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SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY Board of Directors Meeting

Thursday, March 20, 2025, at 6:00 p.m. Capitola Library, 2005 Wharf Road, Capitola

AGENDA

The public may attend and provide public comment in person. The meeting will also be publicly streamed (viewing only) via Zoom webinar: https://us06web.zoom.us/j/81727585364 Webinar ID: 817 2758 5364; Webinar audio by phone (669) 444-9171

1. Call to Order

- 2. Roll Call
- 3. Oral Communications Related to Items Not on the Agenda Issues within the purview of the Santa Cruz Mid-County Groundwater Agency. Guidelines attached.

4. Consent Agenda - pg 4

- 4.1 Approve December 12, 2024 Meeting Minutes
- 4.2 Acknowledge 2025 MGA Board Appointments

5. General Business - pg 13

- 5.1 Approve Submittal of Santa Cruz Mid-County Basin Water Year 2024 Annual Report to the Department of Water Resources
- 5.2 Review Budget for Fiscal Year 2024-25 and Provide Direction on Preliminary Budget for Fiscal Year 2025-26
- 5.3 Consider Consultant Selection for Planning and Technical Services
- 5.4 Consider Amendment to Funding Agreement with the County of Santa Cruz for Planning and Administrative Services and Data Management System
- 5.5 Receive Update on Sustainable Groundwater Management Act Compliance Funding Options Assessment
- 5.6 Conduct Annual Election of Officers

6. Informational Updates - pg 397

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- 6.1 Treasurer's Report
- 6.2 Staff Reports
 - GSP Implementation Status Update
 - SGMI Grant Update
 - Introduction to Groundwater, Watersheds, and Groundwater Sustainability Plans 2025 Short Course
 - Other
- 6.3 Agreement with Geophysical Imaging Partners to Analyze 2017 and 2022 Airborne Electromagnetic Data
- 6.4 Annual Streamflow Monitoring Report Presentation by Trout Unlimited

7. Future Agenda Items

8. Written Communications and Submitted Materials

Written communications received by 4:00 p.m. on the Tuesday of the week prior to a regularly scheduled (Thursday) Board meeting will be distributed to the Board and made available on the MGA website at the time the Agenda is posted.

9. Adjournment

Next Board Meeting: June 12, 2025



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GUIDANCE FOR ORAL AND WRITTEN COMMUNICATIONS AND DISABILITY ACCESS

ORAL COMMUNICATIONS

MGA Board meeting agendas set aside time for oral communications regarding items not on the agenda but within the purview of the MGA. Oral communications are also heard during the consideration of an agenda item.

Anyone wishing to provide public comment should come to the front of the room to be recognized by the Board Chair. Individual comments are limited to three (3) minutes; a maximum time of 15 minutes is set aside each time for oral communications. The time limits may be increased or decreased at the Board Chair's discretion. Speakers must address the entire Board; dialogue is not permitted between speakers and other members of the public or Board members, or among Board members.

While the Board may not take any action based upon oral communications, an issue raised during oral communications may be placed on the agenda for a future Board meeting.

Organized groups wishing to make an oral presentation to the Board may contact Sophia Sholtz at 831-662-2055 or <u>admin@midcountygroundwater.org</u>, preferably at least two weeks prior to the meeting.

WRITTEN COMMUNICATIONS

Written communications to the Santa Cruz Mid-County Groundwater Agency (MGA) Board may be submitted as follows:

- Via email: comment@midcountygroundwater.org
- Via mail or hand delivery: MGA Board of Directors, c/o Emma Olin, 5180 Soquel Drive, Soquel, CA 95073

Deadlines for Submittal:

- Written communications received <u>by</u> 4:00 p.m. on the Tuesday of the week prior to a regularly scheduled (Thursday) Board meeting will be distributed to the Board and made available on the MGA's <u>website</u> at the time the Agenda is posted.
- Written communications received <u>after</u> the 4:00 p.m. deadline will be posted on the MGA <u>website</u> and Board members informed of the communications at the earliest opportunity. Please note, communications received after 9:00 a.m. the day before the Board Meeting may not have time to reach Board members, nor be read by them prior to consideration of an item.
- Written communications received at a Board meeting will be distributed to Board members and posted on the MGA <u>website</u> at the earliest opportunity.

Any written communication submitted to the Board will be made available on the MGA website at <u>http://www.midcountygroundwater.org/committee-meetings</u> and constitutes a public record. Please do not include any private information in your communication that you do not want made available to the public.

DISABILITY ACCESS: Please contact Sophia Sholtz at <u>admin@midcountygroundwater.org</u> or 831-662-2055 for information or to request an accommodation.



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SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY Board of Directors Meeting

Thursday, December 12, 2024, at 6:00 p.m. Capitola Branch Library, 2005 Wharf Road, Capitola Meeting webcast (via Zoom) for remote viewing.

DRAFT MINUTES

1. Call to Order

The meeting was called to order at 6:35 pm by Chair Kennedy.

2. Roll Call

Directors present: (Alternates acting as voting Directors shown in *italics*) Jon Kennedy (Chair) – Private Well Owner Jim Kerr (Secretary) – Private Well Owner Carla Christensen – Soquel Creek Water District Rachél Lather – Soquel Creek Water District Marco Romanini – Central Water District Doug Engfer – City of Santa Cruz Robert Schultz – Private Well Owner

Member Agency Staff present:

Heidi Luckenbach – City of Santa Cruz Melanie Mow Schumacher – Soquel Creek Water District Sierra Ryan – County of Santa Cruz Ralph Bracamonte – Central Water District Leslie Strohm – MGA Treasurer; Financial/Business Manager, Soquel Creek Water District

Supporting Staff and Consultants:

Tim Carson, Rob Swartz – Regional Water Management Foundation (RWMF) Cameron Tana (remote) – Montgomery & Associates (M&A) Ryan Aston (remote) – SCI Consulting Group (SCI)

3. Oral Communications Related to Items Not on the Agenda

Santa Cruz Mid-County Groundwater Agency Board Meeting Minutes – December 12, 2024 Page 2 of 8

Two members of the public offered comment, Jonathan Trent and Becky Steinbruner.

Chair Kennedy offered appreciation to outgoing Supervisor Zach Friend and his analyst, Allyson Violante, for their service to the Santa Cruz Mid-County Groundwater Agency Board.

4. Consent Agenda

- 4.1 Approve September 19, 2024, Meeting Minutes
- 4.2 Approve 2025 Board Meeting Schedule

MOTION: Director Kerr; Second: Director Romanini; to approve the consent agenda. Director Engfer abstained from item 4.1 due to his absence from the September 19, 2024 meeting. Motion passed unanimously.

5. General Business

5.1 Accept Audited 2023/24 Financial Statements

Leslie Strohm presented the report prepared by Davis Farr, LLP (Auditor) on the MGA's audited financial statements. The Auditor issued an unmodified opinion on the financial statements, indicating that the financial statements are free from material misstatement.

Changes in the financial position of the MGA in FY23/24 over previous years are due primarily to grant activity and lower member contributions. Assets and Liabilities both increased by about \$1.5M due to the recognition of pass-through grant expenses related to the Sustainable Groundwater Management Grant. The net position decreased by about \$53,000 to almost \$1.9M due to the MGA spending out of cash reserves in lieu of collecting member contributions. Operating revenues were down due to decreased Member Agency contributions and operating expenses were up with increased activity. Notable expenses were Groundwater Management Services and the Groundwater Monitoring Program, as well as administrative personnel services.

Chair Kennedy requested a status update on the implementation of the MGA Investment Policy. Treasurer Strohm informed the Board that she is in the process of sourcing a trustee to manage and execute the trades and transactions associated with implementing the Investment Policy.

Public Comment: Becky Steinbruner commented. Treasurer Strohm responded that Davis Farr, LLP has served as the independent auditor for the past four years.

MOTION: Director Christensen; Second: Director Romanini; to accept the audited FY23/24 Financial Statements. Motion passed unanimously.

Santa Cruz Mid-County Groundwater Agency Board Meeting Minutes – December 12, 2024 Page 3 of 8

> 5.2 Consider Approval of the Periodic Evaluation of the Groundwater Sustainability Plan

Georgina King (M&A) was absent and unable to present her report; Rob Swartz presented in her place. The Periodic Evaluation (PE) is a written assessment evaluating the MGA's Groundwater Sustainability Plan (GSP) implementation. The Board Draft was available for public comment review for 30 days from August 20 through the September 19 Board Meeting. The only changes to that Board Draft were for schedule-related edits and to address written public comments. The PE will be submitted to DWR before the deadline of January 30, 2025.

The California Department of Water Resources (DWR) will then commence its review of the PE. There is no current date by which DWR must complete its review. The review is intended to ensure that the GSP has been implemented and remains compliant with SGMA in a manner that will likely achieve the sustainability goal. To conduct this review, DWR will review the GSP submitted in 2020, the subsequent annual reports submitted to date, and the 2025 PE.

No questions or comments were received on the item.

MOTION: Director Romanini; Second: Director Lather; to approve the submittal of the Periodic Evaluation of the Santa Cruz Mid-County Groundwater Sustainability Plan to the Department of Water Resources. Motion passed unanimously.

5.3 Consider Amendment 5 to Contract No. 2020-04 with Montgomery and Associates for Groundwater Model Improvement

Tim Carson provided background information on the history of Contract No. 2020-04 with M&A. In 2020, the MGA issued a request for qualifications (RFQ) for planning and technical services including SGMA Annual Reports and the Periodic Evaluation, technical support for groundwater modeling, and hydrologic services. The Board awarded the contract to M&A as a three-year contract expiring November 30, 2023, with an option to extend it for two additional years.

There have not been comprehensive updates or improvements to the existing groundwater model under the current contract. Amendment 5 to Contract No. 2020-04 would add groundwater model improvements to the scope of work with M&A. There is an opportunity to use approximately \$142,000 in Sustainable Groundwater Management Implementation (SGMI) grant funds during Phase 1 of model improvements that are recommended prior to the next PE.

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The request to the Board is for an amount not-to-exceed \$241,000 and for the work to be completed by December 31, 2025, which is the deadline by which SGMI grant-funded activities are to be completed.

Cameron Tana presented on how the MGA groundwater model is used and the proposed Phase 1 model improvements. The presentation may be found on the MGA website.

Director Romanini asked questions on the use of future airborne electromagnetic (AEM) surveys and how they will be used in the groundwater modeling updates. Cameron Tana explained that AEM surveys are primarily used to look at seawater intrusion in the Seascape area and are not as useful when the aim is to better map the structure of aquifers further inland in the Mid-County Basin. AEM flight coverages are limited in inland areas with residential development.

Additional questions were asked about how M&A will use artificial intelligence (AI) to improve their modeling; Cameron Tana responded that when making detailed groundwater models, using physics and collected data can provide more helpful information than large data set-based AI.

Director Engfer requested clarification on the scope and timeline of Phase 2. Cameron Tana explained that the bulk of Phase 2 will involve collecting sufficient data under different climatic and operational conditions to ensure that calibrating a new model will provide meaningful additional information to the MGA. The collection of this data informs the timeline of Phase 2, which should be completed by 2027.

Director Christensen asked about funding for Phase 1 and 2. Phase 2 intends to incorporate data from projects implemented by different agencies operating in the Mid-County Basin. Rob Swartz confirmed that Phase 2 would be funded in an upcoming future budget cycle.

Public Comment: Becky Steinbruner commented.

MOTION: Director Engfer; Second: Director Christensen; to authorize the General Manager of the Soquel Creek Water District to amend Contract No. 2024-04 with Montgomery and Associates for Groundwater Model Improvements in an amount not-to-exceed \$241,000 and completed by December 31, 2025. Motion passed unanimously.

5.4 Sustainable Groundwater Management Act Regulatory Compliance Funding Options Study Santa Cruz Mid-County Groundwater Agency Board Meeting Minutes – December 12, 2024 Page 5 of 8

Rob Swartz described the RFQ released to aid in a Regulatory Compliance Funding Options Study. The Executive Team of the MGA unanimously selected SCI Consulting Group (SCI). The intent of this study is to assess the current funding model of the MGA and present alternative models for the Board's consideration.

Ryan Aston, the project manager for SCI, presented an overview of the funding options assessment project.

The project goal is to determine the recommended long-term funding options to sustain MGA regulatory compliance by identifying agency funding needs, community and stakeholder perspectives, and appropriate legal frameworks.

January and February will be spent refining MGA goals and preliminary funding options and conducting targeted stakeholder meetings; preliminary funding options will be presented to the Board at the March meeting. Once feedback from the Board is incorporated, additional community meetings will be held in April. The final funding options assessment summary will be presented to the Board in June 2025.

Targeted stakeholder meetings are tentatively scheduled for early 2025 and will focus on specific stakeholder categories to get a sense of each community's individual needs: domestic groundwater users, agricultural groundwater users, small water systems using groundwater, and urban water users.

Water Code §10730 and §10730.2 provide the authority for GSAs to charge fees for "Program Administration" and a broad-spectrum of GSA implementation activities, respectively. Preliminary conversations with the Executive Team have led SCI to lean towards §10730 – "Program Administration" funding options instead of broad-spectrum implementation options.

Potential SGMA fee methodologies include volumetric fees, which produce a charge per acre-foot (AF) of groundwater; parcel or land-based, which produces a charge per parcel or land-acre; irrigated acre-based, which produces a charge per irrigated acre; and hybrid, which incorporates one or more of the above options.

Director Romanini commented that the public only has two chances to give their feedback as a part of the outreach efforts.

Director Christensen requested information on the estimated budget for 2026 forward and the approximate amount that SCI is targeting in their fee study. Rob Swartz responded that the ongoing MGA budget will likely be in the \$500,000 to \$600,000 per year range to account for reporting, data collection, and administration of the MGA.

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There was additional discussion on the types of water users in the basin, the average amount of money per parcel that would have to be charged, and what other basins are doing to fund GSAs.

Public Comment: Two members of the public offered comment, Jonathan Trent and Becky Steinbruner. Ryan Aston responded to comment to clarify that for funding studies, methodological units, such as water use, were required to calculate amounts.

MOTION: Director Lather; Second: Director Christensen; to receive an overview presentation of funding options available under SGMA and discuss recommended study approach. Motion passed unanimously.

6. Informational Updates

6.1 Treasurer's Report

The Treasurer's Report can be found in the Agenda Packet for review.

No questions or comments.

6.2 Staff Reports

• GSP Implementation Status Update

Rob Swartz reviewed some positive updates to the Well Metering Program (WMP) including feedback from property owners to confirm land use to determine the applicability of the WMP. At this time, it is estimated that there are fewer than 10 parcels that must comply with the WMP and several of those parcels already have meters installed. Positive contact has been achieved with several parcels including agricultural parcels, Seascape Greens.

• SGMI Grant Update

Tim Carson noted that under the current approved DWR agreement and schedule, SGMI grant-funded activity must be completed by December 31, 2025.

• Hydrologic Support Services

Tim Carson noted that the M&A contract, even with the approved extension, is nearing the end of its 5-year term. The Executive Team will discuss options and present them at a future board meeting. Santa Cruz Mid-County Groundwater Agency Board Meeting Minutes – December 12, 2024 Page 7 of 8

• Administrative and Planning Support Services

Sierra Ryan noted that the Funding Agreement between the MGA and the County of Santa Cruz which includes a contract for services to provide administrative and planning support and a contract for Data Management Services expires at the end of the fiscal year (June 30, 2025). The Executive Team requested that the RWMF, which currently provides administrative and planning support, provide a proposal and cost estimate to extend services for an additional two years. Renewal of the Funding Agreement will be brought to the MGA Board at the March meeting.

It was noted that the MGA Board could extend the Funding Agreement for up to two years or it could elect to conduct a new solicitation for services. If the MGA Board opts to extend the current Agreement for an additional two years, a new solicitation for services (such as a request for qualifications or for proposals) would need to be conducted at that time.

• Other

Tim Carson noted that Soquel Creek Water District will host an Ethics Training on March 4, 2025, from 5-7pm at the Capitola Chambers. The District will also host an Anti-Harassment Training on April 1, 2025 from 5-7pm at the Capitola Chambers.

At the September MGA Board Meeting, there was a request to post the Board meeting agendas at the Capitola Branch Library. Tim Carson clarified that this is already the standard practice of the MGA as required by the Brown Act. The Board agenda is routinely posted outside of the Library's Ow Family Community Room where meetings are conducted. Agendas are posted at the meeting location at least 72-hours in advance of the meetings.

6.3 Annual Status Report on Board Fair Political Practices Commission Compliance

No questions or comments.

7. Future Agenda Items

Director Romanini requested an agenda item concerning compliance with California's increasingly stringent data security protocols and the KISTERS data breach.

8. Written Communications and Submitted Materials

Written communications can be found at the MGA website.

9. Adjournment

Next Board Meeting: March 20, 2025

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SUBMITTED BY:

Sophia Sholtz Regional Water Management Foundation Jim Kerr Santa Cruz Mid-County Groundwater Agency March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 4.2

Title: Acknowledge 2025 MGA Board Appointments

Attachment(s): None.

Recommended Board Action: No action required, informational report only.

Below are the members of the 2025 MGA Board of Directors. Changes from the 2024 Board are italicized.

Soquel Creek Water District

- Carla Christensen
- Dr. Bruce Jaffe
- Jennifer Balboni (Alternate)

City of Santa Cruz

- Susie O'Hara
- David Baskin
- Doug Engfer (Alternate)

County of Santa Cruz

- Supervisor Kim DeSerpa
- Supervisor Manu Koenig
- Shane McKeithen (Alternate)

Private Well Owners

- Curt Abramson
- Jon Kennedy
- Jim Kerr
- Robert Schultz (Alternate)

Central Water District

- Robert Marani
- Marco Romanini
- Frances Basich Whitney (Alternate)

Recommended Board Action:

1. No action required, informational report only.

Submitted by:

Tim Carson Program Director Regional Water Management Foundation March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject:	Agenda Item 5.1
Title:	Approve Submittal of Santa Cruz Mid-County Basin Water Year 2024 Annual Report to the Department of Water Resources
Attachmen	at(s):

1. Draft Water Year (WY) 2024 Annual Report

- 2. Submittal Letter to DWR
- 3. Montgomery & Associates Presentation on the 2024 Annual Report

Recommended Board Action: Approve the submittal of a transmittal letter and the Santa Cruz Mid-County Basin Water Year 2024 Annual Report from the MGA Basin Point of Contact to DWR in accordance with California Code of Regulations, Tit. 23, secs. 353.4 and 356.2.

Background

The Groundwater Sustainability Plan (GSP) for the Santa Cruz Mid-County Groundwater Basin (Basin) was approved by the Department of Water Resources (DWR) on June 3, 2021.

Following adoption of a GSP, the Sustainable Groundwater Management Act (SGMA) requires the Groundwater Sustainability Agency (GSA) to submit an Annual Report to DWR by April 1 of each year. The Annual Report provides data on groundwater conditions and a narrative description of the progress made toward implementing the GSP in the prior water year.

Annual Reports for Water Years 2019 through 2023 were prepared by Montgomery & Associates and are available on the MGA website and on the DWR SGMA portal. The Annual Report for Water Year 2024 (WY 2024), which covers October 1, 2023 to September 30, 2024, was also prepared by Montgomery & Associates.

Discussion

WY 2024 was a normal water year with precipitation that occurred late October through early May. While precipitation readily recharges groundwater in unconfined aquifers, coastal groundwater levels in the semi-confined to confined Purisima aquifers do not typically show a clear response to annual changes in recharge from precipitation because recharge areas are some distance from the coast. Instead, Board of Directors March 20, 2025 Page 2 of 4

groundwater levels respond more directly to changes in groundwater extraction than precipitation. Even though WY 2024 groundwater extraction was the lowest on record, groundwater levels at most monitored wells increased only slightly or remained similar to the previous year. The normal precipitation year, however, did result in a substantial 2,475 acre-feet (AF) basin-wide increase of groundwater in storage, primarily in unconfined areas away from the coast.

Total water used in WY 2024 is 8,382 AF: 86% municipal use (7,200 AF), 7% private domestic use (591 AF), 3% institutional use (276 AF), and 4% agricultural use (315 AF). Groundwater supplied 56% (4,688 AF) of total water use with the remaining water coming from surface water sources outside of the Basin. The distribution of usage is similar to previous years.

The Basin continues to be in a state of overdraft thereby presenting a significant and unreasonable risk of seawater intrusion. There are undesirable results for seawater intrusion because 8 coastal representative monitoring points (RMPs) have 5-year moving average groundwater elevations below their respective minimum threshold (MT) groundwater elevation proxies. The 5-year moving average groundwater elevation below the MT at SP-5 is not considered an undesirable result because there are only 53 months of available data used to calculate the 5-year moving average. For these 8 RMPs—except SP-5 which was recently added to the MGA monitoring network—the 5-year moving averages remained similar to the previous year.

Chloride concentrations at 6 RMPs for seawater intrusion located in the southeastern portion of the Basin (Seascape area) exceeded MTs for seawater intrusion; 5 in the Purisima F unit and 1 in the Aromas. All 6 RMPs exceeded the MT in 2 or more of the last 4 consecutive samples, which constitutes an undesirable result for seawater intrusion. Increasing chloride trends in the RMPs indicate advancing movement of seawater intrusion. This condition triggers the early management action of reducing nearby municipal pumping, which was already low pre-dating the GSP. These additional reductions have been in place for several years with little effect.

Based on recommendations from last year's annual report, the MGA is investigating potential causes of increasing chlorides in the Seascape area. Seawater intrusion within the Purisima F unit has been present prior to the first documented well log (Seascape well) identifying high salinity water in 1970. Airborne electromagnetic (AEM) data provided by DWR confirms seawater intrusion extending inland. Planned work in WY 2025 is to compare results of the 2017 and 2022 AEM surveys in the Seascape area and to conduct either a land-based electromagnetic survey or an AEM survey, depending on private land access or AEM equipment availability, to delineate the inland and lateral extent of seawater intrusion to better inform actions to protect the Basin from seawater intrusion. Additional water quality sampling is also planned

Board of Directors March 20, 2025 Page 3 of 4

in coastal monitoring wells and other private wells in the area to expand the understanding of the chloride distribution.

In WY 2024, only 1 of 5 interconnected surface water RMPs had groundwater elevations below the groundwater elevation proxy MT. This is the same well where exceedances also occurred over the previous 3 years. Since undesirable results are defined as any depletion of interconnected surface water RMP having groundwater elevations below its MT, undesirable results for surface water depletion are occurring.

There are no MT exceedances or undesirable results for the chronic lowering of groundwater levels or groundwater quality degradation sustainability indicators. Net groundwater extraction remains greater than the sustainable yield in only the Aromas Red Sands aquifer group (1 of 3 aquifer groups).

Projects included in the GSP that recharge water or provide for alternative supplies are expected to reduce net groundwater pumping below sustainable yield and reduce undesirable results once they are implemented. Work to plan and implement these projects continued in WY 2024. The projects include the following:

- Pure Water Soquel (PWS) Construction of 3 Seawater Intrusion Prevention (SWIP) wells and 9 monitoring wells have been completed by Soquel Creek Water District (SqCWD). Construction of treatment plants and pipelines is expected to be completed in WY 2025.
- Aquifer Storage and Recovery (ASR) The City of Santa Cruz Water Department (SCWD) continues to work with the California State Water Resources Control Board to finalize its water rights petition that will lead to phased implementation of full-scale ASR at the SCWD's existing Beltz wells. SCWD expects to receive final action on its water rights petition in early 2025. The SCWD is working on permanent modifications to convert the existing Beltz 12 well to a permanent ASR well, this project is on track to be completed in 2026. Beltz 8 design will be completed in 2025, and modifications will take place in 2027. The SCWD completed pilot testing in WY 2024 at a third existing extraction well (Beltz 9) for ASR use. The design phase for modifications to convert Beltz 9 into a permanent ASR well will occur in 2026.
- Water Transfers / In-Lieu Groundwater Recharge an extension of the pilot project agreement between the SCWD and SqCWD runs through May 1, 2026.

Georgina King from Montgomery & Associates will provide an overview presentation to the MGA Board and request authorization to submit the report to the DWR SGMA Portal. Board of Directors March 20, 2025 Page 4 of 4

Recommended Board Action:

1. By MOTION, approve the submittal of a transmittal letter and the Santa Cruz Mid-County Basin Water Year 2024 Annual Report from the MGA Basin Point of Contact to DWR in accordance with California Code of Regulations, Tit. 23, secs. 353.4 and 356.2.

Submitted by:

Rob Swartz Senior Planner Regional Water Management Foundation

On behalf of the MGA Executive Staff

Melanie Mow Schumacher, General Manager, Soquel Creek Water District Ralph Bracamonte, District Manager, Central Water District Heidi Luckenbach, Water Director, City of Santa Cruz Sierra Ryan, Water Resources Manager, County of Santa Cruz



DRAFT

March 7, 2025

Santa Cruz Mid-County Basin Water Year 2024 Annual Report

Prepared for:



1970 Broadway, Suite 225, Oakland, CA elmontgomery.com

 $17 \ {\rm of} \ 428$



March 7, 2025

Santa Cruz Mid-County Basin Water Year 2024 Annual Report

Prepared for:

Santa Cruz Mid-County Groundwater Agency

Prepared by: Montgomery & Associates 1970 Broadway, Suite 225, Oakland, California



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Appendices

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ACRONYMS & ABBREVIATIONS

AEM Airborne electromagnetic
AF acre feet
AFY acre-feet per year
amsl above mean sea level
ASR Aquifer Storage and Recovery
Basin Santa Cruz Mid-County Basin
cfs cubic feet per second
County County of Santa Cruz
CIMIS California Irrigation Management Information System
CWD Central Water District
DSWMAR Distributed Storm Water Managed Aquifer Recharge
DWR California Department of Water Resources
FIR Environmental Impact Report
GSP Groundwater Sustainability Plan
MGA Santa Cruz Mid County Groundwater Agency
mg/I milligrams per liter
MO measurable objective
Model Santa Cruz Mid County Pasin's integrated surface water/groundwater model
MTminimum threshold
NOAA
DPMS Draginitation Dunoff Modeling System
PKMS
PwSPure water Soquel Groundwater Replenishment and Seawater Intrusion
Prevention Project
RMPrepresentative monitoring point
SCWDCity of Santa Cruz Water Department
SCWWIFSanta Cruz Wastewater Treatment Facility
SGMASustainable Groundwater Management Act
SMCsustainable management criteria
SqCWDSoquel Creek Water District
SWIPSeawater Intrusion Prevention
μg/Lmicrograms per liter
WUFwater use factor
WYWater Year (October 1 – September 30)



EXECUTIVE SUMMARY

The Santa Cruz Mid-County Groundwater Agency (MGA) is required to submit an annual report for the Santa Cruz Mid-County Basin (Basin) to the California Department of Water Resources (DWR) by April 1 of each year following the MGA's 2019 adoption of its Groundwater Sustainability Plan (GSP or Plan). DWR approved the GSP on June 3, 2021 (DWR, 2021). The first Periodic Evaluation of the implementation of the MGA's approved GSP was submitted to the Sustainable Groundwater Management Act (SGMA) Portal on January 30, 2025. The evaluation showed that the Basin is being managed sustainably under the existing GSP and no amendment to the Plan is necessary to achieve MGA's sustainability goals. This sixth annual report covers Water Year (WY) 2024 which is from October 1, 2023, to September 30, 2024.

As described in the GSP, DWR has designated the Basin as high priority in critical overdraft. High priority indicates that water users in the Basin have a high dependence on groundwater, and its critical overdraft designation is primarily because active seawater intrusion impacts its productive aquifers due to over pumping. The MGA's sustainability goal is to manage groundwater to ensure beneficial uses and users have access to a safe and reliable groundwater supply that meets current and future Basin demand without causing undesirable results in order to:

- Ensure groundwater is available for beneficial uses and a diverse population of beneficial users
- Protect groundwater supply against seawater intrusion
- Prevent groundwater overdraft within the Basin and resolve problems resulting from prior overdraft
- Maintain or enhance groundwater levels where groundwater dependent ecosystems exist
- Maintain or enhance groundwater contributions to streamflow
- Ensure operational flexibility within the Basin by maintaining a drought reserve
- Support reliable groundwater supply and quality to promote public health and welfare
- Account for changing groundwater conditions related to projected climate change and sea level rise in Basin planning and management
- Do no harm to neighboring groundwater basins in regional efforts to achieve groundwater sustainability

WY 2024 was a normal water year with precipitation that occurred late October through early May. While precipitation readily recharges groundwater in unconfined aquifers, coastal



groundwater levels in the semi-confined to confined Purisima aquifers do not typically show a clear response to annual changes in recharge from precipitation because recharge areas are some distance from the coast. Instead, groundwater levels respond more directly to changes in groundwater extraction than precipitation. Even though WY 2024 groundwater extraction was the lowest on record, groundwater levels at most monitored wells increased only slightly or remained similar to the previous year. The normal precipitation year, however, did result in a substantial 2,475 acre-feet (AF) basin-wide increase of groundwater in storage, primarily in unconfined areas away from the coast.

Total water used in WY 2024 is 8,382 AF: 86% municipal use (7,200 AF), 7% private domestic use (591 AF), 3% institutional use (276 AF), and 4% agricultural use (315 AF). Groundwater supplied 56% (4,688 AF) of total water use with the remaining water coming from surface water sources outside of the Basin. The distribution of usage is similar to previous years.

The Basin continues to be in a state of overdraft thereby presenting a significant and unreasonable risk of seawater intrusion. There are undesirable results for seawater intrusion because 8 coastal representative monitoring points (RMPs) have 5-year moving average groundwater elevations below their respective MT groundwater elevation proxies. The 5-year moving average groundwater elevation below the MT at SP-5 is not considered an undesirable result because there are only 53 months of available data used to calculate the 5-year moving average. For these 8 RMPs—except SP-5 which was recently added to the MGA monitoring network—the 5-year moving averages remained similar to the previous year.

Chloride concentrations at 6 RMPs for seawater intrusion located in the southeastern portion of the Basin (Seascape area) exceeded MTs for seawater intrusion; 5 in the Purisima F unit and 1 in the Aromas. All 6 RMPs exceeded the MT in 2 or more of the last 4 consecutive samples, which constitutes an undesirable result for seawater intrusion. Increasing chloride trends in the RMPs indicate advancing movement of seawater intrusion. This condition triggers the early management action of reducing nearby municipal pumping, which was already low pre-dating the GSP. These additional reductions have been in place for several years with little effect. It is important to call out one RMP, SC-A2RA, that has undesirable results from increasing chloride concentrations even though it is meeting the proxy groundwater elevation measurable objective (MO). This indicates the proxy groundwater elevation MT and MO are not high enough to stop the advancement of seawater intrusion and they should be re-examined.

Based on recommendations from last year's annual report, the MGA is investigating potential causes of increasing chlorides in the Seascape area. Seawater intrusion within the Purisima F unit has been present prior to the first documented well log (Seascape well) identifying high salinity water in 1970. Airborne electromagnetic (AEM) data provided by DWR confirms seawater intrusion extending inland. Planned work in WY 2025 is to conduct a land-based or AEM survey



to delineate the inland and lateral extent of seawater intrusion to better inform actions to protect the Basin from seawater intrusion and to sample private wells in the area to expand understanding of the chloride distribution.

In WY 2024, only 1 of 5 interconnected surface water RMPs had groundwater elevations below the groundwater elevation proxy MT. This is the same well where exceedances also occurred over the previous 3 years. Since undesirable results are defined as any depletion of interconnected surface water RMP having groundwater elevations below its MT, undesirable results for surface water depletion are occurring.

There are no MT exceedances or undesirable results for the chronic lowering of groundwater levels or groundwater quality degradation sustainability indicators. Net groundwater extraction remains greater than the sustainable yield in only the Aromas Red Sands aquifer group (1 of 3 aquifer groups).

Projects included in the GSP that recharge water or provide for alternative supplies are expected to reduce net groundwater pumping below sustainable yield and reduce undesirable results once they are implemented. Work to plan and implement these projects continued in WY 2024. The projects include the following:

- Pure Water Soquel (PWS) Construction of 3 Seawater Intrusion Prevention (SWIP) wells and 9 monitoring wells have been completed by Soquel Creek Water District (SqCWD). Construction of treatment plants and pipelines is expected to be completed in WY 2025.
- Aquifer Storage and Recovery (ASR) The SCWD continues to work with the California State Water Resources Control Board to finalize its water rights petition that will lead to phased implementation of full-scale ASR at the SCWD's existing Beltz wells. SCWD expects to receive final action on its water rights petition in early 2025. The SCWD is working on permanent modifications to convert the existing Beltz 12 well to a permanent ASR well, this project is on track to be completed in 2026. Beltz 8 design will be completed in 2025, and modifications will take place in 2027. The SCWD completed pilot testing in WY 2024 at a third existing extraction well (Beltz 9) for ASR use. The design phase for modifications to convert Beltz 9 into a permanent ASR well will occur in 2026.
- Water Transfers / In-Lieu Groundwater Recharge an extension of the pilot project agreement between the SCWD and SqCWD runs through May 1, 2026.



1 INTRODUCTION

1.1 Purpose of Annual Report

This annual report is a requirement of Water Code §10733.6 and pertains to the Sustainable Groundwater Management Act (SGMA). As the groundwater sustainability agency for the Santa Cruz Mid-County Basin (Basin), the Santa Cruz Mid-County Groundwater Agency (MGA) is required to submit an annual report to the California Department of Water Resources (DWR) by April 1 of each year following the adoption of its Groundwater Sustainability Plan (GSP or Plan). The MGA Board of Directors unanimously adopted the final GSP after a public hearing on November 21, 2019. The GSP was submitted online to DWR on January 30, 2020, and posted for public comment by DWR on February 19, 2020. DWR approved the GSP on June 3, 2021. The first Periodic Evaluation of the implementation of the MGA's approved GSP was submitted to the SGMA Portal on January 30, 2025. The evaluation showed that the Basin is being managed sustainably under the existing GSP and that no amendment to the Plan is necessary to achieve MGA's sustainability goals.

The purpose of annual reports is to demonstrate to DWR during GSP implementation that progress is being made toward meeting interim milestones that are defined in the GSP and that lead to achieving groundwater sustainability. The content requirements of the annual report are outlined in §356.2 of the GSP Regulations.

This sixth annual report covers Water Year (WY) 2024 (October 1, 2023, through September 30, 2024) and includes a description of basin conditions through text, hydrographs, contour maps, estimation of change in groundwater in storage, and distribution of groundwater extraction across the Basin. A comparison of WY 2024 groundwater data against sustainable management criteria (SMC) is provided as a measure of the Basin's progress toward the sustainability goal that must be reached by January 2040.

1.2 Santa Cruz Mid-County Groundwater Sustainability Agency

The MGA was created in March 2016 under a Joint Exercise of Powers Agreement. The MGA is governed by an 11-member Board of Directors consisting of representatives from each member agency and private well representatives within the boundaries of the MGA. The MGA Board is composed of the following:

• Two representatives from the Central Water District (CWD) appointed by the CWD Board of Directors



- Two representatives from the City of Santa Cruz appointed by the City of Santa Cruz City Council
- Two representatives from the County of Santa Cruz (County) appointed by the County of Santa Cruz Board of Supervisors
- Two representatives from the Soquel Creek Water District (SqCWD) appointed by the SqCWD Board of Directors
- Three representatives of private well owners in the Basin appointed by majority vote of the 8 public agency MGA directors

In addition, an alternate representative for each member agency and for the private well owners are appointed to act in the absence of a representative at Board meetings.

The MGA's jurisdictional area coincides exactly with the Santa Cruz Mid-County Basin depicted on Figure 1.



Figure 1. Santa Cruz Mid-County Basin Boundaries



1.3 Basin Description

The Santa Cruz Mid-County Basin is identified by DWR as Basin 3-001 in Bulletin 118 Update 2020 (DWR, 2020). The Basin extends from the Santa Cruz Mountains to the Pacific Ocean and from the edge of the City of Santa Cruz near Twin Lakes in the west to La Selva Beach in the east (Figure 1). The Basin includes portions of the City of Santa Cruz, the entire City of Capitola, and Santa Cruz County census designated places of Twin Lakes, Live Oak, Pleasure Point, Soquel, Seacliff, Aptos, and Rio Del Mar. The Basin also includes portions of Santa Cruz County unincorporated census designated places of Day Valley, Corralitos, Aptos Hills-Larkin Valley, and La Selva Beach (DWR, 2020).

The Basin boundary includes all areas where the stacked aquifer system of the Purisima Formation, Aromas Red Sands, and certain other Tertiary-age aquifer units underlying the Purisima Formation constitute the shared groundwater resource managed by the MGA. The Basin is defined by both geologic and jurisdictional boundaries. Basin boundaries to the west are primarily geologic. Basin boundaries to the east, adjacent to the Pajaro Valley Subbasin managed by Pajaro Valley Water Management Agency, are primarily jurisdictional.

As described in the GSP, DWR lists the Basin as a high priority basin in critical overdraft. The high priority designation indicates that water supply in the Basin has high dependence on groundwater. The Basin is listed in critical overdraft principally because active seawater intrusion impacts its productive aquifers as a result of historical over pumping of the aquifers.



2 BASIN CONDITIONS

2.1 Precipitation and Water Year Type

Precipitation reported at the National Oceanic and Atmospheric Administration (NOAA) Live Oak climate station in WY 2024 was 35.9 inches. This represents 120% of the 29.9 inches per year, long-term average annual precipitation since WY 1942. Figure 2 charts annual rainfall at the Santa Cruz Cooperative climate station and water year type from WY 1984 to WY 2021, and charts annual rainfall at the nearby Live Oak climate station and water year type from WY 2022 to WY 2024. The change in station occurred because the Santa Cruz Cooperative climate station stopped reporting data in April 2022. The annual average rainfall since WY 1984 of 29.3 inches shown on Figure 2 is less than the long-term average of 29.9 inches starting in WY 1942.

The water year type in the Santa Cruz area is based on a classification used by the City of Santa Cruz Water Department (SCWD). The classification uses total annual runoff in the San Lorenzo River—the SCWD's most important water source—measured at the Big Trees gage in the Santa Margarita Basin. Under this classification system, WY 2024 is classified as a normal year. It follows a wet year that was preceded by a normal year in WY 2022. The last dry and critically dry years were WY 2020-2021. Water year type is shown on Figure 2.











2.2 Surface Water Flow

High winter flows—particularly in February—combined with a significant recession period in the spring and summer, resulted in slightly higher-than-average cumulative streamflow in Soquel Creek for WY 2024, closely following historical patterns. Streamflow at the Soquel Creek at Soquel gage peaked multiple times between January 22, 2024, and March 30, 2024, with discharge reaching over 1,000 cubic feet per second (cfs) in January and February (Figure 3). After the March peak, streamflow gradually subsided for the remainder of the water year. Flows at the end of the water year were 2.73 cfs greater than the beginning of the water year. Monthly and cumulative mean streamflow for WY 2024 is compared to the 30-year (WY 1993 to WY 2023) monthly and cumulative average streamflow on Figure 4. Cumulative WY 2024 streamflow was 34,100 AF, which is about 110% of the 30-year cumulative average of 31,000 AF. The monthly streamflow was greater than average in every month from February through September.



Figure 3. WY 2024 Streamflow at USGS Soquel Creek at Soquel Gage





Runoff at USGS Soquel Creek at Soquel Streamflow Gage

2.3 Groundwater Elevations

Contour maps representing spring and fall groundwater elevations for WY 2024 in each principal aquifer are included on Figure 6 through Figure 17. Spring groundwater elevations represent seasonal high conditions while fall groundwater elevations represent seasonal low conditions.

The contour maps intend to represent average conditions for the spring and fall seasons in the aquifer units. Sustainability with respect to seawater intrusion is evaluated based on average groundwater elevations. Therefore, data used for the contour maps are based on the following:

- Average transducer groundwater elevations calculated over spring (March) or fall (September) from monitoring wells, where available.
- Manual monthly measurements from monitoring wells where transducer data are not available, which less comprehensively represent conditions over time but are the best available representation of seasonal average conditions in absence of transducer data.



- Groundwater elevations from monitoring wells adjacent to production wells. Using average groundwater elevations calculated from transducer data that include levels recorded when the adjacent production well is pumping is the best representation of conditions in the aquifer over this time period.
- Static groundwater elevations from production wells without adjacent monitoring wells. Pumping groundwater elevations from production wells are not representative of groundwater elevations in the aquifers due to pumping inefficiencies. Therefore, static groundwater elevations are preferable over pumping elevations but remain less representative than average groundwater elevations from adjacent monitoring wells. Static elevations are therefore the best available representation of seasonal average aquifer conditions for these locations without adjacent monitoring wells.

Contour maps include minimum threshold (MT) groundwater elevation proxies labeled in green text at representative monitoring points (RMPs) for seawater intrusion. RMPs with MT groundwater elevation proxies for seawater intrusion are included only for the principal aquifer unit where nearby municipal pumping takes place. This is because municipal pumping wells are assumed to be the deepest water supply wells in the coastal areas. Seawater intrusion MT groundwater elevation proxies are labeled for reference only as contours representing seasonal conditions cannot be used to evaluate exceedances of MT and undesirable results. For that purpose, 5-year moving average groundwater elevations at seawater intrusion RMPs are compared to the MT as described in Section 3.3.

Hydrographs updated through WY 2024 for RMPs and other monitoring network wells used to evaluate Basin conditions are provided in Appendix A. The hydrographs indicate the water year type and extend back through the full period of record for each well. MTs and measurable objectives (MOs) for RMPs are included on the hydrographs (Figures A-1 through A-41).

Hydrographs in Appendix A are grouped based on the sustainability indicator for which groundwater elevations are used as SMC as follows:

- Figures A-1 through A-17: Chronic Lowering of Groundwater Levels
- Figures A-18 through A-36: Seawater Intrusion Groundwater Elevation Proxies
- Figures A-37 through A-41: Depletion of Interconnected Surface Water Groundwater Elevation Proxies
- Figures A-42 through A-180: Wells in Monitoring Network not used as RMPs for Groundwater Elevations

WY 2024 is classified as a normal year, following a wet year that provided some relief from the 3 preceding years of average or below average rainfall that limited aquifer recharge. Coastal



groundwater levels in the semi-confined to confined Purisima aquifers do not typically show a distinct response to annual changes in recharge because of their distance from recharge areas, depth, and confinement. Instead, groundwater levels in the Purisima aquifers respond more directly to changes in groundwater extraction than precipitation. A decade-long period (WY 2005-2014) of increasing groundwater levels corresponding with reduced extraction has been followed by a period of relatively stable and high groundwater levels during a period of historically low extraction (WY 2015-2020). Groundwater elevations then declined overall in WY 2021, potentially in response to increased extraction and continued dry conditions. In WY 2024, groundwater elevations at most wells increased slightly or remained similar to the previous year.

2.3.1 Aromas Red Sands

A hydrograph of seawater intrusion RMP SC-A3A is included to show representative groundwater conditions in the Aromas Red Sands. At SC-A3A, spring and fall groundwater elevations and the 5-year moving average are above the seawater intrusion MT, but below the seawater intrusion MO (Figure 5 and Appendix A Figure A-18). Contour maps for the Aromas Red Sands are shown on Figure 6 and Figure 7 for spring (March) and fall (September), respectively. Both spring and fall groundwater elevations, including CWD and SqCWD production wells, have stable groundwater elevations compared to last year. Spring and fall groundwater elevations are unavailable for SqCWD's Country Club Well as it remains out of service following the construction of the new Country Club 2 well. Spring and fall static groundwater elevations for CWD-A could not be collected because of nearby pumping from CWD-12.

Groundwater in the Aromas Red Sands generally flows toward the coast with local pumping effects at CWD's Rob Roy wellfield (CWD #4, CWD #10 and CWD #12) and SqCWD's Bonita and San Andreas production wells. Some inflows to the Basin are from the Pajaro Valley Subbasin inland of SqCWD's service area. Groundwater elevations in the Aromas Red Sands are above sea level with coastal elevations between 3 and 8 feet above sea level.

Figure 5. Representative Hydrograph of Aromas Red Sands Conditions at SC-A3A









Figure 6. Aromas Red Sands Groundwater Elevations, Spring 2024






2.3.2 Purisima F and DEF Units

Contour maps for the Purisima F and DEF units are shown on Figure 8 and Figure 9 for spring (March) and fall (September), respectively. The contour maps show localized pumping depressions around production wells. Extraction from the T. Hopkins and Granite Way wells remained similar in WY 2024 compared to WY 2023 resulting in similar sized pumping depressions. Contours show groundwater in the Purisima F and DEF units generally flows at a gentle gradient toward the coast. With evidence of seawater intrusion advancing in the Seascape area, the seawater investigation will more closely examine groundwater flows in this area. There is also Purisima F and DEF units groundwater flow into the Basin from the Pajaro Valley inland of SqCWD's service area.

Groundwater elevations at most coastal wells generally increased or remained similar to the previous year. Seawater intrusion RMP in the Purisima F and DEF units have groundwater elevations and 5-year moving averages above respective seawater intrusion MTs at 3 of 4 RMP in the spring and fall. At seawater intrusion RMP SC-A8A, fall elevations are below the MT, while elevations are above the MT during spring (Appendix A Figure A-20). The annual minimum of the 5-year moving average groundwater elevation at SC-A8A remains below the MT.





Figure 8. Purisima F and DEF Unit Groundwater Elevations, Spring 2024





Figure 9. Purisima F and DEF Unit Groundwater Elevations, Fall 2024



2.3.3 Purisima BC Unit

Contour maps for the Purisima BC unit are shown on Figure 10 and Figure 11 for spring (March) and fall (September), respectively. The maps include the Twin Lakes Church seawater intrusion prevention (SWIP) recharge well and PWS monitoring wells screened in the Purisima BC unit. Both contour maps show a prominent pumping depression around SqCWD's Ledyard, Madeline, and Estates production wells. The pumping depression is more developed in the fall when demand is greatest. Contours indicate groundwater continues to flow from inland and the coast toward the pumping depression.

Spring and fall groundwater elevations at the 2 coastal Purisima BC unit RMP monitoring wells remained similar or increased in WY 2024. Although spring groundwater elevations at SC-9RC are above the MT, the 5-year moving average groundwater elevations at RMPs SC-9RC and SC-8RB remain below the proxy groundwater elevation for seawater intrusion MTs (Appendix A Figures A-23 and A-24).

2.3.4 Purisima A Unit

Contour maps for the Purisima A unit are shown on Figure 12 and Figure 13 for spring (March) and fall (September), respectively. Groundwater generally flows from inland toward the coast with localized pumping depressions around SqCWD and SCWD production wells. Pumping depressions are more defined in the fall when demand is greatest, particularly at SqCWD's Estates production well (Appendix A Figure A-63). Relatively lower groundwater elevations also occur at an inland location around the SC-10RA monitoring well (Appendix A Figure A-41), potentially caused by non-municipal pumping since there are no nearby municipal wells.

Coastal Purisima A unit RMPs Moran Lake Medium, Pleasure Point Medium, and SC-1A have spring and fall groundwater elevations and 5-year moving average groundwater elevations above seawater intrusion MTs. Groundwater elevations at RMPs, SC-3RA and SC-5RA, are above seawater intrusion MTs in both the spring and the fall (Appendix A Figures A-25 and A-26). However, while the 5-year moving average groundwater elevations at SC-5RA remain below the proxy groundwater elevations for seawater intrusion MTs, the 5-year moving average groundwater elevations at SC-3RA are now above the MT. Soquel Point Medium spring and fall groundwater elevations are now above the MT, however the 5-year moving average remains below the seawater intrusion MT.

In the spring, coastal groundwater elevations in the Purisima A unit in the Pleasure Point area, as shown in example hydrographs in Appendix A Figures A-27, A-28, and A-29, increased from the previous year (Figure 12 and Figure 13). This is likely due to managed aquifer recharge at Beltz #9, the Beltz wells were not pumped in January through April 2024, and the Garnet well



was not pumped during the November through January period. Groundwater mounding around Beltz #9 is evident on the WY 2024 spring contour map.

In the fall, the increase in coastal groundwater elevations in the Purisima A unit in the Pleasure Point area is due to a 54% decrease (95.3 MG or 293 AF) in overall pumping at the Beltz wells compared to last water year. The increase in groundwater elevations at SqCWD coastal monitoring wells SC-5RA, SC-9RA, and SC-8RA to the east of SC-3RA in fall WY 2024 compared to fall WY 2023 is due to the SqCWD Tannery well not pumping during the June through September period.

The contour maps show SWIP recharge wells and PWS monitoring wells screened in the Purisima A unit. Since groundwater level data are already being collected for the PWS monitoring wells, they were used as control points for contouring. PWS is not yet operational, however managed recharge is planned to occur at the SWIP wells in WY 2025.

2.3.5 Purisima AA Unit

Contour maps for the Purisima AA unit are shown on Figure 14 and Figure 15 for spring (March) and fall (September), respectively. Groundwater generally flows from inland toward the coast with localized pumping depressions around SqCWD and SCWD production wells. Pumping depressions are more defined in the fall when demand is greatest, particularly at SqCWD's Main Street production well (Appendix A Figure A-68). Relatively lower groundwater elevations have typically occurred at an inland location around the SC-10RAA monitoring well (Appendix A Figure A-14), potentially caused by non-municipal pumping since there are no nearby municipal wells.

Coastal Purisima AA unit RMPs Moran Lake Deep and Pleasure Point Deep have spring and fall groundwater elevations and 5-year moving average groundwater elevations above seawater intrusion MTs. Groundwater elevations at RMP SC-3AA are above seawater intrusion MTs in the spring and below seawater intrusion MTs in the fall (Appendix A Figure A-34). The 5-year moving average groundwater elevations at SC-3AA are above the proxy groundwater elevations for seawater intrusion MT and below the MO, though only 23 months of data is currently available. Five-year moving average groundwater elevations in the Purisima AA unit RMP Soquel Point Deep continues to be below the seawater intrusion MT (Appendix A Figure A-32) while WY 2024 spring and fall groundwater elevations at Soquel Point Deep are above the seawater intrusion MT.

Coastal groundwater elevations in the Purisima AA units in the Pleasure Point area, as shown in example hydrographs in Appendix A Figures A-31 and A-32, increased from the previous year (Figure 14 and Figure 15). This is likely related to a 54% decrease (95.3 MG or 293 AF) in overall pumping at the Beltz wells compared to last water year.





Figure 10. Purisima BC Unit Groundwater Elevations, Spring 2024





Figure 11. Purisima BC Unit Groundwater Elevations, Fall 2024











Figure 13. Purisima A Unit Groundwater Elevations, Fall 2024





Figure 14. Purisima AA Unit Groundwater Elevations, Spring 2024









2.3.6 Tu Unit

Contour maps for the Tu unit are included on Figure 16 and Figure 17 for spring (March) and fall (September), respectively. Overall, groundwater flows toward the coast with localized spring and fall pumping depressions around SqCWD's Main Street municipal supply well.

The Tu unit contour maps show no groundwater mounding at Beltz #12 in WY 2024 because there was no ASR activity conducted at this well in WY 2024. As a result of there being no ASR, spring and fall groundwater elevations (Figure 16 and Figure 17) around Beltz #12 are significantly lower than last year.

Spring groundwater elevations at coastal Tu unit RMP SC-13A dropped by about 8 feet from last spring when there was recharge at Beltz #12, but elevations are still approximately 1 foot above its seawater intrusion MT (Appendix A Figure A-35). Fall groundwater elevations at SC-13A, when groundwater demand is greatest, are below the MT and slightly lower than the previous year. SC-13A's 5-year moving average groundwater elevation is below the MT.





Figure 16.Tu Unit Groundwater Elevations, Spring 2024







2.4 Groundwater Extraction

The volume of groundwater extracted from the Basin in WY 2024 is included in Table 1. The table summarizes groundwater extractions by water use sector and aquifer group. The footnotes of Table 1 identifies the method of measurement and accuracy of measurements. Appendix 2-B of the GSP describes the methodology for estimates. Figure 18 shows the general location and volume of groundwater extractions by use type. To meet requirements for annual reports in the SGMA regulations, Table 1 and Figure 18 show all groundwater extracted including water recovered as part of ASR demonstration testing.

		Aquifer Group			Percentage	
Water Use Sector	Aromas Red Sands and Purisima F	Purisima DEF, BC, A and AA	Tu	Total (AF)		
Private Domestic ^a	53	364	175	591	12%	
Agricultural b	179	117	19	315	7%	
Institutional c	188	81	7	276	6%	
Municipal ^d	1,422	1,419	728	3,569	75%	
Total	1,842	1,981	929	4,751		
Percentage	38.8%	41.7%	19.5%			

Table 1. Water Year 2024 Groundwater Extracted in the Santa Cruz Mid-County Basin

^a Estimated based on change in population over the year and an annual water use factor (WUF) per connection determined from metered Small Water Systems applied to each residence outside of municipal water service areas (less accurate). WUF for WY 2024 is 0.26 AF per connection.

^b Estimated based on irrigation demand determined using the GSFLOW model, crop acreage, and crop coefficient (less accurate). ^c Most water systems in this category reported metered extractions to the County but timing of reporting is too late for inclusion into the Annual Report. Therefore, 2023 data are used for 2024 extractions (less accurate). The volumes from year to year generally do not vary significantly. Where data are not reported to the County, groundwater extraction is estimated based on historical water usage for facility use including an estimate of turf irrigation based on irrigation demand determined using the GSFLOW model, irrigation acreage, and turf's crop coefficient (less accurate)

^d Direct measurement by meters (most accurate); includes 64 AF recovered under SCWD's Aquifer Storage and Recovery demonstration testing.





Figure 18. General Location of Water Year 2024 Groundwater Extracted in the Santa Cruz Mid-County Basin



WY 2024 groundwater extractions were the lowest on record; an estimated 150 AF less groundwater was extracted in WY 2024 compared to WY 2023. The Purisima DEF, BC, A, and AA units account for 42% of groundwater pumped in the Basin, the Aromas Red Sands and Purisima F units provide 39%, and the Tu unit provides 20% (Table 1). The 3 municipal water supply agencies extract an estimated 75% of all groundwater used in the Basin. For WY 2024, municipal extraction in Table 1 includes 64 AF recovered under SCWD's ASR demonstration testing program.

Unmetered domestic extraction is estimated to be 12% of groundwater extracted (Table 1). Estimated extractions are based on a water use factor (WUF) obtained from metered small water system water use for the year and change in population. According to estimates by the California Department of Finance, 2024's population in unincorporated areas of the County remained similar to the previous year. Groundwater extraction by small water systems is reported to the County. Estimates of extraction to meet landscape and agricultural irrigation demand are variable each year because they are modeled based on climate data.

2.5 Surface Water Supply Used for Groundwater Recharge or In-Lieu Use

When SCWD has excess surface water, it can be used in the Basin to (1) either transfer SCWD treated drinking water to SqCWD through a water transfer pilot test program to serve a portion of SqCWD's service area in-lieu of using groundwater, or (2) inject at SCWD ASR wells as part of pilot and demonstration testing. These projects are described in Sections 3.7.3 and 3.7.5.

Excess surface water was available for the ASR program which allowed for 64 AF to be used for SCWD's pilot testing of ASR that included storage of some of its surface water supply at the Beltz #9 well. No water was transferred from SCWD to SqCWD for in-lieu use under the water transfer pilot program. Table 2 summarizes WY 2024 surface water supply used in the Basin for ASR and in-lieu use.

Purpose	Water User	Description	Total (AF) ^a
Aquifer Storage of Surface Water	City of Santa Cruz	ASR Pilot Testing	64
In-Lieu Use	Soquel Creek Water District	Water Transfer Pilot Testing	0
Total			64

Table 2.	Water	Year 2	024 5	Surface	Water	Supply	for	Groundwater	Recharge	or I	In-Lieu	Use
									9			

^a Direct measurement by meters

Aquifer storage and recovery volumes during SCWD pilot and demonstration testing are summarized in Table 3 by water year and aquifer unit, showing annual net storage and cumulative storage. The total cumulative ASR water stored in the Tu unit is 63 AF.



			Purisima	A/AA-Unit				Total			
Water Year	Beltz #8 Injection/ Storage	Beltz #8 Extraction ¹	Beltz #9 Injection/ Storage	Beltz #9 Extraction ¹	Annual Net Storage	Cumulative Storage	Beltz #12 Injection/ Storage	Beltz #12 Extraction ^a	Annual Net Storage	Cumulative Storage	Cumulative Storage
	acre-feet										
2019	0	0	0	0	0	0	64	64	0	0	0
2020	11	11	0	0	0	0	0	0	0	0	0
2021	19	19	0	0	0	0	0	0	0	0	0
2022	110	110	0	0	0	0	153	132	21	21	21
2023	21	21	0	0	0	0	42	0	42	63	63
2024	0	0	64	64	0	0	0	0	0	63	63

Table 3. City of Santa Cruz Water Department ASR Summary

^a Total extraction includes recovery during testing and other periods.

2.6 Total Water Use

WY 2024 water use volumes in the Basin are included in Table 4. The table summarizes total water use by water use sector, water source type, and identifies the method of measurement. The groundwater portion of water use does not include water recovered as part of the SCWD's ASR pilot and demonstration study because it is considered surface water use.

Water Use Sector	Groundwater Use ^f	Surface Water Use ^a	Total Water Use	Percentage of
		Basin Water Use		
Private Domestic ^b	591	Unknown but minimal	591	7%
Agricultural ^c	315	0	315	4%
Institutional ^d	276	0	276	3%
Municipal ^e	3,506	3,694	7,200	86%
Total	4,688	3,694	8,382	
Percentage	56%	44%		

Table 4. Water Year 2024 Water Use in the Santa Cruz Mid-County Basin

^a All municipal surface water used in the Basin is sourced outside of the Basin.

^b Estimated based on annual water WUF per connection determined from metered Small Water Systems and applied to each residence outside of municipal water service areas (less accurate). WUF for WY 2024 was 0.26 AF per connection.

^c Estimated based on irrigation demand determined using the GSFLOW model, crop acreage, and crop coefficient (less accurate).

^d Estimated based on historical water usage for facility use including an estimate of turf irrigation based on irrigation demand determined using the GSFLOW model, irrigation acreage, and turf's crop coefficient (less accurate).

^e Direct measurement by meters (most accurate) for groundwater; estimated for surface water based on a proportion of metered consumption that falls within the Basin less net groundwater extracted at the Beltz wellfield.

^f Groundwater use does not include ASR recovered surface water.



The accuracy of water use measurements is directly correlated with the method used to determine water use. Metered municipal data have the greatest accuracy while estimates of water use based on various assumptions (GSP Appendix 2-B) are less accurate. Although to the extent possible, reasonable checks are made to minimize order of magnitude inaccuracies.

Since WY 2015, total estimated water use has been lower than prior years (Table 5). As most of the water within the Basin is supplied by groundwater, reduced water use has resulted in less groundwater extracted from the Basin over the same period (Table 5). In WY 2024, groundwater from the Basin supplied 56% of water used; surface water from outside the Basin supplied 44%.



Table 5. Annual Water Use in the Santa Cruz Mid-County Basi	n
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	Sources with the Basin Sources Outside of the Basin												
		-	Gro	undwater Use AFY		-	-	Sur	face Water AFY	Use			
Water Year	Private Domestic Use ^a	ate stic a Use ^b	Institutional Use °	Central Water District d	City of Santa Cruz ^{d, e}	Soquel Creek Water District d	Total	City of Santa Cruz ^f	Soquel Creek Water District ^d	Total	Total Water Use AFY		
				N	lunicipal Use	9		N	lunicipal Us	е			
1985	980	352	408	394	181	4,319	6,634	6,413	0	6,413	13,047		
1986	1,001	329	382	404	102	4,272	6,490	6,561	0	6,561	13,051		
1987	1,022	398	445	444	526	5,235	8,070	6,415	0	6,415	14,485		
1988	1,031	372	444	438	943	4,859	8,087	5,314	0	5,314	13,401		
1989	1,004	355	410	406	756	4,797	7,728	4,993	0	4,993	12,721		
1990	1,022	361	420	429	842	4,818	7,892	4,295	0	4,295	12,187		
1991	1,012	349	397	426	254	4,703	7,141	4,628	0	4,628	11,769		
1992	1,017	394	438	467	716	4,908	7,940	4,695	0	4,695	12,635		
1993	1,025	331	390	481	260	4,863	7,350	5,191	0	5,191	12,541		
1994	1,033	329	389	482	463	5,089	7,785	5,178	0	5,178	12,963		
1995	1,036	273	334	459	212	4,855	7,169	5,564	0	5,564	12,733		
1996	1,042	337	397	526	143	5,183	7,628	5,998	0	5, 99 8	13,626		
1997	1,035	386	442	604	245	5,571	8,283	6,381	0	6,381	14,664		
1998	1,041	249	325	534	268	4,966	7,383	5,616	0	5,616	12,999		
1999	1,048	304	363	539	359	5,211	7,824	5,829	0	5,829	13,653		
2000	1,058	325	380	547	593	5,271	8,174	5,587	0	5,587	13,761		
2001	1,044	337	383	557	95	5,175	7,591	6,157	0	6,157	13,748		
2002	1,039	336	397	593	336	5,376	8,077	5,731	0	5,731	13,808		
2003	1,031	327	390	584	416	5,332	8,080	5,653	0	5,653	13,733		



			Source		Sources	Outside of t	he Basin				
			Gro	undwater Use AFY				Sur	face Water AFY	Use	
Water Year	Private Domestic Use ^a	Agricultural Use ^b	Institutional Use c	Central Water District d	City of Santa Cruz ^{d, e}	Soquel Creek Water District d	Total	City of Santa Cruz ^f	Soquel Creek Water District ^d	Total	Total Water Use AFY
				N	lunicipal Use	9		N	lunicipal Us		
2004	1,019	380	422	633	421	5,372	8,247	5,765	0	5,765	14,012
2005	937	275	330	514	316	4,544	6,916	5,459	0	5,459	12,375
2006	935	305	359	544	296	4,549	6,988	5,278	0	5,278	12,266
2007	933	362	408	596	420	4,626	7,345	5,054	0	5,054	12,399
2008	939	380	439	584	561	4,557	7,460	4,971	0	4,971	12,431
2009	874	371	416	594	582	4,162	6,999	4,254	0	4,254	11,253
2010	879	304	360	481	451	3,933	6,408	4,311	0	4,311	10,719
2011	882	270	311	487	637	4,011	6,598	3,931	0	3,931	10,529
2012	890	361	400	535	494	4,159	6,839	4,374	0	4,374	11,213
2013	828	423	326	559	515	4,218	6,869	4,560	0	4,560	11,429
2014	691	436	310	500	510	3,703	6,150	3,571	0	3,571	9,721
2015	553	431	300	391	613	3,154	5,442	3,222	0	3,222	8,664
2016	552	375	293	383	450	3,094	5,147	3,472	0	3,472	8,619
2017	600	218	288	383	463	3,169	5,121	3,726	0	3,726	8,847
2018	599	375	313	377	635	3,340	5,639	3,489	0	3,489	9,128
2019	595	336	308	385	83	3,019	4,726	3,794	165	3,959	8,685
2020	594	407	318	411	244	3,197	5,171	3,487	111	3,598	8,769
2021	586	371	265	406	724	3,262	5,614	2,954	0	2,954	8,568
2022	671	406	263	397	339	3,049	5,125	3,594	<1	3,594	8,719
2023	661	265	271	357	524	2,801	4,880	3,363	12	3,375	8,255



			Source		Sources	Outside of t	he Basin				
			Gro	Surface Water Use AFY							
Water Year	Private Domestic Use ^a	Agricultural Use ^b	Institutional Use ^c	Central Water District d	City of Santa Cruz ^{d, e}	Soquel Creek Water District d	Total	City of Santa Cruz ^f	Soquel Creek Water District ^d	Total	Total Water Use AFY
				Municipal Use				N	lunicipal Us	е	
2024	591	315	276	375	188	2,942	4,687	3,694	0	3,694	8,381

^a Estimated based on annual WUF per connection determined from metered Small Water Systems and applied to each residence outside of municipal water service areas (less accurate). WUF for WY 2024 was 0.26 AF per connection

^b Estimated based on irrigation demand determined using the GSFLOW model, crop acreage, and crop coefficient (less accurate).

^c Estimated based on historical water usage for facility use including an estimate of turf irrigation based on irrigation demand determined using the GSFLOW model, irrigation acreage, and turf's crop coefficient (less accurate).

^d Direct measurement by meters (most accurate).

^e Includes extraction exceeding injection/storage at any Beltz ASR well. Revised to subtract 110 AF of injection for Beltz #8 in WY 2022. Excludes 21 AF of injection at Beltz #8 for WY 2023; WY 2022 and WY 2023 does not include extraction for Beltz #12 because extraction did not exceed injection, Excludes 64 AF of injection at Beltz #9 for WY 2024.

^f SCWD surface water use in the Basin is not directly metered since the City service area is also outside of the Basin. For purposes of reporting, surface water use in the Basin is estimated based on a proportion of metered consumption that falls within the Basin less SCWD groundwater use as described in footnote *e*.



2.7 Change of Groundwater in Storage

Change of groundwater in storage is estimated using water budget output calculated by the Basin's integrated surface water/groundwater GSFLOW model (Model). Appendix 2-D, 2-E, 2-F, and 2-G of the GSP describe development of the Model's historical period (WY 1985-2015). Each year, as part of Annual Report preparation, the Model is updated through the water year covered by the Annual Report. The Model currently simulates WY 1985-2024.

As described in Appendix 2-F, the entire Model area was calibrated using data from WY 1985 to 2015 to support GSP development. The Model has not been fully recalibrated through WY 2024. However, the following localized recalibration efforts have been undertaken to ensure new groundwater sustainability and management projects are accurately simulated in the model:

- A small portion of the Model near the Pure Water Soquel project was recalibrated based on information from pilot testing of the Twin Lakes Church SWIP recharge well (PWS, 2023).
- Simulated streambed conductivity was recalibrated to improve model accuracy at interconnected surface water RMP.
- The Model's simulation of groundwater elevations and surface water discharge was validated from WY 2015 to 2022 to support the Basin Optimization Study. This effort indicated that the Model's accuracy over WY 2015 to 2022 remained similar to the fully calibrated WY 1985 to 2015 period.

Each year the Model is updated with climate data, metered groundwater extraction, metered recharge, and estimates of non-metered pumping. Updates to these inputs for WY 2024 are detailed below.

Updated climate data included the following:

- Precipitation data from the Santa Cruz Co-op station sourced from NOAA. Missing data were filled using a regression from precipitation data from the De Laveaga California Irrigation Management Information System (CIMIS) station.
- Precipitation data from the Watsonville Waterworks station sourced from NOAA.
- Temperature data from the Santa Cruz Co-op station sourced from NOAA. Missing data were filled using a regression from temperature data from the Watsonville Waterworks station.
- Temperature data for the upper watershed location through December 2023 from DAYMET. Because DAYMET data are only available through December 2023,



January 2024 through September 2024 temperature data are derived from a regression of historical DAYMET data (1 km by 1 km grid) with coarser gridded (4 km by 4 km grid) Parameter-elevation Relationships on Independent Slopes Model (PRISM) data, which are available through September 2024.

Updated groundwater extraction data include the following:

- Metered municipal pumping and recharge volumes provided by CWD, SCWD, and SqCWD
- Domestic water use factor of 0.26 acre-feet per year (AFY) and population estimates
- Non-municipal irrigation demand estimated based on Precipitation Runoff Modeling System (PRMS) watershed simulation of potential and actual evapotranspiration with the Model using updated climate data

Based on the updated Model simulation through WY 2024, Figure 19 shows the annual groundwater budget for the Basin including annual change of groundwater in storage and cumulative change of groundwater in storage. Change in storage is presented as a line where negative numbers indicate a loss in storage and positive numbers indicate a gain in storage. WY 2024 had an increase of groundwater in storage of 2,475 AF that follows an even greater increase of 5,229 AF in WY 2022. Cumulative change of groundwater in storage had remained relatively stable from 2005 to 2022 but the last 2 years have had significant gains of groundwater in storage. Generally, since 2005, losses of groundwater in storage have occurred in dry and critically dry years with increases in wet years. The gain in WY 2024 was less than in WY 2023, but still the second largest increase since 2006. In this coastal basin, groundwater in storage increases are lessened by offshore flows. Offshore flows help prevent seawater intrusion but net offshore flows for the Basin do not necessarily prevent localized seawater intrusion.

Figure 20 through Figure 25 show the distribution of modeled WY 2024 change in storage across the Basin for the principal aquifer units: Aromas Red Sands, Purisima F/DEF units, Purisima BC unit, Purisima A unit, Purisima AA unit, and Tu unit. While these maps are required for the annual report, their main use is for evaluating how recharge over the water year has changed groundwater in storage in the unconfined areas of the Basin (Figure 20). WY 2024, while classified as a normal year, had above average recharge due to it following a very wet year which allows groundwater recharge to continue into the next year. Accordingly, groundwater in storage in the unconfined aquifer experienced moderate increases in the central portion and southeastern portions of the Basin. These increases are largely due to recharge of the unconfined aquifer associated with above average precipitation.

For the other aquifers, areas with the greatest change in storage mostly correspond with where the aquifer outcrops at the surface. Large areas represented by uncolored cells indicate little



change in stored groundwater across the Basin. The cells surrounding Beltz #9 in the Purisima A unit (Figure 23) exhibit storage increases in response to ASR injection demonstration operations. Decreases in storage near Beltz #12 in the Purisima AA unit (Figure 24) are a result of increased pumping at that well and the nearby SqCWD O'Neill well relative to the previous year. Storage decreases in the vicinity of these wells, in the Tu aquifer (Figure 25), are also due to increased pumping in these wells, which are screened in both the Purisima AA and the Tu unit.

Overall results from the Model simulation show substantial increases (in green and blue) and limited areas of decrease (in orange and red) of groundwater in storage, while large areas show minimal (no color) changes. This is consistent with WY 2024 Basin-wide storage changes depicted on Figure 19. In general, greater changes of groundwater in storage are limited to where aquifers are unconfined. Therefore, these maps do not fully represent groundwater conditions in the Basin as many of the SMC defining undesirable results relate to groundwater elevations in the confined areas of the aquifer units. In confined areas, groundwater elevations can change substantially with very small changes of groundwater in storage. For example, most RMP with groundwater elevation proxies for the seawater intrusion sustainability indicator are in confined units and therefore this indicator cannot be evaluated by these change in storage maps. The maps also do not always represent where more groundwater is extracted because 1) changes of groundwater in storage can be a relatively small contribution of flow to wells, and 2) changes in storage are strongly influenced by the local transmissivity of the aquifer unit.







Figure 19. Annual Change in Groundwater in Storage for Santa Cruz Mid-County Basin

Figure 20. Water Year 2024 Change of Groundwater in Storage in Aromas Red Sands

5.1.1





Figure 21. Water Year 2024 Change of Groundwater in Storage in Purisima F/DEF Units

5.1.1





Figure 22. Water Year 2024 Change of Groundwater in Storage in Purisima BC Unit















Figure 24. Water Year 2024 Change of Groundwater in Storage in Purisima AA Unit







Figure 25. Water Year 2024 Change of Groundwater in Storage in Tu Unit







3 PROGRESS TOWARD IMPLEMENTING THE PLAN

This section evaluates progress toward achieving the GSP sustainability goal by comparing groundwater conditions in WY 2024 to SMC for each of the applicable sustainability indicators. The section concludes with an update on implementation of projects and management actions to achieve sustainability.

3.1 Chronic Lowering of Groundwater Levels

Table 6 shows the status of SMC at RMPs for chronic lowering of groundwater levels. Sustainable management criteria for this indicator are met when groundwater elevations are at or above the criteria. Hydrographs for chronic lowering of groundwater levels RMPs (Appendix A Figures A-1 through A-17) show WY 2024 groundwater elevations above MTs at all RMPs, so there are no undesirable results for chronic lowering of groundwater levels. Groundwater elevations are below MOs for 15 of the 17 RMPs for this indicator. CWD-5 and Private Well #1 groundwater elevations rose above their MOs. Interim milestones are the same as the long-term MOs based on conditions prior to GSP development, so the goal is to meet MOs throughout the GSP implementation period.



Table 6. Chronic Lowering	g of Groundwater Levels	Sustainable Management Criteria C	ompared to Representative	Monitoring Point Groundwater Elevations

Representative	Well Type	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY 2020	WY 2021	WY 2022	WY 2023	WY 2024
Monitoring Point	Wen Type	Aquiter	Gro	undwater Eleva feet amsl	tion	r	Minimum Averag	e Monthly Grou feet amsl	n	
SC-A7C	Monitoring	Aromas	0	8	8	6.0	5.8	5.8	5.8	6.5
Private Well #2	Production		562	596	596	596.4	594.9	592.9	592.3	594.8
Black	Monitoring	Purisima	10	41	41	46.1	44.1	44.8	40.3	40.4
CWD-5	Monitoring	F	140	194	194	195.1	194.2	193.8	193.8	195.2
SC-23C	Monitoring		15	49	49	45.8	44.5	44.3	44.5	44.3
SC-11RD	Monitoring	Purisima	295	318	318	315.2	315.2	313.7	314.7	315.0
SC-23B	Monitoring	DEF	50	85	85	78.8	62.7	60.0	60.2	60.2
SC-11RB	Monitoring		120	157	157	154.8	152.6	151.8	152.0	153.5
SC-19	Monitoring	Purisima BC	56	95	95	78.4	78.5	73.3	74.2	74.2
SC-23A	Monitoring		0	44	44	38.8	39.6	39.8	39.4	41.0
Coffee Lane Shallow	Monitoring	Purisima	27	47	47	44.7	44.8	43.9	43.9	45.6
SC-22A	Monitoring	А	2	24	24	22.2	22.4	21.6	22.2	23.4
SC-22AA	Monitoring	Purisima	0	22	22	20.3	20.7	19.4	20.1	21.1
SC-10RAA	Monitoring	AA	35	76	76	69.3	69.1	68.2	70.8	70.6
Private Well #1	Production	Purisima AA/Tu	362	387	387	383.5	382.6	379.7	380.2	389.9
30 th Ave Deep	Monitoring	Tu	0	30	30	27.4	21.3	21.8	26.3	27.9
Thurber Lane Deep	Monitoring	IU	-10	33	33	19.1	-1.1	4.6	15.1	13.6

Minimum threshold not met

Minimum threshold achieved but measurable objective not met Measurable objective met



3.2 Reduction of Groundwater in Storage

Table 7 shows the status of reduction of groundwater in storage SMC, which is based on sustainable yields for 3 aquifer groups estimated for the GSP. Sustainable management criteria for this indicator are met when net extraction (all groundwater extraction less injection) is at or below criteria for sustainable yields. Because sustainable yield is primarily based on eliminating critical overdraft related to seawater intrusion, a 5-year moving average net extraction is applied to be consistent with 5-year moving averages used for seawater intrusion MT groundwater elevation proxies. Five-year moving average net extraction below the MT is considered sustainable.

The Tu unit and the Purisima DEF, BC, A, and AA aquifer groups had 5-year average net extraction through WY 2024 less than the sustainable yield/MT. This is the first year that the 5-year average net extraction for the Purisima DEF, BC, A, and AA aquifer group was less than the sustainable yield/MT, likely due to reduced production at the Beltz wellfield. The 5-year average net extraction volumes for the Aromas Red Sands and Purisima F aquifer group is greater than the MT, which indicates undesirable results for this sustainability indicator. Net extraction needs to be reduced to or below MTs to eliminate undesirable results. Groundwater modeling, conducted as part of GSP development and more recently as part of an optimization study, shows that avoidance of undesirable results can be achieved when PWS is implemented. Implementation of PWS and ASR will help the Basin limit net extractions to the sustainable yield thus meeting MOs. The planned ASR project will benefit the Tu unit by prioritizing recharge in Tu unit screened ASR wells. Increased SqCWD pumping from Purisima A and BC aquifer units where PWS injection takes place will allow for reductions of SqCWD Tu unit pumping in the western portion of the Basin and from the Purisima F and Aromas Red Sands in the eastern portion of the Basin.

The interim milestone for 2025 was set based on planned schedule for implementation of projects and management actions to reduce net extraction to below sustainable yield. The 5-year net average extraction for all 3 aquifer groups through WY 2024 did not meet these interim milestones as planned projects and management actions have not been implemented yet.

The MO is based on annual net extraction that could occur while ensuring net annual groundwater extractions greater than the MT will not occur for any 1 of the 3 aquifer groups even if there were 4 subsequent years of maximum projected net groundwater extraction. Net extraction in WY 2024 did not meet MOs for the 3 aquifer groups and was greater than the MT for the Aromas Red Sands and Purisima F aquifer group.


Aquifer Unit Group	Minimum Threshold	Interim Milestone 2025	WY 2020- 2024	Measurable Objective	WY 2024
· · · · · · · · · · · · · · · · · · ·	Five-Year mo	oving average N AFY	Net Extraction AFY		
Aromas Red Sands and Purisima F	1,740	1,930	1,959	1,680	1,841
Purisima DEF, BC, A and AA	2,280	2,110	2,269	960	1,917
Tu	930	720	866	620	929

Table 7. Reduction in Groundwater in Storage Sustainable Management Criteria Compared to Net Extraction

Minimum threshold not met	Measurable objective not met
Minimum threshold met	Measurable objective met

3.3 Seawater Intrusion

3.3.1 Chloride Concentrations

Table 8 shows the status of SMC for chloride concentrations compared to maximum concentrations for the past 5 years, including WY 2024. Sustainable management criteria for this indicator are met when chloride concentrations are at or below criteria concentrations. Any RMP with 2 or more of the last 4 consecutive quarterly samples greater than the MT constitutes an undesirable result for seawater intrusion.

There are 6 wells with 2 or more consecutive exceedances of MTs during WY 2024. These wells include 1 in the Aromas Red Sands, and 5 in the Purisima F unit:

- Chloride concentrations exceeded the MT in 2 of 4 consecutive samples: SC-A3A (Aromas Red Sands), SC-A8A (Purisima F unit), and SC-A5A (Purisima F unit).
- Chloride concentrations exceeded the MT in 3 of 4 consecutive samples: SC-A2RA (Purisima F unit).
- Chloride concentrations exceeded the MT in 4 of 4 consecutive samples: SC-A2RB and SC-A5B; both are Purisima F unit monitoring wells.

Undesirable results are occurring for the first time in monitoring wells SC-A3A and SC-A2RA. Undesirable results have been occurring at SC-A8A and SC-A5A for 2 consecutive years, and have been occurring at SC-A2RB and SC-A5B for 4 or more consecutive years.

There were some notable changes in chloride concentrations in monitoring wells with existing seawater intrusion:

• SC-A3A in the Aromas Red Sands increased 5,900 milligrams per liter (mg/L) to above the MT for the first time.



- SC-A3B in the Aromas Red Sands decreased 530 mg/L and dropped below the MO for the first time.
- SC-A8A in the Purisima F unit increased 1,590 mg/L and remains above the MT.
- SC-A2RA in the Purisima F unit increased 1,800 mg/L and remains above the MT.
- SC-A2RB, SC-A5A, and SC-A5B all in the Purisima F unit had slight increases in chloride concentrations and remain above their respective MTs.

In previous years and in WY 2024, increasing chloride concentrations above the MT have been observed in 5 Purisima F unit RMPs (SC-A5A, SC-A5B, SC-A8A, SC-A2RA, and SC-A2RB) all in the Seascape area. In the future, SqCWD plans to further reduce pumping from the Aromas Red Sands aquifer such as at the Seascape and San Andreas wells with the operation of PWS to help mitigate advancement of seawater intrusion. This year, chloride concentrations also increased above the MT in one of the Aromas Red Sands RMP, SC-A3A, in La Selva Beach. The MT exceedances were noted in January and April 2024, but the chloride concentration dropped to near its MO by July 2024 (Appendix B Figure B-1). MGA will continue to monitor results in this well and consider additional study in the vicinity if the MT exceedance occurs again or if a more definitive increasing chloride concentration is observed.

Other than the San Andreas and Seascape water supply wells and SC-A1B, the other 5 of 8 Purisima F unit RMPs have not achieved MOs; however, 2 of 3 Aromas Red Sands RMPs have achieved MOs. All RMPs in the deeper Purisima units met MOs, except at Soquel Point Deep and SC-3AA in the Purisima AA unit, and SP-5 in the Tu unit. Interim milestones are the same as MOs for chloride concentrations.

Figure 26 shows maximum chloride concentrations mapped with the chloride isocontour established as a MT in the GSP. For this annual report, a Tu unit 250 mg/L MT chloride isocontour has been added to Figure 26. Appendix B includes chemographs for chloride concentrations at coastal monitoring wells; SC-3AA and SP-5 are now included in Appendix B chemographs.

The MGA continues to investigate potential causes of increasing chlorides in the Seascape area (M&A, 2024). Seawater intrusion within the Purisima F unit has been present prior to the first documented well log (Seascape well) identifying high salinity water in 1970. AEM data collected by DWR in 2022 confirms seawater intrusion extending inland. The poor groundwater quality at depth forced water supply and agricultural wells in the area to be completed shallower than planned, typically in the Aromas Red Sands. Planned work in WY 2025 is to sample private wells in the area to expand understanding of chloride distribution and to conduct a land-based or AEM survey to delineate the inland and lateral extent of seawater intrusion to better inform actions to protect the Basin from seawater intrusion.



Table 8. Chloride Concentrations Adjacent to 250 mg/L Chloride Isocontour for Seawater Intrusion

Representative Monitoring Point	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY 2020	WY 2021	WY 2022	WY 2023	WY 2024	
				Maxi	mum Chloride	Concentration	n, mg/L			
Coastal Monitoring Wells – Intruded (undesirable results if > minimum threshold in >=2 of 4 consecutive quarterly samples)										
SC-A3A	Aromas	22,000	17,955	17,955	18,500	18,600	19,200	18,400	24,300*	
SC-A3B	Aromas	4,330	676	676	767	1,070	871	876	346	
SC-A8A	Purisima F	8,000	7,258	7,258	7,670	7,710	9,770	9,310*	10,900*	
SC-A2RA	Purisima F	18,480	14,259	14,259	15,000	15,200	15,400	20,300	22,100*	
SC-A2RB	Purisima F	470	355	355	564*	480*	522*	584*	593*	
Moran Lake Med	Purisima A	700	147	147	53	47	46	47	47	
Soquel Point Med	Purisima A	1,300	1,104	1,104	1,200	1,200	1,200	1,100	1,000	
Coastal Monitoring Wells - Unintruded (undesirable results if > 250 mg/L in >=2 of 4 consecutive quarterly samples)										
SC-A8B	Aromas	250	100	100	35	53	43	36	34	
SC-A1B	Purisima F	250	100	100	29	28	28	28	28	
SC-A1A	Purisima DEF	250	100	100	29	28	28	29	28	
SC-8RD	Purisima DEF	250	100	100	21	20	21	21	21	
SC-9RC	Purisima BC	250	100	100	32	31	31	32	32	
SC-8RB	Purisima BC	250	100	100	15	13	18	14	14	
Pleasure Point Medium	Purisima A	250	100	100	36	NS**	NS**	NS**	NS**	
SC-1A	Purisima A	250	100	100	49	48	47	48	54	
SC-5RA	Purisima A	250	100	100	57	56	56	59	59	
SC-3RA	Purisima A	250	100	100	51	40	50	60	60	
Moran Lake Deep	Purisima AA	250	100	100	66	66	67	69	68	
Pleasure Point Deep	Purisima AA	250	100	100	22	22	24	26	25	
Soquel Point Deep	Purisima AA	250	100	100	170	160	170	170	170	
SC-3AA ¹	Purisima AA	250	100	100	NS	NS	NS	108	108	
SC-13A	Tu	250	100	100	NS	62	66	69	75	



Representative Monitoring Point	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY 2020	WY 2021	WY 2022	WY 2023	WY 2024			
		Maximum Chloride Concentration, mg/L										
SP-51	Tu	250	100	100	100	100	210	110	110			
Inland Monitoring Well- Intruded (undesirable results if > minimum threshold in >=2 of 4 consecutive quarterly samples)												
SC-A5A	Purisima F	9,800	8,575	8,575	10,800*	9,240	11,400	13,100*	13,700*			
Inland Production and Monitoring Wells- Unintruded (undesirable results if > 150 mg/L in >=2 of 4 consecutive quarterly samples)												
SC-A5B	Purisima F	150	100	100	133	173*	164*	195*	227*			
San Andreas PW	Purisima F	150	100	100	22	22	21	22	22			
Seascape PW	Purisima F	150	100	100	19	17	18	18	18			
T. Hopkins PW	Purisima DEF	150	100	100	50	25	45	60	NS			
Estates PW	Purisima BC & A	150	100	100	48	13	45	47	48			
Ledyard PW	Purisima BC	150	100	100	35	12	42	38	36			
Garnet PW	Purisima A	150	100	100	85	86	86	88	88			
Beltz #2	Purisima A	150	100	100	69	68	64	66	64			
Beltz #8 PW	Purisima A	150	100	100	53	52	48	49	NS			
SC-22AA	Purisima AA	150	100	100	41	39	39	39	40			
Corcoran Lagoon Deep	Purisima AA	150	100	100	23	23	NS	27	29			
Schwan Lake	Purisima AA	150	100	100	97	93	93	98	96			

Minimum threshold not met

NS = not sampled

NS** = not sampled due to stuck sampling equipment

Measurable objective met

Minimum threshold achieved but measurable objective not met

* = Undesirable Result

¹ = Added in WY 2024 in accordance with the 2025 Periodic Evaluation





Figure 26. Water Year 2024 Maximum Chloride Concentration Map Compared to Minimum Threshold Isocontour



3.3.2 Groundwater Elevation Proxies

Table 9 lists groundwater elevation proxies used for seawater intrusion SMC. These groundwater elevations are protective elevations estimated to prevent further seawater intrusion over the long-term. Sustainable management criteria for this indicator are met at a specific RMP when 5-year moving average groundwater elevations are at or above the groundwater elevation proxy for the RMP. Two new coastal RMP were added to the MGA groundwater levels network: SC-3AA in the Purisima AA unit and SP-5 in the Tu unit.

Hydrographs for seawater intrusion groundwater elevation proxy RMPs (Figures A-18 through A-36) show 5-year moving averages in comparison to groundwater elevation proxies for seawater intrusion SMC. Annual minimums of the 5-year moving averages for groundwater elevations in the Tu, Purisima AA, A, BC, and DEF unit coastal RMPs were within 6 inches of the previous year except for SC-5RA and SC-3RA which were higher by 1.5 feet and 1 foot, respectively. The Purisima F unit and Aromas Red Sands coastal monitoring wells have stable 5-year moving average groundwater elevations that only changed by two tenths of a foot from the previous year. The 5-year moving average groundwater elevation in SC-A3A in the Aromas Red Sands has remained above its MT for a fourth consecutive year.

Coastal RMPs with 5-year moving average groundwater elevations below MTs include the following:

- SC-A8A (one of 3 Purisima F unit RMPs)
- SC-9RC and SC-8RB in the Purisima BC unit:
- SC-5RA and Soquel Point Medium (2 of 6 Purisima A unit RMPs)
- Soquel Point Deep (1 of 3 Purisima AA unit RMPs)
- SC-13A and SP-5 (both Tu unit RMPs): the 5-year moving average groundwater elevation below the MT at SP-5 is not considered an undesirable result because there are only 53 months of available data used to calculate the 5-year moving average.

Since there are RMPs with 5-year moving average groundwater elevations below MTs, undesirable results for seawater intrusion continue to occur and the Basin remains in a state of critical overdraft. For RMPs with undesirable results, the 5-year moving groundwater elevation averages generally remained close to WY 2023 elevations or had slight increases, except for SC-13A which decreased slightly. MOs for groundwater elevation proxies are met at several RMPs screened in the Purisima F, DEF, and A units, including SC-A2RA in the Seascape area. It is important to acknowledge that because undesirable results from chloride concentrations are occurring in SC-A2RA, its groundwater elevation proxy MTs and MOs are not high enough to stop the advancement of seawater intrusion and they should be re-examined.



Interim milestones for WY 2025 are based on modeled groundwater elevations simulated with a project start date of WY 2023, which was too optimistic since PWS will only start operating in WY 2025. Table 9 shows that 13 of 17 RMPs have groundwater elevations higher than WY 2025 interim milestones. The 4 RMPs with groundwater elevations below their 2025 interim milestones are SC-8RB, SC-5RA, Soquel Point Medium, and Soquel Point Deep (Table 9). The 3 RMPs that have groundwater elevation MT exceedances but are above 2025 interim milestones are SC-A8A, SC-9RC, and SC-13A.



Table 9. Groundwater Elevation Proxies for Seawater Intr
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Representative	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY 2020	WY 2021	WY 2022	WY 2023	WY 2024	
		Gr	oundwater Elev feet amsl	vation	Annual M	Annual Minimum of 5-Year Moving Average Groundwater Elevation, feet amsl				
SC-A3A	Aromas	3	4	3	2.9	3.1	3.2	3.4	3.6	
SC-A1B	Purisima F	3	5	3	7.5	7.4	7.3	7.3	7.3	
SC-A8A	Purisima F	6	7	4.5	5.3	5.0	5.0	5.0	5.2	
SC-A2RA	Purisima F	3	4	3	6.5	6.6	6.6	6.6	6.6	
SC-8RD	Purisima DEF	10	11	10	12.6	13.9	14.0	14.3	14.7	
SC-9RC	Purisima BC	10	11	4.6	8.9	9.6	8.2	8.1	8.2	
SC-8RB	Purisima BC	19	20	8.4	5.8	5.2	4.9	4.9	5.1	
SC-5RA	Purisima A	13	15	13	9.3	10.2	10.1	10.2	11.8	
SC-3RA	Purisima A	10	12	10	11.7	11.5	11.3	11.3	12.3	
SC-1A	Purisima A	4	6	4	9.7	10.4	10.6	10.7	10.8	
Moran Lake Medium	Purisima A	5	6.8	5	5.9	6.2	6.4	6.3	6.4	
Soquel Point Medium	Purisima A	6	7.1	6	5.7	5.9	5.9	5.8	5.8	
Pleasure Point Medium	Purisima A	6.1	6.5	6.1	7.9	9.3	10.2	9.9	9.9	
Moran Lake Deep	Purisima AA	6.7	16	6.7	6.8	7.0	7.2	7.1	7.2	
Soquel Point Deep	Purisima AA	7.5	16	7.5	6.3	6.8	6.9	6.9	7.0	
Pleasure Point Deep	Purisima AA	7.7	16	7.7	8.7	10.1	10.9	10.6	10.2	
SC-3AA ¹	Purisima AA	14.3	20.2	19.1	NA	NA	NA	NA	15.1ª	
SC-13A	Tu	17.2	19	8.3	14.8	15.1	15.4	16.5	16.2	
SP-5 ¹	Tu	24.8	24.8	22.7	NA	NA	NA	NA	22.3 ^b	

Minimum threshold not met

Minimum threshold achieved but measurable objective not met

Measurable objective met

^a = 23 months of data

^b = 53 months of data

 1 = Added in WY 2024 in accordance with the 2025 Periodic Evaluation



3.3.3 Seawater Intrusion Triggers

Although not required by the SGMA regulations, the GSP includes triggers for early management actions to prevent significant and unreasonable seawater intrusion, the indicator for which the Basin is in critical overdraft. Chloride concentration triggers are exceeded when annual average concentrations exceed the 2013-2017 average concentration (i.e., MO) and show an increasing trend. There are 10 wells with annual average chloride concentrations above MOs:

- RMP in the southeastern portion of the Basin
 - o SC-A3A (Aromas Red Sands; Appendix B; Figure B-1)
 - SC-A8A (Purisima F unit; Appendix B; Figure B-3)
 - o SC-A2RA (Purisima F unit; Appendix B; Figure B-4)
 - o SC-A2RB (Purisima F unit; Appendix B; Figure B-5)
 - SC-A5A (Purisima F Unit; Appendix B; Figure B-24)
 - SC-A5B (Purisima F Unit; Appendix B; Figure B-25).
- RMP in the western portion of the Basin
 - Soquel Point Medium (Purisima A unit; Appendix B; Figure B-7)
 - Soquel Point Deep (Purisima AA unit; Appendix B; Figure B-20)
 - SC-3AA (Purisima AA unit; Appendix B; Figure B-21)
 - SP-5 (Tu unit; Appendix B; Figure B-23)

Of those 10 wells, SC-A5Aand SC-A2RB—both in the Purisima F unit in the southeast portion of the Basin—have increasing chloride trends. This indicates advancement of seawater intrusion that may lead to undesirable results and therefore warrants early management action. The GSP recommends reducing extractions from the nearest municipal well as an early management action. SqCWD's Seascape well—screened in the overlying Aromas Red Sands—is the nearest municipal well as it is on the same site as SC-A5B and SC-A5A. Groundwater extraction at the Seascape well has been limited to less than 50 AFY since 2015, which is much less than previous years, and is consistent with sustainable pumping described in the GSP.

As described in Section 3.3.1, the MGA is investigating the cause of increasing chlorides in this area and has identified local private irrigation wells pumping in the Aromas Red Sands in addition to nearby SqCWD municipal wells that may be changing local groundwater flow dynamics in such a way to cause vertical migration of deeper seawater intrusion. Over the next



year, the MGA will continue to collect additional data to better inform actions to protect the Basin from seawater intrusion impacts.

The GSP also includes triggers for groundwater elevation proxies which are at lower elevations than MTs. These triggers are evaluated using 30-day average elevations, rather than the 5-year moving average, to prompt a management action on a shorter time scale. In WY 2024, none of the monitoring wells with SMC for groundwater elevation as a proxy for seawater intrusion had 30-day moving average elevations below trigger levels set at 2 feet amsl.

3.4 Groundwater Quality

Table 10 shows SMC compared to WY 2024 maximum concentrations at RMPs for the degraded groundwater quality indicator. Sustainable management criteria are met when concentrations are at or below criteria. MTs are based on drinking water standards for each constituent of concern. Maximum concentrations at RMPs are also compared to MOs specific to each well based on average WY 2013-2017 concentrations. Interim milestones for groundwater quality are the same as MOs. Exceedances of MT (red shading in the table) for chloride and total dissolved solids are related to seawater intrusion and addressed by that indicator.

In WY 2024, iron and manganese concentrations at several RMPs are greater than MOs that are set higher than MTs. The reason MOs are higher than MTs is because MOs are set at average WY 2013-2017 concentrations, which due to naturally high iron and manganese concentrations are often higher than the drinking water standard used for the MTs. Concentrations above MOs indicate an increase in concentration since WY 2013-2017. Iron and manganese MT exceedances are not considered an undesirable result because it is a pre-existing natural condition not associated with pumping or managed aquifer recharge.

The Rosedale 2 production well had 2 trace detections of 0.64 and 0.43 micrograms per liter $(\mu g/L)$ of MTBE, which are well below the primary drinking water standard of 13 $\mu g/L$. There were no other detections of organic compounds, including 1,2,3-TCP, in any active municipal extraction wells in the Basin.



Table 10. Water Year 2024 Groundwater Quality

Aquifer	Representative Monitoring Point	Total Dissolved Solids mg/L	Chloride mg/L	lron µg/Lª	Manganese µg/Lª	Arsenic µg/L	Chromium (Total) µg/L	Nitrate as Nitrogen mg/L	Organic Compound Detects µg/L
	Minimum Threshold	1,000	250	300	50	10	50	10	
				Water	Year 2023 Maxim	um Concentratio	n		
Aromas	CWD-10 PW	NA	NA	NA	NA	NA	NA	6.0	ND
	SC-A1C	344.0	32.0	NA	NA	NA	NA	NA	NA
	SC-A2RC	136.0	39.0	NA	NA	NA	NA	NA	NA
	SC-A3A	32,600.0	24,300.0	NA	NA	NA	NA	NA	NA
	SC-A3C	108.0	54.0	NA	NA	NA	NA	NA	NA
	SC-A8B	270.0	34.0	NA	NA	NA	NA	NA	NA
	SC-A8C	270.0	37.0	NA	NA	NA	NA	NA	NA
Aromas/	Polo Grounds PW	254.0	23.0	22.0	188.0	ND	ND	0.1	ND
Purisima F	Aptos Jr. High 2 PW	288.0	33.0	12.0	315.0	ND	ND	ND	ND
	Country Club PW ^a	NA	NA	NA	NA	NA	NA	NA	NA
	Bonita PW	296.0	30.0	ND	ND	ND	11.7	3.4	ND
	San Andreas PW	230.0	22.0	ND	9.0	ND	14.1	1.6	ND
	Seascape PW	210.0	18.0	ND	ND	ND	13.6	1.0	ND
Purisima F	CWD-4 PW	NA	NA	NA	NA	NA	NA	5.0	ND
	CWD-12 PW	NA	NA	NA	NA	NA	NA	1.4	ND
	SC-A2RA	30,500.0	22,100.0	512.0	691.0	NA	NA	NA	NA
	SC-A8A	18,200.0	10,900.0	453.0	3,810.0	NA	NA	NA	NA
Purisima	SC-8RD	334.0	21.0	ND	ND	NA	NA	ND	NA
DEF	SC-9RE	528.0	48.9	78.0	54.0	NA	NA	ND	NA
	SC-A1A	217.0	28.0	NA	NA	NA	NA	NA	NA
	T. Hopkins PW	NA	NA	NA	NA	3.5	NA	ND	ND
	Granite Way PW	284.0	27.0	19.0	15.0	0.9	ND	ND	ND
Purisima BC	Madeline 2 PW	426.0	35.5	271.0	9.0	0.5	1.2	ND	ND



Aquifer	Representative Monitoring Point	Total Dissolved Solids mg/L	Chloride mg/L	lron µg/Lª	Manganese µg/Lª	Arsenic µg/L	Chromium (Total) µg/L	Nitrate as Nitrogen mg/L	Organic Compound Detects µg/L
	Minimum Threshold	1,000	250	300	50	10	50	10	
				Water	Year 2023 Maxim	um Concentratio	n		
	Aptos Creek PW	NA	NA	NA	NA	NA	NA	NA	NA
	Ledyard PW	362.0	36.0	77.0	11.0	0.9	1.1	ND	ND
	SC-23A	254.0	20.1	ND	ND	NA	NA	ND	NA
	SC-8RB	508.0	14.0	23.0	ND	NA	NA	ND	NA
	SC-9RC	418.0	32.0	ND	ND	NA	NA	ND	NA
Purisima	30th Ave Shallow	770.0	53.0	120.0	1,300.0	NA	NA	ND	NA
A	Pleasure Point Shallow	260.0	34.0	86.0	100.0	NA	NA	ND	NA
	Estates PW	470.0	48.4	200.0	98.0	0.6	0.8	ND	ND
	Garnet PW	672.0	87.8	1,460.0	446.0	0.9	1.1	ND	ND
	Tannery 2 PW	560.0	63.0	239.0	154.0	0.7	0.8	ND	ND
	Rosedale 2 PW	486.0	46.5	736.0	284.0	0.6	0.9	ND	0.6 (MTBE)
	Beltz #8 PW	NA	43.0	980.0	270.0	2.0	ND	ND	ND
	Beltz #9 PW	490.0	51.0	88.0	140.0	0.8	ND	ND	ND
	SC-3RC	420.0	48.9	181.0	35.0	NA	NA	ND	NA
	SC-5RA	590.0	59.0	66.0	176.0	NA	NA	ND	NA
	SC-9RA	374.0	15.2	209.0	10.0	NA	NA	ND	NA
	SC-10RA	540.0	47.9	736.0	780.0	NA	NA	ND	NA
	SC-22A	368.0	18.0	419.0	556.0	NA	NA	ND	NA
Purisima A/AA	Beltz #10 PW	NA	82.0	1,300.0	390.0	2.9	ND	NA	NA
Purisima	SC-10RAA	248.0	10.2	179.0	74.0	NA	NA	ND	NA
AA	SC-22AAA	596.0	63.0	26.0	44.0	NA	NA	ND	NA
	Coffee Lane Deep	960.0	48.0	ND	130.0	NA	NA	NA	NA
	Pleasure Point Deep	620.0	25.0	620.0	220.0	NA	NA	ND	NA
	Thurber Lane Shallow		Well not sampled since 2006						



Aquifer	Representative Monitoring Point	Total Dissolved Solids mg/L	Chloride mg/L	lron µg/Lª	Manganese µg/Lª	Arsenic µg/L	Chromium (Total) µg/L	Nitrate as Nitrogen mg/L	Organic Compound Detects µg/L
	Minimum Threshold	1,000	250	300	50	10	50	10	
			Water Year 2023 Maximum Concentration						
	Schwan Lake	400.0	96.0	320.0	120.0	NA	NA	NA	NA
Purisima	O'Neill Ranch PW	442.0	59.0	1,000.0	441.0	0.5	0.5	ND	ND
AA/Tu	Main Street PW	336.0	28.4	102.0	26.0	ND	0.6	ND	ND
	Beltz #12 PW	NA	NA	NA	NA	NA	NA	NA	NA
Tu	SC-18RAA	256.0	17.5	44.0	19.0	NA	NA	ND	NA
	Thurber Lane Deep	Well not sampled since 2006							

Maximum concentration between minimum threshold and measurable objective not met (see note b below)

NA = not analyzed

Minimum threshold met but measurable objective not met in wells with MO less than MT

ND = non-detect at the reporting limit

Measurable objective met

Note: Water quality data are compared to MOs based on 2013-2017 average concentrations that are constituent and well specific. Refer to the GSP to see well specific MOs.

^a No Data from Country Club #2 PW because it has not yet been put into service.

^b Values in bold indicate where MO is higher than MT due to natural causes. In these cases, concentrations higher than the MT are not undesirable results.



3.5 Subsidence

As described in the GSP, subsidence is not applicable in the Santa Cruz Mid-County Basin as an indicator of groundwater sustainability.

3.6 Interconnected Surface Water

Table 11 shows groundwater elevation proxies for SMC at RMPs for depletion of interconnected surface water. Sustainable management criteria for this indicator are met when groundwater elevations are at or above proxy elevations.

Hydrographs for 5 depletion of interconnected surface water groundwater elevation proxy RMPs are shown on Figures A-37 through A-41; Appendix A. Of the 5 RMPs, the Balogh monitoring well is the only RMP with minimum average monthly groundwater elevations below its MT groundwater elevation proxy. The other 4 shallow RMPs along Soquel Creek have minimum average monthly groundwater elevation proxies. Since undesirable results are defined as any depletion of interconnected surface water RMP having groundwater elevations below its MT, undesirable results for surface water depletion are occurring. The Wharf Road monitoring well is the only RMP with groundwater elevations above the MO.

Pure Water Soquel replenishment of the Purisima A unit is expected to benefit the streamflow depletion sustainability indicator by raising shallow groundwater levels along Soquel Creek. Without PWS, simulated monthly groundwater levels are projected to be below the MT at most of the shallow wells. With the PWS project, shallow groundwater levels are projected to rise to MOs and remain above MTs to prevent undesirable results for surface water depletions. The expected benefits are maintained when combining SCWD's ASR project to PWS. In addition, shallow groundwater levels rise to MOs at the RMP for interconnected surface water depletion.



Table 11. Groundwater Elevation Proxy for Depletion of Interconnected Surface Water

Well Name	Aquifor	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY 2020	WY 2021	WY 2022	WY 2023	WY 2024	
	riquier	Gro	oundwater Elev feet amsl	ation	Minimum Average Monthly Groundwater Elevation feet amsl					
Balogh		29.1	30.6	29.1	29.1	28.7	28.7	28.8	28.7	
Main St. Shallow	Shallow	22.4	25.3	20.7	22.8	22.3	22.6	22.4	23.9	
Wharf Road	Groundwater	11.9	12.1	11.3	12.4	12.0	12.1	12.1	12.7	
Nob Hill		8.6	10.3	7.3	5.5	8.2	9.0	8.9	9.2	
SC-10RA	Purisima A	68	70	68	69.0	69.9	68.9	69.0	69.3	

Minimum threshold not met

Minimum threshold achieved but measurable objective not met

Measurable objective met



3.7 Update on Project and Management Action Implementation

Below are WY 2024 updates on projects and management actions planned or in the process of being implemented.

3.7.1 Implementation Funding

In May 2022, the MGA was awarded a \$7.6 million Sustainable Groundwater Management Implementation Round 1 Grant. Projects to be funded by the grant are directly focused on addressing groundwater sustainability. Projects funded are summarized in Table 12.

SGMA Implementation Grant Round 1 Component	Status
Inland groundwater pumping optimization to effectively redistribute SqCWD groundwater pumping away from the coast and add a new SqCWD inland production well	Pumping optimization planning is included in the regional optimization study included in the last row of this table. A new inland production well at Cunnison Lane will be completed and equipped in WY 2025
Include Beltz #8 as an additional ASR well in the SCWD's ASR program	See Section 3.7.3
Increase the intertie capacity between SqCWD's subarea 1 and subarea 2 to mitigate the bottleneck caused by undersized pipe thereby improving water reliability	Construction started August 2023 Put into service December 2023
A regional water resources optimization study for Group 1 and 2 projects and management actions identified in the GSP	Study is underway and expected to be completed in April 2025. See Section 3.7.4

Table 12. SGMA Implementation Grant Round 1 Funding Projects

3.7.2 Pure Water Soquel

The PWS project will recharge purified recycled water at 3 SWIP wells to replenish the aquifer and aid in raising groundwater levels above seawater intrusion MTs. The project, which is being constructed to produce up to 1,500 AFY of purified water, has completed California Environmental Quality Act environmental review with a certified Environmental Impact Report (EIR). Planned completion of construction and start-up is anticipated in WY 2025.

Project components include the following:

• Three SWIP wells – Twin Lakes, Willowbrook, and Monterey will be used to recharge Purisima A and BC aquifers with purified recycled water.



- Nine Monitoring wells Monitoring wells have been strategically constructed adjacent to the SWIP wells. These will monitor groundwater quality and levels throughout the operation of Pure Water Soquel.
- Conveyance The project involves the construction of approximately 8 miles of pipelines. These pipelines will transport water to and from the Santa Cruz Wastewater Treatment Facility to the Chanticleer Water Purification Center and convey purified water from the Purification Center to the SWIP wells for aquifer recharge. The pipelines are designed for potential future expansion, doubling the current design capacity if needed.
- Treatment facilities 2 new water treatment facilities are being built. One is a recycled water treatment facility, and the other is a water purification center.
 - New Recycled Water Facility: Located at the Santa Cruz Wastewater Treatment Facility, this facility includes a source water pump station and brine return pipeline to support the new Water Purification Center; a Pacific Gas and Electric metering enclosure near Bay Street and California Street, a radio communication pole, and a tertiary treatment system (cloth filter and UV system). It will produce recycled water for on-site use, a future construction water fill station, and irrigation at a nearby park.
 - New Water Purification Center: Situated at the corner of Soquel Avenue and Chanticleer Avenue in the Live Oak area, this center will use a state-of-the-art, 3-step advanced purification process: microfiltration, reverse osmosis, and ultraviolet light with advanced oxidation and ozone pre-treatment. The purified water will be pumped to the SWIP wells for underground recharge of the groundwater basin. The center will also feature an educational learning center.

SqCWD maintains an informative outreach and education program specific to PWS that includes a dedicated section on its website¹ and periodically includes PWS Project updates in the SqCWD's monthly email blast. Weekly construction updates are also available on the District's website²:

The PWS project is needed to increase coastal groundwater levels to elevations protective of seawater intrusion. Predictive groundwater modeling during GSP development indicated that demand management and water conservation on their own would not achieve MT protective elevations or MOs for the seawater intrusion sustainability indicator. As predicted, some coastal

¹ <u>https://www.soquelcreekwater.org/pws</u>

² https://www.soquelcreekwater.org/256/Construction-Updates



groundwater levels are still below MTs; therefore, recharging groundwater continues to be the planned approach to increase coastal groundwater levels.

Table 13 summarizes construction progress of PWS components for WY 2024 and prior years. Construction of all PWS components is expected to be completed in calendar year 2025. Start-up testing of SWIP recharge wells is scheduled in early 2025.

Project Component	Completed in Prior Water Years	Water Year 2024 Progress
3 SWIP wells	 Twin Lakes Church Well constructed and developed in WY 2019, redeveloped in WY 2020 Willowbrook Well started construction in WY 2020; completed construction and development in WY 2021 Monterey Well constructed and developed in WY 2021 	Aboveground site infrastructure improvements completed in WY 2024. Start-up testing scheduled to start in early 2025.
9 SWIP monitoring wells	All 9 SWIP monitoring wells were constructed and developed in WY 2022 Twin Lakes Church SWIP monitoring wells: TLM-1A, TLM-2A, TLM-2BC, TLM-3BC, & TLM-4BC Willowbrook SWIP monitoring wells: WM-1 and WM-2 Monterey SWIP monitoring wells: MM-1 and MM-2	Completed background groundwater quality sampling, consisting of 4 quarters of sampling at 8 of the 9 monitoring wells (excluding TLM-2BC where background sampling is not required by the GRRP permit)
Conveyance pipelines	Construction of the conveyance pipelines started in May 2021.	Pipeline construction continued in WY 2024 and will be completed in WY 2025
Treatment facilities	Construction of the treatment facilities at the Santa Cruz Wastewater Treatment Facility (SCWWTF) and the Water Purification Center at Chanticleer site started in WY 2022.	Construction at both facility sites continued in WY 2024 and will be completed in WY 2025

Table 13. Status of Pure Water Soquel Project Construction

3.7.3 Aquifer Storage and Recovery

Aquifer Storage and Recovery (ASR) is being evaluated by SCWD as a multi-benefit water supply reliability project. The primary purpose of the ASR project is to store drinking water in the Basin to provide a drought supply for SCWD's service area. The ASR project is expected to also contribute to Basin sustainability. The SCWD continues to work with the California State Water Resources Control Board to finalize its water rights petition for a modification to an existing right that will lead to phased implementation of full-scale ASR at the SCWD's existing



Beltz wells. SCWD expects to receive final action on its water rights petition in early 2025. Work to convert the Beltz 12 well to a permanent ASR well is on track to be completed in calendar year 2026. The Beltz 8 design will be completed in 2025, and modifications will take place in 2027. The SCWD completed pilot testing at Beltz 9 in WY 2024. A design phase for modifications to convert Beltz 9 into a permanent ASR well will occur in 2026.

3.7.4 Optimization Study

SCWD and SqCWD are currently collaborating on the Basin Optimization Study. The study uses the Santa Cruz Mid-County Basin GSFLOW groundwater model to iteratively simulate scenarios and water resources projects. The overarching goal of the study is to identify projects and management alternatives that help meet the water supply needs of SCWD and SqCWD while maintaining GSP sustainability goals. The work started in January 2023 with anticipated completion by June 2025.

Work conducted at the time of this report includes:

- Validating simulated groundwater levels and stream flow in the uncalibrated 2015-2022 period
- Model calibration near SCWD's Beltz wells over the 2015-2022 period to ensure accurate simulation of recent ASR pilot testing, and calibration of simulated streambed conductivity to improve model accuracy at ISW RMP
- Iterative simulation of diverse projects and management actions to identify 4 feasible and sustainable alternatives that improve SCWD and SqCWD supply, with model simulations guided by machine learning guided optimization
- Hydraulic modeling for the 4 selected alternatives to predict the impact of pumping operations and transfers associated with each supply alternative on local distribution systems, including required upgrades for pump stations and the O'Neill intertie linking the 2 agencies
- Distribution system water quality modeling to ensure compatibility of water transferred between SCWD and SqCWD
- Economic and financial analysis/needs assessment analysis to inform the costs and benefits of chosen alternatives

Work described in the last bullet above is currently underway. The completed study will recommend several feasible and sustainable project and management action alternatives that will inform future long-term operations and provide shared regional benefits.



3.7.5 Water Transfers / In-Lieu Groundwater Recharge

As described in the GSP, a water transfer pilot test has been underway for a number of years. The water transfer involves SCWD delivering treated surface water to SqCWD to serve a portion of SqCWD's service area. Currently, an extension of the pilot project agreement allows for transfers through May 1, 2026. There was no water transferred to SqCWD in WY 2024.

Longer-term implementation of water transfers will require a new agreement, including compliance with Proposition 218 requirements to set the cost of service for water delivered and, depending on the annual quantity transferred, waiting for resolution of the places of use changes of the SCWD's San Lorenzo River water rights.

3.7.6 Distributed Storm Water Managed Aquifer Recharge

The County continues to operate 2 Distributed Storm Water Managed Aquifer Recharge (DSWMAR) projects, 1 in Aptos at Polo Grounds County Park, and another in Live Oak at Brommer Street Park. The dry wells recharging stormwater are not currently instrumented. Total estimated average recharge is 20 AFY. A plan for development at additional DSWMAR project sites is not available and continues to be speculative at this time.

3.8 Update on Monitoring Network

3.8.1 Improvement of Monitoring Network

Table 14 summarizes when data gap monitoring features were installed and Figure 27 shows the location of all features added to the monitoring network.

Monitoring Feature	Status	
Deep Tu unit well (SP-5) near Soquel Point	Completed in WY 2020	
Deep Purisima AA unit well near SC-3A	Well SC-3AA installed in WY 2022	
7 shallow streamflow interaction monitoring wells	6 shallow wells installed in 2022 1 well installed in January 2024	
6 stream gages	6 gages installed (see Figure 27) Rating curves established in WY 2023	

Table 1/	Status of Monitoring	Features Identified a	s Data Gans in the	Groundwater 9	Sustainability Plar
	Status of Monitoring	i caluics inclined a	is Data Gaps in the	Gibunuwater	Sustainability Fiai





Figure 27. Monitoring Wells and Stream Gages Installed to Address 2020 GSP Data Gaps



3.8.2 Other Monitoring Network Changes

There are 8 wells in the 2020 GSP monitoring network that cannot be used to collect groundwater levels. Two of those wells have been removed from the MGA groundwater level monitoring network as described in the 2025 Periodic Evaluation:

- SC-A7A in the Purisima F Unit has not been included in the MGA Annual Reports since Water Year 2021. It can no longer be used to collect groundwater level measurements because it likely has a broken seal and does not provide reliable data. SC-A7B also screened in the Purisima F unit can be used in its place to collect groundwater level data.
- SC-14B in the Purisima BC unit. SqCWD has not been able to measure depth to water since 2018 due to stuck airline. SC-14C also screened in the Purisima BC unit can be used in its place to collect groundwater level data.

The other 6 wells tentatively remain in the network even though they are currently inaccessible. SqCWD will try to remove airline equipment stuck in these wells and if successful, SqCWD will resume data collection. The monitoring wells of concern are:

- Purisima A unit wells: SC-14A and SC-17A
- Purisima BC unit: SC-16B and SC-17B
- Purisima DEF unit: SC-17C and SC-17D

A full re-evaluation of MGA monitoring networks was conducted for the 2025 Periodic Evaluation. This re-evaluation confirmed confirm the MGA monitoring networks are providing the quantity and quality of data necessary to monitor groundwater conditions in the Basin during GSP implementation.

Monitoring networks used to evaluate Basin conditions have been expanded to fill all GSP-identified data gaps. Additional new monitoring wells associated with the PWS and ASR projects supplement the existing networks and provide a means for monitoring project performance.

During the evaluation cycle, 19 new dedicated monitoring wells were added to the Basin's groundwater level and quality monitoring networks. Two of these new wells were established as deep RMPs.

3.9 Data Management System

The MGA has a regional data management system (DMS) with a public portal, based on Kister's WISKI platform. The DMS contains groundwater level, groundwater quality, groundwater



extraction, and stream flow data for wells and creeks in the Santa Cruz Mid-County Basin and Santa Margarita Basin.

Website to access public portal: https://sccwaterdata.us/#/html/home

3.10 Planned Studies for WY 2025

The MGA plans to conduct the following studies in WY 2025:

- Continuation of the Seascape seawater intrusion investigation to determine the extent and causes of seawater intrusion. This information will be used to inform management actions needed to stop inland advancement of seawater.
- Mid-County Basin GSFLOW model improvements that include revising model layers to improve simulation of the Purisima DEF unit and incorporating AEM data to improve conceptual and numerical model geometry. The revised GSFLOW model will be assessed to determine the revised model's numerical stability and model calibration. A report documenting the GSFLOW model revisions and status related to numerical stability and model calibration will provide recommendations for addressing issues related to model layering such as numerical instability prior to future calibration efforts.



4 REFERENCES

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Montgomery & Associates (M&A), 2023. Groundwater Model Validation for Optimization Study. Draft Technical Memorandum prepared for City of Santa Cruz Water Department. May, 2023.

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Appendix A

Well Hydrographs







- Measurable Objective

Wet

Hand Measurement

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& ASSOCIATES

Critically Dry Dry Normal



Appendix A

60

50

40

30

20

10

0

10

FIGURE A-3

M

—— Minimum Threshold





SC-11D & SC-11RD at Porter Gulch Aquifer Screened: Purisima DEF





Aquifer Screened: Purisima DEF

& ASSOCIATES





SC-19 at Austrian Aquifer Screened: Purisima BC





Coffee Lane Shallow Aquifer Screened: Purisima A


SC-22AA at 41st Ave Aquifer Screened: Purisima AA



Appendix A

SC-10AA & SC-10RAA at Cherryvale Aquifer Screened: Purisima AA















Aquifer Screened: Purisima F

& ASSOCIATES



Aquifer Screened: Purisima F

SC-8D & SC-8RD at Aptos Creek Aquifer Screened: Purisima DEF







SC-9C & SC-9RC at Seacliff Aquifer Screened: Purisima BC





SC-8B & SC-8RB at Aptos Creek Aquifer Screened: Purisima BC





SC-5A & SC-5RA at New Brighton Aquifer Screened: Purisima A





SC-3A & SC-3RA at Escalona Aquifer Screened: Purisima A/AA



Appendix A



SC-1A at Prospect Aquifer Screened: Purisima A

Moran Lake Medium Aquifer Screened: Purisima A FIGURE A-28 30 30 20 20 10 10 Groundwater Elevation, Feet AMSL nummun hand and my works 0 0 -10 -10 -20 -20 -30 -30 10/1/10 10/1/12 10/1/14 10/1/16 10/1/18 10/1/20 0/1/80 0/1/86 0/1/88 0/1/90 0/1/96 0/1/98 0/1/00 0/1/0 0/1/08 10/1/22 0/1/82 0/1/92 0/1/94 0/1/02 0/1/04 0/1/84 10/1/24 - Hand Measurement Measurable Objective 5 Year Moving Average ••••• Minimum Threshold Transducer Critically Dry Dry Normal Wet 125 of 428

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Aquifer Screened: Purisima A

& ASSOCIATES



Aquifer Screened: Purisima A



Moran Lake Deep Aquifer Screened: Purisima AA

Soquel Point Deep Aquifer Screened: Purisima AA

& ASSOCIATES

Appendix A FIGURE A-32







SC-3AA at Escalona Aquifer Screened: Purisima AA

& ASSOCIATES

Appendix A

FIGURE A-34

5.1.1





Balogh Shallow Well Aquifer Screened: Shallow Well for Surface Water Interactions







Main Street Shallow Well 1 Aquifer Screened: Shallow Well for Surface Water Interactions





Soquel Wharf Shallow Well Aquifer Screened: Shallow Well for Surface Water Interactions





Nob Hill Shallow Well 1 & Nob Hill Shallow Well 2 Aquifer Screened: Shallow Well for Surface Water Interactions



Appendix A FIGURE A-40

SC-10A & SC-10RA at Cherryvale Aquifer Screened: Purisima A



SC-10 Shallow Well Aquifer Screened: Shallow Well for Surface Water Interactions



Appendix A

Lupin Shallow Well Aquifer Screened: Shallow Well for Surface Water Interactions



Appendix A FIGURE A-43

Balogh Shallow Well 2 Aquifer Screened: Shallow Well for Surface Water Interactions



Appendix A FIGURE A-44

Spreckles Shallow Well Aquifer Screened: Shallow Well for Surface Water Interactions



Appendix A

Aptos Village County Park Shallow Well Aquifer Screened: Shallow Well for Surface Water Interactions



Appendix A

Mountain Elementary Shallow Well Aquifer Screened: Shallow Well for Surface Water Interactions



Appendix A


Aptos Creek PW Aquifer Screened: Purisima BC



Appendix A

Appendix A Aptos Jr High & Aptos Jr High 2 PW Aquifer Screened: Purisima F FIGURE A-50 100 100 90 90 80 80 70 70 60 60 Groundwater Elevation, Feet AMSL 50 50 40 40 30 30 20 20 î min 10 10 0 0 -10 -10 -20 -20 10/1/90 10/1/92 10/1/94 10/1/96 10/1/98 10/1/00 10/1/02 10/1/04 10/1/06 10/1/08 10/1/10 10/1/12 10/1/14 10/1/16 10/1/18 10/1/20 10/1/22 0/1/80 0/1/82 0/1/84 0/1/86 0/1/88 10/1/24 Hand Measurement

Critically Dry Dry Normal Wet



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Beltz 10 PW Aquifer Screened: Purisima A/AA

Appendix A FIGURE A-51





140

130

120

110

100

90

80

70

60

50

40

30

20

10

0

-10

-20

-30

-40

-50

-60

-70

-80

-90

-100

Groundwater Elevation, Feet AMSL





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Appendix A Beltz 8 PW Aquifer Screened: Purisima A FIGURE A-54 40 40 30 30 20 20 10 10 Groundwater Elevation, Feet AMSL 0 0 -10 -10 -20 -20 -30 -30 -40 -40 -50 -50 -60 -60 10/1/98 10/1/10 10/1/16 10/1/18 0/1/94 10/1/96 10/1/00 10/1/02 10/1/04 10/1/06 10/1/08 10/1/12 10/1/14 10/1/20 10/1/22 0/1/80 0/1/82 0/1/86 0/1/88 0/1/0 0/1/92 0/1/84 10/1/24 Hand Measurement Transducer Critically Dry Dry Normal Wet



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Beltz 9 PW Aquifer Screened: Purisima A



Appendix A

Bonita PW Aquifer Screened: Aromas/ Purisima F









Appendix A



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Country Club PW & Country Club 2 PW Aquifer Screened: Aromas/ Purisima F



Appendix A



CWD-10 PW Aquifer Screened: Aromas Appendix A

CWD-12 PW Aquifer Screened: Aromas/ Purisima F

& ASSOCIATES





CWD-4 PW Aquifer Screened: Aromas/ Purisima F

Groundwater Elevation, Feet AMSL



80

70

60

50

40

30

20

10

0

-10

-20

-30

-40

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Critically Dry Dry

Normal

Wet

Estates Aquifer Screened: Purisima A

Appendix A



Garnet Aquifer Screened: Purisima A



Appendix A

Granite Way PW Aquifer Screened: Purisima DEF





Appendix A Ledyard Aquifer Screened: Purisima BC FIGURE A-66 80 70 60 50 40 30 20 10 0 -10 Groundwater Elevation, Feet AMSL -20 -30 -40 -50 -60 -70 -80 -90

80

70

60

50

40

30

20

10

0



Madeline PW Aquifer Screened: Purisima BC







Main Street PW Aquifer Screened: Purisima AA/Tu

Appendix A



O'Neill Ranch PW Aquifer Screened: Purisima AA/Tu



Appendix A



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Polo Grounds PW Aquifer Screened: Aromas/ Purisima F



Appendix A



San Andreas PW Aquifer Screened: Aromas/ Purisima F





SC-18AA & SC-18RAA at Main Street Aquifer Screened: Tu



Appendix A FIGURE A-74



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SC-A1A at Cliff Drive Aquifer Screened: Purisima DEF









SC-A2C & SC-A2RC at Sumner Aquifer Screened: Aromas










SC-A5A at Seascape Aquifer Screened: Purisima F





SC-A8B at Dolphin Aquifer Screened: Aromas



FIGURE A-89 50 50 40 40 30 30 Groundwater Elevation, Feet AMSL 20 20 10 10 0 0 -10 -10 -20 -20 -30 -30 10/1/90 10/1/92 10/1/94 10/1/96 10/1/98 10/1/00 10/1/02 10/1/04 10/1/06 10/1/08 10/1/10 10/1/12 10/1/14 10/1/16 10/1/18 10/1/20 10/1/22 0/1/80 0/1/86 0/1/88 0/1/82 0/1/84 10/1/24 Hand Measurement Critically Dry Dry Normal Wet 186 of 428 MONTGOMERY 5.1.1& ASSOCIATES

Schwan Aquifer Screened: Purisima AA

Seascape PW Aquifer Screened: Aromas/ Purisima F

40

30

20

10

0

-10

-20

-30

-40

-50

-60

-70

-80

Groundwater Elevation, Feet AMSL





Appendix A

40

30

20

10

0

-10

-20

-30

-40

-50

-60

-70

-80

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T.Hopkins PW Aquifer Screened: Purisima DEF



Appendix A FIGURE A-91 Tannery & Tannery 2 PW Aquifer Screened: Purisima A

Appendix A FIGURE A-92







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Auto Plaza Shallow



Beltz 4 Deep Aquifer Screened: Purisima A



Beltz 4 Shallow Aquifer Screened: Purisima A



Beltz 6 Aquifer Screened: Purisima A

Appendix A

FIGURE A-100

Beltz 7 Deep Aquifer Screened: Purisima A/AA



Appendix A FIGURE A-101

Beltz 7 Santa Margarita Test Well Aquifer Screened: Tu

















Cory Deep Aquifer Screened: Purisima AA





Cory Shallow Aquifer Screened: Purisima A



CWD-3 Aquifer Screened: Purisima F



CWD-12A Aquifer Screened: Aromas





CWD-12C Aquifer Screened: Purisima F





SC-11A & SC-11RA at Porter Gulch Aquifer Screened: Purisima A/AA

& ASSOCIATES

130 130 120 120 WUr 110 110 Groundwater Elevation, Feet AMSL 100 100 90 90 80 80 70 70 60 60 50 50 10/1/96 10/1/98 10/1/00 10/1/02 10/1/04 10/1/06 10/1/08 10/1/10 10/1/12 10/1/14 10/1/16 10/1/18 10/1/20 10/1/22 0/1/80 0/1/86 0/1/88 06/1/0 0/1/92 0/1/94 0/1/82 0/1/84 10/1/24 Hand Measurement Transducer Critically Dry Dry Normal Wet MONTGOMERY 213 of 428 5.1.1

Appendix A FIGURE A-116

SC-14A at Madeline Aquifer Screened: Purisima A/AA



Appendix A

FIGURE A-117



Aquifer Screened: Purisima BC

5.1.1

Appendix A SC-15A at Rosedale Aquifer Screened: Purisima AA FIGURE A-119 40 40 30 30 20 20 Groundwater Elevation, Feet AMSL 10 10 0 0 -10 -10 -20 -20 -30 -30 -40 -40 10/1/98 10/1/10 10/1/18 10/1/96 10/1/00 10/1/02 10/1/04 10/1/06 10/1/08 10/1/12 10/1/14 10/1/16 10/1/20 10/1/22 0/1/80 0/1/86 0/1/88 0/1/0 0/1/92 0/1/94 0/1/82 0/1/84 10/1/24 Hand Measurement Transducer Critically Dry Dry Normal Wet **MONTGOMERY** & ASSOCIATES 216 of 428 5.1.1


SC-16A at Estates Aquifer Screened: Purisima A/AA







SC-16B at Estates Aquifer Screened: Purisima BC





SC-17C at Ledyard Aquifer Screened: Purisima DEF



SC-17D at Ledyard Aquifer Screened: Purisima DEF



SC-18A & SC-18RA at Main Street Aquifer Screened: Purisima AA





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SC-21AA at Cornwell Aquifer Screened: Purisima AA



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SC-5C & SC-5RC at New Brighton Aquifer Screened: Purisima BC



Appendix A

FIGURE A-136

SC-8A & SC-8RA at Aptos Creek Aquifer Screened: Purisima A







SC-8C & SC-8RC at Aptos Creek Aquifer Screened: Purisima BC







SC-8E & SC-8RE at Aptos Creek Aquifer Screened: Purisima DEF









SC-A2B & SC-A2RB at Sumner Aquifer Screened: Purisima F









SC-A5C at Seascape



SC-A5D at Seascape Aquifer Screened: Aromas



SC-A6A at Bonita Aquifer Screened: Purisima F



SC-A6B at Bonita Aquifer Screened: Purisima F





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SC-A7B at Sells Aquifer Screened: Purisima F



SC-A7D at Sells Aquifer Screened: Aromas





MM-1 Aquifer Screened: Purisima A



MM-2 Aquifer Screened: Purisima A

Appendix A

FIGURE A-151

TLM-1A Aquifer Screened: Purisima A, Purisima BC





TLM-2A Aquifer Screened: Purisima A



TLM-2BC Aquifer Screened: Purisima BC



TLM-3BC Aquifer Screened: Purisima BC


TLM-4BC Aquifer Screened: Purisima BC

Appendix A



WM-1 Aquifer Screened: Purisima A

Appendix A FIGURE A-157



WM-2 Aquifer Screened: Purisima A Appendix A FIGURE A-158



Private Well 3 Aquifer Screened: Purisima B



Private Well 5 Aquifer Screened: Purisima F





Private Well 7













Private Well 11 Aquifer Screened: Purisima F







Private Well 15 Aquifer Screened: Purisima A





















Private Well 21 Aquifer Screened: Purisima A







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Private Well 24 Aquifer Screened: Purisima BC



Private Well 25 Aquifer Screened: Purisima F

Appendix A



Private Well 26 Aquifer Screened: Purisima AA/Tu





Private Well 27



Appendix B

Coastal Monitoring Well Chemographs


















































































































































Groundwater is a vital resource, together let's protect it.

midcountygroundwater.org • 5180 Soquel Drive • Soquel, CA 95073

April 1, 2025

To: California Department of Water Resources

From: Santa Cruz Mid-County Groundwater Agency

Subject: Submittal of the Sixth Annual Report for the Santa Cruz Mid-County Groundwater Agency

The Santa Cruz Mid-County Groundwater Agency (MGA) is the Groundwater Sustainability Agency for the Santa Cruz Mid-County Groundwater Basin, Number 3-001 (Basin). The Basin is classified by the California Department of Water Resources (DWR) as a high priority basin in a state of critical overdraft.

The MGA formed in March 2016 as a Joint Powers Authority, with four member agencies: Central Water District, City of Santa Cruz, County of Santa Cruz, and Soquel Creek Water District. The MGA Board of Directors includes two representatives from each member agency and three private well owner representatives. The MGA initiated development of the Groundwater Sustainability Plan (GSP) in 2017 to guide ongoing management of the Basin with a goal to achieve and maintain groundwater sustainability over a 50-year planning and implementation horizon. GSP development was a collaborative effort among the member agencies and technical consultants, and was informed by input from resource management agencies, community members, and stakeholders.

The GSP was adopted by the MGA Board on November 21, 2019, and approved by DWR in June 2021. Five prior Annual Reports covering Water Years 2019 through 2023 were previously submitted to DWR by their respective April 1st annual deadlines. The MGA is pleased to submit this sixth Annual Report to for Water Year 2024, as required by the California Code of Regulations for Groundwater Sustainability Plans.

Feel free to contact me if you have any questions.

Sincerely,

Seene Ryan

Sierra Ryan Santa Cruz Mid-County Groundwater Agency (831) 204-0008 BasinPOC@midcountygroundwater.org

Santa Cruz Mid-County Basin 6th Annual Report Water Year 2024



Presented by: Georgina King, PG, C.Hg

March 20, 2025

Presentation Content

- 1. Santa Cruz Mid-County GSP Overview
- 2. Water Year 2024 Annual Report
 - Water Year Type/Water Use
 - Sustainability Indicators Results
 - Progress on GSP Implementation
- 3. Key takeaways for Water Year 2024



Santa Cruz Mid-County GSP Overview



GSP Overview

- Basin is classified as a high-priority groundwater basin in critical overdraft due to the ongoing threat of further seawater intrusion into Basin groundwater supplies
- 59% of the Basin's water supply to residents, businesses, industry, and agriculture is from groundwater
 - \sim 4,700 5,600 AF of groundwater pumped per year in the Basin since 2015
 - ~ 2,900 4,000 AF of surface water sourced per year outside of the Basin used to supplement Basin demand since 2015

GSP Summary document:

https://www.midcountygroundwater.org/sites/default/files/uploads/MGA2019-GSP-Public-final.pdf

SGMA Sustainability Indicators

GSP addresses applicable sustainability indicators (5 of 6)













Lowering GW Levels

Seawater Intrusion

Reduction of Storage

Degraded Quality



Surface Water Depletion



Basin Issues – Seawater Intrusion

- In mid-1980s to early 1990s, groundwater levels were 40 120 feet below sea level \rightarrow seawater intrusion
- Levels have recovered significantly but seawater intrusion still occurs





Seawater Intrusion

Basin Issues – Chronic Lowering of Groundwater Levels

- Groundwater levels have not completely recovered even though there have been basin-wide improvements due to increased water conservation and strategic groundwater management
- Need to plan for climate change and its impacts on groundwater recharge
- Additional water supplies are needed to meet demands while also achieving groundwater sustainability





Lowering

GW Levels

-10

-20

-30

-40

Other Basin Issues Resulting from Lowered Groundwater Levels

Depletion of Interconnected Surface Water

- Some creeks in the Basin are partially dependent on inflows from groundwater
- Without those groundwater inflows, some aquatic plants and animals may be impacted, including priority species

Reduction of Groundwater

Groundwater in storage needs to be at volumes that can support long-term water use, preserve or enhance ecological resources, and provide for a drought reserve when local rainfall is below normal



GSP Lays out Path to Sustainability

Sustainability Goals	Desired Basin conditions for all beneficial uses and users
Monitoring Network	To measure basin conditions in response to groundwater management and use
Sustainable Management Criteria	Metrics against which to measure progress of groundwater management and implementing projects & management actions
Projects & Management Actions	Needed to achieve Sustainability Goals


MGA's SGMA Timeline



Water Year 2024 Annual Report



Precipitation

- October 1, 2023 to September 30, 2024
- Average precipitation (about 30 inches)
- Normal water year classification



Water Use

- Groundwater is 56% of basin supply (4,688 AF)
- Lowest groundwater usage on record (WY2019 was previous low at 4,726 AF)

Water Use Sector	Sector Groundwater Use ^f Surface Water Use ^a		Total Water Use	Percentage of
			Basin Water Use	
Private Domestic b	591	Unknown but minimal	591	7%
Agricultural c	315	0	315	4%
Institutional d	276	0	276	3%
Municipal ^e	3,506	3,694	7,200	86%
Total	4,688	3,694	8,382	
Percentage	56%	44%		



OMERY

SSOCIATES



5.1.3

Seawater Intrusion – Chloride Concentrations

Minimum Threshold **Measurable Objective** 750 Historical maximum 2013-2017 average **Undesirable Result** concentration for chloride concentration MT exceedances in 2 intruded wells, for all intruded wells, or more of the last 4 250 mg/L for 100 mg/L forconsecutive samples 250 unintruded coastal unintruded coastal and at any RMP well wells, 150 mg/L for inland wells unintruded inland wells **KEY FINDING:** 6 RMP exceed MT: Undesirable results (UR) There are SC-A2RA Many wells have Undesirable Results continue to occur: SC-A2RB, SC-A5A, occurring at SC-A2RB & SC-A5B (4 or concentrations SC-A5B, SC-A8A & SC-A2RB, SC-A5A, below MOs (27/36) more consecutive years) SC-A3A in the & SC-A5B SC-A5A (2 consecutive Seascape area years)

SC-A2B & SC-A2RE

1.000

Measurable Objective (MO): goal for each sustainability indicator | **Minimum Threshold (MT):** indicator of potential concern | **Undesirable Result:** combination of MT exceedances that cause significant and unreasonable conditions 5.1.3



Seawater

Intrusion

Seawater Intrusion – Proxy Groundwater Elevations

<text><text><text>

SC-A8A at Dolphin Aquifer Screened: Purisima



Seawater Intrusion

MO are met at several RMPs screened in the Purisima F, DEF, and A units.

Measurable Objective

Conservative

groundwater elevation

proxies for seawater

intrusion prevention

8 of 19 RMP have 5-year moving average elevations below MT Purisima F (1/3), Purisima BC (2/2), Purisima A (2/6), Purisima AA (1/4) Tu (2/2)

There are Undesirable Results because some elevations are below MT KEY FINDING: Undesirable results continue to occur. All aquifers, accept for the Aromas Red Sands and the Purisima DEF unit have at least 1 RMP with 5-year average elevations below MT

Measurable Objective (MO): goal for each sustainability indicator | **Minimum Threshold (MT):** indicator of potential concern | **Undesirable Result:** combination of MT exceedances that cause significant and 5.1.3 unreasonable conditions



Chronic Lowering of Groundwater Levels

Minimum Threshold

Based on levels that

sufficiently supply

overlying land use

Aquifer Screened: Pursima AA



Lowering GW Levels

MO was met at 2 RMP

Measurable Objective

75th percentile

historical groundwater

elevation

No RMP wells exceeded MT

There are no Undesirable Results as no RMP has elevations below MT

Undesirable Result

Any RMP's average

monthly elevation falls

below MT

KEY FINDING: Groundwater elevations remain above MTs

Measurable Objective (MO): goal for each sustainability indicator | **Minimum Threshold (MT):** indicator of potential concern | **Undesirable Result:** combination of MT exceedances that cause significant and 5.1.3 unreasonable conditions

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Reduction of Groundwater in Storage

Measurable Objective

Net extraction that allows for 4 subsequent years of maximum projected extraction without causing undesirable results

Minimum Threshold Pumping volumes that avoid undesirable results in projected Basin simulations Undesirable Result 5-year net extraction exceeds sustainable yield (MT) in any aquifer group

Aquifer Unit Group	Minimum Threshold	Interim Milestone 2025	WY 2020- 1e 2024		
	Five-Year mo	oving average N AFY	let Extraction		
Aromas Red Sands and Purisima F	1,740	1,930	1,959		
Purisima DEF, BC, A and AA	2,280	2,110	2,269		
Ти	930	720	866		

None of the 3 aquifer groups met MOs

1 of 3 aquifer groups exceeded their MTs Aromas Red Sand & Purisima F group There are Undesirable Results as pumping was greater than MT for 1 aquifer group

KEY FINDING:

Undesirable results continue to occur. WY 2024 is the first year Net Extraction in the Purisima DEF, BC, A, and AA units did not exceed MT This is due to record low pumping



Reduction of Storage

Measurable Objective (MO): goal for each sustainability indicator | **Minimum Threshold (MT):** indicator of potential concern | **Undesirable Result:** combination of MT exceedances that cause significant and 5.1.3 unreasonable conditions

De	aradation	of Ground	lwater G	Quality

Minimum Threshold

Based on drinking

water standards for

several constituents of

concern

r Quality	Aquifer	Representative Monitoring Point	Total Dissolved Solids mg/L	Chloride mg/L	lron µg/Lª	Manganese µg/Lª	Arsenic µg/L	Chromium (Total) µg/L	Nitrate as Nitrogen mg/L	Compound Detects µg/L					
		Minimum Threshold	1,000	250	300	50	10	50	10						
			Water Year 2023 Maximum Concentration												
		Aptos Creek PW	NA	NA	NA	NA	NA	NA	NA	NA					
		Ledyard PW	362.0	36.0	77.0	11.0	0.9	1.1	ND	ND					
		SC-23A	254.0	20.1	ND	ND	NA	NA	ND	NA					
		SC-8RB	508.0	14.0	23.0	ND	NA	NA	ND	NA					
Undesirable Result		SC-9RC	418.0	32.0	ND	ND	NA	NA	ND	NA					
Undesnable Result	Purisima	30th Ave Shallow	770.0	53.0	120.0	1,300.0	NA	NA	ND	NA					
Any RMP exceeds MT	A	Pleasure Point Shallow	260.0	34.0	86.0	100.0	NA	NA	ND	NA					
		Estates PW	470.0	48.4	200.0	98.0	0.6	0.8	ND	ND					
as a regult of an MCA		Garnet PW	672.0	87.8	1,460.0	446.0	0.9	1.1	ND	ND					
as a result of all wigh		Tannery 2 PW	560.0	63.0	239.0	154.0	0.7	0.8	ND	ND					
• •		Rosedale 2 PW	486.0	46.5	736.0	284.0	0.6	0.9	ND	0.6 (MTBE)					
project or		Beltz #8 PW	NA	43.0	980.0	270.0	2.0	ND	ND	ND					
		Beltz #9 PW	490.0	51.0	88.0	140.0	0.8	ND	ND	ND					
management action		SC-3RC	420.0	48.9	181.0	35.0	NA	NA	ND	NA					
manayement action		SC-5RA	590.0	59.0	66.0	176.0	NA	NA	ND	NA					
		SC-9RA	374.0	15.2	209.0	10.0	NA	NA	ND	NA					
		SC-10RA	540.0	47.9	736.0	780.0	NA	NA	ND	NA					
		SC-22A	368.0	18.0	419.0	556.0	NA	NA	ND	NA					
	Purisima A/AA	Beltz #10 PW	NA	82.0	1,300.0	390.0	2.9	ND	NA	NA					

MO are met at several RMPs

Measurable Objective

2013-2017 average

concentrations

Several RMPs exceeded MT for iron, manganese, TDS, and chloride There are no Undesirable Results because these MT exceedances result from preexisting conditions

KEY FINDING:

While concentrations above drinking water standards exist, they are not a result of Basin management



Degraded Quality

Measurable Objective (MO): goal for each sustainability indicator | Minimum Threshold (MT): indicator of potential concern | Undesirable Result: combination of MT exceedances that cause significant and unreasonable conditions 5.1.3

Depletion of Interconnected Surface Water

Minimum Threshold

Highest seasonal-low

groundwater elevation

during below-average

rainfall years from the

start of monitoring

through 2015

Measurable Objective

Groundwater elevations higher than the creek bed

Undesirable Result Any RMP has minimum monthly groundwater elevation below MT

RMP	Average Monthly Groundwater Elevation, feet amsl
Balogh	28.7
Main St. Shallow	23.9
Wharf Road	12.7
Nob Hill	9.2
SC-10RA	69.3

NA:...



Surface Water Depletion

One RMP (Wharf Road) met its MO

One RMP (Balogh) has groundwater elevations below MT

There are Undesirable Results because there are groundwater elevations below MT

KEY FINDING:

While Undesirable Results continue, only 1 RMP has elevations below MT

Measurable Objective (MO): goal for each sustainability indicator | **Minimum Threshold (MT):** indicator of potential concern | **Undesirable Result:** combination of MT exceedances that cause significant and unreasonable conditions

Summary of Sustainability Status for Water Year 2024



MGA has until January 2040 to Achieve Sustainability



Progress on GSP Implementation in Water Year 2024

- 1. Completed filling monitoring data gaps in interconnected surface water
- 2. Performed1st Periodic Evaluation submitted to DWR in Jan 2025
- 3. Continued water conservation & demand management
- 4. Pure Water Soquel construction completion anticipated in WY 2025
- 5. City of Santa Cruz Aquifer Storage & Recovery (ASR)
 - Waiting for state action on water rights petition
 - Pilot testing at Beltz # 9 completed in WY 2024
 - Modifications to be made to existing production wells to become ASR wells



Key Take Aways for Water Year 2024

Chloride Increases in Seascape Area

• Coastal monitoring well SC-A2RB & inland SC-A5B near Seascape production well

Coastal Protective Groundwater Elevations

- Coastal groundwater levels remained similar or only slightly increased
- Undesirable results occurring in 8 of 19 representative monitoring wells with 5-year moving average groundwater elevations below MTs
- A project, like Pure Water Soquel, is needed to raise coastal groundwater levels to reduce the risk of seawater intrusion

Groundwater Extraction Lowest since 1985

- Water Year 2024 was a normal water year (rainfall 120% of average)
- Net groundwater extraction remains greater than sustainable yield in Aromas/Purisima F
- Net groundwater extraction in Tu unit and Purisima DEF, BC, A, and AA extraction are below sustainable yield

5.1.3









Seawater

Intrusion



Seawater

Questions

March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 5.2

Title: Review Budget for Fiscal Year 2024-25 and Provide Direction on Preliminary Budget for Fiscal Year 2025-26

Attachment(s):

- 1. Table 1. Budget Summary
- 2. Table 2. Operating Expenses

Recommended Board Action: Provide direction to guide the preparation of the Fiscal Year 2025-26 budget.

The attached Tables 1 and 2 present the projected totals for Fiscal Year 2024-2025 (FY 24/25) and the proposed budget for Fiscal Year 2025-2026 (FY 25/26). The FY 24/25 projected operating expenses are based upon the actual expenses incurred July 1 - January 31 and the projected expenses to June 30. Revenue and expenses are presented on an accrual basis which recognizes revenues when they are earned and expenses when they are incurred, even if the payment has not yet been received.

The following narrative summarizes the MGA's beginning cash reserves, operating revenue, operating expenses, and ending reserves.

BEGINNING RESERVES

The beginning reserves for the MGA for FY 24/25 total \$1,851,622 and is projected for FY 25/26 to total \$1,364,520. The beginning reserves amount is the ending reserves amount from the prior year plus any surplus of revenue collected from the prior year over the actual expenses incurred.

OPERATING REVENUE

Operating revenue consists of grant awards and Member Agency contributions. The projected operating revenue for FY 24/25 is projected to be \$585,000 and the preliminary budget for FY 25/26 is \$575,000.

<u>Sustainable Groundwater Management Implementation Grant (SGMI Grant)</u> *Total: \$7,600,000; Years: 2022 – 2025*

Awarded in 2022, this Department of Water Resources (DWR) grant partially funds planning activities and the implementation of selected projects and management Board of Directors March 20, 2025 Page 2 of 9

actions identified in the GSP. The grant includes five (5) separate component projects (described further below in this memo). Components 1 - 4 are led by the Member Agencies; eligible project costs will be reimbursed by the grant. The lead Member Agencies are funding their respective Component(s) as work proceeds (e.g., consultant contracts) and will be reimbursed in arrears as the MGA is reimbursed by DWR via quarterly grant submittals.

<u>Member Agency Contributions</u> – Revenue collected from Member Agencies funds operating expenses. The annual contributions amount is based upon projected operating expenses for the fiscal year, anticipated revenue from grants, and the amount in reserves. In FY 25/26, the preliminary budget does not include contributions from Member Agencies because the amount of anticipated revenue from the grant reimbursements and the amount in reserves do not necessitate a contribution this year.

Member Agency Contributions - SGMI Grant Administration

Revenue for SGMI Grant administration (which is not reimbursed by the grant) will be contributed via annual invoices to Soquel Creek Water District and the City of Santa Cruz for the grant administration costs related to their respective SGMI Grant Components. The projected amount for FY 25/26 is \$75,000.

OPERATING EXPENSES

The operating expenses are presented in the following budget categories:

- Administration
- Legal Support
- Management and Coordination
- Monitoring: Network Expansion, Data Collection, Analysis and Management
- Groundwater Sustainability Plan (GSP) Reporting
- Outreach and Education

Total operating expenses in FY 25/26 are proposed to be \$903,000. This is a reduction of 25% from FY 24/25.

Budget Category: Administration

This budget category includes costs related to the administration of the MGA, including administrative staff support, contracts management, finance staff support and related expenses, insurance, organizational memberships and conferences, as well as miscellaneous supplies and materials.

FY 24/25: The approved budget is \$178,650.

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FY 25/26: The preliminary budget is \$160,500.

Budget Category: Legal Support

As in prior years, the County of Santa Cruz provides general legal counsel. In 2023, the MGA selected the firm Best Best & Krieger, LLP (BBK) to provide legal counsel, as needed, on matters pertaining to the Sustainable Groundwater Management Act (SGMA).

FY 24/25: The approved budget is \$30,000.

FY 25/26: The preliminary budget is \$30,000.

Budget Category: Management and Coordination

This category includes three components:

- Technical work in support of SGMA implementation
- Planning Activities and Implementation Coordination
- SGMI Grant Administration

FY 24/25: The approved budget for this category is \$300,000

FY 25/26: The preliminary budget is \$306,000.

Technical Work: SGMA Support

Montgomery & Associates (M&A) conducts various tasks to support and inform SGMA implementation and agency planning, including tracking SGMA Program Development, consultation and coordination with DWR.

FY 24/25: The approved budget is \$12,084.

FY 25/26: The preliminary budget is \$12,000.

Planning Activities & Implementation Coordination

RWMF is supporting GSP Implementation Coordination and Planning Activities. Tasks in this category include: tracking the progress of the Project and Management Actions (PMAs) identified in the GSP; meeting coordination and facilitation; assisting with the coordination of GSP implementation activities outlined in Chapter 5 of the GSP; assisting in identifying grant opportunities; and considering long-term funding approaches. In 2024, following a solicitation for Request for Qualifications, the MGA selected SCI Consulting Group to study potential approaches for long-term funding necessary for operation of the MGA to comply with SGMA.

FY 24/25: The approved budget is \$187,916. This includes approximately \$50,000 for SCI Consulting to complete the evaluation of long-term funding approaches to comply with SGMA.

FY 25/26: The preliminary budget is \$209,000. This includes \$100,000 for a consultant to support the implementation of a long-term funding approach.

<u>SGMI Grant Administration</u> RWMF is supporting the SGMI Grant administration.

FY 24/25: The approved budget for this work is \$100,000.

FY 25/26: The preliminary budget for this work is \$85,000.

<u>Budget Category: Monitoring Network, Data Collection, Analysis &</u> <u>Management</u>

FY 24/25: The total for this budget category is \$389,000. Funding for Basin monitoring activities is included in the SGMI Grant.

FY 25/26: The preliminary budget for this work is \$151,000.

This category includes the following tasks:

Monitoring Network

FY 24/25: The proposed budget is \$29,000 to support ongoing monitoring activities such as consultant technical support and monitoring equipment (as needed).

FY 25/26: The preliminary budget is \$25,000.

Monitoring: Streamflow

The GSP established Sustainable Management Criteria (SMC) for the depletion of interconnected surface water based on the shallow well and associated streamflow data available in the Basin. Monitoring is needed to evaluate the associated SMC over time.

FY 24/25: \$35,000 is budgeted for Trout Unlimited to conduct Basin streamflow monitoring. The streamflow monitoring efforts are associated with MGA's monitoring

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of nearby shallow groundwater monitoring wells. SGMA requires Groundwater Sustainability Plans to address and quantify depletions of interconnected surface waters to avoid adverse impacts on beneficial uses and consider impacts to groundwater-dependent ecosystems.

FY 25/26: The preliminary budget for Trout Unlimited to continue this work is \$45,000.

Monitoring: Seawater Intrusion

The MGA continues to evaluate seawater intrusion in the aquifers along the coast of the Basin and to characterize the source and extent (vertically and spatially) of the high chloride water in Seascape and the surrounding area. Work continues to assess the need to replicate prior airborne electromagnetic (AEM) surveys or alternatively conduct geophysical surveys and/or inland electromagnetic (EM) surveys.

FY 24/25: \$240,000 is budgeted to evaluate seawater intrusion. This includes work to be performed by M&A and other consultants to conduct field work and investigations to delineate saltwater intrusion using various EM approaches, electromagnetic induction logging, water quality lab analytic testing, and related analyses. Geophysical Imaging Partners is analyzing the 2017 and 2022 AEM data.

FY 25/26: The preliminary budget to continue this work is \$45,000.

Data Coordination & Data Management System (DMS)

The MGA collaborated with the neighboring Santa Margarita Groundwater Agency and the member agencies of both GSAs (Partner Agencies) to develop a DMS. The MGA entered into a funding agreement with the County of Santa Cruz for its proportional share of the consultant (KISTERS) costs to develop and maintain the DMS.

FY 24/25: The approved budget is \$30,000 for KISTERS' annual DMS hosting fee, user licenses, and software as well as DMS-support from M&A.

FY 25/26: The preliminary budget is \$26,000.

Groundwater Extraction Metering Program

The MGA is developing a groundwater metering program that applies to two categories of users: (1) all non-de minimis pumping operations expected to extract more than 5 acre-feet per year, and (2) all non-de minimis pumping operations expected to extract more than 2 acre-feet per year that may impact seawater intrusion or an interconnected stream where groundwater dependent ecosystems are identified in the GSP.

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FY 24/25: The approved budget is 55,000. The current projected total for this work is 15,000 as work to date indicates fewer meter installs will be needed than initially assumed.

FY 25/26: \$10,000 is proposed to continue this work.

Budget Category: GSP Reporting

FY 24/25: The total for this budget category is \$156,550. Funding for GSP Reporting is included in the SGMI Grant.

FY 25/26: The preliminary budget for this work is \$215,500.

This category includes the following tasks:

Groundwater Sustainability Plan Annual Report and Data Reporting

Annual reporting to DWR by April 1st on the GSP implementation is a requirement under SGMA. In addition, semi-annual (2x/year) Basin data reporting to DWR via the SGMA portal is required. M&A will prepare the Annual Report and will compile, format and submit the monitoring data to the SGMA portal.

FY 24/25: The approved budget to develop the GSP Annual Report Water Year 2024 and complete the semi-annual data reporting is \$91,050.

FY 25/26: The preliminary budget for the same tasks is \$95,000.

GSP Periodic Evaluation (5-Year)

The GSP Periodic Evaluation (2025) was successfully completed. Work was led by M&A with support from RWMF and Member Agency staff. The Periodic Evaluation was approved by the Board in December 2024 and submitted to DWR on January 30, 2025. Funding for this work was included in the SGMI Grant.

FY 24/25: The approved budget is \$65,500; the projected expenses are slightly higher by approximately \$2,000.

FY 25/26: No allocation. The next Periodic Evaluation is due by January 30, 2030.

GSP Periodic Evaluation Groundwater Modeling

In December 2024, the Board approved an amendment to the M&A contract for improvements to the groundwater model necessary for the next GSP Periodic Evaluation (due by 2030) in an amount not to exceed \$241,000 (split between the two FYs). Partial funding for this work is included in the SGMI Grant.

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FY 24/25: The budget is 120,500.

FY 25/26: The preliminary budget is 120,500.

Budget Category: Outreach & Education

FY 24/25: The approved budget for outreach is \$30,000 to support ongoing community outreach and engagement on GSP implementation efforts, the non-de minimis groundwater metering program, long-term SGMA compliance funding, and the GSP Periodic Evaluation

FY 25/26: The preliminary budget is \$40,000. The budget increase allows for additional outreach around long-term funding approaches for SGMA compliance.

MEMBER AGENCY LEAD PROJECT & MANAGEMENT ACTIVITIES

SGMI Grant Components

As noted above, the MGA's \$7.6 million Sustainable Groundwater Management Implementation (SGMI) grant award from DWR is funding implementation activities. Four of the Components are led by Member Agencies (Soquel Creek Water District, City of Santa Cruz, County of Santa Cruz); they are leading the contracting and management of their respective components. The MGA entered into sub-grantee agreements with the respective Member Agencies. The Member Agencies will be reimbursed in arrears via the MGA for eligible expenses submitted to and approved by DWR as part of the quarterly grant reporting process. The MGA will reimburse the Member Agencies upon receipt of the grant funds from DWR.

	Lead	Grant
Component Title	Agency	Amount
Cunnison Lane Groundwater Well	SqCWD	\$1,734,560
	City of Santa	
Aquifer Storage and Recovery, Beltz Wellfield	Cruz	\$1,650,000
Park Avenue Transmission Main/Bottleneck		
Improvements	SqCWD	\$740,440
	SqCWD &	
Technical Development of Group 1 and 2 Projects	City of Santa	
and Management Actions	Cruz	\$1,900,000
Sustainable Groundwater Management	MGA &	
Evaluation and Planning	County	\$1,575,000
Total		\$7,600,000

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ENDING RESERVES

<u>General Reserves</u>

Prudent financial management requires that the agency carry a general reserve in order to manage cash flow and mitigate the risk of expense overruns in case actual expenses are greater than anticipated in the budget. The MGA is currently maintaining higher general reserves due to the potential for delays in grant reimbursements related to factors (e.g., state budget process) beyond the control of the MGA.

The estimated projected ending general reserves for FY 24/25 are \$1,364,520 and the preliminary estimate of the ending general reserves in FY 25/26 are \$1,036,520.

Contingency Fund

The contingency fund is set aside to cover unexpected costs. As proposed for FY 25/26, the contingency is \$90,300. This is 10% of total operating expenses.

5-Year GSP Evaluation (2025) Reserve

This reserve, initiated in FY 21/22 prior to the award of the SGMI Grant, was intended to spread out the financial contributions of the Member Agencies to be used to fund the initial Periodic (5-Year) Evaluation (also referred to as the 5-Year Update) over four years from FY 21/22 through FY 24/25. The reserve was drawn down in FY 24/25 and incorporated into Beginning Reserves.

Member Agency Contributions

In prior years, the budget has included member agency contributions as a component of operating revenue. Prior years' member agency contributions and grant funding have built up sufficient cash reserves such that there is no proposed contribution from the Member Agencies for FY 25/26.

Recommended Board Action:

1. By MOTION, provide direction to guide the preparation of the Fiscal Year 2025/2026 budget.

Submitted by:

Tim Carson Program Director Regional Water Management Foundation Board of Directors March 20, 2025 Page 9 of 9

Leslie Strohm

Treasurer

Santa Cruz Mid-County Groundwater Agency

On behalf of the MGA Executive Staff

Melanie Mow Schumacher, General Manager, Soquel Creek Water District Ralph Bracamonte, District Manager, Central Water District Heidi Luckenbach, Water Director, City of Santa Cruz Sierra Ryan, Water Resources Manager, County of Santa Cruz

Table 1. BUDGET SUMMARY

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY BUDGET SUMMARY STATEMENT OF REVENUES, EXPENSES AND CHANGES IN RESERVES FISCAL YEAR 2024/2025 AND FISCAL YEAR 2025/26 BUDGET

	2023/24 ACTUALS			2024/25 BUDGET		2024/25 PROJECTED TOTALS		2025/26 PROPOSED BUDGET	(INCREASE DECREASE) OVER PRIOR YEAR BUDGET	% CHANGE OVER PRIOR YEAR BUDGET
Reginning Reserves											
Beginning Cash Reserves	Ś	1 821 000	Ś	1 776 622	Ś	1 767 922	Ś	1 364 520	Ś	(412 102)	-23%
Drawdown of 5-Year GSP Evaluation (2025) Reserve	Ś		Ś	75.000	Ś	75.000	Ś		Ŷ	(122)202)	20,0
Total Beginning Reserves	\$	1,821,000	\$	1,851,622	\$	1,842,922	\$	1,364,520	\$	(412,102)	-22%
Operating Revenue											
Agency Contributions	Ś	100.000	\$	-	Ś	-	Ś	-	Ś	-	
Agency Contributions - SGMI Grant Administration	Ś	50.330	Ś	60.000	Ś	85.000	Ś	75.000	Ś	15.000	25%
Grant Funds (Received)	Ŧ		Ŧ	,	T	,	Ŧ		т		
DWR Planning (SGWP) (2018 - 2023) Retention Release	\$	-	\$	-	\$	-	\$	-	\$	-	
DWR SGM Implementation (SGMI) (2022 - 2025) ¹	Ś	487.350	\$	500.000		\$500.000	Ś	500.000	Ś	0	0%
Total Operating Revenue	\$	637,680	\$	560,000	\$	585,000	\$	575,000	\$	15,000	3%
Operating Expense											
Administration	\$	143,924	\$	178,650	\$	172,000	\$	160,500	\$	(18,150)	-10%
Legal	\$	14,952	\$	30,000	\$	15,000	\$	30,000	\$	-	0%
Management & Coordination	\$	211,668	\$	300,000	\$	305,000	\$	306,000	\$	6,000	2%
Monitoring	\$	124,057	\$	389,000	\$	262,300	\$	151,000	\$	(238,000)	-61%
GSP Reporting											
GSP Annual Report & Related Data Reporting	\$	88,104	\$	91,050	\$	91,050	\$	95,000	\$	3,950	4%
GSP Periodic Evaluation (PE) (2025)	\$	91,787	\$	65,500	\$	67,552	\$	-	\$	(65,500)	100%
GSP Periodic Evaluation Groundwater Modeling ²	\$	-	\$	120,500	\$	120,500	\$	120,500	\$	-	
Outreach & Education	\$	16,266	\$	30,000	\$	30,000	\$	40,000	\$	10,000	33%
Total Operating Expense	\$	690,758	\$	1,204,700	\$	1,063,402	\$	903,000	\$	(301,700)	-25%
Ending Reserves											
Contingency		81,098		108,420		108,420		90,300	\$	(18,120)	-17%
5-Year GSP Evaluation (2025) Reserve		75,000		-		-		-	\$	-	0%
General Reserve		1,611,824		1,219,002		1,256,100		946,220		(272,782)	-22%
Total Ending Reserves ³	\$	1,767,922	\$	1,327,422	\$	1,364,520	\$	1,036,520	\$	(290,902)	-22%
Member Agency Lead Project & Management Activities											
SGM Implementation (SGMI) Grant Components	\$	1,707,635	\$	3,800,000	\$	3,800,000		1,600,000			

Notes:

1. Operating Revenue on Grant Funds for the DWR Implementation (Anticipated 2022 - 2025) only includes MGA led activities, not Member Agency led activities

2. Groundwater Model improvements approved by Board in December 2024 will inform next Periodic Evaluation

3. Ending reserves are calculated using the accrual basis of accounting and do not reflect actual cash reserves

4. Contingency in FY24/25 is based upon 10% of the FY 24/25 budget as approved in June 2025

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY OPERATING EXPENSES FISCAL YEAR 2024/2025 AND FISCAL YEAR 2025/26 BUDGET

		Ž	2023/24 ACTUALS		2024/25 BUDGET	Ρ	2024/25 PROJECTED TOTALS	ſ	2025/26 PROPOSED BUDGET	(I O YE	INCREASE DECREASE) VER PRIOR AR BUDGET	% CHANGE OVER PRIOR YEAR BUDGET
Operating Expanse												
Administration		Ś	143 974	Ś	178 650	¢	172 000	¢	160 500	¢	(18 150)	-10%
		ې د	14 952	ب د	30,000	ب د	172,000	ب د	30,000	<u>ې</u> د	(18,150)	-10%
Management & Coordination		Ý	14,552	Ŷ	50,000	Ŷ	13,000	Ŷ	30,000	Ŷ		0/0
Technical Work: SGMA Support		Ś	36.140	Ś	12.084	Ś	5.000	Ś	12.000	Ś	(84)	
Planning Activities & Implementation Coordination		•	,	\$	187,916	\$	135,176	\$	209,000	\$	21,084	
SGMI Grant Administration		\$	70,769	\$	100,000	\$	115,000	\$	85,000	\$	(15,000)	
	subtotal	\$	211,668	\$	300,000	\$	305,000	\$	306,000	\$	6,000	2%
Monitoring: Basin Network, Data Collection, Analysis & Managen	nent											
Monitoring Network		\$	71,188	\$	29,000	\$	20,000	\$	25,000	\$	(4,000)	
Monitoring: Streamflow		\$	30,382	\$	35,000	\$	50,000	\$	45,000	\$	10,000	
Monitoring: Seawater Intrusion		\$	-	\$	240,000	\$	154,800	\$	45,000	\$	(195,000)	
Data Coordination & Data Management System		\$	22,487	\$	30,000	\$	22,500	\$	26,000	\$	(4,000)	
Groundwater Extraction Metering Program Implementation		\$	-	\$	55,000	\$	15,000	\$	10,000	\$	(45,000)	
	subtotal	\$	124,057	\$	389,000	\$	262,300	\$	151,000	\$	(238,000)	-61%
GSP Reporting												
GSP Annual Report & Related Data Reporting		\$	88,104	\$	91,050	\$	91,050	\$	95,000	\$	3,950	
GSP Periodic Evaluation (5-Year)		\$	91,787	\$	65,500	\$	67,552	\$	-	\$	(65,500)	
GSP Periodic Evaluation (5-Year) Groundwater Modeling		\$	-	\$	120,500	\$	120,500	\$	120,500		-	
	subtotal	\$	179,891	\$	277,050	\$	279,102	\$	215,500	\$	(61,550)	-22%
Outreach & Education		\$	16,266	\$	30,000	\$	30,000	\$	40,000	\$	10,000	33%
Total Operating Expense		\$	690,758	\$	1,204,700	\$	1,063,402	\$	903,000	\$	(301,700)	-25%
Member Agency Lead Project & Management Activities												
SGM Implementation (SGMI) Grant Components		\$	51,707,635		\$3,800,000		3,800,000		\$1,600,000			

March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 5.3

Title: Consider Consultant Selection for Planning and Technical Services

Attachment(s):

1. Montgomery & Associates Statement of Qualifications

Recommended Board Action: Approve consultant selection for planning and technical services.

Background

The Santa Cruz Mid-County Groundwater Agency (MGA) has relied on consultant support for planning and technical services for the development and subsequent implementation of its Groundwater Sustainability Plan (GSP) since its inception. In November 2020, the MGA approved the selection of Montgomery & Associates (M&A) to provide planning and technical services following a competitive Request for Qualifications (RFQ) process. The M&A professional services agreement has been renewed on an annual basis. The MGA's procurement policy allows professional services to be procured for up to three years, with the option to extend up to two additional years as long as performance is satisfactory and pricing remains competitive.

On January 17, 2025, an RFQ for planning and technical services was posted on the MGA website. The RFQ was also announced through the MGA e-blast and was noticed on a clearinghouse for consultants hosted by the California Special Districts Association. The RFQ was due to MGA by February 14, 2025.

Discussion

In response to the RFQ, M&A was the only firm to submit a Statement of Qualifications (SOQ). A committee of MGA Member Agency staff and representatives consisting of Heidi Luckenbach (City of Santa Cruz Water Department), Sierra Ryan (County of Santa Cruz), and Rob Swartz (Regional Water Management Foundation) completed an evaluation of the M&A SOQ. The committee found the M&A SOQ to be fully responsive and recommends the MGA Board consider approval of the selection of M&A to provide planning and technical services to MGA.

Board of Directors March 20, 2025 Page 2 of 2

As with past consulting support services, the engagement is assumed to be for a period of three years with up to two one-year extensions subject to satisfactory performance. If the Board approves the selection of M&A, MGA staff will develop a professional services agreement and a year one (July 1, 2025 – June, 30, 2026) scope schedule and budget for consideration of MGA Board approval at its June 12, 2025 meeting.

Recommended Board Action:

1. By MOTION, approve the consultant selection for planning and technical services.

Submitted by:

Rob Swartz Senior Planner Regional Water Management Foundation

On behalf of the MGA Executive Staff

Melanie Mow Schumacher, General Manager, Soquel Creek Water District Ralph Bracamonte, District Manager, Central Water District Heidi Luckenbach, Water Director, City of Santa Cruz Sierra Ryan, Water Resources Program Manager, County of Santa Cruz February 14, 2025



Statement of Qualifications

5.3.1

Planning and Technical Services for GSP Implementation and Reporting





1970 Broadway, Suite 225 Oakland, CA 94612 elmontgomery.com

353 of 428



Rob Swartz Santa Cruz Mid-County Basin Point of Contact basinpoc@midcountygroundwater.org

SUBJECT: PLANNING AND TECHNICAL SERVICES FOR THE GROUNDWATER SUSTAINABILITY PLAN IMPLEMENTATION AND REPORTING

Dear Mr. Swartz:

Santa Cruz Mid-County Groundwater Agency (MGA) is seeking a consultant to support the planning, implementation, and reporting for the Groundwater Sustainability Plan (GSP), and Montgomery & Associates (M&A) is the most qualified firm to fulfill this need. Our extensive experience working with the MGA and its member agencies, together with our statewide GSP development, implementation, and reporting experience is a direct benefit to the MGA.

Since the adoption of the Sustainable Groundwater Management Act (SGMA) in 2014, M&A has been at the forefront of its implementation. Principal Hydrogeologist Georgina King, P.G., C.Hg., will continue to serve as project manager for the MGA's planning and technical services. Georgina successfully assisted the MGA with GSP development, various implementation tasks, and the 2025 Periodic Evaluation. Georgina also works with other GSAs across the state on GSP implementation. Cameron Tana, P.E., principal hydrologist, will serve as modeling lead and senior reviewer. We have teamed with local subconsultant Mike Podlech, with whom we can consult on aquatic ecology issues should the need arise. Mike has experience working in the Soquel Creek watershed and will complement our team with his local knowledge. M&A is committed to ensuring that these key staff, along with our technical and support staff, are available to fully support the MGA over the next 5 years.

We have successfully assisted more than 15 GSAs with GSP development, implementation, and reporting. The project team's combined experience includes the following:

- Providing technical and regulatory advice on SGMA requirements and required reporting
- Compiling and authoring public agency GSPs within agreed-upon scope, schedule, and budget
- Extensive work in the Santa Cruz Mid-County Groundwater Basin
- Working with integrated hydrogeological models and developing hydrogeological conceptual models and groundwater budgets
- Investigating seawater intrusion
- Assessing groundwater and surface water interactions and impacts to groundwater-dependent ecosystems
- Collecting and interpreting groundwater- and surface water-related data

In addition to our extensive work with GSAs, M&A supported the Department of Water Resources (DWR) with the development of the *Guide to Annual Reports, Periodic Evaluations, and Plan* <u>Amendments</u> and associated <u>Frequently Asked Questions and Available Resources</u> document. This work has given us a thorough understanding of GSA implementation activities and reporting, and we are highly



qualified to provide technical support for this phase of the MGA's GSP implementation. Our experience aligns with the services listed in the RFQ as follows:

SGMA Technical Support *including hydrogeologic technical support, groundwater modeling, and groundwater model enhancement*: M&A staff are experts in developing seawater intrusion sustainability management criteria, which may need to be re-evaluated at some coastal wells based on rising chloride concentrations. In addition, M&A is experienced with working on the interconnected surface water indicator in this and other basins. M&A developed, calibrated, and continues to use the Basin's GSFLOW model for the MGA member agencies. M&A is also conducting tasks to improve the structure of the model for the MGA based on new information.

Annual Reporting: M&A has prepared 6 annual reports for the MGA GSP. Most of the project team included in this SOQ have also worked on the annual reports.

Periodic Evaluation: M&A prepared the MGA's first periodic evaluation in January 2025. We also completed a periodic evaluation for the Salinas Valley's 180/400-Foot Aquifer Subbasin and developed the Pajaro Valley Water Management Agency's 5-Year Update to its alternative submittal for SGMA. M&A is also assisting 3 Sonoma GSAs to prepare their periodic evaluations.

Thank you for considering our Statement of Qualifications. We are confident that M&A has the local experience, technical expertise, and staff availability to manage the MGA's GSP implementation and reporting tasks, and we look forward to continuing to work with you. Please contact **Georgina King at** <u>gking@elmontgomery.com</u> or (415) 939-4150 if you have questions or need clarification on our SOQ.

In addition to preparing this SOQ, we have reviewed the example Professional Services Agreement included in the RFQ. We kindly request that the following changes be made:

Section 6: strike the third sentence, which reads, "If Consultant normally carries insurance in an amount greater than the minimum amount required by MGA for this Agreement, that greater amount shall become the minimum required amount of insurance for purposes of this Agreement."

Section 11: strike "defend (with counsel reasonably approved by MGA)" from the first sentence.

Sincerely, MONTGOMERY & ASSOCIATES

Georgina King, P.G., C.Hg. Principal Hydrogeologist (415) 939-4150 | <u>gking@elmontgomery.com</u>



1. Qualifications

Groundwater is an essential resource in California. Montgomery & Associates (M&A) has been a leader in water resources consulting for 40 years, providing expert groundwater development and management services.

Company Profile

M&A serves municipal, agricultural, industrial, tribal, and mining clients throughout the West. We provide quality services in water resource planning, environmental hydrogeology, groundwater modeling, surface water-groundwater interaction, water supply and recharge, data management, and mining hydrogeology. The company employs 88 skilled professionals in the United States and 53 in South America. Our staff are currently managing 109 active projects across all offices, combining technical proficiency and planning experience to deliver integrated solutions to water managers and providers.

Since Dr. Errol L. Montgomery founded M&A in 1984, we have earned a reputation for excellence and client satisfaction. Partnering with clients, we develop, manage, and protect groundwater resources. We combine our knowledge and experience to provide science-based solutions to water resource challenges.

With headquarters in Tucson, we have regional offices in Arizona, California, Nevada, Utah, and South America.

Groundwater Management

M&A is a leader in developing plans to protect and manage groundwater and surface water resources at a regional scale and in implementing local groundwater projects to improve water reliability and sustainability. Our groundwater



Tucson (headquarters)

management plans provide a clear roadmap for our clients by including a complete assessment of desired groundwater conditions and viable paths to achieving those conditions. Our plans encompass a thorough inventory of potential water supplies, projections of future demands, and a comprehensive assessment of the various strategies and projects to reach desired conditions. More than just technical memoranda, our management plans integrate our technical expertise in groundwater modeling and managed aquifer recharge within the framework of water policy and water economics. Knowing that management plans must be understood and accepted by many parties, we use advanced visualization tools to communicate technical concepts in clear and understandable terms to stakeholders and clients.

With the acquisition of HydroMetrics Water Resources Inc. in 2018, M&A has secured a reputation as a leading firm in implementing California's Sustainable Groundwater Management Act (SGMA). Since the inception of SGMA, M&A has been a leader, serving as advisors to the California Department of Water Resources (DWR), local water agencies, local stakeholders and growers, and non-governmental



organizations to develop and direct statewide and local SGMA policy. Our experience covers all aspects of SGMA implementation including forming Groundwater Sustainability Agencies (GSAs), applying to modify groundwater basin boundaries, applying for grant funding, leading the development of Groundwater Sustainability Plans (GSPs), implementing GSPs, and preparing annual reports, periodic evaluations, and amended GSPs.

Our work across California over the past 10 years has afforded us perspective and understanding of various basin settings, sustainability issues, and implementation approaches. M&A professionals have responded effectively to the challenges GSAs face in different regions, have efficiently guided them through the early phases of SGMA, and continue to provide strategic advice to help with successful GSP implementation to reach sustainability.

Groundwater Modeling

M&A offers one of the largest, most experienced groundwater modeling teams in the western United States. We employ nearly 20 professionals who are skilled in a variety of numerical groundwater flow and contaminant transport modeling codes for both saturated and unsaturated media, including MODFLOW, GSFLOW, MODFLOW-OWHM, MODFLOW-USG, MODFLOW-SURFACT, IWFM, FEFLOW, MT3D, and Hydrus, as well as PEST for model calibration. M&A's modeling team regularly develops custom tools to provide enhanced analyses by automating modeling tasks and providing our clients advanced analytical methods. We have integrated the results of our groundwater models with decision support tools to allow our clients to quantify uncertainties, estimate risks, and connect hydrologic results to project outcomes. In addition, we often use 3D geologic models to develop model grids and parameterizations and present results in a way that is accessible to project stakeholders.

As part of our modeling process, we routinely manage large and complex datasets such as agricultural and crop water demand, stream-aquifer interactions, and tailings buildout designs. In addition, our predictive models often incorporate future uncertainties such as climate change or estimated future urban and agricultural water demand through scenarios or probabilistic simulations. M&A professionals are also experts in SGMA implementation, having served as advisors to DWR, public and private water agencies, local stakeholders and growers, and non-governmental organizations. Because M&A has been involved with SGMA implementation since 2015, our team has a thorough understanding of SGMA legislation and GSP regulations and are adept at helping GSAs strategize for successful implementation. We specialize in water resource planning, groundwater modeling, and data management, and our expertise is enhanced by our proficiency in GIS analyses and 3D hydrogeologic visualization.



Key Personnel

Our key personnel are highlighted in the following organization chart and brief biographical descriptions. This team is fully committed to the MGA's planning and technical services for GSP implementation and reporting. The M&A team has the capacity to complete annual reports, the next periodic evaluation, and address other needs the MGA may have over the next 5 years. Our team's relevant experience working on GSP implementation for the MGA and other GSAs is an added benefit. Resumes for the project team members are included as Appendix A.







Georgina King, P.G., C.Hg. | Project Manager

Georgina King, principal hydrogeologist, will serve as project manager. She has more than 30 years of professional groundwater experience, 24 of which have been in California where she has managed and conducted technical hydrogeologic studies on groundwater management, sustainable yield, groundwater quality, resource development and protection, and groundwater modeling projects. She has been involved in GSP development in Ventura, Santa Cruz, and Tulare Counties and has

advised GSAs in Sonoma County on development of sustainable management criteria. Georgina was the technical lead for the DWR-approved Santa Cruz Mid-County Basin GSP and project manager for the Santa Margarita Basin GSP. In 2024, she was involved in developing an amended GSP for the Mid-Kaweah GSA. She was project manager on the MGA's recently submitted 2025 Periodic Evaluation. Other project experience includes client liaison and coordination and overseeing design, construction, development, and testing of public water supply wells and monitoring wells across California. Georgina is a California professional geologist and certified hydrogeologist who holds an M.S. in geohydrology and a B.S. in engineering geology.

Cameron Tana, P.E. | Modeling Lead and Senior Technical Reviewer

Cameron Tana is a principal hydrologist who will serve as modeling lead and senior technical reviewer. Cameron is an expert groundwater modeler with extensive experience assisting public agencies in California manage their groundwater resources. He led development of the GSFLOW integrated surface water-groundwater model for the Santa Cruz Mid-County Basin, continues to manage

application of the model to evaluate projects for the MGA member agencies, and is leading the effort to implement structural improvements in the model for the MGA. He is experienced at communicating technical findings to advance groundwater management, taking into account legal, economic, and political challenges. He has a wide variety of experience in groundwater basin management and has been at the forefront of SGMA implementation, including leading development of the 5-year Periodic Evaluation of PV Water's GSP Alternative. Cameron holds an M.Eng. and a B.S. in civil and environmental engineering and an A.B. in economics.



Pete Dennehy, P.G., C.Hg. | Technical Support

Pete Dennehy, senior hydrogeologist, is a California professional geologist and certified hydrogeologist who will provide technical support to the team. Pete was a key team member on the MGA's 2025 Periodic Evaluation and on the Santa Margarita Basin GSP. He has worked on a number of other GSPs and Annual Reports throughout California, including the Santa Margarita Basin. He is adept at

using his technical hydrogeology expertise and project management skills to ensure timely, high-quality deliverables. Pete is working on seawater intrusion and interconnected surface water analyses for the Sonoma Valley and Petaluma Valley Basins. He holds an M.S. in hydrology and a B.S. in geology.





Nick Byler, P.G., C.Hg. | Technical Support

Nick Byler, hydrogeologist, is a California professional geologist and certified hydrogeologist who will provide technical support to the team. Nick has experience with project management and expertise in hydrogeologic investigations. He specializes in sustainable groundwater resources management and water supply. Nick has led field activities and provided drilling and construction oversight for numerous

municipal supply and seawater intrusion prevention wells, many of which are in the Santa Cruz Mid-County Basin. His experience includes water supply well permitting, design, construction, and development; monitoring well and piezometer installation; well destruction; and aquifer testing analysis. For the past 2 years, Nick has been the task manager responsible for the MGA annual reporting. Nick earned his B.S. in earth science.

Patrick Wickham, P.G. | Groundwater Modeler

Patrick Wickham, hydrogeologist, will serve as lead staff groundwater modeler and provide technical and analytical support to the team. He is a California professional geologist who specializes in groundwater management, modeling, and data analysis. Patrick has contributed to projects across California, with a recent focus on the Central Coast and Sacramento Valley to assist with GSP implementation. He is M&A's

lead staff modeler on the Santa Cruz Mid-County Basin Optimization Study nearing completion. He held a similar role as modeler for the Corning Subbasin groundwater model where he developed tools to extract and summarize data to compare to the neighboring subbasin models for inter-basin coordination efforts. He holds an M.S. in hydrologic sciences and a B.S. in environmental science with a geology minor.



Carlotta Leoncini, Ph.D. | Groundwater Modeler

Carlotta Leoncini, hydrogeologist, will serve as a groundwater modeler. She has extensive experience in contaminant hydrology and numerical modeling. She has led successful projects on contaminated sites and has experience in artificial recharge and seawater intrusion prevention. Carlotta is especially skilled in MODFLOW and PEST, having completed a dozen historical and predictive numerical

models. She holds a Ph.D. in hydrogeology, an M.S. in geology, a B.S. in geological sciences, and a geologist in training registration.



Luis Mendez | DMS Access / Hydrogeologist

Luis Mendez, hydrogeologist, will provide Data Management System (DMS) access and support for the team. He is skilled in GIS, cartography, and hydrogeology and has experience in groundwater well development; well construction, maintenance, and rehabilitation; and contractor oversight. Luis provides GIS and data support for the Santa Cruz Mid-County and Santa Margarita Basin GSP development and

implementation. He holds a B.S. in environmental science.




Mike Podlech, Aquatic Ecologist

Mike Podlech will serve as the Aquatic Ecologist who will assist M&A with any work related to groundwater dependent ecosystems (GDEs). Mike is an independent fisheries biologist with more than 25 years of experience in the investigation and management of biological, physical, and chemical conditions of streams, rivers, lakes, and lagoons throughout California. He has extensive experience in sensitive

aquatic resource assessments, watershed management, stream and estuarine restoration, impact analyses, and compliance monitoring. Mike has been the lead fisheries biologist on numerous large CEQA/NEPA projects and regularly engages in Endangered Species Act consultations, including the preparation of Biological Assessments (BA) and Safe Harbor Agreements (SHA). Mike's role on the Monitoring and Adaptive Management Plan to evaluate possible pumping effects on Soquel Creek was to develop a

M&A successfully teamed with Mike Podlech on the Soquel Creek Monitoring and Adaptive Management Plan. The seamless integration with the M&A team will ensure any updates to the GSP for interconnected surface water and groundwater-dependent ecosystems will meet SGMA requirements.

contingency approach for field checking of species during potential pump testing.

The M&A team is also supported by skilled technical editors and document preparation experts.



2. Experience with Similar Projects

Our extensive SGMA-related experience provides the skills and expertise necessary to support the MGA in its planning and technical services for GSP implementation. The following map shows M&A's groundwater sustainability planning and implementation work throughout California. We have successfully assisted more than 15 GSAs with GSP development, implementation, and reporting; groundwater monitoring; SGMA-related technical services; groundwater modeling; and periodic evaluation and GSP amendment support. The



matrix on the following pages lists the services we provided for each of our SGMA clients.





M&A Experience with SGMA-related Services

Client	Basin/Subbasin	Strategic Support	GSA Committees and Board Meetings	Grant Application Support	GSP Development	Hydrogeologic Conceptual Model	Groundwater Modeling	Water Budgets	SMC Development	Seawater Intrusion Data Gaps	Interconnected Surface Water Data Gaps	Monitoring Data Gaps	Water Quality Data Gaps	Inter-basin Coordination	Stakeholder Outreach	Projects & Management Actions	Water Accounting Frameworks	Annual Report Development	Recommended Corrective Actions	GSP Alternative & Update	Incomplete GSP Revisions	GSP Periodic Evaluation	Amended GSP Development
Santa Cruz Mid-County Basin Groundwater Agency	Santa Cruz Mid- County	х	х	х	x	х	х	х	х	х	х	x				х		х	x			х	
Santa Margarita Groundwater Agency	Santa Margarita		х		x	х	х	х	х		х	х				х		х	х				
Pajaro Valley Water	Pajaro Valley		х	х			х	х	х	х	х	х	х		х	х		х	х	х		х	
	Langley Area	х	х	х	Х	Х	Х	Х	Х	х	Х	х		х	Х	Х		х	Х				
	Eastside Aquifer	х	х	Х	х	х	Х	х	х	х	Х	х		х	Х	х		х	Х				
Salinas Valley Basin CSA	180/400-Foot Aquifer	х	х	Х	Х	Х	Х	Х	Х	Х	Х	Х		х	Х	Х		Х	Х			Х	Х
Salinas valley Dasin OSA	Monterey	х	х	х	Х	х	Х	х	х	х	Х	х		х	Х	х		х	Х				
	Forebay	х	х	х	х	Х	х	Х	х	Х	Х	х		х	х	Х		х	х				
	Upper Valley	х	х	Х	Х	х	Х	х	х	Х	Х	х		х	Х	х		х	Х				
Carpinteria GSA	Carpinteria			х			х	Х	х							Х							
	Butte						х							х									
Butte County	Vina	х	х	Х			Х							х	Х								
	Wyandotte Creek						Х							х	Х								
City of Paso Robles	Paso Robles				х		х																
	Santa Rosa Plain	х	х		Х		Х	Х	Х	Х	Х	Х		х	Х	Х		Х	Х				
Sonoma County GSAs	Sonoma Valley	х	Х		х		Х	Х	Х	Х	Х	х		Х	Х	Х		Х	х				
	Petaluma Valley	х	Х		х		х	Х	Х	Х	Х	х		Х	х	Х		Х	х				



Santa Cruz Mid-County Groundwater Agency SOQ Planning and Technical Services for GSP Implementation and Reporting

Client	Basin/Subbasin	Strategic Support	GSA Committees and Board Meetings	Grant Application Support	GSP Development	Hydrogeologic Conceptual Model	Groundwater Modeling	Water Budgets	SMC Development	Seawater Intrusion Data Gaps	Interconnected Surface Water Data Gaps	Monitoring Data Gaps	Water Quality Data Gaps	Inter-basin Coordination	Stakeholder Outreach	Projects & Management Actions	Water Accounting Frameworks	Annual Report Development	Recommended Corrective Actions	GSP Alternative & Update	Incomplete GSP Revisions	GSP Periodic Evaluation	Amended GSP Development
Mid-Kaweah GSA	Kaweah	х	х		х		х	х	х			х	х	х	х		х		х		х		х
Glenn County	Corning	х	х		х	х	х	х	х					х	х	х		х			х		
Eastern Municipal WD	San Jacinto	х											х						х				
City of Dadding	Enterprise	х							х							Х							
City of Redding	Anderson	х							х							Х							
Laguna Irrigation District	Kings	х						х									Х				_		
Turlock Irrigation District	Turlock	х															Х						
Yolo Subbasin Groundwater Agency	Yolo				х	х																	



Experience with GSP Development, Implementation, and Reporting

As indicated in the preceding map and matrix, M&A has extensive experience with all aspects of GSP development, implementation, and reporting. We have assisted many GSAs with GSP development, implementation, and reporting; groundwater monitoring; technical services; groundwater modeling; and periodic evaluation and GSP amendment support.

M&A has secured a reputation as one of the leading firms implementing SGMA across California. Since the act's inception, M&A staff have been actively involved with SGMA, serving as advisors to DWR, local water agencies, local stakeholders and growers, and non-governmental organizations to develop and direct statewide SGMA policy. This experience has provided M&A staff significant working knowledge of SGMA regulations and requirements.

Experience Providing SGMA-Related Technical Support

Hydrogeologic Technical Support

M&A is a specialized groundwater consulting firm focused primarily on providing quality hydrogeologic investigations as the basis of decision making. By working in all the coastal basins from Monterey to the In 2023, some of M&A's SGMA team supported DWR with the development of the *Guide to Annual Reports, Periodic Evaluations, and Plan Amendments* and associated *Frequently Asked Questions and Available Resources* document. This work has informed our understanding of DWR's expectation for GSA implementation activities, reporting requirements, and potential need for amendment.

66

I cannot say enough about M&A staff. Their thorough understanding of SGMA helped us design a process that worked for our community. They were an integral part of the team, helping drive the timeline, coordinating our advisory committee, and adding their perspective. They provided modeling and analysis, wrote technical sections, and presented complex work in a way that was accessible to the public. M&A went above and beyond, and I do not know how we could have completed our GSP without them.

-Sierra Ryan, Water Resource Planner County of Santa Cruz Environmental Health

Santa Cruz Mid-County Basin, we have expertise in analyzing seawater intrusion through regular monitoring of groundwater elevations and chemistry. In all of these basins, we are increasingly turning to geophysical methods to improve on hydrogeological conceptual models (HCMs) and to track seawater intrusion.

An example of a project that spans hydrogeological analysis, geophysical analysis, and monitoring network expansion is the extensive evaluation of hydraulic properties and aquifer interconnectivity in the Salinas Valley Basin Deep Aquifers for the Salinas Valley Groundwater Sustainability Agency. We successfully completed an update to the HCM using a variety of methods and datasets, including literature review, groundwater quality data collection, aquifer testing, Airborne Electromagnetic (AEM) data analysis, and groundwater model evaluation. To address data gaps encountered in the study, we installed 4 monitoring wells–some to a depth of 1,400 feet below ground surface–to monitor groundwater levels, groundwater quality, and seawater intrusion. During this project we partnered with the Ramboll Group and SkyTEM to collect and analyze additional geophysical data to map the aquitard that largely distinguishes the Deep Aquifers from overlying aquifers.



Over the past 9 years working on MGA projects, we have demonstrated our hydrogeological expertise reviewing technical data and information necessary to assess and evaluate sustainability indicators and sustainable management criteria through development of the approved GSP, 6 annual reports, and a periodic evaluation. We assisted in expanding the groundwater and surface water monitoring networks and have an excellent understanding of the networks across the Basin. MGA member agencies continue to have the confidence to entrust us with simulating the potential for projects and management actions to contribute to basin sustainability in both the Santa Margarita Basin and the Mid-County Basin.

Groundwater Modeling

Most groundwater flow models M&A develops are used for groundwater management, since models are the ideal tool for assessing impacts to basin conditions from different projects and management actions. Notably, most the models we work on are basin-wide models. Some of the models we have developed include a surface water component to the model. The groundwater model we developed for the MGA in support of the GSP is an integrated groundwater / surface water flow (GSFLOW) model that is an example of a model that couples 2 different USGS models into an integrated model. This is a much more efficient system than having separate models for surface water and groundwater that are not coupled. A selection of our basin-wide modeling projects we have recently been involved with are provided in the table below.

Client	Project	Experience Highlights
City of Santa Cruz with overall management by Soquel Creek Water District	Optimization Study	Under the MGA's sustainable groundwater management implementation grant, conducted groundwater modeling to identify alternatives that include Pure Water Soquel, Aquifer Storage and Recovery, and inter-agency transfers to improve water supply for the City while meeting sustainability goals. Work included local model recalibration and development of machine learning guided processes to aid optimization.
Soquel Creek Water District	Pure Water Soquel	Updated Santa Cruz Mid-County Basin model based on pilot well information and revised planned pumping distribution to meet sustainability goals. Used model to estimate underground retention times of purified water to meet Title 22 permitting requirements
City of Santa Cruz	Aquifer Storage and Recovery	Evaluated basin impacts from various ASR configurations in both the Santa Cruz Mid-County and Santa Margarita Basin using each basin's groundwater flow model
Central Water District	Aromas and Purisima Basin Management Technical Study	Information from the CWD model has been incorporated into the Santa Cruz Mid-County Basin's GSFLOW model
Sonoma Water	Technical Assistance for Development of 3 GSPs	Reviewed existing models; provided recommendations and led refinements; developed projection scenarios for projects and management actions including simulations of stormwater recharge and aquifer storage and recovery scenarios; assisted in selection of a global circulation model and developed sensitivity analysis on climate change projections; conducted analysis and post-processing to evaluate scenarios against minimum thresholds and measurable objectives

M&A Experience with Groundwater Modeling for Surface Water and Groundwater Planning Purposes



Client	Project	Experience Highlights
Santa Margarita Groundwater Agency	Groundwater Sustainability Plan development	Updated Basin model to MODFLOW 6 and calibrated to updated data. Used model to prepare water budgets for GSP and evaluate sustainability benefits of projects and management actions.
Seaside Basin Watermaster	Seaside Basin Groundwater Flow Model	Developed a groundwater flow model in 2009 that has been updated and recalibrated in 2018; the model is used extensively to evaluate seawater intrusion potential based on various proposed projects and management actions within the basin
Monterey One Water	Pure Water Monterey	Provided modeling support through hydrogeological modeling and analysis for the Pure Water Monterey aquifer recharge project which will involve replenishment of advanced purified recycled water within the Seaside Basin
Pajaro Valley Water Management Agency	Pajaro Valley Groundwater Sustainability Update 2022	Processed groundwater simulations from the Pajaro Valley Hydrologic Model by the U.S. Geological Survey to evaluate groundwater sustainability benefits of the projects in the Basin Management Plan under different climate and sea level scenarios.
Carpinteria Groundwater Sustainability Agency and Carpinteria Valley Water District	Groundwater Sustainability Plan and Carpinteria Advanced Purification Project (CAPP)	Expanded, updated, and calibrated MODFLOW-NWT groundwater model to support the GSP. Simulated groundwater elevations and water budgets from the model inform the basin's GSP and future project planning. 3D model visualizations were built using ParaView and ArcScene. Refined the grid of the model to evaluate underground retention time and other regulatory requirements for CAPP groundwater replenishment with recycled water.
Salinas Valley Basin Groundwater Sustainability Agency	Groundwater Sustainability Plan implementation	Developed the hydrogeologic conceptual model and groundwater budgets; developed variable density seawater intrusion model Also evaluated existing groundwater modeling calibration for the Deep Aquifers Study and developed a water budget using local groundwater models
Mid-Kaweah Groundwater Sustainability Agency	SGMA Support	Updated and calibrated the Kaweah Subbasin groundwater flow model, implemented farm process for water demand management and pumping requirements, and streamflow routing to simulate conjunctive use of groundwater and surface water. Developed predictive simulations accounting for climate change and demand changes to demonstrate the projects and management actions in the GSPs will achieve sustainability



M&A is currently working on the following groundwater model improvements in 2025 beyond updates for the annual reports:

- Revise model layers to improve simulation of the Purisima DEF unit
- Update the GSFLOW model based on the AEM survey data flown by DWR in 2022

Annual Reporting

Over the past 6 years, we have developed a streamlined process for compiling, charting, analyzing, and displaying results for the MGA annual reports. We have consistently staffed annual reporting and semiannual groundwater elevation uploads with professionals who worked on the project team for the GSP and first annual report. This includes staff who can update the GSFLOW model and extract change of groundwater in storage for maps required in the annual report. We strive to continually improve our reporting and will make improvements to subsequent annual reports based on feedback from DWR and others.

Apart from preparing annual reports for the MGA and SMGWA, M&A has prepared annual reports for 5 Salinas Valley subbasins since submission of the GSPs, and has contributed to annual reports for Pajaro Valley, 3 Sonoma basins, and Corning Subbasin.

We are very familiar with the SGMA Portal upload requirements, having been responsible over the past 6 years for successfully uploading the MGA reports and groundwater elevations. We have similar experience in Salinas Valley where uploads are submitted for 5 subbasins.

GSP Periodic Evaluations

We recently prepared the MGA's first Periodic Evaluation, working closely with agency staff for input and feedback. There is a chance the next Periodic Evaluation may conclude an amendment to the GSP is needed. Should an amendment be needed, the M&A team already has a deep understanding of the process used to develop the SMC since the same staff supported GSP development. M&A staff also have experience working on GSP amendments in other basins: the Salinas Valley 180/400-Foot Aquifer Subbasin and the Kaweah Subbasin.



Project Examples

Santa Cruz Mid-County Basin SGMA Support

M&A provided technical assistance to the Santa Cruz Mid-County Groundwater Agency to develop a GSP and has provided ongoing planning and technical support for GSP implementation and reporting

Client:Santa Cruz Mid-County Groundwater Agency (MGA)Dates of Service: 2017–ongoingTeam Members:Georgina King, Cameron Tana, Nick Byler, Patrick Wickham, Luis Mendez

M&A provided technical assistance to the Santa Cruz Mid-County Groundwater Agency (MGA) for GSP development focused on establishing sustainable management criteria together with the GSP advisory committee. M&A also developed a GSFLOW model to help develop water budgets and assess the expected benefits of various groundwater management projects or actions. Over the past 8 years, M&A staff have worked with the executive team of the MGA's member agencies and agency staff members to produce a DWR-approved GSP, 6 annual reports, and most recently, the MGA's first GSP Periodic Evaluation. A significant portion of the work requires close collaboration and coordination with the support staff at the MGA and the staff of member agencies. M&A has been responsible for uploading all required reports and groundwater level monitoring data to the SGMA Portal.



M&A was involved in the development of the regional WISKI DMS, prepared a manual to aid in member agency staff uploads and continues to support member agency staff's use of the DMS.

Other work in the Basin related to GSP implementation includes the Basin Optimization Study and investigation into the causes of seawater intrusion in the Seascape area. The Basin Optimization Study uses the GSFLOW groundwater model to iteratively simulate variations and combinations of water resources projects with the overarching goal to identify projects and management alternatives that help meet the water supply needs of the City of Santa Cruz Water Department and Soquel Creek Water District while maintaining GSP sustainability goals.

Applicability and Relevance to Services Required by the MGA:

- Long-standing experience working with the MGA and its member agencies
- Developed the groundwater model used to inform sustainability management criteria and evaluate impacts from projects and management actions
- Understanding of methodology used to develop water budget and sustainable yield
- > Understanding of methodology used to develop SMC
- Evaluation of progress toward achieving sustainability goals and SMC
- Involvement with Pure Water Soquel and City ASR
- Familiarity with the SGMA Portal and good working relationship with DWR staff implementing the Portal
- Expertise in the WISKI DMS

Nick Byler trained directly with Soquel Creek Water District staff to gain proficiency on their WISKI system. His knowledge of WISKI has enabled M&A to efficiently manage the reporting aspects of GSP development.



Kaweah Subbasin & Mid-Kaweah Groundwater Sustainability Agency SGMA Support

M&A provided SGMA support to the Kaweah Subbasin and Mid-Kaweah GSA

Client:	Mid-Kaweah Groundwater Sustainability Agency	Dates of Service: 2017–ongoing
Team Members:	Georgina King, Pete Dennehy	

M&A has provided strategic SGMA advice to support the Mid-Kaweah GSA since 2017, however, M&A's work over the past 3 years has been focused on supporting the 3 Kaweah GSAs in responding to DWR's incomplete and inadequate determinations of the GSPs. Subbasin-wide work included:

- Developing a coordinated DMS for hydrologic data, well information, groundwater levels, land subsidence, and other groundwater management data relevant to SGMA implementation and compliance
- Updating and calibrating the Kaweah Subbasin groundwater flow model, implementing farm process for water demand management and pumping requirements, and



streamflow routing to simulate conjunctive use of groundwater and surface water

- Developing predictive simulations accounting for climate change and demand changes to demonstrate the projects and management actions in the GSPs will achieve sustainability
- Developing Subbasin land subsidence sustainable management criteria based on stakeholder input on significant and unreasonable conditions, developing modeling tools for projecting subsidence, and linking required groundwater levels needed to sustainably manage subsidence
- Contributing to development of the Kaweah Subbasin Mitigation Program
- Developing a Well Registration application and process

Mid-Kaweah GSA-specific work included amending the MKGSA GSP, developing the MKGSA Well Mitigation Plan, providing technical input on Allocations and the Water Marketing Strategy and Pilot, re-evaluating monitoring networks, and involvement in stakeholder and Board outreach.

Applicability and Relevance to Services Required by the MGA:

- Address chronic lowering of groundwater level corrective actions
- Develop a Well Mitigation Program that includes mitigation for groundwater level impacts
- Contribute to developing demand management strategies
- > Communication with a diverse group of stakeholders
- Trusted SGMA strategic advisor

Prepare an Amended GSP

The team of consultants, GSA staff, legal team, and technical support that contributed their time and effort, much of which was outside of the workday, was really impressive and appreciated.

Aaron Fukuda, Mid-Kaweah GSA Interim General Manager

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Santa Margarita Basin SGMA Support

M&A led development of a GSP and has provided technical support for GSP implementation and reporting

Client:	Santa Margarita Groundwater Agency (SMGWA)	Dates of Service: 2018–ongoing
Team Members:	Georgina King, Cameron Tana, Patrick Wickham, Luis Mendez, P	ete Dennehy

M&A has provided SGMA support to the SMGWA since 2017 starting with a basin boundary modification request that was coordinated with the Santa Cruz Mid-County Basin. A couple of years later, M&A was selected as the lead consultant responsible for preparing a GSP by January 2022. Part of the GSP scope of work was to improve the existing groundwater flow model of the Basin. The model was a key tool in preparing a GSP that met the state's requirements. Specifically, the model was needed to help improve understanding of surface water / groundwater interactions in areas where there are no data, understand the impacts of climate change on groundwater, provide volumes for many components of the water budget, and simulate how the Basin responds to future projects and management actions that are needed to achieve the Basin's sustainable goals. The GSP was approved by DWR in 2023.

M&A has prepared at total of 4 annual reports, with 2 of them prepared in collaboration with Rob Swartz, Senior Planner – Groundwater Sustainability at the Community Foundation Santa Cruz County. M&A has been responsible for submitting semi-annual groundwater level monitoring data to the SGMA Portal's Monitoring Network Module. As part of annual reporting, the groundwater model is updated with the reporting year groundwater extractions, return flows, and climate.



In 2023, M&A sited, designed, oversaw installation, and instrumented 7 monitoring wells across the Basin as one of the first tasks implementing the approved 2022 GSP. The additional wells address groundwater level and interconnected surface water monitoring network data gaps identified in the GSP.

M&A was involved in the development of the regional WISKI DMS, prepared a manual to aid in member agency staff uploads, and continues to support member agency staff's use of the DMS.

Applicability and Relevance to Services Required by the MGA:

- Review technical data and information to assess and evaluate sustainability indicators and SMC
- Having developed the SMC for the Santa Margarita Basin, M&A will be able to fully understand the SMC and their relevance to the Santa Cruz Mid-County Basin
- > Overlap in member agencies for both basins
- > WISKI Data Management System
- Groundwater modeling in support of GSP implementation
- > Expertise in transducer installation



3. Client References

Below are the names, email addresses, and telephone numbers of 3 public agency clients for whom we have conducted similar services within the past 5 years.

Pajaro Valley Water Management Agency Brian Lockwood, General Manager 831-722-9292 | Lockwood@pvwater.org

Salinas Valley Basin Groundwater Sustainability Agency Piret Harmon , General Manager 650-868-0209 | <u>HarmonP@svbgsa.org</u>

Mid-Kaweah Groundwater Sustainability Agency Aaron Fukuda, Interim General Manager 559-686-3425 | <u>akf@tulareid.org</u>

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Montgomery & Associates has been an exceptional consulting firm to work with. They are professional, flexible, and work relentlessly, adapting to every need we had with our multiple GSPs. Lisa has proven to be a high performer under some very challenging circumstances. Our success is a product of their commitment and hard work.

-Gary Petersen, former General Manager, Salinas Valley Basin GSA



Appendix A

Project Team Resumes



Georgina King, P.G., C.Hg. Principal Hydrogeologist

OFFICE: Oakland

YEARS OF EXPERIENCE

Total: 32 | M&A: 16

EDUCATION

M.S., Geohydrology, Rhodes University, Grahamstown, South Africa (1997)

B.S., Engineering Geology, University of Natal-Durban, Kwazulu-Natal, South Africa, (1992)

B.S. Geology, University of Natal-Durban, Kwazulu-Natal, South Africa, (1991)

KEY AREAS OF EXPERTISE

Groundwater basin management

Hydrogeologic characterization

Groundwater recharge

Groundwater quality

Geographical Information Systems and database management

PROFESSIONAL REGISTRATIONS

Professional Geologist #8023, CA

Certified Professional Hydrogeologist #874, CA

Additional Training

Postbaccalaureate Certificate in GIS, Penn State (2016) **Georgina King** was educated in South Africa and spent her early career years with the South African Department of Water Affairs as Assistant Director of groundwater resources for the province of KwaZulu-Natal. She was responsible for technical aspects of managing groundwater, such as establishing a regional monitoring network, enhancing rural water supply, and developing regional hydrogeological maps. Since 2000, Georgina has worked in California and is focused on developing, managing, and protecting groundwater resources. She is experienced in managing and conducting technical studies for basin-wide groundwater management, large-capacity public water supply projects, sustainable yield, and groundwater modeling projects. She has extensive experience in developing and managing geographic information systems (GIS) and databases, which she applies to many of her projects.

Representative Projects

Groundwater Sustainability Planning: Santa Cruz Mid-County Groundwater Agency GSP Development, Santa Cruz Mid-County Groundwater Basin, Santa Cruz County

Technical lead developing sustainable management criteria for the GSP; technical presenter at monthly GSP Advisory Committee meetings; assisted MGA staff with scoping, budgeting, and scheduling work required to meet the January 2020 deadline for high priority basin GSPs; assisted MGA staff with preparing the draft and final GSP; and submitted all required monitoring well data and GSP documents to the DWR SGMA Portal; the MGA GSP was one of the first 2 GSPs to be approved by DWR

Groundwater Sustainability Planning: Santa Cruz Mid-County Groundwater Agency GSP Annual Reports, Santa Cruz Mid-County Groundwater Basin, Santa Cruz County, CA

Project Manager responsible for preparing 2021, 2022 and 2023 Annual Reports as a requirement of GSP implementation, including uploading all required monitoring well data, supporting tables, and Annual Report to the DWR SGMA Portal

Groundwater Sustainability Planning: Santa Margarita Groundwater Agency GSP Annual Reports, Santa Margarita Groundwater Basin, Santa Cruz County, CA

Project manager responsible for the 2022 and 2023 Annual Reports as a requirement of GSP implementation, including uploading all required monitoring well data, supporting tables, and Annual Report to the SGMA Portal

Groundwater Sustainability Planning: Santa Margarita Groundwater Agency Santa Margarita Groundwater Basin, Santa Cruz County, CA

Project manager responsible for developing a GSP to meet SGMA requirements. Included update and expansion of a groundwater flow model; guided the SMGWA Board through the process of basin understanding and developing sustainability management criteria; and managed and guided subconsultants responsible for surface water interactions and projects and management actions. GSP was approved by DWR



Groundwater Sustainability Planning: Mid-Kaweah Groundwater Sustainability Agency (MKGSA) Kaweah Subbasin, Tulare County, CA

Project manager responsible for representing MKGSA in a multi-consultant collaboration to revise groundwater level and subsidence sustainable management criteria for the Kaweah Subbasin. These revisions in response to addressing DWR's inadequate determination of the MKGSA's First Amended GSP

Groundwater Sustainability Planning: Mid-Kaweah Groundwater Sustainability Agency (MKGSA) Kaweah Subbasin, Tulare County, CA

Led development of an Amended GSP in 2022 in response to DWR's incomplete determination of the MKGSA's original GSP; technical work included developing an approach for establishing chronic lowering of groundwater level sustainable management criteria for the Kaweah Subbasin that could be adopted by all 3 GSAs in the Subbasin

GSP Implementation: Salinas Valley Basin Groundwater Sustainability Agency Deep Aquifer Tests, Monterey County, CA

Project manager responsible for developing, coordinating and managing 2 aquifer tests targeted to gain more hydrogeologic information about the Deep Aquifers in the 180-400 foot Subbasin

GSP Implementation: Salinas Valley Basin Groundwater Sustainability Agency Monitoring Well Network Expansion, Monterey County, CA

Project manager responsible for developing technical specification for 3 monitoring wells targeting the Deep Aquifers (approximately 1,500 feet deep) and 1 shallow interconnected surface water monitoring well

Senior SGMA Advisor: CA Department of Water Resources Project Analysis and Monitoring Protocol Development Services, CA

Provided project information and data gathering and analysis, development of case studies for key groundwater projects, and developed monitoring protocols and data standards for interconnected surface water to help guide the successful implementation of SGMA projects

Groundwater Sustainability Planning: Sonoma Water Sonoma, Petaluma, and Santa Rosa Plain Basins, Sonoma County, CA

Advised on development of sustainable management criteria for depletion of interconnected surface water

Groundwater Sustainability Planning: Pajaro Valley Water Management Agency

GSP Alternative Update, Hydrologic and Facilitation Services, Santa Cruz, Monterey, and San Benito Counties, CA Advised on development of sustainable management criteria and developed the monitoring plan for the GSP Alternative's first 5-year update in response to the California Department of Water Resource assessment summary on PV Water's GSP Alternative

Conducted Feasibility Study, Soquel Creek Water District Stormwater Recharge Feasibility, Seascape, Santa Cruz County, CA

Managed and conducted a feasibility study for the capture and use of stormwater as source water for dry wells at several locations at a golf course; quantified volume of stormwater available and how much can potentially be recharged into the groundwater basin

Groundwater Recharge Capacity Evaluation: Tulare Irrigation District Phase I, Tulare, CA

Served as primary analyst and author of a recharge capacity report that estimated the surface and groundwater budgets of the TID service area, identified potential water sources to supplement groundwater recharge, and evaluated recharge capacity and required future capacity given the potential sources available



Cameron Tana, P.E. Principal Groundwater Hydrologist / California Operations Manager

OFFICE: Oakland

YEARS OF EXPERIENCE

Total: 24 | M&A: 19

EDUCATION

M.Eng., Civil and Environmental Engineering, Massachusetts Institute of Technology (1999)

B.S., Civil and Environmental Engineering, Stanford University (1998)

A.B., Economics, Stanford University (1998)

KEY AREAS OF EXPERTISE

3D groundwater flow and transport models

Groundwater basin management

Groundwater recharge

Analysis of pumping impacts

Inverse methods for calibrating numerical models

Estuarine hydrodynamics models

PROFESSIONAL REGISTRATIONS

Registered Professional Engineer (Civil) #C65822, CA **Cameron Tana** is an experienced groundwater hydrologist whose focus is on assisting public agencies in California to manage their groundwater resources. Cameron uses analytical tools and numerical models to address client challenges and is particularly adept at selecting and implementing the analytical tools best suited to tackle specific ground and surface water issues. Cameron excels at communicating technical findings to advance groundwater management, taking into account legal, economic, and political challenges.

Representative Projects

SGMA Implementation: Santa Cruz Mid-County Groundwater Agency (MGA) Santa Cruz Mid-County Groundwater Basin, Santa Cruz County, CA

Presented an overview of groundwater hydrology and groundwater management activities to the Santa Cruz Mid-County Stakeholder Advisory Committee; led successful application to the Department of Water Resources to revise basin boundaries to consolidate portions of the four basins into the Santa Cruz Mid-County; coordinated between MGA members and neighboring agencies to ensure basin boundary modification applications in were consistent; assisted with MGA's notification of its formation as a Groundwater Sustainability Agency to the state and represented MGA in Central Coast advisory group meetings with the California Department of Water Resources; guided presentations on basin conditions and groundwater modeling as part of orientation sessions for the Groundwater Sustainability Plan Advisory Committee and provided technical support for development of sustainability management criteria; presented to the MGA Board on groundwater management ramifications of airborne geophysical data identifying location of saltwater interface offshore; drafted subsections of the Groundwater Sustainability Plan

Groundwater Management Optimization and Groundwater Modeling: Santa Cruz Mid-County Groundwater Agency, Santa Cruz County, CA

Managed modeling for calibration and refinement of Basin model for use to optimize supplemental supply projects such as ASR and IPR, development of a water transfer model and unique decision support modeling tool utilizing machine learning guided optimization (MLGO) with groundwater model to optimize water supply while meeting sustainability management criteria in a Basin that is in critical overdraft due to seawater intrusion

GSFLOW Model Development: Santa Cruz Mid-County Groundwater Agency Santa Cruz Mid-County Basin Integrated Watershed-Groundwater Model, Santa Clara County, CA

Managed development of a GSFLOW model of the Santa Cruz Mid-County Basin that integrates groundwater flow with watershed processes; directed strategy for updates to the basin conceptual model, model construction, incorporation of projected climate change, estimates of non-metered pumping and return flow, and calibration to streamflows and groundwater; led Technical Review Committee meetings and presented to the Agency Board on model development progress; managed preparation of reports documenting model construction and simulations of projects and management actions for inclusion in the GSP



Groundwater Model Updates and Calibration: Santa Margarita Groundwater Agency Santa Margarita Basin Groundwater Model, Santa Cruz County, CA

Provided senior advice and review for updates and calibration of MODFLOW-6 model; model was calibrated to groundwater elevations, streamflows, and stream accretion data; presented to Agency Board on model updates, calibration, and climate change scenario selection to support GSP development

GSP Alternative and Update, Pajaro Valley Water Management Agency Pajaro Valley Groundwater Subbasin, Santa Cruz, Monterey, and San Benito Counties, CA

Supported preparation of Groundwater Sustainability Plan (GSP)Alternative by identifying components of pre-SGMA Basin Management Plan Update with functionally equivalent requirements for GSPs; served as project manager for Periodic Evaluation and Update of Alternative now approved by DWR, including development of sustainable management criteria, evaluation of interconnected surface water depletion, and development of groundwater and surface water monitoring plans; led technical presentations to stakeholder advisory committee; continued as project manager for additional support of GSP Alternative implementation including Annual Report support and PV Water's expansion of its GSP Alternative monitoring network

Groundwater Model Review, Updates, and Utilization for GSPs: Sonoma County Water Agency Santa Rosa Plain, Sonoma Valley, and Petaluma Valley Groundwater Models, Sonoma County, CA

Provided senior advice and review for technical review and updates of GSFLOW model for Santa Rosa Plain Subbasin and MODFLOW-OWHM models for Sonoma Valley and Petaluma Valley Subbasins; reviewed preparation and documentation of water budget results from models; provided guidance on selection of climate change scenario for model simulations of future conditions for GSPs and presented to joint advisory committee meeting; prepared description of use of models to evaluate depletion of interconnected surface waters and preliminary approach to development of seawater intrusion sustainable management criteria

Groundwater Modeling for GSP: Carpinteria Groundwater Sustainability Agency Carpinteria Model, Santa Barbara County, CA

Led update of groundwater model to support Groundwater Sustainability Plan, including temporal refinement, application of revised water budget, and recalibration using PEST; guided development of projected climate change scenario as a baseline for projects and management actions; advised on use of model to simulate IPR with the Carpinteria Advanced Purification Project (CAPP)

Development of Numerical Groundwater Model: Carpinteria Valley Water District Groundwater Management Alternative Evaluation, Santa Barbara County, CA

Led construction and development of a groundwater model based on a hydrogeologic update performed under a California local groundwater assistance grant; directed development of surfaces for model layers based on basin stratigraphy for incorporation in the model, which was calibrated to groundwater level data and designed to assess and compare various groundwater management alternatives for conjunctively managing the Carpinteria Valley Water District's water supplies; led updates to model to support GSP development

Groundwater Model Simulations of Aquifer Storage and Recovery (ASR): City of Santa Cruz Santa Cruz Mid-County Basin and Santa Margarita Basin ASR, Santa Cruz County, CA

Managed use of GSFLOW model of the Santa Cruz Mid-County Basin and MODFLOW model of the Santa Margarita Basin to evaluate feasibility of ASR to provide drought supply for City of Santa Cruz. Provided guidance to development of pumping and injection scenarios, selection of climate change scenarios, and preparation of figures for model results



Pete Dennehy, P.G., C.Hg. Senior Hydrogeologist

OFFICE: Sacramento

YEARS OF EXPERIENCE

Total: 13 | M&A: 4

EDUCATION

M.S., Hydrology, University of California, Davis (2015)

B.S., Geology, Bates College (2008)

KEY AREAS OF EXPERTISE

GSP Development and Implementation

Water Resources Planning

Water Quality Regulatory Compliance

Environmental Assessment and Remediation

PROFESSIONAL REGISTRATIONS

Professional Geologist #9377, CA

Certified Hydrogeologist #1079, CA

40-Hour OSHA HAZWOPER, 8-Hour Refresher **Pete Dennehy** specializes in Sustainable Groundwater Management Act (SGMA) compliance and hydrogeologic investigations for groundwater resource management, contaminant assessment, and remediation. He has extensive project management and regulatory report writing experience for a diverse portfolio of private, public, and government clients. He has managed numerous field programs utilizing well installations, geophysical surveys, aquifer testing, and groundwater sampling. He has built, updated, and analyzed groundwater models to evaluate groundwater resource sustainability and remediation effectiveness. Prior to joining M&A, Pete was a consulting hydrogeologist at Geosyntec Consultants and GZA GeoEnvironmental and a geomorphologist with the National Park Service.

Representative Projects

GSP Development: Santa Margarita Groundwater Agency Santa Cruz County, CA

Drafted portions of the GSP; prepared presentation materials for Advisory Board meetings; participated in client meetings; compiled historical, current, and projected water budgets; developed monitoring networks, sustainable management criteria (SMC), and GSP implementation plan; responded to board and public comments; attended public workshop to answer questions about the GSP

GSP Annual Report Development: Santa Margarita Groundwater Agency Santa Cruz County, CA

Assistant project manager for 2021 and 2022 Annual Report development; gathered and analyzed groundwater conditions data; compiled report; prepared Advisory Board presentation summarizing findings; presented to Advisory Board

GSP Implementation: Sonoma Water Sonoma County, CA

Prepared data gaps analysis and summary for groundwater dependent ecosystems (GDEs) and interconnected surface water (ISW) sustainability indicators to guide discussion by the ISW Working Group; developed Seawater Intrusion Monitoring Work Plan for Sonoma and Petaluma Valleys; compiled materials for presentation and discussion at client and advisory committee meetings

GSP Periodic Evaluation Development: Santa Cruz Mid-County Groundwater Agency Santa Cruz County, CA

Gathered and analyzed groundwater conditions data to evaluate efficacy of GSP implementation for achieving sustainability; prepared sections of Periodic Evaluation document; collaborated with client to address GSA staff, stakeholder, and public comments received on the Periodic Evaluation; prepared Advisory Board presentation summarizing findings

GSP Implementation: California Department of Water Resources (DWR) Statewide, CA

Collaborated with DWR and project team to prepare the Sustainable Groundwater Management Act Implementation Guidance: *Groundwater Sustainability Plan Implementation: A Guide to Annual Reports, Periodic Evaluations, and Plan Amendments*



GSP Development: Petaluma Valley, Sonoma Valley, and Santa Rosa Plain Sonoma County, CA

Drafted SMC sections for 3 GSPs; developed subsidence and water quality SMC approaches; prepared water budget summary graphics; compiled materials for presentation and discussion at client and advisory committee meetings

GSP Development: Corning Subbasin Groundwater Sustainability Agencies (GSAs) Glenn and Tehama Counties, CA

Drafted portions of the GSP; prepared presentation materials for Subbasin Advisory Board meetings; participated in client meetings; developed monitoring networks and SMC; compiled list of potential projects and management actions; developed GSP implementation plan; responded to board and public comments

GSP Annual Report Development: Corning Subbasin GSAs Glenn and Tehama Counties, CA

Project manager for 2021 Annual Report development; gathered and analyzed groundwater conditions data; prepared report to comply with SGMA requirements; led client and project team meetings; presented summary findings to Subbasin Advisory Board

GSP Development: Mid-Kaweah GSA Tulare County, CA

Developed technical approach and modeling tools for projecting subsidence utilizing recent research by collaborators at Stanford University; compiled materials for presentations; drafted SMC and parts of project and management actions sections for GSP revision in response to incomplete determination

GSP Implementation: Laguna Irrigation District and Regional Partners Fresno and Kings Counties, CA

Analyzed water budgets to support water allocation framework negotiations with the North Fork Kings GSA; compiled materials for presentation and discussion at client and advisory committee meetings

GSP Implementation: GHD & California Department of Water Resources (DWR) Statewide, CA

Compiled statewide groundwater project database; develop case study writeups for example projects; prepared project methodology guidance documents for Flood-MAR, Recharge Basin, Aquifer Storage and Recovery, and subsidence projects.

GSP Implementation: Omochumne-Hartnell Water District Elk Grove, CA

Managed monitoring well installation program for a groundwater recharge project utilizing excess wet-season vineyard irrigation (i.e. Flood-MAR) to benefit groundwater/surface water interactions and groundwater levels

Water Resources Planning: Scotts Valley Water District Scotts Valley, CA

Prepare end of wet season groundwater conditions report; evaluate likelihood of dry season groundwater supply shortages; prepare water supply projections for Department of Water Resources contingency planning

Water Resources Planning: Monterey County Water Resources Agency Monterey County, CA

Investigated current and projected land and water use; estimate how projected conditions will impact groundwater levels and seawater intrusion; utilize MODFLOW groundwater model to project a range of potential future scenarios; prepare presentations and routinely updated clients on project status; document findings in a Basin Investigation summary report



Nicholas Byler, P.G., C.Hg. Hydrogeologist

OFFICE: Sacramento

YEARS OF EXPERIENCE

Total: 14 | M&A: 13

EDUCATION

B.S., Earth Science (Geology), University of California, Santa Cruz (2010)

KEY AREAS OF EXPERTISE

Water Supply Well Siting and Design

Managed Aquifer Recharge

GIS (Geographical Information Systems)

SGMA Implementation

Water Resources Planning

PROFESSIONAL REGISTRATIONS

Professional Geologist #9710, CA

Certified Hydrogeologist #1106, CA

ADDITIONAL TRAINING

2012: GRA Principles of Groundwater Flow and Modeling Course

2021: OSHA 40-hour HAZWOPER

2021: MSHA 24-hour New Miner Training

Nick Byler is a California Professional Geologist and Certified Hydrogeologist with project management experience and expertise in groundwater consulting and hydrogeologic investigations. He specializes in sustainable groundwater resources management and water supply and previously worked as a well-site geologist in the oil industry. His experience includes water supply well permitting, design and construction, monitoring well installation using a variety of drilling methods, and aquifer testing analysis. He currently serves as a subject matter expert at the California Board for Professional Engineers, Land Surveyors and Geologists.

Representative Projects

SGMA Implementation: Santa Cruz Mid-County Groundwater Agency Groundwater Sustainability Plan Annual Reporting, Santa Cruz County, CA

Analyzed groundwater sustainability plan annual reports including compilation of water quality and water level data and utilization of scripting tools to batch generate hydrographs and chemographs; preparation of groundwater level contour maps for aquifer units in the basin

GSP Development: Santa Cruz Mid-County Groundwater Agency Santa Cruz County, CA

Drafted portions of the Groundwater Sustainability Plan (GSP); developed monitoring networks, sustainable management criteria, and implementation plan

Well Project Manager, Monitoring Well Installations and Equipping: Salinas Valley Basin Groundwater Sustainability Agency, Monterey County, CA

Managed design, drilling, installation, development, and equipping of 10 monitoring wells up to 1,300 feet deep in residential settings for SGMA compliance. Prepared preliminary design, technical specifications, contractor bid support, construction management services, equipped wells with pressure transducers, and prepared well installation reports

Pneumatic Slug Testing: Salinas Valley Basin Groundwater Sustainability Agency Monterey County, CA

Conducted pneumatic slug tests at monitoring wells in the Salinas Valley Basin site to help refine hydrogeologic parameters used for modeling

GSP Annual Report Development: Santa Cruz Mid-County Groundwater Agency Santa Cruz County, CA

Assisted project manager on GSP Annual Report development; gathered and analyzed groundwater conditions data; and prepared report as a requirement of GSP implementation

Groundwater Sustainability Planning: Santa Cruz Mid-County Groundwater Agency 2025 Periodic Evaluation Monitoring Network Re-Evaluation, Santa Cruz County, CA

Conducted a re-evaluation of the MGA 2020 GSP monitoring network, including an assessment of networks for groundwater levels, groundwater quality, groundwater extraction, and streamflow



Groundwater Sustainability Planning: Pajaro Valley Water GSP Alternative Submittal Update, Santa Cruz and Monterey Counties, CA

Supported preparation of Groundwater Sustainability Plan (GSP)Alternative by identifying components of pre-SGMA Basin Management Plan Update with functionally equivalent requirements for GSPs; supported development of sustainable management criteria, evaluation of interconnected surface water depletion, and development of groundwater and surface water monitoring plans for the Periodic Evaluation and Update of the GSP Alternative

Groundwater Sustainability Monitoring Networks, Pajaro Valley Water GSP Alternative Monitoring Network Expansion, Santa Cruz and Monterey Counties, CA

Managed task to fill monitoring network data gaps in PV Water's GSP Alternative. Evaluated wells newly added to monitoring network for suitability to fill data gaps, including serving as representative monitoring points to assess sustainable management criteria. Preparing preliminary design report including well siting and monitoring well technical specifications to provide to DWR Technical Support Services for installation.

GSP Implementation: GHD & California Department of Water Resources (DWR) Sacramento Valley, CA

Gathered information on existing groundwater projects in the Sacramento Valley including a review of project costs, funding, benefits, and relationship to SGMA sustainability indicators; develop case study writeups for

Drilling and Construction Oversight: Soquel Creek Water District Various Seawater Intrusion Prevention Wells, Santa Cruz County, CA

Led drilling, construction, and development of injections well designed to prevent seawater intrusion and provide additional source of water supply

Basin Boundary Modification: Santa Cruz Mid-County Groundwater Agency Santa Cruz Mid-County Groundwater Basin, Santa Cruz County, CA

Assisted the project team with a basin boundary modification for SGMA implementation, which included both technical and jurisdictional modifications to promote sustainable groundwater management; prepared required GIS layers and metadata for submission to and approval by DWR

Drilling and Construction Oversight: Soquel Creek Water District Granite Way Municipal Supply Well, Santa Cruz County, CA

Oversaw drilling and construction of a new production well for the District to improve redundancy and flexibility in the water production system

Drilling and Construction Oversight: Soquel Creek Water District Aptos Junior High Municipal Supply Well, Santa Cruz County, CA

Oversaw drilling and construction of a replacement production well for the District

Drilling and Construction Oversight: Soquel Creek Water District O'Neill Ranch Municipal Supply Well, Santa Cruz County, CA

Oversaw drilling, construction, and development of a new production well for the District to shift pumping inland from the coast to help prevent induced saltwater intrusion in coastal production wells

Aquifer Testing: Cox #3 Aquifer Test and Vertical Profiling Central Water District, Santa Cruz County, CA

Conducted aquifer testing at the Cox #3 well to obtain hydrogeologic data, aquifer parameters, and document vertical flow paths



Patrick Wickham, P.G. Hydrogeologist

OFFICE: Pasadena

YEARS OF EXPERIENCE

Total: 7 | M&A: 5

EDUCATION

M.S., Hydrologic Sciences, University of California, Davis (2019)

B.S., Environmental Science/Hydrology, Geology Minor, California State University Chico (2017)

KEY AREAS OF EXPERTISE

Hydrogeology and groundwater modeling

CA Sustainable Groundwater Management Act (SGMA) technical assistance

Water Chemistry

Coding and Machine Learning

CODES & SOFTWARE

Python, IWFM, MODFLOW, MT3D, ParaView, ArcGIS, Groundwater Vistas, Grapher/Scripter, PyTorch

PROFESSIONAL REGISTRATIONS

Professional Geologist: #10136, CA

ADDITIONAL TRAININGS

2019: DWR IWFM Handson Workshop **Patrick Wickham** specializes in groundwater management, modeling, and data analysis. His diverse expertise in hydrogeology, water supply planning, and programming allows him to develop novel approaches to complex water resource challenges. He has made significant contributions to groundwater sustainability planning and implementation across California, with a recent focus on the Central Coast and South Coast regions. Patrick also serves as president of the Southern California GRA Branch and as a subject matter expert for the California Board for Professional Engineers, Land Surveyors, and Geologists.

Representative Projects

Groundwater Management Optimization and Groundwater Modeling: Santa Cruz Mid-County Groundwater Agency, Santa Cruz County, CA

Led modeling for refinement and calibration of Basin model to optimize supplemental supply projects and improve water supply while achieving groundwater sustainability; conducted data gap interpolation including neural networks; developed python water transfer model; created unique decision support modeling tool Machine Learning Guided Optimization (MLGO) which utilized AI with a physical groundwater model to optimize water supply using variations of ASR, IPR, and production well placement and volumes, and interagency transfers

Groundwater Sustainability Planning and Modeling: Santa Cruz Mid-County Groundwater Agency, GSP Development, Annual Reporting, and Pure Water Soquel Aquifer Replenishment Project, Santa Cruz County, CA

Contributed to Santa Cruz Mid-County Groundwater Agency GSP focusing on monitoring, groundwater budget, and surface water budget; performed analysis for 3 groundwater sustainability plan annual reports including extending groundwater model through 2022, analysis of sustainability status, development of python codes to identify corrective action trigger levels, automation of complex water demand and return flow protocols, and analysis of groundwater elevation sampling protocol; supported hydrogeological modeling and analysis for an aquifer recharge project injecting purified recycled water within Soquel Creek Water District's Service area, including multiple modeling reports and a Title 22 Report

Groundwater Sustainability Planning: Santa Margarita Basin Groundwater Sustainability Agency, Santa Cruz County, CA

Contributed to Basin Setting, Monitoring Network, Water Budget, and SMC GSP sections including water quality, groundwater level, and storage SMC development; performed robust model output analysis and water budget calculation; led sustainability status analysis for annual reporting

Groundwater Sustainability Planning: Pajaro Valley Water Santa Cruz and Monterey Counties, CA

Developed Periodic Evaluation and Update to GSP Alternate Submittal including chronic lowering of groundwater level SMC development, sustainability status analysis, and development of water budgets and project yields for multiple climate change scenarios; coordinated with client and public committee on multiple responses to public comments; evaluate existing project efficacy at preventing seawater intrusion and maintaining groundwater levels; sustainability status analysis for annual reporting; performed model QC and supported SGMA monitoring network expansion



Groundwater Sustainability Planning and Groundwater Modeling: Corning Subbasin Groundwater Sustainability Agency, Glenn and Tehama Counties, CA

Led GSP data collection team; led writing and data analysis for Hydrologic Conceptual Model, Groundwater Conditions, and Water Budget GSP Sections; led geologic cross section extension; modeler for extensive IWFM model refinement and analysis including model scenarios incorporating climate change and projects and management actions, water budgets, python tools for extraction of model results, 3D visualization of model results, decision support modeling to evaluate potential impacts from agricultural land use and surface water availably changes, and SGMA annual reporting

Groundwater Modeling for Restoration Planning: Ducks Unlimited Sonoma County, CA

Conducted investigative modeling with MODFLOW-OWHM model to analyze impact of wetland restoration on depth to water, land inundation, and beneficial land use

Groundwater Modeling for Sustainability Planning: Sonoma County Water Agency Sonoma County, CA

Developed project and management action scenario, well observation file development, water budget development, and MODFLOW-OWHM model output analysis supporting development and implementation of 3 GSPs. Supported model update for GSP implementation for 3 models by developing new streamflow routing (SFR), Farm Process (FMP), and general head boundary (GHB) datasets.

Groundwater Modeling: Carpinteria Valley Water District Santa Barbara County, CA

Expanded groundwater model boundaries utilizing novel python interpolation and 3D visualization in conjunction with geological analysis; converted annual model to monthly timestep and temporally extended model; recalibrated model using PEST; developed automated model post-processing tools and standalone executables; developed predictive scenarios including seawater intrusion particle tracking; and supported groundwater sustainability plan development

Groundwater Modeling for Habitat Restoration: Ducks Unlimited Sonoma County, CA

Utilized MODFLOW OWHM model to predict impacts of wetland habitat restoration on local depth to water and Baylands inundation; updated and analyzed general head boundary to reflect sea level rise and varying restoration implementations; described implication of results as relevant to project planning

Groundwater Sustainability Planning: Greater Kaweah Groundwater Sustainability Agency Sustainable Management Criteria Development, Tulare and Kings Counties, CA

Developed iterative python-based analysis of nearly 10,000 well completion reports delineated by well use and proposed zone to identify groundwater elevation thresholds suitable for avoidance of domestic and agricultural well impacts

Sustainability Planning: Yolo Subbasin Groundwater Agency Groundwater Sustainability Plan Development, Yolo County, CA

Conducted research, data analysis, and writing for the Yolo Subbasin GSP; led analysis of historical groundwater quality, subsidence, and groundwater elevation data as relevant to SMC

Sustainability Planning: Scotts Valley Water District Groundwater Management Plan Annual Reporting, Santa Cruz County, CA

Conducted writing, figure preparation, and hydrogeological analysis contributing to Water Year 2019 and Water Year 2020 Annual Reports including analysis of groundwater elevations, quality, and supply



Carlotta Leoncini, GIT, Ph.D. Hydrogeologist

OFFICE: Sacramento

YEARS OF EXPERIENCE

Total: 7 | Joined M&A in 2024

EDUCATION

Ph.D., Hydrogeology, University of Bologna, Italy (2022)

M.S., Geology, University of Bologna, Italy (2018)

B.S., Geological Sciences, University of Bologna, Italy (2014)

PROFESSIONAL REGISTRATIONS

Geologist In Training #1752, CA

KEY AREAS OF EXPERTISE

Conceptual hydrogeologic model development

3D groundwater flow and transport models

Well design, testing, and monitoring

Groundwater Quality

CODES & SOFTWARE

Groundwater Vistas

ArcGIS

Surfer

R

Carlotta Leoncini brings to M&A extensive experience in contaminant hydrology and numerical modeling. She has led successful projects on contaminated sites and has experience in artificial recharge and seawater intrusion prevention. Carlotta is especially skilled in MODFLOW and PEST, having completed a dozen explanatory and predicting numerical models. Carlotta is a native Italian speaker and is also fluent in English, Portuguese, and Spanish.

Representative Projects

Model Recalibration and Scenario Analysis: City of Santa Cruz Water Department Santa Cruz County, CA

Recalibrated model by modifying streambed conductivity at ISW RMPs, analyzed historical and predictive model runs under 2 climate scenarios, and prepared a recalibration memo to support decision-making in water resource planning

Tracer Study and Data Analysis: Soquel Creek Water District Santa Cruz County, CA

Reviewed and provided feedback on tracer study work plan; compiled and analyzed background event data to assess aquifer response, supporting sustainable groundwater management

Sonoma Water Agency – Petaluma Model Update Sonoma County, CA

Reviewed USGS model documentation and OWHM2 manual to organize and analyze model inputs, review water budget and pumping assumptions

Carpinteria Basin MAR Injection Well Analysis : Montecito Water District Santa Barbara County, CA

Collaborated with clients and partners on injection well site analysis, water quality considerations, and modeling assumptions for managed aquifer recharge (MAR), enhancing local water supply management sustainability

Santa Margarita Basin Conjunctive Use Planning: City of Santa Cruz Santa Cruz County, California

Conducted quality control on water budget calculations and evaluated supply and demand under various management scenarios under a framework for conjunctive use planning, ensuring sustainable use of both groundwater and surface water resources

Prior Work History

Engineering Geologist II: California State Water Resources Control Board Sacramento, CA

Led a team overseeing 15 active groundwater replenishment projects aimed at artificial recharge or seawater intrusion prevention; assessed accuracy of numerical models through evaluating quality of calibration, sensitivity, and uncertainty analysis; reviewed tracer study workplans and results, determining the need for model recalibration



Groundwater Modeler: Ecosurvey Srl and PSV Srl Engineering consultancies Bologna and Verona, Italy

Concurrently with academic path, developed 12 numerical models and reports for 2 engineering firms in Northern Italy for prediction of contaminant fate and transport (heavy metals, LNAPLs, DNAPLs) for assessment of best remediation strategies and related activities

Staff Hydrogeologist: PSV Srl Engineering Consultancy Verona, Italy

Concurrently with academic path, conducted extensive geotechnic fieldwork on over 20 sites in Northern Italy; compiled borehole stratigraphy, assisted in well installation, and conducted well monitoring and testing; assisted in geophysical study development and analysis (ReMi, MASW, Tromino); analyzed data and drafted reports

Additional Training

Introduction to Python Programming for Groundwater Modelers (2024) - Environmental Simulations Inc.

Automatic Calibration using FEFLOW (2022) – Symple, School of Hydrogeological Modelling

Geostatistics and Kriging (2021) - Italian Geological Society

Numerical Models and How to Make Them Useful (2019) – Watermark Numerical Computing

Model Calibration and Uncertainty Analysis (2017) – Watermark Numerical Computing

Professional Affiliations

International Association of Hydrogeologists - member since 2019

Association of Environmental Engineering Geologists - member since 2023

Publications

Detecting vinyl chloride by phytoscreening in the shallow critical zone at sites with potential human exposure Filippini M., Leoncini C., Luchetti L., Emiliani R., Fabbrizi E., Gargini A., 2022, in Journal of Environmental Management, Volume 319

<u>A quantitative review and meta-analysis on phytoscreening applied to aquifers contaminated by chlorinated</u> <u>ethenes</u>

Leoncini C., Filippini M., Nascimbene J., Gargini A., 2022, in Science of The Total Environment, Volume 817

Peter's Stone, Cressbrook Dale, Derbyshire: landslide or paraglacial feature? Brancaleoni G., Banks V.J., Leoncini C., Kirkham M., Thorpe J., Castellaro S., 2016, in Mercian Geologist, 19(1)

Presentations

Traditional phytoscreening coupled with PID analysis and detector tubes: a rapid in situ assessment of VOCs concentrations and plume delineation

Leoncini C., Filippini M., Gargini A., 2021, in Flowpath – Italian National Meeting on Hydrogeology, Naples, Italy, December 1-3

Optimal hydrogeological conditions for phytoscreening in sites with chloroethenes subsurface contaminations Leoncini C., Filippini M., Gargini A., 2019, in Groundwater Quality Conference, Liège, Belgium, September 9-13

Phytoscreening in sites with chloroethenes contamination in groundwater Leoncini C., Filippini M., Gargini A., 2019, Congress of the Italian Geological Society, Parma, Italy, September 20-25



Luis Mendez Groundwater Hydrologist

OFFICE: Oakland

EXPERIENCE

Total: 5 | M&A: 5

EDUCATION

B.S., Environmental Science, California State University East Bay (2019)

KEY AREAS OF EXPERTISE

Fluent in Spanish

GIS Geodatabase Development, Spatial Analysis, Cartography

Proficient in Arcmap, Grapher,Strater, Microsoft Office

Well Construcition, Development and Testing

Well Abandonment

Contractor Oversight

Groundwater monitoring and datalogging

REGISTRATIONS

Adult First Aid/CPR/AED

AWARDS & DISTINCTIONS

TAU SIGMA Honor Society Member

Earth and Environmental Science Club Member

Sustainability Club Member Luis Mendez is skilled in GIS, cartography, data processing and management, and has extensive field experience in groundwater well construction. His specific experience includes well permitting, construction, maintenance, rehabilitation, destruction, testing, and contractor oversight. He speaks fluent Spanish.

Representative Projects

SGMA Implementation: Santa Cruz Mid-County Groundwater Agency Groundwater Sustainability Plan (GSP) Development, Santa Cruz County, CA

Performed hydrogeological model data analysis and prepared maps, graphs and tables for the GSP

Groundwater Management Planning: Santa Cruz Mid-County Groundwater Agency GSP Annual Report, Santa Cruz County, CA

Prepared groundwater contour maps and change of groundwater in storage maps, groundwater pumping map, sustainable management criteria data tables, and data for submission to DWR; prepared groundwater elevations and change in groundwater in storage sections for annual report

SGMA Implementation: Santa Margarita Groundwater Agency GSP Development, Santa Cruz County, CA

Focused on basin setting, sustainable management criteria, and preparation of GSP figures on ArcMap; managed project geodatabase; prepared graphs, researched land subsidence in area; prepared data for model calibration; prepared water budget and modeling result figures

Groundwater Management Planning: Santa Margarita Groundwater Agency GSP Annual Report, Santa Cruz County, CA

Prepared project geodatabase and report figures and sections on groundwater elevations, water quality, and change in groundwater storage; prepared appendix hydrographs and data for submission to DWR

Data Management System Support: Scotts Valley Water District DMS Data Processing and Upload, Santa Cruz County, CA

Processed and uploaded groundwater level, extraction and water quality data to regional data management system; trained district staff on using the data management system

Data Management System (DMS) Support: City of Santa Cruz Water Department DMS Processing and Upload, Santa Cruz County, CA

Processed and uploaded groundwater level, extraction and water quality data to regional DMS; trained district staff on using the data management system

SGMA Implementation: Yolo Subbasin Groundwater Agency Groundwater Sustainability Plan (GSP) Development, Yolo County, CA

Prepared the project geodatabase and figures for Yolo Subbasin GSP using ArcMap and ArcCatalog; collected and processed data for upload to geodatabase



SGMA Implementation: Corning Subbasin GSP Development, Glenn County, CA

Collected and processed geospatial data; prepared project geodatabase and figures for Corning Subbasin GSP using ArcMap and ArcCatalog; processed and prepared water budget data and figures on Grapher; uploaded project shapefiles to the online data management system for public access

Groundwater Management Planning: Corning Subbasin GSP Annual Report, Glenn County, CA

Collected and processed geospatial data for annual report; prepared groundwater level contour and land subsidence maps

SGMA Implementation: Salinas Valley Basin Groundwater Sustainability Agency GSP Development, Monterey County, CA

Researched and prepared water quality tables for all GSP Basins; prepared figures based on water quality analysis results for all GSP basins

Groundwater Management: Pajaro Valley Water Management Agency Alternative Update Report: Santa Cruz County, CA

Researched and prepared seawater intrusion sustainable management criteria for alternative report and prepared report figures; processed water budget results and prepared figures; managed project geodatabase

SGMA Implementation: Sonoma Valley and Petaluma Valley Groundwater Sustainability Agencies GSP Sonoma County, CA

Prepared water budget figures from model results

Santa Margarita Groundwater Agency: Santa Cruz County, CA SGMA Implementation, GSP Development

Focused on basin setting, sustainable management criteria and preparation of GSP figures on ArcMap; managed project geodatabase; prepared graphs, researched land subsidence in area; prepared data for model calibration; prepared water budget and modeling result figures

SGMA Implementation: Mid Kaweah GSA GSP Revision 2022, Tulare and Kings County, CA

Prepared figures for groundwater level and land subsidence technical reports on ArcMap; prepared public land survey section maps showing well density and depths per section; prepared project locations map

SGMA Implementation: Salinas Valley Basin Groundwater Sustainability Agency Annual Report, Monterey County, CA

Prepared groundwater elevation hydrographs and figures for annual report

Groundwater Management Planning: Santa Cruz Mid-County Groundwater Agency 5 Year Periodic Evaluation, Santa Cruz County, CA

Prepared groundwater level, water quality, and interconnected surface water monitoring network and groundwater dependent ecosystems figures for the Mid-County Basin periodic evaluation

SGMA Implementation, Monitoring Well Permitting and Construction: Santa Margarita Groundwater Agency: Santa Cruz County, CA

Prepared permits and figures for the new monitoring wells to be installed as a part of the Santa Margarita Basin GSP monitoring network enhancement; oversaw well development and collected samples for lab analysis once built

MIKE PODLECH

Aquatic Ecologist

Mr. Podlech is an independent aquatic ecologist specializing in fisheries resources with over 25 years of experience in the investigation and management of biological, physical, and chemical conditions of streams, rivers, lakes, and lagoons throughout California. He has extensive experience in sensitive aquatic habitat assessments and species surveys, watershed management, stream and estuarine restoration, effects analyses, and compliance monitoring. In addition to conducting applied research projects related to anadromous fisheries, Mr. Podlech has been the lead fisheries biologist on numerous large CEQA/NEPA projects and regularly engages in Endangered Species Act consultations, including the preparation of Biological Assessments (BA) and Safe Harbor Agreements (SHA). He is also highly experienced in all aspects of water rights law and guidelines for water diversion impact analyses, including instream flow needs assessments and bypass flow determinations.

Education

M.S., Aquatic Ecology, University of San Francisco 1996

B.S., Environmental Science, University of San Francisco 1994

Specialized Training

California Scientific Collecting Permit #801137-03

Current and past federal Section 4(d) and 10(a) Salmonid Research Permits

Fish Passage Evaluations at Stream Crossings

California Stream Bioassessment Procedure

Professional Affiliations

American Fisheries Society North American Benthological

Society

Professional Experience

Independent Consultant 2007 – current

Environmental Science Associates 1997 – 2007

Institute for Chemical Biology 1994 – 1997

University of San Francisco 1992 - 1994

Relevant Experience

San Lorenzo River Watershed Conjunctive Use Plan

Supporting the San Lorenzo Valley Water District (SLVWD) and County of Santa Cruz in the development of a Conjunctive Use Plan (CUP) to identify opportunities for improving the reliability of SLVWD's water supplies through conjunctively managing its surface and groundwater sources while also increasing stream baseflows for steelhead and coho salmon in the San Lorenzo River watershed. Mr. Podlech prepared a fisheries effects analysis of 22 potential conjunctive use scenarios and developed the final CUP for this Wildlife Conservation Board-funded effort.

Soquel Creek Water District (SqCWD) Well Master Plan EIR

In association with HydroMetrics WRI and ESA, evaluated the potential fisheries effects of SqCWD's Well Master Plan consisting of the construction of five municipal production wells in the Soquel-Aptos area and changes to groundwater pumping operations to improve redundancy and flexibility in the water production and distribution system while redistributing pumping away from coastal and depressed groundwater areas. Key issues evaluated included potential stream baseflow depletion effects on steelhead and coho salmon habitat quality. Coordinated with resource agencies to identify suitable salmonid habitat enhancement projects to address permitting requirements.

Pajaro Valley Water Management Agency (PVWMA) Basin Management Plan Services

Lead fisheries biologist on a consulting team assisting PVWMA in the preparation of CEQA review, permitting, and adaptive management plans for four water supply projects (College Lake, Harkins Slough, Watsonville Slough, Murphy Crossing) identified in a Basin Management Plan aimed at balancing the Pajaro Valley Groundwater Basin. He is preparing CEQA analyses and permitting support documents related to potential impacts to steelhead, tidewater goby, and other native fish species. Tasks include bypass flow analyses, fish passage design support, lagoon impacts evaluation, water rights application support, and regulatory agency coordination.

Relevant Experience (Continued)

Zone 7 Water Agency Stream Maintenance Master Plan EIR

In association with ESA, prepared the fisheries portion of a Master EIR for the Zone 7 Water Agency SMMP, including impact analyses for 45 stream management and flood control projects in three cities (Dublin, Pleasanton, and Livermore) in Alameda County. Conducted technical evaluations of potential fisheries impacts associated with several large-scale project components, such as the proposed diversion of flood flows to the Chain of Lakes Complex.

Dwinnell Dam Fish Passage and Diversion Management Feasibility Analysis

Conducted a Pacific States Marine Fisheries Commission-funded assessment of fish passage and diversion management opportunities and constraints for the Montague Water Conservation District (MWCD) operations on the Shasta River in the Klamath Basin. The project included an assessment of existing and potential coho salmon habitat values upstream of Dwinnell Dam, a conceptual evaluation of potential methods for providing fish passage past Dwinnell Dam, and recommendations for modified diversion operations for the benefit of coho salmon and other salmonids.

Fisheries Aquatic Habitat Collaborative Effort (FAHCE) EIR/EIS

Lead fisheries biologist on the preparation of an EIS/EIR for the Santa Clara Valley Water District (SCVWD) Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) Habitat Conservation Plan (HCP). Analyzed the potential effects of significant changes to the release schedules and quantities at several reservoirs, seismic dam retrofits involving complete reservoir drawdown, downstream habitat restoration, remediation of migration barriers, and other SCVWD management and restoration activities on steelhead, Chinook salmon, and Pacific lamprey.

Pescadero-Butano Watershed and Marsh Restoration Assessments

Completed habitat assessments and restoration recommendations for the Monterey Bay National Marine Sanctuary Foundation (Pescadero-Butano Watershed Assessment) and the Department of Parks and Recreation (Pescadero Marsh Restoration Assessment). Both projects involve integrated analyses of salmonids habitat conditions, sediment source and transport, and water quality leading to the identification and prioritization of habitat restoration sites.

Santa Clara River Estuary Habitat Restoration & Enhancement Feasibility

As lead fisheries expert on a consulting team led by cbec ecoengineering, recently completed preparation of the Santa Clara River Estuary Habitat Restoration & Enhancement Feasibility Study. The study evaluated a number of alternatives for the enhancement of 15 - 25 acres of additional southern California steelhead habitat at the Santa Clara River Estuary through the relocation of a portion of the McGrath State Beach Campground, restoration of the campground to estuarine lagoon, side channel, contiguous wetlands, and contiguous upland riparian habitat.

Integrated Watershed Restoration Program (IWRP)

Over the past 15 years, Mr. Podlech has provided fisheries assistance to the Santa Cruz Resource Conservation District on numerous IWRP projects aimed at fish passage improvements, instream and offchannel fisheries habitat enhancements, bridge replacements, and streambank stabilization projects throughout Santa Cruz County. Tasks typically include fish and habitat assessments, preparation of management plans, identification of potential restoration projects, feasibility evaluations and designs reviews, environmental review and permitting, fish relocations, and construction monitoring. March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 5.4

Title: Consider Amendment to Funding Agreement with the County of Santa Cruz for Planning and Administrative Services and Data Management System

Attachment(s): None.

Recommended Board Action: Approve and authorize the Soquel Creek Water District General Manager to execute an agreement with the County of Santa Cruz for administrative and planning services, and data management system (DMS) hosting and maintenance, in the amount not to exceed \$546,408 for Fiscal Years 2026 and 2027.

Background

KISTERS Water Resources Inc. (KISTERS) was competitively selected in 2020 to develop a joint Data Management System for the Santa Cruz Mid-County Groundwater Agency (MGA) and Santa Margarita Groundwater Agency (SMGWA). They were subsequently retained for ongoing hosting and maintenance.

On January 27, 2022, the MGA Board of Directors formed an Agency Organizational Structure Committee to work with representatives from the SMGWA on a collaborative approach for administrative and planning services. Following a competitive selection process, the Regional Water Management Foundation (RWMF) was chosen to provide these services. Invoiced amounts are based on actual time and materials spent in service to the SMGWA.

As KISTERS and RWMF work for both GSAs, the County, as a member agency of each GSA, administers the two contracts and entered into Revenue Agreements with both GSAs to reimburse costs. The MGA Board approved the current Revenue Agreement on June 16, 2022. Both the Contracts and Revenue Agreements are set to expire on June 30, 2025.

Discussion

In accordance with the County's purchasing policies, the County may annually extend the RWMF and KISTERS contracts for the next two years, after which a new bidding process will be required. Proposals from both contractors have been received and Board of Directors March 20, 2025 Page 2 of 4

reviewed by the Executive Team. The Executive Team recommends that the MGA Board vote to extend the existing Revenue Agreement with the County for an additional two years to accommodate these proposals as provided below:

KISTERS 2025-2026 (total cost to MGA will be approximately 50% of the total)

Pos.	Item no./Description	Unit of Quantity Measure	Price/each	Total
	Contract Extension Water - maintenance contract			
	Contract No. CUCO-KNA-002217			
	07/01/2025 until 06/30/2026 – Year 1			
1	BR-SW-MAIN	1 Year	10,609.00	10,609.00
	WTR SW, Support and Maintenance			
	Annual Support and Maintenance - WISKI User L	icense		
	Total quantity: 2 License			
2	BR-SW-MAIN	1 Year	7,426.30	7,426.30
	WTR SW, Support and Maintenance			
	Annual Support and Maintenance - WISKI Web F	Portal		
2		1 Voar	12 112 72	12 112 72
3	WTR Cloud contracts	1 Teal	15,112.72	15,112.72
	KNA Solf Hosting			
	KINA-Self-Hosting			
	KISTERS HOSting (one year/12 months)			

	Total USD	
I		

31,148.02

Regional Water Management Foundation 2025-2026

Santa Cruz Mid-County Groundwater Agency													
		Program	n			Senior		Administrative					
		Director				Planner			Staff				
Task Category	Hourly rate \$152			Н	ourly rate \$	142	Hourly rate \$94						
	0/1	Est.		Est.	041	Est.	Est.	0/ 1	Est.		Est.		Estimated
	70	Hours ²		Cost ³	70	Hours ²	Cost ³	70	Hours ²		Cost ³		Totals
Administration	50%	210	\$	31,920	10%	84	\$ 11,928	65%	453	\$	42,617	\$	86,465
GSP Implementation Coordination ⁴	20%	84	\$	12,768	70%	588	\$ 83,496	5%	35	\$	3,278	\$	99,542
Outreach	10%	42	\$	6,384	5%	42	\$ 5,964	10%	70	\$	6,557	\$	18,905
Contract Management and Oversight	15%	63	\$	9,576	10%	84	\$ 11,928	20%	140	\$	13,113	\$	34,617
Planning Activities in support of SGMA	5%	21	\$	3,192	5%	42	\$ 5,964	0%	0	\$	-	\$	9,156
Subtotals		420	\$	63,840		840	\$ 119,280		698	\$	65,565	\$	248,685
Expenses												\$	1,250
												\$	249,935

KISTERS 2026-2027 (total cost to MGA will be approximately 50% of the total)

Pos.	Item no./Description	Unit of Quantity Measure	Price/each	Total
	Contract Extension Water - maintenance contract			
	Contract No. CUCO-KNA-002217			
	07/01/2026 until 06/30/2027 – Year 2			
1	BR-SW-MAIN	2 Years	10,927.27	10,927.27
	WTR SW, Support and Maintenance			
	Annual Support and Maintenance - WISKI User	License		
	Total quantity: 2 License			
2	BR-SW-MAIN	2 Years	7,649.09	7,649.09
	WTR SW, Support and Maintenance			
	Annual Support and Maintenance - WISKI Web	Portal		
3	BR-RENTAL	2 Years	13,506.10	13,506.10
	WTR Cloud contracts			
	KNA-Self-Hosting			
	KISTERS Hosting (one year/12 months)			
	т	otal USD		32,082.46

Regional Water Management Foundation 2026-2027

Santa Cruz Mid-County Groundwater Agency													
		Program				Senior		Administrative					
		Director				Planner			Staff				
Task Category	ŀ	Hourly rate \$1	161.1	12	Hourly rate \$150.52			Hourly rate \$99.64					
	oz 1	Est.		Est.	0/1	Est.	Est.	0/1	Est.		Est.		Estimated
	70	Hours ²		Cost ³	70	Hours ²	Cost ³	70	Hours ²		Cost ³		Totals
Administration	50%	210	\$	33,835	10%	84	\$ 12,644	65%	453	\$	45,174	\$	91,653
GSP Implementation Coordination ⁴	20%	84	\$	13,534	65%	546	\$ 82,184	5%	35	\$	3,475	\$	99,193
Outreach	10%	42	\$	6,767	5%	42	\$ 6,322	10%	70	\$	6,950	\$	20,039
Contract Management and Oversight	15%	63	\$	10,151	10%	84	\$ 12,644	20%	140	\$	13,900	\$	36,694
Planning Activities in support of SGMA	5%	21	\$	3,384	10%	84	\$ 12,644	0%	0	\$	-	\$	16,027
Subtotals		420	\$	67,670		840	\$ 126,437		698	\$	69,499	\$	263,606
Expenses												\$	1,250
						•						\$	264,857

Board of Directors March 20, 2025 Page 4 of 4

Recommended Board Action:

1. By MOTION, approve and authorize the Soquel Creek Water District General Manager to execute an agreement with the County of Santa Cruz for administrative and planning services, and data management system (DMS) hosting and maintenance, in the amount not to exceed \$546,408 for Fiscal Years 2026 and 2027.

Submitted by:

Sierra Ryan Water Resources Program Manager County of Santa Cruz

On behalf of the MGA Executive Staff

Melanie Mow Schumacher, General Manager, Soquel Creek Water District Ralph Bracamonte, District Manager, Central Water District Heidi Luckenbach, Water Director, City of Santa Cruz Sierra Ryan, Water Resources Program Manager, County of Santa Cruz March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 5.5

Title:Receive Update on Sustainable Groundwater Management Act
Compliance Funding Options Assessment

Recommended Board Action: Receive an update on the funding options assessment and provide direction.

Background

Since the inception of Santa Cruz Mid-County Groundwater Agency (MGA), the expenses associated with Sustainable Groundwater Management Act (SGMA) compliance have been borne by the four MGA member agencies with grant assistance from the Department of Water Resources. The MGA Groundwater Sustainability Plan identifies the four MGA member agencies as the source of funding for SGMA regulatory compliance through 2025 and the need to further evaluate funding mechanisms for ongoing compliance from 2026 and beyond. Examples of ongoing activities associated with SGMA compliance include, but are not limited to, annual reporting and periodic evaluations of the Groundwater Sustainability Plan, Agency administration, Basin monitoring and data reporting, and maintaining a Data Management System.

In October 2024, following a competitive request for qualifications process, the MGA Executive Staff recommended engaging SCI Consulting Group to conduct a funding options assessment. The goals of the funding options assessment are to: 1) identify MGA funding needs; 2) identify community preferences and stakeholder perspective on funding; 3) identify an appropriate legal framework under SGMA for collecting funding: and 4) recommend long-term funding options available to MGA for SGMA compliance.

The funding options assessment is the first phase as MGA considers a long-term funding plan for SGMA compliance. This first phase is expected to result in providing feasible options for funding that the MGA Board would consider for further development and evaluation.

Discussion

The funding options assessment is currently at the beginning of community engagement to obtain stakeholder perspectives. The first public workshop is Board of Directors March 20, 2025 Page 2 of 2

scheduled for March 17, 2025, and is intended for private domestic users of groundwater. The meeting announcement was mailed directly to 1,813 addresses that were identified as likely to be served by a private domestic well.

The Board will receive a report-out from the initial workshop and will receive additional information on Basin characteristics that SCI Consulting Group is considering as part of the assessment. In collaboration with staff, SCI has identified a potentially optimal approach to fee structure development that involves a hybrid between a parcel fee and an extraction fee. SCI will provide an overview of this approach, along with consideration of feedback from the initial outreach workshop. The Board is being asked to provide direction on the next steps for the assessment.

Recommended Board Action:

1. By MOTION, receive an overview presentation of funding options assessment and provide direction.

Submitted by:

Rob Swartz Senior Planner Regional Water Management Foundation

On behalf of the MGA Executive Staff

Melanie Mow Schumacher, General Manager, Soquel Creek Water District Ralph Bracamonte, District Manager, Central Water District Heidi Luckenbach, Water Director, City of Santa Cruz Sierra Ryan, Water Resources Manager, County of Santa Cruz March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 5.6

Title: Conduct Annual Election of Officers

Attachment(s): None.

Recommended Board Action: Nominate and, if necessary, call for a vote for the Chair, Vice Chair, and Secretary of the Board of Directors of the Santa Cruz Mid-County Groundwater Agency.

The elected officers of the Santa Cruz Mid-County Groundwater Agency Board of Directors are the Chair, Vice Chair, and Secretary, and are elected annually at the first meeting of the calendar year. Directors may make nominations for each of the elected offices. If more than two Directors are nominated for any office, voting occurs until a nominee receives a majority of the votes. No other Board action is required. Board Officers may succeed themselves and serve any number of consecutive or nonconsecutive terms.

The current officers are: Chair: Jon Kennedy, Private Well Owner; Vice-Chair: David Baskin, City of Santa Cruz; Secretary: Jim Kerr, Private Well Owner.

Any change in officers will become effective at the conclusion of the March 20, 2025 Board meeting.

Recommended Board Action:

1. By MOTION, nominate and, if necessary, call for a vote for the Chair, Vice Chair, and Secretary of the Board of Directors of the Santa Cruz Mid-County Groundwater Agency.

Submitted by:

Tim Carson Program Director Regional Water Management Foundation
March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 6.1

Title: Treasurer's Report

Attachment(s):

1. Treasurer's Report for the Period Ending February 28, 2025

Recommended Board Action: No action required, informational report only.

Attached is the Treasurer's Report for December 2024 through February 2025. These reports contain three sections:

- Statement of Changes in Revenues, Expenses and Net Position
 - This interim financial statement provides information on the revenue that has been invoiced to the member agencies and the expenses that have been recorded as of the period ending date.
- Statement of Net Position
 - This interim financial statement details the cash balance at Wells Fargo Bank, the membership revenue still owed through accounts receivable, if any, prepaid expenses such as insurance, outstanding grant receivables or liabilities, and the resulting net income as reported on the Statement of Changes in Revenues, Expenses and Net Position.
- Warrants
 - The list of warrants reflects all payments made by the MGA, either by check or electronic means, for the period covered by the Treasurer's Report.

The Treasurer's Report will be provided at each board meeting according to statutory requirement and to promote transparency of the agency's financial transactions.

Recommended Board Action:

1. No action required, informational report only.

Submitted by:

Leslie Strohm Treasurer Santa Cruz Mid-County Groundwater Agency

Treasurer's Report

Santa Cruz Mid-County Groundwater Agency For the period ended February 28, 2025



Prepared by Leslie Strohm, Treasurer

Prepared on March 7, 2025

Statement of Revenues, Expenses and Changes in Net Position

December 2024 - February 2025

	Total
INCOME	
Total Income	
GROSS PROFIT	0.00
EXPENSES	
5100 Groundwater Management Services	69,224.08
5110 Grndwtr Mgmt - Groundwater Monitoring	36,413.74
5300 Administrative Personnel Services	34,661.89
5315 Office Services	172.80
5340 Computer Services	198.00
5415 Outreach Services	4,805.17
5510 GSP Consulting Services	42,751.50
5515 Audit & Accounting Services	6,455.00
5520 Legal Services	3,523.75
5600 Pass-through Grant Expenses	1,560,054.54
Total Expenses	1,758,260.47
NET OPERATING INCOME	-1,758,260.47
OTHER INCOME	
4401 Grant Revenue - DWR SGMI Grant	1,695,566.15
Total Other Income	1,695,566.15
NET OTHER INCOME	1,695,566.15
NET INCOME	\$ -62,694.32

Statement of Net Position

As of February 28, 2025

	Total
ASSETS	
Current Assets	
Bank Accounts	
1100 Wells Fargo Business Checking	1,696,426.75
Total Bank Accounts	1,696,426.75
Accounts Receivable	
1220 Accounts Receivable - Grants	1,695,566.15
Total Accounts Receivable	1,695,566.15
Other Current Assets	
1400 Prepaid Expenses	281.25
Total Other Current Assets	281.25
Total Current Assets	3,392,274.15
TOTAL ASSETS	\$3,392,274.15
LIABILITIES AND EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
2100 Accounts Payable	169,592.80
2110 Accounts Payable - Grants	1,578,681.63
Total Accounts Payable	1,748,274.43
Total Current Liabilities	1,748,274.43
Total Liabilities	1,748,274.43
Equity	
3100 Retained Earnings	1,899,103.88
Net Income	-255,104.16
Total Equity	1,643,999.72
TOTAL LIABILITIES AND EQUITY	\$3,392,274.15

Warrants

December 2024 - February 2025

Date	Transaction Type	Num	Name	Memo/Description	Cir	Amount
Bill Payment (Cho	eck)					
02/14/2025	Bill Payment (Check)	10417	Errol L Montgomery & Associates Inc	Annual report, Data Management System, GSP evaluation		-5,451.00
						-5,451.00
						·
			County of Santa Cruz (County			
02/14/2025	Bill Payment (Check)	10418	Counsel)	Legal services		-1,543.75
						-1,543.75
02/14/2025	Bill Payment (Check)	10419	Van Essen Instruments B.V.	Divers and cables		-7,813.33
						-7,813.33
00/4 4/0005		10.400	Geophysical Imaging Partners	Analysis of 2017 & 2022		7 405 00
02/14/2025	Bill Payment (Check)	10420	Inc	airborne electromagnetic data		-7,435.00
						-7,435.00
02/14/2025	Bill Payment (Check)	10421	Best Best & Krieger LLP	Legal services		-612.00
						-612.00

Date	Transaction Type	Num	Name	Memo/Description	Clr	Amount
01/09/2025	Bill Payment (Check)	10413	City of Santa Cruz Water Dept	Corrected payment for SGMI grant invoice 8	R	-304,210.08
						-304,210.08
01/09/2025	Bill Payment (Check)	10414	Errol L Montgomery & Associates Inc	2024 Annual Report, GSP Periodic Evaluation, Data Management System	R	-2,409.50 -2,409.50
01/09/2025	Bill Payment (Check)	10415	Soquel Creek Water District (2)	Reimbursement for FY 2024 audit, Quickbooks, Mailchimp, and Zoom Webinar	R	-4,217.25 -4,217.25
01/09/2025	Bill Payment (Check)	10416	Best Best & Krieger LLP	SGMA Legal Support Services	R	-1,368.00 -1,368.00
12/06/2024	Bill Payment (Check)	10409	Soquel Creek Water District (2)	SGMI Grant Expenses	R	-380,943.75 -380,943.75
12/06/2024	Bill Payment (Check)	10410	Errol L Montgomery & Associates Inc	2024 Annual Report, Seawater Intrusion & GSP Evaluation, SGMA Support	R	-7,574.00
Santa Cruz Mid-Coι	unty Groundwater Agency					5/6

Date	Transaction Type	Num	Name	Memo/Description	Clr	Amount
						-7,574.00
12/06/2024	Bill Payment (Check)	10411	Trout Unlimited Inc	Streamflow and Groundwater Monitoring	R	-11,968.48
						-11,968.48
12/06/2024	Bill Payment (Check)	10412	Soquel Creek Water District	Mailchimp & Quickbooks	B	-138 25
12/00/2024		10412	(-)			-138.25
Expense						
01/06/2025	Expense	US00447Vby	Google - Online Payments	G Suite Subscription	R	-86.40
				Google Payment - G Suit		86.40
12/05/2024	Expense	US0043Suxv	Google - Online Payments	G Suite Subscription	R	-86.40
				Google Payment - G Suit		86.40

March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 6.2.1

Title: GSP Implementation Status Update

Recommended Board Action: No action required, informational report only.

The intent of this memorandum is to provide status updates on Groundwater Sustainability Plan (GSP) implementation activities not covered elsewhere on the Board agenda.

<u>Well Registration and Metering Program</u> – Following Board adoption of the policy requiring well registration, metering, and reporting for non-de minimis groundwater users, Regional Water Management Foundation (RWMF) staff has continued to work with well owners to determine applicability of the policy. Based on the latest information, it is estimated that 6 wells are subject to the policy. RWMF staff has received a response from the 6 owners, so the initial registration phase is considered complete. Of the 6 wells, 3 have existing meters and 3 do not. RWMF is continuing to coordinate with those owners to determine if MGA can provide assistance for installing meters through the Sustainable Groundwater Management Implementation Grant awarded by DWR.

<u>Seawater Intrusion Investigation</u> – RWMF and M&A staff are coordinating on the seawater intrusion investigation in the Seascape area. The investigation is exploring options for additional geophysical investigation to characterize the potential advancement of high salinity water in the subsurface near Seascape. Additional data is also being collected through data loggers installed within the screen intervals of the deep monitoring well on Dolphin Drive near Sumner Avenue and the shallow monitoring well at the end of Sumner Avenue that will measure groundwater levels and electrical conductivity. Two additional data loggers are expected to be deployed in the deep monitoring wells at the end of Sumner Avenue and at the Seascape well near Seascape Boulevard in the coming weeks. This will provide a more detailed understanding of water quality changes through time.

Recommended Board Action:

1. No action required, Board to receive presentation by Trout Unlimited

Board of Directors March 20, 2025 Page 2 of 2

Submitted by:

Rob Swartz

Senior Planner Regional Water Management Foundation

Santa Cruz Mid-County Groundwater Agency Sustainable Groundwater Management Act Implementation Grant (Agreement #4600014636)

 1. Project: Cunnison Lane Groundwater Well Lead: Soquel Creek Water District Grant Award: \$1,734,560 Status: Well construction completed; Treatment Plant designs underway 	Activities to Date: Cunnison Lane Groundwater Well construction completed in fall 2024. Geotechnical and topographic surveys in support of water treatment plant (WTP) design were completed. 30% design for the associated WTP were completed; 60% WTP design is in progress. Water quality data from the Cunnison well will inform the subsequent phases of designs for the water treatment facility. 100% design drawings for the raw water pipeline between the Cunnison well and treatment facility are completed.
2. Aquifer Storage & Recovery (ASR), Beltz Wellfield Lead: City of Santa Cruz Grant Award: \$1,650,000 Status: Designs completed to convert the Beltz 12 production well into an ASR facility; Construction bid solicitation open (11/20/24 to 1/10/25). Designs underway for Beltz 8 ASR facility.	Activities to Date: The City's engineering consultant Carollo completed design to convert the Beltz 12 production well into an ASR facility; Issued bid for construction of Beltz 12 in November 2024; awarded bid; issued Notice to Proceed in March 2025. Ongoing development of designs for Beltz 8; 90% design in progress.
3. Park Avenue Transmission Main Improvements Lead Agency: Soquel Creek Water District Grant Award: \$740,440 Status: Completed	Grant funded activity was completed in 2024.
4. Technical Development of GSP Group 1 & 2 Projects Leads: Soquel Creek WD & City of Santa Cruz Grant Award: \$1,900,000 Status: Underway	Activities to Date: Task 1: Develop Objectives and Project Components to Analyze (Led by District). Brown and Caldwell (BC) serves as lead consultant working with District, City, and others on the development and evaluation of alternatives and costs. This task is complete. Task 2: Groundwater Modeling (Led by City). Montgomery and Associates (M&A) serves as lead consultant working with City, District, BC, and hydraulic modeling consultant Akel Engineering. Completed activities include substantial completion of modeling within selected project alternative tracks (Pure Water

4. Technical Development of GSP Group 1 & 2 Projects

Leads: Soquel Creek WD & City of Santa Cruz Grant Award: \$1,900,000 Status: Underway Soquel (PWS), Aquifer Storage & Recovery (ASR), and transfers using machine-learning guided optimization. This process was used to narrow down thousands of scenarios under the project alternative tracks to four that represent different ways PWS, ASR, and transfers could be implemented. A technical memorandum (TM) summarizing this work has been completed and the four selected scenarios are being further analyzed under Tasks 4-7.

Task 3: Hydraulic Modeling (Led by District). Akel Engineering serves as lead consultant working with District, City, and M&A. Akel completed the hydraulic modeling component of the Study and prepared a TM summarizing this work.

Task 4: Water Quality and Regional Compatibility/Optimization (Led by District). BC serves as lead consultant on water quality component. This work included modeling selected projects for potential distribution system water quality impacts and to identify additional water quality studies or treatment needed for project implementation. BC completed this component and summarized the results in a TM.

Task 5: Economic and Financial Analysis/ Modeling (Led by District). BC serves as lead consultant with subconsultants performing specialized evaluations of the selected projects for cost and economic impacts. A draft TM has been completed and a final TM is expected to be completed by the end of March 2025.

Task 6: Needs Assessment (Led by District). BC serves as lead consultant with subconsultants performing specialized evaluations of the selected projects for social, environmental, regulatory, legal & institutional needs. BC completed a draft TM and a review is underway.

Task 7: Develop Final Report with Recommendations and Implementation Workplan (Led by District). BC is currently developing the outline for the final report which is expected to be completed in summer 2025.

5. Sustainable Groundwater Management Evaluation & Planning

Leads: MGA & County of Santa Cruz Grant Award: \$1,575,000 Status: Underway GSP Implementation activities underway: Water Year 2024 Annual Report; 2025 groundwater model improvements; analysis of 2017 and 2022 airborne electromagnetic (AEM) data and available alternatives for additional analysis of seawater intrusion in the Seascape agricultural area; streamflow and groundwater monitoring; development of non-de minimis groundwater usage metering program and recent SGMA compliance funding workshop for domestic groundwater users served by a private well.

M&A completed the first GSP Periodic (5-Year) Evaluation in December 2024. Ongoing M&A activities include Water Year 2024 Annual Report, evaluation of seawater intrusion in the Seascape area, evaluation of the Basin monitoring network, and groundwater model improvements.

Trout Unlimited continues streamflow monitoring, data collection and reporting, associated shallow groundwater monitoring, data collection, and reporting.

Global Imaging Partners is analyzing prior AEM data (2017 and 2022) and available alternatives for additional analysis of existing seawater intrusion in the Seascape area. SCI Consulting is leading a study on long-term funding options for SGMA regulatory compliance.

RWMF staff continues GSP Implementation activities including coordination with MGA member agency staff on GSP Projects and Management Actions, coordination with member agencies and consultants to support GSP implementation efforts, coordination of Basin monitoring network evaluation, groundwater metering program and well registration planning, meeting coordination and facilitation with MGA Member Agency staff, support for monitoring data and Data Management System (WISKI) and online portal, participation in County well ordinance technical advisory committee. Staff also supported planning activities on agency authorities. Supported outreach activities including website



Search



Introduction to Groundwater, Watersheds, and Groundwater Sustainability Plans

An Online Short Course



Introduction to Groundwater, Watersheds, and Groundwater Sustainability Plans 2025

Understanding groundwater and watersheds and how we monitor, assess, and sustainably manage these resources is critical and integral to California Groundwater Sustainability Plans (GSPs) and other water management programs. Private citizens, professionals, decision makers, executives, agency employees, and stakeholders with diverse backgrounds and in a wide variety of private, non-profit, and government responsibilities are increasingly engaged in the sustainable management and assessment of groundwater and surface water.

This online short course will review the fundamental principles of groundwater and watershed hydrology, water budgets, water quality, and water law and regulation in an intuitive, highly accessible fashion. Through real world examples, participants learn about the most common tools for measuring, monitoring, and assessing groundwater and surface water resources. We then review the key steps and elements of planning for groundwater sustainability. Case studies are used so participants learn about

- development of conceptual models, water budgets, and GSP sustainability criteria;
- understanding minimum thresholds and operating targets (measureable objectives) for GSPs and

bow to link those to monitoring networks; © Copyright 2005-2025 The Regents of the University of California, Davis campus. All rights reserved.

- methods for addressing climate variability and climate change;
- recharge as a tool to enhance groundwater supplies; Admin Home (/Home/AdminHome)
- evaluation of Groundwater Sustainability Plans by DWR;

- local Groundwater Sustainability Agency governance; and
- available online planning resources.

Who Should Attend?

The course is specifically geared towards an audience that is or will be involved in the management, assessment, and protection of groundwater and surface water resources under California's SGMA or similar programs. The course will also be useful for those who engage with, e.g., source water assessments, urban water management plans, and integrated regional water management plans. Course attendees, who may have some experience with but no formal training in hydrology or related engineering or science fields, will benefit from the basic and intuitive, yet comprehensive approach of this course.

Date:

Thursdays April 3 and 17 and May 1, 15, and 29, 2025 9 a.m. - 12 p.m. with Q&A 12 - 1 p.m. PDT (GMT-0700)

Recordings of the lectures and Q&A sessions are made available to registrants including late registrants.

Location: This shortcourse will be provided online using Zoom. Participants will be sent instructions upon registration.

Course Materials Included: Presentation material will be sent via email. The course fee also includes the accompanying textbook, mailed via UPS to the attendee's physical address provided

Registration: \$100/\$70 (includes textbook)

Reduced fees (\$70) are available to state agency employees, members of California Groundwater Sustainability Agencies (board, staff, advisory committees) and to participants of the Water Education Foundation "Water 101" Workshop on April 10, 2025.

Contact us for the reduced fee or scholarship coupon code before registering: GroundwaterUCD@gmail.com

Late Registration: You must register at least 24 hours before the course session starts to guarantee that meeting information is sent to you before the short course begins. If you register after April 1, 2025 but before the final registration deadline of September 30, 2025, recordings of the short course sessions you missed will be made available. No registrations are accepted after September 30, 2025.

If you live outside the USA: In the lower registration information section, please enter CA in the State Field. 95616 in the Zip Code Field and 555-55555 in the Telephone Field. You can enter your state/ province, country, postal code and phone number in the supplemental fields provided in the top section. Once you submit the registration information, you will be redirected to a secure credit card site where you will be able to enter your credit card information with the correct address. Thank you.

Cancellation Policy: If you cannot attend on the day of the shortcourse, we make recordings available for you.

For questions please contact: Thomas Harter, GroundwaterUCD@gmail.com

Organized and Sponsored by:

Nora S. Gustavsson Endowed Professorship in Groundwater Resources

University of California Cooperative Extension Groundwater Hydrology Program.

Link:

https://groundwater.ucdavis.edu/Short_Course/ (https://groundwater.ucdavis.edu/Short_Course/)

REGISTER (/PAYMENTS/CHECKOUT/1240)

Register by Sep 30 th

9	LOCATION:
•	Online
•	BEGIN DATE: Apr 03, 2025
-	END DATE : May 29, 2025
	CONTACT INFORMATION: Thomas Harter, GroundwaterUCD@gmail.com
	PRICE PER TICKET: \$100.00
	LAST DAY TO REGISTER ONLINE: Tuesday, September 30, 2025

ACWA Conference + EXPO SPRING 2025

MAY 13 - 15 MONTEREY

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March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 6.3

Title:Agreement with Geophysical Imaging Partners to Analyze 2017 and
2022 Airborne Electromagnetic Data

Attachment(s): None.

Recommended Board Action: No action required, informational report only.

Background

In 2017, to evaluate seawater intrusion Soquel Creek Water District engaged the firm Ramboll to conduct an investigation to identify the saltwater-freshwater interface using an airborne electromagnetic (AEM) geophysical survey along the coast of the Mid-County Groundwater Basin. Max Halkjaer served the lead role on the interpretation and analyses of the AEM survey data.

In 2022, the Department of Water Resources conducted AEM surveys in high- and medium-priority groundwater basins throughout California, including Basins in Santa Cruz County. The flightlines of 2017 and 2022 AEM surveys were not identical, however there are some areas where the surveys overlapped or were in close proximity.

Discussion

In December 2025, the MGA Executive Team approved the sole source selection of Global Imaging Partners to evaluate the 2017 and 2022 AEM geophysical investigations with a focus on saltwater intrusion in the area from Rio Del Mar to La Selva Beach. Mr. Halkjaer, previously of Ramboll, is now a partner with Global Imaging Partners and is uniquely qualified to conduct an evaluation of the two surveys. The objective of the investigation is to ensure that the two datasets are processed using the same procedures and techniques to ensure the data are comparable. In March 2025, an amendment to the agreement added an additional task to consider available alternatives for additional analysis.

The not-to-exceed total budget is \$9,800 as shown in the table below.

Board of Directors March 20, 2025 Page 2 of 2

Tasks	Price (USD)
Task A. Format and Import data. Processing and Inversion	
19 hours @ \$215	4,085
Task B. Presentation of the results	
6 hours @ \$215	1,290
Task C. Meetings	
2 hours @ \$215	430
Task D. Available Alternatives for Additional Analysis	
11 hours @ 215	2,365
Aarhus Workbench license, including the AEM LCI/SCI inversion package cost	1,630
shared as 2 of 13-week times \$10,600 ¹	
Total (USD)	9,800

The MGA's Procurement Policy authorizes the MGA Executive Staff to approve procurements up to \$50,000. Justification for sole source procurement is to be provided to the Board at its next meeting. The selection of Global Imaging Partners is justified as sole source procurements based upon the following:

- 1. The goods or services are unique due to the specialized skill or experience of the consultant and
- 2. The goods or services are required to match, integrate, or be compatible with services from a consultant who previously satisfactorily provided services to the MGA or a Member Agency.

Recommended Board Action:

1. No action required, informational report only.

Submitted by:

Tim Carson Program Director Regional Water Management Foundation March 20, 2025

MEMO TO THE MGA BOARD OF DIRECTORS

Subject: Agenda Item 6.4

Title: Annual Streamflow Monitoring Report

Attachment(s):

1. Soquel Creek and Aptos Creek Streamflow Monitoring Report for Water Year (WY) 2024

Recommended Board Action: No action required, Board to receive presentation by Trout Unlimited.

The Sustainable Groundwater Management Act (SGMA) requires Groundwater Sustainability Plans (GSPs) to address and quantify depletions of interconnected surface waters to avoid adverse impacts on beneficial uses and to consider impacts to groundwater-dependent ecosystems.

In 2022, the MGA contracted with Trout Unlimited to conduct streamflow monitoring at six (6) sites in the Basin during the dry season (generally occurring from late spring to early fall). Measurements are collected for stage, streamflow, temperature and electrical conductivity. These monitoring data serve to inform evaluations of the GSP's Sustainable Management Criteria for the depletion of interconnected surface water based upon streamflow data and shallow well groundwater level data collected at nearby associated monitoring wells in the Basin.

The 2024 dry season streamflow monitoring commenced on May 17 and concluded at the end of October, with the exception of a site at the West Branch of Soquel Creek that will be monitored year-round. Monitoring will commence again in May 2025. This will be the third year of data collection by Trout Unlimited.

Trout Unlimited has completed a dry season monitoring report for 2024 and will provide an overview of 2024 dry season monitoring results.

Recommended Board Action:

1. No action required, Board to receive presentation by Trout Unlimited

Board of Directors March 20, 2025 Page 2 of 2

Submitted by:

Rob Swartz

Senior Planner Regional Water Management Foundation Soquel Creek and Aptos Creek Streamflow Monitoring Report WY2024



FEBRUARY 19, 2025

Prepared By: Trout Unlimited Mia van Docto, Krysia Skorko, Troy Cameron and Anthony Modena



1. Introduction

In 2022, Trout Unlimited (TU) was awarded a 3-year contract from the Santa Cruz Mid-County Groundwater Agency (MGA) to perform dry season (May through October) streamflow and year-round groundwater monitoring in the Santa Cruz Mid-County Groundwater Basin (Basin). The monitoring will inform evaluations of sustainable groundwater management as part of the MGA's 2019 Groundwater Sustainability Plan (GSP). The MGA GSP seeks to avoid undesirable results for five sustainability indicators: groundwater level declines, groundwater storage reductions, interconnected surface water depletion, seawater intrusion, and water quality degradation. The TU monitoring effort will primarily help assess interconnected surface water depletion while contributing to a larger data collection effort by MGA in assessing long-term groundwater levels. In WY2024, TU monitored stream conditions at 7 priority locations in the Basin. This report provides the results of the second year of streamflow monitoring. Funding for this project has been provided in part from the Budget Act of 2021 and through an agreement with the California Department of Water Resources.



2. Study Area

Watershed Characteristics

The Soquel Creek and Aptos Creek watersheds are coastal drainages dominated by mixed conifer forests, comprised mainly of coastal redwood, tan oak, madrone and Douglas fir (RCDSCC 2019). Most of the study area is within unincorporated Santa Cruz County. Soquel Creek drains approximately 42 sq. miles, and Aptos Creek drains approximately 25 sq. miles. Land use in Soquel Creek includes rural residential development, parks and recreation, mining, and timber harvesting. Roughly 25% of the headwaters of the Soquel Creek Watershed are State-protected lands (RCDSCC 2019). Logging has been conducted in the middle and upper watershed since the mid-nineteenth century (RCDSCC 2003). Land use in the Aptos Creek Watershed includes more than 50% forested and state park lands; other land uses include urban and rural residential. There is both historical and modern-day logging on these lands (SCC Environmental Health Dept). Both creeks provide important coho salmon and steelhead trout habitat (RCDSCC 2019).

Rainfall

The Soquel Creek and Aptos Creek watersheds have a Mediterranean climate like most of coastal California, with warm dry summers and cool wet winters. The Parameter-elevation Regression on Independent Slopes Model (PRISM), a precipitation model developed at Oregon State University, indicates that average precipitation throughout the watershed is extremely variable, with the lower portion receiving an average

30 to 40 inches of rainfall annually, and rainfall averages of up to 60 inches in the higher elevation portions of the watersheds. Figure 1 shows 30 years of rainfall data collected beginning in 1994 from the California Irrigation Management Information System (CIMIS) station in Santa Cruz, CA (CIMIS station 104 DeLaveaga, hereafter, DeLaveaga station). The DeLaveaga station is located in the northern portion of the city of Santa Cruz near DeLaveaga Park, at an approximate elevation of 300 feet. The data show that the long-term average annual rainfall here is 29.9 inches. Rainfall in WY2024 was 36.89 inches, above the long-term average, and second above-average year in a row, following three consecutive years of below average rainfall.



Figure 1. Annual precipitation (inches) for 30 years (WY1994 – WY2024), collected at CIMIS station 104 (DeLaveaga). The red dashed line represents the long-term average annual rainfall (29.9 in) collected at the station.

Monitoring Sites

Figure 2 shows the locations of the gages on Soquel Creek and Aptos Creek. Soquel Creek has five gages in both the upper and lower reaches of the watershed. Soquel Creek at the Quarry (Sq04) is the most upstream gage, just downstream of the confluence with Hinckley Creek. Next downstream is East Branch Soquel above West Branch (Sq01), located on the East Branch of Soquel Creek just upstream of the confluence with the West Branch. In 2024, an additional gage at this location on the West Branch (Sq02) was reactivated and monitored. The next downstream gage is the Soquel at Mountain Elementary gage (Sq06). Furthest downstream is the Soquel at Cherryvale gage (Sq05), which is upstream of the confluence with Bates Creek. The two gages on Aptos Creek are in the lower portion of the watershed; Aptos at County Park (Ap01) is upstream of Highway 1 and Aptos below Highway 1 (Ap02) is downstream.



Figure 2. Location of Soquel Creek and Aptos Creek streamflow gages.



3. Streamflow and Conductivity Conditions

Streamflow

TU began seasonal monitoring at the gage network in May of 2024. Each streamflow gage was operated following United States Geological Survey (USGS) standard procedures, as described in Rantz (1982). Streamflow measurements were collected approximately monthly using a Flow Tracker 2, following USGS protocols for measuring streamflow velocity (Turnipseed and Sauer 2010). Staff plate readings were used to detect pressure transducer drift and other factors that may cause phase shifts (i.e., changes in the relationship between stage and streamflow) over the course of the project and to tie data in to surveyed benchmarks. Using measured streamflow values, rating curves were developed to correlate streamflow with stage at each site. Manual measurements of temperature and conductivity were collected using a handheld YSI probe.

Figure 3 shows 15-minute streamflow at the five Soquel Creek gages from May through October 2024. In early May, streamflow was highest at the sites in the lower portion of the watershed (Sq06, Soquel at Mountain Elementary, at ~22 ft³/sec, and Sq05, Soquel at Cherryvale, at ~18 ft³/sec). Flows in the upper portions of the watershed were lower; flows at Sq01 (East Branch Soquel above West Branch) were approximately 15 ft³/sec and the highest gage in the watershed (Sq04, Soquel Creek at the Quarry), had lower flows of approximately 12 ft³/sec. Flows at the West Branch gage (Sq02) were the lowest of all sites, at about 6.5 ft³/sec in mid-May. Flows at all sites receded quickly from May through July, reaching baseflow in mid-August, September and October. The lower portion of the watershed consistently gained flow from the upper portion, and baseflows

remained higher at the lower gages (Sq05, Sq06) than at the upper watershed gages. The lower watershed gages show a higher level of variability and daily fluctuations.

Figure 4 shows 15-minute streamflow at the two Aptos Creek gages from May through October 2024. Because of its smaller watershed size, flows are lower than in Soquel Creek. Flow at the upstream site (Ap01) starts out slightly higher than at the downstream site (Ap02) in May, at approximately 5.5 and 4.5 ft³/sec, respectively. This relationship reverses in early June through August, but by the time the sites recede to baseflow in early September, flows are still slightly higher at the upstream site. These gages are low in the watershed, and similar to the gages in lower Soquel Creek, show high variability and daily fluctuations.

Analysis of data from Sq05, Sq06, Ap01 and Ap02 at a daily time step show that the sensors picked up fluctuations in stage that do not match typical diurnal patterns. This variability could be caused by sensor sensitivity limitations and the locations of the gages. Due to the nature of the reach conditions TU had to work with, these gages are in pools with higher near-bed velocity gradients than the upper watershed gage pools (Sq01 and Sq04). The reaches' more turbulent nature causes water levels to vary more frequently, resulting in slightly noisier data.



Figure 3. Streamflow conditions in Soquel Creek, at all gage sites in WY2024.



Figure 4. Streamflow conditions at Aptos Creek, WY2024.

Conductivity

Manual field measurements of temperature, actual conductivity and specific conductivity at 25 degrees C were made in July through September of 2024, the results are shown in Table 1. Conductivity is a measure of the ability of water to pass an electrical current. Each body of water has a baseline conductivity that is considered to be its normal range, often dictated by local geology. It can be affected by rain, spring water inputs, minerals, tides and mixing zones and evaporation. The normal range for freshwater streams is between 100 and 2,000 μ s/cm (SWRCB 2002). According to the EPA, because dissolved salts and other inorganic chemicals conduct electrical current, conductivity increases as salinity increases.

Comparison of the specific conductivity measurements in Table 1 shows that at each site, conductivity generally increased between July and October as streamflow decreased, and all measurements remained within the normal range for freshwater streams. Specific conductivity at the Aptos sites were similar to each other between sites. The highest conductivities in the Soquel watershed were observed in the upper reaches of the watershed, at the Soquel Creek at the Quarry (Sq04) site and EB Soquel above West Branch site (Sq01), with lower conductivities observed at the further downstream sites (Sq05, Sq06) and at the West Branch site (Sq02)

		Water Temp	Actual Conductivity	Specific Conductivity	
Site	Date/time	(deg C)	at Field Temp	at 25 deg C (µs/cm)	
(Ap01) Village County Park	7/26/2024 11:03	16.1	778	937	
	8/29/2024 12:03	16.8	816	968	
	9/30/2024 11:15	14.7	773	962	
	10/30/2024 11:07	10.8	801	1099	
(AnO2) Lower Antos holow Hury 1	7/26/2024 11:50	16.2	770	024	
(Apoz) Lower Aptos below Hwy 1	2/20/2024 11:59 2/20/2024 12:00	10.3	779 025	934	
	0/20/2024 13:09	10.0	774	978	
	10/30/2024 12:30	11 1	805	1096	
	10/ 50/ 2024 12:10	11.1	803	1050	
(Sq01) E Branch Soquel Abv W Branch	7/16/2024 9:28	17.1	828	975	
	7/25/2024 12:27	19.7	933	1038	
	8/30/2024 10:03	16.5	1021	1219	
	10/1/2024 10:15	15.4	993	1216	
	10/31/2024 11:58	12.1	1044	1385	
(Sa02) West Branch Soquel Creek	7/18/2024 11:25	16.2	695	835	
(5402) West Branch Soquer Creek	7/25/2024 11:25	10.2	706	833	
	8/30/2024 11:14	15.1	700	967	
	10/1/2024 10:32	15.0	737	919	
	10/31/2024 11:21	11.2	745	1027	
	10/01/202111121		, 30	1027	
(Sq04) East Branch Soquel at Quarry	7/16/2024 10:48	16.5	851	1016	
	7/25/2024 9:52	17.5	885	1033	
	8/30/2024 8:58	15.81	1074	1303	
	9/30/2024 14:15	16.7	1039	1235	
	10/31/2024 10:21	11.8	1121	1499	
(Sg05) Soquel at Cherryvale	7/16/2024 14.22	17 1	828	975	
	7/25/2024 14:16	22.4	822	865	
	8/29/2024 14:14	19.8	848	942	
	10/1/2024 12:45	17.8	795	922	
	10/30/2024 13:32	12.3	814	1075	
	· ·				
(Sq06) Soquel at Mountain Elementary	7/16/2024 13:32	20	733	810	
	7/25/2024 15:34	23	811	843	
	10/1/2024 9:15	15	795	983	
	10/30/2024 14:42	12.6	812	1064	

Table 1. Temperature, actual conductivity and specific conductivity measurements, Soquel and Aptos Creeks, WY2024.



4. Conclusions

The gage data presented in this report represent a wetter than average year. Rainfall in WY2024 was 36.89 inches, higher than average of 29.9 inches, and the second wet year in a row following WY2023. All of the gage sites monitored remained flowing throughout the dry season, and specific conductivity remained relatively low. Out of the five gages on Soquel Creek, summer baseflows were highest in the lower portions of the watershed and lowest in the upper portions of the watershed. In Aptos Creek, the downstream gage generally had lower flows than the upstream gage. Flow in the lower portion of both watersheds show higher than expected daily fluctuation in streamflow that could not be explained by diurnal variability. Potential causes of the variability include sensor sensitivity limitations and the gages being in higher near-bed velocity gradient pools. This report represents the second full year of data collection at these gages. Streamflow will continue to be monitored and comparison of multiple years of gaging will provide further insights into streamflow dynamics.

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