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San Luis Obispo Valley Basin Groundwater Sustainability Agencies

San Luis Obispo Valley Groundwater Basin Water Year 2023 Annual Report

March 5, 2024

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San Luis Obispo Valley Groundwater Basin
Water Year 2023 Annual Report

This report was prepared by GSI Water Solutions, Inc., in partnership with Cleath-Harris Geologists, Inc., under the supervision of the professionals whose signatures appear below. The findings or professional opinion were prepared in accordance with generally accepted professional engineering and geologic practice.

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Contents

Tables

Figures

Appendices

Abbreviations and Acronyms

AF	acre-feet
AFY	acre-feet per year
amsl	above mean sea level
Basin	San Luis Obispo Valley Groundwater Basin
City	City of San Luis Obispo
COC	constituent of concern
County	County of San Luis Obispo
DWR	California State Department of Water Resources
ETo	reference evapotranspiration
GSA	Groundwater Sustainability Agency
GSC	Groundwater Sustainability Commission
GSP	Groundwater Sustainability Plan
InSAR	interferometric synthetic-aperture radar
MCL	maximum contaminant level
MOA	memorandum of agreement
PCE	tetrachloroethylene
PFAS	per- and polyfluoroalkyl substances
PWS	public water system
RMS	representative monitoring site
RWQCB	Regional Water Quality Control Board
S	storage coefficient
SGMA	Sustainable Groundwater Management Act
SLOFCWCD	County of San Luis Obispo Flood Control and Water Conservation District
Study	Cost-of-Service Rate Study
TCE	trichloroethylene
WY	Water Year

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Annual Report Elements Guide and Checklist

California Code of Regulations – GSP Regulation Sections	Annual Report Elements	Location in Annual Report
Article 7	Annual Reports and Periodic Evaluations by the Agency	
§ 356.2	Annual Reports	
	Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:	
	(a) General information, including an executive summary and a location map depicting the basin covered by the report.	Executive Summary (§356.2[a])
	(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:	Section 2.4 Groundwater Elevation Monitoring (§356.2[b])
	(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:	Section 3 Groundwater Elevations (§356.2[b][1])
	(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	Section 3.2 Seasonal High and Low (Spring and Fall) (§356.2[b][1][A])
	(B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.	Section 3.3 Hydrographs (§356.2[b][1][B], and Appendix D
	(2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.	Section 4 Groundwater Extractions (§356.2[b][2])
	(3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.	Section 5 Surface Water Use (§356.2[b][3])

California Code of Regulations – GSP Regulation Sections	Annual Report Elements	Location in Annual Report
Article 7	Annual Reports and Periodic Evaluations by the Agency	
§ 356.2	Annual Reports	
	(4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.	Section 6 Total Water Use (§356.2[b][4])
	(5) Change in groundwater in storage shall include the following:	Section 7 Change in Groundwater in Storage (§356.2[b][5])
	(A) Change in groundwater in storage maps for each principal aquifer in the basin.	Section 7.1 Annual Changes in Groundwater Elevation (§356.2[b][5][A])
	(B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.	Section 7.2 Annual and Cumulative Change in Groundwater in Storage Calculations (§356.2[b][5][B]) and Appendix D Hydrographs
	(c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.	Section 8 Progress toward Basin Sustainability (§356.2[c])

Executive Summary (§ 356.2[a])

Introduction

This Annual Report for the San Luis Obispo Valley Groundwater Basin (Basin) (Figure ES-1) for Water Year (WY) 2023 has been prepared in accordance with the Sustainable Groundwater Management Act (SGMA) regulations. Pursuant to the SGMA regulations, an annual report must be submitted to California Department of Water Resources (DWR) by April 1 of each year following the adoption of the Basin's Groundwater Sustainability Plan (GSP). This is the third Annual Report and documents data for WY 2023 (October 1, 2022 through September 30, 2023). The annual report conveys monitoring and water use data to DWR and basin stakeholders on an annual basis to gauge performance of the Basin relative to the sustainability goals set forth in the GSP (WSC et al., 2021).

This Annual Report includes the following sections:

- **Section 1. Introduction – San Luis Obispo Valley Basin Third Annual Report (Water Year 2023)**: A brief background of the formation and activities of the San Luis Obispo Basin GSAs and development and submittal of the GSP.
- **Section 2. San Luis Obispo Basin Setting and Monitoring Networks**: A summary of the basin setting, basin monitoring networks, and ways in which data are used for groundwater management.
- **Section 3. Groundwater Elevations (§356.2[b][1])**: A description of recent monitoring data with groundwater elevation contour maps for spring and fall monitoring events and hydrographs of representative monitoring site (RMS) wells.
- **Section 4. Groundwater Extractions (§356.2[b][2])**: A compilation of metered and estimated groundwater extractions by land use sector and location of extractions.
- **Section 5. Surface Water Use (§356.2[b][3])**: A summary of reported surface water use.
- **Section 6. Total Water Use (§356.2[b][4])**: A presentation of total water use by source and sector.
- **Section 7. Change in Groundwater in Storage (§356.2[b][5])**: A description of the methodology and presentation of changes in groundwater in storage based on fall-to-fall groundwater elevation differences.
- **Section 8. Progress toward Basin Sustainability (§356.2[c])**: A summary of management actions taken throughout the Basin by GSAs and individual entities toward sustainability of the Basin.
- **Section 9: References.**

Groundwater Elevations

WY 2023 was a wet year with above average rainfall. Consequently, water levels rose across most of the Basin. Relative to the basin conditions as reported in the first two Annual Reports (WYs 2020–2021 and 2022), data presented in this report indicate improved groundwater conditions throughout most of the Basin, with groundwater elevations in the RMS wells ranging from approximately 46 feet higher (EV-04) to 4 feet lower (SLV-19) than fall 2022 (Figure ES-2), with an overall increase in total groundwater in storage in the Basin (Table ES-5).

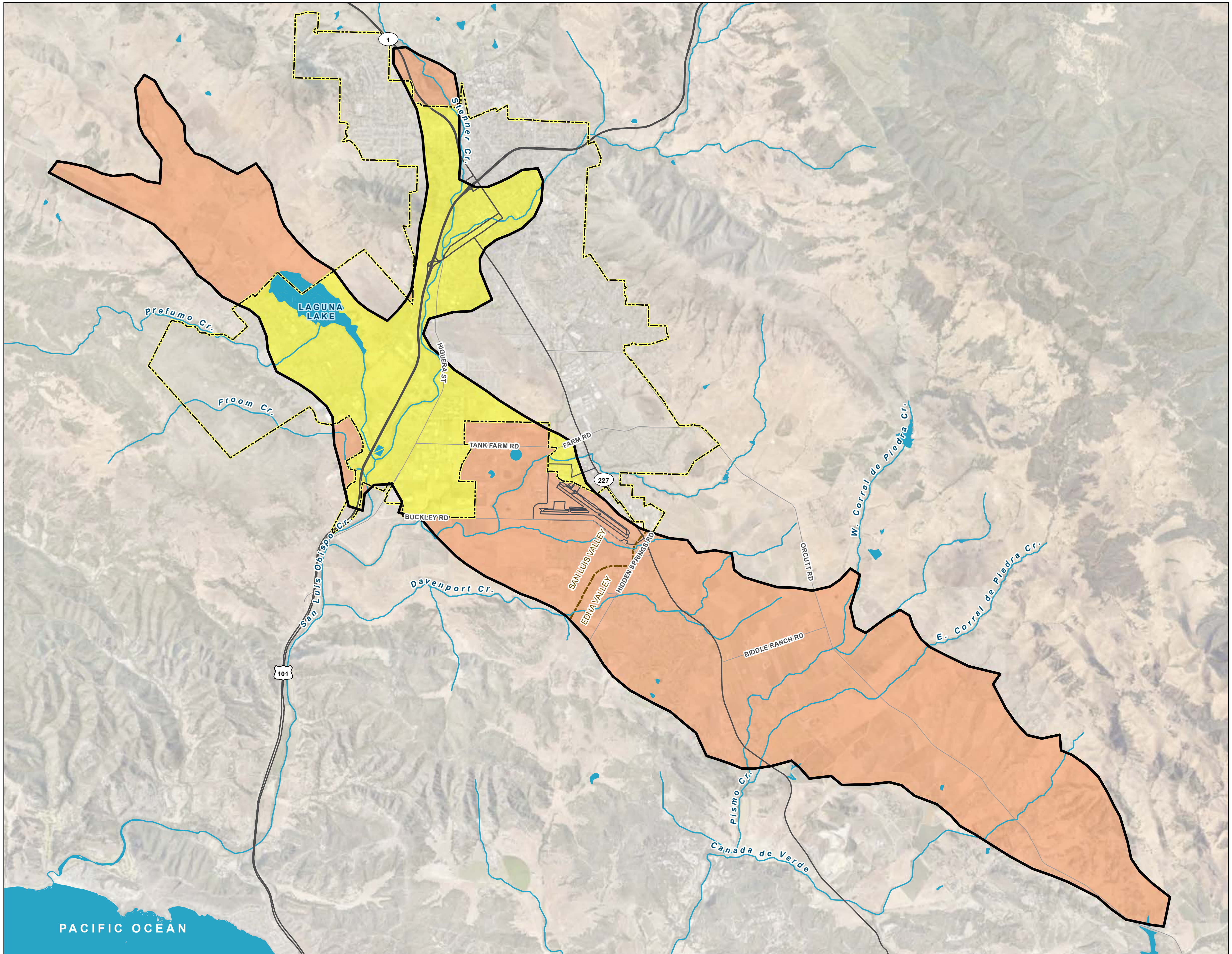

FIGURE ES-1

Extent of the San Luis Obispo Basin and Groundwater Sustainability Agencies

San Luis Obispo, California

LEGEND

Groundwater Sustainability Agencies

- City of San Luis Obispo
- San Luis Obispo County

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5
Miles

Date: February 14, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

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One RMS well in the Edna Valley subarea (RMS EV-13) had WY 2023 water levels that declined below its minimum threshold as published in the GSP. However, a review of the recent water level data and the GSP text describing the methodology used to define the MTs has revealed an apparent clerical error in the MT values tabulated in the published GSP for two RMS wells (EV-13 and EV-09). The methodology for establishing MTs for EV-09 and EV-13, as documented in the GSP and corroborated by GSA and GSC members who participated in the public meetings, is as follows. To maintain operational flexibility and protect agricultural investments in the Edna Valley, it was proposed and accepted that for three Edna Valley RMS wells (EV-04, EV-09, and EV-13), the MTs should be defined at an elevation ten feet lower than the lowest groundwater elevation observed at those wells during the recent drought. A well impact analysis was performed that indicated that such an MT would not have a significant negative impact on domestic wells in the vicinity. Under this methodology, the MTs for EV-09 and EV-13 are 84 And 159 feet amsl; in the GSP the MTs for EV-09 and EV-13 are apparently incorrectly published as 82 and 172 feet amsl, respectively. (The published MT for EV-04 is correct). The methodology for defining the MTs as such was accepted by DWR in their acceptance of the GSP. Under the corrected MT values, there were no water levels below the associated MTs for any Edna Valley RMS wells. Table ES-1 presents the RMS wells for water level decline and sustainable management criteria, with the original and corrected MTs identified for EV-09 and EV-13. Water levels in the San Luis Valley subarea, where there is significantly less groundwater production, have remained essentially stable, with some water level decline measured in two of the 16 wells measured. Water levels in the Edna Valley subarea, which has more intensive agricultural groundwater production, remain comparatively lower than the San Luis Valley, but increased through much of Edna Valley. In general, the groundwater elevations observed in the Basin during WY 2023 reflect differing trends in the San Luis Valley subarea and the Edna Valley subarea.

Table ES-1. Summary of MTs, MOs, and IMs for the San Luis Obispo Valley Groundwater Basin RMSs

RMS	Original MT Proposed Revised MT[1]	MO	2027 IM	2032 IM	2037 IM
San Luis Valley					
SLV-09	102	110	110	110	110
SLV-16	70	100	100	100	100
SLV-19	80	110	110	110	110
SLV-12	96	105	105	105	105
Edna Valley					
EV-09	~~82~~ 84	164	150	155	160
EV-04	160	247	219	229	239
EV-13	~~172~~ 159	248	223	231	238
EV-16	150	190	175	180	185
EV-01	263	314	314	314	314
EV-11	177	227	227	227	227

Notes

[1] Original measurable threshold (MT) is from the GSP. The corrected MT, if applicable, is displayed in red font.

All values are presented as feet NAVD 88.

IM = interim milestone

MO = measurable objective

MT = minimum threshold

NAVD 88 = North American Vertical Datum of 1988

RMS = representative monitoring site

Groundwater Extractions

Total groundwater extractions in the Basin for WY 2023 are estimated to be 5,680 acre-feet (AF). Table ES-2 summarizes the groundwater extractions by water use sector for WY 2023.

The volume of groundwater extractions in the Basin has remained within the historical range of observed extractions documented in the GSP (WSC et al., 2021).

Table ES-2. Groundwater Extractions by Water Use Sector

Water Year	Municipal (AF)	PWS and Rural Domestic (AF)	Agriculture (AF)	Total (AF)
2020	0	1,250	4,960	6,210
2021	0	1,250	5,030	6,280
2022	0	1,290	5,070	6,360
2023	0	1,150	4,530	5,680
Method of Measure	Metered	PWS-Metered Rural Domestic - Estimated	Soil-Water Balance Model	—
Level of Accuracy	High	High-Medium	Medium	—

Notes

Only the soil-water balance model results are displayed in this table.

— = not applicable

AF = acre-feet

PWS = public water systems

Surface Water Use

The Basin currently benefits from entitlements for importing surface water from the Nacimiento Water Project, Whale Rock Reservoir, and Salinas Reservoir to supply municipal groundwater demands in the City of San Luis Obispo. There is currently no surface water available for agricultural or recharge project use within the Basin. A summary of total actual surface water use by source is provided in Table ES-3.

Table ES-3. Total Surface Water Use by Source

Water Year	Nacimiento Water Project (AF)	Whale Rock Reservoir (AF)	Salinas Reservoir (AF)	Total Surface Water Use (AF)
2020	1,562	1,459	2,154	5,176
2021	2,691	1,491	1,266	5,448
2022	4,302	613	575	5,489
2023	1,022	2,816	1,347	5,185

Note

AF = acre-feet

Total Water Use

For WY 2023, quantification of total water use reflected the reporting of metered water production data from public water system (PWS) wells, and metered surface water use. In addition, rural water use and small commercial public water system use was estimated. Agricultural use was estimated using the soil-water balance models used to estimate agricultural crop and applicable urban turf (golf course and playground fields) water supply requirements in previous years. This year, for the second consecutive year, a new satellite-based method was used to estimate agricultural production using LandIQ land use data sets and OpenET satellite data. Results were comparable and are discussed in detail in Section 4. After acceptance of this Annual Report, the GSAs will collectively determine which method to use for future annual reporting. Table ES-4 summarizes the total annual water use in the Basin by source and water use sector.

Table ES-4. Total Annual Water Use in the Basin by Source and Water Use Sector

Water Year	Municipal (AF)		PWS and Rural Domestic (AF)	Agriculture (AF)	Total (AF)
Source:	Groundwater	Surface Water	Groundwater	Groundwater	Groundwater and Surface Water
2020	0	5,176	1,250	4,960	11,390
2021	0	5,448	1,250	5,030	11,728
2022	0	5,489	1,290	5,070	11,849
2023	0	5,185	1,150	4,530	10,865
Method of Measure	Metered	Metered	PWS-Metered Rural Domestic-Estimated	Soil-Water Balance Model	—
Level of Accuracy	High	High	High-Medium	Medium	—

Notes

— = not applicable

AF = acre-feet

PWS = public water systems

Change in Groundwater in Storage

The calculation of change of groundwater in storage in the Basin was derived from a comparison of fall groundwater elevation data from one year to the next, taking the difference between groundwater elevations throughout the Basin as the aquifer becomes saturated (storage gain) or dewatered (storage loss), and multiplying by the appropriate storativity factor for the San Luis Valley and Edna Valley areas to estimate overall changed volume of groundwater in storage in the Basin.

The groundwater elevation change map for fall 2022 to fall 2023 (see Figure ES-2), which was an above-average rainfall year, shows that water levels increased by up to 46 feet in some Edna Valley wells, and increased less than 10 feet in the San Luis Valley.

The annual changes of groundwater in storage calculated for WY 2023 are presented in Table ES-5. Groundwater in storage had decreased somewhat over the three prior water years due to drought and groundwater pumping that exceeded the estimated sustainable yield. However, groundwater in storage in the Basin increased by approximately 12,459 AF during WY 2023 based on calculations of changes in groundwater elevations between fall 2022 and fall 2023 and estimated specific yield in the two subareas in the Basin.

Table ES-5. Annual Changes of Groundwater in Storage for Water Year 2023

Water Year	San Luis Valley (AF)	Edna Valley (AF)	Annual Change in Groundwater in Storage (AF)
2020	210	-750	-540
2021	-450	-5,080	-5,530
2022	273	-1,937	-1,663
2023	1,741	10,718	12,459
Net Change (WYs 2020–2023)	1,774	2,951	4,726

Notes

AF = acre-feet

WY = Water Year

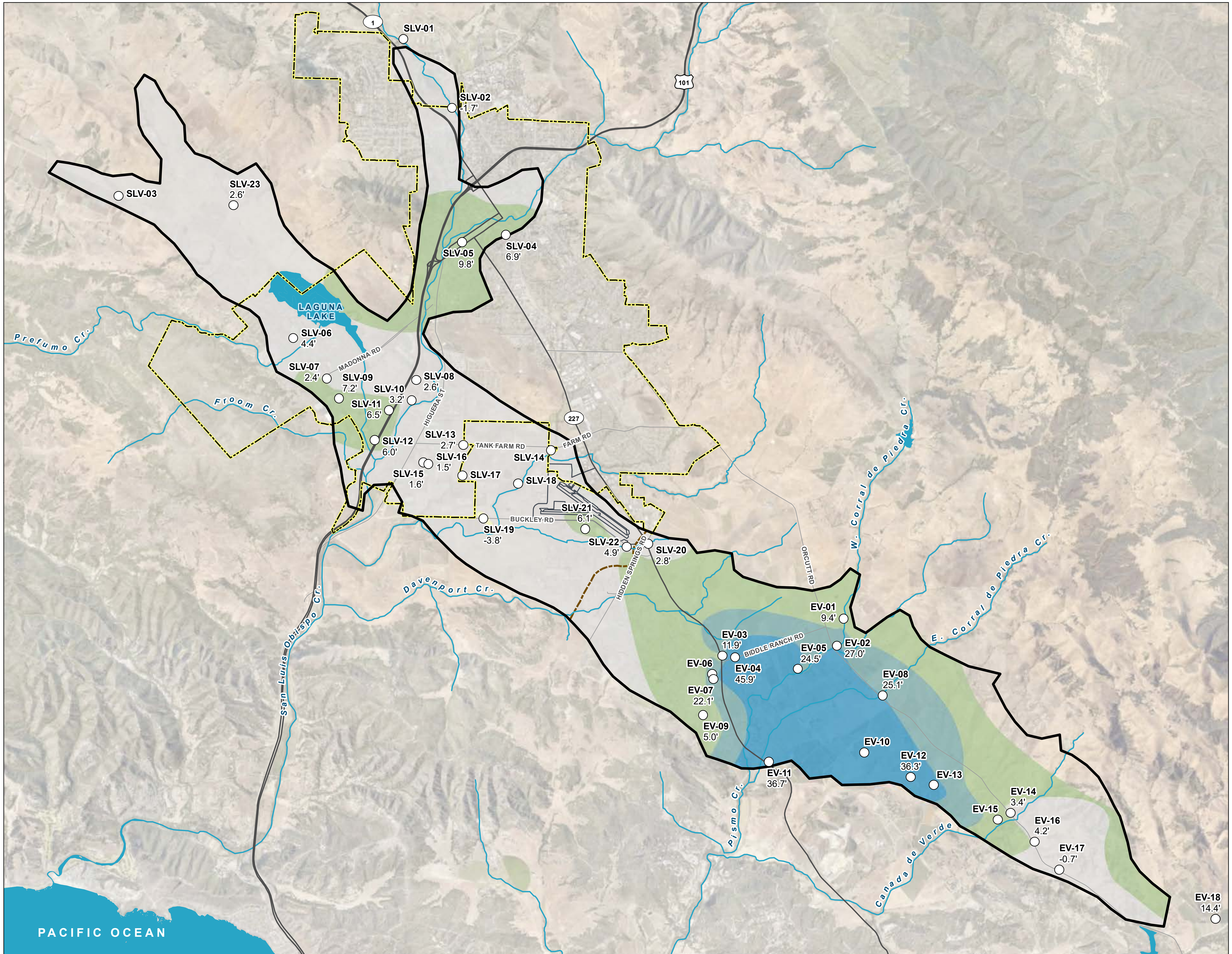

FIGURE ES-2

Annual Change in Groundwater Elevation, October 2022/2023

San Luis Obispo, California

LEGEND

Well

Change in Groundwater Elevation (feet NAVD88)

- >25
- >15 to 25
- >5 to 15
- >0 to 5
- -5 to 0
- -15 to -5
- -25 to -15
- -28 to -25

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5
Miles

Date: March 5, 2024
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Progress toward Meeting Basin Sustainability

DWR Acceptance of San Luis Obispo Valley Basin GSP

On April 27, 2023, DWR transmitted a letter communicating the approval determination of the submitted GSP for the Basin. The GSP was determined to have satisfied all required conditions as detailed in the original SGMA legislation. A number of recommended corrective actions are suggested for additional evaluation during the initial 5-year implementation period, including:

- Investigation into the location and presence of groundwater dependent ecosystems
- Provide additional details and discussion related to specifics components used to establish sustainable management criteria for chronic lowering of groundwater levels.
- Provide additional details and discussion related to specific components used to establish sustainable management criteria for degraded water quality.
- Continue to fill data gaps, collect additional monitoring data, and coordinate with resource agencies and interested stakeholders.
- Provide additional details related to the monitoring networks.

These recommended corrective actions can be considered and addressed over the initial 5-year implementation period. However, DWR acceptance of the plan is an important milestone in the sustainable management of groundwater resources in the Basin.

Summary of Changes in Basin Conditions

WY 2023 was an above-average rainfall year. Most of the 10 RMS wells in the Basin groundwater monitoring network exhibited stabilized or increasing water levels over this period, due to decreased agricultural groundwater extractions and increased rainfall. Despite continued growth of citrus plantings by 81 acres (from 2020), approximately 50 acres of vegetable and deciduous crops have been removed from production, and approximately 9 acres have been converted to pasture, with no net change to vineyard acreage since 2020 (see Section 4.3). Taking into consideration the corrected minimum threshold for RMS EV-13 as previously discussed, WY 2023 water levels in all 10 RMS wells in the Basin were above their minimum thresholds.

Recent InSAR land subsidence data available since publication of the GSP indicates that there was no measurable land subsidence in the Basin during WY 2023 (beyond the method error of measurement of 0.0591-foot). InSAR data for the 5-year period (2018–2023) indicates the Basin meets land subsidence sustainability criteria, with up to 0.075 feet of measurable subsidence measured in the Edna Valley subarea, and no measurable subsidence in the San Luis Valley subarea.

At this time, no additional data describing the interconnectivity of surface water and groundwater or potential surface water depletion are available for analysis. The potential for impacts to this sustainability indicator will be assessed in future annual reports as monitoring network improvements and associated data are developed.

Pursuit of SGMA Implementation Grant Funding

In December 2022, the County Director of Groundwater Sustainability, in coordination with the City and County Groundwater Sustainability Agencies and the Groundwater Sustainability Commission, applied for grant funding through DWR's SGMA Round 2 SGMA Implementation Grant Program. Under this program, approximately $231 million is available statewide in disbursements ranging from $1 to $20 million. The funding is based on competitive scoring and is intended for basins that received no Round 1 funding, which includes Basin.

The grant application requested $7,653,300 dollars funding to facilitate implementation of the following projects and management actions identified in the GSP:

- Recharge for Conjunctive Benefit in Edna Valley
- Basin-wide well verification and registration program
- Pumping fee program
- Irrigated lands best management practices
- Multi-benefit irrigated land repurposing (MILR) program
- Specific well interference mitigation program
- Groundwater extraction measurement program
- Expanded monitoring network
- Varian Ranch Mutual Water Company well 4 feasibility study
- San Luis Obispo Valley Groundwater Basin State Water Project supplemental water study

Each of these projects is described in concept in the GSP and are detailed in the grant application to DWR. Planning and conceptual design were considered for several of these projects. A grant funding award under this program will help move each of these potential projects through the planning phase and move the most feasible toward ultimate implementation.

Ultimately, DWR did not award any funding under this round of grant applications to the Basin GSAs to support their projects and management actions. The GSAs will continue to identify and pursue possible grant funding in the future.

Expanded Monitoring Network

During the GSP development, a significant number of new private wells were added to the existing network monitored by the County. In addition, some City-owned wells which had not been monitored in over 20 years were added to the network. The expanded monitoring network of 41 wells was monitored for the first time during the April 2022 monitoring event. WY 2023 is the first year in which the expanded network was available during both the spring and fall monitoring events. This expanded monitoring network will allow for more detailed groundwater elevation maps and more robust calculation of groundwater in storage in future annual reports.

In addition to the current monitoring network, The City has plans to construct 8 to 12 monitoring wells as part of the ongoing characterization and remediation of a plume of perchloroethylene (PCE) within City limits. This investigation is being performed under the direction of the Regional Water Quality Control Board (RWQCB). The city has indicated that it will make these monitoring wells available for Basin monitoring under SGMA after they are installed.

City Recycled Water to Edna Valley Project

Representatives from the City of San Luis Obispo have continued to meet and negotiate regarding the potential delivery of an interruptible supply of recycled water to Edna Valley for agricultural use. Final terms of a proposed project and costs have not been decided, but conversation continues between the parties.

Cost-of-Service Rate Study for County GSA Area

During the current water year, representatives of Edna Valley growers have initiated discussions with the County GSA regarding the need to generate future revenue to fund some of the supplemental water supply projects and pumping reduction initiatives identified in the GSP. The County GSA, in collaboration with the growers, have initiated the planning process for a Cost-of-Service Rate Study (Study) to support funding groundwater management related activities for the Basin pursuant to SGMA (Water Code §§ 10720 et seq.). More specifically, the primary purpose of this analysis will be to support regulatory fees (Water Code § 10730; Proposition 26) for distributing administrative costs (e.g., costs for general administration, operations, groundwater extraction measurement and Basin monitoring and reporting) to Basin extractors (administrative fees) and to support additional fees (Water Code § 10730.2; Proposition 218) for distributing GSP project costs to Basin extractors (project fees).

This Study will comply with the requirements of SGMA (e.g., it shall not call for the imposition of a regulatory fee on a de minimis extractor unless the extractor is being regulated under SGMA) and the requirements of all other applicable laws, including, without limitation, the procedural and substantive requirements of Propositions 26 and 218 and shall provide supporting documentation evidencing said compliance. Without limiting the foregoing, regarding compliance with Proposition 26, the rate study will provide supporting documentation necessary to determine whether the administrative fees fall within one of the enumerated exceptions from the definition of a “tax” and that the amount of the administrative fees are no more than necessary to cover the reasonable costs of the governmental activities and that the manner in which those costs are allocated to an extractor bear a fair or reasonable relationship to the extractor’s burdens on, or benefits received from, the governmental activity (California Constitution, Article XIIIC, Section 1). Regarding compliance with Proposition 218, the rate study will provide supporting documentation evidencing that the project fees do not exceed the proportional cost of the service attributable to each parcel. The Study will build off the relevant legal opinions and court decisions that provide a foundation for the recommended charges. At the time that this report was issued, no specific timeline for the completion of the proposed Cost-of-Service Rate Study was established.

Summary of Impacts of Projects and Management Actions

The GSP was submitted to DWR in January 2022. The time frame for achieving sustainability is a 20-year period. Additional time will be necessary to assess the effectiveness and quantitative impacts of the projects and management actions either now underway or in the planning and development stages. The implementation of an improved monitoring network in the Basin will provide the data consistency necessary to provide a more robust evaluation of future conditions. The lack of available grant funding has slowed the progress of some proposed projects in Edna Valley. However, all water user groups and stakeholders in the Basin are actively engaged in the water resources planning process, and it is clear that the actions in place and as described in this Annual Report are a good start toward reaching the sustainability goals laid out in the GSP (WSC et al., 2021). The anticipated effects of the projects and management actions now underway are expected to significantly affect the ability of the Basin to reach the necessary sustainability goals.

SECTION 1: Introduction – San Luis Obispo Basin Third Annual Report (Water Year 2023)

This third Annual Report for the San Luis Obispo Valley Basin (Basin) has been prepared for the San Luis Obispo Valley Basin Groundwater Sustainability Committee (GSC) and the Groundwater Sustainability Agencies (GSAs) in accordance with the Sustainable Groundwater Management Act (SGMA) regulations (§ 356.2. Annual Reports) (see Appendix A). Pursuant to the SGMA regulations, a Groundwater Sustainability Plan (GSP) Annual Report must be submitted to California Department of Water Resources (DWR) by April 1 of each year following the adoption of the GSP. With adoption and submittal of the San Luis Obispo Valley Basin GSP on January 26, 2022, the GSAs are required to submit an annual report for the preceding water year (October 1 through September 30) to DWR by April 1, 2024.[1]

1.1 Setting and Background

The *San Luis Obispo Valley Basin Groundwater Sustainability Plan* (WSC et al., 2021) was prepared by Water Systems Consulting (WSC), GSI Water Solutions, Inc. (GSI), Cleath-Harris Geologists (CHG), Stillwater Sciences, and GEI Consultants on behalf of and in cooperation with the GSC and the Basin GSAs. The GSP, and this Annual Report, cover the entire San Luis Obispo Basin (Figure 1). The Basin lies in the central portion of San Luis Obispo County. The majority of the Basin comprises gentle alluvial flatlands and hills that drain San Luis Creek and Pismo Creek watersheds, ranging in elevation from approximately 100 feet above mean sea level (amsl) where San Luis Obispo Creek leaves the Basin to about 450 feet amsl in the higher parts of the Edna Valley. Communities in the Basin are the City of San Luis Obispo (City) and the communities of Edna, Edna Ranch and Varian Ranch. Highway 101 is the most significant north-south highway through the Basin, with State Route 227 running approximately parallel to the axis of the Basin from the City to Edna Valley.

The GSP was jointly developed by two GSAs:

- City of San Luis Obispo GSA
- County of San Luis Obispo GSA

The GSAs overlying the Basin and small water purveyors in the Basin (i.e., Edna Ranch Mutual Water Company [East], Golden State Water Company, and Varian Ranch Mutual Water Company) entered into a Memorandum of Agreement (MOA) on January 25, 2018. The purpose of the MOA was to establish a Basin GSC to act as an advisory body to the GSAs and to develop a single GSP for the entire Basin to be considered for adoption by each GSA and subsequently submitted to DWR for approval. Under the framework of the original MOA, the GSAs and GSC engaged the public and coordinated to jointly develop the San Luis Obispo Valley Basin GSP. At its October 20, 2021 meeting, in accordance with the MOA, the GSC voted unanimously to recommend that the GSAs adopt the GSP and submit it to DWR by the SGMA deadline of January 31, 2022. Subsequent actions by each GSA resulted in unanimous approval of the GSP and a joint submittal of the GSP to DWR on January 26, 2022.

[1] The required time frame of the annual reports, pursuant to the SGMA regulations, is by water year, which is October 1 through September 30 of any water year. However, because the County of San Luis Obispo Groundwater Level Monitoring Program measures water levels in October, the October 2023 measurements are used to reflect conditions at the end of water year 2023.

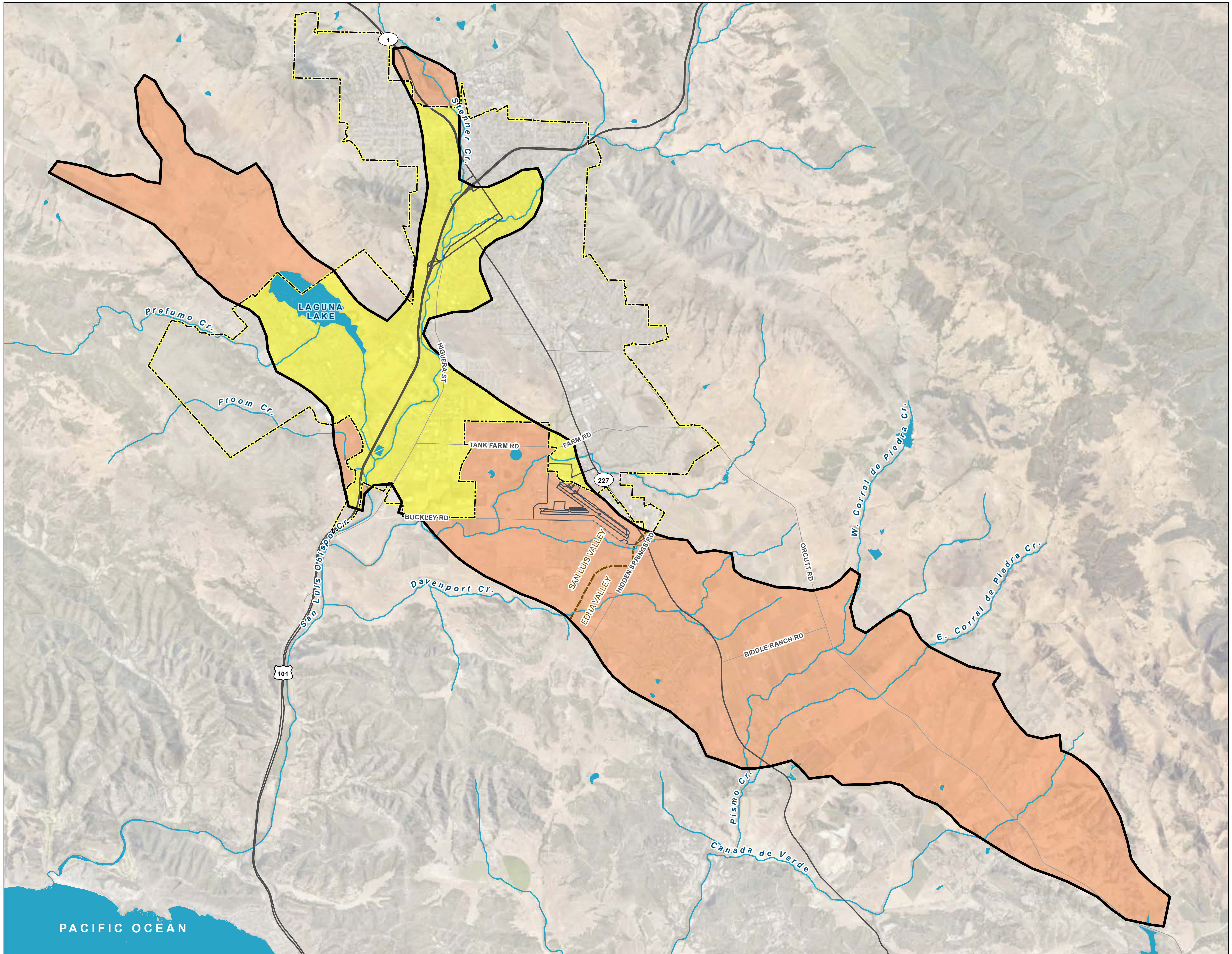

FIGURE 1

Extent of the San Luis Obispo Basin and Groundwater Sustainability Agencies

San Luis Obispo, California

LEGEND

Groundwater Sustainability Agencies

- City of San Luis Obispo
- San Luis Obispo County

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
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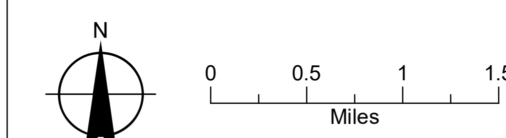

Date: February 14, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

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Each of the GSAs and water purveyors appointed a representative to the GSC to coordinate activities among the parties during the development of the GSP, and the development and submittal of this Water Year (WY) 2023 Annual Report. The GSAs also agreed to designate the County of San Luis Obispo Groundwater Sustainability Director as the Plan Manager with the authority to submit the GSP and the Annual Report and serve as the point of contact with DWR.

1.2 Organization of This Report

The required contents of an Annual Report are provided in the SGMA regulations (§ 356.2), included as Appendix A. Organization of the report is meant to follow the regulations where possible to assist in the review of the document. The sections are briefly described as follows:

- **Section 1. Introduction – San Luis Obispo Valley Basin Third Annual Report (Water Year 2023)**: A brief background of the formation and activities of the San Luis Obispo Valley Basin GSAs and development and submittal of the GSP.
- **Section 2. San Luis Obispo Valley Basin Setting and Monitoring Networks**: A summary of the basin setting, basin monitoring networks, and the ways in which data are used for groundwater management.
- **Section 3. Groundwater Elevations (§356.2[b][1])**: A description of recent monitoring data with groundwater elevation contours for spring and fall monitoring events and representative hydrographs.
- **Section 4. Groundwater Extractions (§356.2[b][2])**: A compilation of metered and estimated groundwater extractions by land use sector and location of extractions.
- **Section 5. Surface Water Use (§356.2[b][3])**: A summary of reported surface water use.
- **Section 6. Total Water Use (§356.2[b][4])**: A presentation of total water use by source and sector.
- **Section 7. Change in Groundwater in Storage (§356.2[b][5])**: A description of the methodology and presentation of changes in groundwater in storage based on fall-to-fall groundwater elevation differences.
- **Section 8. Progress toward Basin Sustainability (§356.2[c])**: A summary of management actions taken throughout the Basin by GSAs and individual entities toward sustainability of the Basin.
- **Section 9: References.**

SECTION 2: San Luis Obispo Valley Basin Setting and Monitoring Networks

2.1 Introduction

This section provides a brief description of the basin setting and the groundwater management monitoring programs described in the GSP (WSC et al., 2021), as well as any notable events affecting monitoring activities or the quality of monitoring results in WY 2023.

2.2 Basin Setting

The Basin is oriented in a northwest-southeast direction and is composed of unconsolidated or loosely consolidated sedimentary materials deposited atop relatively impermeable bedrock (Figure 1). It is approximately 14 miles long and 1.5 miles wide. It covers a surface area of about 12,700 acres (19.9 square miles). The Basin is bounded on the northeast by the bedrock formations of the Santa Lucia Range, and on the southwest by the formations of the San Luis Range and the Edna and Los Osos fault systems. The bottom of the Basin is defined by the contact of permeable sediments with the impermeable bedrock Miocene-aged and Franciscan Assemblage rocks (DWR, 2003). Land surface elevation ranges from less than 100 feet amsl to over 450 feet amsl in the higher parts of the Edna Valley. The Basin is usually identified as having two distinctly different areas: The San Luis Valley subarea and the Edna Valley subarea. The unofficial boundary between these two subareas is a subsurface bedrock divide located just southwest of the airport, approximately coincident with Hidden Springs Road (Figure 1).

The San Luis Valley subarea comprises approximately the northwestern half of the Basin. It is the area of the Basin drained by San Luis Obispo Creek and its tributaries (Prefumo Creek and Stenner Creek west of Highway 101, Davenport Creek and smaller tributaries east of Highway 101). Surface drainage in the San Luis Valley subarea drains out of the Basin via San Luis Obispo Creek, flowing to the south approximately along the alignment of Highway 101 toward the coast in the Avila Beach area. The San Luis Valley subarea includes the parts of the City and California Polytechnic University (Cal Poly) jurisdictional boundaries, which intersect with the Basin boundary, while the remainder of the Basin is unincorporated land. Land use in the City is primarily municipal, residential, and commercial. The area in the northwest part of the Basin, along Los Osos Valley Road, has significant areas of groundwater-dependent irrigated agriculture, primarily row crops.

The Edna Valley subarea comprises approximately the southeastern half of the Basin. The primary creeks that drain this subarea are the east and west branches of Corral de Piedras Creek, which join to form Pismo Creek just south of the basin boundary, draining south out of the Edna Valley into Price Canyon. Smaller tributaries, including Canada de Verde, drain south from the Edna Valley subarea in the extreme southeastern part of Edna Valley, ultimately joining Pismo Creek (Figure 1). The Edna Valley subarea includes unincorporated lands, including lands associated with various private water purveyors' service areas. The primary land use in the Edna Valley subarea is agriculture. Over the past two decades, wine grapes have become the most significant crop type in the Edna Valley.

There are three recognized water-bearing geologic formations that serve as aquifers: the Recent Alluvium, the Paso Robles Formation, and the Squire member of the Pismo Formation. These three formations are comprised of unconsolidated sediments whose productive strata are laterally discontinuous; no extensive confining layer separates one formation from the others throughout the Basin. In the San Luis Valley subarea, the Alluvium is not confined to active stream corridors, but is present at the surface throughout that entire part of the Basin. In the Edna Valley subarea, Alluvium is only present at the surface along active stream channels; the Paso Robles Formation is exposed at the surface in most of the Edna Valley subarea, and the Squire member is present at depth below the Paso Robles Formation. Groundwater production in the Basin has historically been seen as utilization of a single resource. Wells are typically screened across all productive strata regardless of the source geologic formation. In the San Luis Valley subarea, most wells are screened in both the Alluvium and the Paso Robles Formation. In the Edna Valley subarea, wells are typically screened across both the Paso Robles Formation and the Squire member of the Pismo Formation.

2.3 Precipitation and Climatic Periods

Annual precipitation recorded at the Cal Poly weather station is presented by water year in Figure 2. The long-term average annual water year precipitation for the period of record from WY 1871 through 2023 is 21.9 inches, as recorded at the California Irrigation Management Information System (CIMIS) Cal Poly weather station. Climatic periods in the Basin have been determined based on published DWR analysis of historical precipitation data and are displayed for years since 1960 on Figure 2. These climatic periods are categorized according to the following designations: wet, above normal, below normal, dry, and critically dry. A total of 41.15 inches of precipitation were reported at the Cal Poly Station in WY 2023, which is 26 inches greater than WY 2022 and 19 inches above the long-term annual average. Historical precipitation records for the CIMIS Cal Poly weather station are provided in Appendix B.

2.4 Groundwater Elevation Monitoring (§ 356.2[b])

This section provides a brief description of the groundwater management monitoring programs currently in place and any notable events affecting monitoring activities or the quality of monitoring results.

2.4.1 Groundwater Elevation Monitoring Locations

The GSP (WSC et al., 2021) provided a summary of existing groundwater monitoring efforts currently promulgated under various existing local, state, and federal programs. SGMA requires that monitoring networks be developed to provide sufficient data quality, frequency, and spatial distribution to characterize groundwater and surface water in the Basin, and to evaluate changing aquifer conditions in response to GSP implementation. The monitoring network developed in the GSP is intended to support efforts to accomplish the following:

- Monitor changes in groundwater conditions and demonstrate progress toward achieving measurable objectives and minimum thresholds documented in the GSP.
- Quantify annual changes in water use.
- Monitor impacts to the beneficial uses and users of groundwater.

Monitoring networks are developed for each of the five sustainability indicators relevant to the San Luis Obispo Basin:

- Chronic lowering of groundwater levels
- Reduction of groundwater in storage
- Degraded water quality
- Land subsidence
- Depletion of interconnected surface water

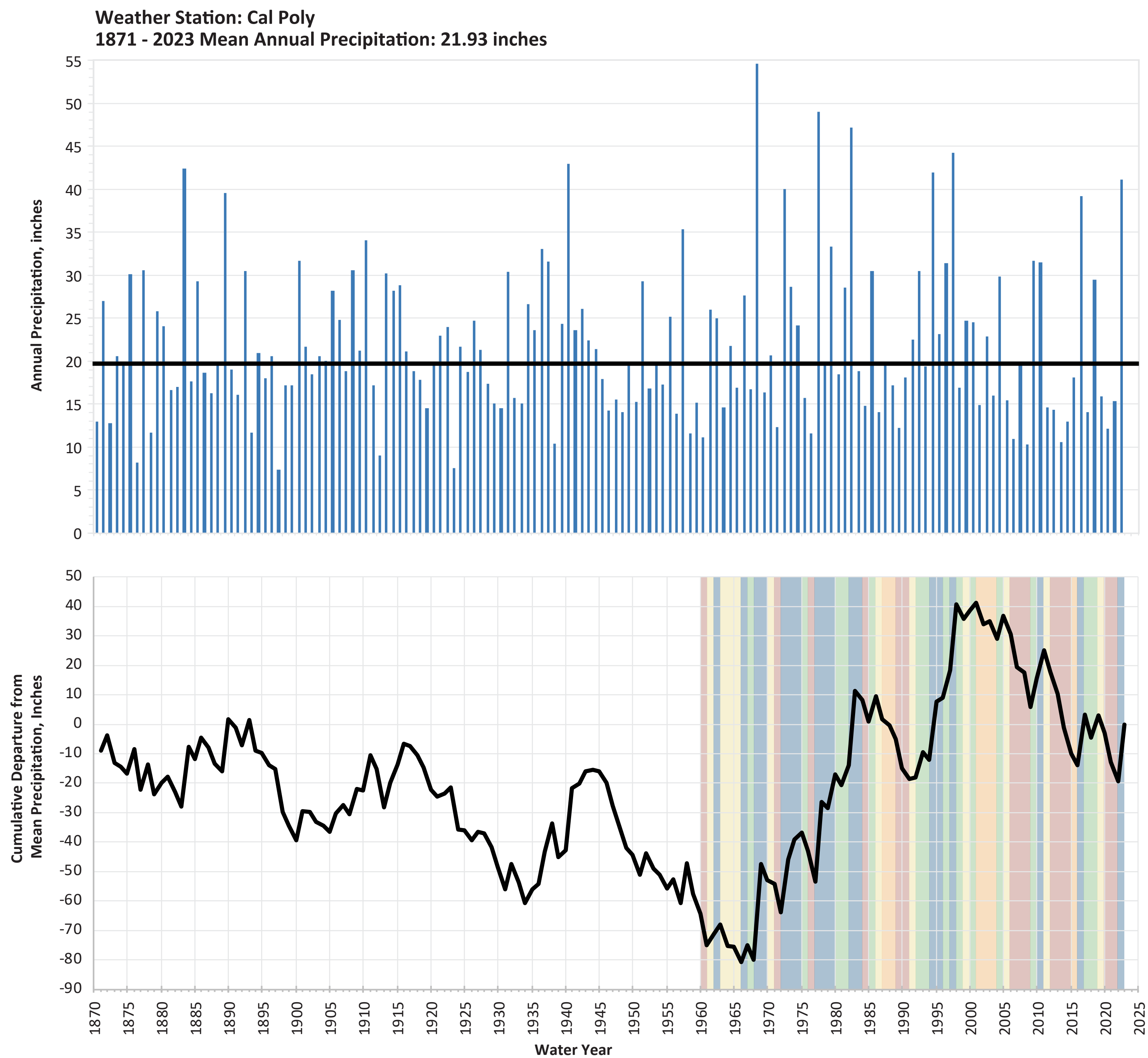

FIGURE 2

Cal Poly Annual Precipitation and Cumulative Departure from Mean Annual Precipitation

San Luis Obispo, California

LEGEND

Cumulative Departure

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

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Monitoring for the first two sustainability indicators (i.e., chronic lowering of water levels and reduction of groundwater in storage) is implemented using the same representative monitoring sites (RMS) identified in the GSP. The GSP identifies an existing network of 10 RMS wells for monitoring of water levels and storage change (WSC et al., 2021). Of these 10 wells, 6 are located in the Edna Valley subarea and 4 are located in the San Luis Valley subarea (Figure 3). These RMS have been monitored biannually, in April and October, for various periods of record. The RMSs are displayed as squares in Figure 3, and a summary of information for each of the wells is included in Appendix C.

The County Flood Control District has historically monitored 12 wells within the Basin, displayed as brown circles on Figure 3. The City has 9 wells (displayed as yellow circles on Figure 3) that were monitored prior to the year 2000, but monitoring stopped at that time, and has been re-started recently. The GSP team made a significant effort to reach out to private well owners in the Basin and identified additional wells to include in the Basin monitoring network. As of fall 2023, the current updated monitoring well network is comprised of 41 wells. These wells were used in the preparation of this WY 2023 Annual Report and will be included in future monitoring efforts during the GSP implementation period.

2.4.2 Monitoring Data Gaps

The GSP originally noted numerous data gaps in the basin monitoring network. Public outreach during the GSP development helped address many of these data gaps. However, ongoing efforts will continue during the implementation phase of the GSP to identify existing wells that can be added to the network, or to construct new wells for the network. These wells are displayed in Figure 3, and a summary of available well information is included in Appendix C.

2.5 Additional Monitoring

Evaluation of the water quality sustainability indicator is achieved through monitoring of an existing network of public water supply (PWS) wells in the Basin. Constituents of concern (COCs) identified in the GSP (WSC et al., 2021) that have the potential to impact suitability of water for public supply or agricultural use include total dissolved solids (TDS), nitrate, and arsenic.

COCs for drinking water are monitored at PWS wells. There are currently 45 PWS wells in the Basin. A subset of nine PWS wells constitute part of the monitoring network for water quality in the Basin. In addition, Agricultural Order 4.0 of the Irrigated Lands Regulatory Program was adopted by the Central Coast Regional Water Quality Control Board (RWQCB) in 2021. Selection of specific wells regulated under that program will be recommended when the program is fully implemented and monitoring data is available for review.

Subsidence was documented in the 1990s along the Los Osos Valley Road corridor. Land subsidence in the Basin is now monitored using interferometric synthetic-aperture radar (InSAR) data collected using microwave satellite imagery provided by DWR. Available data to date indicate no significant subsidence in the Basin that impacts infrastructure. The GSAs will annually assess subsidence using the InSAR data provided by DWR.

Three RMS wells were identified to monitor conditions associated with groundwater/surface water interaction. Additional monitoring network sites to assess the sustainability indicator of groundwater/surface water interconnection is a current data gap that will be addressed during GSP implementation.

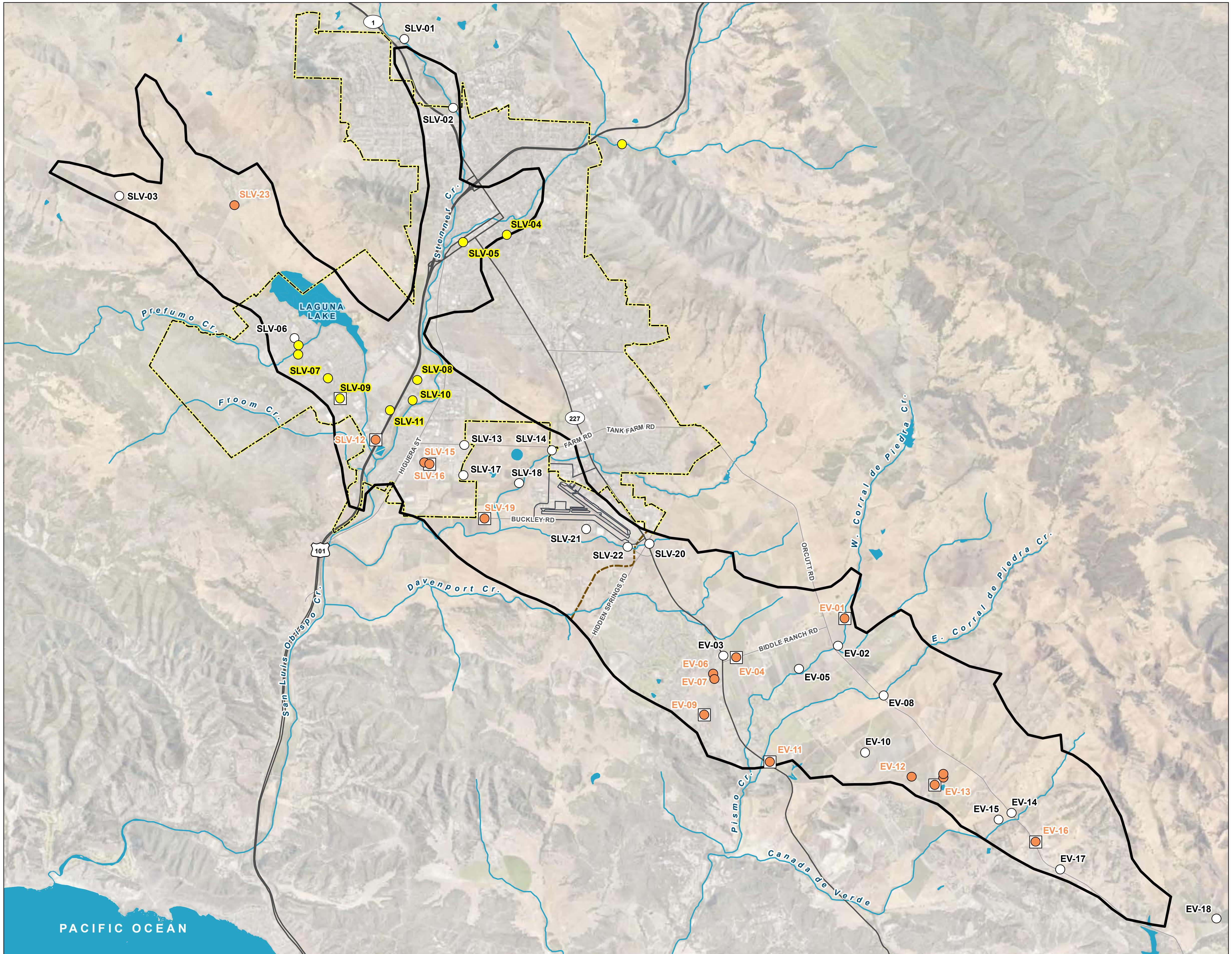

FIGURE 3

Groundwater Level Monitoring Network

San Luis Obispo, California

LEGEND

Monitoring Well

- GSP Approved
- City
- County
- Representative Monitoring Site (RMS) Well

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5
Miles

Date: February 14, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

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SECTION 3: Groundwater Elevations (§ 356.2[b][1])

3.1 Introduction

This section provides a detailed report on groundwater elevations in the Basin for WY 2023. Data presented in this section represent the most up-to-date seasonal conditions in the Basin. The data presented characterize conditions for the highest encountered water in the Basin Aquifer, regardless of screened interval. As discussed in Section 2.2, the aquifer in the Basin is characterized and developed as a single hydrogeologic unit.

Monitoring data are reviewed for quality and an appropriate time frame is chosen to provide the highest consistency in the wells used for each reporting period. Data quality is often difficult to ascertain when measurements are taken by other agencies or private well owners. Well construction information, including surveyed reference elevations, may be incomplete or unavailable at this time. This means that a careful review of the data is required prior to uploading to DWR's new Monitoring Network Module (replacing the current California State Groundwater Elevation Monitoring Program) to verify whether measurements are trending consistent with trends of previous years and with the current year's hydrology and volumes of groundwater extractions.

It was discovered in spring 2023 that the depth to water data reported in the San Luis Obispo Flood Control and Water Conservation District (SLOFCWCD) database were presented as a calculated depth-to-water from the ground surface elevation rather than as measured from the reference point elevation of each well, as was previously understood. This misunderstanding has resulted in prior reported water level elevations that are slightly off from their true value. This same misunderstanding also affected the setting of measurable objectives and minimum thresholds in the GSP. However, all water level elevations presented in this Annual Report have been corrected and represent true water level elevations (in feet relative to mean seal level), including both current WY (2023) and historical values. The minimum thresholds and measurable objectives for each RMS water level well will need to be corrected using this same approach. The resolution of this issue is essentially clerical. Because the differences in elevations between the reference points and ground surface elevations are relatively small (i.e., typically less than two feet), the corrections to the minimum thresholds and measurable objectives are not anticipated to change the results of the findings for the sustainable management criteria being met for each RMS well. A comprehensive survey of all the monitoring wells in the Basin is recommended in the future. A more detailed explanation is provided in a Technical Memorandum (GSI, 2024) attached as Appendix D.

3.1.1 Principal Aquifers

As discussed in Section 2, the three geologic formations in the Basin effectively function as a single basin aquifer. Recent Alluvium thickness ranges from a few feet to over 50 feet. The Paso Robles Formation Aquifer is up to 200 feet thick, and the Squire member of the Pismo Formation is observed to be up to 400 feet thick in some boring logs.

3.2 Seasonal High and Low (Spring and Fall) (§ 356.2[b][1][A])

The assessment of historical groundwater elevation conditions in the Basin as described in the GSP (WSC et al., 2021) is largely based on legacy data from the County of San Luis Obispo Flood Control and Water Conservation District (SLOFCWCD) groundwater monitoring program. Since the development of the GSP, groundwater levels data collection is administered through the San Luis Obispo County Groundwater Sustainability Director. Data is collected from a network of public and private wells in the Basin. The County has a legacy confidentiality agreement with these well owners that precludes the presentation of well locations or well data in public documents. Most well owners in the County network signed an updated confidentiality agreement that allows presentation of these data without revealing owner information. A few well owners did not sign this updated agreement. Data from these wells were used in the development of groundwater elevation contours, but not displayed in the figures in this report. Several wells that were monitored by the City prior to 2000 have only begun to be monitored again recently.

To represent conditions as extensively as possible, this WY 2023 Annual Report uses as many wells as have data collected during select seasons for each groundwater elevation map. This often leads to differing data sets for each water level map. In October 2022, 38 wells were used to generate groundwater elevation contours, with 38 wells in spring 2023 and 35 wells in fall 2023 with available data to generate water level maps. In future years, when the new monitoring network is consistently used from year to year, changes in water levels will be more robustly characterized. As implementation of the GSP progresses, it is anticipated that additional wells will be added to the groundwater monitoring program, expanding the data set.

In accordance with the SGMA regulations, the following information is presented based on available data:

- Groundwater elevation contour maps for fall 2022, spring 2023, and fall 2023.
- A map depicting the change in groundwater elevation for WY 2023.
- Hydrographs for RMS wells (Appendix D).

3.2.1 Basin Aquifer Groundwater Elevations and Contours

As discussed previously, sediments that comprise all three geologic formations in the Basin are interfingered, and no laterally extensive confining layer is observed between any of the formations. There is no significant hydraulic separation between productive sediments of the different formations. The basin aquifer is utilized as a single resource; many wells screen at least two of the formations throughout the Basin. Therefore, groundwater elevation data for the first encountered groundwater in the basin aquifer are contoured as a single hydrogeologic unit.

Groundwater elevation data collected from fall 2022 through fall 2023 for the Basin were contoured to assess spatial variations, yearly fluctuations, trends in groundwater conditions, groundwater flow directions, and horizontal groundwater gradients. Contour maps were prepared for the seasonal spring and fall groundwater levels, which are intended to represent approximations of seasonal high and low water levels at the beginning and end of the local irrigation seasons, respectively. In general, the spring groundwater data are collected in April and the fall groundwater data are collected in October.

Figures 4 through 6 present groundwater elevation contours for fall 2022 (Figure 4), spring 2023 (Figure 5), and fall 2023 (Figure 6). Groundwater elevation highs (spring 2023) range from approximately 313 to 331 feet amsl in the Edna Valley subarea where West Corral de Piedras Creek enters the Basin to less than 110 feet amsl near the area where San Luis Obispo Creek leaves the Basin in the San Luis Valley subarea. Groundwater flow directions remain consistent between the maps, although relative water levels change. In the San Luis Valley subarea regional flow directions generally follow topography, including southward flow roughly parallel to the course of San Luis Obispo Creek, southeastward along Los Osos Valley Road toward San Luis Obispo Creek, and west to southwest toward San Luis Obispo Creek in the vicinity of Tank Farm Road. In Edna Valley, regional flow is west to northwestward toward areas of lower groundwater elevations in San Luis Valley along the northern border of the Basin, and southward toward apparent pumping centers along the southern edge of the Valley.

Figure 4 presents groundwater elevation contours for fall 2022 (note: this map was presented as Figure 6 in the WY 2022 Annual Report [GSI and CHG, 2023]). Figure 6 illustrates groundwater elevation contours for fall 2023. Groundwater elevations were approximately 276 to 289 feet amsl in the Edna Valley subarea where East and West Corral de Piedras Creeks enter the Basin, and the groundwater flow directions in this vicinity remained unchanged from the fall 2021 conditions. Most wells in the Edna Valley subarea were about 5 to 15 feet lower than the spring 2022 levels, which is consistent with previously observed seasonal fluctuations. Seasonal groundwater elevation fluctuations in the San Luis Valley are not as pronounced as in the Edna Valley, with most wells exhibiting approximately 5 to 10 feet of seasonal fluctuation. Groundwater flow direction patterns in the San Luis Valley part of the Basin remain unchanged. The lowest groundwater elevations are observed where San Luis Obispo Creek leaves the Basin, with one observed elevation of 99 feet amsl.

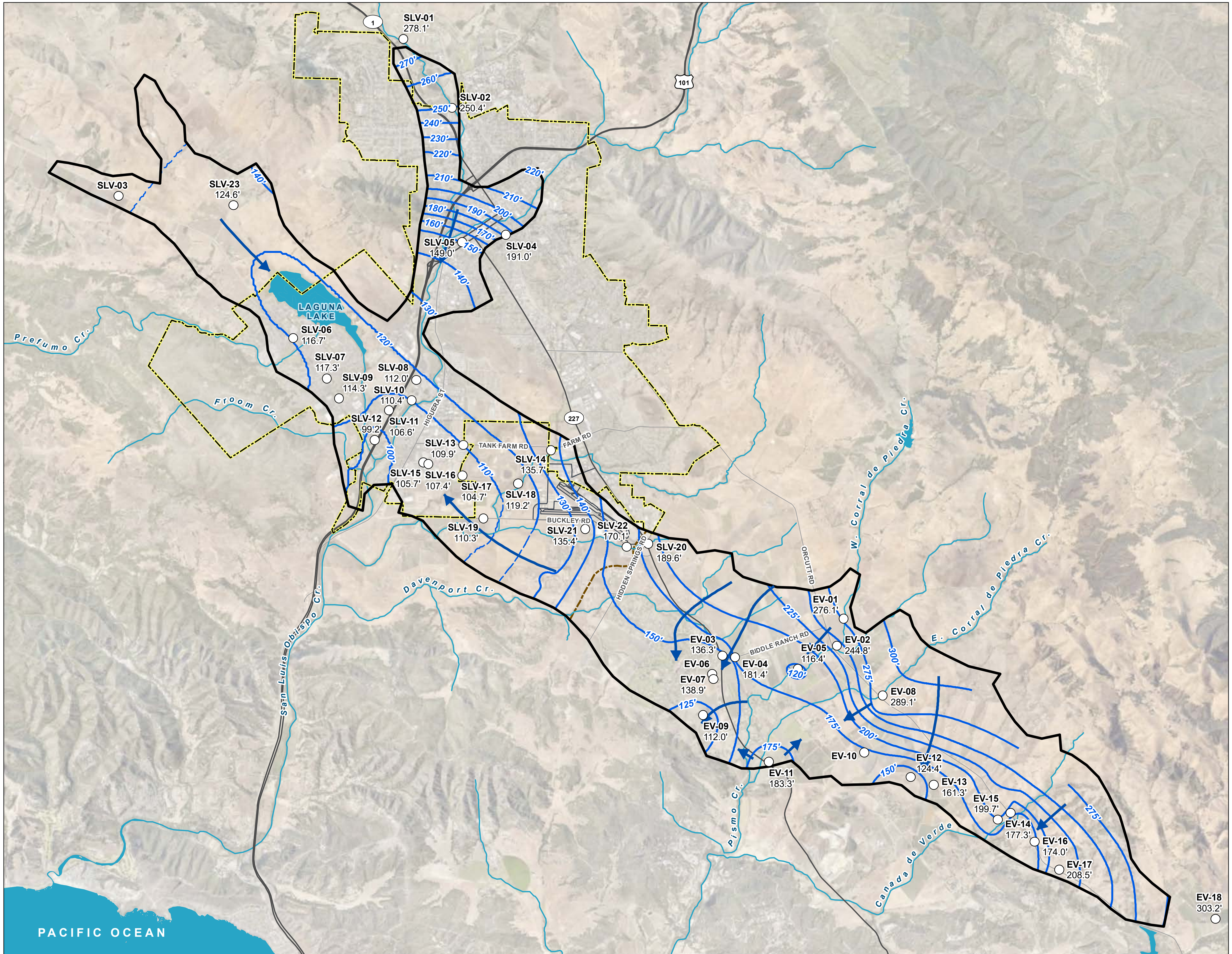

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FIGURE 4

October 2022 Groundwater Contours

San Luis Obispo, California

LEGEND

- Well
- Groundwater Contour, Fall 2022 (dashed where inferred)
- Groundwater Flow Direction

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5 Miles

Date: March 5, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

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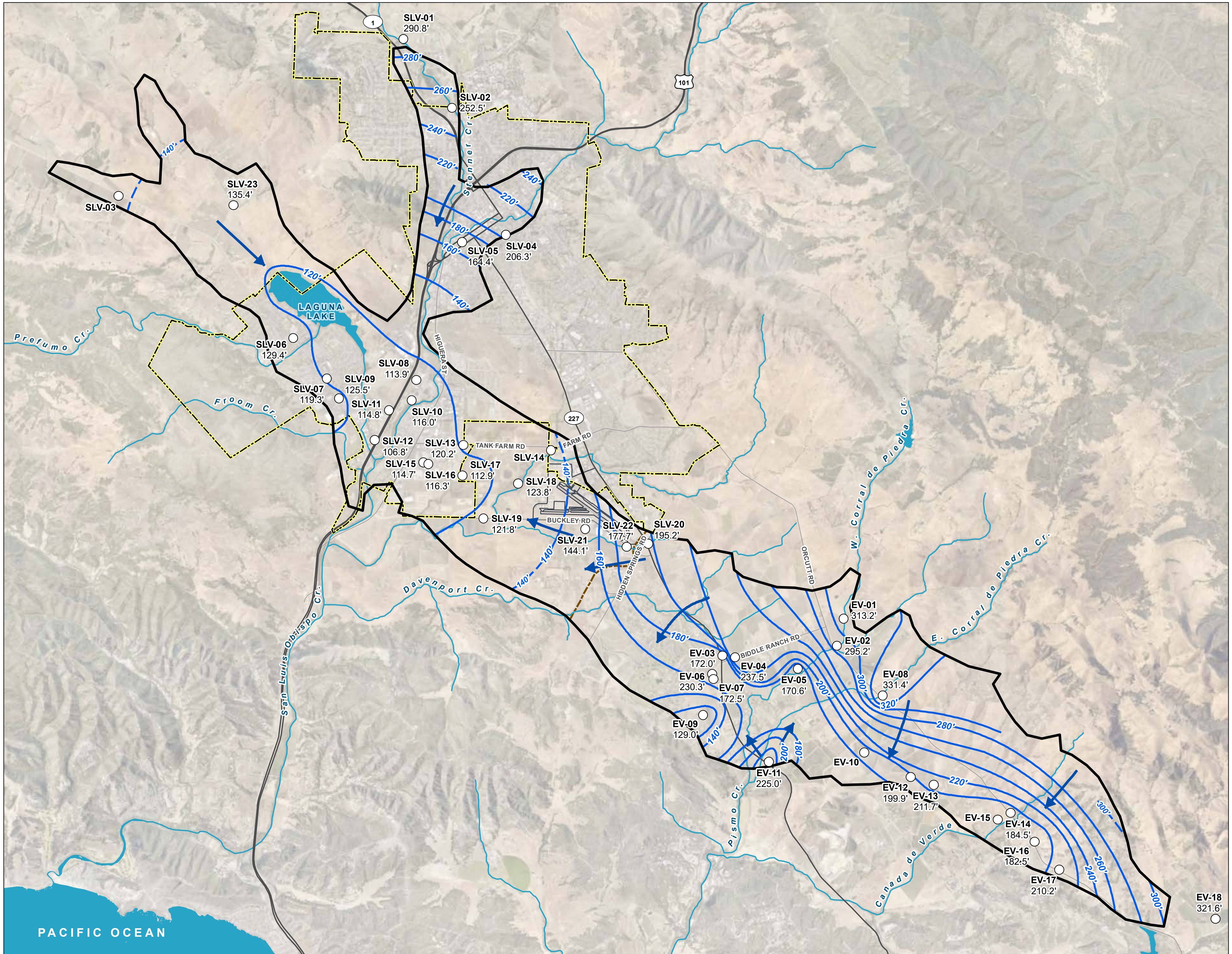
FIGURE 5

April 2023 Groundwater Contours

San Luis Obispo, California



LEGEND

- Well
- Groundwater Contour, Spring 2023 (dashed where inferred)
- Groundwater Flow Direction

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5
Miles

Date: March 5, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

GSI Water Solutions, Inc.

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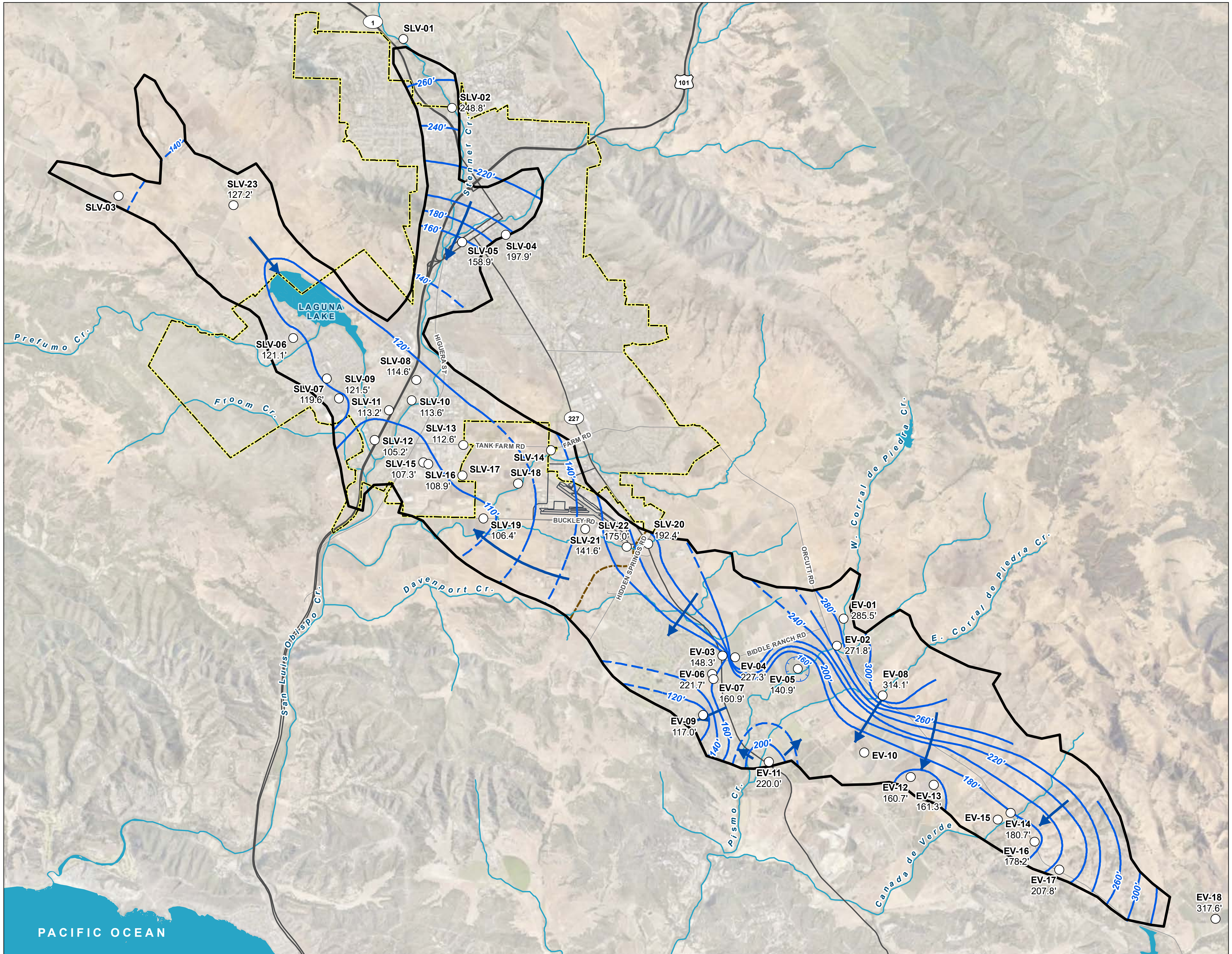
Figure 5 presents groundwater elevation contours for spring 2023, after significant precipitation events in January and February 2023. Groundwater elevations are approximately 331 feet to 313 feet amsl in Edna Valley in the vicinity of EV-08 and EV-01, respectively, where East and West Corral de Piedras Creeks enter the Basin, and the groundwater flow direction in this vicinity is both west/southwest toward San Luis Valley and southward toward pumping centers and the location where Corral de Piedras Creeks exit the Basin. Two predominant flow directions are apparent in the Edna Valley subarea: the northern area gradient is towards the southwest, and the southern area gradient is northward, with an overall regional flow from the Edna Valley west towards the San Luis Valley portion of the Basin. The lowest groundwater elevations in the Basin are observed where San Luis Obispo Creek leaves the Basin, with observed elevations as low as 107 feet amsl.

Figure 6 presents groundwater elevation contours for fall 2023. Groundwater elevations are approximately 286 to 314 feet amsl in the Edna Valley near EV-01 and EV-08, respectively, where East and West Corral de Piedras Creeks enter the Basin, and the groundwater flow directions in this vicinity are largely unchanged from the spring conditions. Fall 2023 water levels for most wells in the Edna Valley are about 10 to 30 feet lower than their spring 2023 levels, which is slightly more fluctuation than previously observed seasonal fluctuations, likely due to above-average precipitation and reduced groundwater extraction in WY 2023. Seasonal groundwater elevation fluctuations in the San Luis Valley are not as pronounced as in the Edna Valley. Groundwater flow direction patterns in the San Luis Valley part of the Basin are unchanged. The lowest groundwater elevations are observed where San Luis Obispo Creek leaves the Basin, with one observed elevation (SLV-12) of 105 feet amsl.

FIGURE 6

October 2023 Groundwater Contours

San Luis Obispo, California



LEGEND

- Well
- Groundwater Contour, Fall 2023 (dashed where inferred)
- Groundwater Flow Direction

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5
Miles

Date: March 5, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

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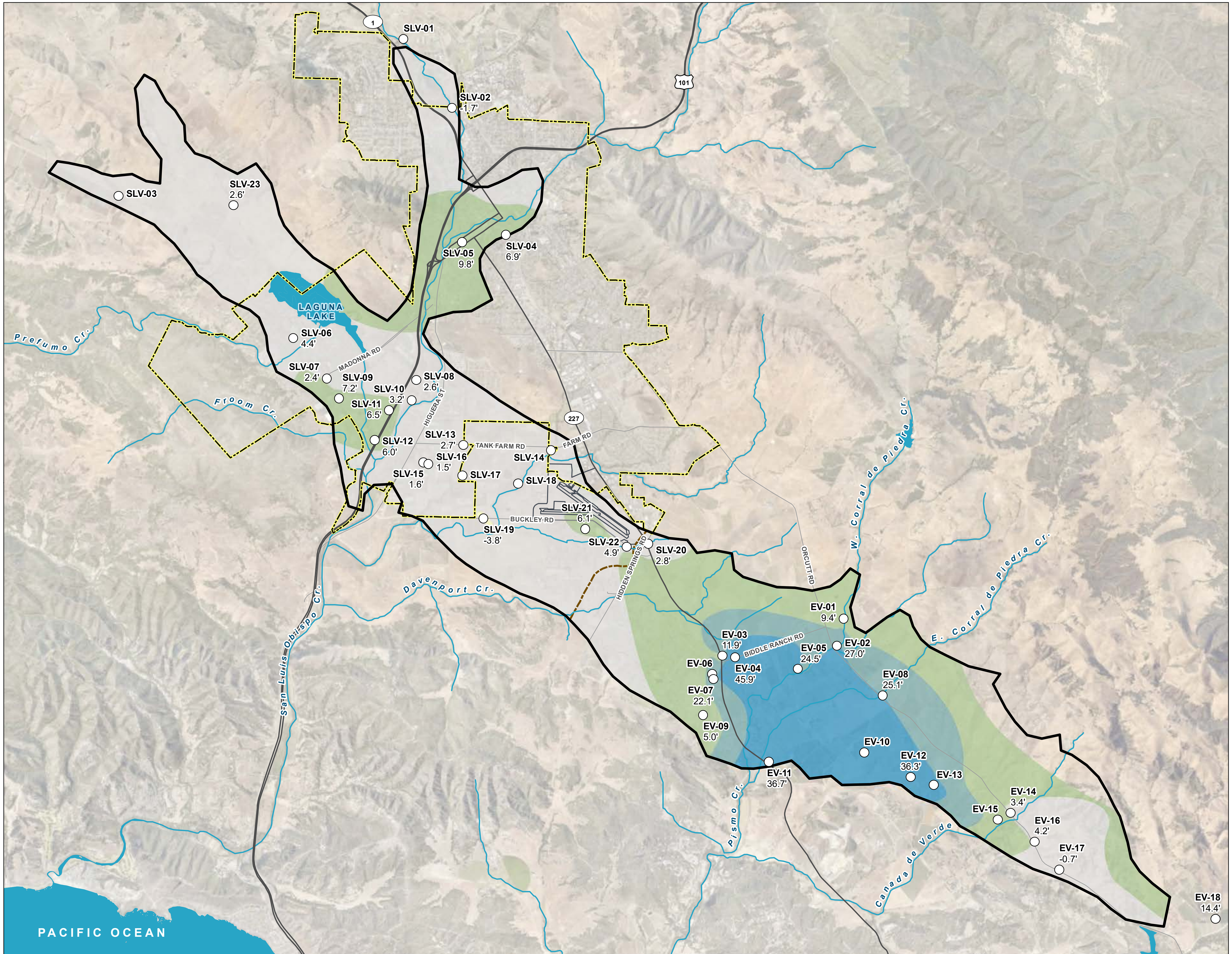
FIGURE 7

Annual Change in Groundwater Elevation, October 2022/2023

San Luis Obispo, California



LEGEND

- Well

Change in Groundwater Elevation (feet NAVD88)

- >25
- >15 to 25
- >5 to 15
- >0 to 5
- -5 to 0
- -15 to -5
- -25 to -15
- -28 to -25

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5
Miles

Date: March 5, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

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3.3 Hydrographs (§ 356.2[b][1][B])

Groundwater elevation hydrographs are used to evaluate changes in groundwater elevations over time. Changes in groundwater elevation at a given point in the Basin can result from many factors, with all or some occurring at any given time. Some of these factors include changing hydrologic trends, seasonal variations in precipitation, varying basin extractions, changing inflows and outflows along boundaries, availability of recharge from surface water sources, and influence from localized pumping conditions. Climatic variation can be one of the most significant factors affecting groundwater elevations over time. For this reason, the hydrographs also display periods of climatic variation with designation of historical water year types as defined by DWR.

Groundwater elevation hydrographs and associated location maps for the 10 RMS wells in the basin monitoring network are presented in Appendix D. These hydrographs also include graphical display of well construction details (if known), ground surface elevation, measurable objectives, minimum thresholds, and interim milestones for each well that were developed during the preparation of the GSP. Many of the hydrographs illustrate a condition of declining water levels since the late 1990s, although some indicate relative water level stability over the same period. Most wells display water levels that decline with the lower-than-average precipitation measured over the previous three water years (2020, 2021, and 2022). WY 2023 was an above-average wet year, and groundwater elevations either rebounded or stabilized in all of the RMS wells.

As described in the GSP (WSC et al., 2021), various criteria were used to define the measurable objectives and minimum thresholds for the RMS wells in different areas of the Basin. Specific to RMS Wells EV-13, EV-04, and EV-09 in the Edna Valley subarea, these three minimum thresholds were approved by the GSA to be established at an elevation of 10 feet lower than their deepest water levels measured during recent drought measurements. Going forward from 2021, the average of the spring and fall measurements in two consecutive water years will be the benchmark against which trends will be assessed.

Of the 10 RMS hydrographs presented in Appendix E, one RMS well (EV-13) exhibited recent groundwater elevations at or below the minimum threshold of 172 feet amsl that was published in the GSP (WSC et al., 2021). However, , a review of the recent water level data and the GSP text describing the methodology used for defining the MTs has revealed an apparent clerical error in the MT values tabulated in the GSP for two RMS wells (EV-13 and EV-09). The methodology for establishing MTs for EV-09 and EV-13, as documented in the GSP and corroborated by GSA and GSC members who participated in the public meetings, is as follows. To protect capital-backed agricultural investments in the Edna Valley, it was proposed and accepted that for three Edna Valley RMS wells (EV-04, EV-09, and EV-13), the MTs should be defined at an elevation ten feet lower than the lowest groundwater elevation observed at those wells during the recent drought. A well impact analysis was performed during GSP development that indicated that such an MT would not have a significant negative impact on domestic wells in the vicinity. Under this methodology, the MTs for EV-09 and EV-13 are 84 And 159 feet amsl; in the GSP the MTs for EV-09 and EV-13 are apparently incorrectly published as 82 and 172 feet amsl, respectively. (The published MT for EV-04 is correct). The methodology for defining the MTs as such was accepted by DWR . Under the corrected MT values, there were no water levels below the associated MTs for any Edna Valley RMS wells. Table 1 displays the originally published and corrected sustainable management criteria.

Table 1. Summary of MTs, MOs, and IMs for the San Luis Obispo Valley Groundwater Basin RMSs

RMS	Original MT Proposed Revised MT[1]	MO	2027 IM	2032 IM	2037 IM
San Luis Valley					
SLV-09	102	110	110	110	110
SLV-16	70	100	100	100	100
SLV-19	80	110	110	110	110
SLV-12	96	105	105	105	105
Edna Valley					
EV-09	~~82~~ 84	164	150	155	160
EV-04	160	247	219	229	239
EV-13	~~172~~ 159	248	223	231	238
EV-16	150	190	175	180	185
EV-01	263	314	314	314	314
EV-11	177	227	227	227	227

Notes

[1] Original measurable threshold (MT) is from the GSP. The corrected MT, if applicable, is displayed in red font.

All values are presented as feet NAVD 88.

IM = interim milestone

MO = measurable objective

MT = minimum threshold

NAVD 88 = North American Vertical Datum of 1988

RMS = representative monitoring site

Although the groundwater elevations in some of the RMS wells continue to trend downward, some of the RMS wells exhibit stable groundwater elevations, despite three consecutive years of below average rainfall between WYs 2020 and 2022, with stabilization or water level recovery in some RMS wells from the wet WY 2023. Future annual reports will document transient groundwater elevations with time at each of the RMS wells, and progress toward sustainability will be evaluated based on these criteria.

SECTION 4: Groundwater Extractions (§ 356.2[b][2])

4.1 Introduction

This section presents the metered and estimated groundwater extractions from the Basin for WY 2023. The types of groundwater extraction described in this section include municipal, agricultural (Tables 2 and 3), rural domestic (Table 4), and small public water systems (Table 5). Each following subsection includes a description of the method of measurement and a qualitative level of accuracy for each estimate. The level of accuracy is rated on a qualitative scale of low, medium, and high. The annual groundwater extraction volumes for all water use sectors are shown in Table 6.

4.2 Municipal Metered Well Production Data

Municipal groundwater extractions are mandated by regulation to be metered data. The City of San Luis Obispo currently uses no groundwater as part of their water supply. The City used groundwater during the 1980s, 1990s, and early 2000s, and still owns several wells that could be activated in the future. The City retains the right to re-start production of groundwater as part of their water supply portfolio as part of carefully planned operations of their water resources planning activities.

4.3 Estimate of Agricultural Extraction

During the GSP development and for the first annual water year report, agricultural pumping was estimated using the soil water budget method. An additional method of estimating agricultural pumping via direct satellite measurement of evapotranspiration was employed for WY 2022, and the results of both methods were compared. Both methods were again employed in this analysis for WY 2023. However, this Annual Report will be the last year in which both methods are used to estimate agricultural extraction, at which time the GSAs will decide on which method to use moving forward for future annual reporting.

4.3.1 Soil Water Budget Method

Agricultural water use constituted 80-percent of the total anthropogenic groundwater use in the Basin in WY 2023. To estimate agricultural water demand, land use data along with climate and soil data were analyzed and processed using the soil-water balance model that was developed for the GSP water budget (GSP Section 6). Annual land use spatial data sets from Land IQ were used to determine the appropriate crop categories, distribution, and acreages, which were then reviewed using aerial imagery and field reconnaissance. Land use types were grouped within five crop categories, including citrus, deciduous, pasture, vegetable, and vineyard, each with a respective set of crop water demand coefficients and water system efficiencies, as described in the GSP water budget. A summary of acreage by crop group is presented in Table 2. Between WYs 2020 and 2023, the total irrigated acreage of crops in the Edna Valley subarea increased by 195 acres, while the total irrigated crop acreage in the San Luis Valley subarea decreased by 159 acres, with a total net increase of 36 acres of irrigated crop acreage across the Basin. Water demand for newer citrus acreage (since 2020) is expected to increase by 20 percent per year until 2025, until reaching the citrus applied irrigation values for mature trees (UC Davis Cooperative Extension, 2020).

Figure 8 shows the distribution of agricultural acreage irrigated by wells extracting water from the Basin for WY 2023. Agricultural fields are shown on parcels overlying the basin, or on which the water extracted for irrigation is interpreted to come from wells in the Basin.

Climate data inputs include precipitation and evapotranspiration (ETo) data from the Cal Poly Weather Station (CIMIS Station 52). Crop coefficients were developed using the DWR Consumptive Use Program Plus

(CUP+) (DWR, 2015), which uses climate data and soil moisture parameters to develop estimated applied water demand for each crop type.

The soil-water balance model was utilized to estimate agricultural water demands through WY 2022 during completion of the GSP and prior Annual Reports. Agricultural water demand for this WY 2023 Annual Report was estimated using the soil-water balance model, and also by the OpenET method as will be discussed below. The resulting estimated groundwater extractions for agricultural demands are summarized in Table 2. The accuracy level rating of these estimated volumes is low-medium.

Table 2. Irrigated Acreage by Crop Type

Crop Group	Irrigated Acreage by Water Year				Net Change
	2020	2021	2022	2023	2020–2023
San Luis Valley					
Citrus	44	44	42	50	6
Deciduous	7	7	3	3	-4
Pasture	28	28	26	27	-1
Vegetable	370	268	214	207	-163
Vineyard	81	81	86	84	3
San Luis Valley Totals	**530**	**430**	**370**	**370**	**-159**
Edna Valley					
Citrus	649	652	688	724	75
Deciduous	3	3	4	2	-1
Pasture	13	13	18	22	9
Vegetable	530	614	608	646	116
Vineyard	1,894	1,820	1,757	1,890	-4
Edna Valley Totals	**3,090**	**3,100**	**3,075**	**3,285**	**195**
Basin					
Citrus	693	696	730	774	81
Deciduous	9	9	7	5	-4
Pasture	40	40	44	49	9
Vegetable	900	882	822	853	-47
Vineyard	1,974	1,900	1,843	1,974	0
Basin Totals	**3,620**	**3,530**	**3,446**	**3,655**	**36**

Table 3. Estimated Agricultural Irrigation Groundwater Extractions

Water Year	San Luis Valley (AF)		Edna Valley (AF)		Agricultural Total (AF)	
	Soil Water Budget	Open ET	Soil Water Budget	Open ET	Soil Water Budget	Open ET
2017	1,550	-	3,640	-	5,190	-
2018	1,190	-	3,550	-	4,740	-
2019	1,030	-	3,350	-	4,380	-
2020	1,200	-	3,760	-	4,960	-
2021	960	-	4,070	-	5,030	-
2022	830	920	4,240	4,903	5,070	5,825
2023	650	531	3,880	3,898	4,530	4,429

Notes

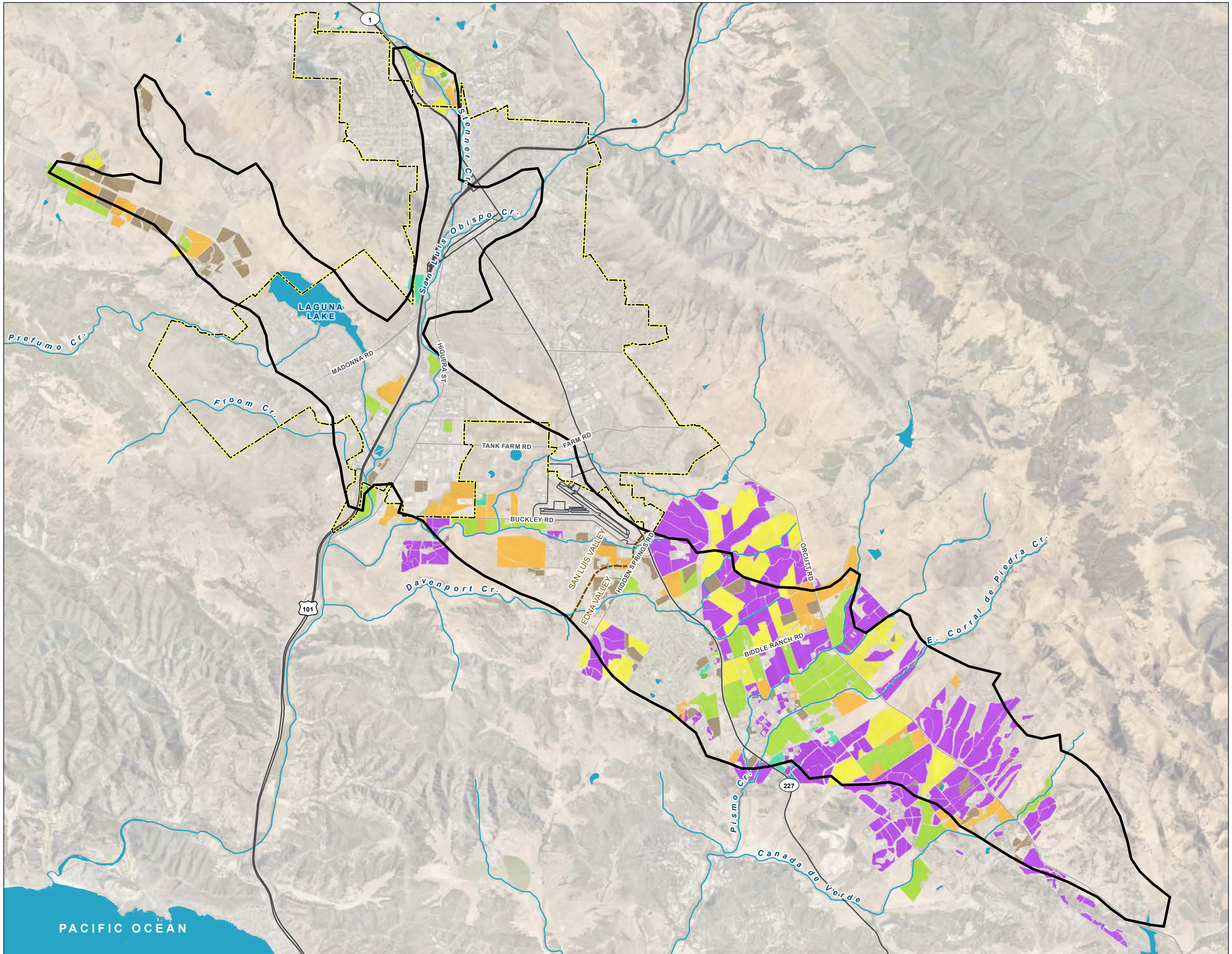
AF = acre-feet

ET = evapotranspiration

FIGURE 8

Irrigated Agriculture 2023

San Luis Obispo, California



LEGEND

2023 Irrigated Agriculture by Crop Type

- Citrus
- Deciduous
- Fallow
- Grain and Hay
- Pasture
- Vegetable
- Vineyard

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5

Miles

Date: March 5, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

GSI Water Solutions, Inc.

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4.3.2 Satellite-Based OpenET Method

To estimate agricultural groundwater extraction, WY 2023 specific land use data from Land IQ was used in conjunction with the OpenET ensemble model.[2] OpenET provides satellite-based estimates of the total amount of water that is transferred from the land surface to the atmosphere through the process of evapotranspiration (ET). The OpenET ensemble model uses Landsat satellite data to produce ET data at a spatial resolution of 30 meters by 30 meters (0.22 acres per pixel). Additional inputs include gridded weather variables such as solar radiation, air temperature, humidity, wind speed, and precipitation (OpenET, 2023). OpenET provides estimates of ET for the entire land surface, or in other words, “wall to wall.” To produce an estimate of ET specific to the irrigated crop acreage in the Subbasin the OpenET ensemble model results are screened by the Land IQ land use data set, thereby removing the estimated ET volumes associated with bare ground, non-irrigated crops or native vegetation. A total of 16 crop types were identified in the WY 2023 Land IQ spatial dataset. These 16 crop types have been grouped into seven basic crop groups: citrus, deciduous, fallow, grain and hay, pasture, vegetable, and vineyard, which are displayed on Figure 8. A summary of acreage by crop group is presented in Table 2. Irrigated agricultural crop types were identified by inspection of monthly ET for each mapped crop type versus monthly ET for fallowed ground. Essentially, crop types were considered irrigated if monthly ET remained high throughout the latter part of the growing season as opposed to the diminishing monthly ET following the rainy season on fallowed ground. ET associated with precipitation events were removed from the analysis by subtracting the volume of rain received (irrigated acreage times decimal feet of spatially variable precipitation received based on gridMET[3]) on a monthly time-step. In addition, vineyard and citrus crop areas were evaluated only for their crop-specific irrigation seasons (April through October and March through November, respectively). Applied irrigation volumes are estimated by scaling up the estimated irrigated crop ET volumes using assumed crop specific irrigation efficiency factors.[4] The resulting volumes are summed by water year, which then represent estimated annual agricultural groundwater extraction. Deficit irrigation is captured in the satellite-based method through the measurement of actual ET. Groundwater extractions for frost protection are captured to the extent that the produced water results in increased ET. It is assumed that the remainder of the water produced for frost protection remains within the Subbasin and percolates back to groundwater. The results of this method are summarized in Table 3.

4.3.3 Results and Discussion

As shown in Table 3, the estimates of groundwater extraction for agricultural irrigation in WY 2023 from the soil-water balance model are 4,530 AF (650 AF in San Luis Valley and 3,880 AF in Edna Valley). The agricultural pumping estimates from the satellite-based method are 4,429 AF (531 AF in San Luis Valley, 3,898 AF in Edna Valley). The similarity in results between the methods demonstrates the utility of the satellite-based method. The satellite-based method is considered more accurate as it directly measures actual ET as it varies spatially and temporally throughout the Basin and throughout the year, thereby

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[2] OpenET uses reference ET data calculated using the American Society of Civil Engineers (ASCE) Standardized Penman-Monteith equation for a grass reference surface, and usually notated as ‘ETo’. For California, OpenET uses Spatial CIMIS meteorological datasets generated by the California DWR to compute ASCE grass reference ET. OpenET provides ET data from multiple satellite-driven models, and also calculates a single “ensemble value” from those models. The models currently included are ALEXI/DisALEXI, eeMETRIC, geeSEBAL, PT-JPL, SIMS, and SSEBop. More information about these models can be found at: https://openetdata.org/methodologies/. All of the models included in the OpenET ensemble have been used by government agencies with responsibility for water use reporting and management in the western U.S., and some models are widely used internationally (OpenET, 2023).

[3] gridMET is a public domain dataset of daily high-spatial resolution (~4-km, 1/24th degree) surface meteorological data covering the contiguous United States from 1979-yesterday (https://www.climatologylab.org/gridmet.html). The methodology behind gridMET is described in Abatzoglou (2013).

[4] Irrigation efficiencies were assigned based on Carollo et al. (2012). Vineyard, the dominant crop in the Subbasin was assigned an irrigation efficiency of 80-percent.

capturing nuances in crop irrigation practices, such as deficit irrigation. The soil-water balance method uses a more rigid approach to capturing ET variability in the basin that may not fully capture the actual climatic variability or nuanced crop irrigation practices that may occur each year.

The soil-water balance model was utilized to estimate agricultural water demands through WY 2019 during completion of the GSP (WSC et al., 2021) and for WYs 2020 and 2021 in the first Annual Report (GSI and CHG, 2022). Agricultural water demands for WYs 2022 and 2023 Annual Reports were estimated using both the soil-water balance model and the satellite-based method. The resulting estimated groundwater extractions for agricultural demands are summarized in Table 3. For the present time, results from the soil-water balance method are carried forward into the total water use calculations (Section 6). The accuracy level rating of this satellite-based method estimated volume is medium-high.

Water extractions for agriculture in the Edna Valley area decreased between WY 2022 and WY 2023 due primarily to a combination of increased precipitation (as rainfall) and decreased evapotranspiration rates. Rainfall at the CIMIS Cal Poly weather station was almost 26 inches greater in WY 2023 compared to WY 2022, leading to lower seasonal evapotranspiration rates. Agricultural water extractions in the San Luis Valley subarea decreased in WY 2023, compared to WY 2022, due primarily to a reduction of evapotranspirative water demand.

4.4 Rural Domestic and Small Public Water System Extraction

Rural domestic and small PWS groundwater extractions in the Basin were estimated using the methods described below.

4.4.1 Rural Domestic Demand

As documented in the GSP water budget (GSP Section 6), rural residential groundwater use through 2019 was estimated based on the number of residences identified on aerial images outside of water company service areas. Each rural residence was assigned a water use of 0.8 AFY, consistent with the San Luis Obispo County Master Water Plan (Carollo et al., 2012). As a comparison, a City study reported residential use for large parcels (>0.26 acres) at 0.6 AFY (City of San Luis Obispo, 2000), which was similar to the average estimated use per service connection in the Golden State Water Company service area over the historical base period. Water use per service connection at Varian Ranch Mutual Water Company and Edna Ranch Mutual Water Company (East) had ranged from 0.6 to 1.5 AFY, averaging approximately 1 acre-foot per year.

For this WY 2023 Annual Report, the same methodology was applied, using an aerial image from 2023 to update the estimated number of rural residences. The resulting groundwater extractions for rural domestic demands in WY 2023 is summarized in Table 4. There was no estimated increase in WY 2023 from WY 2022 for rural domestic totals shown in Table 4, based on a comparison between the 2022 and 2023 areal imagery. The accuracy level rating of these estimated volumes is low-medium.

Table 4. Estimated Rural Domestic Groundwater Extractions

Water Year	San Luis Valley (AF)	Edna Valley (AF)	Rural Domestic Total (AF)
2017	160	120	280
2018	160	130	290
2019	160	130	290
2020	170	130	300
2021	170	140	310
2022	170	140	310
2023	170	140	310

Notes

The totals are rounded to the closest 10 AF.

AF = acre-feet

4.4.2 Small Public Water System Extractions

The category of small PWSs in the Basin includes a wide variety of establishments and facilities that operate mutual water companies and other types of public water systems under the purview of the County Environmental Health. Groundwater extractions for golf courses and playfields (turf) are classified as urban extractions and have been included with the small PWS extractions estimates.

During GSP preparation in 2019, there were 45 small PWSs, using groundwater from wells. Three of these small PWSs, Golden State Water Company, Varian Ranch Mutual Water Company, and Edna Ranch Mutual Water Company (East), provided metered production records. The remaining 42 small PWSs, mostly in the San Luis Valley subarea, were assigned water use categories (such as commercial-service, mixed-use office, manufacturing, etc.) and corresponding water use factors, such as floor space square footage, to estimate water demand.

For the WY 2023 Annual Report, small PWS extractions were updated with the latest available information for WY 2023. The same three small PWSs that previously report production have provided records for WY 2023. The database for the remaining water systems was reviewed, with no changes made for systems where service is now provided by the City. Urban turf irrigation was estimated based on turf acreage, applied water demand, and irrigation system efficiency using the same soil-water budget methodology described for the agricultural extractions.

The total amount of water extracted by small PWSs from the Basin, including turf irrigation extractions, is estimated at 840 AFY in WY 2023, with the majority of use (620 AFY) in the Edna Valley subarea. Water use in the Edna Valley subarea decreased due to a decrease in the estimated evapotranspiration rate of golf course turfgrass in WY 2023, compared to WY 2022.

Estimated groundwater extractions for small PWS demands are summarized in Table 5. The accuracy level rating of these estimated volumes is medium-high.

Table 5. Estimated Small Public Water System Groundwater Extractions

Water Year	San Luis Valley (AF)	Edna Valley (AF)	Small PWS Total (AF)
2017	270	720	990
2018	260	750	1,010
2019	260	650	910
2020	260	690	950
2021	240	700	940
2022	220	760	980
2023	220	620	840

Notes

These amounts include urban extractions for golf and playfields (turf).

The totals are rounded to the closest 10 AF.

AF = acre-feet

4.5 Total Groundwater Extraction Summary

Total groundwater extractions in the Basin for WY 2023 are estimated to be 7,680 AF. Table 6 summarizes the total water use by sector and indicates the method of measure and associated level of accuracy. Approximate points of extraction were spatially distributed and colored according to a grid system to represent the relative pumping across the basin in terms of AF per acre (Figure 9).

Table 6. Total Groundwater Extractions

Water Year	Municipal (AF)	PWS and Rural Domestic (AF)		Agriculture (AF)		Total (AF)
		San Luis Valley (AF)	Edna Valley (AF)	San Luis Valley (AF)	Edna Valley (AF)	
2020	0	430	820	1,200	3,760	6,210
2021	0	410	840	960	4,070	6,280
2022	0	390	900	830	4,240	6,360
2023	0	390	760	650	3,880	5,680
Method of Measure	—	PWS Metered Rural Domestic Estimated		Soil-Water Balance Model		—
Level of Accuracy	—	Medium		Medium		—

Notes

— = not applicable

AF = acre-feet

PWS = public water systems

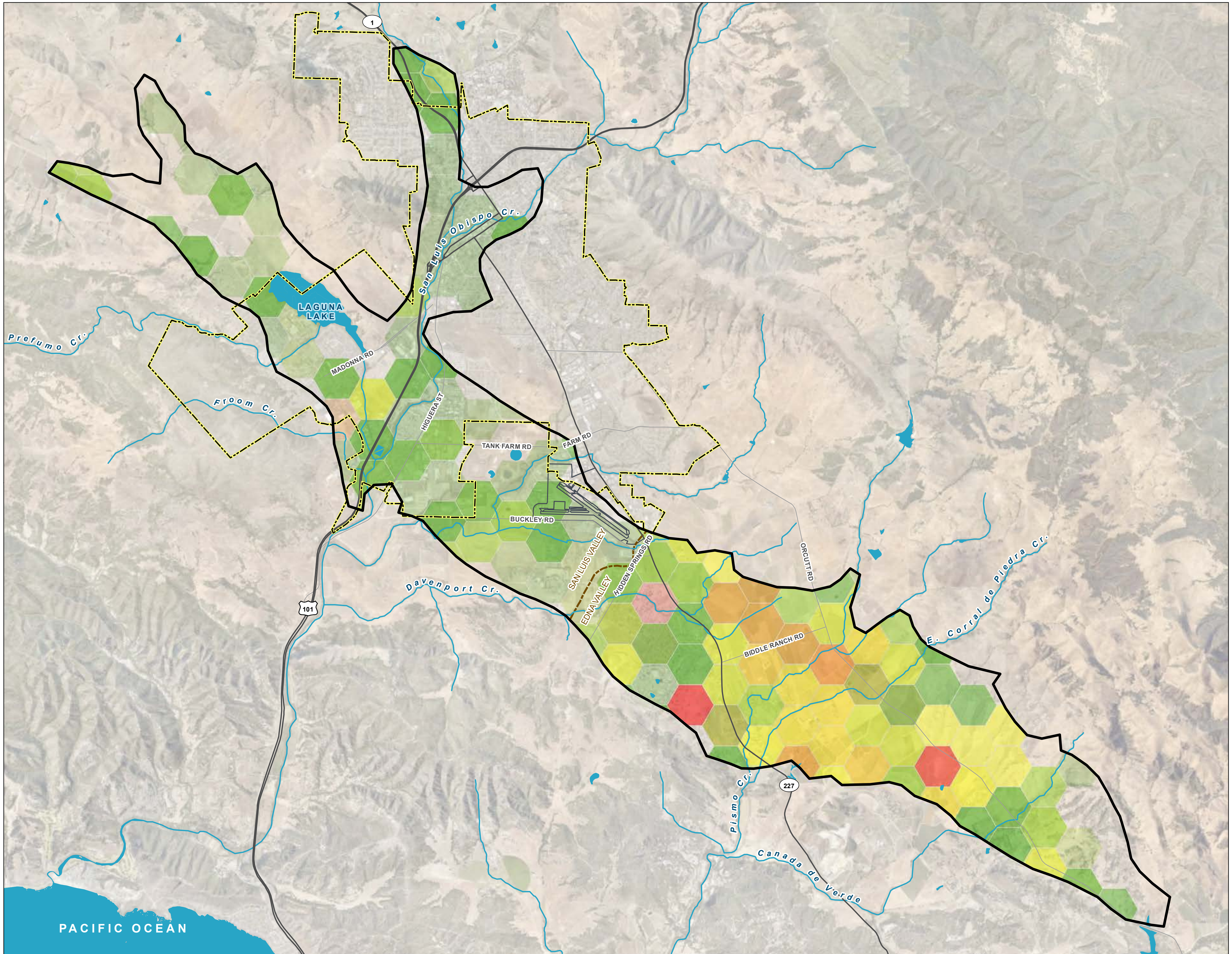

FIGURE 9

Pumping Distribution

San Luis Obispo, California

LEGEND

Summed Q AFY

- >0 - 25
- >25 - 50
- >50 - 100
- >100 - 200
- >200

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5

Miles

Date: March 5, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020

GSI Water Solutions, Inc.

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SECTION 5: **Surface Water Use (§ 356.2[b][3])**

5.1 Introduction

This section addresses the reporting requirement of providing surface water supplies used, or available for use, and describes the annual volume and sources for WY 2023. The method of measurement and level of accuracy is rated on a qualitative scale. The Basin currently benefits from surface water entitlements from the Nacimiento Water Project, Salinas Reservoir (also known as Santa Margarita Lake), and Whale Rock Reservoir to provide municipal supply for the City of San Luis Obispo. Cal Poly receives surface water from Whale Rock and is in the Basin but outside of the City.

Table 7 provides a breakdown of reported surface water municipal use in the Basin, which is used exclusively by the City of San Luis Obispo. There is currently no surface water available for agricultural or recharge project use within the Basin.

5.2 Total Surface Water Use

A summary of total actual surface water use by source is provided in Table 7. The accuracy level rating of these metered data is high.

Environmental uses of surface water are also recognized. Previous studies have estimated that environmental flows required to support ecological functions for steelhead in County streams during spring conditions range from 0.5 cfs to 4 cfs, and during summer conditions range from 0.25 cfs to 1 cfs (Stillwater Sciences, 2014). Environmental flows to maintain steelhead in East and West Corral de Piedras Creeks specifically were estimated at over 2.5 cfs during spring, over 0.5 cfs during summer, and 1.5 cfs the rest of the year (Stillwater Sciences, 2016). Currently, stream gaging in the Basin does not exist to measure flows at these levels. Expanded surface water monitoring was proposed in the GSP to address this data gap.

Table 7. Annual Surface Water Use

Water Year	Nacimiento Water Project (AF)	Whale Rock Reservoir (AF)	Salinas Reservoir (AF)	Total Surface Water Use (AF)
2020	1,562	1,459	2,154	5,176
2021	2,691	1,491	1,266	5,448
2022	4,302	613	575	5,489
2023	1,022	2,816	1,347	5,185

Note

AF = acre-feet

SECTION 6: **Total Water Use (§ 356.2[b][4])**

This section summarizes the total annual groundwater and surface water used to meet municipal, agricultural, and rural demands within the Basin. For WY 2023, the quantification of total water use was completed from reported metered groundwater production, metered surface water delivery, and from models used to estimate agricultural and rural water demand. Table 8 summarizes the total annual water use in the Basin by source and water use sector for WYs 2020 through 2023. The method of measurement and a qualitative level of accuracy for each estimate is rated on a qualitative scale of low, medium, and high.

Table 8. Total Annual Water Use by Source and Water Use Sector

Water Year	Municipal (AF)		PWS and Rural Domestic (AF)	Agriculture (AF)	Total (AF)
Source	Groundwater	Surface Water	Groundwater	Groundwater	Groundwater and Surface Water
2020	0	5,176	1,250	4,960	11,390
2021	0	5,448	1,250	5,030	11,728
2022	0	5,489	1,290	5,070	11,849
2023	0	5,185	1,150	4,530	10,865
Method of Measure	Metered	Metered	Estimated	Soil-Water Balance Model	—
Level of Accuracy	High	High	Medium	Medium	—

Notes

— = not applicable

AF = acre-feet

PWS = public water systems

SECTION 7: Change in Groundwater in Storage (§ 356.2[b][5])

7.1 Annual Changes in Groundwater Elevation (§ 356.2[b][5][A])

Annual changes in groundwater elevation in the San Luis Obispo Basin Aquifer for WY 2023 are derived from comparison of fall groundwater elevations from one year to the next. For example, the fall 2023 groundwater elevations are subtracted from the fall 2022 groundwater elevations resulting in a map depicting the changes in groundwater elevations in the Basin Aquifer that occurred during that time period (Figure 7). The groundwater elevation change map is based on a reasonable and thorough analysis of the currently available data. A non-uniform set of wells was monitored during fall 2022 and fall 2023; therefore, the estimated change in groundwater in storage is interpolated between some wells where data are not available for both 2022 and 2023 fall seasons. It is anticipated that the current expanded monitoring network (Figure 3) will be consistently utilized going forward to more consistently and robustly assess Basin conditions.

Figure 7 presents the calculated annual change in water levels between fall 2022 and fall 2023 based on the groundwater elevations presented in Figures 4 and 6. In San Luis Valley subarea, the majority of the area shows water level changes ranging from -+ 1.5 feet to +9.8 feet, with one well (SV-19) that indicated a slight decline of 3.8 feet. (The reason for the water level decline in this well is unknown; it may be an artifact of nearby agricultural pumping at the time of the water level measurement. This well will be observed for long-term trends in future reports.) Increases in groundwater elevations in the Edna Valley subarea were observed in WY 2023 in areas where there have historically been localized pumping centers, with water level rises ranging from +3 feet (EV-14) to as much as +46 feet (EV-04).

It is important to note, as described previously, that there was not a uniform data set of wells monitored for water levels during the monitoring events. To some extent, this can lead to patterns of water level changes that are artifacts of the data variability and may not reflect true changes in water levels. These occurrences will be minimized once a uniform set of wells is used for calculation in future annual reports and GSP revisions.

In general, the groundwater elevations observed in the Basin during WYs 2021 and 2022 reflect largely static conditions in the San Luis Valley subarea, and water level declines in the Edna Valley subarea. WYs 2020 and 2021 were both below-average precipitation years. The above average precipitation in WY 2023 resulted in overall positive changes in groundwater elevations throughout the Basin, with the largest positive change in the Basin occurring within the Edna Valley subarea.

7.2 Annual and Cumulative Change in Groundwater in Storage Calculations (§ 356.2[b][5][B])

The groundwater elevation change map (Figure 7) represents water level changes within the Basin Aquifer for WY 2023 (October 2022 to October 2023). The estimated change in groundwater in storage utilizes the total change in volume represented by the thickness depicted in Figure 7, including the volume occupied by the aquifer sediments and the volume of groundwater stored within the void space of the aquifer sediments. The portion of void space in the aquifer that can be used for groundwater storage is represented by the aquifer storage coefficient (S), (or specific yield [Sy] for an unconfined aquifer). S is a unitless factor, which is multiplied by the total volume change to derive the change in groundwater in storage. Based on work completed for the GSP (WSC et al., 2021), S is estimated to be 8-percent for the San Luis Valley subarea and

11.7-percent for the Edna Valley subarea.[5] The annual changes of groundwater in storage calculated for WY 2023 are presented in Table 9. The estimated change in groundwater in storage in the Basin for WY 2023 was 12,459 AF, providing an overall net positive change of 4,726 AF for groundwater in storage in the Basin between WYs 2020 through 2023.

Table 9. Annual Change in Groundwater in Storage – San Luis Obispo Valley Basin Aquifer

Water Year	San Luis Valley (AF)	Edna Valley (AF)	Annual Change in Groundwater in Storage (AF)
2020	210	-750	-540
2021	-450	-5,080	-5,530
2022	-156	-1,937	-2,092
2023	1,741	10,718	12,459
Net Change (WYs 2020–2023)	1,774	2,951	4,726

Notes
Historical values are taken from the GSP water budget (see Section 6 of the GSP [WSC et al., 2021]).
Water year types are presented graphically in Appendix E.
AF = acre-feet
WY = Water Year

[5] Appendix F includes derivation of the storage coefficient and a sensitivity analysis.

SECTION 8: Progress toward Basin Sustainability (§ 356.2[c])

8.1 Introduction

This section describes several projects and management actions that are in progress or have been recently implemented in the Basin to attain sustainability and avoid undesirable results. These projects and actions include capital projects and policies intended to improve data sets and to reduce or optimize local groundwater use. Some of the projects were described in concept in the GSP (WSC et al., 2021). Some of the actions described herein are new initiatives. All are intended to be implemented by project participants to reduce pumping and partially mitigate the degree to which the management actions would be needed.

As described in the GSP (WSC et al., 2021), the need for projects and management actions is based on observed basin conditions, including the following:

- Groundwater levels are declining in the Edna Valley portion of the Basin, indicating that the amount of groundwater pumping exceeds the natural recharge.
- Water budgets indicate that the amount of groundwater in storage has been in decline and will continue to decline in the future if there is no net decrease in pumping demand in Edna Valley.

To mitigate declines in groundwater levels in some parts of the Basin, achieve the sustainability goal before 2042, and avoid undesirable results as required by SMGA regulations, an overall reduction of groundwater pumping will be needed. A reduction in groundwater pumping can occur as a result of both management actions and projects that develop new water supplies used in lieu of pumping. The projects and management actions described in this section will help achieve groundwater sustainability by avoiding undesirable results.

This section also provides a brief discussion of land subsidence, potential depletion of interconnected surface waters, and groundwater quality trends that have occurred during WY 2023.

8.2 Implementation Approach

As described in the GSP (WSC et al., 2021), the amount of groundwater pumping in the Basin historically has been more than the estimated sustainable yield of the Basin (5,800 AFY), and groundwater levels are declining in some parts of the Basin. The GSAs have already initiated planning for several projects and management actions. It is anticipated that additional new projects and management actions will be implemented in the future to continue progress toward avoiding or mitigating undesirable results.

Some of the projects and management actions described in this section are basin-wide initiatives and some are area-specific. Generally, the basin-wide management actions apply to all areas of the Basin and reflect relatively basic GSP implementation requirements. Area-specific projects have been designed to aid in mitigating water level declines in certain parts of the Basin.

8.3 Basin-Wide Management Actions and Projects

8.3.1 Grant Funding Coordination

In December 2022, the County Director of Groundwater Sustainability, in coordination with the City and County Groundwater Sustainability Agencies and the Groundwater Sustainability Commission, applied for grant funding through DWR's Sustainable Groundwater Management (SGM) Round 2 SGMA Implementation Grant Program. Under this program, approximately $231 million was made available statewide in disbursements, with individual project funding ranging from $1 to $20 million. The funding was based on competitive scoring and is intended for basins that received no SGM Round 1 funding, which included the Basin.

The grant application requested funding to facilitate implementation of the following projects and management actions identified in the GSP:

- Recharge for Conjunctive Benefit in Edna Valley
- Basin-wide well verification and registration program
- Pumping fee program
- Irrigated lands best management practices
- Multi-benefit irrigated land repurposing (MILR) program
- Specific well interference mitigation program
- Groundwater extraction measurement program
- Expanded monitoring network
- Varian Ranch Mutual Water Company Well 4 feasibility study
- San Luis Obispo Valley Groundwater Basin State Water Project supplemental water study

In September of 2023, DWR released its list of awarded recipients for SGM Round 2 funding, which did not include the Basin. The GSAs will continue to collaborate to identify potential grant-funded opportunities, as funding will be crucial to help move each of these potential projects through the planning phase, and ultimately move the most feasible projects toward implementation.

8.3.2 Expansion of Basin Well Monitoring Network

As discussed in Section 2.4.1, during the GSP development, a significant number of new private wells were added to the existing network monitored by the County. In addition, some City-owned wells which had not been monitored in over 20 years were added to the network. The newly expanded monitoring network of 41 wells was monitored for the first time during the April 2022 monitoring event. WY 2023 was the first year in which the expanded monitoring network was available during the entire water year. This expanded monitoring network will allow for more detailed groundwater elevation maps and calculation of groundwater in storage in future annual reports.

Most of these wells have not been surveyed for location, land surface elevation, or most importantly, water level measuring point elevation. As a result, publicly available Digital Elevation Model data, or other public sources of elevation data, have been used to calculate groundwater elevation. This introduces potential error to the groundwater elevation contour maps and hydrographs. The GSP consultants have recommended completing a physical land survey of all 41 wells in the monitoring network. This will result in a more accurate and consistent data set from which to calculate water level maps, change of storage calculations, and groundwater elevation hydrographs in future annual reports and GSP updates.

The City is currently involved in a project to characterize and remediate a plume of PCE within the city limits. As part of this project, the City anticipates installing from 8 to 12 monitoring wells to assist in the objectives of the plume management. When these monitoring wells are installed, the City has communicated that they will be made available for use in future SGMA monitoring events.

8.3.3 Cost-of-Service Rate Study for County GSA Area

During the current water year, representatives of Edna Valley growers have initiated discussions with the County GSA regarding the need to generate future revenue to fund some of the supplemental water supply projects and pumping reduction initiatives identified in the GSP. The County GSA, in collaboration with the growers, have initiated the planning process for a Cost-of-Service Rate Study (Study) to support funding groundwater management related activities for the Basin pursuant to SGMA (Water Code §§ 10720 et seq.). More specifically, the primary purpose of this analysis will be to support regulatory fees (Water Code § 10730; Proposition 26) for distributing administrative costs (e.g., costs for general administration, operations, groundwater extraction measurement and Basin monitoring and reporting) to Basin extractors (administrative fees) and to support additional fees (Water Code § 10730.2; Proposition 218) for distributing GSP project costs to Basin extractors (project fees).

This Study will comply with the requirements of SGMA (e.g., it shall not call for the imposition of a regulatory fee on a de minimis extractor unless the extractor is being regulated under SGMA) and the requirements of all other applicable laws, including, without limitation, the procedural and substantive requirements of Propositions 26 and 218 and shall provide supporting documentation evidencing said compliance. Without limiting the foregoing, regarding compliance with Proposition 26, the rate study will provide supporting documentation necessary to determine whether the administrative fees fall within one of the enumerated exceptions from the definition of a “tax” and that the amount of the administrative fees are no more than necessary to cover the reasonable costs of the governmental activities and that the manner in which those costs are allocated to an extractor bear a fair or reasonable relationship to the extractor’s burdens on, or benefits received from, the governmental activity (California Constitution, Article XIIIC, Section 1). Regarding compliance with Proposition 218, the rate study will provide supporting documentation evidencing that the project fees do not exceed the proportional cost of the service attributable to each parcel. The Study will build off the relevant legal opinions and court decisions that provide a foundation for the recommended charges. At the time that this report was issued, no specific timeline for the completion of the proposed Cost-of-Service Rate Study was established.

8.4 Area-Specific Projects

8.4.1 City of San Luis Obispo Recycled Water Program

The City of San Luis Obispo has been using recycled water from their Water Resource Recovery Facility (WRRF) as a component of its multi-source water supply since 2006. The City’s goal is to use this water source to the highest and most beneficial use, and to use it to help the City achieve and maintain groundwater sustainability throughout the SGMA implementation period. The City’s priority is to use the recycled water to benefit their service area and rate payers. The City currently has over 50 recycled water accounts, with plans to use this water in the future to help supply future development in their service area.

An upgrade of the WRRF is currently underway. The upgrade will incorporate the use of membrane bioreactor treatment which will produce higher quality recycled water. The design capacity of the WRRF is increasing from 5.1 to 5.4 MGD as part of the project as well. The City anticipates bringing online new recycled water customers in the East Airport Annexation area, San Luis Ranch area, Righetti Ranch area, and Avila Ranch area over the next 1 to 3 years.

The City instituted studies to evaluate an update on recycled water availability, analysis of existing City policies, recycled water cost and pricing, legal analysis, and a pathway to potable reuse. Included in these studies was a Technical Memorandum (TM) produced by Carollo Engineering, This TM evaluated the opportunities and challenges of different types of potential potable reuse projects. The TM includes the following components:

- Background on regulatory development for potable reuse in California and summary of key elements of regulations for indirect potable reuse (IPR) and direct potable reuse (DPR).
- Review of the operational and developing membrane bioreactor (MBR) based potable reuse projects in the United States.
- Description of three potential potable reuse project concepts, including treatment trains, infrastructure needs, and benefits and challenges.
- Summary of the existing assets that the City could utilize for a future potable reuse project (e.g., treatment units, distribution systems, etc.).
- Summary of the project development timelines, and key barriers to success, for potable reuse projects, based on existing and ongoing projects in California and beyond.
- Development of a Plan for the City, including key project elements and potential near- and long-term efforts.

8.4.2 Sentinel Peak Creek Restoration and Fish Habitat Project

The Sentinel Peak Creek Restoration and Fish Habitat Project is described in the GSP (identified as Discharge Relocation Project). Sentinel Peak Resources operates an oil field in Price Canyon 1 to 2 miles south of Edna Valley, and currently discharges highly treated recycled water from their operations to Pismo Creek approximately 1 mile downstream from the edge of the Basin south of Edna Valley. Representatives for Edna Growers and the Edna Ranch Mutual Water Company have engaged in communication with representatives for Sentinel Peak and the Resource Conservation District to discuss a project in which this creek discharge point would be moved upstream to the north edge of the Basin where West Corral de Piedras Creek enters.

This project has been proposed in the past in conjunction with the previous operator of the oil field, Freeport-McMoRan. A consortium of Edna Valley Growers cooperated with state fisheries stakeholders to identify a pipeline route and to obtain political support for the project from local government. Progress on the past efforts to implement this project was postponed when Freeport-McMoRan was sold to Sentinel Peak Resources. Negotiations have re-started, and the two parties are working toward an agreement. However, because no grant funding was awarded to the Basin GSAs during the Round 2 grant applications, there was no substantial progress made on this project in WY 2023.

8.4.3 San Luis Obispo Recycled Water to Edna Valley Project

During preparation of the GSP, a conceptual project was identified in which the City would sell excess available recycled water to growers in Edna Valley on a short term and interruptible basis to augment their water for irrigation. Representatives of Edna Valley growers have engaged in discussions with the County Director of Groundwater Sustainability and City staff to continue negotiations with the intention to move the project forward. The project would require construction of a pipeline from the end of the City’s service area near the airport to growers in Edna Valley. Supply would be limited by seasonal availability constraints and infrastructure limitations described in the GSP (WSC et al., 2021). Negotiations continue with regard to price and feasibility between Edna Valley representatives, City staff, and County stakeholders.

Numerous challenges exist to develop the project, but considerable time and effort has been expended by several private entities as well as County and City staff to develop this conceptual project. The primary benefit from the project would be higher groundwater elevations in the Edna Valley due to reductions in groundwater pumping for irrigation from the use of the recycled water. As previously discussed in the text on the City's Recycled Water Project, the City has instituted studies to evaluate an update on recycled water availability, analysis of existing City policies, recycled water cost and pricing, legal analysis, and a pathway to potable reuse, as due diligence to inform their ultimate decision on providing recycled water to Edna Valley Agriculture.

8.5 Summary of Progress toward Meeting Basin Sustainability

WY 2023 was an above average precipitation year. Relative to the basin conditions at the end of the study period as reported in the GSP, this 2023 Annual Report indicates relative equilibrium in groundwater conditions in the San Luis Valley part of the Basin, and some additional declines in the Edna Valley area of the Basin, but there was overall water level recovery in the Edna Valley area between WYs 2022 and 2023 due to the above-average precipitation and reduction in groundwater extractions. The groundwater level sustainability indicator constitutes an undesirable result when two or more RMS wells within a defined area of the Basin (i.e., San Luis Valley or Edna Valley) must have water level exceedances of minimum thresholds for two consecutive fall measurements, which did not occur in WY 2023. As of WY 2023, the Basin is meeting its groundwater level sustainability criteria. Additionally, the Basin meets its objectives for other sustainability criteria, including land subsidence, degradation of water quality, and change in groundwater in storage in the Basin, as described below.

It is evident that historical groundwater pumping in the Basin has created challenging conditions for sustainable management. However, actions are already underway to collect data, improve the monitoring and data collection networks, and coordinate with affected agencies and entities throughout the Basin to develop projects and solutions that address the mutual interest in the Basin's overall sustainability goal.

8.5.1 DWR Acceptance of GSP

On January 26, 2022, the GSAs submitted their final GSP to DWR, meeting the deadline of January 31, 2022, for high- or medium-priority basins not subject to conditions of overdraft. DWR evaluated the GSP for completeness and to verify the GSP included all the components required by the SGMA (Water Code § 10720 *et seq*.) and GSP Regulations (23 CCR § 350 *et seq*.). On April 27, 2023, DWR released a determination letter approving the GSP. Included with the determination letter is a Statement of Findings and Staff Report. Several recommended corrective actions are presented in the Staff Report that the GSAs should consider during the first 5-year periodic evaluation of the GSP. The April 27, 2023, determination letter with attachments is included in Appendix G.

8.5.2 Subsidence

Land subsidence is the gradual settling of the land surface caused by compaction of compressible sediments in the subsurface. While elastic (i.e., non-permanent) subsidence can be detected with seasonal groundwater fluctuation, inelastic (i.e., permanent) subsidence can be induced by dewatering of compressible sediments, either from natural causes or from human activities such as the lowering of groundwater levels through pumping. Only inelastic subsidence is applicable to SGMA regulations. Using GPS technology, subsidence was documented in the Los Osos Valley in the early 1990s from the dewatering of peat material in the subsurface. More recently, subsidence has been estimated (with 0.059-foot accuracy) using Interferometric Synthetic Aperture Radar (InSAR) technology (Towill, Inc., 2023), which measures ground surface elevation using microwave satellite imagery data.

As documented in the GSP (WSC et al., 2021), review of InSAR data made available by DWR indicated no measurable subsidence occurred in the Basin between 2015 and 2020. Updated InSAR data has been provided by DWR through October 2023. For this Annual Report, InSAR data were assessed on an annual basis from June to the following June, to minimize the influence of elastic subsidence related to seasonal groundwater fluctuation. The single-year (June 2022 through June 2023) data indicate that subsidence was not detected above the InSAR method reporting error of 0.059 foot (Figure 10). The 5-year InSAR data, as measured from June 2018 through June 2023, indicate that minor subsidence (reportable outside of the method reporting error) has occurred in the Edna Valley subarea, with a cumulative 5-year land subsidence measurement of up to 0.075 foot (Figure 11).

Recent data indicate that since publication of the GSP (WSC et al., 2021), land subsidence continues to remain below the established minimum thresholds, with subsidence of less than 0.1 foot per year for WY 2023, and below the 5-year cumulative minimum threshold of 0.5-foot between WYs 2018 and 2023. Therefore, land subsidence is currently not a concern for the Basin and the subsidence sustainability criterion are being met. The GSAs will continue to monitor and report annual subsidence as data becomes available.

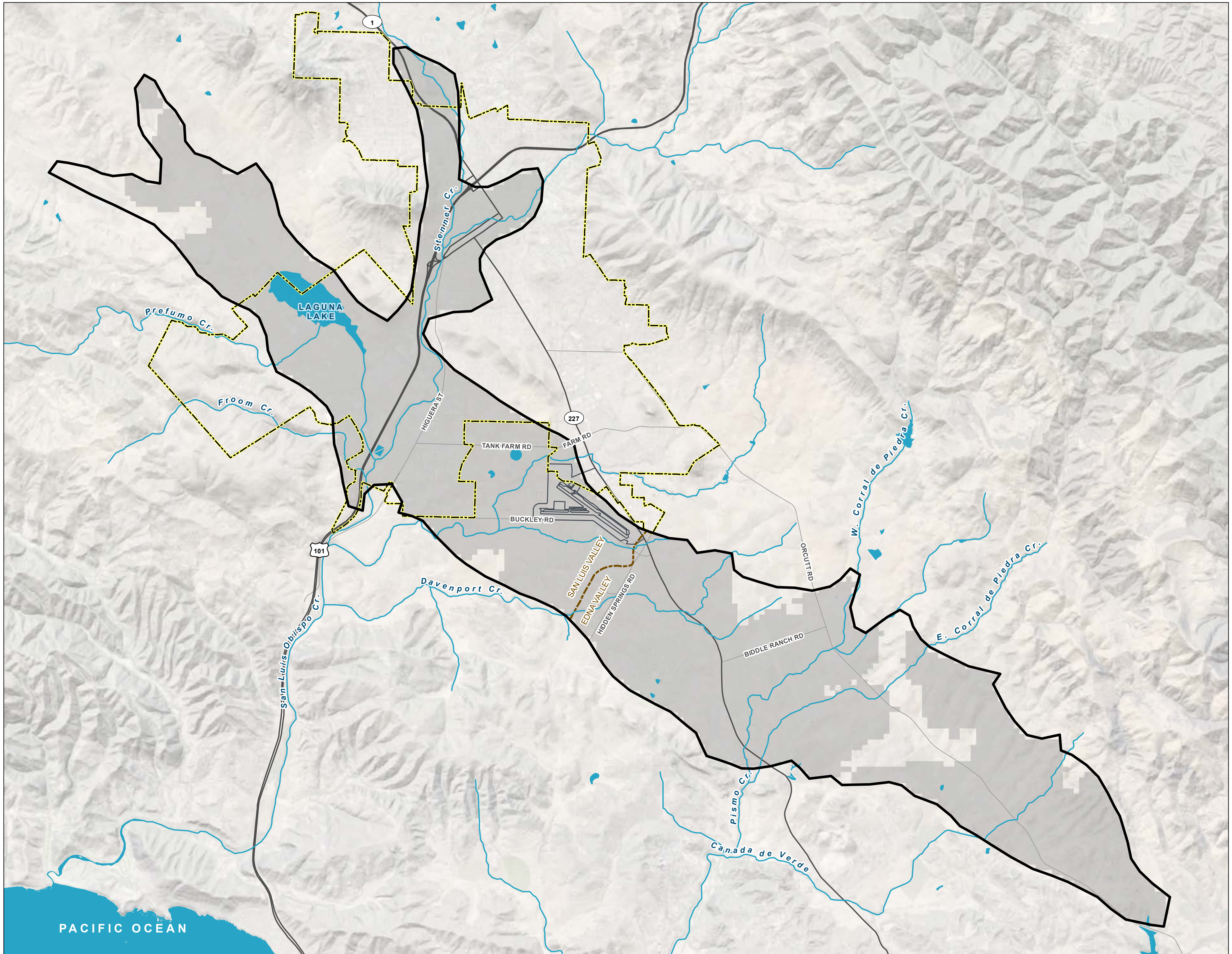

FIGURE 10

Single-Year Land Subsidence Measured by InSAR (June 2022-June 2023)

San Luis Obispo, California

LEGEND

Estimated Land Subsidence (feet):

Measurement within method error (i.e., subsidence ≤0.059 feet)

All Other Features

Bulletin 118 Boundary

Bedrock Divide

City Boundary

SLO Airport

Major Road

Watercourse

Waterbody

N

0 0.5 1 1.5

Miles

Date: February 14, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020, TRE Altamira InSAR dataset

GSI Water Solutions, Inc.

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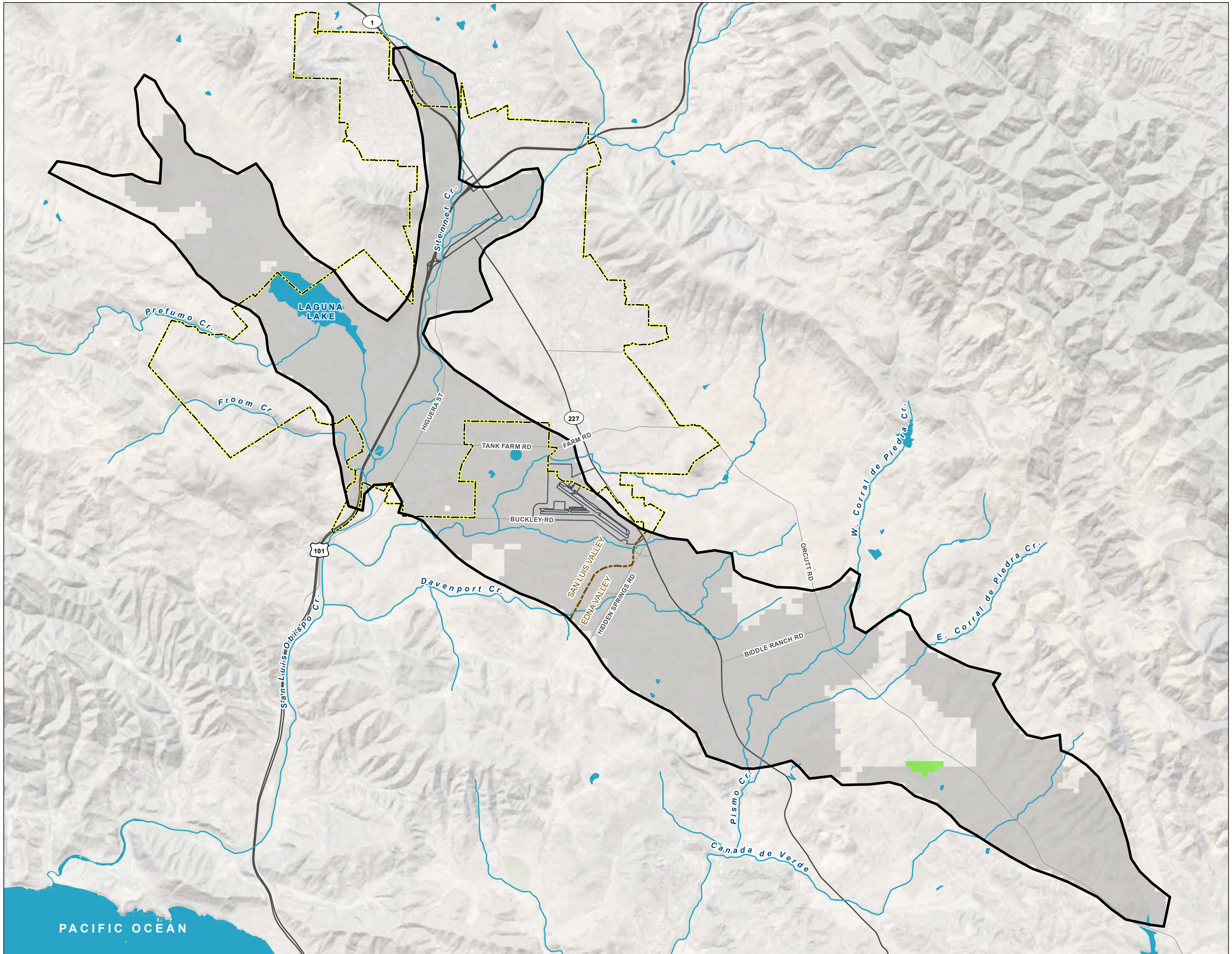

FIGURE 11

Five-Year Land Subsidence Measured by InSAR (June 2018-June 2023)

San Luis Obispo, California

LEGEND

Estimated Land Subsidence (feet):

- Measurement within method error (i.e., subsidence ≤0.059 feet)
- Measurable subsidence less than 0.075 feet

All Other Features

- Bulletin 118 Boundary
- Bedrock Divide
- City Boundary
- SLO Airport
- Major Road
- Watercourse
- Waterbody

N

0 0.5 1 1.5
Miles

Date: February 14, 2024
Data Sources: BLM, ESRI, USGS, Aerial Photo 2020, TRE Altamira InSAR dataset

GSI Water Solutions, Inc.

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8.5.3 Interconnected Surface Water

Transient ephemeral surface water flows and groundwater conditions in the Basin make it difficult to assess the interconnected surface water and groundwater and to quantify the degree to which surface water depletion has occurred. Three RMS wells are designated to monitor conditions of potential interconnected surface water. Potential locations for future stream gage locations and wells were included in the GSP (WSC et al., 2021). It has been a relatively brief time since the submittal of the GSP. No more recent data are available since publication of the GSP to assess the interconnectivity of surface water and groundwater or to quantify potential surface water depletion is available. It is anticipated that long-term improvements to the monitoring network will include more comprehensive data collection to address this data gap. As discussed previously, the Basin GSAs were unsuccessful in procuring grant funding from DWR Round 2 SGMA Implementation grants may help to achieve this goal.

8.5.4 Groundwater Quality

Although groundwater quality is not a primary focus of SGMA, actions or projects undertaken by GSAs to achieve sustainability cannot degrade water quality to the extent that they would cause undesirable results. As stated in the GSP (WSC et al., 2021), groundwater quality in the Basin is generally suitable for both drinking water and agricultural purposes. Three COCs were identified and discussed in the GSP that have the potential to be impacted by groundwater management activities, and include total dissolved solids, nitrate, and arsenic. A review of groundwater quality data available in public datasets since the submittal of the first Annual Report for the nine wells included in the Water Quality Monitoring Network established in the GSP indicate relatively stable trends in TDS, nitrate, or arsenic in all of the Basin water quality monitoring wells. One well operated by Edna Ranch Mutual Water Company (East) that is not included in the established Water Quality Monitoring Network had detections of arsenic above the maximum contaminant level (MCL). However, the purveyor is abiding by all terms of its permit for water delivered to its customers. The GSAs will continue to review groundwater quality data as it becomes available to update the characterization of groundwater quality.

The City of San Luis Obispo is currently the lead agency overseeing the City of San Luis Obispo Tetrachloroethylene (PCE) Plume Characterization Project. This project was initiated to characterize a PCE plume within the San Luis Valley Subarea of San Luis Obispo Valley Groundwater Basin. Investigations to date have delineated the PCE plume in an area approximately 1.5 miles long approximately parallel to Highway 101, extending from the vicinity of the intersection of Walker Street and High Street southward to near Los Osos Valley Road. Samples from several wells in the plume have indicated PCE concentrations that exceed the MCL of 5 micrograms per liter. The City has received $6.6 million in grant funding to install a monitoring network and treatment system to manage the PCE plume and develop a chemical transport model. Public documentation of this project is available through the Central Coast RWQCB (WSC, 2022).

The Central Coast RWQCB is currently overseeing monitoring and investigation of local groundwater that has been identified as containing trichloroethylene (TCE) located southwest of and adjacent to the San Luis Obispo County Regional Airport. Investigations to date have delineated a 1/2-mile-long by 1/3-mile-wide plume, with the highest concentration of TCE reported to be residing below a property on Thread Lane in the city of San Luis Obispo. Cleanup and Abatement Order (CAO) No. R3-2019-0090 was issued on July 31, 2019, to responsible parties by the Central Coast RWQCB with the intent of developing a solution through a Replacement Water Plan to provide replacement water to all accessible properties with wells impacted by the TCE. However, since the issuance of the 2019 CAO, newer data and information collected between March 2020 and November 2022 indicated a nearby property, located on Buckley Road, as having the highest concentration of TCE and to be the source of the TCE in groundwater in this area. These new findings prompted the rescission of CAO No. R3-2019-0091 on July 12, 2023, and issuance of CAO No. R3-2023-

0060 on August 8, 2023, by the Central Coast RWQCB to the responsible parties on Buckley Road. Investigation and development of a remedial action plan of this site are ongoing.[6]

On March 20, 2019, the State Water Resources Control Board (SWRCB) issued order WQ 2019-0005-DWQ for the Determination of the Presence of Per- and Polyfluoroalkyl Substances (PFAS) from sources at the San Luis Obispo County Regional Airport. The Central Coast RWQCB is currently the lead agency investigating the presence and distribution of PFAS in this area, particularly PFAS associated with fire-fighting foams containing PFAS. PFAS compounds are a class of emerging contaminants presently being investigated nationwide. Regulatory MCLs have not yet been established for PFAS compounds. The U.S. Environmental Protection Agency announced on March 14, 2023, the first-ever national drinking water standards for six PFAS compounds (perfluorooctanoic acid [PFOA], perfluorooctane sulfonic acid [PFOS], perfluorohexane sulfonic acid [PFHxS], perfluorononanoic acid [PFNA], perfluorobutane sulfonic acid [PFBS], and GenX as a PFAS mixture); final establishment of these standards will likely not be finalized until after completion of the public adoption process, which may be lengthy. Until then, the California Division of Drinking Water (DDW) has promulgated Health Advisory Levels called "Notification Levels" and "Response Levels" for some PFAS compounds. Where a public drinking water source has detections of a PFAS compound that exceeds its Response Level (where established), the source shall be removed from service or the public water system must provide a public notification within 30 days of the confirmed detection of exceedance. For SWRCB Order WQ 2019-005-DWQ, all public water supply wells located within two miles of the San Luis Obispo County Regional Airport, and numerous privately owned wells in this area, were sampled for PFAS compounds. Untreated groundwater from several wells have indicated PFAS concentrations that exceed their DDW Notification Levels and Response Levels. Based on these findings, the Central Coast RWQCB issued Draft CAO No. R3-2023-00XX on February 16, 2023, and a Voluntary Cleanup and Abatement Agreement (VCAA) was prepared and ratified by the Central Coast RWQCB on July 21, 2023 (Resolution No. R3-2023-0046). Groundwater investigations and remedial action plan development are ongoing under the authority of the Central Coast RWQCB.[7]

Implementation of sustainability projects and/or management actions, as presented in the GSP (WSC et al., 2021), in this WY 2023 Annual Report, or in future reports or GSP updates, are not anticipated to result in degraded groundwater quality in the Basin. Siting of new wells within the Basin should consider potential impacts to groundwater quality by avoiding pumping-induced conditions that may cause migration of known existing contaminant plumes. Any notable changes in groundwater quality will be documented and discussed in future annual reports and GSP updates.

8.5.5 Summary of Changes in Basin Conditions

The below-average rainfall during the previous WYs of 2020 to 2022 impacted groundwater conditions in the Basin through low water levels and declining groundwater in storage. The wet year experienced in WY 2023 resulted in substantial streamflow in East and West Corral de Piedras Creeks. This in turn resulted in substantial increases in water levels and groundwater in storage in Edna Valley. Groundwater in storage in the Basin increased by over 13,000 AF in WY 2023. Despite the net increase in groundwater in storage, WY 2023 groundwater extraction in the Edna Valley subarea (4,640 AF) exceeded its reported sustainable yield estimate of 3,300 AFY, while WY 2023 groundwater extraction in the San Luis Valley subarea (1,040 AF) was well below its preliminary sustainable yield estimate of 2,500 AFY. However, the WY 2023 Basin-wide estimated volume of groundwater extraction (5,680 AF), which declined by about 680 AF from WY 2022, was overall below the reported yield estimate of 5,800 AF for the entire Basin.

[6] Additional information can be found on the RWQCB website at https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000010081
[7] Documentation may be found at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000012768.

The known irrigated acreage in the Basin has not changed dramatically since publication of the GSP but known changes in crop type have been documented (i.e., conversion of vineyard to citrus). The wet year experienced in WY 2023 improved groundwater conditions in Edna Valley markedly. However, in the long term during future droughts, at least some of the projects and management actions described in the GSP and in this Annual Report will be necessary in order to bring the Basin into sustainability.

8.5.6 Summary of Impacts of Projects and Management Actions

In the GSP Determination Letter and Statement of Findings (Appendix G), DWR concluded that the proposed project and management actions as presented in the GSP provide a feasible approach to achieving sustainable managements goals in the Basin and to ensure that the Basin is operated within its sustainable yield within 20 years of implementation of the GSP (DWR, 2023). Groundwater systems respond to stresses slowly and gradually. Additional time will be necessary to evaluate the effectiveness and quantitative impacts of the projects and management actions either now underway or in the planning and implementation stage. Several feasible projects identified in the GSP had no substantial progress during WY 2023 due to lack of available funding. However, it is clear that the actions currently in place and as described in the two prior Annual Reports (WYs 2020, 2021 and 2022) are a good start toward reaching the sustainability goals laid out in the GSP. It is too soon to correlate observed changes in Basin conditions with causes based on water resources management operations. While the interim milestones outlined in the GSP will not be assessed until the five-year GSP update (i.e., 2027),the anticipated effects of the projects and management actions now underway are expected to significantly improve the ability of the Basin stakeholders to reach the necessary sustainability goals. Additionally, the recommended corrective actions will be considered by the GSAs during the first periodic assessment of the GSP.

SECTION 9: **References**

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APPENDICES

APPENDIX A

Sustainable Groundwater Management Act Groundwater Sustainability Plan Regulations for Annual Reports

§ 356.2. Annual Reports

Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:

(a) General information, including an executive summary and a location map depicting the basin covered by the report.

(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:

(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:

(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.

(B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.

(2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.

(3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.

(4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.

(5) Change in groundwater in storage shall include the following:

(A) Change in groundwater in storage maps for each principal aquifer in the basin.

(B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.

(c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.

Note: Authority cited: Section 10733.2, Water Code.

Reference: Sections 10727.2, 10728, and 10733.2, Water Code.

APPENDIX B

CIMIS Precipitation Data

Precipitation Record (1871-2023)
San Luis Obispo - Central Coast Valleys - Station 52 Cal Poly

Data Source: SLO County | Reservoir #1 | ITRC Manual Data | CIMIS Manual Data

Monthly Precipitation Data (inches):

Water Year	Oct.	Nov.	Dec.	Jan	Feb	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	TOTAL
1871	0.68	0.38	2.90	1.51	4.43	0.00	2.79	0.28	0.00	0.00	0.00	0.00	12.97
1872	0.00	2.40	13.93	5.16	3.45	0.71	1.37	0.00	0.00	0.00	0.00	0.00	27.02
1873	0.00	0.00	6.00	5.00	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.79
1874	0.00	0.00	7.96	4.29	4.04	3.23	1.00	0.00	0.00	0.00	0.00	0.00	20.52
1875	4.28	2.05	0.48	12.10	0.28	0.50	0.00	0.00	0.00	0.00	0.00	0.00	19.69
1876	0.00	6.20	2.20	9.87	5.29	5.30	1.26	0.00	0.00	0.00	0.00	0.00	30.12
1877	1.16	0.00	0.00	4.83	0.42	1.74	0.00	0.00	0.00	0.00	0.00	0.00	8.15
1878	0.00	1.42	3.90	7.88	11.91	2.74	2.75	0.00	0.00	0.00	0.00	0.00	30.6
1879	0.00	1.50	2.58	1.78	2.15	1.60	1.80	0.25	0.00	0.00	0.00	0.00	11.66
1880	0.75	1.40	3.03	1.75	7.23	2.36	8.78	0.52	0.00	0.00	0.00	0.00	25.82
1881	0.00	0.48	13.35	4.71	1.90	1.40	1.85	0.00	0.00	0.00	0.00	0.40	24.09
1882	1.65	0.25	2.00	0.85	3.40	6.75	1.73	0.00	0.00	0.00	0.00	0.00	16.63
1883	0.69	2.95	0.44	1.50	1.60	4.88	1.10	3.85	0.00	0.00	0.00	0.00	17.01
1884	0.00	0.00	3.56	10.57	10.21	12.41	3.39	0.00	2.26	0.00	0.00	0.00	42.4
1885	2.17	0.13	8.85	2.25	0.00	0.94	3.15	0.10	0.00	0.00	0.00	0.00	17.59
1886	0.04	12.90	3.67	5.78	0.79	2.37	3.75	0.00	0.00	0.00	0.00	0.00	29.3
1887	0.25	1.25	1.06	1.10	9.60	1.29	1.56	0.36	0.07	0.02	0.00	2.05	18.61
1888	0.25	1.40	3.15	7.02	0.28	3.84	0.14	0.16	0.04	0.00	0.00	0.00	16.28
1889	0.00	4.48	3.36	1.50	2.08	7.51	0.61	0.00	0.00	0.00	0.00	0.00	19.54
1890	9.19	2.46	11.37	7.27	4.67	3.07	0.29	0.41	0.00	0.00	0.00	0.82	39.55
1891	0.00	0.42	6.04	0.88	7.14	1.97	1.96	0.13	0.15	0.00	0.00	0.27	18.96
1892	0.00	0.20	5.15	0.70	2.88	4.25	0.60	2.23	0.05	0.00	0.00	0.00	16.06
1893	0.15	2.76	6.57	4.02	6.35	9.33	1.14	0.08	0.00	0.00	0.00	0.03	30.43
1894	0.82	0.45	1.64	1.83	2.31	0.79	0.41	1.32	0.21	0.05	0.00	1.81	11.64
1895	1.71	0.35	5.45	8.05	1.82	2.44	0.67	0.47	0.00	0.00	0.00	0.00	20.96
1896	1.80	1.56	0.68	8.23	0.00	3.16	2.22	0.10	0.00	0.04	0.20	0.00	17.99
1897	1.44	3.02	3.04	5.22	4.40	3.17	0.18	0.04	0.00	0.00	0.00	0.07	20.58
1898	0.79	0.07	0.65	1.37	2.20	0.91	0.06	1.04	0.04	0.00	0.00	0.20	7.33
1899	0.39	0.08	0.64	5.56	0.28	7.62	1.54	0.10	0.92	0.00	0.00	0.00	17.13
1900	3.92	1.94	4.51	2.13	0.16	2.18	0.98	1.38	0.01	0.00	0.00	0.00	17.21
1901	1.93	8.01	0.26	11.21	5.89	0.58	2.83	0.69	0.00	0.00	0.18	0.10	31.68
1902	2.58	1.58	0.12	1.46	8.79	4.68	2.44	0.03	0.00	0.00	0.00	0.00	21.68
1903	2.00	1.52	1.48	3.67	3.18	4.98	1.66	0.00	0.00	0.00	0.00	0.00	18.49
1904	0.02	0.48	0.32	1.08	6.79	5.13	2.97	0.20	0.00	0.00	0.06	3.54	20.59
1905	1.00	0.13	1.72	2.35	7.51	4.19	0.77	2.26	0.03	0.03	0.00	0.00	19.99
1906	0.00	1.97	0.32	6.37	3.48	10.86	0.71	4.22	0.16	0.00	0.03	0.04	28.16
1907	0.00	1.08	5.14	8.78	2.45	6.79	0.34	0.11	0.02	0.00	0.00	0.07	24.78
1908	3.23	0.01	3.33	6.69	3.59	0.79	0.14	0.21	0.00	0.00	0.00	0.84	18.83
1909	0.59	0.73	1.70	17.00	6.44	4.04	0.03	0.00	0.00	0.00	0.00	0.02	30.55
1910	0.54	2.24	10.09	3.48	0.43	3.81	0.23	0.00	0.00	0.00	0.00	0.41	21.23
1911	0.30	0.27	0.95	14.31	4.86	11.92	1.32	0.08	0.00	0.00	0.00	0.02	34.03
1912	0.12	0.46	3.72	2.80	0.02	5.65	2.27	2.09	0.00	0.00	0.00	0.04	17.17
1913	0.00	0.79	0.24	3.48	1.66	0.96	0.52	0.30	0.09	0.00	0.91	0.07	9.02
1914	0.00	3.97	5.73	15.03	3.31	1.24	0.68	0.06	0.22	0.00	0.00	0.00	30.24
1915	0.08	0.12	6.01	7.11	9.51	0.95	2.47	1.91	0.01	0.01	0.00	0.00	28.18
1916	0.00	0.34	3.58	18.25	2.38	2.12	0.21	0.04	0.00	0.00	0.00	1.94	28.86
1917	1.82	0.38	9.26	1.59	7.01	0.44	0.11	0.49	0.00	0.01	0.00	0.00	21.11
1918	0.09	0.47	0.14	0.55	9.63	7.12	0.04	0.01	0.00	0.00	0.01	0.73	18.79
1919	0.81	4.00	1.92	1.51	5.48	3.35	0.09	0.19	0.00	0.00	0.00	0.42	17.77
1920	0.12	0.14	4.52	0.82	2.36	4.78	1.65	0.00	0.05	0.00	0.03	0.00	14.47
1921	1.23	1.64	3.85	6.18	2.16	2.29	0.57	1.32	0.00	0.00	0.00	0.40	19.64
1922	0.16	0.16	7.22	4.48	6.49	3.46	0.27	0.72	0.00	0.00	0.00	0.00	22.96
1923	0.47	5.30	6.64	4.51	1.36	0.38	4.57	0.01	0.04	0.00	0.00	0.70	23.98
1924	0.16	0.32	0.73	1.46	0.44	4.05	0.33	0.00	0.00	0.00	0.04	0.00	7.53
1925	0.94	0.89	2.04	2.78	4.32	4.21	2.68	3.58	0.15	0.00	0.03	0.06	21.68
1926	0.37	0.05	3.00	3.32	7.29	0.33	4.31	0.06	0.00	0.00	0.00	0.00	18.73
1927	0.66	8.24	1.41	2.78	7.78	2.10	1.54	0.05	0.12	0.00	0.00	0.00	24.68
1928	2.54	3.04	4.93	0.34	3.89	5.65	0.51	0.43	0.00	0.00	0.00	0.00	21.33
1929	0.00	3.51	5.42	1.96	2.90	1.78	1.39	0.00	0.34	0.00	0.00	0.05	17.35
1930	0.00	0.00	0.33	6.07	3.32	3.15	0.67	1.21	0.17	0.00	0.00	0.14	15.06
1931	0.04	1.98	0.63	6.22	1.92	0.54	0.48	2.52	0.16	0.00	0.06	0.00	14.55
1932	0.09	2.88	14.99	4.95	5.92	0.88	0.40	0.18	0.00	0.04	0.02	0.05	30.4
1933	0.33	0.31	1.81	8.87	0.33	1.03	0.17	0.93	1.88	0.00	0.00	0.00	15.66
1934	0.95	0.00	7.11	0.05	4.80	0.07	0.00	0.38	1.61	0.00	0.00	0.07	15.04

Precipitation Record (1871-2023)
San Luis Obispo - Central Coast Valleys - Station 52 Cal Poly

Monthly Precipitation Data (inches):

Water Year	Oct.	Nov.	Dec.	Jan	Feb	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	TOTAL
1935	2.28	3.91	2.84	6.01	0.93	4.59	5.35	0.01	0.00	0.00	0.71	0.00	26.63
1936	0.74	1.94	2.72	2.53	12.00	1.49	1.55	0.14	0.20	0.14	0.00	0.11	23.56
1937	1.69	0.00	8.29	7.98	9.25	5.56	0.22	0.00	0.05	0.00	0.00	0.00	33.04
1938	0.09	0.78	7.51	2.70	11.96	6.79	1.12	0.09	0.00	0.00	0.00	0.54	31.58
1939	0.53	0.48	1.08	3.39	1.97	1.92	0.26	0.13	0.00	0.02	0.00	0.59	10.37
1940	1.34	1.07	1.92	9.29	6.41	1.89	2.37	0.01	0.00	0.00	0.00	0.00	24.3
1941	0.78	0.25	9.68	7.80	9.85	8.60	5.23	0.73	0.00	0.02	0.02	0.00	42.96
1942	1.14	0.95	10.18	2.80	1.93	2.33	3.94	0.30	0.00	0.00	0.01	0.00	23.58
1943	0.54	1.34	3.35	10.83	2.01	6.94	1.04	0.00	0.00	0.00	0.00	0.00	26.05
1944	1.15	0.42	4.57	1.77	9.45	2.61	2.22	0.24	0.01	0.00	0.00	0.00	22.44
1945	0.14	6.10	2.18	0.16	6.48	5.91	0.12	0.10	0.09	0.00	0.03	0.11	21.42
1946	1.14	0.83	7.36	0.63	2.26	4.20	1.24	0.19	0.00	0.04	0.02	0.00	17.91
1947	0.55	6.64	2.68	0.44	1.15	2.04	0.20	0.27	0.24	0.00	0.04	0.00	14.25
1948	1.40	0.12	1.47	0.06	2.17	5.25	4.14	0.89	0.00	0.00	0.00	0.00	15.5
1949	0.39	0.02	3.50	1.94	2.41	5.68	0.11	0.00	0.00	0.00	0.00	0.00	14.05
1950	0.00	2.23	3.85	4.89	3.88	1.41	2.53	0.17	0.00	0.46	0.00	0.03	19.45
1951	2.12	2.38	3.25	3.42	1.31	1.03	1.48	0.13	0.00	0.00	0.04	0.05	15.21
1952	0.93	1.96	8.39	9.53	0.63	6.65	1.05	0.04	0.03	0.05	0.00	0.00	29.26
1953	0.00	3.55	7.28	2.37	0.00	1.40	1.99	0.15	0.04	0.00	0.00	0.00	16.78
1954	0.00	3.45	0.42	6.10	3.50	4.90	1.28	0.09	0.03	0.00	0.00	0.00	19.77
1955	0.00	2.77	3.10	5.60	1.96	0.18	2.67	1.00	0.00	0.00	0.01	0.00	17.29
1956	0.00	1.93	10.88	6.51	1.46	0.01	3.47	0.90	0.00	0.00	0.00	0.00	25.16
1957	0.65	0.00	0.49	3.01	3.88	1.17	3.11	1.57	0.00	0.00	0.00	0.00	13.88
1958	1.68	0.55	4.23	3.78	8.99	8.40	6.51	0.23	0.00	0.00	0.00	0.95	35.32
1959	0.00	0.32	0.18	2.69	6.60	0.00	0.95	0.07	0.00	0.00	0.00	0.73	11.54
1960	0.00	0.00	0.60	4.23	6.85	1.52	1.94	0.04	0.00	0.00	0.00	0.00	15.18
1961	0.22	3.76	1.67	1.97	0.91	1.74	0.49	0.33	0.04	0.01	0.00	0.01	11.15
1962	0.00	4.60	2.14	2.88	13.96	2.16	0.13	0.04	0.06	0.00	0.00	0.00	25.97
1963	1.52	0.04	2.73	3.56	8.08	4.61	3.84	0.33	0.09	0.00	0.00	0.19	24.99
1964	1.94	4.08	0.15	3.01	0.12	2.10	1.69	1.03	0.37	0.02	0.00	0.10	14.61
1965	1.43	3.79	5.78	4.10	0.42	2.29	3.91	0.00	0.00	0.00	0.00	0.00	21.72
1966	0.00	7.80	4.12	2.13	1.15	0.29	0.12	0.00	0.01	0.15	0.00	1.11	16.88
1967	0.00	4.40	7.70	0.00	0.58	6.38	6.90	0.36	0.13	0.00	0.00	1.20	27.65
1968	0.00	3.83	3.05	2.43	2.07	3.70	1.31	0.35	0.00	0.00	0.00	0.01	16.75
1969	3.08	2.10	3.92	24.63	15.16	1.88	3.72	0.00	0.03	0.00	0.00	0.10	54.62
1970	0.62	0.89	1.73	7.28	1.42	4.11	0.18	0.00	0.07	0.00	0.00	0.00	16.3
1971	0.11	6.02	8.51	1.89	0.42	0.73	1.56	1.22	0.00	0.00	0.00	0.19	20.65
1972	0.36	2.00	7.03	1.03	0.86	0.00	0.89	0.06	0.00	0.04	0.00	0.00	12.27
1973	2.72	6.79	2.00	13.84	9.67	4.94	0.00	0.02	0.00	0.00	0.00	0.07	40.05
1974	2.18	4.18	4.90	5.17	0.43	8.97	2.81	0.00	0.02	0.02	0.00	0.00	28.68
1975	1.96	0.74	4.93	0.26	8.35	5.90	2.00	0.00	0.00	0.00	0.00	0.02	24.16
1976	2.23	0.36	0.18	0.01	4.17	2.54	0.88	0.00	0.03	0.00	1.41	3.87	15.68
1977	0.50	1.03	2.49	2.01	0.08	2.13	0.06	3.29	0.00	0.00	0.00	0.03	11.62
1978	0.05	0.28	8.49	15.76	10.71	8.09	4.37	0.00	0.07	0.00	0.00	1.18	49
1979	0.00	2.46	2.24	4.62	5.99	4.03	0.24	0.00	0.00	0.00	0.00	0.20	19.78
1980	1.28	1.21	4.84	9.22	11.91	3.47	0.70	0.43	0.00	0.29	0.00	0.00	33.35
1981	0.00	0.01	2.10	6.40	2.15	7.48	0.34	0.00	0.00	0.00	0.00	0.00	18.48
1982	1.59	2.97	1.97	5.87	1.65	8.89	4.12	0.01	0.17	0.00	0.11	1.19	28.54
1983	1.74	6.28	4.97	10.05	10.53	8.61	3.30	0.61	0.00	0.00	0.91	0.15	47.15
1984	2.47	6.54	6.72	0.18	0.97	1.02	0.82	0.00	0.00	0.00	0.08	0.00	18.8
1985	1.27	3.61	3.76	0.72	1.94	3.07	0.30	0.02	0.00	0.04	0.02	0.04	14.79
1986	1.05	4.39	2.03	2.65	11.79	7.26	0.16	0.00	0.00	0.01	0.00	1.14	30.48
1987	0.00	0.28	1.51	2.48	2.90	6.62	0.19	0.06	0.00	0.00	0.00	0.00	14.04
1988	2.76	1.49	4.95	2.87	2.67	1.29	3.44	0.20	0.18	0.02	0.00	0.00	19.87
1989	0.00	1.85	8.08	0.98	1.66	1.99	0.76	0.12	0.00	0.00	0.00	1.70	17.14
1990	1.62	0.55	0.00	3.91	2.98	0.70	0.48	1.42	0.00	0.00	0.00	0.56	12.22
1991	0.00	0.36	0.43	0.81	2.39	12.82	0.43	0.00	0.80	0.00	0.07	0.00	18.11
1992	0.44	0.58	4.49	3.43	9.84	3.15	0.10	0.00	0.04	0.44	0.00	0.00	22.51
1993	1.29	0.00	5.45	10.51	8.61	4.03	0.25	0.23	0.09	0.00	0.00	0.00	30.46
1994	0.22	1.89	2.20	2.93	5.97	1.43	1.46	0.86	0.00	0.00	0.00	2.38	19.34
1995	0.89	2.51	1.15	16.03	2.25	16.48	1.12	0.74	0.76	0.00	0.00	0.00	41.93
1996	0.02	0.40	3.55	4.68	9.73	1.78	1.90	1.05	0.00	0.00	0.00	0.00	23.11
1997	2.23	4.43	10.88	13.31	0.46	0.00	0.05	0.00	0.00	0.05	0.01	0.00	31.42
1998	0.00	5.84	5.32	6.86	15.07	3.79	3.58	3.41	0.05	0.00	0.00	0.35	44.27
1999	0.37	1.88	1.22	3.62	2.37	5.19	2.07	0.00	0.00	0.00	0.00	0.13	16.85
2000	0.00	1.69	0.08	4.33	13.17	1.92	2.97	0.21	0.34	0.00	0.00	0.02	24.73
2001	2.22	0.03	0.19	8.10	7.17	4.94	1.87	0.00	0.00	0.00	0.00	0.00	24.52
2002	0.49	5.47	3.03	1.31	0.84	2.14	1.33	0.18	0.00	0.00	0.00	0.05	14.84
2003	0.00	4.42	8.07	0.38	3.16	3.51	1.92	1.39	0.00	0.03	0.00	0.00	22.88
2004	0.00	2.71	3.25	1.13	8.29	0.61	0.00	0.00	0.00	0.00	0.00	0.00	15.99

Precipitation Record (1871-2023)
San Luis Obispo - Central Coast Valleys - Station 52 Cal Poly

Monthly Precipitation Data (inches):

Water Year	Oct.	Nov.	Dec.	Jan	Feb	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	TOTAL
2005	0.83	3.96	6.21	6.78	5.54	4.29	0.68	1.46	0.01	0.00	0.00	0.05	29.81
2006	0.01	1.17	0.83	4.32	1.34	3.38	2.88	1.33	0.00	0.20	0.00	0.00	15.46
2007	0.08	0.63	3.03	1.61	4.14	0.51	0.75	0.08	0.00	0.00	0.08	0.04	10.95
2008	0.98	0.08	4.45	9.84	3.58	0.12	0.71	0.00	0.00	0.00	0.16	0.00	19.92
2009	0.19	1.58	1.89	0.87	3.11	1.49	0.51	0.20	0.35	0.00	0.00	0.08	10.27
2010	7.36	0.08	4.80	8.94	5.75	1.81	2.40	0.51	0.00	0.00	0.00	0.01	31.66
2011	2.20	2.24	12.09	0.47	4.33	7.20	0.16	1.42	1.38	0.01	0.00	0.00	31.5
2012	0.51	3.20	0.26	3.27	0.73	2.95	3.69	0.00	0.00	0.00	0.03	0.00	14.64
2013	1.35	3.07	6.42	1.35	0.89	0.90	0.00	0.31	0.01	0.03	0.00	0.02	14.35
2014	0.44	0.34	0.27	0.03	5.83	2.57	1.08	0.00	0.00	0.00	0.00	0.00	10.56
2015	0.00	1.51	5.89	0.12	2.31	0.02	1.49	0.18	0.00	1.37	0.00	0.05	12.94
2016	0.13	1.78	2.50	6.85	0.70	5.84	0.25	0.00	0.00	0.00	0.00	0.00	18.05
2017	2.85	2.10	4.17	13.36	11.00	2.71	2.29	0.45	0.00	0.00	0.04	0.24	39.21
2018	0.01	0.49	0.17	3.55	0.15	9.12	0.56	0.01	0.00	0.00	0.00	0.00	14.06
2019	0.70	5.03	1.20	7.02	7.41	6.01	0.22	1.89	0.00	0.00	0.00	0.00	29.48
2020	0.00	2.28	4.22	0.44	0.02	5.81	2.87	0.19	0.05	0.00	0.00	0.00	15.88
2021	0.00	0.93	1.86	7.92	0.00	1.38	0.00	0.00	0.00	0.05	0.02	0.00	12.16
2022	2.15	0.35	10.13	0.10	0.01	0.73	0.55	0.00	0.01	0.00	0.00	1.30	15.33
2023	0.02	1.02	11.18	11.91	4.55	11.45	0.00	0.67	0.21	0.00	0.02	0.12	41.15

Source: https://cimis.water.ca.gov/UserControls/Reports/MonthlyReportViewer.aspx

APPENDIX C

Groundwater Level and Groundwater Storage Monitoring Well Network

Appendix C
Groundwater Level Monitoring Network

Local ID[1]	TRS / State ID[2]	Well Depth (feet)	Screen Interval (feet)	GSE Elev.[3] (feet AMSL)	RP Elev.[4] (feet AMSL)	"Ft Above"	First WL Data Year	Most Recent WL Data Year	Data Period (Years)	Aquifer[5]	Well Criteria[6]	Well Use[7]	GSA
SLV-01	30S/12E-23E	(pending)	(pending)	304.0	304.0	0.00	2022	2023	1	Qa	GDE, T	MW	County
SLV-02	30S/12E-22G	(pending)	(pending)	276.0	276.0	0.00	2022	2023	1	Qa		MW	City
SLV-03	30S/12E-30P			153.0	153.6	0.60	2022	2022	<1	Qa		IRR-I	County
SLV-04	30S/12E-35B1	48	28-48	215.6	217.2	1.62	1991	2023	33	Qa		IRR-A	City
SLV-05	30S/12E-35D	52	32-52	187.0	188.9	1.87	1990	2023	34	Qa	GDE, T	IRR-A	City
SLV-06	31S/12E-04D	85	45-85	150.0	151.6	1.60	1989	2023	35	Qa	T	MW	City
SLV-07	31S/12E-04K	125	55-125	139.5	140.9	1.42	1992	2023	32	Qpr		PS-I	City
SLV-08	31S/12E-03K	70	50-70	128.0	128.9	0.85	1988	2023	36	Qpr		IRR-A	City
SLV-09	31S/12E-4R1	130	40-130	129.5	131.5	2.00	1988	2023	36	Qa/Qpr	SUB	PS-I	City
SLV-10	31S/12E-3Q	48		131.0	131.4	0.37	2017	2023	7	Qa		MW	City
SLV-11	31S/12E-3P1	61		119.0	120.7	1.70	1990	2023	34	Qa		MW	City
SLV-12	31S/12E-10D3	175	50-90; 150-170	109.2	110.6	1.43	1992	2023	32	Qa/Qpr/Tps	ISW, SUB, T	IRR-A	City
SLV-13	31S/12E-11D	40	5-40	121.8	121.8	0.00	1996	2023	28	Qa	T, GDE	MW	City
SLV-14	31S/12E-12E	20	5-20	144.7	144.7	0.00	1990	2022	33	Qa		MW	County
SLV-15	31S/12E-10G2	190		122.0	122.6	0.60	1965	2023	59	Qpr		IRR-A	City
SLV-16	31S/12E-10H3	165	65-165	122.0	122.6	0.60	1984	2023	40	Qpr	WL	DOM-A	City
SLV-17	31S/12E-11M	100	60-100	119.8	119.8	0.00	1996	2023	28	Qpr		MW	County
SLV-18	31S/12E-11K	30	6-21	133.3	133.3	0.00	1990	2023	34	Qa		MW	County
SLV-19	31S/12E-14C1			128.0	129.6	1.60	1958	2023	66	Qpr	WL, GDE, T	IRR-A	County
SLV-20	31S/13E-18D			202.0	204.0	2.00	2022	2023	2	Qa		MW	County
SLV-21	31S/12E-13A	60	50-60	178.7	178.7	0.00	2018	2023	6	Qpr		MW	County
SLV-22	31S/12E-13C	100	11-100	178.0	179.6	1.60	2004	2023	20	Qpr/Kjf	T	IRR-I	County
SLV-23		48	28-48	138.3	138.0	-0.25	2022	2023	2	Qa	T	MW	County
EV-01	31S/13E-16N1	72		324.0	324.6	0.60	1958	2023	66	Qa	ISW, T	DOM-A	County
EV-02	31S/13E-20A	75		305.0	305.0	0.00	2022	2023	2	Qa	GDE	IRR-I	County
EV-03	31S/13E-19H4	250	178-250	254.0	254.0	0.00	1977	2023	47	Qpr/Tps		IRR-A	County
EV-04	31S/13E-19H1	140		262.0	263.0	1.00	1958	2023	66	Tps	WL, GWS, T	IRR-A	County
EV-05	31S/13E-20G	400	120-400	280.0	281.0	1.00	2022	2023	2	Tps		IRR-I	County
EV-06	31S/13E-19J1			251.0	252.5	1.50	1998	2023	26	Qpr		DOM-I	County
EV-07	31S/13E-19J2			250.0	251.2	1.20	1998	2023	26	Tps		DOM-A	County
EV-08	31S/13E-21L			350.0	350.0	0.00	2022	2023	2	Qa	GDE, T	IRR-A	County
EV-09	31S/13E-19R3	440	130-190; 290-430	239.0	239.0	0.00	1974	2023	50	Tps/Tm	WL, GWS	PS-A	County
EV-10	31S/13E-28F	340	200-330	344.0	344.0	0.00	2022	2022	<1	Qpr/Tps		IRR-A	County
EV-11	31S/13E-20F6	150	55-150	230.0	229.5	-0.50	2011	2023	13	Qpr/Tm	ISW, GDE, T	MW	County
EV-12	31S/13E-28J3	600		303.0	303.9	0.90	1993	2023	31	Qpr/Tps		IRR-A	County
EV-13	31S/13E-27M3	400	130-380	289.0	290.0	1.00	1993	2023	31	Qpr/Tps	WL, GWS	IRR-A	County
EV-14	31S/13E-27R	300	90-290	329.9	329.3	-0.60	2017	2020	4	Qpr/Tps	T	MW	County
EV-15	31S/13E-27Q			307.0	307.0	0.00	1989	2022	34	Qpr/Tps		DOM-I	County
EV-16	31S/13E-35D	260	200-260	323.0	323.0	0.00	1988	2023	36	Tps	WL, GWS	PS-A	County
EV-17	31S/13E-35F	260	200-260	333.0	333.0	0.00	2014	2023	10	Tps/Kjf		PS-I	County
EV-18	31S/13E-36R1			327.0	327.5	0.50	1968	2023	56	(out of Basin)		IRR-A	County

Notes:
1-Representative Monitoring Sites are in bold. Wells with known State Well Completion Reports are underlined.
2-TRS = Township Range Section and ¼-¼ section listed, State Well ID bolded where applicable.
3-Ground surface elevations as interpolated from a Digital Elevation Model (DEM).
4-Reference Point elevations from various sources with variable accuracy.
5-Principal Aquifers are Quaternary Alluvium (Qa), Quaternary Paso Robles Formation (Qpr), and Tertiary Pismo Formation (Tps). Other bedrock aquifers (non-Basin sediments) areTertiary Monterey Formation (Tm) and Cretaceous-Jurassic Franciscan Assemblage (KJf). Aquifers are inferred where construction
6-Representative well criteria include Subsidence (SUB), Interconnected Surface Water Depletion (ISW), Chronic Water Level Decline (WL), and Groundwater Storage Decline (GSW).Other criteria are Transducer site (T), and Groundwater Dependent Ecosystem indicator evaluation site (GDE), which may be paired with nearby existing or proposed stream gage. Transducer installations are pending well owner authorization. Measurement frequency is semi-annual for all wells except Transducer sites (T), which are measured daily.
7- Well Use includes Monitoring Well (MW), Irrigation Well (IRR), Public Supply Well (PS), and Domestic Well (DOM). Modifiers are Active (A) or Inactive (I).Information for some wells inferred pending confirmation

APPENDIX D

Discovery and Resolution of RMS Groundwater Level Monitoring Network Wells Reference Point Elevations Discrepancies - Technical Memorandum

Water Solutions, Inc.

TECHNICAL MEMORANDUM

Discovery and Resolution of RMS Groundwater Level Monitoring Network Wells Reference Point Elevations Discrepancies

To: Blaine Reely, San Luis Obispo County Groundwater Sustainability Director

From: Nate Page, GSI Water Solutions, Inc.

Date: February 16, 2024

1. Introduction

It was discovered during the San Luis Obispo Flood Control and Water Conservation District (SLOFCWCD) groundwater monitoring program spring 2023 groundwater level monitoring event that groundwater elevation data exported from the SLOFCWCD water level database was being, and had previously been, misinterpreted by interested parties in the San Luis Obispo Valley Groundwater Basin (Basin). Beginning with preparation of the Groundwater Sustainability Plan (GSP), depth-to-water (DTW) data[1] received from SLOFCWCD database was interpreted to be reported from the reference point elevation (RPE) of each well. This understanding has been carried forward consistently through all subsequent annual reporting. However, in spring 2023, it was discovered that the DTW data are actually presented as calculated DTW values from the ground surface elevation (GSE). The ramifications of this discovery and the resolution of the issue are discussed below.

2. Discussion

Most of the wells in the water level monitoring network in the Basin have RPEs that are not equivalent to their respective GSEs (see Table 1). The SLOFCWCD includes a field labeled as “Ft Above”, indicating the amount of ‘stickup’, or distance between the GSE and RPE at each well location. Because the DTWs reported in the SLOFCWCD database were misinterpreted as measured from the RPEs of each well, the resulting groundwater elevation (GWE) calculations are off from their true value by an amount equivalent to the distance reported in the “Ft Above” field for each well. For most of the RMS wells in the Basin, the RPE is above the GSE, therefore most GWEs have been reported above their true groundwater elevation. The Measurable Objectives (MOs) and Minimum Thresholds (MTs) established in the GSP are based on historical GWEs for the 10 RMS wells and are therefore subject to this same “Ft Above” issue (*Ft Above Issue*).

All GWEs presented in the San Luis Obispo Valley Basin Water Year 2023 Annual Report have been corrected for the *Ft Above Issue* to represent true groundwater elevations, including both current water year (2023) and historical values. In most cases this correction involved moving GWEs downward; however, GWEs were moved up in three wells that have RPEs below their GSEs, and 15 wells did not have to have adjustments since their RPEs were equal to their GSEs (see Table 1). The MOs and MTs for the 10 RMS wells (as published in the GSP) have not been corrected but will need to be corrected using this same approach. The resolution to the *Ft Above Issue* is essentially clerical. Because both the GWEs and the MOs/MTs for the 10 RMS wells will be moved by the same magnitude, there is no change in status regarding sustainable

[1] The SLOFCWCD database uses the field description “Depth (Distance to Water)”

management criteria for each RMS well. The RPE, GSE, FT Above, and amount of change applied to GWEs for each water level monitoring network well is shown in Table 1.

Table 1. Table Name

Local ID[2]	TRS / State ID	RP (feet NAVD 88)[3]	GSE (feet NAVD 88)	"Ft Above" (feet)	Change applied to GWE (feet)
SLV-01	30S/12E-23E	304.0	304.0	0.00	0.00
SLV-02	30S/12E-22G	276.0	276.0	0.00	0.00
SLV-03	30S/12E-30P	153.6	153.0	0.60	-0.60
SLV-04	30S/12E-35B1	217.2	215.6	1.62	-1.62
SLV-05	30S/12E-35D	188.9	187.0	1.87	-1.87
SLV-06	31S/12E-04D	300.0	150.0	1.60	-1.60
SLV-07	31S/12E-04K	140.9	139.5	1.42	-1.42
SLV-08	31S/12E-03K	128.9	128.0	0.85	-0.85
SLV-09	31S/12E-4R1	131.5	129.5	2.00	-2.00
SLV-10	31S/12E-3Q	131.4	131.0	0.37	-0.37
SLV-11	31S/12E-3P1	120.7	119.0	1.70	-1.70
SLV-12	31S/12E-10D3	110.6	109.2	1.43	-1.43
SLV-13	31S/12E-11D	121.8	121.8	0.00	0.00
SLV-14	31S/12E-12E	144.7	144.7	0.00	0.00
SLV-15	31S/12E-10G2	122.6	122.0	0.60	-0.60
SLV-16	31S/12E-10H3	122.6	122.0	0.60	-0.60
SLV-17	31S/12E-11M	119.8	119.8	0.00	0.00
SLV-18	31S/12E-11K	133.3	133.3	0.00	0.00
SLV-19	31S/12E-14C1	129.6	128.0	1.60	-1.60
SLV-20	31S/13E-18D	204.0	202.0	2.00	-2.00
SLV-21	31S/12E-13A	178.7	178.7	0.00	0.00
SLV-22	31S/12E-13C	179.6	178.0	1.60	-1.60
SLV-23	---	138.0	138.3	-0.25	0.25
EV-01	31S/13E-16N1	324.6	324.0	0.60	-0.60
EV-02	31S/13E-20A	305.0	305.0	0.00	0.00
EV-03	31S/13E-19H4	254.0	254.0	0.00	0.00
EV-04	31S/13E-19H1	263.0	262.0	1.00	-1.00
EV-05	31S/13E-20G	281.0	280.0	1.00	-1.00
EV-06	31S/13E-19J1	252.5	251.0	1.50	-1.50
EV-07	31S/13E-19J2	251.2	250.0	1.20	-1.20
EV-08	31S/13E-21L	350.0	350.0	0.00	0.00
EV-09	31S/13E-19R3	239.0	239.0	0.00	0.00
EV-10	31S/13E-28F	344.0	344.0	0.00	0.00
EV-11	31S/13E-20F6	229.5	230.0	-0.50	0.50
EV-12	31S/13E-28J3	303.9	303.0	0.90	-0.90

EV-13	31S/13E-27M3	290.0	289.0	1.00	-1.00
EV-14	31S/13E-27R	329.3	329.9	-0.60	0.60
EV-15	31S/13E-27Q	307.0	307.0	0.00	0.00
EV-16	31S/13E-35D	323.0	323.0	0.00	0.00
EV-17	31S/13E-35F	333.0	333.0	0.00	0.00
EV-18	31S/13E-36R1	327.5	327.0	0.50	-0.50

Notes

[2] Representative Monitoring Sites (RMS) wells are in bold.

[3] NAVD 88 = North American Vertical Datum of 1988.

3. Summary

It was discovered in spring 2023 that the DTW data reported in the SLOFCWCD database is presented as a calculated depth to water from the ground surface elevation (GSE) rather than as measured from the RPE of each well, as was previously understood. This misunderstanding has resulted in historical reporting of GWEs that are off from their true value by an amount equivalent to the distance reported in the “Ft Above” field for each well. This same misunderstanding also affected the setting of MOs and MTs in the GSP. However, all GWEs presented in the San Luis Obispo Valley Basin Water Year 2023 Annual Report have been corrected for the *Ft Above Issue* to represent true groundwater elevations, including both current water year (2023) and historical values. The MOs and MTs for each water level RMS well will need to be corrected using the same approach. The resolution to the *Ft Above Issue* is essentially clerical. Because both the GWEs and their associated MOs/MTs will be moved by the same magnitude for each well, there will be no change in status regarding sustainable management criteria for each RMS well.

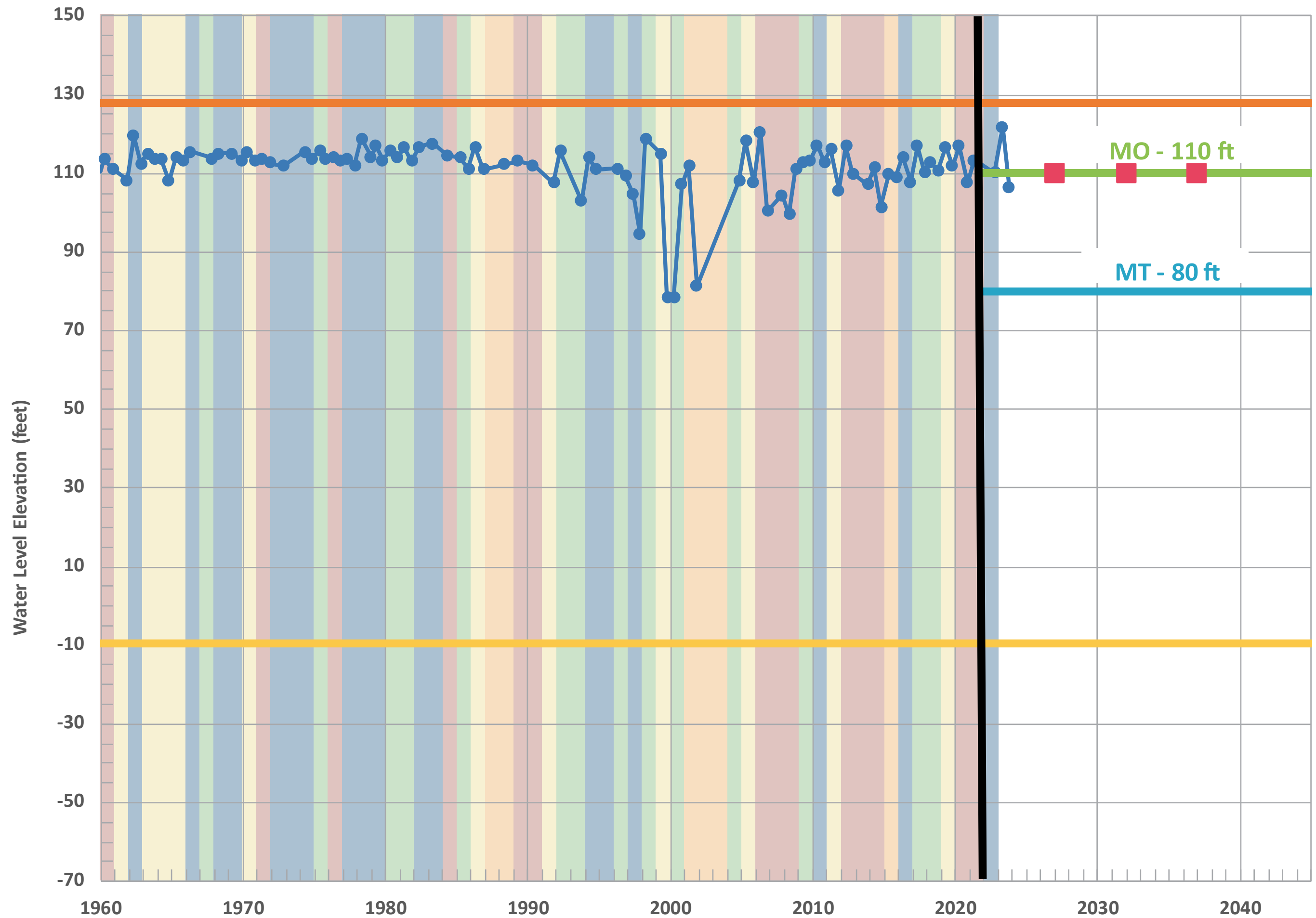
APPENDIX E

Hydrographs

APPENDIX E

RMS SLV-19
(31S/12E-14C01)

San Luis Obispo, California



LEGEND

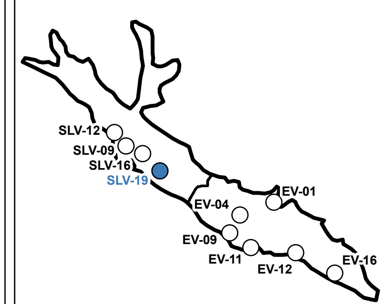
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

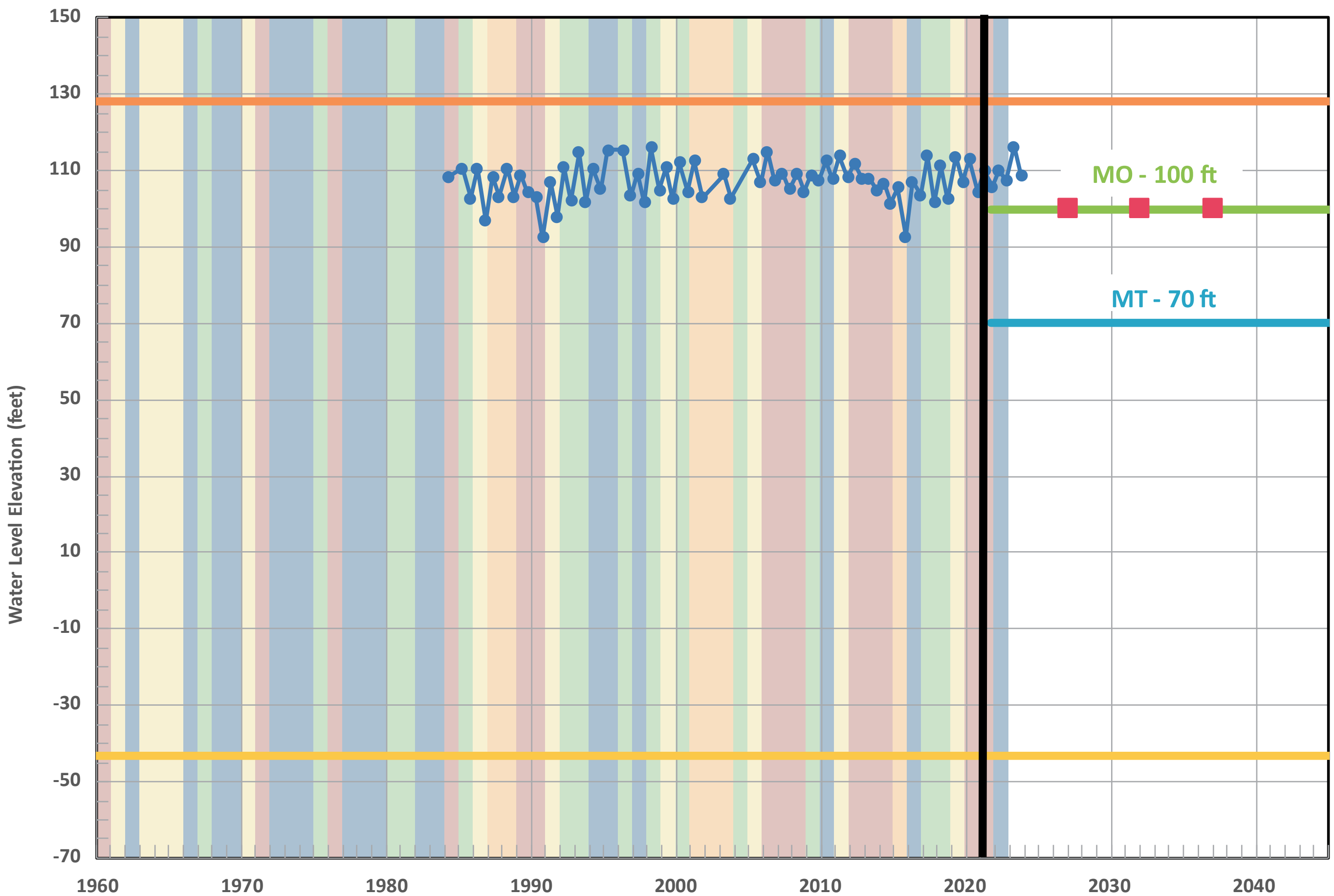
- Screen Interval



APPENDIX E

RMS SLV-16
(31S/12E-10H03)

San Luis Obispo, California



LEGEND

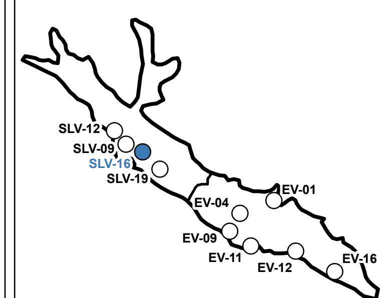
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval

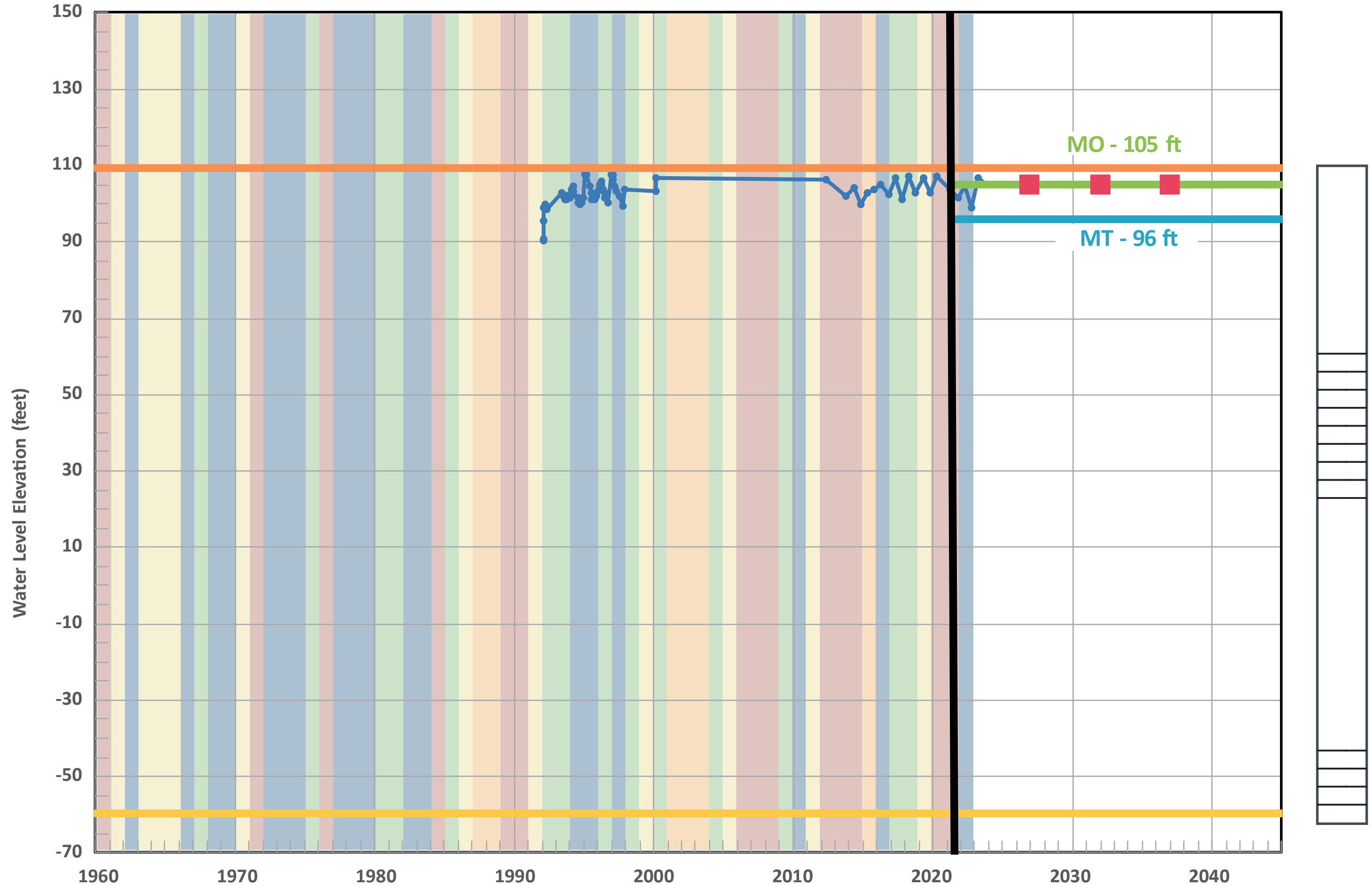


GSI Water Solutions, Inc.

APPENDIX E

RMS SLV-12
(31S/12E-10D03)

San Luis Obispo, California



LEGEND

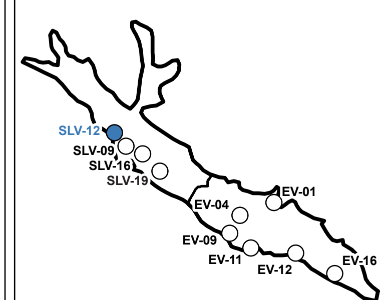
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval



GSI Water Solutions, Inc.

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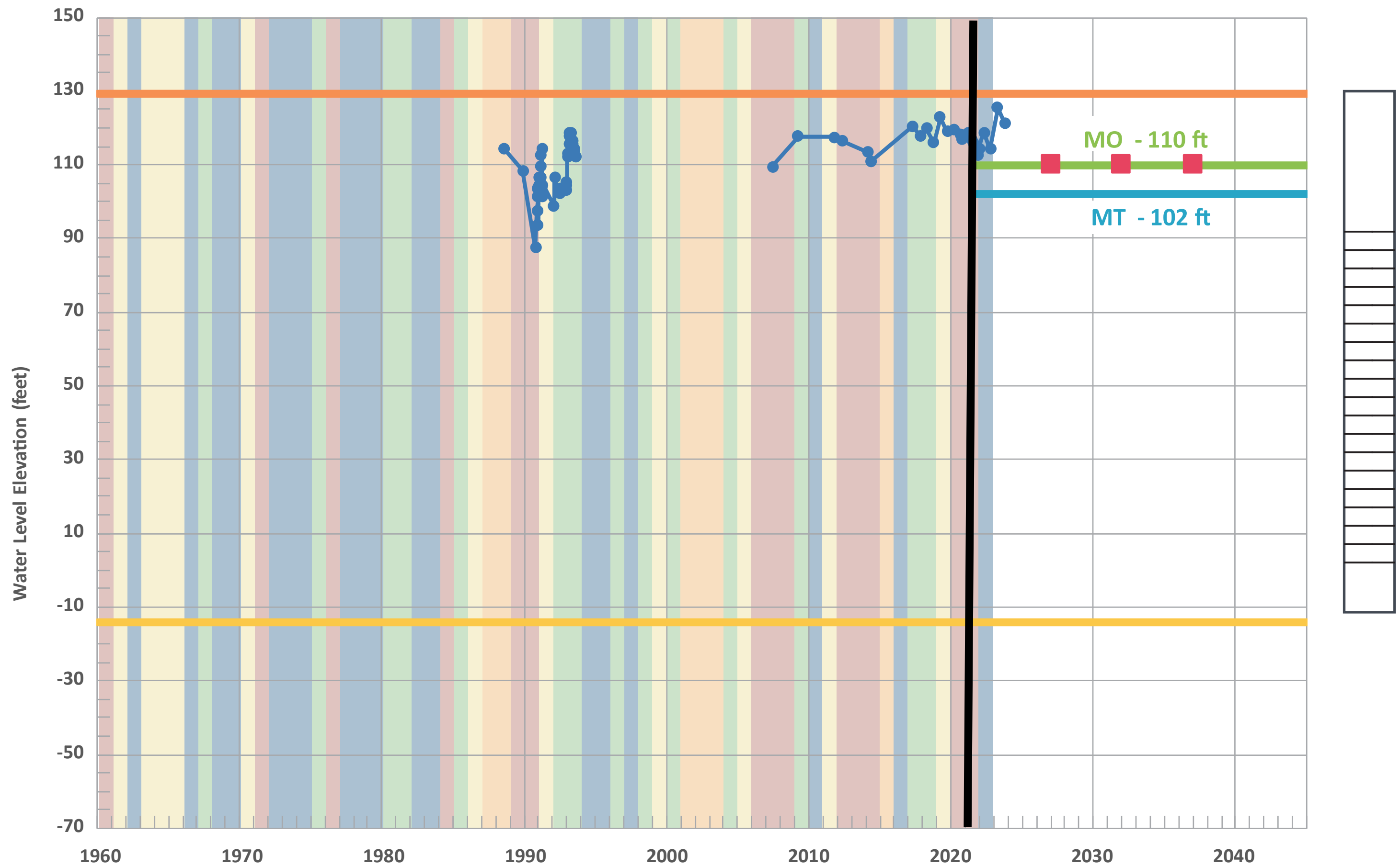


APPENDIX E

RMS SLV-09
(31S/12E-04R01)

San Luis Obispo, California

LEGEND

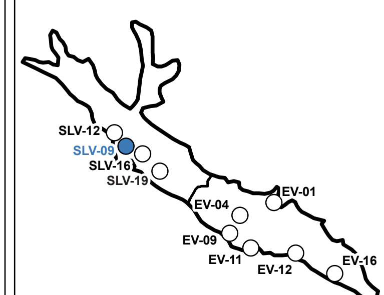
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval



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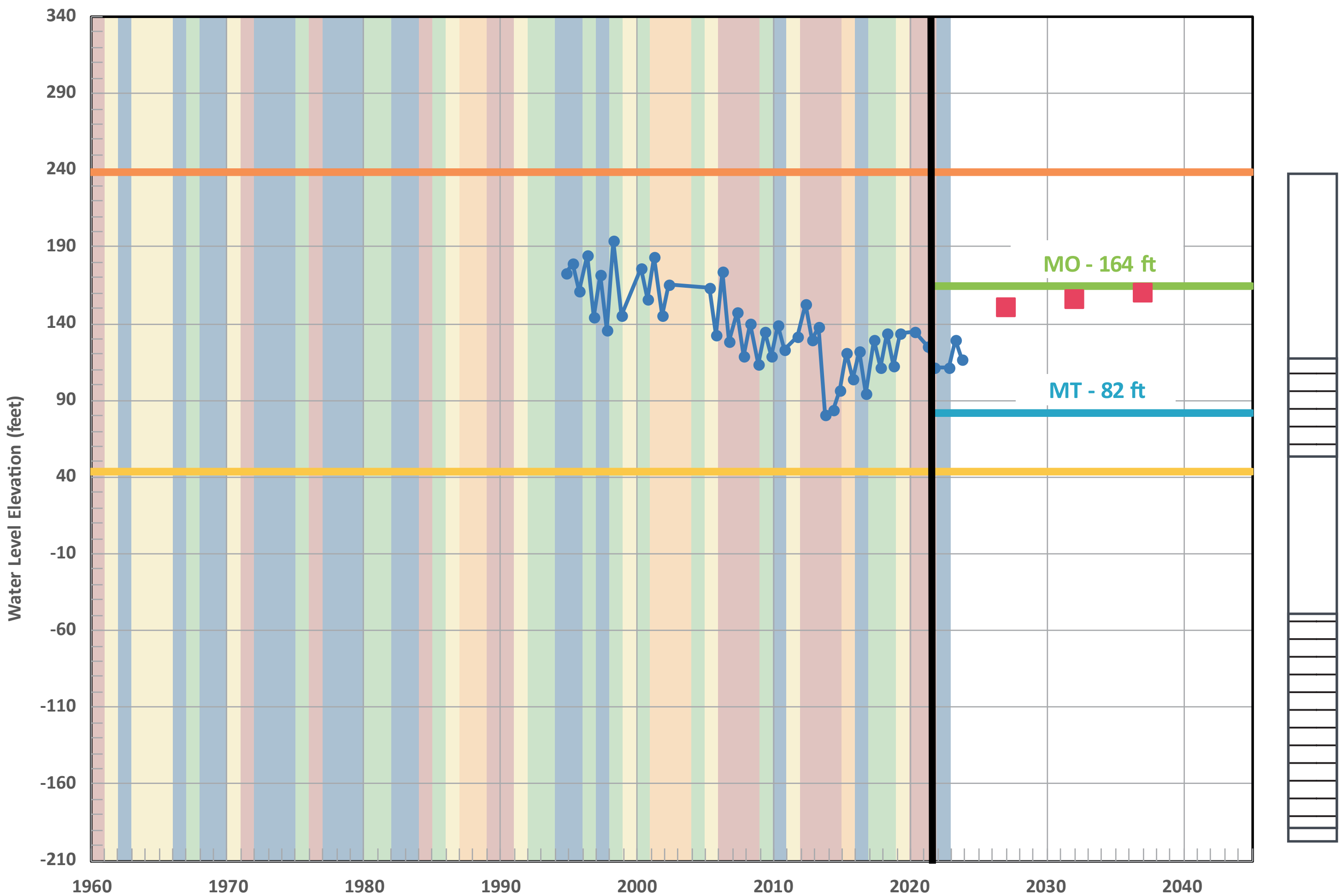
APPENDIX E

RMS EV-09
(31S/13E-19R03)

San Luis Obispo, California



LEGEND

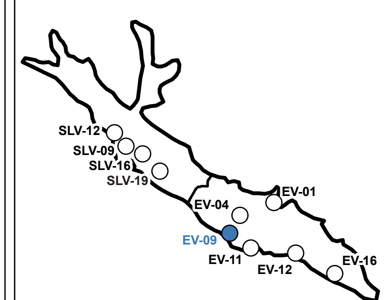
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

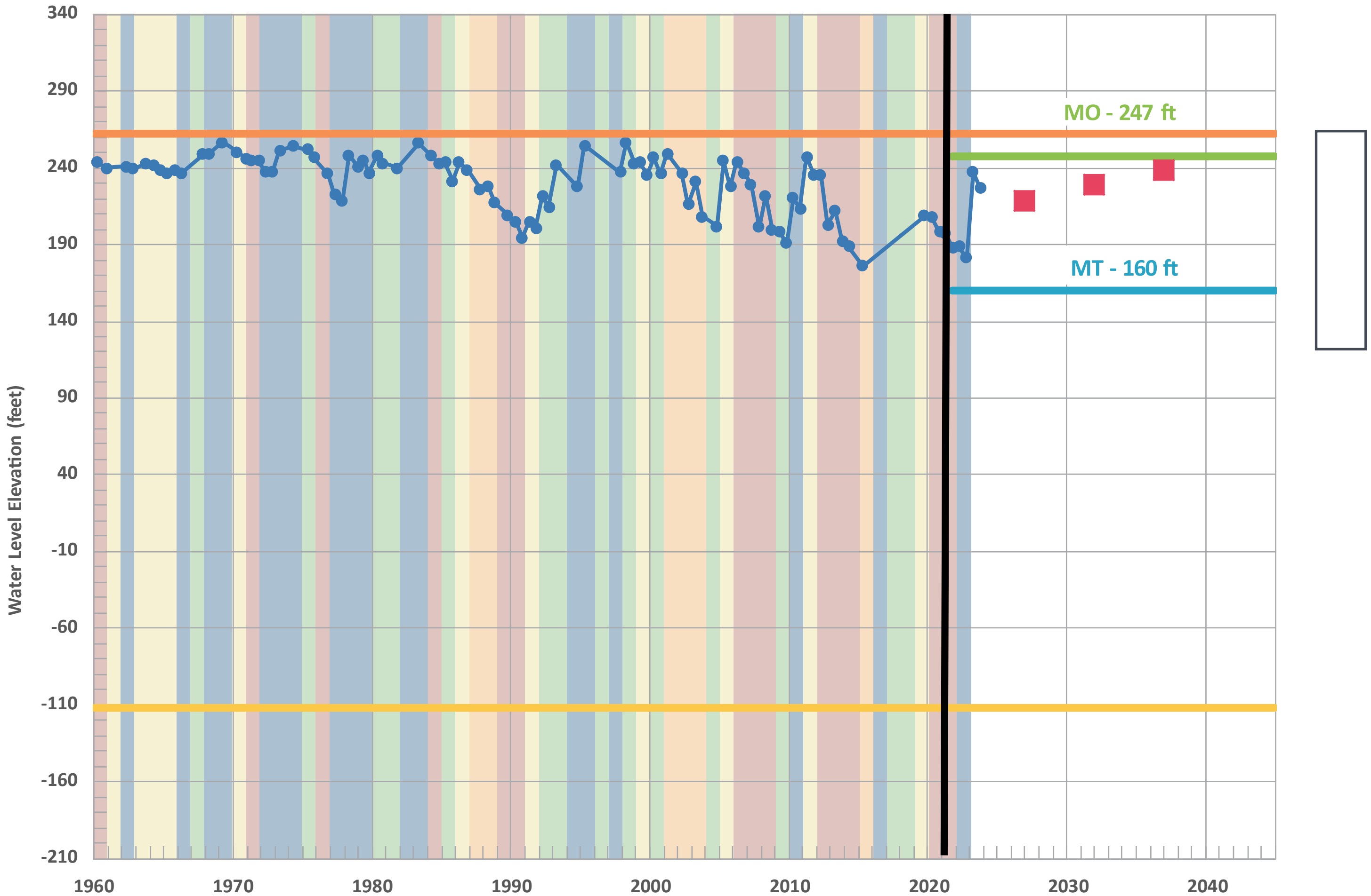
- Screen Interval



APPENDIX E

RMS EV-04
(31S/13E-19H01)

San Luis Obispo, California



LEGEND

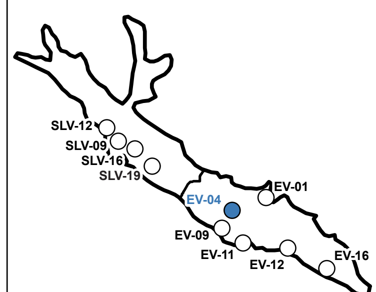
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval

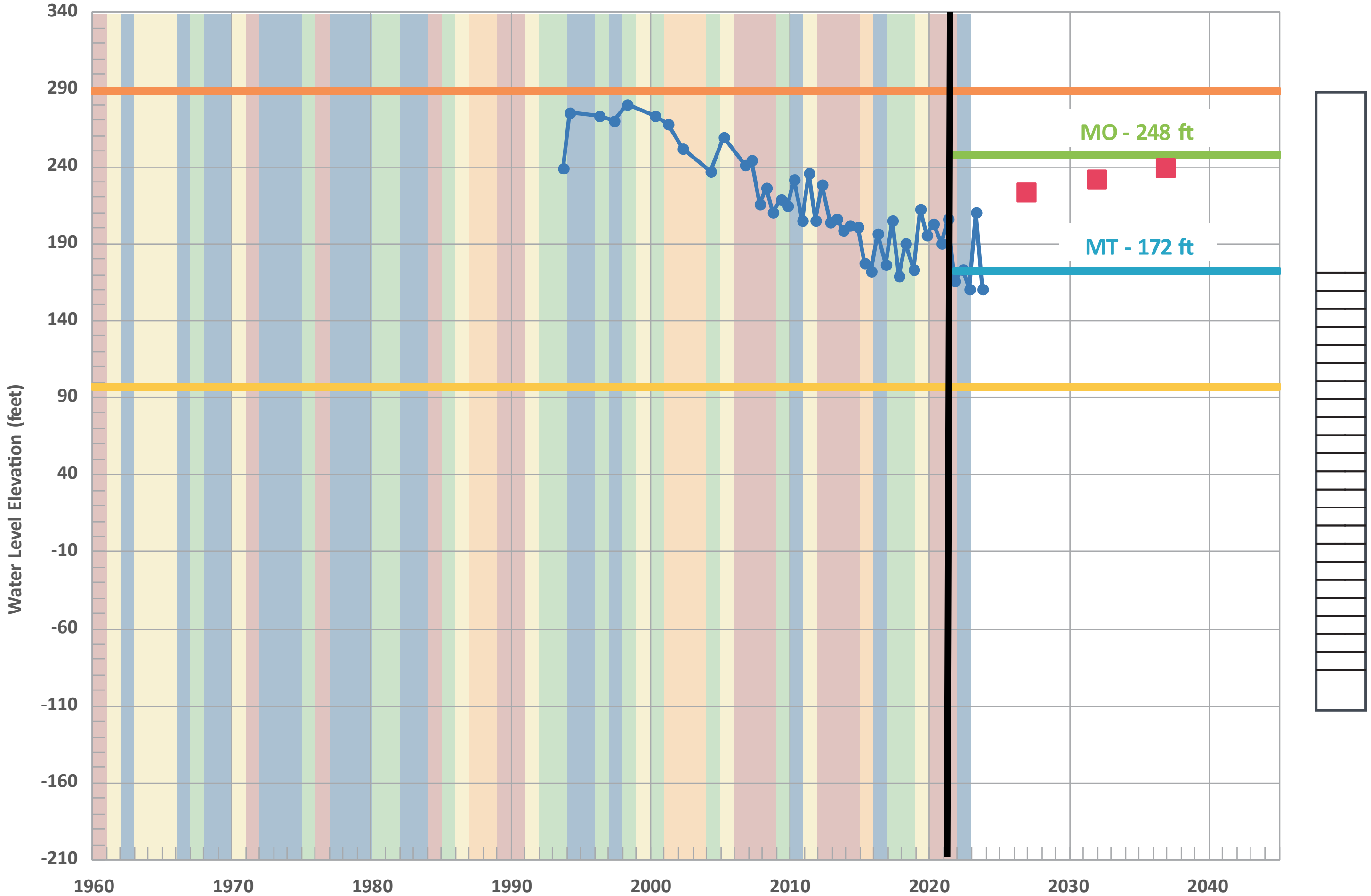


GSI Water Solutions, Inc.

APPENDIX E

RMS EV-13
(31S/13E-27M03)

San Luis Obispo, California



LEGEND

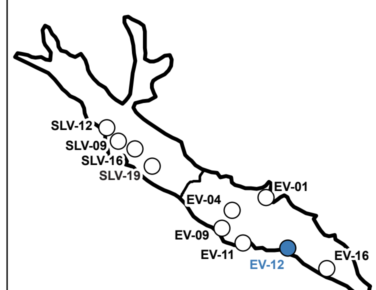
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval



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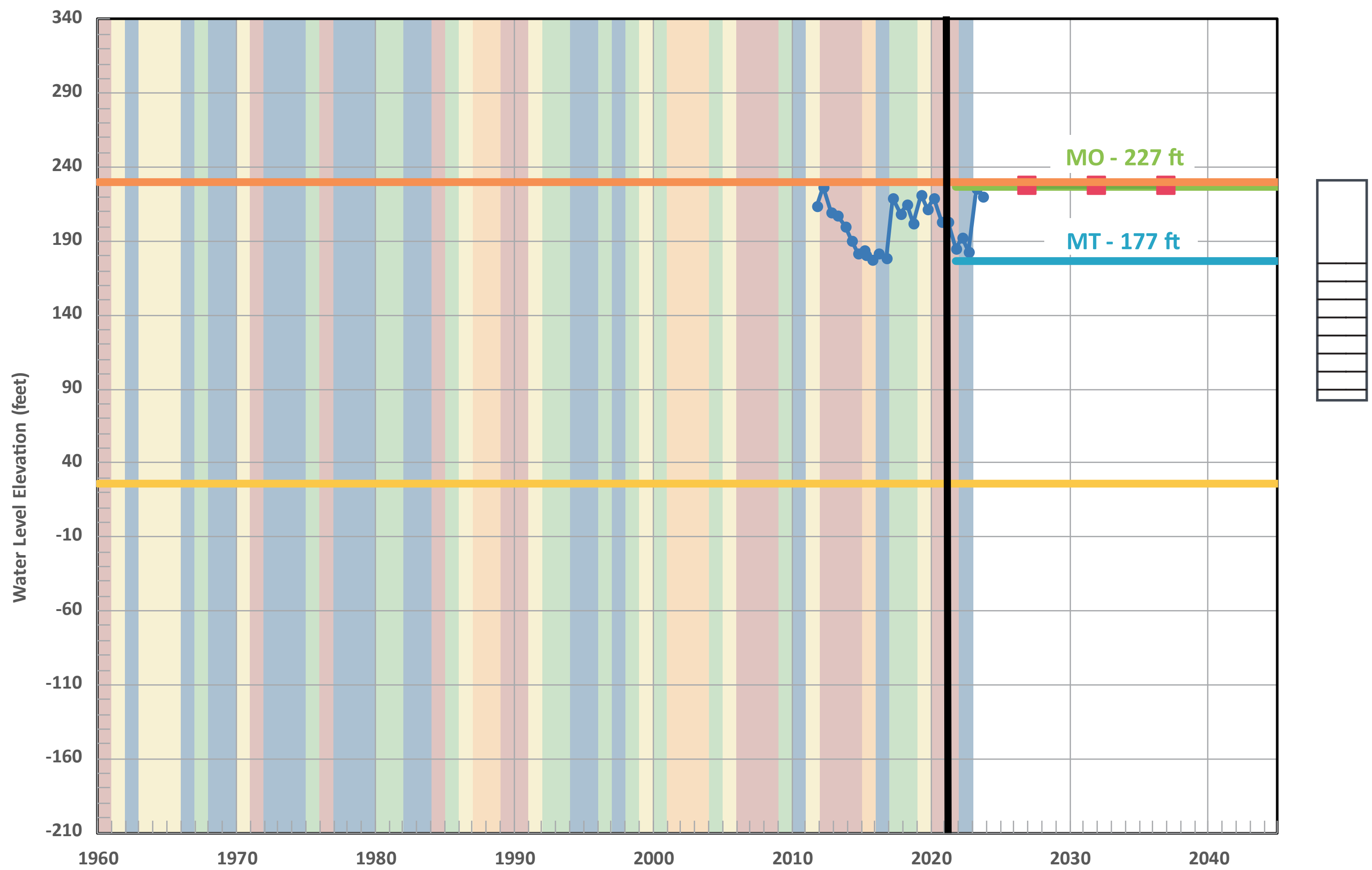
APPENDIX E

RMS EV-11
(31S/13E-29F06)

San Luis Obispo, California



LEGEND

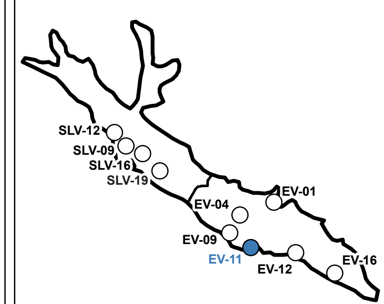
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

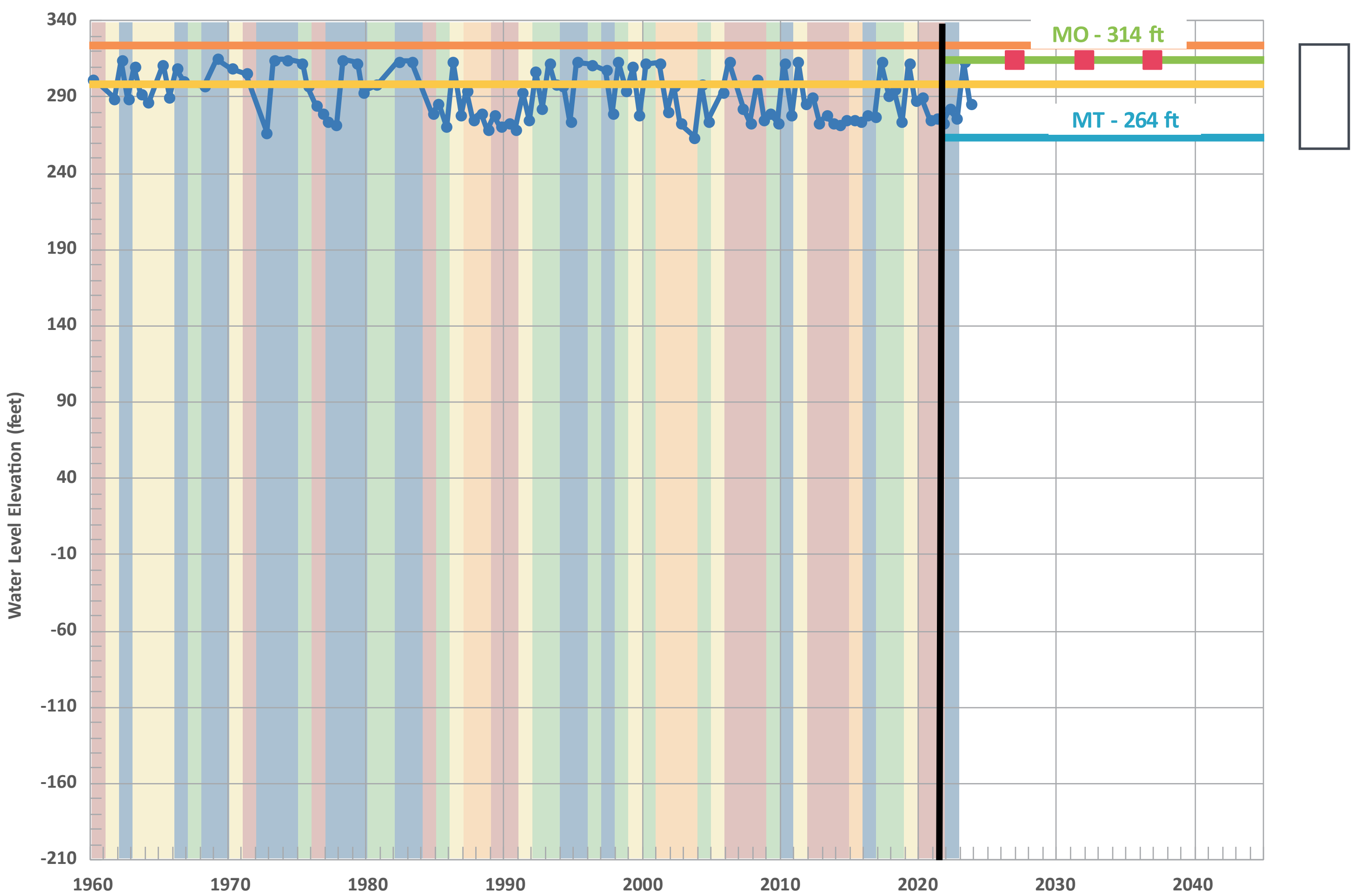
Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval





APPENDIX E

RMS EV-01
(31S/13E-16N01)

San Luis Obispo, California

LEGEND

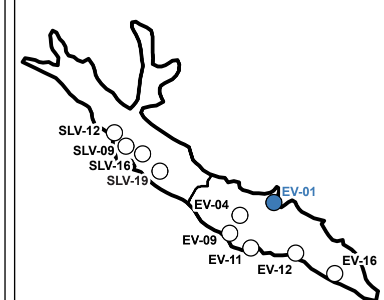
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval



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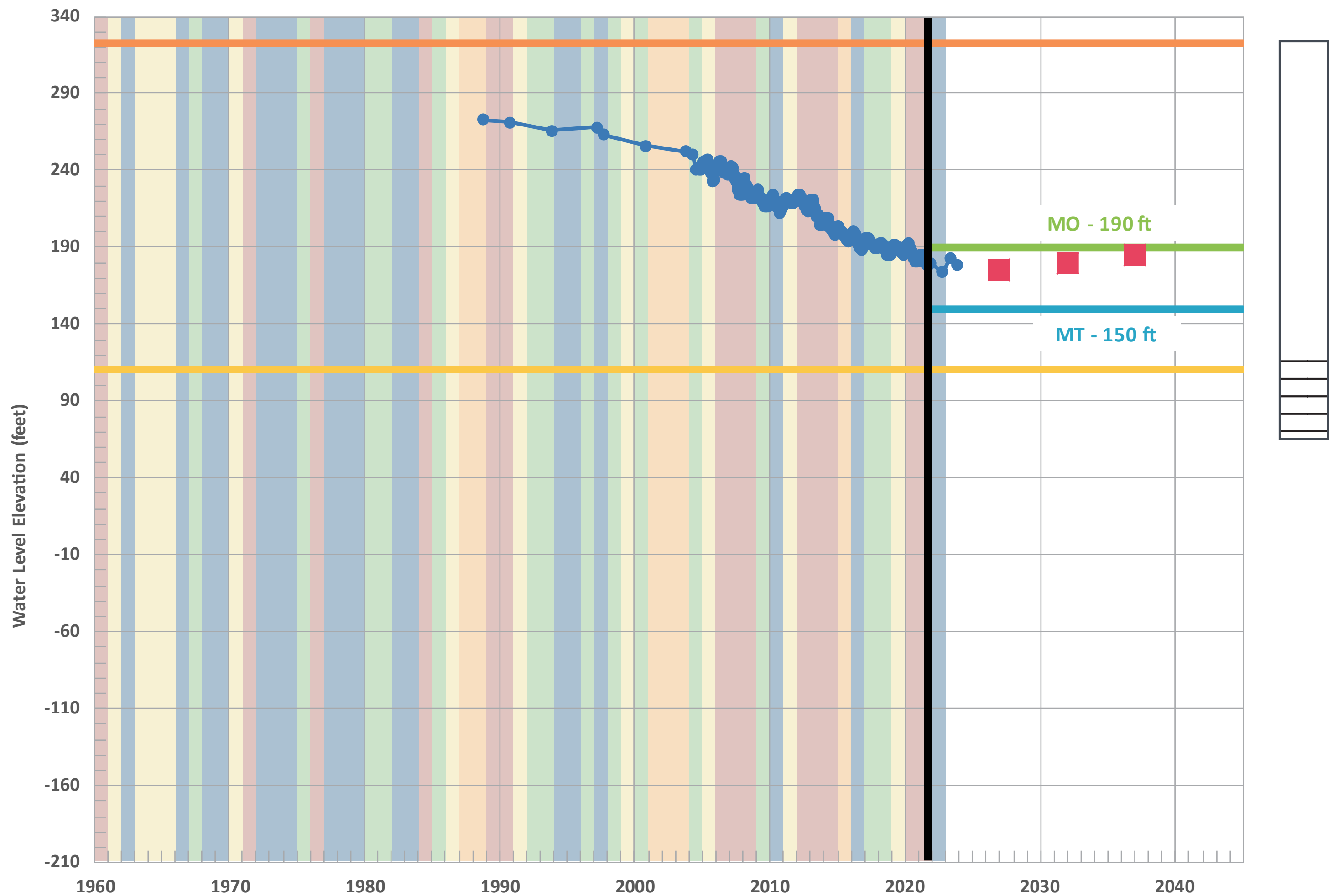
APPENDIX E

RMS EV-16
(VRMWC #1)

San Luis Obispo, California



LEGEND

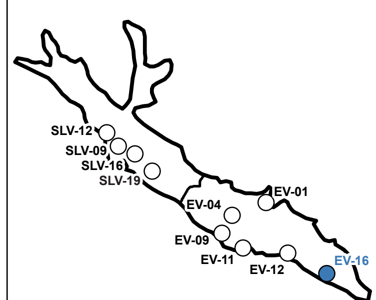
- Observed
- Interim Milestone(s)
- Measurable Objective (MO)
- Minimum Threshold (MT)
- Land Surface Elevation
- Bedrock Elevation (approx)

Water Year Type

- Wet
- Above Normal
- Below Normal
- Dry
- Critical

Well Specifications

- Screen Interval



GSI Water Solutions, Inc.

Y:\0667_County_of_San_Luis_Obisbo\Source_Figures\030_SLO_Basin_WY22_23\Annual_Report

APPENDIX F

Aquifer Storage Coefficient Derivation

6.4.6. Total Groundwater in Storage

Groundwater is stored within the pore space of Basin sediments. The Specific yield is a ratio of the volume of pore water that will drain under the influence of gravity to the total volume of saturated sediments. The specific yield method for estimating groundwater in storage is the product of total saturated Basin volume and average specific yield. Calculation of total groundwater in storage for selected years was performed based on the specific yield method.

Estimates of specific yield for Basin sediments were obtained based on a review of 21 representative well logs. The lithology for each well log was correlated with specific yield values reported for sediment types in San Luis Obispo County (Johnson, 1967). A summary of the correlations is shown in Table 6-13. Locations of well logs used for the specific yield correlations are shown in the referenced cross-sections from the SLO Basin Characterization Report (GSI Water Solutions, 2018).

Groundwater in storage calculations were performed for the Spring conditions of 1986, 1990, 1995, 1998, 2011, 2014, and 2019 using the specific yield method. Water level contours for each year were prepared based on available water level data from various sources, including the SLCFCWCD water level monitoring program, Geotracker Groundwater Information System data, groundwater monitoring reports, Stakeholder provided information, and Environmental Impact Reports. Water level contour maps for the Spring 1986 and Spring 2019 are shown in Figure 6-18 and Figure 6-19.

The water level contours for storage calculations extend to the Basin boundaries. Groundwater levels in the San Luis Valley subarea may contour at, or slightly above, ground surface in areas where wetlands are present, and there are no major differences between Spring 1986 and Spring 2019 water levels. In the Edna Valley subarea, water level contours show some notable areas of decline between 1986 and 2019 near the intersection of Edna Road (Highway 227) and Biddle Ranch Road and at the southeast end of the Basin. Declines in these areas are also shown for other time intervals in Figure 5-8 and Figure 5-9 of Chapter 5 (Groundwater Conditions). Of note, however, is that Spring 2019 water levels shown in Figure 6-18 are lower near the intersection of Edna and Biddle Ranch Road than for the same period shown in Figure 5-6. This is because Figure 5-6 contours pressure in a shallow alluvial aquifer in this area while Figure 6-19 contours pressure in the deeper Pismo Formation aquifer that is the main supply aquifer for irrigation, and more appropriate for water budget storage calculations.

Table 6-13. Specific Yield Averages

		AQUIFER SPECIFIC YIELD (PERCENT)		
WELL ID	BASIN CROSS-SECTION	QAL	QTP	PISMO
139405	B-B'	3.0	4.7	
158599	G-G'	6.8	6.9	18.0
279128	C2-C2'	11.0		
279130	A1-A2	8.2	6.5	3.0
287786	C1-C1'	7.2		
319126	C1-C1'	5.5	11.7	
438979	A1-A2	4.4	8.1	
469906	A3-A4		12.0	10.7
529099	E-E'		8.1	11.2
68734	A2-A3		5.9	8.0
710817	G-G'	3.0	5.0	10.8
73143	A1-A2	12.7	5.8	
782309	A2-A3	7.1	10.5	15.8
782656	D-D'	5.0	16.0	
e026022	H-H'		7.4	18.6
e0047435	G-G'	6.6	4.5	17.6
e0115806	offset I-I'		9.1	16.2
e0161526	F-F'		5.4	15.6
e0183287	H-H'	3.0	7.0	
e0225875	A2-A3	3.6	17.3	10.1
TH1	C1-C1'	5.9	8.9	18.0
AVERAGE SPECIFIC YIELD		**6.2**	**8.5**	**13.4**
BASIN AVERAGE (WEIGHTED)		**10.5**		
SAN LUIS VALLEY SUBAREA (WEIGHTED)		**8.0**		
EDNA VALLEY SUBAREA (WEIGHTED)		**11.7**		

Notes: Cross-sections shown in SLO Basin Characterization Report (GS1 Water Solutions, 2018)

Qal = alluvium; QTp = Paso Robles Formation; Pismo = Pismo Formation

Weighted averages based on penetrated thicknesses of aquifer type.

APPENDIX G

DWR Determination Letter on 2022 Groundwater Sustainability Plan (April 27, 2023)

CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

715 P Street, 8th Floor | Sacramento, CA 95814 | P.O. Box 942836 | Sacramento, CA 94236-0001

April 27, 2023

Blaine Reely, Groundwater Sustainability Director
County of San Luis Obispo
County Government Center
1055 Monterey Street
San Luis Obispo, CA 93408
breely@co.slo.ca.us

RE: Approved Determination of the 2022 Groundwater Sustainability Plan Submitted for the San Luis Obispo Valley Basin

Dear Blaine Reely,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP) submitted for the San Luis Obispo Valley Basin and has determined the GSP is approved. The approval is based on recommendations from the Staff Report, included as an exhibit to the attached Statement of Findings, which describes that the San Luis Obispo Valley Basin GSP satisfies the objectives of the Sustainable Groundwater Management Act (SGMA) and substantially complies with the GSP Regulations. The Staff Report also proposes recommended corrective actions that the Department believes will enhance the GSP and facilitate future evaluation by the Department. The Department strongly encourages the recommended corrective actions be given due consideration and suggests incorporating all resulting changes to the GSP in future updates.

Recognizing SGMA sets a long-term horizon for groundwater sustainability agencies (GSAs) to achieve their basin sustainability goals, monitoring progress is fundamental for successful implementation. GSAs are required to evaluate their GSPs at least every five years and whenever the Plan is amended, and to provide a written assessment to the Department. Accordingly, the Department will evaluate approved GSPs and issue an assessment at least every five years. The Department will initiate the first five-year review of the San Luis Obispo Valley Basin GSP no later than January 26, 2027.

Please contact Sustainable Groundwater Management staff by emailing sgmps@water.ca.gov if you have any questions related to the Department's assessment or implementation of your GSP.

Thank You,

Paul Gosselin
Deputy Director
Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Approval of the San Luis Obispo Valley Basin Groundwater Sustainability Plan

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE APPROVAL OF THE SAN LUIS OBISPO VALLEY BASIN GROUNDWATER SUSTAINABILITY PLAN

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP or Plan) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin covered by the Plan, and whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) The Department is directed to issue an assessment of the Plan within two years of its submission. (Water Code § 10733.4.) This Statement of Findings explains the Department's decision regarding the Plan submitted by the County of San Luis Obispo GSA and the City of San Luis Obispo GSA (GSA(s) or Agencies) for the San Luis Obispo Valley Basin (No. 3-009).

Department management has discussed the Plan with staff and has reviewed the Department Staff Report, entitled Sustainable Groundwater Management Program Groundwater Sustainability Plan Assessment Staff Report, attached as Exhibit A, recommending approval of the GSP. Department management is satisfied that staff have conducted a thorough evaluation and assessment of the Plan and concurs with staff's recommendation and all the recommended corrective actions. The Department therefore **APPROVES** the Plan and makes the following findings:

A. The Plan satisfies the required conditions as outlined in § 355.4(a) of the GSP Regulations (23 CCR § 350 et seq.):

    1. The Plan was submitted within the statutory deadline of January 31, 2022. (Water Code § 10720.7(a); 23 CCR § 355.4(a)(1).)

    2. The Plan was complete, meaning it generally appeared to include the information required by the Act and the GSP Regulations sufficient to warrant a thorough evaluation and issuance of an assessment by the Department. (23 CCR § 355.4(a)(2).)

    3. The Plan, either on its own or in coordination with other Plans, covers the entire San Luis Obispo Valley Basin. (23 CCR § 355.4(a)(3).)

B. The general standards the Department applied in its evaluation and assessment of the Plan are: (1) "conformance" with the specified statutory requirements, (2) "substantial compliance" with the GSP Regulations, (3) whether the Plan is likely to achieve the sustainability goal for the San Luis

Obispo Valley Basin within 20 years of the implementation of the Plan, and (4) whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) Application of these standards requires exercise of the Department's expertise, judgment, and discretion when making its determination of whether a Plan should be deemed "approved," "incomplete," or "inadequate."

The statutes and GSP Regulations require Plans to include and address a multitude and wide range of informational and technical components. The Department has observed a diverse array of approaches to addressing these technical and informational components being used by GSAs in different basins throughout the state. The Department does not apply a set formula or criterion that would require a particular outcome based on how a Plan addresses any one of SGMA's numerous informational and technical components. The Department finds that affording flexibility and discretion to local GSAs is consistent with the standards identified above; the state policy that sustainable groundwater management is best achieved locally through the development, implementation, and updating of local plans and programs (Water Code § 113); and the Legislature's express intent under SGMA that groundwater basins be managed through the actions of local governmental agencies to the greatest extent feasible, while minimizing state intervention to only when necessary to ensure that local agencies manage groundwater in a sustainable manner. (Water Code § 10720.1(h)) The Department's final determination of a Plan's status is made based on the entirety of the Plan's contents on a case-by-case basis, considering and weighing factors relevant to the particular Plan and San Luis Obispo Valley Basin under review.

C. In making these findings and Plan determination, the Department also recognized that: (1) it maintains continuing oversight and jurisdiction to ensure the Plan is adequately implemented; (2) the Legislature intended SGMA to be implemented over many years; (3) SGMA provides Plans 20 years of implementation to achieve the sustainability goal in a San Luis Obispo Valley Basin (with the possibility that the Department may grant GSAs an additional five years upon request if the GSA has made satisfactory progress toward sustainability); and, (4) local agencies acting as GSAs are authorized, but not required, to address undesirable results that occurred prior to enactment of SGMA. (Water Code §§ 10721(r); 10727.2(b); 10733(a); 10733.8.)

D. The Plan conforms with Water Code §§ 10727.2 and 10727.4, substantially complies with 23 CCR § 355.4, and appears likely to achieve the sustainability goal for the San Luis Obispo Valley Basin. It does not appear at this time that the Plan will adversely affect the ability of adjacent basins to implement their GSPs or impede achievement of sustainability goals.

1. The sustainable management criteria and goal to maintain groundwater levels at historical low conditions minus a small margin of operational flexibility designed to account for future drought conditions are reasonable. While Department staff have identified a recommended corrective action, the overall groundwater level and storage conditions in the Basin are generally stable based on the information included in the GSP, so this fault does not preclude plan approval. The Plan relies on credible information and science to quantify the groundwater conditions that the Plan seeks to avoid and provides an objective way to determine whether the Basin is being managed sustainably in accordance with SGMA. (23 CCR § 355.4(b)(1).)

2. The Plan demonstrates a reasonable understanding of where data gaps exist and demonstrates a commitment to eliminate those data gaps. For example, expanding the monitoring network to improve basin characterization, updating the integrated hydrologic model with new collected data, and increasing understanding of surface water and groundwater interaction, with respect to interconnected surface water depletion, groundwater dependent ecosystems, and the water budget. Filling these known data gaps, and others described in the Plan, should lead to refinement of the GSA's monitoring networks and sustainable management criteria and help inform and guide future adaptive management strategies. (23 CCR § 355.4(b)(2).)

3. The projects and management actions proposed are designed to help achieve the sustainable management goals in the Basin and avoid undesirable results. Projects and management actions are largely focused on expanding the monitoring network, addressing the overdraft in the Edna Valley portion of the Basin. The projects and management actions are reasonable and commensurate with the level of understanding of the San Luis Obispo Valley Basin setting. The projects and management actions described in the Plan provide a feasible approach to achieving the San Luis Obispo Valley Basin s sustainability goal and should provide the GSA(s) with greater versatility to adapt and respond to changing conditions and future challenges during GSP implementation. (23 CCR § 355.4(b)(3).)

4. The Plan provides a detailed explanation of how the varied interests of groundwater uses and users in the San Luis Obispo Valley Basin were considered in developing the sustainable management criteria

and how those interests, including domestic wells, would be impacted by the chosen minimum thresholds. (23 CCR § 355.4(b)(4).)

5. The Plan's projects and management actions appear feasible at this time and appear likely to prevent undesirable results and ensure that the San Luis Obispo Valley Basin is operated within its sustainable yield within 20 years. The Department will continue to monitor Plan implementation and reserves the right to change its determination if projects and management actions are not implemented or appear unlikely to prevent undesirable results or achieve sustainability within SGMA timeframes. (23 CCR § 355.4(b)(5).)

6. The Plan includes a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft, if present. (23 CCR § 355.4(b)(6).)

7. At this time, it does not appear that the Plan will adversely affect the ability of an adjacent basin to implement its GSP or impede achievement of sustainability goals in an adjacent basin. The Plan states that the GSAs have developed a cooperative working relationship with the neighboring basin. The Plan includes an analysis of potential impacts to the adjacent basin related to the established minimum thresholds for each sustainability indicator. The Plan does not anticipate any impacts to the adjacent basin resulting from the minimum thresholds defined in the Plan. (23 CCR § 355.4(b)(7).)

8. If required, a satisfactory coordination agreement has been adopted by all relevant parties. (23 CCR § 355.4(b)(8).)

9. The GSAs' four member agencies, Golden State Water Company, Edna Valley Growers Mutual Water Company, Edna Ranch Mutual Water Company, and Varian Ranch Mutual Water Company have historically implemented numerous projects and management actions to address problematic groundwater conditions in the Basin. The GSAs' member agencies and their history of groundwater management provide a reasonable level of confidence that the GSA has the legal authority and financial resources necessary to implement the Plan. (23 CCR § 355.4(b)(9).)

10. Through review of the Plan and consideration of public comments, the Department determines that the GSA(s) adequately responded to comments that raised credible technical or policy issues with the Plan, sufficient to warrant approval of the Plan at this time. The Department also notes that the recommended corrective actions included in the Staff Report are important to addressing certain technical or policy

issues that may have been raised and, if not addressed before future, subsequent plan evaluations, may preclude approval of the Plan in those future evaluations. (23 CCR § 355.4(b)(10).)

E. In addition to the grounds listed above, DWR also finds that:

1. The Plan sets forth minimum thresholds for chronic lowering of groundwater levels that take into consideration the shallow water supply wells (i.e., domestic wells) that may be negatively impacted at different water levels. (San Luis Obispo Valley Basin GSP pp. 266-268.) The Plan sets minimum thresholds at or near historical low conditions minus a small margin of operational flexibility designed to account for future drought conditions. The GSAs state minimum thresholds have been designed to "protect as many domestic wells as possible" (San Luis Obispo p. 266-268). The Plan's compliance with the requirements of SGMA and substantial compliance with the GSP Regulations supports the state policy regarding the human right to water (Water Code § 106.3). The Department developed its GSP Regulations consistent with, and intending to further, the policy through implementation of SGMA and the Regulations, primarily by achieving sustainable groundwater management in a basin. By ensuring substantial compliance with the GSP Regulations, the Department has considered the state policy regarding the human right to water in its evaluation of the Plan. (23 CCR § 350.4(g).)

2. The Plan acknowledges and identifies interconnected surface waters within the Basin. The GSAs proposes initial sustainable management criteria to manage this sustainability indicator and measures to improve understanding and management of depletions of interconnected surface water. The GSAs acknowledges, and the Department agrees, that many data gaps related to interconnected surface water exist. The GSAs should continue filling data gaps, collecting additional monitoring data, and coordinating with resources agencies and interested parties to understand beneficial uses and users that may be impacted by depletions of interconnected surface water caused by groundwater pumping. Future updates to the Plan should aim to improve the initial sustainable management criteria as more information and improved methodologies become available.

3. The California Environmental Quality Act (Public Resources Code § 21000 et seq.) does not apply to the Department's evaluation and assessment of the Plan.

Accordingly, the GSP submitted by the Agencies for the San Luis Obispo Valley Basin is hereby **APPROVED.** The recommended corrective actions identified in the Staff Report will assist the Department's future review of the Plan's implementation for consistency with SGMA and the Department therefore recommends the Agencies address them by the time of the Department's five-year review, which is set to begin on January 26, 2027, as required by Water Code § 10733.8. Failure to address the Department's Recommended Corrective Actions before future, subsequent plan evaluations, may lead to a Plan being determined incomplete or inadequate.

Signed:

Karla Nemeth

Karla Nemeth, Director
Date: April 27, 2023

Exhibit A: Groundwater Sustainability Plan Assessment Staff Report – San Luis Obispo Valley Basin

State of California
Department of Water Resources
Sustainable Groundwater Management Program
Groundwater Sustainability Plan Assessment
Staff Report

Groundwater Basin Name:	San Luis Obispo Valley Groundwater Basin (No. 3-009)
Submitting Agency:	County of San Luis Obispo Groundwater Sustainability Agency City of San Luis Obispo Groundwater Sustainability Agency
Submittal Type:	Initial GSP Submission
Submittal Date:	January 26, 2022
Recommendation:	Approved
Date:	April 27, 2023

The San Luis Obispo Valley Groundwater Basin Groundwater Sustainable Agencies (GSAs or Agencies) submitted the San Luis Obispo Basin Groundwater Sustainable Plan (GSP or Plan) for the San Luis Obispo Basin to the Department of Water Resources (Department) for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA)[1] and GSP Regulations.[2] The GSP covers the entire Basin for the implementation of SGMA.

After evaluation and assessment, Department staff conclude that the Plan includes the required components of a GSP, demonstrates a thorough understanding of the Basin based on what appears to be the best available science and information, sets well explained, supported, and reasonable sustainable management criteria to prevent undesirable results as defined in the Plan, and proposes a set of projects and management actions that will likely achieve the sustainability goal defined for the Basin.[3] Department staff will continue to monitor and evaluate the Basin's progress toward achieving the sustainability goal through annual reporting and future periodic evaluations of the GSP and its implementation.

- ***Based on the current evaluation of the Plan, Department staff recommend the GSP be approved with the recommended corrective actions described herein.***

[1] Water Code § 10720 *et seq*.
[2] 23 CCR § 350 *et seq*.
[3] 23 CCR § 350 *et seq*.

This assessment includes five sections:

- **Section 1 – Summary**: Overview of Department staff's assessment and recommendations.
- **Section 2 – Evaluation Criteria**: Describes the legislative requirements and the Department's evaluation criteria.
- **Section 3 – Required Conditions**: Describes the submission requirements, Plan completeness, and basin coverage required for a GSP to be evaluated by the Department.
- **Section 4 – Plan Evaluation**: Provides an assessment of the contents included in the GSP organized by each Subarticle outlined in the GSP Regulations.
- **Section 5 – Staff Recommendation**: Includes the staff recommendation for the Plan and any recommended or required corrective actions, as applicable.

1 SUMMARY

Department staff recommend approval of the San Luis Obispo Basin GSP. The GSAs have identified areas for improvement of its Plan (e.g., investigate the location and presence of Groundwater Dependent Ecosystems, provide more detail related to the monitoring networks to fill data gaps, and addressing data gaps related to interconnected surface water, including estimations of the quantity and timing of surface water depletions). Department staff concur that those items are important and recommend the GSAs address them as soon as possible. Department staff have also identified additional recommended corrective actions within this assessment that the GSAs should consider addressing by the first periodic evaluation of the Plan. The recommended corrective actions generally focus on the following:

(1) Investigate the location and presence of Groundwater Dependent Ecosystems.
(2) Provide additional details and discussion related to specific components the GSAs used to establish sustainable management criteria for chronic lowering of groundwater levels.
(3) Provide additional details and discussion related to specific components the GSAs used to establish sustainable management criteria for degraded water quality.
(4) Continue to fill data gaps, collect additional monitoring data, coordinate with resources agencies, and interested parties to understand beneficial uses and users that may be impacted by depletions of interconnected surface water caused by groundwater pumping, and potentially refine sustainable management criteria.
(5) Provide additional details related to the monitoring networks.

Addressing the recommended corrective actions identified in Section 5 of this assessment will be important to demonstrate, on an ongoing basis, that implementation of the Plan is likely to achieve the sustainability goal.

2 EVALUATION CRITERIA

The GSAs submitted a single GSP to the Department to evaluate whether the Plan conforms to specified SGMA requirements[4] and is likely to achieve the sustainability goal for the San Luis Obispo Valley Basin.[5] To achieve the sustainability goal for the Basin, the GSP must demonstrate that implementation of the Plan will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.[6] Undesirable results must be defined quantitatively by the GSAs.[7] The Department is also required to evaluate whether the GSP will adversely affect the ability of an adjacent basin to implement its GSP or achieve its sustainability goal.[8]

For the GSP to be evaluated by the Department, it must first be determined that the Plan was submitted by the statutory deadline,[9] and that it is complete and covers the entire basin.[10] If these conditions are satisfied, the Department evaluates the Plan to determine whether it complies with specific SGMA requirements and substantially complies with the GSP Regulations.[11] Substantial compliance means that the supporting information is sufficiently detailed and the analyses sufficiently thorough and reasonable, in the judgment of the Department, to evaluate the Plan, and the Department determines that any discrepancy would not materially affect the ability of the Agency to achieve the sustainability goal for the basin, or the ability of the Department to evaluate the likelihood of the Plan to attain that goal.[12]

When evaluating whether the Plan is likely to achieve the sustainability goal for the Basin, Department staff reviewed the information provided and relied upon in the GSP for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.[13] The Department's review considers whether there is a reasonable relationship between the information provided and the assumptions and conclusions made by the GSAs, including whether the interests of the beneficial uses and users of groundwater in the basin have been considered; whether sustainable management criteria and projects and management actions described in the Plan are commensurate with the level of understanding of the basin setting; and whether those projects and management actions are feasible and likely to prevent undesirable results.[14]

[4] Water Code §§ 10727.2, 10727.4.
[5] Water Code § 10733(a).
[6] Water Code § 10721(v).
[7] 23 CCR § 354.26 *et seq.*
[8] Water Code § 10733(c).
[9] 23 CCR § 355.4(a)(1).
[10] 23 CCR §§ 355.4(a)(2), 355.4(a)(3).
[11] 23 CCR § 350 *et seq.*
[12] 23 CCR § 355.4(b).
[13] 23 CCR § 351(h).
[14] 23 CCR §§ 355.4(b)(1), (3), (4), and (5).

The Department also considers whether the GSAs have the legal authority and financial resources necessary to implement the Plan.[15]

To the extent overdraft is present in a basin, the Department evaluates whether the Plan provides a reasonable assessment of the overdraft and includes reasonable means to mitigate the overdraft.[16] The Department also considers whether the Plan provides reasonable measures and schedules to eliminate identified data gaps.[17] Lastly, the Department's review considers the comments submitted on the Plan and evaluates whether the GSAs adequately responded to the comments that raise credible technical or policy issues with the Plan.[18]

The Department is required to evaluate the Plan within two years of its submittal date and issue a written assessment of the Plan.[19] The assessment is required to include a determination of the Plan's status.[20] The GSP Regulations define the three options for determining the status of a Plan: Approved,[21] Incomplete,[22] or Inadequate.[23]

Even when review indicates that the GSP satisfies the requirements of SGMA and is in substantial compliance with the GSP Regulations, the Department may recommend corrective actions.[24] Recommended corrective actions are intended to facilitate progress in achieving the sustainability goal within the basin and the Department's future evaluations, and to allow the Department to better evaluate whether the Plan adversely affects adjacent basins. While the issues addressed by the recommended corrective actions do not, at this time, preclude approval of the Plan, the Department recommends that the issues be addressed to ensure the Plan's implementation continues to be consistent with SGMA and the Department is able to assess progress in achieving the sustainability goal within the basin.[25] Unless otherwise noted, the Department proposes that recommended corrective actions be addressed by the submission date for the first five-year assessment.[26]

The staff assessment of the GSP involves the review of information presented by the GSA, including models and assumptions, and an evaluation of that information based on scientific reasonableness, including standard or accepted professional and scientific methods and practices. The assessment does not require Department staff to recalculate or reevaluate technical information provided in the Plan or to perform its own geologic or

[15] 23 CCR § 355.4(b)(9).
[16] 23 CCR § 355.4(b)(6).
[17] 23 CCR § 355.4(b)(2).
[18] 23 CCR § 355.4(b)(10).
[19] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[20] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[21] 23 CCR § 355.2(e)(1).
[22] 23 CCR § 355.2(e)(2).
[23] 23 CCR § 355.2(e)(3).
[24] Water Code § 10733.4(d).
[25] Water Code § 10733.8.
[26] 23 CCR § 356.4 *et seq*.

engineering analysis of that information. The staff recommendation to approve a Plan does not signify that Department staff, were they to exercise the professional judgment required to develop a GSP for the basin, would make the same assumptions and interpretations as those contained in the Plan, but simply that Department staff have determined that the assumptions and interpretations relied upon by the submitting GSAs are supported by adequate, credible evidence, and are scientifically reasonable.

Lastly, the Department's review and approval of the Plan is a continual process. Both SGMA and the GSP Regulations provide the Department with the ongoing authority and duty to review the implementation of the Plan.[27] Also, GSAs have an ongoing duty to provide reports to the Department, periodically reassess their plans, and, when necessary, update or amend their plans.[28] The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the progress toward achieving the sustainability goal for the basin and whether Plan implementation adversely affects the ability of adjacent basins to achieve their sustainability goals.

3 Required Conditions

A GSP, to be evaluated by the Department, must be submitted within the applicable statutory deadline. The GSP must also be complete and must, either on its own or in coordination with other GSPs, cover the entire basin.

3.1 Submission Deadline

SGMA required basins categorized as high- or medium-priority and not subject to critical conditions of overdraft to submit a GSP no later than January 31, 2022.[29]

The GSAs submitted its Plan on Jan. 26, 2022.

3.2 Completeness

GSP Regulations specify that the Department shall evaluate a GSP if that GSP is complete and includes the information required by SGMA and the GSP Regulations.[30]

The GSAs submitted an adopted GSP for the entire Basin. After an initial, preliminary review, Department staff found the GSP to be complete and appearing to include the

[27] Water Code § 10733.8; 23 CCR § 355.6.
[28] Water Code §§ 10728 *et seq.*, 10728.2.
[29] Water Code § 10720.7(a)(2).
[30] 23 CCR § 355.4(a)(2).

required information, sufficient to warrant a thorough evaluation by the Department.[31] The Department posted the GSP to its website on Feb. 7, 2022.[32]

3.3 Basin Coverage

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.[33] A GSP that is intended to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting GSAs.

The GSP intends to manage the entire San Luis Obispo Valley Basin. The jurisdictional boundary of the submitting GSAs fully contains the Basin.[34]

4 Plan Evaluation

As stated in Section 355.4 of the GSP Regulations, a basin "shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act." The Department's assessment is based on a number of related factors including whether the elements of a GSP were developed in the manner required by the GSP Regulations, whether the GSP was developed using appropriate data and methodologies and whether its conclusions are scientifically reasonable, and whether the GSP, through the implementation of clearly defined and technically feasible projects and management actions, is likely to achieve a tenable sustainability goal for the basin. The Department staff's evaluation of the likelihood of the Plan to attain the sustainability goal for the Basin is provided below.

4.1 Administrative Information

The GSP Regulations require each Plan to include administrative information identifying the submitting Agency, its decision-making process, and its legal authority;[35] a description of the Plan area and identification of beneficial uses and users in the Plan area;[36] and a description of the ability of the submitting Agency to develop and implement a Plan for that area.[37]

The GSP was submitted by the County of San Luis Obispo (County) GSA and the City of San Luis Obispo (City) GSA. The two GSAs entered into a Memorandum of Agreement (MOA) for the purposes of coordinating preparation of a single GSP for the Basin. The

[31] The Department undertakes a preliminary completeness review of a submitted Plan under section 355.4(a) of the GSP Regulations to determine whether the elements of a Plan required by SGMA and the Regulations have been provided, which is different from a determination, upon review, that a Plan is "incomplete" for purposes of section 355.2(e)(2) of the Regulations.
[32] https://sgma.water.ca.gov/portal/gsp/preview/118.
[33] Water Code § 10727(b); 23 CCR § 355.4(a)(3).
[34] San Luis Obispo Valley Basin GSP, Section 2.3.3, p. 48.
[35] 23 CCR § 354.6 *et seq*.
[36] 23 CCR § 354.8 *et seq*.
[37] 23 CCR § 354.6(e).

MOA also established the Groundwater Sustainability Commission (GSC), which serves as an advisory body to the GSAs, consisting of representatives from the County and City GSAs, as well as representatives from the other signatories to the MOA (i.e., Golden State Water Company (GSWC), Edna Valley Growers Mutual Water Company (EVGMWC), Edna Ranch Mutual Water Company (ERMWC), and Varian Ranch Mutual Water Company (VRMWC).

The Basin is within the southwestern portion of County of San Luis Obispo, is oriented in a northwest-southeast direction, and is approximately 14 miles long and 1.5 miles wide, covering a surface area of about 12,700 acres or 19.9 square miles. The Basin is bounded on the northeast by the Santa Lucia Range and on the southwest by the San Luis Range and the Edna fault system. (See Figure 1)

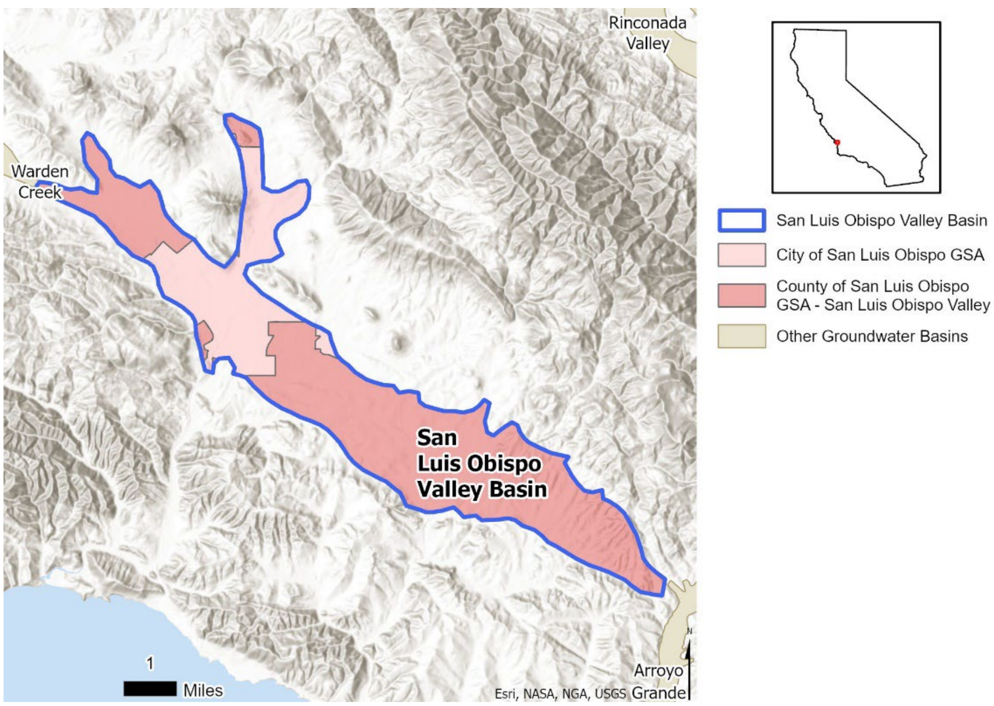


Figure 1: San Luis Obispo Basin Location Map.

The Plan provides information regarding the beneficial uses and users of groundwater as required by SGMA, and contains sufficient detail regarding the water use types, existing water monitoring and resource programs, and types and distribution of land use and land use plans for the Basin. The GSAs provide a list of public meetings, materials, and notifications on its website, and lists of meetings and public comments and how they were addressed by the GSAs are included in the appendices of the GSP.

The GSP describes the legal authority of the GSAs, provides a cost estimate for implementing the GSP for the initial five years, and explains how the Agencies plan to meet those costs. Regarding the legal authority, the GSP states: “[t]he GSAs developing this coordinated GSP were formed in accordance with the requirements of California Water Code Section 10723 et seq."[38] The GSP mentions that per California Water Code (CWC) Section 10721(n), the County and the City of San Luis Obispo qualify as Local Agencies, and each has the jurisdiction to become GSA.[39] Per CWC Section 10725 and after becoming a GSA, they assume all rights and authority granted to GSAs for their respective areas.[40] See the appendix[41] for their resolutions for forming a GSA. The GSP estimates the costs of implementing the GSP for the initial five years at $965,000 per year.[42] A table itemizes the GSP implementation activity and provides its description, an anticipated timeframe, and a cost estimate - this cost estimate does not include the Supplemental Water Feasibility Study nor the planning, design, and construction of Supplemental Water Projects.[43] The GSP declares: "[e]stimates of future annual implementation costs (Years 6 through 20) will be developed during future updates of the GSP."[44] A state grant from DWR (Proposition 1) and "in-kind contributions from the GSAs and GSC members" provided funding for the development of the GSP.[45] A Fee Study will assess fee structures and funding mechanisms for GSP implementation, and in addition to fees, the GSAs may consider grants and low-interest financing.[46]

The GSAs subdivides the Basin into two distinct valleys, with the San Luis Valley in the northwest and the Edna Valley in the southeast. Land use in the San Luis Valley portion of the Basin is primarily municipal, residential, and industrial, while primary land use in the Edna Valley portion of the basin is agricultural.

The GSP's discussion and presentation of administrative information covers the specific items listed in the GSP Regulations in an understandable format using appropriate data. Department staff are aware of no significant inconsistencies or contrary information presented in the GSP and therefore have no significant concerns regarding the quality, data, and discussion of this subject in the GSP. The administrative information included in the Plan substantially complies with the requirements outlined in the GSP Regulations.

4.2 Basin Setting

GSP Regulations require information about the physical setting and characteristics of the basin and current conditions of the basin, including a hydrogeologic conceptual model; a description of historical and current groundwater conditions; and a water budget

[38] San Luis Obispo Valley Basin GSP, Section 2.3, p. 47.
[39] San Luis Obispo Valley Basin GSP, Sections 2.3.1.1-2.3.1.2, p. 47.
[40] San Luis Obispo Valley Basin GSP, Sections 2.3.1.1-2.3.1.2, p. 47.
[41] San Luis Obispo Valley Basin GSP, Appendices B-C, pp. 368-376.
[42] San Luis Obispo Valley Basin GSP, Section 10.1.3, p. 336.
[43] San Luis Obispo Valley Basin GSP, Section 10.1.3, p. 336, Table 10-1, p. 342.
[44] San Luis Obispo Valley Basin GSP, Section 10.1.3, p. 336.
[45] San Luis Obispo Valley Basin GSP, Section 10.2.1, p. 339.
[46] San Luis Obispo Valley Basin GSP, Sections 10.2-10.2.3, p. 339.

accounting for total annual volume of groundwater and surface water entering and leaving the basin, including historical, current, and projected water budget conditions.[47]

4.2.1 Hydrogeologic Conceptual Model

The hydrogeologic conceptual model is a non-numerical model of the physical setting, characteristics, and processes that govern groundwater occurrence within a basin, and represents a local agency's understanding of the geology and hydrology of the basin that support the geologic assumptions used in developing mathematical models, such as those that allow for quantification of the water budget.[48] The GSP Regulations require a descriptive hydrogeologic conceptual model that includes a written description of geologic conditions, supported by cross sections and maps,[49] and includes a description of basin boundaries and the bottom of the basin,[50] principal aquifers and aquitards,[51] and data gaps.[52]

The GSP states the aquifers in the Basin are composed of unconsolidated or loosely consolidated sediments and is underlain and surrounded by bedrock. The unconsolidated to loosely consolidated sediments consist of Recent Alluvium, the Paso Robles Formation, and the Pismo Formation. The Recent Alluvium consisting of gravel, sand, silt, and clay that were deposited by fluvial processes along the Basin's creeks and tributaries. The thickness of the Recent Alluvium ranges from a few feet to more than 50 feet. [53] In most of the Basin, the Recent Alluvium is underlain by the Paso Robles Formation, which consists of poorly sorted, unconsolidated to mildly consolidated sandstone, siltstone, claystone, and thin beds of volcanic tuff that was deposited in a terrestrial setting. The Plan notes that the Paso Robles Formation was sometimes hard to distinguish from the Alluvium in the geophysical logs and well completion reports.[54] In some areas of the Edna Valley, the Paso Robles Formation is underlain by the Pismo Formation, a sequence of marine deposited sediments consisting of claystone, siltstone, sandstone, and conglomerate. Where present, the Pismo Formation has a thickness of up to 400 feet. [55]

The maximum sediment thickness in the Edna Valley it about 400 feet whereas the maximum sediment thickness in the San Luis Valley is about 140 feet.[56] The San Luis Valley area of the Basin is drained by the San Luis Obispo Creek and its tributaries with

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[47] 23 CCR § 354.12.
[48] DWR Best Management Practices for the Sustainable Management of Groundwater: Hydrogeologic Conceptual Model, December 2016: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-3-Hydrogeologic-Conceptual-Model_ay_19.pdf.
[49] 23 CCR §§ 354.14 (a), 354.14 (c).
[50] 23 CCR §§ 354.14 (b)(2-3).
[51] 23 CCR § 354.14 (b)(4) *et seq.*
[52] 23 CCR § 354.14 (b)(5).
[53] San Luis Obispo Valley Basin GSP, Section 4.5.2.1, p. 96.
[54] San Luis Obispo Valley Basin GSP, Section 4.5.2.2, p. 96.
[55] San Luis Obispo Valley Basin GSP, Section 4.5.2.3, pp. 96-97.
[56] San Luis Obispo Valley Basin GSP, Section 4.2, pp. 84-85 and Figure 4-5, p. 90.

surface drainage out of the Basin flowing to the south along the course of Highway 101 towards Avila Beach. The Edna Valley area of the Basin is drained by Pismo Creek and its tributaries with surface drainage out of the Basin flowing to the south into Price Canyon.

The GSP states that the bottom of the Basin is defined by the contact of unconsolidated or loosely consolidated permeable sediments with the impermeable bedrock Miocene-aged and Franciscan Assemblage rocks.[57] The Plan describes the bottom of the Basin aquifers at the occurrence of bedrock, with the bedrock formations having lower permeability and/or porosity and generally considered to be non-water-bearing. The Plan notes that the bedrock formations occasionally yield groundwater flow adequate for local or domestic needs with wells drilled into bedrock often going dry or producing less groundwater than 10 gallons per minute but are not considered part of the Basin.[58] Department staff note cross-sections provided in the Plan depict that many wells are fully or partially screened in the bedrock formation(s).[59]

The Plan does not explicitly identify a single principal aquifer, it describes three aquifers where there "are no significant aquitards that vertically separate the three aquifers in the Basin over large areas."[60] The three groundwater producing aquifer deposits are the Alluvial Aquifer, the Paso Robles Formation Aquifer, and the Pismo Formation Aquifer. Department staff infer that the GSAs regards these groundwater-producing aquifer deposits as comprising a single, undifferentiated "principal aquifer" for the Basin.

The Alluvial Aquifer is described as relatively continuous, comprised of alluvial sediments that underlie the San Luis Obispo Creek, and East/West Corral de Piedras Creeks and their tributary streams, with a thickness that ranges from just a few feet to more than 50 feet.[61] The Paso Robles Formation Aquifer is described as interbedded sand and gravel lenses that were terrestrially derived. The Paso Robles Formation underlies the Alluvium throughout most of the Basin, the Plan does not state its thickness.[62] The Pismo Formation Aquifer is described as interbedded marine sand and gravel lenses. The Pismo Formation is most extensive below the Paso Robles Formation in the Edna Valley, with a thickness of up to 400 feet.[63] The lateral extent of the Basin is defined as the boundary of the sedimentary formations and bedrock[64] and the Plan notes that there is no significant aquitard that vertically separates the three aquifers.[65] The Plan further details that because there is no available groundwater elevation data specific to the three individual aquifers, and because these formations appear to function as combined

[57] San Luis Obispo Valley Basin GSP, Section 4.2, pp. 84-85.
[58] San Luis Obispo Valley Basin GSP, Section 4.5.3, p. 97.
[59] San Luis Obispo Valley Basin GSP, Figures 4-10 – 4-21, pp. 103-114.
[60] San Luis Obispo Valley Basin GSP, Section 4.6, p. 98.
[61] San Luis Obispo Valley Basin GSP, Section 4.5.2.1, p. 96.
[62] San Luis Obispo Valley Basin GSP, Section 4.5.2.2, p. 96.
[63] San Luis Obispo Valley Basin GSP, Section 4.5.2.3, p. 96.
[64] San Luis Obispo Valley Basin GSP, Section 4.5.2, p. 93.
[65] San Luis Obispo Valley Basin GSP, Section 4.6, p. 98.

hydrogeologic units, groundwater elevation data are combined and presented as a single groundwater elevation map as wells are often screened across multiple aquifers.[66]

Department staff note the GSP Regulations define a principal aquifer as “aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems.”[67] While the definition does not preclude fractured bedrock aquifers from being identified as principal aquifers, it also does not require them to be identified as such. Department staff therefore recommend the GSAs provide additional information to support the determination that the bedrock formation(s) should not be considered part of the principal aquifer the GSAs will manage under the GSP including the numbers of wells that are screened within the bedrock formation(s) and the amount of water that is pumped from these wells.[68]

Aquifer properties were compiled from previous reports or calculated from available constant rate pumping tests and were provided as hydraulic conductivity and transmissivity. [69] The aquifer parameter specific storage, which can be used to calculate storativity, was provided in the Plan as an output of groundwater modeling.[70]

The groundwater modeling noted that the model is sensitive to storativity, which “can have a significant impact on seasonal fluctuations of water levels in an aquifer.” [71] The Plan further states that storativity dates in the Basin is sparce and that “[t]his parameter should be evaluated further in future model revisions.” [72] The Plan does not identify this as a data gap. Because the Plan acknowledges that storativity data in the Basin is sparse and that the groundwater model is sensitive to storativity, Department staff recommend the Plan should recognize that storativity is a data gap in the hydrogeologic conceptual model and associated groundwater modeling. [73] Additionally, the GSAs should include a description of reasonable measures and schedule to address the data gap in its next GSP update or subsequent annual report.

The information provided in the GSP that comprises the hydrogeologic conceptual model substantially complies with the requirements outlined in the GSP Regulations. In general, the Plan’s descriptions of the regional geologic setting, the Basin’s physical characteristics, the principal aquifer, and hydrogeologic conceptual model appear to utilize the best available science. Department staff are aware of no significant inconsistencies or contrary technical information presented in the Plan.

[66] San Luis Obispo Valley Basin GSP, Section 5.1, p. 124.
[67] 23 CCR § 351.4 (aa).
[68] 23 CCR § 354.14 (b)(4)
[69] San Luis Obispo Valley Basin GSP, Section 4.6.2. pp. 115-116 and Tables 4.1-4.2, pp. 118-119.
[70] San Luis Obispo Valley Basin GSP, Appendix G, p. 600 and Appendix G, Figures 4-6 – 4-8, pp 604-606.
[71] San Luis Obispo Valley Basin GSP, Appendix G, p. 607.
[72] San Luis Obispo Valley Basin GSP, Appendix G, p. 607.
[73] 23 CCR § 355.4(b)(2).

4.2.2 Groundwater Conditions

The GSP Regulations require a written description of historical and current groundwater conditions for each of the applicable sustainability indicators and groundwater dependent ecosystems that includes the following: groundwater elevation contour maps and hydrographs,[74] a graph depicting change in groundwater storage,[75] maps and cross-sections of the seawater intrusion front,[76] maps of groundwater contamination sites and plumes,[77] maps depicting total subsidence,[78] identification of interconnected surface water systems and an estimate of the quantity and timing of depletions of those systems,[79] and identification of groundwater dependent ecosystems.[80]

The GSP provides a thorough description of current and historical groundwater conditions in the Basin. Groundwater elevation contour maps are provided for the Fall 1954, Spring 1990, Spring 1997, Spring 2011, Spring 2015, and Fall and Spring 2019.[81] The GSP states that to represent seasonal low and seasonal high groundwater conditions, semi-annual groundwater levels have been, and will continue to be, measured in April and October of each year.[82]

The GSP states that the primary direction of groundwater flow in the Basin is from the area of highest groundwater elevations in the Edna Valley northwestward toward San Luis Obispo Creek, where the flow leaves the Basin along the stream. The GSP further states that groundwater in the northwestern areas of the Basin flow southeastward toward the San Luis Obispo Creek and that there are local areas of flow discharging from the southeastern portion of the Basin along Pismo Creek tributaries of East and West Corral de Piedras Creek, and alluvium of other smaller tributaries further to the south. [83]

The Plan includes a figure that displays ten groundwater elevation hydrographs of wells from across the Basin that have the longest period of record.[84] The Plan describes that hydrographs show stable groundwater conditions in the San Luis Valley. The Plan also includes hydrographs from wells in the northern portion of the Edna Valley that display much greater variability in groundwater elevations including in response to seasonal and drought cycle fluctuations, and that this pattern is likely associated with local recharge from the West Corral de Piedras Creek. The GSP describes these hydrographs show a

[74] 23 CCR § 354.16 (a)(1-2).
[75] 23 CCR § 354.16 (b).
[76] 23 CCR § 354.16 (c).
[77] 23 CCR § 354.16 (d).
[78] 23 CCR § 354.16 (e).
[79] 23 CCR § 354.16 (f).
[80] 23 CCR § 354.16 (g).
[81] San Luis Obispo Valley Basin GSP, Section 5.1, pp. 124-134 and Figures 5-1-5-7, pp. 126-134.
[82] San Luis Obispo Valley Basin GSP, Section 7.4.1, p. 246.
[83] San Luis Obispo Valley Basin GSP, Section 5.1, p. 124.
[84] San Luis Obispo Valley Basin GSP, Figure 5-11, p. 141.

steady decline in groundwater elevations in the southern portion of the Edna Valley with declines of about 60 to 100 feet since the year 2000.[85]

The Plan presents several figures to show the change in groundwater elevations over various time periods.[86] Annual change in storage for various water year types is provided by the GSP in several tables.[87] Although figures depict changes in groundwater elevations and the tables provide information regarding annual change in groundwater in storage, the information provided by the Plan does not include a graph required by the GSP Regulations to display annual and cumulative change in the volume of groundwater in storage between seasonal high groundwater conditions, including the annual groundwater use and water year type. Department staff recommend the GSAs submit a graph depicting annual and cumulative change in groundwater in storage, clearly describing that the data is between seasonal high groundwater conditions, in its next GSP update or subsequent annual report.

The GSP states that the Basin is not adjacent to the Pacific Ocean, a bay, or inlet, and that seawater intrusion is not a relevant sustainability indicator for the Basin.[88] Given the geographic setting of the Basin, Department staff regard the reasoning of the GSP as sufficient to demonstrate that sea water intrusion is not present in the basin and is not likely to occur in the future.

The Plan includes figures of groundwater quality constituents of concern (COCs) noted in the Basin including total dissolved solids (TDS), nitrate, and arsenic. The figures show trends in COC concentrations from as far back as 1990 up to 2019.[89] The Plan notes that data reviewed between 1953 and 2019 showed that groundwater in the Basin is generally of good quality for drinking, but that the maximum contaminant levels (MCLs) were exceeded for nitrates and arsenic in 10 percent and 4 percent of samples that were collected during that time period, respectively.[90] TDS concentrations in the basin ranged from 180 mg/L to 3,100 mg/L with an average of 727 mg/L[91] and exceed the secondary MCL for TDS in 15 percent[92] of the samples reviewed. The Plan notes that the secondary MCL for TDS includes a recommendation of 500 mg/L, an upper of 1,000 mg/L, and a short-term limit of 1,500 mg/L[93]. The Plan notes that, in public supply water systems, the MCL exceedances are mitigated with seasonal well use, treatment, or blending.[94]

The Plan states that land subsidence was documented in the San Luis Valley portion of the Basin, along Los Osos Valley Road and in the vicinity of Laguna Lake, that was

[85] San Luis Obispo Valley Basin GSP, Section 5.2, p. 140.
[86] San Luis Obispo Valley Basin GSP, Section 5.1.9, pp. 135-138.
[87] San Luis Obispo Valley Basin GSP, Table 6-1 - 6-3, pp. 172-174.
[88] San Luis Obispo Valley Basin GSP, Section 5.5, p. 147.
[89] San Luis Obispo Valley Basin GSP, Figure 5-19 – 5-21, p. 161, p. 163 and p.165.
[90] San Luis Obispo Valley Basin GSP, Section 5.9.1, p.157.
[91] San Luis Obispo Valley Basin GSP, Section 5.9.3.1, p.160.
[92] San Luis Obispo Valley Basin GSP, Section 5.9.1, p.157.
[93] San Luis Obispo Valley Basin GSP, Section 5.9.3.1, p.160.
[94] San Luis Obispo Valley Basin GSP, Section 5.9.1, p.157.

caused by groundwater pumping. The Plan describes subsidence occurring in the 1990s in young organic soils along Los Osos Valley Road in response to groundwater extractions. That subsidence resulted in more than 1 foot of change and caused damage to local business and homes.[95] The Plan references a 1997 subsidence study that did not report any measurable subsidence in the area.[96] The Plan notes that DWR has defined the Basin as “low subsidence potential,” but the Plan recognizes that there is subsidence potential in the Basin where the compressible young soils exist and has divided the Basin into three categories based on likelihood of future subsidence, with the highest likelihood of future subsidence in areas around Los Oso Valley Road, Laguna Lake, and low-lying wetland areas near Tank Farm Road.[97]

The GSP states San Luis Creek, and its tributaries, have surface water bodies that are interconnected to groundwater within the San Luis Valley portion of the Basin. Interconnected surface water was evaluated utilizing direct measurements and was also modeled as a result of groundwater pumping over the past 20 years. For the Edna Valley portion of the Basin, the GSP states that there is a disconnection of surface water to groundwater in the Edna Valley[98]. The GSAs acknowledges that limited data was available to conduct the analysis and that the model’s output dataset is limited in its conclusions. The GSP states that the characterization of interconnection between surface water and groundwater will continue to be evaluated and refined as additional data and information are acquired during GSP implementation.[99]

The Plan used data from the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset and the results of a technical memorandum included in Appendix F of the GSP to identify and map potential groundwater dependent ecosystems (GDEs).[100] Further, the Plan identifies special status species and sensitive natural communities associated with potential GDEs. The data sources for this analysis are datasets from the U.S. Fish and Wildlife Service, the California Fish and Wildlife Service, and The Nature Conservancy. A list of Federal and State listed threatened and endangered species used as GDE indicators in the Plan are summarized in Appendix F, Table 1.[101]

The Plan states that potential GDEs were identified by first assessing vegetation in the Natural Agricultural Imagery Program 2018 color aerial imagery and comparing vegetation and wetlands to underlying depth to water measurements from 2019 at less than 30 feet. In areas with no depth to groundwater data, potential GDEs were identified based on assumptions made from available limited data in the surrounding area. In the

[95] San Luis Obispo Valley Basin GSP, Section 4.8 pp. 120-121.
[96] San Luis Obispo Valley Basin GSP, Section 5.6 p. 147
[97] San Luis Obispo Valley Basin GSP, Section 4.8 pp. 120-121 and Figure 4-23, p. 122.
[98] San Luis Obispo Valley Basin GSP, Section 5.7.1, p. 150.
[99] San Luis Obispo Valley Basin GSP, p. 288.
[100] San Luis Obispo Valley Basin GSP, Appendix F, pp. 450-492.
[101] San Luis Obispo Valley Basin GSP, Appendix F, Table 1, pp. 458-461.

San Luis Valley, depth to water in the vicinity of the San Luis Obispo Creek was assumed to be less than 30 feet, resulting in the entire San Luis Creek being identified as a potential GDE. In the Edna Valley, depth to water in the Vicinity of Pismo Creek was assumed to be more than 30 feet and depth to water in the vicinity of East Corral de Piedra were assumed to be less than 30 feet.[102] However, in both the San Luis Valley and Edna Valley, the Plan acknowledges there is limited groundwater data available, and the identification is based on only one year of groundwater data. Department staff encourage the GSAs to investigate where GDEs exist in the Basin and update the Plan accordingly.

Despite the identification of a recommended corrective action, the Plan sufficiently describes the historical and current groundwater conditions throughout the Basin, and the information included in the Plan substantially complies with the requirements outlined in the GSP Regulations.

4.2.3 Water Budget

GSP Regulations require a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical; current; and projected water budget conditions,[103] and the sustainable yield.[104]

The GSP provides a historical water budget for 1987-2016 (30 years). The historical budget analysis was performed using an analytical approach consisting of groundwater flow estimates based on Darcy's Law and change in storage calculations based on the specific yield method. Various sources and types of data have been used for the water budget, for example, (1) Hydrogeologic and geologic studies and maps, (2) Groundwater monitoring reports, (3) County stream flow gages, (4) County and NOAA precipitation stations, (5) PRISM 30-year normal dataset (1981-2010), (6) CIMIS weather station data, etc. The water budgets were prepared for the two subareas that cover the Basin. The San Luis Valley portion of the Basin is dominantly urban areas, and the Edna Valley portion of the Basin is dominated by Ag fields especially vineyards (Figure 6-3[105]). Table 6-1[106], Table 6-2[107], and Table 6-3[108] present the historical surface water and groundwater budgets for the San Luis Valley portion of the Basin, the Edna Valley portion of the Basin, and the Basin total, respectively. Bar graphs are also included in Figure 6-4[109] to Figure 6-9[110]. Figures 6-4 to 6-6 illustrate the surface water budget, while Figures 6-7 to 6-9 illustrate the groundwater budget.

[102] San Luis Obispo Valley Basin GSP, Section 5.8.2 p. 154 and Figure 5-17 p. 155.
[103] 23 CCR §§ 354.18 (a), 354.18 (c) *et seq*.
[104] 23 CCR § 354.18 (b)(7).
[105] San Luis Obispo Valley Basin GSP, Figure 6-3, p. 171.
[106] San Luis Obispo Valley Basin GSP, Table 6-1, p. 172.
[107] San Luis Obispo Valley Basin GSP, Table 6-2, p. 173.
[108] San Luis Obispo Valley Basin GSP, Table 6-3, p. 174.
[109] San Luis Obispo Valley Basin GSP, Figure 6-4, p. 175.
[110] San Luis Obispo Valley Basin GSP, Figure 6-9, p. 180.

The GSP reports the overdraft estimates in Table 6-17.[111] The average groundwater extraction in the San Luis Valley portion of the Basin, since 2010, is estimated to be 1,800 AFY, which is 700 AFY less than the average recharge of 2,500 AFY, indicating a surplus of groundwater for this portion of the Basin. The Edna Valley portion of the Basin, groundwater pumping has averaged 4,400 AFY since 2010, which is 1,100 AFY more than the sustainable yield of 3,300 AFY for the portion of the Basin. The GSP identified that the Edna Valley's portion of the Basin overdraft is estimated to be 1,100 AFY. [112]

The GSP provides a current water budget analysis for 2016-2019. The tables and figures cited for the historical water budget include the current water budget.

Future water budgets were developed using the GSFLOW numerical model developed for this GSP (Appendix G). Each simulation was run continuously through the historical calibration period (1987-2019) through the end of the predictive simulation period (2020-2044). According to the GSP regulations, the future water budget should be based on 50 years of historical climate data, the GSP considered 33 years of historical data for the projected water budget analysis. The GSP discusses that this period is a representative historical period spanning a variety of hydrologic year types.[113] The Plan assumed that there will be no increase in irrigated acreage, agricultural pumping, or municipal pumping over the SGMA planning horizon. For the baseline predictive scenario, the historical input data for years 1995-2019 was repeated for the predictive model period of 2020-2044. The 1995-2019 historical period includes several different water year types, including representation of the recent drought. For the climate change scenario, datasets of monthly 2070 change factors for this Basin were applied to precipitation and evapotranspiration data from the historical base period to develop monthly time series of precipitation and evapotranspiration, which were then used to simulate future hydrology conditions. The approach followed in the GSP is consistent with methodologies recommended by the Department.[114] The average of various water budget components projected for the period 2020-2042 is listed in Table 6-21[115] for the surface water budget and Table 6-22[116] for the groundwater budget. No time series of the components is provided. The GSP claims that climate change is not a significant factor that needs to be considered in the Basin over the SGMA planning horizon. Department staff note that since the GSP was adopted and submitted, climate change conditions have advanced faster and more dramatically. It is anticipated that the hotter, drier conditions will result in a loss of 10% of California's water supply. As California adapts to a hotter, drier climate, GSAs

[111] San Luis Obispo Valley Basin GSP, Table 6-17, p. 217.
[112] San Luis Obispo Valley Basin GSP, Table 6-17, p. 217.
[113] San Luis Obispo Valley Basin GSP, Section 6.2.1, pp. 181-183.
[114] DWR Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final_ay_19.pdf.
[115] San Luis Obispo Valley Basin GSP, Table 6-21, p. 230
[116] San Luis Obispo Valley Basin GSP, Table 6-22, p. 231

should be preparing for these changing conditions as they work to sustainably manage groundwater within their jurisdictional areas. The GSAs should consider the potential impacts climate change may have on groundwater management activities during plan implementation. The sustainable yield is 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 as defined by SGMA. The preliminary sustainable yield of the Basin was estimated separately for each of the subareas. The Edna Valley portion of the Basin has experienced cumulative storage declines since 1998, while the San Luis Valley portion of the Basin experiences minimal storage declines during drought but recovers and is typically close to full storage capacity. For the Edna Valley portion of the Basin, the long-term average recharge (3,400 AFY) minus subsurface outflow (100 AFY) gives a sustainable yield estimate of 3,300 AFY. The preliminary sustainable yield of the San Luis Valley portion of the Basin is estimated at 2,500 AFY, based on the long-term average recharge of 3,700 AFY minus 1,200 AFY used by wetlands. These values are summarized in Table 6-16[117].

The water budget described in the GSP substantially complies with the GSP Regulations and is developed using the best available science. Department staff note that the GSA utilized an analytical approach was used for the historical (and current) water budget analysis and a numerical modeling approach (GSFLOW) was used for the projected water budget. The GSP discusses the differences in approaches and indicates that the numerical model will be used for historical/current water budgets in future.

4.2.4 Management Areas

The GSP Regulations provide the option for one or more management areas to be defined within a basin if the GSAs have determined that the creation of the management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives, provided that undesirable results are defined consistently throughout the basin.[118]

There are no management areas proposed within the Plan area.

4.3 Sustainable Management Criteria

GSP Regulations require each Plan to include a sustainability goal for the basin and to characterize and establish undesirable results, minimum thresholds, and measurable objectives for each applicable sustainability indicator, as appropriate. The GSP Regulations require each Plan to define conditions that constitute sustainable groundwater management for the basin including the process by which the GSAs

[117] San Luis Obispo Valley Basin GSP, Table 6-16, p. 216.
[118] 23 CCR § 354.20.

characterizes undesirable results and establishes minimum thresholds and measurable objectives for each applicable sustainability indicator.[119]

4.3.1 Sustainability Goal

GSP Regulations require that GSAs establish a sustainability goal for the basin. The sustainability goal should be based on information provided in the GSP's basin setting and should include an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation.[120]

The GSP describes the sustainability goal as "to manage the [San Luis Obispo Valley] Basin to ensure beneficial uses and basin users have access to a safe and reliable groundwater supply that meets current and future demand without causing undesirable results."[121] The GSAs states that the sustainable management criteria described in Section 8 of the GSP are "based on currently available data and application of the best available science."[122]

The GSP approach to achieve the sustainability goal is through the implementation of their proposed projects and management actions. The projects will be focused on supplemental water sources that could be brought into the Basin, to mitigate overdraft, while the management actions will work towards improving groundwater monitoring metering and groundwater demand management.[123] The GSAs states that they intend to implement the GSP "using an adaptive management strategy. Adaptive management allows the GSAs to react to the success or lack of success of actions and projects implemented in the Basin and to make management decisions to redirect efforts in the Basin to more effectively achieve sustainability goals."[124]

The Plan describes the process for establishing the minimum thresholds and measurable objectives for the Basin as a result of evaluating historical data of groundwater elevations from wells and the water budget, modeling groundwater scenarios which incorporate the proposed projects and management actions and informing the public thought soliciting comments and hosting meetings.[125]

Based on review of the GSP, Department staff conclude that the GSP's discussion and presentation of information related to the Basin's sustainability goal covers the specific items listed in the regulations in an understandable format using appropriate data.

4.3.2 Sustainability Indicators

Sustainability indicators are defined as any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause

[119] 23 CCR § 354.22 *et seq*.
[120] 23 CCR § 354.24.
[121] San Luis Obispo Valley Basin GSP, Section 8.3.1, p 257.
[122] San Luis Obispo Valley Basin GSP, Section 8.1, p 254.
[123] San Luis Obispo Valley Basin GSP, Section 8.3.2, p 257.
[124] San Luis Obispo Valley Basin GSP, Section 8.3.2, p 257.
[125] San Luis Obispo Valley Basin GSP, Section 8.4, pp 257-258.

undesirable results.[126] Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon, significant and unreasonable reduction of groundwater storage, significant and unreasonable seawater intrusion, significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies, land subsidence that substantially interferes with surface land uses, and depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water[127] – but refer to groundwater conditions that are not, in and of themselves, significant and unreasonable. Rather, sustainability indicators refer to the effects caused by changing groundwater conditions that are monitored, and for which criteria in the form of minimum thresholds are established by the agency to define when the effect becomes significant and unreasonable, producing an undesirable result.

GSP Regulations require that GSAs provide descriptions of undesirable results including defining what are significant and unreasonable potential effects to beneficial uses and users for each sustainability indicator.[128] GSP Regulations also require GSPs provide the criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.[129]

GSP Regulations require that the description of minimum thresholds include the information and criteria relied upon to establish and justify the minimum threshold for each sustainability indicator.[130] GSAs are required to describe how conditions at minimum thresholds may affect beneficial uses and users,[131] and the relationship between the minimum thresholds for each sustainability indicator, including an explanation for how the GSAs haves determined conditions at each minimum threshold will avoid causing undesirable results for other sustainability indicators.[132]

GSP Regulations require that GSPs include a description of the criteria used to select measurable objectives, including interim milestones, to achieve the sustainability goal within 20 years.[133] GSP Regulations also require that the measurable objectives be established based on the same metrics and monitoring sites as those used to define minimum thresholds.[134]

[126] 23 CCR § 351(ah).
[127] Water Code § 10721(x).
[128] 23 CCR §§ 354.26 (a), 354.26 (b)(c).
[129] 23 CCR § 354.26 (b)(2).
[130] 23 CCR § 354.28 (b)(1).
[131] 23 CCR § 354.28 (b)(4).
[132] 23 CCR § 354.28 (b)(2).
[133] 23 CCR § 354.30 (a).
[134] 23 CCR § 354.30 (b).

The following subsections thus consolidate three facets of sustainable management criteria: undesirable results, minimum thresholds, and measurable objectives. Information, as presented in the Plan, pertaining to the processes and criteria relied upon to define undesirable results applicable to the Basin, as quantified through the establishment of minimum thresholds, are addressed for each applicable sustainability indicator. A submitting Agency is not required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.[135]

4.3.2.1 Chronic Lowering of Groundwater Levels

In addition to components identified in 23 CCR §§ 354.28 (a-b), for the chronic lowering of groundwater, the GSP Regulations require the minimum threshold for chronic lowering of groundwater levels to be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results that is supported by information about groundwater elevation conditions and potential effects on other sustainability indicators.[136]

The Plan states that "[s]ignificant and unreasonable Chronic Lowering of Groundwater Levels in the Basin are those that: reduce the ability of existing domestic wells of average depth to produce adequate water for domestic purposes (drought resilience); cause significant financial burden to those who rely on the groundwater basin.; interfere with other SGMA Sustainability Indicators."[137] The Plan provides a quantitative description to define an undesirable result for the chronic lowering of groundwater levels occurring when "two or more [representative monitoring sites] RMSs for water levels within a defined area of the Basin (i.e., San Luis Valley or Edna Valley) display exceedances of the minimum threshold groundwater elevation values for two consecutive fall measurements. Geographically isolated exceedances (i.e., conditions in a single well) will require investigation to determine if local or basin wide actions are required in response."[138] The Plan further describes the geographical component of this definition, stating that "[a]llowing two exceedances in a network of 10 RMS wells is reasonable if the exceedances are distributed throughout the Basin. If the exceedances are clustered in a limited area, it indicates that significant unreasonable effects are being experienced by a localized group of landowners. Any single exceedance will require investigation to determine the significance and causes of the observed conditions."[139]

The GSP identified two subareas within the Basin, San Luis Valley portion of the Basin and the Edna Valley portion of the Basin, and states that the rational for the geographical approach is based the significantly different historical trends in groundwater levels in the San Luis Valley and the Edna Valley portions of the Basin.[140] The GSAs set minimum

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135 23 CCR § 354.26 (d).
136 23 CCR § 354.28(c)(1) *et seq*.
137 San Luis Obispo Valley Basin GSP, Section 8.5.1.1, p 264.
138 San Luis Obispo Valley Basin GSP, Section 8.5.1, p 264.
139 San Luis Obispo Valley Basin GSP, Section 8.5.1.3, p 265.
140 San Luis Obispo Valley Basin GSP, Section 8.5.2.1, pp 265-266.

thresholds for the chronic lowering of groundwater using a network of 10 RMS, four located in San Luis Valley and six located in Edna Valley.[141]

In the San Luis Valley portion of the Basin, the Plan states that long-term water level declines have not been observed in either of the monitoring wells or RMS.[142] The Plan further states that "[w]hile seasonal fluctuations continue as would be expected, year-to-year water levels have been essentially stable."[143] The minimum thresholds in the San Luis Valley portion of the Basin for chronic lowering of groundwater levels are set 10 to 20 feet lower than previously observed lowest water levels. The GSA's rationale for the minimum threshold is based on the GSA's assessment "that the San Luis Valley portion of the Basin is in surplus"[144] and the GSA's desire to retain the flexibility to expand the use of groundwater in the future.

Department staff note the GSP does not describe how setting groundwater levels thresholds 10 to 20 feet lower than the previously observed low water levels will avoid significant and unreasonable conditions in the Basin. Department staff conclude that including this information in the GSP will provide additional technical details supporting the description of how the GSA established the sustainable management criteria for chronic lowering of groundwater levels (see Recommended Corrective Action 1a).

Department staff also note that while the GSP states the minimum thresholds have been designed to "protect as many domestic wells as possible"[145]; the GSP does not include an analysis of potential impacts to beneficial uses and users such as domestics well users at the proposed minimum thresholds in the San Luis Valley Area. Department staff recommend the GSAs consider potential impacts to supply wells at the selected minimum threshold for chronic lowering of groundwater levels. The GSA should consider the degree/extent of potential impacts including the percentage, number, and location of potentially impacted wells at the proposed minimum thresholds for chronic lowering of groundwater levels (see Recommended Corrective Action 1b).

In the Edna Valley portion of the Basin minimum thresholds were set using a different methodology because four of the RMS "wells show water level declines over the past 20-30 years (EV-04, EV-09, EV-13, and EV-16)."[146] For this portion of the Basin, the Plan identified a network of six RMS wells where minimum thresholds for the chronic lowering of groundwater are set. The GSP notes that not all the hydrographs for the RMS in the Edna Valley display the same trends. Each hydrograph has unique characteristics depending on the local hydrogeologic setting in the immediate vicinity of the well, and this leads to the consideration of different definitions of minimum thresholds for different

141 San Luis Obispo Valley Basin GSP, Table 8-1, p 264.
142 San Luis Obispo Valley Basin GSP, Section 8.5.2.1, p 266.
143 San Luis Obispo Valley Basin GSP, Section 8.5.2.1, pp 265-266.
144 San Luis Obispo Valley Basin GSP, Section 8.5.2.1, p 266.
145 San Luis Obispo Valley Basin GSP, Section 8.5.2.4, p. 270.
146 San Luis Obispo Valley Basin GSP, Section 8.5.2.1, p 266.

wells."[147] Department staff note the GSP is unclear whether EV-13 or EV-12 is identified as an RMS. Based on the discussion EV-13 is identifies as the RMS, but Figure 8-5 identifies the hydrograph, minimum threshold, measurable objective, and interim milestones are for RMS EV-12. Department staff encourage the GSAs to rectify this issue to provide clarification to the Plan.

The Plan states "RMS EV-13, EV-04, and EV-09 display declining water levels over the past 20-25 years, with historical low elevations occurring around Fall 2015 at the end of the recent drought, followed by some degree of recovery since then."[148] As previously stated, the GSA's process for establishing the minimum thresholds and measurable objectives for the Basin included conducting public meetings to present recommendations using the public comments to inform the established thresholds.

The Plan states that "[a]gricultural stakeholders in the Edna Valley communicated concern that setting the minimum threshold at the 2015 water levels in these wells would not provide them adequate operational flexibility to protect their long investments in the production of agriculture in the area. While de minimis users communicated concern about lowered water levels affecting their ability to pump water for their domestic use."[149] To assess the concerns of private domestic well owners (i.e., de minimis users) of setting the threshold lower than the recent drought levels, the GSAs performed an analysis using these three RMS to evaluate potential water level of minimum thresholds compared to the depths of private domestic wells. The Plan states "the analysis of 2015 water levels, the data indicated 15 wells as "dry", out of 155 wells in the database... for water levels 10 feet lower than 2015 water levels, no additional domestic wells in the County database were indicated as "dry", beyond those identified as dry using 2015 water levels." Based on the analysis and public comments, for EV-13, EV-04, and EV-09 (three of the Edna Valley RMS wells), "the minimum thresholds were defined to be 10 feet lower than the historical low groundwater elevation observed in 2015."[150] Department staff note the GSA's decision to set minimum thresholds at 10 feet below 2015 levels for these wells is reasonable given the provided analysis that shows no additional dry wells are anticipated.

The Plan identifies two additional RMS wells, EV-01 and EV-11, which are intended to monitor surface water/groundwater conditions, have minimum thresholds set at historic lows based on 10 to 60 years of observed data. [151]

The hydrograph for EV-16, located near the southeastern extent of the Basin, displays a relatively steady decline in water levels of 3.25 feet per year since 2000, and the 2011-2015 drought is not apparent in the hydrograph. For this well, the GSAs set the minimum threshold "at an elevation of 150 feet, which is lower than current groundwater elevations

[147] San Luis Obispo Valley Basin GSP, Section 8.5.2.1, p 266.
[148] San Luis Obispo Valley Basin GSP, Section 8.5.2.1, p 266.
[149] San Luis Obispo Valley Basin GSP, Section 8.5.2.1, pp 266-267.
[150] San Luis Obispo Valley Basin GSP, Section 8.5.2.1, pp 267-268; Table 8-2, p 268.
[151] San Luis Obispo Valley Basin GSP. Figure 8-9 and Figure 8-10 p. 263.

of about 180 feet, to allow for the various stakeholders (both agricultural interests and mutual water companies) in the area to implement projects to slow and stabilize the observed water level declines (Figure 8-10)."[152] Department staff note the GSP does not describe how setting the groundwater level threshold at an elevation of 150 feet, approximately 30 feet lower than current groundwater elevation, will avoid significant and unreasonable conditions in the Basin. Department staff conclude that including this information in the GSP will provide additional technical details supporting the description of how the GSA established the sustainable management criteria for chronic lowering of groundwater levels (see Recommended Corrective Action 1c).

The measurable objectives in the San Luis Valley portion of the Basin are established higher than the minimum thresholds groundwater levels. The Plan's definition of measurable objectives "is within the historically observed range of groundwater elevations, but about 20 feet lower than fall 2020 water levels."[153] The GSAs states that the rationale was "to preserve the City's desired flexibility to resume reasonable and managed groundwater use to augment its potable water supply portfolio to serve its customer base.[154] The GPS set interim milestones to equivalent of the measurable objects.[155]

The measurable objectives in the Edna Valley portion of the Basin for EV-04, EV-09, EV-13 were set at the high-water levels observed immediately prior to the 2011-2015 drought (Figure 8-5 through Figure 8-7).[156] The Plan states that the "rationale for this selection was that if the antecedent conditions before the recent drought are replicated, and no significant new groundwater pumping is occurring in the Basin, then the water level declines observed from 2012-2015 in the Basin will not be significantly exceeded in a similar drought. To the extent that groundwater elevations can recover to levels higher than the 2011 levels, the Basin will be more resilient to drought."[157]

For EV-01 and EV-11, the measurable objectives "were set at approximately the average of seasonal high-water levels over the period of record (Figure 8-9, Figure 8-10). For EV-16 the measurable objective "was set slightly below current water levels and near a historic low (Figure 8-8). This approach is to try to prevent further significant reductions in water levels at this location, since it does not appear to have experienced any recovery of water levels since 2015 and needs to maintain sufficient saturated thickness to sustain production for the service area."[158]

[152] San Luis Obispo Valley Basin GSP, Section 8.5.2.1, p 268.
[153] San Luis Obispo Valley Basin GSP, Section 8.5.3.1, p 271.
[154] San Luis Obispo Valley Basin GSP, Section 8.5.2.1, p 266.
[155] San Luis Obispo Valley Basin GSP, Section 8.5.3.2, p 272.
[156] San Luis Obispo Valley Basin GSP, Section 8.5.3.1, p 272.
[157] San Luis Obispo Valley Basin GSP, Section 8.5.3.1, p 272.
[158] San Luis Obispo Valley Basin GSP, Section 8.5.3.1, p 272.

The GSAs plans to assess the minimum thresholds and measurable objectives established "through direct measurement of water levels from existing RMS" and during the 5-year review will determine if additional RMS need to be established.[159]

Although one or more recommended corrective actions were identified, Department staff conclude that the GSP's discussion and presentation of information generally covers the specific items listed in the GSP Regulations. While the supporting information surrounding some of the proposed minimum thresholds is lacking, the GSA's discussion of the stakeholder engagement process within portions of the Edna Valley Area suggests the GSAs likely were considering impacts to beneficial uses and users although this information may not be specifically stated in the Plan. Staff are aware of no significant inconsistencies or contrary information to that presented in the GSP that would preclude approval at this time.

4.3.2.2 Reduction of Groundwater Storage

In addition to components identified in 23 CCR §§ 354.28 (a-b), for the reduction of groundwater storage, the GSP Regulations require the minimum threshold for the reduction of groundwater storage to be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.[160]

The Plan states it is a "well-established hydrogeologic principles that the Reduction of Groundwater Storage Sustainability Indicator is directly correlated to the lowering of water level Sustainability Indicator."[161] Assessment of groundwater storage will initially be evaluated with the same RMS as the chronic lowering of groundwater levels sustainability and those associated water level minimum thresholds and measurable objectives.[162] The Plan further states that "for the current 5-year implementation period, water levels at the RMS will be used as a proxy for the groundwater in storage Sustainability Indicator."[163]

The GSP explains that the effects of the reduction of storage minimum thresholds on beneficial uses and users are equivalent to the potential effects caused by the chronic lowering of groundwater levels.

The measurable objective for the change in storage sustainability indicator was defined using groundwater levels as a proxy.[164] Thus, the change in storage measurable objective is equivalent to the chronic lowering of groundwater levels measurable objective. While groundwater levels are used as a proxy instead of using the total volume

[159] San Luis Obispo Valley Basin GSP, Section 8.5.2.6, p 271.
[160] 23 CCR § 354.28(c)(2).
[161] San Luis Obispo Valley Basin GSP, Section 8.6, p 273.
[162] San Luis Obispo Valley Basin GSP, Section 8.6, p 273.
[163] San Luis Obispo Valley Basin GSP, Section 8.6.2, p 274.
[164] San Luis Obispo Valley Basin GSP, Section 8.6, p 273.

of groundwater extracted, the measurable objective will require that groundwater levels either increase or are maintained at their current levels.

Based on review of the materials referenced in the GSP, staff conclude that the GSP's discussion and presentation of information related to significant and unreasonable reduction of groundwater storage, including the rational that maintaining stable groundwater levels indicates groundwater storage is not being reduced, covers the specific items listed in the GSP Regulations in an understandable format using appropriate data.

4.3.2.3 Seawater Intrusion

In addition to components identified in 23 CCR §§ 354.28 (a-b), for seawater intrusion, the GSP Regulations require the minimum threshold for seawater intrusion to be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results.[165]

The GSP identifies seawater intrusion as a sustainability indicator which is not present and has not established undesirable results, minimum thresholds, and measurable objectives. As the Basin is located inland, away from the ocean, Department staff concur that sustainable management criteria for seawater intrusion is not applicable for the Basin.

Based on review of the GSP, Department staff are aware of no significant inconsistencies or contrary information to what was presented in the GSP and therefore have no significant concerns regarding the quality, data, and discussion of seawater intrusion.

4.3.2.4 Degraded Water Quality

In addition to components identified in 23 CCR §§ 354.28 (a-b), for degraded water quality, the GSP Regulations require the minimum threshold for degraded water quality to be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.[166]

The GSP provides a description of the potential causes of degraded water quality undesirable results and the possible effects on beneficial uses and users in the Basin. The GSP defines an undesirable result for degraded water quality "if, for any 5-year GSP Update period, an increase in groundwater quality minimum threshold exceedances is observed at 20 percent or more of the RMSs in the Basin, as a result of groundwater

[165] 23 CCR § 354.28(c)(3).
[166] 23 CCR § 354.28(c)(4).

management implemented as part of the GSP."[167] The GSP describes the rationale as being "based on the goal of fewer than 20% of the RMSs for water quality exceedances that can occur as a result of GSP groundwater management activities over the next 5-year management period. Based on the current number of wells in the existing water quality monitoring network … the percentage defined equates to a maximum of two wells that can exceed the minimum thresholds."[168]

The GSP defines minimum thresholds for degraded water quality as the EPA-published water quality standards for total dissolved solid (TDS), nitrate, arsenic, trichloroethylene (TCE) and perchloroethylene (PCE) at 9 RMS.

The Plan identified the information used for establishing the degraded groundwater quality minimum thresholds as including historical groundwater quality data from production wells, reviewing federal and state drinking water quality standards, reviewing the RWQCB basin objectives for groundwater quality for TDS, and feedback for stakeholders. The GSP establishes sustainable management criteria thresholds for constituents of concern in the Basin which include TDS, nitrate, arsenic, and the volatile organic compounds of PCE and TCE. The minimum thresholds for the constituents of concern are presented in Table 8-3.[169]

The Plan states that "[e]xceedances of minimum thresholds will be monitored by reviewing water quality reports submitted to the California Division of Drinking Water by municipalities and small water systems for the wells that are included in the Water Quality Monitoring Network."[170] The "measurable objectives are defined as zero exceedances as a result of groundwater management, in samples from the Water Quality Monitoring Network."[171] "The interim milestones for degraded groundwater quality are defined as zero exceedances of the minimum threshold for each constituent of concern for 5, 10 and 15 years after GSP adoption."[172]

Department staff recognize that GSAs are not responsible for improving existing degraded water quality conditions. GSAs are required; however, to manage future groundwater extraction to ensure that groundwater use subject to its jurisdiction does not significantly and unreasonably exacerbate existing degraded water quality conditions. Where natural and other human factors are contributing to water quality degradation, the GSAs may have to confront complex technical and scientific issues regarding the causal role of groundwater extraction and other groundwater management activities, as opposed to other factors, in any continued degradation; but the analysis should be on whether groundwater extraction is causing the degradation in contrast to only looking at whether a specific project or management activity results in water quality degradation (see

[167] San Luis Obispo Valley Basin GSP, Section 8.8, p 278.
[168] San Luis Obispo Valley Basin GSP, Section 8.8, p 278.
[169] San Luis Obispo Valley Basin GSP, Table 8-3, p 278.
[170] San Luis Obispo Valley Basin GSP, Section 8.8.2.6, p 282.
[171] San Luis Obispo Valley Basin GSP, Section 8.8.3, p 282.
[172] San Luis Obispo Valley Basin GSP, Section 8.8.3.2, p 282.

Recommended Corrective Action 2a). Department staff recommend that the GSAs coordinate with the appropriate water quality regulatory programs and agencies in the Basin to understand and develop a process for determining when groundwater management and extraction is resulting in degraded water quality in the Basin (see Recommended Corrective Action 2b).

Based on review of the GSP, Department staff are aware of no significant inconsistencies or contrary information to what was presented in the GSP. However, Department staff note that the approach to focus only on water quality impacts associated with GSP implementation, i.e., GSP-related projects, is inappropriately narrow. SGMA includes in its definition of undesirable results the "significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies."[173] SGMA specifies that the significant and unreasonable effects are those "caused by groundwater conditions occurring throughout the basin," but does not limit them to impacts caused by basin management under the GSP. While the approach to manage degraded water quality in the Basin needs to be revised, this flaw does not prohibit plan approval because water quality in the Basin is generally good;[174] therefore, requiring the GSAs to address this concern by the next periodic update is appropriate.

4.3.2.5 Land Subsidence

In addition to components identified in 23 CCR §§ 354.28 (a-b), the GSP Regulations require the minimum threshold for land subsidence to be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.[175] Minimum thresholds for land subsidence shall be supported by identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects and maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum thresholds and measurable objectives.[176]

According to the GSP, significant and unreasonable land subsidence occurs when "[t]he effects of these undesirable results on the beneficial users and uses (§354.26 (b)(3)) include the damage of critical infrastructure, and the damage of private or commercial structures that would adversely affect their uses. Staying above the minimum threshold will avoid the subsidence undesirable conditions." [177]

The GSP defines an undesirable result for land subsidence "if measured subsidence using Interferometric Synthetic Aperture Radar (InSAR) data, between June of one year

[173] Water Code § 10721(x).
[174] San Luis Obispo Valley Basin GSP, Section 8.8.2.1, p 280.
[175] 23 CCR § 354.28(c)(5).
[176] 23 CCR §§ 354.28(c)(5)(A-B).
[177] San Luis Obispo Valley Basin GSP, Section 8.9.1.3, p 283.

and June of the subsequent year is greater than 0.1 foot in any 1-year, or a cumulative 0.5 foot in any 5-year period, as a result of groundwater management under the GSP, or any long-term permanent subsidence is attributable to groundwater management."[178] The Plan further states that if subsidence is observed, "the GSAs will first assess whether the subsidence may be due to elastic processes. If the subsidence is not elastic, the GSAs will undertake a program to correlate the observed subsidence with measured groundwater levels, and ultimately implement changes to local groundwater management if the subsidence is judged to be the cause of the subsidence."[179]

The Plan states that subsidence minimum threshold is, "[t]he InSAR measured subsidence between June of one year and June of the subsequent year shall be no more than 0.1 foot in any single year and a cumulative 0.5 foot in any five-year period, resulting in no long-term permanent subsidence."[180] The in the discussion of the GSA's method for establishing the minimum threshold numeric value, it is stated that " [t]he general minimum threshold is the absence of long-term land subsidence due to pumping in the Basin" but the GSAs notes that InSAR data are subject to measurement error which is quantified to be an error of 0.1 foot. [181,182]

In addition to InSAR data the GSAs identified RMS SLV-09, located along Los Osos Valley Road is in the area that experienced subsidence in the early 1990s, to monitor for water levels as a proxy for potential subsidence.[183] The rationale for including this well is that "regular data collection from this well could alert the GSAs to conditions that may lead to subsidence before InSAR data are available."[184] The minimum threshold for RMS SLV-09 is set at 102 feet, 15 feet higher than the observed low water level in the early 1990s.[185]

The Plan states that "the measurable objective for subsidence is maintenance of current ground surface elevations."[186] The "interim milestones are identical to the minimum thresholds and measurable objectives."[187]

Department staff conclude that the GSP adequately describes the sustainable management criteria and approach to managing land subsidence. Department staff also believe the Agency used the best information and science available at the time of Plan development.

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[178] San Luis Obispo Valley Basin GSP, Section 8.9.1, p 283.
[179] San Luis Obispo Valley Basin GSP, Section 8.9.1, p 283.
[180] San Luis Obispo Valley Basin GSP, Section 8.9.2, pp 283-284.
[181] San Luis Obispo Valley Basin GSP, Section 8.9.2.1, p 284.
[182] San Luis Obispo Valley Basin GSP, Section 8.9.2.1, p 284.
[183] San Luis Obispo Valley Basin GSP, Section 8.9.2, pp 283-284.
[184] San Luis Obispo Valley Basin GSP, Section 8.9.2, pp 283-284.
[185] San Luis Obispo Valley Basin GSP, Section 8.9.2, pp 283-284.
[186] San Luis Obispo Valley Basin GSP, Section 8.9.3, p 285.
[187] San Luis Obispo Valley Basin GSP, Section 8.9.3, p 285.

4.3.2.6 Depletions of Interconnected Surface Water

SGMA defines undesirable results for the depletion of interconnected surface water as those that have significant and unreasonable adverse impacts on beneficial uses of surface water and are caused by groundwater conditions occurring throughout the basin.[188] The GSP Regulations require that a Plan identify the presence of interconnected surface water systems in the basin and estimate the quantity and timing of depletions of those systems.[189] The GSP Regulations further require that minimum thresholds be set based on the rate or volume of surface water depletions caused by groundwater use, supported by information including the location, quantity, and timing of depletions, that adversely impact beneficial uses of the surface water and may lead to undesirable results.[190]

The Plan acknowledges the presence of interconnected surface waters in the Basin in the San Luis Valley Area within the San Luis Obispo Creek and its tributaries. For the Edna Valley portion of the Basin, the GSP states that there is a disconnection of surface water to groundwater in the Edna Valley.[191] The GSP states interconnected surface water was identified through an analysis involving groundwater levels and stream elevation. The Plan states the "analysis for the Basin consisted of comparing average springtime water level elevations in wells adjacent to the San Luis Obispo Creek with the elevation of the adjacent San Luis Obispo Creek channel. In cases where average springtime water levels were greater than the elevation of the adjacent San Luis Obispo Creek channel, the stream reach was considered as potentially 'gaining'. In cases where average springtime water levels were below the adjacent channel elevation, the stream reach was considered 'losing' and potentially 'disconnected'."[192]. Department staff are satisfied that the GSAs have adopted a reasonable approach to identify the location of interconnected surface waters in the Basin.

The GSAs used the GSFLOW model to estimate streamflow depletion due to groundwater pumping in the San Luis Valley watershed over the past 20 years. For the analysis, in the San Luis Valley portion of the Basin, GSFLOW numerical model was used to estimate streamflow depletion due to groundwater pumping (all streams tributary to San Luis Creek were included in the exercise) in the San Luis Valley watershed over the past 20 years. The model was used to estimate streamflow depletion due to groundwater pumping, with the sensitivity of streamflow to pumping being evaluated by comparing two different model simulations. In the first scenario, the "historical calibration run," Basin pumping estimates were applied to the historically calibrated model and in the second scenario, all pumping in the Basin was eliminated, and the same model output was

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[188] Water Code § 10721(x)(6).
[189] 23 CCR § 354.16 (f).
[190] 23 CCR § 354.28 (c)(6).
[191] San Luis Obispo Valley Basin GSP, Section 5.7.1, p. 150.
[192] San Luis Obispo Valley Basin GSP, Section 5.7, p. 148.

extracted.[193] The results are presented Figure 8-11.[194] Average streamflow in the first scenario was estimated to be 2.7 cubic feet per second, with an average groundwater contribution to streamflow of 1.1 cubic feet per second. In the second scenario, all pumping in the Basin was eliminated, the average streamflow increased to 4.1 cubic feet per second, with an average groundwater contribution of 1.6 cubic feet per second. The GSP states that "these results indicate that streamflow depletion of 1.4 cubic feet per second, and a decrease of groundwater contribution to streamflow of 0.5 cubic feet per second, has occurred due to historical groundwater pumping in the Basin."[195] The GSAs acknowledges that this is a conceptual modeling exercise intended as a sensitivity analysis, and that streamflow in the Basin is not well documented or calibrated. As a result, there is a large amount of uncertainty in these results. Additional monitoring locations for the interconnected surface water, including stream gages and groundwater wells, are proposed in this GSP.[196] Department staff encourage addressing those data gaps to the extent that they can improve the GSAs overall understanding of the conditions leading to depletions in the Basin.

The GSP does not quantify the rate or volume of surface water depletions due to groundwater pumping as the sustainable management criteria as required by the GSP Regulations.[197] Instead, the GSAs proposes to use shallow groundwater levels as a proxy for the depletions of interconnected surface water. The GPS state that "[d]irect measurement of flux between an aquifer and an interconnected stream is not feasible using currently available data. A number of proposals to improve the collection of surface water and interconnected groundwater data are discussed in Chapter 7 (Monitoring Networks), and proposed details for these tasks are discussed in Chapter 10 (Implementation Plan)." [198] The plan further states that "[u]ntil such time as this data is available, this GSP uses water level measurements in representative wells located immediately adjacent to Basin creeks as the SMCs for the Depletion of Interconnected Surface Water Sustainability Indicator." [199] Department staff note the GSP does not demonstrate, with adequate evidence, that the use of groundwater elevations as a proxy for depletions of interconnected surface water is sufficient to quantify the location, quantity, and timing of depletions of interconnected surface water.

The GSP defines an undesirable result for depletion of interconnected surface water "if any of the representative wells monitoring interconnected surface water display exceedances of the minimum threshold values for two consecutive Fall measurements."[200] The GSAs states that "[t]he information used for establishing the

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[193] San Luis Obispo Valley Basin GSP, Section 8.10, p 287.
[194] San Luis Obispo Valley Basin GSP, Figure 8-11, p. 288.
[195] San Luis Obispo Valley Basin GSP, Section 8.10, p 287.
[196] San Luis Obispo Valley Basin GSP, Section 7.4.6, p. 249.
[197] 23 CCR § 354.28 (c)(6).
[198] San Luis Obispo Valley Basin GSP, Section 8.10, p 287.
[199] San Luis Obispo Valley Basin GSP, Section 8.10, p 287.
[200] San Luis Obispo Valley Basin GSP, Section 8.10.1, p 289.

criteria for undesirable results for the Depletion of Interconnected Surface Water Sustainability Indicator is water levels data collected from three RMS wells (i.e., SLV-12 and EV-01, and EV-11) that are located immediately adjacent to San Luis Obispo and Corral de Piedras Creek systems."[201]

In the Plan's discussion of establishing the minimum thresholds for depletion of interconnected surface water, it states that "[c]urrent data are insufficient to determine the rate or volume of surface water deletions in the creeks. Therefore, groundwater elevations in the RMSs intended to monitor surface water/groundwater interaction (SLV-12, EV-01, EV-11) are used as a proxy" "…metric for the Depletion of Interconnected Surface Water Sustainability Indicator is adopted given the challenges and cost of direct monitoring of depletions of interconnected surface water."[202,203] The Plan states that because there are no historical groundwater level declines in the RMS wells, "the minimum thresholds are defined at these three RMSs as the lowest historically observed water level in the period of record."[204]

The Plan states that "[b]y defining minimum thresholds in terms of groundwater elevations in shallow groundwater wells near surface water, the GSAs will monitor and manage this gradient, and in turn, manage potential changes in depletions of interconnected surface."[205]

The GPS states that "[s]imilar to minimum thresholds, measurable objectives were defined using water level data based on the historical water level data observed in RMSs intended to monitor streamflow conditions." [206] The Plans states that the interim milestones are defined to be identical to the water levels associated with the measurable objectives.[207] Minimum thresholds and measurable objectives are presented in Table 8-1 and Figures 8-4, 8-9, and 8-10.[208]

One or more public comments were received expressing concern about the proposed management of depletions of interconnected surface water in the Plan. Department Staff conclude there appears to be uncertainty regarding what scientific studies, reports, information, and biological, physical, or ecological factors are best suited to use when developing sustainable management criteria in the basin for depletions of interconnected surface water under SGMA. Additionally, there appears to be other state and federal agencies that are or may act under other laws and authorities to address biological or ecological concerns regarding low instream flows in portions of the Basin, which appear to be caused by numerous factors of which depletions of interconnected surface waters

[201] San Luis Obispo Valley Basin GSP, Section 8.10.1, p 289.
[202] San Luis Obispo Valley Basin GSP, Section 8.10.2, p 290.
[203] San Luis Obispo Valley Basin GSP, Section 8.10.2.1, p 291.
[204] San Luis Obispo Valley Basin GSP, Section 8.10.2, p 290.
[205] San Luis Obispo Valley Basin GSP, Section 8.10.2.1, p 291.
[206] San Luis Obispo Valley Basin GSP, Section 8.10.3, p 293.
[207] San Luis Obispo Valley Basin GSP, Section 8.10.3.2, p 293.
[208] San Luis Obispo Valley Basin GSP, Table 8-1, p 264; Figure 8-4, p 260, Figure 8-9 and 8-10 p. 263.

from groundwater extractions in the Subbasin is only one. Department staff conclude that at this time, the GSA has considered this issue and explained and supported its choices adequately. It may be that alternative choices or methodology could also be supported by other studies or data, but it does not appear that there is a clear or convincing case that the GSA's choices or explanation are inappropriate.

Department staff understand that quantifying depletions of surface water from groundwater extractions is a complex task that likely requires developing new, specialized tools, models, and methods to understand local hydrogeologic conditions, interactions, and responses. During the initial review of GSPs, Department staff have observed that most GSAs have struggled with this new requirement of SGMA. However, staff believe that most GSAs will more fully comply with regulatory requirements after several years of Plan implementation that includes projects and management actions to address the data gaps and other issues necessary to understand, quantify, and manage depletions of interconnected surface waters. Accordingly, Department staff believes that affording GSAs adequate time to refine their Plans to address interconnected surface waters is appropriate and remains consistent with SGMA's timelines and local control preferences.

The Department will continue to support GSAs in this regard by providing, as appropriate, financial, and technical assistance to GSAs, including the development of guidance describing appropriate methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water caused by groundwater extractions. Once the Department's guidance related to depletions of interconnected surface water is publicly available, the GSA, where applicable, should consider incorporating appropriate guidance approaches into their future periodic updates to the GSP (See Recommended Corrective Action 3a). GSAs should consider availing themselves of the Department's financial or technical assistance, but in any event must continue to fill data gaps, collect additional monitoring data, and implement strategies to better understand and manage depletions of interconnected surface water caused by groundwater extractions and define segments of interconnectivity and timing within their jurisdictional area (See Recommended Corrective Action 3b). Furthermore, GSAs should coordinate with local, state, and federal resources agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion (See Recommended Corrective Action 3c).

4.4 Monitoring Network

The GSP Regulations describe the monitoring network that must be developed for each sustainability indicator including monitoring objectives, monitoring protocols, and data reporting requirements. Collecting monitoring data of a sufficient quality and quantity is necessary for the successful implementation of a groundwater sustainability plan. The GSP Regulations require a monitoring network of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through implementation of the Plan.[209] Specifically, a monitoring network must be able to monitor impacts to beneficial uses and users,[210] monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds,[211] capture seasonal low and high conditions,[212] include required information such as location and well construction and include maps and tables clearly showing the monitoring site type, location, and frequency.[213] Department staff encourage GSAs to collect monitoring data as specified in the GSP, follow SGMA data and reporting standards,[214] fill data gaps identified in the GSP prior to the first periodic update,[215] update monitoring network information as needed, follow monitoring best management practices,[216] and submit all monitoring data to the Department's Monitoring Network Module immediately after collection including any additional groundwater monitoring data that is collected within the Plan area that is used for groundwater management decisions. Department staff note that if GSAs do not fill their identified data gaps, the GSA's basin understanding may not represent the best available science for use to monitor basin conditions.

The GSP has identified 40 monitoring wells to include in the SGMA Monitoring Network, 22 wells in the San Luis Valley and 18 wells in the Edna Valley, for the chronic lowering of groundwater levels sustainability indicator. Well construction information is available for only 31 out of the 40 wells in the GSP. The Plan notes that based on the available construction information, 16 wells are screened in the Alluvial aquifer and 24 wells are screened in the Paso Robles Aquifer, the Pismo Aquifer, or across multiple aquifers.[217] However, it is unclear how the well screened interval was determined for all 40 wells if construction information exists for only 31 wells. Of the 40 monitoring wells, 10 wells are defined as Representative Monitoring Sites (RMS) for which sustainability indicators are defined, four located in the San Luis Valley and six located in the Edna Valley. However, there are a total of 41 wells uploaded to DWR's SGMA Portal Monitoring Network Module (MNM). The MNM is consistent with the GSP regarding a total of 10 wells being identified as RMS. The proposed frequency for collecting groundwater level measurements is semi-annually, April to represent the spring seasonal high and October to represent the fall seasonal low.[218]

The GSP proposes to use groundwater level monitoring as a proxy for the groundwater storage monitoring network because changes in groundwater storage are directly

[209] 23 CCR § 354.32.
[210] 23 CCR § 354.34(b)(2).
[211] 23 CCR § 354.34(b)(3).
[212] 23 CCR § 354.34(c)(1)(B).
[213] 23 CCR §§ 354.34(g-h).
[214] 23 CCR § 352.4 *et seq*.
[215] 23 CCR § 354.38(d).
[216] Department of Water Resources, 2016, Best Management Practices and Guidance Documents.
[217] San Luis Obispo Valley GSP, Section 7.2.5, p. 236.
[218] San Luis Obispo Valley GSP, Section 7.5.4, p. 251.

dependent on changes in groundwater levels.[219] The Plan notes that change in groundwater storage will be monitored using the entire monitoring network and described in annual reports, while select RMS wells will track reduction of groundwater storage as the sustainability indicator.[220] Of the entire groundwater monitoring network (40 wells), six wells are defined as RMS for groundwater storage.[221] DWR staff reviewed the well construction details for the RMS wells for groundwater storage[222] and found two wells are in the San Luis Valley and four wells are located in the Edna Valley.

The GSP states that seawater intrusion is not applicable to the Basin; therefore, no monitoring network is proposed.[223]

The GSP proposes to establish a monitoring network for degraded water quality by reviewing water quality data from nine public water systems supply wells collected by the State Water Resource Control Board's Division of Drinking Water (DDW) and the San Luis Obispo County Environmental Health Services.[224] The GSP states that constituents that will be sampled include arsenic, nitrate, and total dissolved solids (TDS).[225] The GSP also states that Proposition 1 grant funding was received to develop wells to monitor for the anthropogenic contaminant, PCE. When available, representative wells from the new PCE monitoring network will be included in the GSP to monitor for PCE.[226]

Review of the location of groundwater quality monitoring wells within the Basin shows that the geographic density and distribution of wells appears adequate.[227] However, no information is provided on well construction, depth of screened interval, or the aquifer that is being sampled, so no analysis of the adequacy of the groundwater quality monitoring network within each aquifer can be made. The GSAs are dependent on the monitoring density and frequency established by the lead regulatory agencies.

The GSP states that in addition to using InSAR data, two groundwater level monitoring sites will be included in the subsidence monitoring network.[228] The two groundwater level monitoring sites are located within the area that the GSP defined as "expected subsidence with groundwater removal."[229] Of the two groundwater level monitoring sites in the subsidence monitoring network, one well is defined as RMS for which sustainable

[219] San Luis Obispo Valley GSP, Section 7.2.5, p. 236.
[220] San Luis Obispo Valley GSP, Section 7.4.2, pp. 246-247.
[221] San Luis Obispo Valley GSP, Table ES-1, p. 34.
[222] San Luis Obispo Valley GSP, Table 7-1, p. 238.
[223] San Luis Obispo Valley GSP, Section 7.4.3, p. 247.
[224] San Luis Obispo Valley GSP, Section 7.5.4, p. 251.
[225] San Luis Obispo Valley GSP, Section 7.3.2, p. 240.
[226] San Luis Obispo Valley GSP, Section 7.4.4.1, p. 247.
[227] San Luis Obispo Valley GSP, Figure 7-2, p. 242.
[228] San Luis Obispo Valley GSP, Section 7.4.5, p. 248.
[229] San Luis Obispo Valley GSP, Figure 4-23, p. 122 and Figure 7-1, p. 239.

management criteria are defined. [230] The RMS subsidence monitoring network well is located within the area of known subsidence.[231]

The GSP proposes to use a network of stream gages and groundwater level sites to monitor interconnected surface water depletions in the Basin. There are six stream gages that already exist in the San Luis Valley and an additional five stream gages are proposed, two in the San Luis Valley and three in the Edna Valley. [232]

The GSP defines a subset of the groundwater level monitoring network as a proxy for the depletions of interconnected surface water monitoring network. [233] There are eight proposed groundwater level monitoring sites that will be used as a proxy to monitor depletions of interconnected surface water, five in the San Luis Valley and three in the Edna Valley. An additional five monitoring well sites are proposed to be installed in the future, three in the San Luis Valley and two in the Edna Valley. [234] Three of the eight wells in the interconnected surface water monitoring network are defined as RMS for which sustainable management criteria are defined, two in the Edna Valley and one in the San Luis Valley. [235] The three RMS wells are equipped with transducers and will be measured daily. [236] Department staff note no justification was provided in the GSP for the selection of the three RMS to monitor for interconnected surface water depletion. Department staff encourage the GSAs to provide this justification in future updates to the Plan.

Within the San Luis Valley, the RMS well is located in the southern portion of the basin along San Luis Obispo Creek and is screened from 50-90 feet and 150-175 feet through the Alluvial, Paso Robles, and Pismo Aquifers. Within the Edna Valley, one RMS well is located toward the north of the Basin along the West Corral de Piedra Creek and one well is located toward the south of the basin along East Corral de Piedra Creek. The groundwater level monitoring well along the West Corral de Piedra Creek has a total depth of 72 feet with an unknown screen interval. The groundwater level monitoring well along the East Corral de Piedra Creek has an unknown total depth and unknown screened interval making it difficult for Department staff to determine if this well is appropriate to be part of the monitoring network for depletions of interconnected surface water.

The GSP Regulations require GSPs to provide specific information about each monitoring site per the data and reporting standards.[237] As an example, well construction information is required for monitoring sites, but is not provided for wells in the degraded water quality monitoring network. It is imperative the GSAs work to ensure the information defining the monitoring network is consistent within the GSP, consistent with the Department's

[230] San Luis Obispo Valley GSP, Figure 7-1, p. 239, Table 8-1, p. 264.
[231] San Luis Obispo Valley GSP, Figure 4-23, p. 122.
[232] San Luis Obispo Valley GSP, Figure 7-3, p. 245.
[233] San Luis Obispo Valley GSP, Sections 5.7 and 5.7.1, pp. 147-150.
[234] San Luis Obispo Valley GSP, Figure 7-3, p. 245.
[235] San Luis Obispo Valley GSP, Figure 7-1, p. 239, Table 8-1, p. 264.
[236] San Luis Obispo Valley GSP, Table 7-1, p. 238.
[237] 23 CCR §§ 352.4, 354.34(g)(2).

Monitoring Network Module, and follow the data and reporting standards. Department staff recommend there be a reconciliation between the details of the monitoring network provided in the GSP with the requirements of the data and reporting standards in the GSP Regulations (see Recommended Corrective Action 4).

4.5 Projects and Management Actions

The GSP Regulations require a description of the projects and management actions the submitting Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.[238] Each Plan's description of projects and management actions must include details such as: how projects and management actions in the GSP will achieve sustainability, the implementation process and expected benefits, and prioritization and criteria used to initiate projects and management actions.[239]

The GSP proposes seven projects and three management actions that "were centered around supplemental water sources that could be brought into the SLO Basin to mitigate the overdraft".[240] The Plan further states that "[t]he proposed projects and management actions are intended to maintain groundwater levels above minimum thresholds through in-lieu pumping reductions or increased recharge… [i]mproving the management of groundwater in the Basin will help to mitigate overdraft."[241]

The seven proposed projects are to address the overdraft in the Edna Valley portion of the Basin. The three management actions include the expansion of the monitoring network, development and implementation of a groundwater extraction metering and reporting plan, and the development of a demand management plan. Each project or management action includes a description, timetable for implementation, expected quantitative benefits, associated public noticing, overview of any permitting or regulatory process, estimated costs with a funding plan, and legal authority required for implementation.

The Plan adequately describes proposed projects and management actions in a manner that is generally consistent and substantially complies with the GSP Regulations. The projects and management actions are directly related to the sustainable management criteria and present a generally feasible approach to achieving the sustainability goal of the Basin.

4.6 Consideration of Adjacent Basins/Subbasins

SGMA requires the Department to "…evaluate whether a groundwater sustainability plan adversely affects the ability of an adjacent basin to implement their groundwater

[238] 23 CCR § 354.44 (a).
[239] 23 CCR § 354.44 (b) *et seq.*
[240] San Luis Obispo Valley GSP, p. 35.
[241] San Luis Obispo Valley GSP, Section 9.2.3, p. 303.

sustainability plan or impedes achievement of sustainability goals in an adjacent basin."[242] Furthermore, the GSP Regulations state that minimum thresholds defined in each GSP be designed to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.[243]

The San Luis Obispo Valley Basin has two adjacent basins: the Los Osos Valley Basin and the Santa Maria River Valley Basin. The Plan includes an analysis of potential impacts to adjacent basins with the defined minimum thresholds for each sustainability indicator. The Plan does not anticipate any impacts to adjacent basins resulting from the minimum thresholds defined in the Plan.

Department staff will continue to review periodic updates to the Plan to assess whether implementation of the San Luis Obispo GSP is potentially impacting adjacent basins.

4.7 Consideration of Climate Change and Future Conditions

The GSP Regulations require a GSAs to consider future conditions and project how future water use may change due to multiple factors including climate change.[244]

Since the GSP was adopted and submitted, climate change conditions have advanced faster and more dramatically. It is anticipated that the hotter, drier conditions will result in a loss of 10% of California's water supply. As California adapts to a hotter, drier climate, GSAs should be preparing for these changing conditions as they work to sustainably manage groundwater within their jurisdictional areas. Specifically, the Department encourages GSAs to:

1. Explore how their proposed groundwater level thresholds have been established in consideration of groundwater level conditions in the basin based on current and future drought conditions;
2. Explore how groundwater level data from the existing monitoring network will be used to make progress towards sustainable management of the basin given increasing aridification and effects of climate change, such as prolonged drought;
3. Take into consideration changes to surface water reliability and that impact on groundwater conditions;
4. Evaluate updated watershed studies that may modify assumed frequency and magnitude of recharge projects, if applicable, and
5. Continually coordinate with the appropriate groundwater users, including but not limited to domestic well owners and state small water systems, and the appropriate overlying county jurisdictions developing drought plans and establishing local

[242] Water Code § 10733(c).
[243] 23 CCR § 354.28(b)(3).
[244] 23 CCR § 354.18.

drought task forces[245] to evaluate how their Plan's groundwater management strategy aligns with drought planning, response, and mitigation efforts within the basin.

[245] Water Code § 10609.50.

5 STAFF RECOMMENDATION

Department staff recommend approval of the GSP with the recommended corrective actions listed below. The San Luis Obispo Valley Basin GSP conforms with Water Code Sections 10727.2 and 10727.4 of SGMA and substantially complies with the GSP Regulations. Implementation of the GSP will likely achieve the sustainability goal for the San Luis Obispo Valley Basin. The GSAs have identified several areas for improvement of its Plan and Department staff concur that those items are important and should be addressed as soon as possible. Department staff have also identified additional recommended corrective actions that should be considered by the GSAs for the first periodic assessment of its GSP. Addressing these recommended corrective actions will be important to demonstrate that implementation of the Plan is likely to achieve the sustainability goal.

The recommended corrective actions include:

RECOMMENDED CORRECTIVE ACTION 1

Update the sustainable management criteria for the chronic lowering of groundwater levels as follows:

a. Provide further discussion related to the process, information, and data considered when selecting the operational flexibility values of 10 to 20 feet below historical lows in the San Luis Valley Area. Additionally, the GSA should provide more information about how these values represent a level where significant and unreasonable conditions may occur.

b. Provide more information about how the proposed minimum thresholds for the chronic lowering groundwater levels may impact beneficial uses and users. The GSAs should consider the impact of the selected minimum threshold levels on supply wells. The consideration should identify the degree/extent of potential impact including the percentage, number, and location of potentially impacted wells at the proposed minimum thresholds for chronic lowering of groundwater levels.

c. Provide further discussion related to the process, information, and data considered when selecting the minimum threshold of 150 feet for RMS EV-16. Additionally, the GSA should provide more information about how these values represent a level where significant and unreasonable conditions may occur.

RECOMMENDED CORRECTIVE ACTION 2

Update the sustainable management criteria for degraded water quality as follows:

a. Revise the definition of undesirable results so that exceedances of minimum thresholds caused by groundwater extraction, whether the GSAs have implemented pumping regulations or not, are considered in the assessment of undesirable results in the Basin, or explain why the GSAs excludes minimum threshold exceedances that may result from unregulated groundwater pumping in the Basin, in the definition of undesirable results.

b. Coordinate with the appropriate groundwater users, including drinking water, environmental, and irrigation users as identified in the Plan, and water quality regulatory agencies and programs in the Basin to understand and develop a process for determining if groundwater management and extraction is resulting in degraded water quality in the Basin.

Recommended Corrective Action 3

Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, Basin-wide pumping is a complex task and that developing suitable tools may take additional time; however, it is critical for the Department's ongoing and future evaluations of whether GSP implementation is on track to achieve sustainable groundwater management. The Department plans to provide guidance on methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water and support for establishing specific sustainable management criteria in the near future. This guidance is intended to assist GSAs to sustainably manage depletions of interconnected surface water.

In addition, the GSAs should work to address the following items by the first periodic update:

a. Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.

b. Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.

c. Prioritize collaborating and coordinating with local, state, and federal regulatory agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion within the GSA's jurisdictional area.

Recommended Corrective Action 4

Conduct a reconciliation between the details of the monitoring network provided in the GSP with the requirements of the data and reporting standards in the GSP Regulations. Where requirements of the data and reporting standards are not provided, the GSA should include this information in the periodic update of the GSP. As a reminder, updates to the monitoring network must be reflected in the SGMA Portal's Monitoring Network Module.

APPENDIX H

Public Comments on San Luis Obispo Valley Basin
WY 2023 Annual Report