GROUNDWATER SUSTAINABILITY PLAN SANTA ROSA PLAIN GROUNDWATER SUBBASIN

December 2021

Prepared by Sonoma Water

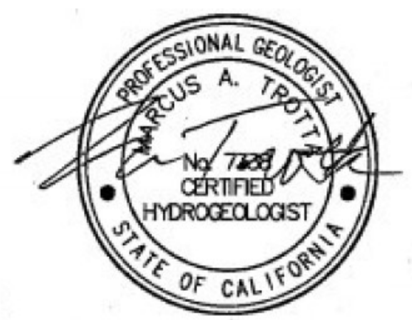
Adopted by the Board of the Santa Rosa Plain Groundwater Sustainability Agency on December 9, 2021

Submitted to California Department of Water Resources January 2022

SANTA ROSA PLAIN GROUNDWATER SUSTAINABILITY AGENCY

Signature Page

Section 3 (Basin Setting) of the Santa Rosa Plain Subbasin Groundwater Sustainability Plan was prepared under the direction of a professional geologist licensed in the state of California as required per California Code of Regulations, Title 23 Section 354.12 consistent with professional standards of practice.



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- Gold Ridge Resource Conservation District (Gold Ridge RCD)
- Sonoma Resource Conservation District (Sonoma RCD)

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ES EXECUTIVE SUMMARY

California's historic Sustainable Groundwater Management Act (SGMA) became effective on January 1, 2015, at the height of the state's last drought. SGMA mandates that groundwater resources be sustainably managed to ensure that water will be available today and into the future for all beneficial users, including flora and fauna, municipal and domestic, agricultural, and business users. The Santa Rosa Plain Groundwater Sustainability Agency (Santa Rosa Plain GSA) was formed to develop and implement this Groundwater Sustainability Plan (GSP or Plan) for the Santa Rosa Plain Groundwater Subbasin (Subbasin) as required by SGMA (**Figure ES-1**).

This GSP lays out a management process for ensuring a sustainable groundwater supply in the future by improving the understanding of this hidden resource, measuring progress through metrics that will be monitored, actively implementing projects, adopting policies and management actions in response to groundwater conditions if they decline unacceptably, and developing the funding needed for long-term implementation. The GSP implementation process includes active engagement of local stakeholders, including disadvantaged communities (DACs), Tribes, residential well owners, farmers, businesses, and environmental representatives.

The Subbasin is classified by California Department of Water Resources (DWR) as a medium-priority basin. Based on the medium-priority designation, the GSA must 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 problems and data gaps, define local goals for sustainable management of the Subbasin, and develop a GSP that achieves and maintains groundwater sustainability 50 years into the future.

Prior to the passage of SGMA, a U.S. Geological Survey (USGS) study was conducted in the Subbasin and surrounding watershed (contributing watershed area—provides water to the groundwater Subbasin), which was published in 2014 and included the development of an integrated surface water and groundwater computer model. Under the leadership of a diverse-stakeholder based Basin Advisory Panel, the voluntary Santa Rosa Plain Groundwater Management Plan (GMP) was developed and released in 2014. The GMP advanced the characterization and monitoring of groundwater conditions and initial study and planning of potential projects within the Subbasin.

This GSP presents detailed, technical information to build upon the work done in the GMP and to better understand groundwater in the Subbasin. The GSP uses quantifiable sustainable management criteria to define sustainability and includes projects, management actions, and an implementation plan necessary to achieve locally determined sustainability goals.

Because Santa Rosa Plain once again faces historic drought conditions, and with climate change projections showing that longer, more severe droughts are inevitable, the GSP lays out a path for long-term sustainability and resiliency, as defined by SGMA. While the current drought highlights water resource challenges, this GSP was not developed to address immediate short-term issues, but is focused on long-term, systemic groundwater issues.

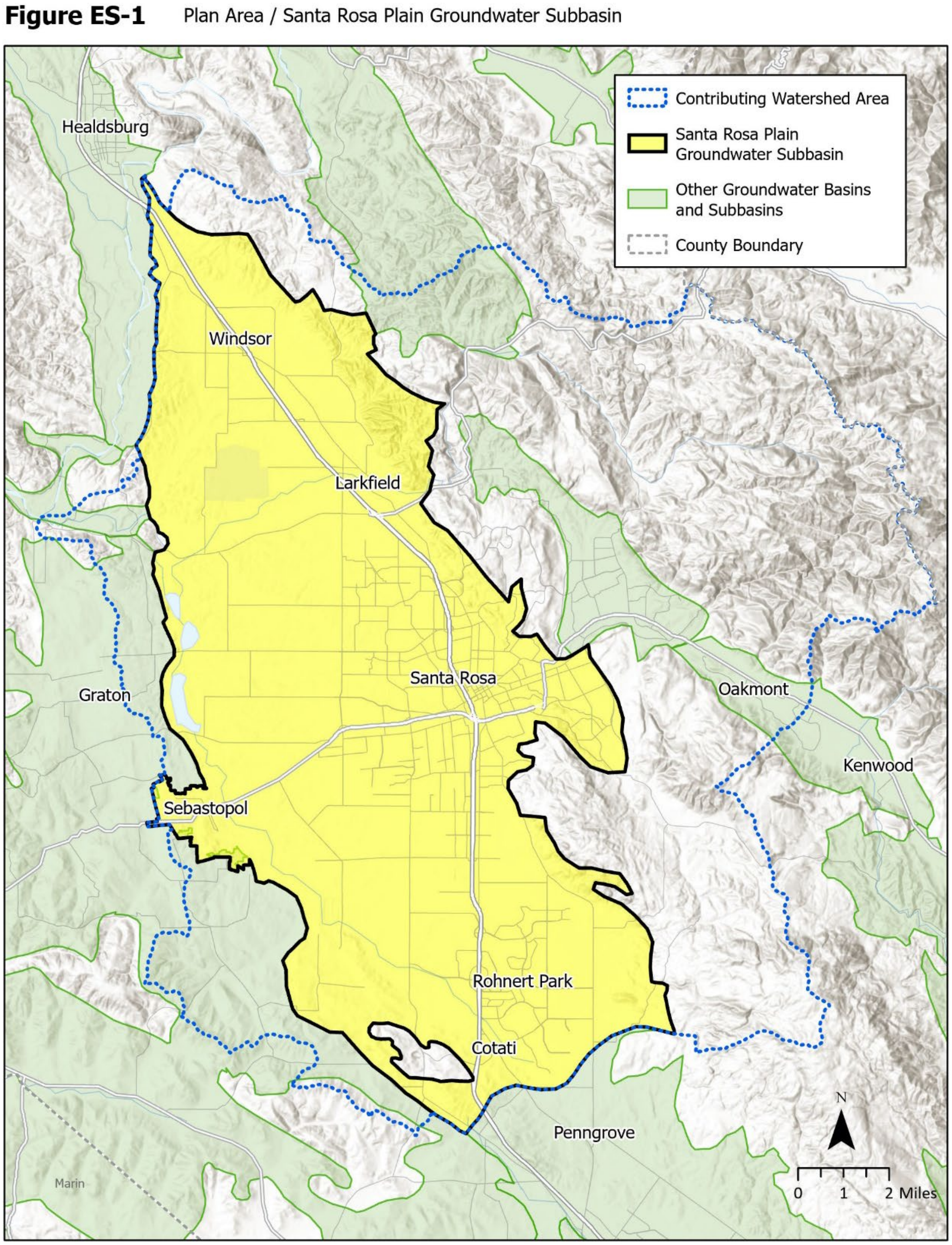

Figure ES-1. Santa Rosa Plain Groundwater Subbasin

For example, using a computerized model, described in **Section ES-3**, the GSP projects a 50-year climate future characterized by a few very dry years, followed by several wet or very wet years, and then a long drought. This scenario is representative of projected conditions in the North Bay, but is one of multiple options that could have been used. The climate scenario will be re-evaluated as more refined projections become available. This approach reflects a key component of this GSP, which is adaptive management. The document identifies areas of uncertainty and describes how new information will be incorporated into GSP implementation to make adjustments and to correct course as appropriate when necessary.

Adaptive Management
A key tenant of this GSP is adaptive management. Adaptive management is a structured, iterative process of robust decision-making in the face of uncertainty, with an aim to reducing uncertainty over time via monitoring and through the incorporation of new information as it becomes available.

This GSP and Executive Summary are organized following DWR's guidance documents (DWR 2016a):

- Executive Summary
- Section 1 Introduction
- Section 2 Description of the Plan Area
- Section 3 Basin Setting
- Section 4 Sustainable Management Criteria
- Section 5 Monitoring Networks
- Section 6 Projects and Management Actions to Achieve Sustainability
- Section 7 Implementation Plan
- Section 8 References and Technical Studies Used to Develop the GSP

ES.1 Introduction

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 Board created an 18-member Advisory Committee to provide feedback and advice on all aspects of the GSP to the Board (**Figure ES-2**). 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 the following groups:

- Two from environmental organizations with a presence in the Subbasin
- Two from rural-residential well owners
- Two from the agricultural community
- One from the business community

The Advisory Committee meetings are open to the public, advertised through a monthly email update, and posted on the website santarosaplaingroundwater.org.

GSP development was a collaborative effort among the Board, Advisory Committee, and technical consultants and was further informed by input from member agencies, resource agencies, and the community, including representatives of DACs, residential well owners, Tribes, agriculture, business, and environmental interests. Key policy issues were vetted, discussed, and modified based on this open, public exchange.

ES.2 Plan Area

Section 2 of the GSP describes the Plan Area, including government jurisdictions, land use, water sources and uses, topography, surface water features, current monitoring and water management programs, and the well-permitting process.

The Plan Area for this GSP covers the entire 80,000-acre Subbasin, which lies within the Coast Ranges geomorphic province. The Subbasin 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. 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 the Subbasin. The urban communities account for about 36 percent of the land use. Residences outside of urban water supply systems rely on groundwater. The exact number of domestic wells is unknown but is estimated to be between 4,000 and 5,500. Agriculture, which accounts for 26 percent of land use—primarily wine grapes—depends on groundwater and recycled water, where available. Native vegetation or water make up 35 percent of land use, and 3 percent of land is classified as vacant. In 2020, imported water accounted for 45 percent of water supply in the Subbasin, groundwater accounted for 35 percent, and recycled water accounted for about 20 percent (**Figure ES-3a**). **Figure ES-3b** shows the DACs in the Subbasin. These communities are generally (but not entirely) located in areas that receive water from municipal suppliers, which rely primarily on surface water supply.

Climate, groundwater, and streamflow conditions in the Subbasin are informed by robust monitoring networks. Multiple studies, programs, land use plans, and regulations affect, inform, and protect current and future water resources, water use, and water quality in the Subbasin. The County is responsible for administering well permits in both incorporated and unincorporated areas of the Subbasin.

ES.3 Basin Setting

Section 3 describes the Subbasin setting based on existing studies related to geology, climate, and historical groundwater conditions.

ES.3.1 Hydrogeologic Conceptual Model

The Hydrogeologic Conceptual Model (HCM) characterizes the physical components of the surface water and groundwater systems, regional hydrology, geology, water quality, and principal aquifers and aquitards.

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 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 and no known existing wells extend deeper than 2,000 feet.

In general, groundwater flows from the east and west highlands to the Laguna de Santa Rosa (**Figure ES-4**). 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 longer to reach the aquifers, due to long travel paths.

For the purpose of implementing SGMA, two principal aquifer systems are described in the GSP: the shallow and deep aquifer systems, which are commonly separated by layers of clay, forming aquitards. The properties and features that are the basis for grouping into shallow and deep aquifer systems include the degree of surface water connectivity, degree of confinement, and responses to hydraulic stresses such as recharge and pumping. Although the deep and shallow aquifer systems are grouped separately, the degree of connection between them is variable depending upon the local nature and thickness of the clay aquitards.

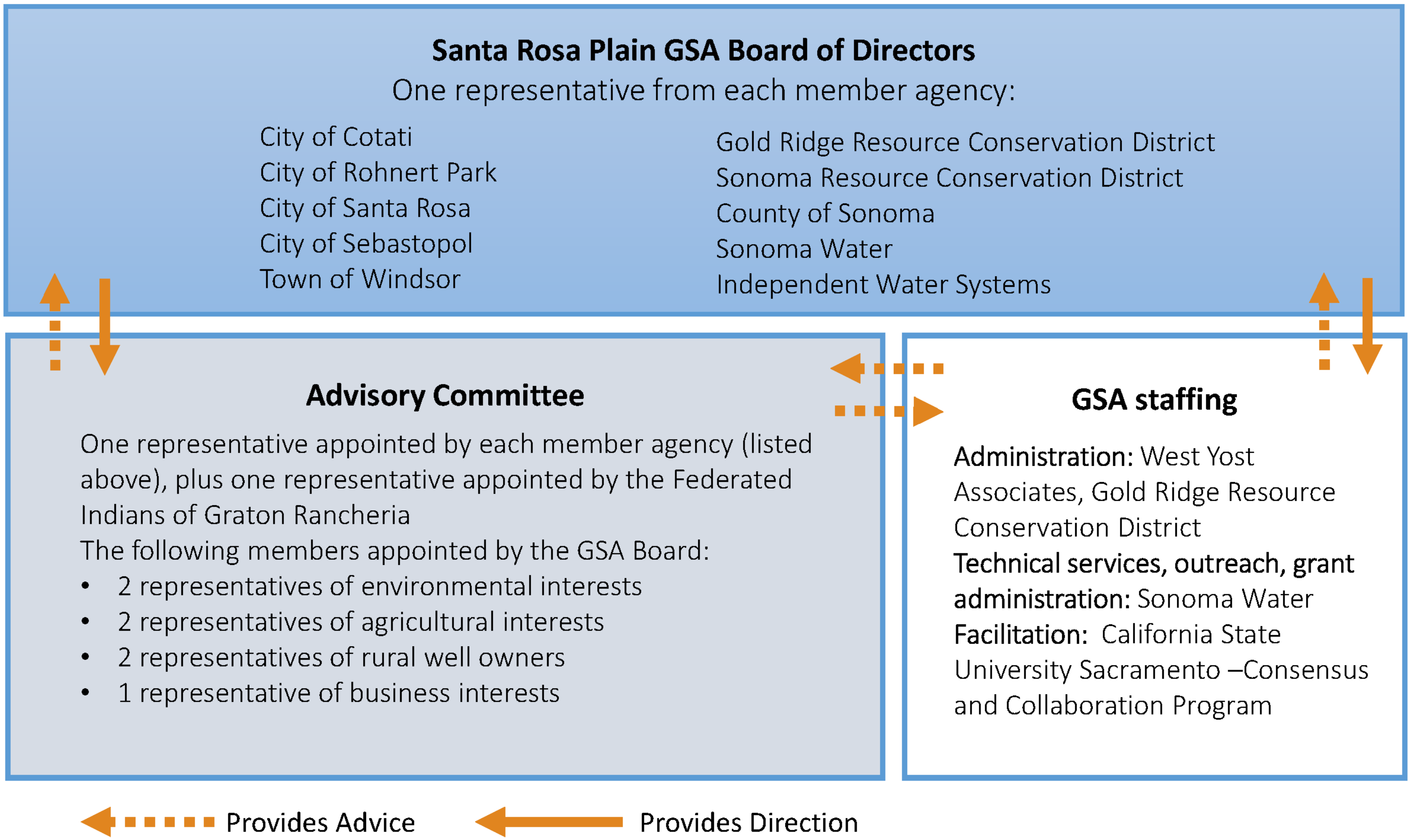

Figure ES-2. GSA Organizational Structure

Figure ES-3a Santa Rosa Plain Water Sector and Water Use Type

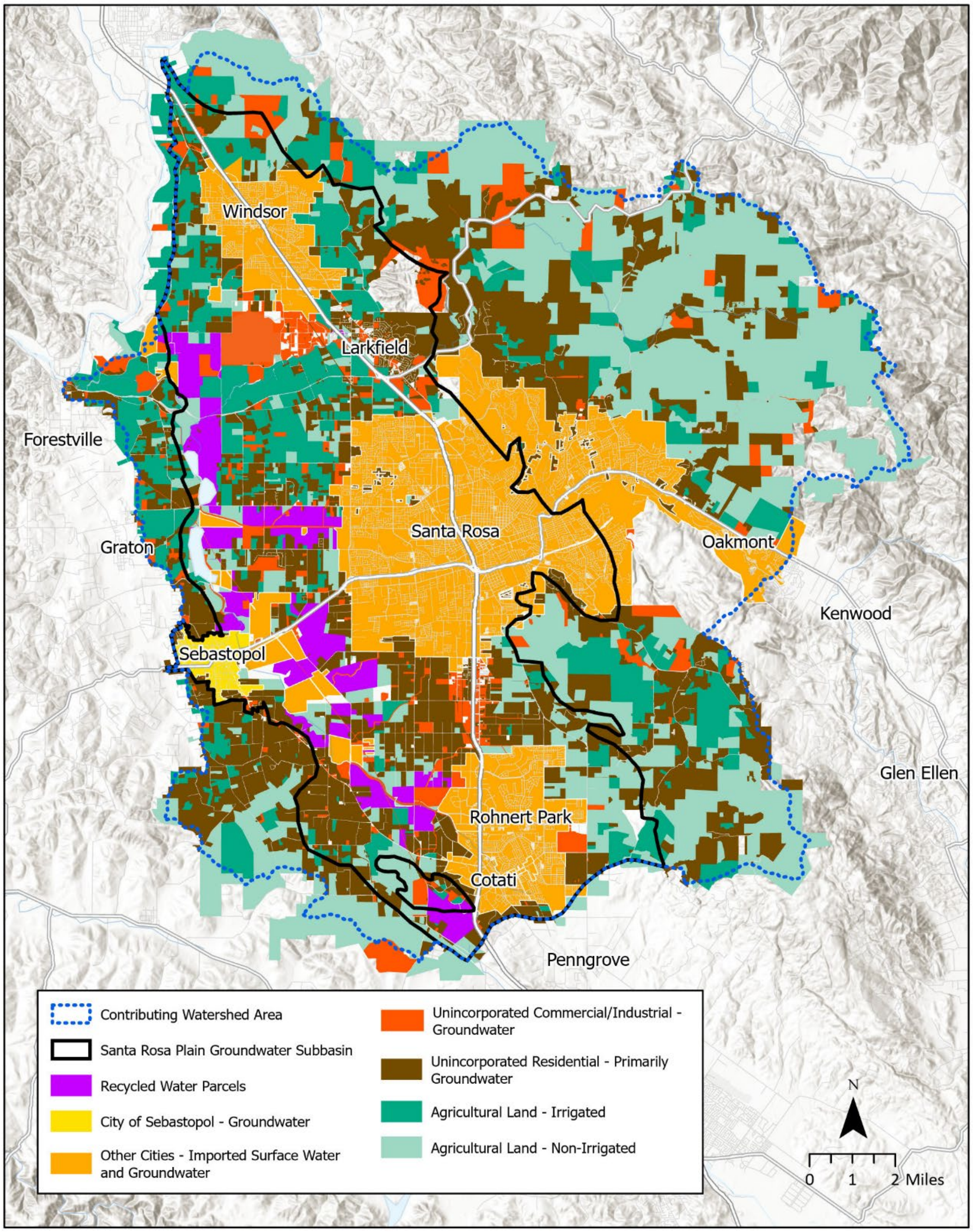

Figure ES-3a. Water Sector and Water Use

Figure ES-3b Santa Rosa Plain Disadvantaged Communities

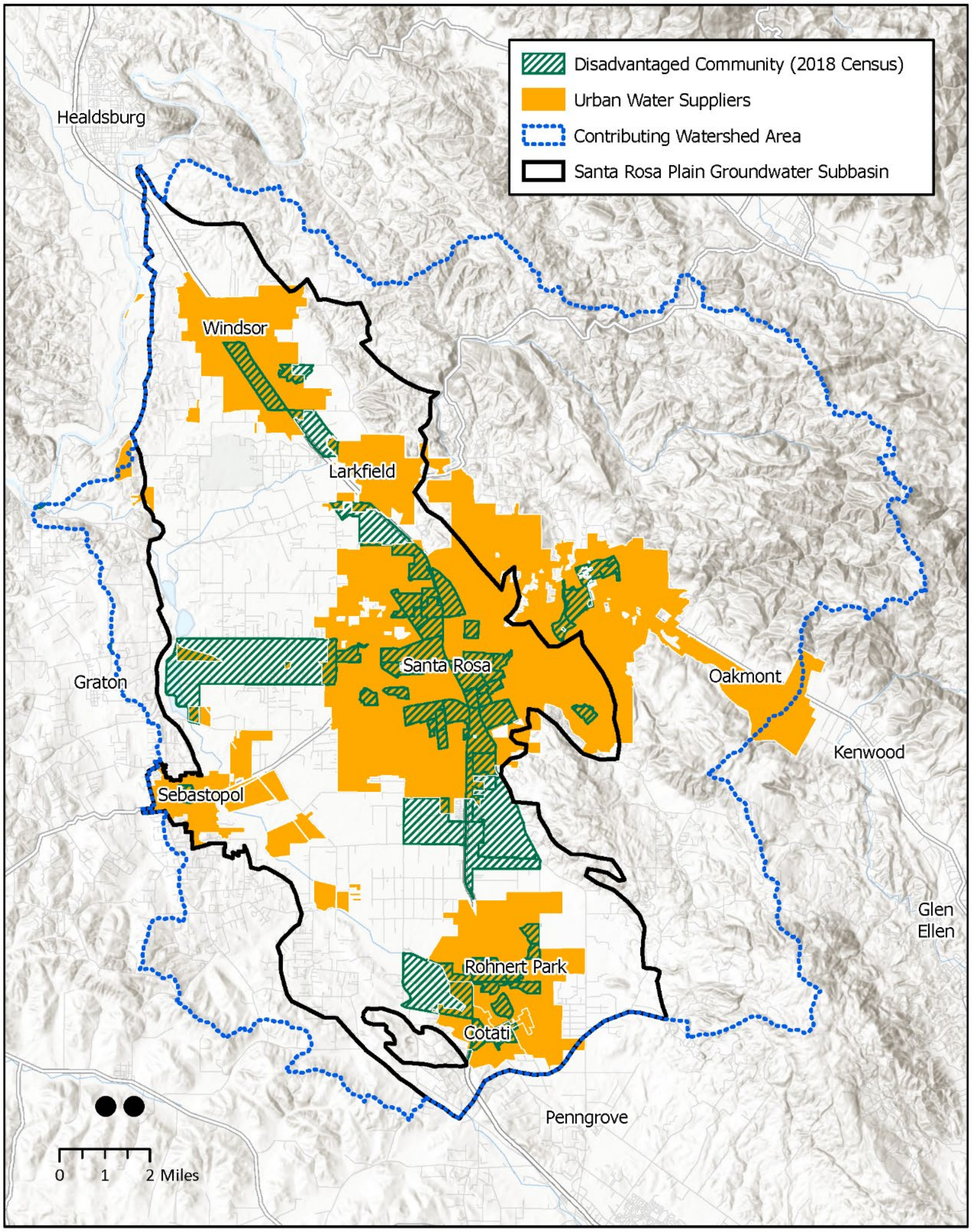

Figure ES-3b. Locations of Disadvantaged Communities

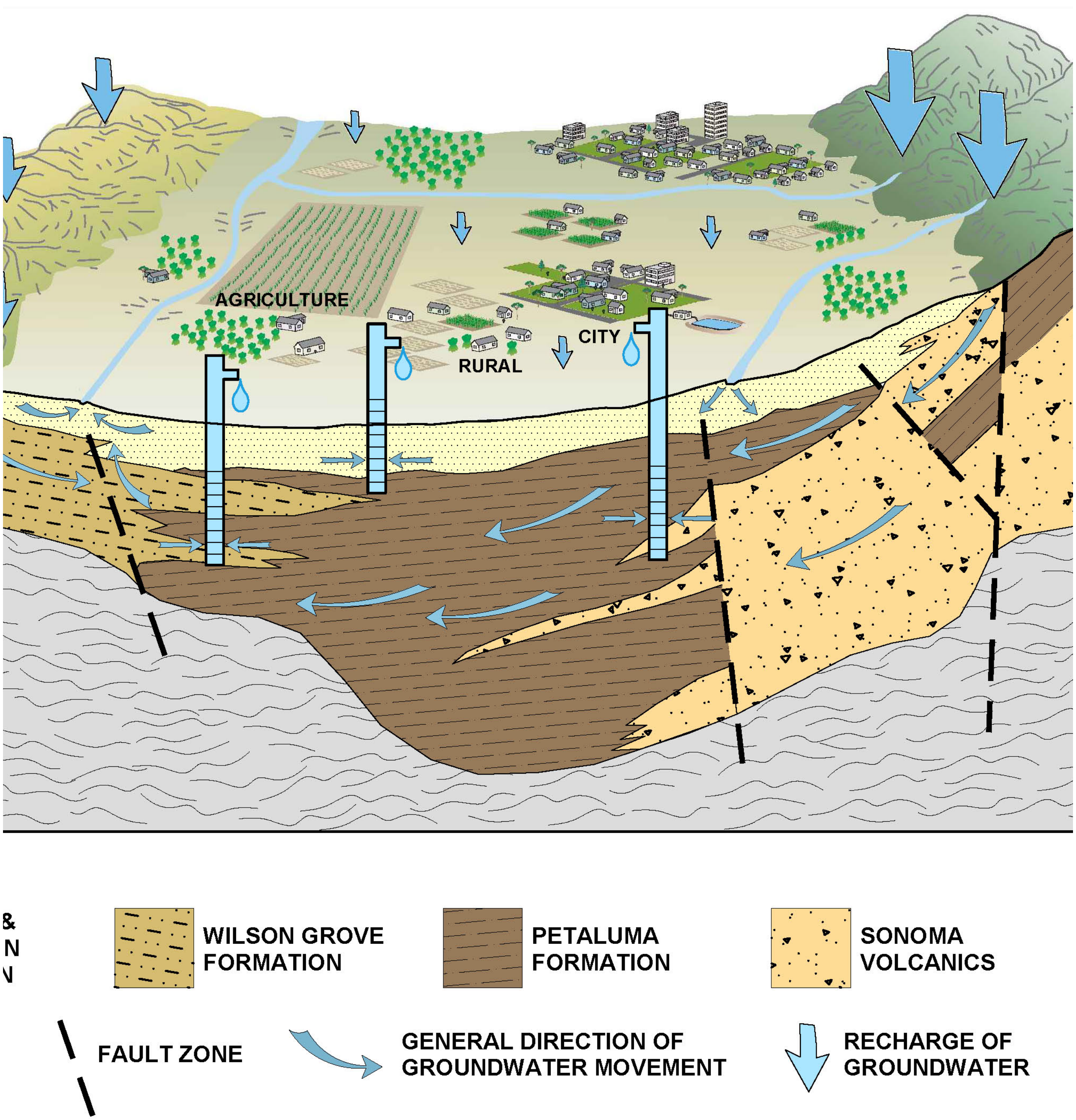

Figure ES-4. Fault Lines

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 properties 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 in the HCM 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.

ES.3.2 Current and Historical Groundwater Conditions

SGMA requires GSAs to evaluate groundwater conditions using six indicators of groundwater sustainability: groundwater levels, groundwater storage, groundwater quality, land subsidence, seawater intrusion, and interconnected surface water-groundwater. Because the Subbasin is not connected to or influenced by the ocean or bay, the seawater intrusion sustainability indicator is not applicable. In **Section 3**, previous studies, monitoring well data, and data from other monitoring networks are used to describe current and historical groundwater conditions for the remaining five sustainability indicators.

Groundwater Levels: Groundwater levels for 31 of the 37 shallow aquifer monitoring wells are generally stable and 6 of the wells exhibit increasing trends. More limited data from the deeper aquifer system finds that of the 24 wells, 7 exhibit relatively stable groundwater levels; 15 in the southern portions of the Subbasin and along the western boundary exhibit increasing trends and 2 wells, located east of and outside the Subbasin but within the contributing watershed area, have declining levels. Historically, groundwater-level declines exceeding 100 feet in the deep aquifer system occurred in the Rohnert Park-Cotati area associated with increases in municipal groundwater pumping due to population growth in the 1980s and 1990s. These declines have since recovered as the use of imported surface water and recycled water has increased and reduced municipal groundwater pumping in this area.

Groundwater Storage: The groundwater budget (described in Section ES-3.5) finds that the amount of groundwater stored in the shallow and deep aquifer systems declined on average by about 2,100 acre-feet per year (AFY) during the drier climate conditions of the current water budget period.

Land Surface Subsidence: Existing data from both Interferometric Synthetic-Aperture Radar (InSAR) and Global positioning system (GPS) stations currently do not indicate that inelastic (irrecoverable) land subsidence is occurring as a result of groundwater pumping.

Groundwater Quality: Groundwater quality monitoring performed throughout the Subbasin for numerous different studies and regulatory programs finds that groundwater quality is generally adequate to support existing beneficial uses. Groundwater quality is naturally poor in some local areas and there are some locally limited human-caused impacts on groundwater quality from land use activities, such as industrial, commercial, agriculture, septic systems, and urban activities.

Interconnected Surface Water and Groundwater: Multiple years of measuring streamflows at different locations combined with high-frequency groundwater monitoring provide evidence of the connection between groundwater and surface water in the Subbasin. In addition, an analysis of environmental beneficial users by a practitioners working group identified aquatic species and habitats that could be adversely affected by the depletion of interconnected surface water caused by groundwater pumping. More data are needed from monitoring wells near creeks and from stream gages to determine the specific impacts of groundwater pumping on surface water and on these groundwater dependent ecosystems (GDEs).

ES.3.3 Groundwater Flow Model

A computerized numerical groundwater flow model, the Santa Rosa Plain Hydrologic Model (SRPHM), developed by the USGS in 2014 and revised by Sonoma Water to incorporate more recent data, is used as a groundwater management tool and to calculate the combined groundwater flows into and out of the basin of both the shallow and deep aquifer**.** The model accounts for precipitation, surface water, and groundwater entering the Subbasin through runoff, streams, septic systems, and other sources; and surface water and groundwater leaving the basin through evapotranspiration, streams, pumping, diversions, and other means.

ES.3.4 Projected Future Basin Conditions, Land Use, and Climate Change

Sustainability in the Subbasin must be achieved and maintained even as conditions—including land use and climate—change. Assumptions for future projected land use changes and water demands were estimated for rural-residential groundwater pumping, agricultural land use footprint, and municipal demands. Two practitioner workgroups and surveys and input from the Advisory Committee helped develop the model data used to project future conditions.

The Santa Rosa Plain GSA chose a climate change scenario that provides for several very dry years through 2025; normal and wetter years through 2050; and then a long-term drought after the mid-twenty-first century. This climate scenario allows for a significant stress test for groundwater resources planning during the GSP implementation horizon. As part of its adaptive approach to groundwater management, the GSA anticipates revising and updating climate projections as part of the 5-year update.

ES.3.5 Water Budget

The water budget was developed using the surface water and groundwater computer model. The water budget provides an accounting and assessment of the total annual volume of surface water and groundwater entering and leaving the basin and the change of the volume of groundwater in storage under historical, current, and projected water budget conditions.

Figure ES-5 summarizes the major sources of groundwater inflows and outflows. Overall, groundwater outflows are larger than inflows, resulting in losses of groundwater in storage of about 2,100 AFY during the current modeled period (2012-2018).

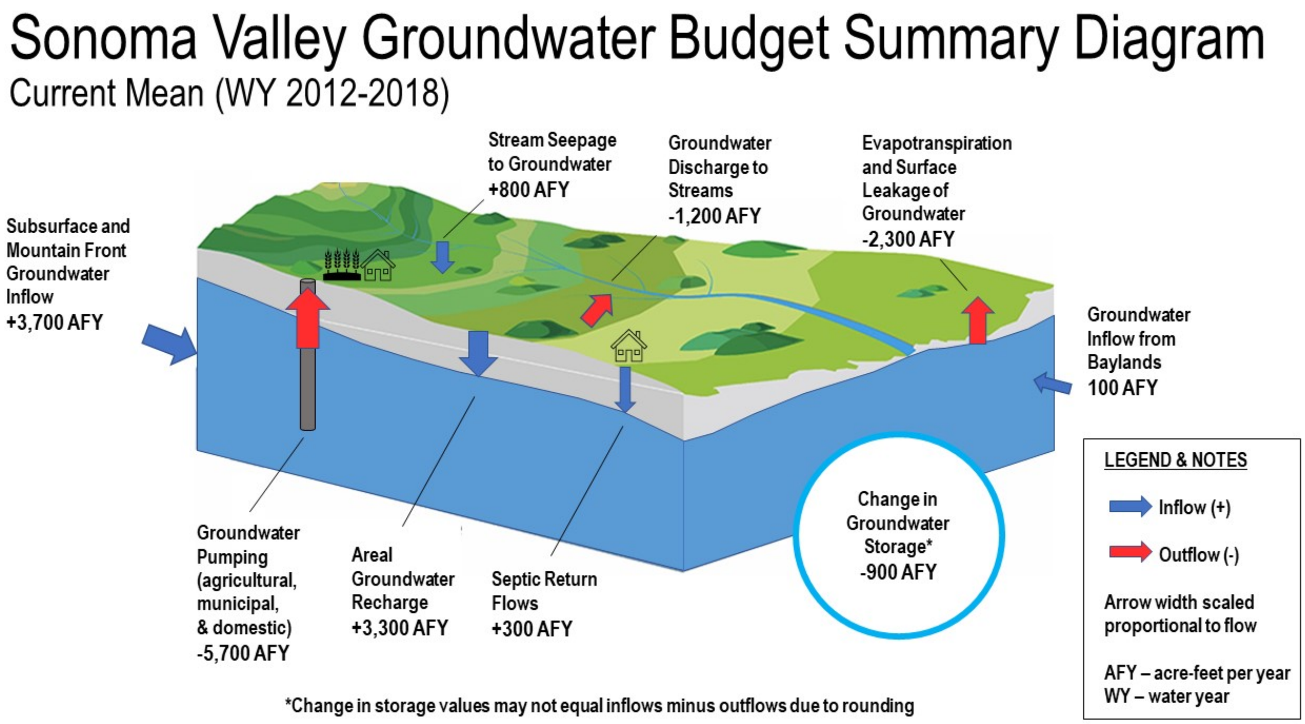

Figure ES-5. Current Water Budget

The projected water budget covers water years (WYs) 2021 to 2070. Storage change from the first year of the historical period in WY 1976 through to the end of the projected period in WY 2070 has a simulated cumulative loss of 97,200 acre-feet (AF). For the first part of the projected period, from WY 2021 to WY 2040, the simulated average loss of groundwater in storage is 200 AFY, reflecting the projected wet and very wet climate change scenario. For the full projected period from WY 2021 through WY 2070, that includes an extended drought beginning in 2050, the simulated average loss of groundwater in storage increases to 1,400 AFY for a total projected loss of 71,500 AF cumulatively over the 50-year period. **Table ES-1** summarizes the historical, current, and projected annual changes in groundwater storage for the Subbasin.

Figure ES-6 illustrates the changes in groundwater inflows, by source, in the historical, current, and future periods, while **Figure ES-7** illustrates the changes in groundwater outflows during the same time periods. The primary source of inflow, precipitation, is projected to increase between 2021-2040, and then decline. Outflows are also projected to increase in the future, through outflows to streams and agricultural pumping.

Table ES-1. Summary Historical (WYs 1976-2018), Current (WYs 2012-2018), and Projected (WYs 2021-2070) Average Annual Change in Groundwater Storage (AFY)[a]

Water Budget Periods	
Average, Historical Period (1976-2018)	-600
Average, Current Period (2012-2018)	-2,100
Future Period	
Average (2021-2070)	**-1,400**

Note:
[a] Values rounded to nearest 100.

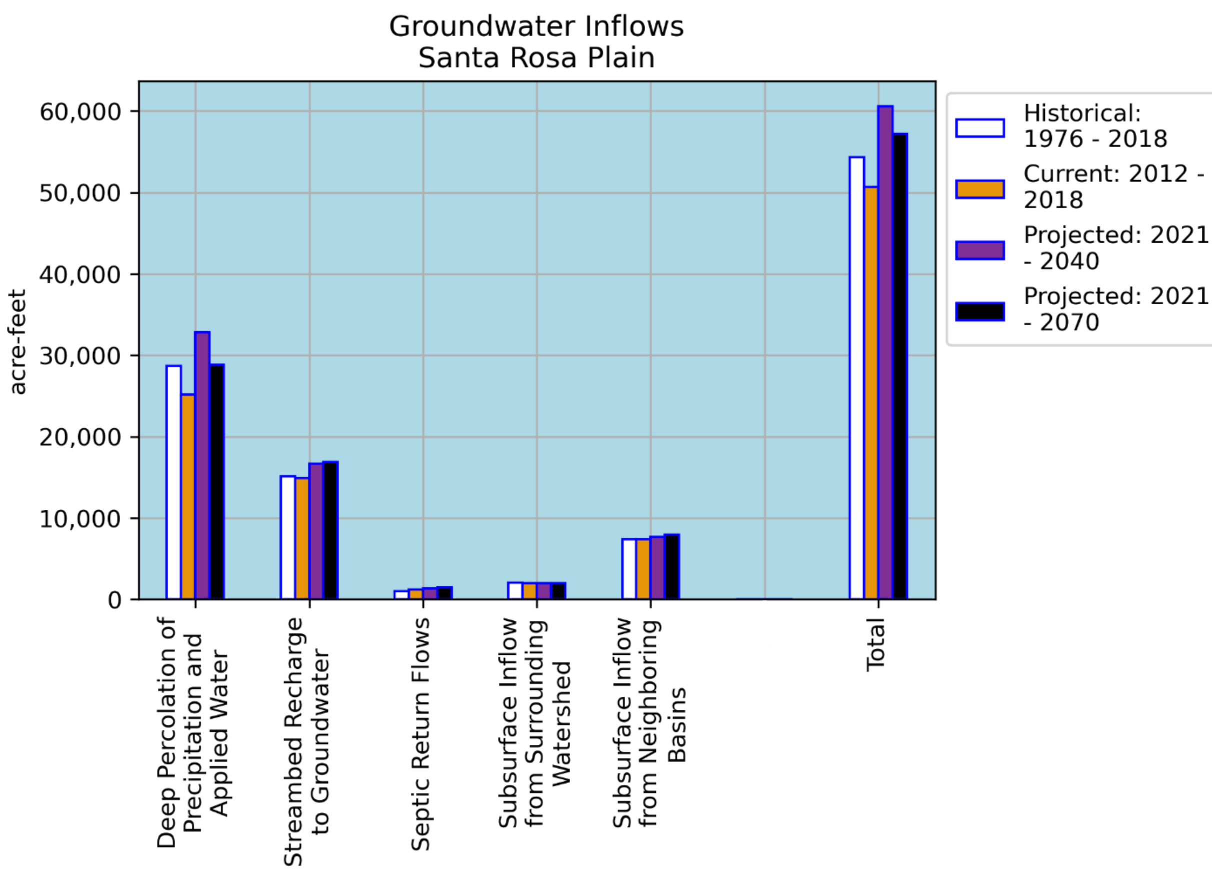

Figure ES-6. Historical, Current, and Future Groundwater Inflows

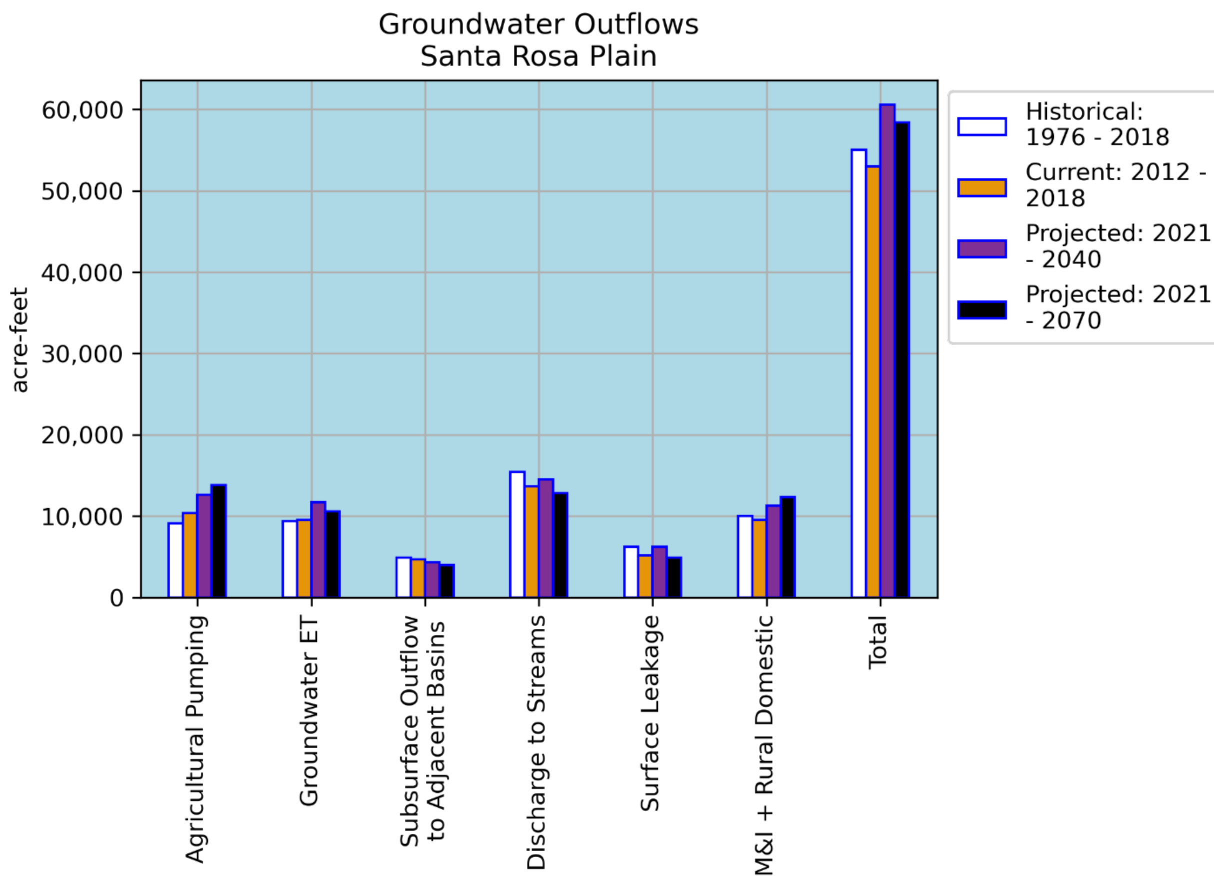

Figure ES-7. Historical, Current, and Future Groundwater Outflows

ES.3.6 Sustainable Yield

The sustainable yield of the Subbasin is an estimate of the quantity of groundwater that can be pumped on a long-term average annual basis without causing undesirable results. Basin-wide pumping within the sustainable yield estimate is neither a measure of, nor proof of, sustainability. However, estimates of sustainable yield using the current and projected simulations may prove useful in estimating the need for projects and management actions to help achieve sustainability.

The 20-year modeled period from WY 2021 to WY 2040 is used to determine the sustainable yield of the Subbasin. The average total annual groundwater pumping for this period is 23,900 AF, which is defined here as the sustainable yield. This value is 39 percent of the total groundwater inflows into the Subbasin, and is greater than the average total groundwater pumpage experienced during the current water budget period. However, as discussed in Section 6.3, the annual average projected pumping for the 50-year period from 2021 to 2070 of 26,100 AF exceeds the sustainable yield indicating that projects and management actions are needed to sustainably manage the Subbasin and avoid potential future undesirable results.

ES.4 Sustainable Management Criteria

SGMA provides specific language and criteria for establishing and maintaining sustainability, including the development of a sustainability goal, which Santa Rosa Plain GSA defines as follows:

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

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

Central to SGMA is the development of sustainable management criteria (SMC) for the sustainability indicators, depicted on **Figure ES-8.** The Santa Rosa Plain GSA identified undesirable results, minimum thresholds (MTs), measurable objectives (MOs), and interim milestones for the sustainability indicators as discussed in **Sections 4.4** through **4.10** (refer to the breakout box for definitions). The five sustainability indicators applicable and relevant to the Subbasin are listed in Table ES-2 with a summary of what the GSA considers significant and unreasonable conditions for each indicator. **Table ES-2** also provides the SMC for all sustainability indicators.

Table ES-2. Santa Rosa Plain GSA Sustainable Management Criteria

Sustainability Indicator	Significant and Unreasonable Statement	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
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. Metric: Historical low elevations minus four-year drought assumption. **Wells with Historical Declines and then recovery:** Maintain above historical low elevations and protect at least 98% of nearby water supply wells. Metric: Shallower (more protective) of historical low elevations OR above the 98th percentile of nearby water supply well depths.	Monthly or monthly-averaged groundwater levels measured at representative monitoring point wells.	**Stable Wells:** Maintain within historical observed ranges. Metric: Historical median spring groundwater elevation **Wells with Historical Declines and then recovery:** Maintain within recent (recovered or recovering) historical observed ranges. Metric: Recent (2010-2019) median spring groundwater elevation	10% of RMPs (2 RMPs within the shallow or deep aquifer) exceed MT for 3 consecutive years
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: • Long-term reductions in groundwater storage; or • 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.
Degraded water quality	Significant and unreasonable water quality conditions occur if an increase in the concentration of constituents of concern in groundwater leads to adverse impacts on beneficial users or uses of groundwater, due to: • Direct actions by Santa Rosa Plain GSP projects or management activities • Undesirable results occurring for other sustainability indicators.	The MT is based on two additional supply wells exceeding MCLs for (1) arsenic, (2) nitrate, or (3) salts (measured as TDS).	The number of public water 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 identical to the MT.	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.
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/year 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/year 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 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)
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 representative monitoring points (shallow monitoring wells near interconnected surface water).	The MO is to maintain groundwater levels within historical observed ranges. Metric: Mean groundwater level for available dry-season observations between 2004 and 2020.	When MTs are exceeded at 40 percent of RMP wells during drought years and 10 percent of RMP wells during non-drought years.

GWL = groundwater levels

RMP = representative monitoring point

Figure ES-8. Sustainable Management Criteria

Components of Sustainable Management Criteria

Sustainability Goal: A succinct statement of the GSA's objectives and desired conditions and how the basin will achieve these conditions.

Significant and Unreasonable Condition: A qualitative statement regarding conditions that should be avoided.

Undesirable Results: A quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the Basin or Subbasin. **Minimum Thresholds:** The quantitative values that reflect what is significant and unreasonable at every measuring site. This value is what you want to try to avoid, and take action if reached.

Measurable Objectives: Specific, quantifiable goals at each representative monitoring site to maintain or improve groundwater conditions in order to maintain or achieve the sustainability goal for the basin. This value is what you want to achieve in the future, where you want to be.

Interim Milestone: The quantitative values that are set to reach at 5-year increments.

Representative Monitoring Sites: These are typical monitoring sites within the broader network of sites that reliably provide high quality data that characterize groundwater conditions in the basin.

ES.5 Monitoring Networks

SGMA requires monitoring networks to quantitatively measure Subbasin health and the GSA's progress in meeting or maintaining sustainability. **Section 5** describes the monitoring networks that are planned in the Subbasin and in the contributing watershed area. The section also discusses how the existing monitoring networks described in **Section 2** were evaluated and refined.

Consideration of Public Trust Resources

While SGMA does not require the Plan to address California's public trust doctrine, a 2018 California Court of Appeal ruling found that groundwater pumping that reduces the flow or volume of water in a navigable stream (and tributaries that supply navigable streams) may violate the public trust in certain fact-specific circumstances (Environmental Law Foundation et al. v. State Water Resources Control Board [2018] 26 Cal.App.5th 844). This Plan recognizes the importance of considering and protecting public trust resources to the extent feasible, including fish and wildlife and recreation, in the Subbasin's streams that are interconnected with groundwater. Working groups that included state and federal resource agencies and environmental non-profits and non-governmental organizations were created and facilitated to help develop the SMC for Interconnected Surface Water and to identify plants and animals that could be affected by surface water depletion due to groundwater pumping. The GSA developed a plan that considers public trust resources.

The purpose of the monitoring networks is to demonstrate progress toward achieving MOs, monitor impacts on groundwater users and uses, monitor changing groundwater conditions, and quantify changes in the water budget.

Representative monitoring point (RMP) networks are a subset of the larger monitoring network and are described in detail in **Section 5** (**Table ES-3**). Representative monitoring points within the RMP network are wells where sustainability indicators are monitored. **Figures ES-9** and **ES-10** illustrate the location of RMPs for chronic lowering of groundwater levels. As shown in **Table ES-3**, **Section 5** includes a monitoring plan for groundwater levels outside the Subbasin but within and along the boundaries of the contributing watershed. These wells are included to provide information on possible changes near the Subbasin boundaries.

Section 5 also identifies the data gaps that exist in the monitoring networks, and describes how these gaps will be filled during GSP implementation. The early years of GSP implementation will specifically focus on filling additional data needs to better monitor interconnected surface water, basin boundary conditions, and specific groundwater levels.

Table ES-3. Monitoring Networks and Initial Representative Monitoring Point Networks

Sustainability Indicator	Monitoring Network	Initial Representative Monitoring Point Network
Chronic Lowering of Groundwater levels	96 wells within the contributing watershed area (including 85 wells in the Subbasin) • 61 wells are in the shallow aquifer • 35 wells in the deep aquifer	14 wells screened within the shallow aquifer 12 wells screened primarily within the deep aquifer
Subbasin Boundary Groundwater-level Monitoring Network: This network provides information on boundary conditions, but is not used for RMPs	16 wells outside boundaries but within contributing watershed, including: 8 wells – Wilson Grove Formation Highlands Basin 1 well – Petaluma Valley Basin 3 wells – Rincon Valley Subbasin 1 well – Alexander Valley Subbasin 2 wells – outside of defined basins	
Reduction in Groundwater Storage	96 wells within the contributing watershed area (including 85 wells in the Subbasin) • 61 wells are in the shallow aquifer • 35 wells in the deep aquifer	13 wells screened within the shallow aquifer 10 wells screened primarily within the deep aquifer
Degraded Water Quality	Existing supply well groundwater quality monitoring programs, as follows: Arsenic: 104 wells Nitrate: 122 wells Salts: 92 wells	Existing supply well groundwater quality monitoring programs, as follows: Arsenic: 104 wells Nitrate: 122 wells Salts: 92 wells
Land Surface Subsidence	3 GPS locations; InSAR satellite in most of the Subbasin	InSAR dataset
Interconnected Surface Water	18 stream gages; 10 shallow monitoring wells adjacent to streams	7 shallow monitoring wells adjacent to streams

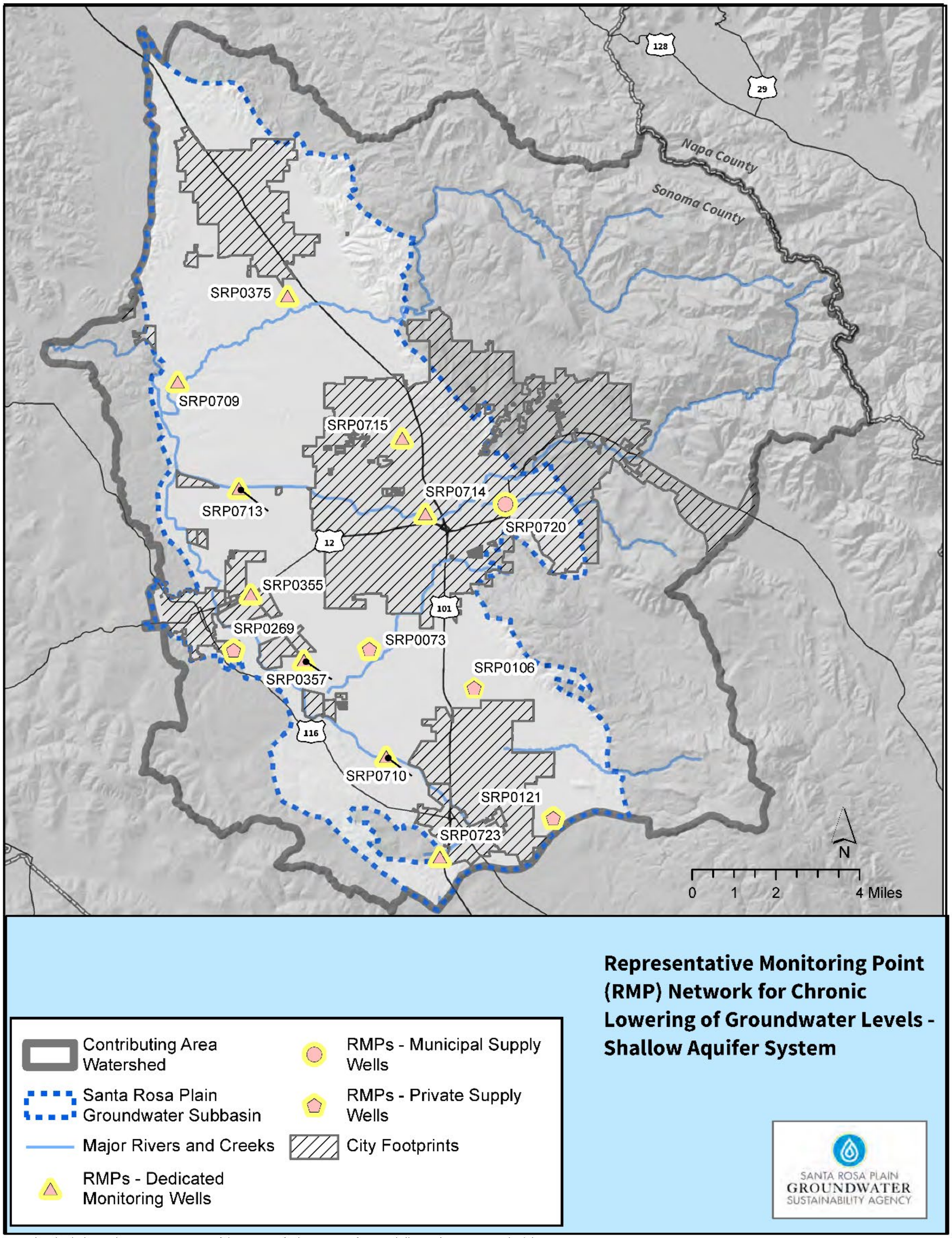

Figure ES-9. Representative Monitoring Point Network for Chronic Lowering of Groundwater Levels, Shallow Aquifer System

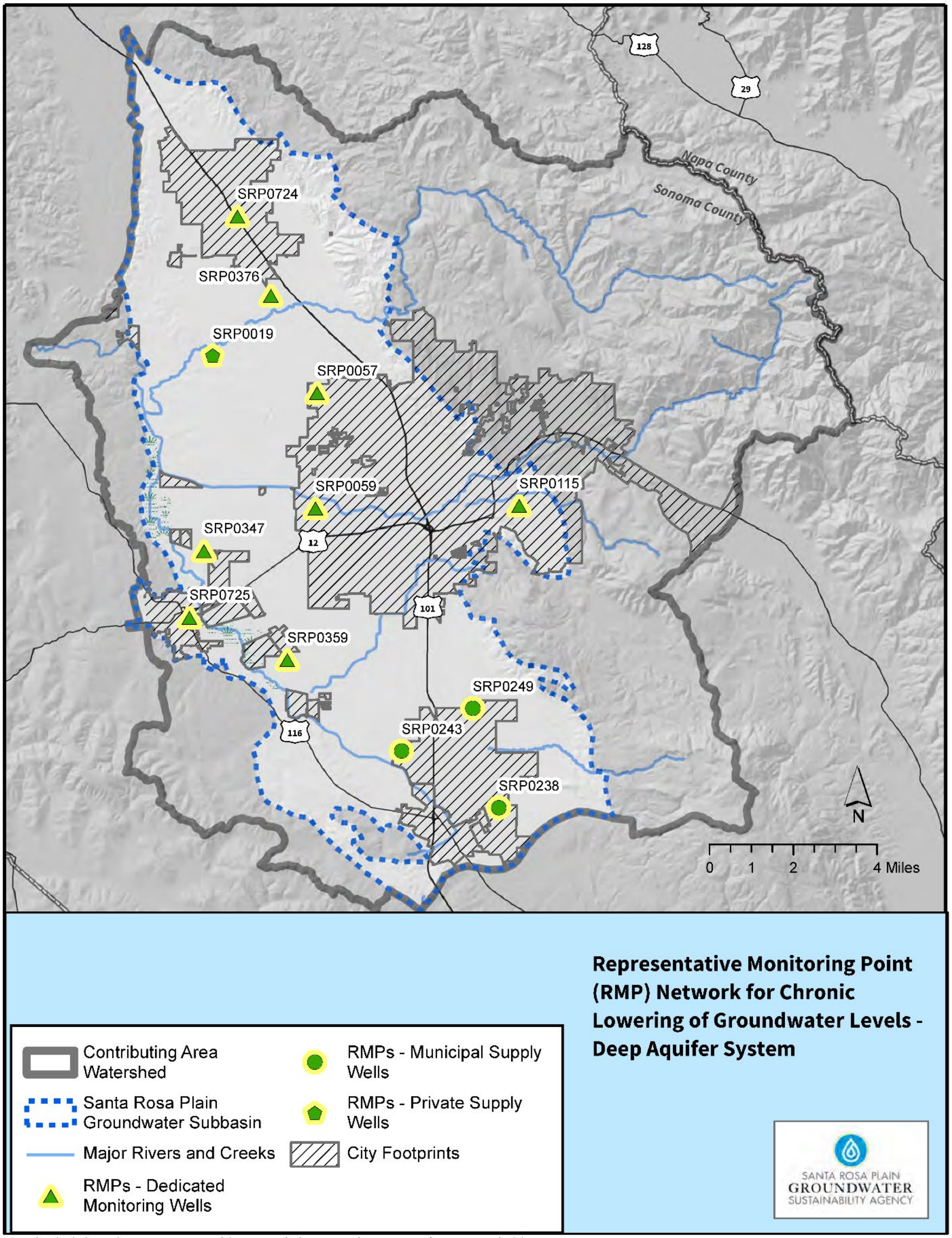

Figure ES-10. Representative Monitoring Point Network for Chronic Lowering of Groundwater Levels, Deep Aquifer System

ES.6 Projects and Management Actions

GSPs are intended to help communities achieve groundwater sustainability as defined by the SMC and based on current and projected future groundwater conditions. **Section 6** of the GSP identifies conceptual projects and management actions that avoid undesirable results and unsustainable groundwater conditions described in **Section 4**. These projects and management actions attempt to balance groundwater pumping reductions with projects that maximize the use of supplemental sources of water.

Projects and management actions are grouped into three categories. The groupings are as follows:

Group 1

- Voluntary reductions in groundwater use through water conservation tools (such as appliance rebates and replacement, smart irrigation controllers, and water use audits), onsite rainwater capture, and greywater use.
    - The programs and education offered to domestic, commercial, and industrial groundwater users will mirror programs offered to regional municipal water users, which have led to a 37 percent reduction in per capita water use since 2010.
    - The programs and education offered to agricultural users would be focused on leveraging existing best management practices and working with farmers who have not had access to or the resources available to reduce water use.
    - For the purposes of simulating these projects using the model, it was assumed that these tools would result in a 20 percent reduction in rural domestic groundwater use and a 10 percent reduction in agricultural groundwater use.

Group 2

- Stormwater capture and recharge, such as floodplain inundation along and near streams. The focus of this project is to temporarily capture local stormwater during high flow events in detention basins or by spreading on farmlands during the dormant season, letting it slowly sink into the ground to recharge the shallow aquifer and provide baseflow to streams near critical coho salmon streams.

Group 3

- Aquifer storage and recovery of treated Russian River drinking water into existing or new deep water supply wells. This project entails using dedicated groundwater wells in reverse during the rainy season to store treated Russian River water when it is plentiful. A feasibility study found that even during drought years, there are periods when river flows are high enough to store water in aquifers for use during the summer, in droughts, or during emergencies.

The project groups were modeled incrementally to assess their effect on Subbasin groundwater resources. Model scenario results indicate that these projects result in raising groundwater levels and improving discharge to streams relative to the projected baseline without projects. The projects were also simulated to help mitigate potential declines in groundwater storage during future extreme droughts.

Considering current uncertainties due to modeling and project information, these project scenarios provide a pathway for reaching sustainability and preparing for future changed conditions in the Subbasin to meet GSP requirements and help address future extreme droughts. Additional data collection and project conceptualization during early phases of GSP implementation will help refine these scenarios and allow for consideration of additional scenarios, including mandatory restrictions on groundwater extractions, if necessary, to achieve sustainability.

ES.6.1 Management Actions

In addition to the projects previously described above, the GSA will initiate the following management actions in the first year of GSP implementation.

Study of and Prioritization of Potential Policy Options: This management action involves a collaboration between the GSA Board, local land use agencies, GSA member agencies, other Sonoma County GSAs, and stakeholders to assess and prioritize future policy options that may be appropriate for the GSA to consider adopting or recommending for adoption by other agencies. This study will prepare a prioritized list of potential policy options for the GSA Board to consider. Based on input from the Advisory Committee and GSA Board, the following initial list of policy options has been developed for potential inclusion in the assessment:

- Water conservation plan requirements for new development
- Discretionary review of well permits for any special areas identified in GSP
- Expand low impact development or water efficient landscape plan requirements
- Modifications to the County well ordinance to improve monitoring of groundwater conditions
- Well construction and permitting recommendations (for example, water quality sampling and reporting for contaminants of concerns, requirement for water-level measurement access, and procedures for preventing cross-screening of aquifers)
- Well metering program for non-residential wells
- Domestic well mitigation program
- Study of water markets
- Permitting and accounting of water hauling

Coordination of Farm Plans with GSP Implementation: This management action involves a collaboration between the three Sonoma County GSAs and interested members of the agricultural community to evaluate the feasibility of developing a program that coordinates farm plans, developed at individual farm sites, with the implementation of the basin-wide GSP.

ES.7 Plan Implementation

Section 7 describes how the GSA will implement the projects and management actions while monitoring groundwater conditions, reporting each year to DWR, closing data gaps, engaging with stakeholders, and managing the organization. The GSA will continue to conduct business in meetings open to the public, maintain an Advisory Committee of representative basin stakeholders to provide recommendations on implementation activities and actions, and hold periodic community meetings to inform and receive input from the community.

A major focus of the initial 5 implementation years will be to gather information and data in many key areas to improve the understanding of potential impacts associated with groundwater conditions on sensitive beneficial users, primarily shallower domestic well users (including DACs) and GDEs. This information and data will inform the consideration of future refinements to SMC and appropriate response actions protective of these sensitive beneficial users. Planning for and permitting initial projects and management actions will begin immediately and will be completed within 5 years.

ES.7.1 Estimated Implementation Costs

Section 7 provides a high-level budget for the estimated cost over the initial 5 years of GSP implementation. Costs are based on the best estimates available and reflect Santa Rosa Plain GSA's understanding of the effort necessary for effective management and to comply with SGMA requirement for monitoring and reporting.

Costs are divided into the following categories: administration and operations (including legal and grants); communication and stakeholder engagement; routine monitoring, data evaluation, and reporting; addressing data gaps; model maintenance, updates, and improvements; conceptual projects and planning design; and 5-year GSP update. Percentage allocations of costs are shown on **Figure ES-11**. Group 1 projects and management actions are scheduled to be implemented by Santa Rosa Plain GSA and partner agencies by 2025. Group 2 and Group 3 projects have a longer planning horizon, and are anticipated to be implemented by 2028, as shown on Figure ES-12. However, some of the projects and management actions may be implemented sooner by other agencies and entities within the Subbasin in response to the 2021 drought conditions.

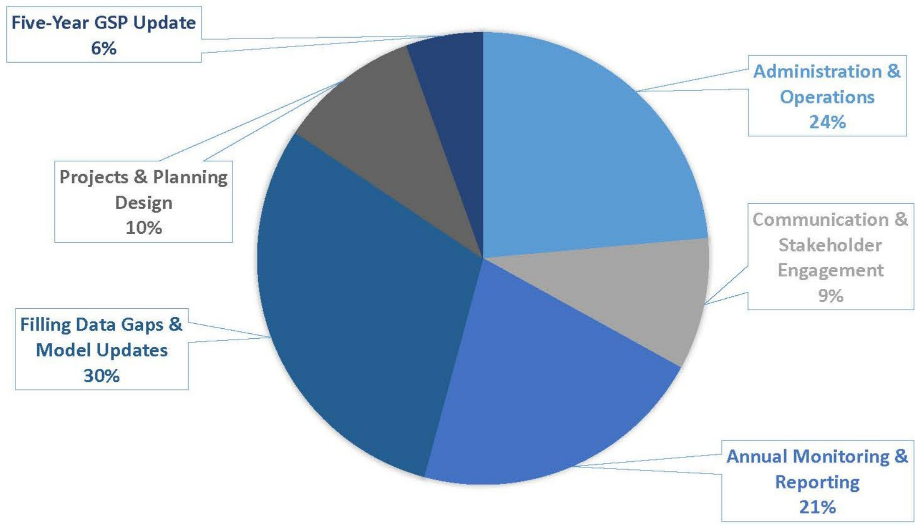

Figure ES-11. Percentage Breakdown of Cost Categories for 5-year GSP Implementation

The mid-range budget projections for the first 5 years total about $5.9 million, averaging about $1.2 million annually, as summarized in **Table ES-4**.

Table ES-4. Mid-range 5-year Total Budget Estimates

GSP Implementation Item	Year 1 2022 to 2023	Year 2 2023 to 2024	Year 3 2024 to 2025	Year 4 2025 to 2026	Year 5 2026 to 2027
GSA Administration and Operations	$285,000	$255,000	$250,000	$240,000	$255,000
Communication and Stakeholder Engagement[a]	$120,000	$95,000	$95,000	$95,000	$110,000
Annual Monitoring, Evaluation, and Reporting	$275,000	$220,000	$220,000	$220,000	$220,000
Data Gap Filling[a]	$100,000	$355,000	$551,000	$290,000	$0
Conceptual Projects and Planning Design[a]	$80,000	$165,000	$265,000	$20,000	$20,000
Model Updates[a]	$50,000	$150,000	$75,000	$50,000	$25,000
5-year GSP Updates[a]	$0	$0	$0	$100,000	$200,000
Subtotal	$910,000	$1,240,000	$1,456,000	$1,015,000	$830,000
10% Contingency - rounded to nearest $5,000	$90,000	$125,000	$145,000	$100,000	$85,000
Total	**$ 1,001,000**	**$ 1,364,000**	**$ 1,601,600**	**$ 1,116,500**	**$ 913,000**
Preliminary average annual costs equal approximately $1.2 million					

Note:
[a] Potential for bond funding/technical services support

ES.7.2 Funding Sources and Mechanisms

Currently, the GSA funds operations, outreach, and GSP development through a groundwater user fee. Municipal water suppliers pay an annual fee based on average annual groundwater extraction, as determined in 2019 when the fee was implemented. The County and Sonoma Water contribute funds to the Santa Rosa Plain GSA in lieu of the fee being collected from residential, agricultural, industrial, commercial, and other groundwater pumpers. The in lieu contribution will end on June 30, 2022, and all groundwater pumpers will be subject to the fee.

The Santa Rosa Plain GSA has successfully applied for and received more than $2 million in state grant funding for GSP development and to help address data gaps. Grant funding through Proposition 68 and future state bond measures continue to be a critical source of revenue, particularly for closing data gaps and for project planning and implementation. In addition, Santa Rosa Plain GSA has initiated a funding study to review its current fee and to identify alternative local financing options moving forward.

ES.8 References and Technical Studies

The final section of the GSP includes a complete list of references and technical studies that supported the development of this GSP.

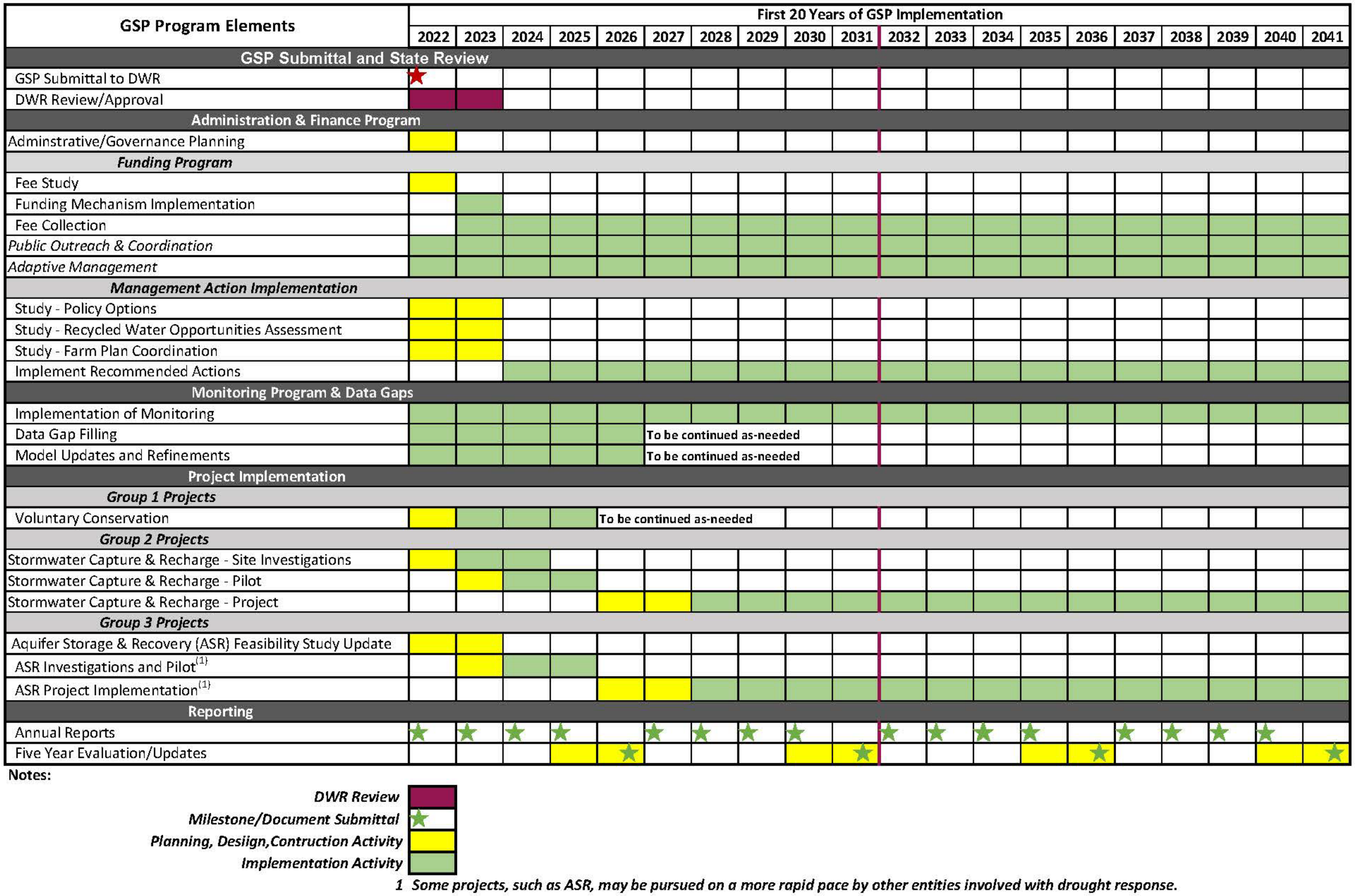

Figure ES-12. Santa Rosa Plain GSP Implementation Schedule

Groundwater Sustainability Plan for Santa Rosa Plain Groundwater Subbasin

Table of Contents

Appendices

Acronyms and Abbreviations

µg/L	microgram(s) per liter
AB	Assembly Bill
AF	acre-feet
AFY	acre-feet per year
AG	agricultural
ASR	aquifer storage and recovery
AWIA	America’s Water Infrastructure Act
Basin	Petaluma groundwater basin
bls	below land surface
BMP	best management practice
Boundary Network	Subbasin Boundary Groundwater-Level Monitoring Network
CASGEM	California Statewide Groundwater Elevation Monitoring
CBI	Consensus Building Institute
CCR	California Code of Regulations
CCTAG	Climate Change Technical Advisory Group
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CII	commercial, industrial, and institutional
COC	constituent of concern
CoCoRaHS	Community Collaborative Rain, Hail and Snow Network
County	Sonoma County
CWC	California Water Code
DAC	Disadvantaged Community
DDW	Division of Drinking Water
DHS	Department of Health Services
DTW	depth-to-groundwater
DWR	California Department of Water Resources
EC	electrical conductivity

ET	evapotranspiration
ft/d	foot(feet) per day
ft/yr	foot(feet) per year
GAMA	Groundwater Ambient Monitoring and Assessment Program
GCM	general circulation model
GDE	groundwater dependent ecosystem
GHB	General Head Boundary
GHG	greenhouse gas
GMP	Groundwater Management Plan
GMWL	global meteoric water line
gpm	gallon(s) per minute
GPS	global positioning system
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWL	groundwater level
HCM	hydrogeologic conceptual model
HUC	Hydrologic Unit Code
InSAR	Interferometric Synthetic Aperture Radar
IRWMP	Integrated Regional Water Management Program
ISW	interconnected surface water
JPA	Joint Exercise of Powers Agreement
km	kilometer(s)
LAFCO	Local Agency Formation Commission
LiDAR	Light Detection and Ranging
M&I	municipal and industrial
MCL	maximum contaminant level
mg/L	milligram(s) per liter
MO	measurable objective
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System

msl	mean sea level
MT	minimum threshold
MWELO	Model Water Efficient Landscape Ordinance
NA	not applicable
NAVD88	North American Vertical Datum of 1988
NCRP	North Coast Resource Partnership
NCRWQCB	North Coast Regional Water Quality Control Board
NGVD29	National Geodetic Vertical Datum of 1929
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWIS	National Water Information System
PBO	Plate Boundary Observatory
PRISM	Parameter-elevation Regressions on Independent Slopes Model
PRMS	Precipitation Runoff Modeling System
RCD	Resource Conservation District
RCP	Representative Concentration Pathway
Regional Boards	Regional Water Quality Control Boards
RMP	representative monitoring point
SC	specific conductance
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SGMA	Sustainable Groundwater Management Act
SMC	sustainable management criteria
SMCL	secondary maximum contaminant level
SNMP	Salt and Nutrient Management Plan
SRPGMP	Santa Rosa Plain Groundwater Management Program
SRPHM	Santa Rosa Plain Hydrologic Model
SSURGO	Soil Survey Geographic Database
SWRCB	State Water Resources Control Board
SWRP	Stormwater Resources Plan

TDS	total dissolved solids
TNC	The Nature Conservancy
TSS	Technical Support Services (a DWR program)
UNAVCO	University NAVSTAR Consortium
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WRE	water resource element
WY	water year

GLOSSARY

* indicates definition from SGMA definitions.

Abandoned well — A well that has not been used for 1 year, unless the owner demonstrates intention to use the well again in accordance with the provisions of Section 115700 of the California Health and Safety Code.

Acre-foot (af) — Equivalent to the volume of water which will cover 1 acre of land to a depth of 1 foot; an acre-foot of water equals 43,560 cubic feet or 325,851 gallons.

Advanced wastewater treatment — Any physical, chemical or biological treatment process used to accomplish a degree of treatment greater than that achieved by secondary treatment.

Advanced water purification — Results in high-quality drinking water using advanced treatment processes available, including, but not limited to microfiltration, reverse osmosis, and high intensity ultraviolet light/advanced oxidation.

Agency* — Refers to a groundwater sustainability agency as defined in the Sustainable Groundwater Management Act.

Agricultural water management plan* — Refers to a plan adopted pursuant to the Agricultural Water Management Planning Act as described in Part 2.8 of Division 6 of the Water Code, commencing with Section 10800 et seq.

Alternative Plan* — Refers to an alternative to a Plan described in Water Code Section 10733.6.

Alluvium — A general geologic term describing stratified unconsolidated beds of sand, gravel, silt and clay deposited by flowing water.

Annual report — The report that transmits monitoring and progress towards meeting sustainable management criteria on the Plan, required on annual basis by Water Code Section 10728.

Appropriator — A party that diverts or extracts surplus water for use on nonriparian or nonoverlying land or for nonriparian or nonoverlying uses. Most public entities holding water rights are appropriators.

Aquiclude — A relatively impermeable rock formation that typically overlies or underlies an aquifer, confining its water under pressure. It usually has the capacity to absorb water, but is not sufficiently porous to conduct water quickly enough to supply a spring or a well. Generally replaced by the term aquitard.

Aquifer — A body of rock that is sufficiently permeable to conduct groundwater and to yield economically significant quantities of water to wells and springs.

Aquifer storage and recovery (ASR) — Injection of water into a well for storage in the aquifer and subsequent recovery from the same well.

Aquifer storage transfer and recovery (ASTR) - Injection of water into a well for storage In the aquifer and recovery from a different well, generally to provide additional water treatment.

Aquifer test — Commonly misnamed a pump test, it consists of pumping one well and recording both the drawdown in that well and may include measuring the drawdown caused by this pumping in other nearby observation wells. The data can be analyzed to show the hydraulic characteristics of the aquifer.

Aquitard — A confining bed or rock formation that retards the movement of water either to or from adjacent beds. Aquitards do not prevent the flow of water but may serve to store groundwater, although they are not effective as sources for wells or springs.

Area of origin* — In an interbasin transfer, the region exporting water.

GLOSSARY

* indicates definition from SGMA definitions.

Arid — A climate or region in which precipitation is so deficient in quantity or occurs so infrequently that intensive agricultural production is not possible without irrigation. Less than 25 cm of annual rainfall or a higher evaporation rate than precipitation rate.

Artesian — A reference to groundwater that is confined under pressure resulting in a condition in which the static water level stands above the top of the aquifer. The groundwater will rise above the overlying confining beds if provided the opportunity to escape upward via a well.

Artesian aquifer — A rock formation containing groundwater under more than hydrostatic pressure.

Artesian well — A well tapping a confined aquifer in which the static water level stands above the top of the aquifer. A flowing artesian well is one in which the tapped water flows out at the land surface. The term artesian well can be applied to a well in which pumping is required for the confined water to reach the surface.

ASR well — Dual purpose well to inject, store and recover source water in an aquifer for subsequent beneficial use.

Bank filtration — Extraction of groundwater from a well or caisson near or under a river or lake that induces infiltration from the surface water body, thereby improving and making more consistent the quality of water recovered.

Baseline* — Historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin. Also baseline conditions.

Basin* — Groundwater basin or subbasin identified and defined in Bulletin 118 or as modified pursuant to Water Code 10722 et seq.

Basin setting* — The information about the physical setting, characteristics, and current conditions of the basin as described by the Agency in the hydrogeologic conceptual model, the groundwater conditions, and the water budget, pursuant to Subarticle 2 of Article 5.

Beneficial use — The use of water for some domestic, agricultural, industrial, social, recreational or instream use. The SWRCB lists 23 types of beneficial uses with water quality criteria for those uses established by the RWQCBs. Water rights holders must demonstrate that the use if both reasonable and beneficial.

Best available science* — The use of sufficient and credible information and data, specific to the decision being made and the time frame available for making that decision, that is consistent with scientific and engineering professional standards of practice.

Best management practice* — A practice, or combination of practices, that are designed to achieve sustainable groundwater management and have been determined to be technologically and economically effective, practicable, and based on best available science.

Board* — The State Water Resources Control Board.

Brackish water — Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic and irrigation uses. Considerably less saline than sea water.

California Department of Fish and Game (DFG) — DFG administers and enforces the California Fish and Game Code, and the regulations promulgated by the Fish and Game Commission.

California Department of Toxic Substances Control (DTSC) — The primary regulatory authority under both state and federal law for hazardous waste disposal within California.

GLOSSARY

* indicates definition from SGMA definitions.

California Department of Water Resources (DWR) — oversees the State Water Project (SWP) and has the ability to implement, promote and encourage statewide water conservation. The DWR also has the responsibility for investigating groundwater conditions, SGMA implementation, and recommending protective actions and the safety of non-federal dams. Updates the State Water Plan every 5 years.

Capillary fringe — The zone immediately above and continuous with the water table in which all or some of the soil or rock interstices are filled with water under less than atmospheric pressure.

CASGEM* — The California Statewide Groundwater Elevation Monitoring Program developed by the Department pursuant to Water Code Section 10920 et seq., or as amended.

Chloride — A compound of chlorine and a positive radical of one or more elements. Useful in recognition of seawater in groundwater, chloride is the dominant anion of ocean water and normally occurs in only small amounts in groundwater.

Closed basin — A basin whose topography prevents surface outflow of water. It is considered to be hydrologically closed if neither surface nor underground outflow of water can occur under average hydrologic conditions.

Community water system — A public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25-year-long residents.

Cone of depression — The conical-shaped area around a well, produced in a water table or potentiometric surface by pumping.

Confined aquifer — A water-bearing subsurface stratum that is bounded above and below by formations of impermeable, or relatively impermeable, soil or rock.

Confined groundwater — Groundwater that is under pressure greater than that of the atmosphere so that, if provided an upward escape route, it will rise above the interface between the top of the aquifer and the impermeable bed which confines it.

Confining bed — A body of impermeable or distinctly less permeable material stratigraphically above one or more aquifers.

Conjunctive use — Also conjunctive operation, the operation of a groundwater basin in combination with a surface water storage and conveyance system to maximize water supply. Water is stored in the groundwater basin for later use by intentionally recharging a basin when a water supply is available.

Connate water — Water entrapped in the interstices of sedimentary rock at the time it was deposited. It may have been derived from ocean or fresh water sources and, typically, is highly mineralized.

Consumptive use — Use of water in a manner that makes it unavailable for use by others, generally because of absorption, evaporation, transpiration or incorporation in a manufactured product.

Contamination — The impairment of water quality as a result of the introduction of pathogens, chemical or industrial wastes, sewage or other pollutants in such concentrations that the water may eventually become unfit for its intended use or constitutes a public health hazard.

Contour line — An imaginary line that connects points of equal value (for example, land surface elevations) above or below a reference value or datum (for example, sea level). Contour lines may also demonstrate variations in other quantifiable properties such as sediment characteristics, porosity or the texture of deposits.

GLOSSARY

* indicates definition from SGMA definitions.

Cumulative departure plot — A graph of the departure from mean for a set of values, typically hydrologic data such as annual rainfall or annual streamflow. The difference between the annual value and the mean value for the full period of the data set is calculated for each data point, and each difference is added cumulatively from the beginning of the period to the end of the period. When portions of the graph have a positive slope, hydrologic values are greater than average (such as in a wet cycle); a negative slope occurs when hydrologic values are less than average (such as in a drought cycle).

Cycle testing — The systematic process in determining the operational recharge and backwashing routine for an ASR well.

Data gap* — A lack of information that significantly affects the understanding of the basin setting or evaluation of the efficacy of Plan implementation, and could limit the ability to assess whether a basin is being sustainably managed.

Deep percolation — Precipitation that moves downward below the root zone towards storage in subsurface strata.

De minimis well — A domestic well that extracts less than 2 acre-feet of groundwater annually. De minimis users cannot be required to report annual pumpage, but can be required to pay a fee if the GSA regulates them.

Depletion — The continued withdrawal of water from a reservoir or groundwater supply faster than its rate of replenishment.

Desalination — A process that converts sea water or brackish water to fresh water or an otherwise more usable condition through removal of dissolved solids. Also called desalting.

Destroyed well — A well that is no longer useful and that has been completely filled in accordance with the procedures described in Section ?B of the California Well Standards, DWR Bulletin 74-81 and Bulletin 74-90 (supplement to Bulletin 74-81).

Developed water — Water either imported into a groundwater basin or salvaged, reclaimed, or process for augmenting local surface water supplies that would not occur under natural conditions.

Domestic well — A water well used to supply water for the domestic needs of an individual residence or systems of four or fewer serviced connections.

Drawdown — The distance by which the potentiometric surface of a groundwater body is lowered by the withdrawal of water through pumping. Drawdown can be described as (1) the lowering of the potentiometric surface or water table as a result of groundwater withdrawal; (2) the difference between the height of a water table before pumping and the height of the water in a well during pumping; (3) diminished pressure in an aquifer as a result of groundwater withdrawal.

Drilling rig — The derrick, mast or standing equipment used to drill a well, together with the motive power, cable and tools used in drilling.

Drought — A prolonged period of dry weather characterized by an absence or a deficiency in rainfall. There is no measure for determining a drought, but qualitatively it usually causes a partial crop failure, a hydrologic imbalance or an interference with the ability to meet established water demands.

Dry well — A well that is constructed in the unsaturated zone of an aquifer and designed to optimize infiltration of water.

GLOSSARY

* indicates definition from SGMA definitions.

Effective porosity — The volume of interconnected openings available for transmission of fluids, frequently expressed as a percentage representing the ratio between volume of available openings and total volume of openings.

Electric well logging — The geophysical process of recording the formations traversed by a drill hole, based upon the measurements of two basic observable parameters: spontaneous potential and the resistivity of the formations to the flow of electric currents. Also geophysical well logging.

Emerging contaminant — A variety of synthetic chemicals, as well as some natural constituents, typically newly discovered in the environment due to improved analytical technological and heightened awareness, and not expected to be present in aquatic systems. For the most part, emerging contaminants are not new chemicals, and not new to the environment, but may suddenly become an issue due to new analytical technology and ability to quantify the constituent, change in regulatory standard, widespread or focused occurrence, heightened public awareness, new toxicological evidence, new chemical or increase in use, or a new legal issue.

Environmental water — Water serving environmental purposes, including instream fishery flow needs, wild and scenic river flows, water needs of freshwater wetlands, and Bay-Delta requirements.

Evaporation — The vaporization of a liquid from a free surface at a temperature below the boiling point; a process that occurs whenever water in a liquid state comes into contact with the unsaturated atmosphere.

Evapotranspiration — That portion of the precipitation returned to the air through direct evaporation or by transpiration of vegetation, no attempt being made to distinguish between the two, or consumptive use by vegetation.

Extraction — The process of withdrawing groundwater from storage by pumping or other controlled means.

Fault — A break or fracture zone in the Earth's crust along which movement of the rock mass adjacent to the fracture has occurred, on at least one side of the break. As a result, the strata of a previously continuous formation are separated relative to one another, with the displacement ranging from inches to thou-sands of feet or hundreds of miles. A fault frequently acts as a barrier to the movement of groundwater.

Field capacity — The amount of water held in a soil by capillary action after gravitational water has percolated downward and drained away; expressed as the ratio of the weight of water retained to the weight of dry soil.

Flowing well — A well yielding water at the land surface without pumping or the aid of any lifting device, but through artesian pressure.

Gravel pack — Artificially placed gravel filter or envelope surrounding a well screen. A gravel pack in a properly developed well serves to stabilize the aquifer, prevents sand from entering the well, permits the use of a large screen slot with a maximum open area, and provides an or annular zone of high permeability, which increases the effective radius and yield of the well.

Groundwater — Subsurface water occurring in the zone of saturation.

Groundwater basin — A groundwater reservoir, defined on the basis of geological and hydrological conditions and possibly consideration of political boundary lines. Often described as a basin or trough-shaped structure that is filled with porous or permeable material that stores and transmits water.

GLOSSARY

* indicates definition from SGMA definitions.

Groundwater budget — A numerical accounting of the recharge, discharge and changes in storage of a geographically defined groundwater system.

Groundwater capture — Increase in the productivity of an aquifer by increasing the recharge rate or by reducing the rate of unused discharge.

Groundwater dependent ecosystem* - Ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.

Groundwater flow* — The volume and direction of groundwater movement into, out of, or throughout a basin.

Groundwater management — The planned and coordinated management of a geographically defined groundwater system with the overall goal of long-term sustainability of the resource.

Groundwater management plan — A comprehensive written document developed for the purpose of groundwater management and adopted by an agency having appropriate legal or statutory authority.

Groundwater storage coefficient — The volume of water released from storage or taken into aquifer storage per unit of surface area of the aquifer per unit of change in the pressure or the head.

Groundwater table — The surface between the zone of saturation and the zone of aeration or the level at which the hydraulic pressure of a body of unconfined groundwater is equal to atmospheric pressure. No water table exists if the upper surface of the zone of saturation is in contact with an overlying confining layer.

Hardness — The content of metallic ions which react with sodium soaps to produce solid soaps or scummy residue and which react with negative ions. Hardness is normally expressed as the total concentration of Ca^{+2} and Mg^{+2} as milligrams per liter equivalent to $CaCO_3$.

Head or static head — Water-level elevation in a well or elevation to which the water of a flowing artesian well will rise in a pipe extended high enough to stop the flow.

Hydraulic conductivity (permeability coefficient) — The degree of permeability of a porous or water-bearing stratum, expressed as the rate of flow of water in gallons/day through a cross section of I square foot at a unit hydraulic gradient at either the prevailing temperature in the field or at a temperature adjusted to 60 degrees Fahrenheit or 15.6 degrees Centigrade. The conductivity can also be expressed in ft/day, cm/s or m/day.

Hydraulic gradient — The slope or gradient of the water table or piezometric or potentiometric surface in the direction of greatest change. A gradient may be expressed as a ratio (vertical to horizontal), a fraction (feet per mile, meters/kilometer), percentage (vertical distance as a percentage of horizontal distance) or as an angle (degrees).

Hydraulic head gradient — In an aquifer or surface watercourse, the change in total head per unit distance of flow in a given direction from a given point, usually in the direction of greatest rate of change.

Hydrogeology — The science that deals with subsurface waters, subsurface water quality and related geologic aspects of surface waters.

Hydrograph — A time record of groundwater level or stream discharge at a given cross section or stream surface elevation, and at a given point. Stream hydrographs generally indicate rate of flow and represent stage, flow, velocity or other characteristics, while groundwater hydrographs represent water level or head.

GLOSSARY

* indicates definition from SGMA definitions.

Hydrologic budget; balance — An accounting of the inflow, outflow, storage and evaporation of water from a hydrologic unit, such as a drainage basin, aquifer, soil zone, lake or reservoir, and expressed by the hydrologic equation as the relationship between inflow and outflow including evaporation, precipitation, runoff and water storage within a hydrologic unit over a specified period of time.

Hydrologic cycle — The process involving the continuous circulation of water from the oceans and the land surface of the Earth to the atmosphere through transpiration and evaporation, and its eventual return to the Earth's surface through various forms of precipitation.

Hydrologic equation — Inflow minus Outflow = +/- Change in Storage. Also called the Law of Mass Conservation, water budget, water balance, hydrologic equation.

Hydrologic region — A study area, consisting of one more planning subareas.

Hydrology — The study of the origin, distribution and circulation of water of the Earth including precipitation, streamflow, infiltration, groundwater storage and evaporation.

Hyporheic zone — Located in the beds and banks of a stream where water and solutes can exchange through the pores spaces and surface water and groundwater mix, linking aquatic and terrestrial systems. The hyporheic zone can be several feet to hundreds of feet deep and wide, depending upon geology and stream channel morphology.

Impermeable — A textural condition of rock, sediment or soil that makes it incapable of transmitting fluid under pressure. The cause is generally low porosity or the presence of small individual pores that lack connectivity.

Imported water — Water transported into a watershed from a different watershed. Native water is water that occurs naturally within a watershed.

Infiltration — (1) The flow of a fluid, such as water, into a solid substance through pores or small interstices, and particularly referring to the movement of water into soil or porous rock; (2) the absorption by soil of water either from precipitation or streamflow; (3) the amount of groundwater that enters pipes through breaks, joints or porous walls.

Infiltration galleries — Buried trenches (often containing slotted pipes or other structural components for water storage space) in permeable soils that allow infiltration through the unsaturated zone to an unconfined aquifer.

Infiltration rate — Rate at which a soil under specified conditions can absorb falling rain or melting snow; in recharge, the rate at which water drains into the ground when a recharge basin is flooded, expressed as quantity of water per unit time.

Injection well — A well through which water is injected to recharge an aquifer, either by pumping or by gravity flow.

In lieu recharge — Groundwater recharge by substituting surface water for groundwater, and accounting for the groundwater saved/stored for future beneficial use.

Interested parties* — Persons and entities on the list of interested persons established by the Agency pursuant to Water Code Section 10723.4.

Interim milestone* — A target value representing measurable groundwater conditions, in increments of five years, set by an Agency as part of a Plan.

Irrigation — Distribution of water to land through artificial means to enhance crop production, either where natural water sources are so deficient as to make crop production impossible or where it is advantageous to supplement the natural water supply at certain critical stages in the development of crops.

Irrigation return flow — Applied water that is not transpired, evaporated or deep percolated into a groundwater basin, but returns to a surface water.

Joint powers agreement (JPA) — An agreement entered into by two or more public agencies that allows them to jointly utilize any power common to the two contracting parties. The JPA is defined in Chapter 5, Division 7 of Title I of the California Government Code, commencing with Section 6500.

Land retirement — Taking land out of agricultural production by leaving it fallow or letting it return to a natural state.

Land subsidence — The lowering of a natural land surface in response to: Earth movements; lowering of fluid pressure (or lowering of groundwater level); removal of underlying supporting materials by mining or solution of solids, either artificially or from natural causes; compaction caused by wetting (hydrocompaction); oxidation of organic matter in soils; added load on the land surface; by tectonic activity; or by lithification.

Leaching — The flushing of salts from the soil by the downward percolation of surface water.

Leaching requirement — The theoretical amount of irrigation water that must pass (leach) through the soil beyond the root zone to keep soil salinity in the root zone within acceptable levels for sustained productive crop growth.

Level of development — In a planning study, the practice of holding constant the population, irrigated acreage, industry and wildlife so that hydrologic variability can be studied to determine adequacy of supplies.

Lithology — The description of rocks, especially in hand specimen and outcrop, on the basis of such characteristics as mineralogy, grain size and color.

Managed aquifer recharge (MAR) — Addition of surface water to a groundwater reservoir by human activity, such as putting surface water into spreading basins or injecting water through wells. Also artificial recharge (older term).

Management area — An area within a basin for which the Plan may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors.

Maximum contaminant level (MCL) — The highest concentration of a constituent in drinking water permitted under federal and state Safe Drinking Water Act regulations.

Measurable objectives* — Specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.

Milligrams per liter (mg/L) — The weight in milligrams of any substance dissolved in one liter of liquid; nearly the same as parts per million.

Mineralization — The process whereby concentrations of minerals, such as salts, increase in water, a natural process resulting from water dissolving minerals found in rocks and soils through which it flows.

Minimum threshold* — A numeric value for each sustainability indicator used to define undesirable results.

GLOSSARY

* indicates definition from SGMA definitions.

Mining — Withdrawal of water from a groundwater resource at a rate that exceeds the rate of replenishment so that the supply is threatened or its economic usefulness is endangered. Refer to overdraft.

MOU — Memorandum of Understanding.

NAD83* — North American Datum of 1983 computed by the National Geodetic Survey, or as modified.

NAVD88* — North American Vertical Datum of 1988 computed by the National Geodetic Survey, or as modified.

National Pollutant Discharge Elimination System (NPDES) — A provision of Section 402 of the federal Clean Water Act of 1972 that established a permitting system for discharges of waste materials to water courses. The program is administered in California by the Regional Water Quality Control Boards.

Nitrate — A salt of nitric acid, a compound containing the radical (NO_3). Dissolved nitrogen in the form of nitrate is the most common contaminant identified in groundwater. Used colloquially to denote all forms of nitrogen.

Nonpoint source — wastewater or contaminant discharge other than from point sources. Also, refer to point source. An example is the regional contamination of groundwater by the overapplication of fertilizers in an agricultural region.

Outflow — The water that is discharged from a drainage basin or from a stream, lake, reservoir or aquifer system.

Overdraft — The intentional or inadvertent withdrawal of water from an aquifer in excess of the amount of water that recharges the basin over a period of years, during which if continued over time could eventually cause the underground supply to be exhausted, cause seawater intrusion, cause subsidence, cause the water table to drop below economically feasible pumping lifts, or cause a detrimental change in water quality. Synonym: groundwater mining.

Overdraft, critical conditions of — A groundwater basin in which the continuation of present practices would probably result in significant adverse overdraft-related environmental, social or economic impacts. There are 21 SGMA priority basins that DWR has defined as critically overdrafted.

Overlying land — Property, a portion of which overlies the water-bearing portion of a groundwater basin. If a portion of the property overlies the water bearing formation, the entire parcel located within the drainage area of the basin is overlying.

Parts per million (ppm) — A measure, by weight and not by volume, of the concentration of a foreign substance in a solution.

Pathogens — Any viruses, bacteria, protozoa or fungi that cause disease.

Perched groundwater — Unconfined groundwater separated from an underlying main body of groundwater by an unsaturated zone.

Percolation — The movement of water through small openings within a porous material.

Permeability — The capability of soil or other geologic formation to transmit water.

Permeable — Porous or fissured so that water easily soaks in or passes through.

Pesticide — Any organic or inorganic substance used to kill or inhibit plant or animal life, including any insecticide, herbicide, rodenticide, algicide, miticide, nematicide or fungicide.

GLOSSARY

* indicates definition from SGMA definitions.

Phreatic zone — The zone beneath the water table in which the pore space is filled with water. Also referred to as the saturated zone.

Piezometer — The basic field device for the measurement of hydraulic head. A pipe sealed along its length, open to water flow at the bottom and open to the atmosphere at the top.

Piezometric surface (potentiometric surface) — An imaginary surface representing the level to which groundwater will rise in a well as a result of the pressure under which it is confined in an aquifer.

Plain language* — Language that the intended audience can readily understand and use because that language is concise, well-organized, uses simple vocabulary, avoids excessive acronyms and technical language, and follows other best practices of plain language writing.

Plan* — A groundwater sustainability plan (GSP) as defined in SGMA.

Plan implementation* — An Agency's exercise of the powers and authorities described in the Act, which commences after an Agency adopts and submits a Plan or Alternative to the Department and begins exercising such powers and authorities.

Plan manager* — An employee or authorized representative of an Agency, or Agencies, appointed through a coordination agreement or other agreement, who has been delegated management authority for submitting the Plan and serving as the point of contact between the Agency and the Department.

Point source — A specific site from which waste or polluted water is discharged into a water body, the source of which can be identified and measured.

Pollution — Contamination or other change in the physical, chemical or biological properties of a substance, especially water (including change in temperature, taste, color or odor) that may eventually impair its quality for use by ecosystem organisms or create a nuisance or make the substance detrimental to public health, safety or welfare. Refer to contamination.

Porosity — Voids or open spaces in alluvium and rocks that can be filled with water, frequently expressed ratio of the volume of open space to the total rock volume, expressed as a percentage.

Potentiometric surface — Refer to piezometric surface.

Precipitation — The discharge of water, in either liquid or solid form, from the atmosphere to the surface of the Earth, including rain, drizzle, sleet, snow, snow pellets, snow grains, ice crystals, ice pellets, hail, dew and frost, usually measured in inches, hundredths of inches or millimeters of equivalent depth in water.

Prescriptive rights — The rights acquired over a period of years by parties who use water adverse to the rights of the lawful owner of a property.

Principal aquifers* — Aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems.

Public water system — A system for the provision of water for human consumption though pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 6o days a year.

Public Utilities Commission (PUC) — The successor to the California Railroad Commission. The PUC regulates the affairs of private investor owned utilities. It does not possess regulatory authority over public entities.

Pumping lift — The distance water must be lifted in a well from the well pumping level to ground surface. pumping level — the position of the groundwater surface in a well during pumping.

GLOSSARY

* indicates definition from SGMA definitions.

Pump tax — Also groundwater charge, extraction fee, production assessment, replenishment assessment, replenishment fee, or basin assessment fee. Assessments levied by public agencies on the amount of groundwater pumped for use in conducting groundwater management activities such as purchasing imported water to replenish groundwater extracted in excess of the perennial yield, building recharge facilities.

Radius of influence — The distance from the center of a well to the limit of the cone of depression.

Rainwater harvesting — Roof runoff is diverted into a tank, well, sump, or caisson where it is allowed to percolate to the water table where it is collected by pumping from a well, or stored for later use.

Reasonable use — Required by the California Constitution, Article X, Section 2, but a term which is not subject to a standard definition; one of the requirements that must be satisfied by any party asserting a water right in California. Primarily thought to refer to the method, manner, or means of use.

Receiving water — Groundwater that will receive the source water recharged.

Recharge — Flow to groundwater storage from precipitation, infiltration from streams, irrigation, spreading basins, injection well and other sources of water.

Recharge area or zone — Surface area or zone in which water infiltrates into the ground, reaches the zone of saturation, recharging the underlying aquifer.

Recharge basin — A surface facility, often a large pond or other similar artificial basin used to increase the percolation of surface water into a groundwater basin thereby replenishing a groundwater supply. Also infiltration basin.

Recharge well — Well that is used to recharge water directly to an aquifer.

Recovery efficiency — Calculated as the cumulative volume of water recovered from storage in an ASR well divided by the cumulative volume previously stored during the same operating cycle, usually expressed as a percentage.

Recycled water — Previously used domestic or municipal water (wastewater) that has been treated for reuse for potable or non-potable beneficial uses, and can serve as source water for recharge. Used synonymously with reclaimed water.

Reference point* — A permanent, stationary and readily identifiable mark or point on a well, such as the top of casing, from which groundwater level measurements are taken, or other monitoring site.

Regional Water Quality Control Boards (RWQCBs) — The primary state agencies that regulate water quality and which are operated pursuant to policies adopted or approved by the State Water Resources Control Board. The RWQCBs have authority to compel cleanup and abatement of groundwater pollution under the Porter-Cologne Water Quality Control Act.

Representative monitoring* — A monitoring site within a broader network of sites that typifies one or more conditions within the basin or an area of the basin.

Residence time — Average amount of time a fluid spends during transport through a volume of subsurface or a laboratory vessel.

Return flow — The portion of withdrawn water not consumed by evapotranspiration or system losses which returns to its source or to another body of water.

Reuse — The additional use of previously used water.

GLOSSARY

* indicates definition from SGMA definitions.

Reverse osmosis — Treatment method for removing salts from water by forcing water through a membrane.

Riparian land — Land that adjoins or abuts a natural watercourse.

Runoff — The surface flow of water from an area; the total volume of surface flow from an area during a specified time.

Safe yield — Refer to sustainable yield.

Saline — Consisting of or containing salts the most common of which are potassium, sodium or magnesium in combination with chloride, nitrate or carbonate.

Salinity — Generally, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity or osmotic pressure. Where sea water is known to be the major sources of salt, salinity is often used to refer to the concentration of chlorides in the water. Refer to total dissolved solids.

Salinity intrusion — The movement of salt water into a body of fresh water. It can occur in either surface water or groundwater bodies. There are six types of salinity intrusion, one of which is sea water intrusion.

Saltwater barrier — A physical facility or method of operating which is designed to prevent the intrusion of salt water into a body of fresh water.

Saltwater intrusion — The phenomenon occurring when a body of salt water, because of its greater density, invades a body of fresh water. It can occur either in surface or groundwater bodies. When groundwater is pumped from aquifers that are in hydraulic connection with the sea, the gradients that are set up may induce a flow of salt water from the sea toward the well.

Saturated zone — The area below the water table in which the soil is completely saturated with groundwater. Also zone of saturation.

Seasonal high* — The highest annual static groundwater elevation that is typically measured in the Spring and associated with stable aquifer conditions following a period of lowest annual groundwater demand.

Seasonal low* — The lowest annual static groundwater elevation that is typically measured in the Summer or Fall, and associated with a period of stable aquifer conditions following a period of highest annual groundwater demand.

Seawater intrusion* — The advancement of seawater into a groundwater supply that results in degradation of water quality in the basin, and includes seawater from any source.

Sediment — Soil or mineral material transported by water and deposited in streams and channels. Sediments constitute the major aquifers in California.

Seepage — The gradual movement of a fluid into, through or from a porous medium.

Sewage — The liquid waste from domestic, commercial and industrial establishments.

Soluble minerals — Naturally occurring substances capable of being dissolved.

Source water — Referred to as the water that will be recharged in a managed aquifer recharge project.

Specific capacity — The volume of water pumped from a well in gallons per minute per foot of drawdown.

Specific retention — As applied to a rock or soil it is the ratio of : 1) the volume of water which, after being saturated, it will retain against the pull of gravity to; 2) its own volume. It is stated as a percentage.

GLOSSARY

* indicates definition from SGMA definitions.

Specific yield — The ratio of the volume of water that a given mass of saturated rock or soil will yield by gravity to the volume of that mass.

Spreading water — Discharging native or imported water to a permeable area for the purpose of allowing it to percolate to the zone of saturation.

Spring — A place where groundwater naturally flows from rock or soil onto the land surface or into a water body. The occurrence of a spring is dependent upon the location of permeable and impermeable rock layers, the level of the water table and on the local topography.

State Water Resources Control Board (SWRCB) — Administrative agency with the primary responsibility for regulating and determining rights to surface water and subterranean stream flow. In addition, the SWRCB has primary responsibility for enforcing the constitutional reasonable use requirement.

Static groundwater level — The water level in a well that is not flowing or being pumped; generally the level immediately before pumping is started after being stopped for a period of time.

Statutory deadline* — The date by which an Agency must be managing a basin pursuant to an adopted Plan, as described in Water Code Sections 10720.7 or 10722.4.

Storativity — The volume of water released from storage in an aquifer in a vertical column of 1 ft^2 when the water table of potentiometric surface declines 1 foot. In an unconfined aquifer it is approximately equal to specific yield.

Supply augmentation alternatives — Water management programs (such as conjunctive use, water banking or water project facility expansion) that increase supply.

Surface spreading — Recharging water at the surface through recharge basins, ponds, pits, trenches, constructed wetlands, or other systems.

Surface supply — Water in reservoirs, lakes or streams; expressed either in terms of rate of flow or volume.

Sustainability indicator* — Any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 10721(x).

Sustainable yield* — The maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result.

Tertiary treatment — The treatment of wastewater beyond the secondary or biological stage. The term normally implies the removal of nutrients, such as phosphorus and nitrogen, and of a high percentage of suspended solids.

Total dissolved solids (TDS) — The quantity of minerals (salts) in solution in water, usually expressed in milligrams per liter or parts per million.

Transmissivity — The capacity of rock to transmit groundwater under pressure, expressed as a quantity of water, at the prevailing temperature, transmitted horizontally in a given period of time through a vertical strip of a given width of the fully saturated thickness of the aquifer, under a hydraulic gradient of one.

Uncertainty* — A lack of understanding of the basin setting that significantly affects an Agency's ability to develop sustainable management criteria and appropriate projects and management actions in a Plan, or to evaluate the efficacy of Plan implementation, and therefore may limit the ability to assess whether a basin is being sustainably managed.

GLOSSARY

* indicates definition from SGMA definitions.

Unconfined groundwater — Groundwater that has a free water table at atmospheric pressure. It is not confined under pressure beneath relatively impermeable rocks or soil.

Underground injection control (UIC) — the UIC Program under the Safe Drinking Water Act, found in Title 40 of the US Federal Code of Regulations, which provides minimum requirements for injection of fluids through wells into the subsurface, including ASR wells.

Unsaturated zone — A subsurface soil zone, also called the vadose zone or the zone of aeration that lies above the zone of saturation (the water table). The interstitial water tends to move under gravity despite being held by molecular capillary forces. This zone of aeration is divided into the belt of soil water, the intermediate belt and the capillary fringe which is just above the zone of saturation.

Urban water management plan* — A plan adopted pursuant to the Urban Water Management Planning Act as described in Part 2.6 of Division 6 of the Water Code, commencing with Section 10610 et seq.

Usable storage capacity — The quantity of groundwater of acceptable quality that can be economically withdrawn from storage.

U.S. Endangered Species Act (ESA) — Federal legislation which provides a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, and which provides a program for the conservation of such threatened and endangered species.

U.S. Environmental Protection Agency (EPA) — The agency was created to permit coordinated and effective governmental action on behalf of the environment. The EPA endeavors to abate and control pollution systematically, by proper integration of a variety of research, monitoring, standard setting and enforcement activities.

Vadose water — Water below the surface of the earth and above the water table, either held by the soil or percolating downward toward the water table through the vadose zone (unsaturated zone).

Waste — Loss of a resource such as water without substantial benefit or beneficial use.

Water banking — A water conservation and use optimization system whereby water is allocated for current use or stored in surface water reservoirs or in aquifers for later use. Water banking is a means of handling surplus water resources during wet years.

Water conservation — Reduction in applied water due to more efficient water use such as implementation of Urban Best Management Practices or Agricultural Efficient Water Management Practices. The extent to which these actions actually create savings in a water supply depends on how they affect total water use and depletion.

Water marketing — The selling or leasing of water rights in an open market.

Water quality — Used to describe the chemical, physical and biological characteristics of water, usually in regard to its suitability for a particular purpose or use.

Water reclamation — As used in this report. Includes water recycling, sea water desalting, groundwater reclamation and desalting agricultural brackish water.

Water recycling — The treatment of urban wastewater to a level rendering it suitable for a specific, direct, beneficial use.

Water source type* — Represents the source from which water is derived to meet the applied beneficial uses, including groundwater, recycled water, reused water, and surface water sources identified as Central Valley Project, the State Water Project, the Colorado River Project, local supplies, and local imported supplies.

Water table — Refer to groundwater table.

Water transfer — Conveyance of groundwater or surface water from one area to another that involves crossing a political or hydrologic boundary. A voluntary change in a point of diversion, place of use, or purpose of use that may involve a change in water rights. A long-term transfer shall be for any period in excess of one year (California Water Code Section 1735.)

Water use sector* — Categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation.

Water year — A continuous 12-month period for which hydrologic records are compiled and summarized. In California, it begins on October 1 and ends September 30 of the following year. Water year 2003 ended Sept 30, 2003.

Water year type* — The classification assess the amount of annual precipitation in a basin.

Well, water well, “Water supply wells” or “supply wells” — Any artificial excavation constructed by any method for the purpose of extracting water from, or injecting water into, the underground. For purposes of this GSP, water supply wells includes all types of wells that provide water for beneficial uses, inclusive of private domestic wells, irrigation wells, industrial wells, commercial wells, and public supply wells. This does not include: (a) oil and gas wells, or geothermal wells constructed under the jurisdiction of the Department of Conservation, except those wells converted to use as water wells; or (b) wells used for the purpose of (1) dewatering during construction, or (2) stabilizing hillsides or earth embankments (Water Code Division 7, Chapter 10, Article 2, Section 13710).

Well casing — Serves as a lining to maintain an open hole from ground surface to the aquifer. It seals out surface water and any undesirable groundwater and also provides structural support against caving materials outside the well. Materials commonly employed for well casing are iron, steel and PVC.

Well completion report — California Water Code Section 13751 requires that anyone who constructs, alters, or destroys a water well, cathodic protection well, groundwater monitoring well, or geothermal heat exchange well must file with the Department of Water Resources a report of completion within 60 days of the completion of the work. Drillers submit their well completion reports with the Online System of Well Completion Reports (OSWCR, say ,Oscar,). OSWCR users create an account based on their C-57 license that DWR will validate. Upon approval users will be able to submit Well Completion Reports.

Well construction — The procedures necessary, using the proper materials and equipment to build a well for a specific purpose.

Well destruction — The procedures necessary using the proper materials and equipment, to ensure the boring is no longer a conduit for contamination of groundwater.

Well log — A graphic record of a well, generally a lithologic and/or stratigraphic record of the units traversed by a borehole.

Section 1: Introduction

Groundwater Sustainability Plan for
Santa Rosa Plain Groundwater Subbasin

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1 INTRODUCTION

In 2014, the State of California enacted the Sustainable Groundwater Management Act (SGMA), which substantially changes the way groundwater is managed in California. This law requires that groundwater basins and subbasins in California designated as medium- or high-priority by the California Department of Water Resources (DWR) under SGMA be managed sustainably.[1] Satisfying the requirements of SGMA generally involves four basic activities that must be completed by local agencies:

1. Forming one or more Groundwater Sustainability Agencies (GSAs) to fully cover the high- or medium-priority basin/subbasin.
2. Developing one or multiple Groundwater Sustainability Plans (GSPs) that fully cover the SGMA high- or medium-priority basin/subbasin.
3. Implementing the GSP and managing to achieve quantifiable objectives and sustainability within 20 years of GSP adoption.
4. Regularly reporting data and GSP progress to the DWR.

The Santa Rosa Plain Groundwater Subbasin (Subbasin), designated as basin number 1-55.01 in DWR's Bulletin No. 118 (DWR 2016a), and shown on **Figure 1-1**, is categorized as a medium-/high-priority basin by DWR (DWR 2020) and is, therefore, required to comply with SGMA.

1.1 Purpose of Groundwater Sustainability Plan

The purpose of this document is to fulfill the GSP requirement and present a path for sustaining groundwater resources in the Subbasin pursuant to the provisions of SGMA. Primary objectives addressed by this GSP are to:

- Meet the requirements of SGMA and DWR's GSP Emergency Regulations (GSP Regulations) by establishing criteria and management actions that will achieve and maintain sustainable groundwater management in the Subbasin within 20 years of GSP adoption.
- Incorporate the best available scientific and technical information by building on the strong technical foundation established through previous technical studies and voluntary groundwater management activities in the Santa Rosa Plain.

[1] DWR prioritizes groundwater basins as critically overdrafted, high-, medium-, low-, and very low-priority based on a variety of technical factors. Refer to https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization.

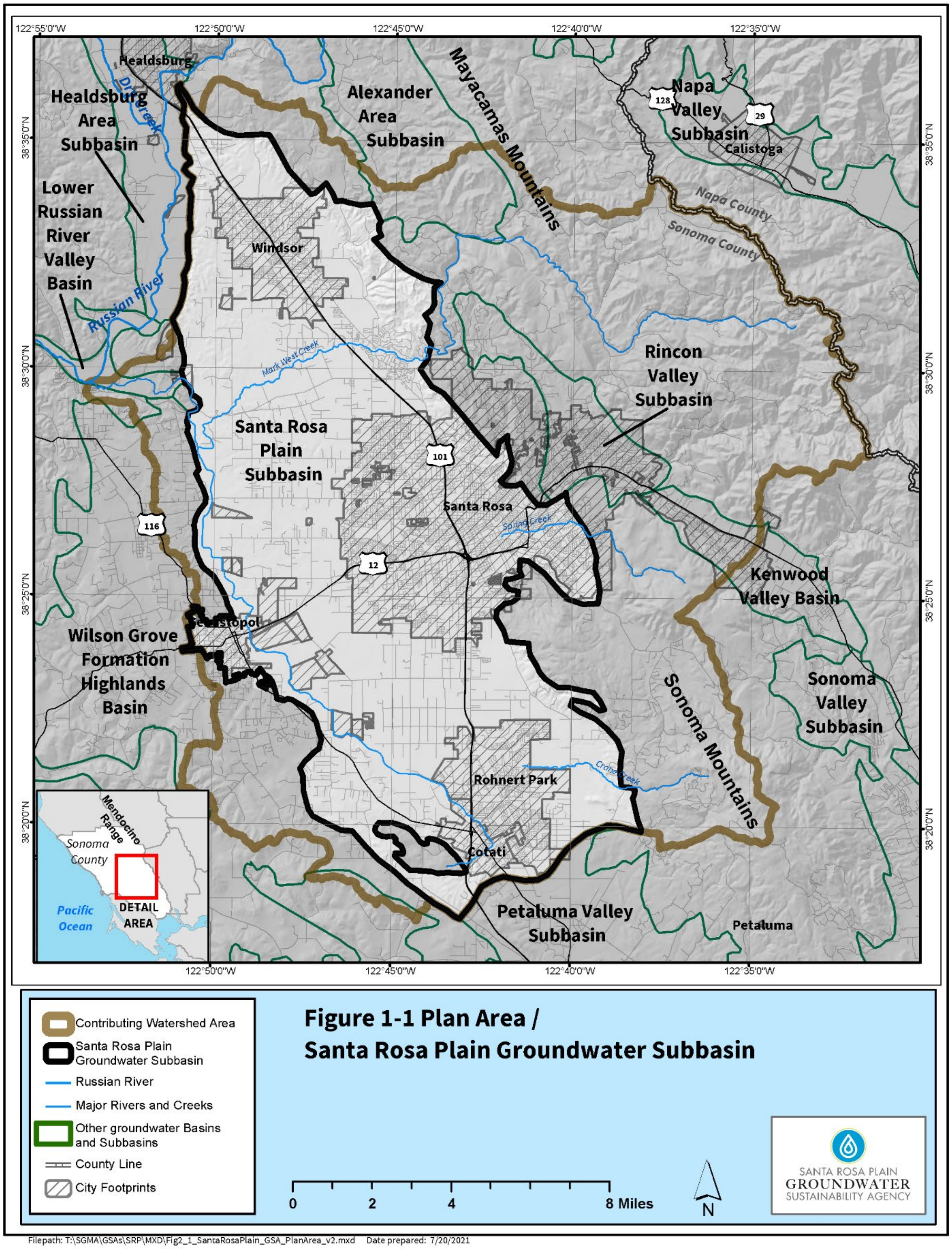

Figure 1-1. Plan Area/Santa Rosa Plain Groundwater Subbasin

- Integrate the perspectives and interests of the many diverse users and uses of groundwater resources within the basin through a process that provides opportunity for significant public and community engagement. Hundreds of comments were received and considered during multiple phases of revising the GSP (**Appendix 1-A**).

- Leverage the limited available funding and local resources through continued regional coordination and information sharing with other local entities and GSAs.

The development of this GSP benefits from a recent history of collaborative groundwater management and water-resource planning by local stakeholders, which had focused on addressing groundwater sustainability issues in the Subbasin prior to the passage of SGMA.

The purpose of the GSP is not to tackle water supply risk and resilience issues or prepare emergency response plans for community drinking water systems. The America's Water Infrastructure Act (AWIA) of 2018 requires community drinking water systems to develop or update risk assessments and emergency response plans to identify vulnerabilities, including malevolent acts and natural disasters, such as floods and droughts, that may potentially threaten the ability of community water systems to deliver safe drinking water.

The Santa Rosa Plain GSA, in collaboration with Sonoma Water, other Sonoma County GSAs, and local water suppliers, has and will continue to provide information to the local community on the severe multi-year drought occurring during the preparation of this GSP and other droughts in the future, including, but not limited to:

- News releases on the status of historically low surface water reservoir supplies

- Messaging to encourage communities to change everyday habits and adapt to eliminate water waste, and to conserve and reduce water usage by 20 percent

- Participation in public workshops on drought conditions and what the community can do to help address this issue

The GSAs do have the authority to mandate conservation and manage extractions but ultimately cannot affect water rights under SGMA. While California's Human Right to Water (California Water Code 106.3) does not apply to the Santa Rosa Plain GSA (which does not provide drinking water and is not a state agency), the GSP is developed to be protective of both groundwater levels and groundwater quality for all beneficial users including residential well owners and disadvantaged communities (DACs). By addressing all beneficial uses and users, the GSP has addressed California's Human Right to Water.

1.2 Guide to the Groundwater Sustainability Plan

The Santa Rosa Plain GSP is organized sequentially, starting with a high-level overview of the Subbasin (**Section 2**), and drilling into more details on hydrology, geology, and the current and projected groundwater conditions (**Section 3**). A discussion of what sustainability means locally is provided in **Section 4**, and **Section 5** details how sustainability will be monitored over time.

Sections 6 (Projects and Management Actions) and **7** (Implementation Plan) describe how sustainability will be achieved. Each section builds on the prior section and contributes to the reader's understanding of the issues facing the Subbasin and the proposed solutions.

This document is composed of the following sections:

- **Front Matter** – This includes a table of contents that can help readers locate specific plan components, and a list of acronyms and abbreviations that can help readers navigate arcane water lingo.
- **Executive Summary** – A brief overview of the GSP, providing high-level information about the Subbasin, sustainability goals, and how the GSP will be implemented.
- **Section 1, Introduction** – Basic administrative information about the GSA, its composition and authorities, and how it communicates with and engages stakeholders.
- **Section 2, Plan Area** – A description of the Subbasin, including jurisdictions, land uses, water uses, and well permitting.
- **Section 3, Basin Setting** – A detailed overview of the Subbasin, including its physical setting, climate, the hydrogeologic conceptual model (which includes the factors that describe and effect its hydrology, such as geologic features, aquifer, and aquitards), current and historical groundwater conditions, the current and projected water budget, and management areas.
- **Section 4, Sustainable Management Criteria** – This section describes proposed management criteria for each of SGMA's six sustainability indicators: groundwater levels, groundwater storage, water quality, land subsidence, seawater intrusion, and surface water depletion.
- **Section 5, Proposed Monitoring Plan** – The Sustainable Management Criteria (SMC) described in Section 4 are quantifiable and are measured over time. This section describes the current monitoring network and proposed enhancements needed to accurately monitor data into the future.
- **Section 6, Projects and Management Actions** – This section describes and ranks projects and actions that could be used to achieve or maintain sustainability by 2042.
- **Section 7, Implementation Plan** – This section describes how the GSP will be implemented over time, including a draft, high-level budget and potential funding sources.
- **Section 8, References** – This section provides a list of all documents cited in this GSP.
- **Appendices** – The appendices to this report provide a wealth of additional information.

Tables 1-1 and **1-2** provide a detailed list of the DWR-required GSP components from the GSP Regulations and SGMA statutes, respectively.

Table 1-1. Cross-reference of GSP Regulations and Associated GSP Sections

Sub-article	Section	Paragraph	Requirement	GSP Section
1. Administrative Information	354.4. General Information	(a)	Executive summary	00
		(b)	List of references and links to technical studies	Appendices
	354.6. Agency Information	-	Agency information pursuant to CWC Section 10723.8 (notification of GSA formation to DWR), along with:	1.2 and Appendices
		(a)	Agency name and mailing address	1.2
		(b)	Agency organization and management structure, persons with management authority for GSP implementation	1.2
		(c)	GSP manager name and contact information	1.2
		(d)	Legal authority of agency	1.2
		(c)	Estimate of GSP implementation costs and description of how agency plans to meet costs	7
	354.8. Description of Plan Area	(a)	Maps of GSP area	Figure 2-1
		(b)	Written description of GSP area	2.1
		(c)-(d)	Identification of existing water-resource monitoring and management programs, and description of any such planned programs	2.4 and 2.5
		(c)	Description of conjunctive use programs	2.5
		(f)	Description of the land use elements or topic categories	2.6
		(g)	Description of additional GSP elements (CWC Section 10727.4)	2.7 and 2.8
	354.10. Notice and Communication	(a)	Description of the beneficial uses and users of groundwater in the subbasin	1.3
		(b)	List of public meetings	1.3
		(c)	Comments and responses regarding the GSP	Appendices
		(d)	Description of communication procedures	1.3
2. Basin Setting	354.12. Introduction to Basin Setting	-	Information about the basin setting (physical setting, characteristics, current conditions, data gaps, uncertainty)	3
	354.14. Hydrogeologic Conceptual Model	(a)	Description of the subbasin hydrogeologic conceptual model	3.1
		(b)	Summary of regional geologic and structural setting, subbasin boundaries, geologic features, principal aquifers, and aquitards	3.1
		(c)	Cross sections depicting major stratigraphic and structural features	Figure 3-5
		(d)	Maps of subbasin physical characteristics	Figures 3-1 through 3-10

Sub-article	Section	Paragraph	Requirement	GSP Section
	354.16. Groundwater Conditions	(a)-(g)	Description of current and historical groundwater conditions including: 1. Groundwater elevation 2. Change in storage 3. Seawater intrusion 4. Groundwater quality issues 5. Land subsidence 6. Interconnected surface water systems 7. Groundwater-dependent ecosystems	3.2
	354.17. Water Budget	(a)	Water budget providing total annual volume of groundwater and surface water entering and leaving the subbasin, including historical, current, and projected water budget conditions, and change in storage	3.3
		(b)-(f)	Development of a numerical groundwater and surface water model to quantify current, historical, and projected: 1. Total surface water entering and leaving by water source type 2. Inflow to the groundwater system by water source type 3. Outflows from the groundwater system by water use sector 4. Change in groundwater storage 5. Overdraft over base period 6. Annual supply, demand, and change in storage by water year type. 7. Estimated sustainable yield	3.3 and Appendix
	354.20. Management Areas	(a)	Description of management areas	3.4
		(b)	Describe purpose, minimum thresholds, measurable objectives, monitoring, analysis	NA
		(c)	Maps and supplemental information	NA
3. Sustainable Management Criteria	354.22. Introduction to Sustainable Management Criteria	-	Criteria by which an agency defines conditions that constitute sustainable groundwater management for the subbasin	4
	354.24. Sustainability Goal	-	Description of subbasin sustainability goal, including basin setting information used to establish the goal, sustainability indicators, discussion of measures to ensure the subbasin will be operated within its sustainable yield, and an explanation of how the sustainability goal is likely to be achieved and maintained	4

Sub-article	Section	Paragraph	Requirement	GSP Section
	354.26. Undesirable Results	(a)	Processes and criteria used to define undesirable results applicable to the subbasin	4
		(b)-(c)	Description of undesirable results, including cause of groundwater conditions and potential effects on beneficial uses and users of groundwater	4
	354.28. Minimum Thresholds	(a)	Establish minimum thresholds to quantify groundwater conditions for each applicable sustainability indicator	4
		(b)-(d)	Describe information and criteria to select, establish, justify, and quantitatively measure minimum thresholds	4
	354.30. Measurable Objectives	(a)-(g)	Establish measurable objectives, including interim milestones in increments of 5 years, to achieve and maintain the subbasin sustainability goal	4
4. Monitoring Networks	354.32. Introduction to Monitoring Networks	-	Description of monitoring network, monitoring objectives, monitoring protocols, and data reporting	5
	354.34. Monitoring Network	(a), (e)-(g)	Development of monitoring network to yield representative information about groundwater conditions	5
		(b)-(d)	Monitoring network objectives	5
		(h)	Maps and tables of monitoring sites	5
		(i)	Monitoring protocols	Appendices
	354.36. Representative Monitoring	(a)-(c)	Designation of representative monitoring sites	5
	354.38. Assessment and Improvement of Monitoring Network	(a)-(d)	Evaluation of monitoring network, including uncertainty, data gaps, and efforts to fill data gaps	5
		(e)	Adjustment of monitoring frequency and density to assess management action effectiveness	5
	354.40. Reporting Monitoring Data to the Department	(f)	Copy of monitoring data from data management system	Digital Submittal
5. Projects and Management Actions	354.44. Projects and Management Actions	(a)-(c)	Description of projects and management actions to achieve and maintain the subbasin sustainability goal	6

Notes:

CWC = California Water Code

NA = not applicable

Table 1-2. Cross-reference of SGMA Statute related to GSP Requirements and GSP Section Numbers

Requirement	GSP Section
Chapter 5 Powers And Authorities	
10726.9. REQUIREMENT OF PLAN TO TAKE INTO ACCOUNT GENERAL PLAN ASSUMPTIONS	
A groundwater sustainability plan shall take into account the most recent planning assumptions stated in local general plans of jurisdictions overlying the basin.	2.6
Chapter 6. Groundwater Sustainability Plans	
10727. REQUIREMENT TO DEVELOP GROUNDWATER SUSTAINABILITY PLAN FOR MEDIUM- AND HIGH-PRIORITY BASINS; FORM OF PLAN	
(a) A groundwater sustainability plan shall be developed and implemented for each medium- or high-priority basin by a GSA to meet the sustainability goal established pursuant to this part. The groundwater sustainability plan may incorporate, extend, or be based on a plan adopted pursuant to Part 2.75 (commencing with Section 10750).	1.0
10727.2. REQUIRED PLAN ELEMENTS A groundwater sustainability plan shall include all of the following:	
(a) A description of the physical setting and characteristics of the aquifer system underlying the basin that includes:	3.0
(1) Historical data, to the extent available.	3.2, 3.3
(2) Groundwater levels, groundwater quality, subsidence, and groundwater-surface water interaction.	3.2
(3) A general discussion of historical and projected water demands and supplies.	3.2, 3.3
(4) A map that details the area of the basin and the boundaries of the GSAs that overlie the basin that have or are developing GSPs.	Figure 3-1
(5) A map identifying existing and potential recharge areas for the basin. The map or maps shall identify the existing recharge areas that substantially contribute to the replenishment of the groundwater basin. The map or maps shall be provided to the appropriate local planning agencies after adoption of the GSP.	Figures 3-8a and 3-8b
(b) (1) Measurable objectives, as well as interim milestones in increments of 5 years, to achieve the sustainability goal in the basin within 20 years of the implementation of the plan.	4.0
(2) A description of how the plan helps meet each objective and how each objective is intended to achieve the sustainability goal for the basin for long-term beneficial uses of groundwater.	4.0
(3) (A) Notwithstanding paragraph (1), at the request of the groundwater sustainability agency, the department may grant an extension of up to 5 years beyond the 20-year sustainability timeframe upon a showing of good cause. The department may grant a second extension of up to 5 years upon a showing of good cause if the GSA has begun implementation of the work plan described in clause (iii) of subparagraph (B). (B) The department may grant an extension pursuant to this paragraph if the groundwater sustainability agency does all of the following: (i) Demonstrates a need for an extension. (ii) Has made progress toward meeting the sustainability goal as demonstrated by its progress at achieving the milestones identified in its GSP. (iii) Adopts a feasible work plan for meeting the sustainability goal during the extension period.	NA
(4) The plan may, but is not required to, address undesirable results that occurred before, and have not been corrected by, January 1, 2015. Notwithstanding paragraphs (1) to (3), inclusive, a	4

Requirement	GSP Section
groundwater sustainability agency has discretion as to whether to set measurable objectives and the timeframes for achieving any objectives for undesirable results that occurred before, and have not been corrected by, January 1, 2015.	
(c) A planning and implementation horizon.	3.4.1.2
(d) Components relating to the following, as applicable to the basin: (1) The monitoring and management of groundwater levels within the basin.	4.0, 5.0, 6.0
(2) The monitoring and management of groundwater quality, groundwater quality degradation, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin.	4.0, 5.0, 6.0
(3) Mitigation of overdraft.	4.0, 5.0, 6.0
(4) How recharge areas identified in the plan substantially contribute to the replenishment of the basin.	3.1.7
(5) A description of surface water supply used or available for use for groundwater recharge or in-lieu use.	2.3.2
(e) A summary of the type of monitoring sites, type of measurements, and the frequency of monitoring for each location monitoring groundwater levels, groundwater quality, subsidence, streamflow, precipitation, evaporation, and tidal influence. The plan shall include a summary of monitoring information such as well depth, screened intervals, and aquifer zones monitored, and a summary of the type of well relied on for the information, including public, irrigation, domestic, industrial, and monitoring wells.	5.0
(f) Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin. The monitoring protocols shall be designed to generate information that promotes efficient and effective groundwater management.	Appendix
(g) A description of the consideration given to the applicable county and city general plans and a description of the various adopted water resources-related plans and programs within the basin and an assessment of how the groundwater sustainability plan may affect those plans.	2.4, 2.5
10727.4. ADDITIONAL PLAN ELEMENTS In addition to the requirements of Section 10727.2, a GSP shall include, where appropriate and in collaboration with the appropriate local agencies, all of the following:	
(a) Control of saline water intrusion.	
(b) Wellhead protection areas and recharge areas.	3.1.7
(c) Migration of contaminated groundwater.	2.1
(d) A well abandonment and well destruction program.	2.7
(e) Replenishment of groundwater extractions.	6.0
(f) Activities implementing, opportunities for, and removing impediments to, conjunctive use or underground storage.	2.1
(h) Measures addressing groundwater contamination cleanup, groundwater recharge, in-lieu use, diversions to storage, conservation, water recycling, conveyance, and extraction projects.	2.5, 6.0
(i) Efficient water management practices, as defined in Section 10902, for the delivery of water and water conservation methods to improve the efficiency of water use.	2.5.4
(j) Efforts to develop relationships with state and federal regulatory agencies.	7

Requirement	GSP Section
(k) Processes to review land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity.	7
(l) Impacts on groundwater-dependent ecosystems.	4
10727.8. PUBLIC NOTIFICATION AND PARTICIPATION; ADVISORY COMMITTEE (a) Prior to initiating the development of a GSP, the GSA shall make available to the public and the department a written statement describing the manner in which interested parties may participate in the development and implementation of the GSP. The GSA shall provide the written statement to the legislative body of any city, county, or city and county located within the geographic area to be covered by the GSP. The GSA may appoint and consult with an advisory committee consisting of interested parties for the purposes of developing and implementing a GSP. The GSA shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin prior to and during the development and implementation of the GSP.	1.2, 1.3, Appendix
(b) For purposes of this section, interested parties include entities listed in Section 10927 that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the GSA.	NA
10728. ANNUAL REPORTING BY GROUNDWATER SUSTAINABILITY AGENCY TO DEPARTMENT On the April 1 following the adoption of a GSP, and annually thereafter, a GSA shall submit a report to the department containing the following information about the basin managed in the GSP: (a) Groundwater elevation data (b) Annual aggregated data identifying groundwater extraction for the preceding water year (c) Surface water supply used for or available for use for groundwater recharge or in-lieu use (d) Total water use (e) Change in groundwater storage	7.0
10728.2. PERIODIC REVIEW AND ASSESSMENT A GSA shall periodically evaluate its GSP, assess changing conditions in the basin that may warrant modification of the plan or management objectives, and may adjust components in the GSP. An evaluation shall focus on determining whether the actions under the GSP are meeting the plan's management objectives and whether those objectives are meeting the sustainability goal in the basin.	7.0
10728.4. ADOPTION OR AMENDMENT OF PLAN FOLLOWING PUBLIC HEARING A GSA may adopt or amend a GSP after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The GSA shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice. Nothing in this section is intended to preclude an agency and a city or county from otherwise consulting or commenting regarding the adoption or amendment of a plan.	1.3, 7.0
10728.6. CEQA NOT APPLICABLE TO PLAN PREPARATION AND ADOPTION Division 13 (commencing with Section 21000) of the Public Resources Code does not apply to the preparation and adoption of plans pursuant to this chapter. Nothing in this part shall be interpreted as exempting from Division 13 (commencing with Section 21000) of the Public Resources Code a project that would implement actions taken pursuant to a plan adopted pursuant to this chapter.	5

Note:

CEQA = California Environmental Quality Act

1.3 Groundwater Sustainability Agency Authorities and Administrative Information

1.3.1 Santa Rosa Plain Groundwater Sustainability Agency

SGMA requires GSAs to be formed to cover basins/subbasins designated by DWR as high- or medium-priority (based on a variety of technical factors). Any local agency that has water supply, water management, or land use responsibility in a groundwater basin is eligible to form a GSA. The legislative intent of SGMA is to encourage GSA-eligible agencies to form one GSA that covers an entire SGMA basin/subbasin and prepare one GSP; however, SGMA offers local agencies the flexibility of forming multiple GSAs and preparing multiple GSPs in a basin/subbasin. SGMA empowers GSAs with new management tools and authorities to, among other things:

- Register groundwater wells
- Collect data/conduct studies
- Measure extractions (with the exception of de minimis wells that pump less than 2 acre-feet per year [AFY])
- Require reporting
- Manage extractions
- Assess fees

The Santa Rosa Plain GSA was formed to meet SGMA requirements in June 2017, and is one of three GSAs established in Sonoma County (the other two are Petaluma Valley and Sonoma Valley). The jurisdictional area of the Santa Rosa Plain GSA is the entire Santa Rosa Plain Subbasin, and no other GSAs have jurisdiction within the 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; Sonoma County Water Agency (Sonoma Water); Sonoma Resource Conservation District (RCD); and an organized group of Mutual Water and Public Utilities Commission-Regulated Companies (Independent Water Systems), in accordance with requirements of CWC Section 10723 for establishing GSAs under the SGMA.

In August 2019, the JPA was amended to include the City of Sebastopol and three neighboring mutual water companies (Fircrest, Belmont Terrace, and Kelly), following an adjustment of the Subbasin boundaries. The boundary change was a result of DWR's proposed 2018 reprioritization of the neighboring Wilson Grove Formation Highlands Basin (Wilson Grove) from very low-priority to medium-priority. Entities within Wilson Grove were concerned about their ability to comply with SGMA, and the cities of Sebastopol and Petaluma, the three mutual water districts, and the County of Marin made jurisdictional requests to DWR to change the basin boundaries. DWR authorized the boundary changes. As a result, Sebastopol and the water companies are now solely within the Santa Rosa Plain Subbasin.

A copy of the resolution forming the JPA and the resolution revising the JPA is included in **Appendix 1-B**.

1.3.2 Santa Rosa Plain Groundwater Sustainability Agency Board and Advisory Committee

The Santa Rosa Plain GSA is governed by 10 Board members and alternates from the member organizations, which each appoint one member and one alternate member (Board members are listed in **Appendix 1-C**). The Santa Rosa Plain GSA Board (GSA Board) members are elected or appointed members of their governing bodies who serve at the pleasure of the member organization appointing them. GSA Board members annually elect the officers of the Board for 1-year terms, which may be extended to multiple consecutive terms. The GSA Board role in the GSP development process is to provide guidance and direction on key components of the GSP and consider recommendations from the Santa Rosa Plain GSA Advisory Committee (Advisory Committee) and input from the public. The GSA Board is responsible for adopting the GSP, authorizing its submission to DWR and for implementation of the GSP. The GSA decision-making process is described in its Joint Exercise of Power Agreement (**Appendix 1-B**).

The Santa Rosa Plain GSA formed an Advisory Committee of 18 members in October 2017 consisting of members appointed by each of the original 9 member agencies, the City of Sebastopol and the Federated Indians of Graton Rancheria, and 7 interest-based members appointed by the Santa Rosa Plain GSA Board. The seven interest-based members are composed of the following groups:

- Environmental (from organizations with a presence in the Basin) (two members)
- Rural residential well owners (two members)
- Business community (one member)
- Agricultural (two members)

As described in **Section 2.1**, the DACs in the Subbasin are generally (although not entirely) located in areas that receive water from municipal-water suppliers, which rely primarily on surface water (not groundwater). However, the Sonoma Water appointee to the Advisory Committee was chosen to represent the DACs and participates from that perspective. As described in **Section 1.4.2.1**, government-to-government outreach was conducted from the County to Tribes when the Santa Rosa Plain GSA was formed. The Federated Indians of Graton Rancheria chose to participate on the Advisory Committee. During the implementation phase of the GSP, federally and non-federally recognized Tribal governments will be contacted to reassess their interest in participating in GSA activities.

The role of the Advisory Committee during the GSP development process is to work toward a consensus and incorporate community and stakeholder interests into recommendations to the GSA Board on GSP development and SGMA implementation. Advisory Committee members also report to, and seek input from, their larger constituency groups on key components and proposals related to GSP development.

The Advisory Committee meets 6 to 10 times annually, and the meetings are open to the public. The Advisory Committee makes recommendations to the GSA Board that reflect the outcome of committee discussions. To ensure that all viewpoints are heard and considered by the Board, the Advisory Committee reports to the GSA Board regularly, identifying areas of agreement and disagreement among the Advisory Committee members. The names of GSA Board and Advisory Committee members can be found in **Appendix 1-C**, and the Advisory Committee Charter is provided in **Appendix 1-D**.

1.3.3 Groundwater Sustainability Agency Coordination

Implementation of SGMA in the Subbasin is closely coordinated with neighboring GSAs in Petaluma Valley and Sonoma Valley, as well as local agencies with land use responsibilities, including the cities of Cotati, Rohnert Park, Santa Rosa, Sebastopol, Town of Windsor, and the County of Sonoma. In addition to close coordination when managing and monitoring along shared Subbasin boundaries, resources are leveraged and shared by the three existing GSAs in Sonoma County to maximize efficiencies, including shared templates and methodologies for certain GSP components, outreach resources, grant opportunities, and the development of data management system tools and technologies.

The Santa Rosa Plain GSA has a service agreement with Sonoma Water for technical support, public outreach and community engagement, and grant writing and management. The GSA also has service agreements with outside firms for administrative support, legal advice, financial decision making, and facilitation services for Advisory Committee meetings.

Contact information for the Santa Rosa Plain GSA is:

Santa Rosa Plain Groundwater Sustainability Agency
2235 Mercury Way #105, Santa Rosa California 95407
www.santarosaplaingroundwater.org (707) 243-8555

GSA Administrator: Andy Rodgers, West Yost Associates, Inc.

GSA Plan Manager: Jay Jasperse, Chief Engineer and Director of Groundwater Management, Sonoma County Water Agency

1.4 Stakeholder Engagement and Communication

SGMA requires that GSAs consider the beneficial uses and users of groundwater. As a result, GSP development included robust outreach and stakeholder engagement through a variety of methods and tools, which are described in detail in **Sections 1.4.2.1** through **1.4.2.3**.

As described in **Section 1.3**, the Santa Rosa Plain GSA is governed by a local board, which receives and considers recommendations from an Advisory Committee representing multiple stakeholder interests. Both the GSA Board and Advisory Committee hold regular public meetings in compliance with California's laws governing public meetings (commonly known as the Brown Act). A list of meetings is provided in **Appendix 1-E**.

All phases of SGMA compliance in the Santa Rosa Plain Groundwater Subbasin have been, and will continue to be, characterized by an open collaborative process with strong stakeholder engagement, providing stakeholders and the public with opportunities to provide input and to influence the process. Information is available on the website, https://santarosaplaingroundwater.org, where all meeting materials and notifications are posted.

1.4.1 Beneficial Uses and Users of Groundwater

SGMA requires GSAs to identify and consult with people and agencies who represent the “beneficial uses and users of groundwater in the basin, including the land uses and property interest potentially affected by the use of groundwater in the basin” (California Code of Regulations [CCR] Section 354.10). **Appendix 1-F**, The *Community Engagement Plan for Development and Adoption of a Groundwater Sustainability Plan* (Santa Rosa Plain GSA 2018), identifies beneficial users and uses as “interested parties” that include water suppliers, agricultural users, business and commercial uses, rural residential well owners, DACs, state and local landowners, and environmental users.

As described in **Section 1.3**, many of these beneficial users and those engaged in beneficial uses are included on the GSA Board or the Advisory Committee. Specific information regarding consultation with representatives of beneficial users and uses is described in the following sections.

1.4.2 Implementation of the Sustainable Groundwater Management Act – Phases of Work

Outreach for SGMA is associated with the following four work phases:

- Phase 1: GSA Formation and Coordination – The formation of the Santa Rosa Plain GSA began in 2015, with an initial stakeholder assessment conducted by the Consensus Building Institute (CBI), followed by negotiations between GSA-eligible entities in the Subbasin. This phase was completed in June 2017, when the GSA was created by a JPA (described in **Section 1.2**).

- Phase 2: GSP Preparation and Submission – This phase of work began in 2018 and will be completed in January 2022. During this phase, outreach was largely guided by a Community Engagement Plan (Santa Rosa Plain GSA 2018) (**Appendix 1-F**). Pre-submission, the final draft GSP was released for public comments and review.

- Phase 3: GSP Review and Evaluation – This phase began in 2019, with the majority of the review taking place in 2021. This phase will continue through 2022, when the GSP is submitted and DWR provides additional opportunity for additional public review and comments.

- Phase 4: Implementation and Reporting – Following the submission of the GSP to DWR, the Santa Rosa Plain GSA will begin implementing projects and programs to reach sustainability in the Subbasin. This will be an ongoing phase, with 5-year updates that will include public input and feedback, as the GSA strives for sustainability by 2042.

1.4.2.1 Phase 1: Groundwater Sustainability Agency Formation and Coordination

From 2015 through 2017, local agencies worked with the CBI to facilitate the formation of the Santa Rosa Plain GSA. CBI began by conducting a stakeholder assessment in the three Sonoma County basins and subbasins (Santa Rosa Plain Subbasin, Petaluma Valley Basin, and Sonoma Valley Subbasin) that were immediately subject to SGMA implementation. Assessment results were described in *Findings and Recommendations on Implementing the Sustainable Groundwater Management Act in Sonoma County* (**Appendix 1-F**).

The assessment included interviews with and surveys of representatives of key stakeholder groups. During the assessment phase, the County of Sonoma sent government-to-government letters to federally recognized Tribes within the three basins and subbasins, and the Federated Indians of Graton Rancheria chose to participate on the Santa Rosa Plain Advisory Committee. The stakeholder assessment resulted in recommendations for a transparent and inclusive process for local implementation of SGMA and also recommended that separate GSAs be created for each of the three basins/subbasins to reflect the local basin characteristics and stakeholder concerns. Other findings include the following:

- There is an overall commitment to long-term sustainable groundwater management and the importance of groundwater-surface water interaction, conjunctive use, and integrated water-resources management.
- Respondents respect local knowledge and control for water management and expressed concern about (1) needing to participate in management decisions for other basins and (2) having agencies or stakeholders from external jurisdictions making decisions about local groundwater. At the same time, some recognize a need for a regional perspective on water resources and land use; those with this perspective feel confident that regional considerations can blend with local decisions.
- Agencies expressed concerns about costs and funding SGMA implementation.
- Stakeholders demonstrated a high level of expectation for public outreach and stakeholder involvement. Respondents urged expansive outreach to rural residential well owners and those seeking guidance and input from basin advisory panels and the public on forming the GSA.

The assessment prescribed a process for input and decision making which involved representatives of the GSA-eligible entities in the Subbasin. The process was implemented, and included community forums that were held in 2016 to receive and consider input from the public on GSA formation.

Some areas of the Subbasin are classified as DACs by the DWR (DWR 2021a), the Sonoma County Transportation Authority (SCTA 2017), and Sonoma County Department of Health Services (2014). Representatives of DAC stakeholders were included in the assessment survey, or were separately interviewed by staff during the GSA formation process.

The beneficial uses and users of the Subbasin, as defined by SGMA (CWC Section 10723.2), are represented in the structure of the GSA Board and the Advisory Committee. GSP beneficiaries include private domestic well owners, agriculture, businesses, municipal public water systems, DACs, and environmental users.

Stakeholders on the GSA Board and Advisory Committee include representatives from municipal-water suppliers, agriculture, environmental organizations, businesses, rural well owners, and at-large community members. Refer to **Section 1.2** for additional information about GSA Board and Advisory Committee composition.

1.4.2.2 Phase 2: Preparation and Submission

The GSA Board and Advisory Committee were actively engaged in the development of the GSP, including:

- Reviewing and commenting on GSP sections as they were prepared
- Providing feedback and suggestions for SMC (discussed in **Section 4** of this GSP)
- Actively engaging and soliciting feedback from the stakeholders they represent

All meetings were publicly advertised and conducted in accordance with California's Ralph M. Brown Act and other public meeting laws (beginning at Government Code 54950). Meetings held during the pandemic were advertised and conducted in accordance with Governor Newsom's Executive Orders N-25-20 issued on March 3, 2020 and N-29-20, issued on March 4, 2020. Public comment was included on every item, and meeting minutes were taken and are available via the website.

Broader public input was determined to be a critical component of GSP development, and was guided by the *Community Engagement Plan for Development and Adoption of a Groundwater Sustainability Plan Santa Rosa Plain Groundwater Sustainability Agency* (Santa Rosa Plain GSA 2018) (**Appendix 1-F**)*,* which was adopted by the Board in January 2018. To encourage stakeholder engagement, key outreach tools included:

- Development of an Interested Parties List through both meeting attendance and by soliciting the public to sign-up via the website

- Monthly informational emails to the Interested Parties list that provided information regarding SGMA implementation, GSP planning, and groundwater management

- Development of a website with meeting information and GSP materials, including a location for public comments as draft GSP sections were released

- Public forums on the SGMA implementation process, subbasin conditions, SMC development, draft SMCs, and the draft GSP

- Forums coordinated with the other Sonoma County GSAs on cross-cutting issues, including climate change modeling (as discussed in **Appendix 3-E**) and groundwater recharge

- Presentations to and discussions with key stakeholder groups in the Subbasin, including the Sonoma Water Coalition (a countywide coalition of environmental groups), environmental stakeholder groups, cannabis growers, the Sonoma County Farm Bureau's water committee, the Sebastopol Grange, and organizations serving DACs, including California Human Development, Latino Service Providers, and Los Cien

- A survey mailed to all domestic well owners in the basin, in both English and Spanish, assessing their priorities regarding groundwater sustainability and identifying key issues related to groundwater resources

- Focus groups, including a basin-wide group, a DAC group that included representatives from the other Sonoma County basins, and an agricultural focus group

- A campaign targeted to informing domestic well owners, including a website revision, social media messaging, newspaper ads, and lawn signs

- Participation in 2021 Drought-Drop-By events, where groundwater users were provided with information about the GSP along with a water-saving toolkit

During the pandemic, outreach continued through these activities. Regular GSA Board and Advisory Committee meetings, and two community meetings, were held virtually.

1.4.2.3 Phase 3: Groundwater Sustainability Plan Review and Evaluation

Phase 3 began in 2019, with the majority of the review occurring in 2021. During this phase, sections of the draft GSP were released sequentially to the GSA Board, Advisory Committee, and public for comments. In addition, the draft GSP was posted on the website and made available at regional libraries and all city and town halls in the Subbasin. During the 30-day review period, 20 comments were received from 15 individuals or organizations. All comments submitted through the various Advisory Committee, GSA Board, and public reviews are available in **Appendix 1-A**. During the public comment period, a community workshop attended by approximately 45 people provided an overview of GSP content. In addition, a Board meeting held during the comment period allowed the public the opportunity to provide verbal comments and feedback.

Public comments were incorporated into the GSP as appropriate, and the final GSP will be considered by the GSA Board in early December.

Following submittal to DWR, there will be a 75-day comment period through DWR's SGMA portal at http://sgma.water.ca.gov/portal/. Comments will be posted to the DWR website prior to the state agency's evaluation, assessment, and approval.

1.4.2.4 Phase 4: Implementation and Reporting

Phase 4 will continue through the duration of the 50-year planning window to ensure that sustainability is achieved and maintained, and that the activities, programs, and policies of the GSA are transparent and inclusive. Both the GSA Board and Advisory Committee will continue to meet, and the Advisory Committee's scope and purpose will be refined to focus on GSP implementation. Tribal governments will be contacted to reassess their interest in participation in the GSA and in the implementation process.

Section 2: Description of Plan Area

Groundwater Sustainability Plan for
Santa Rosa Plain Groundwater Subbasin

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2 DESCRIPTION OF PLAN AREA (23 CCR 354.8 B)

This section provides a description of the area covered by the GSP (Plan Area), including the Santa Rosa Plain Groundwater Subbasin's (Subbasin) general physical setting and jurisdictional areas; topography and surface water features; land use characteristics; water source types and uses; existing monitoring and management programs; applicable land use plans; and the well permitting process. The numbers in parentheses in each subheading indicate the applicable SGMA regulation.

2.1 General Setting and Jurisdictional Areas (23 CCR 354.8 b)

The Plan Area for this GSP is the entire 80,000-acre Subbasin, which lies within the Coast Ranges geomorphic province and is one of three coastal alluvial subbasins of the Santa Rosa Valley Groundwater Basin (that is, Santa Rosa Plain, Healdsburg Area, and Rincon Valley) in the North Coast Hydrologic Region (**Figure 2-1)**. It 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 and the width varies from approximately 9 miles through the Santa Rosa area to 6 miles at the south end of the valley 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. Outside city limits, the Subbasin is characterized by native vegetation, rural properties, and agriculture – primarily vineyards but also nurseries, dairies, and row crops. The principal streams in the Subbasin are Mark West Creek, Santa Rosa Creek, and Laguna de Santa Rosa **(Figure 2-2)**, which drain a combined watershed area of approximately 251 square miles.

Adjacent groundwater basins and subbasins are also shown on **Figure 2-1** and include the very low-priority Healdsburg Area Subbasin (designated as basin 1-55.02 by DWR) to the north, the very low-priority Wilson Grove Formation Highlands Basin (designated as basin 1-059 by DWR) to the west, and the medium-priority Petaluma Valley Basin (designated as basin 2-001 by DWR) to the south. The very low-priority Alexander Area Subbasin (designated as basin 1-054.01 by DWR) and the very low-priority Rincon Valley Subbasin (designated as basin 1-054.03 by DWR) both abut a small eastern segment of the Subbasin boundary. The only adjacent GSA is the Petaluma Valley GSA, which formed in June 2017 and is responsible for implementing SGMA in the Petaluma Valley Basin. As very low-priority groundwater basins/subbasins, the Healdsburg Area, Wilson Grove Formation Highlands, Alexander Valley, and Rincon Valley are not required to form GSAs or develop GSPs; only high- and medium-priority basins are required to meet SGMA mandates.

Available technical information related to the hydrologic connection between the Santa Rosa Plain Subbasin and adjacent basins and subbasins is included in **Section 3** (Basin Setting) and provisions for coordinating with applicable GSAs and other local agencies within neighboring basins and subbasins are described in **Section 7** (Implementation Plan).

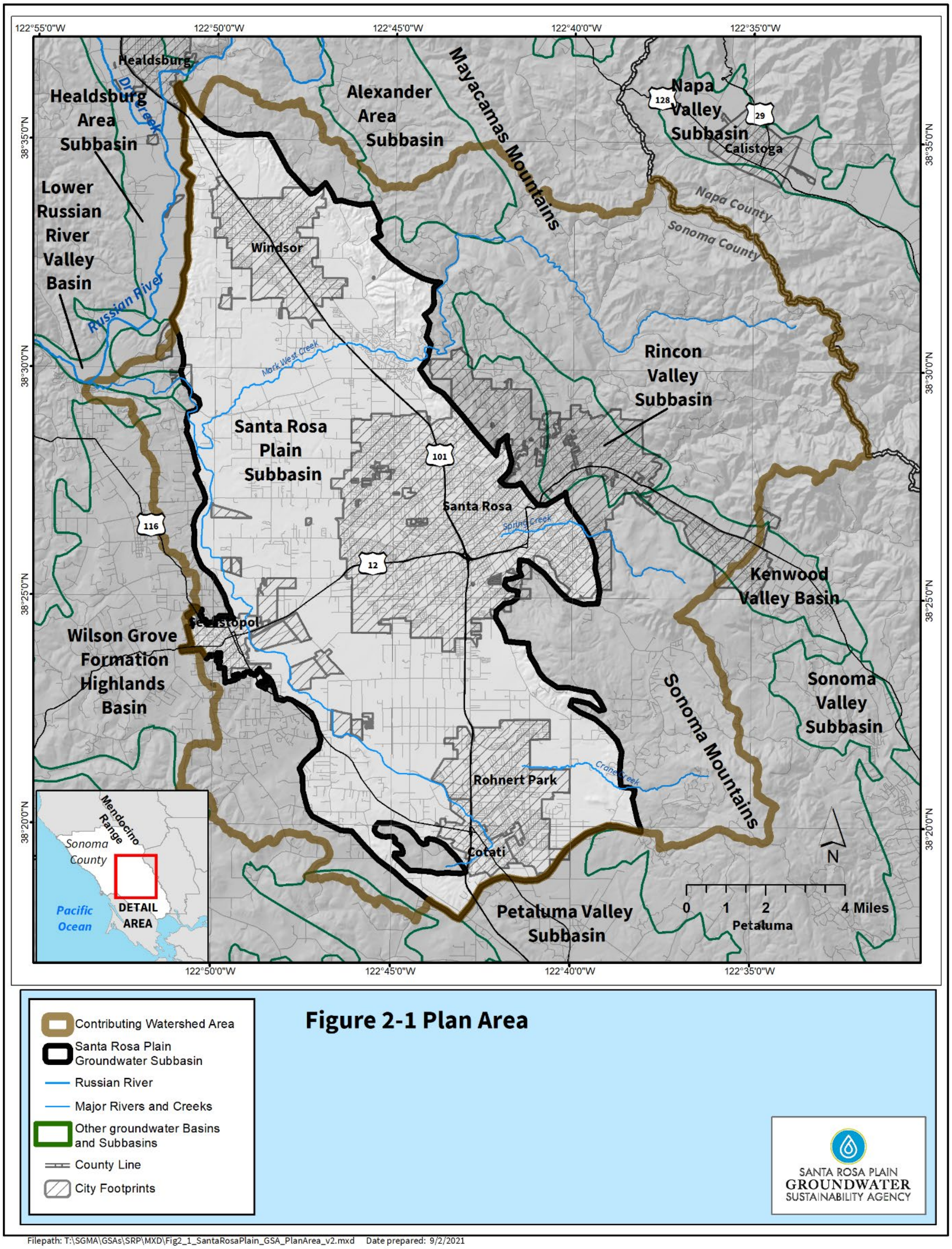

Figure 2-1. Plan Area

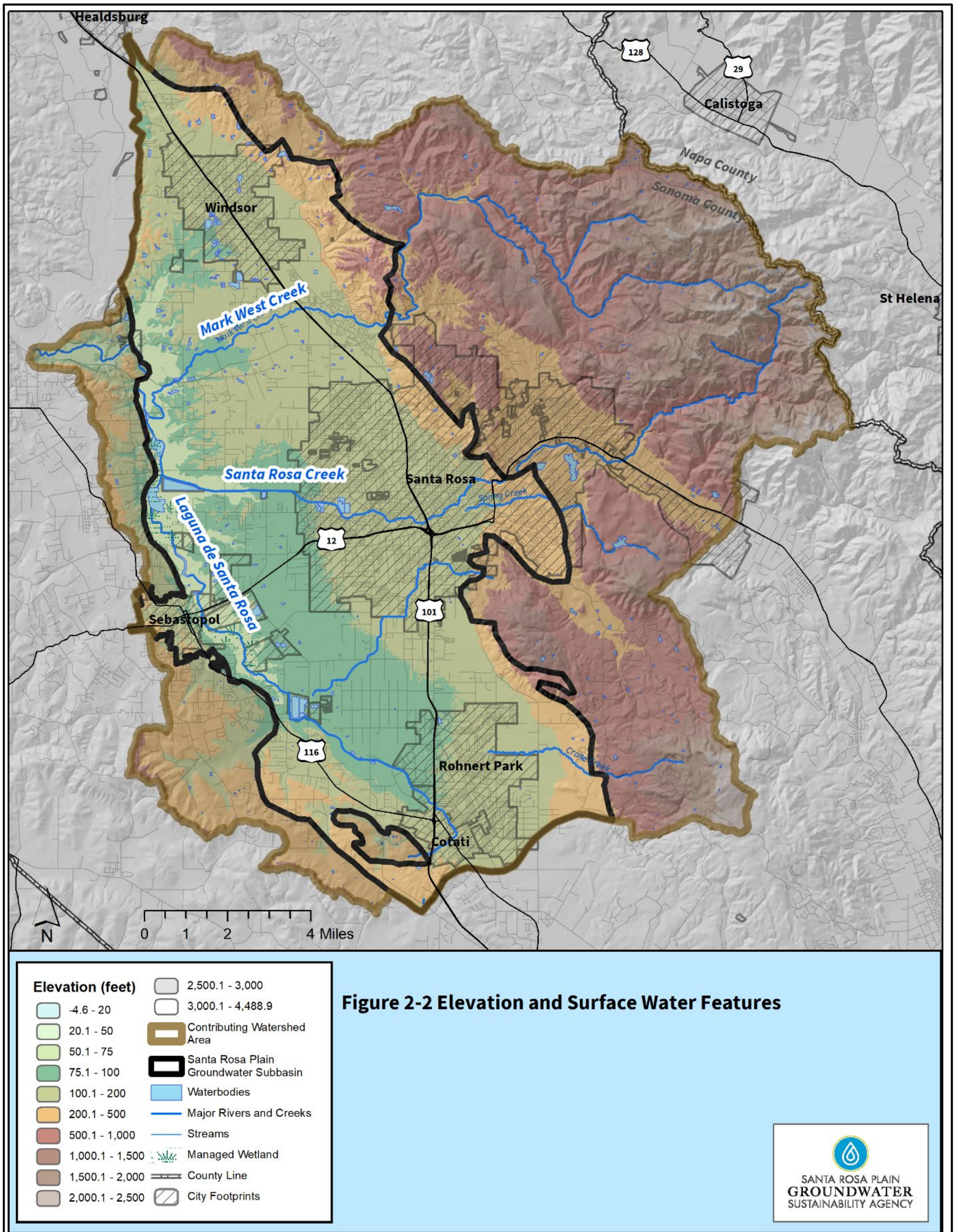

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Figure 2-2. Elevation and Surface Water Features

While the Plan Area and jurisdiction of the Santa Rosa Plain GSA is limited to the Santa Rosa Plain Subbasin as defined by SGMA basin prioritization (DWR 2020) and DWR's Bulletin 118 (DWR 2003), technical studies (including monitoring and groundwater-flow modeling) indicate that contributing watershed areas outside of the Subbasin are hydrologically connected and represent important sources of inflow (both in the form of surface streamflows and subsurface inflows) to the Subbasin. In recognition of the hydrologic connection with the contributing watershed areas, available data and information from these areas are also included in this GSP. The contributing watershed area is also shown on **Figure 2-1** and is a modified version of the Laguna-Mark West Watershed that extends slightly outside of the watershed to encompass the entire Bulletin 118 Santa Rosa Plain Subbasin at the northernmost boundary and a portion of the western boundary around the City of Sebastopol. Distinctions between metrics and features associated with the Bulletin 118 Santa Rosa Plain Subbasin jurisdictional area of the GSA and contributing watershed areas are clearly indicated or displayed in relevant sections and figures.

Local agencies with jurisdiction within the Subbasin include the Santa Rosa Plain GSA; Cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol; Town of Windsor; Gold Ridge RCD, Sonoma RCD; Sonoma Water; and County of Sonoma. **Figure 2-3** shows the jurisdictional boundaries of these local agencies, state, federal and tribal lands, and protected lands within the Subbasin. State lands include Sonoma State University within the Subbasin and several state parks and preserves located within the contributing watershed area. Tribal lands include lands owned by the Federated Indians of Graton Rancheria (west of Rohnert Park) and by the Lytton Band of Pomo Indians (west of Windsor). Protected lands shown on **Figure 2-3** include city parks and fields, county regional parks and preserves, special district properties and preserves, state parks and preserves, and nonprofit preserves. There are no federally owned lands within the Subbasin or contributing watershed.

Figure 2-3 shows the DACs in the Subbasin. These communities generally are located in areas that receive water from municipal suppliers, which rely primarily on surface water supply, as described in **Section 2.3**.

The California Legislature assigned primary responsibility for protecting and enhancing California's surface water and groundwater quality to the State Water Resources Control Board (SWRCB), and the nine regional water quality control boards (Regional Boards). The SWRCB provides state-level coordination for the water quality control program and regulatory monitoring by establishing statewide policies and plans for implementing state and federal laws and regulations. The Regional Boards adopt and implement water quality control plans (basin plans), recognizing the unique characteristics of each region's natural surface water and groundwater quality, actual and potential beneficial uses, and surface water and groundwater quality problems. Article 3 of Chapter 4 of the Porter-Cologne Act directs the Regional Boards to adopt, review, and revise basin plans, and provides specific guidance on factors that must be considered in adopting surface water and groundwater quality objectives and implementation measures.

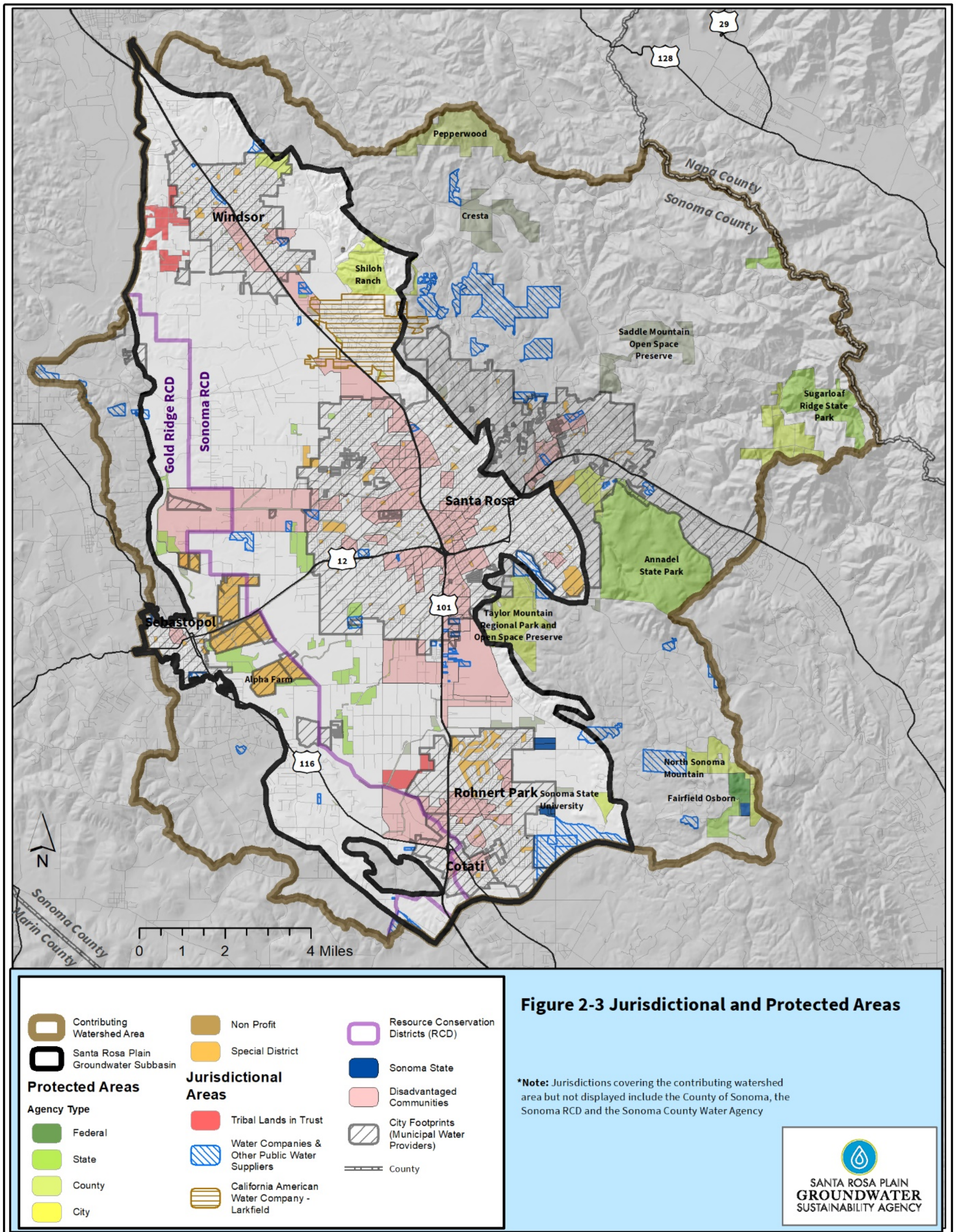

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Figure 2-3. Jurisdictional and Protected Areas

The North Coast Regional Water Quality Control Board (NCRWQCB) implements water quality regulations in the watershed, including establishing Total Maximum Daily Loads for water quality impairments within the Laguna de Santa Rosa watershed, adopting General Waste Discharge Requirements for agricultural lands, dairies, recycled water, and for stormwater and wastewater discharges. The NCRWQCB and the California Department of Toxic Substances Control (DTSC) are responsible for regulating the cleanup of contaminant sites and contaminated groundwater; the GSA has no authority to regulate groundwater contaminant site cleanups or the migration of plumes.

2.2 General Land Use Characteristics (23 CCR 354.8 b)

Land use maps for 1999, 2012, and 2013 within the Subbasin are shown on **Figures 2-4a, 2-4b,** and **2-4c**, respectively. Land use mapping over the past several decades provides a measure of growth and land use changes in the Subbasin, which includes increases in residential and commercial land uses and irrigated agriculture and a resulting decrease in native vegetation or water (**Figures 2-4a** and **2-4b**). **Figure 2-4c** presents more detailed classification of vegetation types within the Subbasin and contributing watershed areas from the Sonoma County Light Detection and Ranging (LiDAR) and Vegetation Mapping Program.

Existing land use conditions correlate most closely with the 2012 land use survey (DWR 2012) (**Figure 2-4b**), which indicates the Subbasin is primarily comprised of urban, residential, commercial, and industrial land uses (36 percent), and native vegetation or water (35 percent) with irrigated and non-irrigated agriculture making up approximately 26 percent of the land uses. The major urban and residential areas in the Subbasin include the Cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, the Town of Windsor, several unincorporated communities, and areas of rural and semirural residential development.

2.3 Water Source Types and Water Use Sectors (23 CCR 354.8 b)

This GSP recognizes that the efficient use and conjunctive management of the various available water sources is integral to achieving sustainable groundwater management in the Subbasin. The Subbasin has four primary water sources: groundwater, imported surface water, local surface water, and recycled water. An overview of the spatial distribution of the reliance on the four primary water source types by primary water use sectors in the Subbasin is shown on **Figure 2-5** and provided in **Sections 2.4.1** through **2.4.4**. Additional details on water uses associated with the Subbasin water budget are described in **Section 3** (Basin Setting) and additional information on the availability and feasibility for future uses is included in **Section 6** (Projects and Actions).

Initially, communities in the Santa Rosa Plain relied completely on abundant springs and surface water during its settlement and early growth period. Census information for Sonoma County indicates relatively flat population growth from 1890 to 1940, then growth increased until about 2000. Since then, growth has slowed and has remained relatively constant. Local surface water supply accounted for approximately 3 percent of the water supply in the Subbasin in 2020.

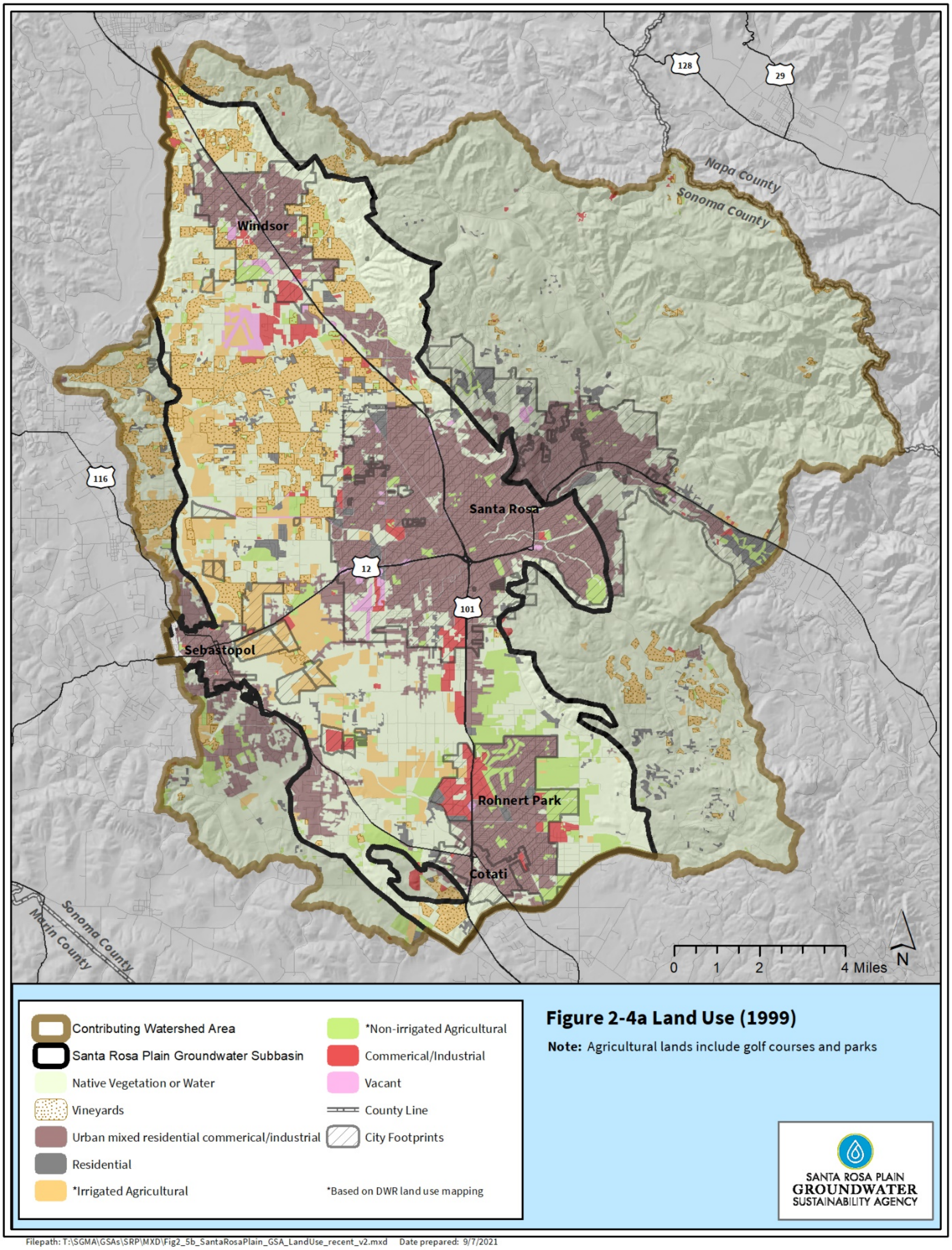

Figure 2-4a. Land Use (1999)

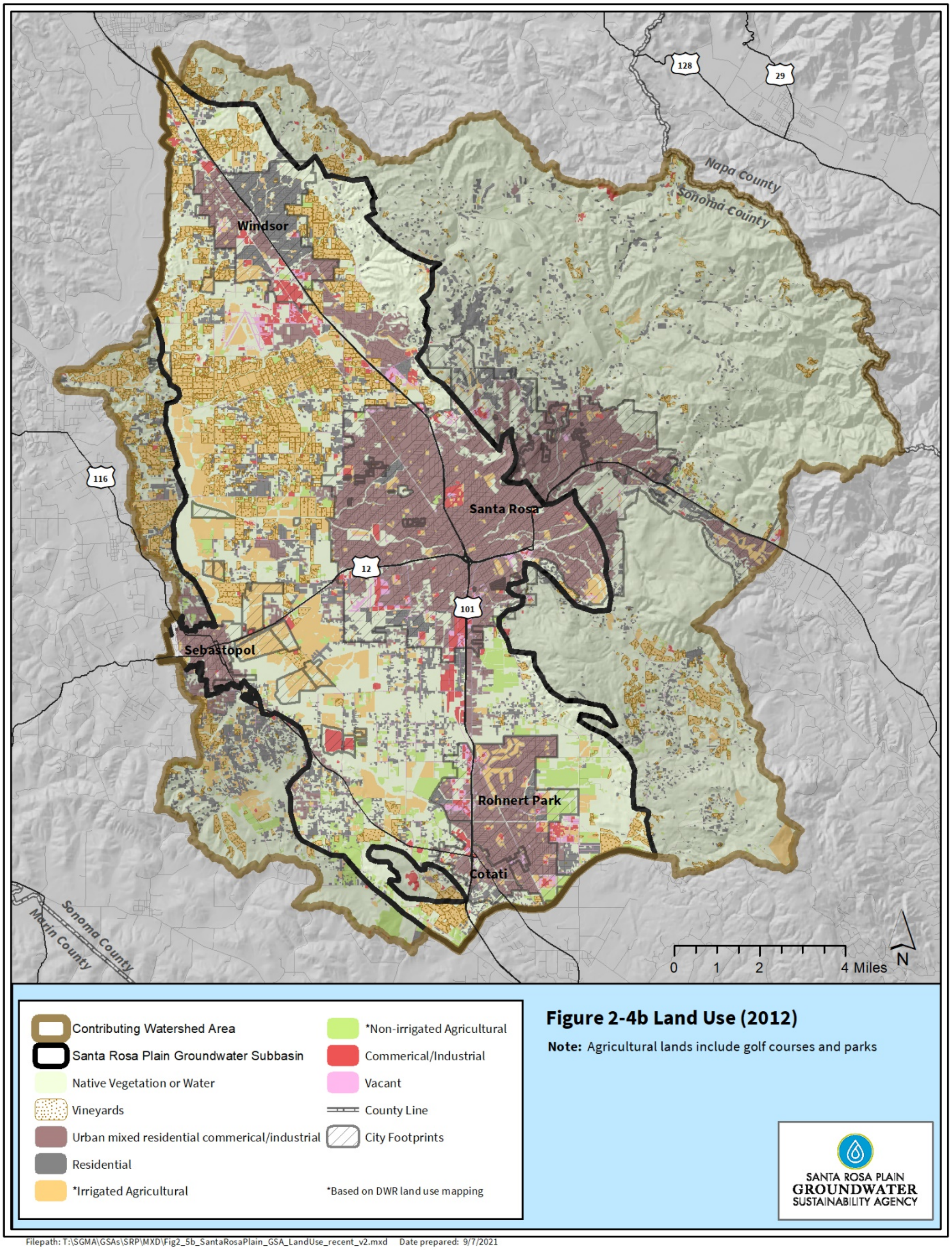

Figure 2-4b. Land Use (2012)

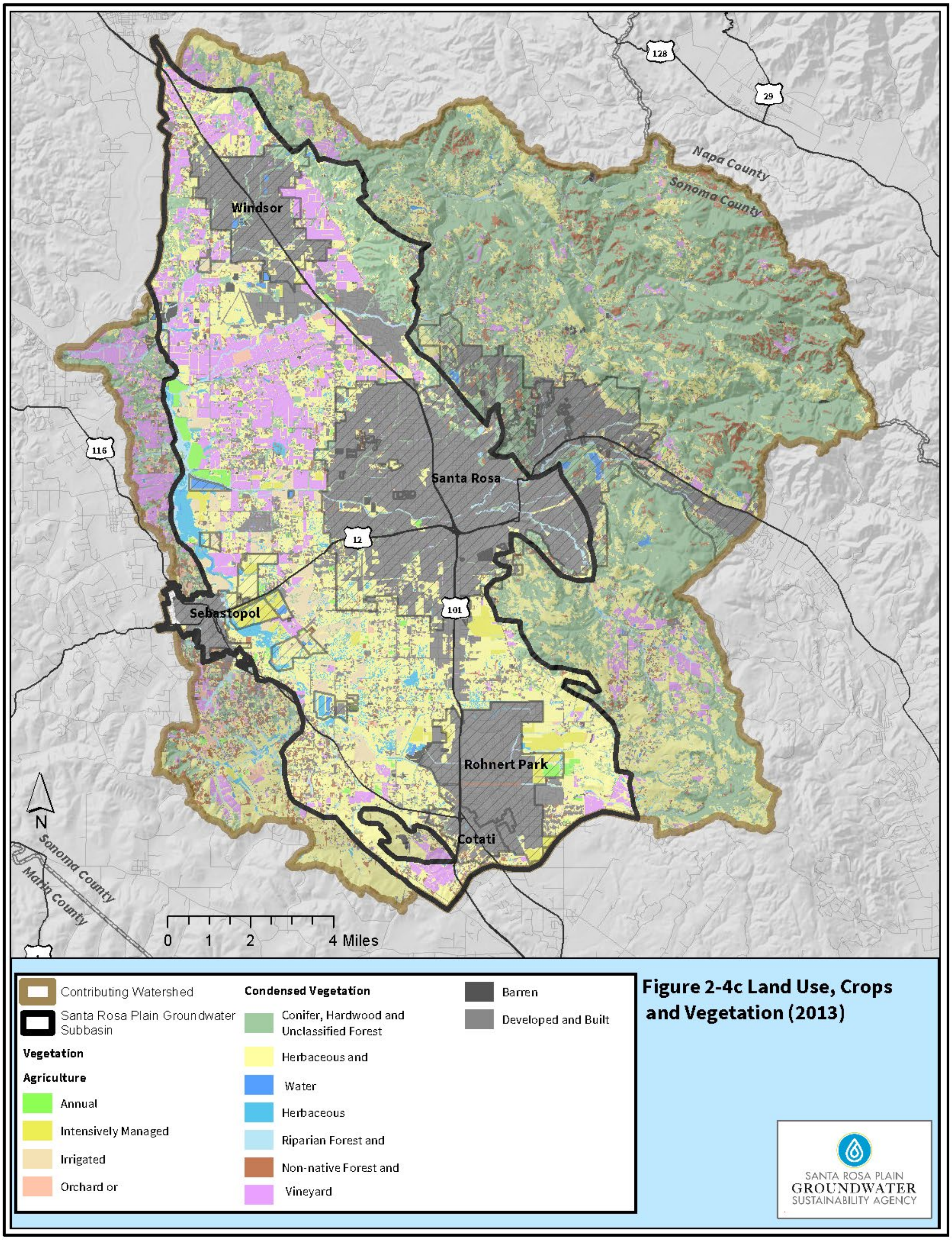

Figure 2-4c. Land Use, Crops, and Vegetation (2013)

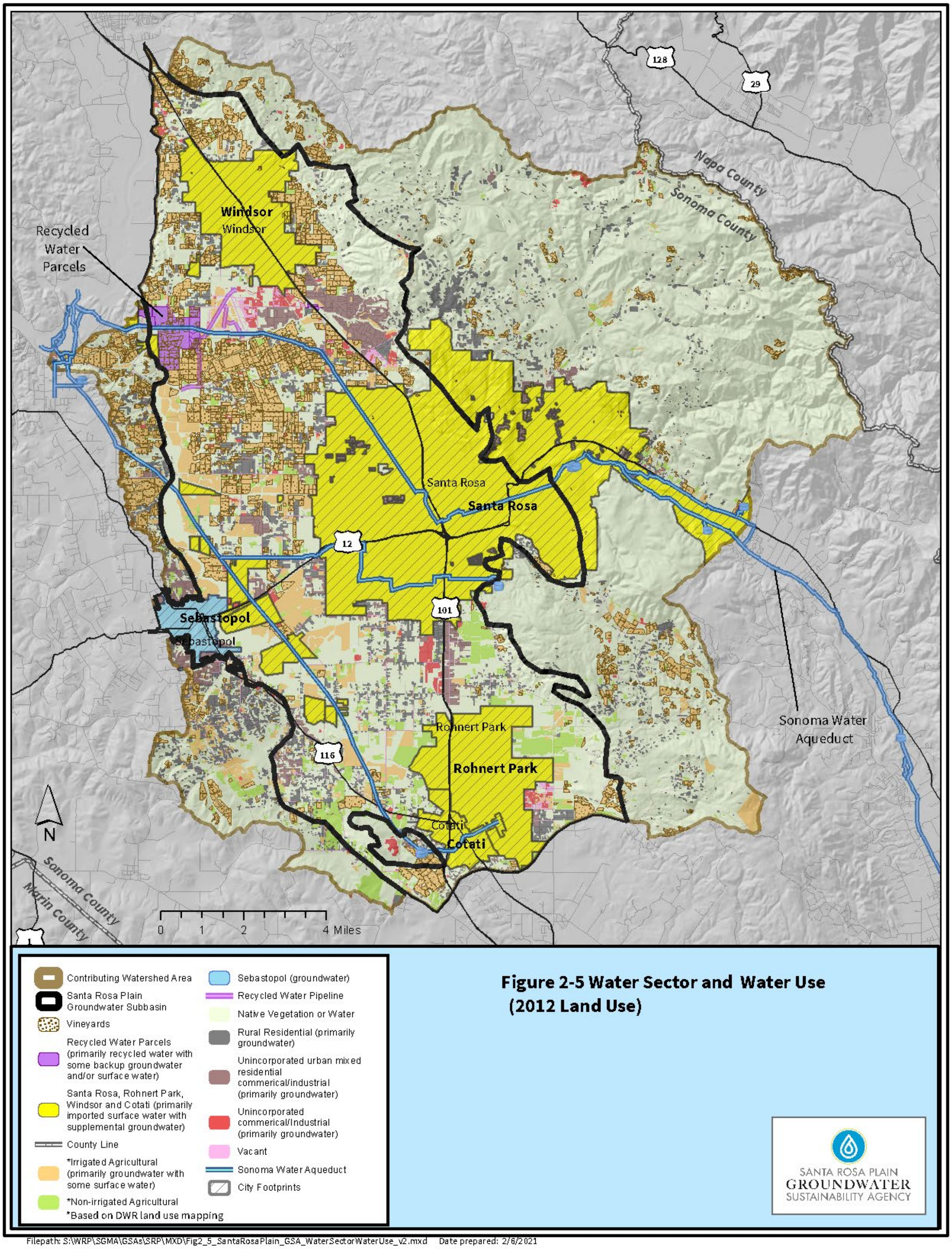

Figure 2-5. Water Sector and Water Use

Historically, the Santa Rosa Plain relied completely on its local groundwater and surface water resources until 1959 with the completion of the Santa Rosa Aqueduct and initiation of Russian River-imported surface water deliveries resulting in a mix of imported surface water and groundwater to meet water-supply demands. Deliveries to the City of Santa Rosa have been between 5,000 and 6,000 AFY over the past 25 years. With the completion of the Russian River-Cotati Intertie pipeline in 1975, deliveries of Russian River-imported surface water began flowing to Cotati and the City of Rohnert Park. Deliveries to City of Rohnert Park ranged between 2,600 and 2,900 AFY between 1996 and 2003, a period of localized groundwater declines, increased to more than 4,000 AFY for a number of years, and has ranged between 2,200 and 3,000 AFY in more recent times. Deliveries to City of Cotati have ranged between roughly 400 and 800 AFY, and for the Town of Windsor ranged between 500 and 700 AFY over the same time period. Russian River-imported water supply accounts for about 45 percent of the Subbasin water supply today.

Growth in the wine industry and increasing vineyards in the Santa Rosa Plain accounts for most of the agricultural demand expansion, from about 2,500 acres of vineyards in 1974 to about 9,700 acres of vineyards in the Subbasin in 2016. Groundwater pumping for irrigated crops in the Subbasin was estimated through the groundwater model, ranging from 5,700 AFY to 13,900 AFY with a median of 9,000 AFY. Urban and private systems groundwater demands did not begin to ramp up until later due in part to the Santa Rosa Aqueduct imported water supplements beginning in the 1960s, followed by the Russian River-Cotati Intertie. Urban and small system groundwater pumping has ranged from 4,800 AFY to 11,100 AFY with a median of 8,000 AFY. Rural residential well pumping has ranged from 2,000 AFY to 2,900 AFY with a median of 2,600 AFY. Because of incomplete well permit information, the exact number of domestic wells is unknown but is estimated to be between 4,000 and 5,500. Over time, the recently launched Groundwater Users Information Data Exchange will lead to more accurate information on the number of residential wells. Today, groundwater accounts for approximately 35 percent of the overall Subbasin water supply.

Deliveries of recycled water commenced in 1990 and is used for landscape and agricultural irrigation. An estimated 10,200 AFY has been used for the irrigation of vineyards, replacing groundwater pumping. Recycled water accounts for about 20 percent of the water supply in the Subbasin.

2.3.1 Groundwater

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, which also utilizes 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; the Cities of Santa Rosa, Rohnert Park, and Cotati, all of which operate municipal wellfields within the Subbasin and contributing watershed areas. **Figure 2-6a** shows the approximate location and density of water wells within the Subbasin and contributing watershed areas based on available data from DWR. **Figure 2-6b** illustrates the depth of groundwater wells in the Subbasin and watershed.

2.3.2 Imported Surface Water

Imported water consists of Russian River water sourced from Sonoma Water's production facilities located outside of the Subbasin that is delivered via aqueduct to the 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.

2.3.3 Local Surface Water

Local surface water from Mark West Creek, Santa Rosa Creek, and Laguna de Santa Rosa (**Figure 2-2**) and their tributaries represents an important source of supply for some water users. Information on the approximate amounts of surface water is available through reported surface water diversions filed with the California SWRCB (2018).

2.3.4 Recycled Water

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 (**Figure 2-1**), which is used for crop and landscape irrigation in lieu of using groundwater or imported water. Recycled water produced from the City of Santa Rosa's Laguna Treatment Plant (serving Santa Rosa, Cotati, Rohnert Park, and Sebastopol) 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 contributing watershed.

2.4 Existing Monitoring Programs and Networks (23 CCR 354.8 c, d, e)

Existing monitoring programs and networks within the Subbasin have been developed and implemented by many agencies, organizations, and volunteers for a variety of purposes. This section provides a description of the existing monitoring programs and networks. An assessment of the existing monitoring networks and programs for their suitability to comply with DWR's GSP Regulations, including identification of data gaps, is described in **Section 5** (Monitoring Plan).

2.4.1 Groundwater-level Monitoring

Numerous organizations within the Subbasin and contributing watershed areas collect groundwater-level measurements, including DWR; Sonoma Water; the Sonoma and Gold Ridge RCDs; the Cities of Cotati, Rohnert Park, and Santa Rosa; the Town of Windsor; Sonoma State University; and many operators of small mutual water systems. Permit Sonoma administers the Use Permit Groundwater Monitoring Program, which requires the measurement and reporting of groundwater levels on a quarterly or monthly basis for commercial and industrial projects requiring a use permit and using more than 0.5 AFY of water. Groundwater levels are measured from a combination of private wells, dedicated monitoring wells, and inactive and active public water-supply wells.

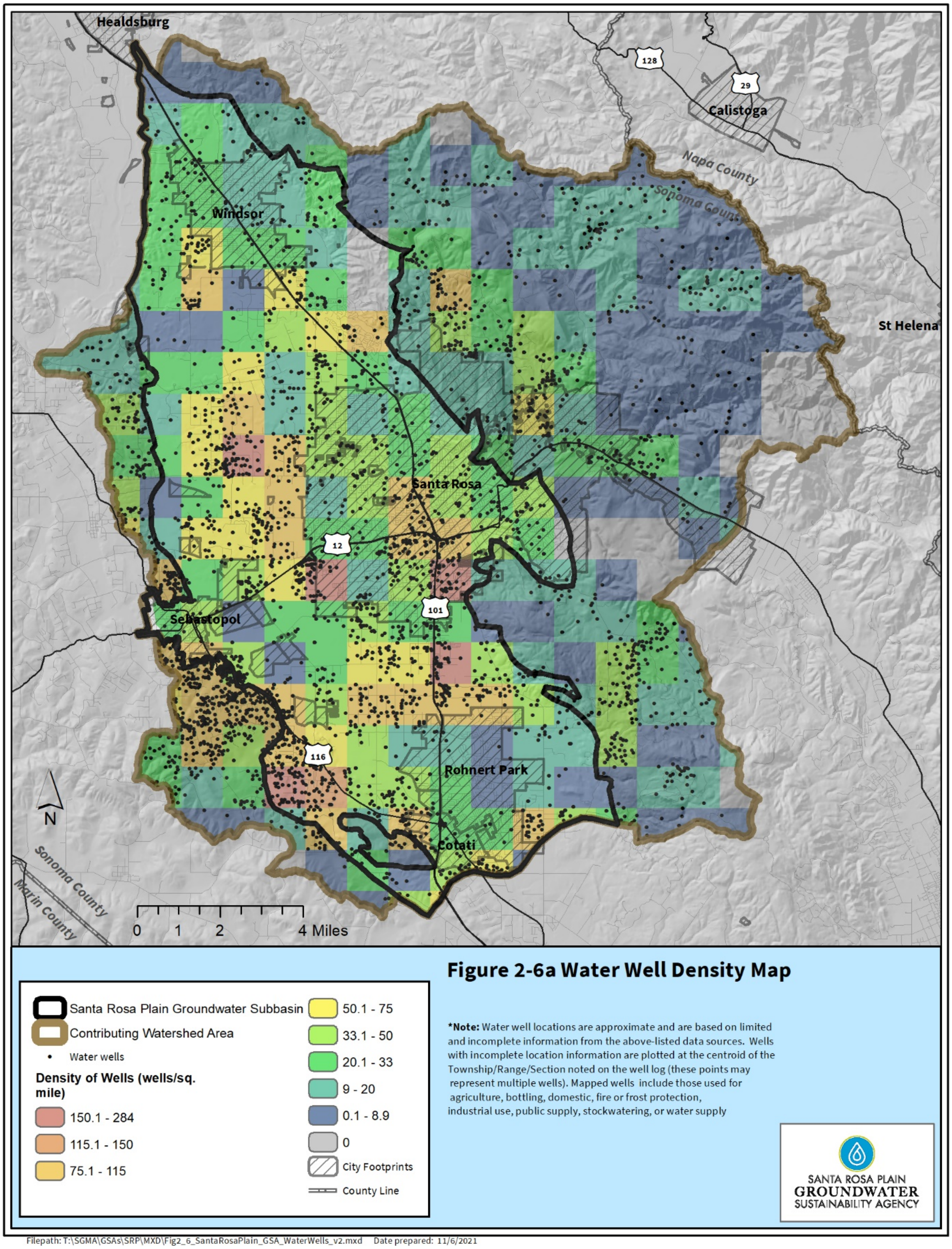

Figure 2-6a. Water Wells

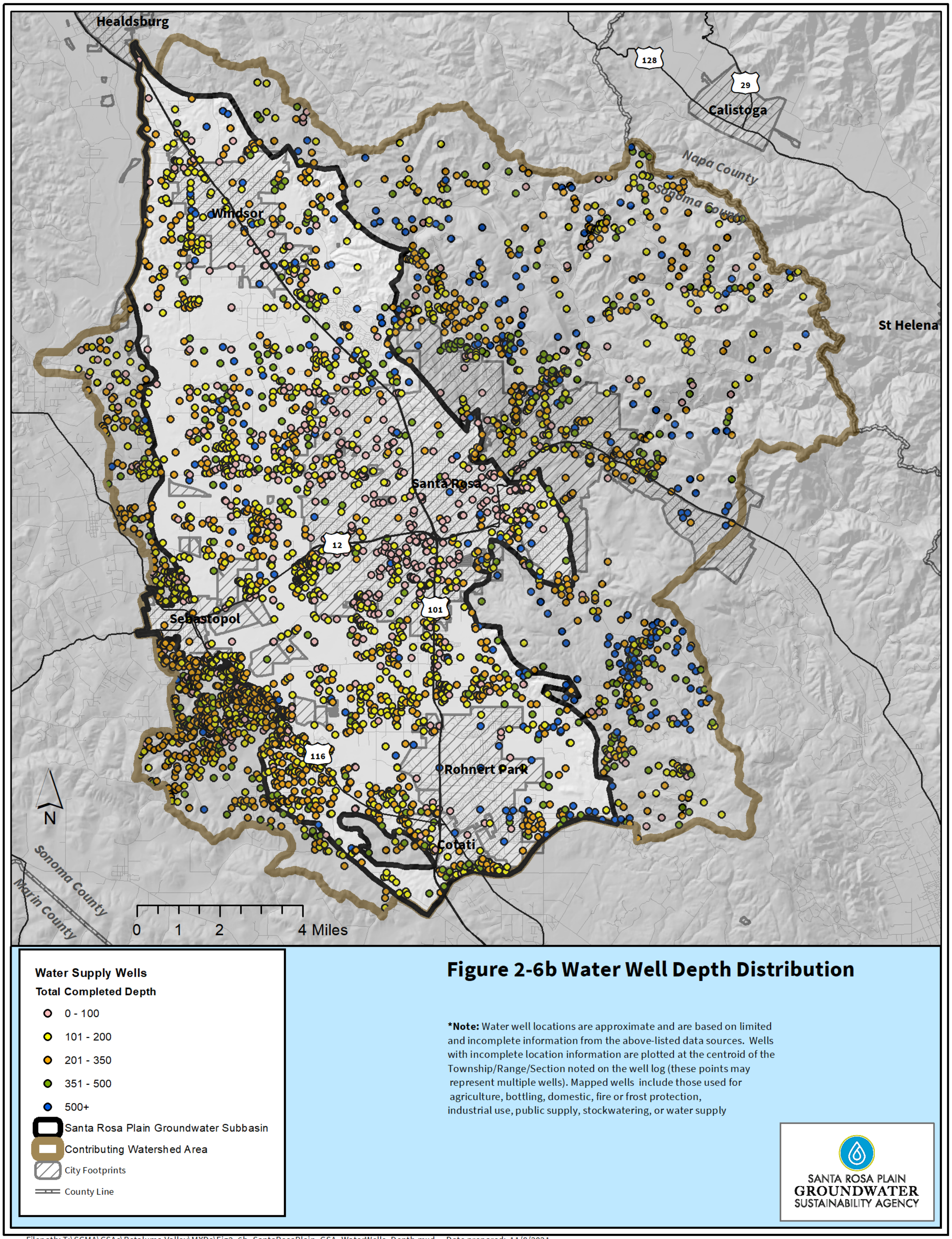

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Figure 2-6b. Water Well Depth Distribution

The Groundwater-level Monitoring Network expanded significantly under the voluntary Santa Rosa Plain Groundwater Management Program (SRPGMP 2017) through public outreach and education to private well owners who volunteered to have their wells monitored. The majority of wells monitored in the program are voluntary private domestic and agricultural wells, with a smaller but significant portion of publicly owned water-supply wells and dedicated monitoring wells.

Groundwater-level monitoring is generally conducted twice a year, in the spring and fall, at 134 groundwater-level monitoring program wells within the watershed, as shown on **Figures 2-7a** and **2-7b**. A subset of the wells is monitored on a more frequent basis, including continuous monitoring using pressure transducers. The 134 wells in the existing monitoring program were subdivided according to their well-screen depth or total depth, where known, into the following categories:

- Less than 200 feet deep
- 200 to 500 feet deep
- Greater than 500 feet deep
- Unknown well-screen and depth

DWR has measured groundwater levels in a network of wells within the Subbasin for decades. Most of these wells were incorporated into DWR's monitoring network between the mid-1950s and 1981. Measurements are generally collected from these wells semiannually in the spring and fall, although a subset of wells are monitored monthly.

Groundwater-level data are available to the public from DWR, SWRCB, and the U.S. Geological Survey (USGS). The DWR California statewide Groundwater Elevation Monitoring (CASGEM) Program is a state program to compile groundwater-level monitoring data statewide from local monitoring programs. A subset of the Subbasin groundwater-level monitoring data is reported by Sonoma Water to the CASGEM program. The SWRCB GeoTracker program provides groundwater-level monitoring data on a number of soil and groundwater cleanup sites in the Subbasin. The USGS operates the National Water Information System (NWIS; https://waterdata.usgs.gov/nwis), which is a database of surface water and groundwater data.

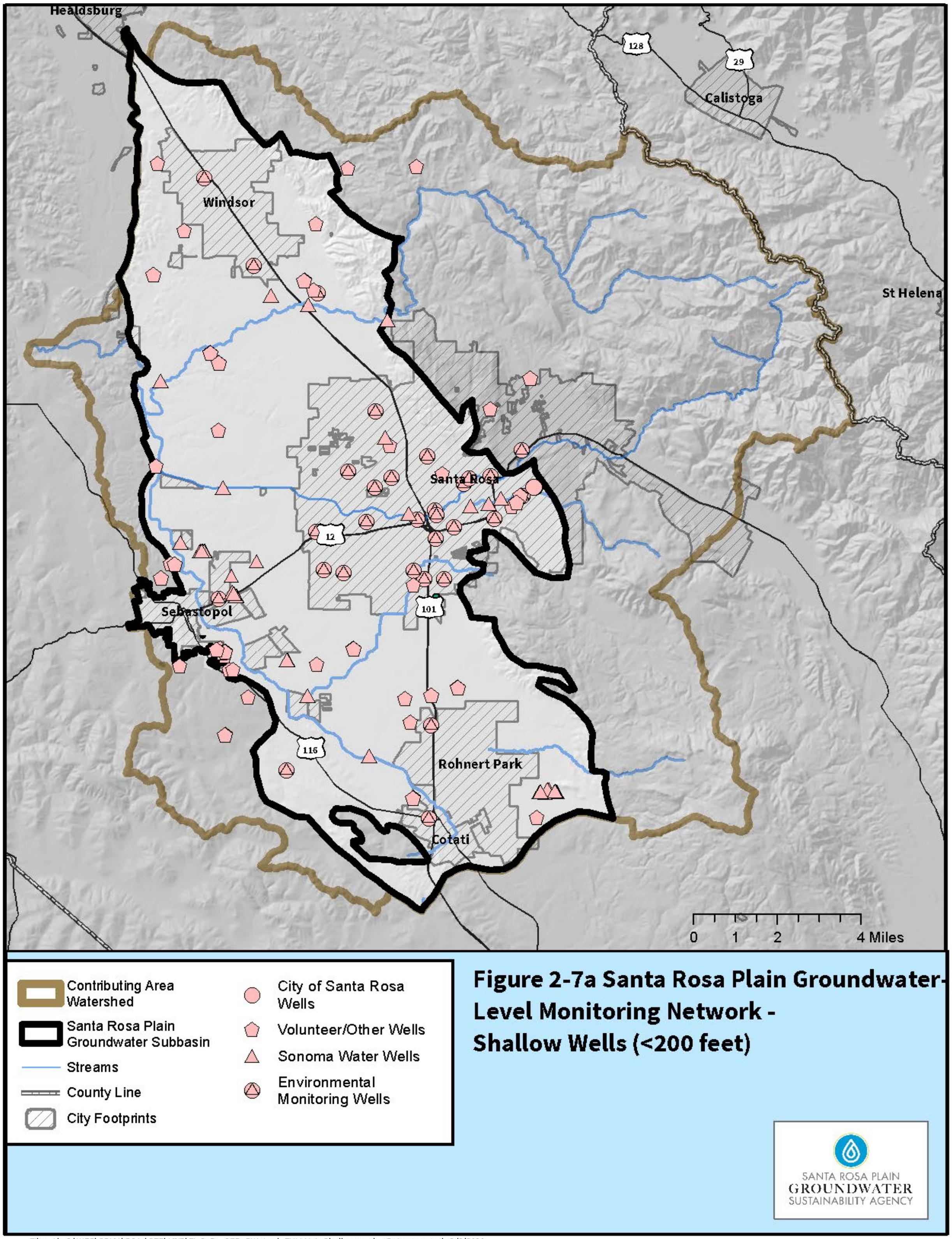

Figure 2-7a. Santa Rosa Plain Groundwater-level Monitoring Network – Shallow Wells (< 200 feet)

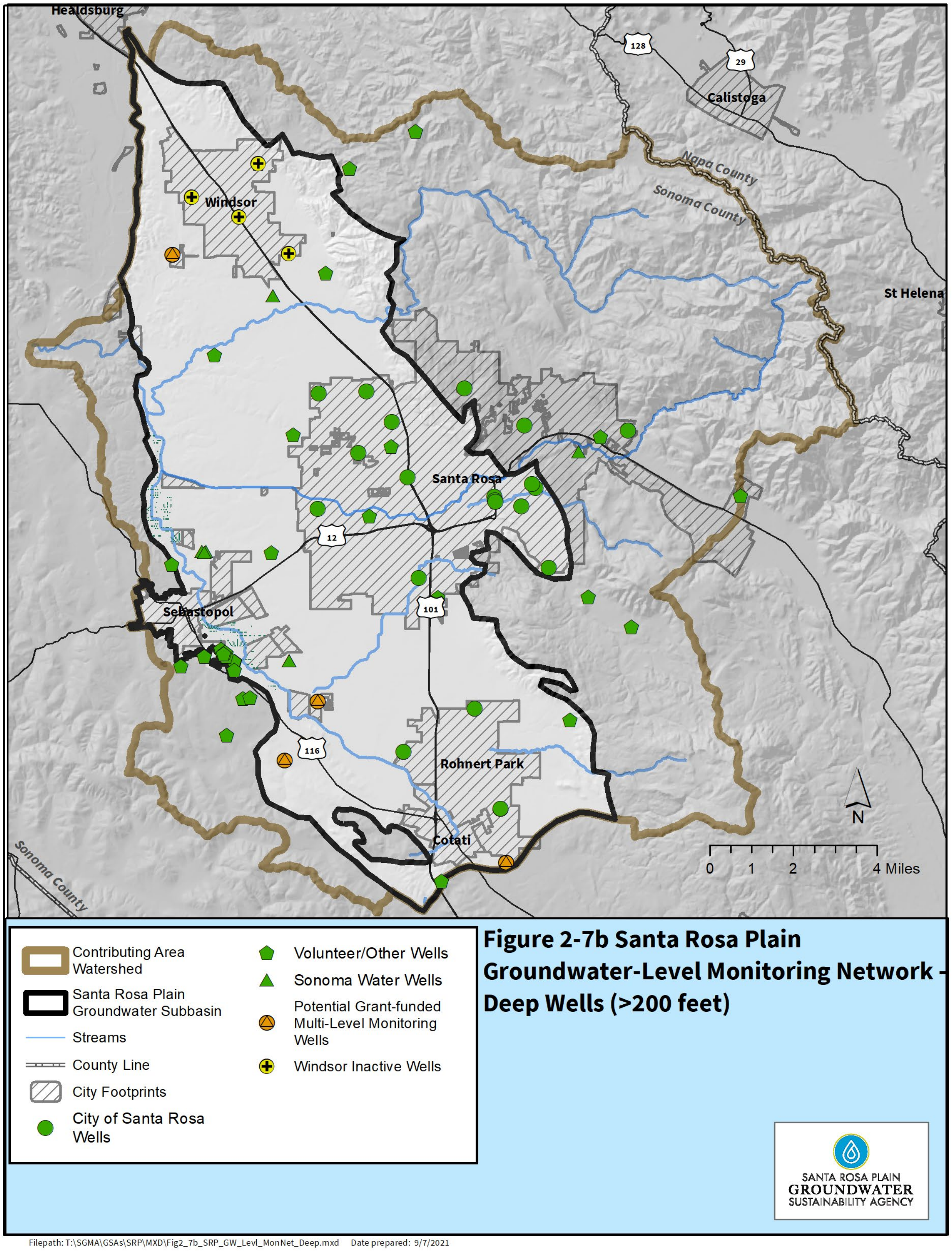

Figure 2-7b. Santa Rosa Plain Groundwater-level Monitoring Network – Deep Wells (> 200 feet)

2.4.2 Groundwater Quality Monitoring

Groundwater quality data has been collected through many different programs and initiatives described in **Sections 2.5.2.1** through **2.5.2.5**. The synthesis and evaluation of results from the below-water quality monitoring programs are described in **Section 3** (Basin Setting).

2.4.2.1 Public Water-Supply Well Monitoring

The SWRCB's Division of Drinking Water (DDW) monitors public water system wells for compliance with CCR Title 22 requirements for drinking water standards. Title 22 includes standards relative to levels of organic and inorganic compounds such as metals, microbial compounds, and radiological analytes. Data are available for active and inactive drinking water sources, for water systems that serve the public, and wells defined as serving 15 or more connections, or more than 25 people per day. In the Subbasin, DDW wells were monitored for Title 22 requirements.

2.4.2.2 State Water Resources Control Board Groundwater Ambient Monitoring and Assessment Program

Established in 2000, the Groundwater Ambient Monitoring and Assessment (GAMA) Program monitors groundwater quality throughout the State of California. GAMA is intended to create a comprehensive groundwater monitoring program and increase public access to groundwater quality and contamination information. GAMA receives data from a variety of monitoring entities, including DWR, USGS, and the SWRCB.

2.4.2.3 Water Data Library

DWR monitors groundwater quality data and reports the results through the Water Data Library. Samples are collected from a variety of well types including irrigation, stock, domestic, and some public-supply wells. Wells are not sampled regularly, and most wells have only 1 or 2 days' worth of sampling measurements and large temporal gaps between the results. Constituents most frequently monitored include chloride, sodium, calcium, boron, magnesium, and sulfate. Measurements taken include conductance, pH, total alkalinity, and hardness. Additional dissolved nutrients, metals, and total dissolved solids (TDS) are also sampled but have fewer sample results available.

2.4.2.4 Santa Rosa Plain Salt and Nutrient Management Plan

The Santa Rosa Plain Salt and Nutrient Management Plan (SNMP) was prepared in 2013 (City of Santa Rosa 2013a) in accordance with California's Recycled Water Policy of 2009 (as amended in 2013 and 2018, SWRCB 2018) by the City of Santa Rosa in collaboration with partner agencies (Cities of Cotati, Sebastopol, Rohnert Park; Town of Windsor; and Sonoma Water). Santa Rosa submitted the final SNMP in 2013 and the NCRWQCB approved the SNMP in a letter dated September 1, 2015. The SNMP proposed a conceptual monitoring framework and implementation plan that the NCRWQCB approved as part of the SNMP review and approval process. A Revised Monitoring and Reporting Program (MRP) was submitted to the NCRWQCB in August 2021 and is currently being reviewed by the NCRWQCB (City of Santa Rosa 2021). Developed to comply with the SNMP, the MRP is proposed to include monitoring of TDS and nitrate using laboratory methods and pH, temperature, and electrical conductivity (EC) using field methods from six monitoring wells in an area of high recycled water application with higher potential risk to water quality in the central portions of the Subbasin. Upon the implementation of the MRP, monitoring efforts will be coordinated and, where possible, combined with the monitoring program described in **Section 5** (Proposed Monitoring Program).

2.4.2.5 U.S. Geological Survey

Special studies conducted by the USGS within the Santa Rosa Plain Subbasin have included the collection and analysis of groundwater quality data. Water quality analyses have included major ions, trace elements, nutrients, stable isotopes (oxygen-18 and deuterium), tritium, the radioactive isotope of carbon (carbon-14), and the stable isotope of carbon (carbon-13). Data collected by the USGS through these studies are available on the NWIS database (USGS 2021).

2.4.3 Climate Monitoring

Climate-monitoring stations in the watershed provide part of the information necessary for forecasting weather conditions, flood preparedness, drought preparedness, water-supply planning, and for determining the Subbasin water budget. Climate-monitoring stations may include sensors to collect data on rainfall, air temperature, relative humidity, wind speed and direction, solar radiation, soil temperature, and moisture. Climate data (**Figure 2-7c**) in the Subbasin are collected by several stakeholders, agencies, and tools, including:

- Western Weather Group (http://www.westernwx.com/sonoma)
- Community Collaborative Rain, Hail and Snow Network (CoCoRaHS 2021)
- Sonoma Water, OneRain program (https://sonoma.onerain.com/home.php)
- California Irrigation Management Information System (CIMIS; DWR 2021c)
- National Weather Service's MesoWest gages
- Pepperwood Preserve
- National Oceanic and Atmospheric Administration's (NOAA's) National Climate Data Center

The primary weather station in the Subbasin, which has been used to calculate mean annual rainfall, is Climate Station Sonoma County Airport (National Climatic Data Center #7965). The station is located at the Charles M. Schulz Sonoma County Airport. Data are available from 1903 to the present at this station; however, the station dataset does not contain a complete record of daily rainfall.

2.4.4 Surface Water Monitoring

Existing continuous surface water monitoring in the watershed includes nine stream gaging stations operated by the USGS, seven gages operated by Sonoma Water, and one stream gage operated by the Pepperwood Preserve (**Figure 2-7d**). Most streamflow records within the Plan Area date back to Water Year (WY) 1999 through the present. Data collection by Sonoma Water began in 2018.

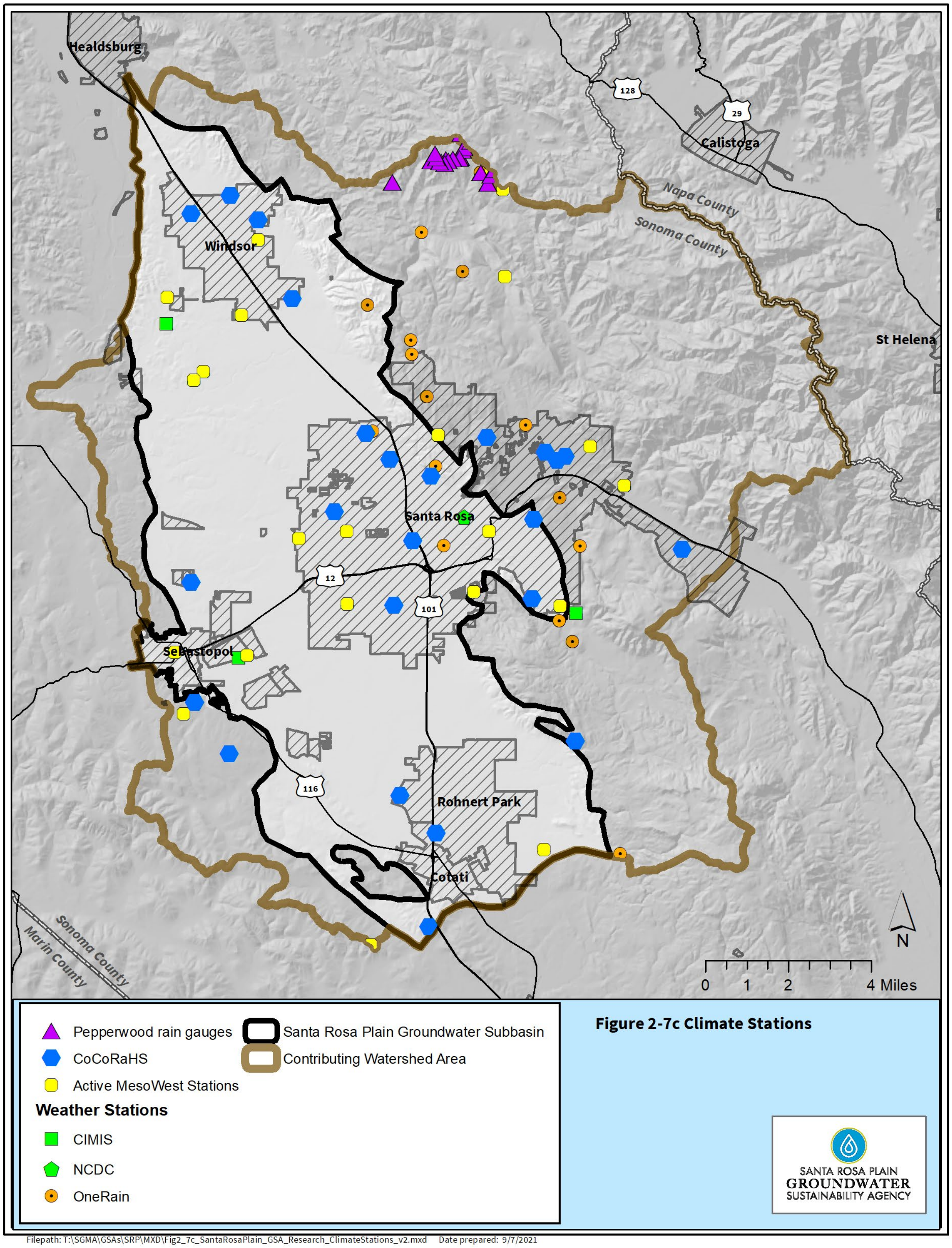

Figure 2-7c. Climate Stations

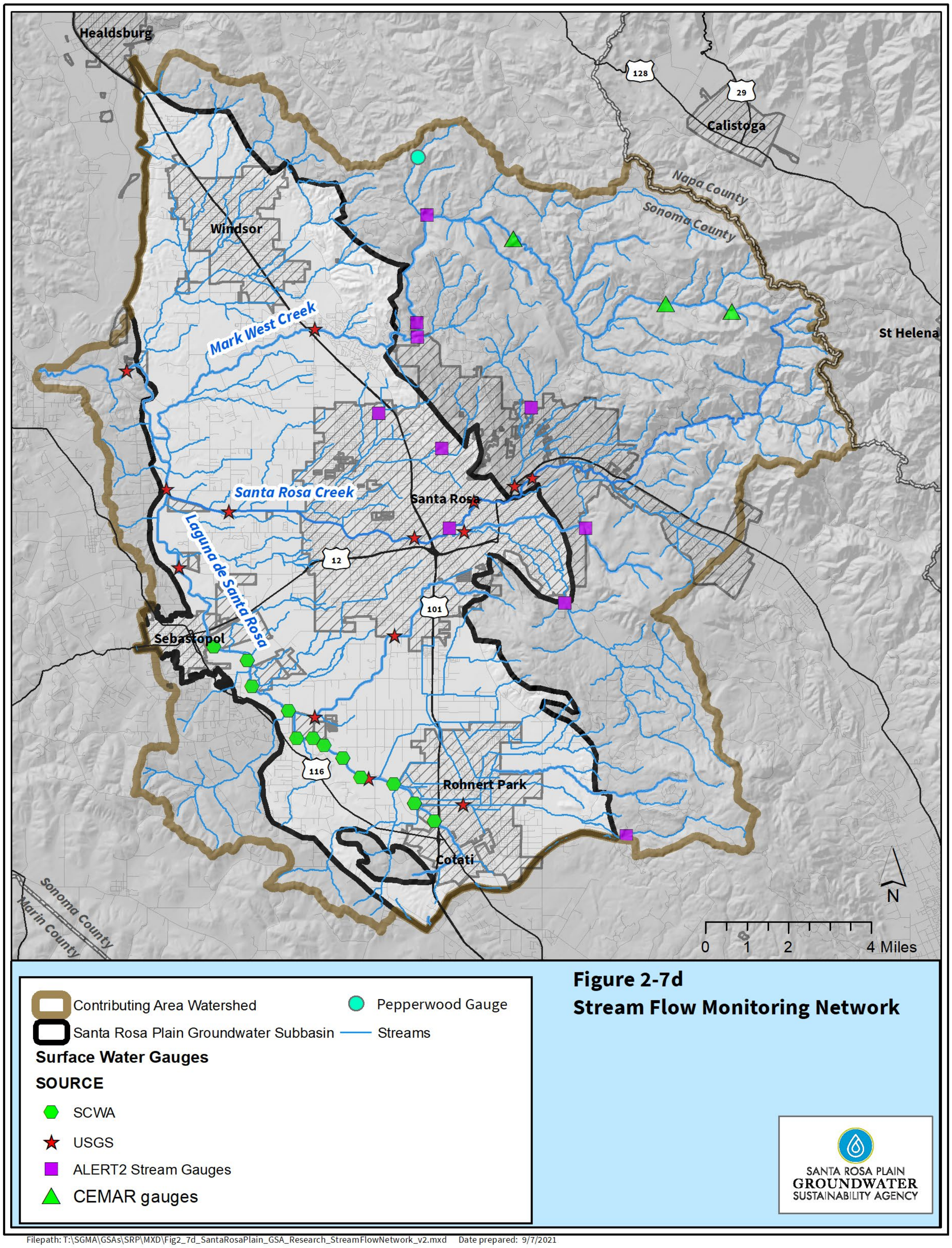

Figure 2-7d. Streamflow Monitoring Network

2.4.5 Land Surface Subsidence Monitoring

There are two primary systems for monitoring land surface subsidence in the Subbasin, described as follows:

- To support the implementation of SGMA, subsidence is currently estimated every month by DWR using Interferometric Synthetic-Aperture Radar (InSAR) data. The InSAR data are spatially extensive (covering nearly the entire Subbasin) with data available monthly going back to 2015.

- In the Subbasin, global positioning system (GPS) stations monitored by the University NAVSTAR Consortium's (UNAVCO) Plate Boundary Observatory (PBO) program are currently used as an indicator of subsidence. There are currently no regularly scheduled theodolite or total station surveys and no extensometers in the Subbasin. The UNAVCO PBO network consists of a network of about 1,100 continuous GPS and meteorology stations in the western United States used to monitor multiple pieces of information, including subsidence. There is one station in the Subbasin and two in the contributing watershed: (1) P197, located on Highway 12 at Fulton Road; (2) P196, located along Meacham Road southeast of Cotati, and (3) P201, located on the ridgetop just north of Mark West Quarry.

2.5 Existing Management Programs and Studies (23 CCR 354.8 c, d, e)

There are many existing and previous water management programs, studies, and initiatives covering the Subbasin that have been developed for a variety of purposes by multiple agencies and organizations. This section summarizes those deemed most relevant to groundwater management planning and indicates the type of information from these plans that is incorporated into subsequent sections of this GSP.

2.5.1 Santa Rosa Plain Groundwater Management Program

The USGS completed two groundwater studies of the Santa Rosa Plain Watershed in collaboration with Sonoma Water; the Cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol; the Town of Windsor; Sonoma County; and the California American Water Company (Nishikawa 2013; Woolfenden and Nishikawa 2014).

These studies formed the basis of the 2014 Santa Rosa Plain Watershed Groundwater Monitoring Plan, developed for the Santa Rosa Plain Watershed under the leadership of a Basin Advisory Panel, composed of a diverse group of local stakeholders. The Groundwater Monitoring Plan was prepared under the authority of the Groundwater Management Act, California Water Code (Water Code) Section 10750 et seq., originally enacted as Assembly Bill (AB) 3030 in 1992 to encourage voluntary, nonregulatory groundwater management at the local level.

The Groundwater Monitoring Plan goal was to locally and voluntarily manage, protect, and enhance groundwater resources for all beneficial uses in a sustainable, environmentally sound, economical, and equitable manner for generations to come. This plan identified a range of voluntary water management actions, including groundwater recharge, groundwater banking, increased water-use efficiency, and greater use of recycled water to reduce demand for groundwater. Key information, tools, and outcomes from these previous groundwater management planning activities include the following:

- Technical information on the Subbasin hydrology, hydrogeologic framework, water chemistry and source, surface water and groundwater interaction monitoring, and records of groundwater levels.
- Significant expansion of monitoring activities.
- Initiation of studies for groundwater banking and stormwater recharge.
- Initial scoping of projects and actions to sustain groundwater resources in the Santa Rosa Plain.
- Engagement of local stakeholders in local groundwater planning and management.

Concurrently, the USGS and Sonoma Water entered into a cooperative agreement for the development of an integrated computer model (GSFLOW) of surface water and groundwater systems in the Subbasin and contributing watershed area.

In 2017, as the Santa Rosa Plain GSA was forming and beginning to assume management responsibilities for the Subbasin under SGMA, the Basin Advisory Panel and Technical Advisory Committee dissolved.

2.5.2 Urban Water Management Planning

Municipalities and other urban water providers regularly assess future water supplies, through both mandated Urban Water Management Plans (UWMPs) and other documents or processes.

UWMPs are prepared every 5 years by California's urban water suppliers to support long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands. Every urban water supplier that either provides more than 3,000 AFY of water or serves more than 3,000 customers is required to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years. The plans are submitted to DWR, which then reviews the submitted plans to ensure they have completed the requirements identified in the Urban Water Management Planning Act (Division 6 Part 2.6 of the Water Code Sections 10610–10656).

Within the Subbasin, UWMPs are prepared by Sonoma Water (as a wholesaler) and the Cities of Cotati, Rohnert Park, and Santa Rosa, and the Town of Windsor (as water retailers). The City of Sebastopol currently serves fewer than 3,000 customers and supplies less than 3,000 AFY and is, therefore, not required to prepare an UWMP. California American Water Company's Larkfield District has not historically prepared a UWMP because it serves fewer than 3,000 customers, but is preparing one in 2021. The UWMPs discuss and describe the following:

- Existing water supplies and infrastructure
- Projected water demands over the next 20 years, based on population growth projections, land use designations and growth policies in city and county general plans
- Projected water supplies available over the next 20 years, the reliability of that supply, and general plans for water-supply projects
- Current and planned water conservation activities, targets, and compliance
- A water shortage contingency analysis
- A comparison of water supply and water demand over the next 20 years under different hydrological assumptions (normal year, single dry year, and four consecutive dry years)

Because local groundwater makes up a portion of the water supply for urban purveyors within the Subbasin, the UWMPs also discuss and describe groundwater production facilities, historical and projected groundwater use, and the conditions of the groundwater basin. Thus, UWMPs serve as a routine mechanism for local urban water providers to coordinate and plan for future urban groundwater use. The most recent projections for future urban groundwater use are incorporated into the projected water budget described in **Section 3** (Basin Setting). However, it is noted that UWMPs do not consider rural residential, agricultural and small municipal/mutual water systems.

In addition to the state-required UWMPs, many local urban water providers perform other water-supply planning activities related to groundwater, including the development of water master plans, preparation of water-supply assessments for larger proposed developments (more than 500 dwelling units or equivalent), updates of city and county general plans as described previously, and other activities. Information regarding some of these activities is summarized as follows:

- The Cities of Cotati (Cotati 2011), Santa Rosa (City of Santa Rosa 2014), Sebastopol (City of Sebastopol 2005), and the Town of Windsor (Town of Windsor 2011) have developed Water Master Plans, which assess water-supply needs and describe planned projects.
- The City of Santa Rosa adopted a Groundwater Master Plan (City of Santa Rosa 2013c) to provide strategic direction for managing the groundwater resources within the urban growth boundary of the city. The master plan integrates groundwater and surface water protection and management with water conservation and reuse to increase groundwater reliability and sustainability. The master plan includes the following:
    - Recommendations for an emergency groundwater supply plan
    - Development of a key well monitoring network
    - Conceptual evaluation of aquifer storage and recovery (ASR)

  - Recommended groundwater policies designed to guide the future role of groundwater and promote balanced use and sustainability for the groundwater resources available to the city
  - Identification of specific groundwater projects and programs based on these recommended policies

- Sonoma Water has developed a *Water Supply Strategies Action Plan* in coordination with its water contractors to increase water-supply system reliability, resiliency, and efficiency in the face of limited resources, regulatory constraints, and climate change uncertainties (Sonoma Water 2018).
- Beginning with passage of SB 610 in 2002, water-supply assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects that are subject to California Environmental Quality Act (CEQA) (as defined in Water Code 10912[a]). The water-supply assessments are required to determine water-supply sufficiency for a 20-year projection in addition to the demand of existing and other planned future uses.

2.5.3 North Coast Resource Partnership

In 2002, the California State Legislature approved the Integrated Regional Water Management Planning Act (SB 1672). The implementation of the Act facilitates regional cooperation in water resources planning, and along with the passage of Propositions 50, 84, 1E, and 1, has provided grant funding for projects identified in a regional plan, referred to as an Integrated Regional Water Management Plan (IRWMP).

The North Coast IRWMP was formed in 2004 as a voluntary, nonregulatory, stakeholder-driven planning meant to emphasize shared priorities and local autonomy, authority, knowledge, and approaches to achieving tribal, state, regional, and local priorities related to North Coast water infrastructure, watersheds, public health, and economic vitality. The North Coast IRWMP changed its name in early 2013 to the North Coast Resource Partnership (NCRP). The NCRP continues to focus on areas of common interest and concern to North Coast stakeholders, and on attracting funding to the North Coast Region, and recognizes unique local solutions in different parts of the region (https://northcoastresourcepartnership.org).

The NCRP serves as a comprehensive planning tool that links other water resources management plans and programs through collaborative processes, coordination, and communication.

2.5.4 Climate Change Studies and Planning

Projected changes in climate include increased variability in precipitation and rises in air temperature, resulting in a shorter wet season, longer dry season, more droughts, and more extreme high flows. To face these potential changes in climate, local organizations are working with federal and state partners, including the USGS, DWR, NOAA, and the U.S. Army Corps of Engineers to advance the science in our region in an effort to plan for and adapt to predicted changes. Local agencies have also partnered to form the Sonoma County Regional Climate Protection Authority and developed a regional Climate Action Plan (Sonoma County Regional Climate Protection Authority 2016). Findings and results from these efforts are described in **Section 3** (Basin Setting) and incorporated into future model projections in this GSP. In addition, the City of Santa Rosa has prepared two Climate Action Plans: the communitywide *Climate Action Plan* (City of Santa Rosa 2012) and the *Municipal Operations Climate Action Plan* (City of Santa Rosa 2013b).

2.5.5 Groundwater Banking Feasibility Study

Because of uncertainties in the reliability of regional future water supplies (both surface water and groundwater), Sonoma Water; the Cities of Rohnert Park, Cotati, and Sonoma; Valley of the Moon Water District; and the Town of Windsor conducted the Groundwater Banking Feasibility Study for a regional groundwater banking program to investigate the viability of enhancing the conjunctive management of surface water and groundwater resources (GEI et al. 2013).

Conceptually, the groundwater banking program would involve the diversion and transmission of surplus Russian River water produced at existing drinking water production facilities during wet weather conditions (that is, the winter and spring seasons) for storage in the Santa Rosa Plain Groundwater Subbasin and/or Sonoma Valley Groundwater Subbasin. The stored water would then be available for subsequent recovery and use during dry weather conditions (that is, the summer and fall seasons) or emergency situations. The Groundwater Banking Feasibility Study provided an evaluation of the regional needs and benefits, source water availability and quality, regional hydrogeologic conditions, and alternatives for groundwater banking.

Based on the findings from the study, which found that area aquifers are generally suitable for ASR, pilot studies to further assess the technical feasibility were recommended and currently are being pursued in the City of Sonoma, where a pilot project was completed in fall of 2018. The pilot project resulted in the empirical verification of specific hydrogeologic and water quality factors. The next steps are a technical and economic viability assessment of ASR technology in the region. If deemed feasible, the pilot project results could be used to complete environmental documentation and design for a full-scale or permanent ASR project in the region. Results from the pilot project also provided information on the technical feasibility for ASR in Sonoma Valley to other local agencies.

2.5.6 Water Conservation

Numerous regional and local water conservation programs are operational in the Plan Area including the Sonoma-Marin Saving Water Partnership, the LandSmart Program, and the Sustainable Winegrowing Program.

These programs are described in **Sections 2.6.6.1**, **2.6.6.5**, and **2.6.6.6**, respectively, however, it is anticipated that changes will likely occur as a result of sweeping legislation approved in 2018: AB 1668 (Friedman) and SB 606 (Hertzberg), which lay out a new long-term water conservation framework for California. The framework addresses both the urban and agricultural sectors, with goals to establish long-term improvements in water conservation and drought planning that recognize the need to adapt to climate change and the resulting longer and more intense droughts in California. The development of programs and initiatives is organized around four primary goals as follows:

1. Use water more wisely
2. Eliminate water waste
3. Strengthen local drought resilience
4. Improve agricultural water-use efficiency and drought planning

To fully plan, develop, and implement the new framework, DWR and the SWRCB are working together in collaboration with stakeholders to develop new standards for the following:

- Indoor residential water use
- Outdoor residential water use
- Commercial, industrial, and institutional (CII) water use for landscape irrigation with dedicated meters
- Water loss

Based on these standards, urban water suppliers will be required to stay within annual water budgets for their service areas. In addition, water suppliers will need to report on implementation of new performance measures for CII water use.

The legislation also made important changes to existing urban and agricultural water management planning, and enhanced drought preparedness and water shortage contingency planning for both urban water suppliers and small water systems and rural communities. Currently, state agencies are conducting needed studies and investigations, and developing standards and performance measures, web-based tools and calculators, data and data platforms, reports, and recommendations for adoption of new regulations.

2.5.6.1 Sonoma-Marin Water Saving Partnership

The Sonoma-Marin Saving Water Partnership represents 10 water utilities in Sonoma and Marin counties that are signatories to the California Water Efficiency Partnership and have joined to create a regional approach to water-use efficiency. Within the Subbasin, these utilities include the Cities of Cotati, Rohnert Park, and Santa Rosa; the Town of Windsor; California American Water Company's Larkfield District and Sonoma Water. Water conservation and water-use efficiency program elements specific to the Sonoma-Marin Saving Water Partnership include the following:

- Establishing a conservation coordinator and water waste prohibition, assistance, and water loss control programs (audits, leak detection, and repair).
- Metering urban water and conservation pricing (tiered structure).

- Developing and maintaining public information and school education programs on water and conservation.
- Increasing conservation through specific urban residential programs for increasing indoor (high-efficiency toilets, fixtures, and washers) and outdoor (landscaping assistance, surveys, and retrofits) conservation.
- Increasing conservation through specific industrial and large-landscape assistance, surveys, and retrofits.
- Initiating rebate programs for high-efficiency appliances and fixtures.
- Training for qualified water efficient landscapers that provides education on proper plant selection for local climates, irrigation-system design and maintenance, and irrigation-system programming and operation.
- Offering an online water wise gardening website that offers a Mediterranean and native plant list, design and garden installation tips, and irrigation-system design and maintenance information.
- Providing a green business program that provides businesses with water and energy conservation information and incentives, to reduce waste and prevent pollution.

In addition to the partnership, its member agencies and the City of Sebastopol have water conservation programs to assist their communities in improving water-use efficiency to reduce water waste.

2.5.6.2 Windsor Pay as You Save

Windsor Efficiency "pay as you save" is a mechanism to provide efficiency upgrades for Town of Windsor home and apartment occupants. Examples of water efficiency measures eligible under the program are high-efficiency showerheads, toilets, faucet aerators, drought-resistant landscaping, and high-efficiency clothes washers.

2.5.6.3 Model Water Efficient Landscape Ordinances

Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15) directed DWR to update the state's Model Water Efficient Landscape Ordinance (MWELO) through expedited regulation. Local agencies must adopt the MWELO or adopt a local ordinance that must be at least as effective in conserving water as MWELO by December 1, 2015. Executive Order B-29-15 and the revised ordinance require that local agencies report on the implementation and enforcement of their single agency Local Ordinances to DWR by December 31, 2015. Reporting for all agencies is due by January 31 of each year thereafter.

The county and cities have all developed individual water efficient landscape ordinances. The new water efficient landscape ordinances require a landscape plan check for certain projects, as described in each ordinance. It includes requirements for landscape water budgets, landscape and irrigation design, and irrigation scheduling.

2.5.6.4 Rural Landowner Programs

There are also resources for implementing water conservation practices for rural landowners not connected to city water utilities or who are ineligible for urban water conservation program rebates. These include the following:

- A water conservation and stormwater management guide for all types of landowners is called *Slow it. Spread it. Sink it. Store It!* produced by the Sonoma RCD (2015). This homeowner's and landowner's guide offers many ideas and tips on practices that can help to protect and replenish groundwater resources, reduce erosion and pollution, prevent flooding, and increase water conservation and stormwater management.

- A guide focusing on rainwater catchment systems called *Roof Water Harvesting for a Low Impact Water Supply, Featuring the Brazilian Ball Pre-Filter System: A Case Study* produced by the Occidental Arts and Ecology Center's WATER Institute (2008).

2.5.6.5 LandSmart Program

The Sonoma RCD, Napa RCD, and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service developed the LandSmart Program to promote productive lands and thriving streams through planning and on-the-ground implementation of beneficial management practices, including efficient irrigation. LandSmart Plans are developed by the agricultural producer, who can also seek certification from the RCD's certification team once plans are complete. Plan templates and guidance materials are designed to assess current practices and identify recommendations for other practices that would benefit natural resources such as water quantity and quality. Practices are prioritized and tracked over time. Information on the LandSmart Program is available at www.LandSmart.org.

2.5.6.6 Sustainable Winegrowing

Members of Wine Institute and the California Association of Winegrape Growers introduced the Code of Sustainable Winegrowing Practices Self-Assessment Workbook in 2002 (updated in 2006, 2013, and 2020) to promote environmental stewardship and social responsibility in the California wine industry (California Sustainable Winegrowing Alliance 2020). The workbook addresses a number of criteria for measuring performance, including Vineyard Water Management and Winery Water Conservation and Quality. More information on sustainable winegrowing practices is available at http://www.sustainablewinegrowing.org/. Additionally, the Sonoma County Winegrowers have developed a Sustainability Certification Program for vineyards, which includes water conservation assessments.

2.5.7 Stormwater Management

The need for integrating appropriate stormwater management practices while protecting and preserving groundwater resources is increasingly recognized by decision makers and such practices have been integrated into several initiatives and planning efforts.

2.5.7.1 Storm Water Resources Plans

Storm Water Resources Plans (SWRPs) are required by Senate Bill 985 (Pavley 2014) to be eligible to seek funding from any future state bond measures for stormwater projects. A SWRP is a nonregulatory, watershed-based, and stakeholder-driven plan that builds on local stormwater management objectives and identifies and prioritizes projects that capture, treat, or reuse stormwater and dry weather runoff. The *Russian River Storm Water Resource Plan* was developed by the Russian River Watershed Association for the Russian River Watershed (which includes the Subbasin) with support from local agencies and partners to identify and prioritize stormwater management projects (Russian River Watershed Association 2018). These projects must provide at least two benefits, which may include environmental enhancement, flood protection, groundwater recharge, water quality improvement, and/or recreational opportunities. The Russian River SWRP provides a framework for submitting, quantifying, scoring, and ranking future projects in an objective and data-driven format.

2.5.7.2 Stormwater Management-Groundwater Recharge

Sonoma Water conducted scoping studies in three of its flood zones to identify opportunities to alleviate flooding, while possibly recharging groundwater aquifers or providing other benefits. The *Stormwater Management-Groundwater Recharge* study (Sonoma Water 2012) assessed the feasibility of projects in Laguna-Mark West watershed (subwatershed of the Santa Rosa Plain Watershed), which informed the development of the Russian River SWRP.

Local growers have also been investigating the feasibility of performing on-farm recharge projects within the Subbasin through the performance of pilot studies and field investigations.

2.5.7.3 Municipal Stormwater Permit Program

Pursuant to the Federal Water Pollution Control Act (Clean Water Act) Section 402(p), California’s Phase I Municipal Separate Storm Sewer System (MS4) Permit Program regulates stormwater discharges from an MS4 serving a population of 100,000 or more through the National Pollution Discharge Elimination System (NPDES). Sonoma Water is a co-permittee with the City of Santa Rosa and the County of Sonoma inside the Phase I MS4 permit boundary, incorporating most of the Subbasin. In 2013, municipalities serving a population of less than 100,000 were designated in the Phase II Permit Program and were provided an option to align with the Phase I MS4 program in an effort to foster watershed-wide consistency and collaboration.

Within the Santa Rosa Plain Subbasin, the Cities of Cotati, Rohnert Park, and Sebastopol, and the Town of Windsor, and the Phase II-designated portions of the County of Sonoma elected to participate in the 2015 Phase I permit program as co-permittees. Each co-permittee in the Subbasin has developed a draft Non-Stormwater Best Management Practices (BMP) Plan (BMP Plan) to eliminate or minimize the discharge of pollutants to the MS4 related to select types of discharges and conduct seasonal water quality monitoring and annual reporting.

To comply with the MS4 permit, the City of Santa Rosa and County of Sonoma developed a Low Impact Development Technical Design Manual (2011), which provides technical guidance for project designs that require the implementation of permanent stormwater BMPs. Low-impact development, as it relates to stormwater, aims for a design to mimic the hydraulic function of an undeveloped site by capturing, treating, and infiltrating stormwater as close to the source as possible, and locating small scale landscape-based features throughout the project site. Each co-permittee is responsible for applying these permit requirements in conformance with this manual, at a minimum, to new development, retrofit projects, and applicable infrastructure improvement projects within their jurisdiction.

2.5.7.4 Water Smart Development Guidebook

Sonoma Water developed the *Water Smart Development Guidebook* (2013) to provide Sonoma County land developers; city and county planning officials; and environmental-regulatory agencies with a reference guide that can help them avoid and minimize potential adverse impacts on water resources from development projects. The guidebook provides guidance for planning and designing water resource-related project elements for residential and commercial developments. The three core guidebook sections focus on ways to increase water conservation and water reuse and reduce stormwater impacts.

2.6 General Plan and Related Plan Land Use Categories

Existing city and county planning activities that are directly or indirectly linked with water supply and groundwater management include general plans, and specific plans, which are described in **Section 2.2.1** through **2.2.2**. and UWMPs. Under SGMA, cities and counties retain their land use authorities; however, in recognizing the linkages between land use and water management, SGMA does require increased coordination between land use planners and GSAs. Cities and counties must now refer proposed general plan changes to GSAs, and similarly GSPs must consider “the most recent planning assumptions stated in local general plans of jurisdictions overlying the basin” (CWC Section 10726.9). In addition, Government Code Section 65350.5 stipulates that before general plans are adopted other GSPs must be reviewed and considered.

Future land use planning and associated growth projections are incorporated into the analysis of the projected water budget, over the planning and implementation horizon (**Section 3** [Basin Setting]).

The Cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, the Town of Windsor, and Sonoma County general plans and specific plans provide growth estimates that are used in the UWMPs and in this GSP to project future water demands. These growth estimates are incorporated into the sustainable management criteria and metrics, including measurable objectives and interim milestones, the sustainability goal, proposed projects, and management actions. Projections of future groundwater availability and planned projects and actions needed for sustaining groundwater resources in the Subbasin will be shared with city and county planners for incorporation into their respective land use planning and decision-making.

In addition to coordinating on activities within the Subbasin, coordination and information sharing between the GSA and land use planning agencies will be needed for the contributing