South American Subbasin Groundwater Sustainability Plan

Draft Third Annual Report, Water Year 2023

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SOUTH AMERICAN SUBBASIN GSP - ANNUAL REPORT

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Executive Summary

California Water Code (CWC) §356.2 requires the submission of an annual report to DWR by April 1 of each year following the adoption of the Groundwater Sustainability Plan (GSP). This report is the third annual report submitted to DWR following GSP submission and provides an update on basin conditions and plan implementation progress within the South American Subbasin (SASb) for Water Year 2023 (October 1, 2022 – September 30, 2023).

The SASb GSP provides an analysis of potential impacts to all beneficial users of groundwater, including, but not limited to, water supply entities, shallow well users, interconnected surface waters, and groundwater dependent ecosystems. Results assume a moderate warming climate change scenario and projected groundwater use and suggest that if 100% of the 45 Representative Monitoring Points (RMP) in the SASb simultaneously reached groundwater level minimum thresholds (MTs), less than 5% of wells would be impacted, less than 5% of interconnected surface water reach length would be impacted, and less than 5% of groundwater dependent ecosystem area would be impacted (Section 3.2, Section 3.3, and Appendices 3A-3C of the adopted SASb GSP; SASb, 2021). Thus, groundwater level MTs developed for the SASb GSP are intended to conservatively protect against impacts to beneficial users of groundwater within a reasonable margin of safety, and the maintenance of groundwater levels above MTs is a proxy that strongly indicates the avoidance of impacts to all beneficial users. Effective tracking and adjustments to attain sustainable management criteria (SMC) outline a path towards sustainable, long-term groundwater management that achieves the Basin's Sustainability Goal:

> **The Sustainability Goal of the Basin is to protect and ensure the long-term viability of groundwater resources for domestic, urban, agricultural, industrial, and environmental beneficial users of groundwater. The Sustainability Goal will be achieved by rigorous assessment of potential impacts to these beneficial users, and scientifically-informed management that avoids significant and unreasonable impacts to beneficial uses and users of groundwater.**

Importantly, measured data in the 2023 water year do not indicate the occurrence of significant undesirable results in the SASb (**Table ES-1**).

The remainder of the Executive Summary presents key metrics for water year 2023, including groundwater level data, groundwater quality data, land subsidence data, estimated water use, estimated groundwater use, estimated groundwater storage change, and progress on Plan Implementation regarding projects and management actions. In the sections and appendices that follow the Executive Summary, each key metric is discussed in detail.

It is noted that water years 2021 and 2022 were critically dry. The lack of rainfall and decreased availability of surface water during critically dry periods resulted in lower groundwater levels due to lack of natural recharge, and increased groundwater pumping. Water year 2023 was a wet year and the relatively low groundwater extractions and relatively high recharge into the aquifer resulted in higher groundwater levels and increased groundwater storage.

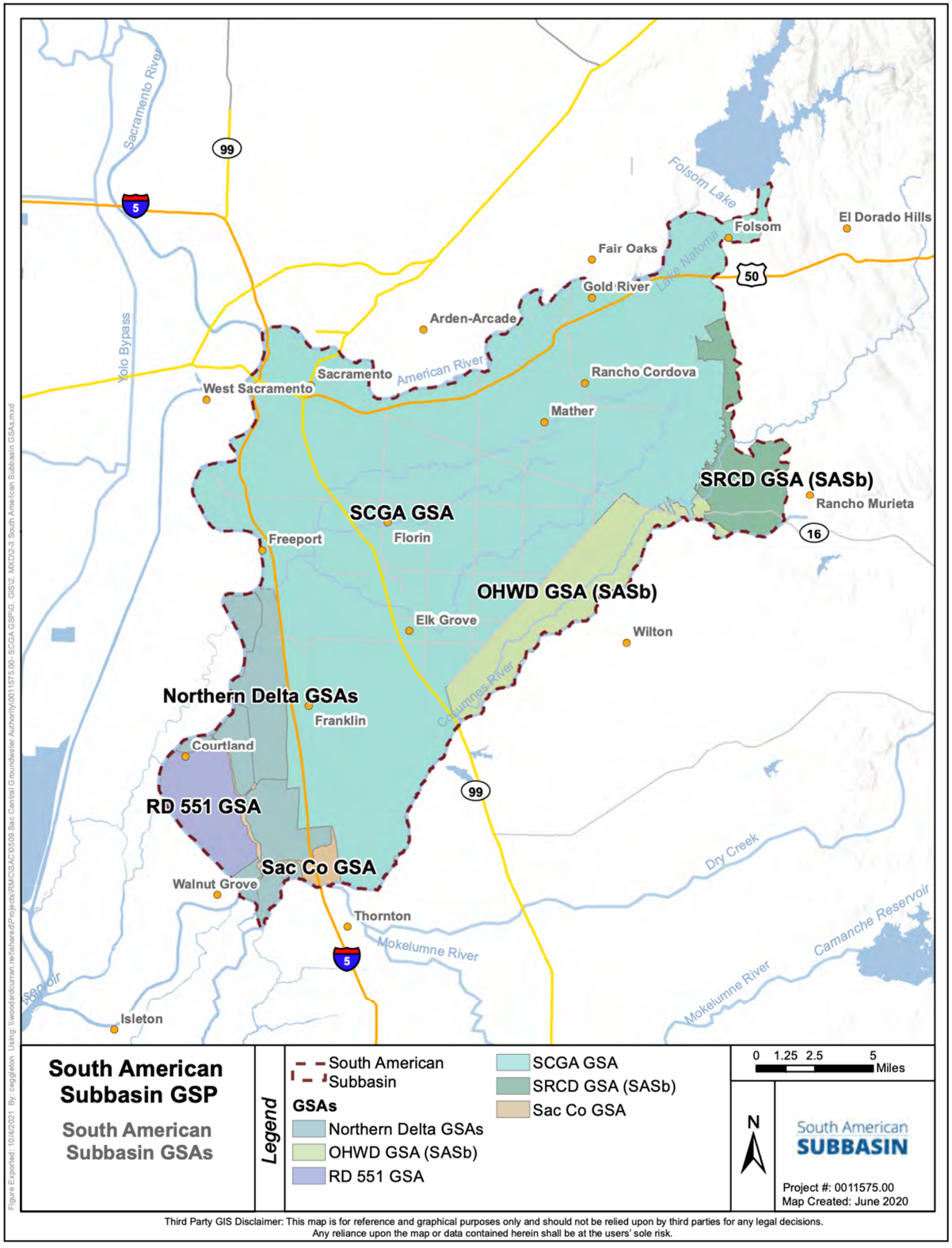

Figure ES-1: South American Subbasin and its six GSAs in Sacramento County, California

Table ES-1: Summary of Sustainable Management Criteria

Sustainability Indicator	Minimum Threshold (MT)	Measurable Objective (MO)	Occurrence of Undesirable Results	Water Year 2023 Annual Report Status
Groundwater Levels	Set at historical minimum elevations to protect sensitive uses and users and avoid undesirable results.	Average groundwater levels observed from January 2015 to June 2021. MOs are higher in the Harvest Water area to account for recharge over time.	More than 25% of representative monitoring wells fall below MTs for three consecutive years.	***No occurrence of undesirable results***
Groundwater Storage	Groundwater levels used as a proxy for this sustainability indicator.			***No occurrence of undesirable results***
Seawater Intrusion	This sustainability indicator is not applicable in the SASb.			
Degraded Groundwater Quality	Nitrate = 10 mg/L Specific Conductance = 1600 micromhos/cm	Maintain concentration at each RMP below the maximum concentration observed at the RMP prior to May 2020. No MO shall exceed 90% of the MT (9 mg/L for nitrate, 1440 micromhos/cm for specific conductance).	More than 2 RMPs exceeding the MT for Nitrate or for Specific Conductance.	***No occurrence of undesirable results***
Land Subsidence	Groundwater levels used as a proxy for this sustainability indicator.			***No occurrence of undesirable results***
Depletions of Inter-connected Surface Waters	Groundwater levels used as a proxy for this sustainability indicator.			***No occurrence of undesirable results***

Groundwater Levels

Measured groundwater levels in the 2023 water year were above MTs in 93% of RMPs and do not indicate the occurrence of undesirable results (**Section Error! Reference source not found.**). Fall 2023 groundwater levels were compared to minimum thresholds, measurable objectives, and 2027 milestones. The measurement taken on the date closest to September 30, 2023 (the end of the 2023 water year) was used for each well. Groundwater levels stayed above MTs in 93% of measured RMPs; thus 7% of measured RMPs were below MTs. This frequency of wells below MTs avoids the identification of undesirable results identified in the GSP (25% of wells below MTs for three consecutive years) and, by extension, avoids significant and unreasonable impacts to domestic, urban, agricultural, and industrial groundwater users. Groundwater levels in measured RMPs for interconnected surface water (ISW) stayed above MTs in 100% of RMPs; thus no measured RMPs were below MTs, which avoids the occurrence of significant and unreasonable impacts to ISW.

Water Use and Groundwater Budget

Total groundwater extractions for the 2023 water year are estimated to be 182,600 AF (**Section 2.2**), while surface water diversions are estimated to be 130,600 AF (**Section 2.3**). Total water use is estimated to be 313,100 AF, and total water use by water use sector (which does not include remediation water) is estimated to be 285,700 AF (**Section 2.4**). The CoSANA model was used to develop a water budget for the basin to estimate the change in storage of the SASb during water year 2023. As noted, water year 2023 was a wet year; it is estimated that there was an increase in basin storage of about 57,000 AF during the water year (**Section 2.5**). During the 29-year period from 1995-2023, there has been an estimated cumulative increase in groundwater storage of 141,400 AF, reflecting an average annual increase of about 4,900 AF per year.

Land Subsidence

Land subsidence was measured by satellite data (i.e., InSAR) and found to be negligible (**Section 2.6**). Estimated land subsidence fell within instrument error, and is not a cause for concern. These findings are consistent with the relatively stable groundwater levels observed in the 2023 water year, and with the historical record.

Groundwater Quality

Groundwater quality SMC are defined for nitrate and specific conductance. Measured groundwater concentrations during water year 2023 are presented in **Section 2.7** and do not indicate the occurrence of undesirable results (greater than two wells with exceedances for either nitrate or specific conductance). One RMP exceeded the MT for specific conductance, and no RMPs exceeded the MT for nitrate.

Plan Implementation Progress

This section describes progress made in the implementation of the GSP, including tracking and support for planned projects and implementation of management actions identified in the GSP. This section also includes an overview of plan implementation activities anticipated for the coming year.

1 Introduction

The South American Subbasin (SASb, or basin) Groundwater Sustainability Plan (GSP or Plan) was adopted in November and December of 2021 by six Groundwater Sustainability Agencies (GSAs) formed in accordance with the Sustainable Groundwater Management Act (SGMA) of 2014. The GSAs were formed to coordinate, develop, and implement a GSP for the South American Subbasin (DWR Subbasin No. 5-012.01). The GSP was submitted to the California Department of Water Resources (DWR) on January 27, 2022, ahead of the January 31, 2022 deadline for high and medium priority basins.

California Water Code (CWC) §356.2 requires the submission of an annual report to DWR by April 1 of each year following the adoption of the GSP. This report is the third annual report submitted to DWR following submission of the GSP and provides an update on basin conditions and initial plan implementation progress within the SASb for Water Year 2023 (October 1, 2022 – September 30, 2023). CWC §356.2 requires annual reports to include general information about the SASb and GSP, groundwater elevation data (contour maps and hydrographs), groundwater extraction, surface water supply, changes in groundwater storage, and a description of progress towards implementation of the GSP since the end of the study period for the previous annual report.

The annual report production schedule follows the completion of the preceding water year:

- September 30: end of water year for upcoming reporting period
- October 1 – November 15 (1.5 months): input preceding water year data into the Data Management System (DMS)
- November – February (4 months): produce draft report
- March (1 month): review and finalize report
- April 1: submit finalized report to DWR

GSAs implement the annual reporting process by collecting groundwater data, coordinating and communicating with stakeholders and the public, and overseeing the monitoring, modeling, and sustainable management criteria (SMC) tracking that informs annual reporting. GSAs are also responsible for broader SGMA implementation.

Fundamentally, the Annual Report serves as an annual touchpoint and progress report to survey groundwater conditions across the basin, evaluate conditions against sustainable management criteria, summarize implementation activities, and communicate findings with state agencies, member agencies, and the public. It is noted that data relevant to the production of the GSP, and key metrics such as water level and groundwater quality, are available on the basin's data management system (DMS)[1].

[1] https://opti.woodardcurran.com/southamericansubbasin/main.php

2 Basin Conditions

2.1 Groundwater Elevations

The SASb GSP defines Sustainable Management Criteria with respect to quantifiable impacts to beneficial users of groundwater that if exceeded, would lead to the occurrence of undesirable results. The SASb GSP focuses on three classes of sensitive groundwater users – shallow wells, interconnected surface waters, and groundwater dependent ecosystems – in three technical appendices. Results suggested that if 100% of the 45 RMPs in the SASb simultaneously reached groundwater level MTs, less than 5% of wells would be impacted, less than 5% of interconnected surface water reach length would be impacted, and less than 5% of groundwater dependent ecosystem area would be impacted (Section 3.2, Section 3.3, and Appendices 3A-3C; SASb, 2021). Hence, groundwater level MTs developed for the SASb GSP conservatively protect against impacts to all beneficial users of groundwater within a reasonable margin of safety; the maintenance of groundwater levels above MTs is a proxy that strongly indicates the avoidance of impacts to beneficial users.

The groundwater elevation monitoring network is described in Section 3.5.2 of the GSP and is designed to demonstrate groundwater occurrence, level, flow directions, and hydraulic gradients between the principal aquifer and surface water features. The groundwater level monitoring network presented in the GSP included 45 wells; however, two wells were recently sealed or destroyed, leaving 43 wells as shown in **Figure 2-1**.

Groundwater level data was collected from the following sources:

- Department of Water Resources (DWR)
- Omochumne-Hartnell Water District (OHWD)
- University of California Davis (UCD)
- Sacramento State University (CSUS)
- Sacramento Central Groundwater Authority (SCGA)
- Aerojet

The intent of comparing fall 2023 groundwater levels to minimum thresholds, measurable objectives, and 2027 milestones is to evaluate the status of groundwater conditions in the SASb. In implementing this approach, the measurement taken on the date closest to September 30, 2023 (the end of the 2023 water year) was used for each RMP well. This evaluation includes measurements from 43 RMPs. Measurements from 42 RMPs were collected in October 2023, and measurement from one RMP was collected in December 2023. **Table 2-1** provides a comparison of measured groundwater elevations at each monitoring well with minimum thresholds, measurable objectives, and the 2027 interim milestones. **Figure 2-2** displays a map of each RMP measured in fall 2023 and compares the measured groundwater elevation to the RMP's MT. Separate maps for the upper and lower aquifer are provided.

Groundwater levels evaluated for the 2023 water year stayed above MTs in 93% of measured RMPs[2]; thus 7% of measured RMPs were below MTs, which avoids the occurrence of undesirable results (defined in the GSP as 25% of RMP wells below MTs for three consecutive years) and by extension, reflects an absence of significant and unreasonable impacts to domestic, urban, agricultural and industrial groundwater users. Of the 43 wells included in this evaluation, 3 were

[2] 43 groundwater level and storage RMPs are included in this evaluation, and 40/43 of these RMPs (93%) stayed above MTs.

below the minimum threshold and 7 were below the 2027 interim milestone at the time of measurement. All 3 RMPs with water levels below the minimum threshold are in the lower aquifer.

The groundwater level measured at RMP 25 was -10.3 ft above mean sea level (AMSL) in October 2023, which is uncharacteristically low for this RMP. The RMP is a domestic well with an MT of 4 ft. AMSL. Since 2005 no measurement at this RMP has been below 5 ft. AMSL. This suggests that the October 2023 measurement may be inaccurate, possibly due to equipment or operator error, or influenced by an event such as pumping at the well or a nearby well.

RMP 31, an irrigation well located on a golf course, had a groundwater level of -24.3 ft. AMSL in October 2023. The RMP's MT is -22 ft. AMSL, and in reviewing the RMP's hydrograph, presented in *Appendix A: Groundwater Elevation Hydrographs*, water levels at this well appear to be experiencing a gradual but steady decline since 2005 (with one uncharacteristically high, and likely inaccurate, measurement in December 2017).

RMP 39, a monitoring well for the Aerojet Superfund Site, had a measured groundwater level of 98.8 ft. AMSL in October 2023, which is just below the well's MT of 99 ft. AMSL. As shown in Appendix A, groundwater levels at this well have been relatively consistent but below the MT since April 2022. Groundwater remediation pumping is conducted in the region of the Aerojet Superfund Site. Further evaluation is needed to determine if this remediation pumping impacts water levels at this RMP. If so, a determination needs to be made if this RMP accurately represents water levels in the Subbasin, or if the RMP should be removed from the water level RMP network.

Groundwater levels in measured RMPs for interconnected surface water (ISW)[3] stayed above MTs in 100% of RMPs; thus none of the measured RMPs were below MTs, which avoids the occurrence of significant and unreasonable impacts to ISW. The two RMPs that have been removed from the network were both ISW RMPs (the sealed RMP_37 and destroyed RMP_40). As with last year's Annual Report, this report evaluates RMP_42 as an ISW well to replace the recently destroyed RMP_40, resulting in 9 ISW RMPs as opposed to the original 10. Of the 9 ISW RMPs, one was below the 2027 interim milestone at the time of measurement, and 8 were above. The ISW RMPs are indicated in **Figure 2-1** and **Figure 2-2**.

[3] 9 ISW RMP measurements are included as part of this evaluation, and 9/9 (100%) of these RMPs stayed above MTs.

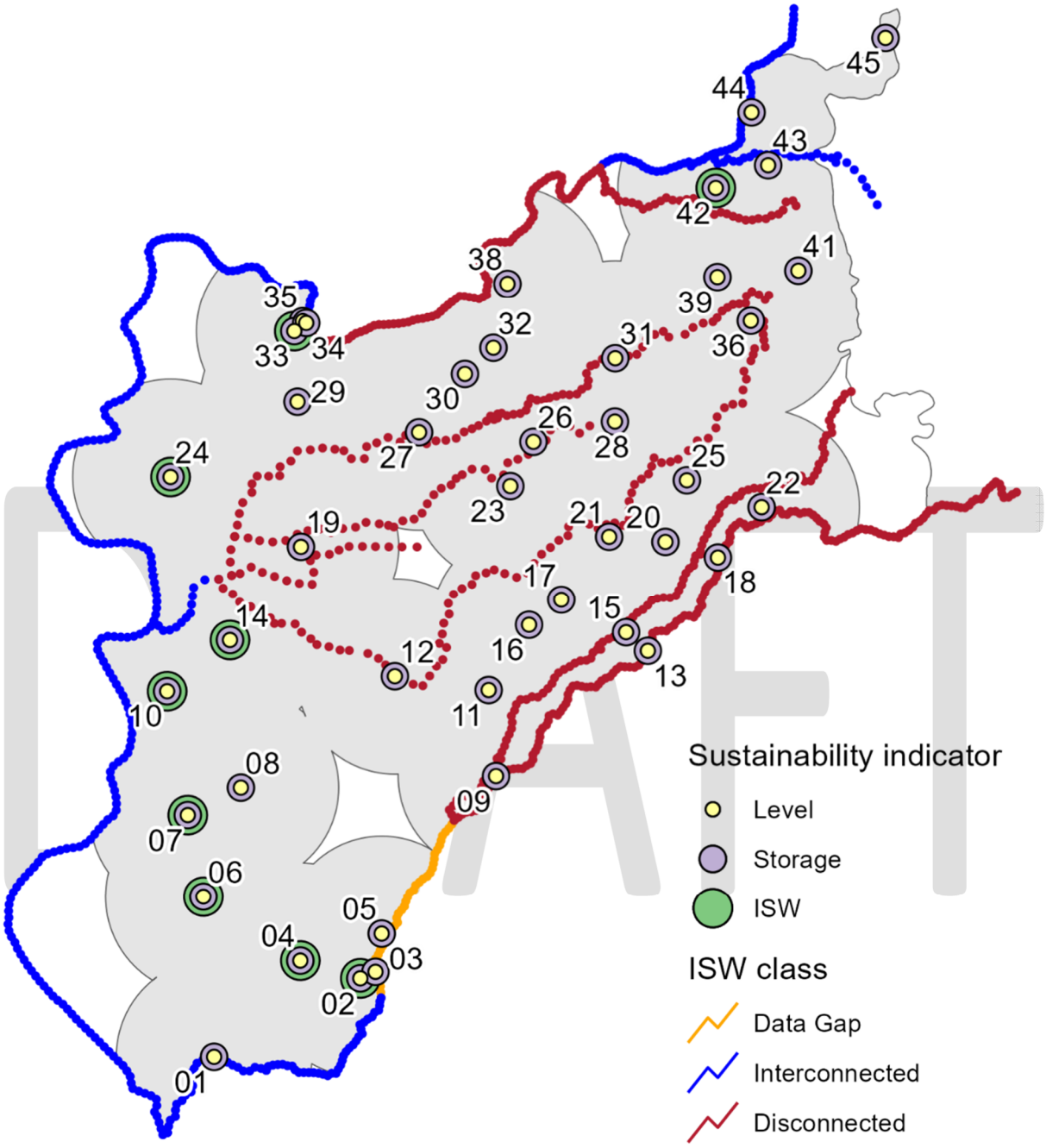

Figure 2-1: Groundwater Levels Monitoring Network (red dots indicate probable disconnected reaches, blue dots indicate probable interconnected reaches). Network coverage is depicted with grey, circular 24.25 square mile buffers around each monitoring point.

Table 2-1: Measured Elevations in Water Year 2023 Compared to Sustainability Criteria and 2027 Interim Milestones

RMP	Aquifer Zone	WY 2023 Date Measured	WY 2023 Measured Elevation (feet amsl)	Minimum Threshold (feet)	Measurable Objective (feet)	Status Compared to MT and MO	2027 Interim Milestone (feet)	Status compared to 2027 IM
01	upper	10/17/2023	1.6	-3	1	Above MO	-2	Above IM
02	upper	10/11/2023	-12.8	-29	12	Above MT	-18	Above IM
03	upper	10/31/2023	1.6	-14	14	Above MT	-6	Above IM
04	upper	10/11/2023	-18.7	-46	-10	Above MT	-36	Above IM
05	upper	12/5/2023	8.5	-15	31	Above MT	-3	Above IM
06	upper	10/11/2023	-17.8	-28	9	Above MT	-18	Above IM
07	upper	10/18/2023	-7.8	-12	-3	Above MT	-9	Above IM
08	upper	10/18/2023	-17.1	-28	-19	Above MO	-25	Above IM
09	upper	10/25/2023	33.5	-3	26	Above MO	5	Above IM
10	upper	10/18/2023	-6.9	-11	-7	Above MO	-9	Above IM
11	upper	10/12/2023	-15.3	-33	-22	Above MO	-30	Above IM
12	lower	10/10/2023	-31.9	-41	-34	Above MO	-38	Above IM
13	upper	10/15/2023	-22.7	-37	-20	Above MT	-32	Above IM
14	upper	10/31/2023	-9.4	-18	-14	Above MO	-16	Above IM
15	upper	10/15/2023	36.7	-34	31	Above MO	-17	Above IM
16	upper	10/4/2023	-29.1	-42	-33	Above MO	-39	Above IM
17	lower	10/18/2023	-32.6	-47	-38	Above MO	-44	Above IM
18	lower	10/15/2023	13.1	5	10	Above MO	7	Above IM
19	lower	10/12/2023	-12.0	-23	-17	Above MO	-21	Above IM
20	upper	10/25/2023	-8.3	-17	-8	Above MT	-14	Above IM
21	lower	10/17/2023	-21.6	-54	-37	Above MO	-49	Above IM
22	lower	10/25/2023	40.0	14	35	Above MO	20	Above IM
23	upper	10/4/2023	-26.1	-34	-29	Above MO	-32	Above IM
24	upper	10/12/2023	-3.6	-12	-7	Above MO	-10	Above IM
25	lower	10/17/2023	-10.3	4	10	Below MT	6	Below IM
26	lower	10/31/2023	-23.8	-34	-28	Above MO	-32	Above IM
27	upper	10/4/2023	-13.4	-50	-34	Above MO	-45	Above IM
28	lower	10/15/2023	-14.1	-21	-14	Above MT	-18	Above IM
29	upper	10/4/2023	-0.8	-5	1	Above MT	-3	Above IM
30	lower	10/31/2023	-14.1	-41	-29	Above MO	-37	Above IM
31	lower	10/17/2023	-24.3	-22	-10	Below MT	-18	Below IM
32	lower	10/12/2023	-3.9	-16	-6	Above MO	-13	Above IM
33	upper	10/31/2023	5.8	-5	-1	Above MO	-3	Above IM
34	upper	10/31/2023	2.9	-6	-1	Above MO	-4	Above IM
35	lower	10/31/2023	3.1	-8	-4	Above MO	-6	Above IM
36	lower	10/18/2023	68.8	68	75	Above MT	71	Below IM
37 (1)	upper	n/a	n/a	1	5	Unknown	3	Unknown
38	upper	10/17/2023	28.4	15	19	Above MO	17	Above IM
39	lower	10/24/2023	98.8	99	105	Below MT	101	Below IM
40 (1)	lower	n/a	n/a	14	48	Unknown	24	Unknown
41	upper	10/12/2023	101.5	90	123	Above MT	99	Above IM
42	lower	10/25/2023	103.7	102	110	Above MT	105	Below IM
43	lower	10/25/2023	201.1	198	206	Above MT	201	Above IM
44	lower	10/31/2023	131.8	130	133	Above MT	132	Below IM
45	lower	10/13/2023	362.4	362	366	Above MT	363	Below IM

1. RMP removed from the network due to the RMP being sealed (RMP_37) or destroyed (RMP_40).

Groundwater elevations measured at RMPs in the 2023 water year are reported as biannual contour maps (i.e., spring and fall levels) and hydrographs. Contour maps provide a regional, spatial snapshot of groundwater levels, whereas hydrographs drill down into representative locations and show data from preceding water years to illustrate long-term trends and dependencies on water year type. Contour maps (**Figure 2-3**) show groundwater elevations across spring and fall seasons, with characteristically slightly higher spring levels compared to fall levels. Wells within a 20-kilometer (12.42 mile) buffer of the SASb boundary are retained in groundwater level interpolation (via ordinary kriging) to represent cross-boundary hydraulic gradients and the regional groundwater elevations in Sacramento County within which the SASb is located. Spring (February to May) and fall (October to November) measurements are grouped by month to create the two groundwater level contour maps.

As reported in the SASb GSP, groundwater elevation gradients point inwards towards centers of groundwater pumping. Groundwater elevations are near land surface elevation in the southwestern portion of the SASb.

Hydrographs of groundwater elevations and water year type using historical data from January 1, 2005 through the current reporting year are presented in **Figure 2-4**. Larger images of the hydrographs that include an extended period of record are presented in *Appendix A: Groundwater Elevation Hydrographs*.

2.1.1 Groundwater Elevation Monitoring Network Status Update

As detailed in the Annual Report for water year 2022, two water level RMPs have been removed from the network (RMP_37 was sealed and RMP_40 was destroyed). Both wells were also part of the initial ISW network. The 2022 Annual Report proposed to define RMP_42 as an ISW well to replace the recently destroyed RMP_40.

With the two wells removed from the network, the remaining 43 water level RMPs provide adequate coverage that is representative of basin conditions. However, a process to plan for the replacement of the wells will be developed with the goal of adding additional wells as needed to the RMP network in the GSP's 5-year update.

To ensure that all RMPs are sampled, the detailed monitoring plan that is implemented each year is presented in *Appendix B: Groundwater Level Monitoring Coordination Plan*.

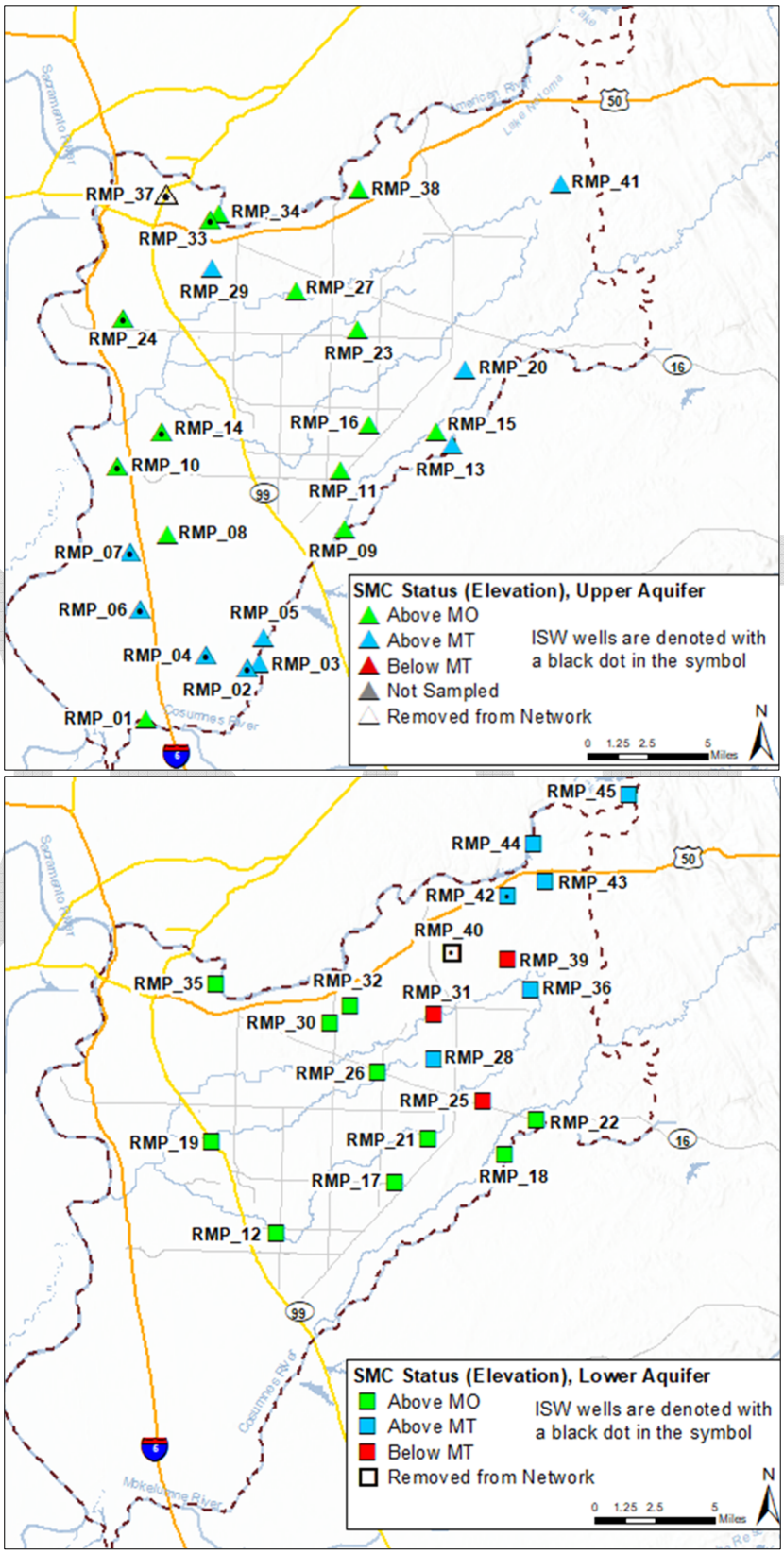

Figure 2-2: Water Year 2023 Measured Groundwater Elevations Compared to Sustainability Criteria, Upper Aquifer (above image) and Lower Aquifer (below image)

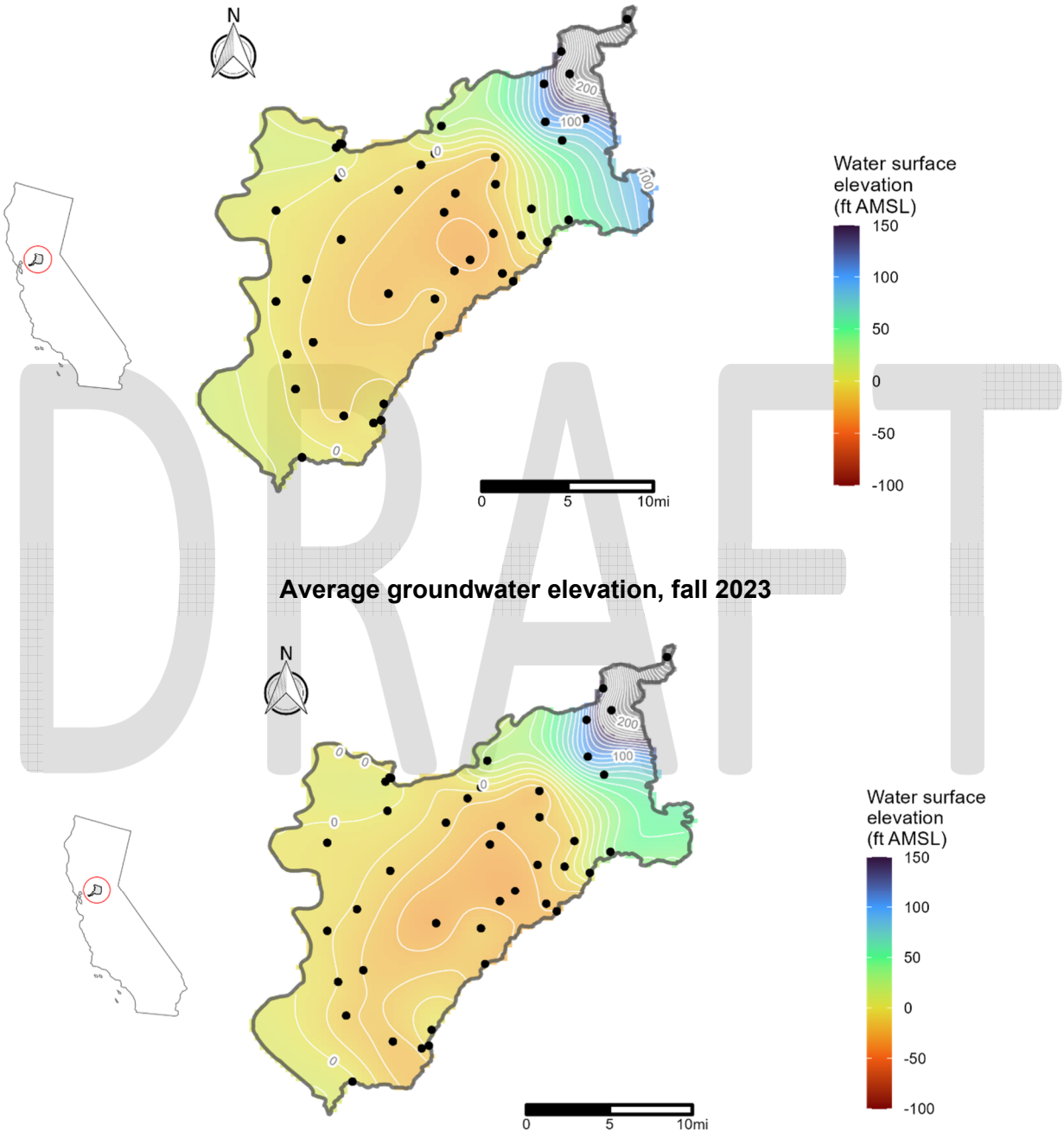

Figure 2-3: Spring (upper plot) and fall (lower plot) seasonal high and low groundwater elevation contours for water year 2023 in the South American Subbasin (ft AMSL). Black dots indicate wells within the basin with measured groundwater elevation data used to create the groundwater elevation contours.

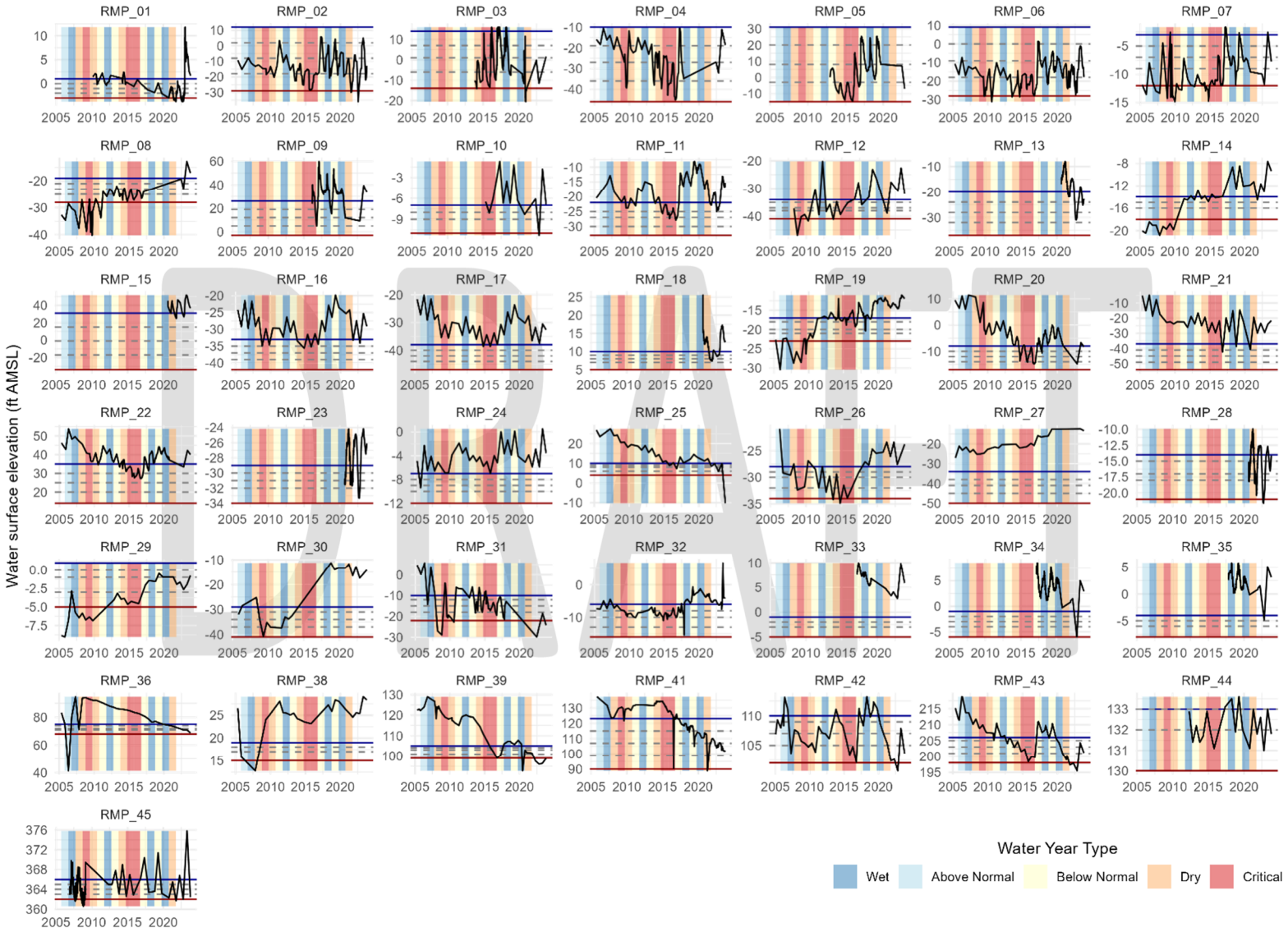

Figure 2-4: Groundwater elevation at RMPs in the SASb. SMC levels are drawn as horizontal dashed lines and indicate the MO (dark blue), IMs (light grey), and MT (dark red). Larger images are presented in Appendix A.

2.2 Groundwater Extractions

Table 2-2 summarizes monthly groundwater extractions for water year 2023 by water use sector. Groundwater extraction data for municipal and industrial, and remediation uses were obtained from the following entities located in the SASb:

- Aerojet
- California American Water Company
- City of Sacramento
- Elk Grove Water District
- Golden State Water Company
- Kiefer Landfill
- Sacramento County Water Agency
- Tokay Park Water Company

Groundwater extractions for agricultural and agricultural residential water users were estimated using the Cosumnes-South American-North American (CoSANA) model based on factors including land use, evapotranspiration, and precipitation. CoSANA is a fully integrated surface and groundwater flow model covering all three subbasins. Details about CoSANA can be found in the CoSANA model documentation report that is included as Appendix 2-B to the GSP. For the Annual Report, CoSANA was extended to include the 2023 water year by extending the model input data, including land use, evapotranspiration, precipitation, surface water flows, surface water deliveries, and groundwater extractions.

For the 2023 water year, total groundwater extractions are estimated to be 182,600 AF. This is less than the sustainable yield of 235,000 AF estimated in the GSP. **Figure C-1** in *Appendix C* displays the general locations of groundwater extractions as modeled by CoSANA in the SASb during the 2023 water year.

Table 2-2: Monthly Groundwater Extractions (AF) by Water Use Sector, Water Year 2023

Month	Municipal & Industrial (AF)	Agricultural (including Ag Res) (AF)	Remediation (AF)	Total Groundwater Extractions (AF)
Oct-22	6,100	9,400	2,300	17,800
Nov-22	3,400	2,700	2,300	8,400
Dec-22	2,600	1,100	2,400	6,100
Jan-23	2,100	900	2,200	5,200
Feb-23	2,300	1,200	2,200	5,700
Mar-23	2,200	1,600	2,400	6,200
Apr-23	3,000	9,400	2,400	14,800
May-23	4,100	13,500	2,300	19,900
Jun-23	4,400	15,800	2,300	22,500
Jul-23	5,400	19,500	2,200	27,100
Aug-23	5,100	20,900	2,300	28,300
Sep-23	4,400	13,900	2,300	20,600
Total	45,100	109,900	27,600	182,600

2.3 Surface Water Supply

SGMA requires that the GSP annual report tabulate "*Surface water supply used or available for use*…" (emphasis added, CCR §356.2 [b] [3]). Error! Not a valid bookmark self-reference. summarizes total monthly surface water available for use for water year 2023, broken down by water use sector. The table reports total surface water diversions and not surface water used, which is difficult to parse out by sector. Direct measurements were provided by the following water agencies:

- California American Water Company
- City of Folsom
- City of Sacramento
- Golden State Water Company
- Rancho Murieta Community Service District
- Sacramento County Water Agency

In addition, surface water diversions were estimated using data from the State Water Resource Control Board's eWRIMS datasets for Omochumne Hartnell Water District and Sloughhouse Resource Conservation District.

For the 2023 water year, total surface water diversions are estimated to be 130,600 AF.

Table 2-3: Monthly Surface Water Diversions (AF) by Water Use Sector, Water Year 2023

Month	Municipal & Industrial (AF)	Agricultural (AF)	Total Surface Water (AF)
Oct-22	7,100	300	7,400
Nov-22	4,400	-	4,400
Dec-22	4,000	-	4,000
Jan-23	4,100	-	4,100
Feb-23	3,800	-	3,800
Mar-23	4,200	100	4,300
Apr-23	5,500	400	5,900
May-23	8,300	4,400	12,700
Jun-23	10,100	11,500	21,600
Jul-23	11,800	15,500	27,300
Aug-23	11,900	9,700	21,600
Sep-23	10,300	3,200	13,500
Total	85,500	45,100	130,600

2.4 Total Water Use

In this Annual Report, total water use is assumed to equal the total combined applied water and precipitation from all sources in the SASb, including all consumptive water use (evapotranspiration) and non-consumptive water use (other water uses, e.g. deep percolation and runoff).

Table 2-4 summarizes monthly combined groundwater and remediation extractions (**Table 2-2**) and surface water available for use (**Table 2-3**) for water year 2023 by water source. Total water use by water source in water year 2023 is estimated to be 313,100 AF.

Table 2-5 summarizes the total monthly water use by water use sector. Total water use by water use sector (which does not include remediation water) is estimated to be 285,700.

Table 2-4: Monthly Total Water Use (AF) by Water Source, Water Year 2023

Month	Groundwater (AF)	Surface Water (AF)	Remediation (AF)	Total Water Use (AF) - by Source
Oct-22	15,500	7,400	2,300	25,200
Nov-22	6,100	4,400	2,300	12,800
Dec-22	3,700	4,000	2,400	10,100
Jan-23	3,000	4,100	2,200	9,300
Feb-23	3,400	3,800	2,200	9,400
Mar-23	3,700	4,300	2,400	10,400
Apr-23	12,400	5,900	2,400	20,700
May-23	17,600	12,700	2,300	32,600
Jun-23	20,200	21,600	2,300	44,100
Jul-23	24,900	27,300	2,200	54,400
Aug-23	26,000	21,600	2,300	49,900
Sep-23	18,300	13,600	2,300	34,200
Total	154,800	130,700	27,600	313,100

Table 2-5: Monthly Total Water Use (AF) by Water Use Sector, Water Year 2023

Month	Municipal & Industrial (AF)	Agricultural (AF)	Refuge, Native and Riparian (AF)[1]	Total Water Use (AF) - by Sector[2]
Oct-22	13,200	9,700	N/A	22,900
Nov-22	7,800	2,700	N/A	10,500
Dec-22	6,600	1,200	N/A	7,800
Jan-23	6,300	900	N/A	7,200
Feb-23	6,000	1,200	N/A	7,200
Mar-23	6,400	1,600	N/A	8,000
Apr-23	8,500	9,800	N/A	18,300
May-23	12,400	17,900	N/A	30,300
Jun-23	14,600	27,300	N/A	41,900
Jul-23	17,200	35,000	N/A	52,200
Aug-23	16,900	30,600	N/A	47,500
Sep-23	14,800	17,100	N/A	31,900

Month	Municipal & Industrial (AF)	Agricultural (AF)	Refuge, Native and Riparian (AF)[1]	Total Water Use (AF) - by Sector[2]
Total	130,700	155,000	N/A	285,700

[1] Refuge, native and riparian water uses are not explicitly modeled in CoSANA

[2] Total water use by water use sector does not include remediation water

2.5 Change in Groundwater Storage

The CoSANA model was used to estimate historical change in storage of the SASb from water years 1995-2019 for the South American GSP. The model was extended through water year 2023 in advance of development of this annual report.

Figure 2-5 shows the historical annual groundwater budget by year and water year type (according to the Sacramento River index). The figure shows the annual value for each water budget component – including groundwater pumping and change in storage – in each year, as well as the cumulative water volume change in storage each year for the period from 1995 through 2023. As noted above, groundwater extractions in the 2023 water year were significantly lower than the sustainable yield (182,600 AF versus 235,000 AF). Due to the relatively low groundwater extractions and the relatively high recharge into the aquifer during the wet water year, it is estimated that there was an increase in subbasin storage of about 57,000 AF during the water year. During the 29-year period from 1995-2023, there has been an estimated cumulative increase in groundwater storage of 141,400 AF, reflecting an average annual increase of about 4,900 AF per year.

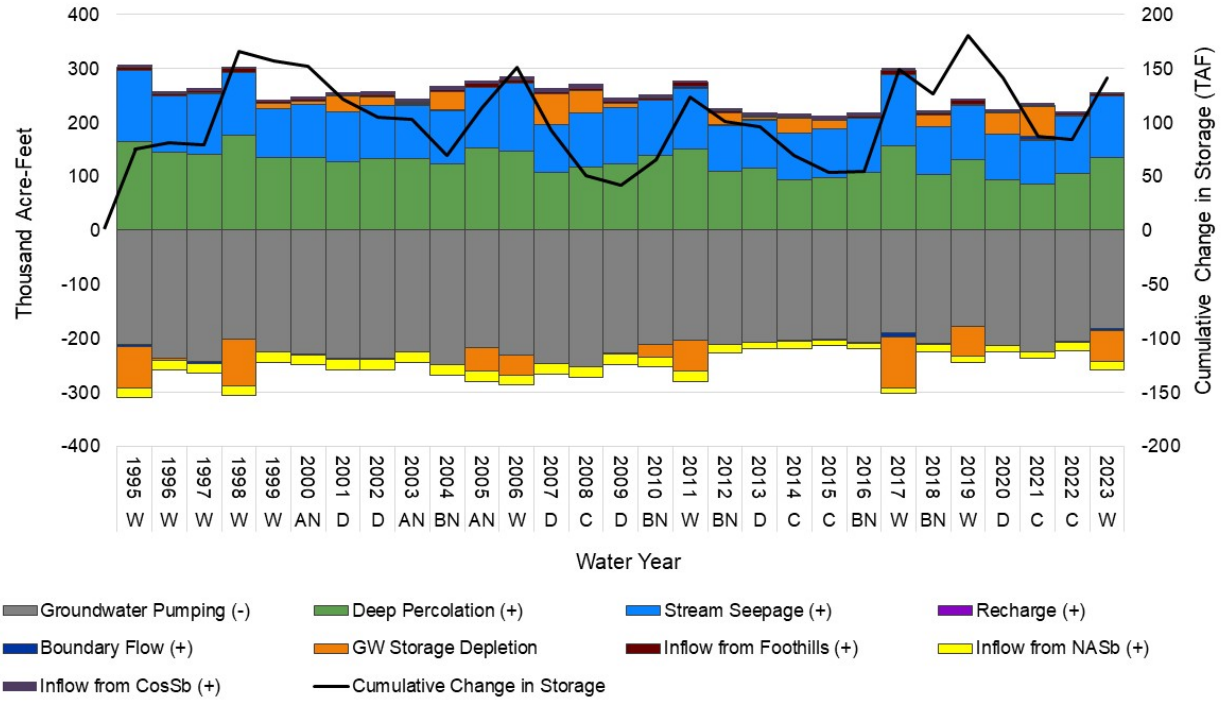

Figure 2-5: Historical Annual Groundwater Budget by Year, Water Year Type, and Cumulative Water Volume [4]

Figure C-2 in *Appendix C* displays the total change in groundwater storage, in units of inches, in the principal aquifer of the SASb for water year 2023 in a spatial format as estimated by outputs from CoSANA.

2.6 Land Subsidence

Land subsidence is the lowering of the ground surface elevation. Typically caused by natural compaction, sinkholes, or pumping groundwater from below thick clay layers, land subsidence can be elastic or inelastic. Inelastic subsidence is generally irreversible whereas elastic subsidence refers to usually small, reversible decreases of the ground surface that correspond to seasonal changes in groundwater elevation, and which rebound to pre-subsidence elevations. As found in the adopted SASb GSP, land subsidence is not known to be historically or currently significant in the Subbasin. These trends persist in the 2023 Water Year; measured land subsidence is within instrument measurement error.

2.7 Groundwater Quality

The groundwater quality monitoring network is described in Section 3.5.2 of the GSP and is designed to capture sufficient spatial and temporal detail to understand groundwater quality in the basin. The groundwater quality monitoring network includes 21 wells as shown in **Figure 2-6**. The monitoring network includes one domestic well, seventeen municipal wells, and three monitoring

[4] Source: Water year types based on the Sacramento Valley Water Year Index, but 2023 has been assumed to be wet while waiting for DWR to publish a final 2023 value.

wells. The Sacramento Regional County Sanitation District (Regional San) Harvest Water Project is in the process of developing a groundwater monitoring network for the Harvest Water Project area. Once that network is complete, it is anticipated that wells for the area will be added to the SASb's water quality monitoring network at the GSP's 5-year update.

Groundwater quality SMC were established in the GSP for nitrate (as nitrogen) and specific conductance (a measure of salinity). It is noted that the term "minimum threshold" is predominantly used in SGMA regulations and is applied to most sustainability indicators. The term "maximum threshold" is equivalent but is used for water quality as there is a defined maximum limit for the concentration of constituents in groundwater. The maximum threshold concentration for each of the constituents of concern is their associated regulatory threshold. For nitrate this corresponds to the Title 22 Primary Maximum Contaminant Level (MCL) of 10 mg/L, and for specific conductance this corresponds to the Title 22 Secondary Maximum Contaminant Level (SMCL) of 1600 micromhos/cm. The measurable objective for each RMP is to maintain the concentration below the maximum concentration observed at the RMP prior to May 2020. In addition, no measurable objective shall exceed 90% of the maximum threshold (9 mg/L for nitrate, 1440 micromhos/cm for specific conductance).

Significant and undesirable results for groundwater quality are defined to occur when the number of RMPs experiencing exceedances above the maximum threshold is greater than the number of RMPs with exceedances as of May 22, 2020 (two for nitrate, and two for specific conductance)[5]. It is important to note that this threshold relies on the *number* of RMPs experiencing exceedances above the maximum threshold, and not necessarily the *same* RMPs.

Available groundwater quality data for water year 2023 were downloaded for each RMP from the Groundwater Ambient Monitoring and Assessment (GAMA) Groundwater Information System for both constituents on January 3, 2024. Some monitoring entities do not report specific conductance data to GAMA; this information was obtained either from the State Water Resources Control Board's GeoTracker or directly from the monitoring entity. For each RMP, the measurable objective as well as the maximum measured concentration during water year 2023 is presented in **Table 2-6**. In instances where specific conductance was not measured at an RMP but total dissolved solids (TDS) was, the associated TDS value was converted to specific conductance using a conversion factor of 1.56 (UCANR, 2023).

As shown, measured groundwater quality concentrations during water year 2023 do not indicate the occurrence of undesirable results. One RMP exceeded the maximum threshold for specific conductance, and no RMPs exceeded the maximum threshold for nitrate. Two RMPs exceeded the measurable objective for nitrate, and five RMPs exceeded the measurable objective for specific conductance. Nitrate was not monitored at three RMPs, and specific conductance or TDS was not monitored at six RMPs. Additional information on this is provided in the following subsection. *Appendix D: Water Quality Time Series* presents time series spanning from 2005 for nitrate and specific conductance at each RMP.

Table 2-6 substitutes the reporting limit for the nitrate result in instances where GAMA denoted the value was below the reporting limit, but above the method detection limit (i.e., the result is an estimated value). The substitution of the reporting limit in these instances documents that water quality is at least as good as the reporting limit. These instances are noted in the table. Additionally, the nitrate graphs in *Appendix D* substitute non-detect (ND) values with one half the reporting limit, and substitute estimated values with the reporting limit. This does not change the evaluation of water quality SMCs.

[5] Criteria to define undesirable results for groundwater quality were revised in Appendix D of the First Annual Report for the SASb, water year 2021 (SASb, 2022).

The initial evaluation of groundwater quality conducted for the GSP identified elevated concentrations of arsenic, iron, and manganese in some wells in the SASb. These constituents were not assigned SMCs, but their concentrations at the water quality RMPs are monitored to track potential mobilization or exceedances of the primary MCLs or secondary MCLs, which are measured as averages. Arsenic has a primary MCL of 10 µg/L, iron has an SMCL of 300 µg/L, and manganese has an SMCL of 50 µg/L.

Table 2-7 presents summary statistics of concentration data collected at the water quality RMPs during the period January 1, 2005 to September 30, 2023 (non-detect values are substituted with one half the reporting limit, and estimated values are substituted with the reporting limit). For each RMP, the table provides the average value of measurements, as well as the minimum, and maximum values. The number of measurements is also provided. As shown, 20 of the 21 RMPs were sampled for each constituent during the period of analysis. Two of the 20 resulted in an exceedance of the arsenic MCL, 7 of the 20 resulted in an exceedance of the iron SMCL, and 11 of the 20 resulted in an exceedance of the manganese SMCL. Results will be updated in subsequent annual reports. Additional information, including a review of previous studies in the basin, discussion of the numeric regulatory thresholds, and results of the groundwater quality analysis performed for the GSP can be found in Appendix 2-D of the GSP.

2.7.1 Groundwater Quality Monitoring Network Status Update

During GSP development, wells were selected for inclusion in the water quality monitoring network due to the spatial location of the well, and the long term publicly available record of nitrate and specific conductance (or TDS) data. The analysis presented in this Annual report represents water year 2023 which spans October 1, 2022 to September 30, 2023. However, at the time groundwater quality data was obtained (January 2024), some wells were lacking data for this period and the monitoring entities were contacted directly to obtain the information.

Though much of the missing data was acquired and is included in this report, nitrate data was unavailable for three wells and specific conductance or TDS data was unavailable for six wells. Information regarding the missing measurements, and planned action for follow up, is as follows:

- RMP 3410033-006 is missing specific conductance or TDS. The monitoring entity, Florin County Water District, was contacted but did not follow up by the time of Annual Report production. Communication with the water district will continue and it will be determined if specific conductance can be reported. If specific conductance is not monitored, an inquiry will be made with the water district to determine if specific conductance can be monitored in the future at the well.
- RMP 3400375-001 is missing specific conductance or TDS. The monitoring entity, Slavic Missionary Church, stopped this measurement due to a change in monitoring personnel. An inquiry will be made to determine if specific conductance can be monitored and reported annually at the well in the future.
- RMP 3410023-015 is missing nitrate and specific conductance or TDS. The water system name is Cal Am Fruitridge Vista. A contact for the water system communicated that the well is a standby well on a 9-year sampling period. An inquiry will be made with the water system to determine if nitrate and specific conductance can be monitored annually at the well in the future.
- RMP 3410029-015 is missing nitrate and specific conductance or TDS. The water system name is SCWA – Lanua/Vineyard. A contact for the water system communicated that the well is temporarily offline for repairs. When not offline, the well is sampled on a 3-year sampling period for specific conductance and annually for nitrate. An inquiry will be

made with the water system to determine if specific conductance can be monitored annually at the well in the future.

- RMP 3410029-027 is missing specific conductance or TDS. The water system name is SCWA – Lanua/Vineyard. A contact for the water system communicated that the well is sampled on a 3-year sampling period for specific conductance and is sampled annually for nitrate. An inquiry will be made with the water system to determine if specific conductance can be monitored annually at the well in the future.
- RMP S7-SAC-SA10 is missing nitrate and specific conductance or TDS. The well is a domestic well and no information exists online regarding the well owner. The well was last sampled in 2017. It is recommended that this well be removed from the water quality monitoring network as no contact with the owner can be made. Additionally, this well is located directly north of the Harvest Water project area. Once new wells from that network are added to the GSP's water quality monitoring network, this region will have sufficient spatial coverage for this area.

As noted, communication is ongoing to facilitate the monitoring of wells with missing data. Continued follow-up communication efforts will be made to ensure that water quality data is available for future annual reports. If this is not successful, a plan for the continued collection of representative water quality data will be developed. Options may include alternate monitoring entities for the wells, or inclusion of different wells in the network.

Additionally, it is noted that in previous annual reports, specific conductance data for the following three wells was unavailable and TDS was converted to specific conductance using a standard conversion factor: L10005519750-MW-G(S), L10008601447-MW-13, L10007396297-MW-40B. Communication with the monitoring entities for these wells determined that specific conductance is measured but not reported to GAMA, and instead the measurements are recorded on field sheets that are accessed on the State Water Resources Control Board's GeoTracker.

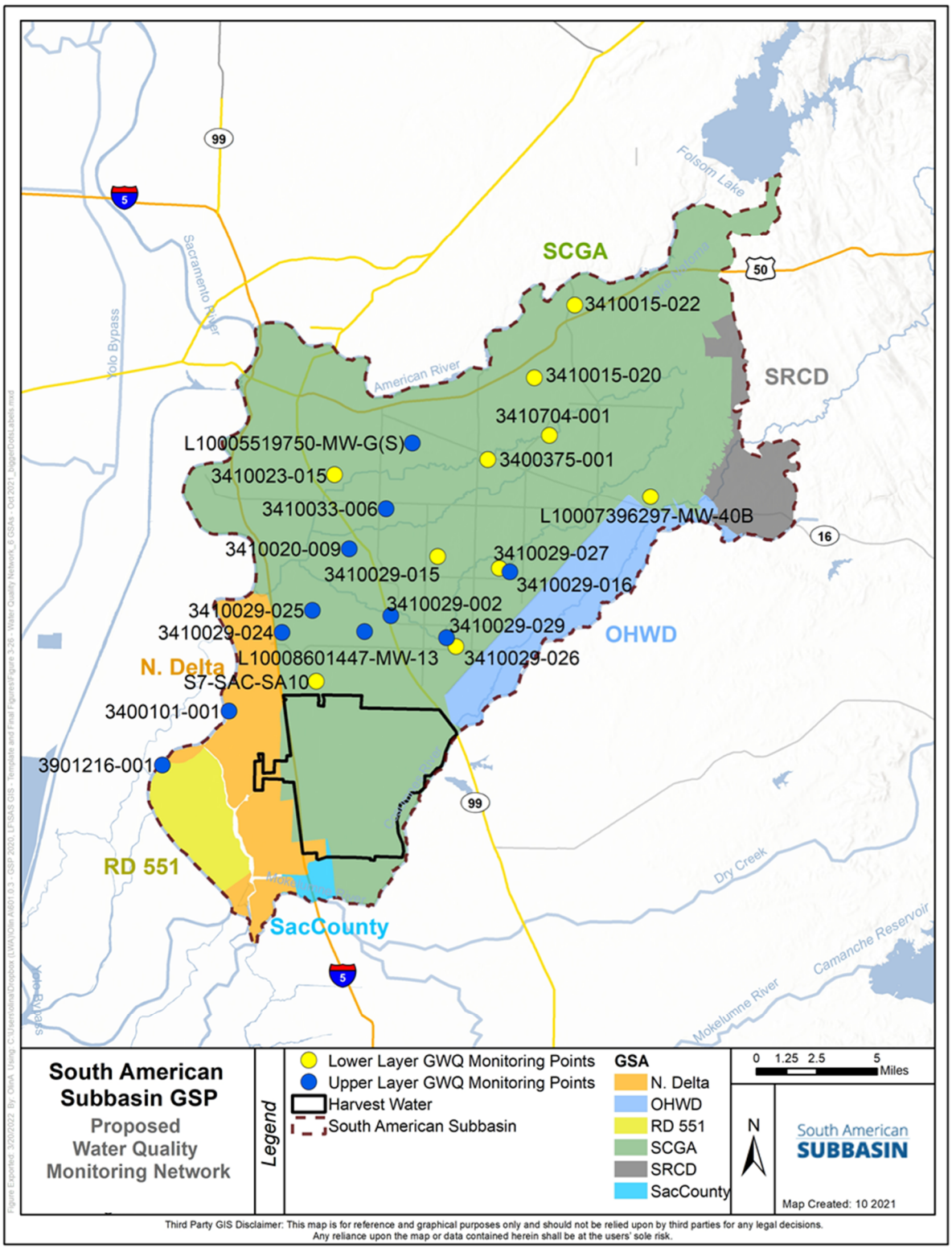

Figure 2-6: Groundwater Quality Monitoring Network

Table 2-6: Water Year 2023 Groundwater Quality (Nitrate MT is 10 mg/L; Specific Conductance MT is 1600 micromhos/cm)

Aquifer Zone	RMP	Nitrate as Nitrogen (mg/L)		Specific Conductance (micromhos/cm)	
		Measurable Objective	Maximum Concentration, WY 2023	Measurable Objective	Maximum Measurement, WY 2023
Upper	3410020-009	3.8	3.6	492	532
Upper	3410029-002	3.0	3.5	470	530
Upper	3410029-016	1.1	0.62	246	220
Upper	3410029-029	2.0	2.1	494	390
Upper	3410033-006	7.2	3.6	520	not monitored
Upper	L10005519750-MW-G(S)	9.0	6.4	967 (1)	984
Upper	L10008601447-MW-13	4.2	1.4	640 (1)	507
Upper	3400101-001	0.5	0.23 (2)	1,200	490
Upper	3410029-024	0.9	0.23 (2)	595	550
Upper	3410029-025	0.5	0.23 (2)	1,440	1,500
Upper	3901216-001	1.3	1	1,440	1,980
Lower	3400375-001	5.0	0.4 (2)	180	not monitored
Lower	3410015-020	2.1	1.5	240	250
Lower	3410015-022	1.6	0.4	340	250
Lower	3410023-015	1.0	not monitored	915	not monitored
Lower	3410029-015	0.5	not monitored	670	not monitored
Lower	3410029-026	0.5	0.12 (3)	232	220
Lower	3410029-027	0.5	0.23 (2)	230	not monitored
Lower	3410704-001	0.5	0.23 (2)	170	160
Lower	L10007396297-MW-40B	1.9	1.3	359 (1)	284
Lower	S7-SAC-SA10	1.7	not monitored	404	not monitored

Maximum threshold and measurable objective both exceeded

Maximum threshold not exceeded, measurable objective exceeded

Measurable objective not exceeded

1. Specific conductance data previously unavailable for this well; MO value determined from conversion of TDS to specific conductance using a conversion factor of 1.56 (UCANR, 2023).
2. Value detected at a concentration below the RL and above the MDL, value of the RL is reported
3. Value was non-detect; result substituted with one half the reporting limit.

Table 2-7. Summary Statistics for Arsenic, Iron, and Manganese During the Period January 1, 2005 to September 30, 2023

Representative Monitoring Point	Arsenic (µg/L)				Iron (µg/L)				Manganese (µg/L)			
	Avg.	Min.	Max.	Count	Avg.	Min.	Max.	Count	Avg.	Min.	Max.	Count
3410020-009	4.0	3.1	5.8	7	94	11	144	7	20 (1)	20	20	7
3410029-002	5.5	4.4	7.7	9	84 (1)	30	100	9	18 (1)	10	20	9
3410029-016	3.1	2	4.3	8	90 (1)	30	100	7	19 (1)	10	20	7
3410029-029	4.0	2.3	4.8	9	84 (1)	30	100	9	18 (1)	10	20	9
3410033-006	2.7	2	3.2	7	90 (1)	30	100	7	19 (1)	10	20	7
L10005519750-MW-G(S)	2.3	2	2.8	4	80	50	170	4	14	10	26	4
L10008601447-MW-13	4.8	2.1	10	18	2571	26.9	5000	18	556	94	1080	18
3400101-001	3.7	2	5.3	6	787	100	1200	7	319	280	370	7
3410029-024	47.1	7.3	85	90	691	0	3700	87	297	20	460	87
3410029-025	9.5	2	28	251	309	100	2400	186	661	20	1000	192
3901216-001	3.7	3	4	9	113	50	240	7	27	20	50	7
3400375-001	2.8	2	3.6	2	100 (1)	100	100	2	65	20	110	2
3410015-020	2.3	2	3.3	8	131	30	420	8	15	1	23	8
3410015-022	2.5	1.1	4.5	7	104	89	130	7	36	11	110	64
3410023-015	6.4	4.4	8.5	3	453	450	460	3	453	440	470	4
3410029-015	2.0 (1)	2	2	6	96	40	130	8	92	81	120	13
3410029-026	2.0 (1)	2	2	8	112	100	160	10	197	27	240	14
3410029-027	2.0 (1)	2	2	7	143	42	250	8	139	38	170	10
3410704-001	2.0 (1)	2	2	7	196	0	950	8	125	95	180	12
L10007396297-MW-40B	NS (2)											
S7-SAC-SA10	9.0	9	9	1	17	17.1	17.1	1	0.76	0.76	0.76	1

1. All results during the sampling period were either non-detect or estimated values.
2. NS, not sampled during the period of analysis.

3 Plan Implementation Progress

3.1 Overview of Implementation Activities

This section of the Annual Report provides updates and describes progress towards implementing the GSP (Plan), including implementation of projects and management actions since adoption of the GSP. **Section 0** describes the progress on implementing projects and management actions, with focus on water year 2023 and on activities planned for water year 2024. **Section 3.3** describes progress made towards addressing the recommended corrective actions that were included in the GSP Determination letter. **Section** Error! Reference source not found.**4** describes the funding sources for the implementation activities that are planned for water year 2024.

3.2 Implementation Progress

3.2.1 Current Condition for Each Sustainability Indicator

Quantifiable sustainability indicators from WY2023 were used to determine the occurrence of undesirable results using monitoring data. **Table 3-1** contains a summary of the status of the sustainable management criteria relative to sustainability indicators.

3.2.2 Projects and Management Action Progress and Anticipated Activities for the Coming Year

The progress of projects and management actions that are described in the SASb GSP are summarized in this section. **Table 3-2** provides a summary of projects, including project description, implementation date and project mechanism. **Table 3-3** includes the accomplishments in the recently completed water year for the projects mentioned in **Table 3-2** and the plans for the upcoming water year 2024.

Minor fixes and corrections of the SASb Data Management System (DMS)[6] were completed in 2023 and data from the DMS have been used for stakeholder and board presentations. The SASb GSP was implemented with local funding to support the SASb monitoring, Well Protection Program, and other projects. The following subsections describe GSP projects and management actions activities in the second year of plan implementation.

[6] https://opti.woodardcurran.com/southamericansubbasin/login.php

Table 3-1. Summary of Sustainable Management Criteria

Sustainability Indicator	Minimum Threshold (MT)	Measurable Objective (MO)	Occurrence of Undesirable Results	Water Year 2023 Annual Report Status
Groundwater Levels	Set at historical minimum elevations to protect sensitive uses and users and avoid undesirable results.	Average groundwater levels observed from January 2015 to June 2021. MOs are higher in the Harvest Water area to account for recharge over time.	More than 25% of representative monitoring wells fall below MTs for three consecutive years.	***No occurrence of undesirable results***
Groundwater Storage	Groundwater levels used as a proxy for this sustainability indicator.			***No occurrence of undesirable results***
Seawater Intrusion	This sustainability indicator is not applicable in the SASb.			
Degraded Groundwater Quality	Nitrate = 10 mg/L Specific Conductance = 1600 micromhos/cm	Maintain concentration at each RMP below the maximum concentration observed at the RMP prior to May 2020. No MO shall exceed 90% of the MT (9 mg/L for nitrate, 1440 micromhos/cm for specific conductance).	More than 2 RMPs exceeding the MT for Nitrate or for Specific Conductance.	***No occurrence of undesirable results***
Land Subsidence	Groundwater levels used as a proxy for this sustainability indicator.			***No occurrence of undesirable results***
Depletions of Inter-connected Surface Waters	Groundwater levels used as a proxy for this sustainability indicator.			***No occurrence of undesirable results***

Table 3-2. Project and Management Action Summary

GSA	Project	Project Mechanism	First Year Facilities Available for Use	Status	Project Description
SCGA and Northern Delta	Harvest Water Project	Increased Recharge and Reduced Groundwater Pumping	2026	Implementing	Treated recycled water will provide up to 50,000-acre-feet per year (AFY) to irrigate more than 16,000 acres of agricultural and 400 acres of habitat land. For additional information, see https://www.regionalsan.com/harvest-water
OHWD	OHWD Groundwater Recharge Project	Increased Recharge	2020	Implementing	Up to 4,000 AF diverted from the Cosumnes River to 1,168-acres of agricultural land between Cosumnes River and Deer Creek.
SCGA	Regional Conjunctive Use Program	Increased Recharge and Reduced Groundwater Pumping	2000	Implementing	Increase conjunctive use amongst both SASb and NASb and municipal water purveyors. Planned projects will utilize existing infrastructure through water transfers, groundwater recharge projects, wholesale agreements, or wheeling agreements.
SCGA	Vineyard ASR well (part of Regional Conjunctive Use Program)	Increased Recharge	2020	Implementing	Construction of VSWTP was completed in 2011. ASR program is continuing, including the installation of ASR wells and existing system adaptation.
SCGA, SRCD and OHWD	Sacramento Area Flood Control Agency (SAFCA) Flood-MAR	Increased Recharge	2030	Planned	To safely contain floods with a 1-in-500 annual probability of occurrence, release water from Folsom Dam down the Folsom South Canal for recharge in the SASb and Cosumnes subbasins.
All	Shallow/Vulnerable Well Protection Program	Outreach and collaboration	2022	Implementing	Program assists qualifying shallow well users impacted by groundwater level decline.
All	Sacramento County Environmental Management Wells Program	Outreach and collaboration	2022	Implementing	GSAs coordinate with Program to establish revised requirements for well construction to avoid future impacts on shallow well users, GDEs and the GSP monitoring network.
All	GSP Monitoring Network Data Gaps	Data Collection	2023	Planned	GSAs to plan, implement and fund efforts to fill data gaps including: refine information regarding wells in GSP Monitoring Network, understand surface water and groundwater interactions along Cosumnes River

Table 3-3. Project and Management Action Implementation Summary

GSA	Project	Project Mechanism	First Year Facilities Available for Use	Status	WY2023 Accomplishments	WY2024 Proposed Activities
SCGA and North Delta	Harvest Water Project	Increased Recharge and Reduced Groundwater Pumping	2026	Implementing	SWRCB/CDFW Public Benefits Contracts executed in June 2023. Bidding process underway for the Harvest Water pump station, on-farm connections, transmission main, and distribution pipelines. See https://www.regionalsan.com/harvest-water	Work to obtain water quality permits. Complete planning early implementation EcoPlan projects with targeted landowners. Construction is anticipated to continue in 2024. See https://www.regionalsan.com/harvest-water
OHWD	OHWD Groundwater Recharge Project	Increased Recharge	2020	Implementing	Five-year temporary permit from State Water Board granted in January 2023. A net 72.69 acre-feet from the Cosumnes River was recharged. Construction of fish screens completed.	Continued operation per five-year temporary permit conditions for diversions from the Cosumnes River obtained from the SWRCB.
SCGA	Regional Conjunctive Use Program	Increased Recharge and Reduced Groundwater Pumping	2000	Implementing	Work on developing water bank and ASR well at Vineyard SWP continued.	Continue work on developing water bank and ASR well at Vineyard SWP.
SCGA	Vineyard ASR well (part of Regional Conjunctive Use Program)	Increased Recharge	2020	Implementing	Planning for 3-cycle pilot test. Initiated 3-cycle ASR pilot test during late 2023.	Complete pilot testing including recharge, storage, and recovery pumping. Results to be provided in Technical Memorandum.
SCGA, SRCD and OHWD	Sacramento Area Flood Control Agency (SAFCA) Flood-MAR	Increased Recharge	2030	Planned	Two exploratory borings completed in coordination with SAFCA and DWR TSS. Boring results used to calibrate the geophysical tTem results for use in siting vadose zone recharge wells.	Coordinate with SAFCA, RWA and SASb GSAs to determine approvals needed to develop a pilot program.

GSA	Project	Project Mechanism	First Year Facilities Available for Use	Status	WY2023 Accomplishments	WY2024 Proposed Activities
All	Shallow/Vulnerable Well Protection Program	Outreach and collaboration	2022	Implementing	The Domestic Well Advisory Group (DWAG) was formed to coordinate outreach through the Volunteer Monitoring Program (VMP) and other methods. Regular water level measurements were collected and reported through the DMS and to DWR in spring and fall seasons. Continued engagement with domestic well owners through outreach.	Improve domestic well inventory through outreach and coordination with VMP.
All	Sacramento County Environmental Management Wells Program	Outreach and collaboration	2022	Implementing	Implementation of Governor's Executive Order and approved well permits.	GSAs intend to continue discussions with the Sacramento County Environmental Management Department (SCEMD) to develop ordinance modifications pertaining to wells in the jurisdiction of SCEMD in WY2024.
All	GSP Monitoring Network Data Gaps	Data Collection	2023	Planned	The DWAG members were selected, and a charter was developed in 2023. The DWAG is intended to facilitate coordination with the VMP to help fill data gaps ongoing in 2024. Plans were developed to collect missing well construction information from RMPs with incomplete information.	Spatial data gaps in the monitoring network potentially filled by continuing the development of the Voluntary Monitoring Network (VMN). Well construction information for RMPs will be collected to address data gaps.

3.2.3 Projects

In WY2023, progress was made for the following projects planned for implementation in the SASb GSP. The planned projects are described by group following the GSP structure and include projects planned for near-term implementation (Group 2) and supplemental projects (Group 3).

3.2.3.1 Group 2

Harvest Water Project

The Harvest Water project, sponsored by the Sacramento Regional County Sanitation District, will provide a supply of disinfected tertiary-treated recycled water, up to 50,000-acre feet per year (AFY) to irrigate more than 16,000 acres of agricultural and 400 acres of habitat lands. This project will reduce the need for groundwater pumping, support habitat protection efforts, restore depleted groundwater levels by up to 35 feet within 15 years, and increase groundwater storage by approximately 245,000 AF within 10 years (GSP 2022).

The Harvest Water team worked with staff from the Department of Fish & Wildlife to complete the program's Ecosystem benefits and develop an ecosystem Public Benefits contract and Adaptive Management Plan. The Groundwater Accounting and Conjunctive Use Projects were in progress through WY2023, completing a groundwater monitoring plan and collection of baseline groundwater measurements.

Harvest Water was awarded $291.8 million in grant funding under California's Water Storage Investment Program (WSIP). As a result, the Harvest Water Project is fully funded.

The Capital Improvements Program progressed with the following accomplishments: The Harvest Water Pumping Station, Elk Grove Transmission Main, Central/South and West Distribution Pipelines almost reached their 100% design milestones in 2023. Franklin/Eschinger reached completed 100% design. Water rights were secured, CEQA and NEQA environmental documents were completed, and all necessary environmental permits were obtained. Construction bids are in progress for various capital program projects and construction began in late 2023. Construction is anticipated to continue in 2024. For more information, see https://www.regionalsan.com/harvest-water.

Omochumne-Hartnell Water District Groundwater Recharge Project

The Omochumne-Hartnell Water District (OHWD) Groundwater Recharge Project will divert up to 4,000 AF per year of surface water from the Cosumnes River to a 1,168-acre spreading area located between the Cosumnes River and Deer Creek to alleviate groundwater storage overdraft in both the SASb and Cosumnes Subbasin. The use of available water during high flow events could allow the watershed to recover and result in Cosumnes River flows to persist during the dry season as the groundwater levels are incrementally increased through recharge (GSP 2022).

In WY2023, OHWD was granted a five-year temporary groundwater recharge permit through the State Water Resources Control Board. The permit was issued in January 2023, authorizing OHWD to divert 2,444 AF from the Cosumnes River in Sacramento County during high flow events for the period December 1st- March 15th, upon installation of fish screens on both the pumps currently available. Construction of fish screens was completed, and a net 72.69 acre-feet from the Cosumnes River was recharged in water year 2023.

The OHWD will continue to operate the recharge site. While implementing the project using the 5-year temporary permit, OHWD will apply for a standard diversion permit in WY2024 to extend the period of diversion.

Regional Conjunctive Use Program

Efforts to increase operational flexibility and capacity of conjunctive use by construction of system interties, treatment plant improvements, and development of groundwater wells will continue. These efforts have been and are being conducted by California-American Water, City of Sacramento, Sacramento County Water Agency, and the Golden State Water Company (GSP 2022).

The program was initiated after regional entities completed the Sacramento Water Forum Agreement in 2000 (America River Basin Study, page ES-3). Program benefits are achieved through reduced groundwater pumping in wet years by delivery of additional surface water.

The Vineyard Surface Water Treatment Plant construction was completed in 2011, and a feasibility study for the implementation of an Aquifer Storage and Recovery (ASR) program was completed in 2022. The feasibility study included the conceptual designs for the conversion of one existing supply well to ASR, four additional proposed ASR wells and a cost-benefit analysis for the implementation of the program. A 3-cycle ASR pilot test was initiated in late 2023, including the first two cycles of recharge, storage, and recovery pumping plus a third period of recharge. The third period of storage and recovery pumping will be completed in early 2024, and the pilot test results will be described in a Technical Memorandum. The pilot testing and topside design for the Vineyard Surface Water Treatment Plant (VSWTP) ASR Well Implementation are scheduled for completion in the upcoming water year.

3.2.3.2 Group 3

Sacramento Area Flood Control Agency's (SAFCA) Flood-MAR Project

The SAFCA project is planned to combine Flood-MAR (Managed Aquifer Recharge) with modifications to the three largest non-federal dams in the American River Basin to safely contain floods with a 1-in-500 annual probability occurrence. The SAFCA Flood-MAR project includes measures to conserve water for environmental, agricultural, and urban use by allowing conditional storage, aquifer recharge, and beneficial use of winter runoff (GSP 2022).

One of the sites under consideration for MAR is located northwest of the intersection of Sunrise Boulevard and Kiefer Boulevard. This parcel is referred to as the Mather South parcel. Site-specific information regarding subsurface geology from a time-domain electromagnetic geophysical survey conducted by towing a light-weight sled over the land surface, referred to as Tow-TEM, was performed on November 30, 2020. In the summer of 2022, the Sacramento Central Groundwater Authority (SCGA) GSA collaborated with SAFCA and DWR's Technical Support Services (TSS) to obtain the necessary permits.

Two soil borings were drilled, and the cores logged and interpreted during the last week of September. The interpretations were used to analyze the Tow-TEM geophysical survey and the results are available to support developing a pilot recharge program. In the upcoming year, SAFCA, RWA and SASb GSAs will coordinate to determine approvals needed and agency roles in a pilot program.

3.2.4 Management Actions

In WY2023, progress was made for the following four Management Actions considered in the development of the SASb GSP.

3.2.4.1 Management Action No. 1 – Shallow/Vulnerable Well Protection Program

A focus of WY2023 activities was to select Domestic Well Advisory Group (DWAG) members and continue the engagement with domestic well owners that was initiated during GSP development. Regular water level measurements were collected and reported through the DMS and to DWR through the Monitoring Network Module on the SGMA Portal in spring and fall seasons.

The focus of WY2024 GSP implementation activities will be to coordinate with the DWAG to continue to improve the domestic well inventory. GSAs will work closely with the DWAG and the VMP to evaluate data quality and potential for inclusion of voluntary monitoring data into the SASb monitoring program. Specific action updates include:

Improved Well Inventory

The well inventory improvement work was paused while establishing the DWAG. The DWAG can assist with outreach to domestic well owners and seek information to improve the domestic well inventory.

Domestic Well Advisory Group

The DWAG has been formed to coordinate community outreach, engage stakeholders on well construction standards, support the volunteer monitoring effort and support further development of the well protection program. A critical objective of DWAG is to assist in the definition of the scope and administrative details of the mitigation element of the well protection program. The group charter was developed and the first DWAG meeting was held in January 2024.

Volunteer Monitoring Program

A volunteer who applied for and was selected as a DWAG member, began collecting water levels from domestic wells where access was provided, within the subbasin. Water levels have been collected from 29 wells since January 2022. Continued coordination with the VMP is planned for 2024.

3.2.4.2 Management Action No. 2 – Well Permit Coordination

The GSAs have worked with the Sacramento County Environmental Management Department (SCEMD) to implement the Governor's Executive Order for GSAs to review well permit applications. The GSAs intend to build on this cooperation to discuss ways the SCEMD and GSAs within the SASb, in collaboration with GSAs in the North American Subbasin (NASb) and other subbasins within the SCEMD jurisdiction, can cooperate to achieve the GSP groundwater sustainability goals.

3.2.4.3 Management Action No. 3 – Coordination Activities

The GSAs finalized a Memorandum of Agreement (MOA) to establish the governance for SASb GSP implementation in November 2022, including a governance structure and cost sharing plan for GSP Implementation. The MOA established an Executive Committee comprised of the managers of the GSAs in the SASb.

NASb and SASb Executive Committees met in September 2023 to discuss individual basin GSP implementation progress and coordination of an inter-basin monitoring network that spans NASb and SASb. The SASb Executive Committee in collaboration with NASb GSA has coordinated with RWA on the regional groundwater banking and accounting framework. Many of the agencies along the Cosumnes River have formed GSAs in both the SASb and in the Cosumnes Subbasin and the same GSA staff are involved in both subbasins, such that separate coordination meetings are needed less between the SASb and the Consumnes Subbasins.

Model updates that occur every year to support the annual report include incorporation of hydrology data, water supply and operations data, municipal production records, more recent land-use data in the model datasets

The Executive Committee will continue to meet regularly and will coordinate the following activities:

- Discussions with representatives from land use agencies to promote consistency of future plans with the adopted GSP.
- Discussions with representatives of GSAs and stakeholders in North American and Cosumnes Subbasins to track and maintain records of all funding and associated GSP components.
- Continued discussions with the Regional Water Authority (RWA) and other regional partners in: (a) the development of a regional groundwater banking and accounting framework; and (b) the development of a revised Climate Change assessment for use in the 5-year GSP update.

The Executive Committee will continue to coordinate and communicate with stakeholders and participating GSAs for project coordination, as needed.

3.2.4.4 Management Action No. 4 – Actions to Address Data Gaps

Three specific data gaps were presented in the GSP to be addressed during plan implementation, including the following:

- Collection of well depth and screened interval information for specific wells in the GSP Monitoring Network.
- Collection of surface water and groundwater data and information along the middle reach of the Cosumnes River to help resolve uncertainties regarding surface water/groundwater interactions in this area.
- Analysis of water quality samples collected by domestic well owners under the Domestic Well Protection Program Voluntary Monitoring Network.

The plan, schedule and budget were coordinated between the SASb and NASb working groups for these tasks in 2022 during the development of the SGMA grant application. Progress towards addressing these data gaps considers funding limitations in 2023. The development and forming of the DWAG was prioritized in 2023. Collaboration with the DWAG to address the above-mentioned data gaps is anticipated to start in 2024. The following activities are ongoing, and will continue through WY2024:

Monitoring Network Update

An update of the existing SASb Monitoring Network is necessary to obtain missing well construction information like well depth and screened interval information for specific wells in the GSP Monitoring Network.

Water Quality Sample Collection

Water quality samples will be collected and analyzed from domestic wells where owner consent is obtained. It is anticipated that these wells would likely also consent to participation in the Voluntary Monitoring Network. Samples are anticipated to be collected in collaboration with the VMP.

3.3 Progress Made Towards Addressing Recommended Corrective Actions in GSP Determination

A GSP determination letter was issued to SASb in response to DWR's approval of the submitted plan on July 27, 2023. The letter provided four recommended corrective actions to be considered and addressed by the Plan's first Periodic Evaluation due in 2027. The four corrective actions issued by DWR for SASb, include:

1) **Recommended Corrective Action 1**: Amend or update the sustainable management criteria for arsenic, specific conductivity/total dissolved solids (TDS), and clarify the threshold exceedances in individual aquifer zones that would indicate undesirable results.
2) **Recommended Corrective Action 2**: Revised definition of undesirable results for land subsidence.
3) **Recommended Corrective Action 3**: Interconnected surface water assessment and address of data gaps.
4) **Recommended Corrective Action 4**: Additional information on the monitoring network.

SASb GSAs are scoping the necessary work to address corrective actions in the GSP evaluation. Available groundwater water quality data for the SASb monitoring network are being evaluated from the GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) portal. Pending the evaluation of existing data, a plan will be determined for establishing sustainable management criteria for arsenic. A similar evaluation will be conducted to evaluate available specific conductivity (SC) and TDS data for SASb monitoring network wells. Results from this evaluation will be considered to determine the relationship between SC and TDS data. The quantitative definition of undesirable results for the individual aquifer zones will be considered and described in the Periodic Evaluation.

The review and evaluation of the current definition of undesirable results for land subsidence will be performed in preparation of the first Periodic Evaluation. GSAs plan to develop the scope of work for assessing interconnected surface water impacts and data gaps once the DWR guidance is released. Missing monitoring network information denoted in the GSP Determination letter will be obtained prior to completion of the Periodic Evaluation.

3.4 Funding Sources

3.4.1 DWR Support

Facilitation support has been provided by DWR for ongoing basin coordination and for ongoing DWAG coordination.

3.4.2 Locally Funded Activities

All the planning and implementation activities described in the previous sections were locally funded in WY2023 except the DWAG related coordination.

4 References

California Department of Water Resources (CA-DWR). 2017. Sustainable Management Criteria Best Management Practice, dated November 2017, 38 pp.

Towill, Inc., 2021. InSAR Data Accuracy for California Groundwater Basins CGPS Data Comparative Analysis January 2015 to September 2019. https://data.cnra.ca.gov/dataset/tre-altamira-insar-subsidence/resource/a1949b59-2435-4e5d-bb29-7a8d432454f5.

University of California Agriculture and Natural Resources (UCANR). 2023. Salinity measurement and unit conversion. Salinity Management. University of California Division of Agriculture and Natural Resources. Visited March 22, 2023. https://ucanr.edu/sites/Salinity/Salinity_Management/Salinity_Basics/Salinity_measurement_and_unit_conversions/

South American Subbasin (SASb). 2021. South American Subbasin Groundwater Sustainability Plan, dated October 29, 2021. Available online at: https://sgma.water.ca.gov/portal/gsp/preview/111

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Appendix A: Groundwater Elevation Hydrographs

Appendix B: Groundwater Level Monitoring Coordination Plan

A monitoring data collection, communication, and coordination strategy is developed to ensure timely and complete data collection at all RMPs and submittal to DWR's monitoring network module (MNM) to support annual reporting and SMC evaluation. The plan fundamentally hinges on the completion of a monitoring checklist, and includes all parties responsible for data collection, management, submittal, and use. At the time of writing, these parties include:

- **Collectors** (*SCWA, OHWD, LWA, Aerojet, Sacramento State*)
- **Manager** (*SCGA as the plan administrator*)
- **Users** (*SCGA, OHWD, LWA, Aerojet, Sacramento State, public and DWR*)
- **DMS Manager (Woodard & Curran transitioning to SCGA staff over time)**

The plan is divided into spring and fall periods, with six phases in each period, each representing sequential effort. A flow chart of the six phases is included in Attachment A.

Phase 0. *March 1/September 1:* Managers communicate with **Collectors** to verify schedule and identify any impediments to successful data collection.

Phase 1. *April 1 – April 30 / October 1 – October 31*: spring/fall groundwater level data is measured and input to the spreadsheet (GroundwaterLevelTemplateSASB_RMPs.xlsx) by **Collectors** and transferred to **Manager** who imports the spreadsheets into the DMS. The spreadsheet serves a seasonal tracking effort, thus it is used twice per year: once in spring, and once in fall.

Collectors provide progress updates to **Manager** (SCGA staff) to ensure data is collected from all wells in the monitoring network. List of wells in the monitoring network is provided in Attachment B. **Manager** keeps track of issues with the individual wells as reported by **Collectors** (inaccessibility, etc.). Assigned collectors are summarized below in Table 1. Contact information is provided in Attachment C.

Table 1. Collectors for SASb.

Organization	Name	Number of Wells
SCWA	Robert Steeg/Ramon Roybal	23
Sacramento State	Dr. Amelia Van Keuren	3
OHWD	Stephen Julian/Andrew Calderwood (LWA)	6
SCGA	Andrew Calderwood/Olin Applegate	2
DWR	Automatic API transfer to DMS	6
Aerojet	SCGA Staff (retrieve from RWA)	3
	Total	43

DWR Wells are monitored by DWR staff and data are available for review through CASGEM or the MNM. Data from CASGEM will be uploaded to the DMS via an automatic API transfer, to be performed by April 30 / October 31.

Phase 2. *May 1 – May 15 / November 1 – November 15*: spring/fall groundwater level data is reviewed by **Managers** in the spreadsheet by May 15 / November 15. RMPs without a valid spring/fall sample are identified by **Managers** and communicated to **Collectors** for data collection in Phase 3.

Phase 3. *May 16 – May 31 / November 16 – November 30*: RMPs identified in Phase 2 missing a spring/fall measurement are measured and input to the spreadsheet (GroundwaterLevelTemplateSASB_RMPs.xlsx) by **Collectors**, who then give these data to **Managers**, and Phases 1-3 are iteratively repeated until all data is present, or a decision is made that data cannot be collected during the semi-annual event.

Importantly, Phases 1-3 ensure adequate time for collectors to measure missing RMPs in the late spring or fall, should missing or otherwise inadequate data be collected. Data collection efforts will be tracked.

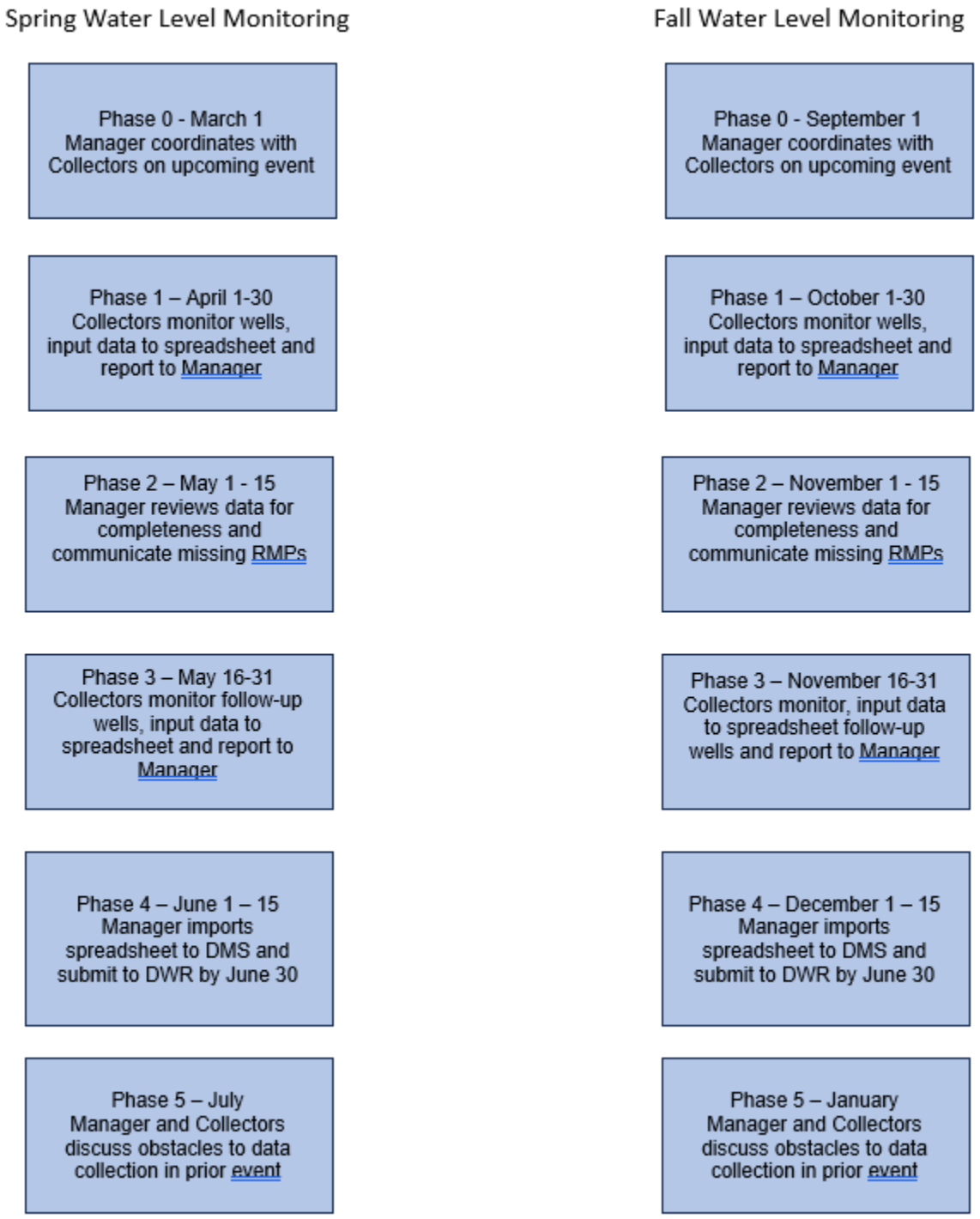
Phase 4. *June 1 – June 15 / December 1 – December 15:* The spreadsheet with the collected data is imported to the DMS by the **Manager**. After import of groundwater level data to the DMS, hydrographs are reviewed by the **Managers**. **Managers** coordinate with **Collectors** to make corrections or check data for errors. Follow up on missing groundwater levels will be coordinated at this time. **Collectors** provide required corrections by June 15/December 15.

Corrections will be made to the DMS by the **Manager** dependent on findings in Phase 4. The **Manager** will export the data from the DMS and submit the data to DWR's MNM by June 30/December 31.

Phase 5. *July 1 – July 30 / January 1 – January 30:* **Managers** work with **Collectors** to identify opportunities to overcome obstacles to data collection for RMPs that were not monitored during the prior semi-annual event.

Attachment A. Monitoring Phases

Groundwater Level Monitoring Coordination Plan



Attachment B. Monitoring Wells

Groundwater Level Monitoring Coordination Plan

RMP	SWN	code2	GSA	GSA	Fall2022 Monitoring
RMP_01	05N05E30A004M	382604N1214665W001	N. Delta	N. Delta	SCWA (Steeg)
RMP_03		MW_17	SCGA	SCGA	SCWA (Steeg)
RMP_04	05N05E10C003M	383009N1214224W001	SCGA	SCGA	SCWA (Steeg)
RMP_05		MW_2	SCGA	SCGA	SCWA (Steeg)
RMP_07	06N04E24A001M	383610N1214825W001	N. Delta	N. Delta	SCWA (Steeg)
RMP_08	06N05E17F001M	383728N1214548W001	SCGA	SCGA	SCWA (Steeg)
RMP_10		384125N1214946W001	N. Delta	N. Delta	SCWA (Steeg)
RMP_12	07N05E36A001M	SCGA #4	SCGA	SCGA	SCWA (Steeg)
RMP_14	07N05E29D001M	SCGA #3	SCGA	SCGA	SCWA (Steeg)
RMP_16	07N06E22R002M	SCGA #9	SCGA	SCGA	SCWA (Steeg)
RMP_17	07N06E14Q001M	SCGA #7	SCGA	SCGA	SCWA (Steeg)
RMP_21	07N06E12A001M	SCGA #6	SCGA	SCGA	SCWA (Steeg)
RMP_24	08N04E36L001M	SCGA #10	SCGA	SCGA	SCWA (Steeg)
RMP_25	08N07E33E001M	SCGA #23	OHWD	OHWD	SCWA (Steeg)
RMP_26	08N06E27H002M	SCGA #15	SCGA	SCGA	SCWA (Steeg)
RMP_27	08N06E30C001M	SCGA #17	SCGA	SCGA	SCWA (Steeg)
RMP_29	08N05E21H002M	SCGA #11	SCGA	SCGA	SCWA (Steeg)
RMP_30	08N06E17H001M	SCGA #12	SCGA	SCGA	SCWA (Steeg)
RMP_31	08N07E18E002M	385543N1212592W001	SCGA	SCGA	SCWA (Steeg)
RMP_36	08N07E02N001M	SCGA #20	SCGA	SCGA	SCWA (Steeg)
RMP_38	09N06E33R001M	SCGA #24	SCGA	SCGA	SCWA (Steeg)
RMP_44	09N07E02N001M	SCGA #27	SCGA	SCGA	SCWA (Steeg)
RMP_45	10N08E29J001M	SCGA #29	SCGA	SCGA	SCWA (Steeg)
RMP_33		SS_MW1	SCGA	SCGA	Sacramento State
RMP_34		SS_DWR2D	SCGA	SCGA	Sacramento State
RMP_35		SS_DWR3D	SCGA	SCGA	Sacramento State
RMP_09		MW_DR1	OHWD	OHWD	OHWD (Stephen Julian)
RMP_20	07N07E08B003M	384783N1212311W001	OHWD	OHWD	OHWD (Stephen Julian)
RMP_22	07N07E02C001M	384931N1211797W001	OHWD	OHWD	OHWD (Stephen Julian)
RMP_13		ACR_13	OHWD	OHWD	LWA
RMP_15		ACR_14	OHWD	OHWD	LWA
RMP_18		ACR_16	OHWD	OHWD	LWA
RMP_23		ACR_76	SCGA	SCGA	LWA
RMP_28		ACR_77	SCGA	SCGA	LWA
RMP_02	05N05E12N003M	382939N1213904W001	SCGA	SCGA	DWR--API
RMP_06	06N05E31L003M	383270N1214736W001	SCGA	SCGA	DWR--API
RMP_11	07N06E33K001M	384150N1213239W001	SCGA	SCGA	DWR--API
RMP_19	07N05E10M001M	384738N1214249W001	SCGA	SCGA	DWR--API
RMP_32	08N06E09Q004M	385578N1213240W001	SCGA	SCGA	DWR--API
RMP_41	09N07E36F001M	385923N1211621W001	SRCD	SRCD	DWR--API
RMP_37	08N05E06H001M	385784N1214655W001	SCGA	SCGA	Destroyed
RMP_40	09N07E31G001M	385914N1212475W001	SCGA	SCGA	Destroyed
RMP_39		ARJ1256	SCGA	SCGA	Aerojet
RMP_42		ARJ188	SCGA	SCGA	Aerojet
RMP_43		ARJ3390	SCGA	SCGA	Aerojet

Attachment C. Contact Information for Collectors

Groundwater Level Monitoring Coordination Plan

Organization	Name	email	Phone
SCWA	Robert Steeg	steegb@saccounty.net	
Sacramento State	Dr. Amelia Van Keuren	vankeuren@csus.edu	
OHWD	Andrew Calderwood (LWA)	andrewc@lwa.com	
SCGA (collector)	Olin Applegate	olina@lwa.com	
SCGA Manager	Bryan Thoreson	bthoreson@geiconsultants.com	
DWR	Automatic API transfer to DMS	N/A	
Aerojet	SCGA Staff (currently Sebastien Poore, W&C) retrieve from Aerojet (Jaco Fourie)	jaco.fourie@rocket.com spoore@woodardcurran.com	

Appendix C: Spatial Representation of Groundwater Extractions and Change in Groundwater Storage as Estimated by CoSANA

Figure C-1 displays the general locations of groundwater extractions in the SASb during the 2023 water year. This figure represents the normalized extraction rates per unit area by CoSANA model elements for municipal and industrial, agricultural (including agricultural residential) and remediation extractions. The municipal and industrial and remediation extractions are reported by well, while the agricultural and ag res extractions are estimated by area using the CoSANA model.

Figure C-2 displays the total change in groundwater storage in the principal aquifer of the SASb for water year 2023 in a spatial format as estimated by outputs from CoSANA. The change in storage is shown in units of inches. CoSANA calculates a change in volume per area of model element. Since the model elements vary in size, visually displaying a map of volume change per model element is not spatially intuitive, so the results have been normalized to show change in depth by dividing the volume by area per model element. Consistent with the increase in overall subbasin storage during the 2023 water year, the figures show relative increases in storage (positive change in depth shown in yellow and tan colored shades) in most areas of the basin, with only small areas with relative decreases in storage (negative change in depth shown in shades of brown). Note that the results shown are modeled changes in storage and may not reflect measured changes in groundwater levels at individual wells during the water year.

Overall, the groundwater storage is relatively constant in most parts of the basin for the 2023 water year. The most significant increases in groundwater storage occur along the American River and Cosumnes River corridors. Slight decreases in storage are seen in the eastern central half of the basin.

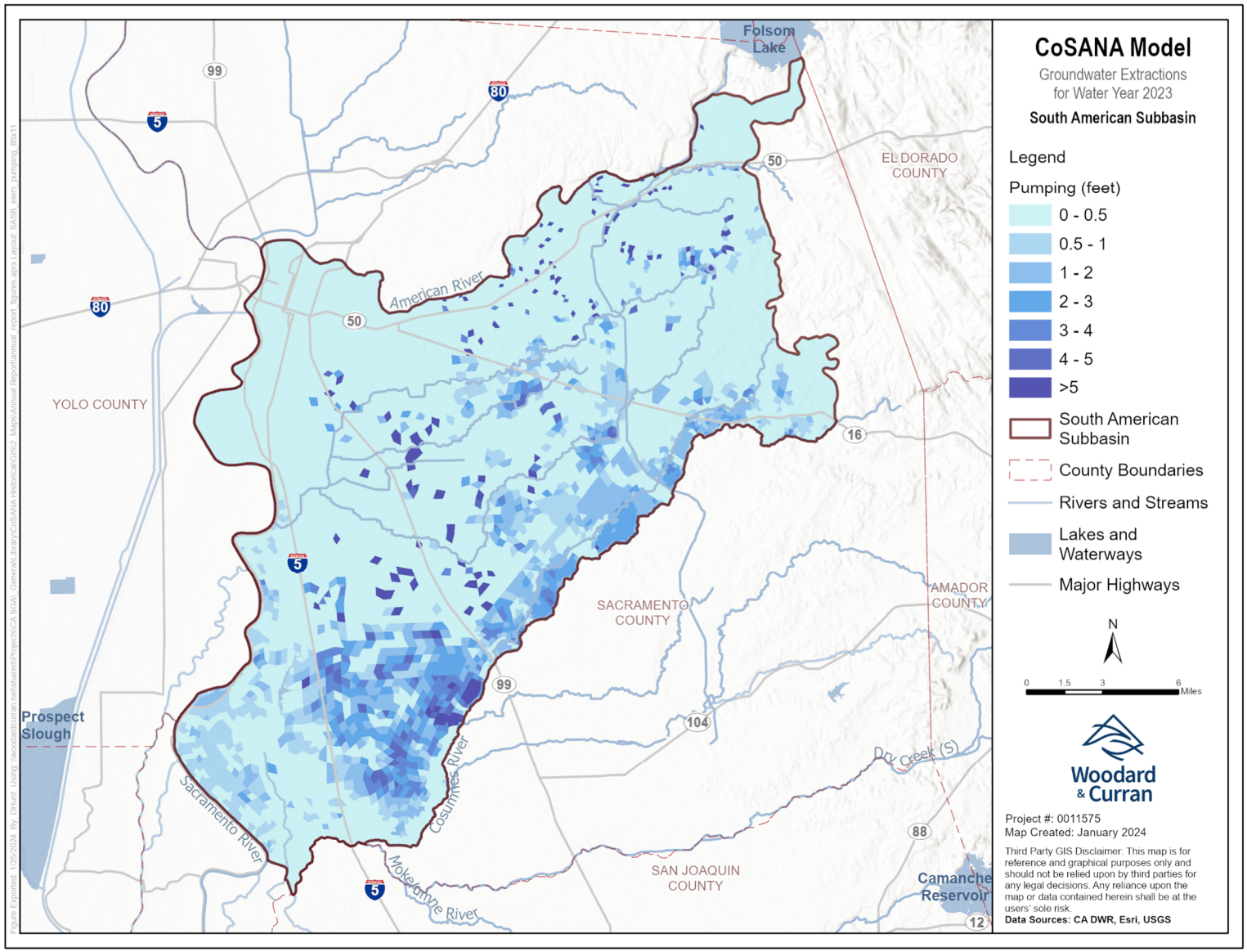


Figure C-1: General Location of Groundwater Extractions in WY 2023 in the South American Subbasin

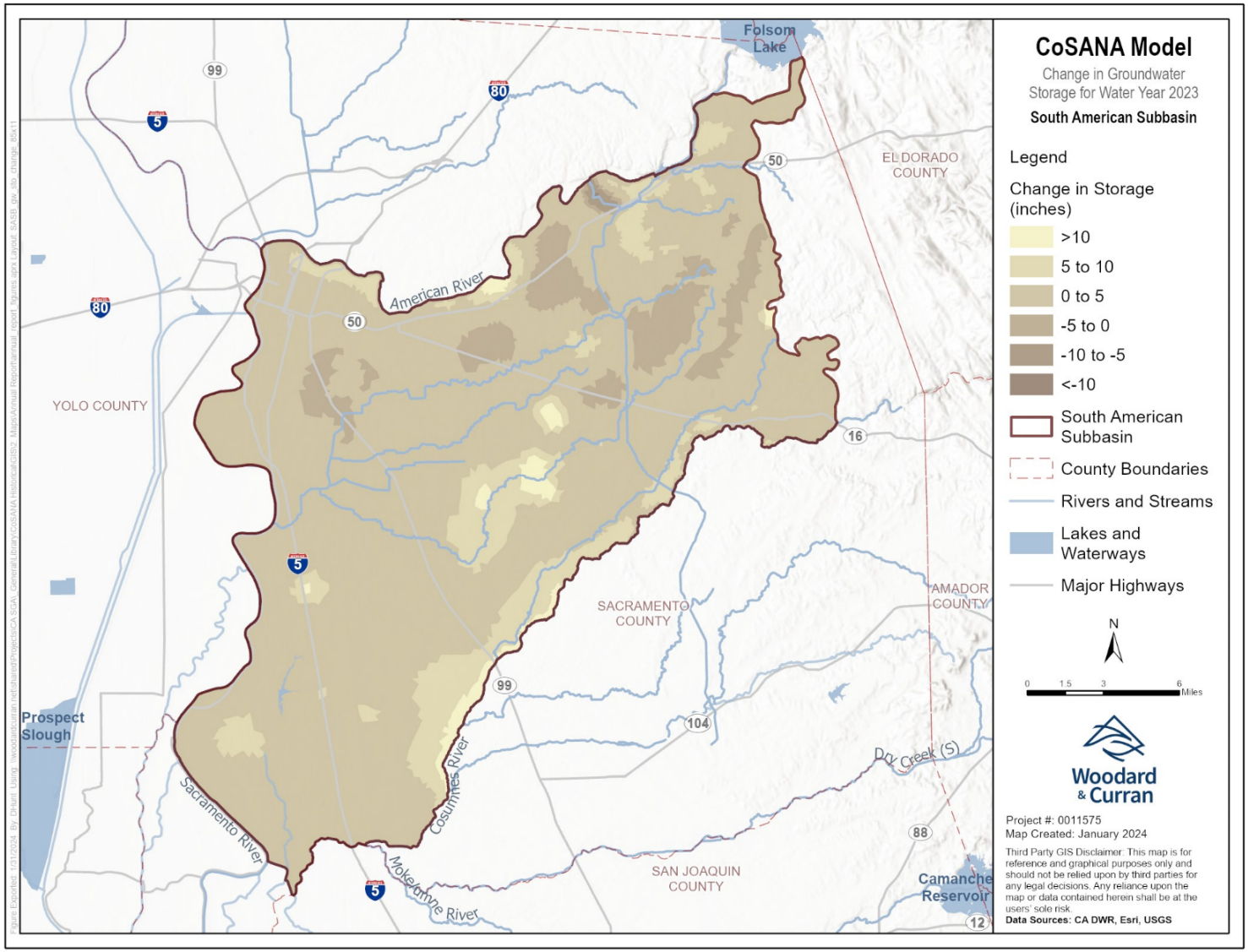


Figure C-2: Estimated Spatial Change in Groundwater Storage (inches) in the South American Subbasin over the 2023 Water Year

Appendix D: Water Quality Time Series

This appendix provides time series of nitrate as nitrogen and specific conductance for wells included in the groundwater quality monitoring network. The maximum threshold concentration for nitrate is the Title 22 Primary Maximum Contaminant Level of 10 mg/L, and for specific conductance is the Title 22 Secondary Maximum Contaminant Level of 1600 micromhos/cm. The measurable objective for each well is displayed on each chart. The Y-axis displays the same maximum value of 10 mg/L for nitrate and 750 µmhos/cm for specific conductance, with the exception of red Y-axis values which denote a higher maximum value of 15 mg/L for nitrate, and 2200 µmhos/cm for specific conductance. The nitrate graphs substitute non-detect values with one half the reporting limit, and substitute estimated values with the reporting limit. The substitution of the reporting limit in these instances documents that water quality is at least as good as the reporting limit These instances are denoted on the graphs. This does not change the evaluation of water quality SMCs.