



Santa Rosa Plain Groundwater Subbasin Groundwater Sustainability Plan **First Periodic Evaluation**

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Prepared for



SANTA ROSA PLAIN
GROUNDWATER
SUSTAINABILITY AGENCY

EXECUTIVE SUMMARY

The Santa Rosa Plain Subbasin's (Subbasin) first Periodic Evaluation covers the evaluation cycle between Water Years 2021 and 2025, immediately following the adoption of the Groundwater Sustainability Plan (GSP) in December 2021. The Periodic Evaluation summarizes and analyzes information and data collected over the past five years and assesses the progress made with GSP implementation, in compliance with the Sustainable Groundwater Management Act. The Subbasin covers 80,000 acres and is designated by the California Department of Water Resources (DWR) as a medium-priority basin.

Over this five-year evaluation cycle, the Santa Rosa Plain Groundwater Sustainability Agency (GSA) made significant progress implementing the GSP through the collection of new information to support the understanding of the Subbasin; advancement of programs, projects, and management actions to progress sustainability; and expansion of groundwater awareness and engagement of groundwater users. Over the evaluation cycle, the GSA used the findings of this work to clarify and update information presented in the GSP and address Recommended Corrective Actions provided by DWR. Key activities and findings described in this Periodic Evaluation are summarized below, along with applicable next steps.

The GSP Remains an Appropriate Plan for Sustainable Groundwater Management

This Periodic Evaluation demonstrates that there is no need to revise sustainable management criteria, change projects, or update any other policy decisions made in the GSP.

The Periodic Evaluation concludes that the GSP does not necessitate a Plan Amendment at this time, as the GSP continues to be an appropriate guiding policy plan for achieving the Subbasin sustainability goal, defined in the GSP as:

The goal of this GSP is to adaptively and sustainably manage, protect, and enhance groundwater resources while allowing for reasonable and managed growth through:

- *Careful monitoring of groundwater conditions*
- *Close coordination and collaboration with other entities and regulatory agencies that have a stake or role in groundwater management in the Subbasin*
- *A diverse portfolio of projects and management actions that ensure clean and plentiful groundwater for future uses and users in an environmentally sound and equitable manner*

The need for any amendments to the GSP will continue to be evaluated throughout the implementation period of the GSP (2022 to 2042) and reported to DWR at a minimum frequency of every five years.

Groundwater Conditions Remain Stable

Review of groundwater data over the past five years indicates overall stable groundwater conditions, and no undesirable results have occurred relative to sustainable management criteria.

The GSP establishes specific measurable criteria (sustainable management criteria or SMCs) that constitute sustainable groundwater conditions within the Subbasin. SMCs include measurable objectives which set the goal for desired groundwater conditions and minimum thresholds which represent indications of undesirable results. The GSA is required to manage the Subbasin to avoid undesirable results indicative of significant and unreasonable effects caused by groundwater conditions.

Overall, groundwater conditions remained stable during the evaluation cycle, which included one of the more significant droughts on record (Water Year 2021) followed by four years of normal and above average rainfall.

As described below, the Subbasin did not experience undesirable results for any of the five applicable sustainability indicators in this first evaluation cycle.

GROUNDWATER LEVELS AND STORAGE: Minimum thresholds were assessed at representative monitoring points (RMPs) for both the shallow and the deep aquifer systems. During this evaluation cycle, fall groundwater elevations in both the shallow and deep aquifer system networks remained above their minimum thresholds each year and measurable objectives were achieved during the normal and wet years at up to 81 percent of the RMPs with available data. Groundwater elevations are used as a proxy for evaluating changes in groundwater storage. Since no minimum threshold exceedances or undesirable results of groundwater elevations were observed, groundwater storage is also stable.

GROUNDWATER QUALITY: The SMCs for degraded water quality were developed based on a network of public water system supply wells regulated by the State Water Resources Control Board's Division of Drinking Water for three constituents of concern: nitrate, arsenic, and salinity (measured as total dissolved solids). Undesirable results for groundwater quality have not occurred in the Santa Rosa Plain Subbasin during the current evaluation cycle. Additionally, evaluation of current conditions show no minimum threshold exceedances during the evaluation cycle for nitrate, arsenic, or total dissolved solids.

INTERCONNECTED SURFACE WATER: Initial SMCs were established using groundwater levels as a proxy for interconnected surface water depletion using seven shallow monitoring wells. Overall, dry-season groundwater elevations were stable or increasing in most RMPs. To date, minimum threshold exceedances occurred in only two wells during the 2021 drought year. Since then, groundwater levels at RMPs recovered and most remained above measurable objectives. Levels constituting undesirable results have not occurred in the Subbasin during the evaluation cycle.

LAND SUBSIDENCE: Land surface subsidence is measured with DWR-provided InSAR data. During this evaluation cycle, InSAR data show negligible increases and decreases in land surface elevation within the measurement error of +/- 0.1 foot in most areas of the Subbasin, which indicates that inelastic land subsidence attributable to groundwater pumping is not occurring.

Sustainable management criteria established within the GSP remain applicable and appropriate based on review of new information and data and no changes to the methodology or approach for setting SMC are deemed necessary at this time. The GSA will continue to evaluate the need to modify SMC as new information becomes available, including DWR's forthcoming DWR guidance on interconnected surface water depletion.

Refined Monitoring Networks Provide Robust Data Acquisition

Monitoring networks were improved and nearly all monitoring network data gaps were filled with new well installations and voluntary monitoring programs.

Improvements to the groundwater level monitoring networks were achieved through construction of six new multi-level monitoring wells and leveraging private wells volunteered for monitoring through the GSA's Level Up! monitoring program. Three of the new multi-level monitoring wells were added to the shallow and deep aquifer system RMP networks for groundwater levels. The remaining three new multi-level monitoring wells will be added to the RMP networks once a sufficient amount of groundwater level measurements have been collected and analyzed.

Improvements to the interconnected surface water monitoring network were achieved through construction of four new shallow monitoring wells near interconnected streams within the Subbasin. These four wells will be added to the interconnected surface water RMP monitoring network once a sufficient amount of groundwater level measurements have been collected and analyzed.

Updates were made to the water quality monitoring network to reduce redundancies and better align monitoring frequencies for constituents of concern.

At this time, the RMP monitoring networks are determined to be adequate for the purpose of managing the Subbasin and implementing the GSP. The groundwater level monitoring network spatial data gaps identified in the GSP have been addressed during this evaluation cycle with the exception of the northernmost data gap area in the deep aquifer system monitoring network. The GSA will work with partner agencies to identify potential inactive municipal wells in that area for incorporation into the monitoring network. This and any other data gaps identified in the future are planned to be addressed by strategically leveraging existing wells volunteered by partner agencies and private groundwater users through the Level Up! voluntary groundwater level monitoring program.

New Information Collected and Analyzed Fills Data Gaps and Improves Understanding of Subbasin

New information collected and analyzed with DWR grant funding has filled other important data gaps identified in the GSP and improved the GSA's understanding of Subbasin conditions, including updates to Subbasin water budgets.

Substantial progress was achieved in filling the primary data gaps identified within the GSP. Key new information collected includes:

- Refinement of the water supply well inventory, which was used to revise the well density mapping and evaluate potential impacts on beneficial users relative to the potential for future groundwater level declines.
- Additional characterization of interconnected surface water (ISW) and groundwater dependent ecosystems (GDEs) with newer datasets and through field evaluations to improve spatial and temporal understanding and enhance characterization and monitoring of ISW/GDE conditions in the Subbasin.
- Collection and evaluation of geophysical data, including Airborne Electromagnetic surveys flown by DWR and ground-based surveys performed by GSA to refine geologic structure and improve other aspects of the hydrogeologic conceptual model.
- Improved understanding of groundwater use within the Subbasin through development and implementation of the voluntary Flow Smart flow metering program and collection of groundwater extraction information directly from groundwater users through the Groundwater User Information Data Exchange (GUIDE) platform.
- Expanded groundwater level monitoring through development of the voluntary Level Up! groundwater level monitoring program, which has engaged 45 well owners within the Subbasin and included targeted outreach to groundwater users in GSP-identified data gap areas.

Current Groundwater Use within Sustainable Yield and Projected Future Use Sustained through Planned Projects and Management Actions

Recent and current groundwater use remains within the sustainable yield and updates to the modeled water budgets and simulated future groundwater levels indicate the existing framework of projects and management actions remains appropriate to address projected climate and land use changes.

Water use within the Subbasin during the current evaluation cycle was consistent with recent water use patterns and trends with estimates of annual groundwater extraction ranging from approximately 17,800 to 20,400 acre-feet per year (AFY) with higher levels of extraction occurring in drier years. Groundwater

extraction remained within the estimated sustainable yield for the Subbasin of 23,900 AFY, defined as the quantity of groundwater that can be pumped on a long-term average annual basis without causing undesirable results.

The groundwater flow model for the Subbasin was improved through recalibration and incorporation of new information and data. Simulations performed using the model indicate that historical declines in storage over the 42-year historical period (WY 1976 through 2018) of -900 AFY were partially offset by increases in storage of +300 AFY over the more current five-year period (WY 2019 through 2024).

Future baseline projections (no new projects or management actions) based on updated climate and land use projections indicate a potential continued long-term decline in storage of -900 AFY over the 50-year projected period (WY 2025 through 2075) and the occurrence of undesirable results for groundwater levels and groundwater storage.

Future projections with projects and management actions - consisting of implementing water-use efficiency programs, aquifer storage and recovery projects, and stormwater capture and recharge projects were simulated to confirm that this framework of projects and management actions remains appropriate to maintain sustainable conditions within the Subbasin. The results of these simulations indicate that implementation of a combination of these projects and management actions would successfully eliminate the potential future undesirable results simulated in the baseline scenario.

Recommended Corrective Actions Were Addressed

DWR issued six recommended corrective actions in its January 2023 GSP approval letter, that have been addressed or are in the process of being addressed pending forthcoming guidance from DWR.

The recommended corrective actions related to the water budget, chronic lowering of groundwater level SMC, interconnected surface water SMC, and groundwater level and quality monitoring networks. Table 1 summarizes each recommended corrective actions and provides updates on their status and how they are being or have been addressed.

Table ES1. Summary of Recommended Corrective Actions with Status and Approach		
Corrective Action Number - Topic	DWR Recommended Corrective Action	Status and Approach for Addressing Recommended Corrective Action
1 - Water Budget	Include surface water imports to the Subbasin from the Russian River system in the historical and projected water budgets.	Information on Russian River imported surface water to the Subbasin was included in each of the Annual Reports surface water supply tables and is summarized in Section 6.4 of the Periodic Evaluation. The GSA considers this RCA addressed and no further action is required.
2 - GWL Undesirable Result Further information on emergency operations and extended drought impacts included in Undesirable Result definition	Provide further explanation and description related to what constitutes emergency operations and analyze the anticipated groundwater conditions that would lead to emergency operations and the potential effects on beneficial uses and users if conditions extend beyond the 4-year drought factor.	Emergency operations as defined in the GSP are intended to represent short-term events (i.e., earthquakes or wildfires) that may trigger temporary increases in groundwater pumping. Further information and explanation is provided in Section 3.2 of the Periodic Evaluation.

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		The GSA considers this RCA addressed and no further action is required.
3 - GWL Minimum Threshold Further information on protective criteria utilized in developing minimum thresholds	Disclose the total number of wells that may be impacted by the proposed minimum threshold and provide a description related to the spatial relationship of the potentially impacted wells and the representative monitoring points.	A well impact analysis was performed using recently updated information from the updated well inventory and RMP network. The well impact analysis assesses the number of supply wells that could potentially be impacted by minimum threshold exceedances and is described in Section 4.3.3 of the Periodic Evaluation. The GSA considers this RCA addressed and no further action is required.
4a - ISW SMC Elaborate on methodology used for initial SMC and identification of ISW	Elaborate on how the percentile - ranking in groundwater wells near the RMPs was developed and applied to the MTs. For future updates of SMC, explain how the measurements from the RMPs and future data gap filling efforts will be interpreted to modify the initial SMC.	Further information and explanation on how the percentile rankings were developed are provided in Section 3.4.1 of the Periodic Evaluation. The GSA is awaiting issuance of DWR's final Guidance for Managing ISW Depletion prior to considering and implementing changes to the methodology for refining the ISW SMC.
4b - ISW SMC Use forthcoming DWR guidance	Consider utilizing the ISW guidance, as appropriate, when issued by DWR to establish quantifiable SMC and management actions.	Upon release, the final Guidance for Managing ISW Depletion will serve as a reference for potential updates to the ISW SMC and inform the application of groundwater modeling tools used to simulate and manage ISW depletions.
4c - ISW SMC Fill data gaps	Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of ISW and define segments of interconnectivity and timing.	Substantial progress made in filling data gaps related to ISW and GDEs is provided in Section 3.4.3 of the Periodic Evaluation.
4d - ISW SMC Collaboration with beneficial users and resource agencies	Prioritize collaborating and coordinating with local, state, and federal regulatory agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion within the GSA's jurisdictional area.	Engagement with an ISW/GDE practitioner work group composed of local, state, and federal regulatory agencies, and interested GDE and ISW practitioners to provide expertise to improve ISW and GDE characterization is described in Section 3.4.4 of the Periodic Evaluation.
5 - Degraded Water Quality Monitoring Network Additional details needed	Provide monitoring network map and information on monitoring site type and data collection frequency.	Compiled well-specific information maps of the monitoring networks are provided in Section 5.3 of the Periodic Evaluation.

6 - Monitoring Network Reconcile details provided with GSP regulations	Reconcile monitoring network details with GSP requirements and ensure well construction details are provided for each monitoring site.	A reconciliation between the details of the monitoring network with DWR's data and reporting standards is provided in Section 5. All updated details associated with the monitoring network have been added to the SGMA Portals Monitoring Network Module. The GSA considers this RCA addressed and no further action is required.
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Project and Management Actions are on Track

Progress has been made on projects and management actions (PMAs) through planning, pilot studies, and initial implementation.

Reducing groundwater use through voluntary water-use efficiency measures and practices was advanced through establishment of the Well Aware program and engagement of local partner organizations and agencies to connect with specific groundwater-user classes. Activities included performance of a parcel-scale groundwater demand assessment and performance of a pilot program which included: 1) outreach and education, 2) developing the Well Aware Toolkit, 3) consultations and leak checks, and 4) demonstration sites or a case study recognition program.

Studies and pilot projects for stormwater capture and recharge and aquifer storage and recovery were performed within the Subbasin revealing potential opportunities for enhancing groundwater recharge and offsetting groundwater extraction through increased utilization of both imported and local wet-weather surface water flows.

The GSA assessed policy and program options within the authorities of the GSA and/or local land use agencies that support the sustainability goal for the Subbasin, which included stakeholder surveys and establishing a prioritized list of policies and programs for the GSA to consider.

Since submitting the GSP, the GSA has not implemented enforcement actions, but it has implemented various governance and policy actions in alignment with the GSP. These actions have improved efficiency of the GSA, established a local independent funding source, and provided more information on groundwater use. The GSA also provided technical and policy perspectives on the County of Sonoma Well Ordinance Update, which is not under SGMA, but is related to SGMA implementation.

GSA Continues Robust Stakeholder Engagement and Inter-Agency Coordination

GSA has continued to prioritize public engagement and agency collaboration to achieve long-term groundwater sustainability.

The GSA has continued to expand public education and create meaningful opportunities for stakeholders to better understand groundwater challenges and contribute to solutions. This outreach includes, but is not limited to, holding publicly noticed meetings, updating information on the GSA's website, maintaining and expanding the GSA's interested parties list, issuing quarterly newsletters, posting on social media, creating educational videos, sending direct mailings for sharing of key information, issuance of press releases, using survey tools and direct communication to capture stakeholder feedback, and utilizing partner agencies and organizations to support outreach to specific groundwater user classes. In addition, the GSA has actively partnered and coordinated with nearby GSAs, other local agencies, state agencies, federal agencies, and tribes, as needed. The GSA has also actively participated and commented on numerous land-use and water-supply planning initiatives and plans.

Summary of Recommended Next Steps

Findings of this Periodic Evaluation will inform the prioritization and timeframe for the GSA's next steps in implementing the GSP.

Based on the findings of this Periodic Evaluation, the following next steps have been developed and grouped into general types of activities.

Monitoring and Evaluating Groundwater Conditions for Sustainability

- Establish SMC at recently constructed monitoring wells once a sufficient amount of groundwater level measurements have been collected and analyzed.
- Coordinate with public water supply systems to optimize the water quality monitoring network.
- Evaluate forthcoming ISW guidance and assess need for refinements to ISW monitoring and management approaches.
- Strategically leverage voluntary groundwater level monitoring program (Level Up!) to fill any remaining or future gaps within the monitoring networks.

Filling Data and Information Gaps

- Maintain and further improve well inventory.
- Analyze data from Flow Smart program and consider need and opportunities for future program expansion.
- Further integration of recently collected data from the monitoring well drilling and construction and geophysical investigations into the hydrogeologic conceptual model.

Water Use and Water Budget Tracking

- Continue to improve estimates of key water budget terms within the Subbasin, including groundwater extraction and changes in storage.
- Continue to maintain and update model in preparation for any other additional scenarios, including any needed to evaluate the ISW depletion SMC following issuance of DWR's ISW guidance, and in preparation for the next Periodic Evaluation cycle.

Projects and Management Actions

- Continue advancing the water use efficiency program through existing outreach and engagement platforms and further evaluate the cost/benefit of the Well Aware program components to support the GSA's implementation planning and inform the prioritization specific actions and initiatives, including expanding outreach and engagement, establishing specific metrics and goals for the program, continuing and expanding regional partnerships.
- Evaluate the results of recently completed and ongoing stormwater capture and recharge and ASR pilot projects within the Subbasin to identify opportunities and constraints and inform the cost/benefit for full-scale implementation. Engage with Sonoma Water and its water supply contractors in evaluating opportunities and constraints associated with developing a regional water bank strategy.
- Assess opportunities for any future expansion or optimization of recycled water supplies within the Subbasin that offset groundwater extraction.

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- Continue engaging with farmer organizations and growers to develop groundwater sustainability practices and incentives which could be incorporated into existing farm plans and certification programs.

Engagement with Stakeholders and Other Agencies

- Continue and explore opportunities for enhancing and optimizing the stakeholder and local agency outreach and engagement programs.
- Further engage key stakeholders including underrepresented communities, California Tribes, and small farmers by determining and conveying specific benefits of sustainable groundwater management to these users.

The next steps identified above form the basis for ongoing updates to the implementation plan for the GSP over the next five-year evaluation cycle (WY 2026 through WY 2030).

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
AEM	airborne electromagnetic
AF	acre-feet
AFY	acre-feet per year
AMI	Advanced Metering Infrastructure
ASR	aquifer storage and recovery
bls	below land surface
BMP	best management practice
CAFF	Community Alliance with Family Farmers
CalWEP	California Water Efficiency Partnership
CDFW	California Department of Fish and Wildlife
CMIP5	Coupled Model and Intercomparison Project 5
CMIP6	Coupled Model and Intercomparison Project 6
COC	constituent of concern
County	Sonoma County
CPI / CPI-U	Consumer Price Index / Consumer Price Index for All Urban Consumers
DDW	Division of Drinking Water
DTW	depth-to-groundwater
DWR	California Department of Water Resources
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERT	electrical resistivity tomography
ET	evapotranspiration
GAMA	Groundwater Ambient Monitoring and Assessment Program
GDE	groundwater dependent ecosystem
GHB	general head boundary (model component)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GUIDE	Groundwater-User Information Data Exchange
GWL	groundwater level
HCM	hydrogeologic conceptual model
IM	interim milestone
InSAR	Interferometric Synthetic Aperture Radar
ISW	interconnected surface water
JPA	Joint Exercise of Powers Agreement
LTDIB	Long Term Drought Indicator Blend
MCL	maximum contaminant level
mg/L	milligram(s) per liter

M&I	municipal and industrial
MO	measurable objective
msl	mean sea level
MT	minimum threshold
NA	not applicable
NCCAG	Natural Communities Commonly Associated with Groundwater
NDVI	Normalized Difference Vegetation Index
OFR	on-farm recharge
OSWCR	Online System for Well Completion Reports
PE	Periodic Evaluation
PFAS	per- and polyfluoroalkyl substances
PLSS	Public Land Survey System
PMA(s)	Project and Management Action(s)
PWS	Public Water System
QAQC	quality assurance / quality control
RCA	Recommended Corrective Action
RCD	Resource Conservation District
RMP	representative monitoring point
RWQCB	Regional Water Quality Control Board
SFR	Streamflow Routing (model package)
SGMA	Sustainable Groundwater Management Act
SMC	sustainable management criteria
SMCL	secondary maximum contaminant level
SRPHM	Santa Rosa Plain Hydrologic Model
SSP	Shared Socioeconomic Pathway
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TNC	The Nature Conservancy
TSS	Technical Support Services (a DWR program)
UR	Undesirable Result
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WUE	water use efficiency
WY	water year

1 INTRODUCTION

The Sustainable Groundwater Management Act (SGMA) requires an evaluation of a Groundwater Sustainability Plan (GSP) to be completed no longer than every 5 years following GSP submission by the relevant Groundwater Sustainability Agency (GSA). This evaluation is referred to as a Periodic Evaluation and is intended to be a thorough assessment of how a GSP is performing and whether modifications and an amendment to a GSP are needed. Recommended corrective actions (RCAs) from the Department of Water Resources (DWR)'s GSP approval letter review must also be addressed by the time of Periodic Evaluation submittal.

1.1 Purpose and Content of Periodic Evaluation

The Periodic Evaluation for the Santa Rosa Plain Subbasin has been prepared in accordance with the SGMA Legislation and California Department of Water Resources (DWR) GSP Regulations (§ 356.4. Periodic Evaluation by Agency) and covers Water Year (WY) 2021 through WY 2025 (the evaluation cycle). The Periodic Evaluation also generally follows guidance and recommendations included in DWR's Groundwater Sustainability Plan Implementation, A Guide to Annual Reports, Periodic Evaluations, & Plan Amendments (DWR, 2023a) and includes:

- Background information on the GSA and GSP (Section 1);
- A summary of significant new information collected during the evaluation cycle (Section 2);
- Responses to DWR's Recommended Corrective Actions (Section 3);
- An evaluation of groundwater conditions relative to sustainable management criteria (Section 4);
- An assessment and update of monitoring networks (Section 5);
- An evaluation of the basin setting based on new information or changes in water use (Section 6);
- A summary of implementation activities related to projects and management actions (Section 7);
- A summary of new authorities exercised by the GSA (Section 8);
- A description of outreach and coordination activities (Section 9);
- A description of the consideration of adjacent basins and GSP implementation challenges (Section 10); and
- A summary of key take aways from the Periodic Evaluation and overview of next steps (Section 11).

1.2 Description of GSA

In 2017, local GSA-eligible entities formed the Santa Rosa Plain GSA to develop and implement the GSP for the Santa Rosa Plain Subbasin (Subbasin). The Santa Rosa Plain GSA was formed through a Joint Exercise of Powers Agreement (JPA) entered into by the cities of Cotati, Rohnert Park, and Santa Rosa; the Town of Windsor; Gold Ridge Resource Conservation District (RCD); Sonoma County (County); Sonoma County Water Agency (Sonoma Water); Sonoma RCD; and an organized group of mutual water and Public Utilities Commission-regulated companies (Independent Water Systems), in accordance with the requirements of California Water Code Section 10723 for establishing GSAs under the SGMA. In August 2019 following an

adjustment of the Subbasin boundaries, the City of Sebastopol entered the JPA. During this time, three mutual water companies neighboring Sebastopol joined the Independent Water Systems group.

In recognition of the importance of stakeholder input, the GSA Board created an 18-member Advisory Committee to provide feedback and advice on all aspects of the GSP planning, development and implementation activities to the GSA Board. The Advisory Committee consists of members appointed by each member agency, the Federated Indians of Graton Rancheria, and seven interest-based members appointed by the Santa Rosa Plain GSA Board. The seven interest-based members represent environmental organizations with a presence in the Subbasin, rural-residential well owners, the agricultural community, and the business community. This stakeholder-based Advisory Committee representing multiple stakeholder interests is continuing to provide guidance and recommendations to the GSA Board and GSA staff during implementation of the GSP and serve as an interface with their respective interests.

1.3 GSP Overview

The Subbasin is classified by DWR as a medium-priority basin and was required to submit the GSP to DWR by January 31, 2022. The Santa Rosa Plain GSA began work on the GSP in 2018, to identify and quantify existing groundwater problems and data gaps, define local goals for sustainable management of the Subbasin, and develop a GSP that achieves groundwater sustainability within 20 years and maintains it 50 years into the future. The GSP was adopted by the GSA Board on December 9, 2021 and submitted to DWR on January 29, 2022. DWR completed its assessment and approved the GSP on January 26, 2023 (DWR, 2023b).

The sustainability goal of the GSP is to adaptively and sustainably manage, protect, and enhance groundwater resources while allowing for reasonable and managed growth through:

- Careful monitoring of groundwater conditions;
- Close coordination and collaboration with other entities and regulatory agencies that have a stake or role in groundwater management in the Subbasin; and
- Developing a diverse portfolio of projects and management actions that ensure clean and plentiful groundwater for future uses and users in an environmentally sound and equitable manner.

Projects and management actions that the GSA has identified as potential measures to be implemented to ensure sustainability are included in Sections 6 and 7 of the GSP (Sonoma Water, 2021a). These measures include actions proposed to fill data gaps and reduce uncertainty to inform future refinement and possible modification of the initial sustainable management criteria (SMC). While all of the identified measures may not be implemented, some combination of these measures will be implemented to ensure the Subbasin is operated within its sustainable yield and achieves and maintains sustainability. The measures to achieve sustainability are centered on advancing the following projects and management actions within the Subbasin:

- Implementation and assessment of voluntary conservation and groundwater-use efficiency projects;
- Planning and implementation of aquifer storage and recovery (ASR) projects;
- Planning and implementation of stormwater capture and recharge projects;
- Assessment and prioritization of potential policy options, including demand management measures, for future GSA consideration;

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- Coordination with agricultural groundwater users within the Subbasin to integrate measures that support sustainable groundwater management with farm plans that are developed at individual farm sites; and
- Assessment of additional opportunities to expand and/or maximize efficiencies of appropriate uses of recycled water supplies.

The projects and management actions are being implemented using an adaptive management strategy, which will allow the GSA to react to the progress and outcomes of projects and management actions implemented in the Subbasin and to make management decisions to redirect efforts in the Subbasin as necessary to effectively achieve the sustainability goal.

2 NEW INFORMATION COLLECTED

During GSP implementation, new information was collected to fill data gaps, improve groundwater characterization efforts, and further inform the Hydrogeologic Conceptual Model (HCM). The new information is used to improve understanding of Subbasin conditions and does not necessitate a plan amendment. Table 2-1 summarizes the new information collected, how it was used in development of the Periodic Evaluation, and cross-references the appendix and sections of this report where the information is incorporated.

Table 2-1. Summary of New Information Collected Since the GSP			
Significant New Information Collected	General Description of New Information	Use of New Information in the Periodic Evaluation	Reference to Section in Periodic Evaluation Where Information Is Discussed
Supply Well Inventory	Compile information in DWR's Online System for Well Completion Reports (OSWCR), well permitting records, and other local analyses to update well locations and construction records within the Subbasin	The well inventory supported additional evaluation for: • Well density mapping • Protectiveness of groundwater level SMC • Location of supply wells for potential impacts to ISW/GDEs	Section 2.1 and 4.2 Appendix 2.1
ISW/GDE Evaluation	Characterization of interconnected surface water (ISW) and groundwater dependent ecosystems (GDEs)	Improve spatial and temporal understanding to fill data gaps and enhance characterization and monitoring of ISW/GDE conditions in the Subbasin	Section 6.2 Appendix 6.2
Geophysical Data	Collection and evaluation of geophysical data, including Airborne Electromagnetic (AEM) surveys flown by DWR and ground-based surveys performed by GSA	Help refine geologic structure and improve other aspects of the HCM	Section 6.1 Appendix 6.1
Groundwater Extraction	Developed and piloted a voluntary flow metering program (Flow Smart) and obtained groundwater extraction information directly from groundwater users through Groundwater User Information Data Exchange (GUIDE) platform	Improve understanding of groundwater use within Subbasin and support planning for water-use efficiency programs	Section 2.2

Table 2-1. Summary of New Information Collected Since the GSP

Significant New Information Collected	General Description of New Information	Use of New Information in the Periodic Evaluation	Reference to Section in Periodic Evaluation Where Information Is Discussed
Groundwater level monitoring	Construction and monitoring of new monitoring wells. Initiation of new voluntary groundwater level monitoring program (Level Up)	Fill data gaps in groundwater level monitoring network to improve understanding and monitoring of groundwater conditions	Section 5
Voluntary Water-Use Efficiency Program Assessment and Pilot	Findings from assessment of WUE opportunities, including preliminary cost-benefit information	Support planning for implementing water-use efficiency programs	Section 7
Aquifer Storage and Recovery (ASR) Pilot Testing	Data and findings from recently completed ASR pilot testing from two wells within the Subbasin	Ongoing evaluation of results provides the GSAs and member agencies information on how ASR could perform under a variety of hydrogeologic and geochemical environments and will support planning for implementing full-scale ASR programs within Subbasin	Section 7
Stormwater Capture and Recharge Investigations and Pilot	Initial data and findings from recently completed investigation of stormwater capture and recharge opportunities and on-farm recharge pilot	Ongoing evaluation of results provides the GSAs with information on the cost-benefit of stormwater recharge practices and supports planning for future projects within Subbasin	Section 7

2.1 Updated Well Inventory

With funding from a Sustainable Groundwater Management (SGM) Implementation grant, the GSA and its partners completed an updated inventory of wells within the Subbasin. The purpose of the inventory is to compile well information from various sources into a single comprehensive inventory to use for GSP implementation and well permitting. In WY 2025, the GSA and partners completed compiling and integrating existing well construction information from well log databases including DWR's Online System of Well Completion Reports (OSWCR), the County's well permitting database, and databases developed by the USGS and Sonoma Water for previous groundwater studies. A comparison with parcel-specific information available through the Groundwater Information Data Exchange (GUIDE) was also performed.

The well inventory includes records for approximately 9,400 supply wells within the Subbasin. These wells are shown on Figure 2-1 through Figure 2-3. The well inventory includes improved well location and construction data compared to the OSWCR database. Well depth and/or screen interval depths are known and documented for 89 percent of wells in the well inventory, and reported well use/type is known and documented for 87 percent of wells. Locations of many wells were refined, and considerably fewer wells were located at section centroids following initial quality assurance / quality control (QAQC). Nevertheless, 34 percent of wells still have insufficient location data and are located at section centroids. A memorandum documenting the completion of the updated well inventory has been completed and includes recommendations for additional refinements, including location refinements, incorporation of other data sources, and use of artificial intelligence tools to capture additional data (Appendix 2-1).

The updated well inventory provides a better understanding of the locations, depths, and purposes of groundwater extraction in the Subbasin and is being used to support updates to well density mapping, evaluation of the protectiveness of the groundwater level SMC for shallow well users, and evaluation of potential impacts on interconnected surface water (ISW) and groundwater dependent ecosystems (GDEs).

Maps of supply well density (Figure 2-1), average depth (Figure 2-2) and maximum depth (Figure 2-3) by Public Land Survey System (PLSS) Section are shown below, updating the information provided in the GSP.

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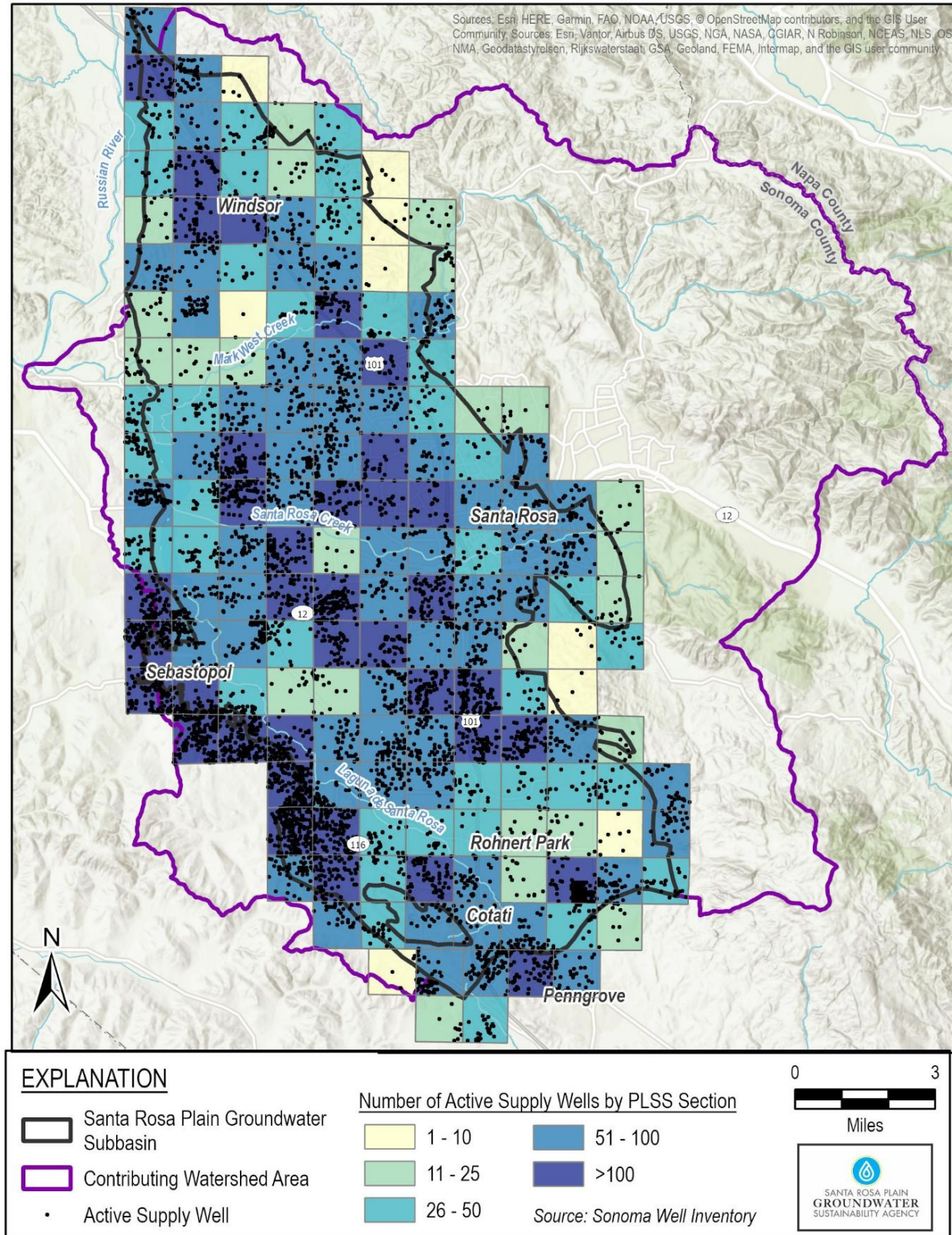


Figure 2-1. Supply Well Density by PLSS Section

First Periodic Evaluation
 Santa Rosa Plain Groundwater Subbasin

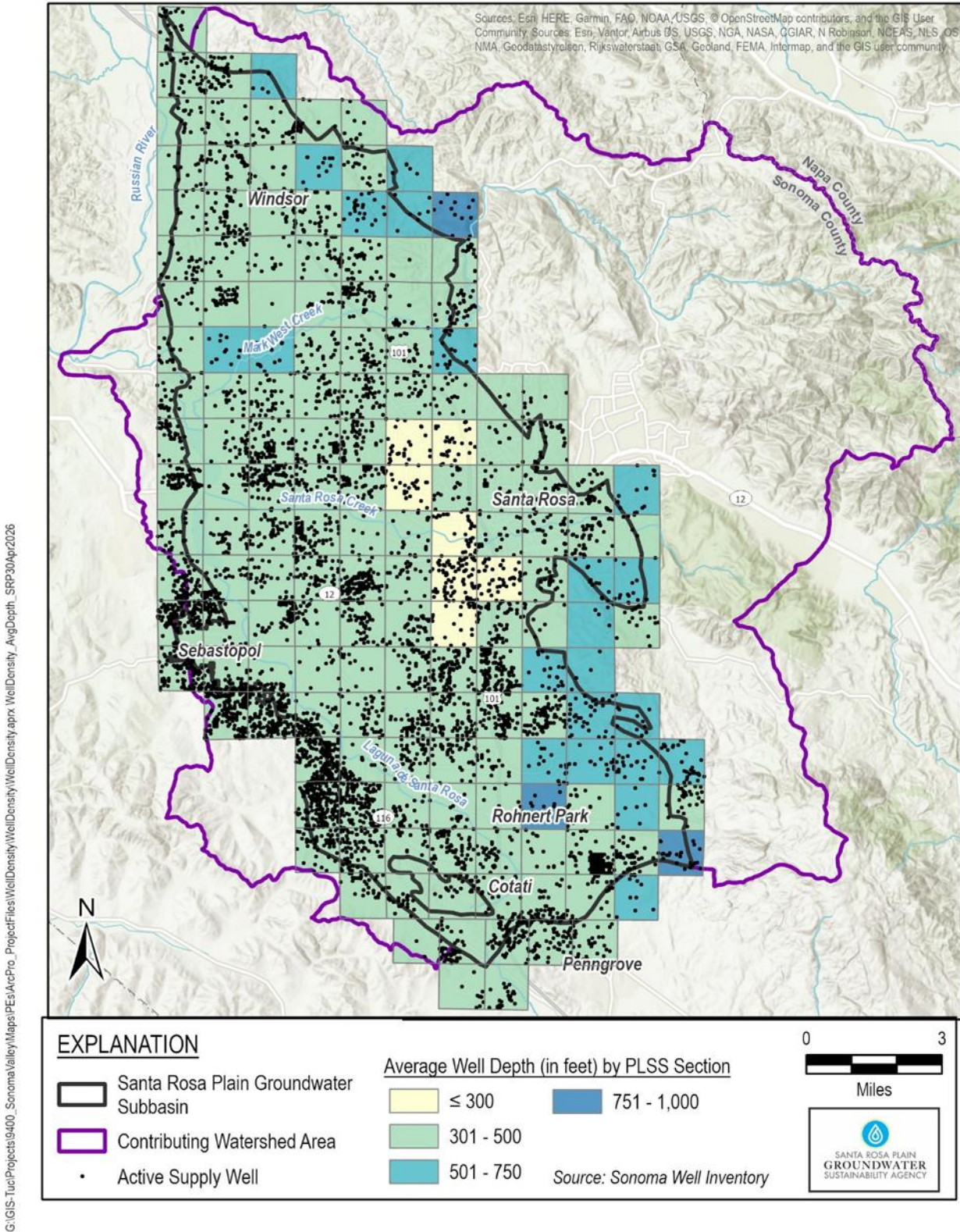


Figure 2-2. Supply Well Average Depth by PLSS

First Periodic Evaluation Santa Rosa Plain Groundwater Subbasin

G:\GIS-Tuc\Projects\9400_Sonoma Valley\Maps\PEs\ArcPro_ProjectFiles\WellDensity\WellDensity.aprx WellDensity.aprx MaxDepth_SRP30Apr2026

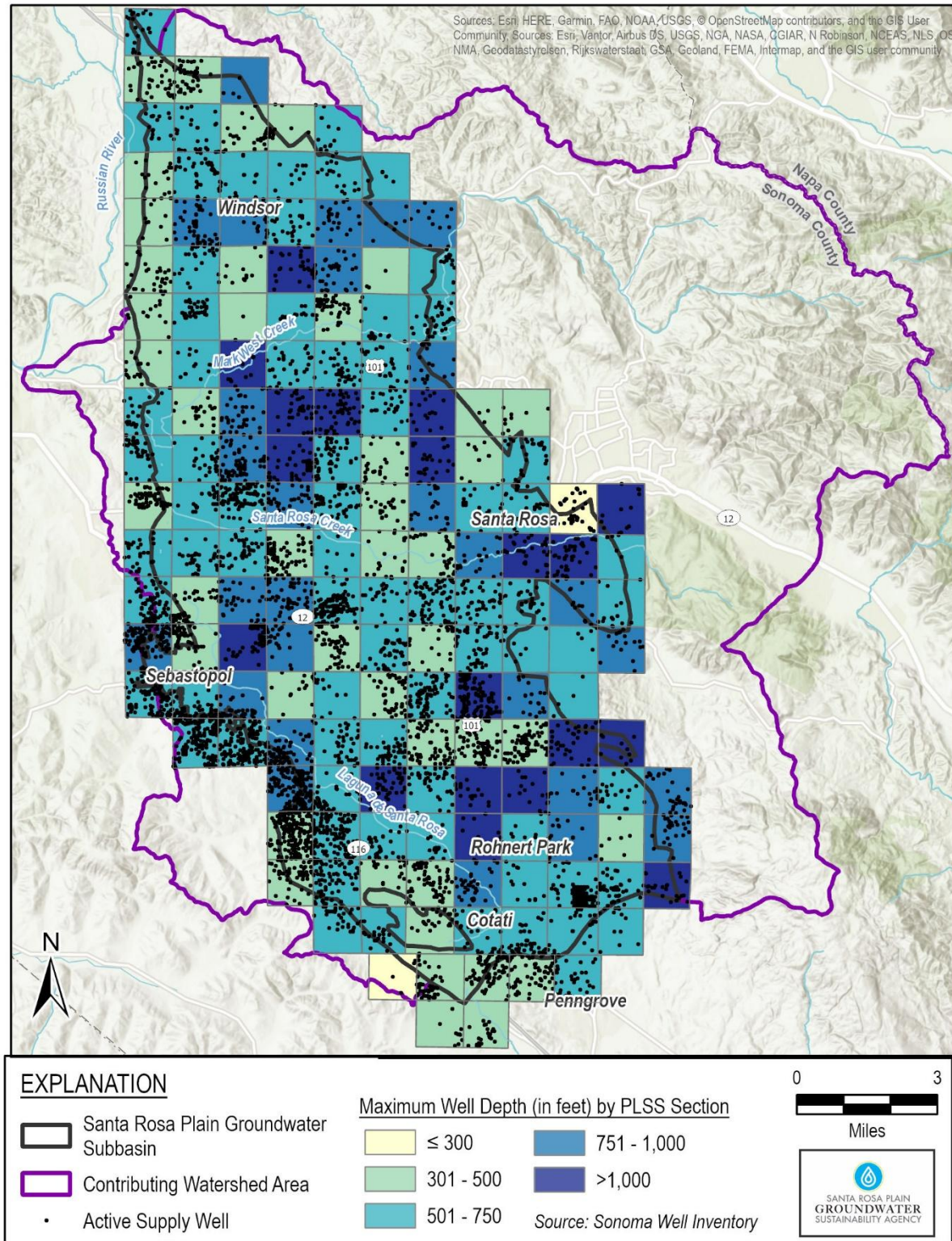


Figure 2-3 Supply Well Maximum Depth by PLSS Section

2.2 Voluntary Flow Metering Program (Flow Smart)

The GSP identified the distribution and amount of groundwater extraction as a data gap for characterizing Subbasin groundwater use and conditions. Groundwater extraction associated with agricultural, commercial, industrial, and rural residential water-use sectors that have not historically measured and reported water use was identified as a source of uncertainty in the Subbasin groundwater model and water budget.

To address data gaps associated with groundwater extraction and evaluate the cost and effectiveness of flow metering for reducing groundwater demands, the GSA implemented a voluntary flow metering program (Flow Smart) for the Subbasin using funding under the SGM Implementation grant. In 2024, the GSA developed a work plan for a voluntary flow-metering program, which included a review of examples of metering plans from other GSAs and similar agencies, review of existing policies and ordinances relevant to metering of private wells and small water systems in Sonoma County, a proposed outreach and selection process, recommended meter types, installation process, and operational protocols and reporting.

Based on the work plan, the GSA established the Flow Smart voluntary flow-metering program, which included outreach to prospective participants, well site evaluations, and installation of telemetry-enabled flow meters. In fall 2025, flow meters were installed at the 24 well sites with confidential reporting to the GSA through automated metering infrastructure. The instrumented well sites are spread throughout the Subbasin and incorporate a range of groundwater use types considered reasonably representative of overall non-metered groundwater use types within the Subbasin including:

- 13 rural residential properties with groundwater use for domestic supply and landscape irrigation;
- 7 agricultural properties with groundwater uses including agricultural irrigation, landscape irrigation, and domestic supply; and
- 4 County Parks with groundwater use for landscape irrigation.

A technical memorandum describing the Flow Smart program implementation, metered locations, outcomes, and insights has been prepared and is available on the GSA's website. Some of the primary insights and observations from the voluntary program include:

- Outreach and program participation required establishing a level of trust between participants and the GSA. Partnership with trusted community organizations, including Sonoma RCD, Gold Ridge RCD, Community Alliance with Family Farmers (CAFF), University of California (UC) Cooperative Extension, and Sonoma County Environmental Health, was essential to build interest.
- Flow meters equipped with automated meter reading technology are a benefit to well owners and GSA staff. The use of telemetry allows well owners access to personalized flow data and improves efficiency of data acquisition by the GSA.
- Flow meters and online data tracking tools provide well owners with the ability to monitor for leak detection.

Evaluation of the data reported through the Flow Smart program will be performed by the GSA once a full year of metered data is available. Ongoing and planned next steps for the Flow Smart program include:

- Providing technical support for existing volunteers, including sharing information on leak detection diagnosis and repair options with well-users.

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- Aggregating flow meter data by user type and evaluating water-use patterns for comparison with current water-use assumptions made by the GSA.
- Assessing data gaps of the pilot program for types and locations of groundwater users.
- Evaluating the cost/benefit of the metering program to support the GSA's implementation planning.

3 RESPONSE TO DWR RECOMMENDED CORRECTIVE ACTIONS

In a letter dated January 26, 2023, detailing its review and approval of the Santa Rosa Plain GSA's GSP, the DWR provided six recommended corrective actions (RCAs) to enhance the GSP and facilitate future evaluation by DWR. The RCAs are related to the water budget, chronic lowering of groundwater level SMC, ISW SMC, and groundwater level and quality monitoring networks. The following sections summarize each RCA, provide updates on their status, include information on how each RCA is addressed, and reference the relevant sections where the new information has been added or used in additional analysis.

None of the RCAs led to warranting consideration of a GSP amendment.

3.1 RCA 1 – Water Budget

DWR RCA 1: *The GSP should include all sources of water in the historical and projected water budgets and, specifically, identify surface water imports to the Subbasin from the Russian River.*

GSA Response: The GSP historical and projected water budgets were developed with a numerical groundwater model that did not include imported surface water supplied by Sonoma Water to major urban water suppliers, since the model only simulates groundwater pumping demands, not surface water use from imported sources. Therefore, the imported surface water was not included in the calculation of total water budgets. However, the groundwater budget was accurately depicted in the GSP. Since GSP submittal, the Annual Reports have included imported surface water deliveries in the water supply tables, and this information is summarized in Section 6.4 of this Periodic Evaluation. Annual imported surface water deliveries within the Subbasin will continue to be reported in Annual Reports.

The GSA considers this RCA addressed and no further action is required.

3.2 RCA 2 – Chronic Lowering of Groundwater Levels Undesirable Result

DWR RCA 2: *The GSP's undesirable results definition for chronic lowering of groundwater levels includes drought conditions stating that minimum threshold exceedances caused by "emergency operational issues or droughts that extend for longer than the 4-year drought factor incorporated into the minimum thresholds" will not contribute to an undesirable result unless the groundwater levels do not recover in proceeding hydrologically normal to wet years. The GSP, however, provides little discussion of the process, information, and data considered when presenting the discussion of what constitutes emergency operations. The GSP should provide further explanation and description related to what constitutes emergency operations. Additionally, the GSP should analyze the anticipated groundwater conditions that would lead to emergency operations and the potential effects on beneficial uses and users if conditions extend beyond the 4-year drought factor.*

GSA Response: The intention of including emergency operations in the undesirable results definition is to address responses to emergencies, including seismic, wildfire and flood events, which could result in temporary shortages of imported surface water deliveries within the Subbasin. Such events could lead to shortages in health and safety water demands within communities served by imported water supplies. Health and safety water demands refer to the requirements for providing access to water that is safe for human consumption and use based on indoor water uses and critical infrastructure such as hospitals and firefighting infrastructure. During any temporary impairment of imported surface water deliveries caused by these hazards, Sonoma Water and its water supply contractors may conduct emergency operations and increase groundwater extraction from their municipal wellfields within the Subbasin to help meet health and safety water demands. Resulting increases in short-term groundwater extraction could cause temporary drawdown of groundwater levels within the capture zones of municipal wellfields, which could

cause minimum threshold exceedances depending upon the timing, duration, and magnitude of the short-term drawdowns and the proximity to representative monitoring points (RMPs).

Sonoma Water has recently completed a Regional Water Supply Resilience Study, which analyzes the impacts and response scenarios to potential future emergencies and identifies resilience strategies to mitigate future impacts (Jacobs, 2026). The findings of the study indicate that aside from drought, seismic events are likely to cause the most significant impact on Sonoma Water's water supply facilities and could result in health and safety water shortages of 4,000 acre-feet for approximately 300 days within the Subbasin. Since undesirable result conditions for chronic lowering of groundwater levels are defined as minimum threshold (MT) exceedances occurring for three consecutive years, these shorter-term potential emergency operational issues would not lead to undesirable results.

The potential effects on beneficial uses and users if conditions extend beyond the 4-year drought factor could include the same effects for undesirable results described in Section 4.5.4.3 of the GSP. These potential effects include impacting beneficial users ability to meet their water demands should declines in groundwater levels significantly reduce the saturated thickness of aquifers from which wells can pump. These potential conditions are accounted for by setting the MT at the shallower (more protective) of either the historic low minus the drought factor or the calculated well impact depth.

The GSA considers this RCA addressed and no further action is required.

3.3 RCA 3 – Chronic Lowering of Groundwater Levels Minimum Threshold

DWR RCA 3: The minimum threshold for chronic lowering of groundwater levels was set at the 98th percentile shallowest supply well depth, plus a saturated thickness value of 10 feet. The GSP does not disclose the total number of wells that could be potentially impacted at the proposed minimum threshold. The GSA should more explicitly disclose the total number of wells that may be impacted by the proposed minimum threshold. The GSA should also provide a description related to the spatial relationship of the potentially impacted wells and the representative monitoring point associated with each of the vicinity area polygons used for the statistical well impact depth analysis.

GSA Response: In response to RCA 3, the updated RMP network and updated well inventory were used to analyze the total number of supply wells that could potentially be impacted by MT exceedances. Results of the analysis indicate that a total of 58 supply wells (all located within the shallow aquifer system) would potentially be impacted should groundwater levels decline below the established MTs. No supply wells in the deep aquifer are projected to be impacted should groundwater levels decline below the established MTs in the deep aquifer. The total number of potentially impacted wells represents approximately 1.1 percent of the 5,000 supply wells within the Subbasin's well inventory with a reported bottom of well screen or total depth. This finding is consistent with the approach originally employed in the GSP, which was to set the minimum thresholds at depths sufficient to protect at least 98 percent of supply wells within the Subbasin from impacts related to the chronic lowering of groundwater levels. The methods and results for this analysis and full response to RCA 3 are provided in Section 4.3.3.

The GSA considers this RCA addressed and no further action is required.

3.4 RCA 4 – Interconnected Surface Water SMC

DWR listed four ISW items for the GSA to address by the first Periodic Evaluation:

- Interconnected Surface Water SMC Methodology
- DWR Interconnected Surface Water Guidance
- Interconnected Surface Water Data Gaps

- Collaboration with Beneficial Users and Resource Agencies

3.4.1 RCA 4a – Interconnected Surface Water SMC Methodology

DWR RCA 4a: *Elaborate on how the percentile -ranking in groundwater wells near the representative monitoring points was developed and applied to the minimum thresholds for depletions of interconnected surface water. The GSP should also provide an explanation, as part of the future methodology for refining the minimum thresholds, of how the measurements from the shallow near stream representative monitoring points and future data gap filling efforts will be interpreted to modify the initial sustainable management criteria. The explanation of how the newly acquired data will be applied to refining the minimum thresholds should include an assessment of how the observed conditions compare to the conditions in 2014, 2015, and 2016.*

GSA Response: A detailed description for the methodology utilized in developing the SMC for the depletion of ISW, including how the percentile-ranking in groundwater wells near the RMPs was developed and applied to minimum thresholds is provided in Appendix 4-D of the GSP. The procedure is summarized below:

1. First, the hydrologic model for the Subbasin is used to estimate the magnitude of dry-season ISW depletion and corresponding simulated groundwater level at each RMP location for each year during 2004 through 2018. For most RMP locations, simulated ISW depletion and groundwater levels are correlated, with lower groundwater levels correlating more closely with highest levels of ISW depletion during the 2014 through 2016 drought.
2. For each RMP location, the distribution of dry-season groundwater levels 2004 through 2018 were ranked, and the percentile ranking for the drought years (i.e., the average of 2014, 2015, and 2016 dry-season groundwater levels) were determined. These percentile rankings represent the groundwater level proxy for the years exhibiting the highest levels of simulated ISW depletion. As summarized in Table 1 of Appendix 4-D of the GSP, the simulated mean 2014 through 2016 groundwater level percentile rankings applied at RMPs range from 10 to 18.9 percent (at RMP SRP0713, the 10th percentile was substituted for the calculated value due to poor correlation between simulated ISW depletion and groundwater levels).
3. The percentile rankings of simulated dry-season groundwater levels were then translated to observed groundwater level data at each RMP location to establish correlation between measured groundwater levels and simulated ISW depletion. However, the dedicated shallow monitoring wells at RMP locations were installed in Fall 2019, so the observational record was insufficient to directly evaluate the percentile-ranking of historical dry-season groundwater levels at these dedicated wells. Instead, the percentile ranking was evaluated at an adjacent well (or wells) with a longer period of record at RMP locations where adjacent well(s) with sufficient records exist. The percentile ranking was then translated from the adjacent well(s) to the dedicated RMP well using concurrent 2019 and 2020 dry-season groundwater levels as match points. The match-point procedure is illustrated in Step 4 on Figure 3 in Appendix 4-D of the GSP.

As indicated in the response to RCA 4b, below, the GSA is awaiting issuance of DWR's final Guidance for Managing ISW Depletion prior to considering and implementing any changes to the methodology for refining the ISW SMC. Should the initial SMC be modified based on review of the guidance, the GSA will provide an explanation for how the measurements from the shallow near stream representative monitoring points and future data gap filling efforts will be interpreted and applied to refining the minimum thresholds, including an assessment of how the observed conditions compare to the conditions in 2014, 2015, and 2016.

3.4.2 RCA 4b – DWR Interconnected Surface Water Guidance

DWR RCA 4b: *Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.*

GSA Response: In 2024, DWR released a series of three draft technical papers and organized an informational webinar providing a general overview of the technical aspects of ISW and the quantification of depletions of ISW due to pumping. Based on the technical basis provided in the three papers, DWR is in the process of developing guidance for GSAs to consider for managing depletions of ISW and appropriately setting SMC based on stream conditions.

The draft papers were considered during the characterization of ISW in response to RCA 4c. Upon release, the final Guidance for Managing ISW Depletion will serve as a reference for potential updates to the ISW SMC and inform the application of groundwater modeling tools used to simulate and manage ISW depletions.

3.4.3 RCA 4c – Interconnected Surface Water Data Gaps

DWR RCA 4c: *Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.*

GSA Response: The Santa Rosa Plain GSP acknowledged that understanding of ISW in the Subbasin is constrained by limited shallow groundwater and stream monitoring, and short data records. During this first evaluation cycle, the GSA prioritized closing these data gaps through expansion of shallow groundwater and stream monitoring near likely interconnected reaches (see Section 5.4), targeted field studies (such as seepage runs, shallow monitoring clusters, and GDE surveys described in Section 4.6), and incorporating new data into updated groundwater flow modeling (see Section 6.3). These efforts refined ISW mapping and are intended to improve understanding of streamflow depletion from groundwater pumping and strengthen protection of GDEs. An adaptive management framework ensures that ISW monitoring results are evaluated annually and incorporated into periodic evaluations, allowing SMC and monitoring strategies to be refined as scientific understanding improves.

During the evaluation cycle, significant new data was collected to address identified data gaps related to ISW and GDEs. For ISW, new field data include installation of four shallow monitoring wells to expand shallow groundwater monitoring near streams, providing higher-resolution groundwater elevation data to assess gaining and losing stream conditions. In addition, nine seasonal seepage runs between October 2021 and August 2024 were conducted on Windsor Creek, Pool Creek, Mark West Creek, Piner Creek, Russel Creek, Paulin Creek, Matanzas Creek, Santa Rosa Creek, Colgan Creek, Laguna De Santa Rosa, Gosser Creek, Copeland Creek. These seepage runs provided direct field measurements of streamflow gains and losses over short stream segments, improving understanding of spatial and seasonal variability in groundwater–surface water interactions that could not be resolved through modeling alone. A technical memorandum documenting updated ISW characterization can be found in Appendix 6-2. This information was used to verify model assumptions and results of simulated streamflow-aquifer interactions and gaining/losing conditions.

Substantial new analysis and data were generated to update and evaluate GDE extent and condition. The GDE mapping was refined using spring 2023 groundwater levels, a wetter-than-average year that better represents conditions under which groundwater-supported vegetation is expressed, resulting in an expanded mapped GDE extent compared to the original GSP. Long-term Normalized Difference Vegetation Index (NDVI) remote sensing datasets (1985–2023) were analyzed to assess vegetation health

trends and short-term variability, allowing differentiation between climate-driven, disturbance-related (e.g., wildfire), and potential groundwater-related responses. In addition, a well inventory and shallow well density analysis was developed and used as a surrogate indicator for potential groundwater pumping near ISW and GDEs. Finally, field-based GDE vegetation surveys were conducted at six representative sites in September 2025 to ground-truth remote sensing results and document on-the-ground vegetation condition, species composition, and stress indicators. Appendix 6-2 documents the updated GDE studies conducted over the evaluation cycle.

Together, these new datasets substantially strengthen the technical basis for evaluating ISW and GDE conditions and inform future monitoring priorities and potential refinement of SMC.

3.4.4 RCA 4d – Collaboration with Beneficial Users and Resource Agencies

DWR RCA 4d: *Prioritize collaborating and coordinating with local, state, and federal regulatory agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion within the GSA’s jurisdictional area.*

GSA Response: The Santa Rosa Plain GSA has continued to collaborate with beneficial users and resources agencies through the evaluation cycle by re-engaging members of practitioner Work Groups who participated in ISW analysis and GDE mapping during GSP development.

The most recent Work Group comprises local and interested GDE and ISW practitioners who provided expert advice and perspectives to the technical team of Sonoma Water and Montgomery & Associates at five meetings starting in September 2024 and ending in February 2026. Additionally, the technical team met with the Napa County GSA in January 2025 to share ISW/GDE characterization and monitoring approaches being taken. Input from these meetings was incorporated into the updated characterization of ISW and GDEs.

Work Group members included staff representatives from:

- Santa Rosa Plain GSA, Petaluma Valley GSA, and Sonoma Valley GSA
- Environmental Representatives: Environmental Defense Fund, Laguna de Santa Rosa Foundation, Sonoma Ecology Center, and The Nature Conservancy
- Environmental Consultants/GSA Advisory Committee Members
- Resource Agencies: California Fish and Wildlife, DWR, Gold Ridge RCD, National Marine Fisheries Service, Permit Sonoma, RWQCB San Francisco Bay, and Sonoma RCD
- Other Agencies: City of Petaluma

At the November 2024 Work Group meeting, guest speakers Craig Altare and Andrew Renshaw from DWR gave an overview of the ISW technical papers and upcoming guidance document, and answered questions on those topics.

The Work Group will be reconvened as needed, for example, once DWR’s Guidance for Managing ISW Depletions is available and the GSA starts work on applying the guidance to refine management of ISW depletions.

3.5 RCA 5 – Groundwater Quality Monitoring Network Details

DWR RCA 5: *Define the monitoring site type and data collection frequency in tabular format for the degraded water quality monitoring network in the GSP.*

GSA Response: Section 5.3 provides tabular data on the groundwater quality monitoring network for each constituent of concern, including available screen interval depths. All wells in the network are public water supply wells that are part of the State Water Resources Control Board Groundwater Ambient Monitoring and Assessment (GAMA) program. The GSA continues to coordinate with the water systems to support improved sampling frequency and provide missing well construction information.

3.6 RCA 6 – Monitoring Network Reconciliation

DWR RCA 6: *Conduct a reconciliation between the details of the monitoring network provided in the GSP with the requirements of the data and reporting standards in the GSP Regulations. Where requirements of the data and reporting standards are not provided, the GSA should include this information in the periodic update of the GSP. As a reminder, updates to the monitoring network must be reflected in the SGMA Portal's Monitoring Network Module.*

GSA Response: A reconciliation between the details of the monitoring network with DWR's data and reporting standards is provided in Section 5. All updated details associated with the monitoring network have been updated in the SGMA Portals Monitoring Network Module.

The GSA considers this RCA addressed and no further action is required.

4 GROUNDWATER CONDITIONS RELATIVE TO SUSTAINABLE MANAGEMENT CRITERIA

Groundwater conditions are evaluated routinely to ensure groundwater resources are being managed sustainably for all beneficial uses and users. This section describes the sustainability goals, sustainability approach, and metrics used to evaluate groundwater sustainability. Subsections for each sustainability indicator follow with an evaluation of groundwater conditions between WY 2021 and WY 2025 relative to SMC and whether the indicator is on track to achieve sustainability.

4.1 Sustainability Goal

The Sustainability Goal for the Santa Rosa Plain Subbasin was described in the 2021 GSP as follows:

The goal of this GSP is to adaptively and sustainably manage, protect, and enhance groundwater resources while allowing for reasonable and managed growth through:

- Careful monitoring of groundwater conditions
- Close coordination and collaboration with other entities and regulatory agencies that have a stake or role in groundwater management in the Subbasin
- A diverse portfolio of projects and management actions that ensure clean and plentiful groundwater for future uses and users in an environmentally sound and equitable manner

The GSP includes five applicable sustainability indicators (Sonoma Water, 2021). Seawater intrusion is not an applicable indicator for this inland Subbasin. Each applicable indicator is described below relative to recent conditions as documented in the past five Annual Reports since GSP submittal.

4.2 Summary of General Hydrologic Conditions for Evaluation Cycle

As documented in annual reports for WY 2021 through 2025, the evaluation cycle began with two consecutive years of below average rainfall which included the third driest water year (WY 2021) on record over the last 127 years, followed by three years of above average rainfall. Mean annual precipitation in the Subbasin is assessed using observed data from Climate Station Santa Rosa (National Oceanographic and Atmospheric Administration Station USC00047965), which is located near the Santa Rosa Airport at an elevation of 109 feet. As shown on Figure 4-1, this station recorded an annual average of 33.6 inches of rainfall between WY 2021 and WY 2025 which is comparable with the long-term average annual rainfall from WY 1903 to WY 2025 at this station of 33.2 inches of precipitation (and the more recent 20-year and 10-year averages of 33.1 and 34.0 respectively). The values are calculated based on the record from the Parameter-elevation Regressions on Independent Slopes Model (PRISM) Climate Group (2023) which estimates missing data using nearby gages and statistical methods.

The GSP methodology for classifying water year types applies a 3-year rolling weighted average to the combined yearly precipitation record in order to account for the latency in response of groundwater recharge to precipitation, infiltration, and other processes. Based on this methodology, the evaluation cycle included one very dry year (WY 2021), one dry year (WY 2022), two normal years (WY 2023 and WY 2024), and one wet year (WY 2025), as indicated on Figure 4-1.

Figure 4-2 provides a graph of precipitation and streamflows for water years 1999 through 2025. The yearly discharge at multiple streamflow gages in the Subbasin were at 25-year lows at the beginning of the evaluation cycle in WY 2021 and recovered to normal and above normal conditions in the wetter conditions between WY 2023 and WY 2025.

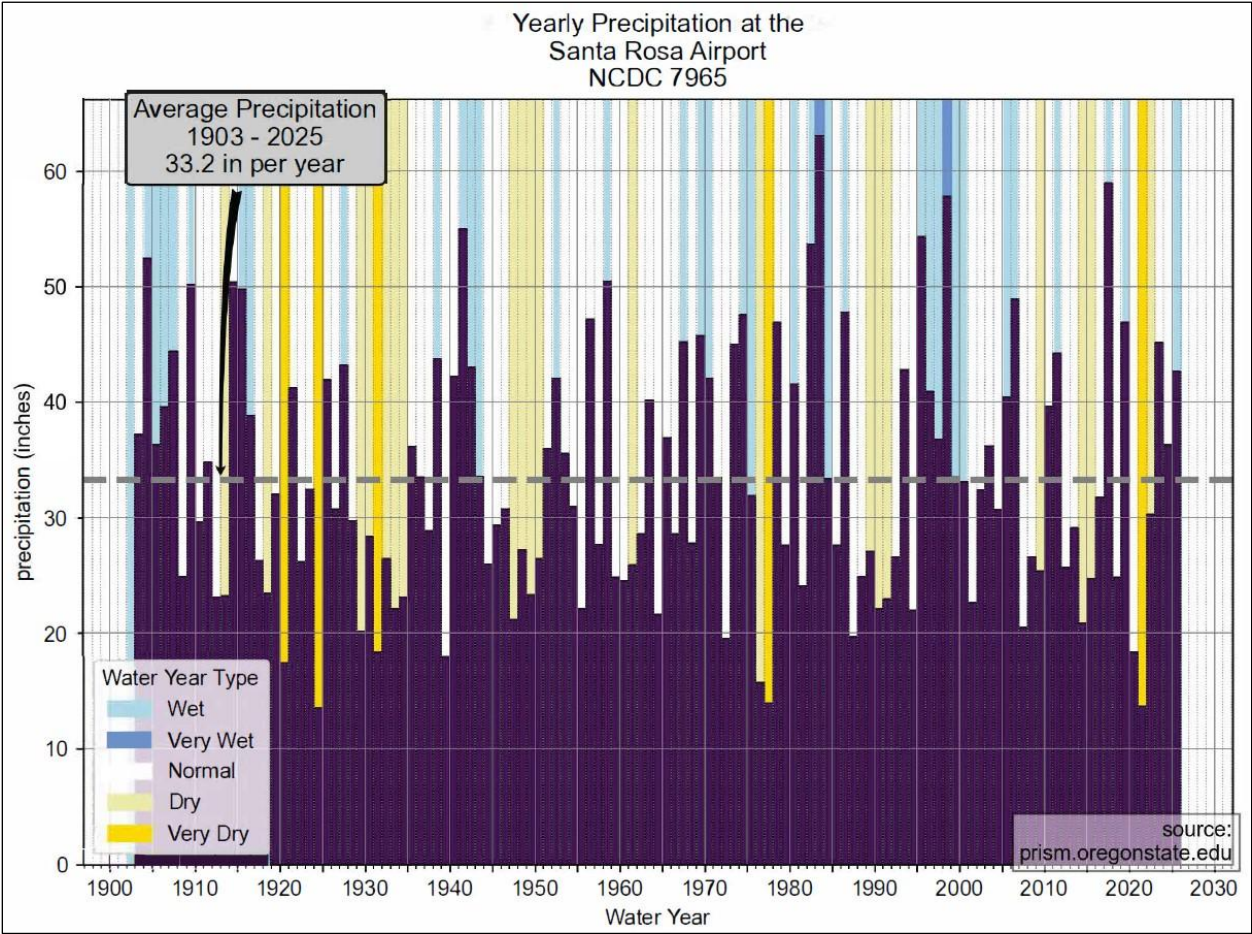


Figure 4-1. Annual Precipitation at the Santa Rosa Airport 1903 to 2025

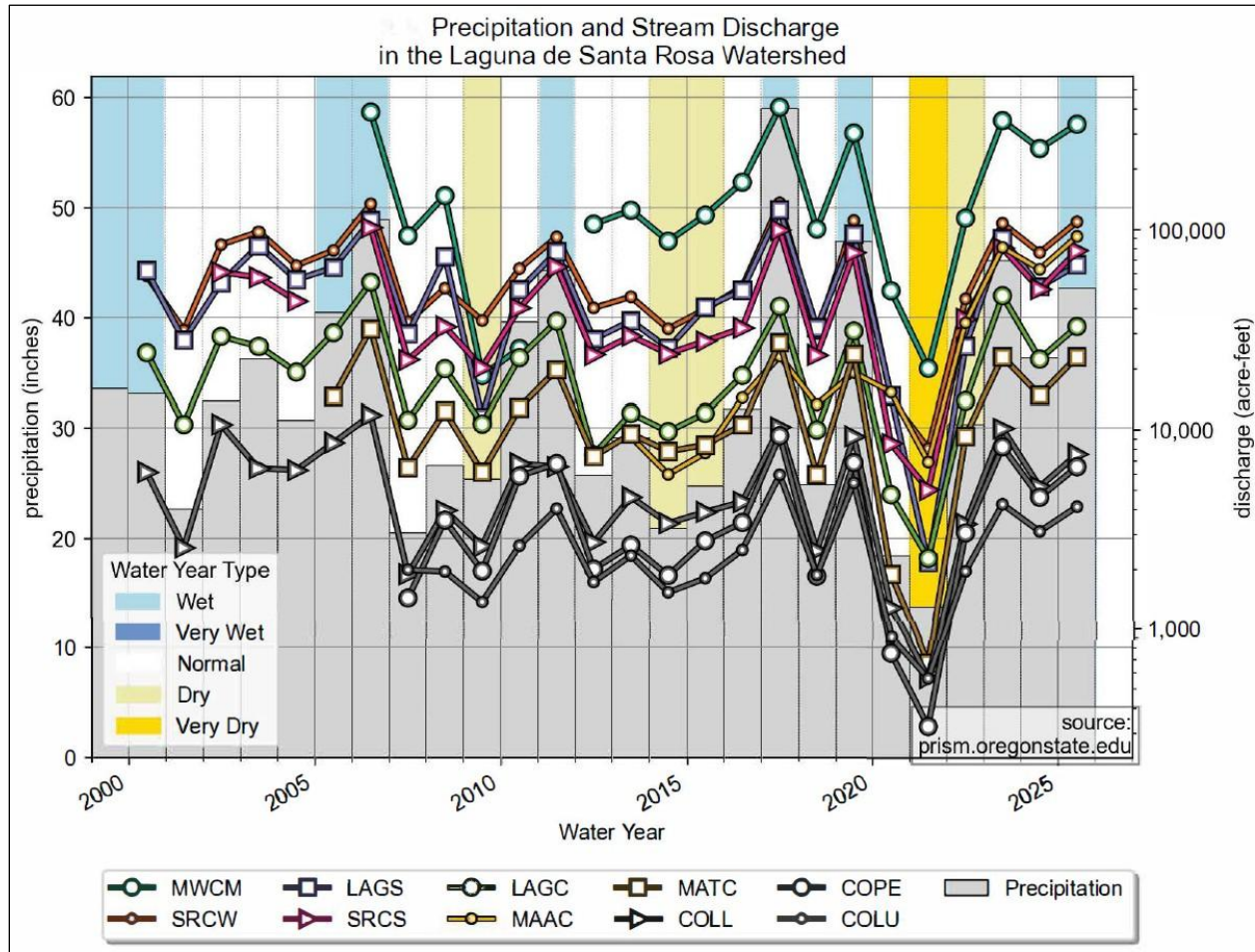


Figure 4-2. Annual Streamflow Discharges 2000 to 2025

4.3 Chronic Lowering of Groundwater Levels

The chronic lowering of groundwater levels sustainability indicator is used to evaluate long-term changes in groundwater levels in both the shallow and deep aquifer systems. In the Santa Rosa Plain Subbasin, significant and unreasonable chronic lowering of groundwater levels is defined as groundwater elevations that substantially exceed historical declines or result in adverse impacts to beneficial users of groundwater, including domestic, municipal, and agricultural users, as well as groundwater-dependent vegetation. Groundwater levels are also closely linked to other sustainability indicators and are used as a proxy for evaluating reduction of groundwater storage (Section 4.4) and depletion of interconnected surface water (Section 4.6). The following subsections describe the SMC for chronic lowering of groundwater levels and compare current conditions in both aquifer systems to the established management criteria.

4.3.1 Groundwater Level SMC Definition in the 2021 GSP

As described in Section 4.5 of the GSP, the SMC for chronic lowering of groundwater levels were developed through the review of historical groundwater level data, evaluation of long-term and recent declining trends, depths and construction details of supply wells, and an assessment of modeled future drought scenarios from projected climate and supply well impacts. Groundwater level minimum thresholds (MT) are based on observed historical low conditions (i.e., fall conditions), potential drought

conditions, and the depths at which impacts could occur to water wells. Groundwater level measurable objectives (MO) are based on observed historical high and median spring elevations depending on groundwater level trends. Table 4-11 provides a summary of the groundwater level SMC developed for the GSP. For the five-year evaluation cycle, there are 14 shallow aquifer system and 12 deep aquifer system representative monitoring points (RMPs) included in the groundwater level representative monitoring network to represent this sustainability indicator.

Table 4-1. Santa Rosa Plain Subbasin Sustainable Management Criteria for Chronic Lowering of Groundwater Levels (2021 GSP)

Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Chronic lowering of groundwater levels that significantly exceed historical levels or cause significant and unreasonable impacts on beneficial users.	Stable Wells: Maintain near historical observed ranges while accounting for future droughts and climate variability. Metric: Historical low elevations minus four-year drought assumption. Wells with Historical Declines and then recovery: Maintain above historical low elevations and protect at least 98% of nearby water supply wells. Metric: Shallower (more protective) of historical low elevations OR above the 98th percentile of nearby water supply well depths.	Monthly or monthly-averaged groundwater levels measured at representative monitoring point wells.	Stable Wells: Maintain within historical observed ranges. Metric: Historical median spring groundwater elevation. Wells with Historical Declines and then recovery: Maintain within recent (recovered or recovering) historical observed ranges. Metric: Recent (2010-2019) median spring groundwater elevation.	10% of RMPs (2 RMPs within the shallow or deep aquifer) exceed MT for 3 consecutive years.	The MO is based on recent conditions therefore interim milestones are identical to the MO.

4.3.2 Current Groundwater Level Conditions Relative to SMC

The MT for RMPs with stable groundwater elevation trends is defined as the shallower (more protective) elevation of either the historical low elevation adjusted for a 4-year drought period, or elevations above the 98th percentile of nearby water supply well depths. Similarly, the MT for RMPs with declining elevation trends is defined as the shallower (more protective) elevation of either the historical low elevations, or elevations above the 98th percentile of nearby water supply well depths. An undesirable result (UR) is measured as 10 percent of RMPs exceeding the MT for 3 consecutive years. During the five-year evaluation cycle (WYs 2021–2025), no undesirable results for chronic lowering of groundwater levels have occurred in the Subbasin.

MTs are assessed annually using fall groundwater elevation measurements. Table 4-22 summarizes fall groundwater elevations compared to the MTs for the 14 RMPs in the shallow aquifer system network and the 12 RMPs in the deep aquifer system monitoring network from WY 2021 through 2025.

During the five-year evaluation cycle, fall groundwater elevations in both the shallow and deep aquifer system networks remained above their MTs each year. Warning level thresholds were also developed for four wells in the deep aquifer system groundwater level network to account for some uncertainties in MT development. The four wells with established warning levels are SRP0347, SRP0238, SRP0243 and SRP0249. During the evaluation cycle, fall groundwater elevations at these four wells were above their warning levels, which are more protective than their MTs (Table 4-22). However, in WY 2022 during the 2021/2022 drought, SRP0238 levels were close to its warning level, but groundwater levels recovered the following wetter year (Sonoma Water, 2024).

Figure 4-3 depicts the shallow aquifer system fall groundwater elevations relative to the MT. Over the five-year assessment period, groundwater elevations across the 14 RMPs have generally remained 5 feet or more above the MT. Groundwater elevation trends have either been generally stable or on an increasing trend during the evaluation cycle. Some RMPs, including SRP0269, SRP0710, SRP0723, and SRP0713, show clear improving trends with increasing groundwater elevations staying above the MTs.

Figure 4-4 depicts the deep aquifer system fall groundwater elevations relative to the MT and shows that, over the five-year assessment period, groundwater elevations across the 12 RMPs have consistently remained above their MTs. Groundwater elevation trends vary across the deep aquifer system monitoring network; however, similar patterns are observed across the RMPs. During the first two evaluation years, groundwater levels declined in response to dryer than normal conditions, with the lowest elevations occurring in WY 2022, followed by increasing elevations in WY 2023, and generally stable or slightly increasing elevations in WYs 2024–2025. Only one measurement has been taken at SRP0059, which was during wet WY 2025, and showed that fall conditions were 3 feet above its MT.

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Table 4-2. Summary of Fall Conditions Relative to Minimum Thresholds by Aquifer System (2021-2025)						
Representative Monitoring Point	Minimum Threshold (feet amsl)	Fall Groundwater Elevation (feet amsl)				
		WY 2021 (very dry year)	WY 2022 (dry year)	WY 2023 (normal year)	WY 2024 (normal year)	WY 2025 (wet year)
Shallow Aquifer System						
SRP0073	64	NM	NM	NM	NM	NM
SRP0106	72	80	82.35	85	84.7	85.7
SRP0121	75	95.4	NM	NM	NM	NM
SRP0269	61	79.6	79.08	83.4	84.46	86.15
SRP0355	46	52.8	53.83	56	56.51	58.6
SRP0357	53	61.8	65.72	65.5	66.9	67.1
SRP0375	85	91.5	96.01	101.9	111.99	106.8
SRP0709	54	56.3	58.9	60	58.51	59.9
SRP0710	53	60.4	61.05	62	62.89	63.6
SRP0713	47	56.3	57.79	58.7	57.6	65.7
SRP0714	124	127.9	128	128.1	128.11	128.2
SRP0715	119	123.1	123.71	124.2	124.14	124.6
SRP0720	159	170	167.58	179.2	172.98	173.9
SRP0723	193	198	200.69	203	203.49	204.19
Deep Aquifer System						
SRP0019	12	32.5	NM	NM	NM	40.02
SRP0057	100	104.9	106.55	110.8	NM	111.5
SRP0059	67	NM	NM	NM	NM	70.08
SRP0115	169	182.7	NM	NM	177.81	NM
SRP0238	-28	43	31.23	81.7	62.96	68.18
SRP0243	-83	14.2	8.99	16.6	16.66	12.74
SRP0249	-97	56.7	55.27	68.4	NM	68.35
SRP0347	-86	34.8	33.4	40.4	41.7	43.2
SRP0359	21	49.4	50.84	52.9	54.68	56.5
SRP0376	76	88.5	87.97	95.8	94.53	94.633
SRP0724	69	81.1	82.16	85.2	84.73	85.18
SRP0725	17	NM	50.33	54	52.7	54.3
Note: NM: Not measured						

First Periodic Evaluation
Santa Rosa Plain Groundwater Subbasin

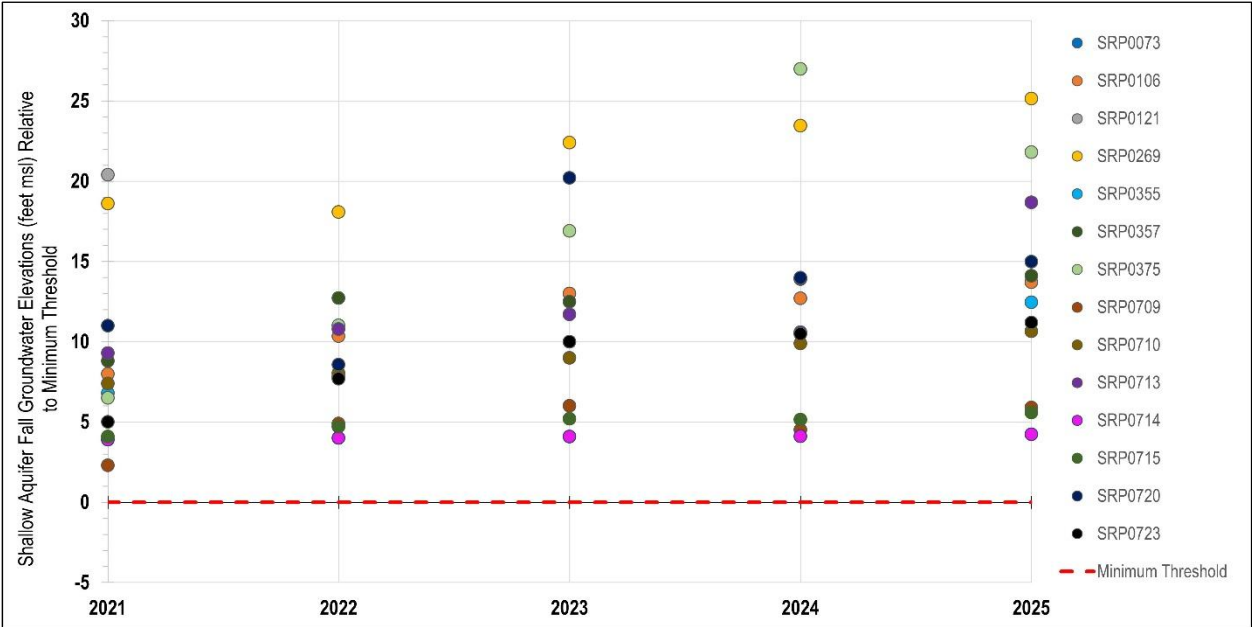


Figure 4-3. Fall Groundwater Elevations Compared to Minimum Threshold for Shallow Aquifer System Representative Monitoring Points (2021-2025)

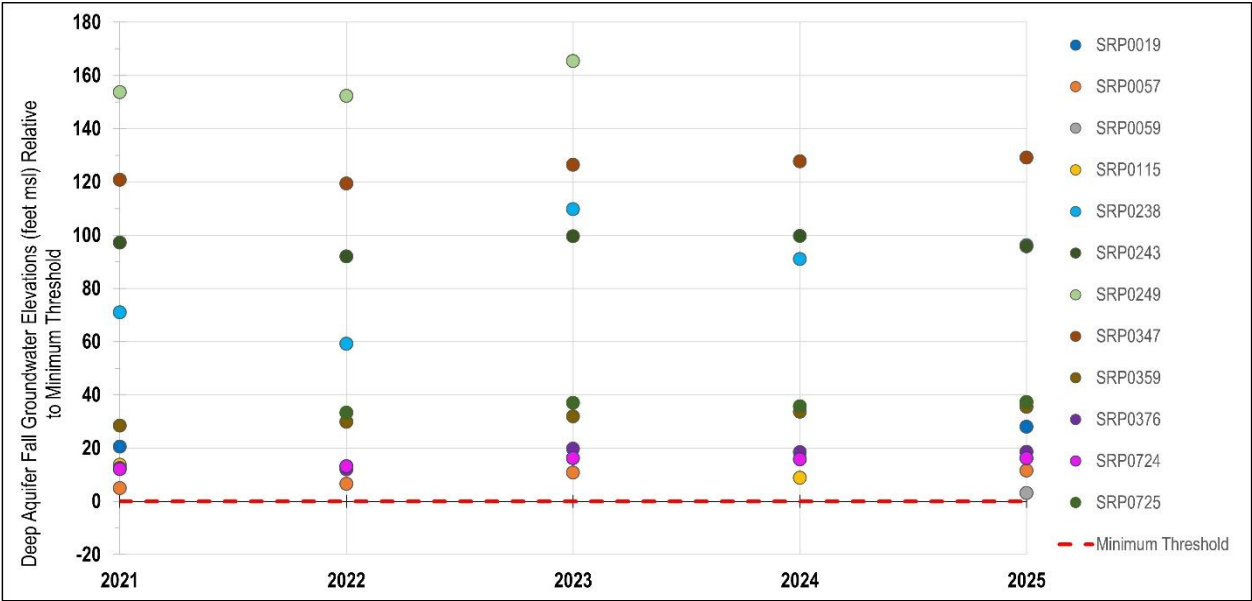


Figure 4-4. Fall Groundwater Elevations Compared to Minimum Threshold for Deep Aquifer System Representative Monitoring Points (2021-2025)

The measurable objective (MO) for groundwater levels is defined as the historical spring median elevation for RMPs with historical stable conditions and the pre-2010 median spring elevation for RMPs with identified declining elevation trends. Interim milestone (IM) refers to a target value that should be achieved every 5 years to demonstrate progress towards sustainability. For all RMPs, the MO is essentially set at recent conditions (that is, the aim of the MO is to maintain groundwater levels within historical and recent ranges), therefore IMs are essentially equivalent to the MO throughout the GSP implementation period. MOs are assessed annually using spring groundwater elevation measurements.

Table 4-3 summarizes spring groundwater elevations compared to MOs/IMs for the 14 RMPs in the shallow aquifer system and 12 RMPs in the deep aquifer system from WYs 2021 to 2025. During the evaluation cycle, 83 percent of wells in the shallow aquifer system and 71 percent of wells in the deep aquifer system with available measurements had elevations above the MO in the last three water years (WY 2023-2025) with levels improving at the majority of RMPs over time due to wetter hydrologic conditions.

Figure 4-5 depicts the shallow aquifer system spring groundwater elevations relative to the MO. Over the five-year assessment period, groundwater elevations across the 14 RMPs generally remained within 10 feet of their target elevations, or MOs. The figure shows that conditions are improving across the network over the evaluation cycle, specifically at wells SRP0355 and SRP0269. In contrast, spring elevations at well SRP0375 have continued to be below its MO.

Figure 4-6 plots the deep aquifer system spring groundwater elevations relative to the MO and shows that, over the five-year assessment period, groundwater elevations across the 11 measured RMPs have generally remained within 20 feet of their target elevations, or MOs. The figure shows that conditions have been improving at well SRP0724, SRP0359 and SRP0347, while spring groundwater levels exhibited a decline at well SRP0115 between 2022 and 2025.

Table 4-3. Summary of Spring Groundwater Elevations Compared to Chronic Lowering of Groundwater Level Sustainable Management Criteria, by Aquifer (2021-2025)							
Representative Monitoring Point	Measurable Objective (feet amsl)	Interim Milestone (feet amsl)	Spring Groundwater Elevation (feet amsl)				
			WY 2021 (very dry year)	WY 2022 (dry year)	WY 2023 (normal year)	WY 2024 (normal year)	WY 2025 (wet year)
Shallow Aquifer System							
SRP0073	86	86	NM	NM	NM	NM	NM
SRP0106	93	93	84.4	90.9	95.5	95.7	95.8
SRP0121	137	137	115.1	NM	NM	NM	NM
SRP0269	82	82	81.9	82.6	85.3	87.9	89.3
SRP0355	55	55	56.2	57.1	60.1	63.2	64.5
SRP0357	69	69	66.1	67.9	70.2	71.1	71.6
SRP0375	115	115	106.1	102.4	114.1	113.5	113.7
SRP0709	61	61	60.5	60.5	63.7	62.2	61.6
SRP0710	64	64	61.7	61.8	62.7	63.8	64.7
SRP0713	62	62	59.9	63.6	67.2	65.9	65.7
SRP0714	130	130	129.8	129.3	133.5	131.7	131
SRP0715	127	127	126.9	126.7	129.4	128.5	127.9
SRP0720	177	177	179.6	178.6	181.8	182	180.4
SRP0723	202	202	208.5	200.4	203.5	204.6	206
Deep Aquifer System							
SRP0019	45	45	42.2	NM	NM	NM	NM
SRP0057	128	128	113.3	115.1	119.6	NM	122
SRP0059	76	76	NM	NM	NM	NM	NM
SRP0115	200	200	202.9	205.6	NM	NM	198.9
SRP0238	71	71	70.9	67.2	75.6	81.8	83.4
SRP0243	37	37	24	24.2	21.9	28.9	29.2
SRP0249	71	71	70.1	66.3	69.1	NM	NM
SRP0347	41	41	40.4	43.6	46.5	50.9	53.4
SRP0359	54	54	53.9	54.5	56.1	57.6	59.3
SRP0376	109	109	98.8	99.1	107.4	109.5	107.3
SRP0724	88	88	86.8	87	88.8	90.5	90.5
SRP0725	32	32	NM	52.6	56.9	57.4	58.2
NM: not measured							
Spring measurement above the MO and IM							

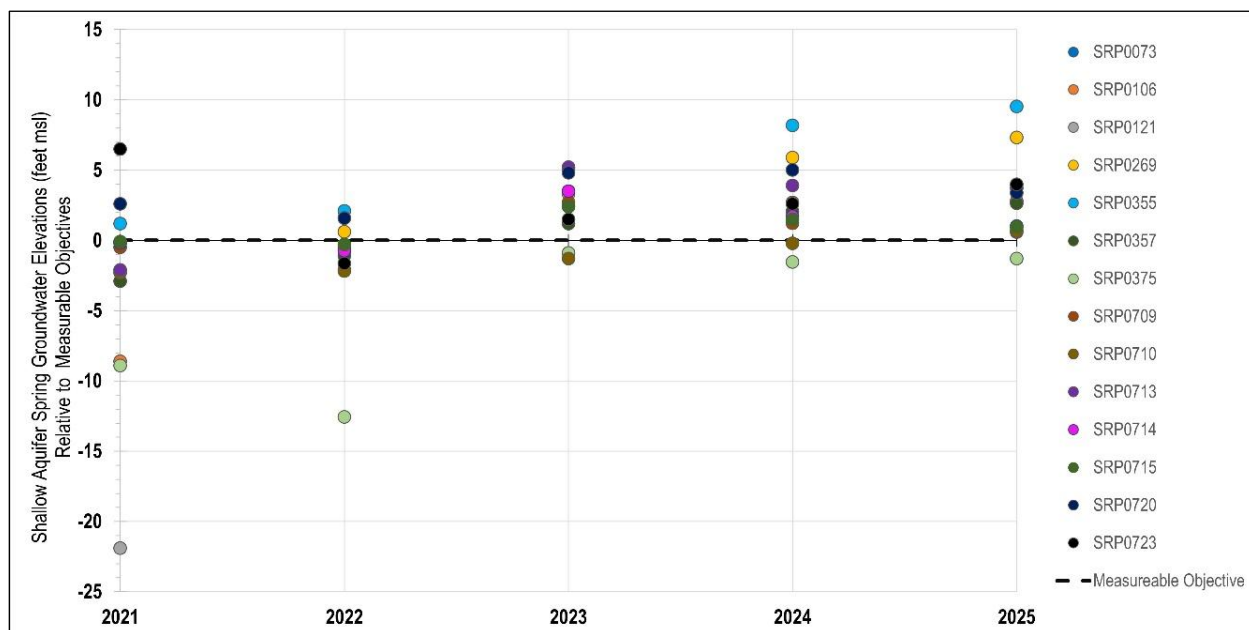


Figure 4-5. Spring Groundwater Elevations Relative to Chronic Lowering of Groundwater Level Measurable Objectives for Shallow Aquifer System Representative Monitoring Points (2021-2025)

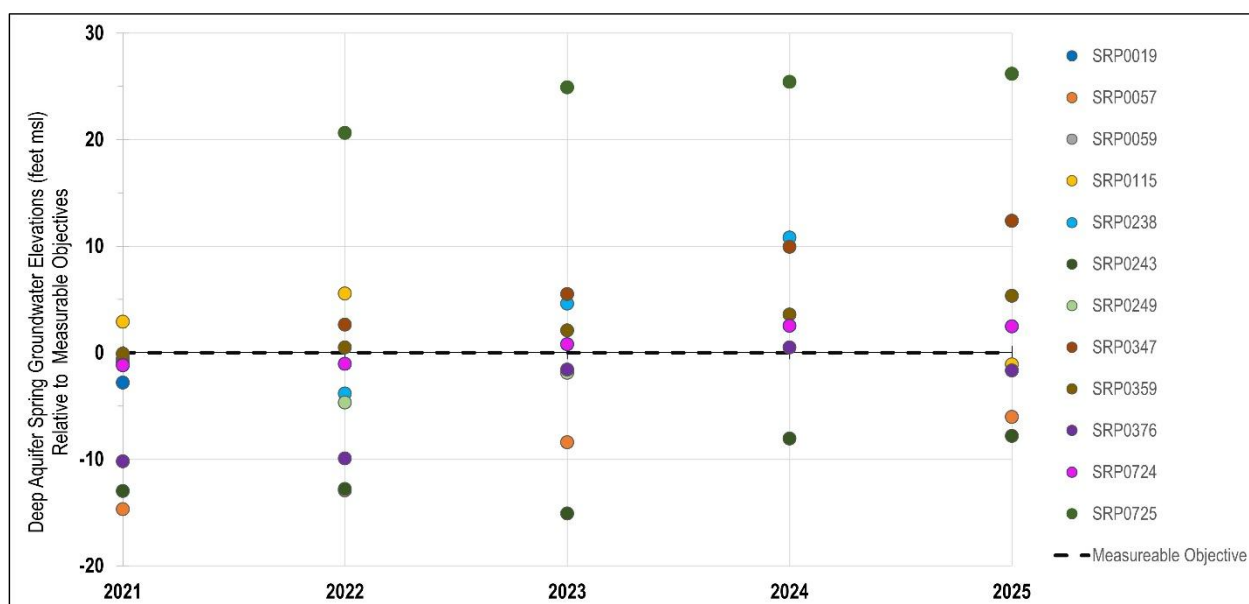


Figure 4-6. Spring Groundwater Elevations Relative to Chronic Lowering of Groundwater Level Measurable Objectives for Deep Aquifer System Representative Monitoring Points (2021-2025)

4.3.3 Evaluation of Groundwater Level SMC

During the five-year evaluation cycle, undesirable results have not occurred in the Subbasin. Additionally, there have been no MT exceedances in the last five water years (WY 2021-2025). Annual assessment of groundwater levels will continue throughout GSP implementation. As described in Section 5.1.2, new monitoring wells have recently been installed and added to the groundwater level RMP and SMC were developed for the new wells, reflecting the overall same rationale and approach described in the GSP. The

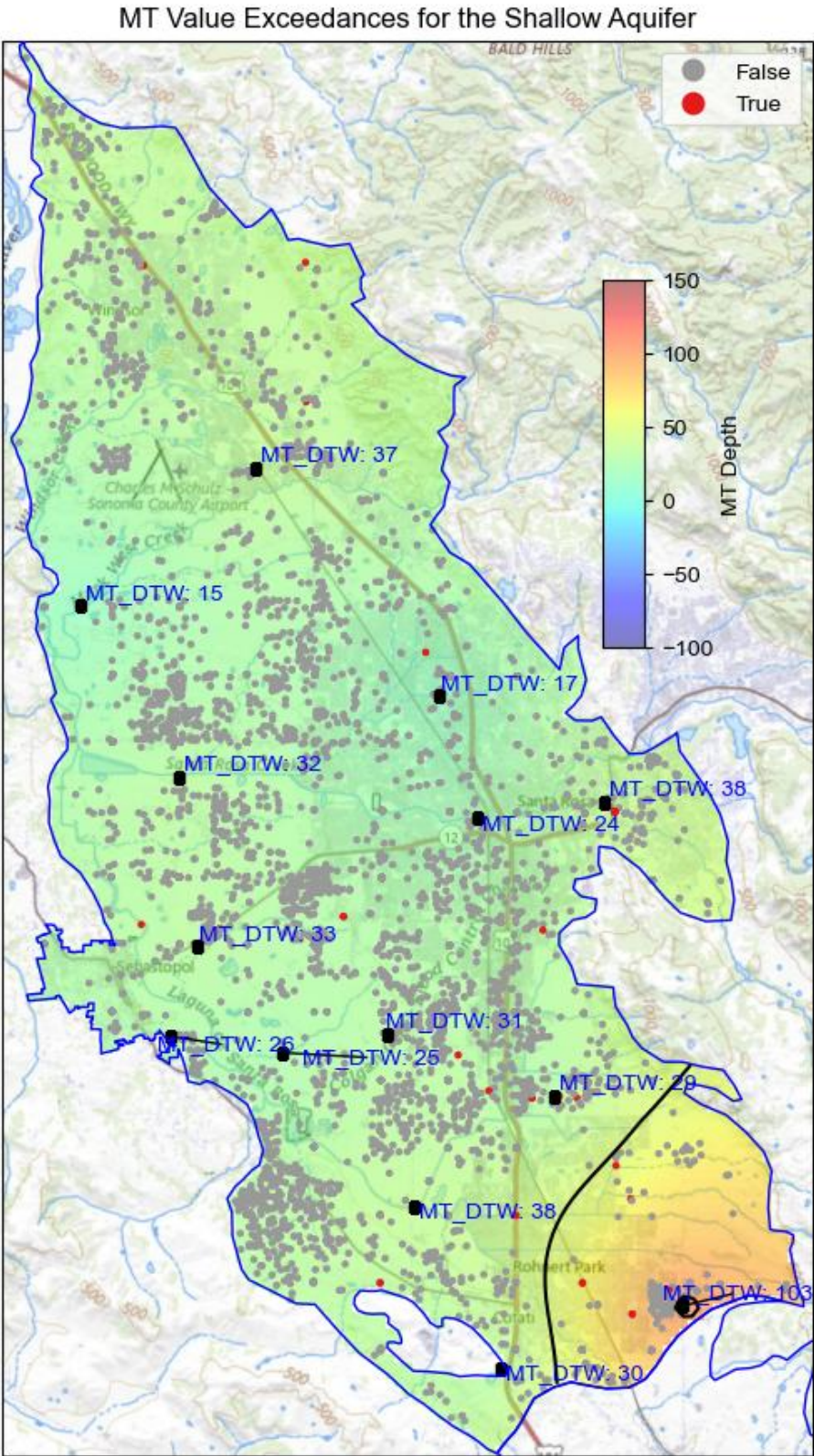
next Annual Report will include the new RMPs in the evaluation of the SMC status for chronic lowering of groundwater levels.

As described in the GSP, the methodology for incorporating the potential impacts on existing well users involved the calculation of a well impact depth at each RMP through a statistical evaluation of known well construction information for all water supply wells (i.e., domestic wells, irrigation wells, public supply wells, and industrial wells) located within the vicinity of each RMP. The well impact depth was set at the 98th percentile shallowest supply well depth, plus a saturated thickness factor of 10 feet for wells completed within the shallow aquifer system and 50 feet for wells completed within the deep aquifer system to accommodate a reasonable level of drawdown due to production from existing wells.

In response to RCA 3, the updated RMP network and updated well inventory were used to analyze the total number of supply wells that could potentially be impacted by MT exceedances by applying the following methodology:

- Established MT elevations for the updated RMP network were converted to depth-to-water (MT depth-to-water).
- The resulting MT depth-to-water at each RMP was interpolated throughout the entire Subbasin, as shown in Figure 4-7 and Figure 4-8.
- The well impact depth was determined for each supply well containing either total depth or bottom of well screen attributes using methods consistent with the GSP:
 - Wells shallower than 40 feet were filtered out from database to remove records for non-supply wells (for example, monitoring wells) and older (greater than 50-year-old wells) that have likely been replaced.
 - Shallow aquifer system wells: For wells shallower than 200 feet in depth and wells with more than half of the screened interval above 200 feet in depth, the well impact depth was assigned as the depth to 10 feet above the bottom of the well screen or 10 feet above the total depth of the well (for wells lacking bottom of well screen information).
 - Deep aquifer system wells: For wells with total depth greater than 200 feet and more than half of screened interval below 200 feet below ground surface, the well impact depth was assigned as the depth to 50 feet above the bottom of the well screen or 50 feet above the total depth of the well (for wells lacking bottom of well screen information).
- Supply wells at which the contoured MT depth-to-water surface was below the well impact depth are considered to be impacted in this analysis and are shown on Figure 4-7.

Results of the analysis indicate that a total of 58 supply wells (all located within the shallow aquifer system, as shown on Figure 4-7) would potentially be impacted should groundwater levels decline below the established MTs. Results from analyzing the deep aquifer wells, shown on Figure 4-8, indicate that there are no wells with well screen depths that are below the interpolated deep MT values. These results represent approximately 1.1 percent of the total 5,000 supply wells within the Subbasin's well inventory with a reported bottom of well screen or total depth. This finding is consistent with the approach originally employed in the GSP, which was to set the minimum thresholds at depths sufficient to protect at least 98 percent of supply wells within the Subbasin from impacts related to the chronic lowering of groundwater levels. Accordingly, no changes to SMC for the chronic lowering of groundwater levels are necessary or proposed at this time.



Note: Wells shown in red have screen impact depths below the interpolated MT value

Figure 4-7. Supply Wells with Screen Depths Below Interpolated MT Values in the Shallow Aquifer

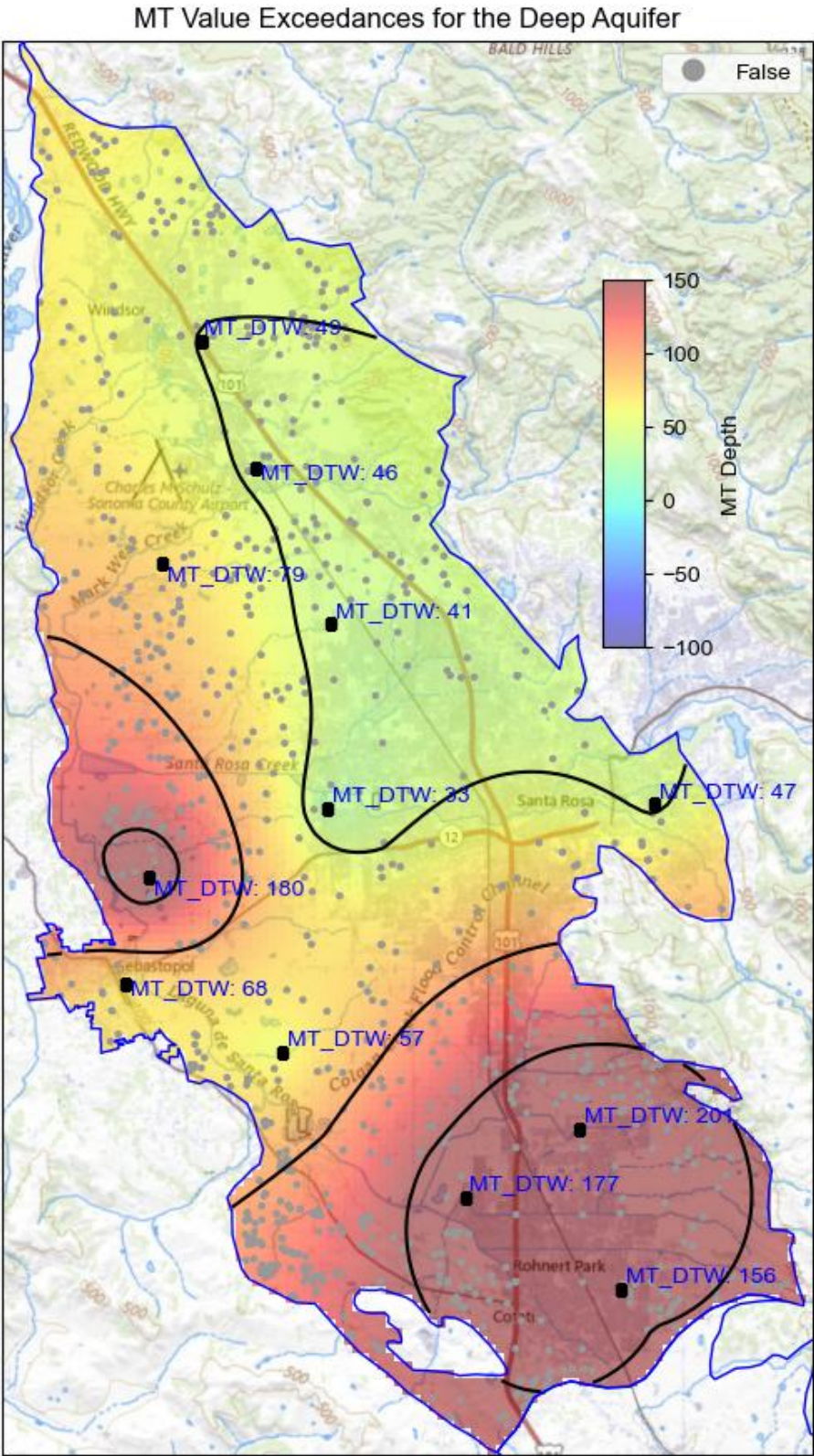


Figure 4-8. Supply Wells with Screen Depths Below Interpolated MT Values in the Deep Aquifer

4.4 Reduction of Groundwater in Storage

In the Santa Rosa Plain Subbasin, significant and unreasonable reduction of groundwater in storage is defined in the 2021 GSP as a “Reduction of groundwater storage that causes significant and unreasonable impacts on the long-term sustainable beneficial use of groundwater in the subbasin, as caused by long-term reductions in groundwater storage; or pumping exceeding the sustainable yield” (Sonoma Water, 2021). Consistent with Section 354.28(c)(2) of GSP Regulations, groundwater elevations are used as a proxy for evaluating changes in groundwater storage. Maintaining groundwater levels above the MTs established for chronic lowering of groundwater levels is considered protective of depleting groundwater in storage in both the shallow and deep aquifer systems. The following subsections describe the SMC and evaluate current conditions of groundwater storage.

4.4.1 Groundwater Storage SMC Definition in the 2021 GSP

As described in Section 4.6 of the GSP, reduction of groundwater in storage SMC are evaluated using the chronic lowering of groundwater level RMPs and SMC as a proxy. Therefore, the MTs, MOs, and interim milestones (IMs) for reduction of groundwater in storage are the same as for chronic lowering of groundwater levels. Groundwater storage change is estimated and assessed annually using numerical model aquifer parameters and evaluating change in groundwater levels within the Subbasin’s aquifer systems. Table 4-4 provides a summary of the groundwater storage SMC developed for the GSP.

Table 4-4. Santa Rosa Plain Subbasin Sustainable Management Criteria for Reduction of Groundwater in Storage (2021 GSP)

Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Reduction of groundwater storage that causes significant and unreasonable impacts to the long-term sustainable beneficial use of groundwater in the Subbasin, as caused by: • Long-term reductions in groundwater storage • Pumping exceeding the sustainable yield	Measured using groundwater elevations as a proxy. MT for groundwater storage is identical to the MT for the chronic lowering of groundwater levels.	Annual groundwater storage will be calculated and reported by comparing changes in contoured groundwater elevations. However, monitoring for the chronic lowering of groundwater levels will be used to compare with MT and MO.	MO for groundwater storage is identical to the MO for the chronic lowering of groundwater levels.	Undesirable result for groundwater storage is identical to the undesirable result for the chronic lowering of groundwater levels.	Interim milestones for groundwater storage are identical to the interim milestones for chronic lowering of groundwater levels.

4.4.2 Current Groundwater Storage Conditions Relative to SMC

The groundwater storage SMC are the same as the chronic lowering of groundwater level SMC. As described in Section 4.3.1, there have been no MT exceedances during the five-year evaluation cycle (2021-2025) and undesirable results have not occurred in the Subbasin.

4.4.3 Evaluation of Groundwater Storage SMC

The reduction of groundwater in storage is evaluated using the chronic lowering of groundwater levels RMP network and SMC as a proxy. During the five-year evaluation cycle, undesirable results for reduction of groundwater in storage have not occurred in the Santa Rosa Plain Subbasin and there have been no MT exceedances in the last five water years (WY 2021-2025). Additionally, groundwater in storage generally increases, with only minor decreases occurring during particularly dry years – this indicates the aquifer systems are well-balanced. Annual assessment of groundwater levels relative to storage conditions will continue throughout GSP implementation.

4.5 Degraded Groundwater Quality

The degraded groundwater quality sustainability indicator is used to track the quality of identified constituents of concern (COCs) in the Subbasin to avoid significant and unreasonable conditions. As described in Section 4 of the GSP, “Significant and unreasonable water quality conditions occur if an increase in the concentration of COCs in groundwater leads to adverse impacts on beneficial users or uses of groundwater, due to direct actions by the Santa Rosa Plain Subbasin GSP project or management activities or undesirable results occurring for other sustainability indicators” (Sonoma Water, 2021). Groundwater quality data collected during the evaluation cycle were reviewed to assess conditions relative to sustainability metrics for the three COCs. The following subsections summarize these metrics and compare current conditions to the established management criteria.

4.5.1 Groundwater Quality SMC Definition in the 2021 GSP

The SMC for degraded water quality were developed based on a network of public water system supply wells regulated by the California State Water Resources Control Board’s (SWRCB) Division of Drinking Water (DDW). During GSP development, nitrate, arsenic, and salinity [measured as total dissolved solids (TDS)] were identified as the three constituents of concern (COCs) that may impact groundwater quality across the Subbasin. Regulatory standards such as a maximum contaminant level (MCLs) or secondary maximum contaminant level (SMCL) were used to establish the MTs for the three COCs. MCLs have been established by the U.S. Environmental Protection Agency (EPA) for nitrate and arsenic. The MCLs for nitrate and arsenic are 10 mg/L and 10 µg/L, respectively. There is no MCL for TDS, however, the SWRCB has set an SMCL for TDS of 500 mg/L based on water quality aesthetics (taste, order, etc.).

The MT for degraded water quality is based on two additional exceedances of any MCL or SMCL in existing supply wells over any baseline exceedances that occurred between 2015 and 2020 (GSP baseline period). The MT for degraded water quality is evaluated each year as the annual average concentration that exceeds baseline conditions. It is important to note that the water quality data evaluated are from public drinking water systems that provide treatment to remove these and other constituents of potential concern to levels below applicable regulatory standards. The concentrations presented for these wells are prior to such treatment, so as to allow for a characterization of native (or ambient) groundwater quality.

The specific exceedances were set for each COC based on the following rationale:

- For arsenic there were 21 RMPs with at least one MCL exceedance during the 2015 to 2020 baseline period; with an allowable 2 additional supply well MCL exceedances over baseline exceedances, the MT for arsenic is 23 public supply well exceedances of the MCL of 10 µg/L.

- For nitrate there were 2 RMPs with at least one MCL exceedance during the 2015 to 2020 baseline period; with an allowable 2 additional supply well MCL exceedances over baseline exceedances, the MT for nitrate is 4 public supply well exceedances of the MCL of 10 mg/L.
- For TDS there were 2 RMPs with at least one MCL exceedance during the 2015 to 2020 baseline period; with an allowable 2 additional supply well SMCL exceedances over baseline exceedances, the MT for TDS is 4 public supply well exceedances of the SMCL of 500 mg/L.

The MO and IMs for degraded water quality are set to the baseline conditions, where no additional supply wells exceed the established regulatory standards. Table 4-5 summarizes the SMC for the degraded water quality sustainability indicator.

Undesirable results for groundwater quality occur in the Subbasin if, “during two consecutive years, a single groundwater quality MT is exceeded when computing annual averages at the same well, as a direct result of project of management actions taken as part of GSP implementation or undesirable results occurring for other sustainability indicators” (Sonoma Water, 2021).

Table 4-5. Santa Rosa Plain Subbasin Sustainable Management Criteria for Degradation of Groundwater Quality (2021 GSP)

Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Significant and unreasonable water quality conditions occur if an increase in the concentration of constituents of concern in groundwater leads to adverse impacts on beneficial users or uses of groundwater, due to: • Direct actions by Santa Rosa Plain GSP projects or management activities • Undesirable results occurring for other sustainability indicators	The MT is based on two additional supply wells exceeding MCLs for (1) arsenic, (2) nitrate, or (3) salinity (measured as TDS).	The number of public supply wells with annual average concentrations of arsenic, nitrate, or TDS that exceed MCLs in groundwater quality data available through state data sources.	The MO is based on zero additional supply wells exceeding the applicable maximum contaminant level for (1) arsenic, (2) nitrate, or (3) salts (measured as TDS).	An undesirable result occurs if, during 2 consecutive years, a single groundwater quality MT is exceeded when computing annual averages at the same well, as a direct result of projects or management actions taken as part of GSP implementation.	The MO is based on current conditions; therefore, interim milestones are identical to the MO.

4.5.2 Current Groundwater Quality Conditions Relative to SMC

Annual average concentration measurements from public water system supply wells for nitrate, arsenic, and TDS were evaluated for the past five years (2021-2025), based on submitted Annual Report data, and compared to the groundwater quality SMC. During this evaluation cycle, there were no MT exceedances for the three COCs monitored. Current groundwater quality conditions are generally good across the Subbasin, improving slightly compared to baseline conditions.

4.5.2.1 Nitrate as Nitrogen

The MCL for nitrate as nitrogen (nitrate) in drinking water is 10 mg/L. The established MT for nitrate in the Subbasin is four additional supply wells exceeding the MCL in a given year. During the 2021-2025 evaluation cycle, two wells had annual average concentrations above the nitrate MCL: RMP CA4900853_003_003 exceeded the MCL in 2021 and 2022 and RMP CA4900913_001_001 exceeded the MCL in 2023 and 2025. However, no MT exceedances for nitrate occurred as there were less than four RMPs with MCL exceedances in a given year.

As shown on Figure 4-9, annual average nitrate concentrations are largely below the MCL. There are only two RMPs with MCL exceedances: CA4900853_003_003, located on the western border of the Subbasin, and CA4900913_001_001 located towards the center of the Subbasin (Figure 4-10). Figure 4-10 maps the locations of the 112 RMPs that were sampled between 2021 and 2025, symbolized by detected MCL exceedances, where green indicates a RMP with no MCL exceedance and red indicates a RMP that had at least one MCL exceedance during the evaluation cycle.

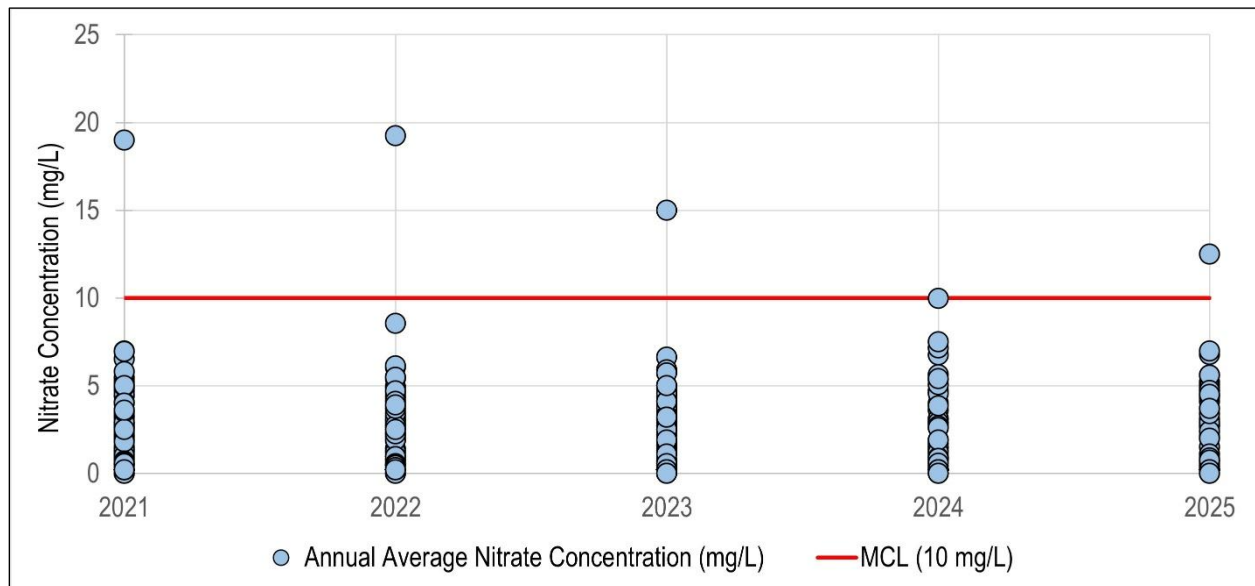


Figure 4-9. Annual Average Nitrate Concentrations for Public Water Supply Wells Sampled Between 2021 to 2025

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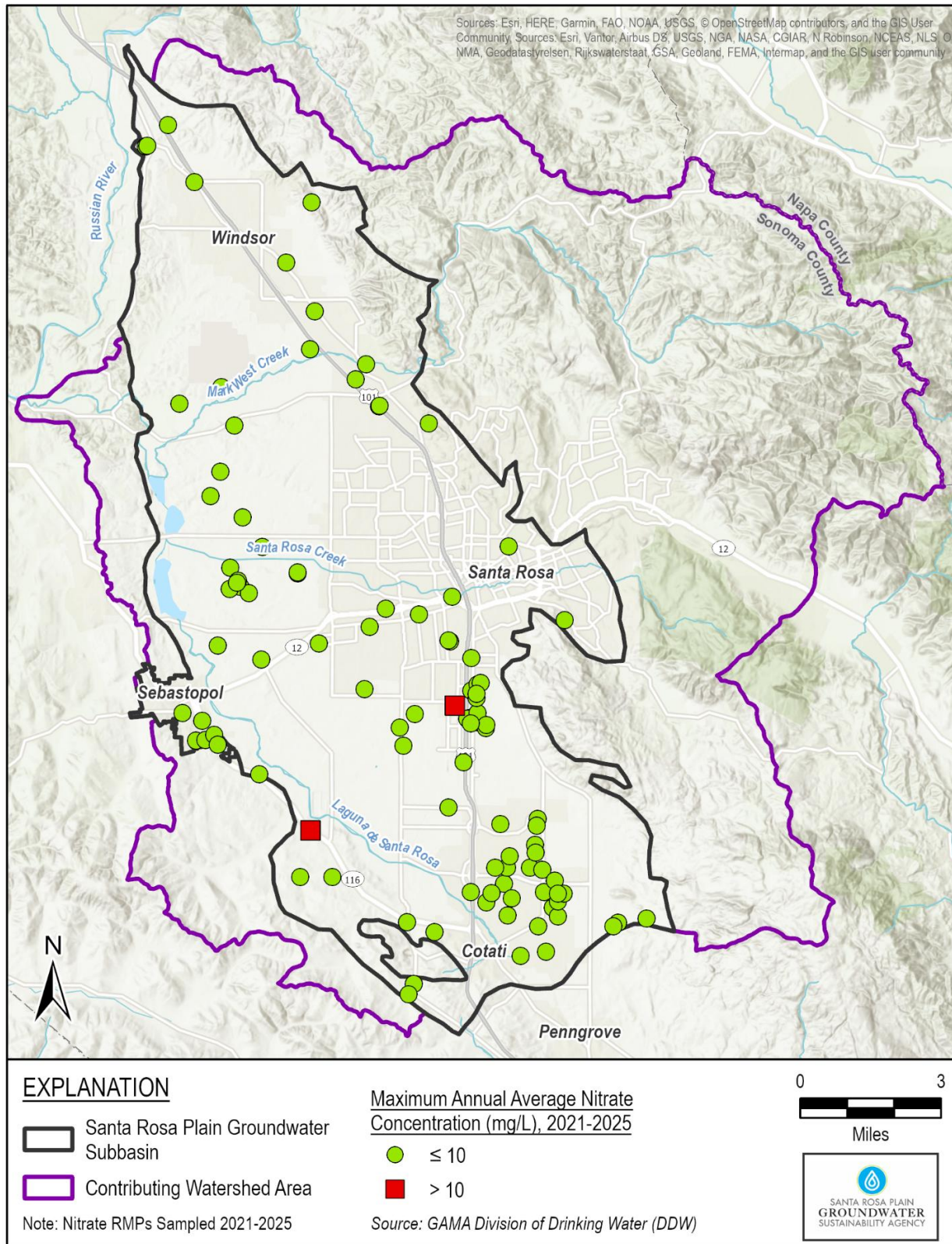


Figure 4-10. Location of RMP Public Water Supply Wells Sampled for Nitrate Between 2021 and 2025

4.5.2.2 Arsenic

The MCL for arsenic is 10 µg/L. The established MT for arsenic in the Subbasin is 23 additional supply wells exceeding the MCL. During the evaluation cycle, annual average concentrations above the MCL were detected each year. In 2021, 16 wells had MCL exceedances, 15 in 2022, 14 in 2023, 12 in 2024, and 11 wells in 2025. No year had more than 23 wells with concentrations above the MCL, therefore no MT exceedances for arsenic occurred during annual assessments.

Figure 4-11 shows annual average arsenic concentrations regularly exceeding the regulatory standard of 10 µg/L. Figure 4-12 maps the locations of the 91 RMPs sampled between 2021 and 2025, symbolized by MCL exceedances. Arsenic continues to be a challenging COC, as it is naturally occurring in the Subbasin. Importantly, arsenic in groundwater did not worsen during the evaluation cycle.

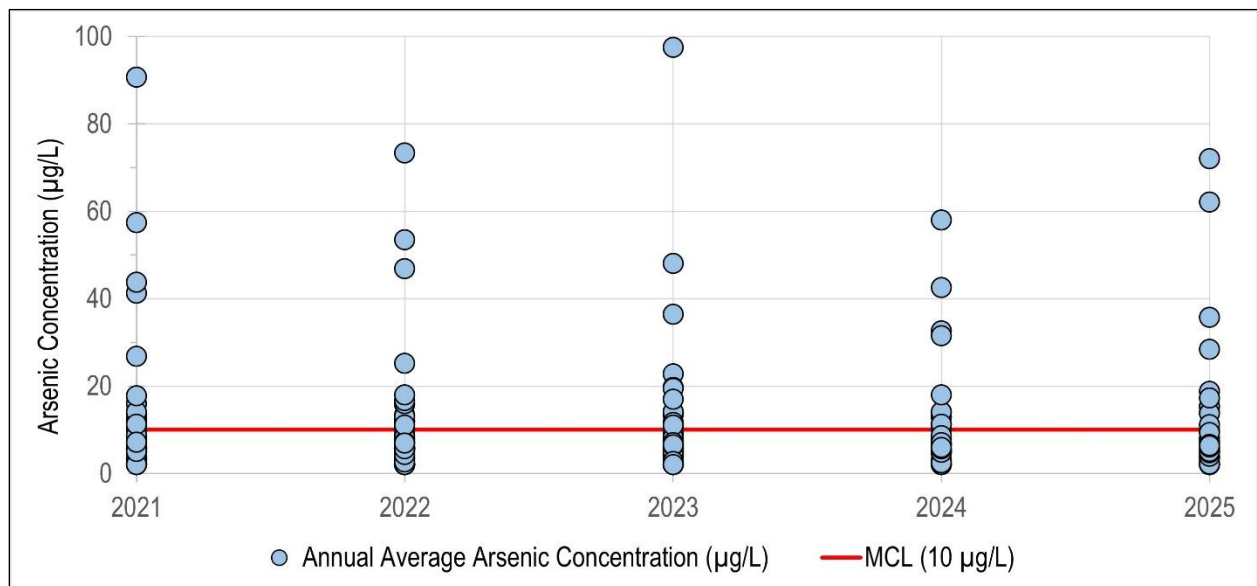


Figure 4-11. Annual Average Arsenic Concentrations for Public Water Supply Wells Sampled Between 2021 and 2025

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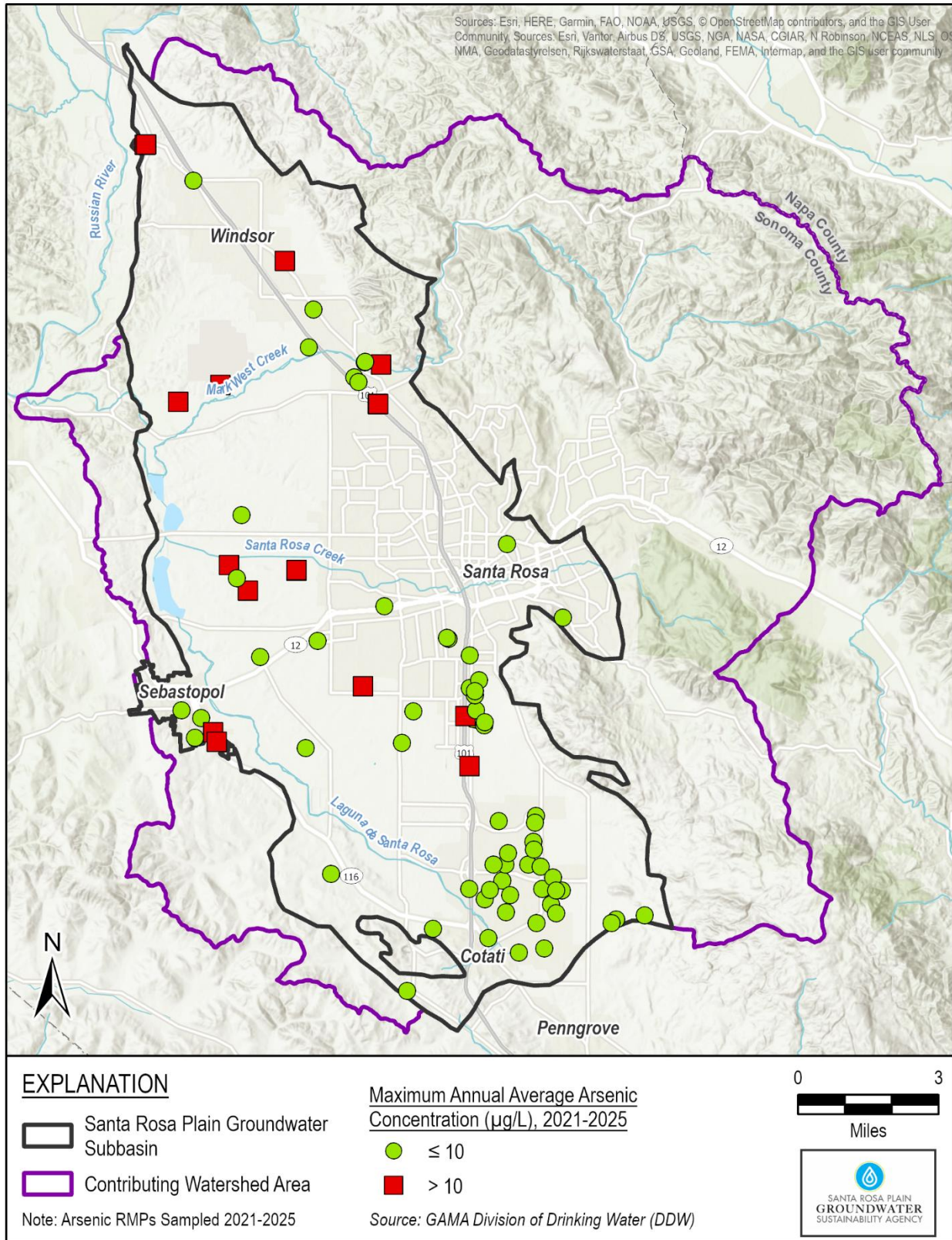


Figure 4-12. Location of RMP Public Water Supply Wells Sampled for Arsenic Between 2021 and 2025

4.5.2.3 Total Dissolved Solids

The SMCL for TDS used to establish the MT is 500 mg/L. The established MT for TDS in the Subbasin is four additional supply wells exceeding the SMCL. During the evaluation cycle, annual average concentrations above the SMCL were detected in WY 2021, however no MT exceedances for TDS occurred, as only one well had SMCL exceedances.

As shown on Figure 4-13, annual average TDS concentrations have generally remained below the SMCL of 500 mg/L. However, in the past five years there were two exceedances at or above the SMCL in two different wells. In 2021, average concentrations were recorded to above the regulatory limit for the public supply well CA4910014_031_031. In 2023, average concentrations were recorded to be at the regulatory limit for the public supply well CA4901346_002_002. Figure 4-14 shows the locations of all 76 RMP wells that have been sampled at least once for TDS in the past five years, and identifies the one well, CA4910014_031_031, with an SMCL exceedance.

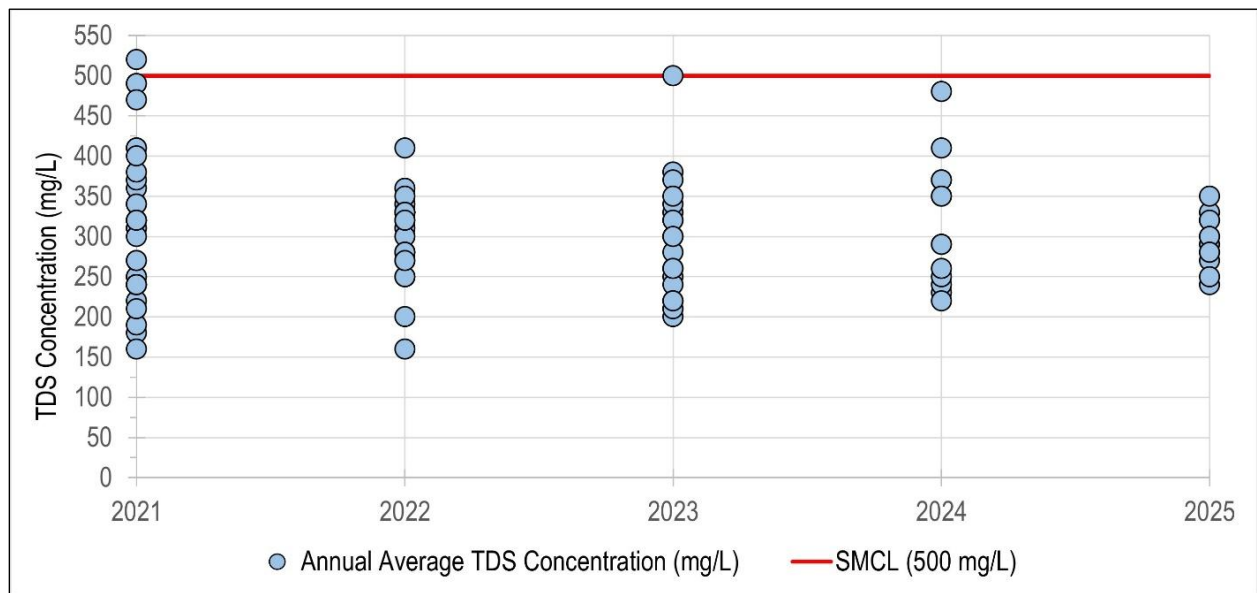


Figure 4-13. Annual Average Total Dissolved Solids Concentrations for Public Water Supply Wells Sampled Between 2021 and 2025

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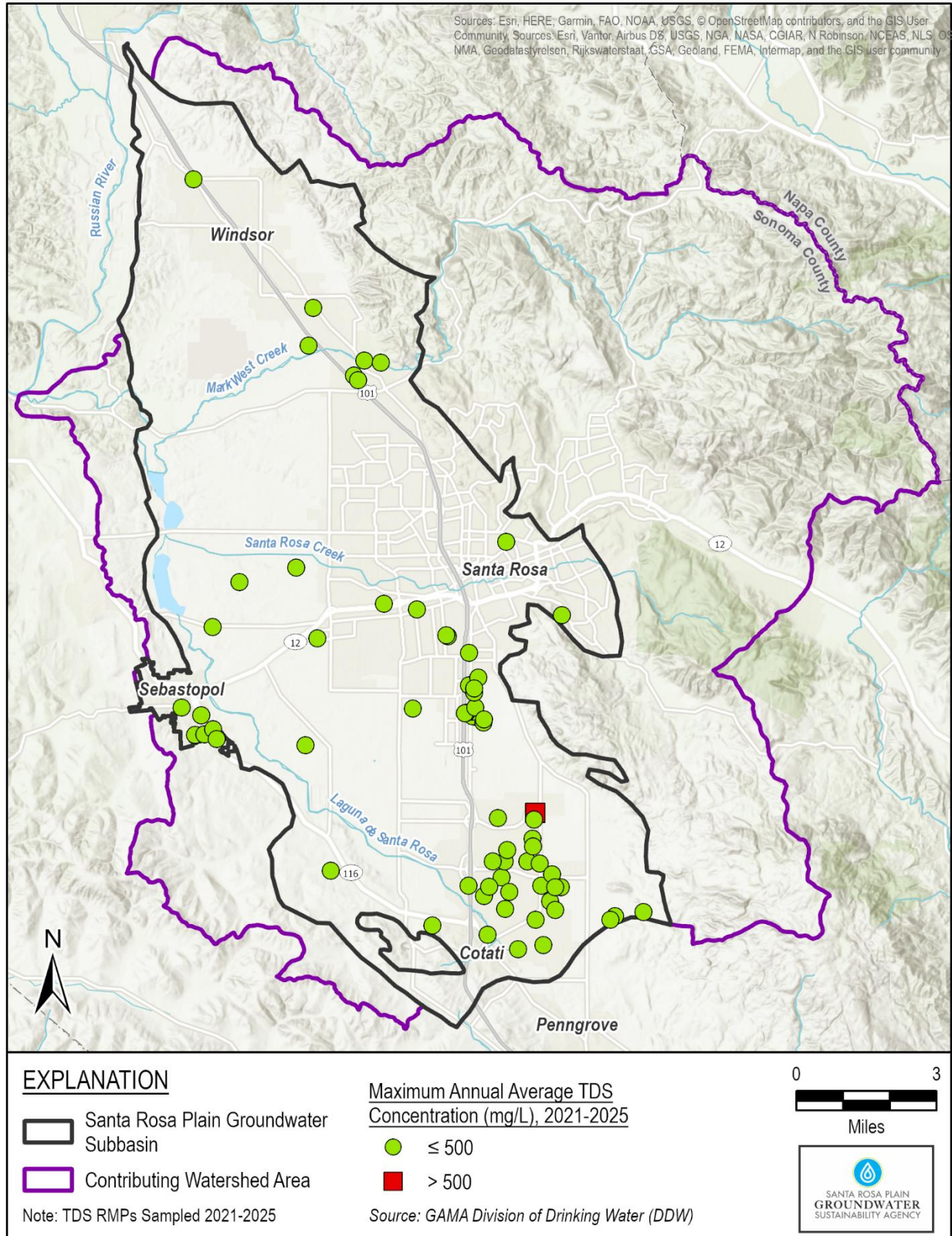


Figure 4-14. Location of RMP Public Water Supply Wells Sampled for Total Dissolved Solids Between 2021 and 2025

4.5.3 Evaluation of Water Quality SMC

Undesirable results for groundwater quality have not occurred in the Santa Rosa Plain Subbasin during the evaluation cycle and GSP projects and management activities are still in the planning phase. Additionally, evaluation of current conditions show no MT exceedances from 2021-2025 for nitrate, arsenic, or TDS. However, during GSP implementation, inconsistencies in the groundwater quality networks were identified, as testing frequency for different constituents in public supply wells is prescribed by DDW permitting requirements and is not always annual. To address this inconsistency, a reassessment of the monitoring network to account for sampling frequency and other criteria was undertaken and documented in Section 5.3. The resulting updates to the networks did not warrant any changes to the groundwater quality SMCs.

As described in the GSP, the GSA will continue to evaluate new information and the potential need to add additional COCs (including emerging contaminants such as per- and polyfluoroalkyl substances – known as PFAS) in the future based on the criteria described in the GSP for identifying COCs. The criteria identified in the GSP are:

1. They have an established level of concern such as an MCL or secondary maximum contaminant level (SMCL), or a level that reduces crop production.
2. They have been found in the Subbasin at levels above the level of concern and are routinely analyzed and reported through existing regulatory monitoring programs.
3. The occurrence of the COC is extensive throughout the Subbasin.

The evaluation of existing data and these criteria resulted in identifying nitrate, arsenic, and TDS as current COCs in the GSP.

4.6 Depletion of Interconnected Surface Water

The GSP states “Significant and unreasonable depletion of surface water from interconnected streams occurs when surface water depletion, caused by groundwater pumping within the Subbasin, exceeds historical depletion or adversely impacts the viability of GDEs or other beneficial users of surface water.” In the GSP, locations of likely ISWs are identified in the Subbasin using a combination of groundwater level observations compared to streambed elevations and groundwater modeling outputs to provide information on percent of time a stream is gaining, median stream flow, and surface leakage estimates. The observation and modeling data are combined into a scoring system to determine where ISWs likely occur. Results showed ISWs occurred throughout the Subbasin, including Laguna de Santa Rosa and major tributaries. Disconnected stream segments occur mainly on upper reaches of small tributaries to Laguna de Santa Rosa. The GSA monitors and evaluates groundwater levels in seven shallow RMP wells near streams for ISW. Over this evaluation cycle, MT exceedances have only occurred in 2021, with most wells above MOs for the past three years. Criteria for undesirable conditions have not occurred during the evaluation cycle.

The GSP identified data gaps in the analysis of depletion of ISW that the GSA addressed during the first evaluation cycle. ISW data gaps were addressed in the following ways: installation of additional monitoring wells coupled with stream monitoring; seepage runs starting in 2021; and installation of three ISW monitoring clusters in 2025 consisting of a stilling well, streambed and bank piezometers, and an in-stream subsurface temperature rod. Section 5.4 and Appendix 6-2 summarize evaluation of these new data.

4.6.1 Depletion of Interconnected Surface Water SMC Definition in the 2021 GSP

Table 4-6 provides a summary of the ISW SMC developed for the GSP. The GSP recognizes data are insufficient to directly calculate the rate or volume of surface water depletions due to groundwater pumping, and additional data and model improvements are required to quantify surface water depletion due to pumping. Isolating the impacts of pumping on ISWs is challenging due to other influences on changes in streamflow, such as precipitation, stream diversions, evapotranspiration, and gaining/losing conditions due to naturally occurring conditions such as geology. Therefore, initial ISW SMC were established using groundwater levels as a proxy for rate/volume of surface water depletion. Seven shallow monitoring wells are used as RMPs for ISW. MTs are based on groundwater levels during the 3-year period over which the model simulated the highest rate of streamflow depletion (2014-2016), and MOs are based on the average dry-season groundwater level observed from 2004 to 2020. Undesirable result criteria vary depending on drought or non-drought conditions for the water year. Drought is classified based on the water year average value of the US Drought Monitor's Long Term Drought Indicator Blend (LTDIB) (further described in Appendix 4-B of the GSP).

Table 4-6. Santa Rosa Plain Subbasin Sustainable Management Criteria for Interconnected Surface Water (2021 GSP)

Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Significant and unreasonable depletion of surface water from interconnected streams occurs when surface water depletion, caused by groundwater pumping within the Subbasin, exceeds historical depletion or adversely impacts the viability of GDEs or other beneficial users of surface water.	Maintain estimated streamflow depletions below historical maximum amounts. Metric: Shallow groundwater elevations are used as a proxy for stream depletion. The MT is the equivalent groundwater level, representing the 3 years (2014-2016) during which the most surface water depletion due to groundwater pumping was estimated between 2004-2018.	Monthly-averaged groundwater levels measured in representative monitoring points (shallow monitoring wells near interconnected surface water).	The MO is to maintain groundwater levels within historical observed ranges. Metric: Mean groundwater level for available dry-season observations between 2004 and 2020.	When MTs are exceeded at 40 percent of RMP wells during drought years and 10 percent of RMP wells during non-drought years and are entirely or partially attributable to groundwater pumping under the jurisdiction of the GSA.	The MO is based on current conditions; therefore, interim milestones are identical to current conditions.

4.6.2 Current Interconnected Surface Water Conditions Relative to SMC

Table 4-7. Average Dry-Season Groundwater Elevations in ISW RMPs Relative to Minimum Thresholds and Measurable Objectives and Figure 4-15 summarize the ISW RMP measurements relative to SMC during water years 2021 through 2025 using data collected for the past five Annual Reports. Average dry-season groundwater level fluctuations ranged from 0.4 to 9.8 feet in RMPs during the evaluation cycle. Overall, dry-season groundwater elevations are stable or increasing in most RMPs. To date, MT exceedances occurred only in two wells during the 2021 drought year. Since then, most RMPs are above the MO. Levels constituting undesirable results have not occurred in the Subbasin during the evaluation cycle.

Table 4-7. Average Dry-Season Groundwater Elevations in ISW RMPs Relative to Minimum Thresholds and Measurable Objectives							
Representative Monitoring Point	Minimum Threshold, feet amsl	Measurable Objective, feet amsl	Average Dry-Season Groundwater Elevation, feet amsl				
			WY 2021	WY 2022	WY 2023	WY 2024	WY 2025
			Drought Year	Non-Drought Year			
SRP0707	111.4	118.1	112.2	115.6	122	121.1	NM
SRP0709	56	58.2	56.9	59.3	60	59.5	60
SRP0711	63.3	63.7	62.5	65.2	67.4	67	68.5
SRP0712	45.2	46.3	45.5	48.9*	49.2	50.4	51.4
SRP0713	57.9	58.4	56.8	58.7	58.7	59.6	65.7
SRP0714	126.2	128.2	128	128.2	128.1	128.4	128.4
SRP0716	124.4	125.2	124.7	125	125.4	125.3	125.5
Percent of wells below MT			29%	0%	0%	0%	0%
NM: not measured							
Average dry-season groundwater level below MT							
Average dry-season groundwater level above MO							
*Interpolated groundwater elevation data used to gap-fill during 6/20/2022–8/9/2022							

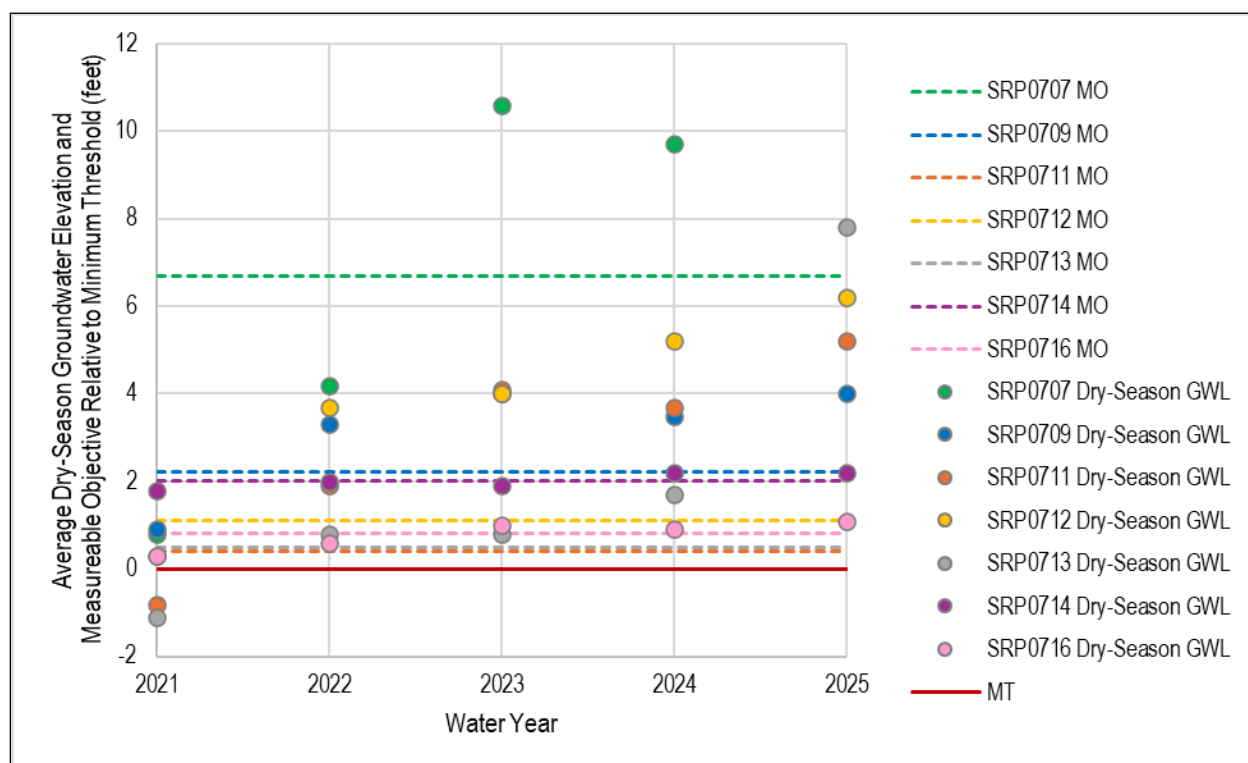


Figure 4-15. Average Dry-Season Groundwater Elevations in Interconnected Surface Water RMPs Relative to Minimum Thresholds and Measurable Objectives

4.6.3 Evaluation of Interconnected Surface Water SMC

Undesirable results for ISW have not occurred in the Santa Rosa Plain Subbasin during the evaluation cycle. No changes in ISW SMC methodology are recommended currently. The GSA will integrate forthcoming DWR guidance on ISW depletion when it is available.

An evaluation of Normalized Difference Vegetation Index (NDVI) over time to track GDE health in the Subbasin is described in Section 6.2.3 and Appendix 6-2. In general, NDVI trends for GDEs across the Subbasin are stable or slightly increasing from 1985 to 2024 with only 8.6 percent of GDEs having declining trends over the same period. WY 2021 was one of the driest years between 1985 and 2024. In response to those dry conditions, NDVI decreased in some GDEs, however, after 2023's wet year, NDVI values incrementally increased back to 2020 values by 2024. Given there are no long-term GDE health declines and there is correlation between MTs being temporarily exceeded in 2021 (Table 4-7). Average Dry-Season Groundwater Elevations in ISW RMPs Relative to Minimum Thresholds and Measurable Objectives) and temporary declines in NDVI in some GDEs during the same period, the SMC for ISW appear protective of GDE vegetation health.

4.7 Land Subsidence

Land subsidence SMC are designed to prevent significant and unreasonable impacts to critical infrastructure due to lowering of groundwater levels caused by groundwater pumping. As described in Section 4.9 of the GSP, there are several available subsidence datasets including DWR's Interferometric Synthetic Aperture Radar (InSAR) and GPS monitoring of active faults that have historically provided subsidence monitoring data. While limited to recent time periods, inelastic land surface subsidence due to groundwater pumping does not appear to be occurring. The available data show that over time, land

surface elevation is relatively stable throughout the Subbasin and where minimal land surface movement is noted, it is more likely related to active faults than groundwater pumping.

4.7.1 Land Subsidence SMC Definition in the 2021 GSP

The GSP established land subsidence SMC to prevent significant and unreasonable impacts to critical infrastructure. The InSAR data is the representative monitoring network used by the GSA to evaluate subsidence. The subsidence SMC described in the GSP are summarized in Table 4-8.

Table 4-8. Santa Rosa Plain Subbasin Sustainable Management Criteria for Land Subsidence (2021 GSP)

Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Any rate of inelastic subsidence caused by groundwater pumping is a significant and unreasonable condition, everywhere in the Subbasin and regardless of the beneficial uses and users.	0.1 feet/year of inelastic subsidence.	DWR-provided InSAR dataset average annual subsidence for each 100- by 100-meter pixel.	0.1 feet/year of inelastic subsidence (identical to the MT and InSAR measurement error).	A land subsidence undesirable result will occur in the Subbasin if: 1. The land subsidence MT of 0.1 feet is exceeded over a 25-acre area in a single year. 2. Cumulative total subsidence of 0.2 feet is exceeded over a 25-acre area within a 5-year period. 3. The MT exceedance is determined to be correlated with (1) groundwater pumping, and (2) a MT exceedance of the chronic lowering of groundwater levels SMC.	The MO is set at the InSAR measurement error, therefore interim milestones are not necessary.

4.7.2 Current Subsidence Conditions Relative to SMC

Subsidence measured by InSAR continues to show negligible increases and decreases in land surface elevation within the measurement error of +/- 0.1 foot in most areas of the Subbasin, which indicates that inelastic land subsidence is generally not occurring. Figure 4-16 shows the five-year cumulative subsidence for the Subbasin from October 2020 to October 2025, and Figure 4-17 shows the annual subsidence for the Subbasin from October 2024 to October 2025. A small area shaded brown on the cumulative subsidence map (Figure 4-16) exceeds 0.1 foot of subsidence. Areas shaded yellow have land surface subsidence within the range of potential InSAR measurement error.

In WY 2025, new data collected and improvements in InSAR processing expanded the InSAR dataset to areas of the Subbasin that had not previously been mapped by DWR. From WYs 2020 to 2024 InSAR data were available for 92 percent of the Subbasin (Figure 4-16). In WY 2025, the spatial coverage improved, now covering 99.9 percent of the Subbasin (Figure 4-17).

There is one location in the middle of the Subbasin between Mark West Creek and Santa Rosa Creek with 0.11 feet of subsidence between October 2020 to October 2025 (brown color on Figure 4-16), which is slightly greater than the InSAR measurement error. Since 0.1 feet of subsidence is observed in this location over five years, it is not an MT exceedance or an undesirable result; an MT exceedance is 0.1 feet of subsidence in 1 year and an undesirable result is 0.2 feet over a 25-acre area over five years. This area is also directly on the Trenton Ridge Fault described in the GSP. The small amount of land subsidence could be related to seismic activity, hydrostatic loading, or other processes besides groundwater pumping, as discussed further below. The GSA will continue to monitor InSAR data to evaluate whether the rate or cumulative area of land surface deformation increases further.

Land subsidence measured in the Subbasin using a continuous Global Navigation Satellite System (GNSS) station, P197, provides valuable information on seasonal and temporal trends. The GNSS station is operated by the National Science Foundation's Geodetic Facility for the Advancement of Geoscience, formerly "UNAVCO". GPS data demonstrates a consistent lowering of the land surface, totaling about 0.1 feet between 2005 and 2026 (Figure 4-18).

The GPS station data seasonal and annual trends suggest that lowering of groundwater levels is not the main process causing land surface deformation in the Subbasin. In most years, the land surface is lowest in the spring when groundwater levels are highest, which does not coincide with the higher pumping occurring in the summer with lower water levels in the fall. Also, the land surface appears to be slightly more stable in droughts like 2012-2016 and 2020-2022 and have greater deformation in wet years like 2017, 2019, and 2023. Combined, these trends suggest that land surface deformation in the Subbasin is due to different geologic processes rather than lowering of groundwater levels. The most likely cause of this seasonal elastic response is natural hydrologic loading of water causing the ground surface to compact in the spring. The long-term land surface deformation trend may also be related to active tectonics in the Subbasin.

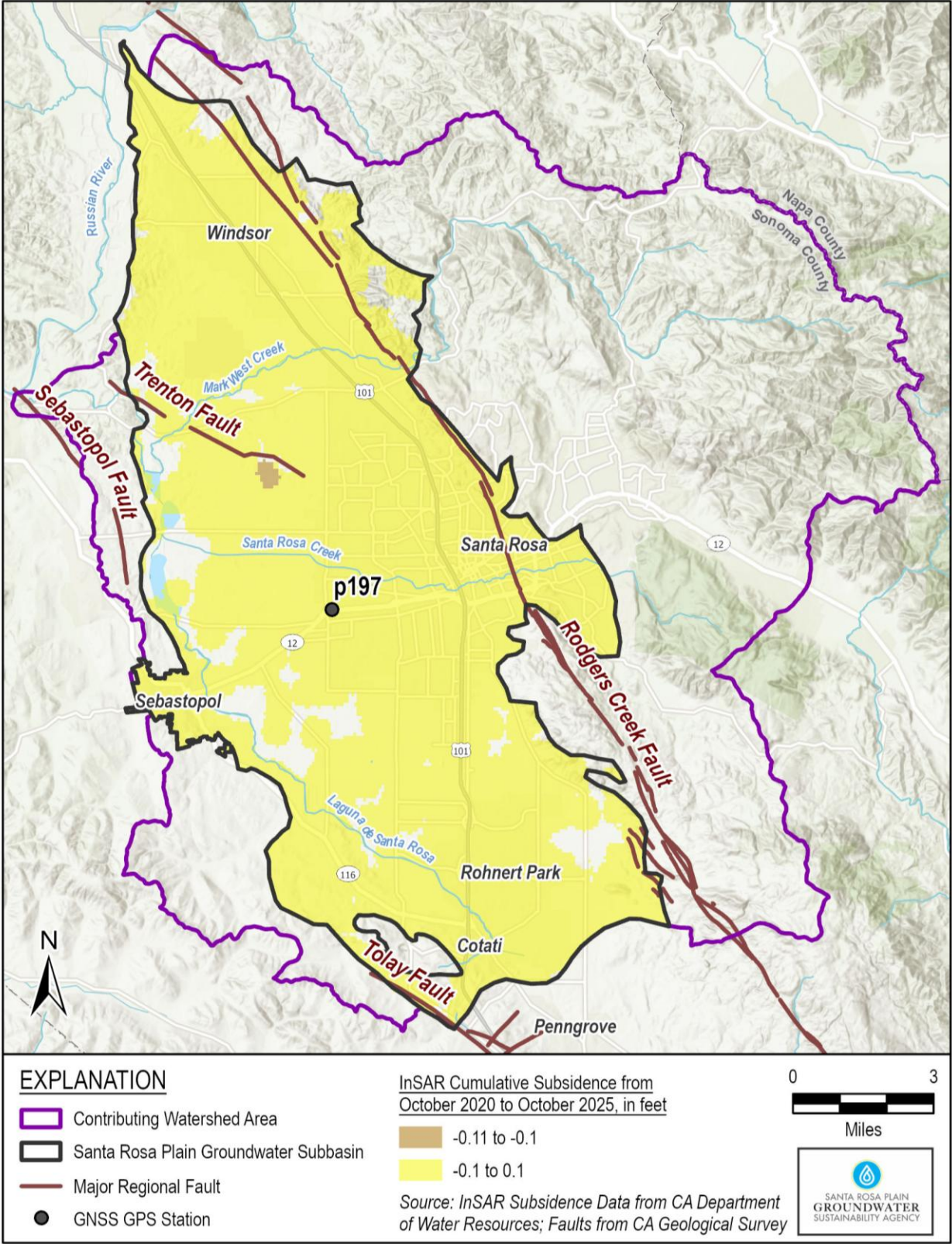


Figure 4-16. Santa Rosa Plain Subbasin Cumulative Land Subsidence, WY 2020-2025

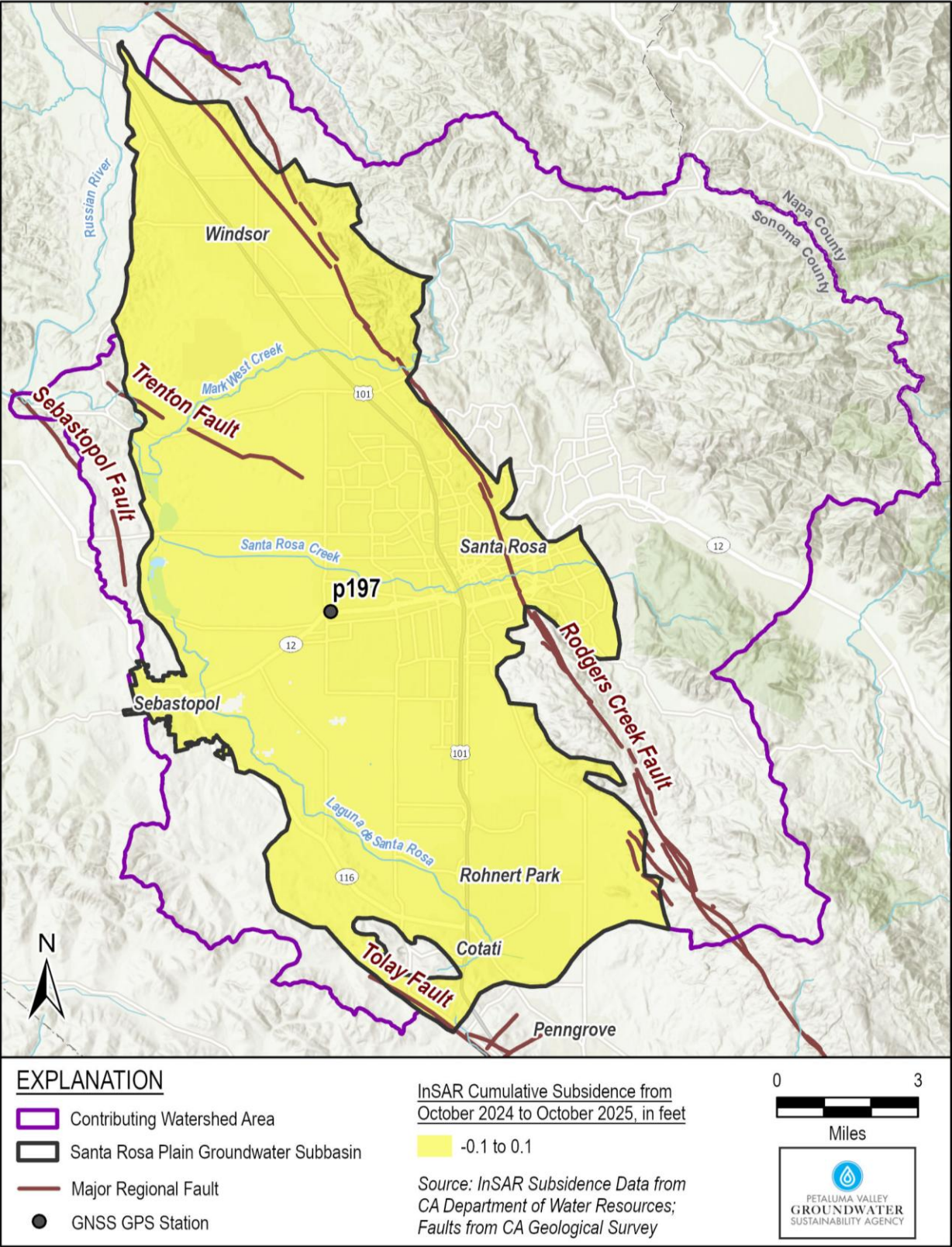
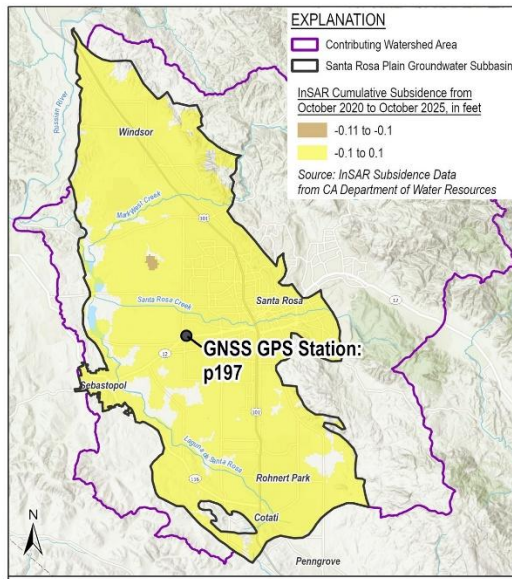


Figure 4-17. Santa Rosa Plain Subbasin Annual Land Subsidence, WY 2025



Station Code: p197
 Latitude: 38.4285603858
 Longitude: -122.7673851644
 Basin: 1-059 WILSON GROVE FORMATION HIGHLANDS
 Sub Basin: 1-059 WILSON GROVE FORMATION HIGHLANDS

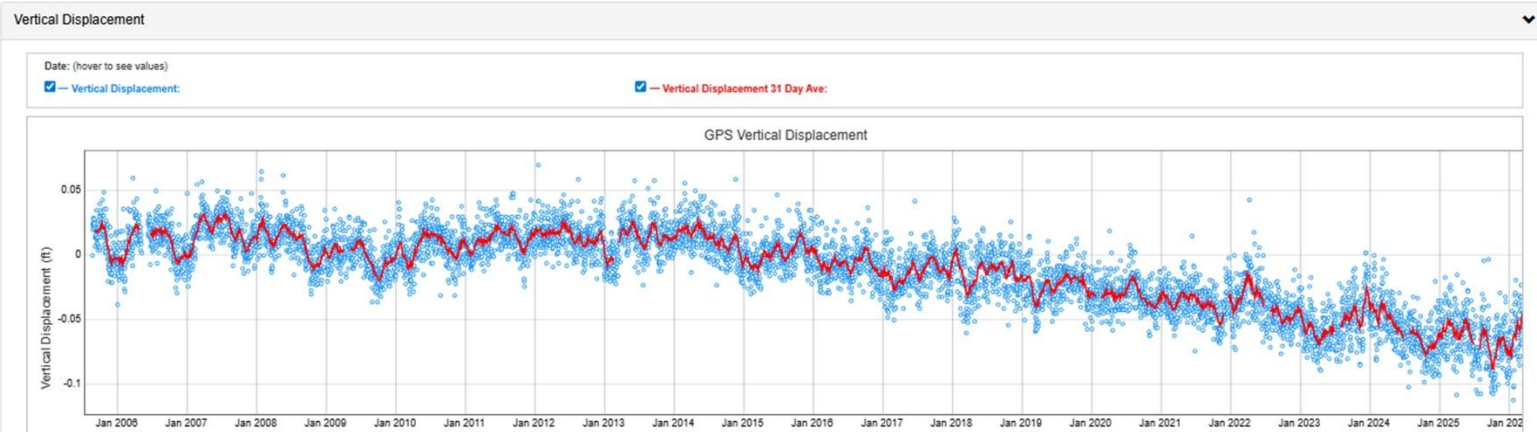
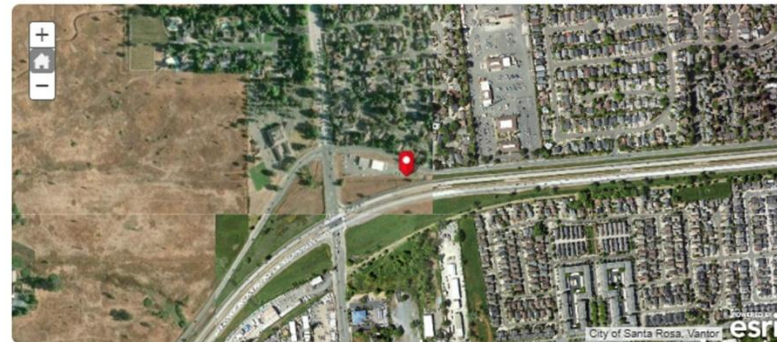


Figure 4-18. Land Subsidence Measured at Global Navigation Satellite System Station P197, 2005-2026 (DWR, 2026a)

4.7.3 Evaluation of Subsidence SMC

The GSA is effectively managing subsidence by maintaining stable groundwater levels above the historical low levels, as discussed in Section 4.3. The GSP states, “nearly all of the hydrographs indicate relatively stable groundwater level conditions over time or increasing trends with the exception of wells within the southern portion of the Subbasin. A few hydrographs in the Cotati area show a decline in groundwater levels for the late 1970s and 1980s, which reached an historic low in the early 1990s, followed by recovery in the early 2000s”. The GSA routinely reviews subsidence monitoring data for inelastic subsidence due to groundwater pumping for GSP Annual Reports and no significant subsidence has been measured in the evaluation cycle.

Since the GSP was submitted, DWR released the Best Management Practices of the Sustainable Management of Groundwater – Land Subsidence (Subsidence BMP; DWR, 2026b), to help GSAs establish effective subsidence management approaches. The subsidence management approach in the GSP is reviewed below for alignment with the BMP. The GSP approach is generally consistent with DWR’s recommendations. Specific recommendations in the BMP relevant to the Subbasin, including the subsidence monitoring approach, critical infrastructure analysis, and SMC identification, are discussed below.

4.7.3.1 Subsidence Monitoring

BMP: “The land surface monitoring network should be capable of identifying the spatial extent and magnitude of land subsidence, including the ability to evaluate temporal changes and efficacy of management strategies.”

DWR provides InSAR monitoring data at sufficient frequency and spatial coverage in the Subbasin to effectively identify and address subsidence issues if they occur. InSAR data are available across most of the Subbasin since 2015 (Figure 4-16). The few remaining gaps in InSAR coverage were filled in WY 2025 (Figure 4-17). Subsidence monitoring data are available quarterly from DWR and reviewed at a minimum annually after fall groundwater level measurements are collected.

4.7.3.2 Critical Infrastructure

BMP: “An essential part of subsidence management under SGMA is the review and identification of infrastructure within a basin as well as determining the amount of subsidence that may interfere with these surface land uses. Investigations should broadly encompass any infrastructure, land use, and property interest (current and future) that may be impaired by changes in land elevation and areas around them where groundwater pumping may affect subsidence.”

The GSP broadly identified preventing critical infrastructure as the rationale for the protective SMC. Since there has been no significant local subsidence, there is no information available regarding specific tolerances of local infrastructure to subsidence. If subsidence is observed in the future, the GSAs will coordinate with infrastructure owners or managers to adaptively manage the Subbasin to prevent infrastructure impacts. If subsidence is observed in the future, Table 4-9 provides a summary of critical infrastructure and potential impacts for the GSA to review and manage.

Table 4-9. Potential Risks to Critical Infrastructure in the Santa Rosa Plain Subbasin Compared to DWR's Subsidence Best Management Practices

Infrastructure or Land Use Type (Subsidence BMP)	Critical Infrastructure Types (Subsidence BMP)	Potential Impacts (Subsidence BMP)	Santa Rosa Plain Subbasin Infrastructure
Cities and Communities	• Property drainage • Power systems • Municipal water systems • Sewer systems	• Physical damage • Reduced service reliability • Increased maintenance	• Communities are present with utilities, transportation, and stormwater infrastructure • Cities include Santa Rosa, Rohnert Park, Sebastopol, and Cotati • Communities include Windsor and other smaller unincorporated communities
Pipelines and Other Utilities	• Natural gas • Water • Electrical	• Cracking or joint failure • Over-pressurization • Reduced capacity • Pinch-points and un-alignment of transmission poles, towers, and lines	• Numerous utilities in communities • Electrical transmission also present in rural areas
Transportation	• Private rail • Drainage Systems • Highways • Bridges	• Rail deformation, instability, or loss of use during flooding • Surface cracking • Drainage failure • Structural instability • Loss of use due to flooding	• State Highways 12, 101, and 116 • Sonoma-Marin Area Rail Transit • Numerous other local roads, bridges, and drainage systems throughout the Subbasin
Canals	• Federal, local, and state canal systems	• Reduced conveyance, freeboard • Lining damage • Altered slope • Erosion and sedimentation of unlined channels	• Santa Rosa and Cotati water supply aqueducts, municipal distribution networks, wastewater, and recycled water systems

Table 4-9. Potential Risks to Critical Infrastructure in the Santa Rosa Plain Subbasin Compared to DWR's Subsidence Best Management Practices

Infrastructure or Land Use Type (Subsidence BMP)	Critical Infrastructure Types (Subsidence BMP)	Potential Impacts (Subsidence BMP)	Santa Rosa Plain Subbasin Infrastructure
Flood Control & Drainage	Federal, State, and Local flood facilities (e.g., levees, bypasses, and dams)	- Loss of grade - Structural failure - Reduced flood capacity - Levee overtopping or breach	- Laguna de Santa Rosa is a natural flood retention basin that the Russian River spills into at flood stage - Other local creeks are incised and have a combination of natural and manmade levees for flood control
Groundwater Pumping Facilities	Domestic, agricultural, and public supply wells	- Casing collapse - Reduced capacity - Operational inefficiencies - Sand and gravel damaging pump bowls	- Critical infrastructure includes public supply wells in the cities and communities. - Domestic and agricultural supply wells are dispersed throughout the Subbasin and have various subsidence tolerance depending on construction and age

4.7.3.3 Significant and Unreasonable Conditions

BMP: “Each GSP that has proposed to lower groundwater levels below recent low levels should establish undesirable results and provide clear qualitative and quantitative definitions. This qualitative definition should clearly describe what constitutes significant and unreasonable conditions (e.g., damage to infrastructure, collapsed well casings, etc.) the GSA is managing the basin to avoid.”

The GSP defined significant and unreasonable conditions for the Subbasin as “any rate of future inelastic subsidence caused by groundwater pumping everywhere in the Subbasin regardless of the beneficial uses and users”. There is critical infrastructure throughout the Subbasin, so the GSP assumed that any measurable subsidence could present risks to infrastructure owners. Additional information on critical infrastructure locations and potential impacts if subsidence were to occur in the Subbasin is described in Table 4-9.

4.7.3.4 Undesirable Results

BMP: “Each GSP should also include a quantitative description of undesirable results that represent a specific numerical value when subsidence that is substantially interfering with land uses becomes significant and unreasonable. Considering impacts to infrastructure often occur at a specific location, the quantitative definition of undesirable results may be based on as little as a single exceedance of a minimum threshold if an exceedance at that location leads to the significant and unreasonable conditions (e.g., damage to infrastructure, collapsed well casings, etc.) the GSA is managing the basin to avoid. The definition of undesirable results for land subsidence should be made in conjunction with entities responsible for the operation and maintenance of the infrastructure and the specific tolerance of that infrastructure or any mitigation efforts that are agreed upon by the GSA and the infrastructure manager.”

The GSP includes a quantitative definition of undesirable results. The definition prevents a single MT exceedance from being considered an unsustainable condition. It is likely that an independent MT exceedance could be an anomalous observation or elastic subsidence. Therefore, by using a quantitative combination of MT exceedances over a relatively small area and short period, the GSA can effectively isolate subsidence undesirable results from noise in the data. The undesirable results definition in the GSP is aligned with the Subsidence BMP recommendations.

4.7.3.5 Minimum Threshold

BMP: “The minimum threshold for subsidence should be reflective of local conditions. In areas that have not recently experienced land subsidence, the minimum threshold should be set to disallow the onset of subsidence. This could be zero or the measurement error of the monitoring equipment.”

The GSP aligns with the BMP recommendations for subsidence MTs. The MT is 0.1 feet/year, which is the InSAR measurement error.

4.7.3.6 Measurable Objective

BMP: “In basins that have not experienced land subsidence, the measurable objective should be set at zero.”

The GSP subsidence MO is 0.1 feet/year, which is the measurement error. The MO is set at a level that will alert the GSAs if measurable subsidence starts to occur, with the goal of allowing no measurable inelastic subsidence to occur. The GSP is generally aligned with the BMPs recommendation to set the MO at zero subsidence.

4.7.3.7 Subsidence Management

The BMP identifies four subsidence and groundwater level management scenarios and recommends best management practices for each. The Subbasin falls in the Subsidence BMP “Scenario 2” approach – since there is no historical subsidence but groundwater level minimum thresholds in some RMPs are lower than historical low levels (Section 4.3).

BMP: “In Scenario 2 areas without recent subsidence that are managing groundwater levels below recent lows, the GSA should monitor land subsidence and have PMAs ready to implement if subsidence is detected. Once subsidence is detected, the GSA should implement these PMAs and raise groundwater level thresholds and any associated sustainable management criteria, as the presence of new subsidence indicates groundwater levels have dropped below the critical head.”

The GSAs are actively monitoring and managing groundwater levels to achieve MOs. The groundwater level MOs are above historical low levels. In some cases, the groundwater level MTs are below historical low levels in an RMP, but many RMPs are new and have short historical records. It is likely that groundwater level MTs are below historical low levels in some areas and subsidence could occur if groundwater levels decline to the MT and the local hydrogeologic conditions are prone to subsidence. To date, there has been no indication of inelastic subsidence due to groundwater pumping anywhere in the Subbasin. Project and management actions (PMAs) identified in the GSP are designed to address potential future groundwater level declines and also help manage any future potential subsidence, should either happen in the future. The groundwater level SMC are discussed in Section 4.3 and PMAs are discussed in Section 7.

5 MONITORING NETWORKS

The GSP establishes monitoring networks for five sustainability indicators – chronic lowering of groundwater levels, reduction of groundwater in storage, degraded groundwater quality, land subsidence, and depletion of interconnected surface water. Groundwater storage and interconnected surface water are both monitored using groundwater levels as a proxy. Seawater intrusion is not an applicable indicator for this inland Subbasin. This section discusses data gap filling efforts during the evaluation cycle, evaluates how the monitoring networks identified in the GSP are operating, provides updates to the RMP networks, and verifies associated SMC.

5.1 Chronic Lowering of Groundwater Levels

Groundwater levels are monitored using a network of wells for evaluating three sustainability indicators (1) chronic lowering of groundwater levels, (2) reduction of groundwater in storage, and (3) depletion of ISW. There are two principal aquifers identified in the Subbasin with unique groundwater level monitoring networks. The shallow aquifer system which is generally shallower than 200 feet deep, and deep aquifer system which is generally deeper than 200 feet. The GSP groundwater level monitoring network consists of 96 wells in the Subbasin's watershed, including 85 wells in the Subbasin and 11 wells in the surrounding watershed. Within the GSP groundwater level monitoring network, there are 61 wells in the shallow aquifer system (Figure 5-1) and 35 wells in the deep aquifer system (Figure 5-2).

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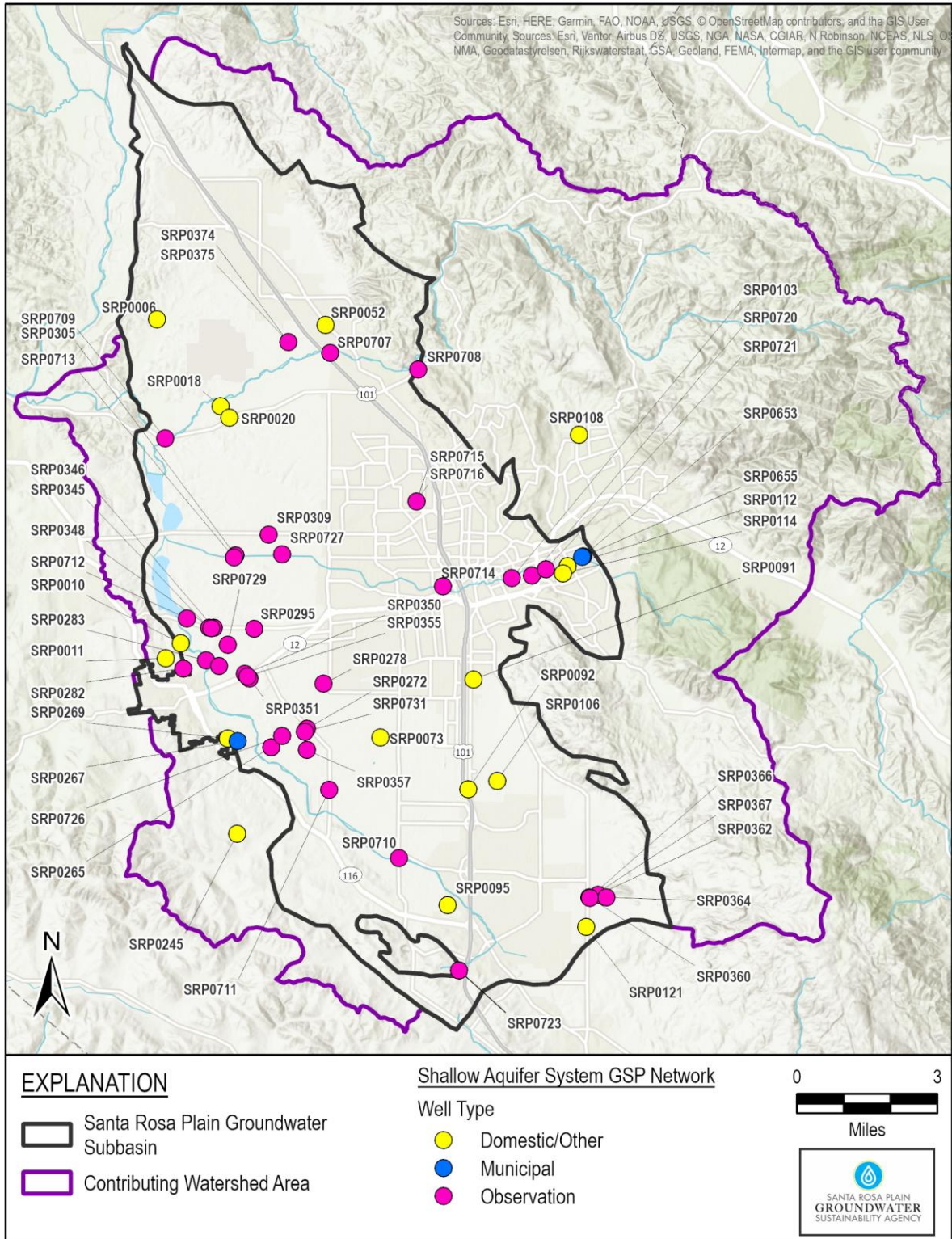


Figure 5-1. 2021 GSP Groundwater Level Monitoring Network – Shallow Aquifer System

G:\GIS-Tuc\Projects\9400_SonomaValley\Maps\PEs\ArcPro_Pet_Son.aprx Figure 7-2, 2022 GSP Groundwater Level Monitoring Network - Deep Aquifer System, SRP27 Apr 2026

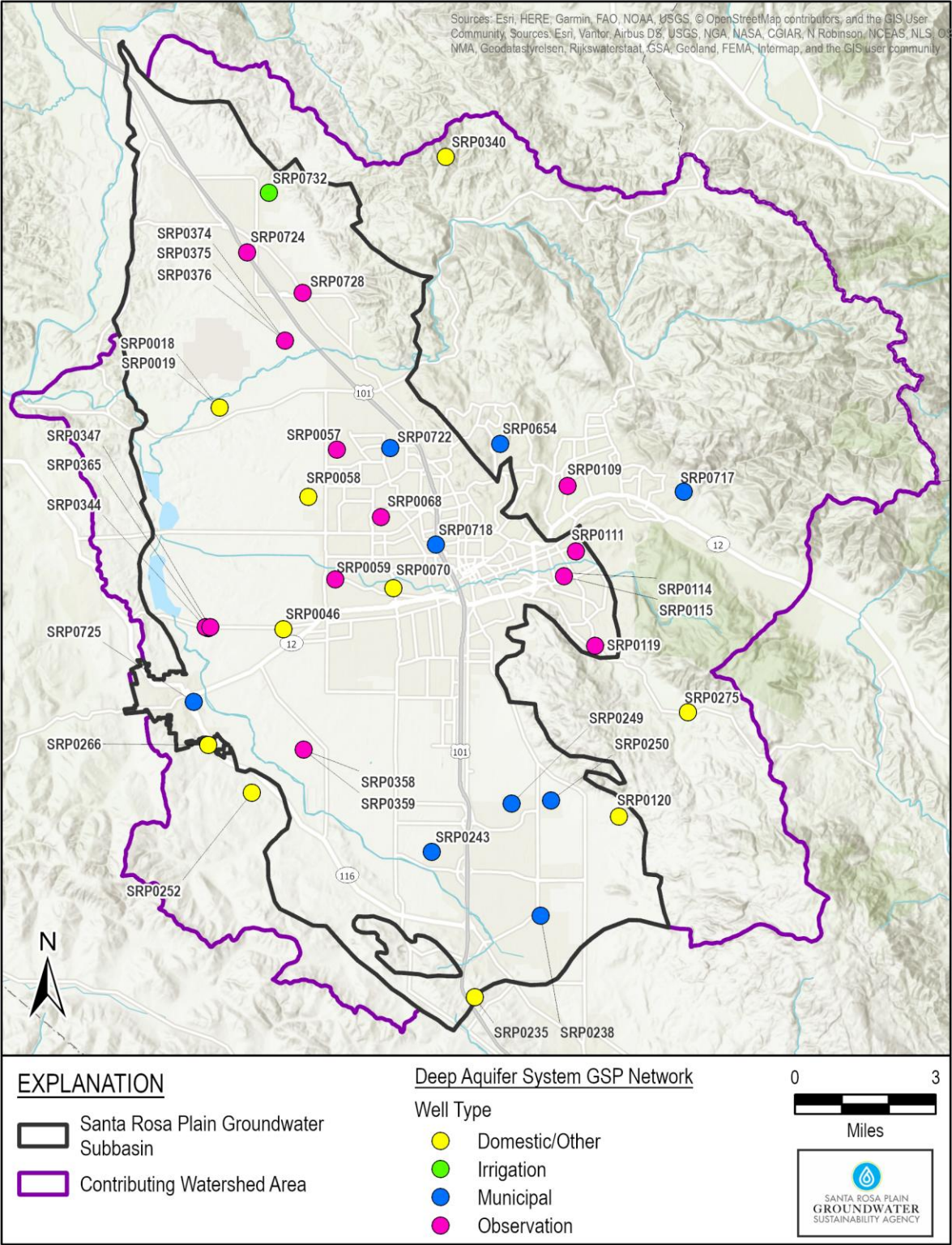


Figure 5-2. 2021 GSP Groundwater Level Monitoring Network – Deep Aquifer System

RMP wells, which represent a subset of the larger GSP network, are used to evaluate groundwater conditions relative to SMC. There are 26 RMP wells in the GSP network for monitoring the chronic lowering of groundwater levels SMC and as a proxy to evaluate the reduction of groundwater in storage. Of these, 14 are shallow aquifer system wells (Figure 5-3) and 12 are deep aquifer system wells (Figure 5-4).

G:\GIS-Tuc\Projects\9400_SonomaValley\Maps\PEs\ArcPro_Pet_Son.aprx Figure7-3_2022 GSP Groundwater Level RMPs - Shallow Aquifer System_SRP14May2026

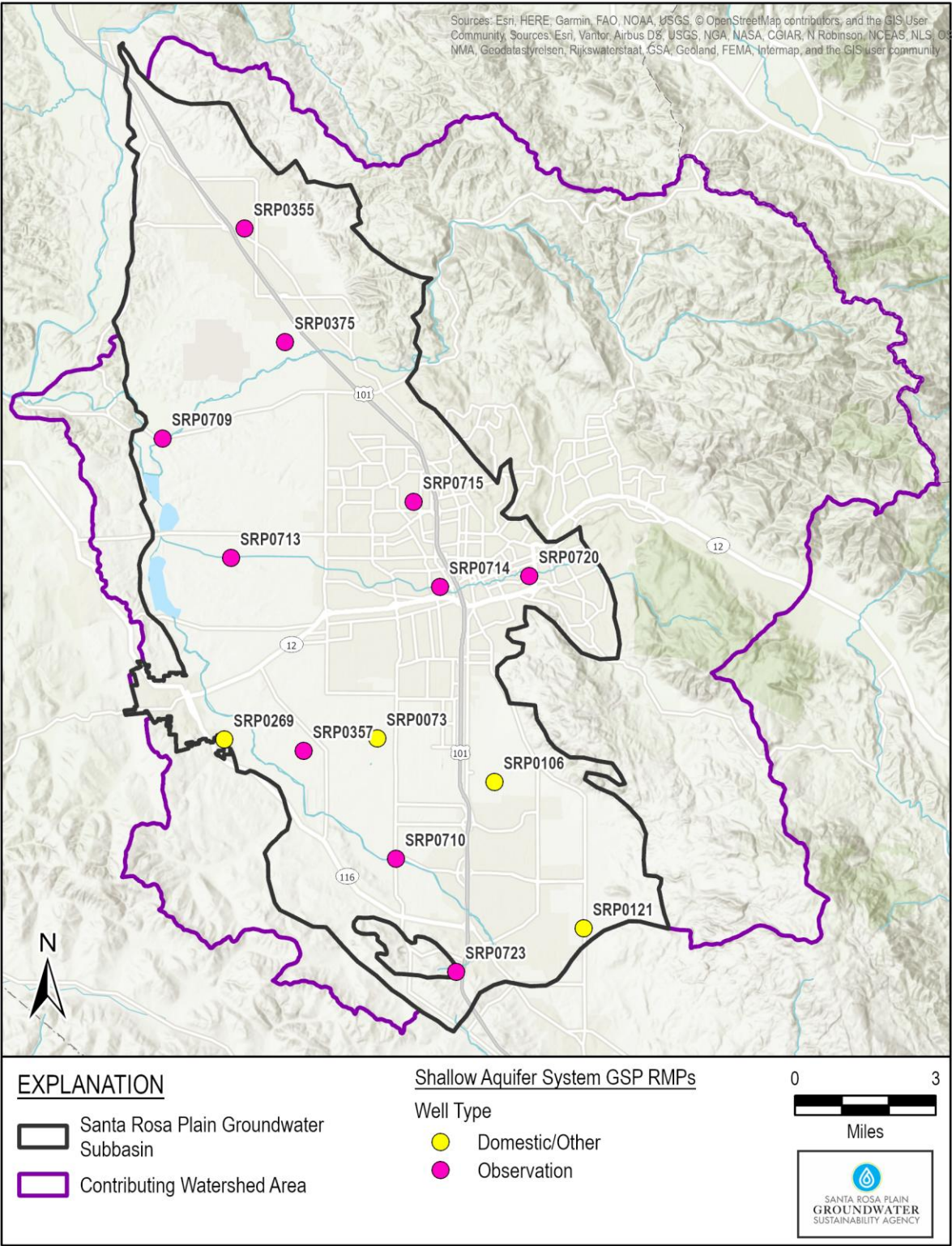


Figure 5-3. 2021 GSP Groundwater Level RMP Network – Shallow Aquifer System

G:\GIS-Tuc\Projects\9400_SonomaValley\Maps\PEs\ArcPro_Pet_Son.aprx Figure 7-4_2022 GSP Groundwater Level RMPs - Deep Aquifer System_SRP22May2026

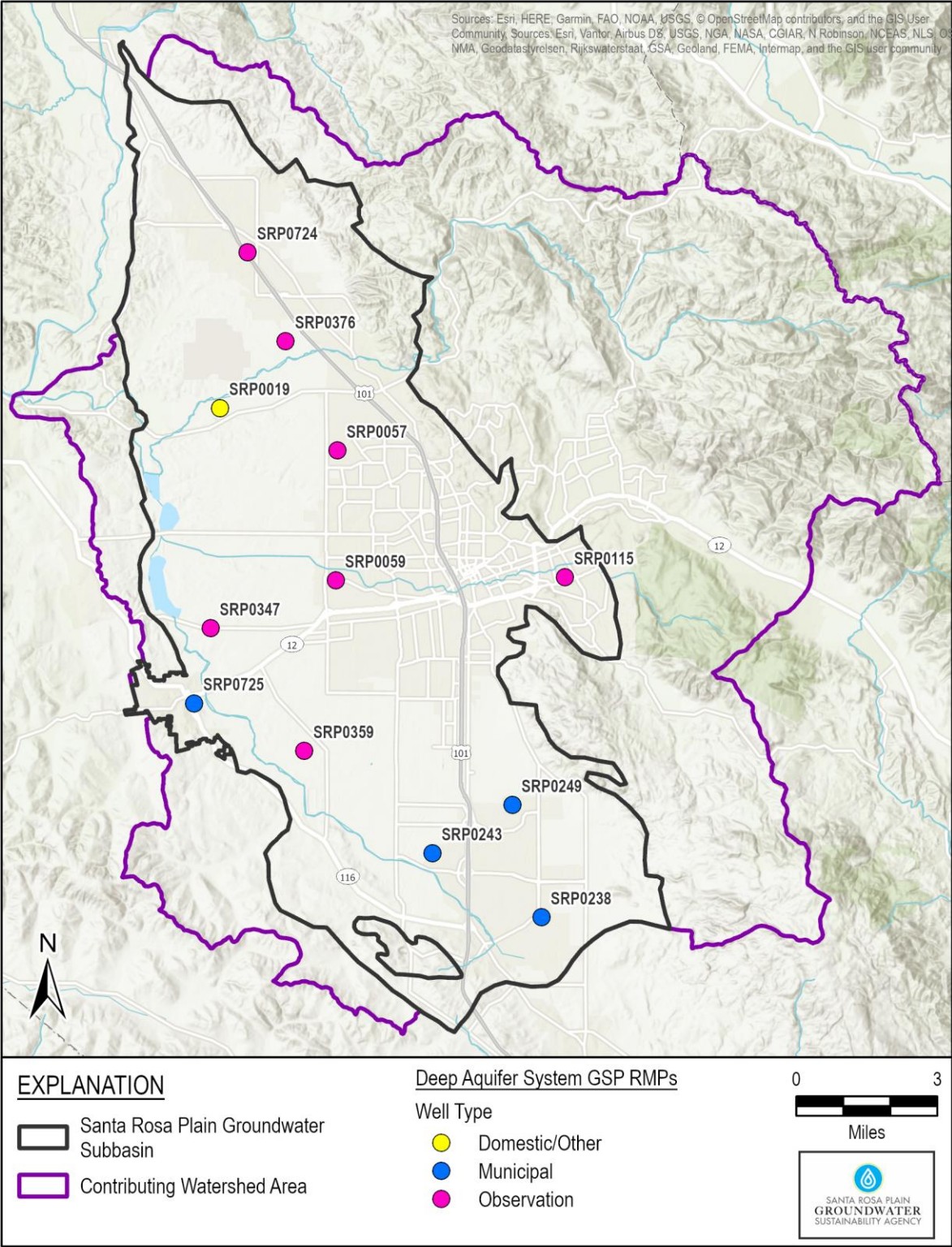


Figure 5-4. 2021 GSP Groundwater Level RMP Network – Deep Aquifer System

5.1.1 Status of GSP Data Gaps

The GSP identified two spatial data gap areas in the shallow groundwater level monitoring network (Figure 5-5) and five spatial data gap areas in the deep groundwater level monitoring network (Figure 5-6). The GSA has completed multiple projects during GSP implementation in order to fill data gaps in the groundwater level monitoring networks, as described below.

Three multi-level monitoring wells were installed in 2022 utilizing DWR's Proposition 68 grant funding to fill data gaps in the shallow and deep groundwater level monitoring networks. These nested monitoring wells are SRPDMW-1 (SRP0736, SRP0737, SRP0738), SRPDMW-2 (SRP0739, SRP0740, SRP0741), and SRPDMW-3 (SRP0742, SRP0743, SRP0744) as shown on Figure 5-5 and Figure 5-6. A technical memorandum documenting the construction of these wells is provided in Appendix 5-1. The 2022 multi-level monitoring wells filled two GSP-identified data gaps in the deep groundwater level monitoring network, provided a replacement RMP for a shallow domestic well with access challenges (SRP0073), and improved monitoring along the southern subbasin boundary. The shallow casings at SRPDMW-2 and SRPDMW-3 also fill data gaps in the interconnected surface water monitoring network as discussed below in Section 5.4.

In 2024, the GSA launched a voluntary groundwater level monitoring program called LEVEL UP!. Targeted outreach for the program was conducted to well owners in the GSP-identified data gap areas. Well owners who sign up for the program are able to borrow an acoustic water level monitoring device from the GSA to collect semi-annual water level measurements from their well. Program participants then submit their measurements to the GSA via the Sonoma County Groundwater Data Dashboard. At the time of Periodic Evaluation preparation, 45 well owners in the Santa Rosa Plain Subbasin have signed up for the LEVEL UP! Program. Eight of those well owners have been selected for facilitated monitoring by GSA partner agency trained staff. These wells were selected because they have known well construction information and are located in or adjacent to data gap areas. These eight new volunteer wells have been added to the groundwater level monitoring network and are shown on Figure 5-5 and Figure 5-6.

Three additional multi-level monitoring wells were installed in 2025-2026 by the GSA under the SGM Implementation grant to fill remaining data gaps in the groundwater level monitoring networks. These nested monitoring wells are SRPDMW-4, SRPDMW-5, and SRPDMW-6 as shown on Figure 5-5 and Figure 5-6. A technical memorandum documenting the construction of these wells is provided in Appendix 5-2. The 2025-2026 multi-level monitoring wells filled two GSP-identified data gaps in the deep groundwater level monitoring network and one GSP-identified data gap in the shallow network. SRPDMW-4 provides improved data quality in the southeast corner of the Subbasin where previous monitoring efforts relied primarily on private supply wells.

All of the groundwater level monitoring network spatial data gaps identified in the GSP have been addressed during the first five years of GSP implementation with the exception of the northernmost data gap area in the deep aquifer system monitoring network. The GSA will work with the Town of Windsor to identify potential inactive municipal wells in that area for incorporation into the monitoring network.

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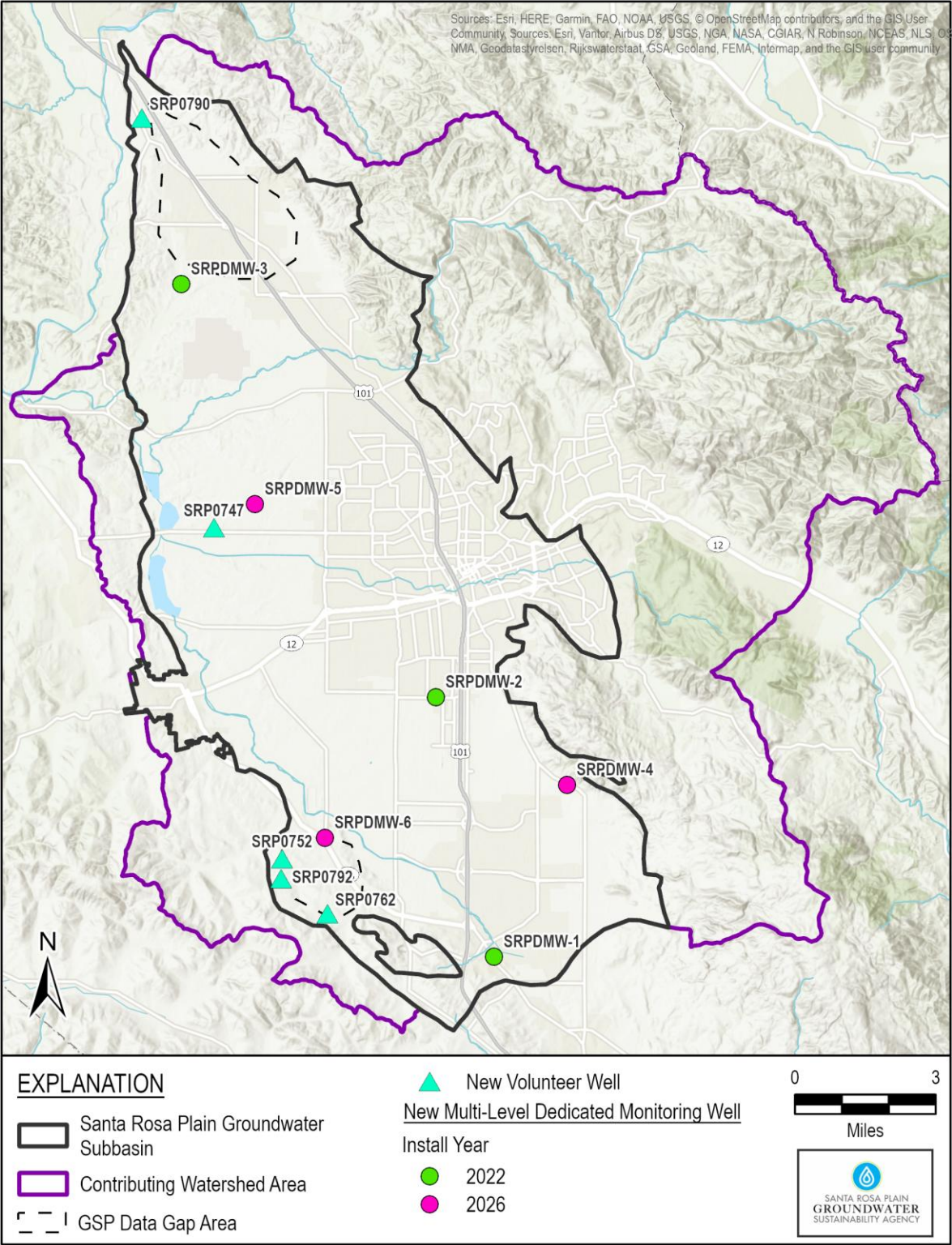


Figure 5-5. Addressed and Remaining Data Gaps – Shallow Aquifer System

G:\GIS-Tuc\Projects\9400_SonomaValley\Maps\PEs\ArcPro_ProjectFiles\MonitoringNetwork\SRP_Pet_Son.aprx Figure7-6_GSP Groundwater Level Monitoring Data Gaps - Deep Aquifer System_SRP27Apr2026

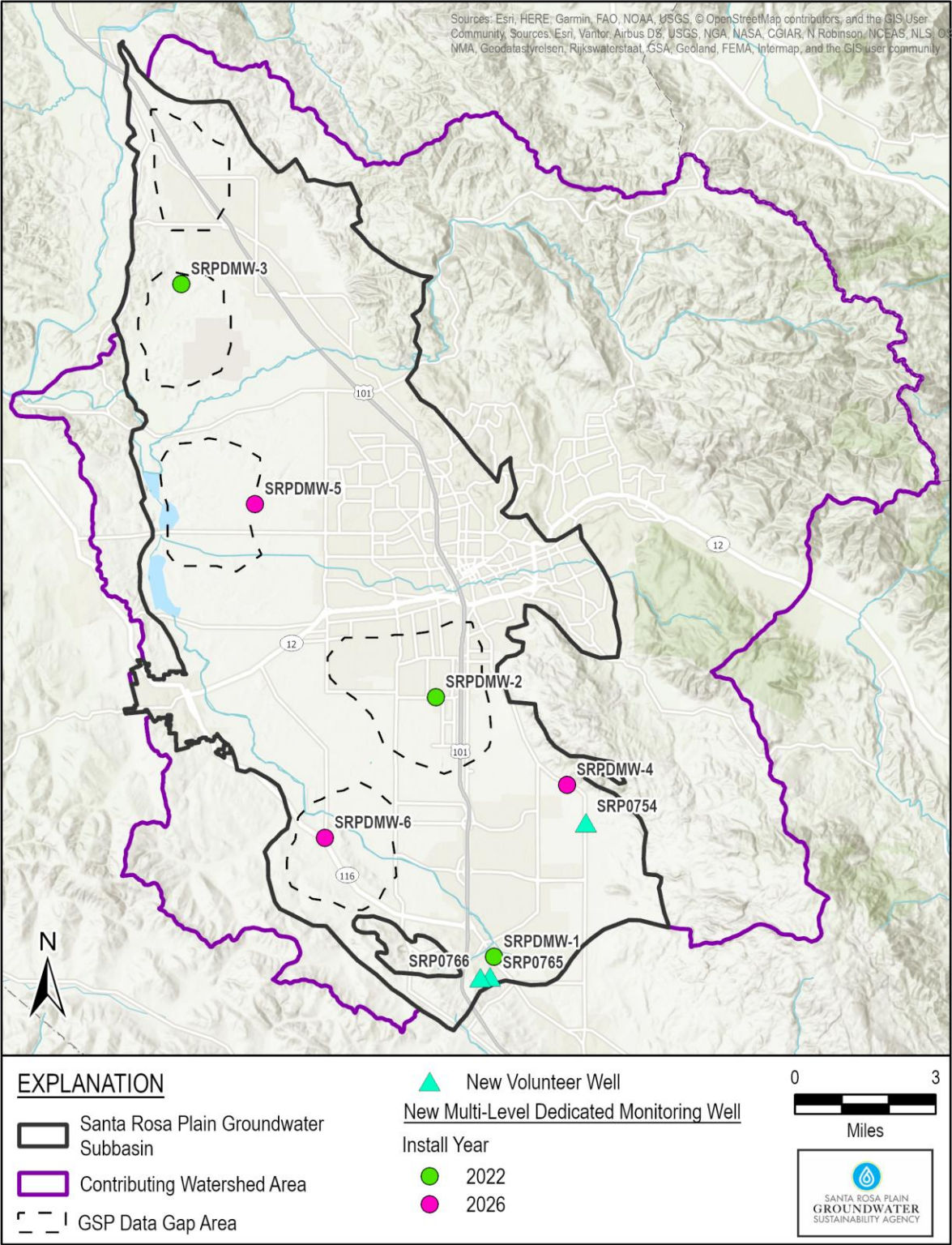


Figure 5-6. Addressed and Remaining Data Gaps – Deep Aquifer System

5.1.2 Representative Monitoring Network Assessment

The groundwater level RMP networks were assessed as part of the Periodic Evaluation with the following goals in mind:

- Incorporate new dedicated monitoring wells installed since GSP adoption
- Consider removal of redundant RMP wells and RMP wells with access or data quality issues from the RMP networks
- Develop Sustainable Management Criteria (SMC) for new RMP wells

As depicted in Table 5-1, two wells (SRP0073 and SRP0121) were removed and four wells (SRP0712, SRP0736, SRP0739, and SRP0743) were added to the groundwater level RMP network for the shallow aquifer system. Rationale for removal and addition of these wells to the RMP network is provided below.

- Removal: SRP0073 is a private supply well with incomplete well construction data that was monitored by DWR on a semi-annual basis from 1989-2017. After DWR discontinued monitoring, the GSA attempted to contact the well owner in an effort to resume monitoring but was unable to secure a new access agreement.
- Removal: SRP00121 is a private supply well with incomplete well construction data that was monitored by DWR on a semi-annual, then monthly basis from 1989-2021. After DWR discontinued monitoring, the GSA attempted to contact the well owner in an effort to resume monitoring but was unable to secure a new access agreement.
- Addition: SRP0712 is a dedicated monitoring well located along the western subbasin boundary installed through DWR's TSS program in 2019.
- Addition: SRP0736 is part of the SRPDMW-1 multi-level monitoring well located along the southern subbasin boundary installed in 2022. It provides information about conditions near the boundary with the Petaluma Valley Basin.
- Addition: SRP0739 is part of the SRPDMW-2 multi-level monitoring well located in the southern-central area of the subbasin installed in 2022. It monitors a portion of the subbasin with a high density of shallow supply wells and effectively replaces SRP0073 in RMP network.
- Addition: SRP0743 is part of the SRPDMW-3 multi-level monitoring well located in the northwestern area of the subbasin installed in 2022. It is adjacent to a GSP-identified data gap area and provides data for a portion of the subbasin that previously lacked dedicated monitoring infrastructure.

The revised groundwater level RMP network for the shallow aquifer system is shown in Figure 5-7 and includes a total of 16 wells.

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Table 5-1. Groundwater Level RMP Assessment - Shallow Aquifer System						
Data Management System ID						
Station Name	Station Number	Type of Well	Well Depth (feet)	Well Depth Category	Screened Interval(s) (feet)	Periodic Evaluation Status
SRP0710	SRP-H18-02_ Stony	Observation	45.5	Shallow (0-200ft)	35-45	Keep
SRP0709	SRP-C09-01_ River Rd	Observation	33.5	Shallow (0-200ft)	23-33	Keep
SRP0713	SRP-D11-02_ Willow	Observation	45.5	Shallow (0-200ft)	25-45	Keep
SRP0714	SRP-H12-01_ Pierson	Observation	51.5	Shallow (0-200ft)	41-51	Keep
SRP0715	SRP-H10-04_ Hardies	Observation	40.5	Shallow (0-200ft)	30-40	Keep
SRP0355	SCWA_SEB_ MW_07	Observation	90	Shallow (0-200ft)	70-90	Keep
SRP0357	SCWA_TODD_ _RED	Observation	80	Shallow (0-200ft)	60-80	Keep
SRP0375	SCWA_Airport_ MW_02	Observation	140	Shallow (0-200ft)	120-140	Keep
SRP0720	Hoen Well	Observation	115	Shallow (0-200ft)	Unknown	Keep
SRP0723	MW-114	Observation	38	Shallow (0-200ft)	Unknown	Keep
SRP0073	SRP-G15-01	Unknown	80	Shallow (0-200ft)	Unknown	Remove
SRP0106	SRP-J16-01	Unknown	90	Shallow (0-200ft)	Unknown	Keep
SRP0121	SRP-L19-01	Unknown	150	Shallow (0-200ft)	Unknown	Remove
SRP0269	WGFH-08	Unknown	160	Shallow (0-200ft)	100-160	Keep
SRP0736	SRPDMW-1-9 5	Observation	95	Shallow (0-200ft)	75-90	Add
SRP0739	SRPDMW-2-8 2	Observation	82	Shallow (0-200ft)	72-82	Add
SRP0743	SRPDMW-3-8 6	Observation	86	Shallow (0-200ft)	66-81	Add
SRP0712	SRP-C13-03_ Sanford	Observation	48.5	Shallow (0-200ft)	28-48	Add

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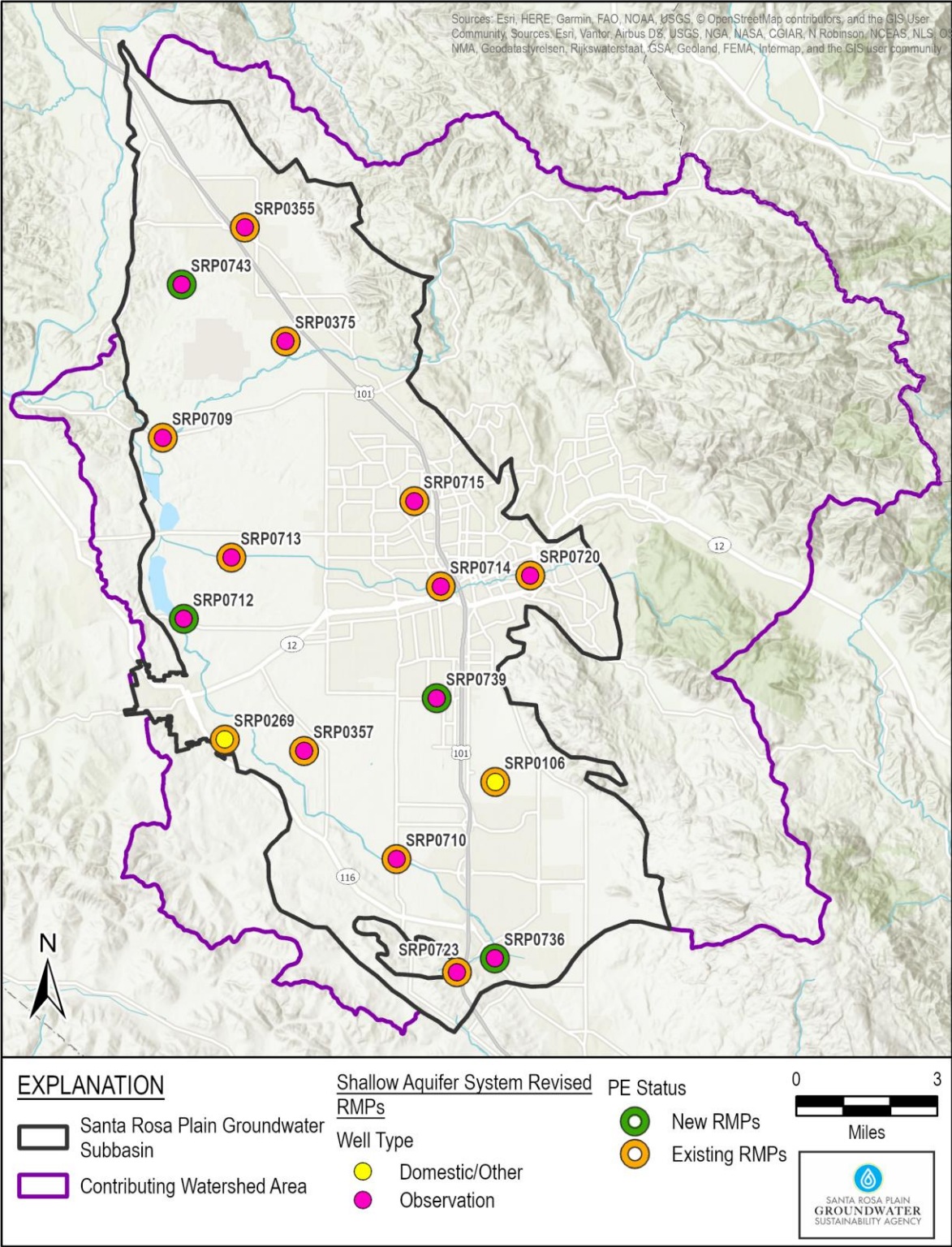


Figure 5-7. Revised Groundwater Level RMP Network – Shallow Aquifer System

As depicted in Table 5-2, no wells were removed and three wells (SRP0738, SRP0740, and SRP0744) were added to the groundwater level RMP network for the deep aquifer system. Rationale for addition of these wells to the RMP network is provided below.

- Addition: SRP0738 is part of the SRPDMW-1 multi-level monitoring well located along the southern subbasin boundary installed in 2022. It provides information about conditions near the boundary with the Petaluma Valley Basin.
- Addition: SRP0740 is part of the SRPDMW-2 multi-level monitoring well located in the southern-central area of the subbasin installed in 2022. It fills a GSP-identified data gap in the RMP network for the deep aquifer system (Figure 5-6).
- Addition: SRP0744 is part of the SRPDMW-3 multi-level monitoring well located in the northwestern area of the subbasin installed in 2022. It fills a GSP-identified data gap in the RMP network for the deep aquifer system (Figure 5-6).

The revised groundwater level RMP network for the deep aquifer system is shown in Figure 5-8 and includes a total of 15 wells.

As discussed in Section 3.6, a reconciliation between the details of the groundwater level monitoring networks with DWR's data and reporting standards has been conducted as part of this Periodic Evaluation. Improvements to the RMP networks are described above. The full groundwater level monitoring networks have also been assessed and revised. Redundant wells and wells with data quality issues (including missing construction information) and/or access issues have been removed from the networks. New monitoring wells and volunteer wells have been added to the networks. The revised full groundwater level monitoring networks for the shallow and deep aquifer systems are provided in Appendix 5-3.

Table 5-2. Groundwater Level RMP Assessment - Deep Aquifer System

Data Management System ID						
Station Name	Station Number	Type of Well	Well Depth (feet)	Well Depth Category	Screened Interval(s) (feet)	Periodic Evaluation Status
SRP0359	SCWA_TODD_WHITE	Observation	257	Medium (200-500ft)	237-257	Keep
SRP0347	SCWA_OCC_MW_04	Observation	740	Medium (200-500ft)	660-740	Keep
SRP0376	SCWA_Airport_MW_03	Observation	360	Medium (200-500ft)	340-360	Keep
SRP0115	SRP-K12-04	Observation	870	Deep (>500ft)	500-860	Keep
SRP0057	SRP-F09-02	Observation	360	Medium (200-500ft)	200-350	Keep
SRP0059	SRP-F12-01	Observation	694	Medium (200-500ft)	199-684	Keep
SRP0238	SRP-K19-01	Municipal	380	Medium (200-500ft)	130-380	Keep
SRP0249	SRP-J17-01	Municipal	462	Medium (200-500ft)	302-462	Keep
SRP0243	SRP-H18-01	Municipal	582	Deep (>500ft)	258-582	Keep
SRP0724	Windsor_Bluebird	Observation	765	Deep (>500ft)	695-745	Keep
SRP0725	Sebastopol Well #5	Municipal	528	Deep (>500ft)	138-528	Keep
SRP0019	SRP-D08-02	Unknown	1048	Deep (>500ft)	?	Keep
SRP0738	SRPDMW-1-450	Observation	450	Medium (200-500ft)	430-445	Add
SRP0740	SRPDMW-2-281	Observation	281	Medium (200-500ft)	251-276	Add
SRP0744	SRPDMW-3-210	Observation	210	Medium (200-500ft)	195-205	Add

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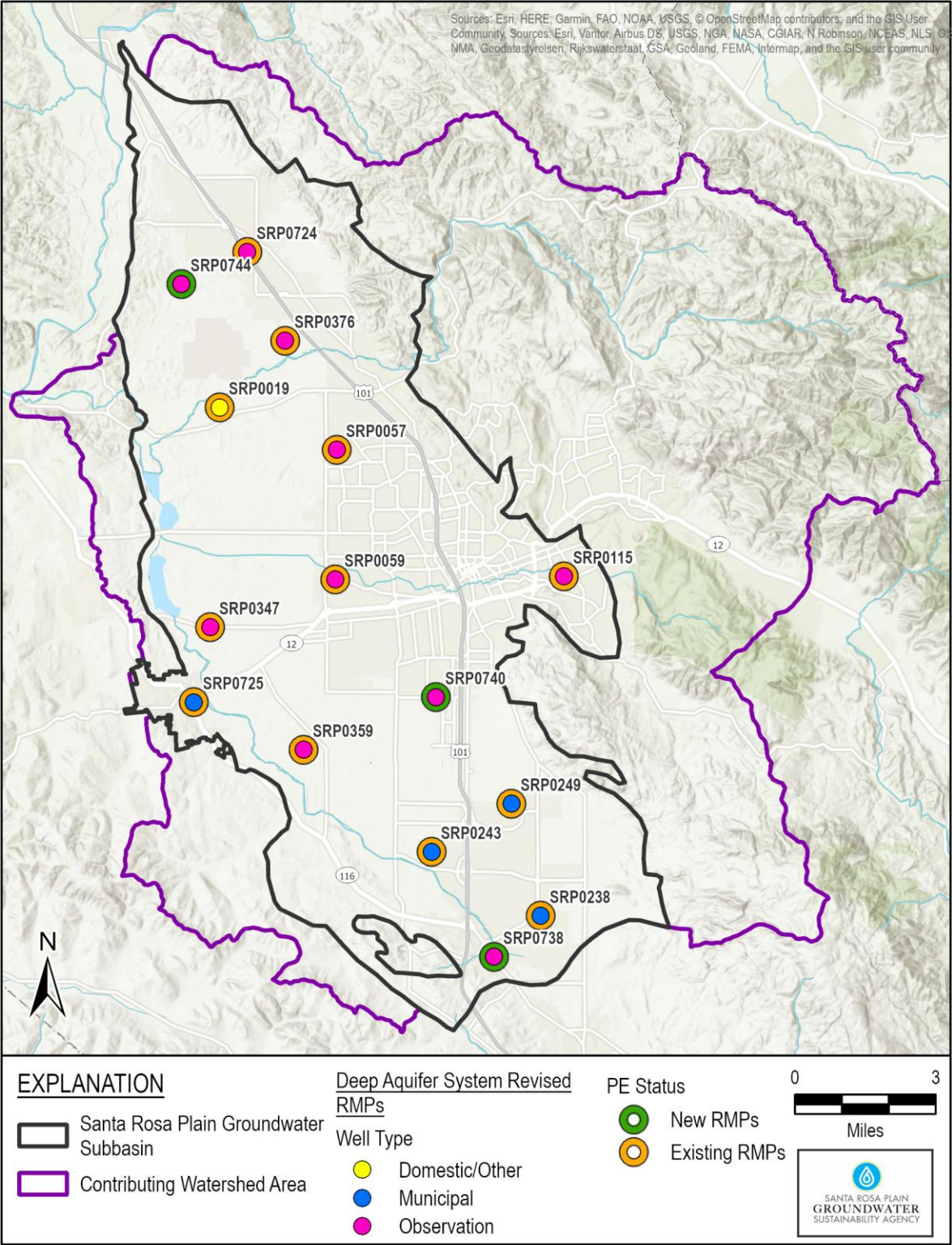


Figure 5-8. Revised Groundwater Level RMP Network – Deep Aquifer System

5.1.3 Sustainable Management Criteria Updates

Sustainable management criteria for existing groundwater level RMPs remain the same as described in the GSP. The same general methodology as described in the GSP was used to calculate SMC for new RMP wells. Minimum thresholds were set at each new RMP based on the three following primary factors:

1. Review of groundwater level data and hydrographs to identify the lowest historical groundwater elevation at each RMP after removing any measurements flagged as “questionable measurements” or otherwise anomalous measurements from the datasets.
2. Calculation of “well impact depths” in the vicinity of each RMP to identify depths at which lowering of groundwater levels may impact well users, including domestic, agricultural, public supply, and industrial wells.
3. Calculation of a “drought factor or buffer” to account for reasonably foreseeable future droughts.

The methodology for incorporating potential impacts on existing well users (well impact depths) into MT calculations is described in Section 4.5.2.1 of the GSP. That same methodology was used to calculate well impact depths for the new RMPs, with the following exceptions:

- The improved well inventory was used to calculate supply well statistics (total number of supply wells, shallowest supply well total depth, 98th percentile shallowest supply well total depth, and average supply well depth) in the vicinity of each new RMP.
- Rather than drawing polygons using mid-points between RMP wells and subbasin boundaries, a one-mile radius around each new RMP well was used as the vicinity area (the area for which supply well statistics are calculated). This simplified approach was tested using existing RMPs and did not result in changes to the MT calculations, so it was deemed an appropriate methodology for the new RMPs.

The methodology for incorporating historical lows and drought factors (buffers) into MT calculations is described in Section 4.5.2.1 of the GSP. That same methodology was used to calculate historical lows and drought factors for the new RMPs, with the following exceptions:

- The GSP methodology for calculating historic lows plus drought factors for wells with stable trends and less than ten years of data was used for the new RMP wells. Rather than calculating a model-derived drought factor for each RMP location, a single drought factor was used for the new shallow RMPs and a single drought factor was used for the new deep RMPs. The drought factors used for the new RMP wells are the averages of the projected drought factors from the GSP RMP wells for each respective aquifer system (-6 feet for the shallow aquifer system and -10 feet for the deep aquifer system). This is illustrated in Table 5-3 and Table 5-4.

Consistent with the GSP methodology, the more conservative value between the well impact depth and historical low with drought factor at each new RMP well was used as the minimum threshold.

The methodology for calculating measurable objectives (MOs) is described in Section 4.5.3.1 of the GSP. The same methodology that was used to calculate MOs for RMP wells with stable trends in the GSP (historical spring median groundwater elevations) was used for the new RMPs. SMC for the new RMP wells is presented in Table 5-3 and Table 5-4.

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Table 5-3. SMC for New RMP Wells - Shallow Aquifer System

							MT	MO
Well ID	Observed Historical Low (feet msl)	Year of Observed Historical Low	Calculated Drought Factor (feet)	Drought Factor Years	Historic Low minus Drought Factor (feet msl)	Well Impact Depths (feet msl) 98th percentile plus 10 feet	Shallower of Historical Low minus 4-year Drought or Well Impact Depth	Historical Spring Median
SRP0736	78.3	2022	-6	Projected	72	66	72	83
SRP0739	98.9	2024	-6	Projected	93	79	93	105
SRP0743	70.1	2024	-6	Projected	64	39	64	76
SRP0712	43.7	2022	-6	Projected	38	20	38	52

Table 5-4. SMC for New RMP Wells - Deep Aquifer System

							MT	MO
Well ID	Observed Historical Low (feet msl)	Year of Observed Historical Low	Calculated Drought Factor (feet)	Drought Factor Years	Historic Low minus Drought Factor (feet msl)	Well Impact Depths (feet msl) 98th percentile plus 10 feet	Shallower of Historical Low minus 4-year Drought or Well Impact Depth	Historical Spring Median
SRP0738	69	2022	-10	Projected	59	-61	59	75
SRP0740	89	2022	-10	Projected	79	-117	79	95
SRP0744	64.6	2024	-10	Projected	55	-112	55	70

5.2 Reduction of Groundwater in Storage

Reduction of groundwater in storage is monitored using the chronic lowering of groundwater levels as a proxy. Therefore, Section 5.1 describes the status of data gaps, monitoring network assessment, and sustainable management criteria updates for reduction of groundwater storage monitoring network in addition to the chronic lowering of groundwater levels.

5.3 Degraded Groundwater Quality

As described in the GSP, degradation of groundwater quality is assessed at public drinking water supply wells regulated by the SWRCB DDW (Sonoma Water, 2021). Concentration data from these wells are used to evaluate annual groundwater quality conditions in the Subbasin and data is made available through the SWRCB's GAMA database. During GSP development, nitrate, arsenic, and salinity (measured as TDS) were identified as the three COCs that may impact groundwater quality and beneficial users across the Subbasin. A total of 104 DDW public supply wells were identified in the GSP as the Subbasin's arsenic water quality network, 122 for the nitrate network, and 92 public supply wells for the TDS representative water quality monitoring network. The wells included in each network were selected based on available data during the initial 2015-2019 baseline assessment period. As described in Section 4.5, the MT for degraded water quality is calculated as the number of supply wells sampled from 2015 to 2019 with MCL or SMCL exceedances (baseline exceedances) plus two additional supply well exceedances.

Table 5-5 summarizes the GSP public supply well network by constituent, including the regulatory standard (MCL or SMCL), baseline exceedances, and MTs.

Figure 5-9 through Figure 5-11 show the locations of each RMP in the arsenic, nitrate, and TDS GSP networks, respectively.

Table 5-5. Minimum Thresholds for Degradation of Groundwater Quality for the Public Supply Wells in the Santa Rosa Plain Subbasin GSP Monitoring Network				
Constituent of Concern	Regulatory Exceedance Standard	Number of Sampled Wells in GSP Monitoring Network (2015-2020)	Number of Wells Exceeding Regulatory Standard (2015-2020)	Minimum Threshold (Number of Regulatory Exceedances Allowed)
Arsenic	10 µg/L	104	21	23
Nitrate	10 mg/L	122	2	4
TDS	500 mg/L	92*	2	4
Note: *There was a typo in the GSP, where 94 wells were identified, versus 92 being the correct number.				

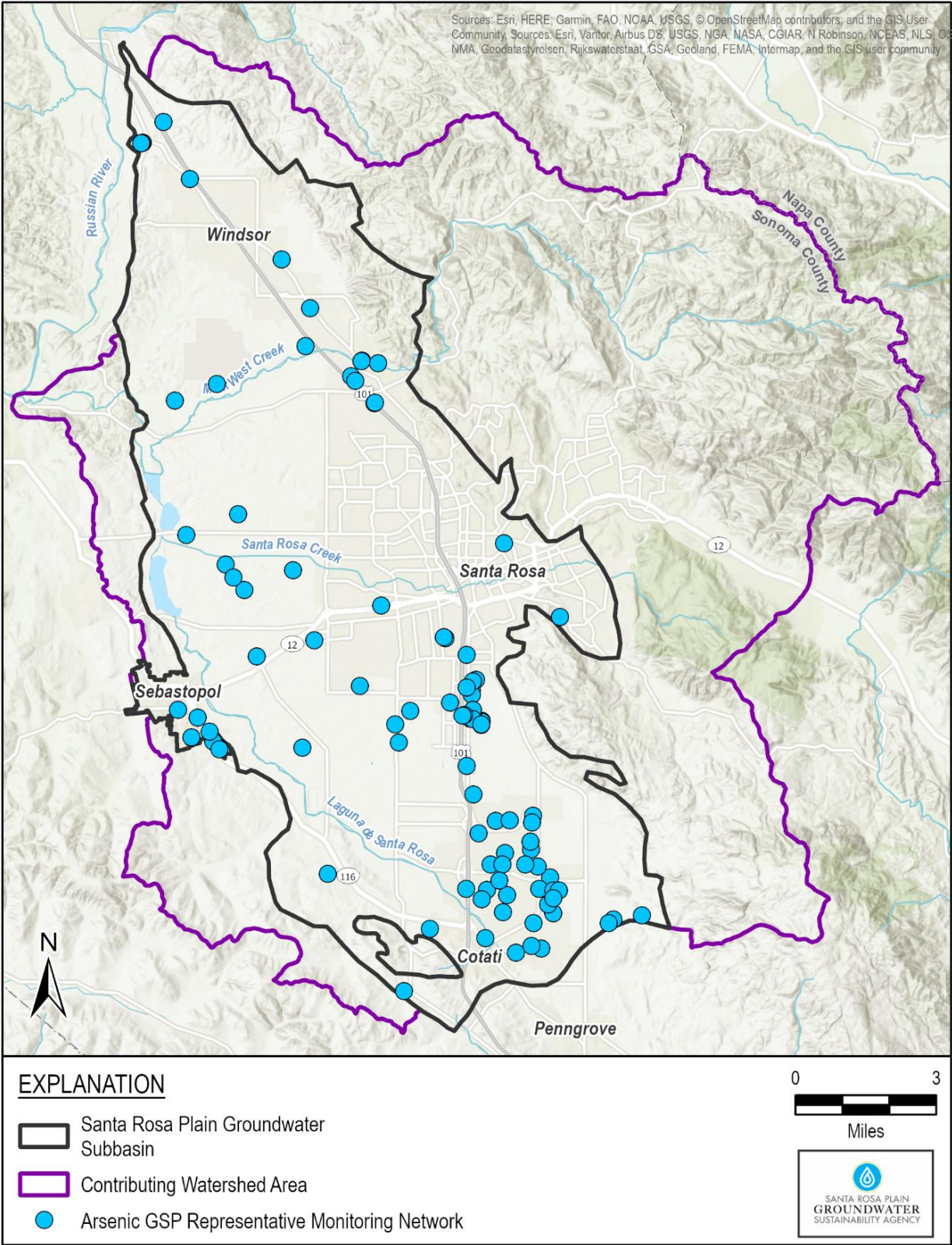


Figure 5-9. Santa Rosa Plain Subbasin Arsenic GSP Representative Monitoring Network

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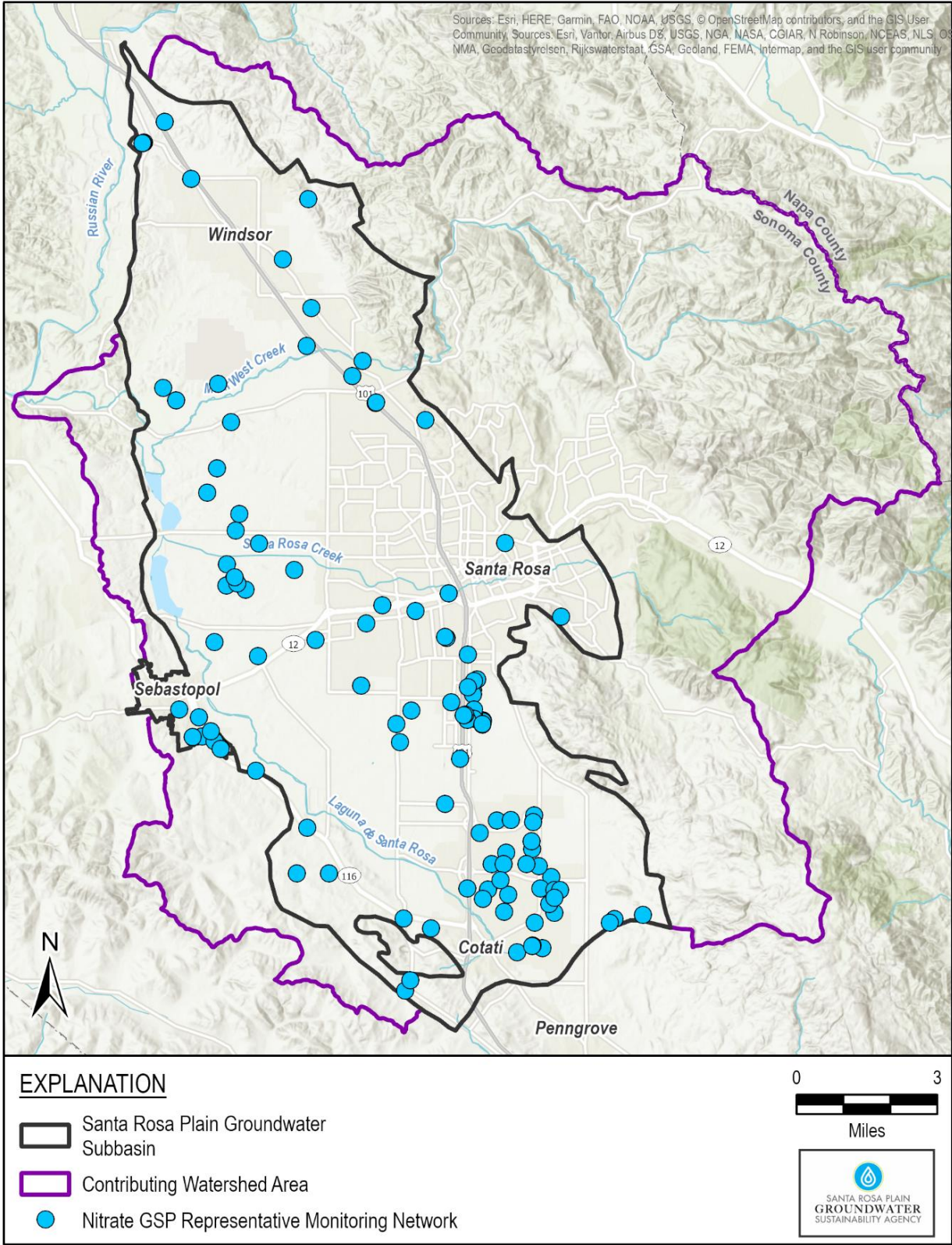


Figure 5-10. Santa Rosa Plain Subbasin Nitrate GSP Representative Monitoring Network

First Periodic Evaluation
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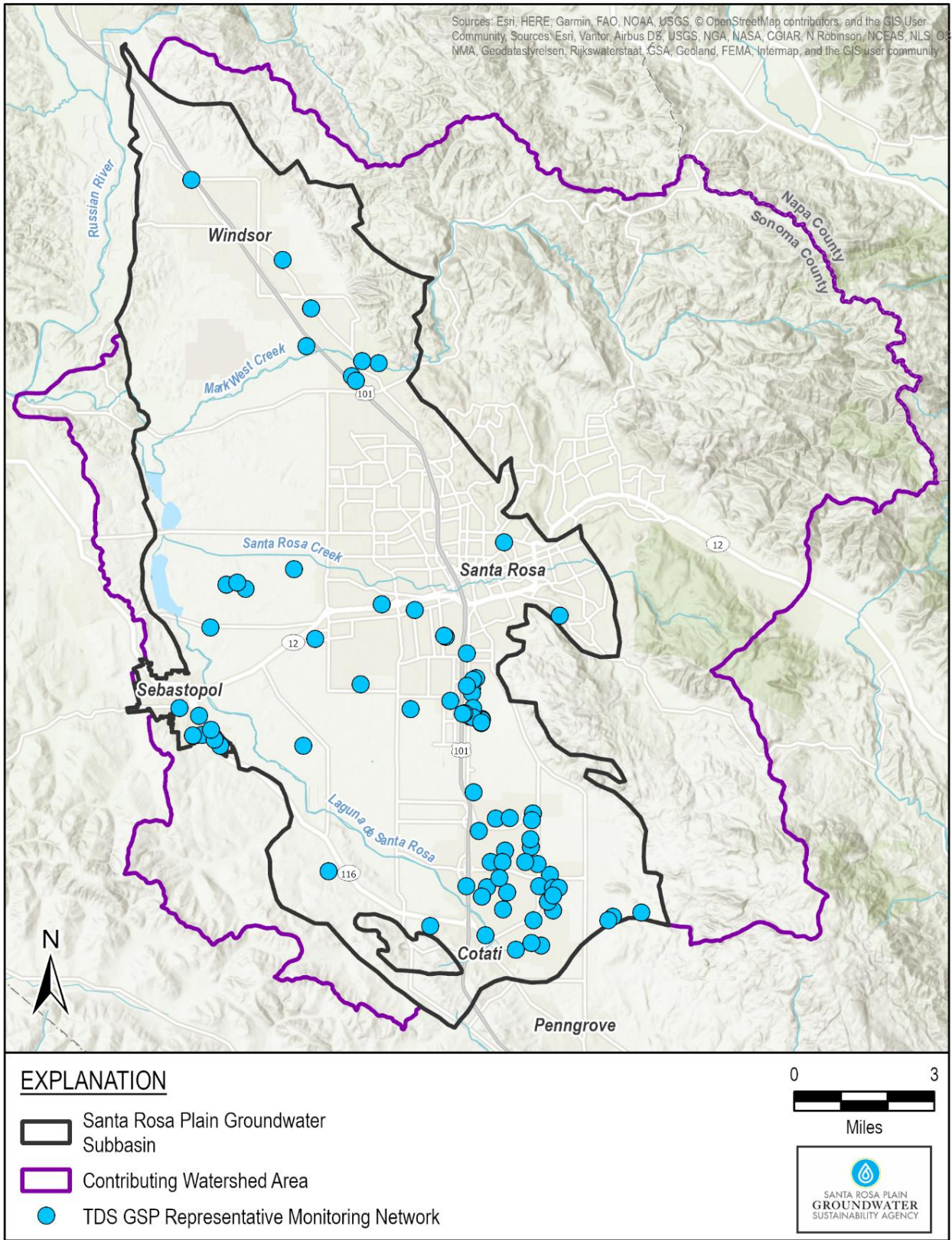


Figure 5-11. Santa Rosa Plain Subbasin Total Dissolved Solids GSP Representative Monitoring Network

5.3.1 Status of GSP Data Gaps for Groundwater Quality

There are no data gaps associated with any of the degraded water quality monitoring networks identified in the GSP. However, observed inconsistencies in sampling frequency among existing public supply wells during the evaluation cycle presented an opportunity to refine the networks. A comprehensive evaluation of each COC RMP network was conducted to guide network improvements. Appendix 5-4 describes the evaluation approach, and Sections 5.3.2 through 5.3.4 summarize the results of the evaluation. The revised water quality networks did not reveal any new data gaps across the representative groundwater quality COC monitoring networks.

5.3.2 Monitoring Network Assessment for Groundwater Quality

A comprehensive network evaluation was conducted for the arsenic, nitrate, and TDS networks to assess each well's suitability for monitoring groundwater quality conditions in the Subbasin. The evaluation considered specific criteria such as recent sample data, availability of construction information, and the location of wells included in the existing networks. This data informed the network refinement process, which consisted of assigning a suitability score to each well and analyzing the scores spatially. A review of DDW wells not initially included in the GSP networks provided additional wells to potentially add to the networks in areas that had less monitoring. This approach focused on improving data reliability and spatial coverage while avoiding the creation of data gaps in the network. Additional details on the evaluation methodology and supporting analyses are provided in Appendix 5-4.

The network evaluation identified 34 wells in the arsenic network, 33 wells in the nitrate network, and 22 wells in the TDS network that did not meet one or more of the evaluation criteria. These wells were removed from their respective representative monitoring networks. The evaluation of additional DDW wells identified two supply wells in the arsenic network, seven wells in the nitrate network, and one well in the TDS network to add as RMPs. As described in Section 2 in Appendix 5-4, the decision to remove existing supply wells was based on a combination of insufficient sampling data during the 2021-2025 evaluation cycle and spatial redundancy, and the decision to add supply wells was based on consistent sampling data and filling spatial data gaps. Table 5-6 summarizes the number of wells removed from the initial GSP networks, the number of wells added, and the number of wells included in the revised networks following completion of the full network evaluation and spatial analysis described in Appendix 5-4.

Table 5-6. Summary of Santa Rosa Plain Subbasin Monitoring Network Assessment				
Constituent of Concern	Number of Wells in GSP Network	Number of Wells Removed	Number of Wells Added	Number of Wells in Revised Periodic Evaluation Network
Arsenic	104	34	2	72
Nitrate	122	33	7	96
TDS	92	22	1	71

5.3.3 Revised Groundwater Quality Representative Monitoring Networks

The groundwater quality monitoring networks in the Santa Rosa Plain Subbasin were revised to exclude wells that are no longer reliable for assessing current and future conditions and add wells to the networks that have more consistent annual water quality monitoring.

A total of 72 wells are included in the revised arsenic representative monitoring network (Figure 5-12), 96 wells for nitrate (Figure 5-13), and 71 wells for the TDS network (Figure 5-14). Of the RMPs across the three networks, 42 wells are part of all three networks. Appendix 5-4 includes information including water system, coordinates, and available well construction information for each RMP. This additional information addresses RCA 6, as described in Section 3.6.

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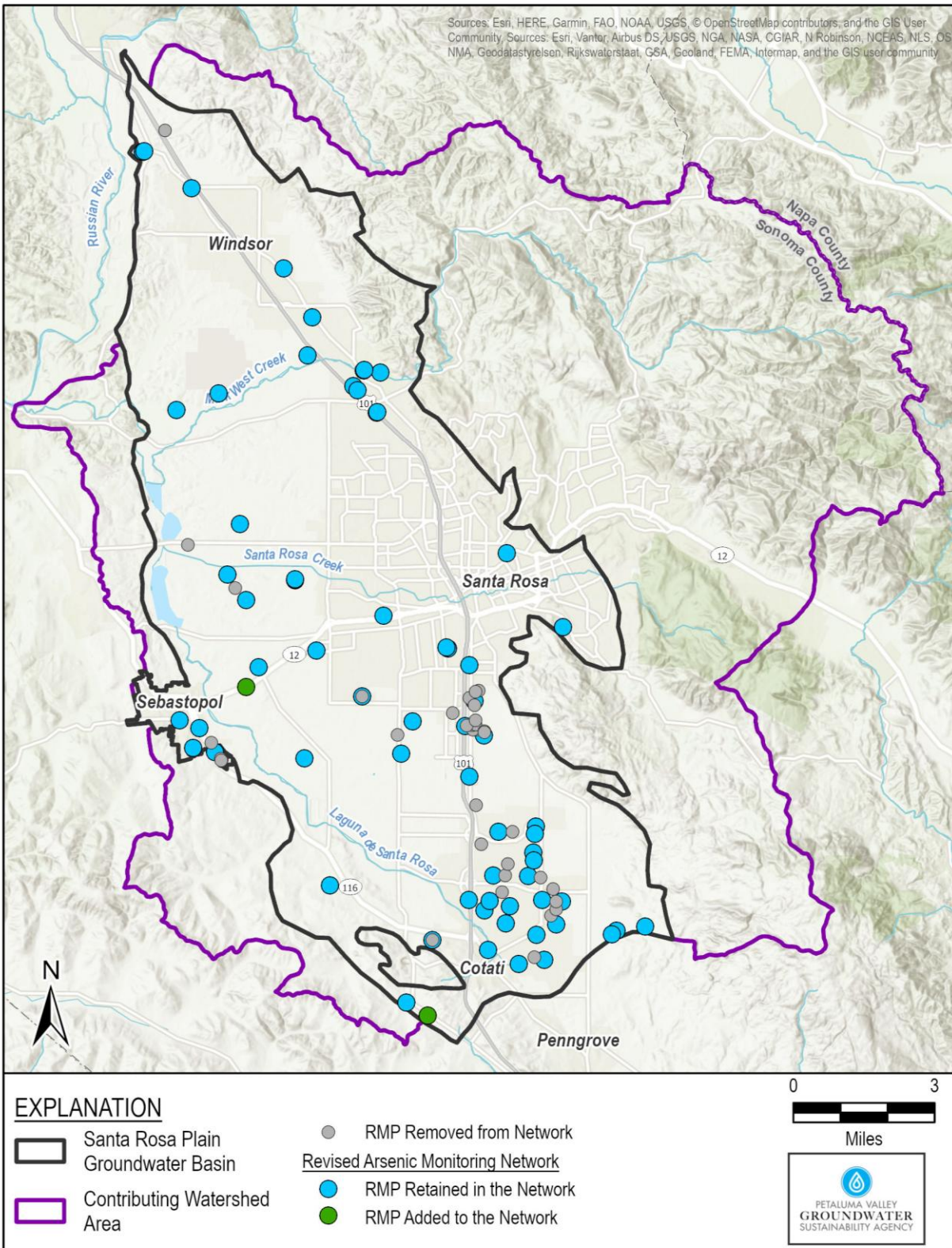


Figure 5-12. Santa Rosa Plain Subbasin Revised Arsenic Representative Monitoring Network

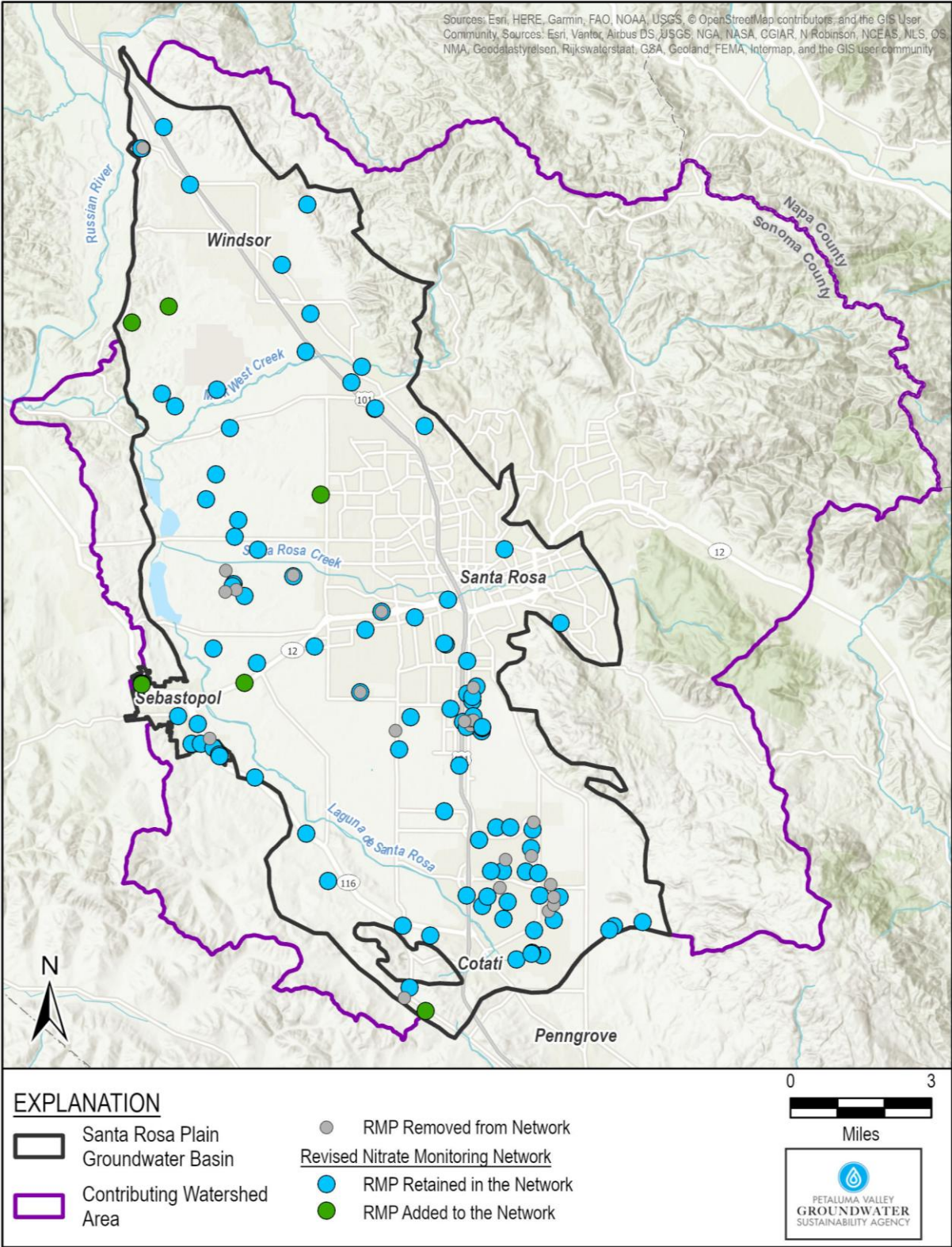


Figure 5-13. Santa Rosa Plain Subbasin Revised Nitrate Representative Monitoring Network

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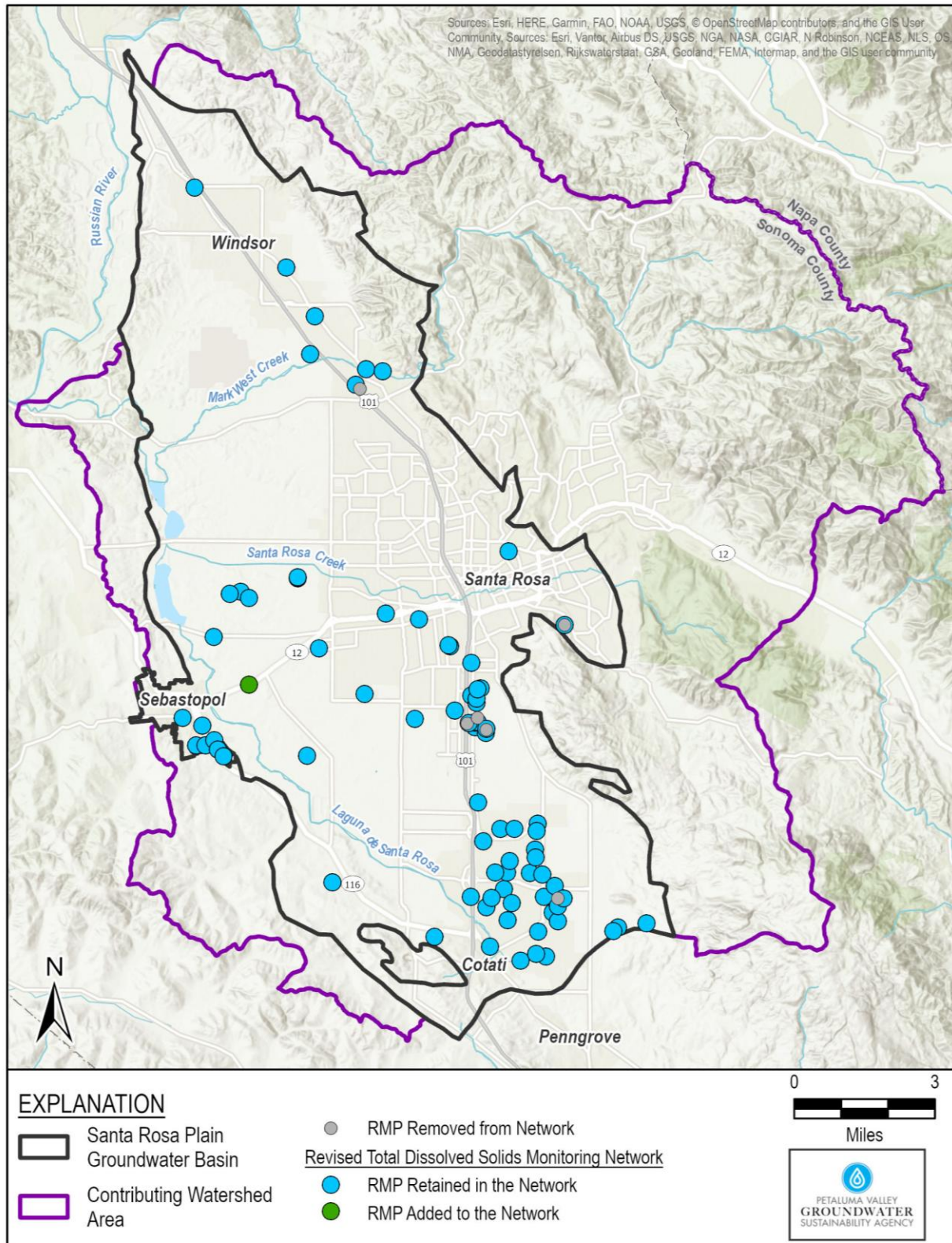


Figure 5-14. Santa Rosa Plain Subbasin Revised TDS Representative Monitoring Network

5.3.4 Sustainable Management Criteria Update for Groundwater Quality

The revised groundwater quality monitoring networks do not warrant changes to the degraded water quality SMC. Using best available data, each representative monitoring network was refined to improve reliability and support effective groundwater quality monitoring. Table 5-7 summarizes the revised network compared to the MTs for each COC. With the removal of wells for the arsenic RMP network, the percentage of MT wells compared to the number of total wells in the network is now higher (32 percent), than it was for the GSP network (22 percent). This means that there may be a higher probability of reaching the MT for arsenic; however, it is a naturally occurring COC, and if groundwater quality degrades in areas that is not due to actions by the GSA, then it would not constitute an undesirable result (Section 4.5). For nitrate and TDS, the revised Periodic Evaluation (PE) network is similar to the GSP network. Therefore, the current SMC remain adequate for monitoring and managing groundwater quality in the Subbasin.

Periodic assessment of the networks will continue as part of future GSP implementation. In addition, coordination with the water systems will continue during implementation to increase monitoring frequency and support annual groundwater quality assessment to the SMC.

Table 5-7. Santa Rosa Plain Subbasin Revised Network Compared to Sustainable Management Criteria by Constituent of Concern

Constituent of Concern	Minimum Threshold (Number of Regulatory Exceedances Allowed)	Number of Wells in GSP Network	Number of Wells in Revised PE Network	% of Revised Network Compared to Minimum Threshold
Arsenic	23	104	72	32%
Nitrate	4	122	96	4%
TDS	4	92	71	6%

5.4 Depletion of Interconnected Surface Water

Depletion of interconnected surface water is monitored using a network of monitoring wells, co-located adjacent to USGS stream gages where feasible. The GSP monitoring network for the depletion of interconnected surface water (ISW monitoring network) includes 10 shallow dedicated monitoring wells, five of which are located adjacent to existing USGS stream gages (Figure 5-15 and Table 5-8).

A subset of seven of the shallow monitoring wells are considered ISW RMPs, for which sustainable management criteria are set in the GSP.

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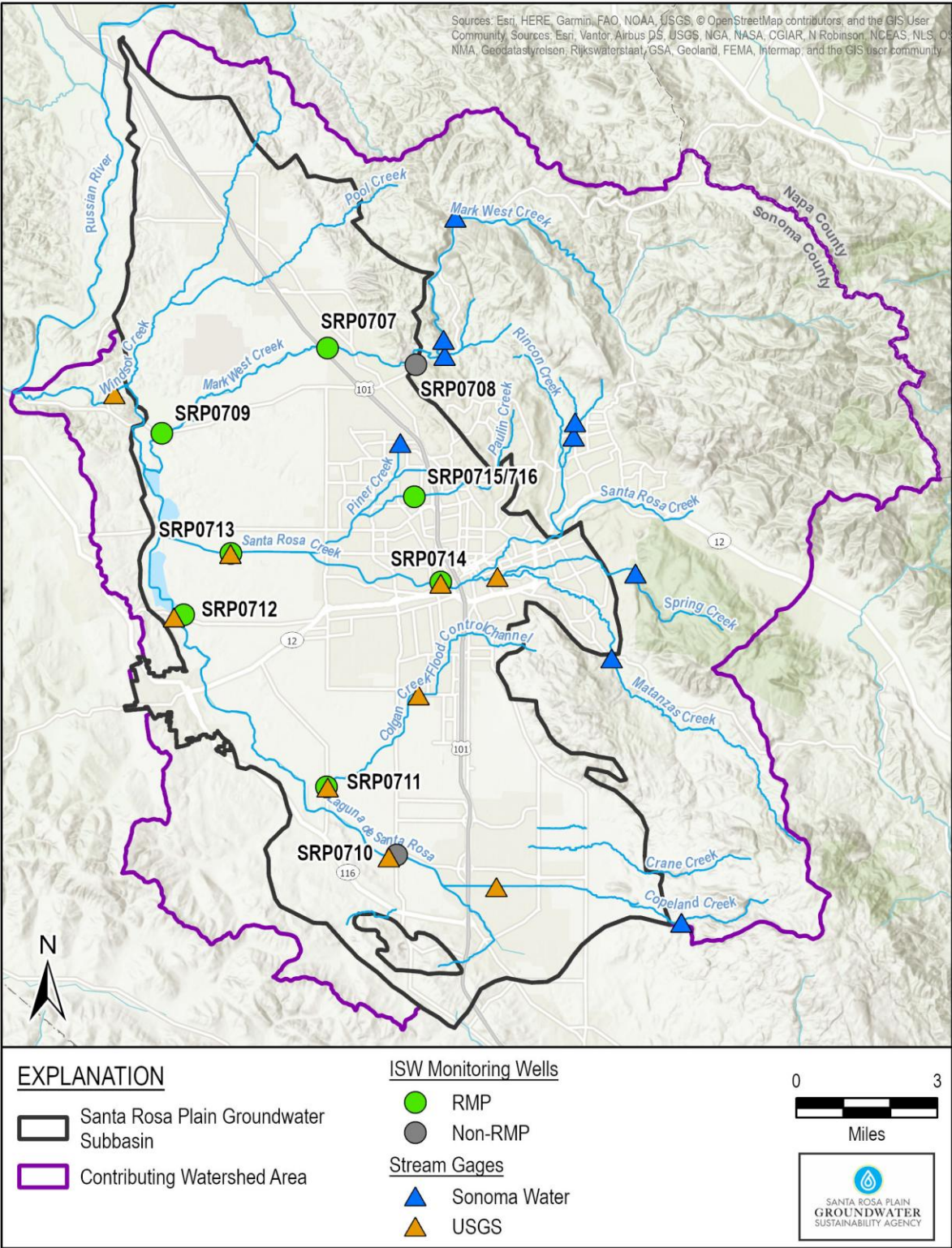


Figure 5-15. 2021 GSP ISW Monitoring Network

5.4.1 Status of GSP Data Gaps for Depletion of Interconnected Surface Water

The GSP identified four spatial data gap areas in the ISW monitoring network (Figure 5-16). The GSA has completed several projects during GSP implementation in order to fill data gaps in the ISW monitoring network, as described below.

Most of the wells in the ISW monitoring network were installed through DWR's Technical Support Services (TSS) program in 2019 and were included in the GSP monitoring network. Two shallow stream-adjacent monitoring wells, SRP0745 and SRP0746, were installed during a second phase of TSS work in 2022. SRP0745 is adjacent to the confluence of Mark West Creek and Windsor Creek, filling a GSP-identified data gap, and located in the vicinity of the existing USGS gage on Mark West Creek near Mirabel Heights. SRP0746 is adjacent to a previously unmonitored portion of Mark West Creek in the north-central area of the subbasin. SRP0739 and SRP0742 were installed as part of the Proposition 68-funded multi-level monitoring well program in 2022 and fill GSP-identified data gaps along Colgan Creek and Windsor Creek, respectively. SRP0739 is also in the vicinity of the existing USGS gage on Colgan Creek near Santa Rosa. SRP0815 and SRP0816 were installed in 2025 utilizing SGM Implementation grant funds and improve ISW monitoring along Copeland Creek and Matanzas Creek, respectively. SRP0815 is adjacent to the existing USGS gage on Copeland Creek in Rohnert Park. The revised ISW monitoring network is shown in Figure 5-16 and Table 5-8.

All of the ISW monitoring network data gaps identified in the GSP have been addressed during the first five years of GSP implementation with the exception of permanent stilling wells with pressure transducers in Windsor Creek and Mark West Creek adjacent to SRP0707 and SRP0742. The GSA will continue to pursue installation of these stilling wells.

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Table 5-8. Revised ISW Monitoring Network

Station Name	Type of Well	Well Depth (feet)	Well Depth Category	Screened Interval(s) (feet)	ISW RMP	Additional ID Information
Initial GSP ISW Monitoring Network						
SRP0707	Observation	50.5	Shallow (0-200ft)	30-50	Yes	Mark West Creek at Fulton Rd.
SRP0709	Observation	33.5	Shallow (0-200ft)	23-33	Yes	Mark West Creek at River Rd.
SRP0711	Observation	45.5	Shallow (0-200ft)	35-45	Yes	Colgan Creek at Llano Rd.
SRP0712	Observation	48.5	Shallow (0-200ft)	28-48	Yes	Laguna de Santa Rosa at Occidental Rd.
SRP0713	Observation	45.5	Shallow (0-200ft)	25-45	Yes	Santa Rosa Creek at Willowside Rd.
SRP0714	Observation	51.5	Shallow (0-200ft)	41-51	Yes	Santa Rosa Creek at Pierson St.
SRP0716	Observation	20.5	Shallow (0-200ft)	15-20	Yes	Paulin Creek at Hardies Ln - Shallow
SRP0708	Observation	25.5	Shallow (0-200ft)	15-25	No	Mark West Creek at Wikiup Bridge Way
SRP0710	Observation	45.5	Shallow (0-200ft)	35-45	No	Laguna de Santa Rosa at Stony Point Rd.
SRP0715	Observation	40.5	Shallow (0-200ft)	30-40	No	Paulin Creek at Hardies Ln. - Deep
New ISW Monitoring Wells						
SRP0739	Observation	82	Shallow (0-200ft)	72-82	No	Colgan Creek at Bellevue Ave
SRP0742	Observation	50	Shallow (0-200ft)	30-45	No	Windsor Creek at Starr Rd.
SRP0745	Observation	33	Shallow (0-200ft)	18-33	No	Mark West Creek at Windsor Creek

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Table 5-8. Revised ISW Monitoring Network

Station Name	Type of Well	Well Depth (feet)	Well Depth Category	Screened Interval(s) (feet)	ISW RMP	Additional ID Information
SRP0746	Observation	38	Shallow (0-200ft)	18-38	No	Mark West Creek at Sonoma County Airport
SRP0815	Observation	50	Shallow (0-200ft)	35-45	No	Copeland Creek at USGS Gage
SRP0816	Observation	48	Shallow (0-200ft)	23-43	No	Matanzas Creek at Hoen Ave

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G:\GIS-Tuc\Projects\9400_SonomaValley\Maps\PEs\ArcPro_ProjectFiles\MonitoringNetwork\MonitoringNetwork_SRP_Pet_Son.aprx Figure 7-10 Addressed and Remaining Data Gaps ISW Monitoring Network SRP26Jun2026

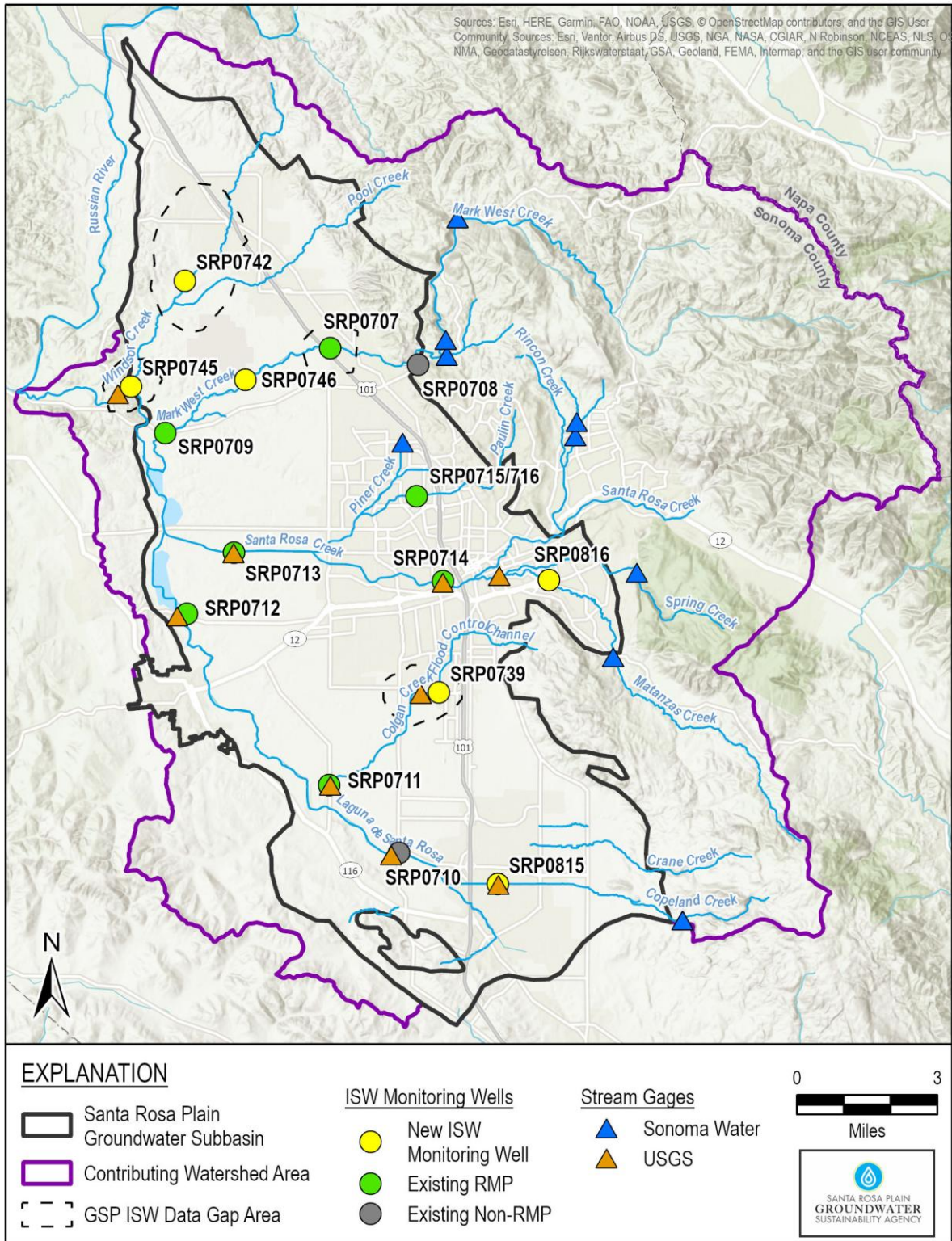


Figure 5-16. Addressed and Remaining Data Gaps – ISW Monitoring Network

5.4.2 Monitoring Network Assessment for Depletion of Interconnected Surface Water

The ISW monitoring network is comprehensive and monitors near-stream shallow groundwater levels for all of the major surface water bodies in the subbasin. No additional shallow stream-adjacent monitoring wells are necessary at this time and no new ISW RMPs are designated at this time. Several of the new ISW monitoring wells will likely be designated as RMPs in the future, following review of DWR's upcoming guidance on managing ISW depletion.

5.4.3 Sustainable Management Criteria Update for Depletion of Interconnected Surface Water

No changes to the depletion of interconnected surface water SMC are needed at this time. Consideration of updates to the SMC for ISW depletion and establishing SMC for new RMPs will be evaluated following review of DWR's final guidance on managing ISW depletion.

5.5 Land Subsidence

Subsidence is monitored in the Subbasin using InSAR and a single GPS monitoring station. Each 100-square-meter InSAR grid cell, or pixel, is a subsidence RMP. The GPS station is not an RMP but does provide precise and valuable information about subsidence trends at a single point in the Subbasin to complement InSAR data.

5.5.1 Status of GSP Data Gaps for Land Subsidence

There are no significant data gaps in the InSAR land subsidence network. From WY 2020-2025 InSAR data was available for 92 percent of the Subbasin (Figure 4-16). In WY 2025, the spatial coverage improved, now covering 99.9 percent of the Subbasin (Figure 4-17).

5.5.2 Monitoring Network Assessment for Land Subsidence

The land subsidence monitoring network is performing as intended to evaluate subsidence conditions in the Subbasin.

5.5.3 Sustainable Management Criteria Update for Land Subsidence

No changes to the land subsidence SMC are needed at this time, since the monitoring network did not change since the GSP submittal, the GSP's SMC approach is generally consistent with DWR's BMP recommendations, and no undesirable results have been measured as discussed in Section 4.7.

6 BASIN SETTING BASED ON NEW INFORMATION OR CHANGES IN WATER USE

This section evaluates the basin setting based on new information or changes in basin water use within the Subbasin. This section describes updates to the understanding of the basin setting, including the hydrogeologic conceptual model, groundwater conditions, groundwater flow model updates, and water budgets.

6.1 Hydrogeologic Conceptual Model

Section 3.1.8.1 of the GSP identifies data gaps associated with the hydrogeologic conceptual model related to the geologic complexities of the Subbasin and limited high-quality subsurface lithologic data available to characterize lateral and vertical continuity and properties of aquifers and aquitards in the Subbasin. Following adoption of the GSP and during the evaluation cycle, the GSA has advanced its understanding of the hydrogeologic conceptual model for the Subbasin through drilling, logging and construction of six multi-level groundwater monitoring wells and acquisition and analysis of geophysical data. This section summarizes primary findings from these activities. Detailed descriptions of the work activities and results of the well drilling and construction and geophysical surveys are provided in Appendices 5-1, 5-2, and 6-1.

6.1.1 Drilling and Construction of Multi-level Monitoring Wells

Six new multi-level monitoring wells were constructed in 2022 and 2026 at the locations shown on Figure 5-5 and Figure 5-6. The boreholes for these wells were drilled to depths ranging from 273 to 530 feet below ground surface. General hydrogeologic findings from each location are summarized below:

SRPDMW-1 is a triple-completion well located in Cotati near the southern boundary of the Subbasin. The geologic units encountered at SRPDMW-1 are interpreted as the Quaternary Alluvium/Glen Ellen Formation (undifferentiated) and the Petaluma Formation. The Quaternary Alluvium/Glen Ellen Formation extends from the ground surface to approximately 250 feet bgs and is characterized at this location by its overall heterogeneity with relatively thin beds of clay, silt, sand, and gravel. The Petaluma Formation extends from approximately 250 feet bgs to the bottom of the borehole (520 feet bgs) and is characterized at this location by thick sequences of clay with relatively thin layers of silty gravel. Groundwater level measurements collected from the multi-level well indicate that vertical hydraulic gradients are upward within the upper and lower portions of the shallow aquifer system and downward between the shallow and deep aquifer systems.

SRPDMW-2 is located in southern Santa Rosa in the eastern portions of the Subbasin. The geologic units encountered at SRPDMW-2 are interpreted as the Quaternary Alluvium/Glen Ellen Formation (undifferentiated) and the Petaluma Formation. The Quaternary Alluvium/Glen Ellen Formation extends from the ground surface to approximately 175 feet bgs at this location. Similar to SRPDMW-1, the Quaternary Alluvium/Glen Ellen Formation encountered at SRPDMW-2 is heterogeneous and consists of beds of clay and poorly sorted sand and gravel. The Petaluma Formation extends from approximately 175 feet bgs to the bottom of the borehole (530 feet bgs). The Petaluma Formation at this location is generally coarser-grained and less homogenous than that observed at SRPDMW-1 and contains beds of clay interspersed with relatively thin beds of sand and gravel. Groundwater level measurements collected from the multi-level well indicate that vertical hydraulic gradients are downward between the shallow and deep aquifer systems.

SRPDMW-3 is located southwest of Windsor in the northwestern southern portions of the Subbasin. The geologic units encountered at SRPDMW-3 are interpreted as the Quaternary Alluvium/Glen Ellen Formation (undifferentiated), Petaluma Formation, and Franciscan Complex basement rock. The Quaternary Alluvium/Glen Ellen Formation extends from the ground surface to approximately 85 feet bgs and is characterized at this location by its relative coarseness with thin beds of sand, gravel, clayey sand, and clayey gravel. The Petaluma Formation extends from approximately 85 feet bgs to 260 feet bgs and is characterized at this location by thick sequences of clay with a relatively thin bed of sandy silt. Franciscan Complex basement rock was encountered shallower than expected at 260 feet bgs. The lithologic log and e-log indicate that confining layers are present at the SRPDMW-3 location from approximately 135 feet bgs to 190 feet bgs and 210 feet bgs to 250 feet bgs. Groundwater level measurements collected from the multi-level well indicate that vertical hydraulic gradients are downward between the shallow and deep aquifer systems.

SRPDMW-4 is located off Petaluma Hill Road northeast of Rohnert Park in the southeastern portions of the Subbasin. SRPDMW-4 was drilled in an open field overlaying an alluvial fan of sediments coming off of the Sonoma volcanic range. Preliminary studies showed a varying degree of gravels, sands, and clays without a definite pattern. Drilling at this location encountered clays to a depth of 40 feet bgs when the lithology transitioned to well graded sands and gravels to a depth of 110 feet bgs, the first well completion was screened in this material from 90 to 100 feet bgs. Below 110 feet bgs, a thick lean clay unit created an impermeable layer between aquifer material down to 120 feet bgs, where more sandy gravels were encountered down to 170 feet bgs, where the second well completion was screened between 150 and 170 feet bgs. Materials present between 170 feet and 380 feet were largely comprised of sandy clays, which did not exhibit hydraulic properties sufficient to warrant completion of a deeper screened zone.

SRPDMW-5 is located off Sunny View Way west of Santa Rosa near the Laguna de Santa Rosa alongside a residential road, just north of the corner confluence of Sunny View Way and Oak Farm Lane. Geologic materials encountered in this location consist of silty clays from ground surface to a depth of 60 feet bgs. From 60 to 100 feet bgs was a mixture of coarse-grained sand and gravel where the first well completion screened interval was set at 75 to 95 feet bgs. From 100 to 360 feet bgs, were thick blue clays with sporadic lenses of sand that did not produce water. Between 360 to 400 feet bgs, coarse grained sands and gravels were encountered, and the second well completion screened interval was placed at 380 to 400 feet bgs. A thick clay unit sat below to total depth of 410 feet bgs.

SRPDMW-6 is located off Llano Road west of Cotati in the southwestern portions of the Subbasin. Geologic materials encountered in this location consisted of coarse-grained sands and gravels down to a depth of 50 feet bgs. From 50 to 130 feet bgs, dense clays with sporadic sand and gravel lenses were present. Aquifer material was encountered between 130 to 250 feet bgs consisting of well-rounded sands and gravels in alternating depositional facies, where the first well completion was screened between 210 and 220 feet bgs. Between 250 and 310 feet bgs were clay formations interbedded by angular gravel and sand layers without any hydraulic conductivity. Between 315 and 335 feet bgs., a coarse-grained sand and gravel unit was encountered where the final well completion was screened. This deeper screened zone was found to exhibit artesian water pressure conditions with static groundwater levels occurring.

6.1.2 Acquisition and Analysis of Geophysical Data

Geophysical data acquired and analyzed within the Subbasin during the evaluation cycle includes airborne electromagnetic (AEM) data from California's Department of Water Resources (DWR) Statewide AEM Survey conducted in November 2021 and ground-based surveys conducted in 2025. The AEM surveys consisted of five transects totaling approximately 30 miles within the Subbasin, primarily oriented parallel with and along the western and eastern Subbasin boundaries. Data obtained from the AEM surveys were processed and inverted by DWR and were integrated into the 3D visualization software Leapfrog for comparison with ground-based geophysical data collected in 2025 and use in future updates to the hydrogeologic conceptual model.

The ground-based geophysical surveys were completed in 2025 utilizing funding from the SGM Implementation grant. The GSA engaged Collier Consulting and Ramboll to review and evaluate existing geophysical datasets from previous investigations, prepare a work plan for geophysical investigations and conduct geophysical investigations to inform updates of hydrogeologic conceptual models. The consultant team completed collection and analysis of 3 miles of electrical resistivity tomography data and 18 miles of towed time-domain electromagnetic data. A geophysical investigation report summarizing the scope and finding of the ground-based surveys, along with detailed maps showing the survey location and integration of relevant AEM data is provided in Appendix 6-1. The ground-based geophysical surveys were focused in three main areas of the Subbasin. The following summarizes the objectives and primary findings from each area:

6.1.2.1 Sebastopol Fault along the Joe Rodota Trail

The objectives for this area were to characterize the location and alignment of the Sebastopol Fault and the differences between aquifer materials on either side of the fault along the Joe Rodota Trail. Findings from the geophysical surveys indicated the possible location of the Sebastopol Fault or strand associated with the fault at the location of the Highway 12 bridge over the Laguna de Santa Rosa. This inferred location of the Sebastopol Fault is consistent with the alignment of the fault where it is mapped from geologic mapping south of the Joe Rodota Trail (Clahan et al, 2003). While the infrastructure associated with the bridge structure interfered with the geophysical data, the potential location of the fault is inferred from the fact that the Wilson Grove Formation is deeper on one side (east) than the other (west), that could be a result of normal fault movement.

The Joe Rodota Trail electrical resistivity tomography (ERT) results show high resistivity (coarse-grained) materials close to the surface in the west and dipping to -300 ft in elevation at 5,500 ft along the eastern end of the line. These resistivity values indicating coarser materials are consistent with the Wilson Grove formation, which forms a primary productive unit within the deep aquifer system. This layer of coarse material is overlain by low resistivity (fine-grained) layer. This finer-grained layer is between 50 ft and -200 ft in elevation between the bridge and the steel pipe aqueduct. This finer grained material dominates the eastern side of the line and likely forms a significant aquitard overlying the Wilson Grove formation units of the deep aquifer system.

6.1.2.2 Copeland Creek Alluvial Fan

The objectives for this area were to characterize the distribution of shallow clay deposits which may inhibit recharge and locations of higher permeability shallow deposits along and surrounding Copeland Creek, including the transition from alluvial sediments to volcanic units. The results reveal a layered geology of interchanging channel deposits and floodplain deposits, with high resistivities displaying a channel-like geometry suggestive of former tributaries in the area. Primary results from the geophysical surveys indicate a strong recharge potential below a near surface, fine-grained unit. While coarse materials noted near the surface that appear to be in connection with the shallow aquifer may support surface spreading

recharge operation and enhance baseflow to Copeland Creek, recharge to the deeper aquifer may be complicated by the fine-grained layers identified at around 15-20m (50-65 ft) and below 40 m (130 ft).

The closest connection with the near surface to the deeper aquifer is to the east/northeast of the site where sediments coming off the hill may act as “mountain front” recharge but the potential for this would require further characterization. The AEM models near land-based surveyed locations indicate extremely resistive subsurface conditions in the hills northeast of Copeland Creek, with resistivity decreasing toward the valley. These high-resistivity signatures in the AEM models are believed to correspond to the Sonoma Volcanics east of the site, where the creek’s headwaters begin. These formations likely constitute the parent materials being surveyed by the ground-based geophysical surveys further downstream. It also appears that the Sonoma Volcanics extend to west beneath the alluvial sediments within the Subbasin.

6.1.2.3 Southern Subbasin Boundary

The objectives for this area were to identify any geologic controls along the southern Subbasin boundary shared with the Petaluma Valley Groundwater Basin to the south. Primary results from the geophysical surveys do not reveal a distinct geologic change across the basin boundary defined by Bulletin 118. Only slight mounding is visible with dips north or south. There is no resistivity evidence of a fault or separating stratigraphic unit, largely indicating geologic connectivity and absence of geologic barriers to groundwater flow between the basins, particularly in the deeper aquifer, though coverage was limited to mostly north-south transects. Future groundwater level data collected from new multi-level wells constructed along the basin boundary within both the Santa Rosa Plain Subbasin and Petaluma Valley Basin will help characterize groundwater fluxes across the shared basin boundary.

6.2 Groundwater Conditions

This section summarizes the GSA’s understanding of groundwater conditions within the Subbasin based on new information obtained following the GSP adoption.

6.2.1 New Understanding of Regional Groundwater Conditions in the Subbasin

The GSA’s understanding of regional groundwater conditions within the Subbasin has not significantly changed from those described in Section 3.2 of the GSP. New information, data and monitoring improvements described in this Periodic Evaluation have helped fill localized data gaps and enhanced the GSAs ability to manage groundwater conditions within the Subbasin. Additionally, many of the programs advanced during the Periodic Evaluation review cycle are in the early stages of development and analysis (e.g., the Flow Smart program) and have not yet resulted in significant new understanding of groundwater conditions.

6.2.2 New Information and Evaluation of Interconnected Surface Water

Since the initial ISW analysis for the 2021 GSP (Section 3.2.6 of GSP), the GSA has continued to collect groundwater level data at shallow monitoring wells and started conducting seepage runs in 2021 to characterize gaining/losing stream conditions throughout the Subbasin. Review of the additional groundwater level data in combination with the seepage run data led to refinements in spatial and temporal characterization of ISW beyond the baseline understanding presented in the GSP. Appendix 6-2 contains a technical memorandum providing details on data sources, methodology, and results of the updated ISW analysis.

Comparing groundwater elevations in shallow monitoring wells to streambed elevations indicates gain/loss conditions at the monitoring point scale. Figure 6-16-1 shows the ISW classification of 16 shallow monitoring wells near streams based on analysis relative to streambed elevation. Groundwater level data in 14 of the wells are responsive to streamflow, indicating connection to surface water. Data from two

wells indicate disconnection: SRP0712 and SRP0357. SRP0712 is a current RMP well but data collected from it indicate it is likely too far from the stream to be a meaningful well in assessing ISW. SRP0357 is also likely too far from the Laguna De Santa Rosa to be sufficient for assessing ISW given its deeper screen interval depth (60-80 feet).

In contrast to the point scale groundwater data, seepage run data provide information on gain/loss conditions averaged over a stream segment. Sonoma Water conducted nine seepage runs between October 2021 and August 2024. Figure 6-16 shows the overall classification of each surveyed segment. Almost all mapped stream systems indicate interconnection at some segments, including Windsor Creek, Pool Creek, Mark West Creek, Piner Creek, Russel Creek, Paulin Creek, Matanzas Creek, Santa Rosa Creek, Colgan Creek, Laguna De Santa Rosa, Gosser Creek, and Copeland Creek. Along Windsor and Santa Rosa creeks, gaining conditions are consistently observed higher in the watershed where the alluvial aquifer is thin and bedrock is shallow, resulting in limited losses to the alluvial sediments. As streams enter the valley and alluvial sediments thicken, a combination of gaining and losing conditions are observed. In the southeast portion of the Subbasin around Crane Creek, the presence of high permeability alluvial fan deposits results in high infiltration rates and generally losing stream conditions.

Combined interpretation of groundwater level and seepage run data indicates varying degrees of surface water interconnection throughout the Subbasin. Figure 6-16 shows the overlay of ISW classification based on well and seepage run data. Due to the difference in spatial scale of the seepage run and groundwater level data analyses, it is inevitable that the two approaches for ISW classification sometimes provide differing results. For example, groundwater levels at well SRP011 show mostly losing conditions while seepage runs along Colgan Creek upstream of the well show gaining to neutral conditions. The seepage run results based on a mass balance approach compare downstream flow to the sum of upstream flow, which can obscure changes in gaining/losing conditions on a small scale throughout the segment. The well observations, however, provide point data that indicate conditions can change between gaining/losing even along relatively small segments of streams.

Overall, connection between shallow groundwater and surface water is evident throughout the Subbasin and gaining/losing conditions vary spatially and seasonally as is expected within the hydrogeologic setting of the Santa Rosa Plain Subbasin. Results of the updated analysis confirm ISW on segments of Windsor, Pool, Mark West, Piner, Russel, Paulin, Matanzas, Santa Rosa, Colgan, Copeland, and Gosser creeks and the Laguna de Santa Rosa which is consistent with the ISW mapping in the GSP. The updated analysis based on information collected from new shallow wells and seepage run results is responsive to RCA 4c, which recommends filling data gaps, collecting additional monitoring data, and defining segments of interconnectivity and timing. A practitioner Work Group guided and reviewed the updated ISW analysis process, responsive to the RCA 4d recommendation to collaborate with local, state, and federal regulatory agencies and interested parties.

The data collected enhances the understanding of surface water-groundwater interactions within the Subbasin and can be used to verify the Subbasin groundwater model and inform future ISW monitoring and management.

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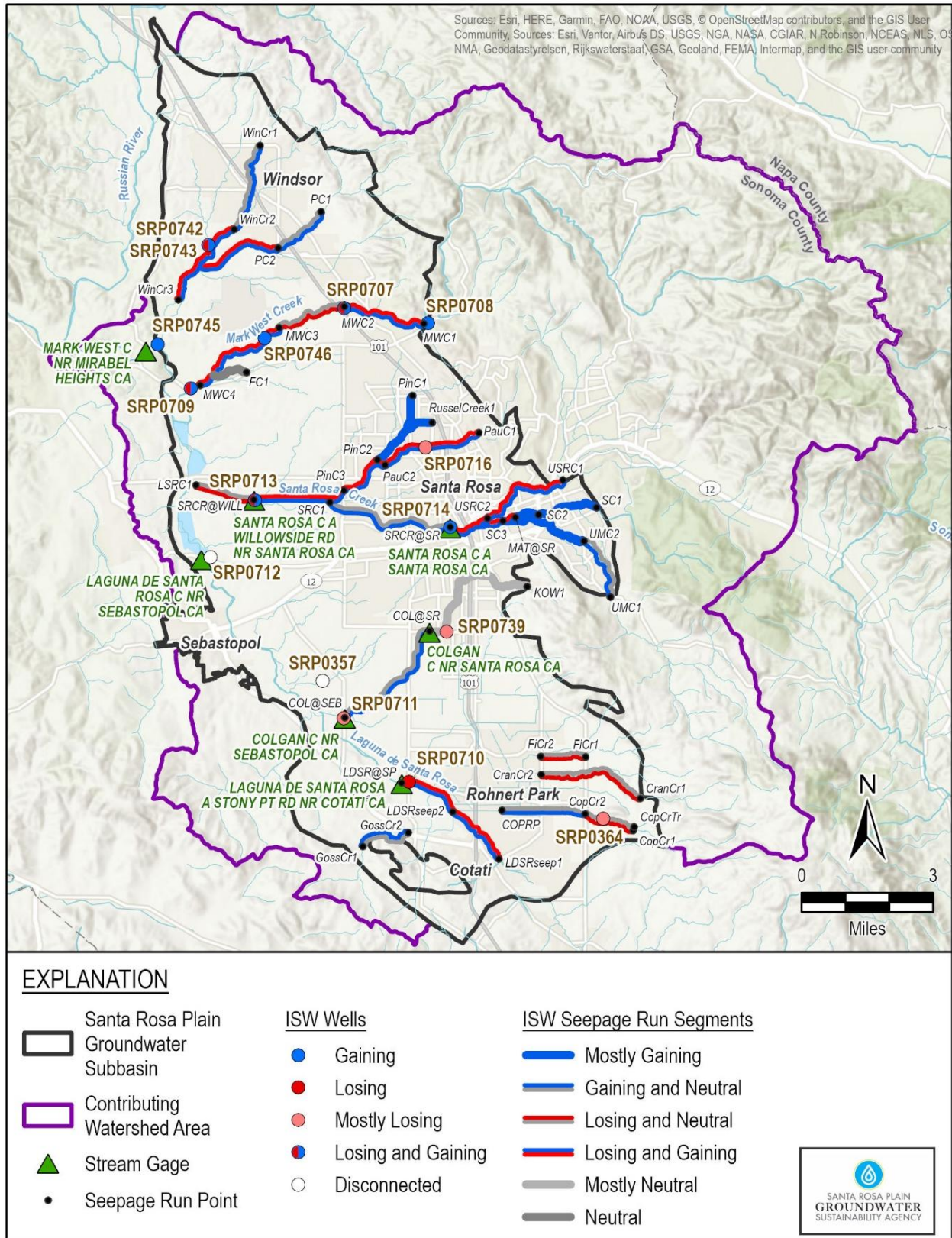


Figure 6-1. Santa Rosa Plain Subbasin Interconnected Surface Water Classification

6.2.3 New Information and Evaluation of Groundwater-Dependent Ecosystems

The initial characterization of GDEs in the Santa Rosa Plain Subbasin, as presented in the 2022 GSP, was based on shallow groundwater levels from the dry years of 2015-2016. The initial GDE extent was mapped using vegetation polygons from the 2013 Sonoma Veg Map, identifying GDEs in areas where the average depth to groundwater was within 30 feet of the land surface (*Sonoma Veg Map*, 2013). These conditions represented a baseline under drought-impacted, lower groundwater levels. To reflect wetter conditions and to address recommendations from the practitioner Work Group, GDE mapping was updated using spring 2023 shallow groundwater levels, which were higher due to above-average rainfall and classified as a normal water year. The update of GDE extent provides a more comprehensive assessment by incorporating wetter climate conditions and adding the Natural Communities Commonly Associated with Groundwater (NCCAG 2.0) dataset to identify GDEs (The Nature Conservancy, 2025).

Table 6-1 summarizes GDE categories in the Santa Rosa Plain Subbasin, comparing areas from using spring depth to water data in 2015/2016 and 2023. Totals indicate an overall increase in GDE extent of 886 acres when using the 2023 spring groundwater levels. There is a decrease in phreatophyte vegetation because while much of the Subbasin experienced groundwater level increases, some areas had declines in levels. Figure 6-2 compares the mapped GDE distribution based on spring depth to water data in 2015/2016 and 2023.

Table 6-1. Santa Rosa Plain Subbasin Change in GDE Extent Based on Using Spring 2023 Depth to Water		
GDE Category	GDE Area based on 2015/2016 Spring Depth to Water	GDE Area based on 2023 Spring Depth to Water
Freshwater Marsh (Sonoma Veg Map)	952	1,249
Oak Woodland (Sonoma Veg Map)	1,710	1,999
Riparian Forest (Sonoma Veg Map)	1,152	1,556
Wetlands (TNC/NCCAG)	452	413
Phreatophyte Vegetation (TNC/NCCAG)	817	752
Total	5,083	5,969

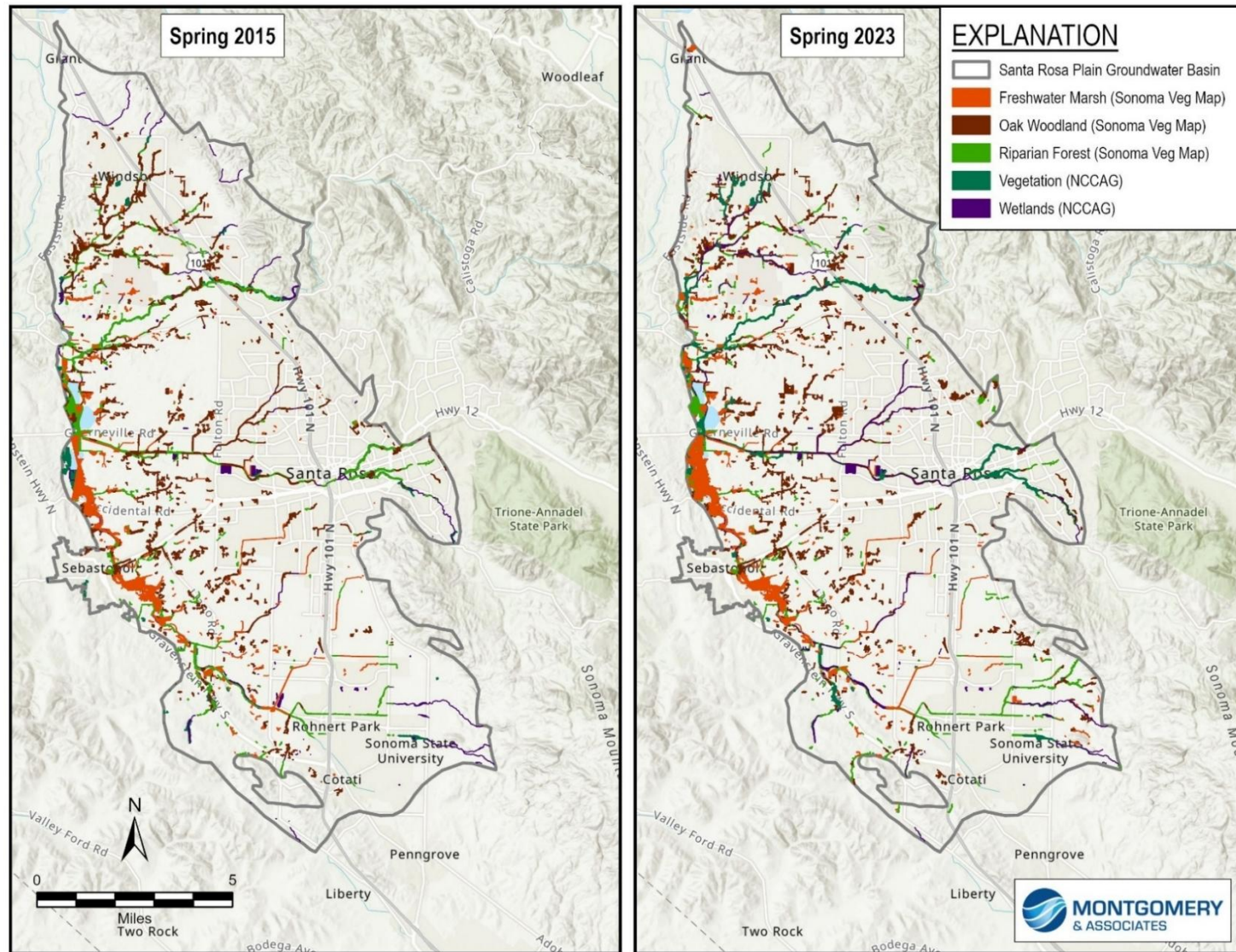


Figure 6-2. Santa Rosa Plain Subbasin Groundwater-Dependent Ecosystem Extent Comparison Based on Spring 2015/2016 and Spring 2023 Depth to Groundwater

The updated mapping helps fill data gaps and ensures the GDE characterization responds to stakeholder input and environmental conditions. More details on data sources, methodology, and results are available in Appendix 6-2, which is a technical memorandum documenting the revised analysis.

Vegetation health using Normalized Difference Vegetation Index (NDVI) was evaluated across these GDE polygons to identify trends and changes in GDE health. Methods developed by The Nature Conservancy were used to summarize NDVI from Landsat 8 satellite imagery for each GDE polygon. In general, GDEs in summer 2023 were healthy with over 75 percent of GDE polygons having an average NDVI of 0.45 or higher, which is considered moderately to very healthy (Melissa Rohde, personal communication, January 30, 2025). Most of the GDE polygons exhibit stable or slightly increasing vegetation health trends based on NDVI values over the 40-year period from 1985 to 2024. Only 8.6 percent of GDE polygons show declining NDVI trends over that period. Time series of NDVI revealed abrupt changes in GDE polygons where fire or land use change impacted NDVI for the polygon. These GDE polygons were flagged and evaluated for inclusion in the GDE designation or not based on confirmed disturbances. Several GDEs were excluded due to fire-impacts and land use changes. Appendix 6-2, Figures 13 and 14 provide examples of declining NDVI disruption due to fire and land use change.

To ground-truth NDVI values with observed GDE health, field surveys were conducted in September 2025 within 0.5-acre survey areas at six accessible GDE communities: four in riparian forest and two in oak woodlands. Sonoma Ecology Center biologists recorded native and non-native vegetation density and health, supported by geolocated photos. General findings from the six surveyed GDE sites indicate healthy to vigorous conditions. Native dominant species show little to no acute stress, with localized stress limited to select individuals. Non-native invasives — including Himalayan blackberry, Harding grass, and French broom — are present across sites but not dominant. Survey results are being analyzed and compared to concurrent NDVI data to inform future GDE monitoring strategies.

6.3 Model Updates

The SRPHM 1.0+ hydrologic model was used to support the GSP (Sonoma Water, 2021). Since publication of the GSP, SRPHM has undergone two updates. SRPHM 2.1 was used to support this Periodic Evaluation and the water budgets presented in Sections 6.4.4 and 6.4.5 reflect this updated version.

The first model update was a recalibration of SRPHM 1.0+ undertaken by the USGS in cooperation with the SWRCB and Sonoma Water, released as SRPHM 2.0 (Alzraiee *et al.*, 2025). The recalibration largely focused on lowering simulated groundwater heads that results from updated, decreased pumping estimates. A detailed description of the recalibration is provided in Scientific Investigations Report 2024-5121 (Alzraiee *et al.*, 2025).

The second update produced SRPHM 2.1, which was developed for this Periodic Evaluation based on recommendations identified during GSP implementation (GSP Appendix 7-A; Sonoma Water, 2021) and in consultation with Sonoma Water. SRPHM 2.1 extends the SRPHM 2.0 simulation period through WY 2024 using updated climate, recycled water supply, pumping, and septic return flow inputs. Rural domestic pumping and septic return flow estimates were revised across the full historical period using parcel-level water use data from the GUIDE database compiled during GSP implementation. SRPHM 2.1 includes no structural changes relative to SRPHM 2.0. A full recalibration of these changes to the model was not necessary, as the calibration was largely unchanged. A complete description of the SRPHM 2.1 updates, inputs, and validation is provided in Appendix 6-3. SRPHM 2.1 provides an appropriate and effective tool for evaluating basin conditions, supporting groundwater budget development, and informing GSP implementation, including evaluation of management actions under projected climate variability.

6.4 Water Use Changes and Associated Water Budget

This section describes changes to land use and water use, including surface water supply reliability over the evaluation cycle. Using best available information on water use and land use, current and projected water budgets are updated from those developed for the 2021 GSP.

6.4.1 Land Use Changes

An analysis of the DWR 2016 land use compared to more recent DWR land use datasets from 2020 and 2023 showed minimal changes (less than 2 percentage points difference) in agricultural land use, including vineyards (Figure 6-3). The analysis is documented in a report on model updates contained in Appendix 6-3. Due to recent adverse economic conditions and reduced demand for wine, there has been some fallowing of vineyards which is not yet captured in available land use datasets. Based on current best available information, there have not been any mapped significant land use changes over the evaluation cycle.

Urban areas continue to represent the largest land use category. Most of the urban land cover is in the north and southeast portions of the Subbasin, including the cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol (on the western boundary of the Subbasin), and the Town of Windsor (Sonoma Water, 2021). The second largest land use is agriculture, which is largely comprised of vineyards, followed by pastures. Vineyards are predominantly found in the northwest portions of the Subbasin and around the Town of Windsor. Pastures cover much of the central and southern portions of the Subbasin's western boundary. Native riparian accounts for the fourth largest land use category in the Subbasin and is primarily concentrated along the southwest and eastern borders of the Subbasin.

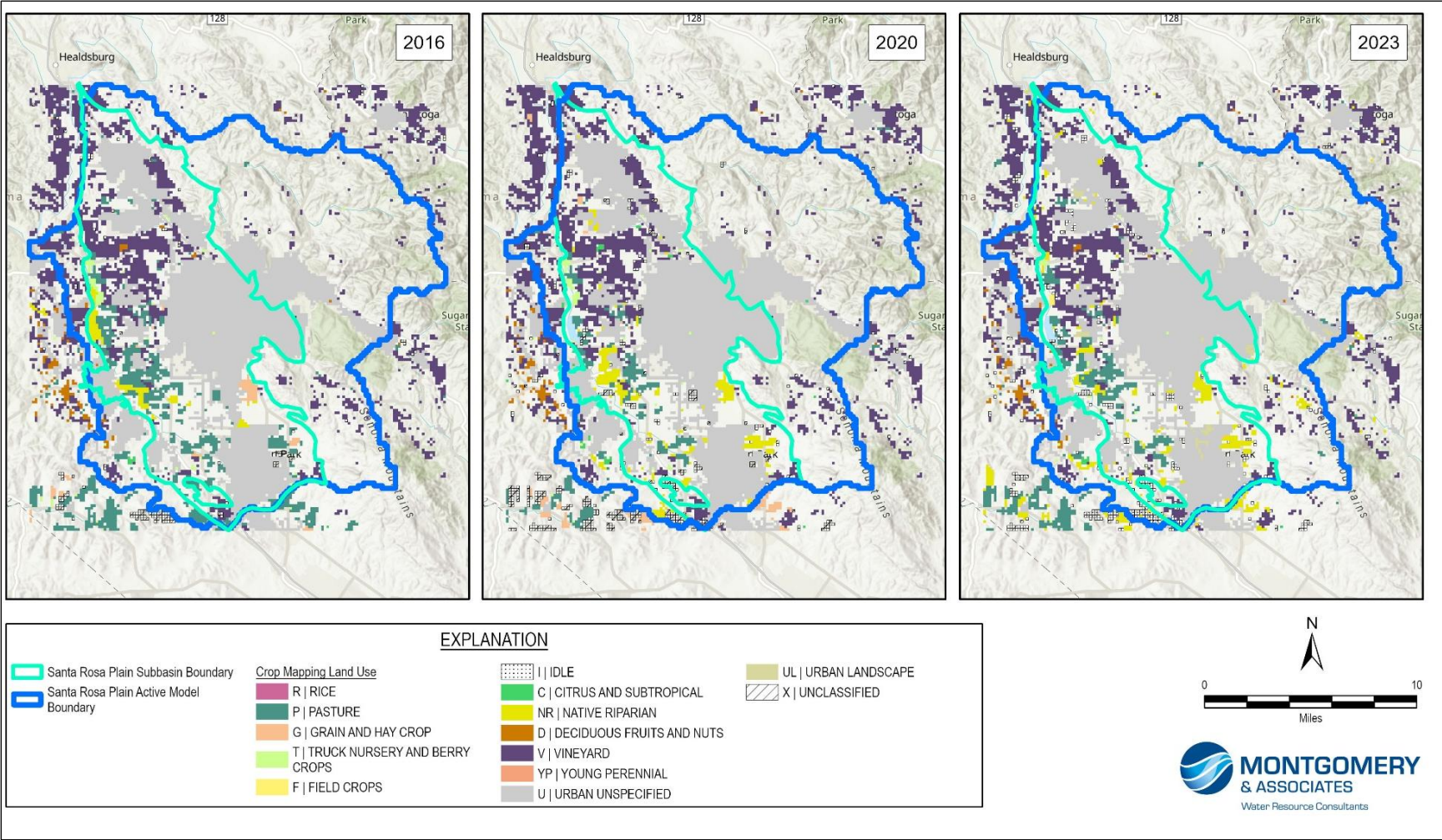


Figure 6-3. Comparison of 2016, 2020, and 2023 Land Use in Santa Rosa Plain Subbasin and Watershed Area

6.4.2 Water Use Changes

As described in Section 2.3 of the GSP, groundwater extraction, surface water (imported and local diversions), and recycled water are the primary sources of water supply in the Subbasin. Groundwater is the only source of supply for the City of Sebastopol and supports the agricultural, rural residential, unincorporated commercial, and unincorporated industrial water-use sectors. Groundwater also represents an important supplemental and emergency supply for the cities of Santa Rosa, Rohnert Park, Cotati, and the Town of Windsor. Imported surface water from the Russian River accounts for the largest source of water in the Subbasin and supplies the cities of Santa Rosa, Rohnert Park, Cotati, the Town of Windsor, and California American Water’s Larkfield Wikiup District. Recycled water from wastewater treatment plants operated by the Town of Windsor and City of Santa Rosa contributes an important component of the overall water use, serving as an alternative to groundwater or imported water for agricultural and landscape irrigation. Local surface water diversions from Mark West Creek, Santa Rosa Creek, and the Laguna de Santa Rosa serve as a smaller source of supply for some agricultural users (Sonoma Water, 2026a).

Figure 6-4 shows total estimated water use volumes from 2020 to 2025, classified by the Subbasin’s primary water sources. Municipal surface water and groundwater uses, as well as recycled water are based on metered and reported data, while GUIDE land-use based estimates are used for groundwater use estimates for all other sectors (agricultural, commercial, and rural domestic). Local surface water diversions are based on reported surface water diversions filed with the SWRCB.

Total water use over the evaluation cycle (2021 to 2025) averaged 45,838 acre-feet per year (AFY), which was less than the WY 2020 total water use of 51,533 acre-feet (AF). Of the three primary sources, surface water use has the greatest variability, peaking at 25,312 AF in 2020 (a normal year) and reaching its lowest use at 21,022 AF in 2022 (a dry year). Recycled water use fluctuated by 2,207 acre-feet over the evaluation cycle, peaking at 5,945 AF in 2022 (a dry year) and reaching its lowest use at 3,738 AF in 2021 (a very dry water year). Estimated groundwater extraction varied from approximately 17,800 AFY to 20,400 AFY during the evaluation cycle with the highest levels of extraction occurring during the 2021/2022 drought. Total annual estimated groundwater extraction remained below the estimated sustainable yield for the Subbasin of 23,900 AFY during the evaluation cycle.

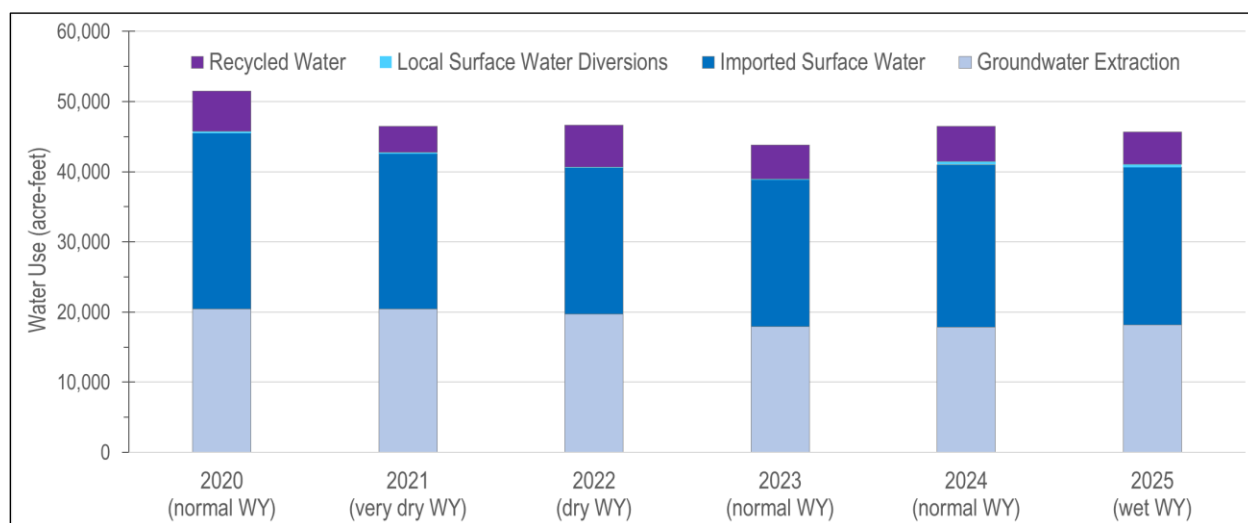


Figure 6-4. Total Water Use in the Santa Rosa Plain Subbasin by Source (2020-2025)

Using the groundwater budgets described in Sections 6.4.4 and 6.4.5, the current and projected groundwater extraction in the GSP water budgets and the current and projected groundwater extraction in the updated water budgets developed for this PE were compared and summarized in Table 6-2.

The GSP estimated an approximately 29 percent increase (5,900 AFY) in average total groundwater pumping from current (WY 2012-2018) to projected (WY 2021-2070) conditions across all water-use sectors. The largest projected increase was in agricultural pumping (33 percent), attributable to projected expansion of irrigated crop acreage in the Subbasin combined with increased potential ET and irrigation demand under the climate change projection. Municipal demand was projected to increase by approximately 31 percent, and rural domestic demand was projected to increase by approximately 10 percent.

The updated Periodic Evaluation water budgets show more modest growth in estimated pumping from current (WY 2019-2024) to projected (WY 2025-2074) conditions. Across sectors, average pumping increases approximately 22 percent (4,200 AFY). Agricultural pumping is projected to increase approximately 19 percent, 14 percentage points less than the increase projected by the GSP. The smaller projected increase reflects a methodological difference and updated projected future climate and hydrology, rather than a finding that future agricultural water demand will be lower than previously anticipated. Projected growth in combined municipal and industrial and rural domestic pumping is broadly similar between the GSP and updated PE projections. The projected 31 percent increase in municipal groundwater pumping is considered to remain appropriate based on the stable to decreasing trends observed in municipal pumping during the evaluation cycle. Trends in groundwater pumping across all groundwater use sectors and any known plans for future changes to groundwater pumping patterns will continue to be evaluated and incorporated into future projected scenarios.

Table 6-2. Comparison of Groundwater Extraction between Santa Rosa Plain Subbasin Current and Projected Water Budgets			
Groundwater Pumping by Sector	GSP Water Budgets	Updated Periodic Evaluation Water Budgets	Key Difference
Agricultural	33% increase from current to projected	19% increase from current to projected	Updated water budgets show less pumping, difference reflects methodological updates, not reduced future demand
Municipal & Industrial	31% increase from current to projected	Increase similar to GSP projected increase	No substantial difference
Rural Domestic	10% increase from current to projected	Increase similar to GSP projected increase	No substantial difference
Total Groundwater Pumping (All Sectors)	29% increase (~5,900 AFY) from current to projected	22% increase (~4,200 AFY) from current to projected	Updated water budgets show slightly less pumping than GSP water budgets

6.4.3 Surface Water Supply Reliability

As described in Section 6.4.2, imported Russian River surface water is delivered by Sonoma Water to the cities of Santa Rosa, Cotati, and Rohnert Park, the Town of Windsor, and California American Water's Larkfield Wikiup District. Based on a water supply reliability analysis of imported Russian River water in Section 6 of Sonoma Water's 2025 Urban Water Management Plan (UWMP), a comparison of the projected water supply and demand for Sonoma Water from 2030 through 2050 concludes that Sonoma Water expects to have adequate water supply through the 2050 planning horizon, including in dry years (Sonoma Water, 2026b). In the event of an unexpected shortage, Sonoma Water will work with its customers to reduce water demands, or to utilize additional local water sources, or both.

A drought risk assessment in the 2025 UWMP compares estimated water supplies and demands for the next five years, assuming those years are similar to the five consecutive driest years on record (1987-1991). The comparison shows that Sonoma Water has adequate water supply to meet demands. The key issues that may create a water shortage situation include drought conditions and emergencies resulting from events such as earthquakes and contamination.

As described in Section 3.2, Sonoma Water recently completed a Regional Water Supply Resilience Study, which analyzes the impacts and response scenarios to potential future hazards (Jacobs, 2026). The key findings of this Resilience Study indicate:

- Drought is the most severe threat, causing the largest potential shortage and longest duration of water scarcity.
- Seismic events are also a significant hazard to the regional water supply system.
- Uncertainty associated with future diversions of Eel River water through the Potter Valley Project is important, but the potential impact is largely experienced in the Upper Russian River and storage in Lake Mendocino. The regional water system operated by Sonoma Water delivers imported surface water into the Subbasin from Lake Sonoma through its transmission system. These deliveries are projected to only experience modest and short duration impacts associated with reduced diversions from the Eel River.
- Wildfires, when coupled with flood-after-fire, are significant, but acute and relatively short duration hazards to regional water supply.
- Flooding risk to the water supply system is likely acute and short duration.

Identified resilience strategies to mitigate future impacts from emergencies are being developed by Sonoma Water and its water supply contractors and include actions that are consistent with many of the GSP PMAs such as reducing water demands and developing a regional water bank.

6.4.4 Updated Current Groundwater Budget

The updated current groundwater budget represents conditions from WY 2019 through WY 2024, which covers a range of climatic conditions including 1 wet, 3 normal, 1 dry, and 1 very dry water year types. This 6-year period follows the WY 2012-2018 current period reported in the GSP and reflects the most recent water use and hydrologic conditions in the Subbasin. The updated current groundwater budget inflows and outflows (WY 2019-2024) remain broadly consistent with the current groundwater budget for WY 2012-2018 as published in the GSP (Table 6-3 and Table 6-4). Both groundwater budgets were developed using the same groundwater model, although the model was recalibrated by the USGS and further updated during the evaluation cycle to incorporate the latest available information (Section 6.3 and Appendix 6-3).

Table 6-3 provides a comparison between the GSP and updated current groundwater budgets, as simulated with the two model versions: GSP model and SRPHM 2.1 (updated model for this assessment). Average annual groundwater inflows simulated by the updated model total approximately 51,100 AFY, similar to the GSP value of approximately 50,700 AFY. The relative proportions of individual inflow components remain consistent with the GSP. Deep percolation of precipitation and applied water continues to be the largest inflow, followed by streambed recharge and subsurface inflow from neighboring basins. Average recharge and subsurface inflow from the surrounding watershed both increased slightly, 3 percent and 5 percent, respectively, while average streambed recharge and subsurface inflow from neighboring basins both decreased 3 percent and 7 percent, respectively. Septic return flows have the greatest change, increasing 33 percent from 1,200 AFY to 1,600 AFY, reflecting the GUIDE-based revisions to rural domestic pumping and septic return flow estimates incorporated into SRPHM 2.1 (Appendix 6-3).

Table 6-3. Summary of Simulated Groundwater Inflows from the GSP Model (WY 2012-2018) and SRPHM 2.1 Current Period (WY 2019-2024)						
	Annual Statistic	Deep Percolation (Recharge)	Streambed Recharge	Septic Return Flows	Subsurface Inflow from Surrounding Watershed	Subsurface Inflow from Neighboring Basins
	Acre-feet per year*					
GSP Model WY 2012-2018	Mean	25,200	14,900	1,200	2,000	7,400
	Minimum	12,600	12,300	1,200	2,000	7,100
	Maximum	53,400	19,700	1,200	2,100	7,700
	Median	20,800	14,700	1,200	2,000	7,400
Updated Model SRPHM 2.1 WY 2019-2024	Mean	26,000	14,500	1,600	2,100	6,900
	Minimum	8,900	10,900	1,600	2,000	6,600
	Maximum	38,100	16,900	1,600	2,100	7,200
	Median	27,800	15,700	1,600	2,100	6,800
*Values are rounded to the nearest 100 acre-feet						

Average annual groundwater outflows simulated by SRPHM 2.1 total approximately 50,800 AFY, compared to approximately 53,000 AFY in the GSP. The largest individual decreases in outflows occur in agricultural pumping (9,100 AFY versus 10,400 AFY, 13 percent decrease) and discharge to streams (12,600 AFY versus 13,700 AFY, 9 percent decrease). These differences are consistent with the USGS model recalibration (resulting in SRPHM 2.0), which reduced simulated recharge, agricultural pumping, discharge to streams, outflow to adjacent basins, and surface leakage relative to the GSP model (Alzraiee *et al.*, 2025). Combined average municipal and industrial and rural domestic pumping increased 9 percent from 9,500 AFY to 10,400 AFY, reflecting the GUIDE-based revisions to rural domestic pumping estimates (rural domestic pumping increased from approximately 2,900 AFY to 4,200 AFY). Groundwater evapotranspiration remains at 9,500 AFY, while subsurface outflow to adjacent basins and surface leakage decreased 8 percent and 6 percent, respectively.

Generally, some of the differences between GSP and PE current water budgets can be attributed to the different time frame and associated hydrology, as well as model updates.

Table 6-4. Summary of Simulated Groundwater Outflows from the GSP Model (WY 2012-2018) and SRPHM 2.1 Current Period (WY 2019-2024)							
	Annual Statistic	Agricultural Pumping	Groundwater ET	Subsurface Outflow to Adjacent Basins	Discharge to Streams	Surface Leakage	M&I + Rural Domestic
	Acre-feet per year*						
GSP Model WY 2012-2018	Mean	10,400	9,500	4,700	13,700	5,200	9,500
	Minimum	8,700	8,600	4,500	10,200	3,200	7,300
	Maximum	11,400	11,800	5,000	19,200	9,500	11,200
	Median	10,400	9,200	4,700	14,100	5,100	9,900
Updated Model SRPHM 2.1 WY 2019-2024	Mean	9,100	9,500	4,300	12,600	4,900	10,400
	Minimum	7,700	8,000	4,200	8,100	2,600	9,200
	Maximum	11,100	10,900	4,400	16,500	7,000	11,000
	Median	9,100	9,600	4,300	12,700	5,100	10,600
*Values are rounded to the nearest 100 acre-feet							

6.4.5 Updated Projected Groundwater Budget

The projected groundwater budget represents the 50-year planning and implementation horizon under projected water demand and climate conditions. The updated projected period spans WY 2025 through WY 2074, compared to WY 2021 through WY 2070 for the GSP projection. The following subsections describe the assumptions and approach used to develop the updated projected groundwater budget and the resulting inflow and outflow components relative to those reported in the GSP.

6.4.5.1 Projected Assumptions and Approach

Future projected conditions are based on model simulations using the updated model as well as estimates of projected climate change and groundwater pumping. In contrast with the GSP model, future projected land use changes were not considered in this evaluation, due to low evidence of major anticipated land use changes.

As with the GSP model, climate change was incorporated into projected future simulation scenarios to assess the impact of climate change on groundwater conditions, demands, and availability, and to identify uncertainties in future conditions when including projects and management actions, and verify SMC.

The GSP model used a climate scenario included in the Coupled Model and Intercomparison Project 5 (CMIP5; see Section 3.3.6.1 of GSP). The updated projected water budget uses more recent climate information from the Coupled Model and Intercomparison Project 6 (CMIP6), which features higher spatial resolution with enhanced physical parameterizations and improved representations of synoptic processes. Shared Socioeconomic Pathways (SSPs) are scenarios used in climate research to explore how global societal trends might influence future greenhouse gas emissions and climate change. The updated climate scenario also strongly reflects trends in updated forecasts of precipitation and temperature. The specific climate change scenario (EC-Earth3-Veg SSP3-7.0) was chosen to be consistent with the approach in the GSP to use a central tendency climate change projection that best represents projected mean conditions in the Subbasin (Appendix 6-4). Compared with average conditions within the Russian River Watershed between

1981 and 2010, the updated scenario is approximately 4°F warmer and 1 percent drier. Compared to the GSP climate change scenario, the updated scenario is slightly drier and cooler.

Model inputs for the projected baseline are consistent with prior GSP modeling, using updated best available information (Table 6-5).

Table 6-5. Summary of Model Inputs for Predictive Baseline Scenario	
Model Component	Approach for Developing Projected Scenario
Land use and irrigation status	Kept constant from the end of the historical model, reflecting current understanding of projected land use changes.
Small water system pumping	Maintained at 2019-2024 average annual volumes.
Larger municipalities pumping	Used identical assumptions to the GSP, updated based on the new future climate year classifications (very dry, dry, normal, wet, very wet), and with the groundwater production patterns observed in the current period (WY 2019 to WY 2024).
Rural Domestic Pumping	Rural domestic pumping repeats the last year of the updated SRPHM (WY 2024), while incorporating the same volumetric growth factors used in the GSP (0.5% per year). WY 2024 was used as a base because it reflects updated GUIDE-based water use information.
Septic return flows	Similar to rural domestic pumping; used the WY 2024 value increased by the same factor over the 50-year period.
Recycled water	Repeated the annual average volume from WY 2019 to WY 2024, repeated for the entire 50-year scenario.

6.4.5.2 Projected Groundwater Budget Results

Projected groundwater inflows and outflows are summarized in Table 6-6 and Table 6-7 and presented graphically in Figure 6-5 and Figure 6-6, respectively. Mean annual projected groundwater inflows simulated by the updated model total approximately 51,000 AFY, which are lower than the GSP model projected total of approximately 57,200 AFY. The largest change is in deep percolation of precipitation and applied water, which averages 24,500 AFY in updated compared to 28,800 AFY in the GSP. The new projected climate scenario used for this evaluation (described in the previous section) estimates overall less precipitation, which reduces the total inflow compared to the GSP. The projected climate scenario also estimates slightly cooler temperatures compared to the GSP projected scenario, which reduces ET, and thus the need for applied irrigation water. Streambed recharge decreases slightly (15,800 AFY versus 16,900 AFY), and subsurface inflow from neighboring basins declines from 8,000 AFY to 7,000 AFY. These two inflow changes are primarily driven by model updates, but also by the projected hydrology. Septic return flows (1,800 AFY versus 1,500 AFY) are slightly higher in the updated model, while subsurface inflow from surrounding watershed areas shows slight variation from the GSP. Consistent with the current water budget, projected deep percolation and streambed recharge remain the dominant inflow components.

Table 6-6. Summary of Simulated Groundwater Inflows from the GSP Model (WY 2021-2070) and SRPHM 2.1 Projected Period (WY 2025-2074)

	Annual Statistic	Deep Percolation (Recharge)	Streambed Recharge	Septic Return Flows	Subsurface Inflow from Surrounding Watershed	Subsurface Inflow from Neighboring Basins
	Acre-feet per year*					
GSP Model WY 2021-2070	Mean	28,800	16,900	1,500	2,000	8,000
	Minimum	6,200	10,500	1,200	1,900	7,200
	Maximum	57,900	21,700	1,700	2,200	8,500
	Median	27,200	17,200	1,500	2,000	8,100
Updated Model SRPHM 2.1 WY 2025-2074	Mean	24,500	15,800	1,800	1,900	7,000
	Minimum	5,400	9,200	1,600	1,800	6,500
	Maximum	45,600	21,600	1,900	2,000	7,500
	Median	24,200	15,800	1,800	1,900	7,000

*Values are rounded to the nearest 100 acre-feet

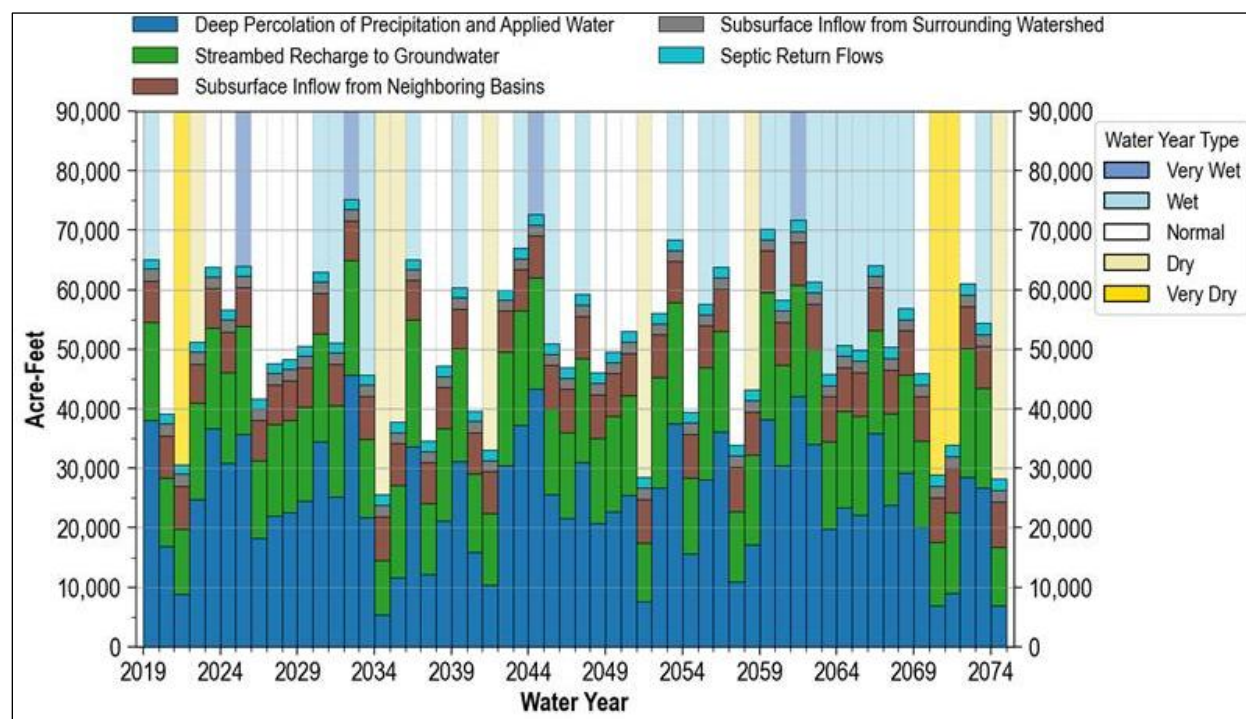


Figure 6-5. Current and Projected Inflows to Santa Rosa Plain Subbasin

Mean annual projected groundwater outflows simulated by the updated model total approximately 51,900 AFY, compared to approximately 58,400 AFY in the GSP. Agricultural pumping averages 10,800 AFY in the revised projected water budget, down from 13,800 AFY in the GSP, a difference largely attributable to holding irrigated acreage constant in the updated model projected period, whereas the GSP projection incorporated an increase in irrigated acreage. Differences in the projected climate scenarios and the effects of the recalibration also contribute to these differences. Groundwater discharge to streams (10,800 AFY versus 12,800 AFY), surface leakage (4,000 AFY versus 4,900 AFY), and groundwater ET (9,600 AFY versus 10,600 AFY) are also lower in the updated projection. Reductions in discharge to streams and surface leakage are consistent with the USGS recalibration, while a reduction in groundwater ET is consistent with a cooler projected climate scenario relative to the GSP. Combined M&I and rural domestic pumping is similar (12,800 AFY versus 12,300 AFY), and subsurface outflow to adjacent basins shows slight variation from the GSP.

Overall, the updated projected water budget shows smaller total inflows and outflows than the GSP projection but preserves the relative proportions among individual budget components. Deep percolation continues to be the dominant inflow, and groundwater pumping combined with discharge to streams remain the largest outflows.

Table 6-7. Summary of Simulated Groundwater Outflows from the GSP Model (WY 2021-2070) and SRPHM 2.1 Projected Period (WY 2025–2074)

	Annual Statistic	Agricultural Pumping	Groundwater ET	Subsurface Outflow to Adjacent Basins	Discharge to Streams	Surface Leakage	M&I + Rural Domestic
	Acre-feet per year*						
GSP Model WY 2021-2070	Mean	13,800	10,600	4,000	12,800	4,900	12,300
	Minimum	10,700	6,900	3,400	7,800	1,500	9,500
	Maximum	16,800	15,500	4,500	20,600	11,400	13,700
	Median	13,700	10,700	4,100	13,100	5,000	12,700
Updated Model SRPHM 2.1 WY 2025-2074	Mean	10,800	9,600	3,900	10,800	4,000	12,800
	Minimum	5,100	6,200	3,600	5,500	1,500	8,200
	Maximum	14,400	13,300	4,200	17,400	7,900	15,500
	Median	10,700	9,600	3,900	10,900	4,000	13,000

*Values are rounded to the nearest 100 acre-feet

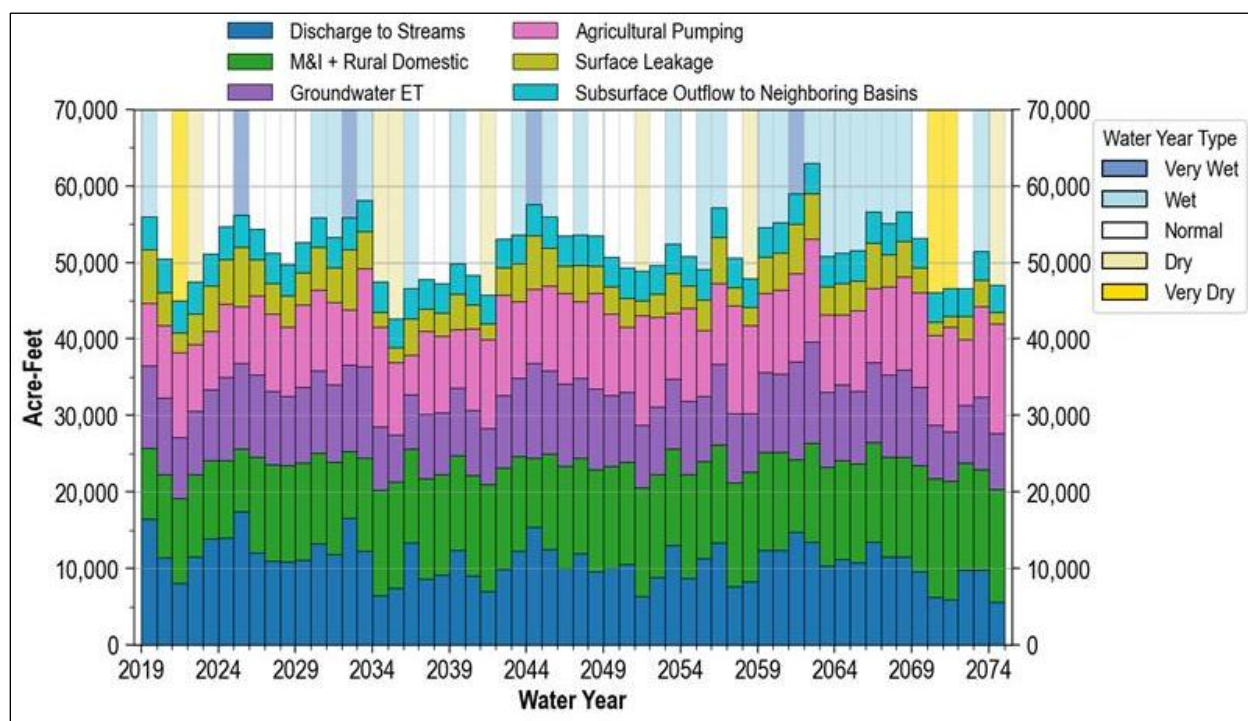


Figure 6-6. Current and Projected Outflows from Santa Rosa Plain Subbasin

6.4.6 Evaluation of Projected Groundwater Levels Compared to SMC

The projected baseline model was used to evaluate simulated groundwater levels at RMPs and potential future projected MT exceedances and undesirable results. In the shallow aquifer, only 1 RMP well is predicted to have an MT exceedance over the predictive simulation period, which does not constitute an undesirable result. In the deep aquifer, the projected baseline scenario predicts MT exceedances at 9 RMP wells over the simulation period. Based on the repeated number of exceedances, this would result in seven wells (47 percent) contributing to an undesirable result.

This evaluation shows the need to implement PMAs to avoid undesirable results in the future and ensure sustainability in the Subbasin. Further analysis and a comparison on how MT exceedances and undesirable results can be avoided is provided in Section 7.7.2.4.

6.4.7 Change in Storage and Sustainable Yield

Change in groundwater storage is equal to the sum of groundwater inflows minus the sum of groundwater outflows over the budget period. A negative value indicates net storage depletion; a positive value indicates net gain. Annual statistics for the projected period simulated by the updated model (WY 2025-2074) and the corresponding GSP projected period (WY 2021-2070) are summarized in Table 6-8.

Table 6-8. Summary of Santa Rosa Plain Subbasin Projected Average Annual Change in Groundwater Storage		
Annual Statistic (AFY)	GSP Model WY 2021 - 2070	Updated Model WY 2025 - 2074
Mean	-1,400	-900
Minimum	-24,900	-21,900
Maximum	18,000	19,000
Median	-2,000	-1,800
*Values are rounded to the nearest 100 acre-feet		

Consistent with the GSP projection, the updated projected water budget indicates that the Subbasin would experience an average annual decline in groundwater storage over the 50-year projection period. The mean annual change in storage simulated by the updated model is -900 AFY, compared to -1,400 AFY in the GSP projection. Minimum, maximum, and median annual values are similar between the two projections, with the largest single-year declines of approximately -21,900 AFY in the updated model and -24,900 AFY in the GSP, and maximum single-year gains of approximately 19,000 AFY and 18,000 AFY, respectively. Median annual change in storage is -1,800 AFY in the updated model and -2,000 AFY in the GSP, indicating that most years simulated in both projections exhibit net storage loss.

Projected annual and cumulative change in groundwater storage within the Subbasin are presented in Figure 6-7. On a cumulative basis, the total change in groundwater storage simulated during the 50-year projected period is approximately -47,300 AF. For comparison, the GSP reported a cumulative decline of -71,500 acre-feet during the 50-year projected period (WY 2021–2070). The updated projection therefore indicates approximately 24,200 AF less cumulative storage decline than the GSP projection.

As in the GSP projection, storage changes remain correlated with water year type. Cumulative storage change oscillates between 10,000 and -35,000 AF throughout most of the projected period, centered approximately around -20,000 AF. During the latter part of the projected simulation period, two very dry and one dry year in a five-year span from WY 2070 to WY 2074 result in a notable decline in storage, exceeding 40,000 AF. This pattern differs from the GSP projection, which exhibited a more sustained cumulative decline beginning around WY 2050 as the climate projection became relatively warmer and drier than the earlier portion of the projected period.

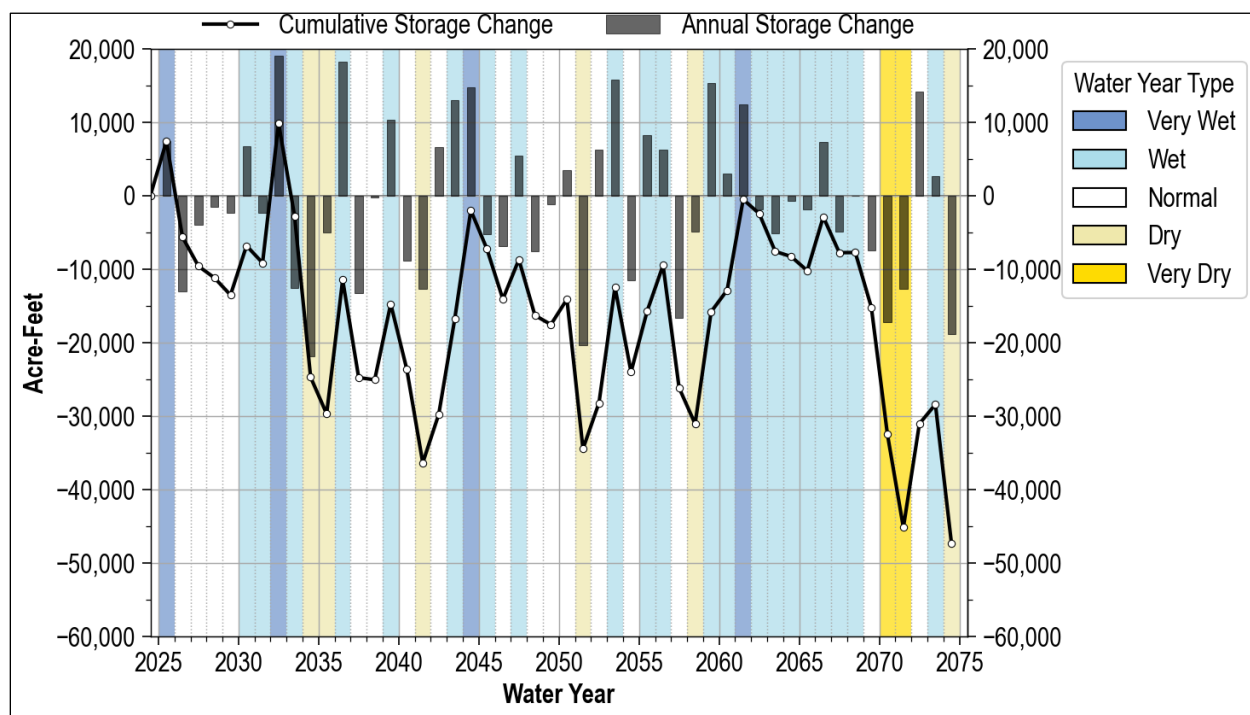


Figure 6-7. Projected Santa Rosa Plain Subbasin Groundwater Storage Change

As defined in the GSP, “The sustainable yield of the Subbasin is an estimate of the quantity of groundwater that can be pumped on a long-term average annual basis without causing undesirable results.” The sustainable yield of 23,900 AFY calculated for the Subbasin is based on average annual pumping in the two-decade period from WY 2021-2040, as simulated by the baseline GSP projected scenario. This period was chosen because it contained a range of water year types and had close to zero cumulative change in storage. Like the GSP predictive scenario, the first two decades of the updated predictive scenario period (WY 2025-2045) contain a range of water year types and simulate close to zero cumulative change in storage (Figure 6-7). Average pumping over WY 2025-2045 in the updated baseline scenario (22,300 AFY) is lower than the sustainable yield, and average pumping over the entire updated baseline scenario is also slightly lower than the sustainable yield (23,600 AFY). Average pumping from WY 2046-2074 of the updated baseline scenario is higher than the sustainable yield due to the drought simulated in this period (24,600 AFY; Figure 6-8).

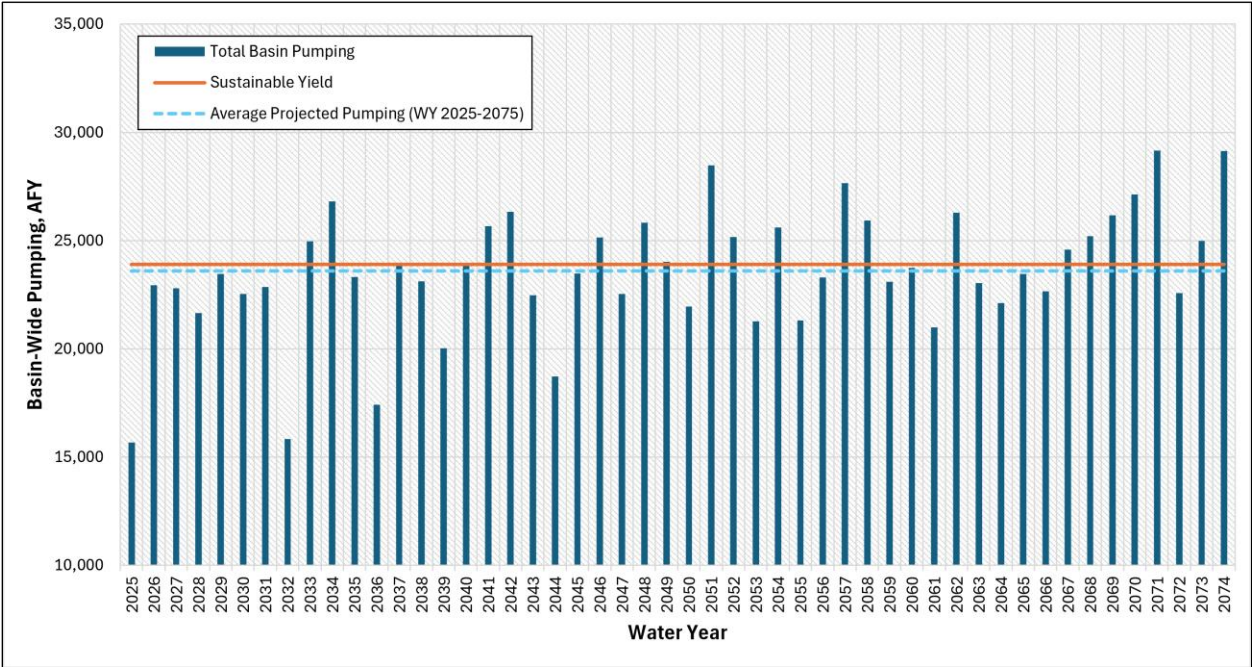


Figure 6-8. Projected Santa Rosa Plain Baseline Pumping Compared to Sustainable Yield

7 STATUS OF PROJECTS AND MANAGEMENT ACTIONS

The GSP regulations require a description of the projects and management actions (PMAs) the GSA has determined will achieve the GSP's sustainability goal, including projects and management actions to respond to changing conditions. The GSP identified the following three projects and three management actions requiring additional assessment and noted that not all projects and actions have to be implemented to attain sustainability:

Projects

- Water-Use Efficiency (WUE) and Alternate Water Source Projects
- Stormwater Capture and Recharge
- Aquifer Storage and Recovery (ASR)

Management Actions

- Coordination with farm plans and grower certification programs
- Assessment and prioritization of potential policy and program options
- Assessment of additional recycled water opportunities

Table 7-1 includes a brief description, status, expected schedule, and summary of anticipated benefits and benefits accrued or observed to date. Sections 7.1 through 7.6 provide a description of each PMA, an implementation status update, and planned or recommended next steps. Section 7.7 describes the results of updated model simulations performed to confirm the three projects remain appropriate for maintaining sustainable groundwater conditions within the Subbasin.

Table 7-1. Project and Management Actions Summary				
Project or Management Action Name	Project or Management Action Description	Project Status	Expected Schedule	Anticipated Benefits and any Benefits Observed to Date
Water-Use Efficiency and Alternate Water Source Projects	Develop a voluntary program to deliver conservation tools and incentives to groundwater users and monitor results of water-use efficiency (WUE) measures. This project includes an assessment of groundwater-use characteristics, existing levels of water-use efficiency, and recommendations on preferred tools and strategies for implementation. While implementation of these projects is initially planned to be on a voluntary basis, the project will also identify specific metrics for evaluating the benefits of the projects and assess conditions that may lead to mandatory implementation of demand management actions.	Ongoing	2024-2042	Anticipated benefits for the WUE program will depend upon the types and degree of measures implemented, which will be evaluated through an updated implementation plan. At a minimum, the Well Aware voluntary program is expected to build awareness around groundwater use to increase efficiency and reduce groundwater demand. Initial benefits generated to date include significant direct engagement with groundwater users through the 2025 pilot Well Aware program which shared water-savings resources and tools and is estimated to have generated an estimated 26,000 touchpoints across the Santa Rosa Plain, Sonoma Valley, and Petaluma Valley basins through workshops, tabling events, presentations, newsletters, social media, and community outreach. This pilot laid the groundwork for further development of incentives and conservation tools over the next five years. Rough estimates of benefits and costs associated with outreach, Well Aware Toolkit hosting, and conservation consultations were developed based on the pilot program and indicate that the pilot could have potentially achieved 56-68 AFY of groundwater savings across the three basins (West Yost, 2026). Potential benefits of full build-out of a conceptual WUE program evaluated through model scenarios are described in Section 7.7.
Stormwater Capture and Recharge	Enhance and increase the recharge of groundwater through projects and land management practices that capture and infiltrate stormwater runoff. Project includes evaluating and piloting various recharge techniques and practices for local suitability, including stormwater detention features, low-impact development practices, on-farm recharge, and other farming practices.	Planning	2025-2042	Implementation of the stormwater capture and recharge projects are primarily anticipated to help avoid undesirable results for the depletion of interconnected surface water sustainability indicator. Depending upon the location of stormwater capture and recharge projects, and hydraulic connection between surficial recharge locations and the shallow aquifer system, there may be benefits to the chronic lowering of groundwater levels, groundwater storage, and land subsidence sustainability indicators. Initial benefits observed include, information sharing with landowners and groundwater users on potential stormwater capture and recharge techniques and opportunities, and initial insights on landowner interest in implementing stormwater recharge projects and practices. Evaluation of results from pilot studies is anticipated to yield additional benefits.
Coordination and support for planning and implementation of ASR projects	Local agencies have conducted regional and site-specific assessments and pilot studies for Aquifer Storage and Recovery (ASR) in the Santa Rosa Plain Subbasin. ASR would divert surplus Russian River drinking water during wet seasons for underground storage and recovery during dry periods or emergencies. Results from the pilot studies in the Santa Rosa Plain and neighboring Petaluma Valley Basin and Sonoma Valley Subbasin will provide the GSAs and other partners insights on how ASR could perform under a variety of hydrogeologic and geochemical environments and inform long-term ASR planning. Sonoma Water is also initiating an assessment of regional water banking opportunities, which includes an updated analysis of wintertime Russian River supply availability and conveyance capacity.	Planning	2025-2042	Anticipated benefits from implementation of ASR projects include: Limiting the potential for chronic lowering of groundwater levels and undesirable results for other associated sustainability indicators. Enhanced reliability of the regional water supply during droughts, natural hazard events (such as earthquakes), and periods of peak seasonal water demands. Initial benefits observed include information gained through the two pilot studies completed in 2025-2026, and one additional planned for 2027, and information sharing and collaboration with GSA member agency municipal water purveyors on ASR opportunities within the Subbasin. Evaluation of results from pilot studies is anticipated to yield additional benefits.
Assessment of additional recycled water opportunities	Evaluate options to expand and/or optimize the recycled water use for agricultural and landscape irrigation in the Subbasin that replaces or offsets groundwater use. This project will involve collaboration between the GSA, City of Santa Rosa, Town of Windsor, Sonoma Water, and others to assess additional recycled water opportunities.	Ongoing	2023-2042	Potential benefits from implementation of expanding and maximizing the efficiency of recycled use is anticipated to include a reduction in groundwater pumping and localized increases in groundwater levels. Project not yet implemented.

Table 7-1. Project and Management Actions Summary				
Project or Management Action Name	Project or Management Action Description	Project Status	Expected Schedule	Anticipated Benefits and any Benefits Observed to Date
Assessment of Potential Policy and Program Options	SGMA grants GSAs several authorities to support groundwater sustainability, often requiring coordination with land use agencies. This management action involves collaboration among the GSA Board, local land use agencies, member agencies, and stakeholders to evaluate potential policy and program options the GSA may adopt or recommend. A prioritized list of policies and programs will be developed and maintained, and updated as-needed.	Ongoing	2023-2042	Specific expected benefits for this management action will depend upon the type and scope of any policy options that are recommended and adopted by the GSA Board and/or partner agencies. However, the types of policy options considered and recommended will be those that focus on avoiding undesirable results and achieving the sustainability goal. Initial benefits observed include information and engagement with GSA Board, Advisory Committee and other stakeholders through dialogue and community and agricultural user surveys on policy and program options.
Coordination with Farm Plans and Grower Certification Programs	Integrate activities that support GSP implementation with existing farm plans or certification programs. Farm plans and other certification programs are voluntary, site-specific plans developed by third-party organizations with landowners to implement best practices that address issues like sediment runoff and water quality. The effort will focus on integrating shared goals such as improving water use efficiency, enhancing recharge, expanding monitoring, and streamlining data sharing—while also addressing challenges like data privacy, quality standards, and performance verification.	Conceptual	2027-2042	Anticipated benefits would include information sharing and coordination between the GSA and growers within the Subbasin. Other benefits will depend upon the outcome of the coordination activities and identification of mutual areas of interest to incorporate into Farm Plans. Potential areas of benefit include improvements to the GSAs monitoring network, filling key data gap areas, and advancing projects (such as water-use efficiency or recharge projects) that support the sustainability goal and avoid undesirable results to sustainability indicators. Project not yet implemented.

7.1 Water Use Efficiency and Alternate Water Source Projects

As conceptually described in the GSP, this project would develop a voluntary program to deliver conservation tools and incentives to groundwater users and monitor results of water-use efficiency (WUE) measures. This project includes an assessment of groundwater-use characteristics, existing levels of water-use efficiency, and recommendations on preferred tools and strategies for implementation. While implementation of these projects is initially planned to be on a voluntary basis, the project will also identify specific metrics for evaluating the benefits of the projects and assess conditions that may lead to mandatory implementation of demand management actions.

7.1.1 Implementation Status Update and Planned Next Steps

To help understand the market for water use efficiency projects, marketing approaches, water saving potential, and establish appropriate participation goals for future programs, the GSA decided to conduct a water use efficiency pilot program. This pilot was jointly conducted with the adjacent Sonoma Valley and Petaluma Valley GSAs (collectively referred to as the Sonoma County GSAs) with SGM Implementation funding.

The project began with a demand assessment for non-municipal groundwater users (Maddaus Water Management et al., 2024). The demand assessment included a comprehensive review of groundwater use for all groundwater-use parcels within the Subbasin, leveraging as many known data sources as possible to support better understanding of agricultural, rural residential, and non-residential (commercial, industrial, and institutional) demands. Applied groundwater use for irrigation was estimated using remotely-sensed evapotranspiration (ET) estimates for both a dry (2022) and wet (2023) water year. Findings from the assessment informed a work plan designed to pilot new measures. Based on the demand assessment findings, a catalog of potential water use efficiency measures was developed and four voluntary educational and outreach measures which complied with grant-funding requirements were proposed to evaluate within a pilot program. The grant did not support funding of rebates and incentives.

The results of the Demand Assessment identified:

- Significant groundwater use by private well owners.
- Outdoor irrigation dominates groundwater demand and in particular vineyards, non-vineyard agriculture, and rural residential irrigation make up the largest sectors.
- Vineyards use water efficiently per acre but represent a key opportunity for water savings, making up 26 percent of outdoor groundwater demand.
- Indoor water use is likely inefficient due to aged fixtures.
- Lack of metering limits accuracy and could hide leaking infrastructure.
- For outreaching to groundwater users, education and information sharing through trusted messengers are essential.

In 2025, the Well Aware pilot program was launched with a focus on translating findings from the countywide groundwater demand assessment into practical, voluntary strategies that engage groundwater users, build awareness of groundwater conditions, and prepare the GSA for continued education and potential future incentive based WUE programs. Through the pilot program, outreach and education materials were developed and distributed, an online resource tool of water conservation strategies and funding was developed, conservation consultations were conducted through various mechanisms and pathways, and a demonstration site to showcase water use efficiency practices was launched. Local partner collaborations extended resources for agricultural and rural residential users.

Following a year of the Pilot Program:

- 26,000 outreach touchpoints were accomplished,
- 22 events were attended by GSA representatives,
- 108 unique users interacted with the interactive web tool with over 3,500 views,
- 79 consultations were conducted of groundwater users,
- 10 partner organizations supported outreach, and
- Future potential savings and participation were explored through a Water Use Efficiency Incentive Workplan.

Findings from the pilot program provide feedback/lessons learned that can be applied to future conservation messaging and programs.

Planned next steps for advancing the WUE program include further evaluating the cost/benefit of the Well Aware program components to support the GSA's implementation planning and inform the prioritization for the below recommended next steps:

- Continue and expand the Well Aware education and outreach program to maintain momentum and familiarity.
- Establish realistic, measurable water-savings goals and metrics supported by a mix of education, technical assistance, and incentives.
- Identify groundwater and/or climate conditions that could trigger certain WUE action levels, with lower levels of WUE implementation for periods with sustainable conditions and increasing levels of WUE implementation for drought years or future SMC exceedances.
- Pursue grant funding to support incentive-based WUE programs, administered through trusted third-party partners where possible.
- Build on successful consultation models, particularly those that prequalify sites for future funding.
- Advance regional collaboration by exploring participation in the Sonoma-Marín Saving Water Partnership and California Water Efficiency Partnership (CalWEP).

7.2 Stormwater Capture and Recharge

As described in the GSP, this project is intended to enhance and increase the recharge of groundwater through projects and land management practices that capture and infiltrate stormwater runoff. The project includes evaluating and piloting various recharge techniques and practices for local suitability, including stormwater detention features, low-impact development practices, on-farm recharge, and other farming practices.

7.2.1 Implementation Status Update and Planned Next Steps

The GSA and their partners began developing strategies and approaches for stormwater capture, recharge and conservation for the Subbasin in 2024 by implementing two projects with funding from the SGM Implementation grant: (1) On-Farm Recharge (OFR) vineyard pilots and (2) developing a BMPs strategy to capture and retain stormwater runoff at Crane Creek Regional Park. Both efforts were carried out with the goal of developing feasible, economically viable and scalable approaches.

7.2.1.1 Mark West Creek OFR Pilot

The OFR pilot began with outreach to vineyard landowners within the GSA, prioritizing Mark West Creek. The outreach effort identified potential pilot study locations, and selected a vineyard site on Fulton Road along Mark West Creek for the OFR investigation and pilot.

Towards achieving the goal of developing feasible and economically viable OFR practices, the pilot expanded from actively farmed vineyard lands to also include fallowed lands, which are becoming more prevalent with recent wine market declines in the area. In consideration of scalability, drip systems were utilized for OFR pilots on vineyards as drip is the predominant vineyard irrigation method in the region. For fallow fields, impact sprinklers, associated with remnant frost protection systems, were used for OFR since the drip systems were removed when pulling vineyards.

The pilot included four treatment areas, two controls and two OFR treatments:

- Vineyard OFR, drip: Estimated 31 inches applied across 3.3 studied acres (~8.5 acre-feet), January 13 – March 26.
- Vineyard Control: No OFR across 6.5 studied acres.
- Fallow OFR, impact sprinklers: Estimated 34 inches applied across 4.8 studied acres (~13.6 acre-feet), January 12 – March 13.
- Fallow Control: No OFR across 5 studied acres.

The scope of work for the OFR investigation and pilot has included:

- Design and permitting for the pilot study conducted in early 2025;
- Installing monitoring instrumentation between October and January 2026, including shallow groundwater monitoring wells, soil moisture sensors, flowmeters and acquisition of geophysical data;
- Implementing OFR water applications from January into March 2026;
- Monitoring the responses in soil moisture, recharge water infiltration, water quality, and groundwater levels prior to, through, and subsequent to OFR operation on actively recharged blocks, as well as control blocks which did not receive recharge water; and
- Evaluating effects of recharge practices on vineyard and fallowed land cultural practices and management, and their associated effort and costs.

The results from the pilot study are being used to calculate recharge water budgets, estimate the costs to implement long-term OFR, evaluate potential crop responses, evaluate subsurface and groundwater level responses and their duration, and identify challenges and opportunities related to implementation and feasibility. The primary goal of the OFR pilot is to provide foundational information regarding how to implement OFR on vineyards in integration with vineyard agronomic practices, establish reasonable water quality and storage expectations, and estimate bottom line farm costs and benefits.

7.2.1.2 Crane Creek BMP Strategy

The goal of the Upland Stormwater Recharge Practices program at Crane Creek Regional Park is to identify and evaluate potential stormwater capture and recharge practices and to provide a template for piloting these practices within the Park. The effort at Crane Creek Regional Park is considered an opportunity to improve stormwater runoff management within the Park to benefit groundwater resources within the Subbasin. Implementation of suggested practices will provide ancillary benefits such as benefitting

recreation and creating ecological resources and opportunities for public education. Moreover, implementation within the Park will provide proof-of-concept testing in preparation of potential implementation of similar strategies more broadly.

Work activities began in 2024 and have included site visits, review of available hydrologic and geomorphic data, preliminary modeling of Crane Creek flows and bank overtopping, evaluation of potential BMPs for implementation at Crane Creek Regional Park to:

- Promote in-stream pooling within Crane Creek and extending periods for in-stream infiltration;
- Promote aggradation and in-stream pooling in Crane Creek to enable bank overtopping and diversion of water into relic channels and neighboring areas to increase opportunities for broader infiltration;
- Promote in-stream pooling of localized stormwater runoff in non-named creeks and relic creeks, to slow runoff and extend local recharge opportunities.

A proposal for a proof-of-concept pilot program within Crane Creek is being developed with consideration of implementing Beaver Dam Analogs (BDAs) for pooling, directing and overtopping flows, and possibly constructing swales on contour to further trap and infiltrate stormwater runoff.

7.3 Aquifer Storage and Recovery

As described in the GSP, this project involves the diversion and transmission of surplus Russian River water produced at existing drinking water production facilities during wet weather conditions (that is, the winter and spring seasons) for storage in the deep aquifer system of the Subbasin. The stored water would then be available for subsequent recovery and use during dry weather conditions (that is, the summer and fall seasons) or emergency situations. Regional planning for ASR and well-specific assessments has been performed by local agencies within the Subbasin, including preparation of a 2013 Groundwater Banking Feasibility Study, which provided an evaluation of regional needs and benefits, source water availability and quality, regional hydrogeologic conditions, and alternatives for groundwater banking (GEI et al., 2013). The GSP identified the following activities to advance the planning and implementation of ASR within the Subbasin:

- Update the source water (Russian River) availability and transmission system capacity assumptions from the 2013 Groundwater Banking Feasibility Study
- Further evaluate and conduct pilot studies at locations which may be favorable for future ASR operations
- Coordinate and support planning and implementation of ASR projects being planned or implemented by other project proponents

7.3.1 Implementation Status Update and Planned Next Steps

Following adoption of the GSP, planning and implementation of ASR efforts, including site investigations and pilot studies, have significantly advanced within the Subbasin.

Through funding awarded from the SGM Implementation grant, the GSA and its consultant compiled, updated, and evaluated existing data and coordinated with member agency staff with municipal wells which could serve as candidates for focused characterization or pilot testing. Based on review of existing data and discussions with municipal well operators, an ASR pilot test was planned, permitted and implemented at the City of Santa Rosa's Martha Way test well, which is located within the eastern portions

of the Subbasin. Following permit approval from the California Regional Water Quality Control Board (RWQCB), ASR pilot testing of the Martha Way test well began on September 18 and was completed on December 22, 2025. The ASR pilot testing involved the recharge, storage, and recovery of approximately 7 acre-feet of treated drinking water. Findings from the ASR pilot test indicate that future full-scale ASR operations appear technically feasible based on the aquifer systems hydraulic and geochemical response to recharge, storage and recovery during the pilot test (GEI, 2026a).

Primary recommendations from the ASR pilot test include 1) additional rehabilitation and characterization of the test well; 2) additional characterization of the local aquifer system through construction of monitoring wells and additional pilot testing; 3) evaluating the local capacity of the distribution system for conveying recharge water; and 4) evaluating whether treatment would be needed for water recovered from the well.

Through funding from DWR's Drought Resiliency Program, Sonoma Water retrofitted two of its wellsite facilities within the Subbasin to accommodate future ASR operations. The Sebastopol Road well was modified in 2023 by sealing off the lower 170 feet of the well screen to improve water quality and the Occidental Road Well was replaced in 2023. Sonoma Water completed an ASR pilot study at the Sebastopol Road well and is planning for a future ASR pilot study at the Occidental Road well. Following well modifications and permitting, ASR pilot testing of the Sebastopol Road well was performed between October 2025 and February 2026 and involved the recharge, storage, and recovery of approximately 21 acre-feet of treated drinking water. Findings from the ASR pilot test are being analyzed to evaluate the need to address the formation of arsenic observed within stored and recovered water during the ASR pilot test (GEI, 2026b).

The Town of Windsor is in the planning and permitting stages for performance of an ASR pilot study at its Los Amigos property. The Town's Los Amigos ASR pilot test is intended to generate operational data to inform the design of a potential long-term future ASR program. Key objectives of the pilot study include evaluating water quality, injection characteristics, and recovery efficiency. The pilot test includes drilling two ASR wells and one or more monitoring wells, installing necessary utility connections, and conducting pump tests. Injection and recovery will occur over a two-year period, with water injected during winter months and extracted later for evaluation. The Town of Windsor plans to begin pilot testing in 2027.

Results from these pilot studies, in combination with findings from other ASR pilot studies in Sonoma Valley and Petaluma Valley will provide the GSAs and other partners insights on how ASR could perform under a variety of hydrogeologic and geochemical environments. Sonoma Water is also initiating an assessment of regional water banking opportunities, which includes an updated analysis of wintertime Russian River supply availability and conveyance capacity.

7.4 Recycled Water Expansion

This project involves a collaboration between the GSA and City of Santa Rosa and participating cities for the Santa Rosa Water Reuse System, Town of Windsor, and Sonoma Water for the Airport/Larkfield/Wikiup Sanitation Zone to perform an assessment of additional recycled water opportunities. As described in Section 6.1 of the GSP, based on limitations and uncertainty related to the potential for future expansion of recycled water supplies, additional expansion of recycled water deliveries for irrigation supplies was not included with the projects evaluated using scenario modeling.

7.4.1 Implementation Status Update and Planned Next Steps

Initial discussions on additional recycled water opportunities began in 2025 and will be continued in 2026. Implementation will be considered following an assessment that will evaluate current and future supply

availability and constraints, explore ways to optimize use, and analyze the preliminary costs and benefits of potential expansion options.

7.5 Assessment and Prioritization of Potential Policy Options

This management action involves the assessment and prioritization of potential policies and programs the GSA could consider developing to supplement supply side projects, such as large-scale recharge or recycled water projects which are being pursued concurrently, to help achieve and maintain sustainability.

7.5.1 Implementation Status Update and Planned Next Steps

The GSA conducted a policy and programs options study with the goal of developing a vetted and prioritized “living” list of policies and programs within the authorities of the GSA and/or local land use agencies that support the sustainability goal for the Subbasin. The study focused on policies and programs that exhibit the potential to achieve one or more of the following objectives: reduce groundwater demands, fill data gaps, align with existing policies and facilitate coordination with other agencies, improve management of groundwater resources, and protect beneficial users.

In Fall 2024 and 2025, the GSA conducted surveys of groundwater users on the policies and programs included in the study. The findings from this survey will inform updates to the study in WY 2026, along with any new information, changing groundwater conditions, other stakeholder input, and GSA Board priorities. The input received from the Board, Advisory Committee, and surveys was used to refine the list of options and develop a phased and “condition” based approach to considering and developing policies and programs. The list of policies and programs is categorized into the following categories based on their readiness and need to implement: (1) Continue or Initiate Planning/Implementation; (2) Further Evaluate and (3) Place On-hold, Pending Future Need or New Information. The revised potential options are grouped by the above categories as indicated below.

Continue or Initiate Planning/Implementation: These include activities that (1) were specifically proposed for implementation within the GSP and previously vetted through stakeholder engagement during GSP development, (2) have an existing or likely funding source, and/or (3) are not likely to be controversial or result in significant impacts to stakeholders, including voluntary actions and educational programs that will help stakeholders and the GSA meet its goals.

- Voluntary water-use efficiency (WUE) program (continue)
- Groundwater user education and engagement program (continue)
- Voluntary metering program (continue)
- Integrate groundwater sustainability components with farm plans/certification programs
- Encourage/incentivize recharge enhancement actions and projects (initiate)
- Consideration of GSP criteria for discretionary projects (initiate)

Further Evaluate: These activities are being more fully evaluated prior to being considered for planning or implementation. Further evaluation is ongoing and includes continued information compilation, evaluation of potential benefits and impacts, and coordination with other agencies and interested parties.

- Encourage/incentivize use of available alternative water sources
- Align requirements of the amended well ordinance throughout the entirety of GSA's jurisdiction
- Well permitting review/well construction recommendations
- Mitigation opportunities for projects

Place On-hold, Pending Future Need or New Information: The below policies and programs are on hold pending future need and groundwater conditions. These represent activities that are not considered necessary to achieve or maintain groundwater sustainability at this time. These activities (1) require additional information or findings from other activities prior to being more fully considered, (2) are more controversial or have significant potential impacts on stakeholders and would require a clear and justified need to implement, and/or (3) are significantly lacking available information needed to evaluate. While focused planning for these activities is on hold, staff do recommend continued assessment and monitoring of statewide or other similar efforts being undertaken elsewhere. It is recommended that updates to the recommended status of each policy and program be prepared every two years at a minimum or as new information indicates more focused planning should be conducted.

- Mandatory metering program for non-diminimis users
- Groundwater allocation framework
- Mandatory extraction limitations
- Groundwater trading program
- Drinking water well mitigation program
- Permitting and accounting of water hauling
- Land repurposing strategies

7.6 Coordination with Farm Plans and Grower Certification Programs

This management action involves a collaboration between the three Sonoma County GSA's and interested members of the agricultural community to evaluate the feasibility of developing a program that coordinates Farm Plans, developed at individual farm sites, with the implementation of the Subbasin-wide GSP. The goal of the management action is to promote and facilitate sharing of groundwater data with the GSA that support filling of data gaps, such as groundwater level, groundwater-use and groundwater quality data and promote adoption of practices that support groundwater sustainability at the farm-scale, such as water-use efficiency recharge enhancement practices.

Expected benefits would include information sharing and coordination between the GSA and growers within the Subbasin. Other benefits will depend upon the outcome of the coordination activities and identification of mutual areas of interest to incorporate into farm plans and certification programs. Potential areas of benefit include improvements to the GSAs monitoring network, filling key data gap areas, and advancing projects (such as water-use efficiency or recharge projects) that support the sustainability goal and avoid undesirable results to sustainability indicators.

7.6.1 Implementation Status Update and Planned Next Steps

In 2025, the GSA began meeting with grower interest groups on integrating activities that support GSP implementation with existing Farm Plans or certification programs which will help address a number of key data gaps, such as water-use, monitoring, and the potential for enhancing groundwater recharge.

The GSA is continuing to develop program concepts with organizations and growers involved in existing farm plans and certification programs to identify areas of mutual interest in addition to challenges that need to be addressed (such as, data confidentiality, data quality requirements, and verification of performance). The GSA is also coordinating with the Napa County GSA on potential collaboration for the initiative, as the Napa County GSA is actively developing a certification program.

7.7 Evaluation of Projects through Scenario Modeling

For the GSP, the three projects (WUE, stormwater capture and recharge, and ASR) were simulated using SRPHM 1+ to evaluate potential effects and benefits of the projects. For this Periodic Evaluation, an updated PMA scenario was simulated using the revised projected baseline model (Section 6.3) to confirm the three projects remain appropriate for maintaining sustainable groundwater conditions within the Subbasin.

7.7.1 Overview of Previous GSP Scenario Modeling

This section summarizes previous scenario modeling performed for the GSP. The three projects were simulated iteratively for the GSP with Group 1 (WUE only), Group 2 (WUE + stormwater capture), and Group 3 (WUE + stormwater capture + ASR). Results from the Group 3 scenario, which combined all three projects (consistent with the updated PMA scenario described in Section 7.7.2), improve groundwater conditions and reduce the number of MT exceedances simulated for the GSP projected baseline scenario. Implementation of the three projects was projected to prohibit the occurrence of undesirable results.

- Simulated project yield: total of 2,740 AFY (1,200 AFY from reduction in agricultural consumptive use, 600 AFY reduction in rural domestic groundwater use, and 940 AFY in reduction of municipal groundwater pumping through ASR)
- Stormwater capture and recharge: 240 AFY of additional recharge in the Subbasin
- Simulated increase in groundwater levels: 5- to 15-foot increases, primarily in the deep aquifer system in the northern portions of the Subbasin
- Simulated increase in groundwater storage: 300 AFY
- Simulated net reduction in surface water depletion: 700 AFY

The updated model was used to update the projected PMA scenarios and update estimated changes in water budgets and change in storage, as described below.

7.7.2 Summary and Results of Periodic Evaluation Scenario Modeling

The same three projects modeled in the GSP (WUE, stormwater capture and recharge and ASR) were evaluated for the updated PMA scenario.

Project assumptions and the modeling approach for each project category follow those used in the GSP (described in Appendix 6-A), with minor modifications described below. The updated PMA scenario was simulated as a single combined scenario incorporating all three projects, rather than iteratively, and includes the same projects as in the GSP Group 3 scenario described above.

7.7.2.1 Water Use Efficiency

Water use efficiency is simulated through reductions in agricultural crop water demand and in rural domestic pumping, beginning in WY 2025 and continuing through the end of the projected period. Agricultural crop coefficients were rescaled uniformly across all crop types to lower potential evapotranspiration and thus effectively reduce groundwater pumping by approximately 15 percent. Rural domestic pumping rates are reduced by 15 percent through rescaling of specified pumping rates. Consistent with the GSP, the rural domestic reduction is assumed to occur through reductions in outdoor water use only; indoor water use, and the septic return flows associated with it, are held constant relative to the projected baseline. The reductions simulated in the updated PMA scenario (15 percent for both components) nominally differ from those applied in the GSP, which used a 10 percent reduction in vineyard crop coefficients and a 20 percent reduction in rural domestic pumping.

7.7.2.2 Stormwater Capture and Recharge

Stormwater capture and recharge is simulated along lower Mark West Creek using the same methodology applied in the GSP (Appendix 6-A). Available stormwater for diversion is determined from the simulated streamflow in the updated projected baseline scenario (SRPHM 2.1, Section 6.3) using the same diversion threshold applied in the GSP. As in the GSP, diverted water is applied to the soil zone of 184 downslope model cells (1,840 acres), and may be consumed by ET or lost through runoff or other soil-zone processes prior to becoming recharge (see GSP, Figure 6.1). A total of 11,400 AF are diverted during the simulated period.

7.7.2.3 Aquifer Storage and Recovery

ASR is simulated through injection at the same five wells used in the GSP — operated by Sonoma Water, the City of Santa Rosa, the Town of Windsor, the City of Rohnert Park, and the City of Cotati — with total annual injection of approximately 930 AFY once all wells are online. The GSP injection timeseries was extended for the updated PMA scenario to reflect the updated projected period (WY 2025 through WY 2074), with no other modifications.

7.7.2.4 Model Results

Monthly simulated hydrographs for representative monitoring points (RMP) were developed to compare both the baseline and the updated PMA scenario. The chronic lowering of groundwater level sustainable management criteria (SMC) describes minimum threshold (MT) exceedances and undesirable results (UR) as:

Groundwater levels in 10 percent of the RMPs in either the shallow or deep aquifer systems exceed their MTs for three consecutive fall measurements.[...]

If MT exceedances are caused by emergency operational issues or droughts that extend for longer than the 4-year drought factor incorporated into the MTs [...], it is not considered an undesirable result unless the groundwater levels do not rebound to above the thresholds during future normal and wet years following long-term droughts

Accordingly, average fall groundwater elevations (September through November) are plotted on these hydrographs for comparison (Appendix 7-1).

The updated PMA scenario has the most beneficial effect on the deep aquifer, where it raises groundwater elevations by roughly 5-15 feet. These effects are not as dominant in the shallow aquifer, where water levels are generally more stable.

The updated PMA scenario reduces total groundwater pumping by around 3,070 AFY. On average the updated PMA scenario projected groundwater storage change over WY 2025-2074 is about 290 AFY more positive than the baseline groundwater storage change. The updated PMA scenario also has about 620 AFY less streambed recharge and about 630 AFY more groundwater discharge to streams over the WY 2025-2074 period, a result of Subbasin-wide increases in groundwater elevation (Table 7-2). M&I pumping is not reduced in the projected scenario, but it is offset by ASR injections (net decrease in pumping overall).

Figure 7-1 compares the annual and cumulative projected change in storage for the Baseline Scenario and for the PMA Scenario. Overall, the PMA Scenario results in a cumulative increase in storage of 15,000 acre-feet at the end of the projected period, compared to the Baseline Scenario.

Table 7-2. Change in Select Water Budget Components with PMA Scenario		
Water Budget Component	Volume Change with PMA Scenario (AFY)	Percent Change with PMA Scenario
Agricultural Pumping	-1,530	-14%
Rural Domestic	--690	-15%
M&I (ASR injection)	-850	-10%
Streambed Recharge	-620	-4%
Discharge to Streams	630	6%
Change in Storage	290	-31%

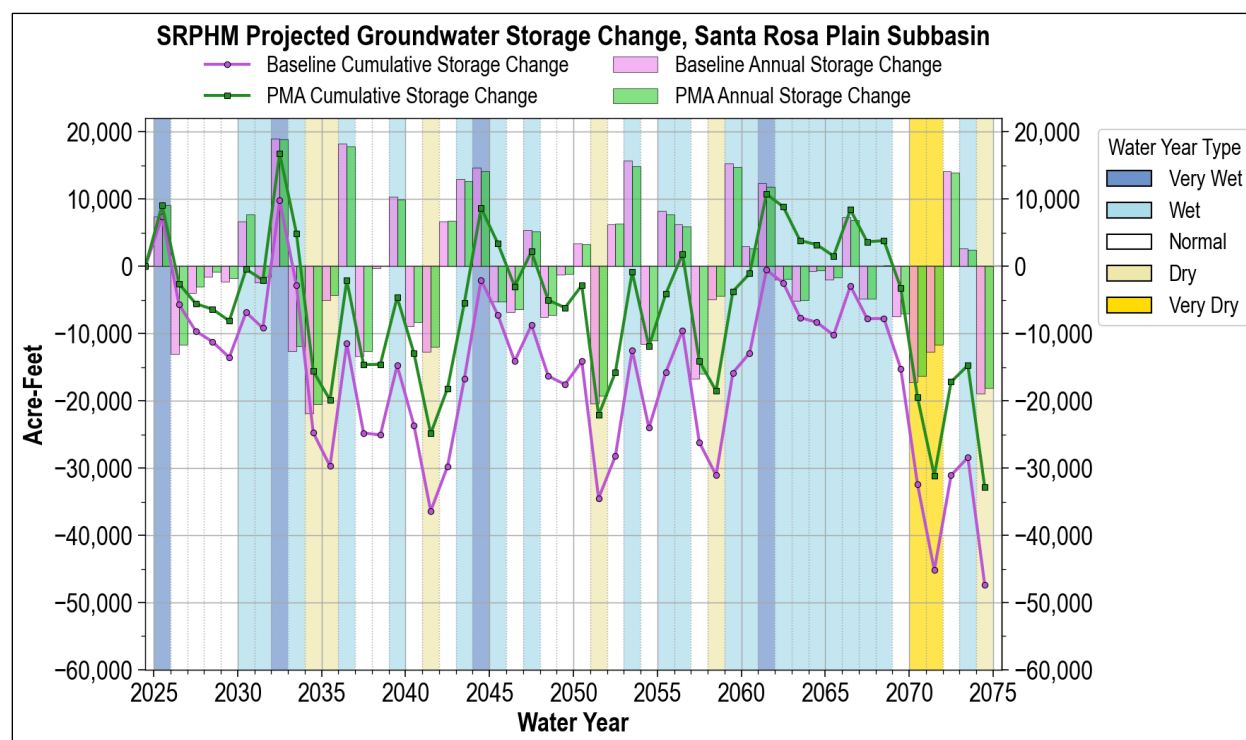


Figure 7-1. Projected Change in Storage for Baseline and PMA Scenarios

Undesirable results are calculated for the baseline and the updated PMA scenario in Table 7-3. The shallow aquifer has no undesirable results in either the baseline or the updated PMA scenario. The deep aquifer has significant contribution to undesirable results in the baseline scenario, with seven wells (47 percent) contributing to undesirable results due to 3 consecutive annual MT exceedances. The updated PMA scenario has only one well (SRP0057) which contributes to undesirable results (7 percent). While three consecutive MT exceedances also occur at SRP0359 and SRP0738, they occur during a drought period and quickly recover when the drought ends (see Water Year 2069-2073), and therefore do not constitute an undesirable result. Figure 7-2 shows the location of RMP wells where multiple consecutive MT exceedances are simulated and contribute to an undesirable result.

Overall, similar to the GSP scenario, the updated PMA scenario indicates that the three projects remain effective at raising groundwater levels and prevent the occurrence of undesirable results in the Subbasin.

Table 7-3. Minimum Threshold Exceedances by RMP and Undesirable Results in Baseline and PMA Scenarios

RMP	Aquifer System	Baseline Scenario		PMA Scenario	
		Annual MT Exceedances	Contribution to Undesirable Results (3 consecutive fall MT exceedances)	Annual MT Exceedances	Contribution to Undesirable Results (3 consecutive fall MT exceedances)
SRP0106	Shallow	0	No	0	No
SRP0269	Shallow	0	No	0	No
SRP0355	Shallow	0	No	0	No
SRP0357	Shallow	0	No	0	No
SRP0375	Shallow	0	No	0	No
SRP0709	Shallow	0	No	0	No
SRP0710	Shallow	0	No	0	No
SRP0712	Shallow	0	No	0	No
SRP0713	Shallow	0	No	0	No
SRP0714	Shallow	0	No	0	No
SRP0715	Shallow	0	No	0	No
SRP0720	Shallow	0	No	0	No
SRP0723	Shallow	0	No	0	No
SRP0736	Shallow	0	No	0	No
SRP0739	Shallow	0	No	0	No
SRP0743	Shallow	0	No	0	No
% Contribution to Undesirable Results	Shallow Aquifer	0%		0%	
SRP0019	Deep	0	No	0	No
SRP0057	Deep	50	Yes	49	Yes
SRP0059	Deep	35	Yes	1	No
SRP0115	Deep	0	No	0	No
SRP0238	Deep	0	No	0	No
SRP0243	Deep	0	No	0	No
SRP0249	Deep	0	No	0	No
SRP0347	Deep	0	No	0	No
SRP0359	Deep	11	Yes	7	No*
SRP0376	Deep	32	Yes	2	No
SRP0724	Deep	24	Yes	0	No

Table 7-3. Minimum Threshold Exceedances by RMP and Undesirable Results in Baseline and PMA Scenarios					
RMP	Aquifer System	Baseline Scenario		PMA Scenario	
		Annual MT Exceedances	Contribution to Undesirable Results (3 consecutive fall MT exceedances)	Annual MT Exceedances	Contribution to Undesirable Results (3 consecutive fall MT exceedances)
SRP0725	Deep	0	No	0	No
SRP0738	Deep	22	Yes	9	No*
SRP0740	Deep	2	No	0	No
SRP0744	Deep	38	Yes	2	No
% Contribution to Undesirable Results	Deep Aquifer	47%		7%	

*SRP0359 and SRP0738 have 3 MT exceedances during an extended drought period and recover quickly when the drought ends, therefore they do not contribute to undesirable results

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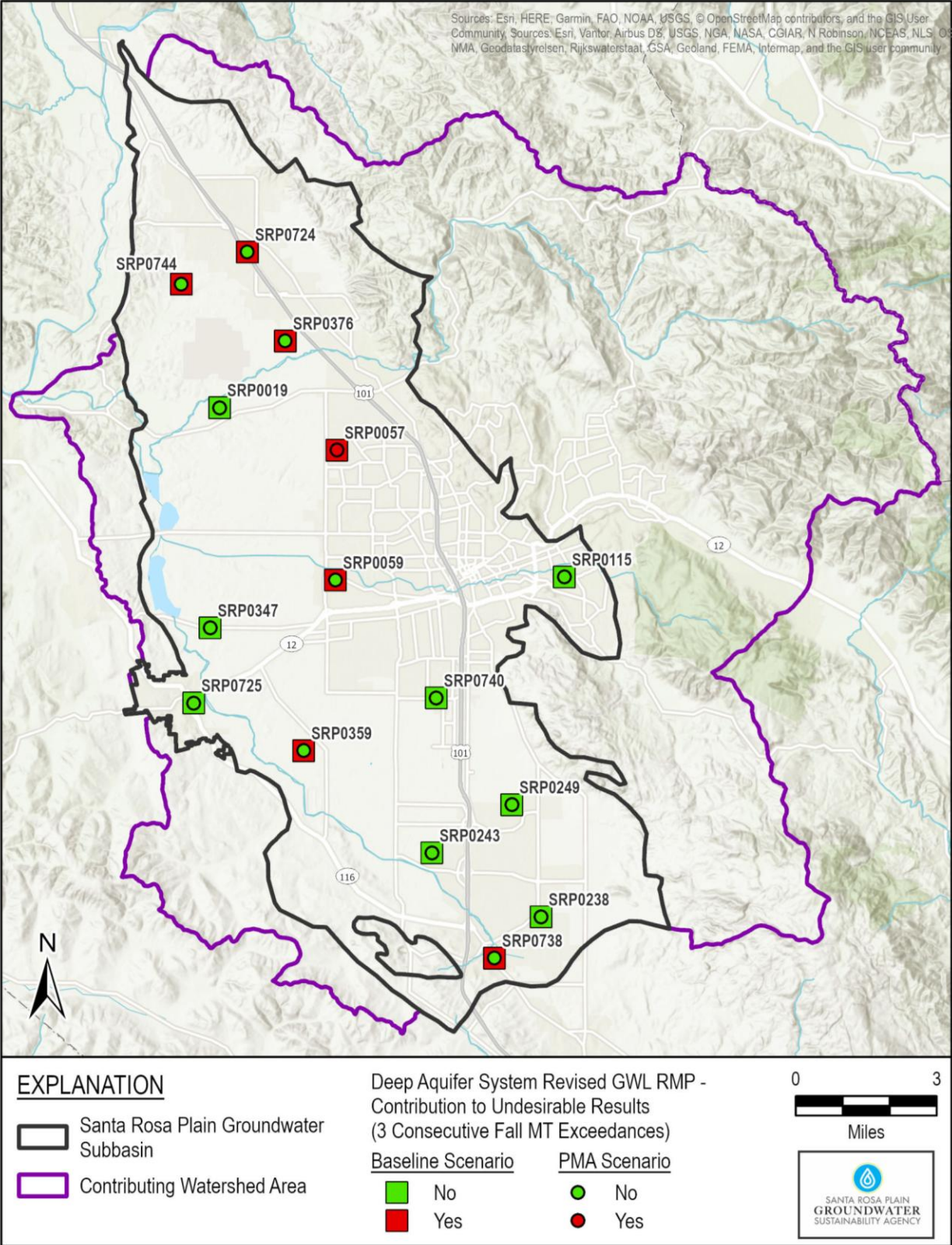


Figure 7-2. Deep RMPs with Contribution to Undesirable Results in Predictive Model Scenario

8 GSA AUTHORITIES AND ENFORCEMENT ACTIONS

This section of the Periodic Evaluation discusses the GSA’s authorities that have been exercised, such as changes in governance or GSA policies, or other components of GSP implementation that are not considered under the categories of Projects and Management Actions. These actions can include amendments to the governance structure of the GSA, assessment of a groundwater use fee, consideration of applicable county ordinances, and other authorities the GSA has exercised since the submission of the adopted GSP.

The GSA has not implemented any enforcement actions to date. Since the GSP adoption, the GSA has implemented multiple governance and policy actions applicable to the GSP, including:

- Joint Exercise of Powers Agreement and Bylaws Updates
- Registration Requirement of Groundwater Use Facilities
- Adoption of Groundwater Sustainability Fee
- Voluntary Flow-Metering Pilot Program
- EO N-7-22 and N-3-23 Well Permit Review

In addition, the GSA has participated in the following regulations outside of SGMA that are related to SGMA implementation.

- County of Sonoma Well Ordinance Update

8.1 Joint Exercise of Powers Agreement and Bylaws Updates

Updates to both the GSA Joint Exercise of Powers Agreement, effective May 27, 2017, and the GSA Bylaws, are currently (as of May 2026) in progress. Both minor and substantive revisions are being considered.

8.2 Registration Requirement of Groundwater Use Facilities

In 2019, the GSA adopted Ordinance 19-02, Requiring Registration of Groundwater Use Facilities, Water User Reporting and Authorizing the Adoption of Groundwater Sustainability Fee requiring all groundwater use facilities to register their wells. The Groundwater Users Information Data Exchange (“GUIDE”) Program, launched in the Santa Rosa Plain Subbasin in 2021, serves as the well registration mechanism for groundwater users and provides a mechanism to update well information if applicable. On July 14, 2022, Ordinance 19-02 was replaced with Ordinance No. 22-01 Requiring Registration of Groundwater Use Facilities, Establishing A Method of Calculating Groundwater Use and Authorizing the Adoption of Groundwater Sustainability Fee.

8.3 Adoption of Groundwater Sustainability Fee

In June 2019, the GSA Board approved a Groundwater Sustainability Fee as authorized by Water Code section 10730 and pursuant to Agency Ordinance No. 19-01. The approved rate was intended to cover three fiscal years, during which time the GSP would be developed and approved, and after which the Board would reevaluate and reconsider the rate. During this time, Sonoma County and the Sonoma County Water Agency covered fees for all private pumpers.

From 2021 to July 2022, a Rate and Fee Study was conducted to update the groundwater sustainability fee. On July 14, 2022, the GSA Board approved a Groundwater Sustainability Fee as authorized by Water Code section 10730 and pursuant to Agency Ordinance No. 22-01. The adopted fee methodology is a Proposition 26 regulatory fee based on groundwater usage.

In 2024, an update to the Rate and Fee Study was conducted due to corrections in groundwater use which resulted in a decrease in fee revenues, changes to annual expenses, and incorporation of new grant revenues and expenses in annual budgets. The fee methodology was not changed, however the Board included a provision to allow for the adjustment of fees levied in future fiscal years based on the annual change in the San Francisco-Oakland-Hayward Consumer Price Index for All Urban Consumers (“CPI” or “CPI-U”). The current fee (as of July 2026) is \$46.04 per acre-foot of groundwater extraction.

8.4 Voluntary Flow-Metering Pilot Program

While the GSA has not adopted any new policies or exercised its authority in requiring flow metering of supply wells, in 2024 and 2025, the GSA implemented a voluntary groundwater extraction metering program, titled the Flow Smart Program. As described in Section 2.2, with funding from the DWR SGM Implementation grant, the GSA was able to install Advanced Metering Infrastructure (AMI) enabled flow meters on 24 wells within the Subbasin.

8.5 EO N-7-22 and N-3-23 Well Permit Review

In March 2022 Governor Newsom issued Drought Executive Order (EO) N-7-22 which included new well permitting requirements for local agencies. This EO was superseded by Executive Order N-3-23 in February 2023. Under Action 9 in Executive Order N-7-22, local well permitting agencies were required to consult with GSAs during the well permitting process for wells intending to extract groundwater from high or medium priority groundwater basins and subbasins. The well permitting agency was required to consult with the GSA and receive written verification from the GSA that the proposed well location was generally consistent (not inconsistent) with the applicable GSP and would not decrease the likelihood of achieving the sustainability goals that the GSAs have developed under SGMA. These requirements were continued and slightly modified under Executive Order N-3-23.

In September 2024, Governor Newsom issued Executive Order N-3-24 which terminated the requirement for well permit review by GSAs in Sonoma County. From the issuance of Executive Order N-7-22 until the issuance of Executive Order N-3-24, the Santa Rosa Plain GSA received and responded to 11 well permit review referrals, which would increase groundwater extraction by an estimated 17 AFY once the wells are installed and pumps are activated.

8.6 County of Sonoma Well Ordinance Update

Between 2022 and 2023, the County of Sonoma updated its Well Ordinance to require consideration of potential impacts to public trust resources when issuing certain well permits. GSA staff, along with members of the Advisory Committee and GSA Board, participated in the Well Ordinance Technical and Policy Working Groups, providing technical expertise and policy perspectives on behalf of the GSA. In April 2023, the County Board of Supervisors approved amendments to the Well Ordinance, which took effect on May 18, 2023.

The amended ordinance established a new regulatory process for evaluating potential adverse impacts to public trust resources, including habitat for Coho salmon, as part of the well permitting process. It also established water conservation requirements for all new wells, as well as well-meter installation and water-use reporting requirements for new nonresidential wells.

In May 2023, following adoption of the amended ordinance, California Coastkeeper Alliance and Russian Riverkeeper (Riverkeeper) filed a lawsuit against the County, alleging that the ordinance adoption process violated the California Environmental Quality Act (CEQA) and the Public Trust Doctrine. In August 2024, Superior Court Judge Bradford DeMeo ruled in favor of Riverkeeper and directed the County, among other things, to suspend non-emergency water well permitting.

The County appealed the decision to the First District California Court of Appeal. On March 27, 2025, the Court of Appeal granted a temporary stay of the Superior Court's order, allowing the County to resume well permitting while the appeal was pending.

On August 4, 2026, the Court of Appeal issued a split decision. The Court reversed the Superior Court's finding that the Well Ordinance amendment process violated the Public Trust Doctrine but agreed that the County's use of certain CEQA exemptions was inappropriate. The Court remanded the case to the Superior Court to issue a new judgment consistent with the appellate decision.

9 OUTREACH, ENGAGEMENT, AND COORDINATION WITH OTHER AGENCIES

This section describes continued outreach, engagement, and communication with stakeholders and agencies in the Subbasin since the GSP was approved by the GSA Board of Directors in December 2021.

9.1 Public Outreach and Engagement

The Santa Rosa Plain GSA has built public engagement into the core of its approach to achieving long-term groundwater sustainability. As outlined in the GSP, the agency recognizes that successful implementation depends not only on technical projects and management actions, but also on an informed and involved community. Since GSP submittal, the GSA has continued to emphasize educating the public and creating meaningful opportunities for stakeholders to better understand groundwater challenges and contribute to solutions.

9.1.1 Assessment of Public Comments Submitted to the GSA after GSP Approval

Since the GSP was approved by the GSA Board in December 2021, one comment has been received on the GSP. This comment was received on April 8, 2022 from the California Department of Fish and Wildlife (CDFW) and summarized the October 2021 comments from CDFW, the GSA's response, and CDFW's reply to that response around interconnected surface water (ISW) and groundwater dependent ecosystems (GDEs). CDFW's comments have informed work on filling ISW-GDE data gaps as described in Section 5.4.

9.1.2 Public Engagement

The GSA seeks to ensure that all beneficial users of groundwater, including residents, agricultural users, businesses, and local agencies, have opportunities to participate in decision-making. This includes enhancing understanding of groundwater resources, encouraging informed feedback throughout implementation of the GSP, and coordinating closely with local governments, Tribal communities, and partner agencies. By doing so, the GSA works to align groundwater management actions with the needs and perspectives of the broader community.

To make participation accessible and effective, the GSA employs a variety of outreach methods and prioritizes transparency in its communications, described in further detail in Section 9.1.3. Community meetings are held at convenient times and locations to encourage broad attendance, and the agency is committed to providing accurate, up-to-date information while responding to community questions and concerns. From leveraging relationships with key community partners, to holding public meetings, to talking with stakeholders one on one, this inclusive and responsive approach helps build trust, supports informed decision-making, and ensures that the implementation of PMAs is successful.

Public engagement is guided by the GSA's Community Engagement Plan which was originally adopted in 2018, is reviewed annually, and was updated in 2025 to capture outreach activities associated with GSP implementation. Community engagement has been essential to filling data gaps, implementing PMAs, and successfully establishing a groundwater sustainability fee.

9.1.3 Evaluation of Methods for Outreach and Engagement

Table 9-1 lists outreach methods used by the GSA and describes relevant activities that have been carried forward after GSP adoption.

Table 9-1. Outreach Methods and Actions Taken Since GSP Submittal

Outreach Method	Notes
GSA Websites: santarosaplaingroundwater.org sonomacountygroundwater.org	The GSA website is our primary tool for information dissemination. All documents, the meeting calendar, project updates, programs and announcements are posted to the website, which is updated regularly. A blog platform on the site offers a vehicle for longer-form storytelling related to groundwater sustainability and features images as well as narratives. In addition, the website includes several web tools including the Data Dashboard, Groundwater User Information Data Exchange (GUIDE), and Well Aware Toolkit which groundwater users can access to gain more information about groundwater levels, groundwater use, and how to save groundwater. New interested parties can sign-up for the GSA newsletter easily. Most resources on the website are available in English and Spanish. In addition to a Santa Rosa Plain GSA specific website, the GSA also supports a website for all three Sonoma County GSAs which is used for joint programs and messaging.
Quarterly Newsletter and GSA Email Updates	During GSP development, the GSA sent monthly email updates to the interested parties list. Starting in 2023, this shifted to a Quarterly Newsletter sent to the interested parties list. This newsletter is produced in coordination with the Sonoma Valley and Petaluma Valley GSAs, with articles and updates relevant to each of the three GSAs: blog articles featuring people and programs in the community, GSP project updates, announcements, and meeting information. Periodic email updates are also sent when needed, such as public meetings notices, program announcements, and invitations to participate in surveys. The Interested Parties List is a shared list across the three Sonoma County GSAs and currently contains 3,393 subscribers (as of May 2026).
Social Media: Facebook, Instagram, and YouTube @sonomacountygroundwater	Social media accounts are shared across the three Sonoma County GSAs. Content posted includes educational information about groundwater science and groundwater management for a general audience, information about programs, as well as important announcements. Since 2022, content posted has increased in scope and frequency every year on the GSA social channels and the engagement has likewise increased. Content has included educational videos, seasonally appropriate water use tips, and event announcements.
Public Meetings and Workshops	Regular meetings of the GSA Board of Directors and Advisory Committee provide opportunities for public engagement on GSP implementation. See Section 9.2 for a summary of Board and Advisory Committee meetings. In addition to regular Board meetings, the GSA has held five public workshops since GSP submittal: two virtual and two in person workshops in 2022 on groundwater sustainability fees, and a joint workshop with the Petaluma Valley GSA in August 2025 on current groundwater conditions and GSP implementation strategies.

Table 9-1. Outreach Methods and Actions Taken Since GSP Submittal

Outreach Method	Notes
Mailings	Direct mailings are sent to targeted interested parties for specific management actions or projects. Since adoption of the GSP, mailings have been sent to alert groundwater users to new groundwater sustainability fees (7,864 letters sent in Fall 2022) and for initiation of the Level Up voluntary groundwater management program (1,968 letters sent in Summer 2024).
Public Notices	When the GSA Board has taken action on an item that is required to be publicly noticed (establishment of fees, contracting for construction projects, etc.), the GSA has provided a written statement describing how interested parties may participate in the development and implementation of the item. When required, notices have been published in the newspaper, posted on the website, and sent via email.
Press Releases	Press releases have been issued both by the Santa Rosa Plain GSA and jointly by the three Sonoma County GSAs. Since GSP submittal, four press releases have been issued on groundwater sustainability fees and grant funding.
Direct Communications	One-on-one conversations can be the most informative outreach method for groundwater user desires and needs. The GSA has utilized direct communication and conversations with groundwater users, elected officials, and member and stakeholder agencies to inform implementation actions, program participation, and policy considerations. Stakeholders and groundwater user groups the GSA has engaged for one-on-one conversations include, but is not limited to: California Land Stewardship Institute, Community Alliance with Family Farmers, Daily Acts, Gold Ridge RCD, Leadership Santa Rosa, Rotary Club of Sebastopol, Santa Rosa Board of Public Utilities, Sonoma County Farm Bureau, Sonoma County Bar Association, Sonoma RCD, Sonoma State University, and UC Cooperative Extension.
Surveys	Online survey tools, such as Survey Monkey, are periodically used to gather stakeholder ideas and feedback on key issues. Since GSP submittal, the GSA has conducted two surveys as part of the Policy and Programs Options Study to gather stakeholder input on potential policies and programs: one in Fall 2024 for a general audience, and one in Fall 2025 focused on agricultural groundwater users.
Fact Sheets and Other Print Materials	Informational materials are critical education tools and necessary to circulate consistent, accurate information. In addition to general GSA and groundwater fact sheets, the GSA also produces annual summaries of the Annual Report, and project fact sheets (recent examples include fact sheets on the Level Up! voluntary monitoring program, Flow Smart voluntary metering program, Data Dashboard, and Well Aware case studies).
Partner Communications	The GSA utilizes partner agency networks to connect with groundwater users where partner agencies may have a pre-existing or established relationship. Partner distribution lists and newsletters are utilized, along with the GSA supporting direct communications between partners and their networks, to support projects and management actions.

9.2 Responsibilities of the GSA Board

The GSA Board and Advisory Committee have continued to meet regularly since GSP adoption in December 2021, including:

Year	GSA Board	GSA Advisory Committee
2022	2 meetings remote via Zoom 4 meetings in person	3 meetings remote via Zoom 1 meeting in person
2023	3 meetings in person	3 meetings in person
2024	6 meetings in person	3 meetings in person
2025	4 meetings in person	3 meetings in person

In compliance with the Brown Act, Board and Advisory Committee meetings are open to the public, and all required meeting materials are remediated for accessibility and posted on the GSA website at least 72 hours before the meeting. Notices of Board and Advisory Committee meeting dates are announced in the quarterly newsletter via email to 2,807 (as of April 2026) interested persons. This list was built through sign-ups at outreach events, public meetings, and the GSA website.

9.3 Coordination with Other Agencies

The GSA and its member agencies have coordinated with adjacent basins, reached out to applicable agencies, developed inter-agency agreements, and participated in inter-agency planning efforts. These are discussed in the subsections below.

9.3.1 Coordination with GSAs in Hydrologically Connected Basins

The one adjacent groundwater basin to the Santa Rosa Plain Subbasin is the Petaluma Valley Basin (2-001). Implementation of SGMA in the Santa Rosa Plain Subbasin is closely coordinated with the Petaluma Valley GSA and the GSA in the Sonoma Valley Subbasin (2-002.02) which is also nearby. In addition to closely coordinating on managing for sustainability and monitoring groundwater conditions along shared basin boundaries, resources are leveraged and shared by the three existing GSAs in Sonoma County to maximize efficiencies, including joint implementation of PMAs, shared outreach resources, collaboration on grant opportunities, and the joint development of data management system tools and technologies. This collaboration is cost efficient for the agencies, and also helps create cohesive messaging in outreach to the public.

The GSA utilizes collaborative staffing with the Petaluma Valley GSA and Sonoma Valley GSA to maximize efficiencies and work towards regionwide groundwater sustainability. Though the GSAs are governed separately, the three GSAs share technical, administrative, financial, outreach, and legal staff teams (referred to as Sonoma County GSA staff) and frequently contract with the same consultants to provide coordinated services across all three GSAs. Member agency staff provide technical expertise, leadership, and administrative support for the GSA. Sonoma County GSA staff and member agency staff coordinate via regular GSA-specific staff meetings and routinely coordinate across all three basins through monthly interbasin coordination meetings. These meetings are led by the Interbasin Coordinator and Plan Manager, who are part of the Sonoma County GSA staff. This model for interbasin collaboration and resource sharing was critical during GSP development and is vital to the successful coordinated implementation of the three Sonoma County GSPs.

9.3.2 Coordination with Tribal, Federal, State, and Other Local Agencies

A Federated Indians of Graton Rancheria representative has served and actively participated on the Advisory Committee since the committee was established in 2017. All California Native American Tribal Governments that are traditionally and culturally affiliated with Sonoma County were notified of the initiation of implementation of the GSP in November 2022 and were invited to participate in the process. Coordination with tribes that responded to that invitation commenced in early 2023.

There are minimal State or Federal lands and no State or Federal water supply facilities within the GSA Subbasin. This has resulted in limited engagement with those agencies aside from coordination with the Department of Water Resources, and collection of groundwater sustainability fees from State lands that use groundwater. Additionally, the GSA closely coordinated with the North Coast RWQCB for ASR pilot project permits.

The most extensive coordination has been with member agencies. In addition to regular coordination meetings with all member agency staff, the GSA coordinated with individual member agencies on the implementation of specific GSP projects. For instance, the GSA has coordinated with the City of Santa Rosa, Sonoma Water, and Town of Windsor on aquifer storage and recovery (ASR) pilot projects, and has coordinated with City of Santa Rosa, Town of Windsor, Sonoma Water, and others to assess additional recycled water opportunities. GSP implementation projects have also been led and supported by other local organizations such as the Community Alliance with Family Farmers and Daily Acts.

The GSA also coordinates regularly with the County and Permit Sonoma on sharing groundwater information, including the status of well permit applications within the Subbasin. Approximately 275 Class I or Class II water well permits have been issued or finalized between 2020 and 2025 (average of 45 per year and 19 in 2025) with the majority (approximately 70%) being domestic wells for rural residences.

9.3.3 Inter-Agency Coordination

In addition to the coordination described throughout this Section, the GSA coordinates extensively with other local planning agencies on efforts that could impact GSP Implementation. The GSA is currently engaging with local jurisdictions that are initiating or planning updates to their General Plans, including the City of Rohnert Park and County of Sonoma to recommend that general plans align with growth projections included in the GSP and include groundwater sustainability policies, and has provided comments on the City of Santa Rosa's Water Supply Alternatives Plan.

In addition, the GSA extensively coordinates with Permit Sonoma, the County of Sonoma's permitting agency. The GSA has provided input into several countywide planning processes, including the Well Ordinance Update (described in Section 8.6), the Sonoma County Comprehensive Cannabis Program Update, and the Drought Resilience Plan. In addition, the GSA has reviewed 64 Land Use Completeness Referrals for alignment with the GSP. Coordination has also included establishing and improving protocols and procedures for sharing groundwater information between Permit Sonoma and the GSA, including the status of well permit applications within the Subbasin, and collaborating to create the Groundwater Users Information Data Exchange or GUIDE program (described in Section 8.2).

Additional points of coordination between the County of Sonoma and the GSA include domestic well inventories; sharing of groundwater level data and monitoring coordination; outreach coordination for consistent messaging to stakeholders; and exploring solutions that mitigate risks to vulnerable domestic well owners. This includes coordinating with Permit Sonoma and the Sonoma Valley and Petaluma Valley GSAs on how to address future permit applications for new wells in areas experiencing undesirable results in the Sonoma Valley Subbasin.

In 2024, Sonoma Water launched the Russian River Watershed Resilience Program and Watershed Network, as one of five DWR pilot programs funded through the DWR Watershed Resilience Program. One of the results of this program is the creation of the Russian River Watershed Resilience Plan, which provides a comprehensive analysis of climate change impacts to water resources in the Russian River Watershed. The GSA participated in Watershed Network meetings and made recommendations to inform groundwater components throughout development of the Plan, as surface water from the Russian River is a critical portion of the Subbasin's overall water supply.

Lastly, the GSA coordinates and regularly communicates with nearby GSAs in Napa, Ukiah, Lake, and Yolo Counties, who have similar groundwater user types and shared regional interests. Coordination meetings occur as-needed with these GSAs for the purpose of general information exchange.

10 OTHER INFORMATION

This section describes the consideration of adjacent basins in the management of the Santa Rosa Plain Subbasin, as well as GSP implementation challenges, and legal challenges.

10.1 Consideration of Adjacent Basins

As described above in Section 9.3.1, the Santa Rosa Plain GSA closely coordinates with the adjacent Petaluma Valley Basin and Sonoma Valley Subbasin. Both technical and administrative staff are shared, along with other contracted staff, and each GSA has shared member agencies with the adjacent basins. Given this close coordination and similar approaches to basin management, including similar approaches to SMCs, the three GSAs are in alignment.

Section 4 of the GSP includes an evaluation of the effect of minimum thresholds on neighboring basins and subbasins for each sustainability indicator. The Santa Rosa Plain Subbasin is hydraulically connected with one neighboring basin that is categorized as medium priority and is also subject to SGMA: the Petaluma Valley Basin, to the south. The Santa Rosa Plain Subbasin is also hydraulically connected to the very low-priority Healdsburg Area Subbasin to the northwest, and the Wilson Grove Formation Highlands Basin to the west, both of which are not required to develop GSPs under SGMA.

There is no evidence in the recent annual reports of any significant change in regional groundwater conditions across the common boundaries with adjacent hydraulically connected basins and subbasins and groundwater levels have exhibited either stable or increasing trends in these areas. Therefore, it is determined that the implementation of the Santa Rosa Plain Subbasin GSP during the 2021-2025 evaluation cycle has not caused any negative impacts on adjacent and hydraulically connected basins and subbasins and there are no concerns that GSP Implementation will affect the basins' abilities to achieve their respective sustainability goals.

As indicated in Sections 5.1 and 6.1, construction of new monitoring wells, additional voluntary monitoring and geophysical investigations along the Subbasin boundaries has enhanced the GSA's ability to characterize groundwater conditions and track trends in these areas. The GSA will continue to manage the Subbasin to consider potential impacts on adjacent basins and subbasin conditions, and will maintain communications with the Petaluma Valley GSA and County to assess potential impacts in the future.

10.2 Challenges Not Previously Discussed

The most significant challenge for successful implementation of the GSP is acquiring funding to finance GSP implementation. While the GSA has had a fee in place since 2019 to fund operational expenses, this fee does not include full funding for filling data gaps or for implementing project and management actions, which have been primarily funded by grants up to this point. Additional grant funding remains uncertain, and development and implementation of fees sufficient to fund full GSP implementation remains a challenge for the GSA.

10.3 Legal Challenges

There have been no legal challenges involving the Santa Rosa Plain GSA nor has there been any indication of a potential adjudication.

11 SUMMARY OF KEY TAKEAWAYS OF THE PERIODIC EVALUATION AND RECOMMENDED NEXT STEPS

Based on the information evaluated and presented in this Periodic Evaluation, the GSP remains an appropriate and viable Plan for achieving sustainable groundwater management in the Santa Rosa Plain Subbasin and does not necessitate a Plan Amendment at this time. The need for any amendments to the GSP will continue to be evaluated throughout the implementation period of the GSP and reported to DWR at a minimum frequency of every five years.

Over the evaluation cycle, the GSA has made significant progress implementing the GSP through the collection of new information to support the understanding of the Subbasin, advancement of programs, projects and management actions and raising groundwater awareness and engagement of groundwater users. Key activities and findings described in this Periodic Evaluation are summarized below, along with applicable next steps. The next steps identified below form the basis for ongoing updates to the implementation plan for the GSP over the next five years (2027 through 2032).

11.1 Monitoring and Evaluating Groundwater Conditions for Sustainability

Over the five-year evaluation cycle, the Subbasin experienced one of the more significant droughts on record (WY 2021), followed by four years of normal and above average rainfall. During this time, the Subbasin did not experience undesirable results for any of the five applicable sustainability indicators. Minimum threshold exceedances were limited to two ISW RMPs during the WY 2021 drought which subsequently recovered and have remained above measurable objectives for four consecutive years.

Improvements to the monitoring networks were achieved through construction of six new multi-level monitoring wells and four additional shallow monitoring wells for ISW monitoring. Updates were made to the water quality monitoring network to limit redundancies and better align monitoring frequencies for constituents of concern. At this time, the RMP monitoring networks are determined to be adequate for the purpose of managing the Subbasin and implementing the GSP.

Sustainable management criteria established within the GSP were determined to be appropriate and no changes to the methodology or approach for setting SMC are necessary at this time. SMC were established following the GSP methodology for three of the new RMPs added to the groundwater level monitoring network, which have a sufficient amount of available data.

11.1.1 Next Steps for Monitoring and Evaluating Groundwater Conditions for Sustainability

- Establish SMC at the three new multi-level wells constructed in 2025 and 2026 once a sufficient amount of groundwater level measurements have been collected and analyzed.
- Coordinate with PWS systems to optimize water quality monitoring network.
- Evaluate forthcoming ISW guidance and assess need for refinements to ISW monitoring and management approach. Several of the new ISW monitoring wells will likely be designated as RMPs in the future and SMC will be established for these following review of DWR's forthcoming guidance on managing ISW depletion.
- Strategically leverage voluntary groundwater level monitoring program (Level Up!) to fill any remaining or future gaps within the monitoring networks.

11.1.2 Filling of Data and Information Gaps and Addressing DWR's Recommended Corrective Actions

Substantial progress has been made in filling the primary data gaps identified within the GSP. Key new information collected includes:

- Refinement of the water supply well inventory that was used to revise the well density mapping and evaluate potential impacts on beneficial users relative to groundwater level SMC.
- Improving the characterization and monitoring for interconnected surface water and groundwater-dependent ecosystems.
- Collection and evaluation of geophysical data, including Airborne Electromagnetic (AEM) surveys flown by DWR and ground-based surveys performed by GSA to help refine geologic structure and improve other aspects of the hydrogeologic conceptual model.
- Developing and piloting a voluntary flow metering program (Flow Smart) and obtaining groundwater extraction information directly from groundwater users through Groundwater User Information Data Exchange (GUIDE) platform to improve understanding of groundwater use within the Subbasin and support planning for water-use efficiency programs.

Together, this data and analysis allowed the GSA to clarify information presented in the GSP and address DWR-provided Recommended Corrective Actions.

11.1.3 Next Steps for Filling Data and Information Gaps

- Maintain and further improve well inventory.
- Analysis of data from Flow Smart program and consider need and opportunities for future expansion.
- Further integration of recently collected data from the monitoring well drilling and construction and geophysical investigations into the hydrogeologic conceptual model.

11.1.4 Water Use Changes and Associated Water Budgets

Water use within the Subbasin during the evaluation cycle was consistent with recent water use patterns and trends with estimates of annual groundwater extraction ranging from approximately 17,800 to 20,400 AFY with higher levels of extraction occurring in drier years. Groundwater extraction remained within the estimated sustainable yield for the Subbasin of 23,900 AFY.

The groundwater flow model for the Subbasin was improved through recalibration and incorporation of new information and data. Simulations performed using the model indicate that historical declines in storage over the 42-year historical period (WY 1976 through 2018) of -900 AFY were partially offset by increases in storage of +300 AFY over the more current five-year period (WY 2019 through 2024).

Future baseline projections (no new projects or management actions) based on updated climate and land use projections indicate a potential continued long-term decline in storage of -900 AFY over the 50-year projected period (WY 2025 through 2075) and the occurrence of undesirable results for groundwater levels and groundwater storage.

Future projections with projects and management actions indicate that undesirable results would be eliminated.

11.1.5 Next Steps for Water Use and Water Budgets

- Continue to improve estimates of key water budget terms within the Subbasin, including groundwater extraction and changes in storage.
- Continue to maintain and update model in preparation for any other additional scenarios, including any needed to evaluate the ISW depletion SMC following issuance of DWR's ISW guidance, and in preparation for the next Periodic Evaluation cycle.

11.1.6 Status of Projects and Management Actions

Substantial progress in advancing the planning and implementation of projects and management actions was achieved during the evaluation cycle by the GSA.

Reducing groundwater use through voluntary water-use efficiency measures and practices was advanced through establishment of the Well Aware program and engagement of local partner organizations and agencies to connect with specific groundwater-user classes. Activities included performance of a parcel-scale groundwater demand assessment and performance of a pilot program which included 1) outreach and education, 2) developing the Well Aware Toolkit, 3) consultations and leak checks, and 4) demonstration sites or case study recognition program.

Studies and pilot projects for stormwater capture and recharge and ASR were performed within the Subbasin revealing potential opportunities for enhancing groundwater recharge and offsetting groundwater extraction through increased utilization of both imported and local wet-weather surface water flows.

The GSA assessed policy and programs options within the authorities of the GSA and/or local land use agencies that support the sustainability goal for the Subbasin, which included stakeholder surveys and establishing a prioritized list of policies and programs for the GSA to consider.

11.1.7 Next Steps for Projects and Management Actions

The following next steps envisioned for continued advancement of projects and management actions are summarized from more detailed descriptions provided in Section 7.

- Continue advancing the WUE program through existing outreach and engagement platforms and further evaluate the cost/benefit of the Well Aware program components to support the GSA's implementation planning and inform the prioritization of specific actions and initiatives, including expanding outreach and engagement, establishing specific metrics and goals for the program, continuing and expanding regional partnerships.
- Evaluate the results of recently completed and ongoing stormwater capture and recharge and ASR pilot projects within the Subbasin to identify opportunities and constraints and inform the cost/benefit for full-scale implementation. Engage with Sonoma Water and its water supply contractors in evaluating opportunities and constraints associated with developing a regional water bank strategy.
- Assess opportunities for any future expansion or optimization of recycled water supplies within the Subbasin that offset groundwater extraction.
- Continue engaging with farmer organizations and growers to develop groundwater sustainability practices and incentives which could be incorporated into existing farm plans and certification programs.

11.1.8 Engagement with Stakeholders and Other Agencies

During the evaluation cycle the GSA has greatly expanded its outreach and engagement with groundwater users and local agencies and organizations within the Subbasin. These activities are fully described in Section 9 and included: holding publicly noticed meetings, expanding and updating information on the GSA's website, supporting the community-focused voluntary programs developed by the GSA, maintaining and expanding the GSA's interested parties list, issuing quarterly newsletters, expanding outreach through social media posts, educational videos to inform stakeholders about the GSA, direct mailings for sharing of key information, issuance of press releases, use of survey tools and direct communication to capture stakeholder feedback, and utilizing partner agencies and organizations to support outreach to specific groundwater user classes. The GSA has also actively participated and commented on numerous land-use and water-supply planning initiatives and plans.

11.1.9 Next Steps for Engagement with Stakeholders and Other Agencies

- Continue and explore opportunities for enhancing and optimizing the stakeholder and local agency outreach and engagement programs.
- Further engage key stakeholders including underrepresented communities, California Tribes, and small farmers by determining and conveying specific benefits of sustainable groundwater management to these users.

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