SANTA ROSA PLAIN SUBBASIN ANNUAL REPORT Water Year 2024

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Prepared by Sonoma Water

SANTA ROSA PLAIN GROUNDWATER SUSTAINABILITY AGENCY

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ACRONYMS AND ABBREVIATIONS

µg/L	microgram(s) per liter
AF	acre-feet
AFY	acre-feet per year
ASR	aquifer storage and recovery
bls	below land surface
CEQA	California Environmental Quality Act
COC	constituent of concern
County	Sonoma County
DAC	Disadvantaged Community
DDW	Division of Drinking Water
DTW	depth-to-groundwater
DWR	California Department of Water Resources
EO	Executive Order
ET	evapotranspiration
eWRIMS	Electronic Water Rights Information Management System
GAMA	Groundwater Ambient Monitoring and Assessment Program
GDE	groundwater dependent ecosystem
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GUIDE	Groundwater-User Information Data Exchange
GWLE	groundwater level estimator
GWL	groundwater level
HCM	hydrogeologic conceptual model
InSAR	Interferometric Synthetic Aperture Radar
ISW	interconnected surface water
JPA	Joint Exercise of Powers Agreement
MCL	maximum contaminant level
mg/L	milligram(s) per liter
MO	measurable objective
msl	mean sea level
MT	minimum threshold
NA	not applicable
PWS	Public Water System
RCD	Resource Conservation District
RMP	representative monitoring point
SGMA	Sustainable Groundwater Management Act
SMC	sustainable management criteria
SMCL	secondary maximum contaminant level
SWIG	Sebastopol Water Information Group
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TSS	Technical Support Services (a DWR program)
USGS	U.S. Geological Survey
WY	water year

EXECUTIVE SUMMARY

The 2014 California Sustainable Groundwater Management Act (SGMA) requires that, following adoption of a Groundwater Sustainability Plan (GSP), Groundwater Sustainability Agencies (GSAs) annually report on the condition of the basin in the previous water year and show that the GSP is being implemented in a manner that is designed to achieve the sustainability goal for the basin. Department of Water Resources (DWR) completed its assessment and approved the GSP for Santa Rosa Plain Subbasin on January 26, 2023 (DWR, 2023).

This Water Year (WY) 2024 Annual Report for the Santa Rosa Plain Subbasin includes background information on the GSA and GSP (Section 1), a summary of the plan area and hydrogeologic setting (Section 2), WY 2024 conditions and status of sustainability indicators (Section 3), and a summary of planned and in-progress GSP implementation activities (Section 4).

Using the methodology for classifying water years during implementation of the GSP, WY 2024 (October 1, 2023 – September 30, 2024) is classified as a normal water year. WY 2024 represented the second year of above average precipitation following three consecutive years of below average rainfall from WY 2020 –WY 2022.

Groundwater Conditions: Groundwater conditions in WY 2024 for each sustainability indicator are summarized below:

Chronic Lowering of Groundwater Levels: There were no minimum threshold exceedances for the chronic lowering of groundwater levels in WY 2024 and groundwater levels at wells with established warning levels remained above those threshold values. Groundwater-levels were generally similar to fall 2023 throughout the majority of the Subbasin within the shallow aquifer system, with areas of moderate increases and decreases of up to about 5 feet occurring in some areas, primarily in the northern portions of the Subbasin. Groundwater-levels within the deep aquifer system exhibited minimal to moderate changes ranging up to 5 feet throughout the majority of the Subbasin in WY 2024 compared with WY 2023. Areas of decreases ranging up to approximately 20 feet occur in the southern and southeastern portions of the Subbasin in the vicinity of Rohnert Park. These decreases are primarily explained by increases of comparable levels which occurred during the prior WY 2023. .

Reduction of Groundwater in Storage: No minimum threshold exceedances occurred in WY 2024 for the Reduction of Groundwater in Storage Sustainability Indicator. The annual change in groundwater in storage within the Subbasin for WY 2024 is estimated to be an approximate 3,060 acre-feet increase, with essentially all of the estimated storage change occurring in the shallow aquifer system. The WY 2023 and 2024 increases have offset approximately 69% of the storage declines observed during the preceding three dry years of WY 2020 through 2022. Overall, between 2012 and 2023, there has been a cumulative decrease in storage of about 4,880 acre-feet or an average of approximately -375 acre feet per year (AFY).

Degradation of Water Quality: There were no exceedances of minimum thresholds for degraded water quality in WY 2024.

Land Surface Subsidence: There were no exceedances of minimum thresholds for subsidence in WY 2024.

Depletion of Interconnected Surface Water: There were no exceedances of minimum thresholds for the depletion of interconnected surface water in WY 2024 and measurable objectives were achieved at all seven representative monitoring points (RMPs) based on average measured dry-season low groundwater levels.

Total Water Use: Based on the estimated and metered uses of groundwater, surface water and recycled water, total water use within the Subbasin was an estimated 46,594 acre-feet in 2024, which is slightly below the 5-year average of 47,057 acre-feet (WY 2020 to 2024). The total estimated annual groundwater extraction is approximately 17,898 acre-feet for 2024 which is below the estimated sustainable yield for the Subbasin of 23,900 acre-feet (Sonoma Water, 2022a).

GSP Implementation Progress: GSP activities performed in WY 2024 and in-progress or planned activities for WY 2025 include the following:

Communication and Stakeholder Engagement

- Holding public GSA Board, Advisory Committee and community meetings.
- Maintaining and updating the on-line Groundwater User Information and Data Exchange (GUIDE) program to exchange parcel-specific water use information with groundwater users has continued.
- Significant direct outreach to growers and rural well owners for voluntary monitoring/metering, water-use efficiency programs and recharge initiatives.

Land Use Planning and Well Permitting Integration/Coordination

- Continued establishing protocols and procedures for the sharing of groundwater information between Permit Sonoma and the GSAs in Sonoma County, including the status of litigation related to the County's Well Ordinance.
- Coordinated with Permit Sonoma and the Sonoma Valley and Petaluma Valley GSAs on concepts for addressing future permit applications for new wells in areas experiencing undesirable results in the neighboring Sonoma Valley Subbasin.
- Coordination with the County and cities within the Subbasin on planned and in-progress general plan updates, other regional planning efforts, and proposed development projects with the potential to affect groundwater resources.

Addressing Data Gaps

- Developing a groundwater-dependent ecosystem (GDE) and interconnected surface water (ISW) data gaps assessment approach.
- Development of a coordinated voluntary groundwater-level monitoring program (Level Up!).
- Planning and design of new dedicated monitoring wells.
- Refinement of groundwater use estimates through the GUIDE program.
- Developing an updated inventory of water wells within the Subbasin.
- Developing and implementing a voluntary metering program (Flow Smart).

Projects and Management Actions

Activities related to projects and management actions within the Subbasin include:

- Development, discussion and outreach for the policy and programs options study.

- Assessment of existing water use and water-use efficiency opportunities and development of work plan to pilot and implement conservation and groundwater-use efficiency opportunities.
- Initial planning for investigating existing wells for ASR suitability within the City of Santa Rosa and City of Rohnert Park for scoping and conducting focused investigations and evaluation of ASR feasibility. Other ASR-related planning within the Subbasin has been conducted by Sonoma Water and the Town of Windsor which plan to conduct ASR pilot studies within the Subbasin in WY 2025 and WY 2026, respectively.
- Assessment and selection of a potential location and techniques to implement an On-Farm Recharge (OFR) investigation and pilot project near Mark West Creek and designing Upland Stormwater Recharge Practices for implementation at Crane Creek. Additional work activities in 2025 will include preparation of a work plan to implement the recharge investigations and pilot projects.
- In WY 2025, the GSA will coordinate with recycled water purveyors within the Subbasin to initiate an evaluation of recycled water availability for offsetting groundwater use within the Subbasin.

The Santa Rosa Plain GSA received a DWR-grant to fund several projects to support advancing many of the above-described groundwater sustainability activities, which are planned to be completed within the next 2 years. Through the advancement of these activities and securing the funding needed to fully implement the GSP, the Santa Rosa Plain GSA will make substantial progress towards achieving the sustainability goal for the Subbasin.

1 INTRODUCTION AND BACKGROUND

The 2014 California Sustainable Groundwater Management Act (SGMA) requires that, following adoption of a Groundwater Sustainability Plan (GSP), Groundwater Sustainability Agencies (GSAs) annually report on the condition of the basin for the previous water year and show that the GSP is being implemented in a manner that is designed to achieve the sustainability goal for the basin.

1.1 Purpose and Content of Annual Report

The Water Year (WY) 2024 Annual Report for the Santa Rosa Plain Subbasin has been prepared in accordance with the SGMA Legislation and California Department of Water Resources (DWR) GSP Regulations (§ 356.2. Annual Reports). The Annual Report also generally follows guidance and recommendations included DWR's *Groundwater Sustainability Plan Implementation, A Guide to Annual Reports, Periodic Evaluations, & Plan Amendments* (DWR, 2023a).

Pursuant to the DWR regulations, a GSP Annual Report for the preceding water year (October 1 through September 30) must be submitted to DWR by April 1 of each year following the adoption of the GSP. This WY 2024 (October 1, 2023 – September 30, 2024) Annual Report for the Santa Rosa Plain includes background information on the GSA and GSP (Section 1), a summary of the plan area and hydrogeologic setting (Section 2), WY 2024 conditions and status of sustainability indicators (Section 3), and a summary of planned and in-progress GSP implementation activities (Section 4).

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; Sonoma County (County); Sonoma County Water Agency (Sonoma Water); Sonoma Resource Conservation District; 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 JPA was amended to include the City of Sebastopol. 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, 2022a). 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;
- 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 recycled water supplies.

The projects and management actions will be 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 PLAN AREA AND HYDROGEOLOGIC SETTING OVERVIEW

This section provides an overview of the plan area and Subbasin hydrogeologic setting, as described in Sections 2 and 3 of the GSP (Sonoma Water, 2022a).

2.1 Plan Area

The 80,000-acre Santa Rosa Plain Subbasin lies within the Coast Ranges geomorphic province and is one of three coastal alluvial subbasins of the Santa Rosa Valley Groundwater Basin in the North Coast Hydrologic Region; Healdsburg Area and Rincon Valley are the other two subbasins (**Figure 2-1**). The Santa Rosa Plain Subbasin is generally bounded on the west by low-lying hills of the Mendocino Range and on the east by the Sonoma Mountains and Mayacamas Mountains. The Subbasin is approximately 22 miles long from north to south and the width from west to east varies from approximately 9 miles through the Santa Rosa area to 6 miles at the south end near the City of Cotati and narrows greatly at its northern end. The Subbasin includes the Town of Windsor; Cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol; and areas of unincorporated rural communities.

The major urban water suppliers in the Subbasin are the individual cities and towns and Cal-American Water Company's Larkfield system. Most of these water suppliers rely primarily on imported Russian River water supplied by Sonoma Water, but they also pump groundwater for supplemental supply, and during droughts and in emergencies. The City of Sebastopol relies entirely on groundwater pumped from wells located within the Subbasin. The urban communities account for about 36 percent of the land use. Rural residences outside of urban water supply systems rely on groundwater extracted from domestic wells. The exact number of domestic wells is unknown but is estimated to be between 4,000 and 5,500 (Sonoma Water, 2022a). Agriculture, which accounts for 26 percent of land use—mostly wine grapes—primarily depends on groundwater and recycled water, where available. Native vegetation and/or water make up 35 percent of land use, and 3 percent of land is classified as vacant. Disadvantaged communities within the Subbasin are generally (but not entirely) located in areas that receive water from municipal suppliers, which rely primarily on surface water supply. One area where disadvantaged communities are known to utilize private wells within the Subbasin include the Roseland area of southwest Santa Rosa.

2.2 Hydrogeologic Setting

The Subbasin is located within a region of geologic complexity caused by long periods of active tectonic deformation, volcanic activity, and sea-level changes. Faults in the Subbasin serve as major structural boundaries for geologic formations and groundwater movement. Groundwater resources are highly variable throughout the Subbasin. The productive freshwater aquifers occur both at shallower depths, generally less than 200 feet below land surface (bls) where many residential wells are drilled, and at deeper depths, where many municipal, industrial, and agricultural wells are constructed. The Subbasin's deepest wells extend to approximately 1,500 feet bls and no known existing wells extend deeper than 2,000 feet bls.

In general, groundwater flows from the east and west highlands to the Laguna de Santa Rosa. Faults along the Subbasin boundary may impede, enhance, or redirect groundwater flow and affect groundwater quality locally. Principal sources of groundwater recharge within the Santa Rosa Plain watershed are direct infiltration of precipitation and infiltration from streams. The shallow aquifer system receives most of this type of recharge every year. Recharge that reaches the deeper aquifer zones is less understood but is inferred to come from a combination of leakage from overlying shallow aquifers and mountain-front recharge along the margins of the valley. Deeper recharge may take decades or thousands of years, in some cases, to reach the aquifers due to long travel paths.

For the purpose of implementing SGMA, two principal aquifer systems were identified and are described in the GSP: the shallow and deep aquifer systems, which are commonly separated by layers of clay,

forming low permeability aquitards. The shallow aquifer system serves a number of different users and uses, with the primary extractions being from domestic water-supply wells and, in some areas, agricultural and public water-supply wells. In many areas the shallow aquifer system is locally and seasonally connected to creeks and streams and in some areas where groundwater levels are close to the ground surface, the shallow aquifer system provides water for vegetation communities in the Subbasin. The deep aquifer system is generally confined to semi-confined and is not spatially connected with surface water (although hydraulic connections between the shallow and deep aquifers do provide for hydraulic connectivity between surface water and the deep aquifer). The deep aquifer system serves a combination of rural-residential water users with domestic water-supply wells in the unincorporated areas of the Subbasin, agricultural wells used for crop irrigation, industrial and commercial wells, and public water-supply wells for municipal and smaller public supply systems.

Primary data gaps identified in the GSP include the geometry and properties of aquifer and aquitards, how the faults in the Subbasin affect groundwater flow, and basin boundary characteristics. Additionally, more data are needed to better understand groundwater recharge and discharge mechanisms, including surface water-groundwater interactions, and the amount and locations of groundwater extractions. Progress in addressing these identified data gaps are described in Section 4 of this annual report.

3 WY 2024 SUBBASIN CONDITIONS AND SUSTAINABILITY INDICATOR STATUS

This section summarizes Subbasin conditions and the status of each applicable sustainability indicator within the Subbasin based on available WY 2024 data (or most recent data available where WY 2024 data are not yet available). All available monitoring data included in this annual report are also being submitted electronically on forms provided by DWR.

3.1 Climate Conditions

Precipitation that falls within the Subbasin contributes to runoff and percolation components of the water budget. 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 in near the Santa Rosa Airport at an elevation of 109 feet. As shown on **Figure 3-1a**, this station recorded 36.3 inches of rainfall in WY 2024 compared with the average long-term rainfall from WY 1903 to WY 2024 at this station of 33.1 inches of precipitation (and the more recent 20-year and 10-year averages of 32.6 and 33.1 respectively). In previous annual reports these statistics were based on a precipitation record with frequent gaps in the record. In this annual report, 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. **Figure 3-1b** provides a graph of precipitation and streamflows for water years 1999 through 2024. WY 2024 represented the second year of above average precipitation following three consecutive year of below average rainfall which included the third driest water year on record over the last 127 years in WY 2021. The yearly discharge at multiple sites in the Subbasin above average for WY 2024 for the comparison period from WY 1999 to WY 2024.

For the purposes of comparing and classifying WY types for the GSP, data from PRISM and historical data were used from Sonoma Valley, Santa Rosa Plain, and Petaluma Valley to develop an aggregated WY classification for all three basins for 1895 to January 2020 (as described in Appendix 3-A of the GSP).

The GSP methodology 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. As described in Appendix 4-B of the GSP, the US Drought Monitor's Long Term Drought Indicator Blend (LTDIB) is used to assess drought conditions for GSP implementation purposes, where a drought is considered to occur when the LTDIB water-year averaged value meets or exceeds that of the D1, or moderate drought (Sonoma Water, 2022a). As shown in **Figure 3-1b**, this method classifies WY 2024 as a normal year, which is not considered a drought condition for the purposes of determining undesirable results during GSP implementation.

3.2 Groundwater Levels

The groundwater-level monitoring network consists of a total of 113 wells within and along the boundaries of the contributing watershed areas, including 96 wells within the Subbasin itself. The locations of the monitoring wells for the shallow and deep aquifer systems are shown on **Figures 3-2a and 3-2b**, respectively. The locations of monitoring wells located along and outside the boundaries of the Subbasin (the Subbasin boundary groundwater-level monitoring network) are shown on **Figure 3-2c.** The current representative monitoring point (RMP) network for the chronic lowering of groundwater levels sustainability indicator consists of 14 wells screened within the shallow aquifer system and 12 wells screened primarily within the deep aquifer system (**Figures 3-2d and 3-2e**).

3.2.1 Groundwater Level Contours

Groundwater-elevation maps prepared for this annual report follow the methodology used in the GSP and contour the shallow aquifer system and deeper aquifer system separately based on water-level data from the shallow and deep aquifer system wells, respectively. The Groundwater Level Estimator (GWLE) was developed to estimate groundwater levels for the Subbasin. The GWLE uses the best available data, including available groundwater level observations and groundwater elevation head outputs of the numerical groundwater flow models and is described in **Appendix A**.

Seasonal high and low groundwater-elevation contour maps for the shallow and deep aquifers developed using the GWLE are shown on **Figures 3-3 through 3-6** for the spring and fall seasons of WY 2024. Groundwater-elevation contour maps for both the shallow and deep aquifer systems are consistent with historical contour maps provided in the GSP's. From the south end and west side of the valley, groundwater flows northwesterly and east, respectively toward the Laguna de Santa Rosa. Overall, the contours indicate that groundwater elevations in the fall are generally lower than in the spring, a typical seasonal dynamic for the Subbasin, while the spatial patterns of groundwater flow direction in the Subbasin were similar for both the spring and fall of 2024.

It is important to note that groundwater elevations measured in nearby wells can be highly variable due to differences in well design (that is, the depth and length of well-screen intervals) and the spatial variations in aquifer materials (which can vary abruptly due to the complex geologic conditions and numerous fault zones present in the Subbasin). Therefore, the associated groundwater-level contour maps represent generalized groundwater flow patterns and should not be used to interpret more localized or site-specific conditions.

To provide a spatial comparison of year-to-year changes in groundwater elevations and provide data needed to estimate annual groundwater storage changes described in Section 3.3, groundwater-level change maps were developed for each aquifer system. These groundwater-level change maps were

developed by differencing fall 2023 and fall 2024 groundwater elevations used for the contour maps for the shallow aquifer system (**Figure 3-7**) and deep aquifer system (**Figure 3-8**). These maps help provide a geographic view of areas with the biggest change in water levels from year to year. Fall 2024 groundwater-levels were generally similar to fall 2023 throughout the majority of the Subbasin within the shallow aquifer system, with areas of moderate increases and decreases of up to about 5 feet occurring in some areas, primarily in the northern portions of the Subbasin (**Figure 3-7**). Groundwater-levels within the deep aquifer system exhibited either minimal to moderate changes ranging up to 5 feet throughout the majority of the Subbasin in WY 2024 compared with WY 2023. Areas of decreases ranging up to approximately 20 feet primarily occur in the southern and southeastern portions of the Subbasin in the vicinity of Rohnert Park (**Figure 3-8**). These decreases are primarily explained by increases of comparable levels which occurred during the prior WY 2023 when the City of Rohnert Park reduced its groundwater pumping.

3.2.2 Groundwater Level Hydrographs

Trends in groundwater elevations can be further assessed with hydrographs that plot changes in groundwater elevations over time. Hydrographs for all monitoring wells within the groundwater-level monitoring network that have new data after October 2022 are provided in **Appendix B**. Hydrographs for RMPs included in **Appendix C** are further evaluated to assess the status of SMC in Section 3.2.3, below.

3.2.3 Sustainable Management Criteria Status for Chronic Lowering of Groundwater Levels

Section 4.5 of the GSP describes the process, information and methodology used to establish SMC for the chronic lowering of groundwater levels. A summary of these SMC described in the GSP are provided in **Table 3-1**.

Table 3-1. Sustainable Management Criteria Summary for Chronic Lowering of Groundwater Levels

Sustainability Indicator	Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Chronic lowering of groundwater levels	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 and protect at least 98 percent of nearby water supply wells. Metric: Shallower (more protective) of historical low elevations minus 4-year drought assumption or above the 98th percentile of nearby water supply well depths.	Monthly or monthly-averaged groundwater levels measured at RMP wells.	**Stable Wells:** Maintain within historical observed ranges. Metric: Historical median spring groundwater elevation	10 percent 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.
		Wells with Historical Declines and then recovery: Maintain above historical low elevations and protect at least 98 percent of nearby water supply wells. Metric: Shallower (more protective) of historical low elevations OR above the 98th percentile of nearby water supply well depths.		**Wells with Historical Declines and then recovery:** Maintain within recent (recovered or recovering) historical observed ranges. Metric: Recent (2010-2019 for recovered wells and 2015-2019 for recovering wells) median spring groundwater elevation		

Table 3-2 shows sustainable management criteria at each RMP for chronic lowering of groundwater levels, along with measured seasonal high (spring) and seasonal low (fall) groundwater levels for comparison with measurable objectives and minimum thresholds, respectively. Sustainable management criteria for this sustainability indicator are met when groundwater elevations are at or above the criteria. For RMPs equipped with pressure transducers, monthly-averaged measurements are used for comparison with minimum thresholds (lowest monthly fall measurements) and measurable objectives (highest monthly spring measurements). As indicated in **Table 3-2a,** displayed in hydrographs for chronic lowering of groundwater levels RMPs (**Appendix C**) and Figure 3-2e and Figure 3-2f:

- Seasonal high groundwater elevations measured in spring 2024 at 10 of the 12 shallow aquifer system RMPs and 6 of the 7 deep aquifer system RMPs with available data are above measurable objectives.
- Seasonal low groundwater elevations measured in fall 2024 at all RMPs with available data are above minimum thresholds indicating that undesirable result conditions are not occurring in WY 2024 (Table 3-2b).
- During the GSP development, 4 wells were assigned Warning Levels as protective measures to account for the uncertainties of the Minimum Thresholds and their impacts on beneficial users. The following wells have Warning Levels: SRP0347, SRP0238, SRP0243 and SRP0249. All of the water levels in these wells are above the Warning Levels in WY 2024. In the WY 2022 Annual Report SRP0238 was noted to be close to its Warning Level at the end of the 2020-2022 drought. The wetter years of WY 2023 and WY 2024 have resulted in recovery of groundwater levels at SRP0238 such that spring groundwater levels are now achieving measurable objectives.

- Seven RMPs were unavailable for fall measurements (3 wells which DWR stopped monitoring, 2 wells due to maintenance, and 2 wells due to transducer failures). GSA staff is working to replace/resume monitoring at these RMPs.

Table 3-2a. 2024 Sustainable Management Criteria Status for Chronic Lowering of Groundwater Levels

Well ID	Depth	Spring 2024 Groundwater Level (feet msl)	Measurable Objective	Fall 2024 Groundwater Level (feet msl)	Minimum Threshold
SRP0073	**Shallow**	NM	86	NM	64
SRP0106	**Shallow**	95.7	93	84.7	72
SRP0121	**Shallow**	NM	137	NM	75
SRP0269	**Shallow**	87.9	82	84.5	61
SRP0355	**Shallow**	63.2	55	56.5	46
SRP0357	**Shallow**	71.1	69	66.9	53
SRP0375	**Shallow**	113.5	115	112	85
SRP0709	**Shallow**	62.2	61	58.5	54
SRP0710	**Shallow**	63.8	64	62.9	53
SRP0713	**Shallow**	65.9	62	57.6	47
SRP0714	**Shallow**	131.7	130	128.1	124
SRP0715	**Shallow**	128.5	127	124.1	119
SRP0720	**Shallow**	182	177	173	159
SRP0723	**Shallow**	204.6	202	203.5	193
SRP0019	**Deep**	NM	45	NM	12
SRP0057	**Deep**	NM	128	NM	100
SRP0059	**Deep**	NM	76	NM	67
SRP0115	**Deep**	NM	200	177.8	169
SRP0238	**Deep**	81.8	71	63	-28
SRP0243	**Deep**	28.9	37	16.7	-83
SRP0249	**Deep**	NM	71	NM	-97
SRP0347	**Deep**	50.9	41	41.7	-86
SRP0359	**Deep**	57.6	54	54.7	21
SRP0376	**Deep**	109.5	109	94.5	76
SRP0724	**Deep**	90.5	88	84.7	69
SRP0725	**Deep**	57.4	32	52.7	17

NM: Not Measured

*: Questionable Measurement

**: Measurement collected outside of Spring measurement window (March-May)

Spring Measurement above measurable objective

Fall Measurement below minimum threshold

Table 3-2b. 2024 Undesirable Result Status for Chronic Lowering of Groundwater Levels

Depth	Well ID	2022	2023	2024	MT	Number of Minimum Threshold Exceedances
Shallow	**SRP0106**	82.35	85	84.7	72	0
	SRP0121	NM	NM	NM	75	0
	SRP0269	79.08	83.4	84.46	61	0
	SRP0355	53.83	56	56.51	46	0
	SRP0357	65.72	65.5	66.9	53	0
	SRP0375	96.01	101.9	111.99	85	0
	SRP0709	58.9	60	58.51	54	0
	SRP0710	61.05	62	62.89	53	0
	SRP0713	57.79	58.7	57.6	47	0
	SRP0714	128	128.1	128.11	124	0
	SRP0715	123.71	124.2	124.14	119	0
	SRP0720	167.58	179.2	172.98	159	0
	SRP0723	200.69	203	203.49	193	0
Percent of wells exceeding MT for 3 consecutive fall measurements		-	-	-	-	0.0%
Deep	**SRP0019**	NM	NM	NM	12	0
	SRP0057	106.55	110.8	NM	100	0
	SRP0115	NM	NM	177.81	169	0
	SRP0238	31.23	81.7	62.96	-28	0
	SRP0243	8.99	16.6	16.66	-83	0
	SRP0249	55.27	68.4	NM	-97	0
	SRP0347	33.4	40.4	41.7	-86	0
	SRP0359	50.84	52.9	54.68	21	0
	SRP0376	87.97	95.8	94.53	76	0
	SRP0724	82.16	85.2	84.73	69	0
	SRP0725	50.33	54	52.7	17	0
Percent of wells exceeding MT for 3 consecutive fall measurements		-	-	-	-	0.0%

3.3 Groundwater Storage

DWR's GSP Regulations require annual estimation and reporting of groundwater storage changes for each principal aquifer. For the GSP, the numerical groundwater flow model was used to estimate the water budget and annual change in storage. The numerical groundwater flow model developed for the Subbasin extends to the end of WY 2018. Due to the complexity and cost of updating the numerical model annually, an alternate method based on annual measured changes in groundwater levels is used to estimate changes in groundwater storage from WY 2022 to 2023 for the annual report.

Three main parameters must be identified in order to calculate the change in storage between two dates: 1) the average change in groundwater levels over the Subbasin, 2) the aquifer system's storage coefficients; and 3) the thickness of the aquifer for confined aquifers such as the deep aquifer. The groundwater-level change values over the Subbasin (**Figures 3-7 and 3-8**) developed using the GWLE (methodology described in **Appendix A**), along with the groundwater storage coefficients and aquifer thickness, were used to calculate the change in groundwater storage for each principal aquifer system.

As described in the GSP Basin Setting section, the shallow aquifer is assumed to be 200 feet thick on average from ground surface, and for the deep aquifer system which occurs beneath the shallow aquifer system, the thickness is assumed to be 300 feet on average. The storage coefficients defined in the groundwater flow model are spatially interpolated to the GWLE grid. The specific yield values defined for layer 1 of the groundwater flow model are used for the shallow aquifer and specific storage values from layer 4 are used for the storage coefficients for the deep aquifer. Though not directly comparable due to the variable thickness of the model layer, model layer 1 is used to compare the GWLE estimates of groundwater storage change for the shallow aquifer. Model layers 3 and 4 are used to compare with the GWLE estimates for the deep aquifer.

The GWLE employs statistical regression to predict groundwater levels across time, space, and depth using gathered observations. With each addition of new data in annual reports, this statistical relationship undergoes an update. Consequently, estimates for water levels and storage changes from previous years may vary between annual reports, as summarized in **Appendix A**. Though this adjustment may seem counterintuitive, it optimally utilizes the extensive groundwater level observation dataset amassed in the Subbasin.

Graphs of groundwater storage changes estimated using both the numerical model and groundwater-level method are shown in **Figures 3-9 and 3-10**. As indicated in **Table 3-3**, the GWLE change method estimates an increase in storage of 3,060 acre-feet from WY 2023 to WY 2024. Overall, between 2012 and 2023, there has been a cumulative decrease in storage of about 4,880 acre-feet or an average of approximately -375 AFY. The WY 2023 and 2024 increases have offset approximately 69% of the storage declines observed during the three dry years of WY 2020 through 2022. Spatial changes in groundwater storage estimated using the groundwater-level method are displayed on **Figures 3-11 and 3-12** for the shallow and deep aquifer systems, respectively. In terms of volume, the shallow aquifer system experiences roughly 100 times larger changes of groundwater in storage compared to the deep aquifer. This is primarily because the storage coefficients for unconfined aquifer systems (such as the shallow aquifer system) are typically three to four orders of magnitude greater than storage coefficients for confined aquifer systems typical of the deep aquifer system (Alley et al, 1999).

While the two methods provide a reasonable correlation for annual storage changes and use consistent datasets and assumptions where possible, there are discrepancies due to the inherent differences in underlying approaches and assumptions of each tool. Uncertainty related to assumptions for storage coefficients coupled with the necessity to rely on interpolated water levels through data gap areas in the groundwater level monitoring network, contributes to a moderate amount of method uncertainty for the groundwater-level change method. In addition, the groundwater elevation change method is susceptible to potential over or under-estimation due to the method's inability to account for the time-varying interaction between all of the hydrologic processes that are incorporated into the groundwater flow model simulations. Regardless, the groundwater elevation change method is considered the best available tool for efficiently estimating annual change in groundwater in storage and will inform future updates of the numerical flow model for the 5-year GSP update.

Table 3-3. Estimated Annual Groundwater Storage Changes

	Estimated Storage Change (acre-feet)			
Water Year	**Deep, Fall**	**Shallow, Fall**	**Annual Total**	**Cumulative**
2012	-80	-2,900	-2,970	-2,970
2013	-80	-11,140	-11,220	-14,190
2014	-50	-3,610	-3,660	-17,850
2015	-20	-4,540	-4,560	-22,410
2016	40	880	920	-21,490
2017	90	15,610	15,710	-5,780
2018	40	2,960	3,000	-2,780
2019	-40	2,930	2,890	110
2020	-40	-11,740	-11,780	-11,670
2021	-20	-5,890	-5,910	-17,580
2022	30	1,750	1,780	-15,800
2023	150	7,700	7,860	-7,940
2024	0	3,060	3,060	-4,880

3.3.1 Sustainable Management Criteria Status for Reduction in Groundwater Storage

Section 4.6 of the GSP describes the process, information and methodology used to establish SMC for the reduction in groundwater storage. As indicated in **Table 3-4** and described in Section 4.6 of the GSP, the reduction in groundwater storage SMC is evaluated using groundwater levels as a proxy based on well-established hydrogeologic principles that the volume of groundwater in storage is directly proportional to groundwater elevations.

Table 3-4. Sustainable Management Criteria Summary for Reduction of Groundwater Storage

Sustainability Indicator	Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Reduction in groundwater storage	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 either: • 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 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 MTs and MOs.	MO for groundwater storage is identical to the MO for chronic lowering of groundwater levels.	Undesirable result for groundwater storage is identical to the undesirable result for chronic lowering of groundwater levels.	Interim milestones for groundwater storage are identical to the interim milestones for chronic lowering of groundwater levels.

As the reduction of groundwater in storage is evaluated with the same minimum thresholds and measurable objectives as the chronic lowering of groundwater levels, the reduction of groundwater in storage sustainability indicator also did not exceed minimum thresholds and the conditions for undesirable results are not occurring related to the reduction of groundwater in storage.

3.4 Groundwater Quality

Potential groundwater quality degradation is considered in the GSP to ensure that activities associated with implementing the GSP, such as projects and management actions, do not degrade current water quality conditions. As stated in the GSP, groundwater quality in the Subbasin is generally suitable for both drinking water and agricultural purposes. Three constituents of concern (COC's) were identified and discussed in the GSP: arsenic, nitrate and salinity (measured as total dissolved solids [TDS]).

Degradation of groundwater quality is measured in public water system supply wells using data reported to the SWRCB Division of Drinking Water (DDW) through the SWRCB's GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) database. The COC for municipal public water system supply wells and domestic wells have a Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL) established by the State's Title 22 Regulations. Data for WY 2023 were downloaded from the SWRCB's GeoTracker GAMA database for comparison with SMC.

3.4.1 Sustainable Management Criteria Status for Degraded Water Quality

Section 4.8 of the GSP describes the process, information and methodology used to establish SMC for the degradation of water quality. A summary of these SMC described in the GSP are provided in **Table 3-5**.

Table 3-5. Sustainable Management Criteria Summary for Degradation of Water Quality

Sustainability Indicator	Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Degraded water quality	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 either: • 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) salts (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.

Table 3-6 shows the number of wells that have exceeded the regulatory standard in WY 2024, along with the number of wells sampled and minimum thresholds for each COC. The degradation of groundwater quality undesirable result occurs if, during two consecutive years, a single groundwater quality minimum threshold is exceeded when computing annual averages at the same well, as a direct result of projects or management actions undertaken as part of GSP implementation. **Appendix D** shows the water quality values for all wells and constituents for WY 2024. As indicated in **Table 3-6**, there were no exceedances of the minimum thresholds established for DDW public water system supply wells in 2024 and, therefore, undesirable results are not occurring. Additionally, the GSA has not yet undertaken projects or management actions that have the potential to impact water quality.

Table 3-6. 2024 Sustainable Management Criteria Status for Degradation of Water Quality

Constituent of Concern	Regulatory Exceedance Standard	Standard Units	Number of Sampled Wells in Monitoring Network (2024)	Number of Wells Exceeding Regulatory Standard (2024)	Minimum Threshold
Arsenic	10	ug/l	34	12	23
Nitrate	10	mg/l	61	0	4
TDS	500	mg/l	13	0	4

3.5 Subsidence

As described in Section 4.9 of the GSP, available Subbasin-wide datasets (while limited to recent time periods) do not indicate the occurrence of inelastic land surface subsidence due to groundwater pumping within the Subbasin and there have been no problems reported by Subbasin stakeholders related to historical inelastic subsidence (for example, damage to infrastructure or modified drainage patterns).

Subsidence is measured using Interferometric Synthetic-Aperture Radar (InSAR) data. These data are provided by DWR on the SGMA data viewer portal (DWR, 2022). **Figure 3-13a** shows the annual subsidence for the Subbasin from October 2023 to October 2024. Data continue to show negligible increases and decreases in land surface elevation. Results were within the measurement error of +/- 0.1 foot, and therefore indicate no inelastic land subsidence is occurring in the Subbasin. **Figure 3-13b** shows the 5-year cumulative subsidence for the Subbasin.

3.5.1 Sustainable Management Criteria Status for Subsidence

Section 4.9 of the GSP describes the process, information and methodology used to establish SMC for land subsidence. A summary of these SMC described in the GSP is provided in **Table 3-7**.

Table 3-7. Sustainable Management Criteria Summary for Subsidence

Sustainability Indicator	Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Subsidence	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 ft/yr of inelastic subsidence (elastic and inelastic).	DWR-provided InSAR dataset average annual subsidence for each 100-meter-by-100-meter grid cell.	The MO is identical to the MT (0.1 ft/yr of subsidence)	Annual MT of 0.1 foot total subsidence is exceeded over a minimum 25-acre area or cumulative total subsidence of 0.2 foot is exceeded over a geographic area of 25 acres within 5-year period and MT exceedance is determined to be correlated with: (1) groundwater pumping, (2) a MT exceedance of the chronic lowering of GWLs SMC (that is, groundwater levels have fallen below historical lows)	The MO is set at current conditions; therefore, interim milestones are also identical to current conditions.

As indicated on **Figure 3-13a** annual subsidence within the Subbasin from October 2023 to October 2024 was within estimated error of measurement of +/- 0.1 foot and therefore minimum thresholds are not exceeded, and measurable objectives are achieved. There are no areas in the Subbasin that exceed the Undesirable Results threshold of 0.2 feet of subsidence over the 5-year period **(Figure 3-13b).**

3.6 Interconnected Surface Water

As shown in **Figure 3-1b**, the total volume of streamflow measured at surface water gages within the Subbasin remained above average in WY 2024 compared with the previous water years.

Available data are currently insufficient to directly calculate the rate or volume of surface water depletions due to groundwater pumping from streamflow measurements or reliably estimate depletions from a surface water budget. Quantifying surface water depletion due to pumping is a challenge because: (1) it cannot be measured directly; and (2) the influence of surface water depletion by pumping is often obscured by other factors, such as precipitation and runoff, surface water diversions, evapotranspiration (ET), and natural groundwater/surface water interactions. Therefore, groundwater levels are used as a proxy for the rate or volume of surface water depletion for these initial SMC.

3.6.1 Sustainable Management Criteria Status for Interconnected Surface Water

Section 4.10 of the GSP describes the process, information and methodology used to establish SMC for interconnected surface water. Due to significant data and information gaps related to surface water depletion, the GSP includes:

- A detailed adaptive management plan for developing new information and data to refine the SMC during initial years of GSP implementation; and
- Initial SMC focused on not exceeding historical levels of streamflow depletion based on available data and modeling tools.

A summary of these SMC described in the GSP is provided in **Table 3-8**.

Table 3-8 Sustainable Management Criteria Summary for Interconnected Surface Water

Sustainability Indicator	Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Depletion of interconnected surface water	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 RMPs (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.

As described in Section 4.10 of the GSP, groundwater-levels monitored at shallow dedicated monitoring wells near streams are used as a proxy for depletion of interconnected surface water. **Figure 3-14** displays the RMP network for interconnected surface water. **Table 3-9** shows sustainable management criteria at each RMP for interconnected surface water, along with WY 2024 average measured dry-season low groundwater levels for comparison with minimum thresholds. Sustainable management criteria for this sustainability indicator are met when groundwater elevations are at or above the criteria. As indicated in **Table 3-9** and displayed in hydrographs for interconnected surface water RMPs (**Appendix E**):

- Measurable objectives were achieved at all seven of the RMPs in WY 2024 based on average measured dry-season low groundwater levels.
- Average dry-season low groundwater levels measured in fall 2024 at all RMPs are above minimum thresholds indicating that undesirable result conditions are not occurring in WY 2024.

Table 3-9. 2024 Sustainable Management Criteria Status for Interconnected Surface Water

Station	Measurable Objective	Average 2024 July - Sep. Groundwater Level (ft msl)	Minimum Threshold
SRP0707	118.1	121.1	111.4
SRP0709	58.2	59.5	56
SRP0711	63.7	67	63.3
SRP0712	46.3	50.4	45.2
SRP0713	58.4	59.6	57.9
SRP0714	128.2	128.4	126.2
SRP0716	125.2	125.3	124.4

Notes:

Dry season average above measurable objective

Dry season average below minimum threshold

In recognition of the significant information and data limitations, and the importance of interconnected surface water to beneficial users within the Subbasin, Section 7 of the GSP describes potential future studies and activities identified in coordination with the surface water work group (Sonoma Water, 2022a). Work related to updating and refining the mapping of interconnected surface water kicked off in September 2024 with reestablishment of a practitioner work group to help guide this work, along with updated mapping of groundwater-dependent ecosystems and consideration of revisions to sustainable management criteria. This work will continue through WY 2025 with the goal of developing new information for the GSP Periodic Evaluation.

3.7 Water Supply and Use

This section provides estimates of water use within the Subbasin from the three primary sources of supply: groundwater extraction, surface water (imported and local diversions) and recycled water. As described in the following sections, groundwater use for many of the water-use sectors is not metered and reported and the data represents estimates based on best available data and information. Due to the need to estimate much of the groundwater use and uncertainties regarding the accuracy of data on surface water diversions within the Subbasin, corrections to these datasets are included in this annual report and values for estimates from previous years differ from those presented in the WY 2023 Annual Report. It is likely that similar corrections will be made periodically in future annual reports, as the GSA continues to gather more accurate information on water use within the Subbasin.

As reporting deadlines and time-periods for many of the information sources vary based on the requirements of different regulatory programs, water use data are reported on a calendar year basis.

3.7.1 Groundwater Extraction

Groundwater is the primary water supply for irrigated agriculture (where access to recycled water is not available), rural residential properties (including many mutual water companies), commercial and industrial users in unincorporated areas, and the City of Sebastopol. Groundwater is also the primary source of supply for California American Water Company's Larkfield District for urban supply, which also

uses imported surface water as a source of secondary supply. Groundwater is also an important supplemental or backup source of supply for many of the municipal water purveyors, including Sonoma Water, and the Cities of Santa Rosa, Rohnert Park, and Cotati, all of which operate municipal wellfields within the Subbasin and contributing watershed areas.

Table 3-10 provides estimated groundwater extraction for 2024, along with 2020 through 2023 for each water-use sector in the Subbasin and identifies the general method of measurement and qualitative level of accuracy for each measurement. The level of accuracy is rated on a qualitative scale of low, medium, and high. Groundwater extraction calculated using metered data is assigned a high level of accuracy based on the assumption that flow meters are routinely calibrated and maintained by operators of public water and industrial systems. Groundwater extraction estimated based on land use methods (as described below) are assigned a low-medium level of accuracy based on the multiple assumptions inherent to this method and inability to calculate a range of uncertainty. Values from previous annual reports are updated when new data becomes available and is reflected in the tables below. The total annual groundwater extraction estimated using these methods for 2024 (17,898 acre-feet) is within the estimated sustainable yield for the Subbasin of 23,900 acre-feet (Sonoma Water, 2022a). The lower levels of groundwater extraction in 2023 compared with the three previous years are primarily due to changes associated with updates and corrections to the GUIDE database based on information provided by groundwater users, decreases in municipal public water systems, and changes in agricultural pumpage estimates.

Table 3-10 Estimated Groundwater Extraction (acre-feet)

Water-Use Sector	2020	2021	2022	2023	2024	Method	Accuracy
Agriculture	6,700	6,700	5,620	5,119	4951	Land-use (estimate)	low-medium
Rural Residential	4,100	4,100	3,960	3,976	3964	Land-use (estimate)	low-medium
Municipal PWS	5,129	5,151	5,008	4,224	3,917	direct (metered)	high
Non-municipal PWS	1,748	1,657	1,568	1,519	1,519	direct (metered)	high
Non PWS Commercial	1,344	1,340	1,160	1,025	1405	Land-use (estimate)	low-medium
Turf - Golf course and schools	1,285	1,290	2,227	2,092	2024	Land-use (estimate)	low-medium
Urban irrigation	160	160	120	118	118	Land-use (estimate)	low-medium
Total Subbasin	**20,466**	**20,398**	**19,663**	**18,073**	**17,898**		

As indicated in **Table 3-10**, for the majority of water-use sectors, groundwater extraction is estimated using best available information. For this annual report, estimates based on land use for agriculture, rural residential, non-PWS commercial, golf courses and schools turf irrigation, and urban irrigation have been developed through parcel-specific estimates as part of the rate and fee study (SCI and LWA, 2022).

This work has built upon prior parcel-specific estimates developed for the 2019 fee study (Raftelis, 2019) and information from the GSP. The general approach is to apply water-use factors based on the County's assessor use code descriptions and other attributes for the parcel, such as the parcels irrigated acreage. For example, rural residential parcels with single residences are assigned a water-use factor of 0.5 acre-feet per year and vineyards are assigned a water-use factor of 0.6 acre-feet per acre (Raftelis, 2019). **Figure 3-16** displays the generalized location and volume or rate of groundwater extraction for WY 2024 based on these assumptions. These estimates continue to be further refined as information is provided by groundwater users within the Subbasin through outreach conducted as part of the GUIDE program.

For municipal and non-municipal (e.g., mutual water systems, wineries, and restaurants) PWS, metered and reported data are used. Non-municipal PWS groundwater extraction is not required to be reported to SWRCB-DDW until April of each year, therefore the reported usage for 2023 is used to estimate groundwater extraction for 2024. Since the non-municipal PWS systems generally do not have other sources of water supply their yearly extraction does not vary significantly. For the municipal PWS, the metered and reported groundwater extraction for 2024 was provided and is included in **Table 3-11**.

Improvements to the measurement of groundwater extraction within the Subbasin is identified as a primary data gap in the GSP and is being addressed through several grant-funded studies and programs, including remotely sensed evapotranspiration (ET)-based estimates and the voluntary metering program (Flow Smart).

Table 3-11 Municipal Groundwater Extraction (acre-feet)

Municipal by PWS	**2020**	**2021**	**2022**	**2023**	**2024**
Sonoma Water	0	0	342	0	0
City of Santa Rosa	1,253	1323	1126	1293	1034
City of Rohnert Park	2410	2481	2348	1739	1753
City of Cotati	345	350	266	266	204
Town of Windsor	50	50	50	50	50
City of Sebastopol	1071	947	876	876	897
Total Municipal	**5129**	**5151**	**5008**	**4224**	**3917**

3.7.2 Surface Water Supply and Use

Surface water used within the Subbasin includes both imported surface water and local surface water diverted from within the Subbasin. Imported water consists of Russian River water diverted under Sonoma Water's water rights at Sonoma Water and Town of Windsor diversion facilities located outside of the Subbasin and delivered via aqueduct to cities within the Subbasin. Imported surface water represents the primary source of water for urban residents and businesses that are served by the Cities of Cotati, Rohnert Park, and Santa Rosa, and the Town of Windsor.

Local surface water from Mark West Creek, Santa Rosa Creek, and Laguna de Santa Rosa and their tributaries represents a minor source of supply for some agricultural water users within the Subbasin. Information on the approximate amounts of diverted surface water is available through reported surface water diversions filed with the California SWRCB (2023). The data available from the SWRCB's Electronic Water Rights Information Management System (eWRIMS) are not considered complete and

include a high level of uncertainty. For the purposes of this annual report, the estimated local surface water use is based on the actual reported surface water diversions from eWRIMS.

Table 3-12 provides the quantities of imported water and local surface water delivered within the Subbasin for 2020 through 2024.

Table 3-12 Surface Water Use (acre-feet)

Surface Water User	2020	2021	2022	2023	2024
Cotati	589	482	480	492	591
Rohnert Park	2,411	2,482	2,048	2,346	2,884
Santa Rosa	18,024	15,841	15,179	15,059	16,195
Windsor	3,721	3,134	2,974	2,803	3,148
Cal-Am - Larkfield	278	248	222	271	353
Total Imported Surface Water Use	*25,022*	*22,187*	*20,903*	*20,971*	*23,171*
Local Surface Water Diversions	290	191	119	113	472
Total Subbasin	**25,312**	**22,378**	**21,022**	**21,084**	**23,643**

3.7.3 Recycled Water Supply and Use

Recycled water is treated to tertiary standards by wastewater treatment plants operated by the Town of Windsor, the City of Santa Rosa, and Airport Larkfield Wikiup Sanitation Zone, and is delivered for crop and landscape irrigation in lieu of using groundwater or imported surface water. Recycled water produced from the City of Santa Rosa's Laguna Treatment Plant and the Town of Windsor's Wastewater Treatment Facility is also delivered for energy generation to the Geysers Geothermal Steamfield located in the Mayacamas Mountains outside of the Subbasin.

Table 3-13 provides the quantities of recycled water delivered within the Subbasin for 2024, along with 2020 through 2023 for agricultural, golf course and landscape irrigation. The quantities of recycled water delivered to users within the Subbasin was 5,116 acre-feet in 2024.

Table 3-13 Recycled Water Use (acre-feet)

Recycled Water System	2020	2021	2022	2023	2024
Santa Rosa Regional Water Reuse System	4,743	2,746	4,744	3,872	4,052
Town of Windsor	724	612	790	708	787
Airport Larkfield Wikiup Sanitation District	288	380	411	278	214
Total Subbasin	**5,755**	**3,738**	**5,945**	**4,858**	**5,054**

3.7.4 Total Subbasin Water Use

Total water use within the Subbasin is summarized in **Table 3-14** based on the estimated and metered uses of groundwater, surface water and recycled water described above. Total water use within the Subbasin is estimated to be 46,594 acre-feet in 2024. In general, conjunctive use of surface water and groundwater supplies results in lower imported surface water use during drier years due to reductions in surface water availability, increased levels of conservation of in the urban water use sector, and increased use of municipal groundwater. The lower overall decreasing trend in groundwater extraction is primarily due to continued changes in estimated agricultural irrigation estimates associated with updates and corrections to the GUIDE database based on information provided by groundwater-users. Additionally, the above-average precipitation in WY 2024 decreases agricultural and other irrigation demands.

Table 3-14 Total Subbasin Water Use (acre-feet)

	2020	**2021**	**2022**	**2023**	**2024**
Groundwater Extraction	19,768	19,791	19,145	18,073	17,898
Surface Water	25,312	22,378	21,022	21,084	23,643
Recycled Water	5,755	3,738	5,945	4,858	5,054
Total Subbasin Water Use	**50,835**	**45,907**	**46,112**	**44,015**	**46,594**

Total water use within the Subbasin for WY 2024 is further broken down by water use sector in **Table 3-15**.

Table 3-15. Total Subbasin Water Use by Water Use Sector (acre-feet)

Water-Use Sector	Groundwater Extraction	Imported Surface Water Use	Local Surface Water Use	Recycled Water Use	Total Water Use	Method
Agriculture	4,951	-	472	4,544	**9,967**	Land-use (estimate) for groundwater extraction, estimates from SWRCB eWRMS database for local surface water, direct metered recycled water deliveries
Rural Residential	3,964	-	-	-	**3,964**	Land-use (estimate)
Urban (Municipal PWS and urban private wells)	4,035	23,171	-		**27,206**	Direct (metered) for municipal groundwater extraction land use estimates for urban private wells
Non-municipal PWS and industrial	1,519	-	-	-	**1,519**	Direct (metered)
Non PWS Commercial	1,405	-	-	-	**1,405**	Land-use (estimate)
Turf - Golf course and schools	2,024	-	-	510	**2,534**	Land-use (estimate) for groundwater extraction, direct metered recycled water deliveries
Total Subbasin	**17,898**	**23,171**	**472**	**5,054**	**46,594**	

4 GSP IMPLEMENTATION PROGRESS

This section summarizes progress on implementing the GSP, including: (1) a summary of DWR's approval of the GSP and the GSA's initial approach to addressing DWR's recommended corrective actions; (2) an updated 5-year GSP implementation schedule; and (3) a summary of completed, in-progress and planned near-term GSP implementation activities.

DWR GSP Approval and Recommended Corrective Actions

On January 26, 2023, DWR issued its approval of the GSP, which included recommended corrective actions for the GSA to address in the 5-Year GSP Periodic Evaluation, due in January 2027. **Table 4-1** summarizes DWR's recommended corrective actions and identifies the GSA's initial plan and approach to address each recommended corrective action. As indicated in **Table 4-1**, the GSA's efforts in filling data gaps, particularly for interconnected surface water, will help address several of the recommended corrective actions.

Table 4-1. Summary of Approach to Address DWR's Recommended Corrective Actions on 2022 GSP

Corrective Action Number - Topic	DWR Recommended Corrective Action	GSA Initial Approach for Addressing Recommended Corrective Action	Timeline to Complete or Evaluate
1 - Water budget	Include surface water imports to the Subbasin from the Russian River system in the historical and projected water budgets.	Evaluate whether imported Russian River surface water should be incorporated into the model and simulated directly or added to the output of water budgets simulated by the model.	Develop for 5-yr assessment report
2 – Groundwater-level Sustainable Management Criteria (SMC) - further information on emergency operations and extended drought impacts	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 GSP are intended to represent short-term events (i.e., earthquakes or wildfires) that may trigger temporary increases in groundwater pumping. Technical team will develop approach for assessing potential effects on beneficial users.	Develop for 5-yr assessment report
3 – Groundwater level SMC - further information on protective criteria utilized in developing MT	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.	Utilize information collected through the GUIDE program and planned project to improve mapping of well logs and well construction details to the parcel-scale to perform needed analysis.	Develop for 5-yr assessment report

Corrective Action Number - Topic	DWR Recommended Corrective Action	GSA Initial Approach for Addressing Recommended Corrective Action	Timeline to Complete or Evaluate
4a – Interconnected surface water SMC - elaborate on methodology used for initial SMC and potential revisions	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.	Evaluate data and information collected from planned studies and monitoring specific to ISW and GDEs and incorporate into refined SMC to be developed for the 5-year assessment report.	Develop for 5-yr assessment report
4b - Interconnected surface water SMC - use forthcoming DWR guidance	Consider utilizing the ISW guidance, as appropriate, when issued by the Department to establish quantifiable SMC and management actions.	Technical team will explore engagement in discussions with DWR on developing an appropriate guidance for this item	Waiting for DWR guidance - planned for 2025
4c - Interconnected surface water 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.	In progress - implement planned studies and monitoring described in GSP	Ongoing - document in 5-yr assessment report
4d - Interconnected surface water 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.	In progress - GSA staff are currently participating in working groups formed by Permit Sonoma to address potential public trust impacts associated with well permitting in Sonoma County, which includes many of the relevant resource agencies. The GSP technical team will continue to collaborate with resource agencies and interested parties on this topic	Ongoing - document in 5-yr assessment report
5 - Degraded Water Quality Monitoring Network - additional details needed	Provide monitoring network map and information on monitoring site type and data collection frequency.	While the GSP summarizes the type of wells, monitoring entity, and monitoring frequency, the technical team will compile well-specific information and develop a map of the monitoring network.	Ongoing - document in 5-yr assessment report
6 - Monitoring network - reconcile details provided with regs	Reconcile monitoring network details with GSP requirements and ensure well construction details are provided for each monitoring site.	Coordinate with SWRCB-DDW and public water suppliers to obtain well construction information for public supply wells included in degraded water quality monitoring network.	Ongoing - document in 5-yr assessment report

GSP Implementation Activities

This section describes GSP implementation activities performed in WY 2024, as well as planned and in-progress GSP implementation activities for WY 2025. Much of the activities are funded through a SGMA Round 2 Implementation Grant awarded to the GSA.

Communication and Stakeholder Engagement

- During WY 2024, the GSA held four GSA Board and three advisory committee meetings, which are open to the public. The GSA has also continued maintaining and improving its website and developing quarterly newsletters for sharing information with groundwater users.
- In WY 2024, the GSA partnered with local organizations such as the Community Alliance with Family Farmers, Resource Conservation Districts, Daily Acts and others to engage with groundwater users on many of the grant-funded programs, including voluntary monitoring and metering programs, voluntary water-use efficiency (WUE) measures, and groundwater recharge initiatives. Outreach activities associated with these programs have included direct mailings to groundwater users, email campaigns, social media postings, presentations at stakeholder-specific forums, and one-on-one conversations with groundwater users.
- The GSA continues to engage directly with groundwater users through the on-line GUIDE program interface to transparently engage with groundwater users and allow GSA staff to quickly reference and exchange information for a specific parcel with groundwater users.
- In WY 2025, the GSA will collaborate with grower interest groups on integrating activities that support GSP implementation with Farm Plans will help address a number of key data gaps, such as water-use, monitoring, and the potential for enhancing groundwater recharge.

Land Use Planning and Well Permitting Integration/Coordination

- The GSA continued coordinating with the County in establishing protocols and procedures for sharing groundwater information between Permit Sonoma and the GSAs in Sonoma County, including the status of well permit applications within the Subbasin. **Appendix F** presents a chart and location map for well permit applications for water wells that have been issued or finaled within the Subbasin between 2015 and 2024. As indicated in **Appendix F**, approximately 452 Class I or Class II water well permits have been issued or finaled between 2015 and 2024 (average of 45 per year and 27 in 2024) with the majority (approximately 74%) being domestic wells for rural residences.
- In WY 2024, the GSA received and responded to referrals for well permit review under Governor Newsom's March 2022 Drought Executive Order (EO) N-7-22 that included new well permitting requirements for local agencies. This requirement was rescinded in September 2024 under Executive Order N-3-24. While this requirement was in place, the Santa Rosa Plain GSA completed 11 referrals with a total proposed increase in groundwater extraction of 17.13 AFY, including 3 referrals completed in WY 2024.
- Staff from all three Sonoma County GSAs have coordinated to develop options for considering permit applications for future new water wells within areas experiencing undesirable results. This was prompted by undesirable result conditions in the Sonoma Valley Subbasin caused by the chronic lowering of groundwater levels. While the Santa Rosa Plain Subbasin is not currently

at risk of experiencing undesirable results, the proposed approach could also be applied to the Santa Rosa Plain should undesirable results occur in the future. The GSA has also been receiving updates on the status of litigation which has challenged the County of Sonoma's updated well ordinance adopted in 2023 to include consideration of impacts to Public Trust Resources when issuing certain well permits. The GSA will continue tracking and engaging with the County on any potential future well permitting changes.

- The GSA has developed review comments for proposed development projects with the potential to effect groundwater resources, including the Koi Nation of Northern California Shiloh Resort and Casino Project Environmental Impact Statement. The GSA is also engaging with local jurisdictions that are initiating or planning updates to their General Plans and has continued coordination and engagement with the County and other stakeholders in preparation of a countywide Drought Resilience. Points of coordination between the County and the GSA include: domestic well inventories; sharing of groundwater-level data and monitoring coordination; outreach coordination for consistent messaging to stakeholders; and potential common solutions to mitigating risks to vulnerable domestic well owners.

<u>Addressing Data Gaps</u>

- *ISW and GDEs*: GSA staff and subconsultant Montgomery & Associates (M&A) developed a memorandum for improving the characterization and monitoring of ISW and GDEs within the Subbasin. The memorandum summarizes the existing approach from the GSP, review of previous comments submitted to the GSA related to ISW and GDEs, review of DWR's recommended corrective actions, review of work completed or proposed related to characterizing ISW and GDEs by other GSAs in similar basins, and initial recommendations for studies and collection of new data. In WY 2024, the GSA reconvened a practitioner work group to help prioritize, scope and initiate activities to address the ISW and GDE data gaps identified in the GSP. This work group has focused discussion and input on review of analysis of recently collected data and information and proposed approaches for characterizing and monitoring ISW and GDEs. GSA staff and work group members are currently scoping field studies and testing of potential monitoring approaches for improving ISW and GDE characterization. The GSA has also advanced the planning for construction of two shallow groundwater monitoring wells to improve the monitoring network for interconnected surface water within the Subbasin. The wells are anticipated to be constructed in spring or summer 2025.
- *Groundwater levels*: GSA staff formed a groundwater monitoring subcommittee comprised of representatives from three GSA Advisory Committees within Sonoma County, along with staff from Permit Sonoma, Sonoma and Gold Ridge RCDs, Sebastopol Water Information Group, and the Sonoma Ecology Center. The subcommittee met multiple times and discussed and reviewed goals and objectives, data gap areas, monitoring approaches, data reporting and management, data sharing and display, monitoring protocols, coordination with DWR, and outreach approaches. In August 2024, the GSA launched the LEVEL UP! Voluntary Well Monitoring Program, including a well-attended public webinar. In fall 2024, the GSA, outreach partners and community volunteers performed the first voluntary monitoring data collection event. To support the sharing and intake of data for the voluntary program, the GSA has published the Sonoma County Groundwater Data Dashboard to its website. GSA staff and GEI Consultants

have evaluated data gap areas, performed initial screening and environmental review of potential monitoring well locations for up to three multilevel monitoring wells. Construction of the monitoring wells is planned for 2025.

Groundwater Extraction: The GSA made significant progress in addressing this key data gap in WY 2024 through a number of programs and activities described below. These efforts will continue in WY 2025 and will also include evaluation of recently developed information from the WUE assessment, including remotely-sensed evapotranspiration (ET) estimates.

- *GUIDE Program updates*: Through implementation of the GUIDE program, the GSA has engaged in significant communication with individual groundwater users on their groundwater use at the parcel-level scale. Through this engagement, the GSA has continued making corrections to existing estimates of groundwater extraction within the Subbasin based on verifiable information provided by groundwater users.
- *Well Inventory*: In WY 2024, GSA staff, M&A and Permit Sonoma staff have made substantial progress on 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, including a comparison with parcel-specific information available through GUIDE. A memorandum documenting the completion of the updated well inventory has been completed and is under staff review.
- *Voluntary Flow-metering (Flow Smart)*: In WY 2024 GSA Staff and M&A developed a work plan for the voluntary flow-metering program to improve the GSAs understanding of groundwater extraction. The work plan includes review of examples of metering plans from other GSPs and similar agencies, review of existing policies and ordinances relevant to metering of private wells and small water systems in Sonoma County, outreach and selection process, recommended meter types, installation, and operational protocols and reporting. Based on the work plan, the GSA established the Flow Smart voluntary flow-metering program, where well owners can simultaneously get more information about their groundwater and help contribute to the GSA's overall understanding of the basin. Upon signing up and being accepted into the program, well owners receive a complimentary flow-meter and installation service. The GSA developed outreach materials, conducted outreach, and contracted with Odell's Pump and Motor for installation and certification of flow meters. Through January 2025, staff had received sign ups from 25 well owners within the Subbasin based on this outreach. The results of the voluntary metering program will inform cost/benefit analysis of longer-term voluntary or mandatory metering programs.

<u>Model Updates and Refinements</u>

- The GSA initiated development of input datasets needed for updating the numerical groundwater flow model for the Subbasin and will work on updating the model and developing potential model scenarios for the GSP Periodic Evaluation.

Project and Management Action Planning and Implementation

Activities related to planning and implementing projects and management actions within the Subbasin include both demand management programs and projects that are intended to increase or augment water supplies.

Planning and Implementation of Projects

- *Aquifer storage and recovery (ASR)*: GSA staff and GEI have 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. Initial planning for investigating existing wells for ASR suitability within the City of Santa Rosa and City of Rohnert Park is currently underway. Next steps include scoping and conducting focused investigations and evaluation of ASR feasibility. Other ASR-related planning within the Subbasin has been conducted by Sonoma Water and the Town of Windsor which plan to conduct ASR pilot studies within the Subbasin in WY 2025 and WY 2026, respectively. 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.
- *Stormwater Capture and Recharge*: The GSA contracted with Bachand Associates team, which includes Geosystems Analysis, Ramboll, and the Sonoma RCD, to plan and implement stormwater capture and recharge investigations and pilots. The consultant team is finalizing selection of a potential location and techniques to implement an On-Farm Recharge (OFR) investigation and pilot project near Mark West Creek and designing Upland Stormwater Recharge Practices for implementation at Crane Creek. Additional work activities in 2025 will include preparation of a work plan to implement the recharge investigations and implementation of the pilot projects.
- *Recycled Water Planning*: The SGMA Implementation Grant also includes funding for evaluating recycled water availability for offsetting groundwater use within the Subbasin. In WY 2025, the GSA will coordinate with recycled water purveyors within the Subbasin to initiate the evaluation.

Planning and Implementation of Demand Management Programs

- *Water Use Efficiency (WUE) Assessment and Pilot Program (Well Aware)*: In WY 2024, the GSA, consultant team and partners developed the WUE assessment and work plan for implementing a WUE pilot program in WY 2025. The WUE assessment includes a comprehensive review of groundwater use within the Subbasin and includes all parcels in the Santa Rosa Plain GSA, leveraging as many known data sources as possible to support better understanding of agricultural, rural residential, and non-residential (commercial, industrial, and institutional) demands. Findings from the assessment informed the work plan designed to pilot new measures, launch an outreach campaign, and incorporate feedback/lessons learned that can be applied to future conservation messaging and programs. The results of the voluntary water-use efficiency program will also inform cost/benefit analysis of programs the GSA could consider incentivizing or implementing in the future.
- *Policy and Programs Options Study*: 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 is 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, the GSA conducted a survey 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 2025, along with any new information, changing groundwater conditions, other stakeholder input, and GSA Board priorities.

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Windsor
Fulton
Santa Rosa
Sebastopol
Graton
Forestville
Rio Dell
Rohnert Park
Cotati
Calistoga
Petaluma Valley
Sonoma Valley
Santa Rosa Plain
Petaluma Valley
Basin Boundary
Basin Watershed
Plan Area
Figure 2-1

Figure 3-1a: Yearly Precipitation at the
Santa Rosa Airport
NCDC 7965

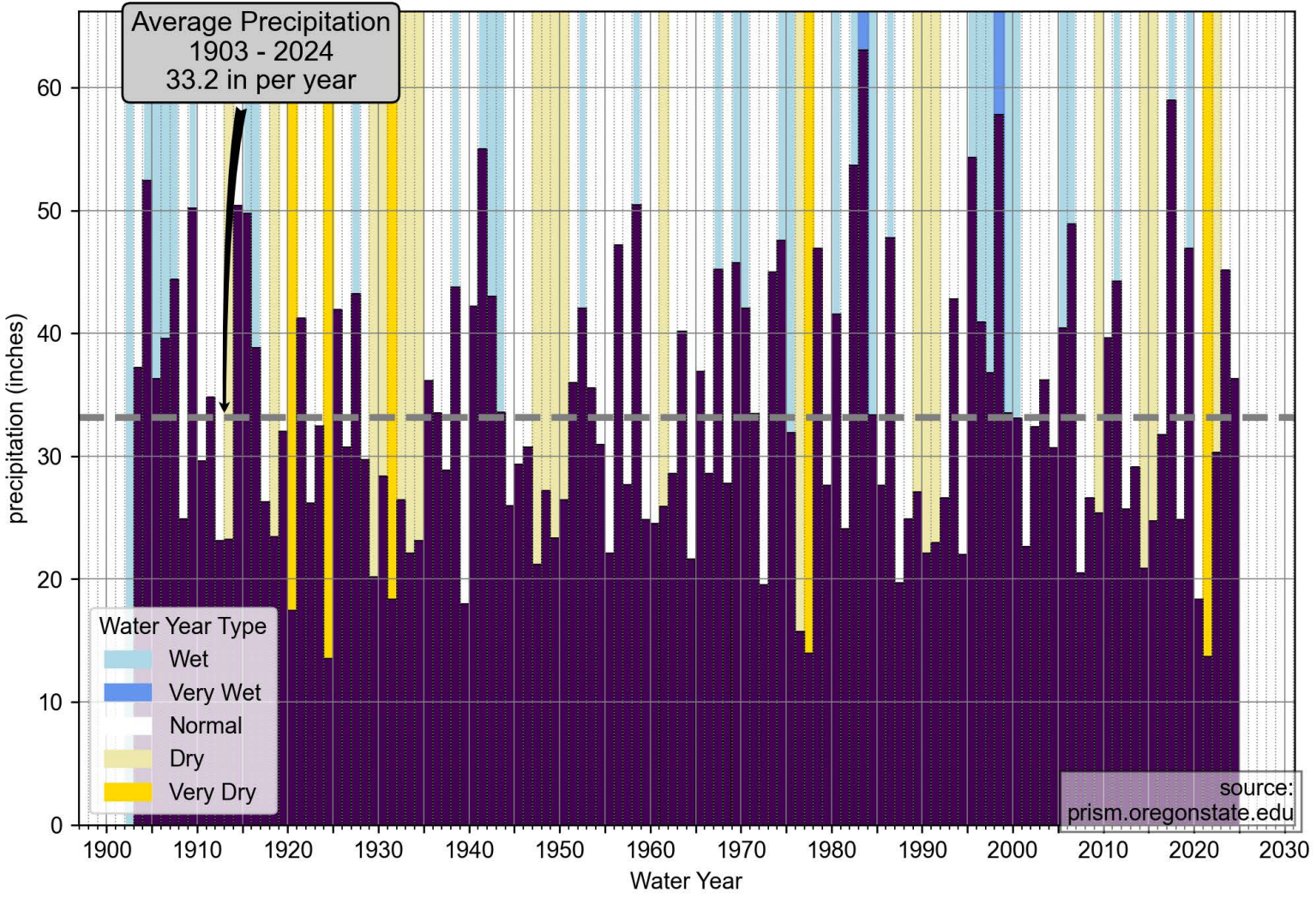


Figure 3-1b: Precipitation and Stream Discharge
in the Laguna de Santa Rosa Watershed

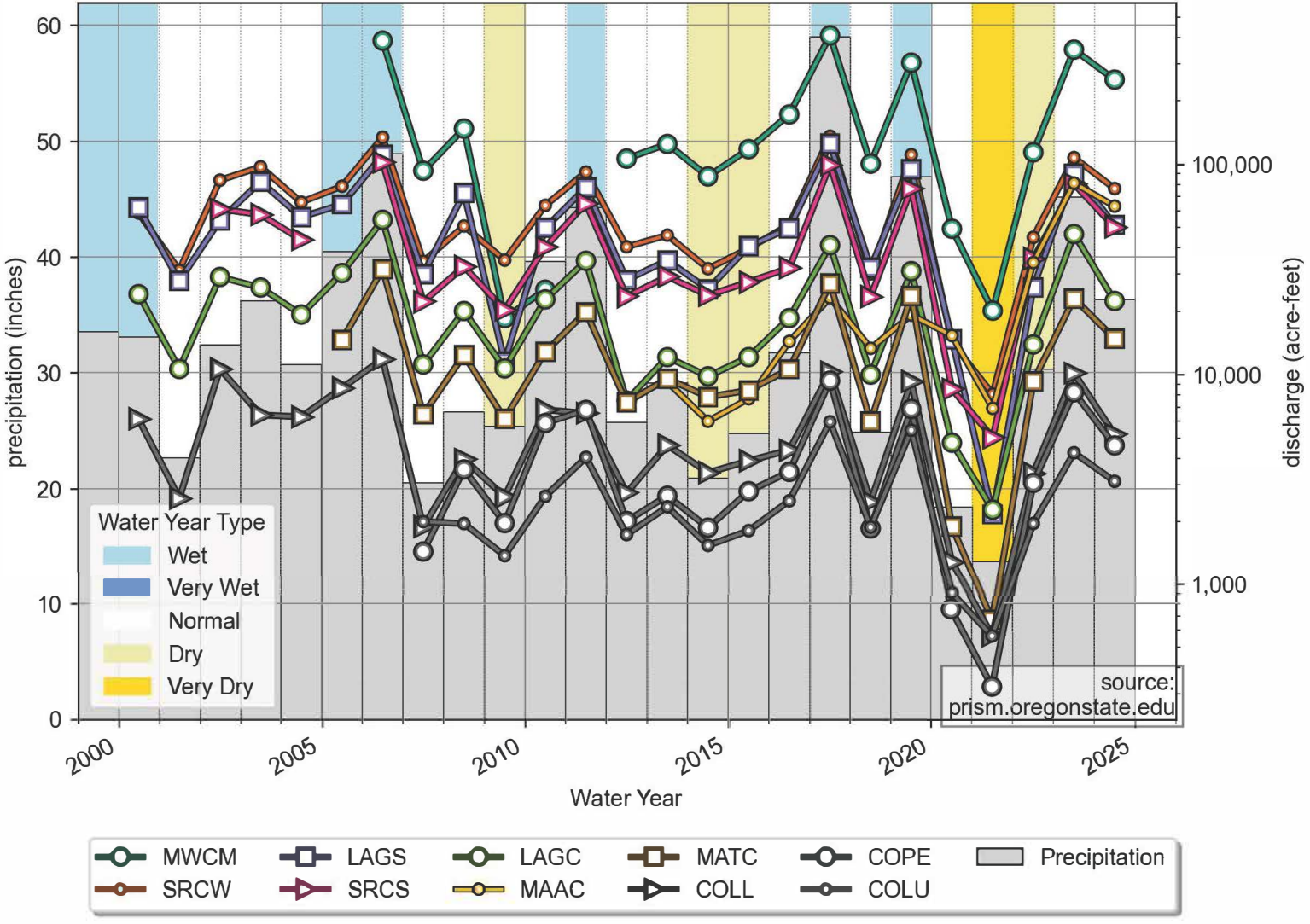
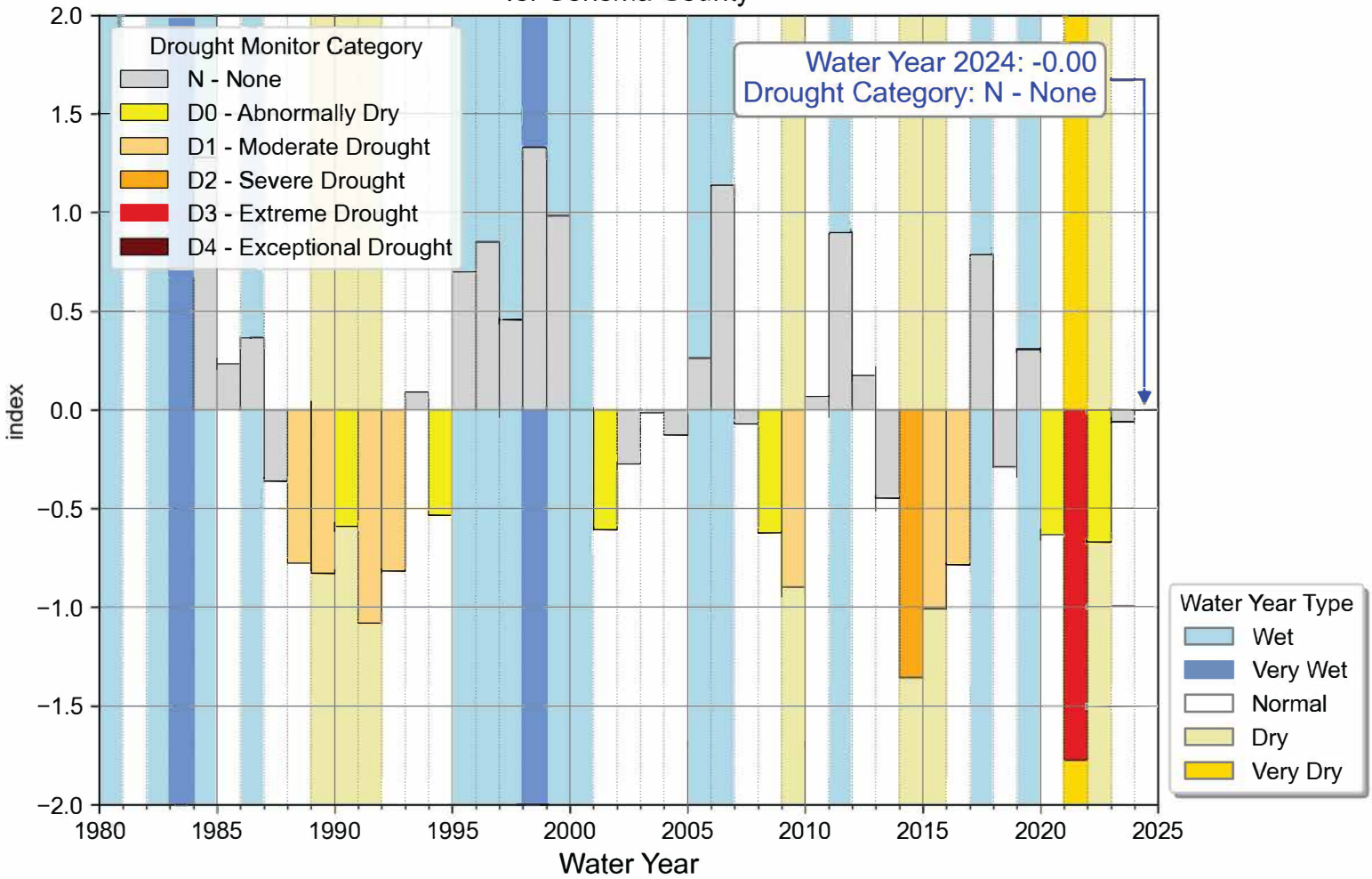


Figure 3-1c: US Drought Monitor,
Objective Long-Term Drought Indicator Blend
for Sonoma County



source: https://www.drought.gov/data-maps-tools/short-and-long-term-drought-indicator-blends
via: https://app.climateengine.org/climateEngine

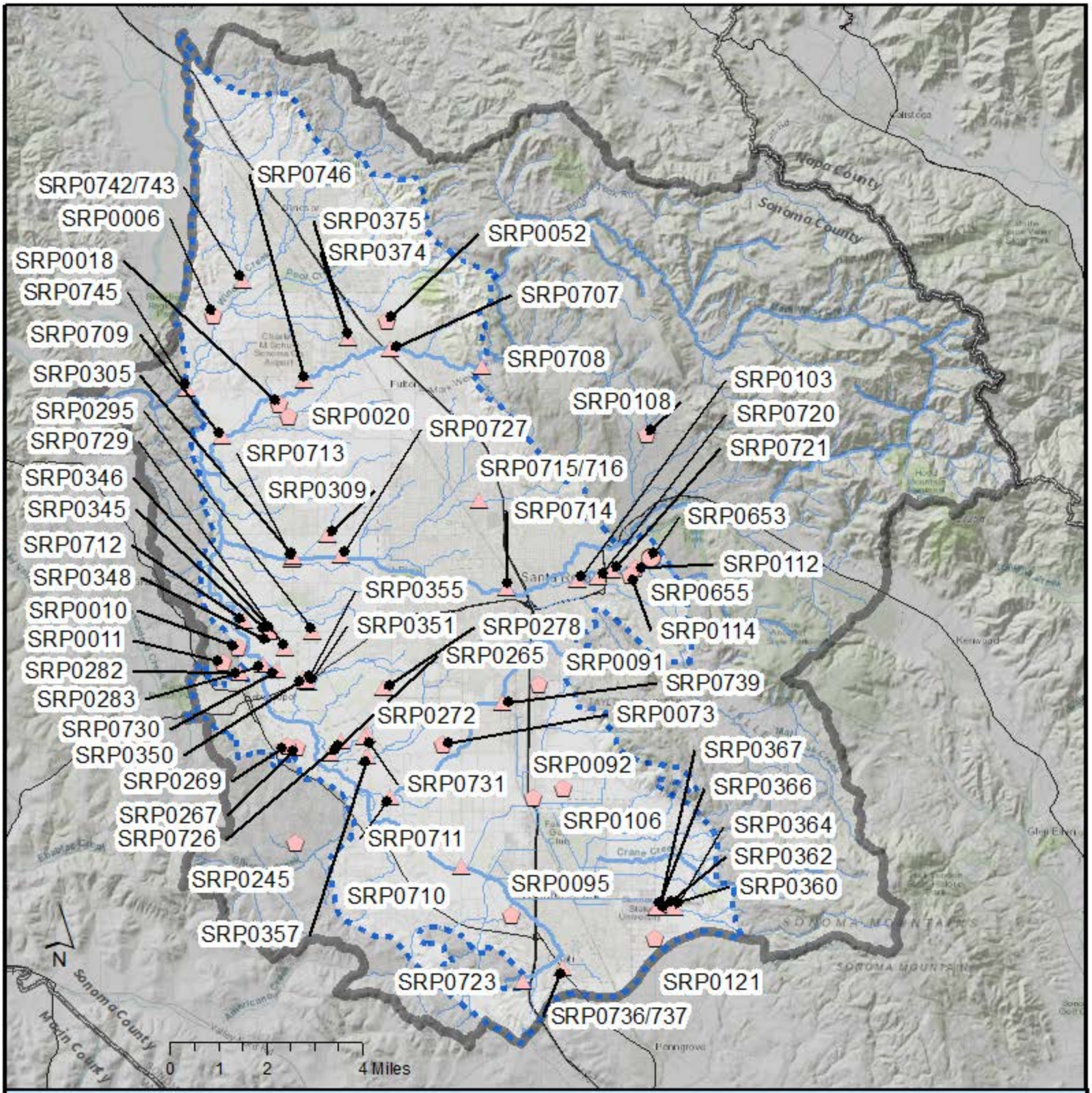
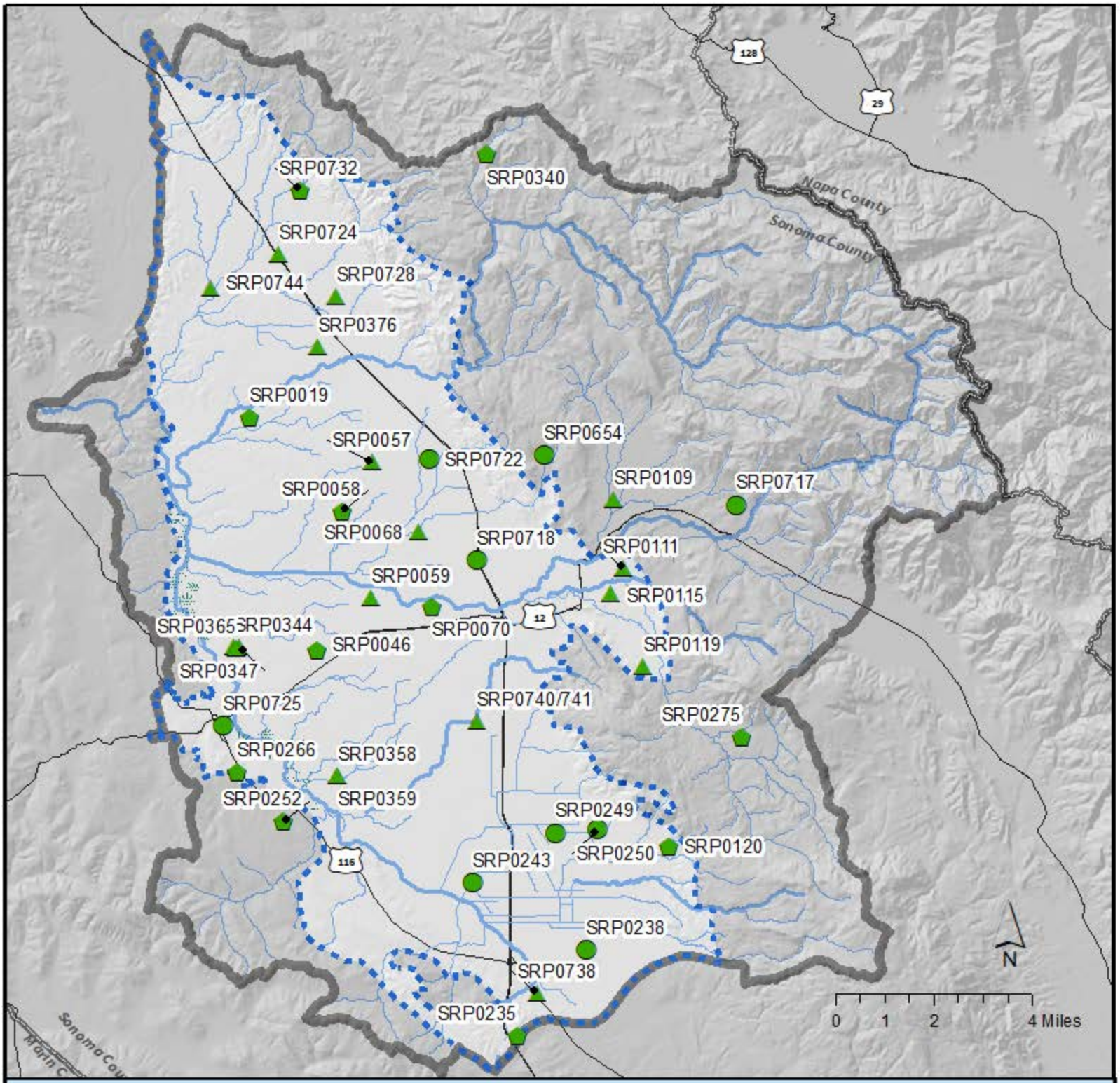


Figure 3-2a
Groundwater-Level Monitoring Network for GSP Implementation Shallow Aquifer System

SANTA ROSA PLAIN GROUNDWATER SUSTAINABILITY AGENCY

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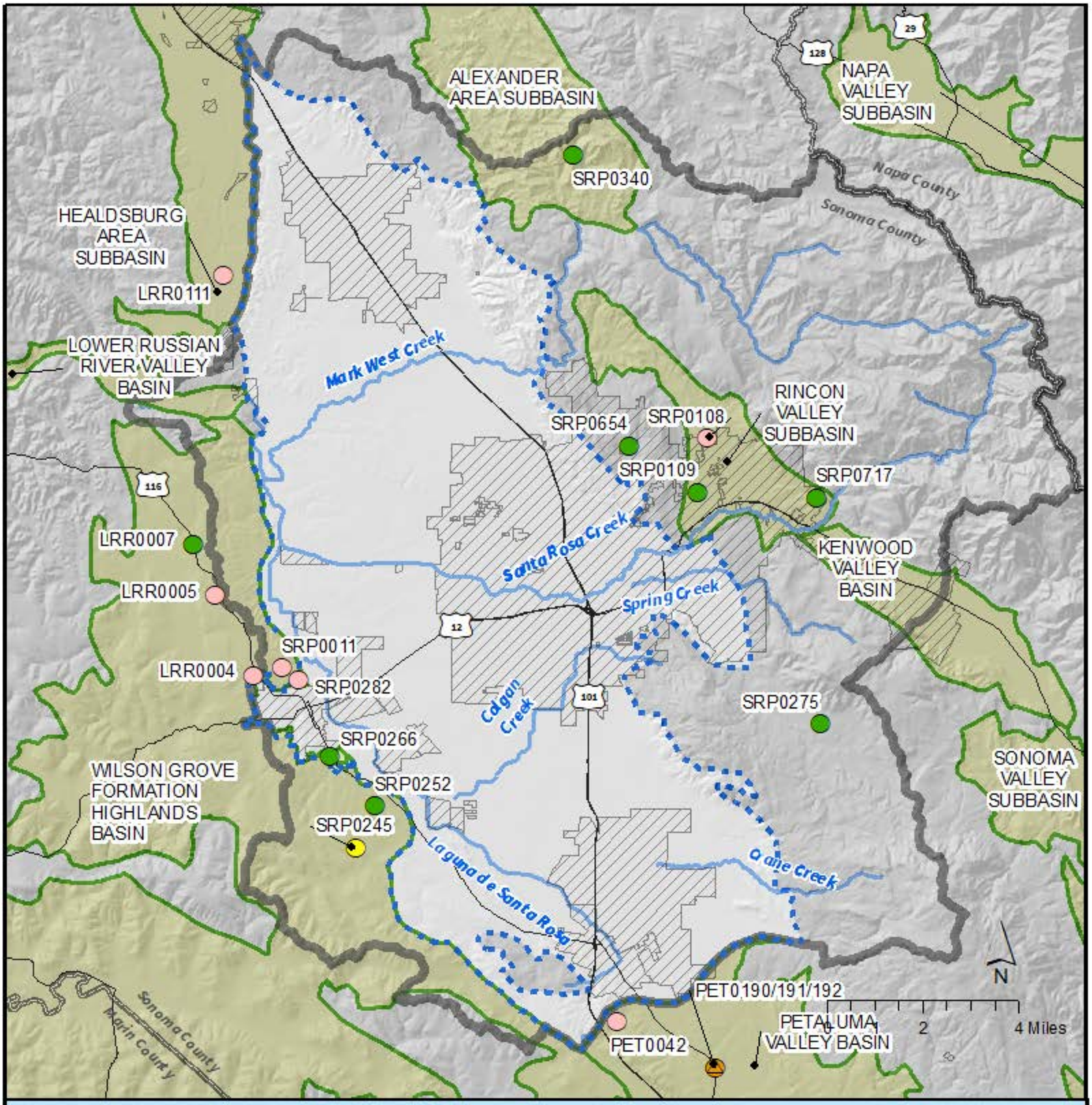


Santa Rosa Plain Groundwater Subbasin
Contributing Area Watershed
Major Rivers and Creeks
Streams
County Line
Dedicated Monitoring Wells
Monitored Municipal Supply Wells
Monitored Private Supply Wells

Figure 3-2b
Groundwater-Level Monitoring Network for GSP Implementation Deep Aquifer System

SANTA ROSA PLAIN GROUNDWATER SUSTAINABILITY AGENCY

Filepath: T:\mbuttress\SGMA Monitoring Networks\Santa Rosa Plain\SRP_GW_Levl_FULLNet_D.mxd Date prepared: 3/11/2024



Santa Rosa Plain Groundwater Subbasin

Contributing Area Watershed

Other Groundwater Basins and Subbasins

County Line

City Footprints

Monitored Boundary Wells

Well Depth

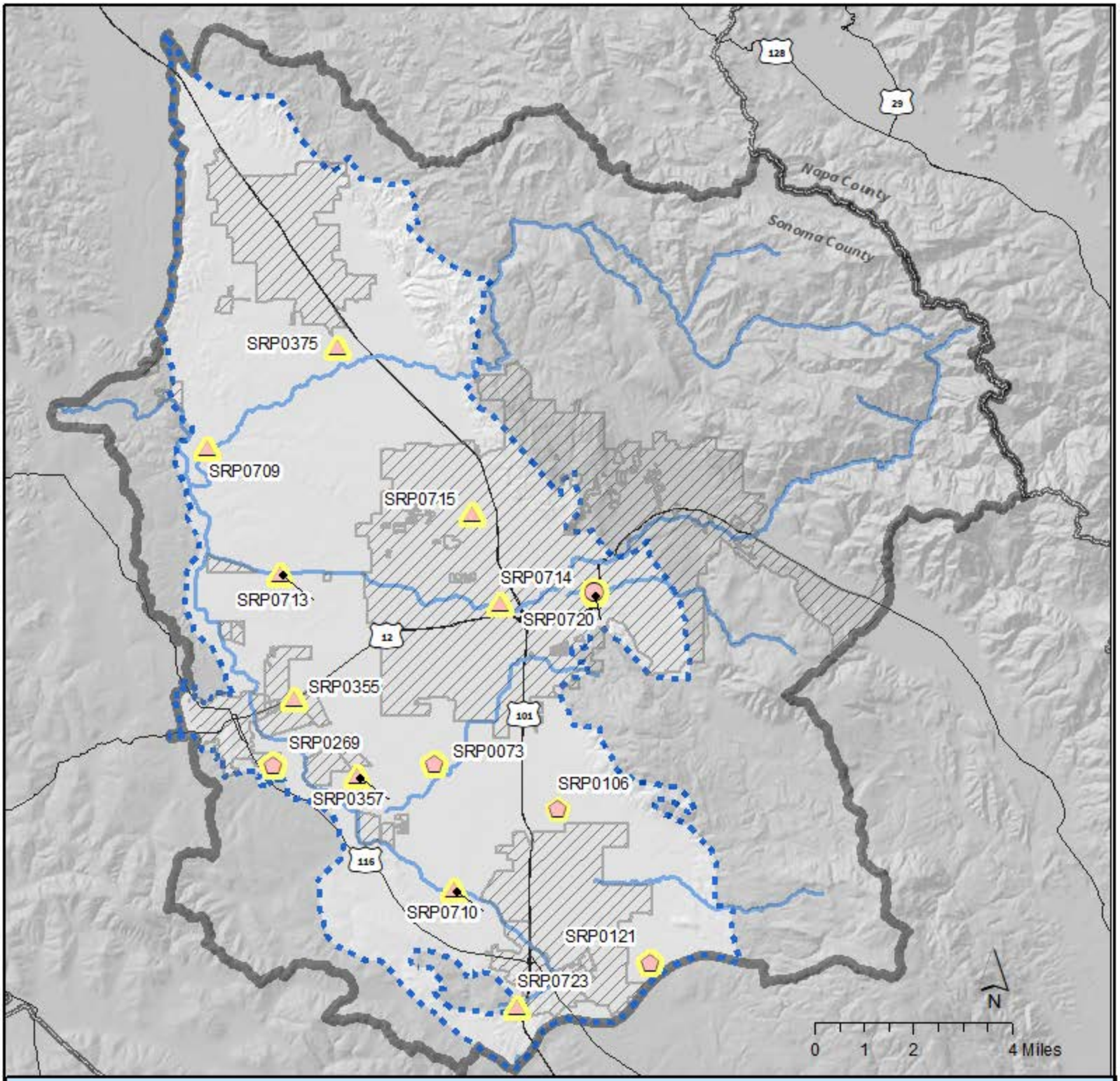
- Shallow (0-200ft)
- Medium (200-500ft)
- Unknown

New Dedicated Multi-Level Monitoring Wells

Figure 3-2c Subbasin Boundary Groundwater-Level Monitoring Network

SANTA ROSA PLAIN GROUNDWATER SUSTAINABILITY AGENCY

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RMPs - Dedicated Monitoring Wells

RMPs - Municipal Supply Wells

RMPs - Private Supply Wells

Santa Rosa Plain Groundwater Subbasin

Contributing Area Watershed

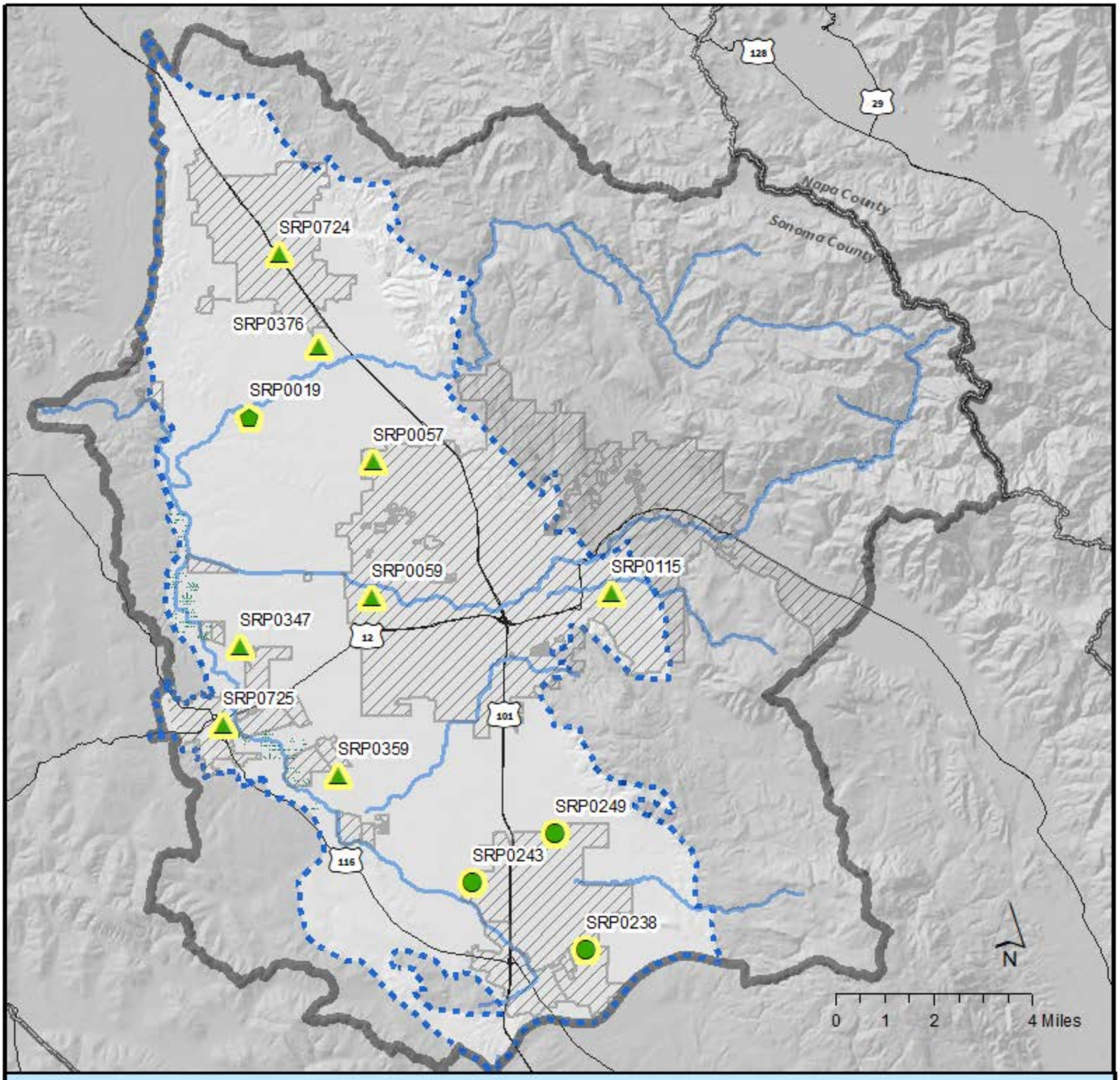
Major Rivers and Creeks

City Footprints

Figure 3-2d
RMP Network for Chronic Lowering of Groundwater Levels Shallow Aquifer System

SANTA ROSA PLAIN GROUNDWATER SUSTAINABILITY AGENCY

Filepath: T:\mbuttress\SGMA Monitoring Networks\Santa Rosa Plain\SRP_Potential_RMPs_Shallow.mxd Date prepared: 3/11/2024



RMPs - Dedicated Monitoring Wells

RMPs - Municipal Supply Wells

RMPs - Private Supply Wells

Santa Rosa Plain Groundwater Subbasin

Contributing Area Watershed

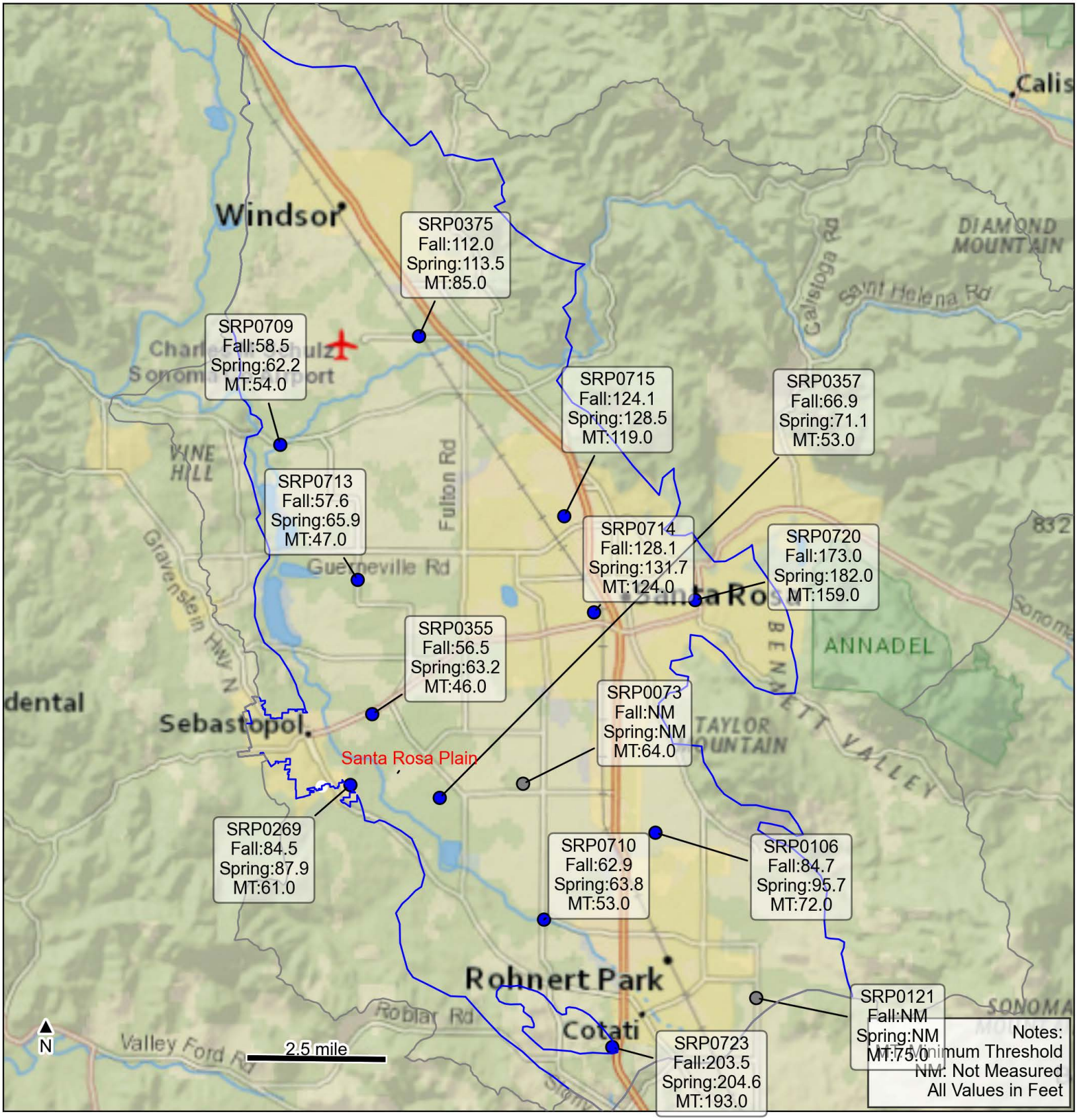
Major Rivers and Creeks

City Footprints

Figure 3-2e
RMP Network for Chronic Lowering of Groundwater Levels Deep Aquifer System

SANTA ROSA PLAIN GROUNDWATER SUSTAINABILITY AGENCY

Filepath: T:\mbuttress\SGMA Monitoring Networks\Santa Rosa Plain\SRP_Potential_RMPs_Deep.mxd Date prepared: 3/11/2024



Waterlevel SMC Status

Below MT | Above MT | Not Measured

Groundwater Waterlevel Values and Minimum Threshold Exceedances for the Shallow Aquifer for Water Year 2024

Figure 3-2f

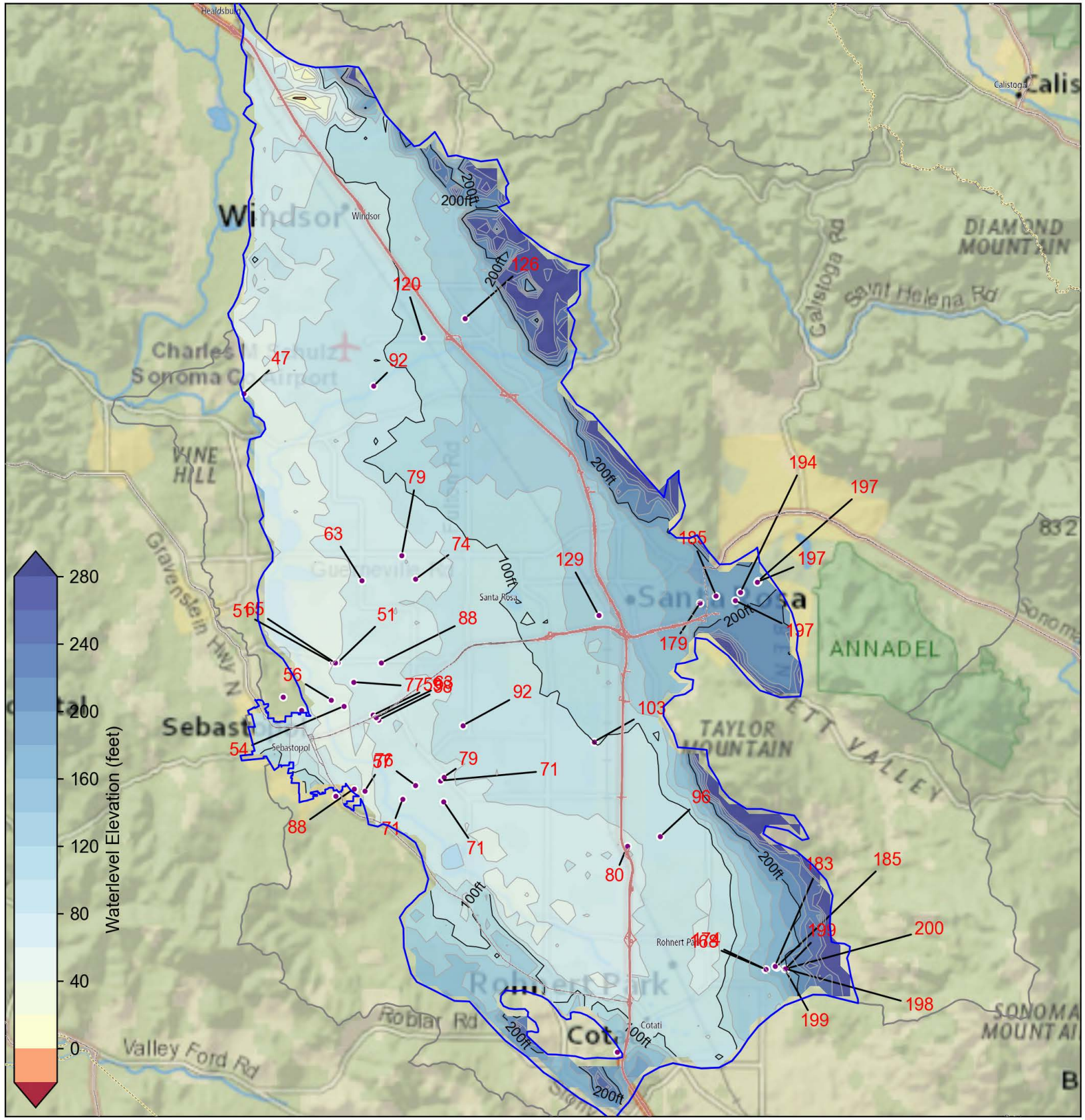


Waterlevel SMC Status

Below MT | Above MT | Not Measured

Groundwater Waterlevel Values and Minimum Threshold Exceedances for the Deep Aquifer for Water Year 2024

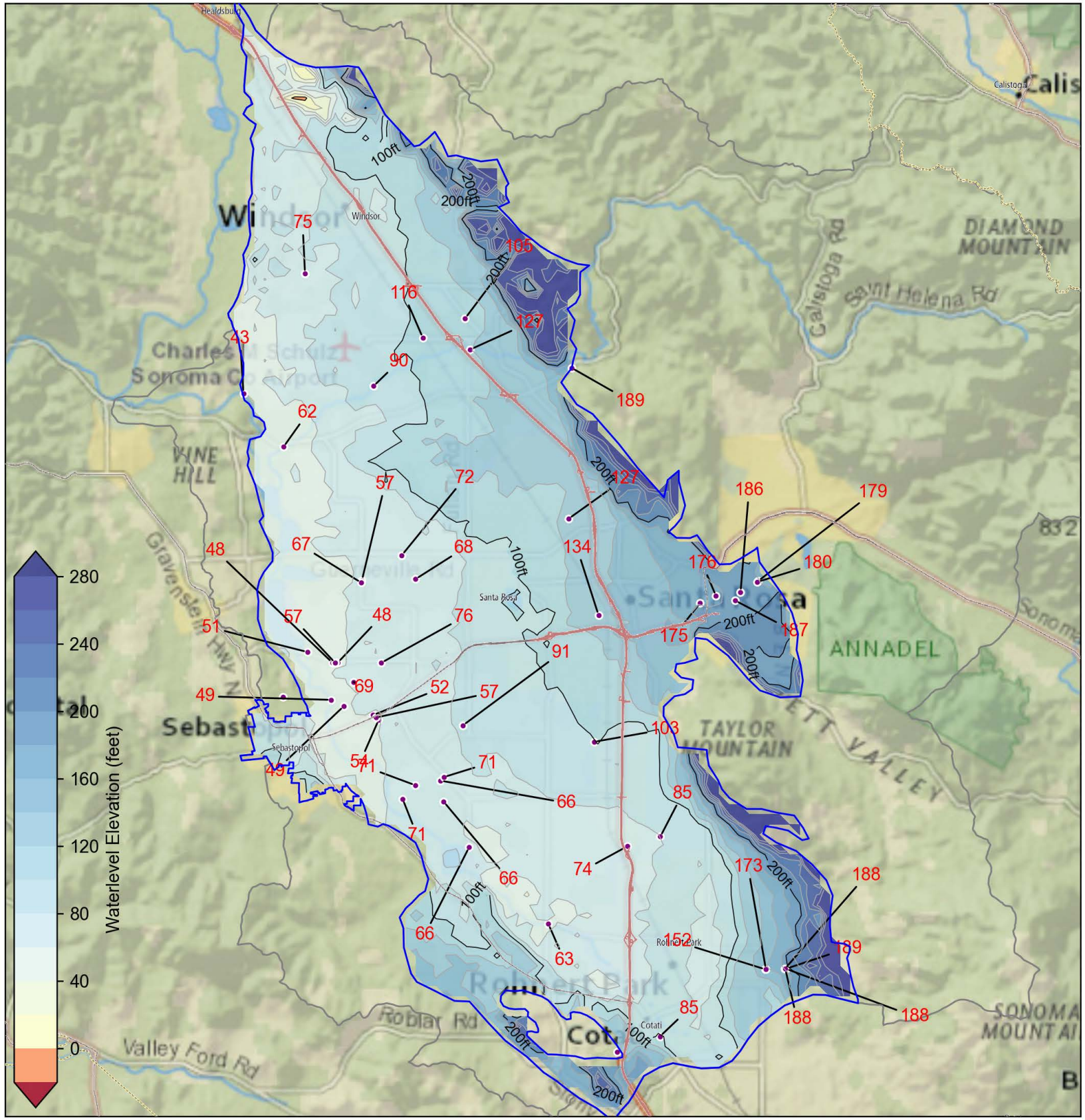
Figure 3-2g



- Groundwater Contour (100 ft)
- Groundwater Contour (20 ft)
- Observed Groundwater Elevation (ft)
- Basin Boundary
- Basin Watershed

Groundwater Elevation Contour Map for the Shallow Aquifer, 2024, Spring

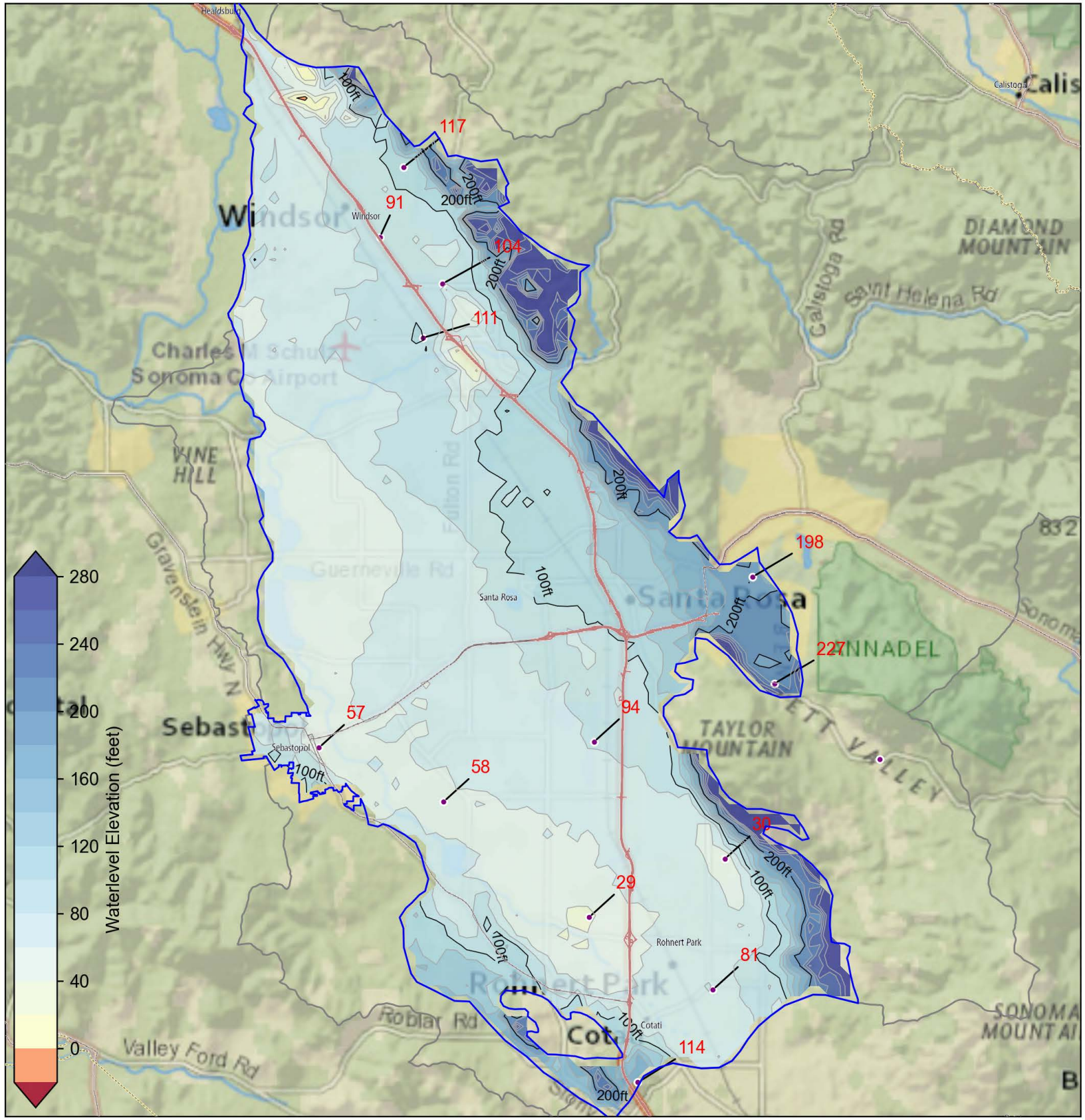
Figure 3-3



- Groundwater Contour (100 ft)
- Groundwater Contour (20 ft)
- Observed Groundwater Elevation (ft)
- Basin Boundary
- Basin Watershed

Groundwater Elevation Contour Map for the Shallow Aquifer, 2024, Fall

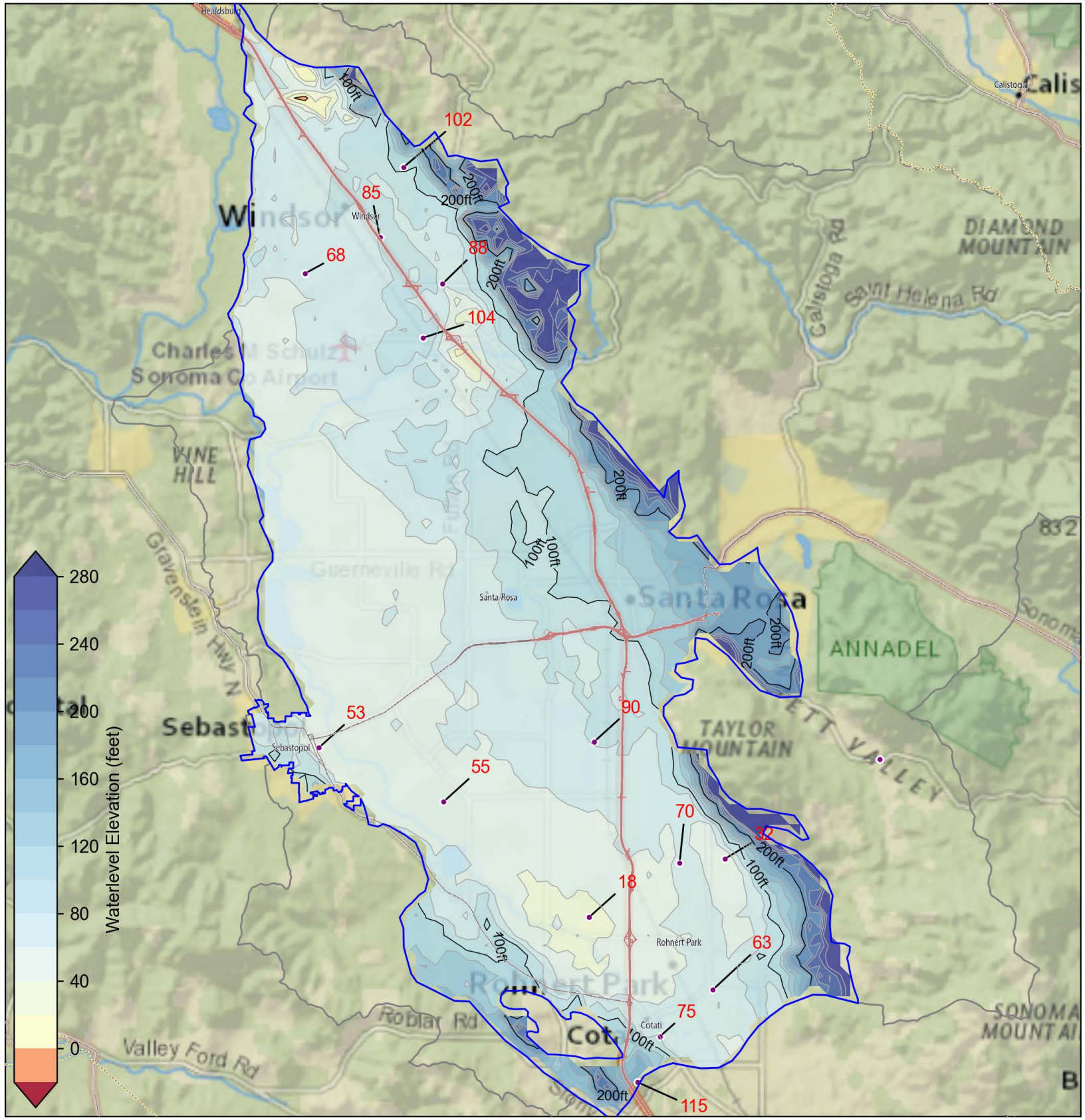
Figure 3-4



- Groundwater Contour (100 ft)
- Groundwater Contour (20 ft)
- Observed Groundwater Elevation (ft)
- Basin Boundary
- Basin Watershed

Groundwater Elevation Contour Map for the Deep Aquifer, 2024, Spring

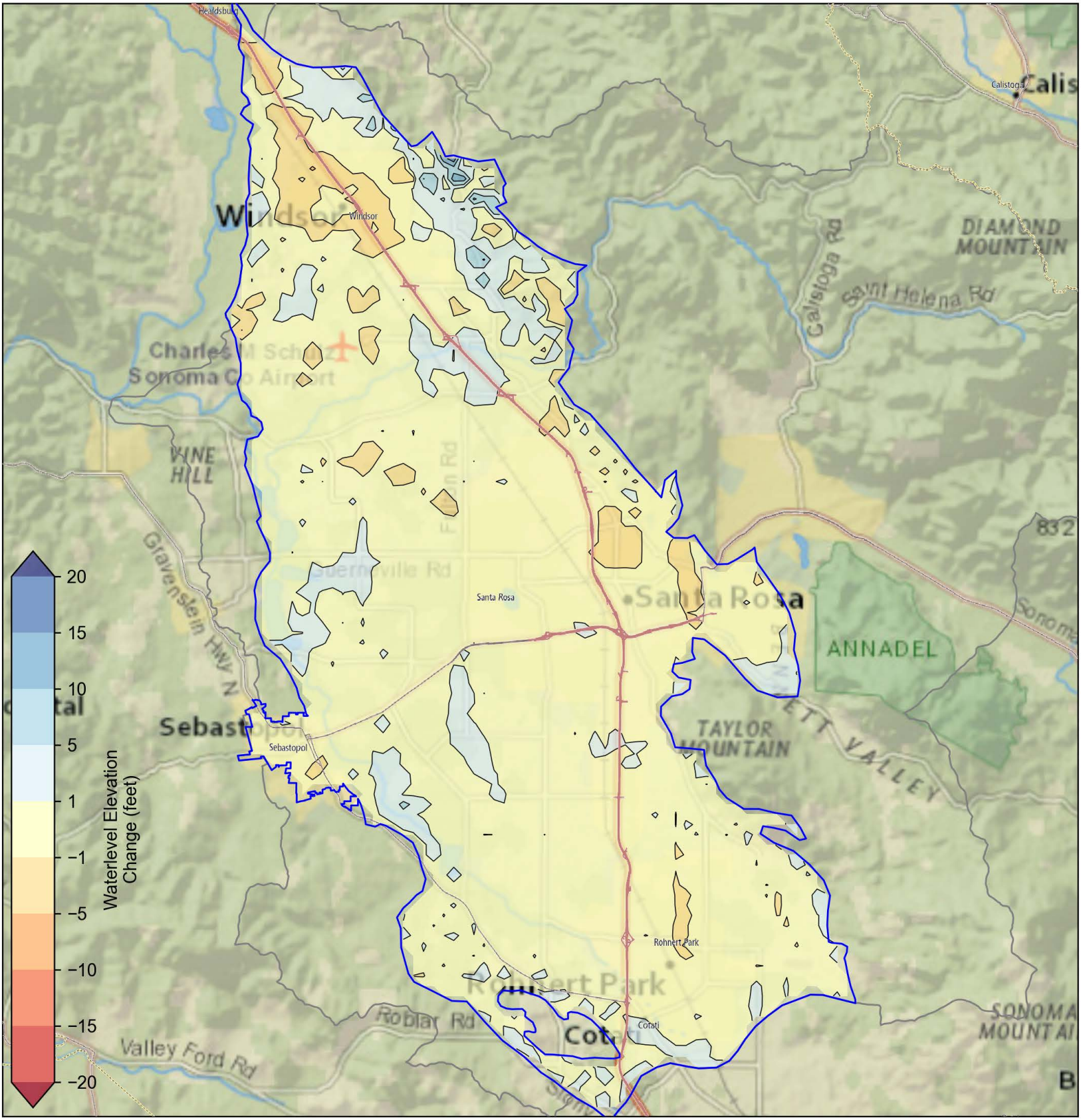
Figure 3-5



- Groundwater Contour (100 ft)
- Groundwater Contour (20 ft)
- Observed Groundwater Elevation (ft)
- Basin Boundary
- Basin Watershed

Groundwater Elevation Contour Map for the Deep Aquifer, 2024, Fall

Figure 3-6

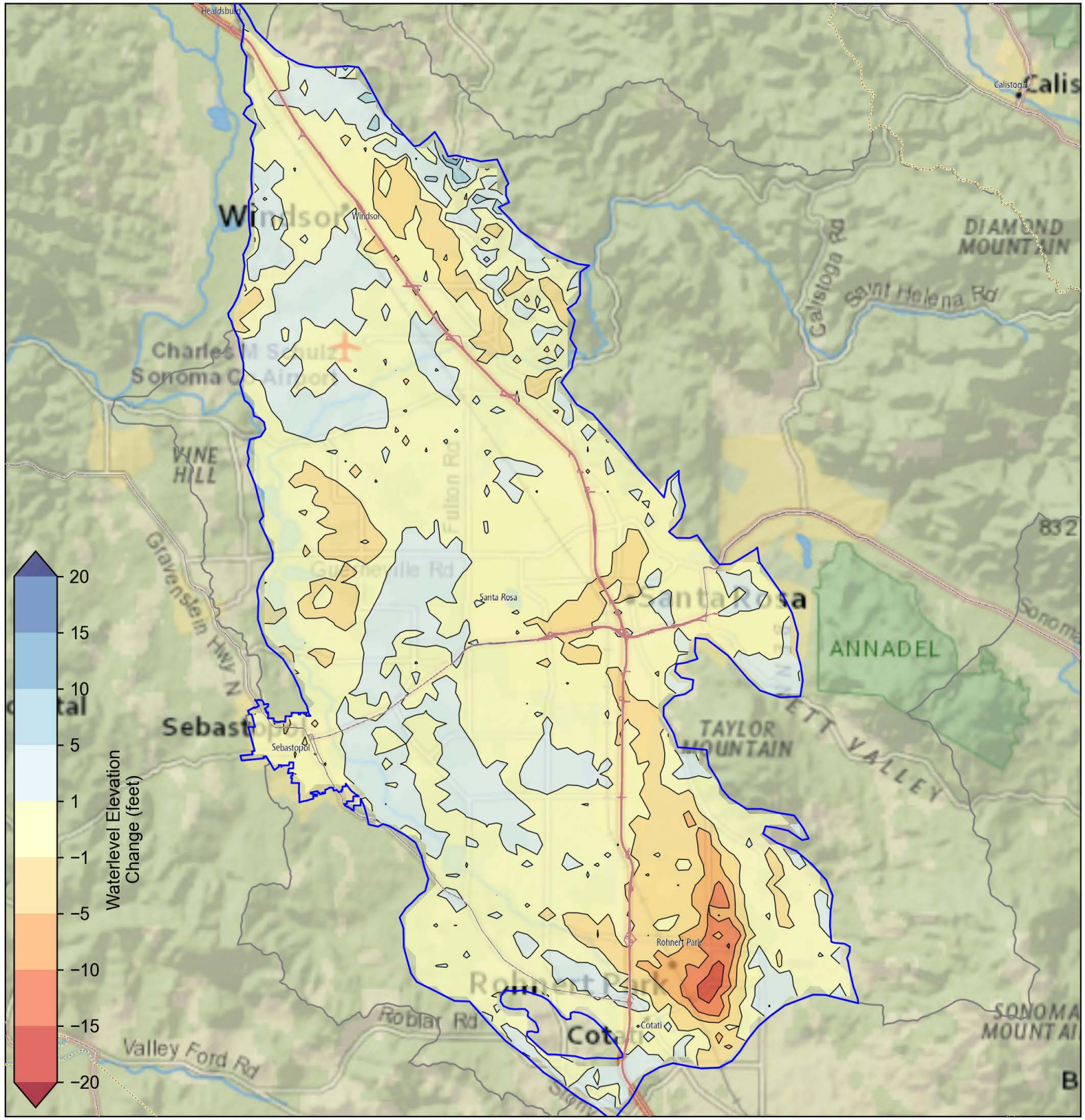


Basin Boundary

Basin Watershed

Groundwater-Level Change from 2023 to 2024, Shallow Aquifer, Fall

Figure 3-7



Basin Boundary
Basin Watershed

Groundwater-Level Change from 2023 to 2024, Deep Aquifer, Fall

Figure 3-8

Figure 3-9: Groundwater Storage Change, Shallow Aquifer

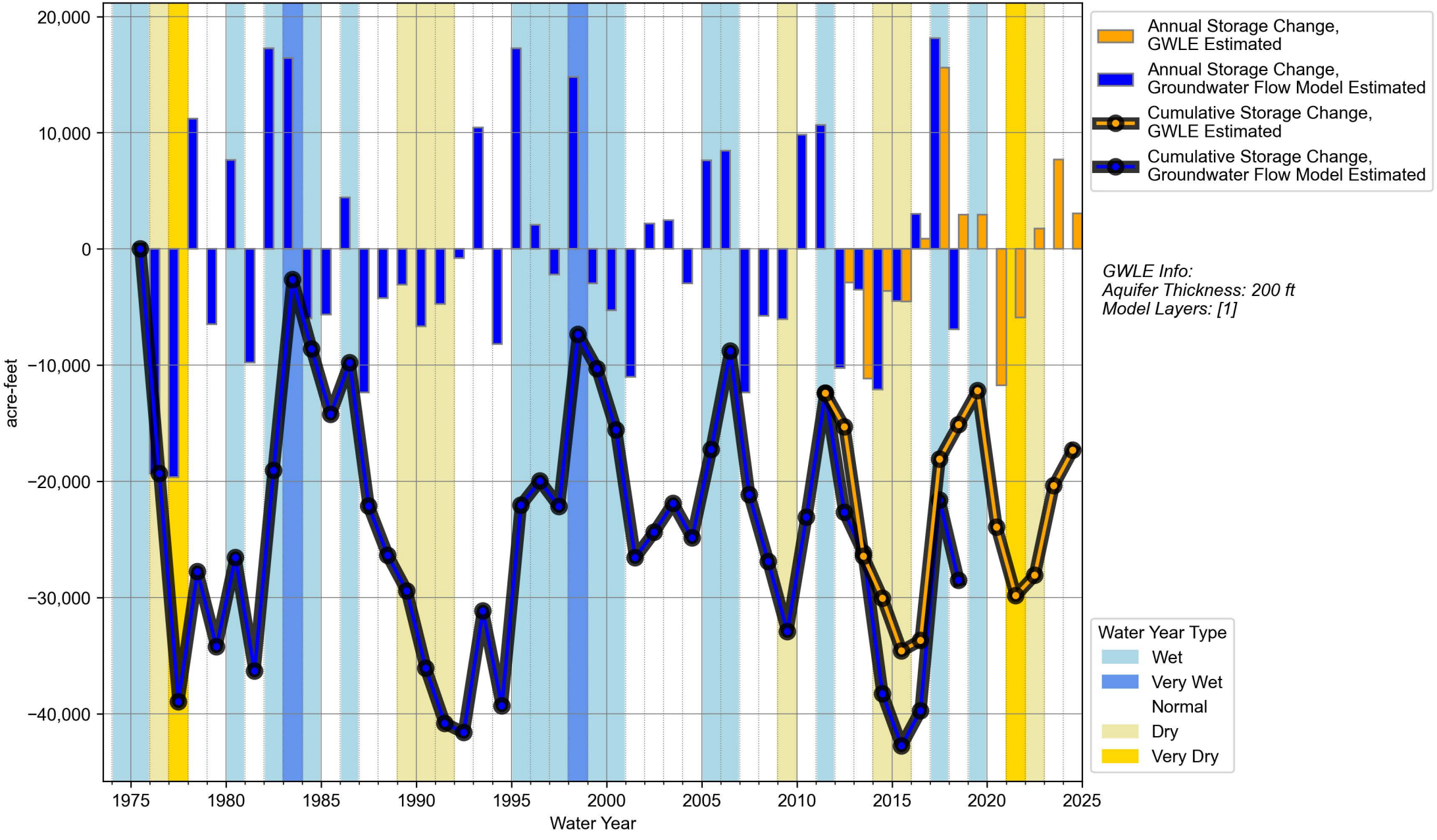
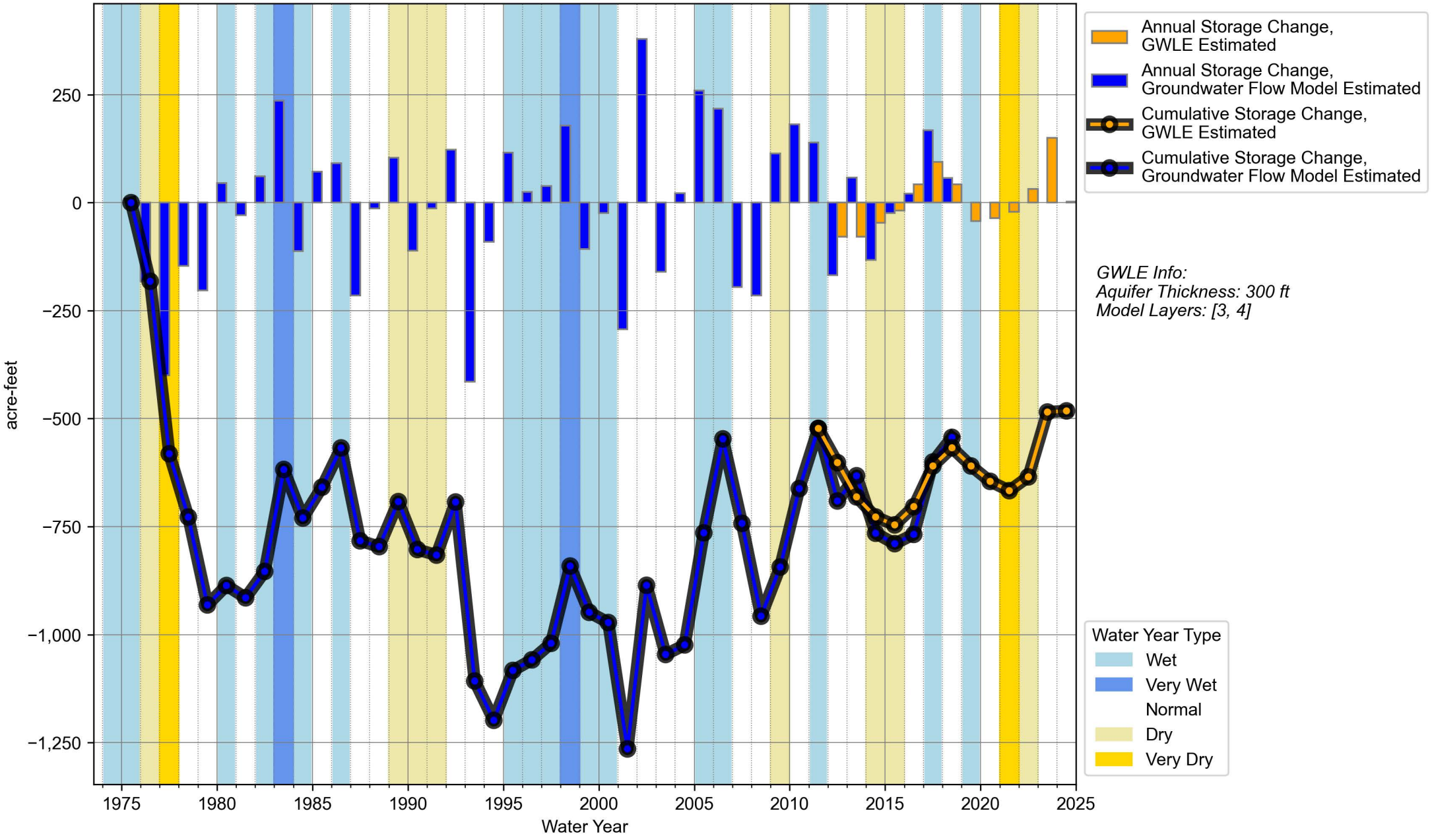
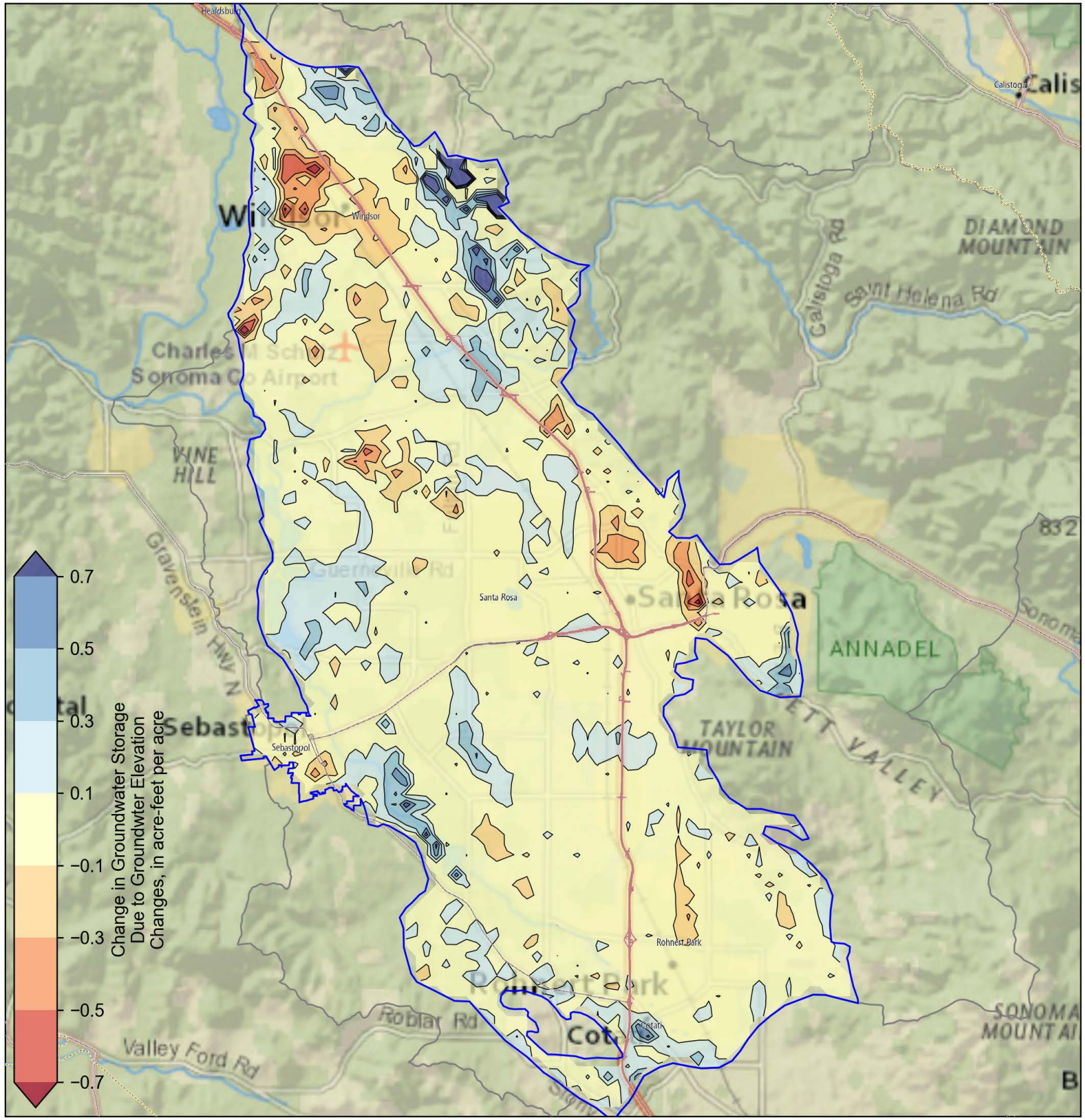


Figure 3-10: Groundwater Storage Change, Deep Aquifer

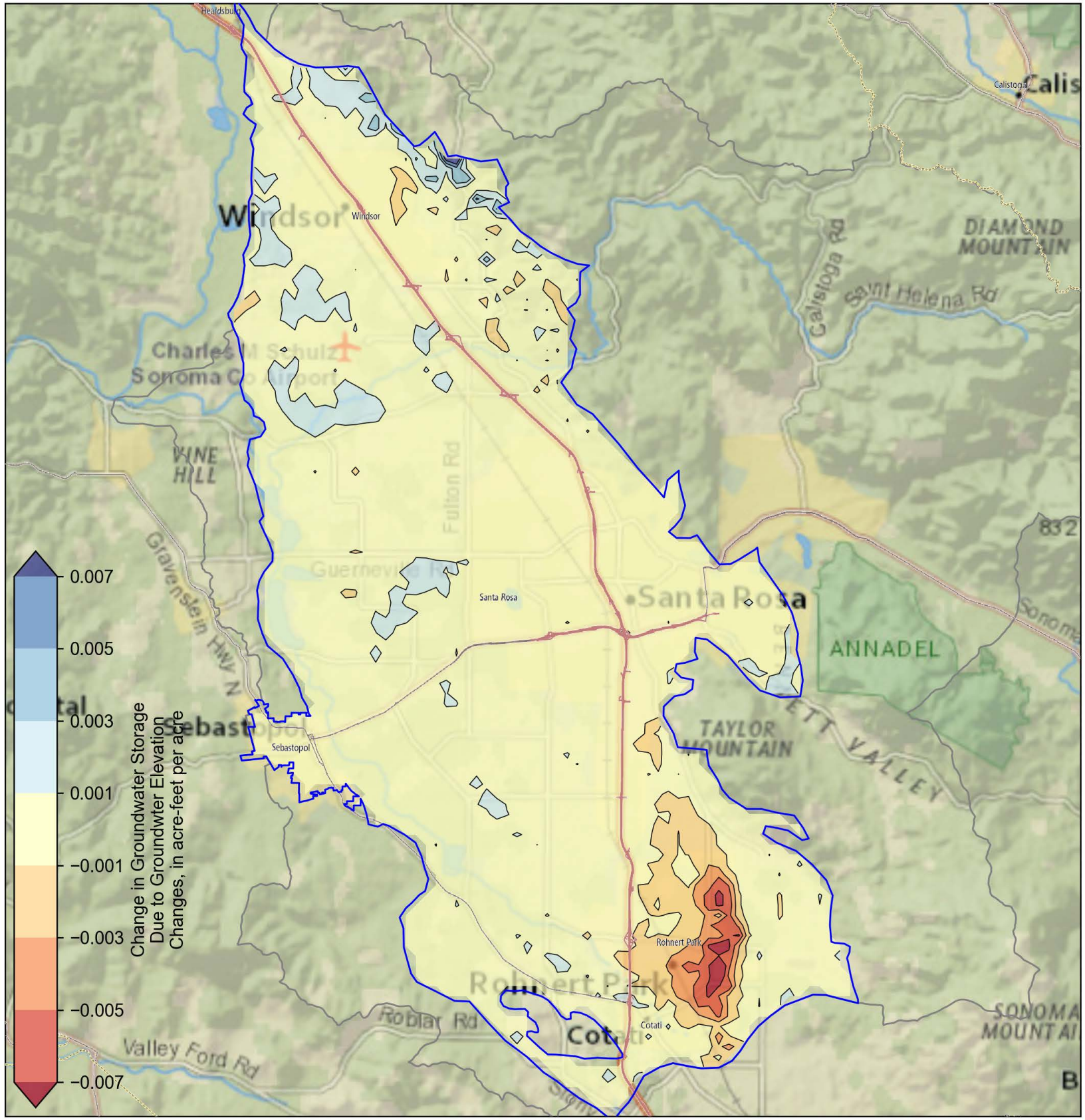




Basin Boundary
Basin Watershed

Change in Groundwater Storage from 2023 to 2024, Shallow Aquifer, Fall

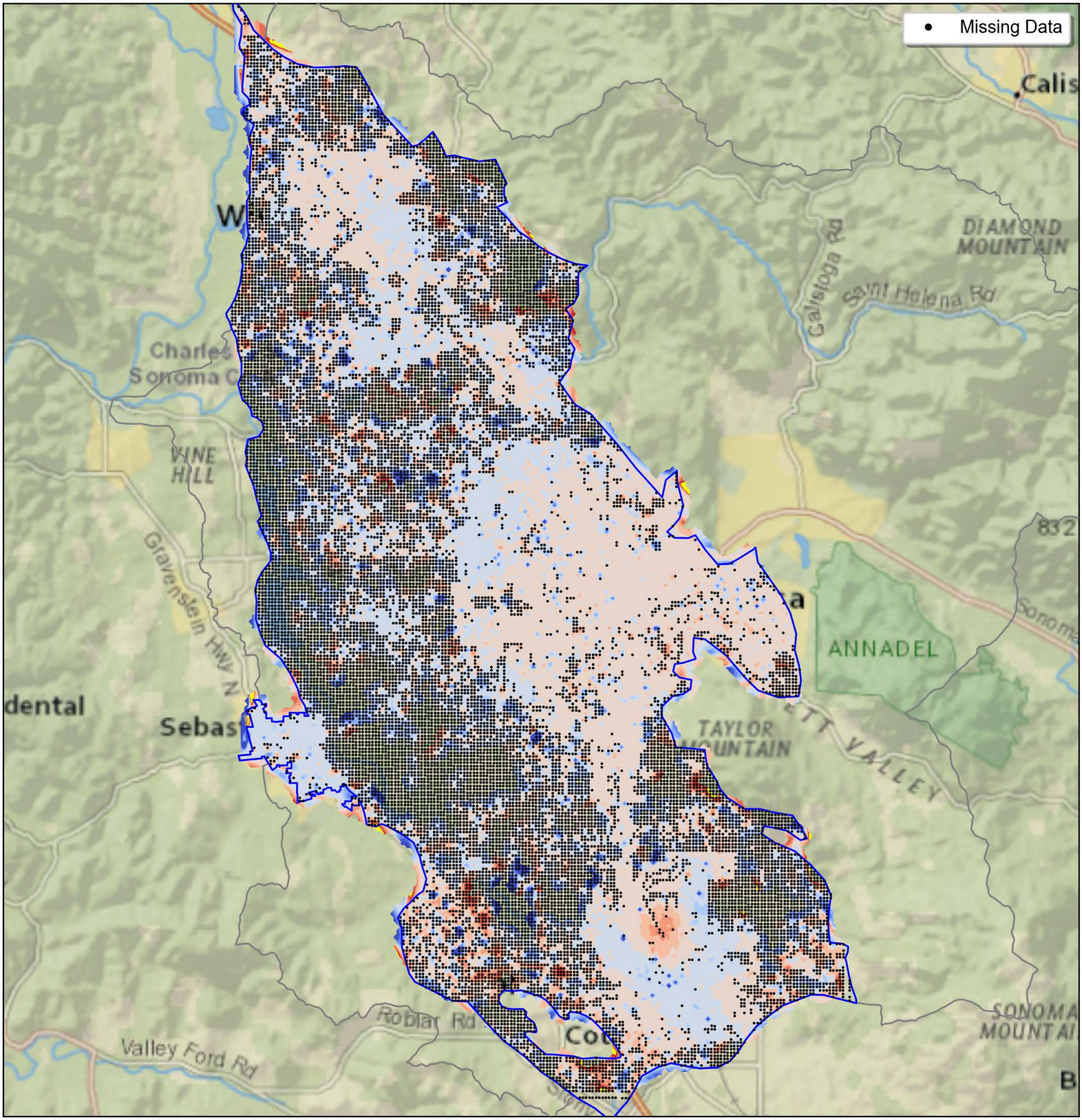
Figure 3-11



Basin Boundary
Basin Watershed

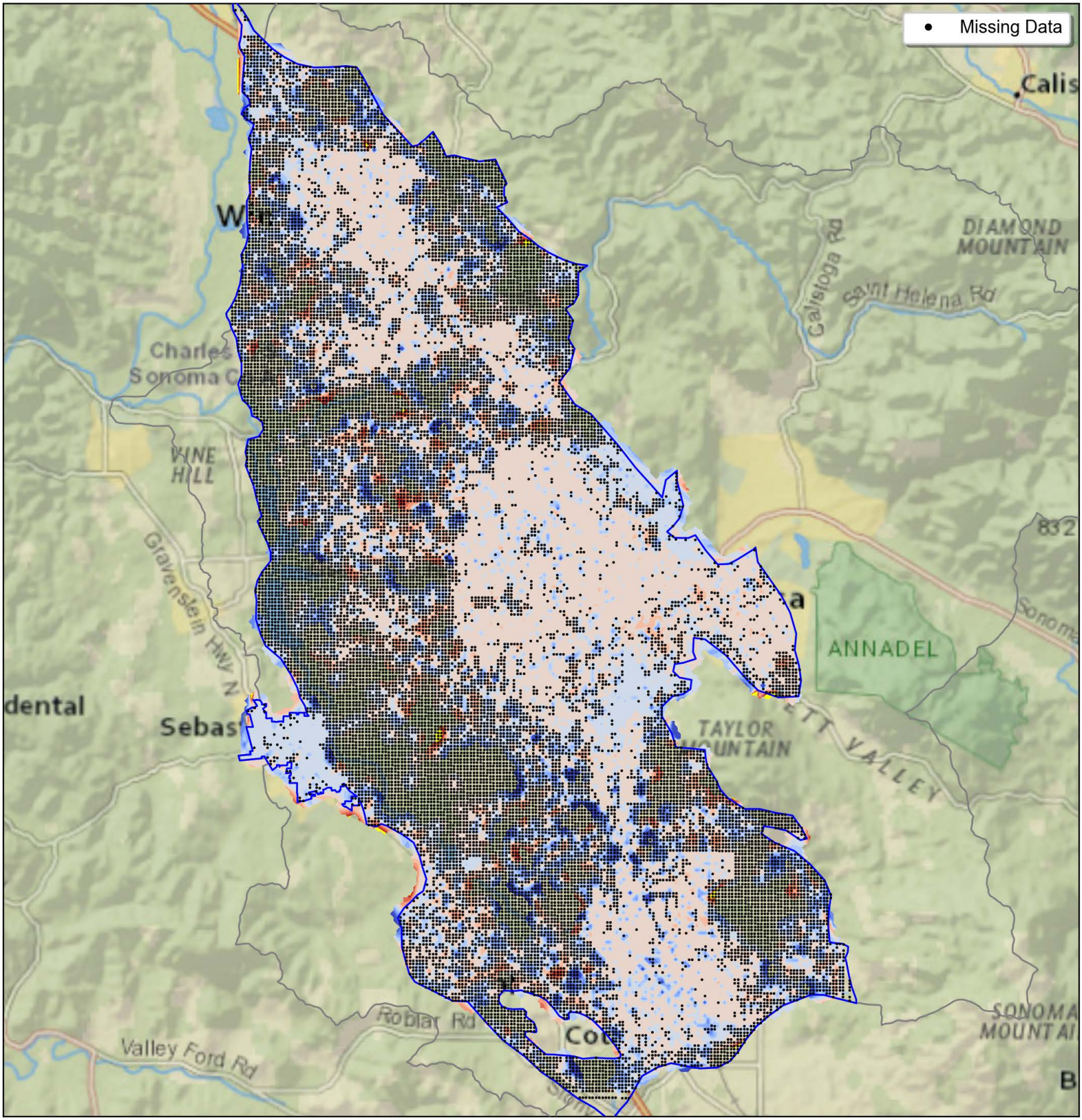
Change in Groundwater Storage from 2023 to 2024, Deep Aquifer, Fall

Figure 3-12



Annual Subsidence, Water Year 2024

Figure 3-13a



Five-Year Total Subsidence, Water Year 2024

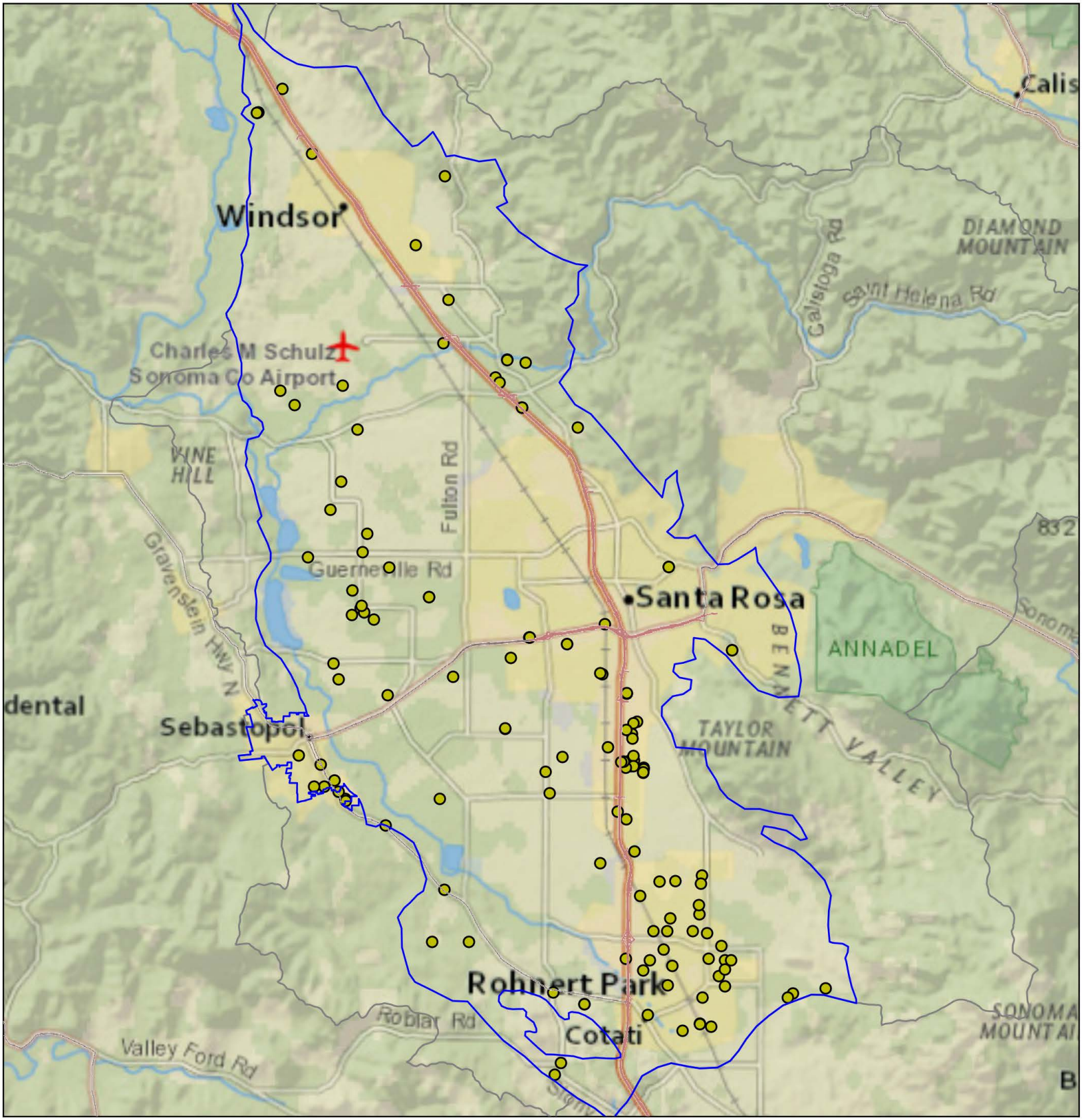
Figure 3-13b



Interconnected Surface Water RMP

Interconnected Surface Water Representative Monitoring Points

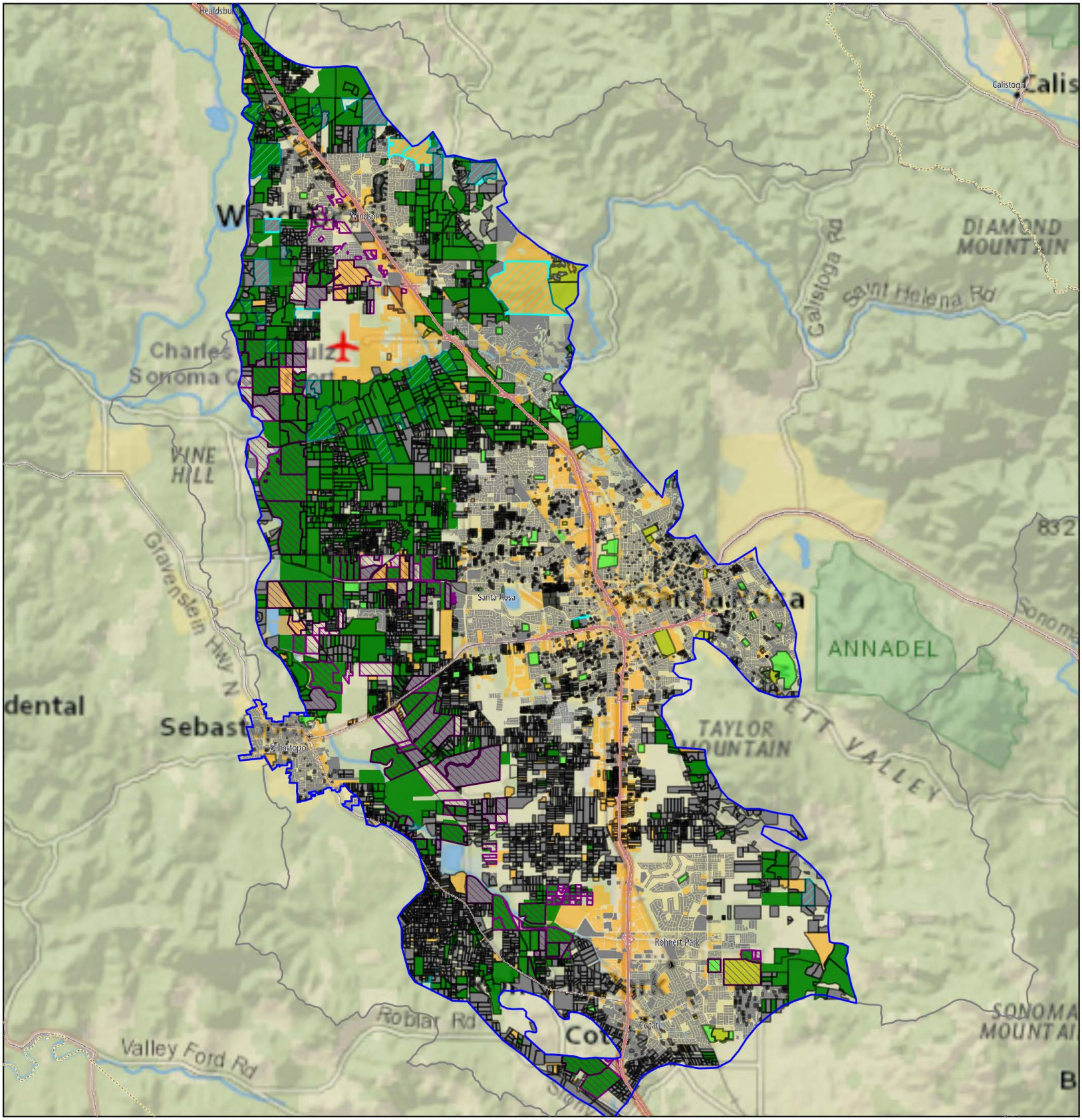
Figure 3-14



Arsenic, Nitrate, TDS Water Quality RMP

RMP Water Quality Network, Water Year 2024

Figure 3-15



Groundwater Use and Sources, Water Year 2024

Figure 3-16

Appendix A Description of Groundwater Level Estimator

Appendix A

Description of the Groundwater Level Estimator (GWLE)

Updated February 19, 2025

The groundwater level estimator (GWLE) was developed to estimate groundwater levels for the Petaluma Valley Basin, Santa Rosa Plain Subbasin and Sonoma Valley Subbasin. The GWLE is used to facilitate development of fall and spring groundwater elevation contour maps, annual groundwater-level change maps, and groundwater storage change estimates. It incorporates the best available data, including available groundwater level observations and groundwater elevation head outputs of the numerical groundwater flow models from each basin. The GWLE is a statistical regression model, which is fitted on independent variables, such as the date, elevation, and precipitation from the databases of groundwater level observations. The groundwater level observation is the dependent variable in the regression. The groundwater level observations span from 1950 to 2024, total 13,021, 8,734, and 2,729 for the Santa Rosa Plain, Sonoma Valley and Petaluma Valley, respectively. The simulated groundwater elevations from the numerical model range from 1974 to 2018, and total 103,960, 57,428 and 328,512 measurements (**Table A-1**). The number of observations from the numerical models depends on the number of stress periods, horizontal discretization (ie model cell size), spatial extent, and spatial resolution of the extracted data of each model. Simulated heads are extracted from the last time step of every month for all models. Measurement errors from observed data and errors in the simulated equivalent groundwater elevations contribute error in the GWLE.

Data was cleaned and edited during the preparation of the Water Year 2024 Annual Report development. Some timeseries contained bad values or were mis-labeled. These values were removed or marked as bad so that they were not included in the GWLE regression estimates.

Table 1. Description of GWLE Regression Data

		Simulated Data From Numerical Model	**Observed Data**
Santa Rosa Plain	**number of observations**	103,960	13,021
	first observation	1974-Oct	1950-Mar
	last observation	2018-Nov	2024-Dec
Sonoma Valley	**number of observations**	57,428	8,734
	first observation	1969-Dec	1950-Jan
	last observation	2018-Sep	2024-Oct
Petaluma Valley	**number of observations**	328,512	2,729
	first observation	1959-Oct	1953-Apr
	last observation	2018-Sep	2024-Dec

The independent variables in the GWLE are expected to impact groundwater levels, though the functional relationship is not necessarily known – or needed to be known. The statistical relationship is deduced by the regression model and does not depend on physical functional relationships to produce useful predictions of groundwater levels. The selection of independent variables for the regression

requires that they must be spatially and temporally available for the locations and times of interest. The following are the independent variables assigned to each groundwater level observation.

- Ground elevation
- Date
- Time of year in fraction
- Shallow observation (True/False)
- Slope
- Simplified geology
- Geophysical indicator (Simple Bouguer gravity anomaly, mGal); Langenheim et al 2006
- Geophysical indicator (Complete Bouguer gravity anomaly, mGal); Langenheim et al 2006
- Geophysical indicator (isostatic gravity anomaly, mGal); Langenheim et al 2006
- Precipitation – series of preceding 10-year cumulative precipitation anomaly
- Temperature – series of preceding 10-year cumulative temperature anomaly

The independent and dependent data are fitted using the extra trees regressor (Geurts and Whenkel, 2006). The fitting process is akin to using a least-squares regression, which may use one or multiple independent variables to predict a dependent variable. The extra trees regressor is a stochastic machine-learning algorithm that balances accuracy and over-fitting by training the model on subsamples of the parameter space. Though the regressor is stochastic (random), it is reproducible. The extra trees regressor was chosen by fitting a suite of other models and comparing the visual and statistical outputs.

During the fitting process the dependent variables are weighted by data source; observed groundwater elevations are assigned a weight of 1.0 whereas the numerically derived simulated heads are given a weight of 0.25. After fitting the GWLE to the groundwater level observation data and independent parameters, the fitted model can be used to estimate groundwater level observations at any time, location, or elevation. The accuracy of the estimated values depends on how robust the model is for the estimated values. As such, predictions made for periods where data coverage is sparse, such as earlier than 2000 or located farther from observed data, will have higher uncertainties and errors.

The regression model is re-fitted to all of the data when new data is introduced into the GWLE model for the annual updates. Because of this groundwater levels predicted (estimated) by the GWLE will change for all years and locations. When new observations are introduced for wells that had not previously existed, this may cause larger changes in predicted groundwater levels from earlier periods. When new data is added to wells with pre-existing long-term records, the updated predicted groundwater levels will likely experience small changes compared to previous Annual Reports. Furthermore, the updating of the input data in the GWLE will impact the estimates of the groundwater storage changes. Changes to groundwater storage estimates from prior Annual Reports are documented in this Appendix, as summarized in Table 2, 3, 4 and 5. Figure 1 shows the 4 versions of the estimated groundwater storage changes for the three annual reports

This method best uses all available data and results in continued improvements to estimated groundwater-level and storage changes, as the GSA continues to collect new data and fill data gaps in the monitoring networks. The GWLE is an automated, defensible method that is a cost-effective approach for producing the routinely used datasets. The utility of such a tool will increase as the amount

of data continues to grow due to ongoing growth in groundwater observation datasets and development of improved numerical flow models.

Table 2 Aquifer storage change estimates for the 2024 annual report

	Petaluma Valley	Santa Rosa Plain		Sonoma Valley	
Season	**Fall**	**Deep, Fall**	**Shallow, Fall**	**Deep, Fall**	**Shallow, Fall**
	Storage Change (af)	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**
Water year					
2012	-9,330	-80	-2,900	-20	-2,080
2013	-9,400	-80	-11,140	-30	-1,260
2014	-1,190	-50	-3,610	20	-480
2015	-1,430	-20	-4,540	0	450
2016	23,250	40	880	-10	240
2017	5,020	90	15,610	20	1,890
2018	-5,030	40	2,960	-30	-1,010
2019	-1,250	-40	2,930	10	1,380
2020	190	-40	-11,740	-10	10
2021	70	-20	-5,890	-60	-180
2022	-5,700	30	1,750	-10	-990
2023	3,300	150	7,700	30	1,470
2024	-3,800	0	3,060	10	290

Table 3 Aquifer storage change estimates for the 2023 annual report

	Petaluma Valley	Santa Rosa Plain		Sonoma Valley	
Season	**Fall**	**Deep, Fall**	**Shallow, Fall**	**Deep, Fall**	**Shallow, Fall**
Water year	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**
2012	-10,130	-70	-3,440	-20	-1,740
2013	-8,770	-140	-11,700	-30	-1,110
2014	-1,580	0	-6,080	20	-890
2015	-1,480	0	-4,730	0	450
2016	23,020	60	1,330	0	320
2017	4,740	110	18,990	20	1,730
2018	-4,240	50	2,950	-30	-730
2019	170	-70	2,660	10	1,280
2020	-740	-140	-10,470	-20	160
2021	1,300	20	60	-60	-200
2022	-4,430	10	-1,360	-10	-230
2023	1,070	160	6,300	30	1,080

Table 4 Aquifer storage change estimates for the 2022 annual report

	Petaluma Valley	Santa Rosa Plain		Sonoma Valley	
Season	**Fall**	**Deep, Fall**	**Shallow, Fall**	**Deep, Fall**	**Shallow, Fall**
Water year	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**
2012	-9,300	20	810	-20	-1,810
2013	-8,820	-130	-5,380	-30	-1,260
2014	-2,470	-20	-6,520	20	-710
2015	-2,010	-30	-3,520	-10	490
2016	22,800	60	2,250	0	250
2017	5,650	110	12,070	20	1,770
2018	-4,400	30	-1,270	-30	-810
2019	-780	-90	4,070	-10	1,190
2020	1,020	-80	-12,370	-30	420
2021	580	-40	-9,260	-30	-370
2022	-4,020	-10	6,770	-10	-480

Table 5 Aquifer storage change estimates for the 2021 annual report

	Petaluma Valley	Santa Rosa Plain		Sonoma Valley	
Season	**Fall**	**Deep, Fall**	**Shallow, Fall**	**Deep, Fall**	**Shallow, Fall**
Water year	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**	**Storage Change (af)**
2012	-10,650	-70	-2,980	-20	-1,730
2013	-8,180	-80	-11,030	-30	-1,200
2014	-2,330	-50	-5,850	20	-850
2015	-1,630	-10	-4,900	0	460
2016	23,680	50	-990	0	290
2017	5,600	90	19,590	20	1,880
2018	-5,430	50	2,530	-30	-800
2019	-480	-70	4,200	10	1,300
2020	1,170	-110	-12,500	-10	420
2021	1,010	10	-2,570	-30	-130

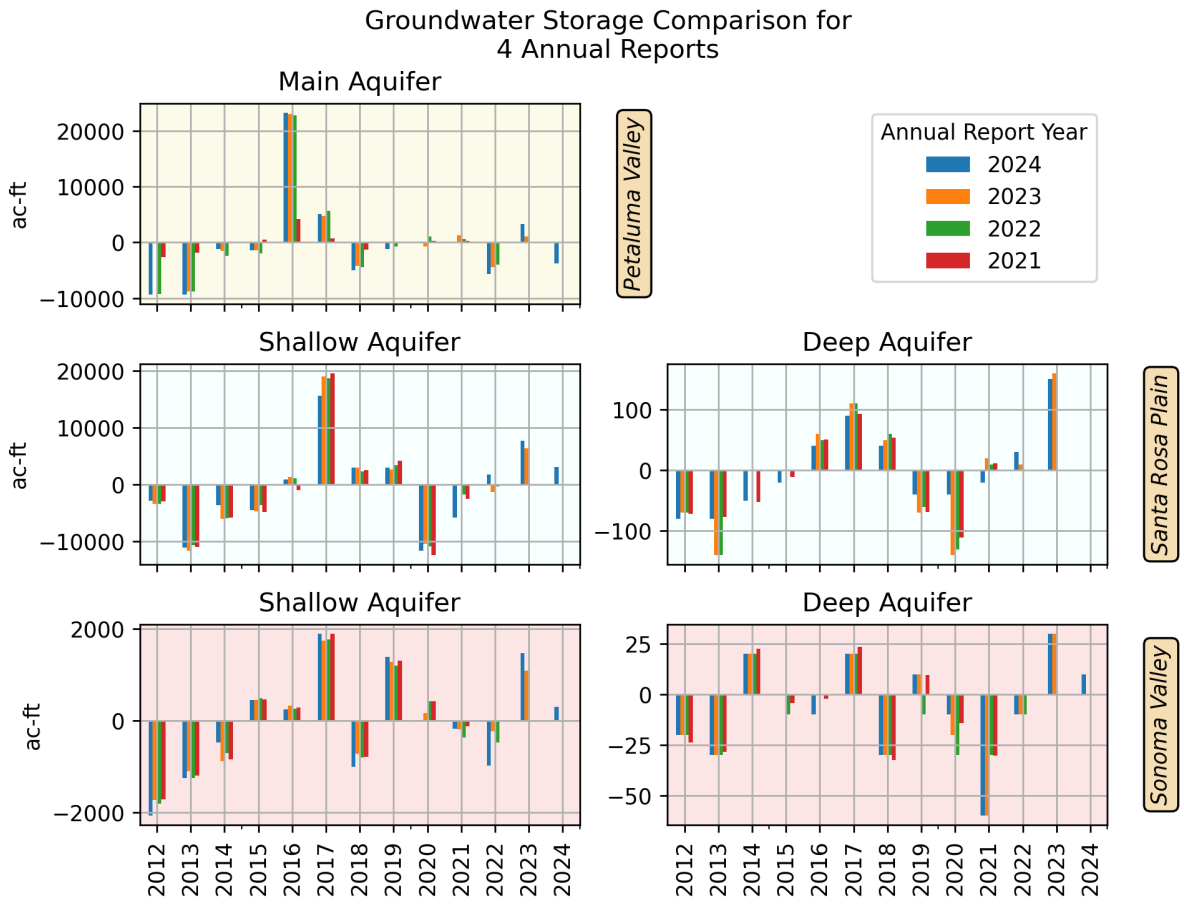


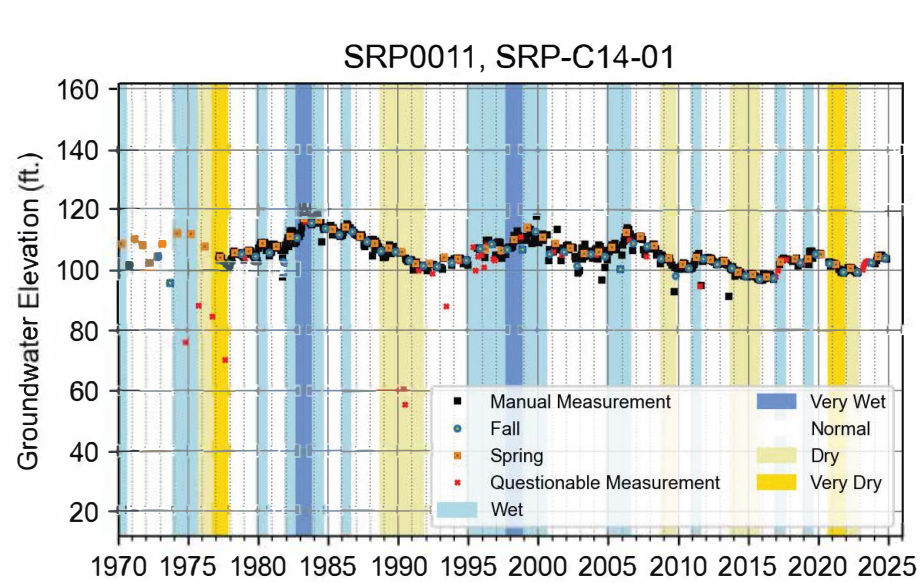
Figure 1 Groundwater Storage Comparison for Three Annual Reports

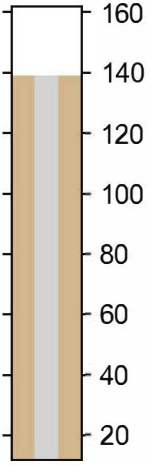
References

P. Geurts, D. Ernst., and L. Wehenkel, "Extremely randomized trees", Machine Learning, 63(1), 3-42, 2006.

V.E. Langenheim, C.W. Roberts, C.A. McCabe, D.K. McPhee, J.E. Tilden, and R.C. Jachens. 2006, Preliminary Isostatic Gravity Map of the Sonoma Volcanic Field and Vicinity, Sonoma and Napa Counties, California. U.S. Geological Survey Open-File Report 2006-1056 Version 1.0.

Appendix B Hydrographs for Full Groundwater-Level Monitoring Network



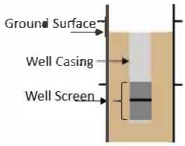


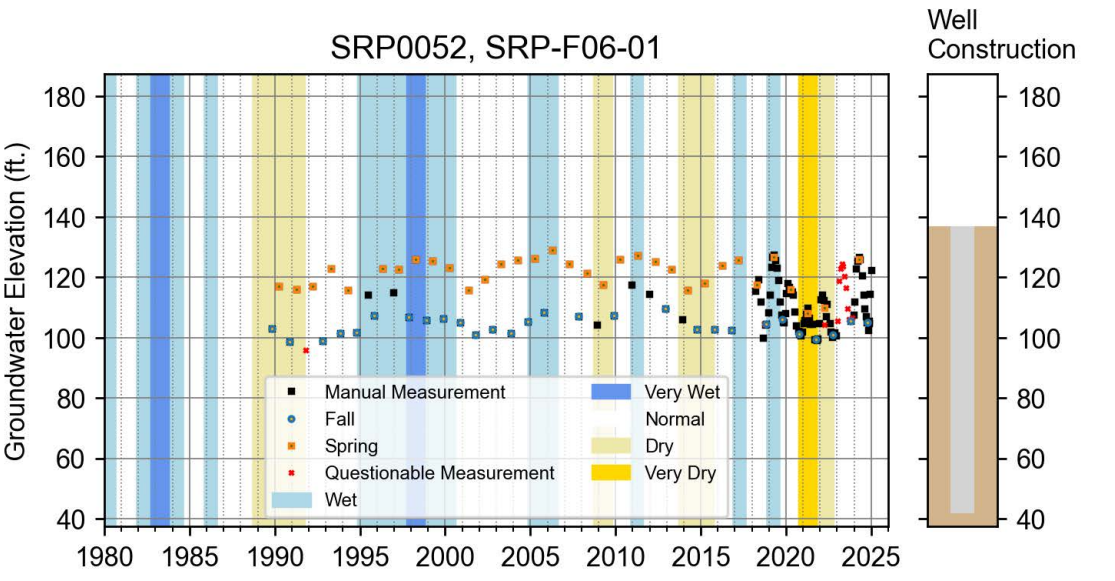
Well Depth: 167.0 ft
Groundwater Basin: WILSON GROVE FORMATION HIGHLANDS
Screened Intervals:
Elevation: 139 ft
Lat.: 38.41360 Lon.: -122.83350

Location



Well Construction Legend



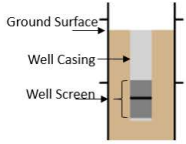


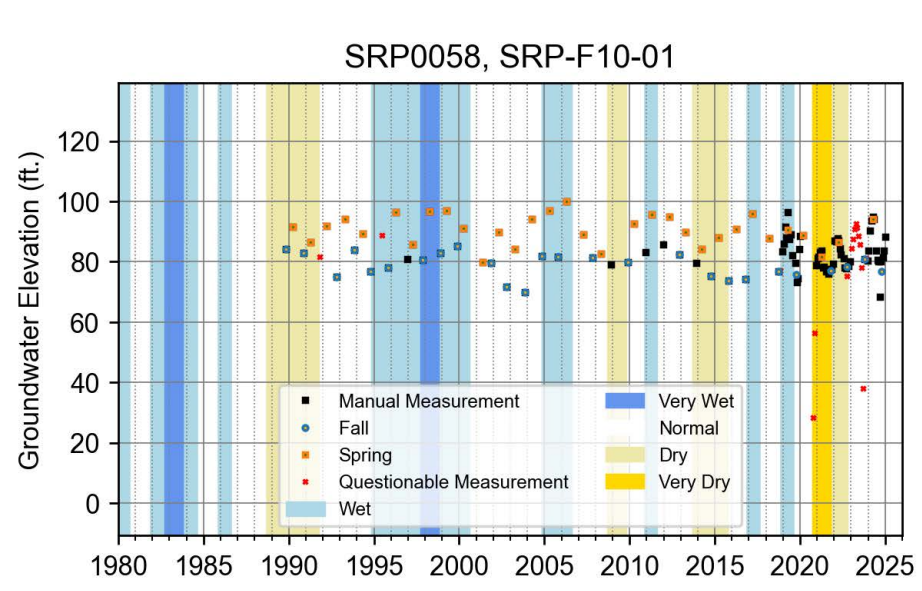
Well Depth: 95.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 137 ft
Lat.: 38.51710 Lon.: -122.77170

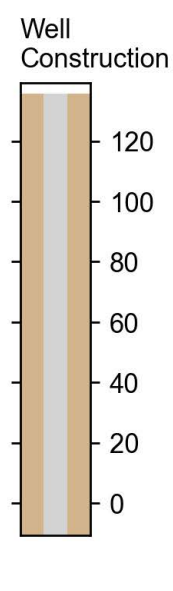
Location



Well Construction Legend





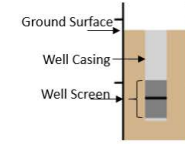


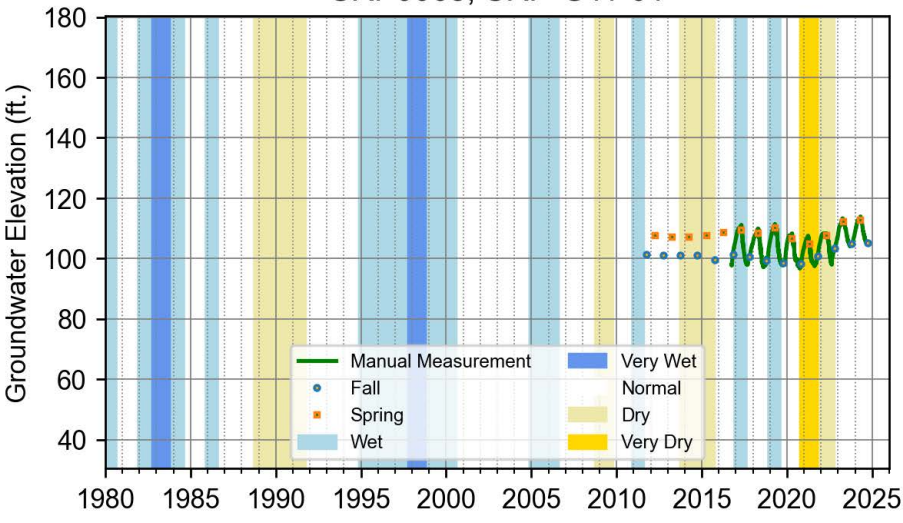
Well Depth: 220.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 136 ft
Lat.: 38.46370 Lon.: -122.77670

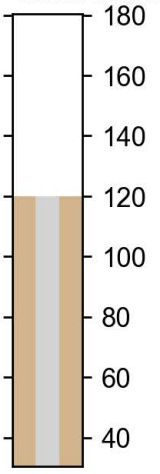
Location



Well Construction Legend





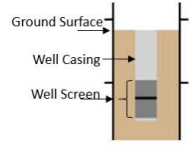


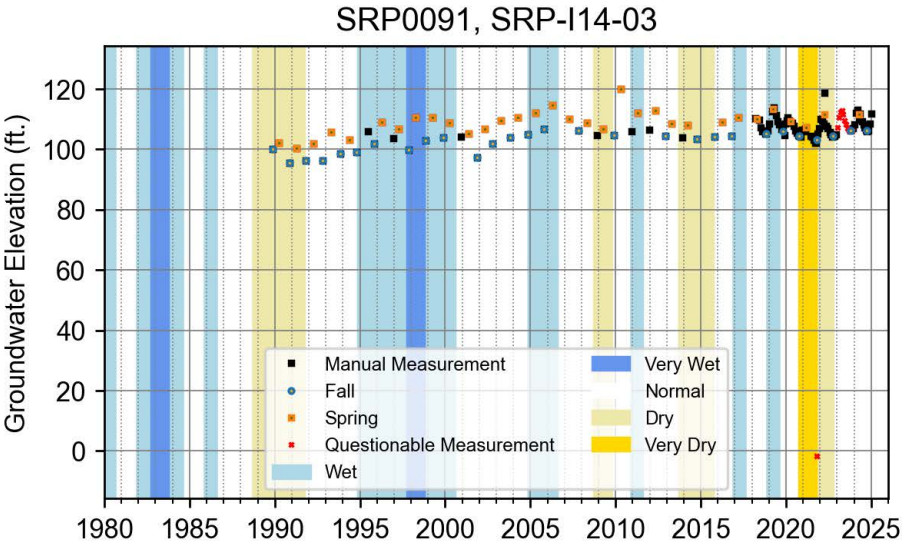
Well Depth: 694.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 156-176 ft, 196-216 ft, 277-308 ft, 328-348 ft, 409-450 ft, 592-684 ft
Elevation: 120 ft
Lat.: 38.45765 Lon.: -122.74798

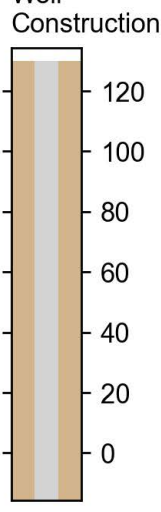
Location



Well Construction Legend





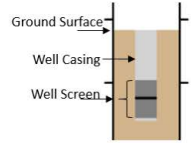


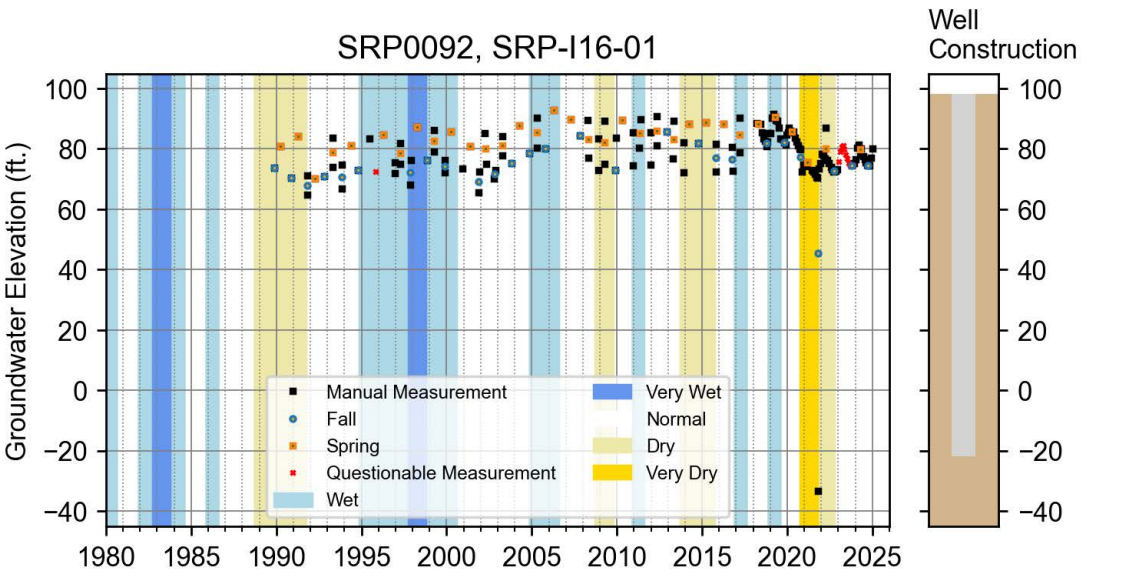
Well Depth: 205.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 130 ft
Lat.: 38.40780 Lon.: -122.71240

Location



Well Construction Legend



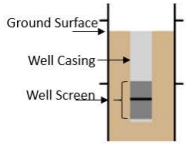


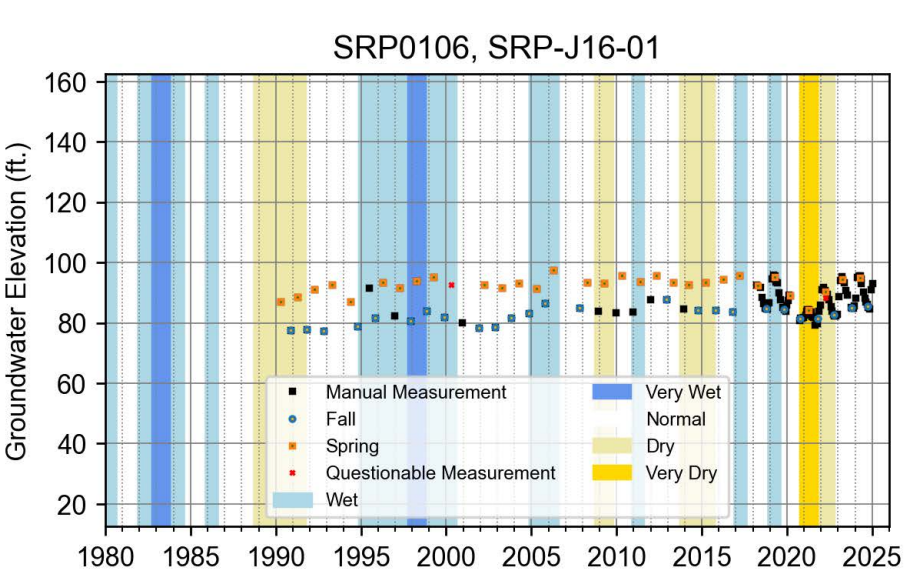
Well Depth: 120.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 98 ft
Lat.: 38.37380 Lon.: -122.71410

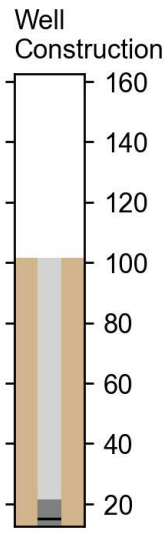
Location



Well Construction Legend



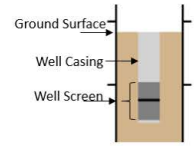


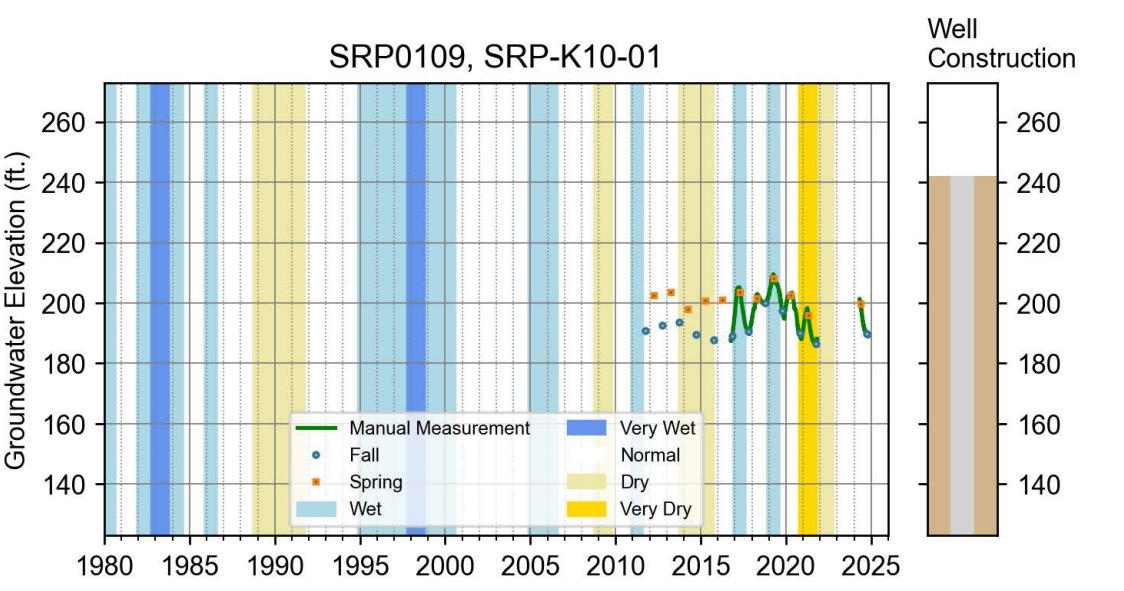


Well Depth: 90.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 80-90 ft
Elevation: 102 ft
Lat.: 38.37650 Lon.: -122.70270

Location





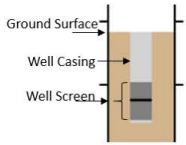


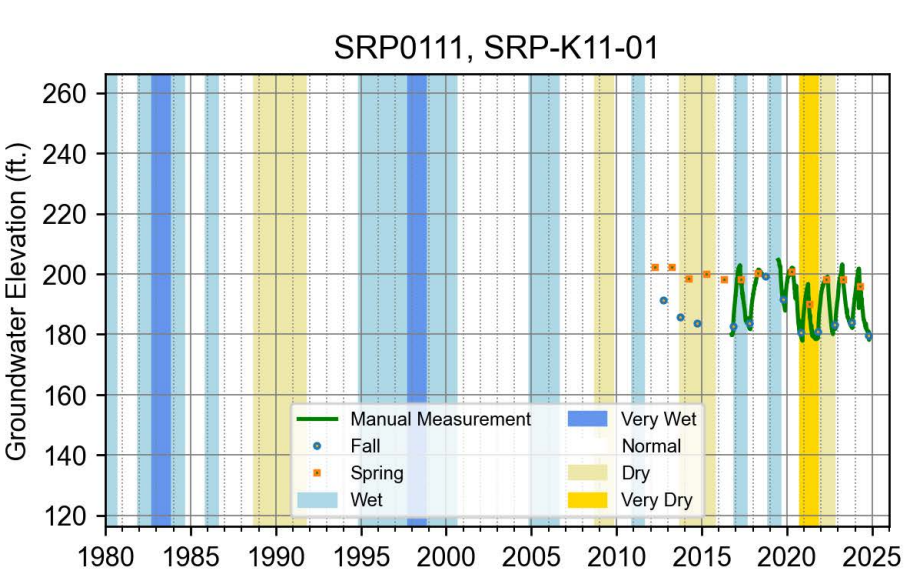
Well Depth: 470.0 ft
Groundwater Basin: SANTA ROSA VALLEY - RINCON VALLEY
Screened Intervals: 390-460 ft
Elevation: 242 ft
Lat.: 38.46759 Lon.: -122.67489

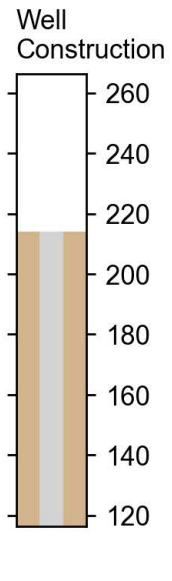
Location



Well Construction Legend





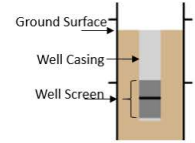


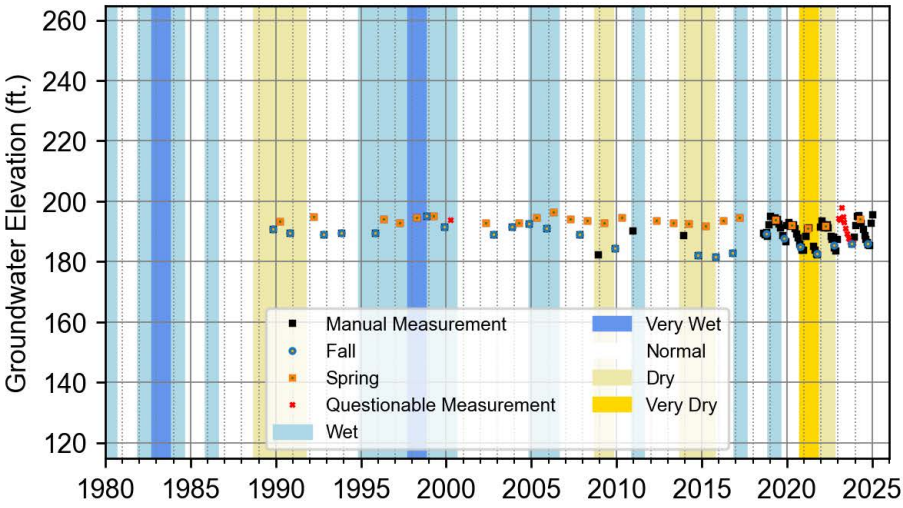
Well Depth: 660.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 600-650 ft
Elevation: 214 ft
Lat.: 38.44741 Lon.: -122.67143

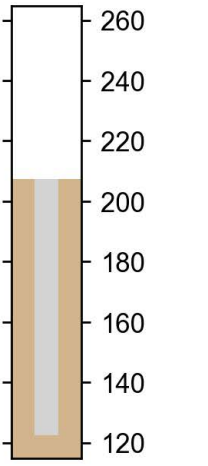
Location



Well Construction Legend





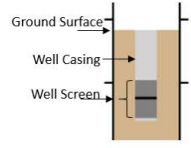


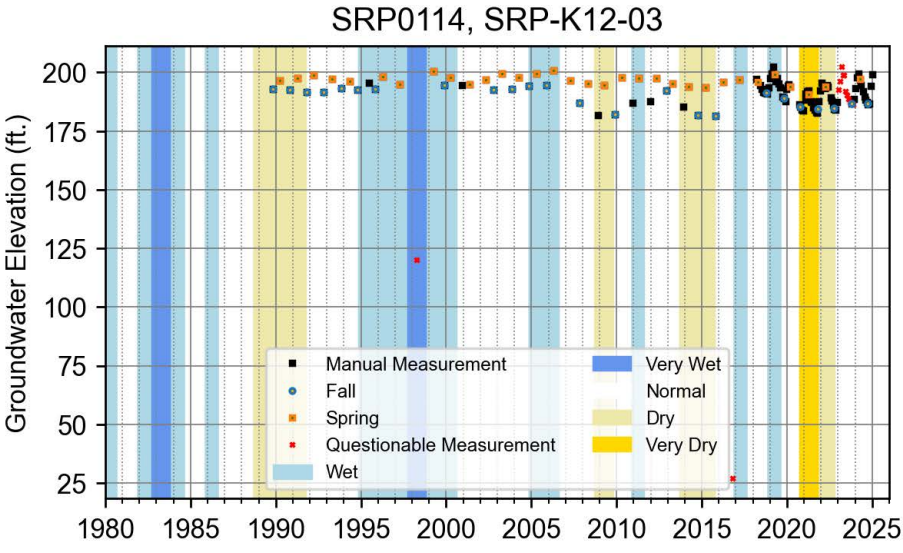
Well Depth: 85.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 207 ft
Lat.: 38.44320 Lon.: -122.67560

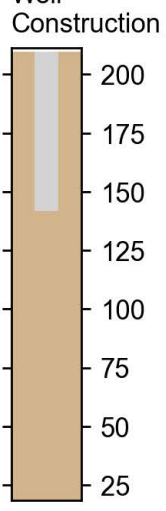
Location



Well Construction Legend





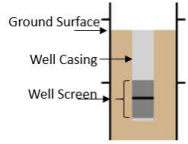


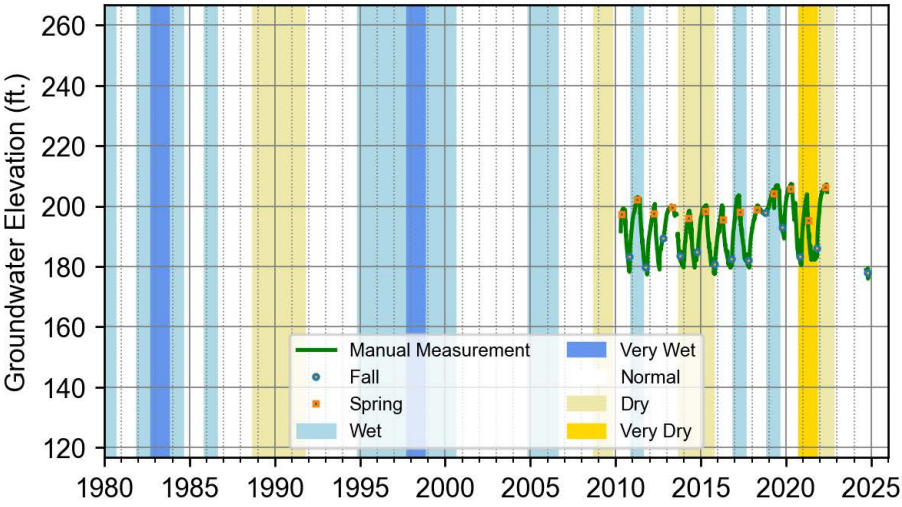
Well Depth: 68.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 210 ft
Lat.: 38.44090 Lon.: -122.67740

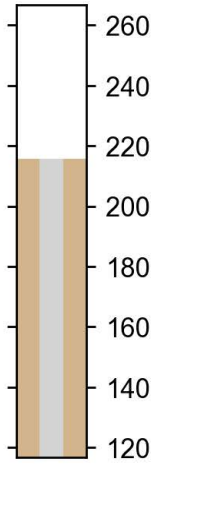
Location



Well Construction Legend





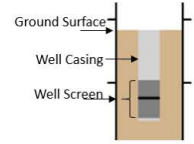


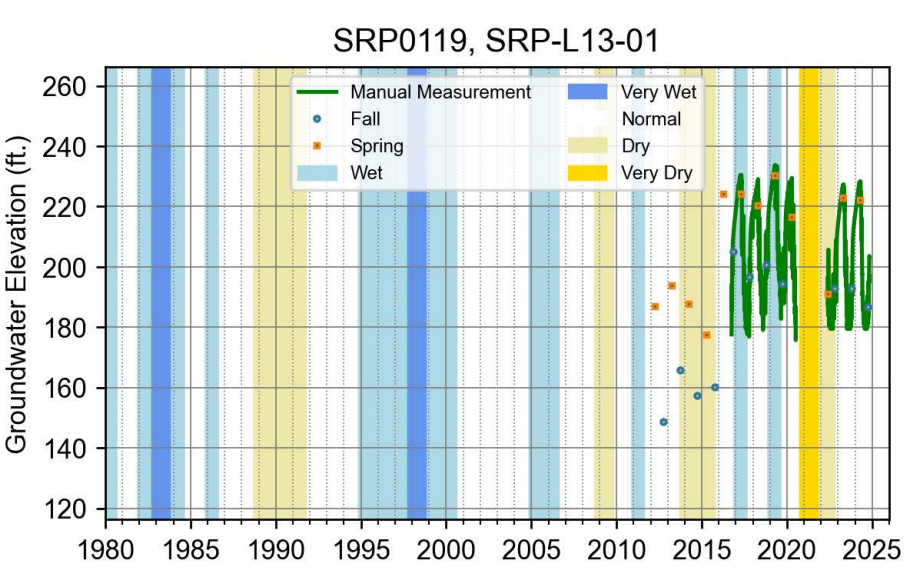
Well Depth: 870.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 500-620 ft, 750-860 ft
Elevation: 216 ft
Lat.: 38.43972 Lon.: -122.67606

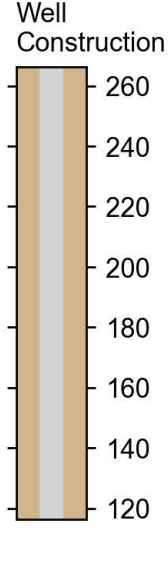
Location



Well Construction Legend





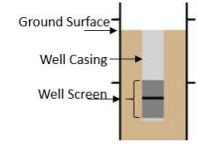


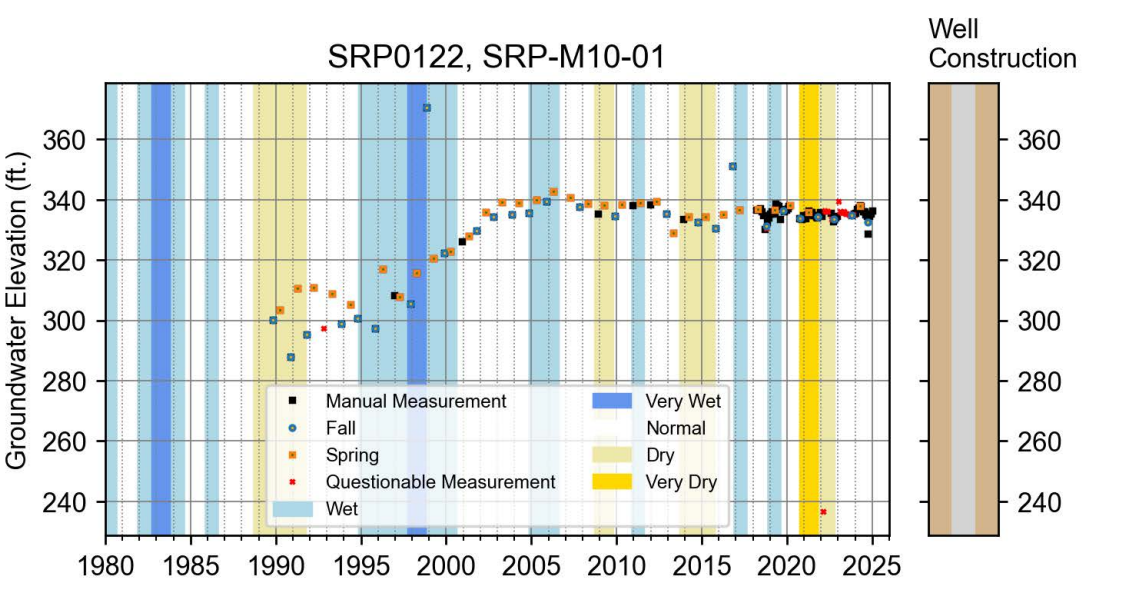
Well Depth: 380.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 350-370 ft
Elevation: 277 ft
Lat.: 38.41839 Lon.: -122.66367

Location



Well Construction Legend



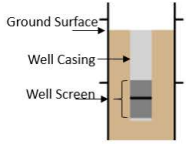


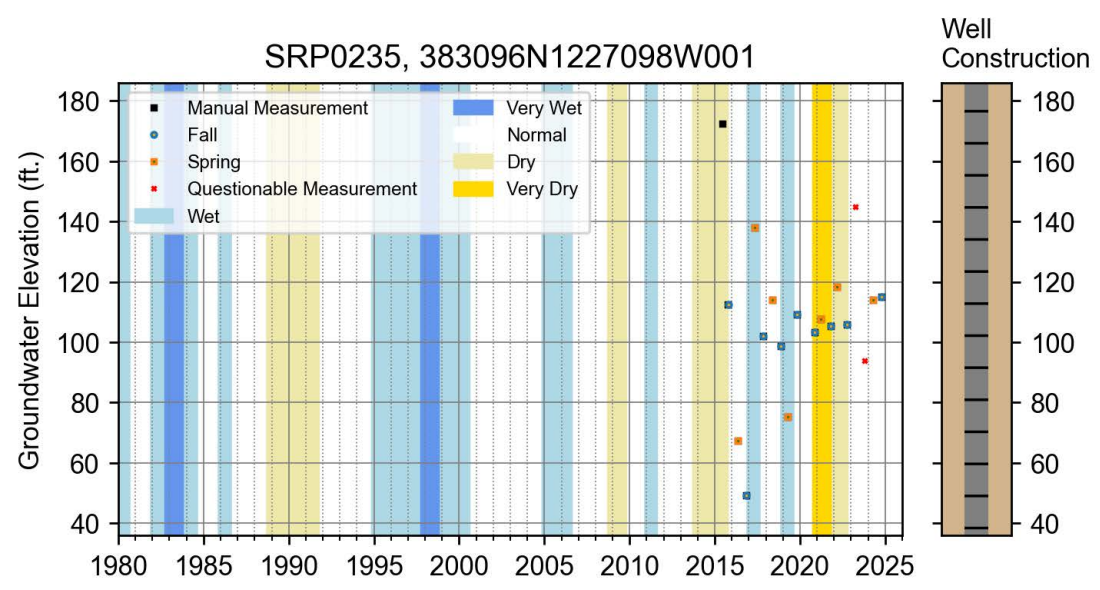
Well Depth: 296.0 ft
Groundwater Basin: SANTA ROSA VALLEY - RINCON VALLEY
Screened Intervals:
Elevation: 385 ft
Lat.: 38.46380 Lon.: -122.64140

Location



Well Construction Legend



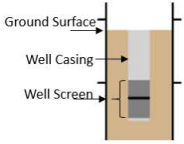


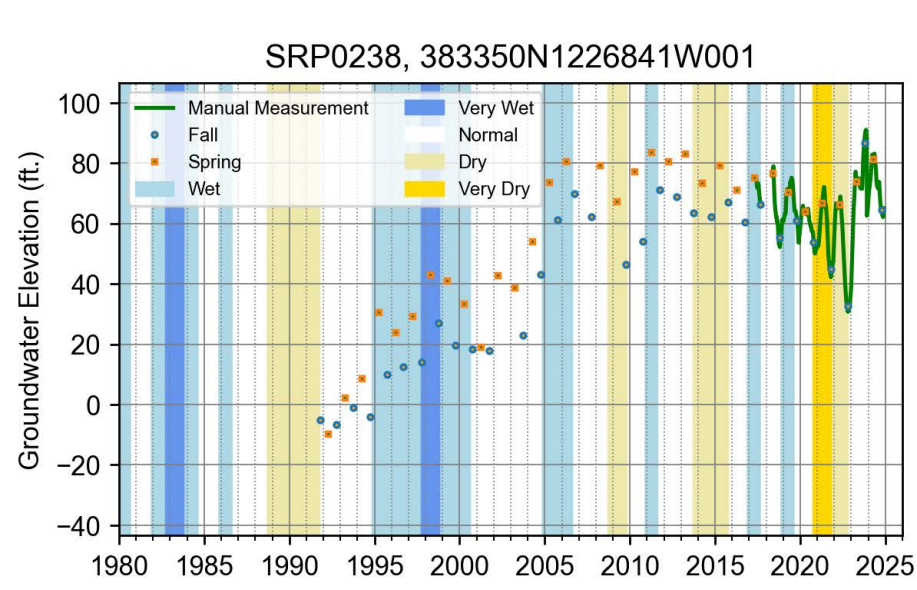
Well Depth: 419.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 118-238 ft, 388-138 ft, 258-418 ft
Elevation: 312 ft
Lat.: 38.30960 Lon.: -122.70980

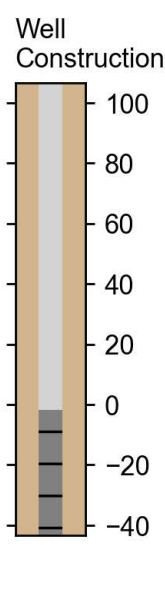
Location



Well Construction Legend





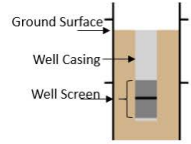


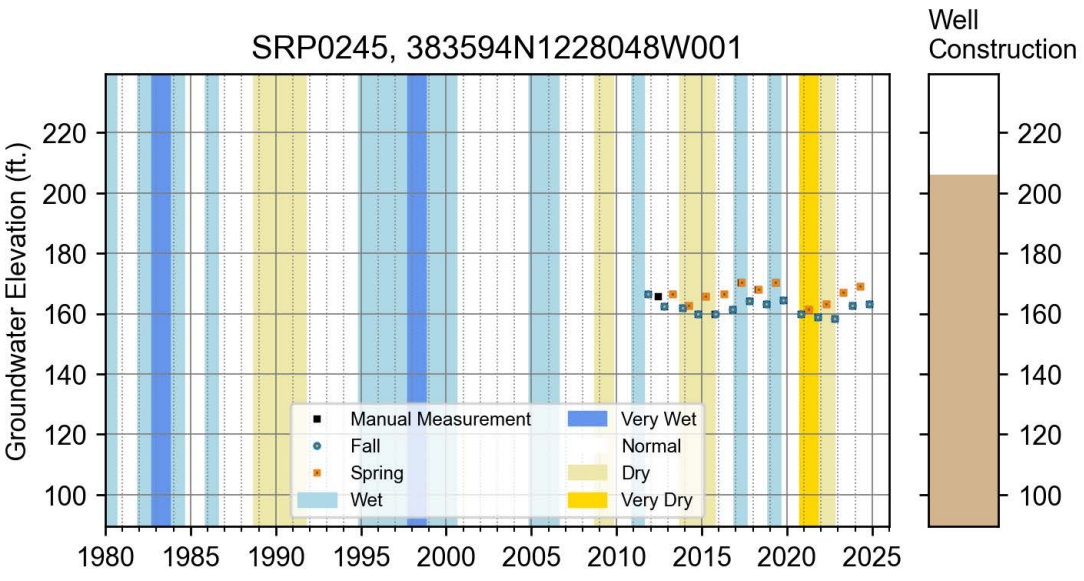
Well Depth: 380.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 130-270 ft, 290-320 ft, 360-380 ft
Elevation: 128 ft
Lat.: 38.33496 Lon.: -122.68414

Location



Well Construction Legend



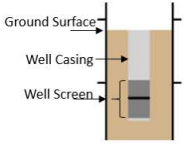


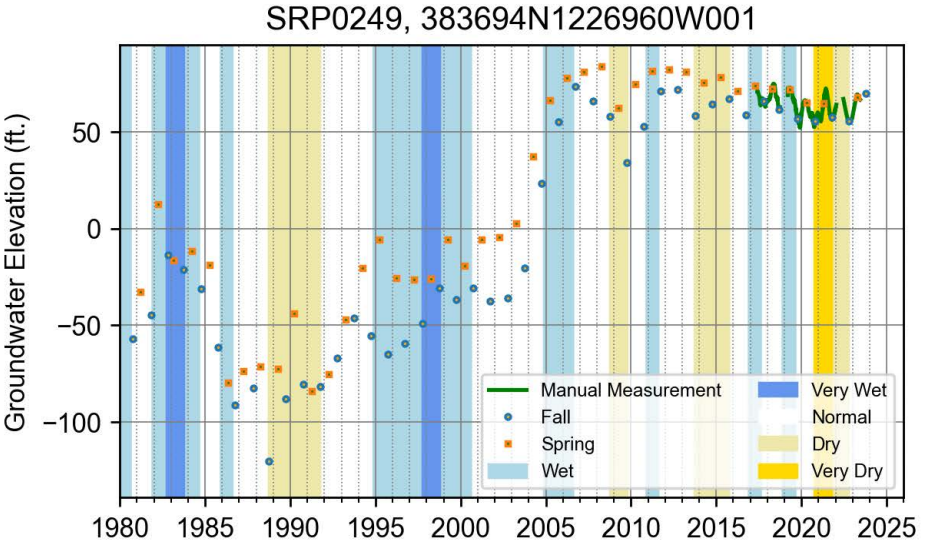
Groundwater Basin: WILSON GROVE FORMATION HIGHLANDS
Screened Intervals:
Elevation: 206 ft
Lat.: 38.35940 Lon.: -122.80480

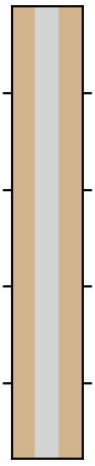
Location



Well Construction Legend





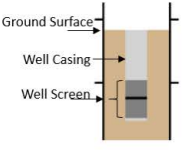


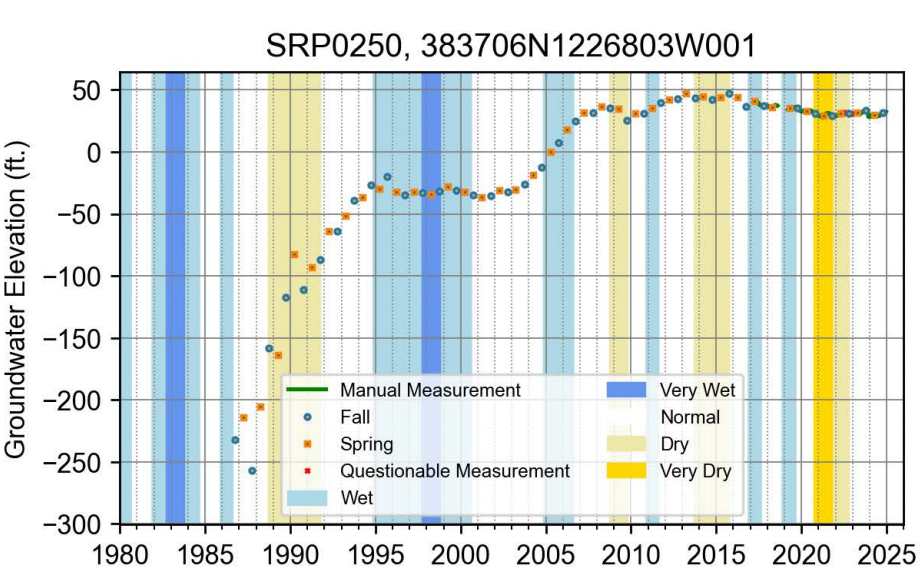
Well Depth: 462.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 302-310 ft, 326-332 ft, 404-462 ft
Elevation: 103 ft
Lat.: 38.36942 Lon.: -122.69597

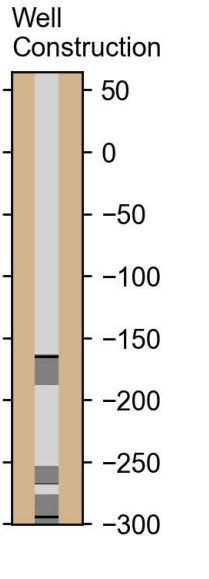
Location



Well Construction Legend





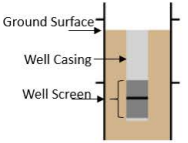


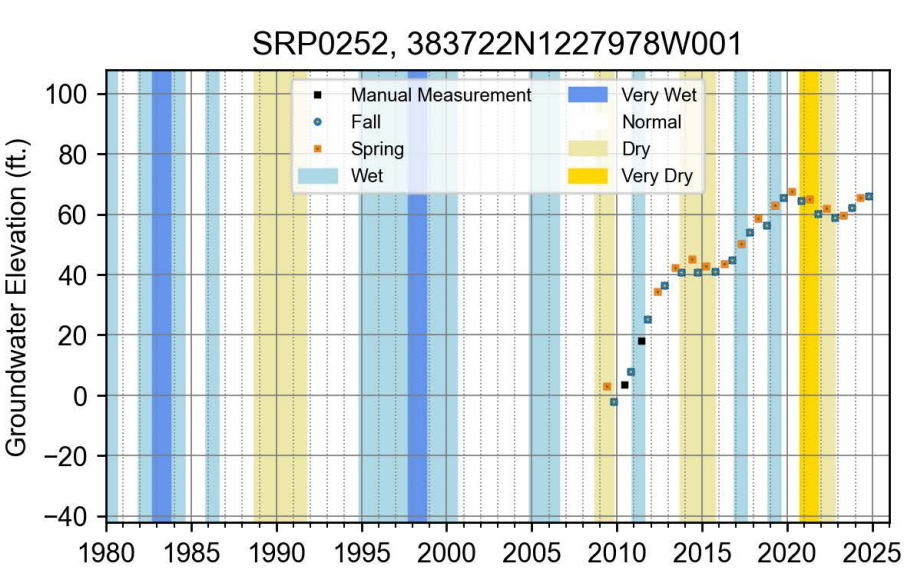
Well Depth: 540.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 297-322 ft, 387-402 ft, 410-470 ft, 482-492 ft, 500-540 ft
Elevation: 134 ft
Lat.: 38.37059 Lon.: -122.68034

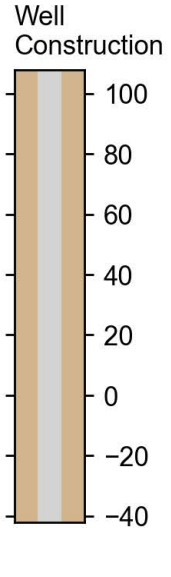
Location



Well Construction Legend





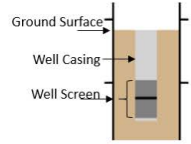


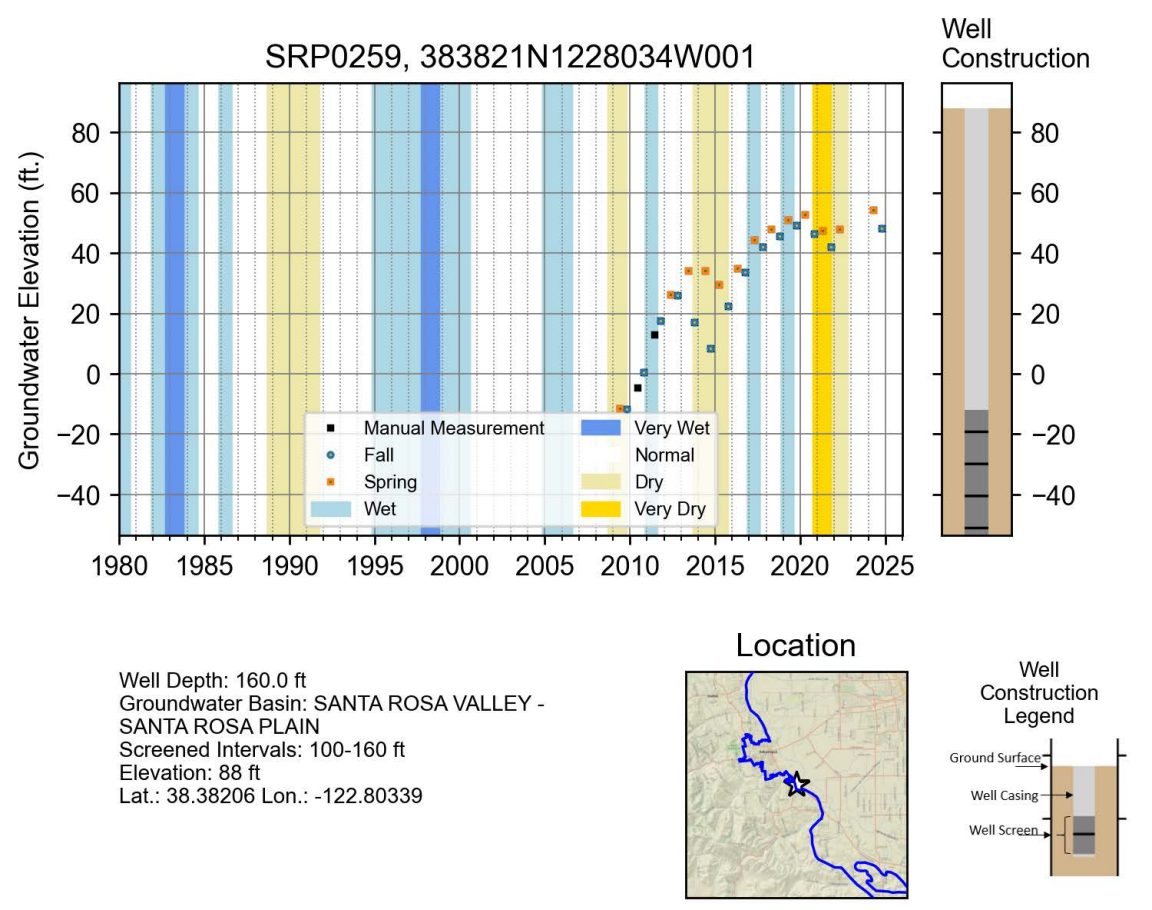
Well Depth: 220.0 ft
Groundwater Basin: WILSON GROVE
FORMATION HIGHLANDS
Screened Intervals:
Elevation: 144 ft
Lat.: 38.37219 Lon.: -122.79775

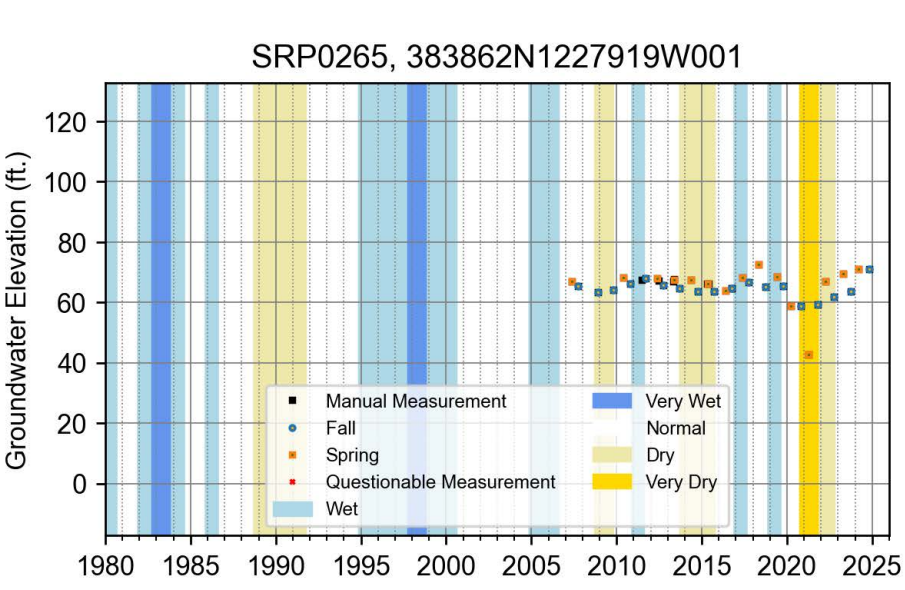
Location

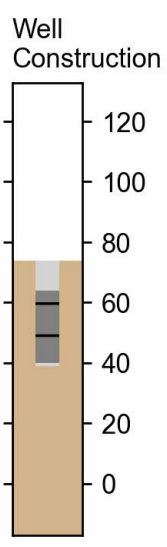


Well Construction Legend




SRP0259, 383821N1228034W001
Groundwater Elevation (ft.)
80
60
40
20
0
−20
−40
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Manual Measurement
Fall
Spring
Wet
Very Wet
Normal
Dry
Very Dry
Well Construction
80
60
40
20
0
−20
−40
Well Depth: 160.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 100-160 ft
Elevation: 88 ft
Lat.: 38.38206 Lon.: -122.80339
Location
Well Construction Legend
Ground Surface
Well Casing
Well Screen



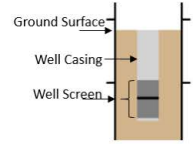


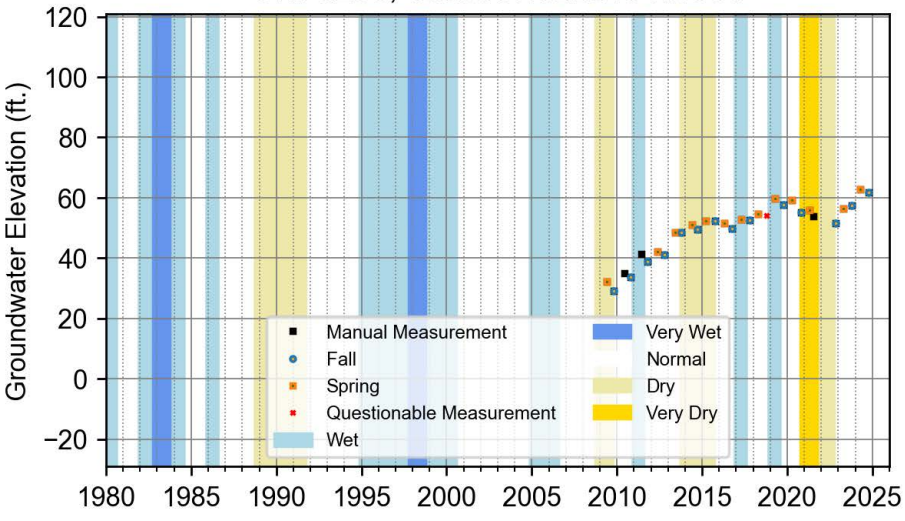
Well Depth: 35.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 10-34 ft
Elevation: 74 ft
Lat.: 38.38617 Lon.: -122.79188

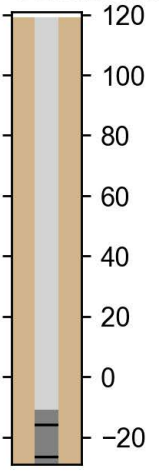
Location



Well Construction Legend

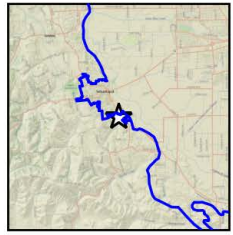




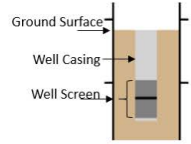


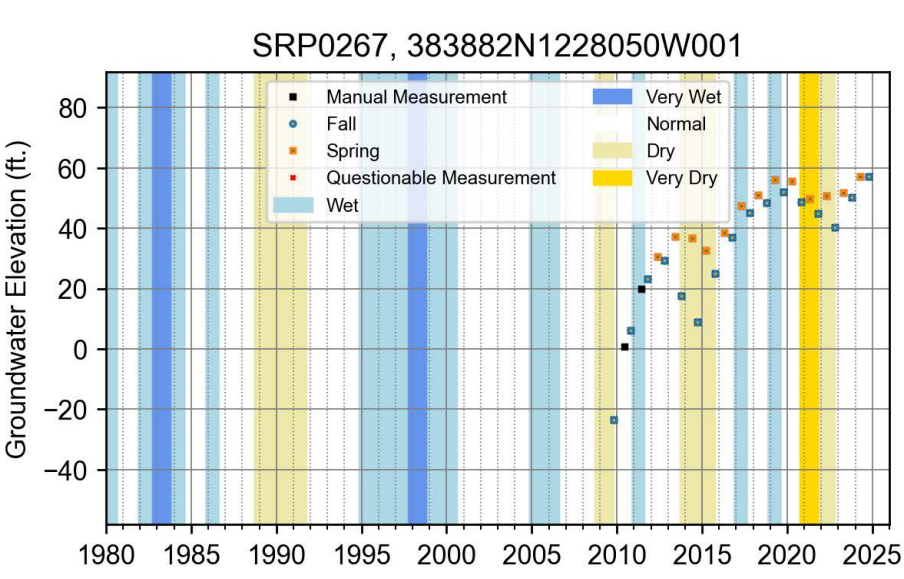
Well Depth: 260.0 ft
Groundwater Basin: WILSON GROVE
FORMATION HIGHLANDS
Screened Intervals: 130-250 ft
Elevation: 119 ft
Lat.: 38.38675 Lon.: -122.81508

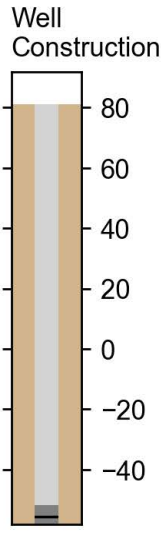
Location



Well Construction Legend





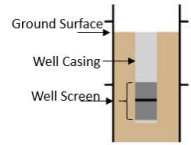


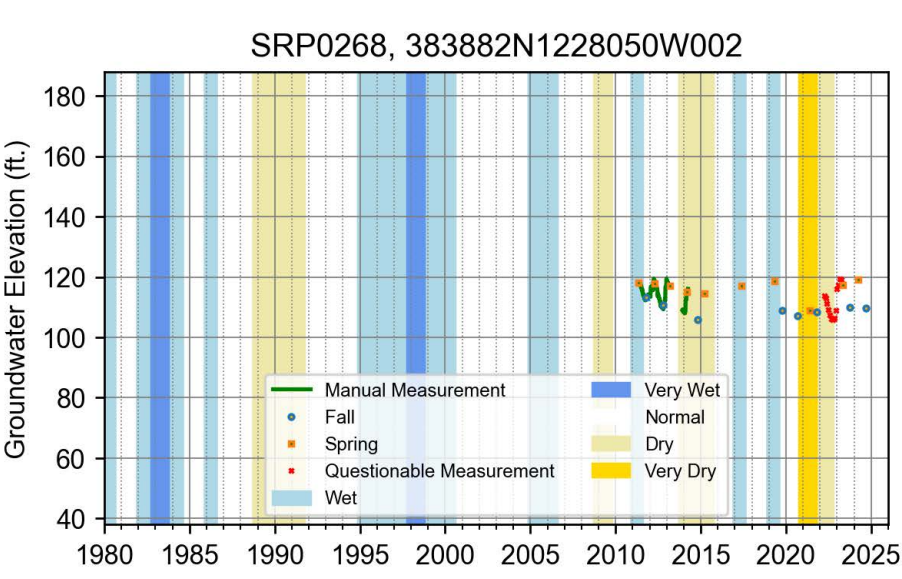
Well Depth: 205.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 133-193 ft
Elevation: 81 ft
Lat.: 38.38823 Lon.: -122.80500

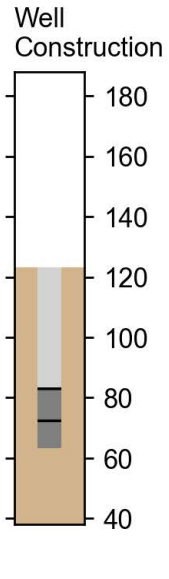
Location



Well Construction Legend





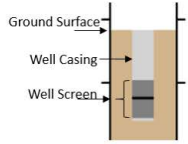


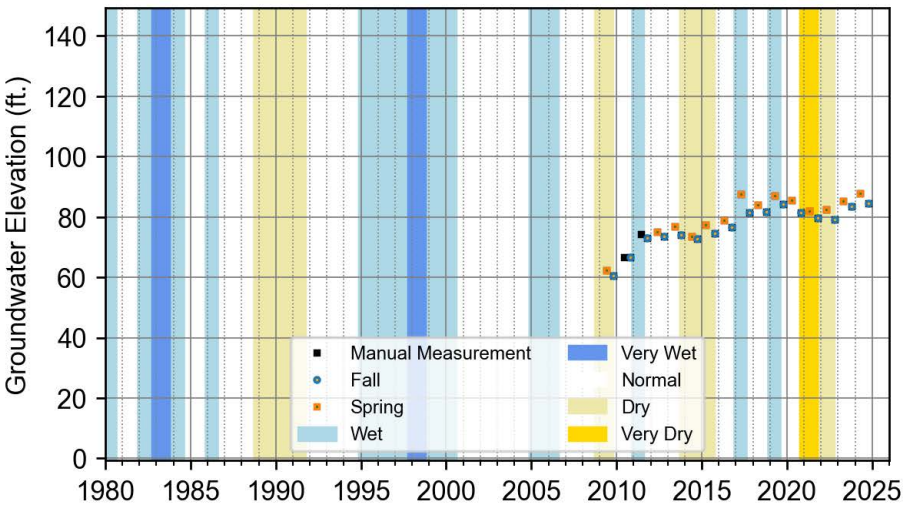
Well Depth: 60.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 40-60 ft
Elevation: 123 ft
Lat.: 38.51172 Lon.: -122.78626

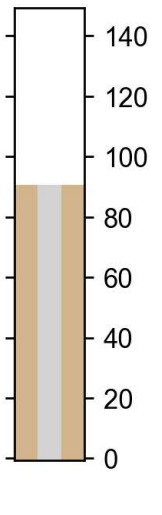
Location



Well Construction Legend





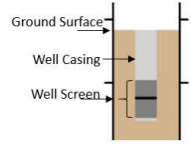


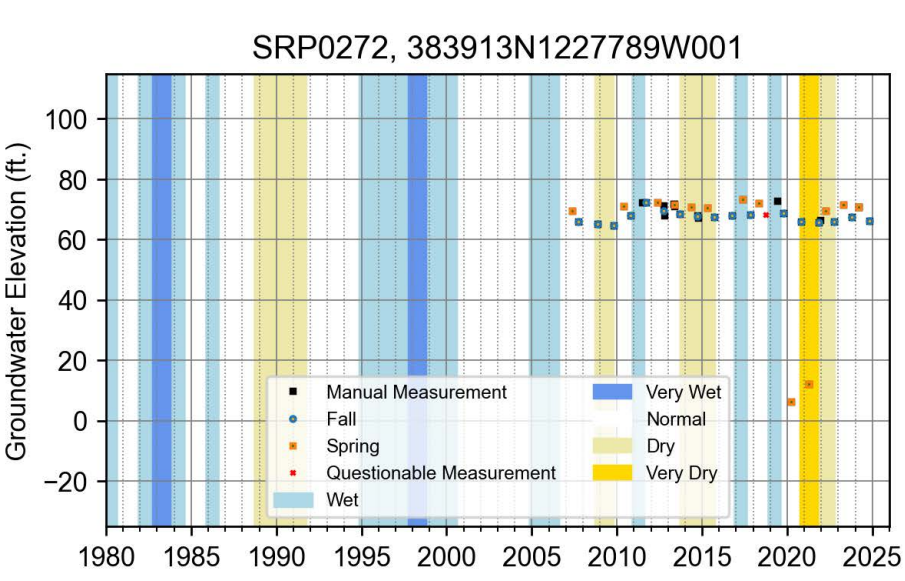
Well Depth: 160.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 100-160 ft
Elevation: 91 ft
Lat.: 38.38886 Lon.: -122.80875

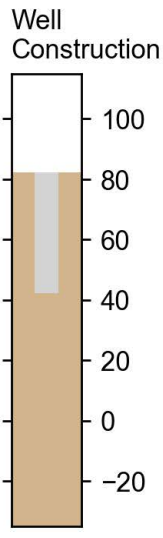
Location



Well Construction Legend





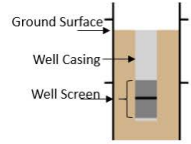


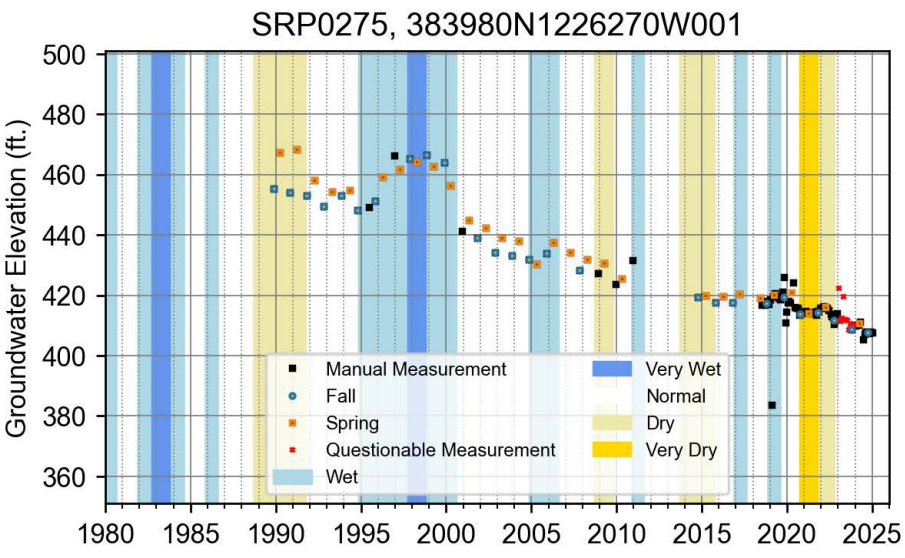
Well Depth: 40.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 82 ft
Lat.: 38.39126 Lon.: -122.77886

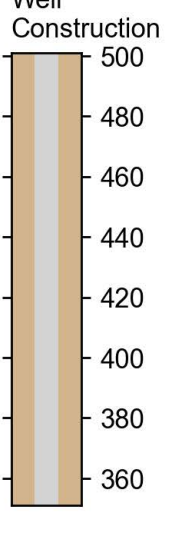
Location



Well Construction Legend





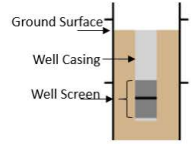


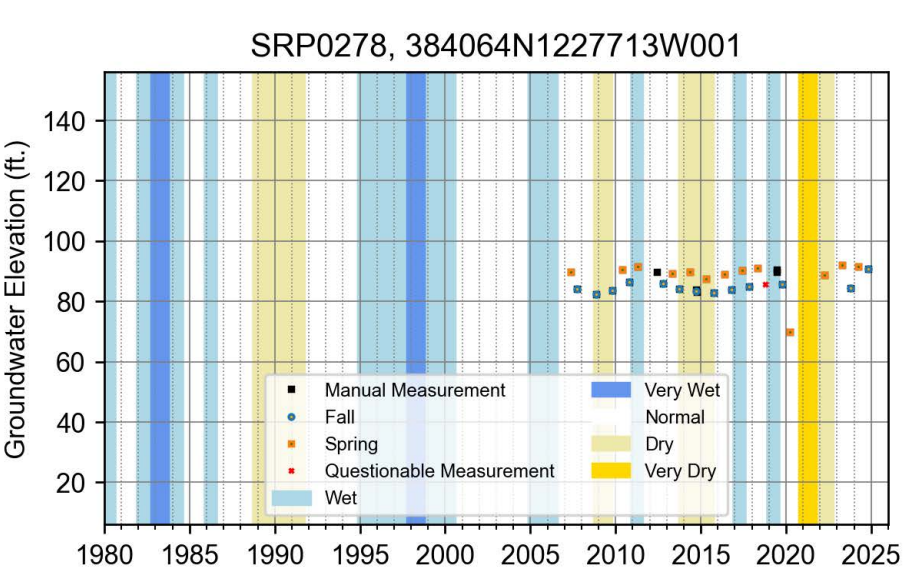
Well Depth: 254.0 ft
Groundwater Basin: None
Screened Intervals: 234-254 ft
Elevation: 521 ft
Lat.: 38.39800 Lon.: -122.62700

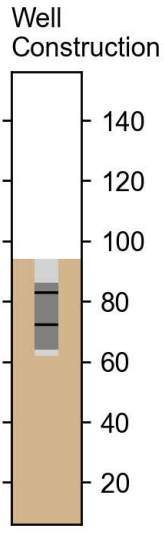
Location



Well Construction Legend





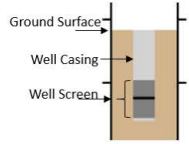


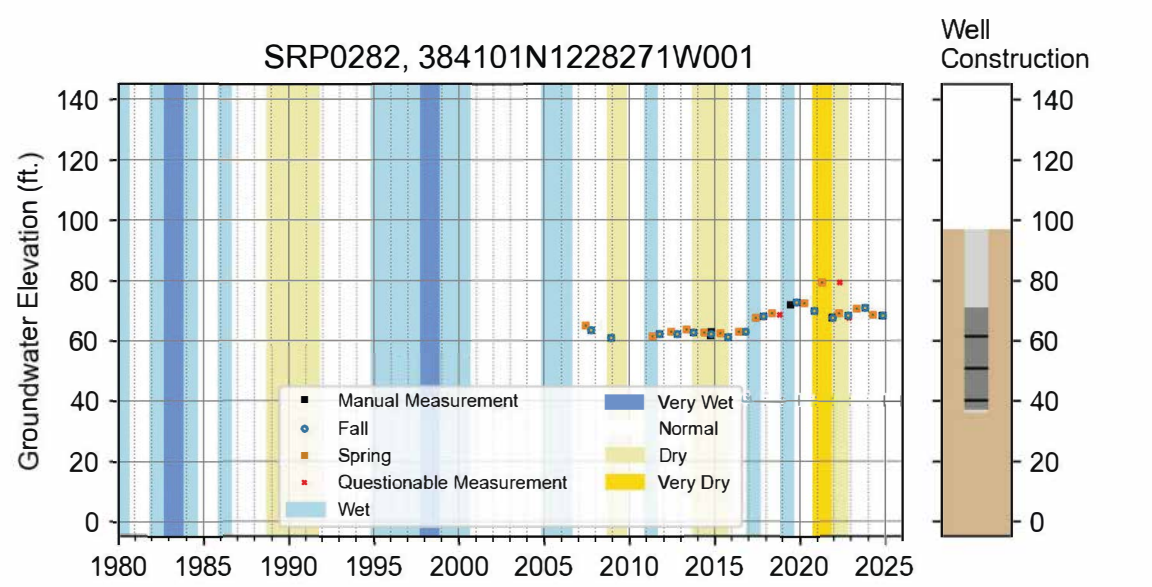
Well Depth: 32.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 8-30 ft
Elevation: 94 ft
Lat.: 38.40635 Lon.: -122.77126

Location



Well Construction Legend



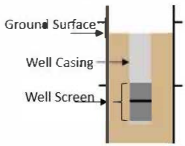


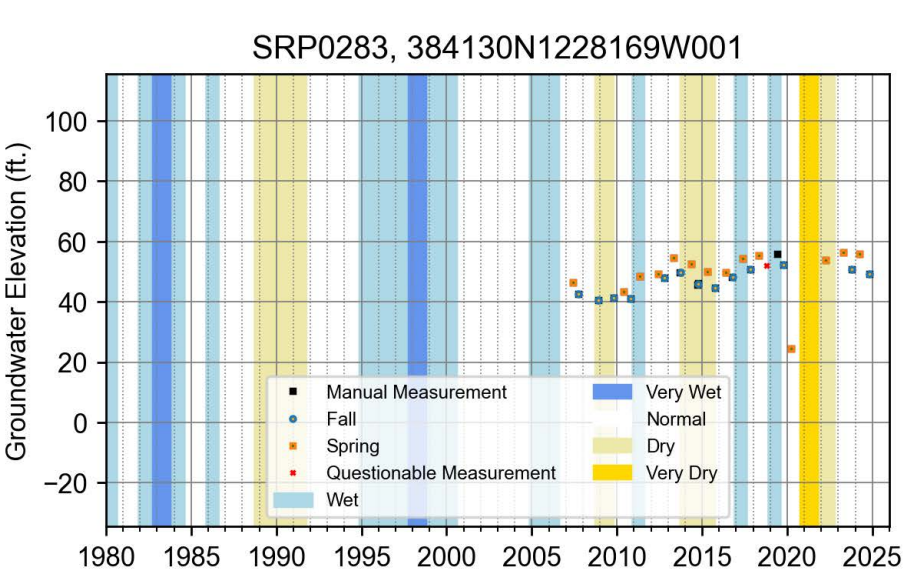
Well Depth: 61.0 ft
Groundwater Basin: WILSON GROVE FORMATION HIGHLANDS
Screened Intervals: 26-60 ft
Elevation: 97 ft
Lat.: 38.41011 Lon.: -122.82712

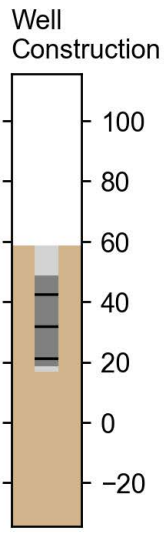
Location



Well Construction Legend





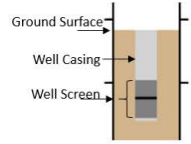


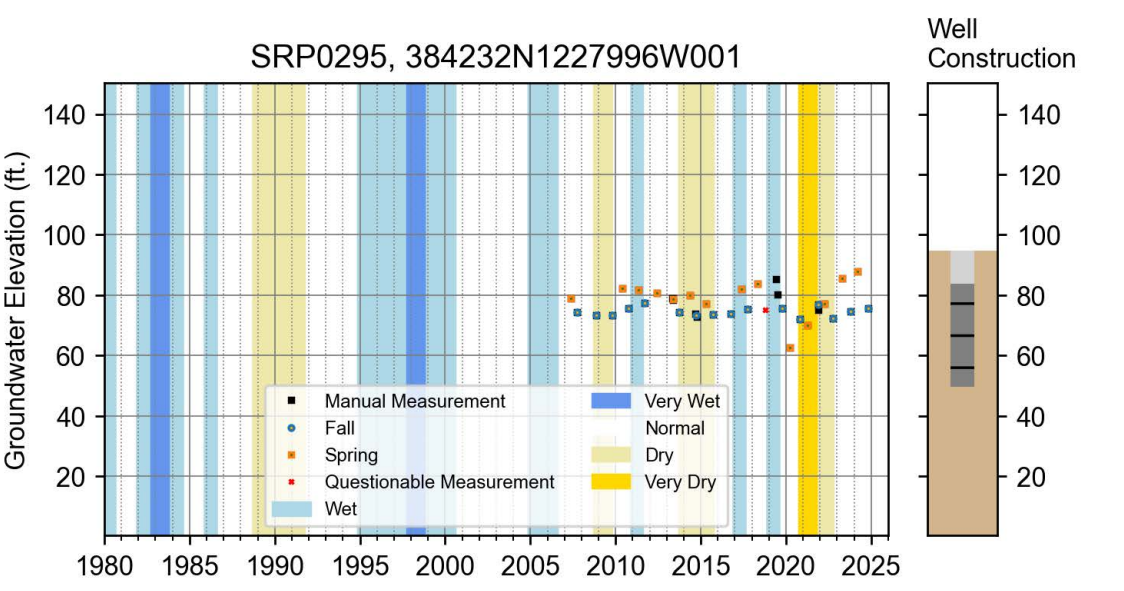
Well Depth: 42.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 10-40 ft
Elevation: 59 ft
Lat.: 38.41298 Lon.: -122.81685

Location



Well Construction Legend



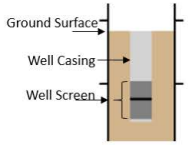


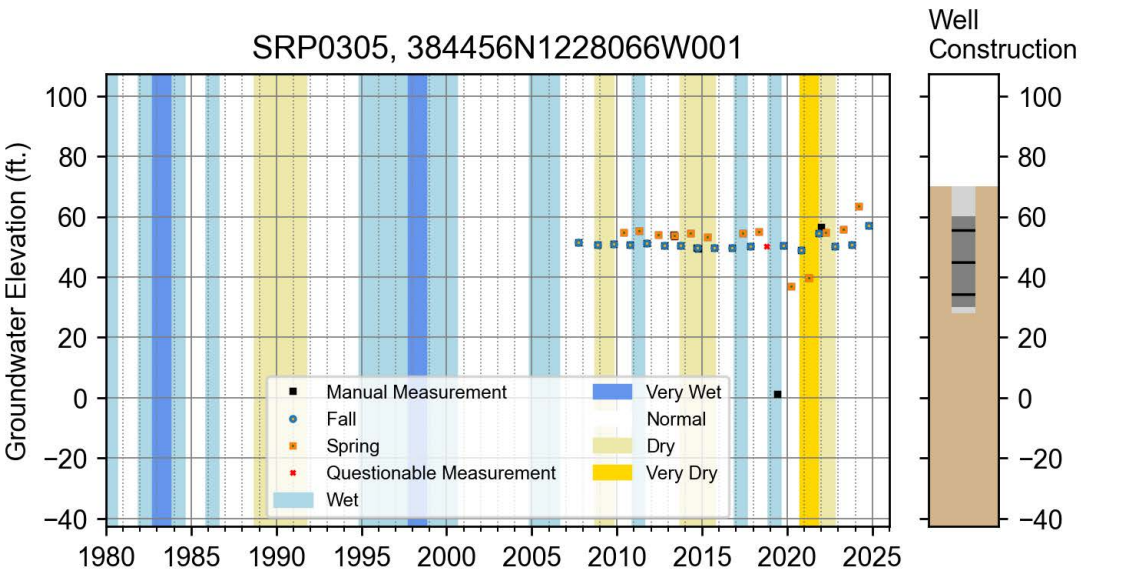
Well Depth: 45.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 11-45 ft
Elevation: 95 ft
Lat.: 38.42320 Lon.: -122.79964

Location



Well Construction Legend



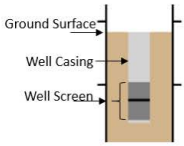


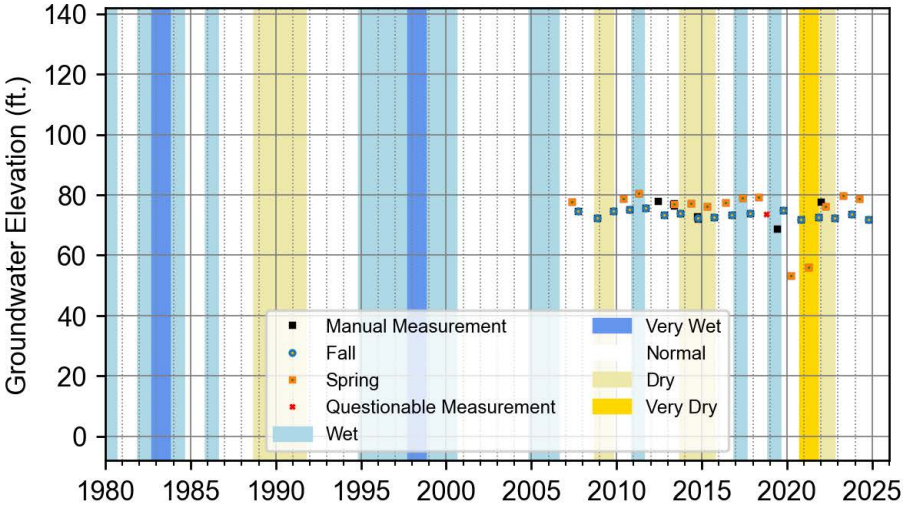
Well Depth: 42.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 10-40 ft
Elevation: 70 ft
Lat.: 38.44558 Lon.: -122.80662

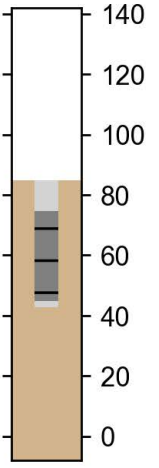
Location



Well Construction Legend





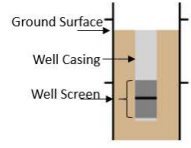


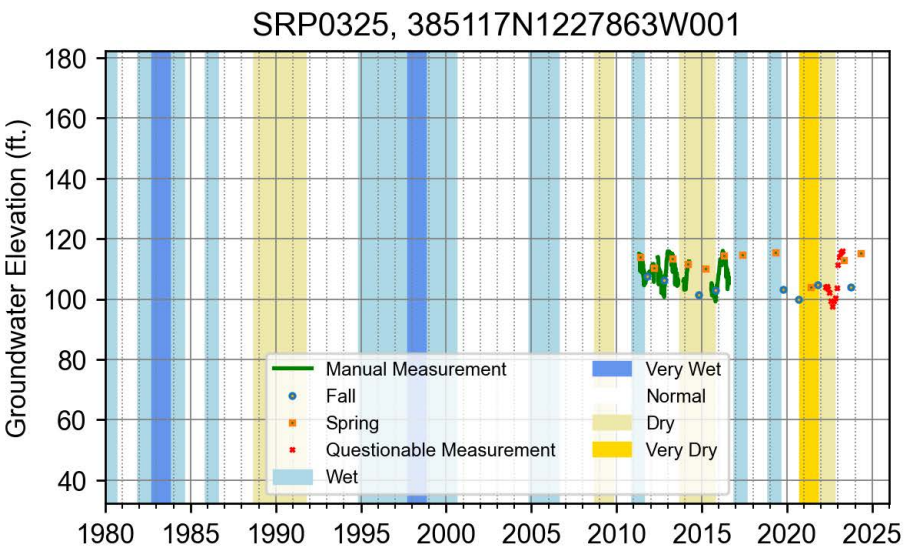
Well Depth: 42.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 10-40 ft
Elevation: 85 ft
Lat.: 38.45251 Lon.: -122.79289

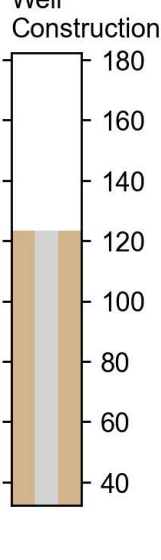
Location



Well Construction Legend





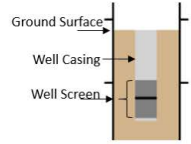


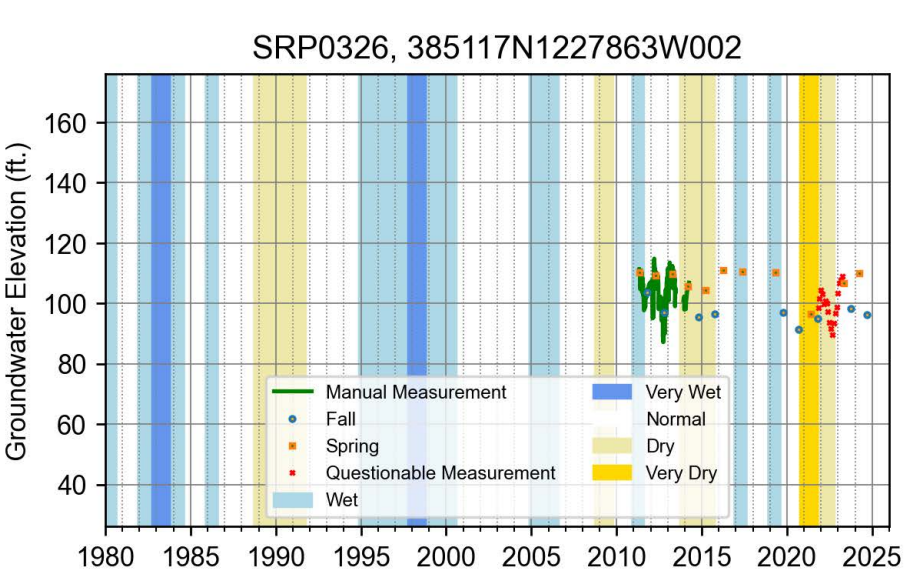
Well Depth: 140.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 120-140 ft
Elevation: 123 ft
Lat.: 38.51172 Lon.: -122.78626

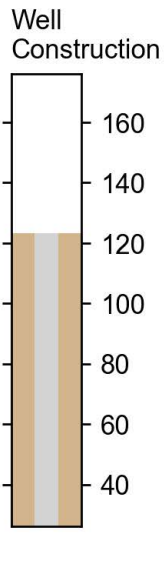
Location



Well Construction Legend





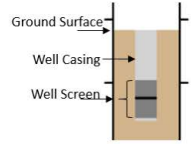


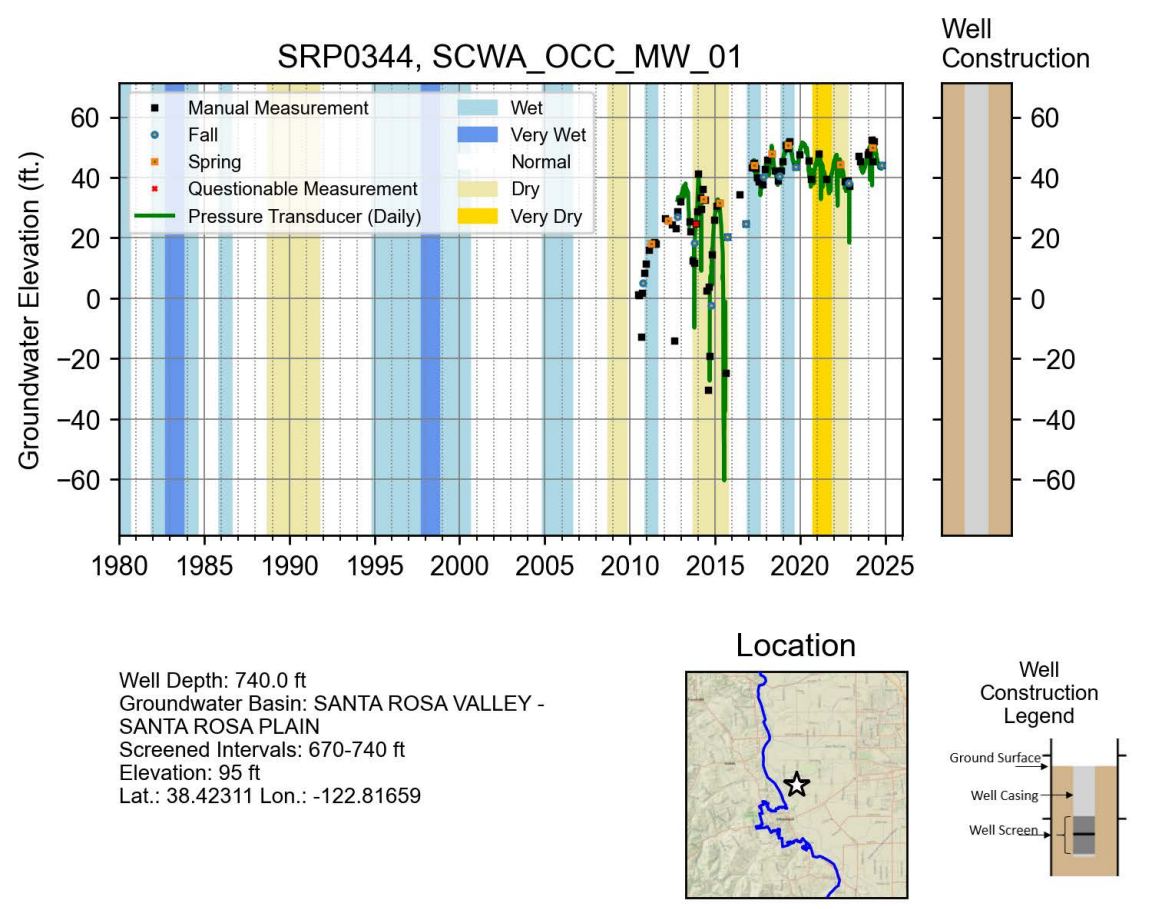
Well Depth: 360.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 340-360 ft
Elevation: 123 ft
Lat.: 38.51172 Lon.: -122.78626

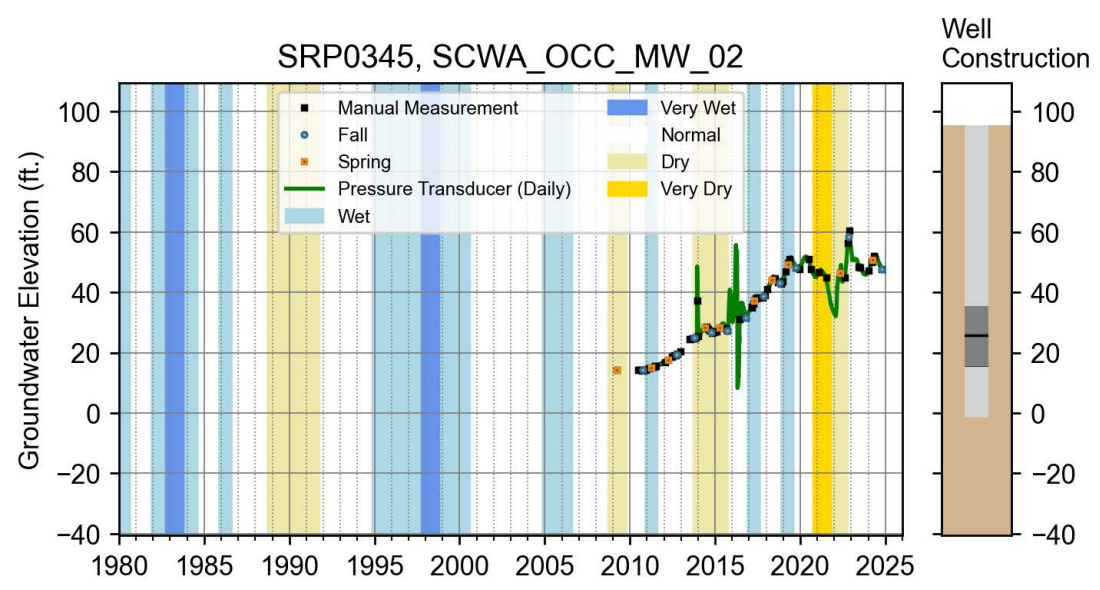
Location



Well Construction Legend




SRP0344, SCWA_OCC_MW_01
Groundwater Elevation (ft.)
Manual Measurement
Fall
Spring
Questionable Measurement
Pressure Transducer (Daily)
Wet
Very Wet
Normal
Dry
Very Dry
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Well Construction
Well Depth: 740.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 670-740 ft
Elevation: 95 ft
Lat.: 38.42311 Lon.: -122.81659
Location
Well Construction Legend
Ground Surface
Well Casing
Well Screen

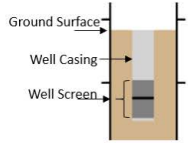


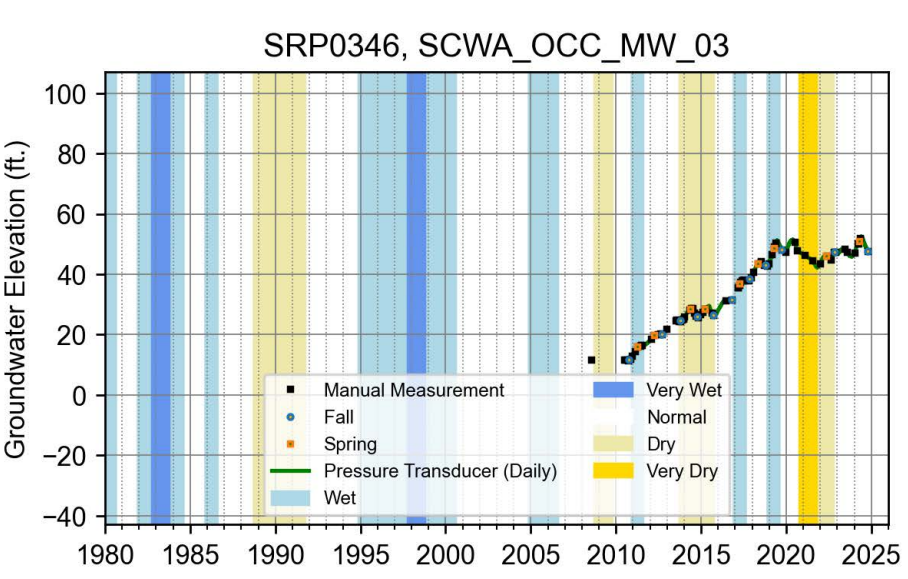
Well Depth: 97.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 60-80 ft
Elevation: 95 ft
Lat.: 38.42311 Lon.: -122.81659

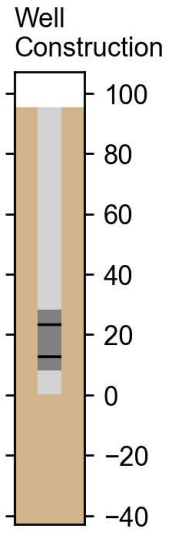
Location



Well Construction Legend





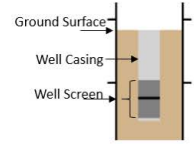


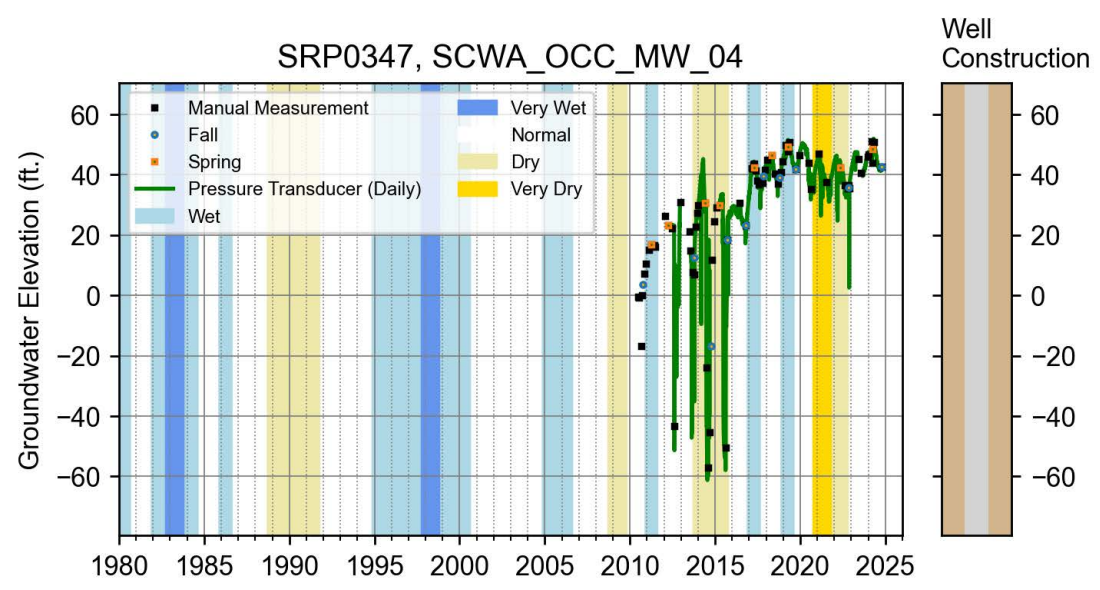
Well Depth: 95.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 67-87 ft
Elevation: 95 ft
Lat.: 38.42314 Lon.: -122.81472

Location



Well Construction Legend



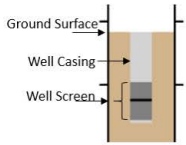


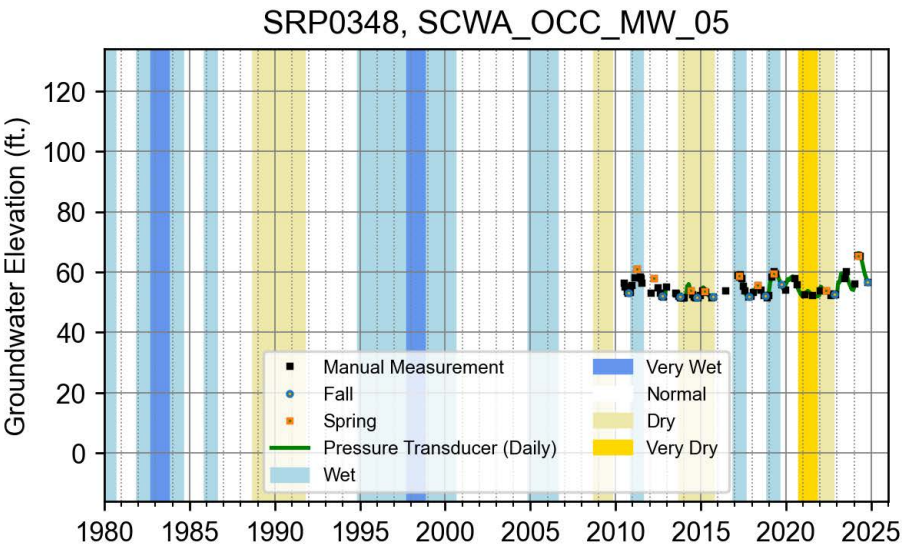
Well Depth: 740.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 660-740 ft
Elevation: 95 ft
Lat.: 38.42316 Lon.: -122.81479

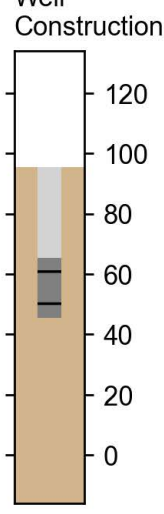
Location



Well Construction Legend





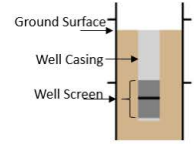


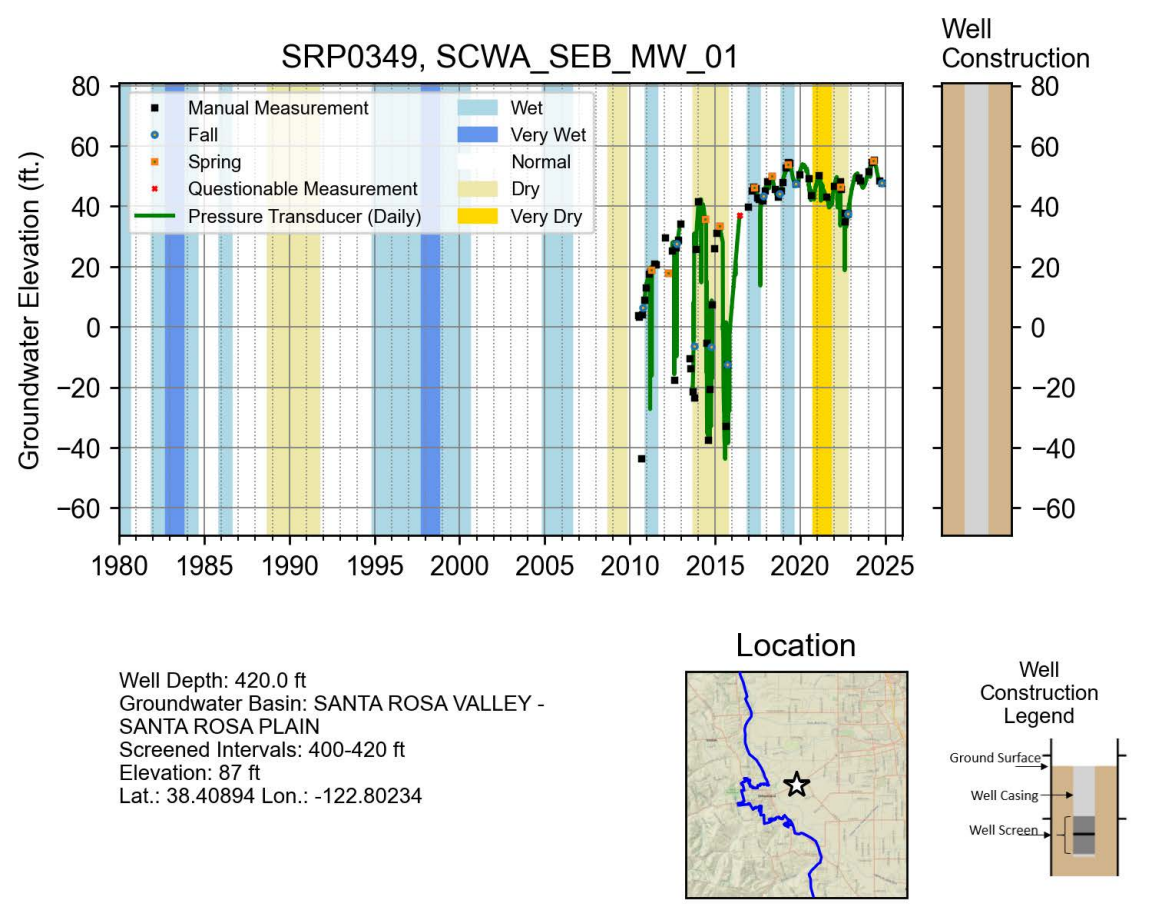
Well Depth: 44.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 30-50 ft
Elevation: 95 ft
Lat.: 38.42306 Lon.: -122.81564

Location



Well Construction Legend

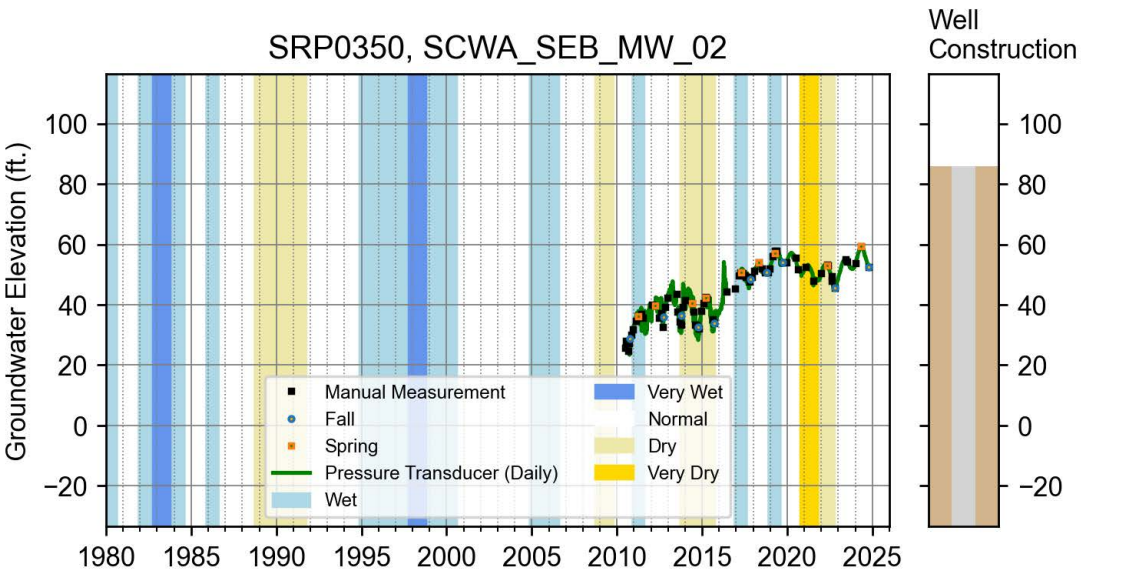




Well Depth: 420.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 400-420 ft
Elevation: 87 ft
Lat.: 38.40894 Lon.: -122.80234

Location

Well Construction Legend

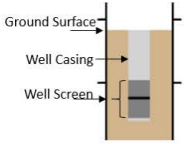


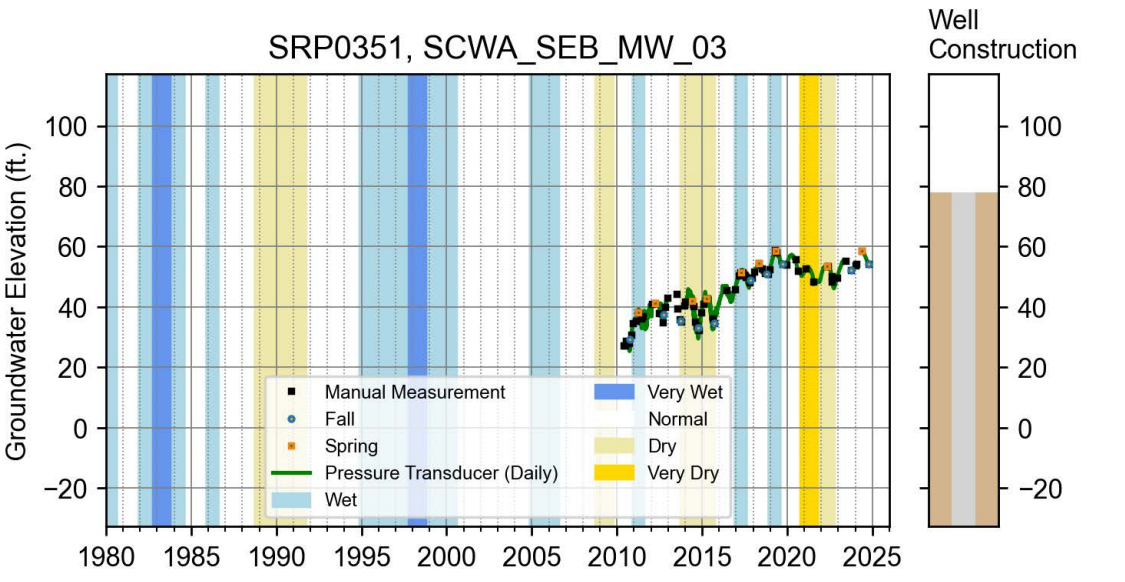
Well Depth: 200.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 170-190 ft
Elevation: 86 ft
Lat.: 38.40894 Lon.: -122.80234

Location



Well Construction Legend



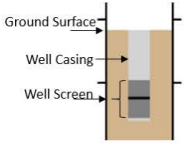


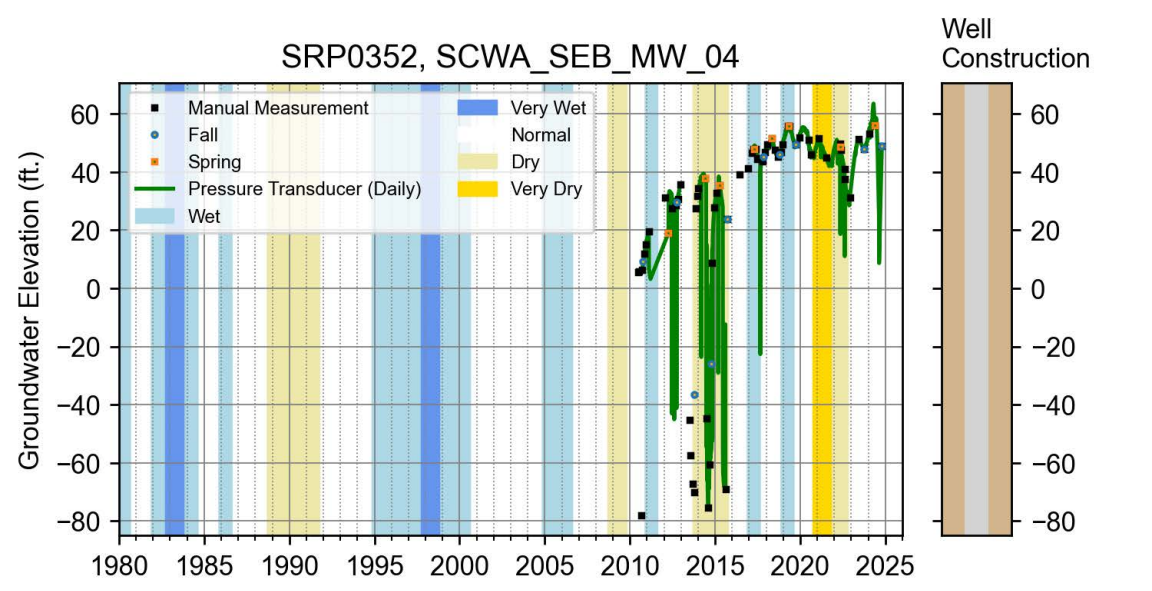
Well Depth: 200.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 164-190 ft
Elevation: 78 ft
Lat.: 38.40764 Lon.: -122.80041

Location



Well Construction Legend



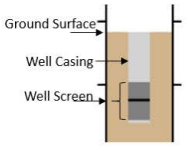


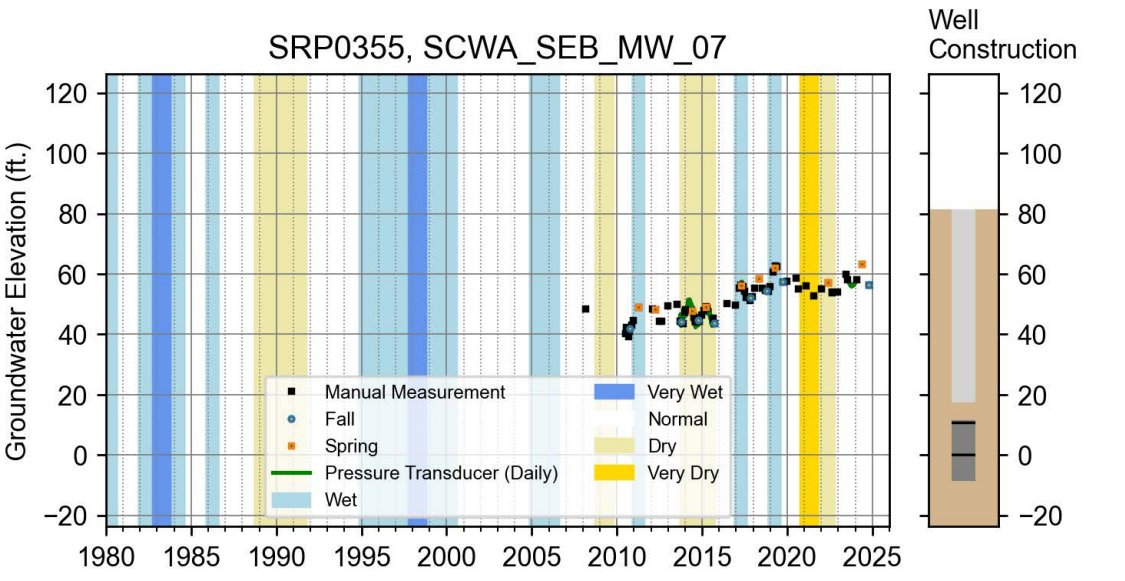
Well Depth: 400.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 380-400 ft
Elevation: 78 ft
Lat.: 38.40764 Lon.: -122.80041

Location



Well Construction Legend



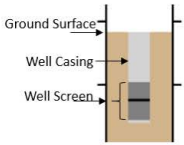


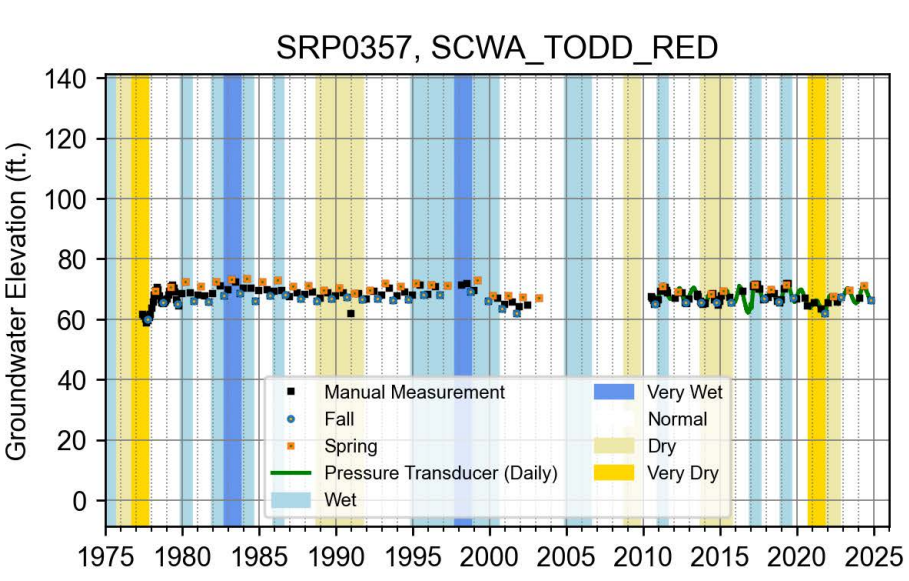
Well Depth: 64.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 70-90 ft
Elevation: 81 ft
Lat.: 38.40827 Lon.: -122.80139

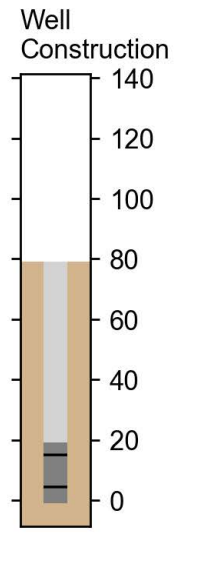
Location



Well Construction Legend

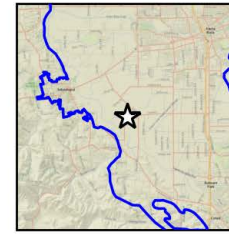




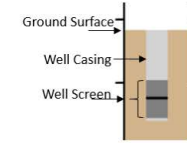


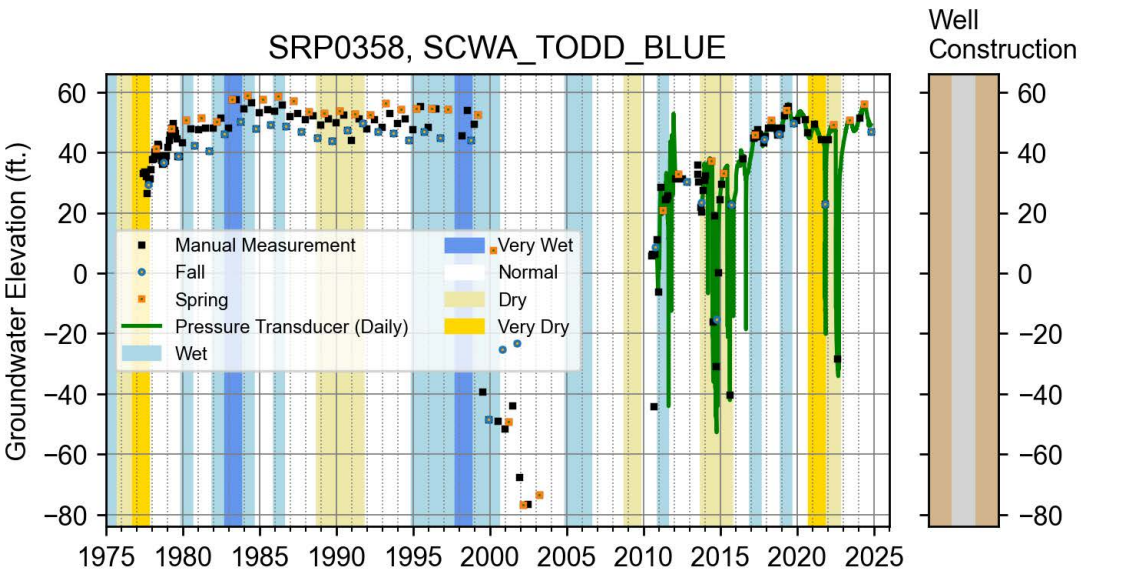
Well Depth: 80.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 60-80 ft
Elevation: 79 ft
Lat.: 38.38555 Lon.: -122.77769

Location



Well Construction Legend



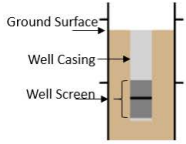


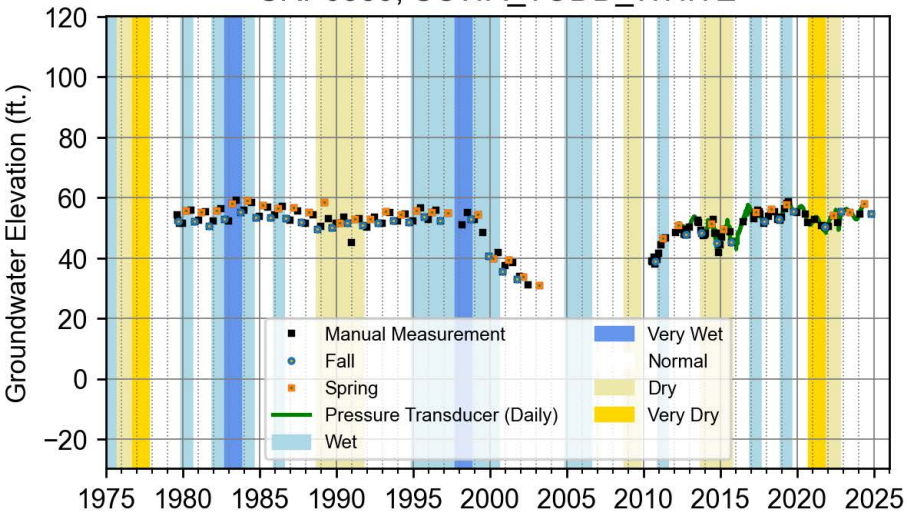
Well Depth: 570.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 550-570 ft
Elevation: 79 ft
Lat.: 38.38555 Lon.: -122.77768

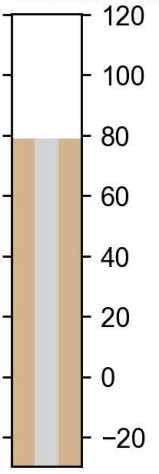
Location



Well Construction Legend





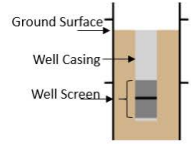


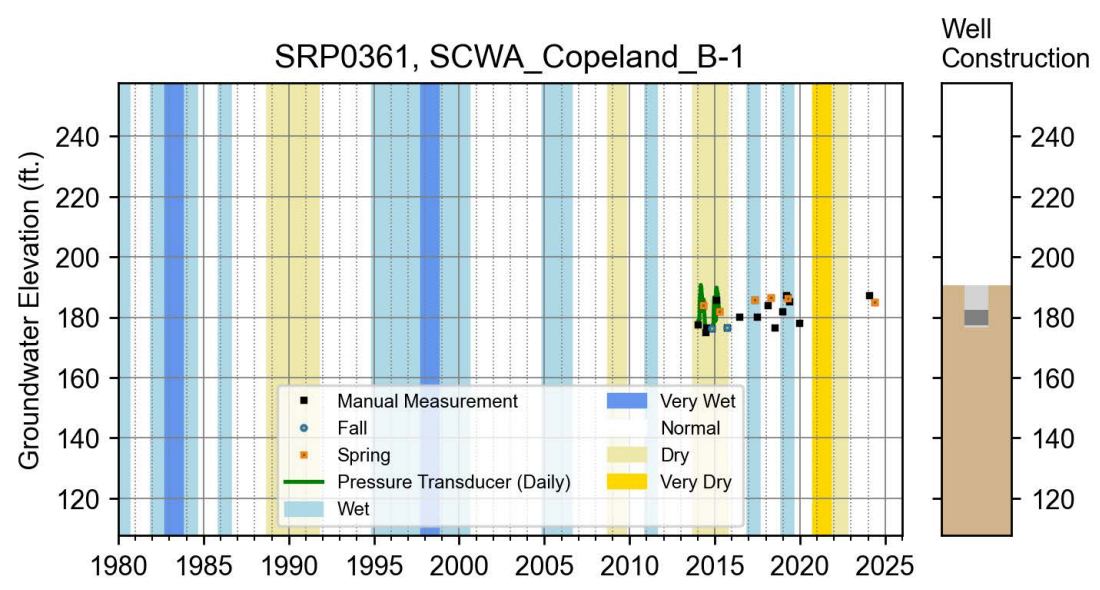
Well Depth: 257.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 237-257 ft
Elevation: 79 ft
Lat.: 38.38555 Lon.: -122.77768

Location



Well Construction Legend



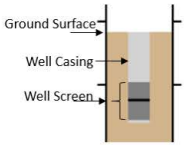


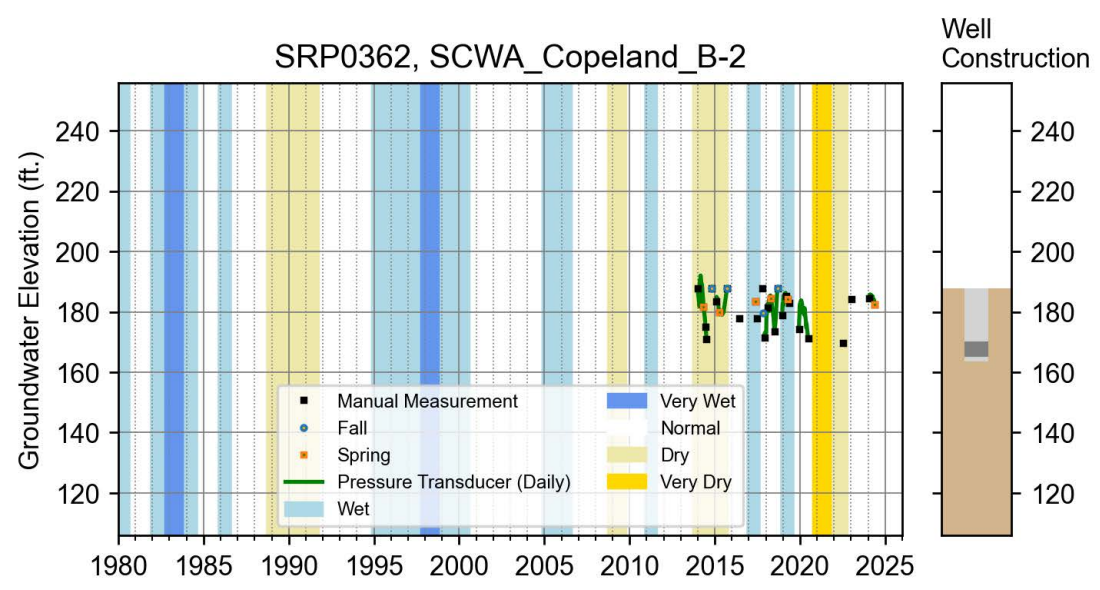
Well Depth: 14.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 8-13 ft
Elevation: 191 ft
Lat.: 38.34127 Lon.: -122.66228

Location



Well Construction Legend



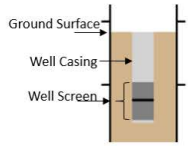


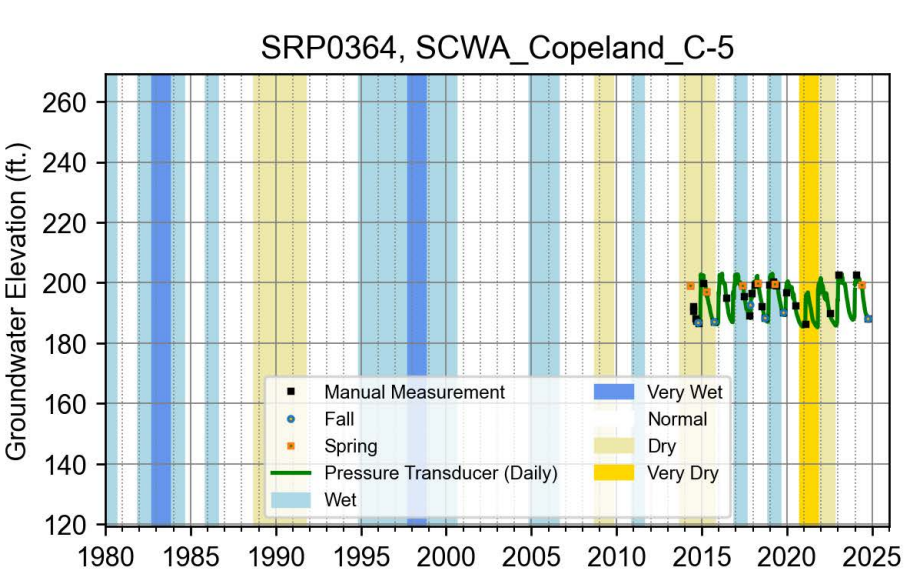
Well Depth: 24.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 18-23 ft
Elevation: 188 ft
Lat.: 38.34150 Lon.: -122.66273

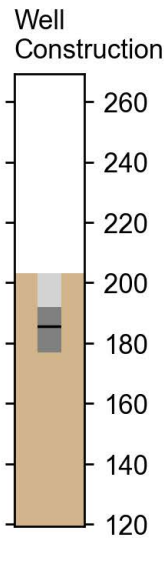
Location



Well Construction Legend

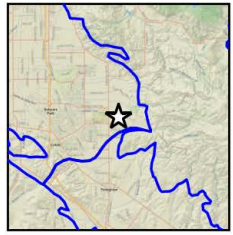




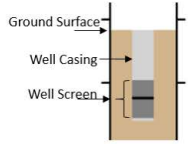


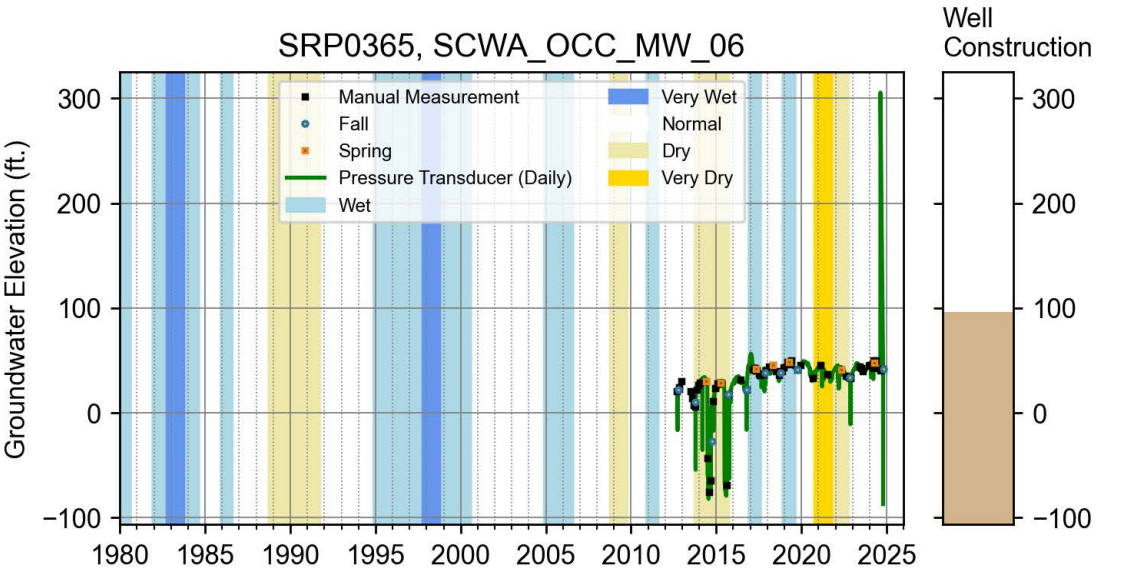
Well Depth: 26.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 11-26 ft
Elevation: 203 ft
Lat.: 38.34076 Lon.: -122.65935

Location



Well Construction Legend



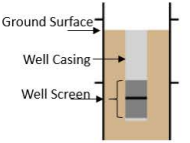


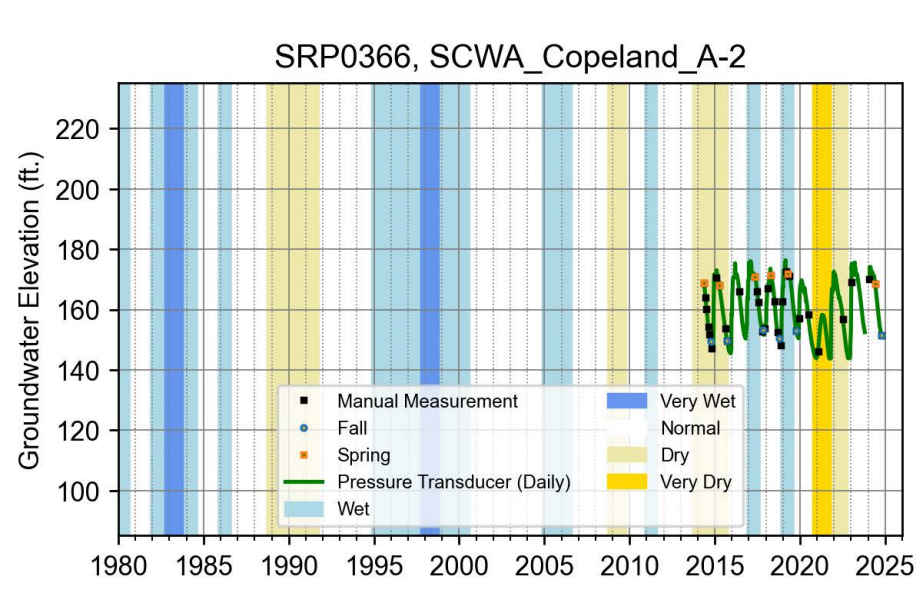
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 96 ft
Lat.: 38.42281 Lon.: -122.81553

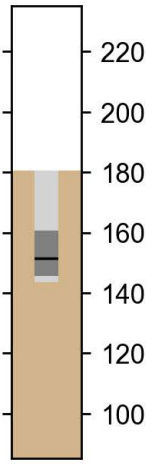
Location



Well Construction Legend





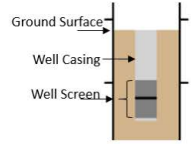


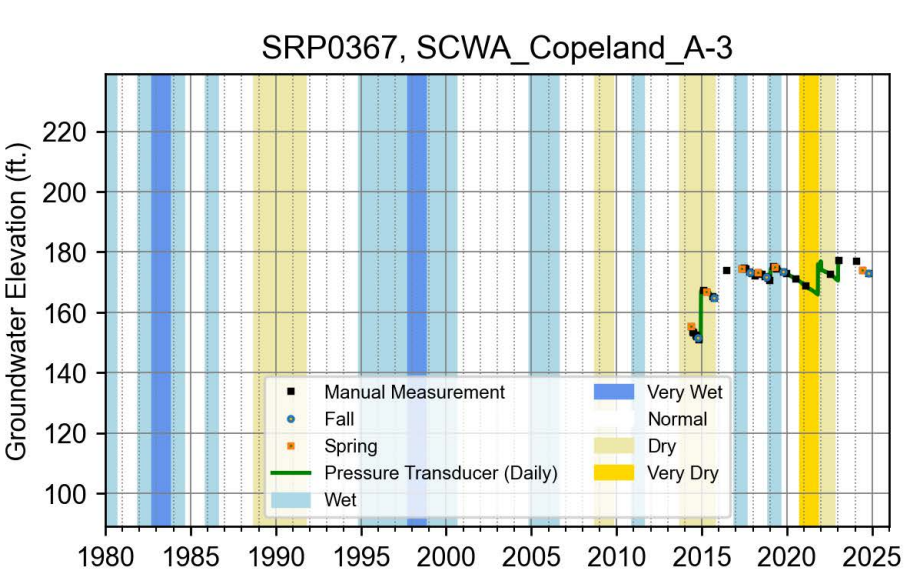
Well Depth: 37.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 20-35 ft
Elevation: 181 ft
Lat.: 38.34059 Lon.: -122.66600

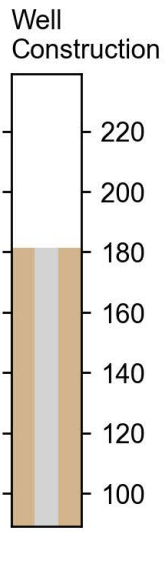
Location



Well Construction Legend





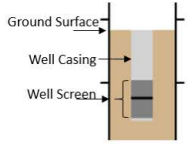


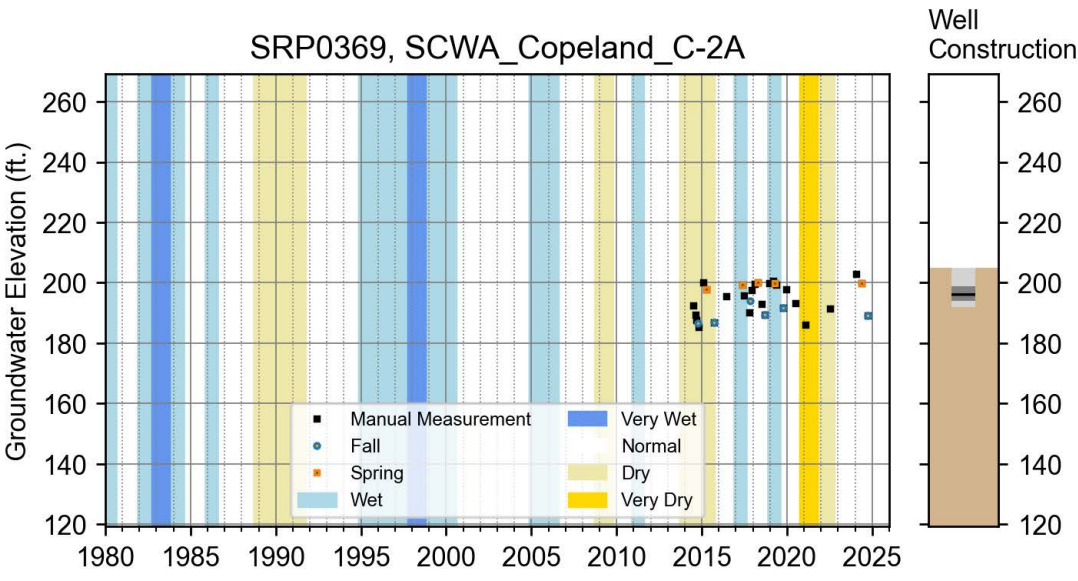
Well Depth: 122.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 105-120 ft
Elevation: 181 ft
Lat.: 38.34058 Lon.: -122.66587

Location



Well Construction Legend



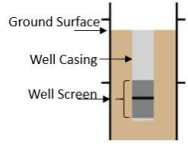


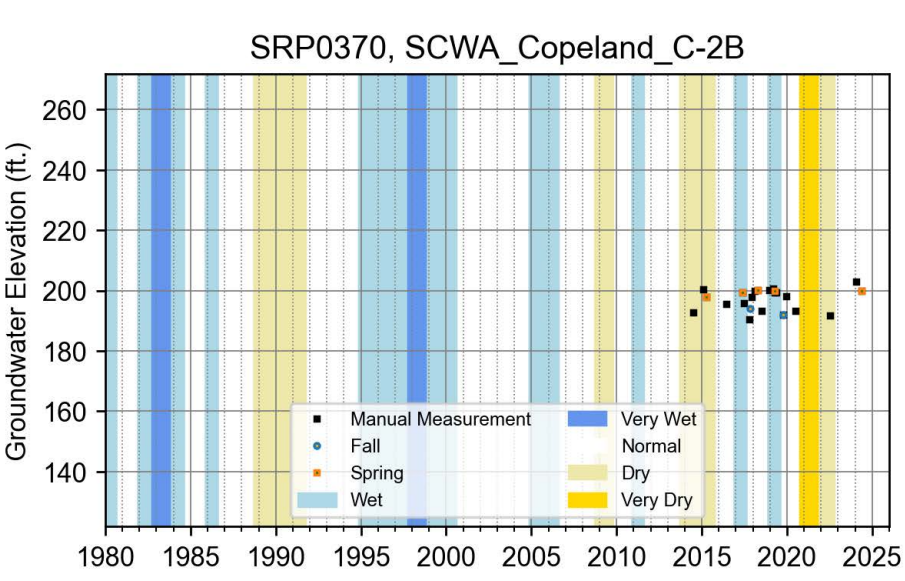
Well Depth: 13.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 6-11 ft
Elevation: 205 ft
Lat.: 38.34084 Lon.: -122.65884

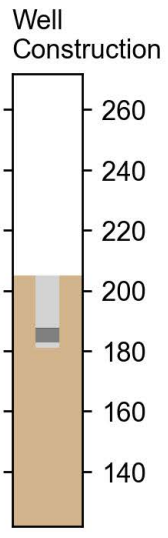
Location



Well Construction Legend

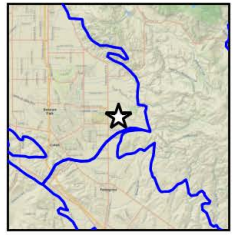


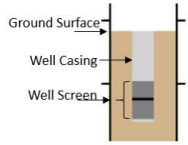


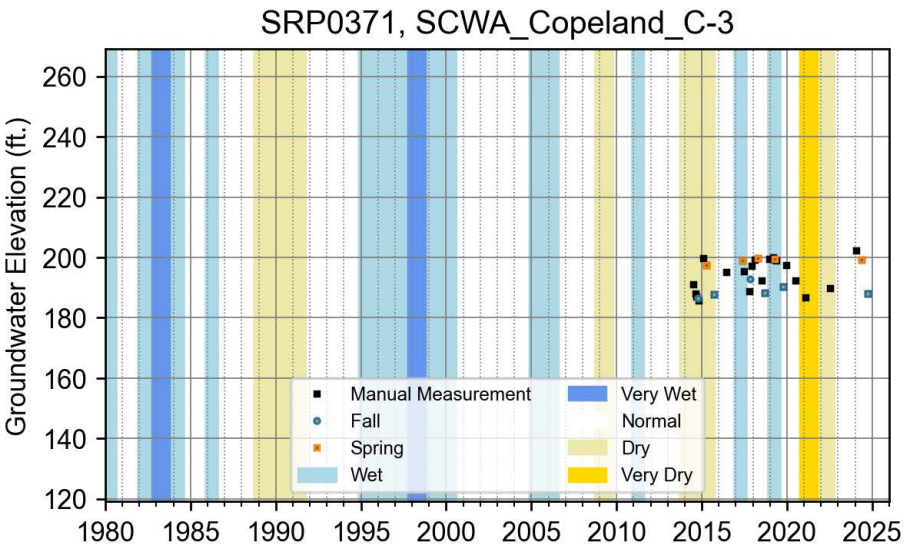


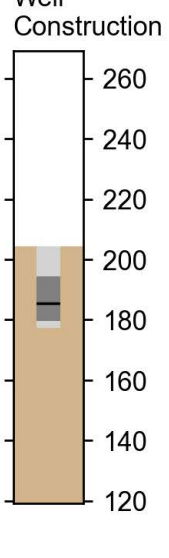
Well Depth: 24.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 17-22 ft
Elevation: 205 ft
Lat.: 38.34084 Lon.: -122.65884

Location







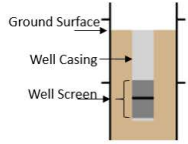


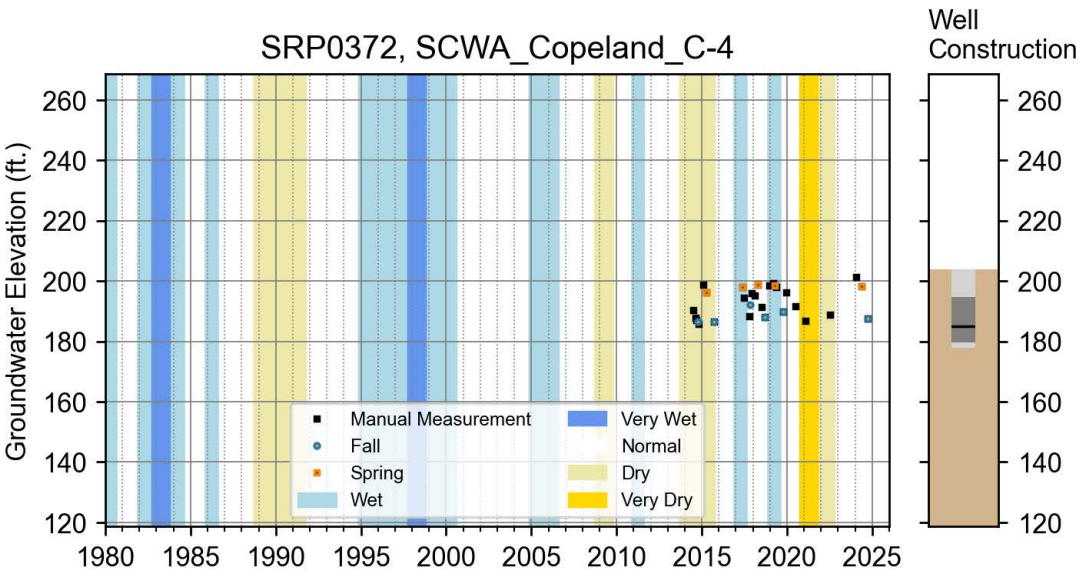
Well Depth: 27.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 10-25 ft
Elevation: 204 ft
Lat.: 38.34082 Lon.: -122.65901

Location



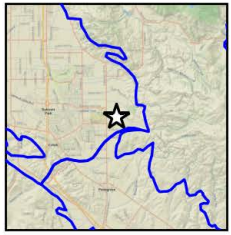
Well Construction Legend



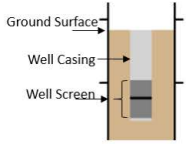


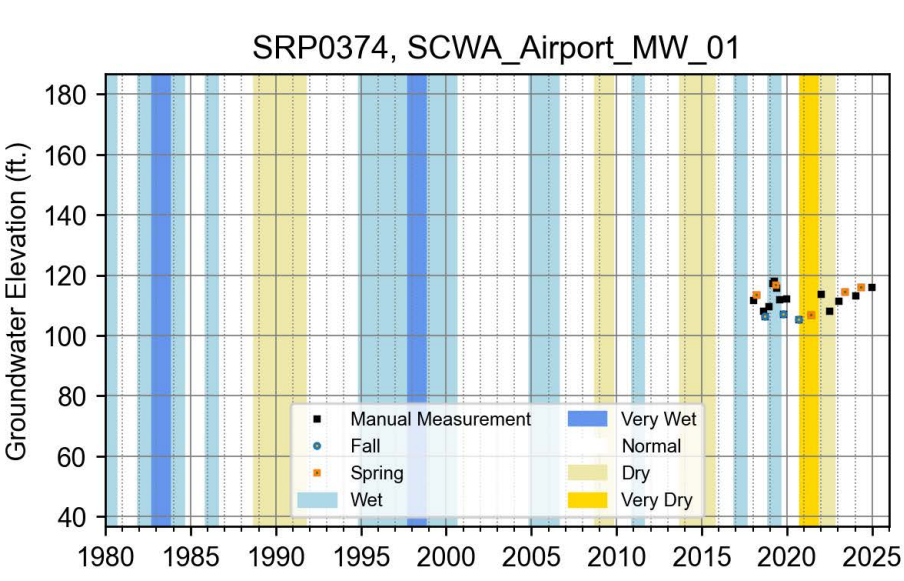
Well Depth: 26.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 9-24 ft
Elevation: 204 ft
Lat.: 38.34078 Lon.: -122.65918

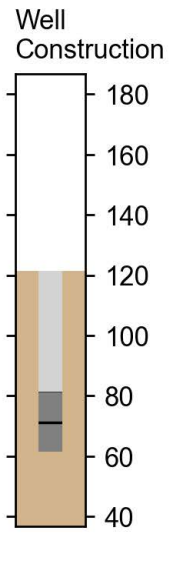
Location



Well Construction Legend





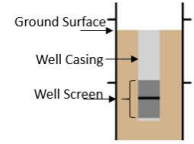


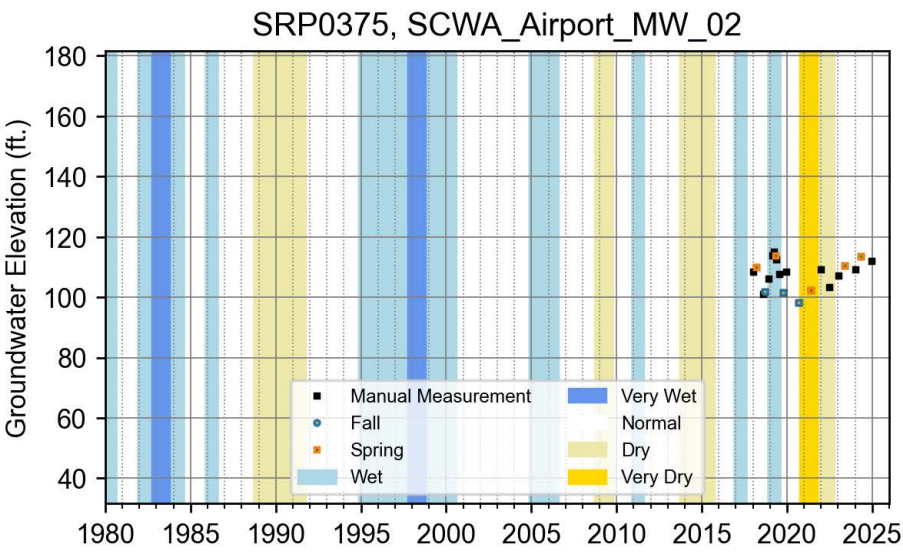
Well Depth: 60.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 40-60 ft
Elevation: 121 ft
Lat.: 38.51172 Lon.: -122.78627

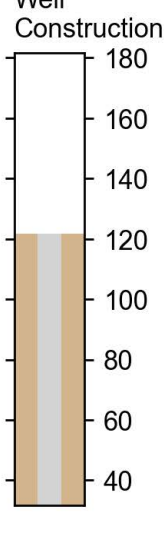
Location



Well Construction Legend





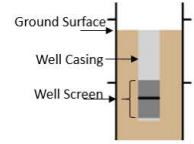


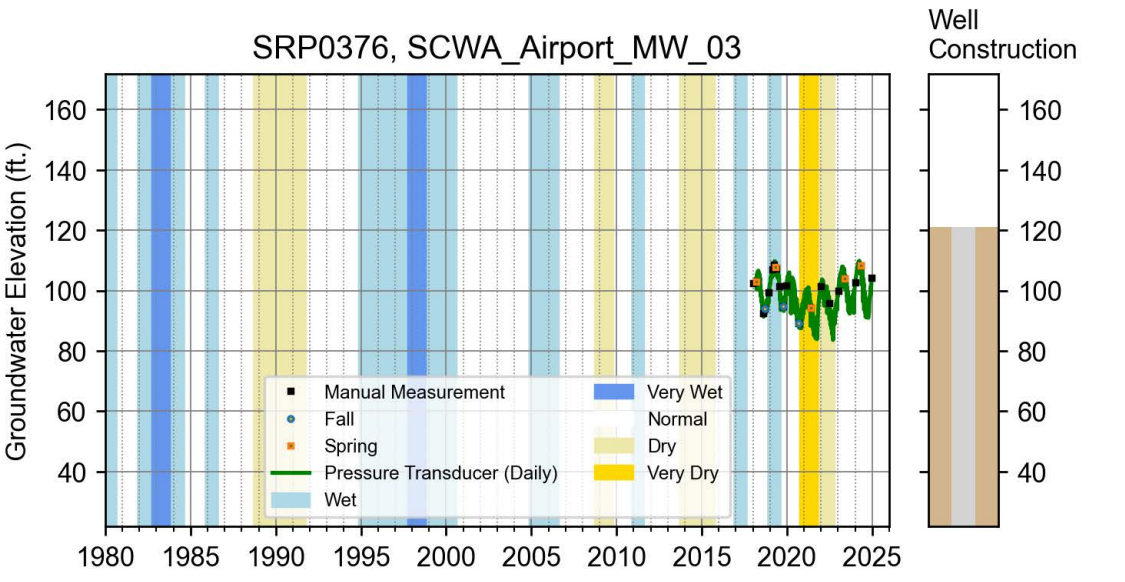
Well Depth: 140.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 120-140 ft
Elevation: 122 ft
Lat.: 38.51172 Lon.: -122.78626

Location



Well Construction Legend



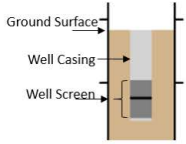


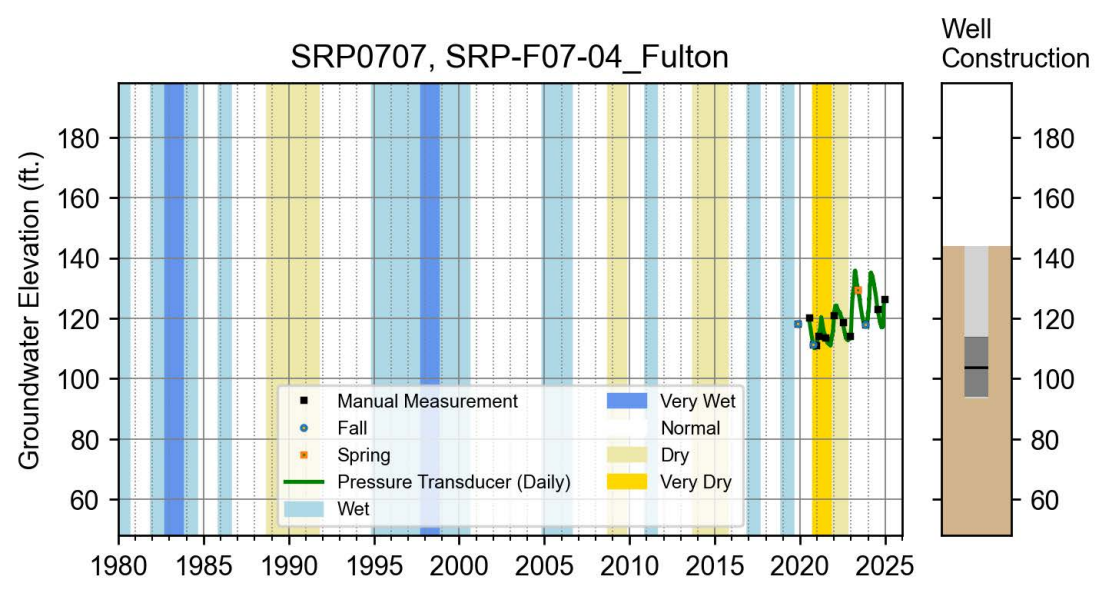
Well Depth: 360.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 340-360 ft
Elevation: 121 ft
Lat.: 38.51172 Lon.: -122.78626

Location



Well Construction Legend



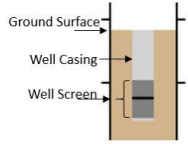


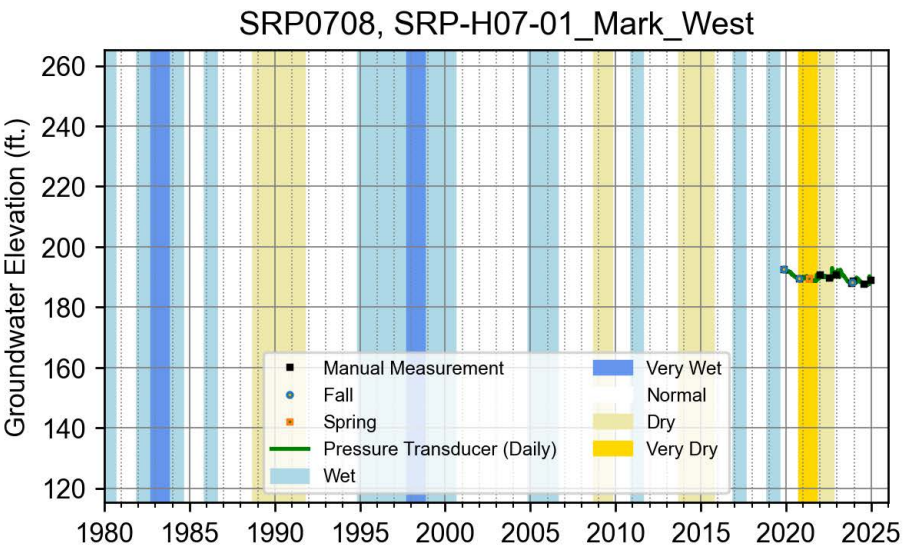
Well Depth: 50.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 30-50 ft
Elevation: 144 ft
Lat.: 38.50865 Lon.: -122.76983

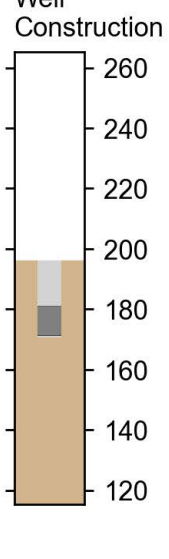
Location



Well Construction Legend





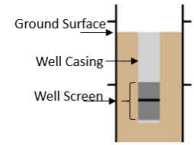


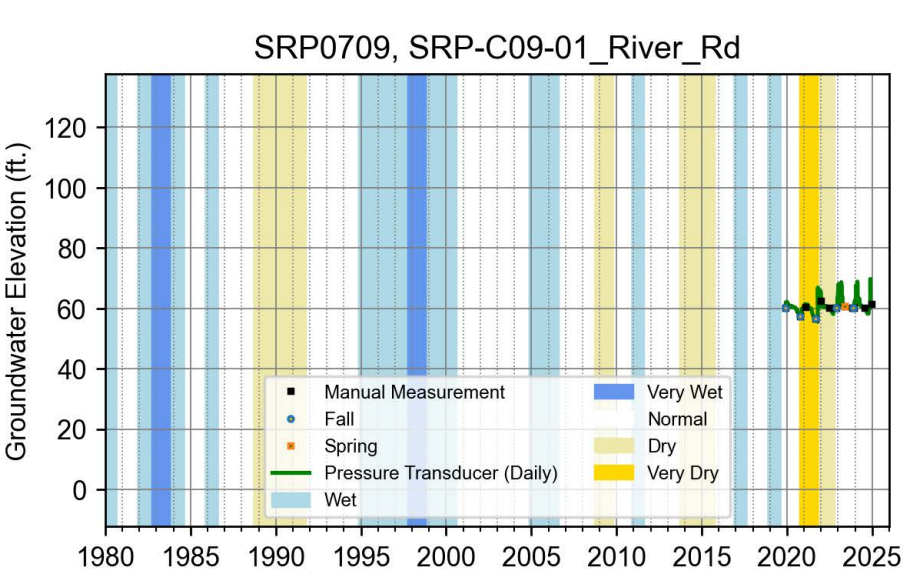
Well Depth: 25.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 15-25 ft
Elevation: 196 ft
Lat.: 38.50389 Lon.: -122.73469

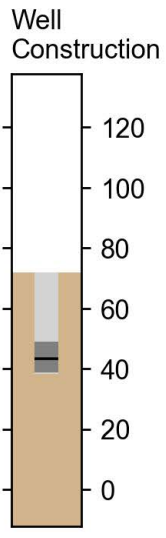
Location



Well Construction Legend



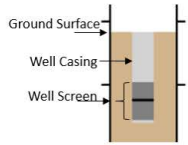


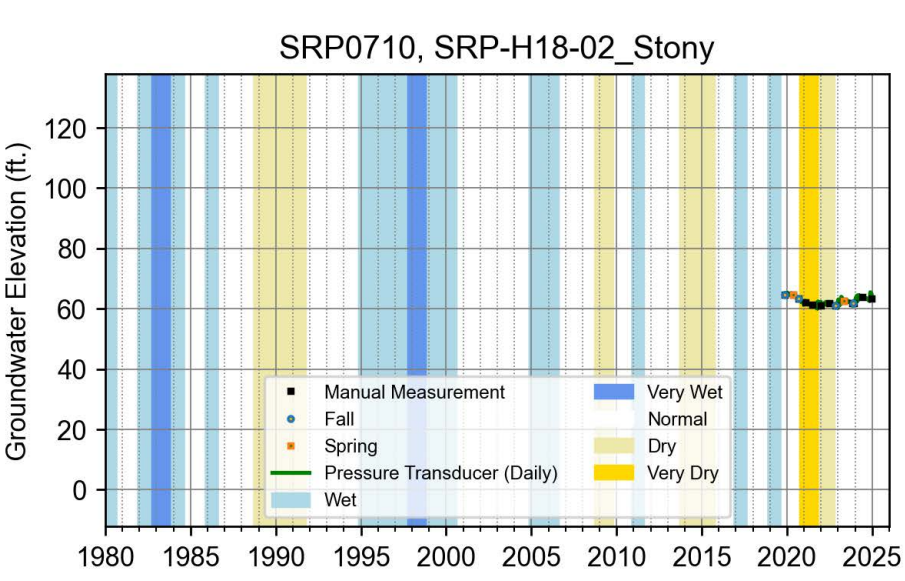


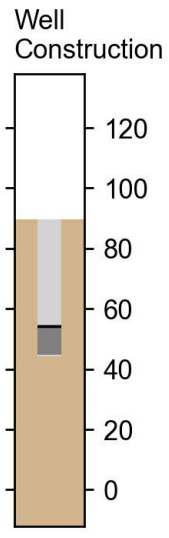
Well Depth: 33.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 23-33 ft
Elevation: 72 ft
Lat.: 38.48170 Lon.: -122.83417

Location







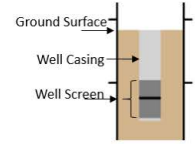


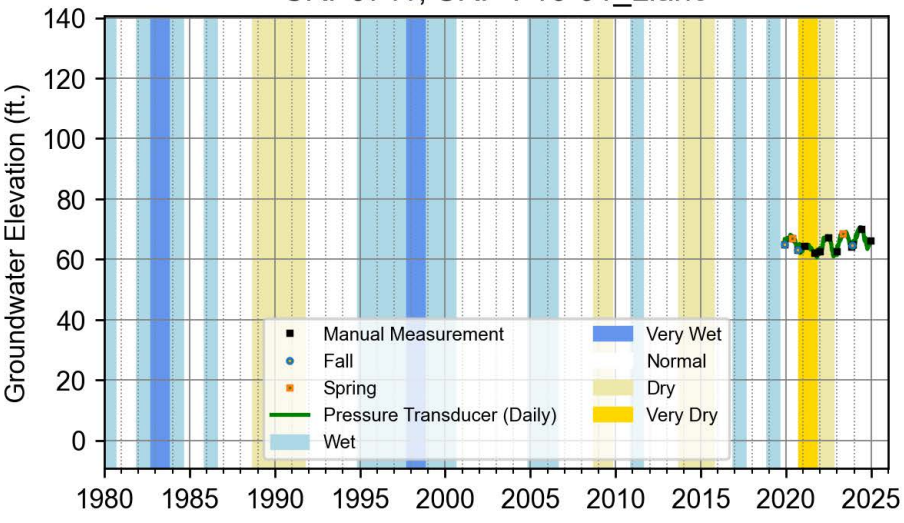
Well Depth: 45.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 35-45 ft
Elevation: 90 ft
Lat.: 38.35250 Lon.: -122.74114

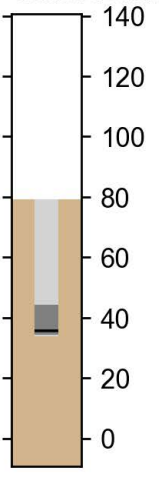
Location



Well Construction Legend





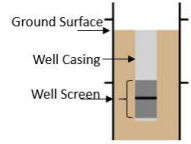


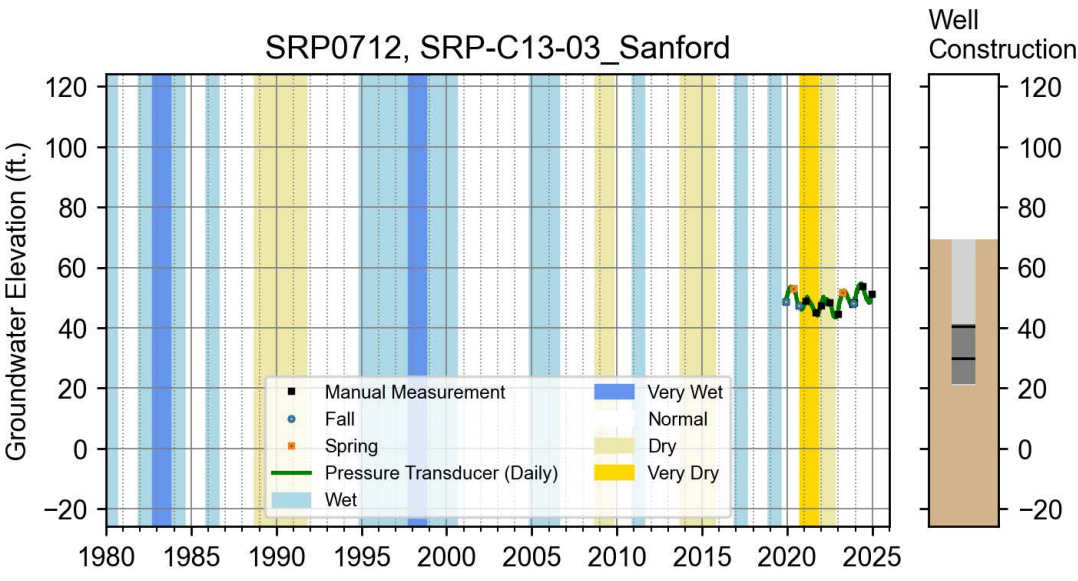
Well Depth: 45.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 35-45 ft
Elevation: 79 ft
Lat.: 38.37323 Lon.: -122.76874

Location



Well Construction Legend



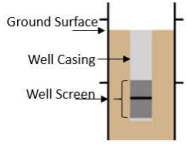


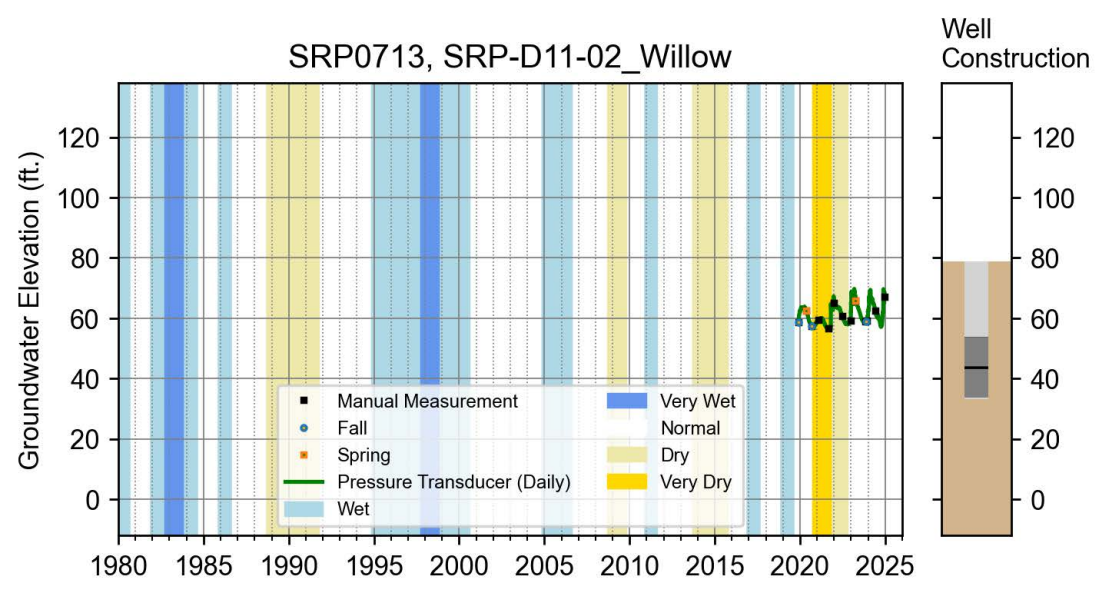
Well Depth: 48.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 28-48 ft
Elevation: 69 ft
Lat.: 38.42595 Lon.: -122.82525

Location



Well Construction Legend



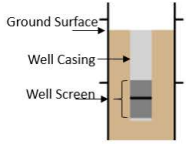


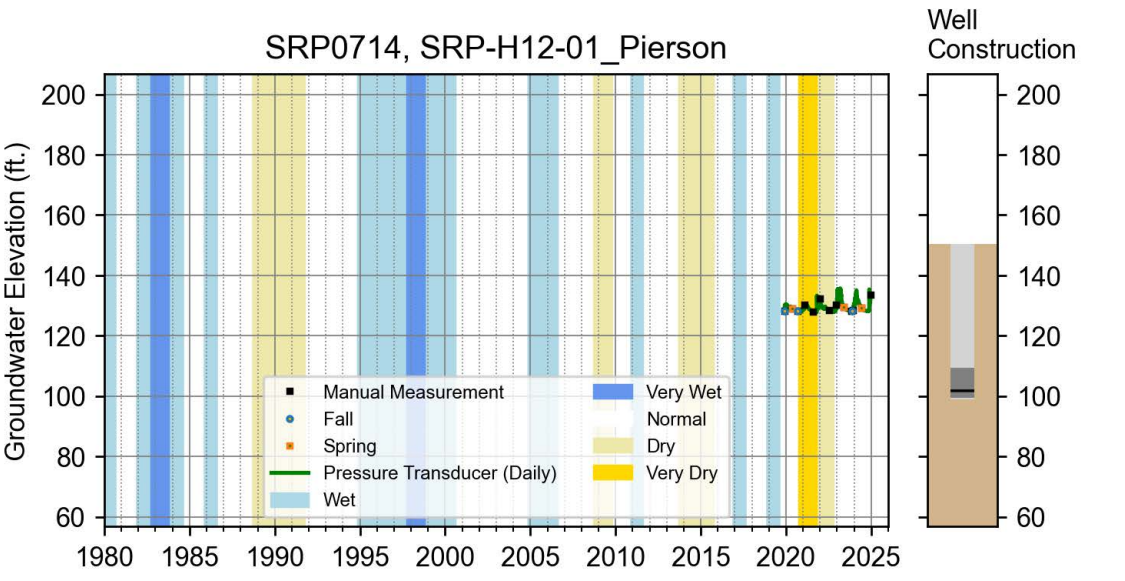
Well Depth: 45.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 25-45 ft
Elevation: 79 ft
Lat.: 38.44495 Lon.: -122.80684

Location



Well Construction Legend



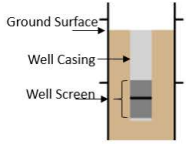


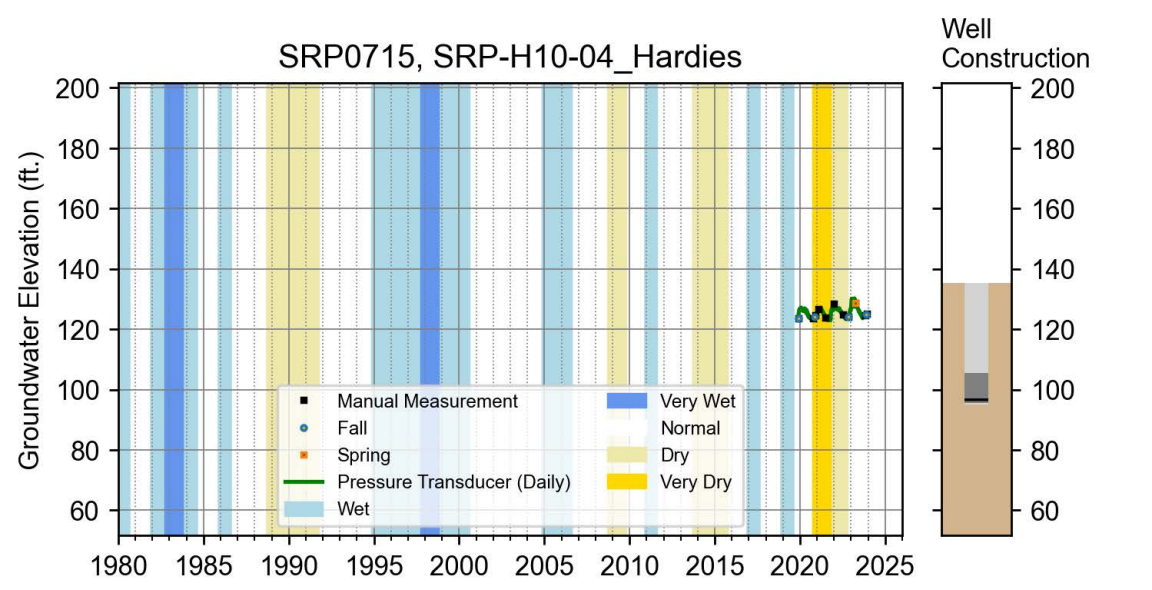
Well Depth: 51.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 41-51 ft
Elevation: 150 ft
Lat.: 38.43661 Lon.: -122.72465

Location



Well Construction Legend



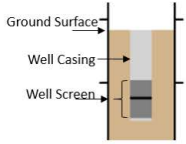


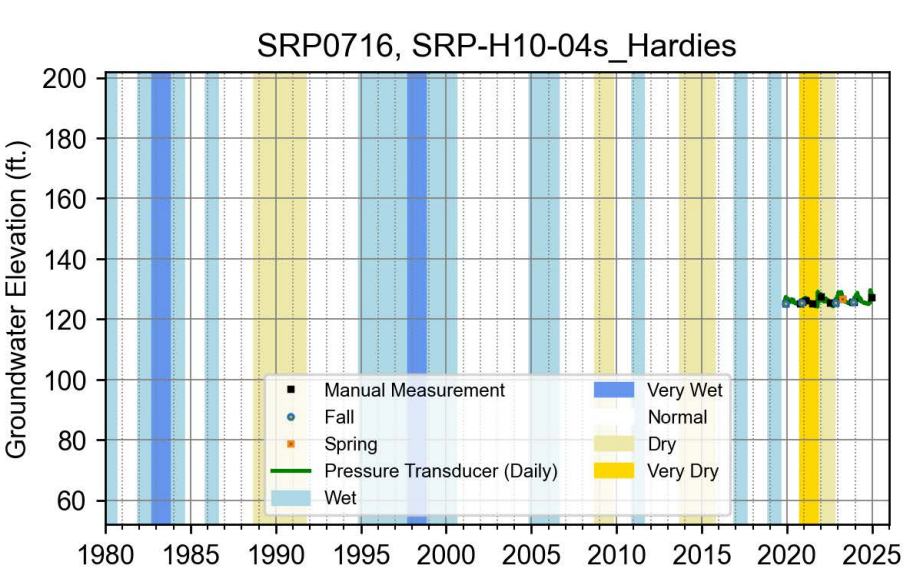
Well Depth: 40.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 30-40 ft
Elevation: 135 ft
Lat.: 38.46283 Lon.: -122.73526

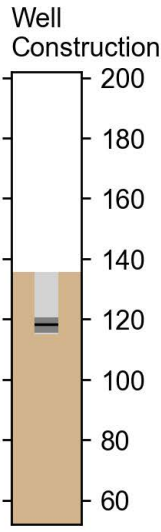
Location



Well Construction Legend





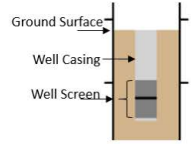


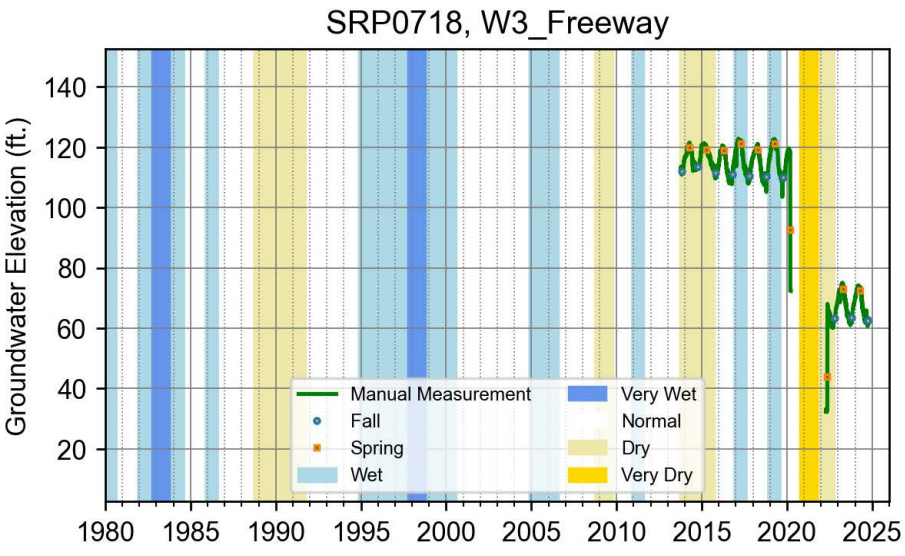
Well Depth: 20.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 15-20 ft
Elevation: 136 ft
Lat.: 38.46282 Lon.: -122.73528

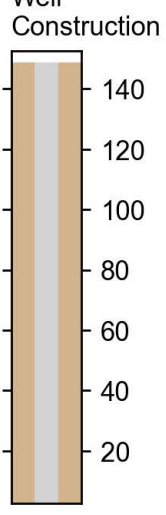
Location



Well Construction Legend





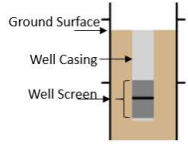


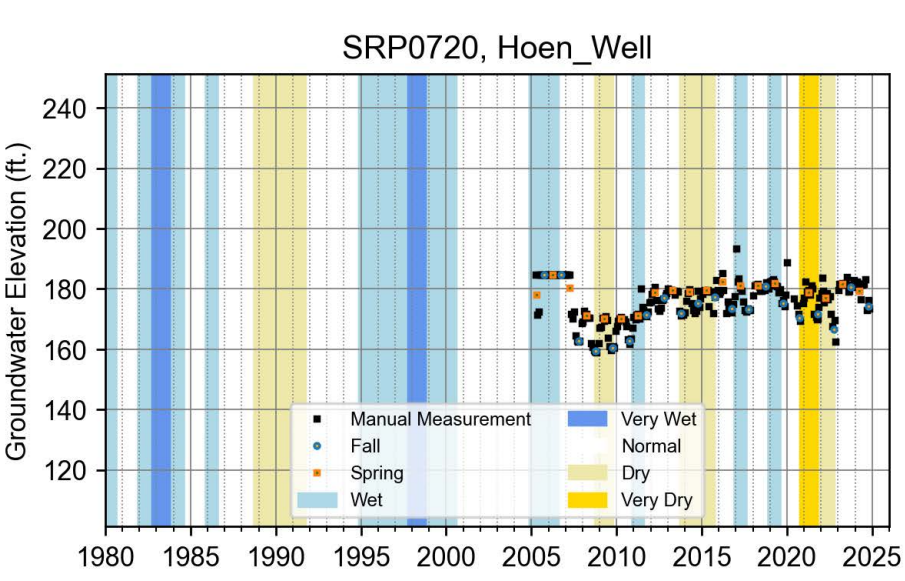
Well Depth: 817.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 149 ft
Lat.: 38.44929 Lon.: -122.72630

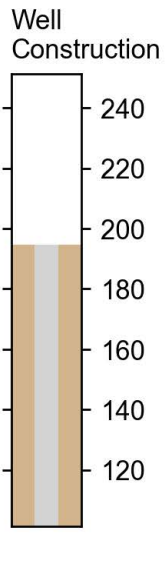
Location



Well Construction Legend





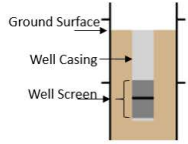


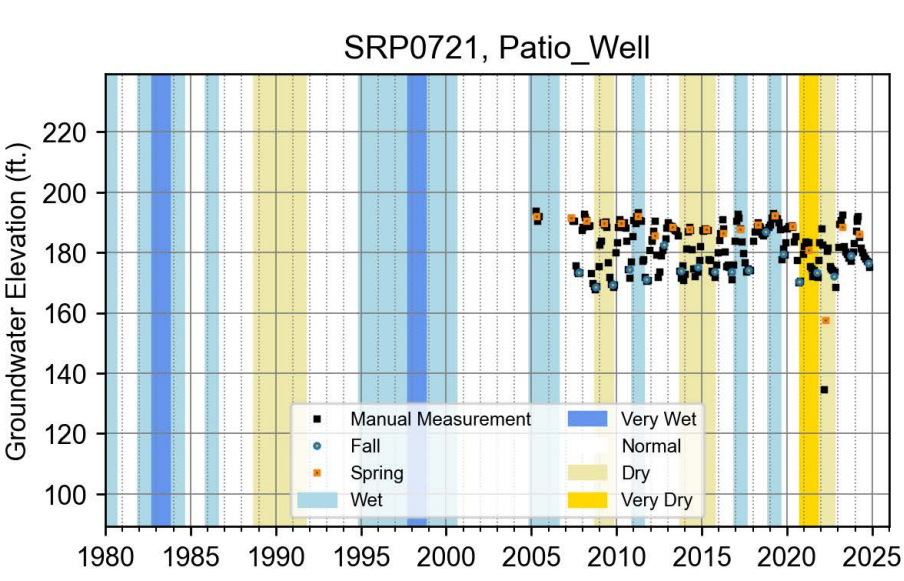
Well Depth: 115.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 195 ft
Lat.: 38.44019 Lon.: -122.68957

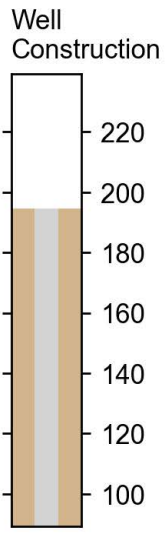
Location



Well Construction Legend





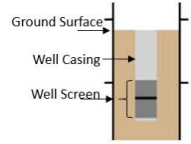


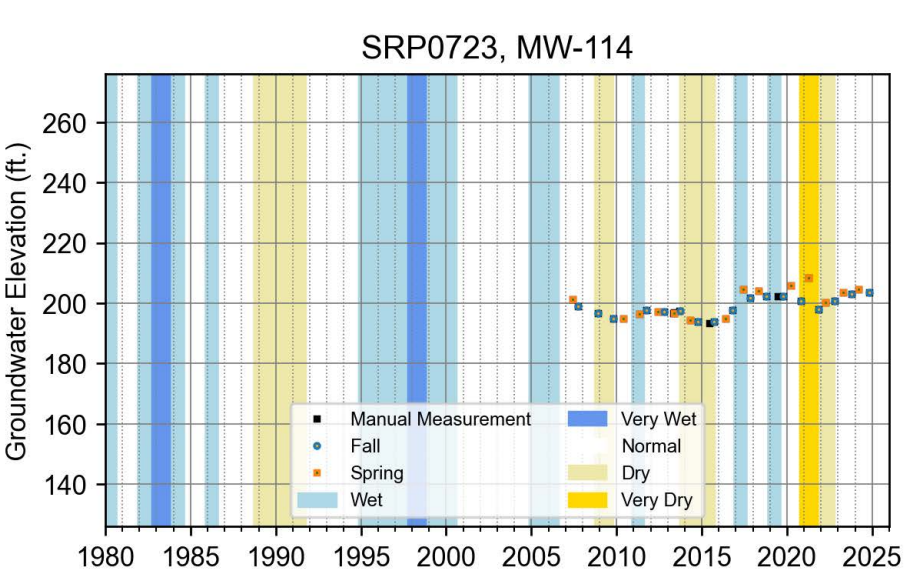
Well Depth: 115.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 195 ft
Lat.: 38.44213 Lon.: -122.68409

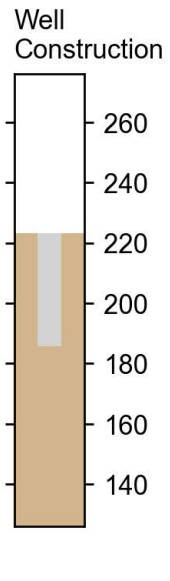
Location



Well Construction Legend





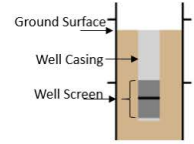


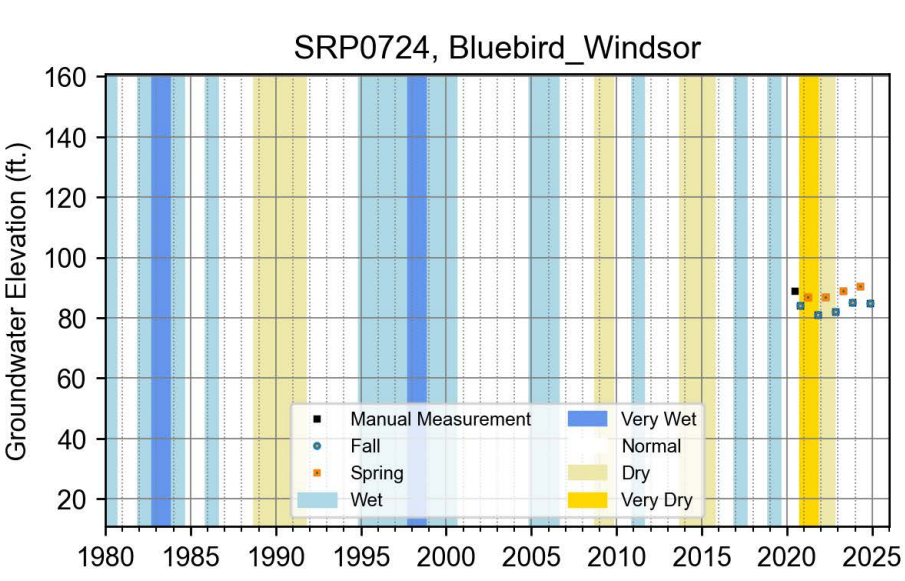
Well Depth: 37.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 223 ft
Lat.: 38.31779 Lon.: -122.71711

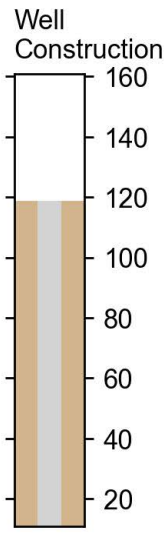
Location



Well Construction Legend





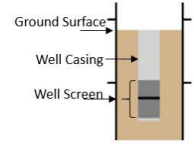


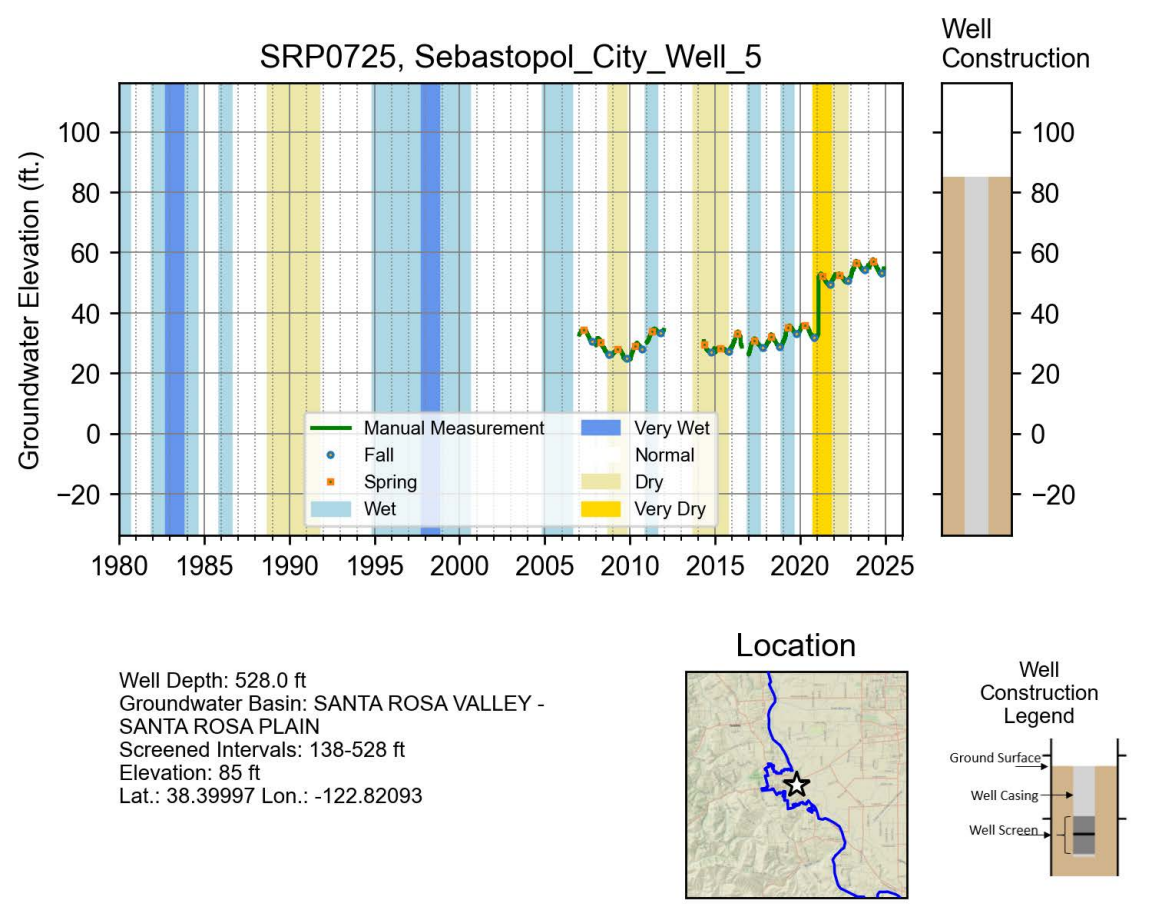
Well Depth: 765.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 695-745 ft
Elevation: 119 ft
Lat.: 38.53903 Lon.: -122.80146

Location



Well Construction Legend

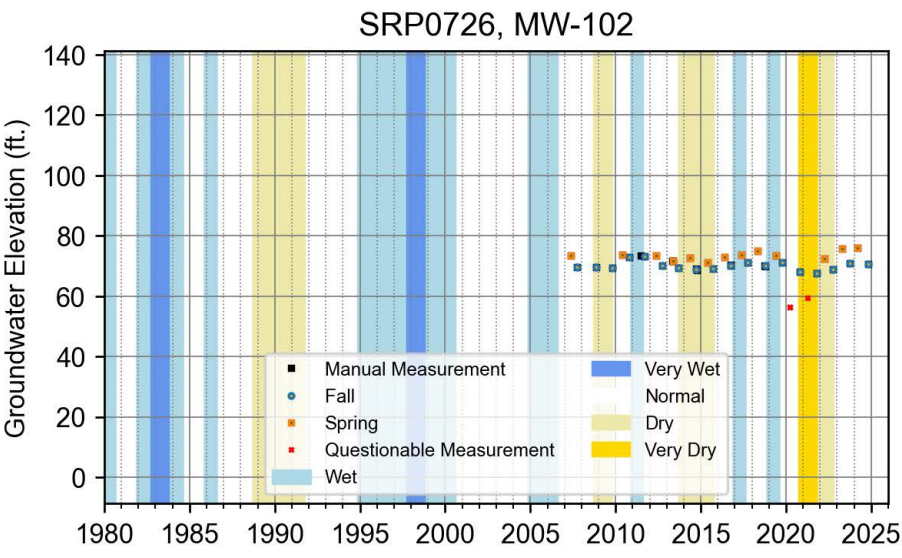


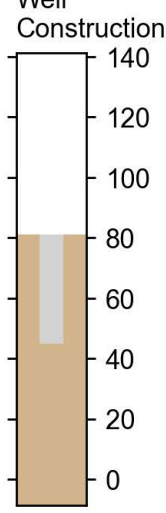


Well Depth: 528.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 138-528 ft
Elevation: 85 ft
Lat.: 38.39997 Lon.: -122.82093

Location

Well Construction Legend



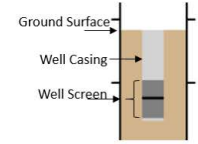


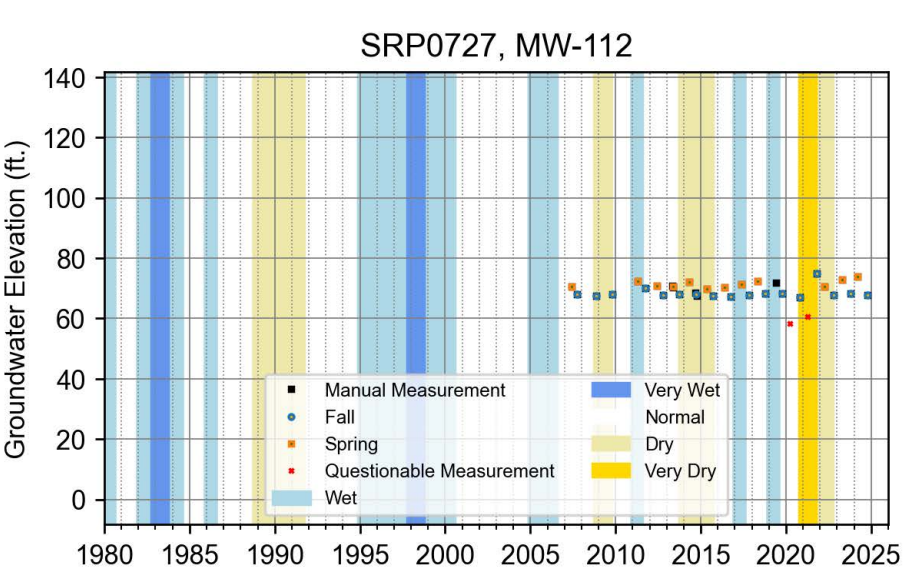
Well Depth: 36.3 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 81 ft
Lat.: 38.38995 Lon.: -122.78751

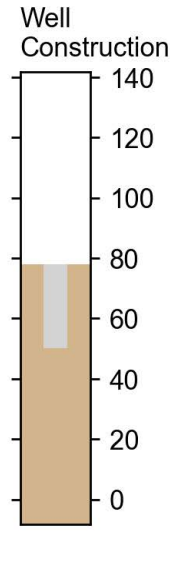
Location



Well Construction Legend





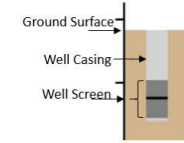


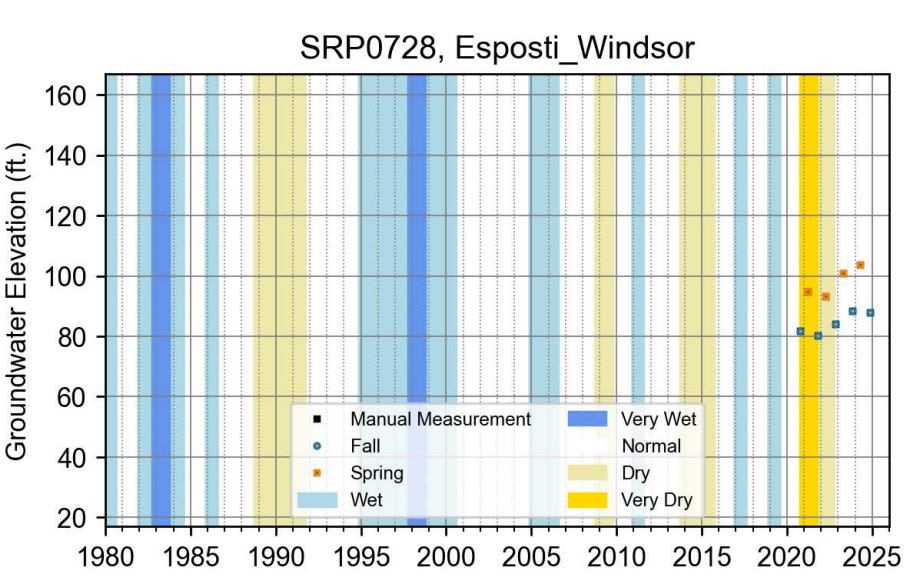
Well Depth: 27.9 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 78 ft
Lat.: 38.44604 Lon.: -122.78810

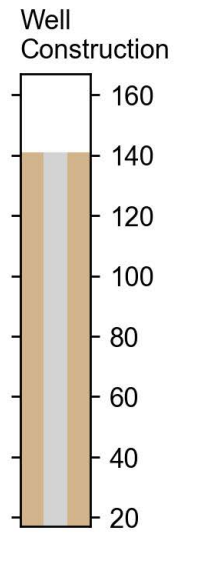
Location



Well Construction Legend





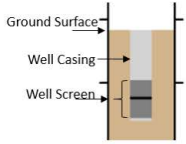


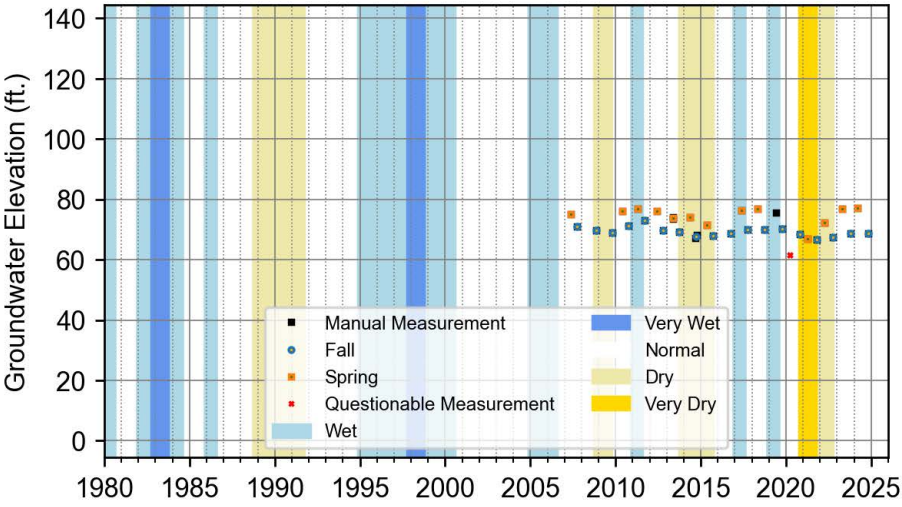
Well Depth: 670.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 380-420 ft, 430-450 ft, 460-470 ft, 480-510 ft, 545-565 ft, 615-655 ft
Elevation: 141 ft
Lat.: 38.52650 Lon.: -122.77958

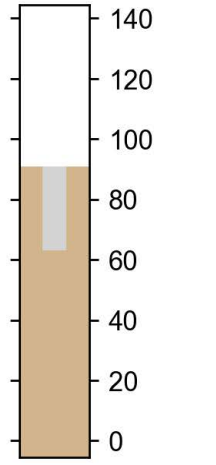
Location



Well Construction Legend





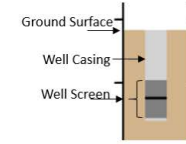


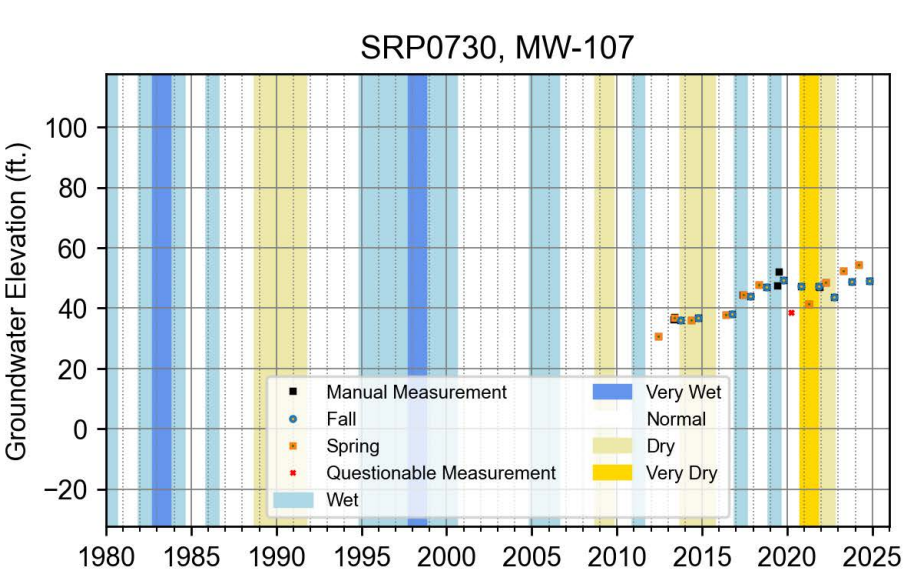
Well Depth: 27.9 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 91 ft
Lat.: 38.41788 Lon.: -122.80918

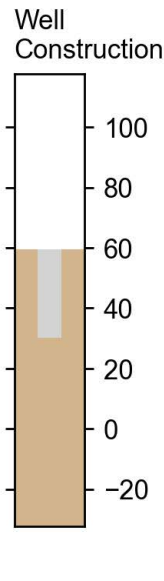
Location



Well Construction Legend



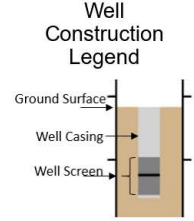


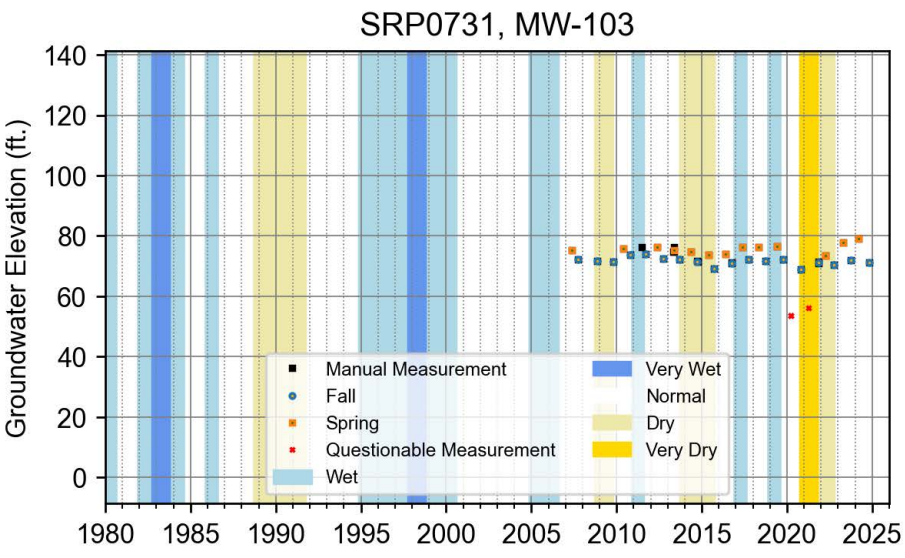


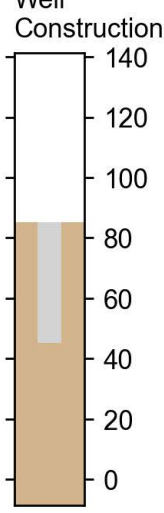
Well Depth: 29.1 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 59 ft
Lat.: 38.41128 Lon.: -122.81251

Location







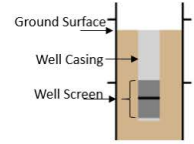


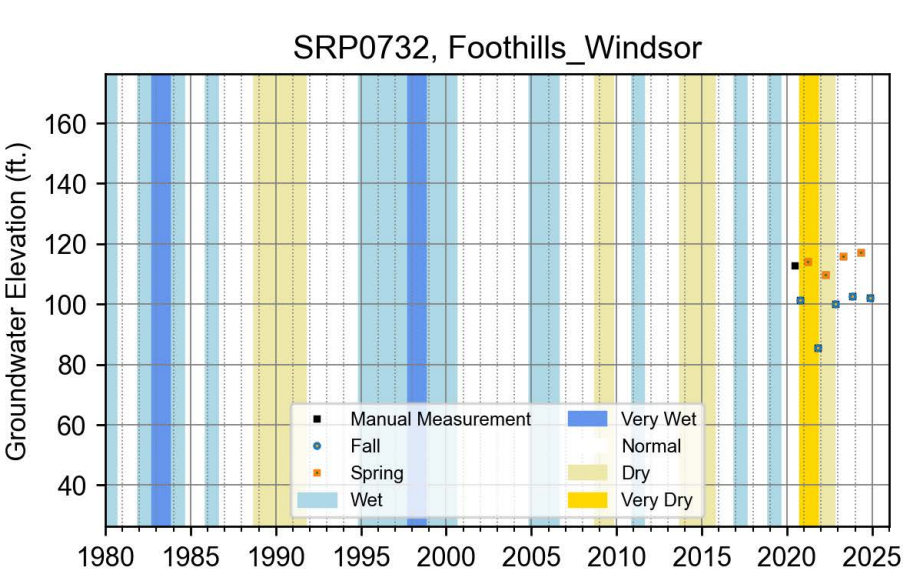
Well Depth: 40.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 85 ft
Lat.: 38.39224 Lon.: -122.77770

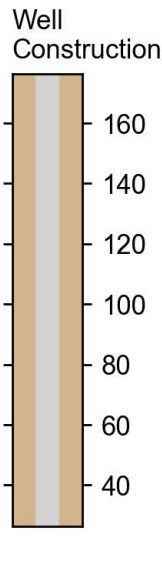
Location



Well Construction Legend





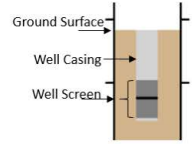


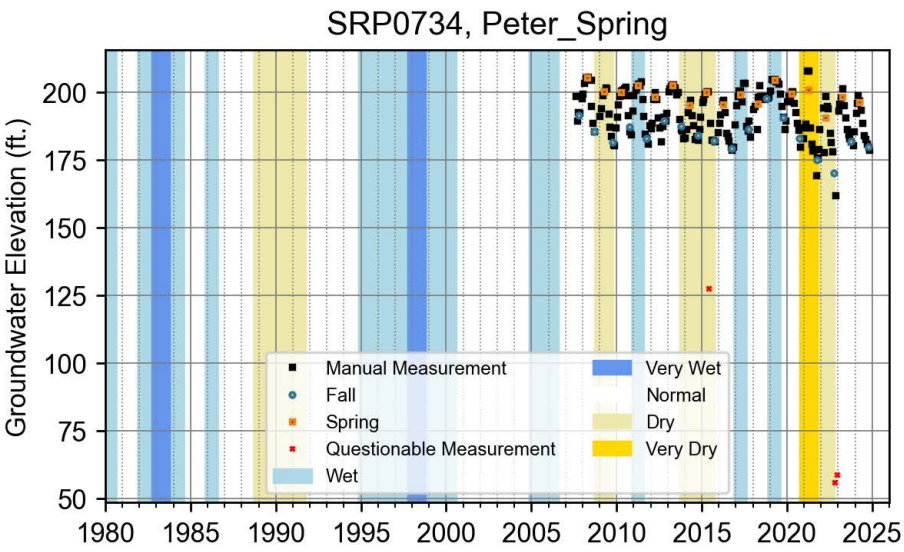
Well Depth: 350.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 160-350 ft
Elevation: 176 ft
Lat.: 38.55809 Lon.: -122.79351

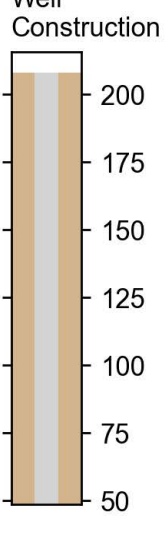
Location



Well Construction Legend





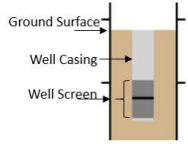


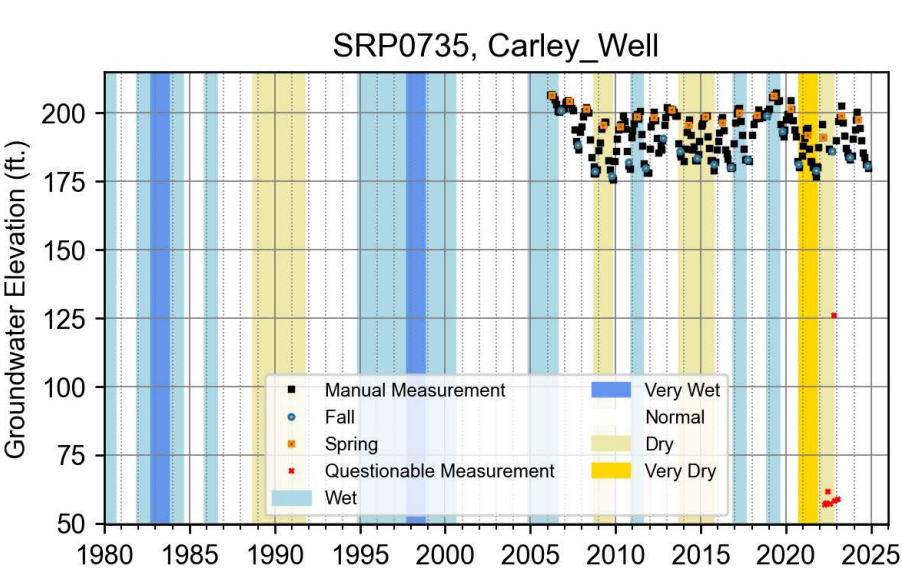
Well Depth: 160.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 208 ft
Lat.: 38.44623 Lon.: -122.66960

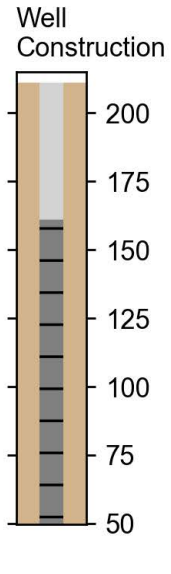
Location



Well Construction Legend





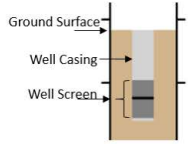


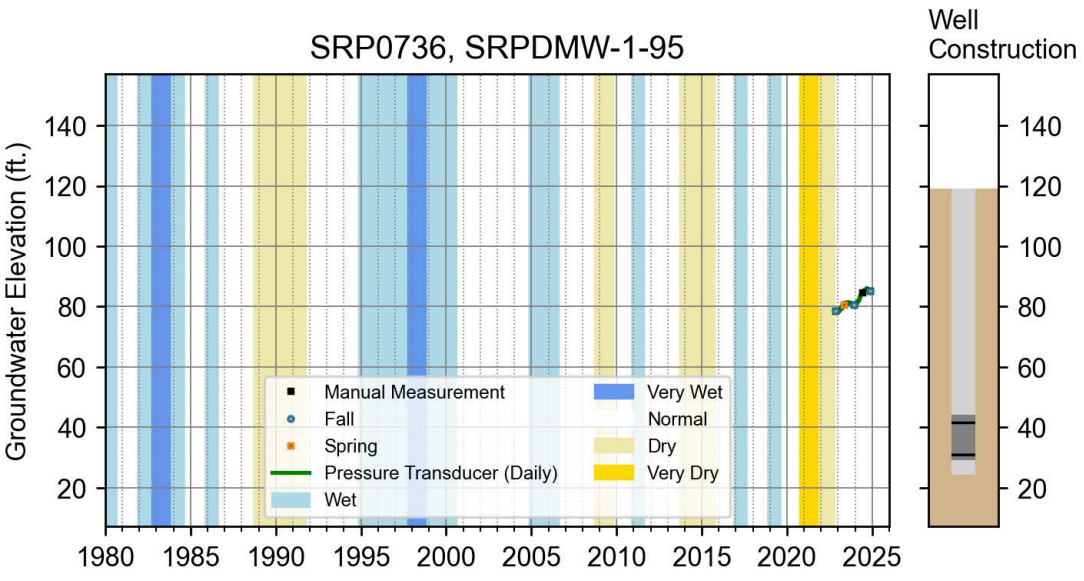
Well Depth: 208.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 50-190 ft
Elevation: 211 ft
Lat.: 38.44601 Lon.: -122.66986

Location



Well Construction Legend



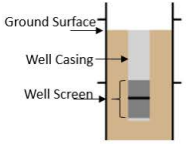


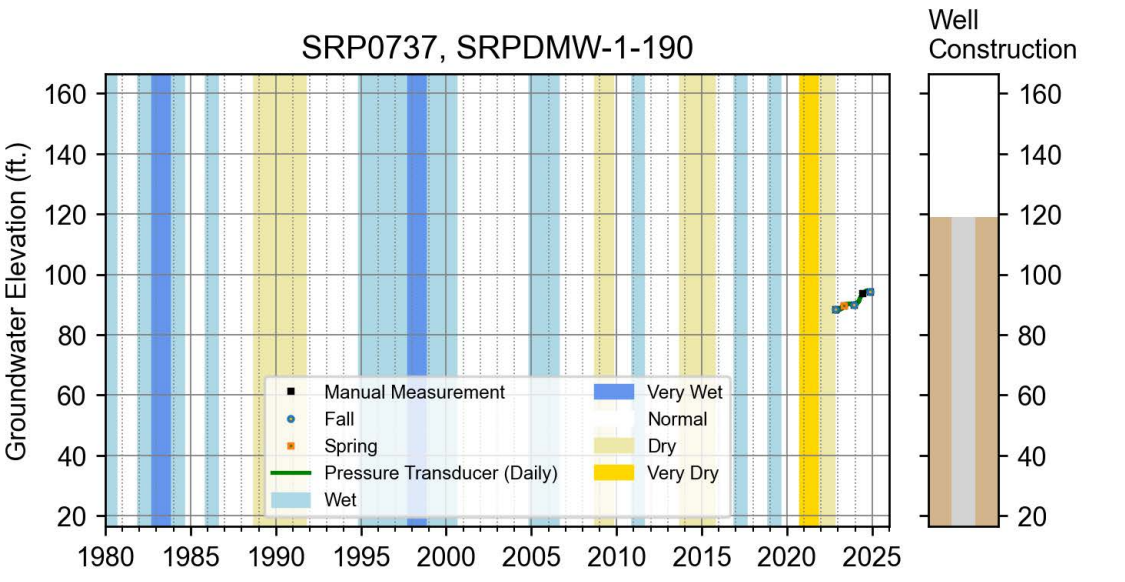
Well Depth: 95.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 75-90 ft
Elevation: 119 ft
Lat.: 38.32213 Lon.: -122.70230

Location



Well Construction Legend



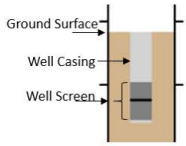


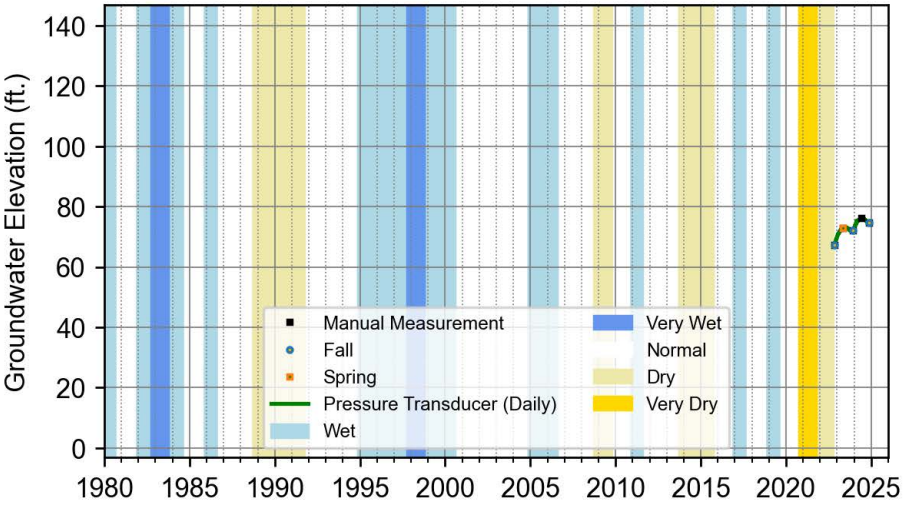
Well Depth: 190.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 170-185 ft
Elevation: 119 ft
Lat.: 38.32213 Lon.: -122.70230

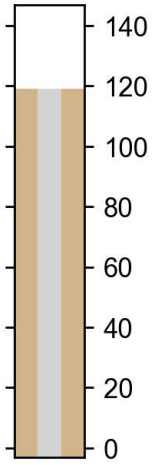
Location



Well Construction Legend





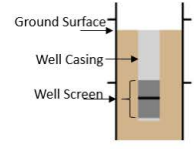


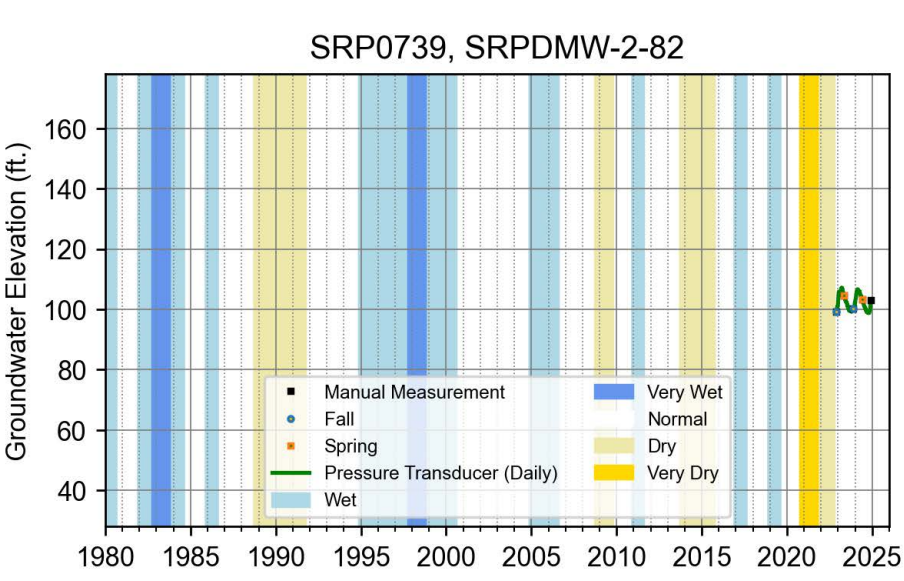
Well Depth: 450.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 430-445 ft
Elevation: 119 ft
Lat.: 38.32213 Lon.: -122.70230

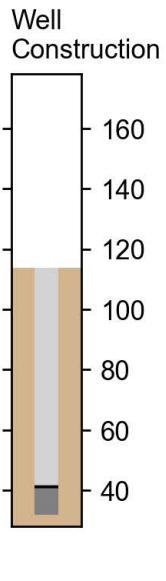
Location



Well Construction Legend



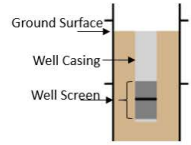


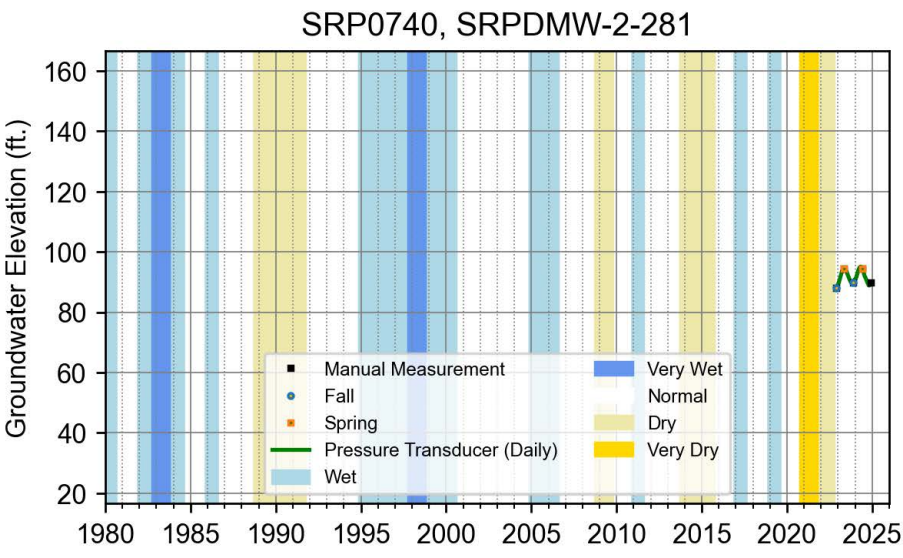


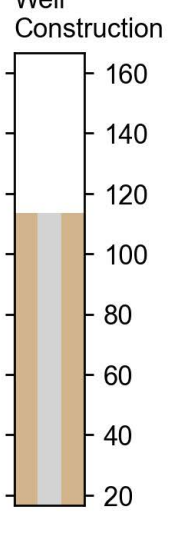
Well Depth: 82.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 72-82 ft
Elevation: 114 ft
Lat.: 38.40217 Lon.: -122.72587

Location







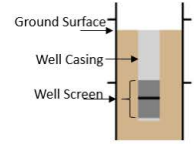


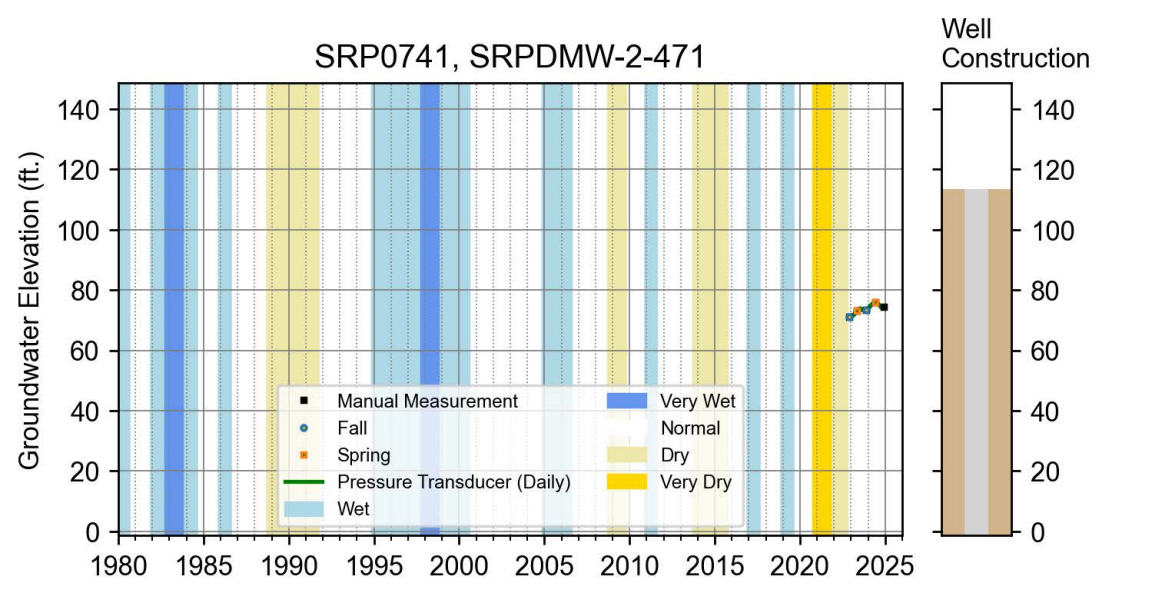
Well Depth: 281.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 251-261 ft, 266-276 ft
Elevation: 114 ft
Lat.: 38.40217 Lon.: -122.72587

Location



Well Construction Legend



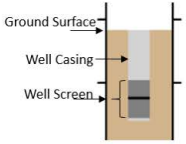


Well Depth: 471.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 456-466 ft
Elevation: 113 ft
Lat.: 38.40217 Lon.: -122.72587

Location



Well Construction Legend



Appendix C Hydrographs for Chronic Lowering of Groundwater Levels Sustainability Indicator

Contents:

1: SRP0019

2: SRP0057

3: SRP0059

4: SRP0073

5: SRP0106

6: SRP0115

7: SRP0121

8: SRP0238

9: SRP0243

10: SRP0249

11: SRP0269

12: SRP0347

13: SRP0355

14: SRP0357

15: SRP0359

16: SRP0375

17: SRP0376

18: SRP0709

19: SRP0710

20: SRP0713

21: SRP0714

22: SRP0715

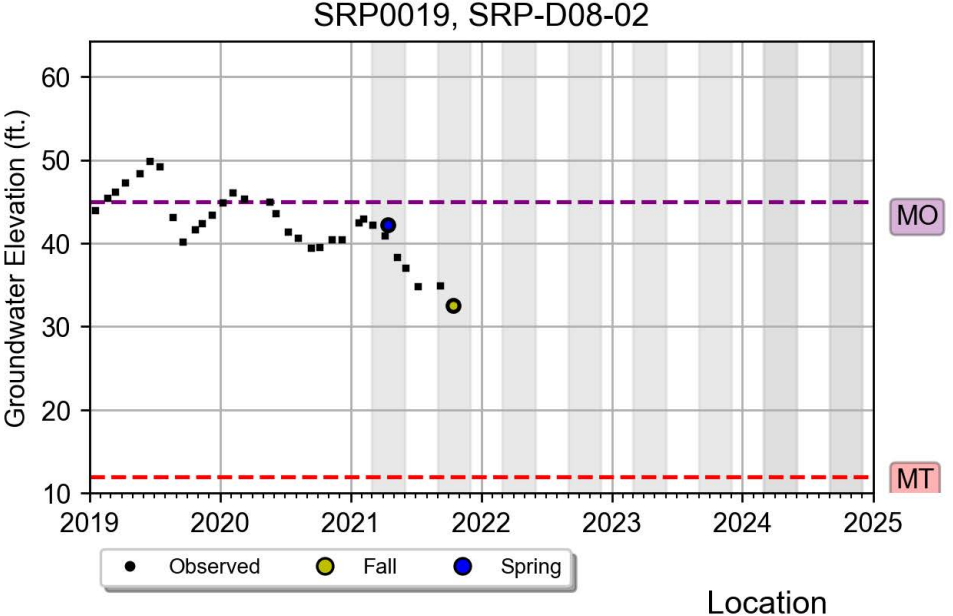
23: SRP0720

24: SRP0723

25: SRP0724

26: SRP0725

WY 2024 Status:
Not Measured

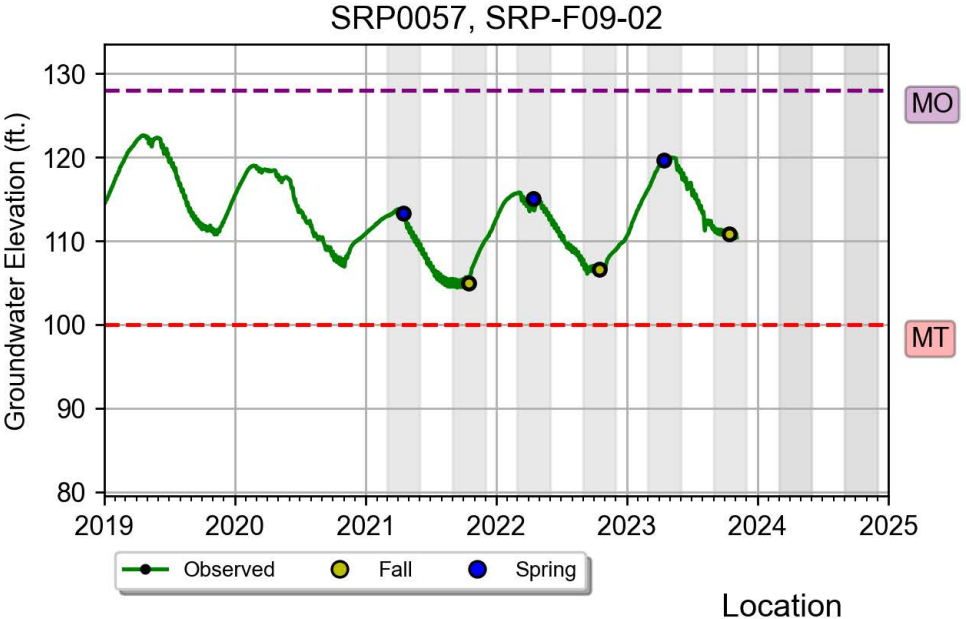


Well Depth: 1048.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 94 ft
Lat.: 38.49100 Lon.: -122.81180

Location



WY 2024 Status:
Not Measured

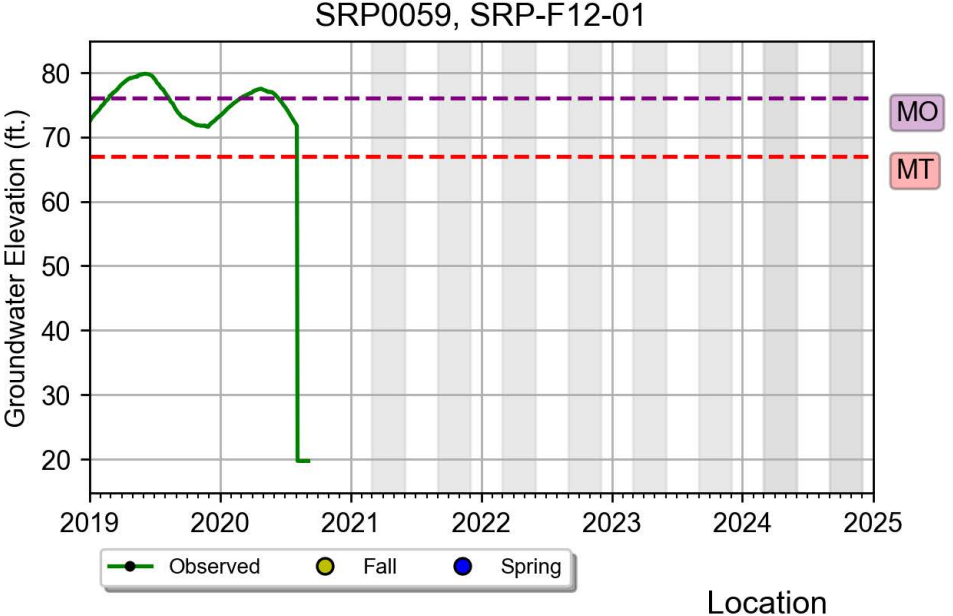


Well Depth: 360.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 200-350 ft
Elevation: 142 ft
Lat.: 38.47821 Lon.: -122.76566

Location



WY 2024 Status:
Not Measured

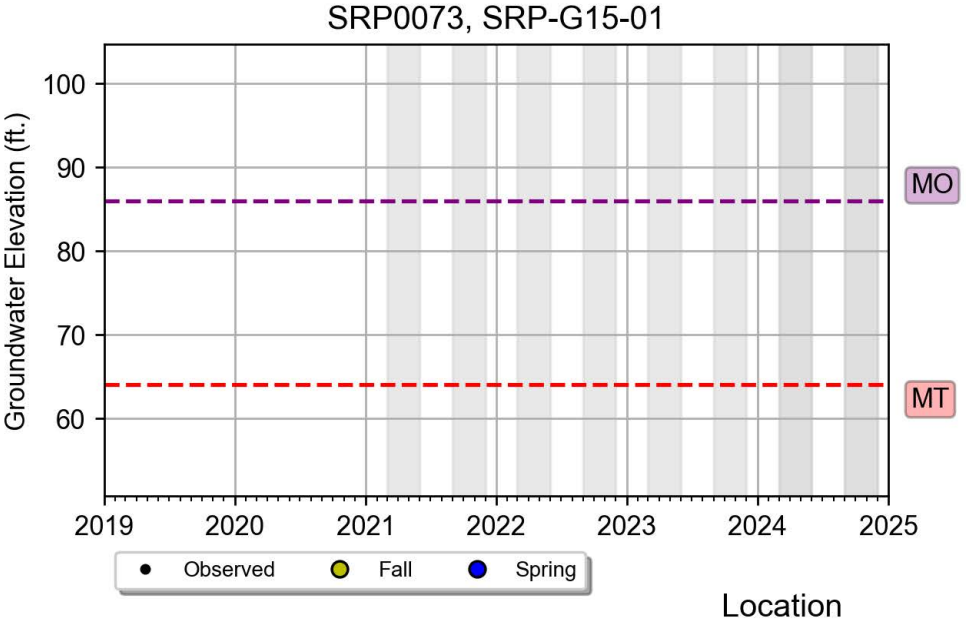


Well Depth: 694.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 199-209 ft, 239-290 ft, 330-340 ft, 401-421 ft, 441-451 ft, 472-532 ft, 593-634 ft, 654-684 ft
Elevation: 101 ft
Lat.: 38.43822 Lon.: -122.76580

Location



WY 2024 Status:
Not Measured

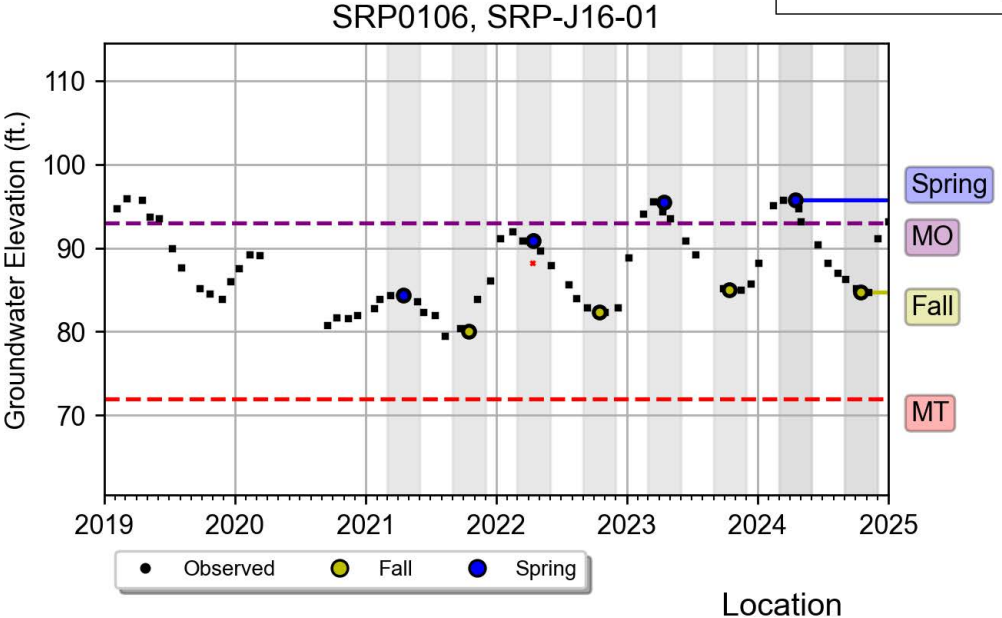


Location



Well Depth: 80.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 94 ft
Lat.: 38.38960 Lon.: -122.74880

WY 2024 Status:
Waterlevel Above Minimum Threshold

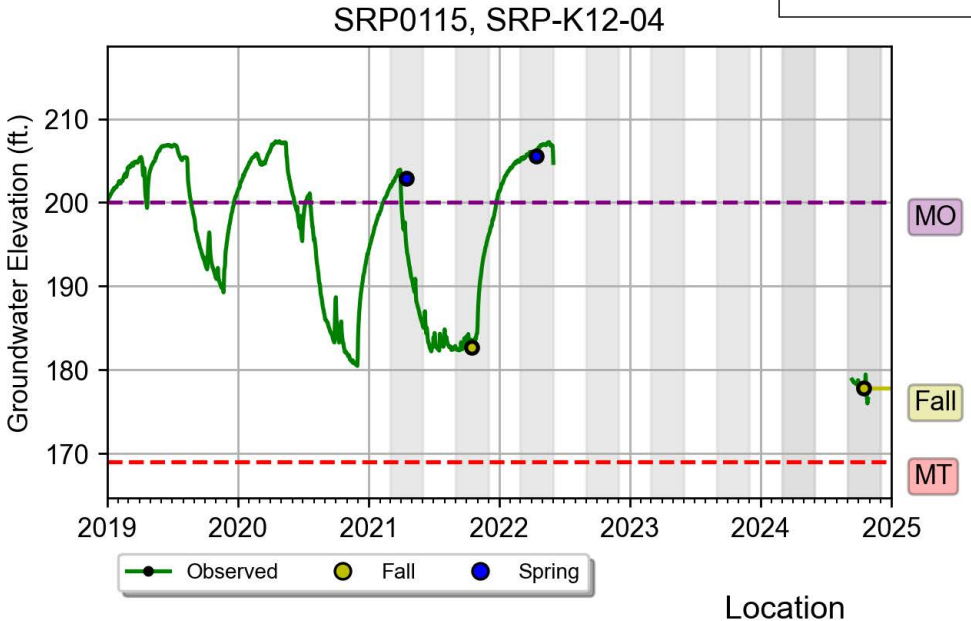


Location



Well Depth: 90.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 80-90 ft
Elevation: 102 ft
Lat.: 38.37650 Lon.: -122.70270

WY 2024 Status:
Waterlevel Above Minimum Threshold

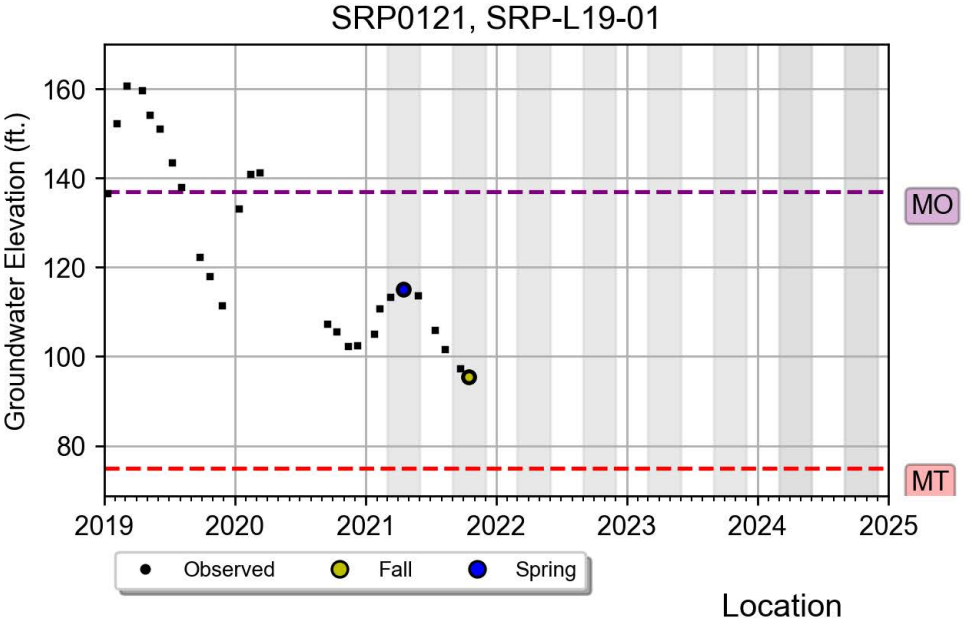


Location



Well Depth: 870.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 500-620 ft, 750-860 ft
Elevation: 216 ft
Lat.: 38.43972 Lon.: -122.67606

WY 2024 Status:
Not Measured

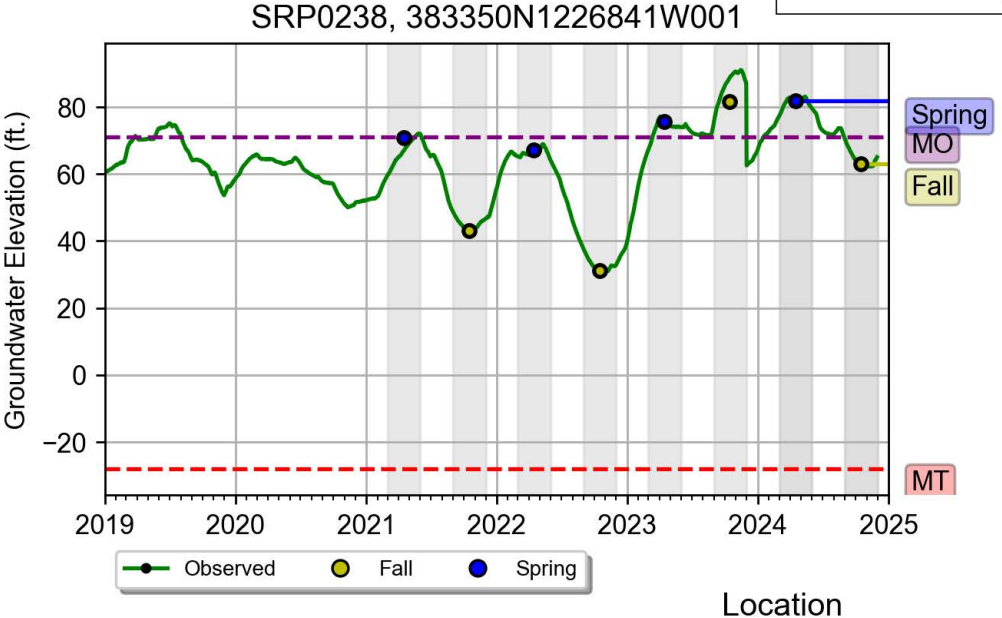


Well Depth: 150.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 179 ft
Lat.: 38.33150 Lon.: -122.66730

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

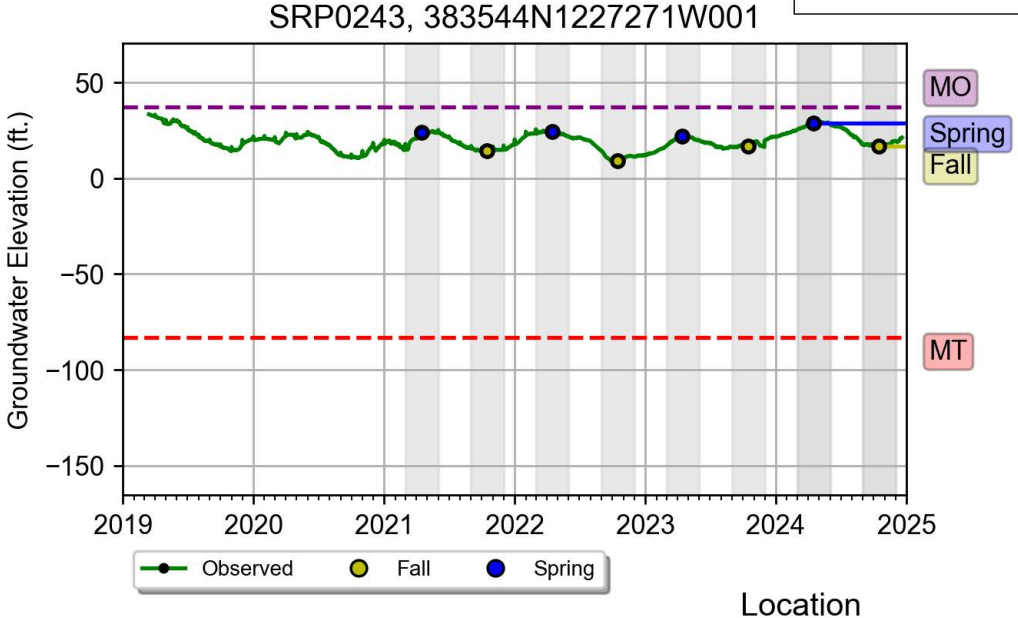


Well Depth: 380.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 130-270 ft, 290-320 ft, 360-380 ft
Elevation: 128 ft
Lat.: 38.33496 Lon.: -122.68414

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

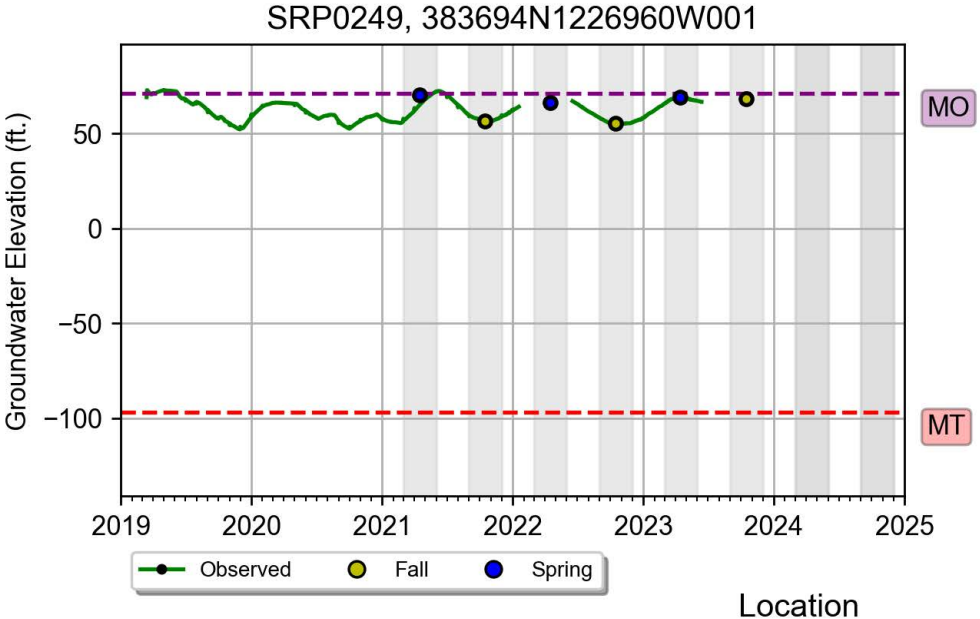


Well Depth: 582.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 258-292 ft, 356-378 ft, 396-406 ft, 418-428 ft, 496-536 ft, 576-582 ft
Elevation: 91 ft
Lat.: 38.35442 Lon.: -122.72711

Location



WY 2024 Status:
Not Measured

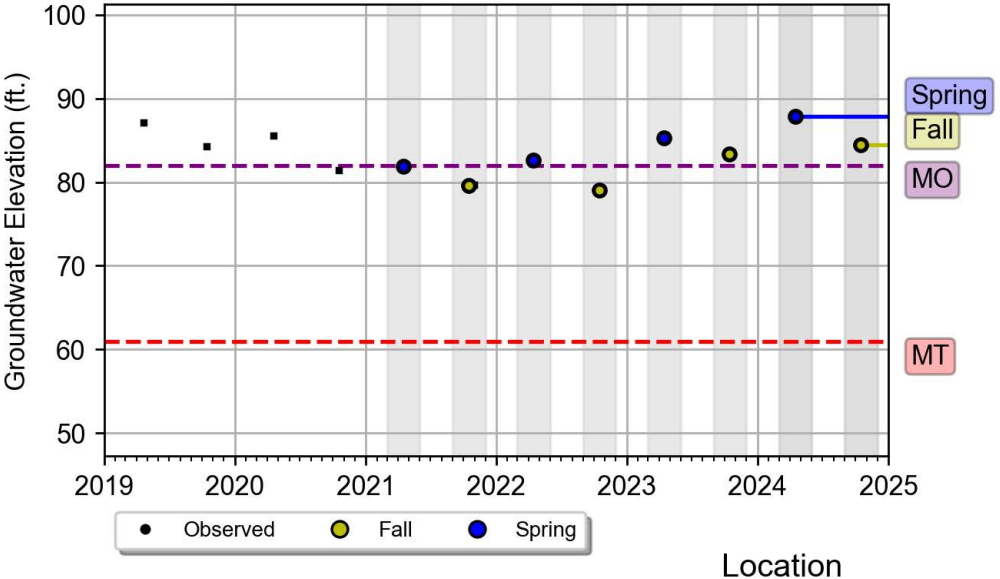


Well Depth: 462.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 302-310 ft, 326-332 ft, 404-462 ft
Elevation: 103 ft
Lat.: 38.36942 Lon.: -122.69597

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

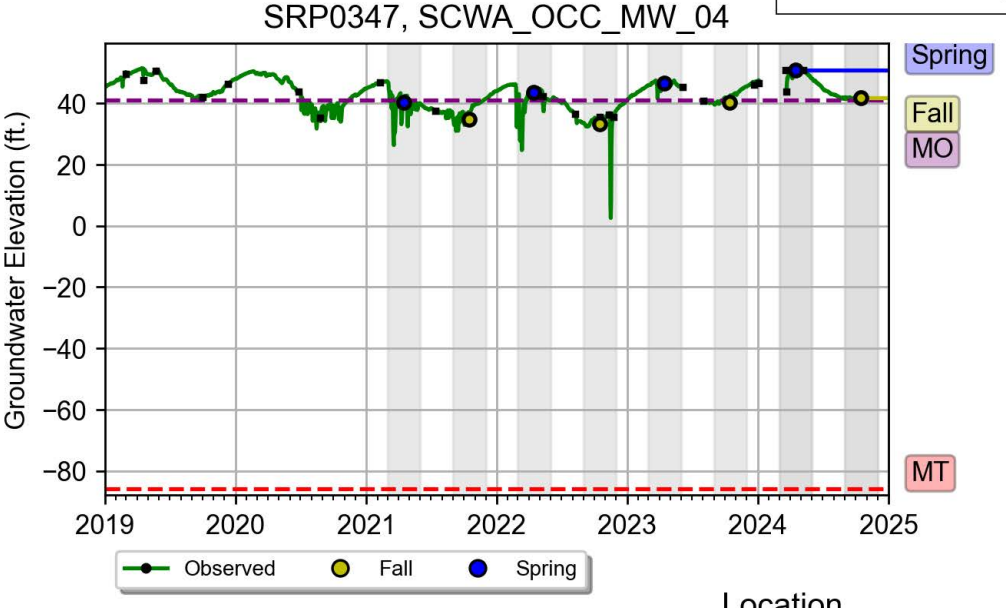


Location



Well Depth: 160.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 100-160 ft
Elevation: 91 ft
Lat.: 38.38886 Lon.: -122.80875

WY 2024 Status:
Waterlevel Above Minimum Threshold

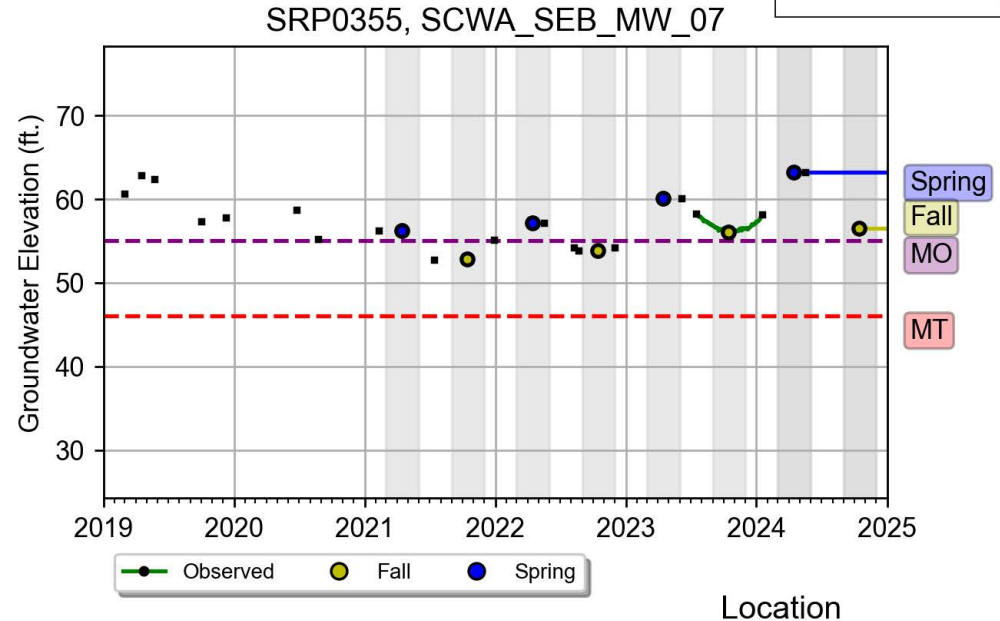


Location



Well Depth: 740.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 660-740 ft
Elevation: 95 ft
Lat.: 38.42316 Lon.: -122.81479

WY 2024 Status:
Waterlevel Above Minimum Threshold

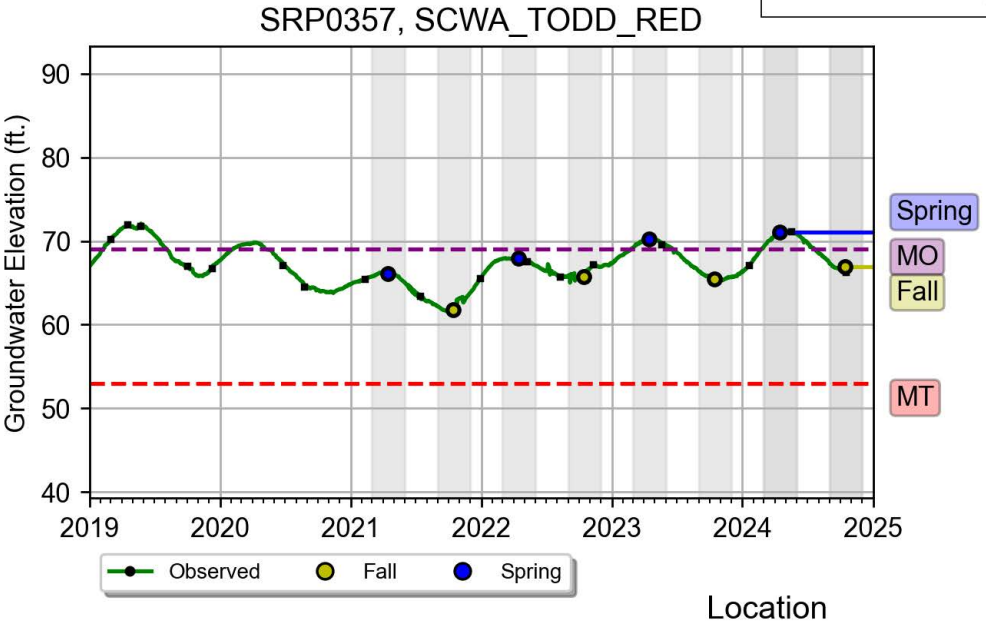


Well Depth: 64.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 70-90 ft
Elevation: 81 ft
Lat.: 38.40827 Lon.: -122.80139

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

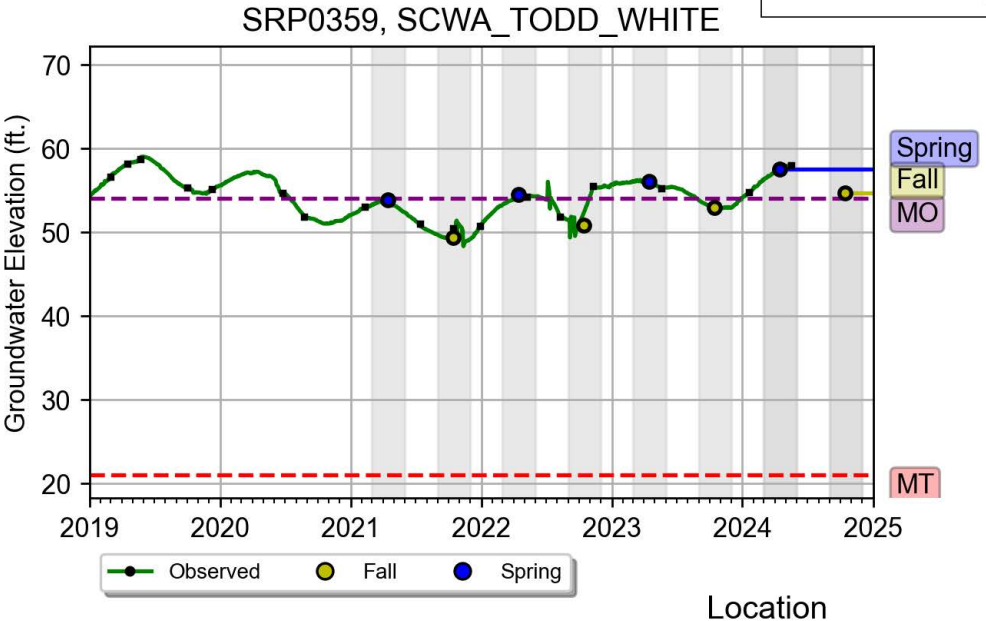


Well Depth: 80.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 60-80 ft
Elevation: 79 ft
Lat.: 38.38555 Lon.: -122.77769

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

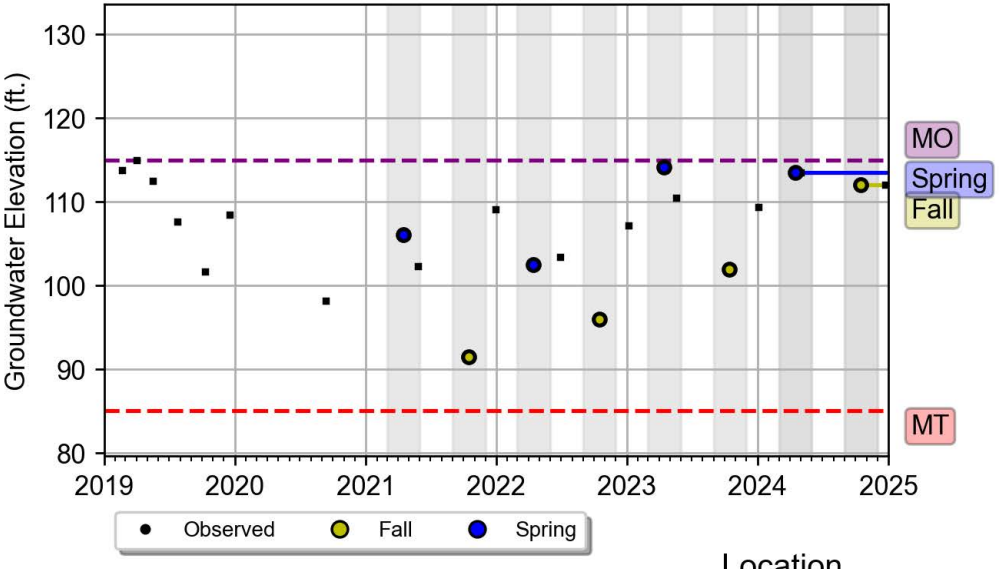


Well Depth: 257.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 237-257 ft
Elevation: 79 ft
Lat.: 38.38555 Lon.: -122.77768

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

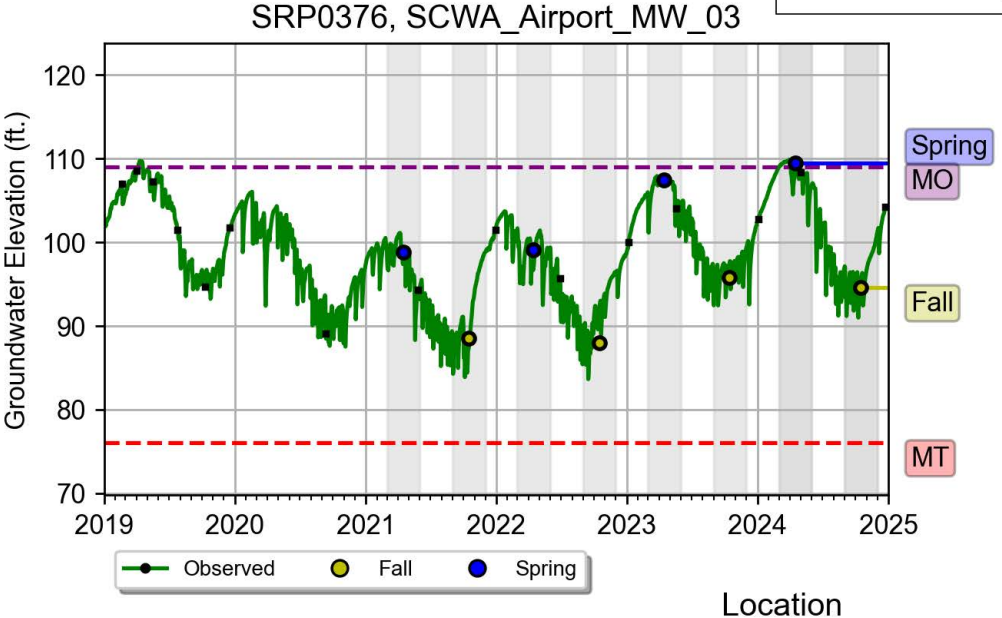


Location



Well Depth: 140.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 120-140 ft
Elevation: 122 ft
Lat.: 38.51172 Lon.: -122.78626

WY 2024 Status:
Waterlevel Above Minimum Threshold

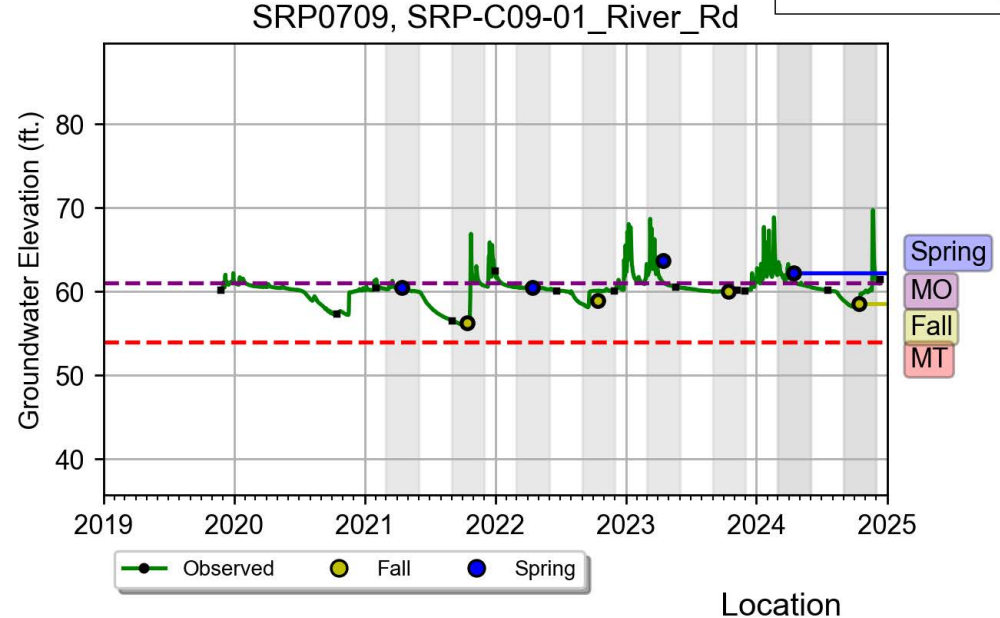


Well Depth: 360.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 340-360 ft
Elevation: 121 ft
Lat.: 38.51172 Lon.: -122.78626

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

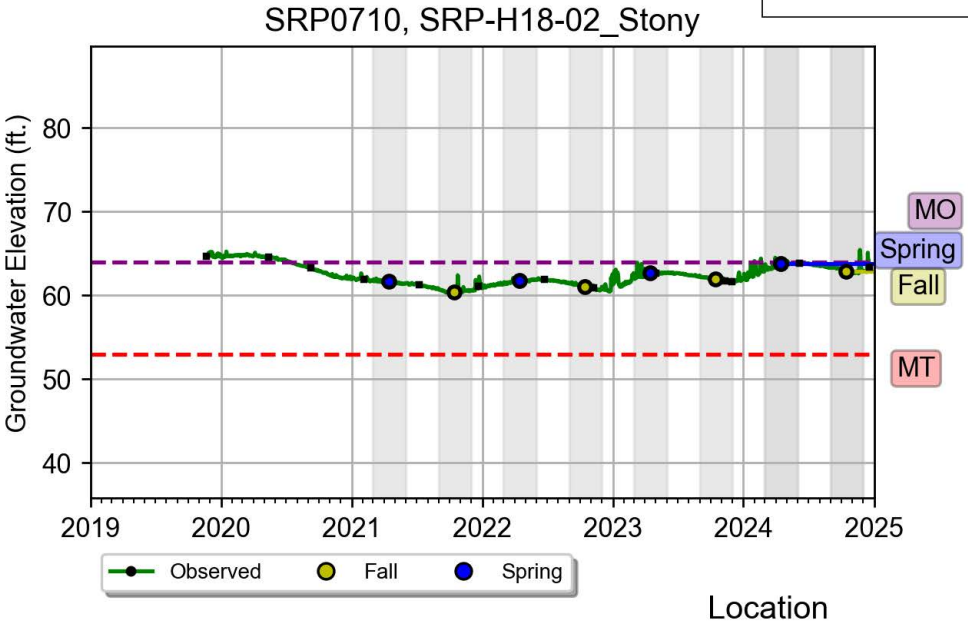


Well Depth: 33.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 23-33 ft
Elevation: 72 ft
Lat.: 38.48170 Lon.: -122.83417

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

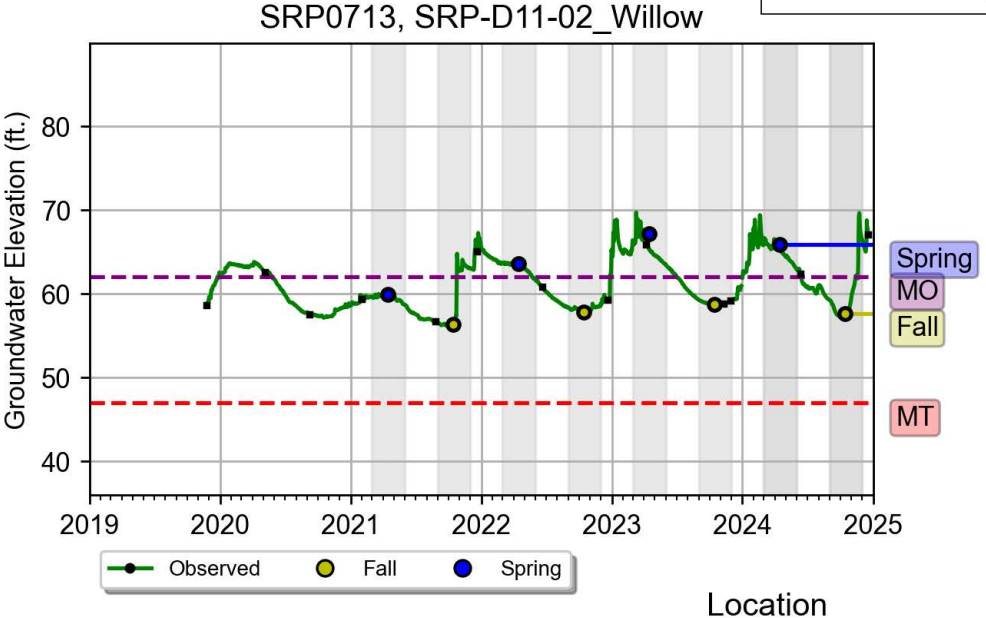


Well Depth: 45.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 35-45 ft
Elevation: 90 ft
Lat.: 38.35250 Lon.: -122.74114

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

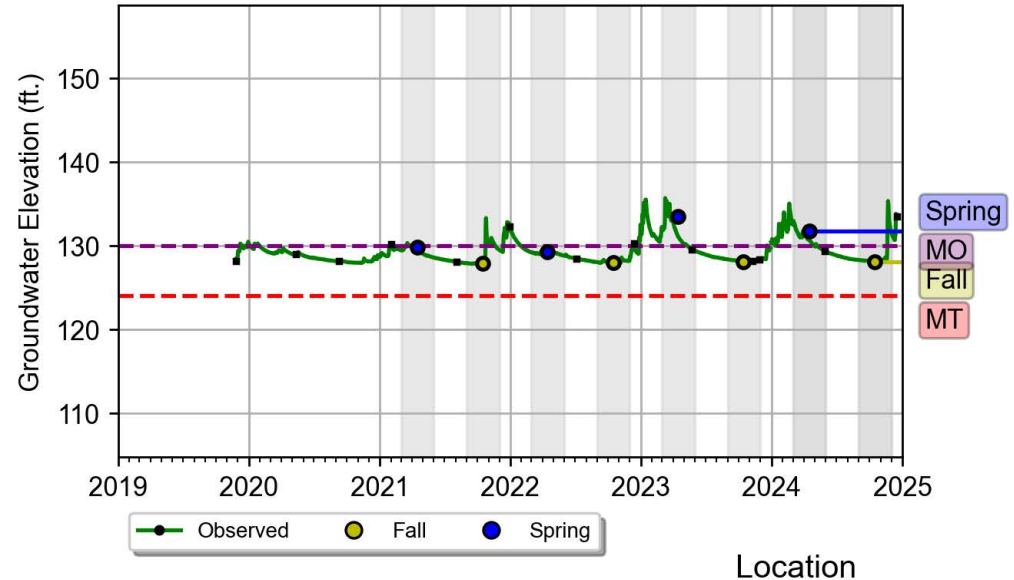


Location



Well Depth: 45.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 25-45 ft
Elevation: 79 ft
Lat.: 38.44495 Lon.: -122.80684

WY 2024 Status:
Waterlevel Above Minimum Threshold

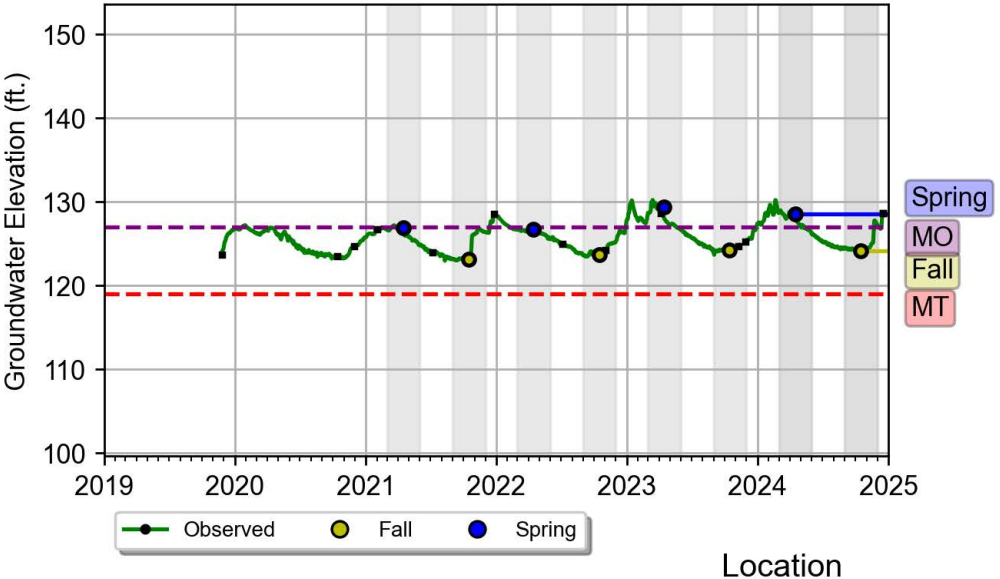


Well Depth: 51.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 41-51 ft
Elevation: 150 ft
Lat.: 38.43661 Lon.: -122.72465

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

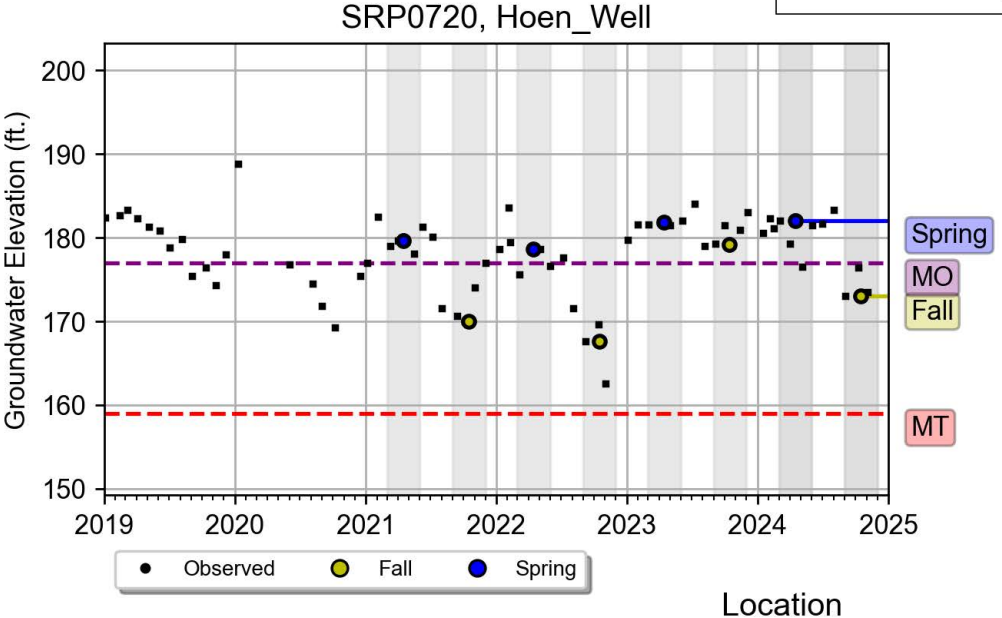


Well Depth: 40.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 30-40 ft
Elevation: 135 ft
Lat.: 38.46283 Lon.: -122.73526

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold

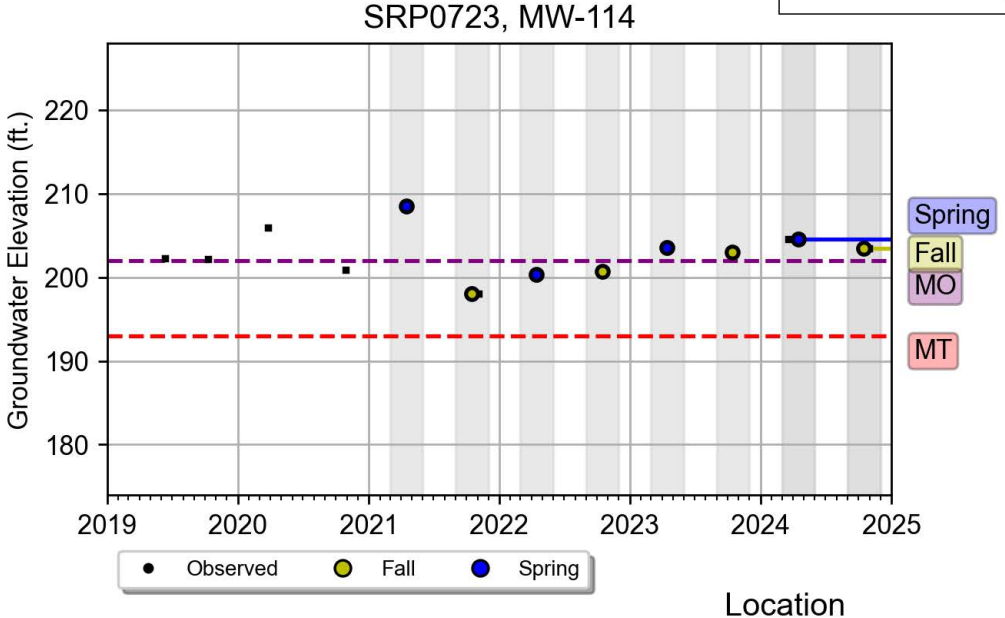


Location



Well Depth: 115.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 195 ft
Lat.: 38.44019 Lon.: -122.68957

WY 2024 Status:
Waterlevel Above Minimum Threshold

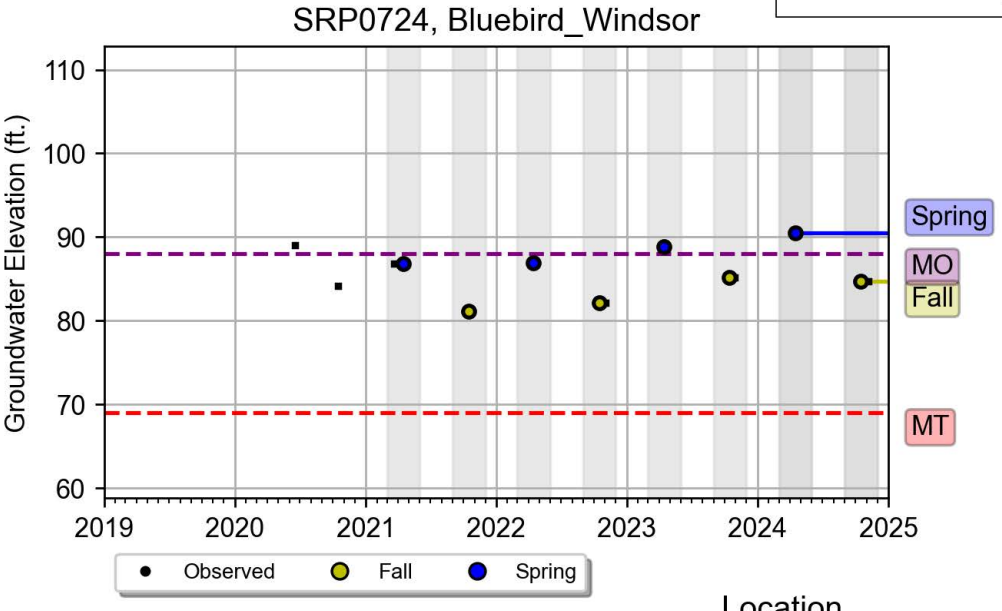


Location



Well Depth: 37.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals:
Elevation: 223 ft
Lat.: 38.31779 Lon.: -122.71711

WY 2024 Status:
Waterlevel Above Minimum Threshold

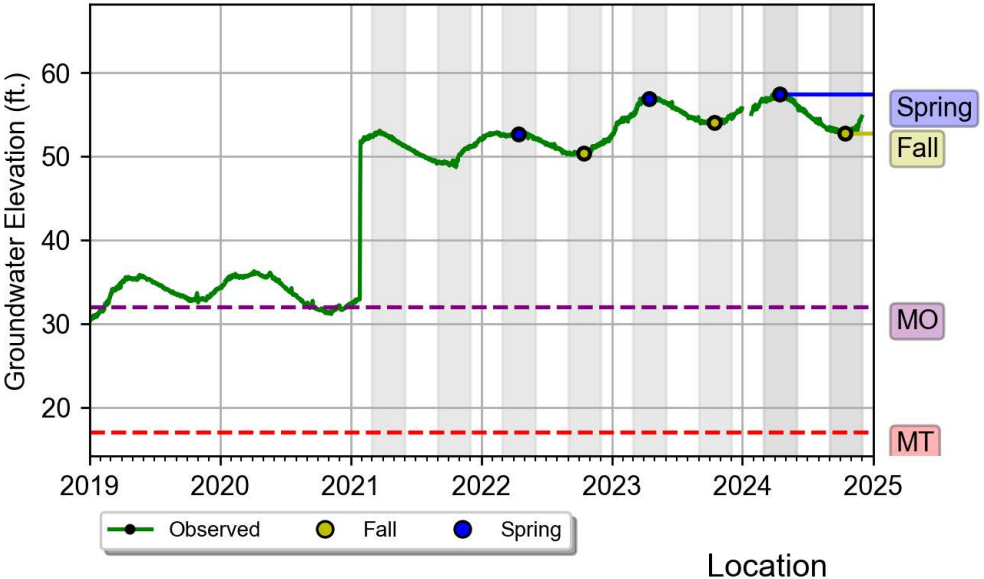


Well Depth: 765.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 695-745 ft
Elevation: 119 ft
Lat.: 38.53903 Lon.: -122.80146

Location



WY 2024 Status:
Waterlevel Above Minimum Threshold



Well Depth: 528.0 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 138-528 ft
Elevation: 85 ft
Lat.: 38.39997 Lon.: -122.82093

Location



Appendix D Water Quality Values for Degradation of Water Quality Sustainability Indicator

Well ID	Number of Measurements Taken in 2024	Annual Average Arsenic Concentration (ug/l)	Minimum Arsenic Concentration (ug/l)	Maximum Arsenic Concentration (ug/l)
CA4900513_003_003	1	4.6	4.6	4.6
CA4900546_001_001	5	6.82	5.3	7.8
CA4900553_001_001	2	5.15	3.9	6.4
CA4900553_004_004	3	10.03	8.7	12
CA4900699_002_002	2	5.05	4.8	5.3
CA4900723_001_001	6	12.83	10	16
CA4900787_001_001	1	3.1	3.1	3.1
CA4900791_006_006	2	13	13	13
CA4900795_001_001	3	5.4	5	6
CA4900796_001_001	7	5.39	5.3	5.6
CA4900796_003_003	7	6.3	5.2	11
CA4900799_003_003	3	4.77	4.3	5.2
CA4900812_001_001	6	6.8	5.7	7.4
CA4900878_008_008	3	32.6	9.8	78
CA4900897_003_003	2	42.5	39	46
CA4900897_004_004	2	14	12	16
CA4900904_001_001	2	31.5	24	39
CA4900907_001_001	5	7.8	5.4	11
CA4901156_001_001	1	2	2	2
CA4901232_001_001	7	58	34	82

CA4901370_001_001	3	11.2	8.6	14
CA4901370_002_002	3	14	13	16
CA4901431_001_001	3	18	17	19
CA4910009_007_007	1	2	2	2
CA4910009_008_008	1	2	2	2
CA4910011_005_005	40	11.25	10.05	13
CA4910014_005_005	2	2.4	2.4	2.4
CA4910014_006_006	1	2.4	2.4	2.4
CA4910014_016_016	3	4.83	4.6	5.2
CA4910023_004_004	3	5.67	5	6
CA4910023_005_005	3	6.67	6	7
CA4910023_006_006	3	8.67	6	10
CA4910023_007_007	3	7	6	8
CA4910023_010_010	14	5.92	4.7	8

Well ID	Number of Measurements Taken in 2024	Annual Average Nitrate Concentration (mg/l)	Minimum Nitrate Concentration (mg/l)	Maximum Nitrate Concentration (mg/l)
CA4900513_003_003	1	0.2	0.2	0.2
CA4900546_001_001	1	0.8	0.8	0.8
CA4900548_001_001	1	0.2	0.2	0.2
CA4900559_001_001	2	1.45	1.1	1.8
CA4900559_002_002	2	4.7	4.5	4.9
CA4900667_004_004	1	0.2	0.2	0.2
CA4900675_001_001	2	6.75	6.6	6.9
CA4900675_003_003	2	5.35	5.2	5.5
CA4900694_001_001	1	0.41	0.41	0.41
CA4900699_002_002	1	4	4	4
CA4900720_001_001	1	1.9	1.9	1.9
CA4900728_001_001	2	4.55	4.5	4.6
CA4900787_001_001	1	2.8	2.8	2.8
CA4900791_006_006	1	0.2	0.2	0.2
CA4900794_002_002	1	2.9	2.9	2.9
CA4900795_001_001	1	1	1	1
CA4900796_001_001	2	3.6	1.3	5.9
CA4900796_003_003	1	2.6	2.6	2.6
CA4900797_001_001	2	7.15	7	7.3
CA4900798_002_002	1	3.1	3.1	3.1

CA4900799_002_002	1	1.7	1.7	1.7
CA4900799_003_003	1	1.3	1.3	1.3
CA4900817_002_002	1	0.2	0.2	0.2
CA4900832_002_002	1	3.1	3.1	3.1
CA4900878_008_008	1	1.5	1.5	1.5
CA4900897_003_003	1	0.89	0.89	0.89
CA4900897_004_004	2	0.2	0.2	0.2
CA4900913_001_001	3	9.966666667	5.9	13
CA4900934_001_001	3	5.633333333	5.2	5.9
CA4901008_001_001	1	0.2	0.2	0.2
CA4901063_001_001	1	0.2	0.2	0.2
CA4901093_001_001	1	0.2	0.2	0.2
CA4901156_001_001	1	0.2	0.2	0.2
CA4901165_001_001	1	0.2	0.2	0.2
CA4901175_001_001	1	1.2	1.2	1.2
CA4901232_001_001	1	0.9	0.9	0.9
CA4901269_001_001	1	0.2	0.2	0.2
CA4901312_001_001	1	0.2	0.2	0.2
CA4901321_001_001	1	0.2	0.2	0.2
CA4901324_001_001	1	2.9	2.9	2.9
CA4901336_001_001	2	0.2	0.2	0.2
CA4901346_002_002	2	5.05	4.9	5.2

CA4901365_001_001	1	2.7	2.7	2.7
CA4901407_001_001	1	2.6	2.6	2.6
CA4901431_001_001	1	0.81	0.81	0.81
CA4910011_002_002	1	1.9	1.9	1.9
CA4910011_005_005	1	0.2	0.2	0.2
CA4910011_015_015	1	0.7	0.7	0.7
CA4910014_011_011	1	0.86	0.86	0.86
CA4910014_014_014	1	0.2	0.2	0.2
CA4910014_016_016	1	0.57	0.57	0.57
CA4910014_040_040	3	7.5	5.9	8.6
CA4910014_044_044	1	0.2	0.2	0.2
CA4910016_002_002	1	0.2	0.2	0.2
CA4910017_020_020	1	0.2	0.2	0.2
CA4910022_001_001	1	0.2	0.2	0.2
CA4910022_004_004	1	0.2	0.2	0.2
CA4910023_004_004	1	0.01	0.01	0.01
CA4910023_005_005	1	0.01	0.01	0.01
CA4910027_002_002	2	5.4	4.9	5.9
CA4910027_003_003	2	3.85	3.3	4.4

Well ID	Number of Measurements Taken in 2024	Annual Average TDS Concentration (mg/l)	Minimum TDS Concentration (mg/l)	Maximum TDS Concentration (mg/l)
CA4900513_003_003	1	290	290	290
CA4900675_001_001	1	350	350	350
CA4900675_003_003	1	370	370	370
CA4900787_001_001	1	370	370	370
CA4900795_001_001	1	230	230	230
CA4900796_001_001	1	480	480	480
CA4900796_003_003	1	410	410	410
CA4910011_005_005	1	240	240	240
CA4910014_044_044	1	350	350	350
CA4910023_004_004	1	250	250	250
CA4910023_005_005	1	220	220	220
CA4910023_006_006	1	290	290	290
CA4910023_007_007	1	260	260	260

Appendix E Hydrographs for Depletion of Interconnected Surface Water Sustainability Indicator

Contents:

1: SRP0707

2: SRP0709

3: SRP0711

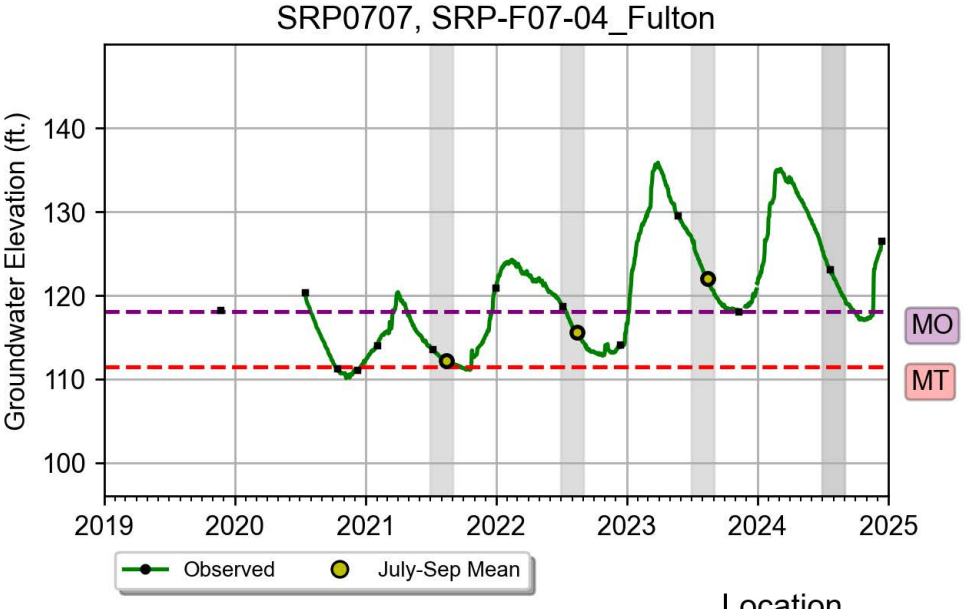
4: SRP0712

5: SRP0713

6: SRP0714

7: SRP0716

WY 2024 Status:
Not Measured

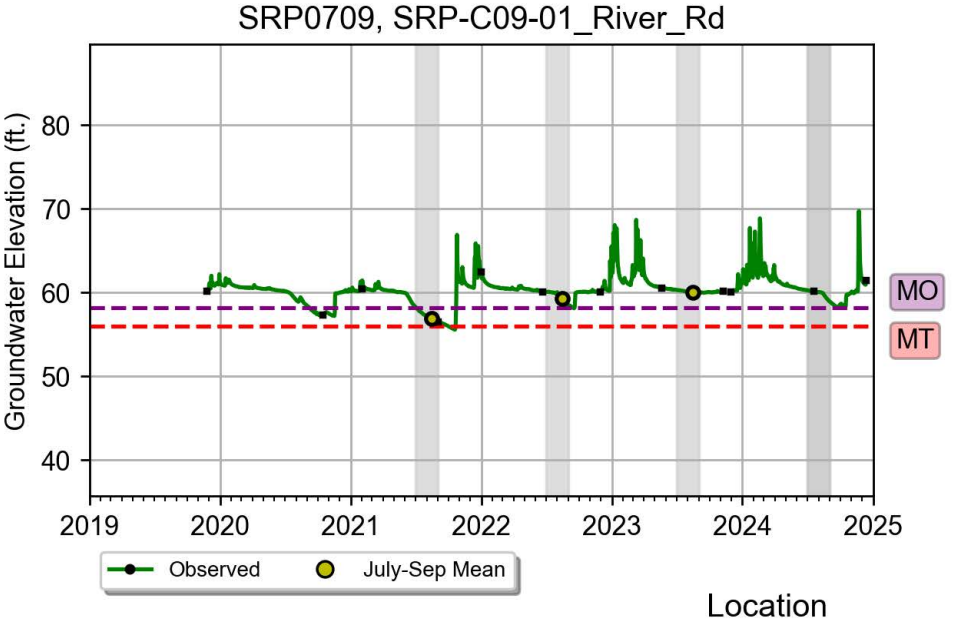


Location



Well Depth: 50.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 30-50 ft
Elevation: 144 ft
Lat.: 38.50865 Lon.: -122.76983

WY 2024 Status:
Not Measured

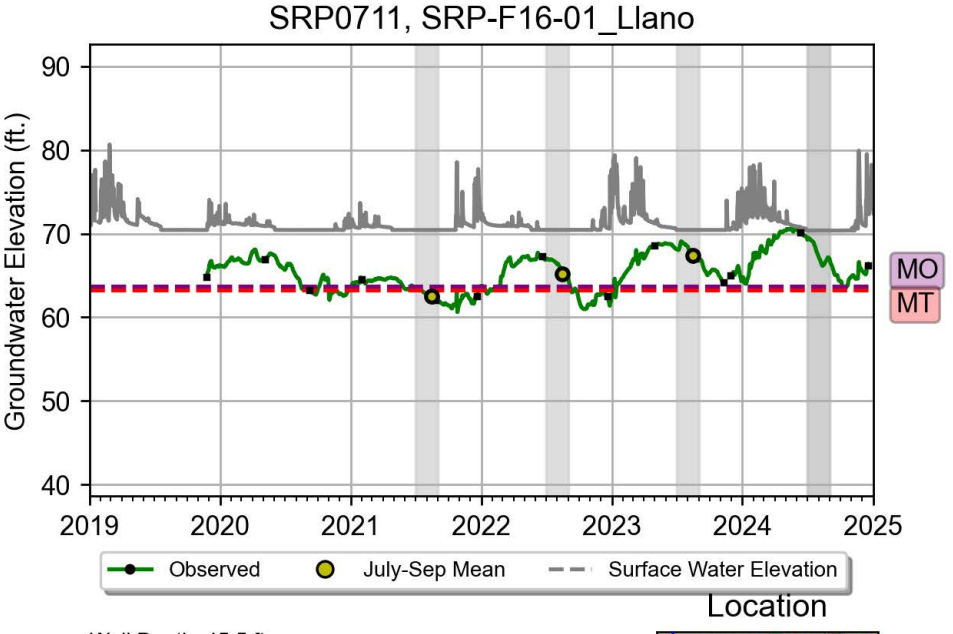


Well Depth: 33.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 23-33 ft
Elevation: 72 ft
Lat.: 38.48170 Lon.: -122.83417

Location



WY 2024 Status:
Not Measured

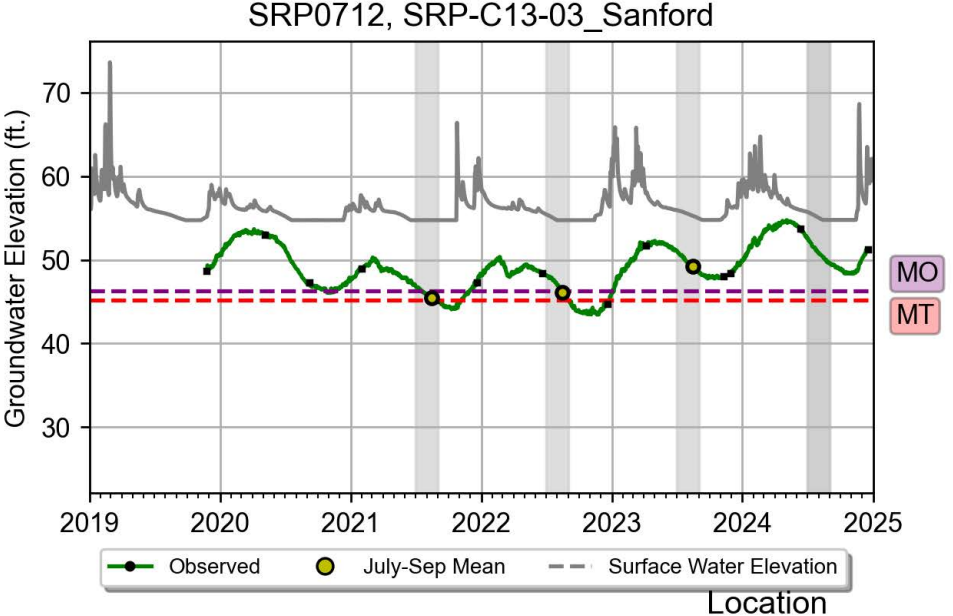


Location



Well Depth: 45.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 35-45 ft
Elevation: 79 ft
Lat.: 38.37323 Lon.: -122.76874

WY 2024 Status:
Not Measured

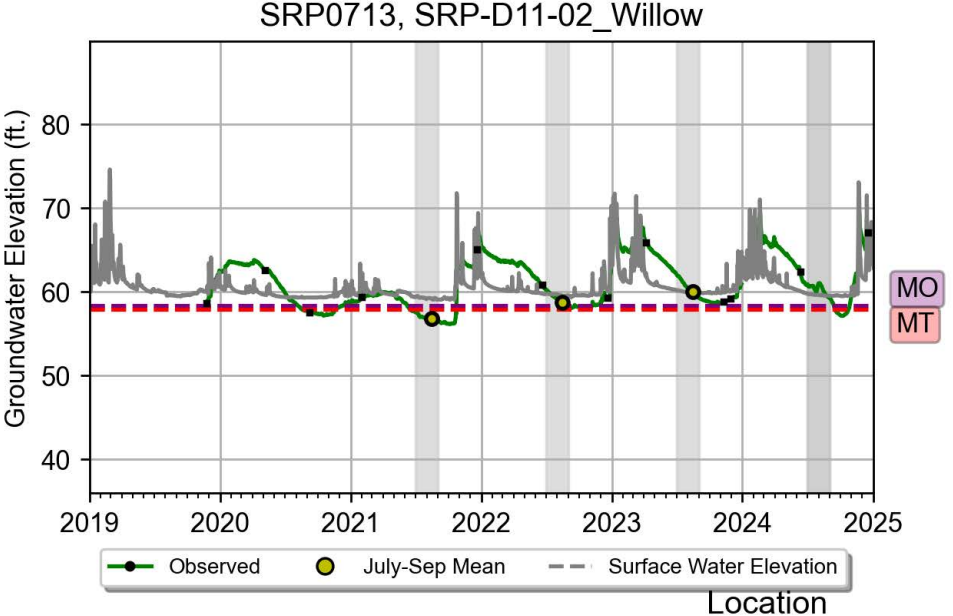


Location



Well Depth: 48.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 28-48 ft
Elevation: 69 ft
Lat.: 38.42595 Lon.: -122.82525

WY 2024 Status:
Not Measured

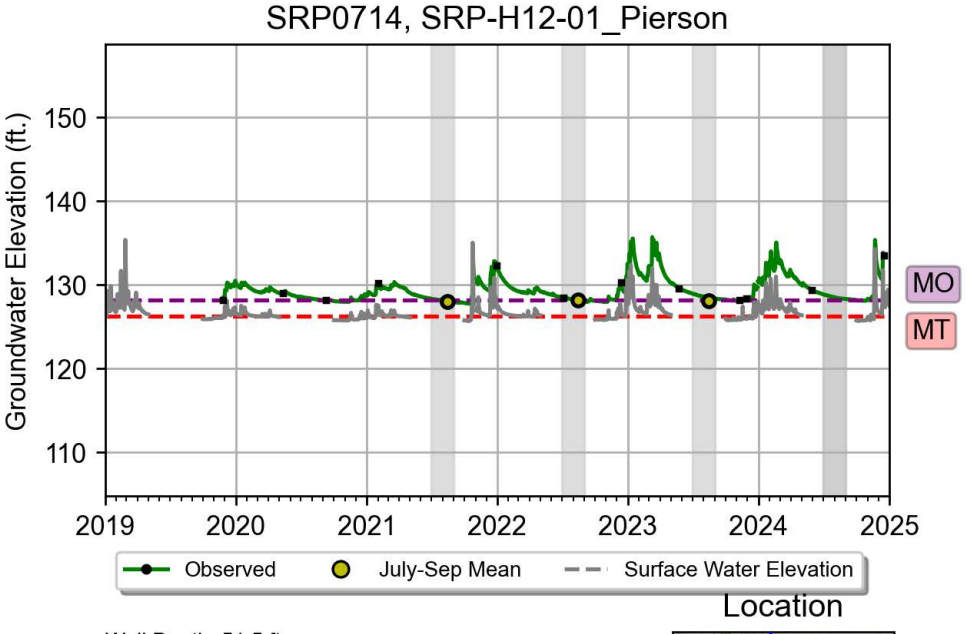


Location



Well Depth: 45.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 25-45 ft
Elevation: 79 ft
Lat.: 38.44495 Lon.: -122.80684

WY 2024 Status:
Not Measured

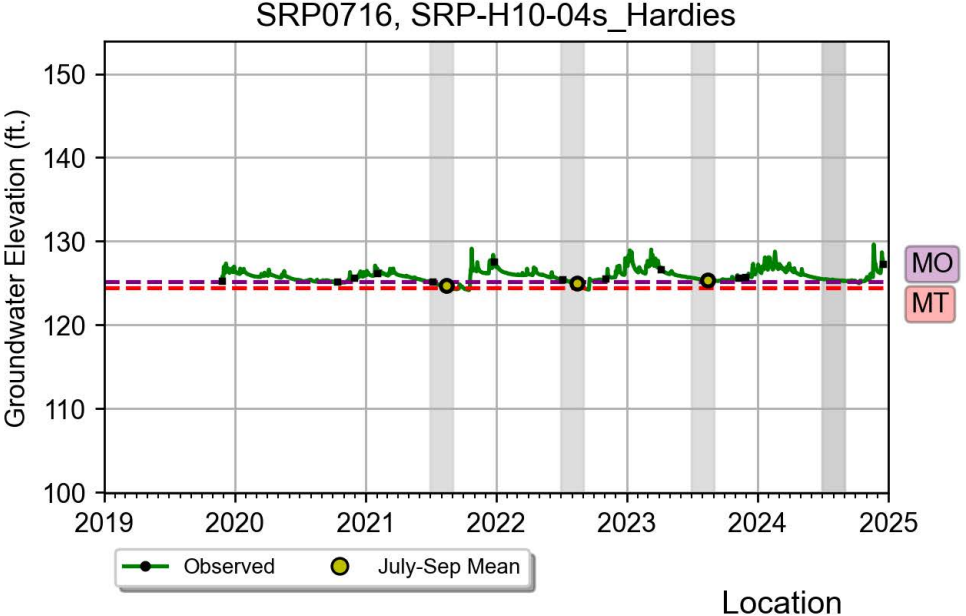


Location



Well Depth: 51.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 41-51 ft
Elevation: 150 ft
Lat.: 38.43661 Lon.: -122.72465

WY 2024 Status:
Not Measured

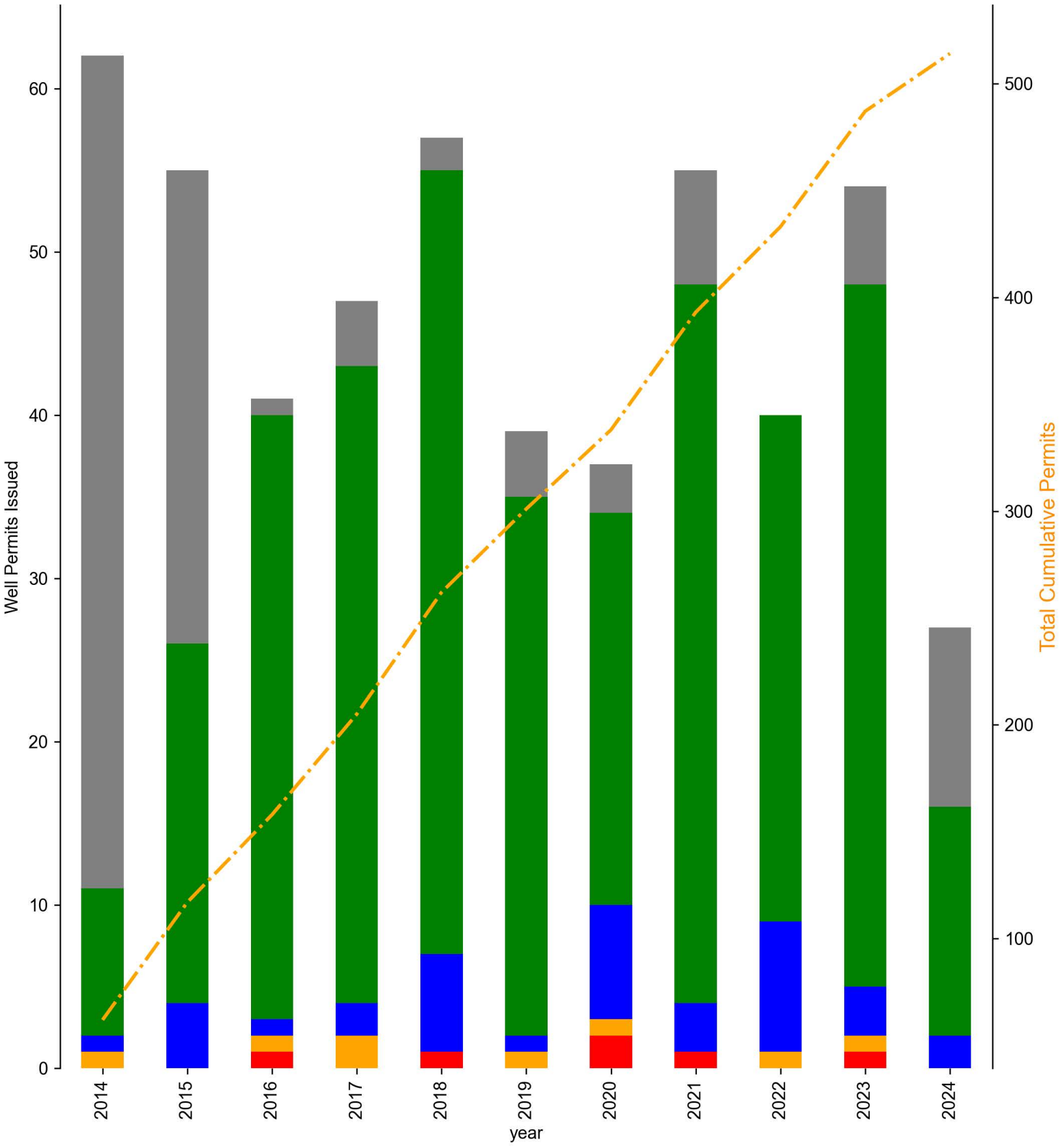


Well Depth: 20.5 ft
Groundwater Basin: SANTA ROSA VALLEY - SANTA ROSA PLAIN
Screened Intervals: 15-20 ft
Elevation: 136 ft
Lat.: 38.46282 Lon.: -122.73528

Location

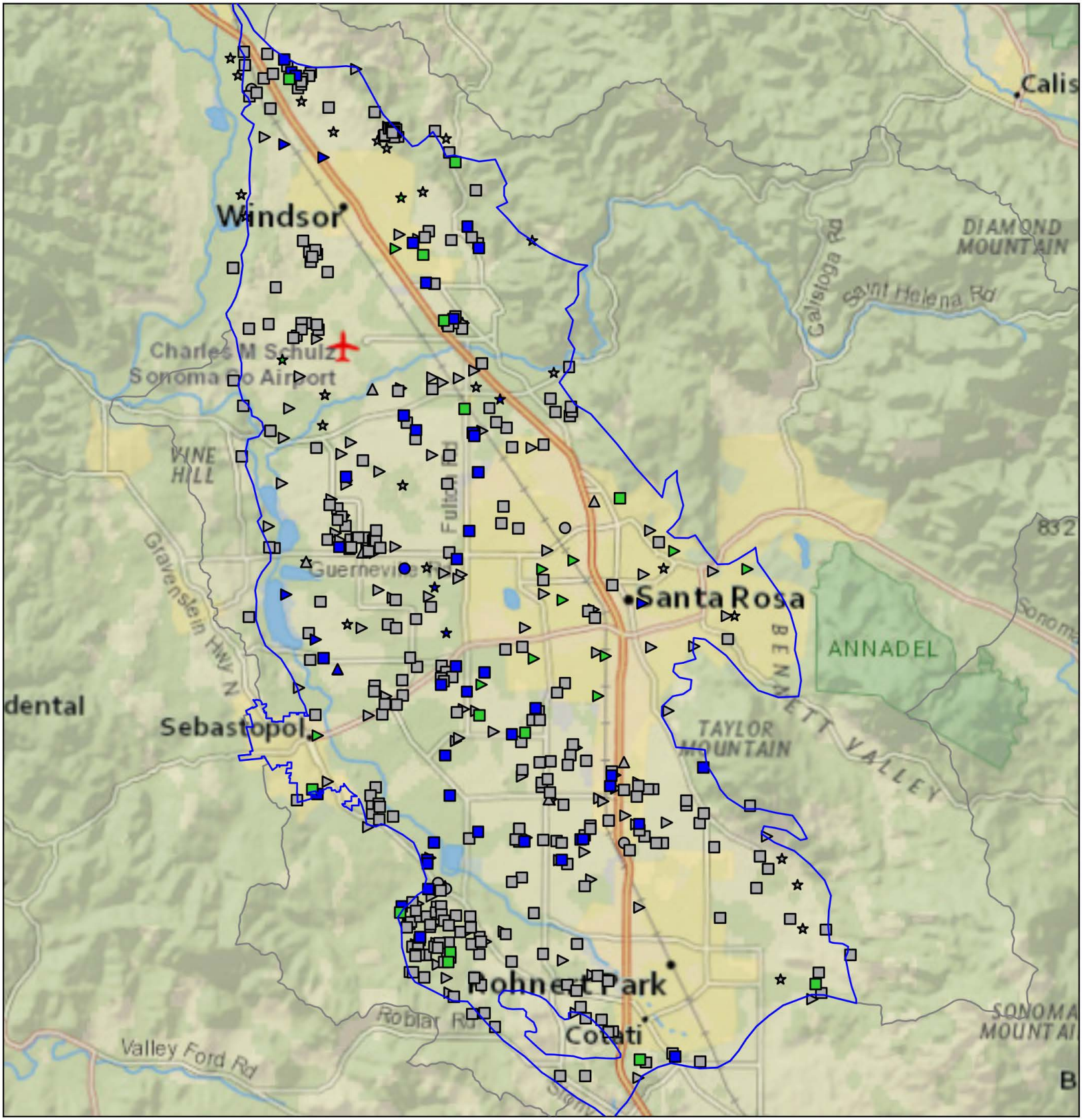


Appendix F Water Well Permits Issued by Permit Sonoma within Subbasin (2015 – 2024)



Number of Water Well Permits Issued Per Year

Appendix F



Well Permits Issued 2015-2022
- Irrigation
- Residential
- Community
- Commercial
- Industrial
- Unknown

Well Permits Issued in 2023
- Irrigation
- Residential
- Community
- Commercial
- Industrial
- Unknown

Well Permits Issued in 2024
- Irrigation
- Residential
- Community
- Commercial
- Industrial
- Unknown

Water Well Permits Issued 2015-2024

Appendix F