Quarterly Water Level Monitoring

Table 1 lists the group of monitoring wells to be measured quarterly during the GSP development period for water level. Water level monitoring well locations are shown on Figure 1. Prior to taking water level measurements, well totalizer readings will be recorded on the field monitoring form, along with noting any nearby pumping wells (i.e., within eyesight, or approximately 100 yards). Groundwater level measurements should be made using an electric water level sounder calibrated to the nearest 0.01 ft. Measurements will be made to the nearest 0.01 ft relative to an established reference point (RP) at the top of each well casing (or sounding tube). Existing survey data for well RP elevation will be available in the monitoring database. If the well does not have an existing reference point elevation, the well will be surveyed and added to the database.

Depths to groundwater will be compared, in the field, to previous measurements and remeasured if significantly different. Groundwater level measurements will be recorded using a permanent ink pen on appropriate field forms. Depth to groundwater measurements will be converted to groundwater elevations (above mean sea level [amsl]) by subtracting the depth to water from the known RP elevation. Whenever possible, water level measurements from all the monitoring wells shall be collected within a 24-hour period. Personal Protective Equipment (PPE) to be worn while performing this task consists of modified nitrile gloves.

Since many of the monitoring wells in the subbasin represent active pumping wells, the sampling team will need to coordinate with well owners prior to a water level monitoring event so that readings may be representative of static water level conditions. If possible, it is recommended that wells be measured after a period of no pumping to allow local water levels to recover (e.g., coordinate well shut off the night before and measure water levels the next morning).

3.2.2 Semi-Annual Water Quality Sampling

Table 1 lists the group of monitoring wells to be sampled semi-annually during the GSP development period. Water quality monitoring well locations are shown on Figure 2. The primary goal of groundwater sampling is to collect representative water samples for use in water quality analysis to characterize water chemistry throughout the basin (both spatially and vertically). Water quality analysis can be compromised by field personnel in two primary ways: by collecting samples that are not representative of the aquifer to be tested, and by improperly handling the sample after collection. For these reasons, water quality samples should be collected by personnel thoroughly trained in the proper techniques and procedures as detailed below. National guidelines for groundwater sampling are described by the United States Environmental Protection Agency (USEPA) in the *Field Sampling Guidance Document #1220 – Groundwater Well Sampling*. Additionally, procedures, methods and guidelines specific to California standards are described in California Code of Regulations (CCR), Title 22, Social Security, Chapter 15, *Domestic Water Quality and Monitoring*.

Prior to collecting groundwater samples, the following activities should be performed:

- Review of the SAP
- Assembly of proper sampling equipment and forms
- Decontamination of purging and sampling equipment
- Calibration of field instruments following the manufacturer’s instructions

3.2.2.1 Decontamination Procedures

Decontamination is a requirement to eliminate the transfer of contaminants from one groundwater monitoring well to another and protect the health and safety of personnel who may come in contact with equipment. All equipment must be decontaminated prior to use and between wells. Decontamination procedures described herein shall be performed at the beginning of each day of field work, between each well, at the end of each day of field work and whenever the equipment is suspected of having been contaminated. A simple triple-rinse system is utilized to decontaminate the water level meter and any other piece of equipment prior to installation into a monitoring well. The triple-rinse system consists of non-phosphate soap solution followed by tap water rinse and final rinse with deionized (DI) water. Submersible pumps, if needed for sampling, are decontaminated by allowing the impellers to run and recirculate while immersed in a non-phosphate solution followed by immersion in a DI or distilled water baths. The final rinse of any equipment entering a monitoring well should be performed with de-ionized or distilled water.

3.2.2.2 Well Purging

Properly purging, or removing stagnant water from, a well ensures that the water tested is as closely representative of the in-place groundwater as possible. Because standing water in a monitoring well is typically in contact with the atmosphere, it may not be representative of the surrounding aquifer conditions. Contact with the atmosphere allows influx of atmospheric oxygen, changing the reduction/oxidation (redox) potential of groundwater, and hence, the solubility of certain dissolved species. It should be noted that purging may induce stresses that can bring small particles into suspension and draw them into the monitoring well.

Common purging equipment for groundwater monitoring wells include pumps (peristaltic, positive-displacement, or submersible), bailers, and in-situ devices. All pumping equipment should also be operated at reduced flow rates during purging and sample collection to avoid as much agitation as possible. Since the selected monitoring wells for the basin monitoring during development of the GSP consist of existing, operable wells with dedicated pumps, submersible sampling pumps should not be necessary[1]. In addition, since sampling will be conducted on operating wells, no pump to waste should be necessary.

For inactive wells (non-pumping), to ensure that representative groundwater samples are collected, a minimum purge volume of three (3) and up to a maximum of five (5) times the volume of standing water in the well should be removed. For active pumping wells, purging should continue a minimum of 15 minutes to allow consecutive water quality field parameters measurements, as detailed below.

[1] If, at any time during the initial monitoring period, pumps are removed from selected monitoring wells, a submersible pump should be used to collect necessary water quality samples. The pump should be lowered into the well and suspended immediately above the screen interval of the well using a cable marked and measured so that the pump intake is not lowered past the target depth. It is important that all submersible pumps are equipped with a check-valve between the pumping unit and tubing, to ensure that water cannot flow back into the well at the event of a power outage/surge or pump failure, causing agitation of the source water. Additionally, it is important that all components of the pump that will be in direct contact with the sample water be constructed of inert materials (i.e., Teflon®, stainless steel, or glass), to ensure that truly representative samples are collected. Groundwater in contact with pump components that are not constructed of inert materials may not yield representative water quality results as trace metals can be introduced, thereby changing the physical or chemical properties of the water sampled.

During the purging process, water quality field parameters should be monitored for stabilization, as detailed in the table below.

Table 3-1. Purged Groundwater Stabilization Criteria for Water Quality Indicators

Parameter	Criteria
pH	+/- 0.1
SEC	+/-3 - 5%
ORP	+/- 20 mV
Turbidity	+/- 10% (or <10 NTUs)
DO	+/- 0.2 mg/L

Notes:
- SEC = specific electrical conductance
- ORP = redox potential
- DO = dissolved oxygen
- mV = millivolts
- NTU = nephelometric turbidity units
- mg/L = milligrams per liter

Should water quality parameters not stabilize after the removal of three well volumes, additional well volumes maybe removed. The following table provides the casing volumes of commonly sized monitoring wells.

Table 3-2. Well Casing Diameter vs. Volume

Well Casing Diameter [inches]	Volume [gal/ft]
6	1.469
8	2.611
10	4.286
12	6.122
14	7.996
16	10.444
18	13.218

In order to reduce unnecessary runtime of private or active pumping wells being used for water quality monitoring, it is suggested that water quality sampling be made on a later date than water level monitoring events. The sampling team could therefore coordinate with well owners to sample the monitoring wells while they are being operated and therefore already be sufficiently purged (i.e., have been pumping for a minimum of four hours prior to water quality sampling).

3.2.2.3 Monitoring of Field Parameters

During the purging process, a handheld multi-parameter meter should be used to continuously monitor changes in, at a minimum, pH, specific electrical conductance (SEC), turbidity, and temperature. Other commonly monitored water quality constituents include redox potential (ORP) and dissolved oxygen (DO) in the groundwater. There is no set criterion for the number of measurements to be taken to determine stability. Generally, measurements should be taken every 15 minutes during purging, however, measurements must be taken more frequently if the purge volume is low.

For active pumping wells, these field parameters should be measured at the start of purging and approximately every 15 minutes until stable or until approximately five well volumes have been purged. For inactive wells, parameters will be measured at the start of purging, at removal of each well volume up to three volumes, and if not stable at three volumes, then approximately every ½ volume thereafter until stable or until approximately five well volumes have been purged. After the volumetric purging requirement has been met, and all field parameters have stabilized, groundwater samples can be collected.

For active production wells, the sampling team and applicable parties will coordinate and allow for a minimum of four hours pumping prior to collecting samples. Even if a well has been pumping a sufficient period of time, field parameters should still be checked prior to sampling.

If the groundwater monitoring well has a slow recharge rate, then a slower purge rate must be implemented to ensure that three casing volumes have been evacuated. In situations where groundwater monitoring wells are pumped dry (regardless of whether three casing volumes have been removed from that well or not), an adequate purge volume is assumed and, following recovery, groundwater samples can be collected. In these cases, the water chemistry dictates the appropriateness of sample collection. A minimum of four measurements showing consistent parameters from the recovered volume constitutes stability. Once observed and reported to show consistency, the well can be sampled during the next groundwater recharge (US EPA, 2004).

3.2.2.4 Sample Collection, Preservation, and Containers

Groundwater samples shall be collected immediately following the purging activities described above. Sampling personnel must wear new nitrile gloves during sampling events and must replace and discard nitrile gloves between purging and sampling of subsequent wells. Samples prepped for analysis should be collected directly from the dedicated sampling port into appropriate laboratory-cleaned containers with Teflon® lined caps (when required) and labeled for identification.

The following guidelines should be followed when transferring groundwater from the sampling device into the proper container:

- Sample containers should not be opened until immediately prior to filling.
- The insides of sample containers should not be touched.
- Sampling containers will be filled slowly and with minimal aeration with the pump.
- Sampling containers will not be overfilled, as this can result in the loss of preservative.
- Sampling containers will be filled completely without bubbles or headspace unless specified by the lab.

- Sampling containers will be filled as expeditiously as possible to minimize the time between filling the first sample container and the last.
- Immediately after collection, water quality samples should be placed in a cooler and be maintained at a temperature of 39.2 degrees Fahrenheit (4 degrees Celsius) until they are delivered to the water quality laboratory performing the analysis.

The type of bottles, preservatives, holding times, and filtering requirements depend on the type of laboratory analysis required. Sampling personnel are advised to review the proposed schedule of analysis for each monitoring point with laboratory staff prior to the start of fieldwork, in order to assure that the proper bottles/containers, preservatives, holding time, and filtering procedures are in order.

Groundwater samples will be analyzed for the following general mineral and physical constituents along with selected inorganic parameters:

Table 3-3. Water Quality Sampling Analytical Suites and Approved Methods

Constituent	Method
Physical Properties	
Oxidation-Reduction Potential (Field)	Field Meter - Myron L 6PII
pH (Field)	Field Meter - YSI Pro Plus
Turbidity (Field)	Field Meter - Hach 2100P
Temperature (Field)	Field Meter - YSI Pro Plus
Dissolved Oxygen (Field)	Field Meter - YSI Pro Plus
General Minerals and Inorganic Chemicals	
Alkalinity	SM 2320B
Aluminum by ICP	EPA 200.7
Arsenic by ICPMS	EPA 200.8
Chromium by ICPMS	EPA 200.8
Dissolved Boron by ICP	EPA 200.7
Dissolved Calcium by ICP	EPA 200.7
Dissolved Chloride	EPA 300.0
Dissolved Iron by ICP	EPA 200.7
Dissolved Manganese by ICPMS	EPA 200.8
Dissolved Nitrite	EPA 300.0
Dissolved Potassium by ICP	EPA 200.7

Constituent	Method
Dissolved Sodium by ICP	EPA 200.7
Dissolved Sulfate	EPA 300.0
Hardness Package	Varies
Nitrate + Nitrite Package Calc	Varies
Perchlorate*	EPA 314.0
Specific Conductance	SM 2510B
Total dissolved Phosphorous	SM 4500P B E
Total dissolved solids	SM 2540C
Zinc by ICPMS	EPA 200.8

*Only select wells near locations of historical elevated perchlorate will be sampled (see discussion below).

While perchlorate is not a widespread constituent of concern in the Upper San Luis Rey Valley Groundwater Subbasin, there have been a few localized areas with elevated levels of perchlorate in the Pauma Subbasin. These locations are shown in the following figure. Proposed monitoring wells in the vicinity of and just downgradient of these historically higher perchlorate areas will also be sampled for perchlorate. These wells (MW-1, MW-4, MW-5, and MW-12) are denoted in Table 1. Perchlorate samples should be taken in accordance with laboratory guidelines.

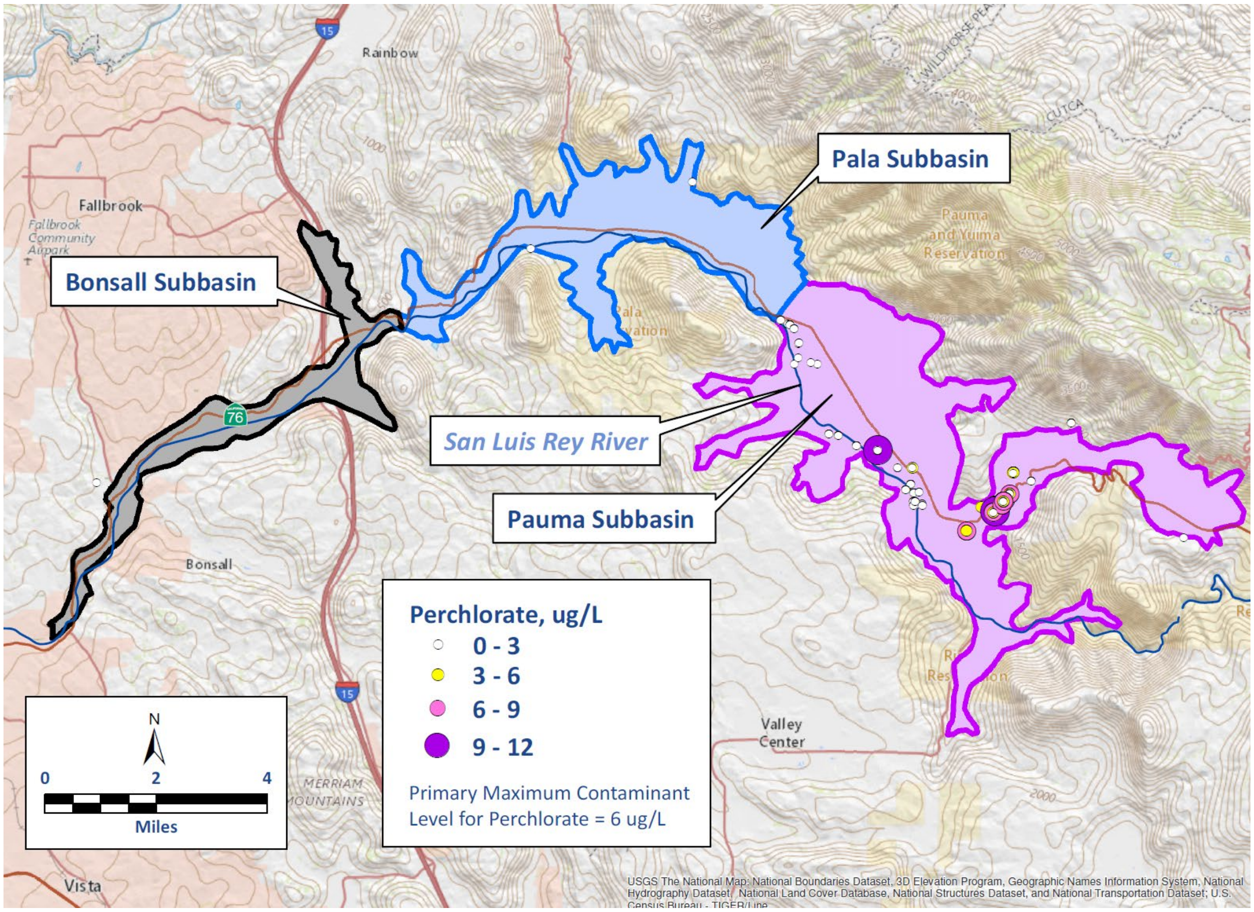


Figure 3-1. Historical Areas with Elevated Perchlorate Concentrations

After the two water quality sampling events proposed during GSP development, the suite of analytes will be reviewed to determine if all the analytes are required for future sampling under implementation of the GSP, or if other analytes should be added (e.g., organic compounds). The water quality analytical work will allow on-going evaluation of potential water quality changes occurring in the basin in relation to identified GSP sustainability indicators and objectives.

3.2.2.5 Sample Handling and Documentation

Each containerized groundwater sample should be immediately stored in an ice chest or cooler and transported under proper chain-of-custody (COC) protocol to a State-certified laboratory for analysis. Because of their prior experience in the basin, it is proposed that Babcock Laboratories be used for analytical testing. The COC should be filled out completely by the field personnel responsible for sample collection and be maintained up to date throughout the sampling event. The COC should also include water quality field parameters recorded at the time of sample collection. Samples should be submitted to the laboratory well before their holding time is over, and ideally submitted less than 24 hours from the time of collection (i.e., same day, if possible, due to the actual time of day the sample is collected).

3.2.2.5.1 Field Documentation

A field data sheet with recorded purging parameters should be completed and stored in a site logbook. Example field forms are provided as Appendix A and Appendix B for water level and water quality monitoring events, respectively. Additional information to be recorded will include, but not necessarily limited to, the following:

- Date and time of fieldwork
- Monitoring point identification and location
- Summary of daily activities including time of arrivals/departures of Field Technician and/or other visitors to the sampling site(s)
- Weather conditions
- Well totalizer reading
- Note of any nearby wells actively pumping (i.e., within eyesight, or approximately 100 yards)
- Any deviations from the associated work plan or this SAP
- Sample date, time, types, numbers, and quantities
- Sample container preservation steps performed (if required)
- Sampling equipment used
- Decontamination steps performed
- Calibration and maintenance performed
- Multi-meter manufacturer and model number and serial number
- Monitoring point screened interval(s)
- Measured depth to groundwater within well casing(s)
- Calculated casing volume based on depth to the groundwater
- Purge method, device, frequency and discharge rate
- Measured water quality parameters
- Sample collection time, method, and device
- Confirmation that COC forms were properly completed and sample custody transferred in accordance with this SAP

3.2.2.5.2 Sample Identification and Labeling

Unique sample numbers must be assigned to identify and describe each groundwater sample collected in the field. Samples should be identified and tracked by sample point number where the sample originated and the date the sample was collected. For example, a sample collected from monitoring well MW-1 on March 4, 2021 at 2:30 pm would be identified as "MW-1-210304-1430." Trip blanks should be identified using the sample ID assigned by the laboratory. Duplicate samples should be identified in the same way regular samples are identified (i.e., SAMPLE POINT ID-DATE-TIME) but they will be identified as duplicates in the sampler's notes. Each sample container will be clearly labeled using an indelible permanent ink pen on waterproof adhesive labels.

Each sample container will contain the following information:

- Project name

- Project number
- Site/project location
- Sampling point ID (i.e., MW-1)
- Date and time of collection
- Name of the sampler(s)
- Any preservatives added or present in container
- Analysis to be performed

3.2.2.5.3 Chain-of-Custody Procedure

The COC procedure provides a record of the possession and handling of individual samples from the time of collection in the field to receipt by the laboratory for analysis. The field COC record is used to record the custody of all samples collected and maintained by sampling personnel. All sample sets shall be accompanied by a COC. This record documents transfer of custody of samples from the sampling personnel to another person, to the laboratory. The COC also serves as a sample logging mechanism for laboratory personnel. The COC form shall contain the following information:

- Individual sample identification
- Name and signature of sampler(s)
- Project manager and contact information
- Sample collection time(s)
- Sample matrix
- Sample preservative(s)
- Total number of sample containers
- Chain-of-custody record
- Analyses to be performed

3.3 Quality Assurance and Quality Control (QA/QC)

QA/QC procedures are important to verify that measured water level and quality data are accurate and representative of actual basin conditions. Therefore, water quality sampling will follow a set of rigorous QA/QC procedures. Many of these procedures are incorporated in the monitoring protocols outlined above to ensure the accurate and reliable collection of water level and water quality data.

In addition, field quality control (QC) samples will be collected and analyzed to assess the consistency and performance of the groundwater sampling activities. QC samples for the sampling program will include field duplicates, equipment blanks, and trip blanks. As part of the water quality analysis, the laboratory will be required to run QA/QC per the method requirements and provide a QA/QC report for each analytical method.

General quality assurance (QA) procedures include documenting field data sheets within site logbooks, and operating instrumentation in accordance with manufacturer instructions, specification, and work plans.

3.3.1 Field Duplicates

Field duplicates consist of two samples (an original and a duplicate) of the same matrix that are collected at the same time from the same sampling point. Field duplicate samples are used to evaluate the precision of the overall sample collection and analysis process. Field duplicates shall be collected at a frequency of 1 per 10 regular samples and will be analyzed for the full set of analyses requested for the original sample. Exact locations of duplicate samples and sample identifications shall be recorded in the sampler's field notes.

3.3.2 Equipment Blanks

Collection and analysis of field equipment blanks (EBs) are provided as QC checks of the integrity and effectiveness of field equipment decontamination procedures. Equipment blank samples are prepared by rinsing field sampling equipment, such as a multi-meter, with deionized water and collecting the rinsate in sample bottles. EB samples are assigned unique sample numbers so as to not be identified by the laboratory as EB samples. One EB sample shall be collected for every day of sampling when using non-dedicated equipment to collect groundwater samples. The EB samples will be analyzed for the same compounds as those analyzed for the regular groundwater samples.

3.4 General Field Equipment

The following is a list of, at minimum, the general field equipment and supplies used during monitoring and sampling:

- Water level indicator (i.e., electric sounder)
- Log book and field forms
- Calculator
- Water quality bottle sets and COC forms
- Tape measure and engineer's rule
- Basic hand tools, including
  - Screwdriver
  - Pliers
  - Hacksaw
  - Hammer
  - Flashlight
- Adjustable wrench
- Leather work gloves
- Nitrile gloves
- Appropriate personal protective equipment (PPE)
- 5-gallon buckets
- Decontamination supplies, including
  - Tap Water
  - Distilled or deionized water
  - Non-phosphate soap

   - Brushes
- Appropriate monitoring well purge equipment (if necessary – see Section 3.2.2.2), including
   - Submersible pump
   - Generator
   - Hose clamps
   - Safety cable
   - Tubing
   - Bailer
- Filters (as required)

3.5 Reporting

A well inventory database will be developed for the monitoring effort as an Excel spreadsheet. This will include well elevations so that water level measurements can be converted into elevation. Water level monitoring data and groundwater analytical data will be included in the database to create chemographs comparing groundwater quality data to groundwater elevation data over time and to generate quality parameters in the basin. The hydrographs and chemographs will also allow the GSA to track temporal changes in groundwater levels and water quality as new data are collected. Data entered will be compatible with Global Information System (GIS) to generate groundwater elevation and water quality maps of the basin.

Groundwater quality data will be submitted to the GSA approximately 30 days after each sampling event, or at the earliest possible date, depending on normal sample turn-around times and laboratory reporting. Quarterly data reports will consist of a summary of groundwater conditions using maps, figures, and tables.

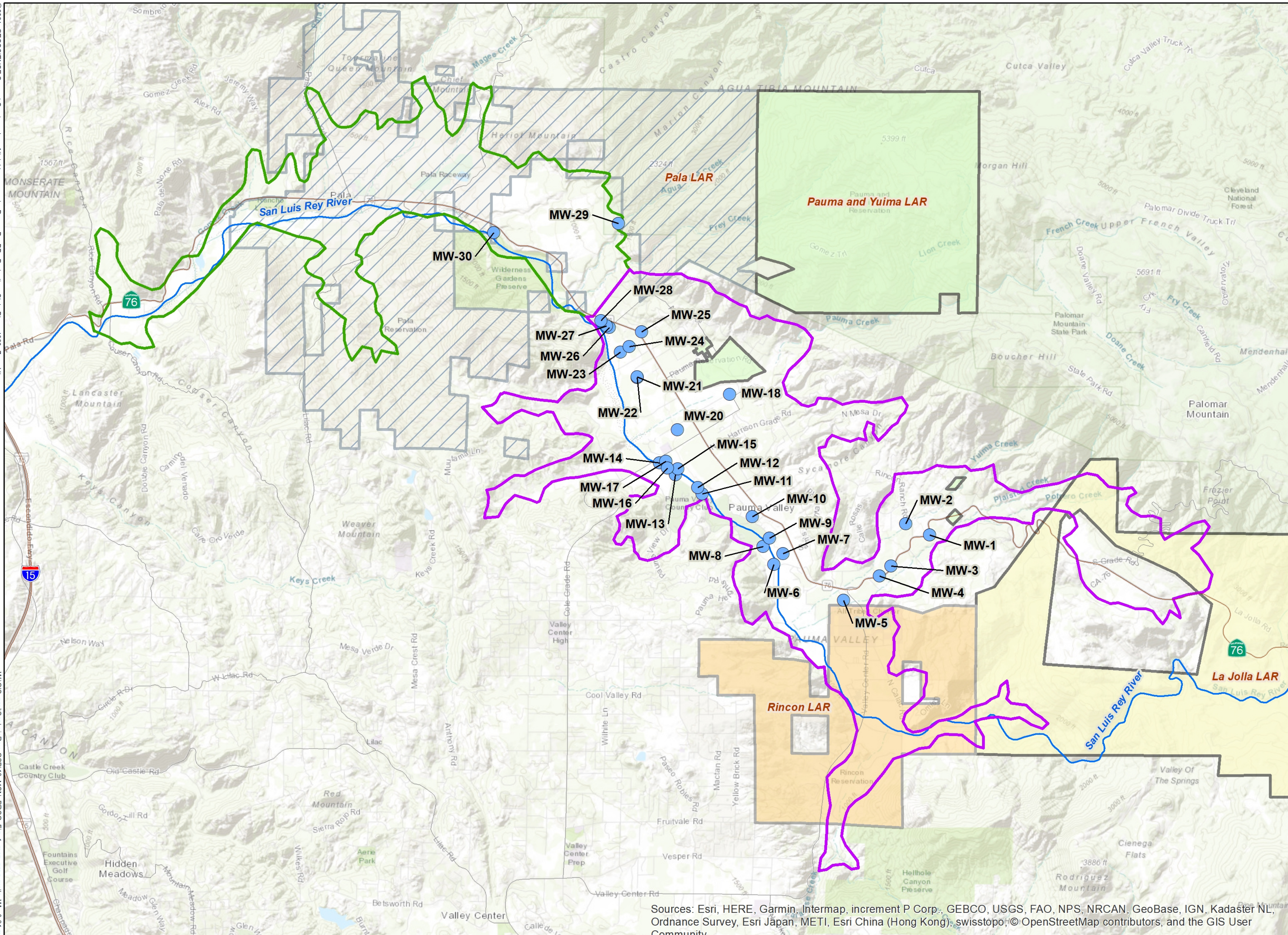
4.0 References

California Code of Regulations (CCR), Title 22, Social Security, Chapter 15, Domestic Water Quality and Monitoring.

USEPA (United States Environmental Protection Agency), 2004. Groundwater Well Sampling, Field Sampling Guidance Document #1220, Method 314.0.

FIGURES

GEOSCIENCE



EXPLANATION

- Well Location for Water Level Monitoring
- Pala Subbasin Boundary (DWR Bulletin 118, 2016)
- Pauma Subbasin Boundary (DWR Bulletin 118, 2016)

N

0 1 2
Miles

MONITORING WELL LOCATIONS - WATER LEVEL

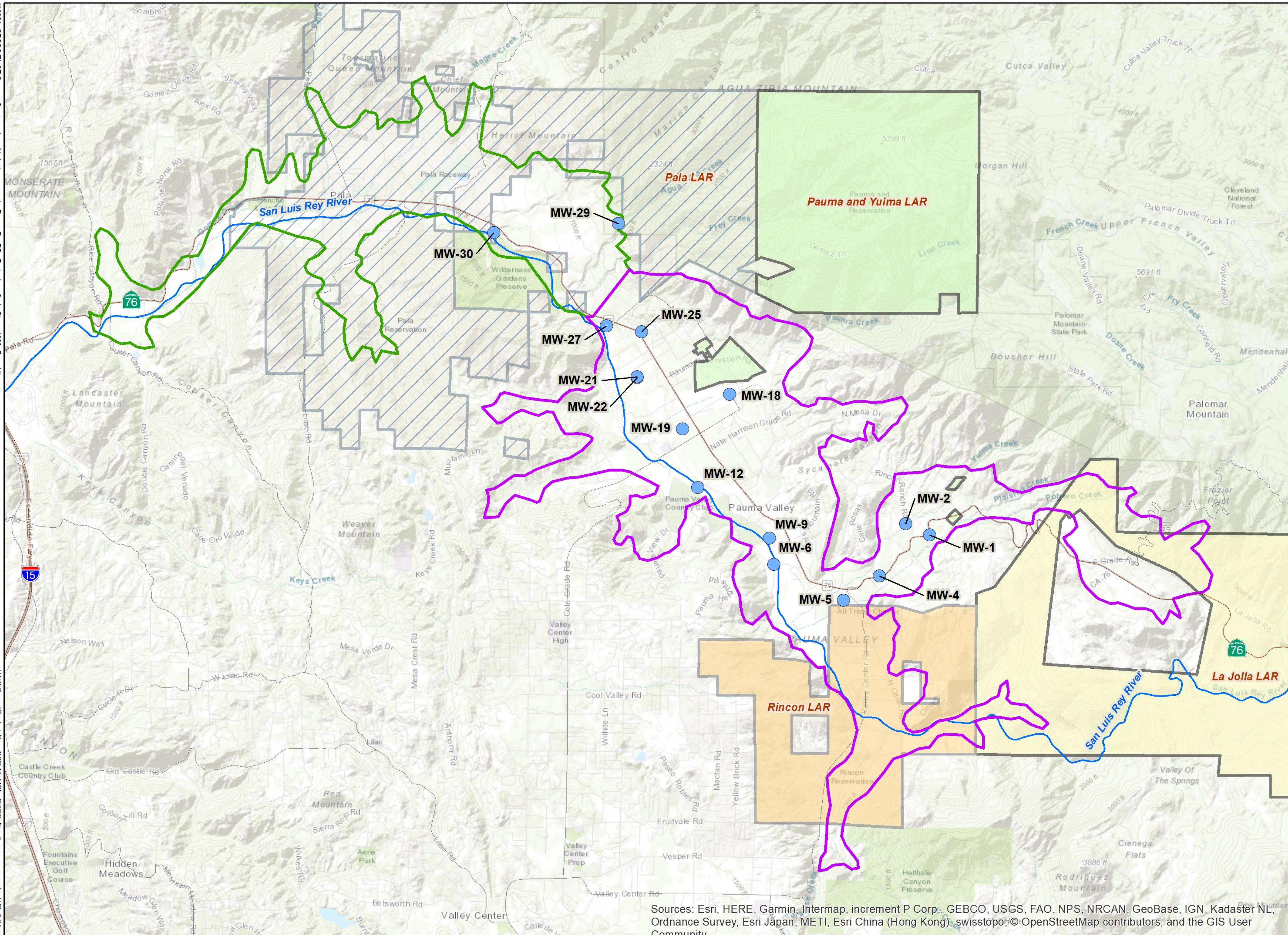
W:\GIS_proj\SanLuisRey_GSP\16_MON_PROG_Fig_1_mon_prog_wells_WL_3-21.mxd

Mar-21

YUIMA MUNICIPAL WATER DISTRICT **DRAFT** **FIGURE 1**

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - MONITORING PROGRAM

GEOSCIENCE



EXPLANATION

- Well Location for Water Quality Monitoring
- Pala Subbasin Boundary (DWR Bulletin 118, 2016)
- Pauma Subbasin Boundary (DWR Bulletin 118, 2016)

N

0 1 2

Miles

MONITORING WELL LOCATIONS - WATER QUALITY

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Mar-21

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FIGURE 2

UPPER SAN LUIS REY VALLEY GROUNDWATER SUSTAINABILITY PLAN - MONITORING PROGRAM

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TABLE

Wells to be Monitored during Development of Groundwater Sustainability Plan

Monitoring Well ID	MONITORING EVENT								
	March 2021			May 2021			September 2021		
	Groundwater Level	***Water Quality***		***Groundwater Level***	***Water Quality***		***Groundwater Level***	***Water Quality***	
		Physical, General Mineral & Inorganic Chemicals[1]	Perchlorate		Physical, General Mineral & Inorganic Chemicals[1]	Perchlorate		Physical, General Mineral & Inorganic Chemicals[1]	Perchlorate
MW-1	x	x	x	x			x	x	x
MW-2	x	x		x			x	x	
MW-3	x			x			x		
MW-4	x	x	x	x			x	x	x
MW-5	x	x	x	x			x	x	x
MW-6	x	x		x			x	x	
MW-7	x			x			x		
MW-8	x			x			x		
MW-9	x	x		x			x	x	
MW-10	x			x			x		
MW-11	x			x			x		
MW-12	x	x	x	x			x	x	x
MW-13	x			x			x		
MW-14	x			x			x		
MW-15	x			x			x		
MW-16	x			x			x		
MW-17	x			x			x		
MW-18	x	x		x			x	x	
MW-19		x						x	
MW-20	x			x			x		
MW-21	x	x		x			x	x	
MW-22	x	x		x			x	x	
MW-23	x			x			x		
MW-24	x			x			x		
MW-25	x	x		x			x	x	
MW-26	x			x			x		
MW-27	x	x		x			x	x	
MW-28	x			x			x		
MW-29	x	x		x			x	x	
MW-30	x	x		x			x	x	

[1] See Monitoring Program TM text, Section 3.2.2.4 for detailed list of analytes

APPENDIX A

Water Level Measurement Field Form

GEOSCIENCE

GEOSCIENCE
GEOSCIENCE Support Services, Inc.
P.O. Box 220, Claremont, CA 91711
Tel: (909) 451-6650 Fax: (909) 451-6638
www.gssiwater.com

USLR GSP
Water Level Monitoring

Name ____________________ **Firm** ____________________

Date / Day ____________________ **Weather** ____________________

Well	RP	Time	Depth to Water (ft brp)	Totalizer Reading	Nearby Pumping Wells	Notes:
MW-1						
MW-2						
MW-3						
MW-4						
MW-5						
MW-6						
MW-7						
MW-8						
MW-9						
MW-10						
MW-11						
MW-12						
MW-13						
MW-14						
MW-15						
MW-16						
MW-17						
MW-18						
MW-20						
MW-21						
MW-22						
MW-23						
MW-24						
MW-25						
MW-26						
MW-27						
MW-28						
MW-29						
MW-30						

APPENDIX B

Water Quality Sampling Field Form

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www.gssiwater.com

WATER QUALITY SAMPLING DATA SHEET

Client: ____________________________________ Sampled By: ______________________________
Well Name/Number: ________________________ Test Date: ________________________________
Well Dia: _______in Well Depth: _________ft bgs Screened Interval: ___________________ft bgs
Static WL: ______________ ft brp Reference Point Elevation: ______________ ft amsl
RP: _______________________________ Pump Depth: _________________ ft bgs
Totalizer Reading:

Time	Water Level (ft brp)	Temp (°C)	Cond (µS/cm)	TDS (mg/L)	SDI	DO (mg/L)	pH	ORP (mV)	Turbitity (NTU)

Sampling Method:
Casing Volume:
Tubing Volume:
Volume Pumped Before Sampling:
Flow Rate:

Stabilization Criteria:
3 to 5 minute recordings with 3 consecutive readings within:
pH: +/- 0.1 unit Turb: +/- 10%
Cond: +/- 3% DO: +/- 10%
ORP: +/- 10 mV Desired Flow Rate: 100 to 500 mL/min

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The First Name in Groundwater