

Executive Summary

This Five-Year Review and Update Report for the Sonoma Valley Groundwater Management Program (GMP) reviews progress between 2008 and 2013. The report also provides an overview of groundwater conditions, assesses whether management activities are achieving basin management objectives, and presents a summary of planned future management activities. While progress has been made in many areas of the GMP, additional efforts are needed to meet several basin management objectives and address areas long term declining groundwater levels in southern Sonoma Valley.

The GMP is implemented under the voluntary, non-regulatory Sonoma Valley Groundwater Management Plan (Plan) completed in 2007 by a broad coalition of local stakeholders for Sonoma Valley (Figure ES-1). ***The goal of the Plan is to locally manage, protect, and enhance groundwater resources for all beneficial uses, in a sustainable, environmentally sound, economical, and equitable manner for generations to come.*** As part of the Plan, Basin Management Objectives (BMOs) were developed by the Panel to provide measurable and verifiable accomplishments for meeting the overall goal of the Plan.

Basin Management Objectives

- BMO-1** Maintain groundwater elevations for the support of beneficial uses of groundwater and to protect against inelastic land subsidence.
- BMO-2** Improve water use efficiency and conservation.
- BMO-3** Identify and protect groundwater recharge areas and enhance the recharge of groundwater where appropriate.
- BMO-4** Manage groundwater in conjunction with other water sources.
- BMO-5** Protect groundwater quality for beneficial uses including minimizing saline intrusion.
- BMO-6** Protect against adverse interactions between groundwater and surface water flows.
- BMO-7** Improve the community's awareness of groundwater planning, water resources, and legal issues.
- BMO-8** Improve the groundwater database and basin understanding through consistent monitoring and additional surveys, and improve basin analytical tools including the groundwater simulation model.
- BMO-9** Manage groundwater with local control.
- BMO-10** Explore, identify and maximize non-regulatory approaches to manage the groundwater

Management components developed to meet the BMOs are:

- 1 - Stakeholder Involvement**
- 2 - Monitoring Program**
- 3 - Groundwater Resources Protection**
- 4 - Groundwater sustainability**
- 5 - Planning Integration**

The plan is available at: <http://www.scwa.ca.gov/svgroundwater/>

PLAN PROGRESS

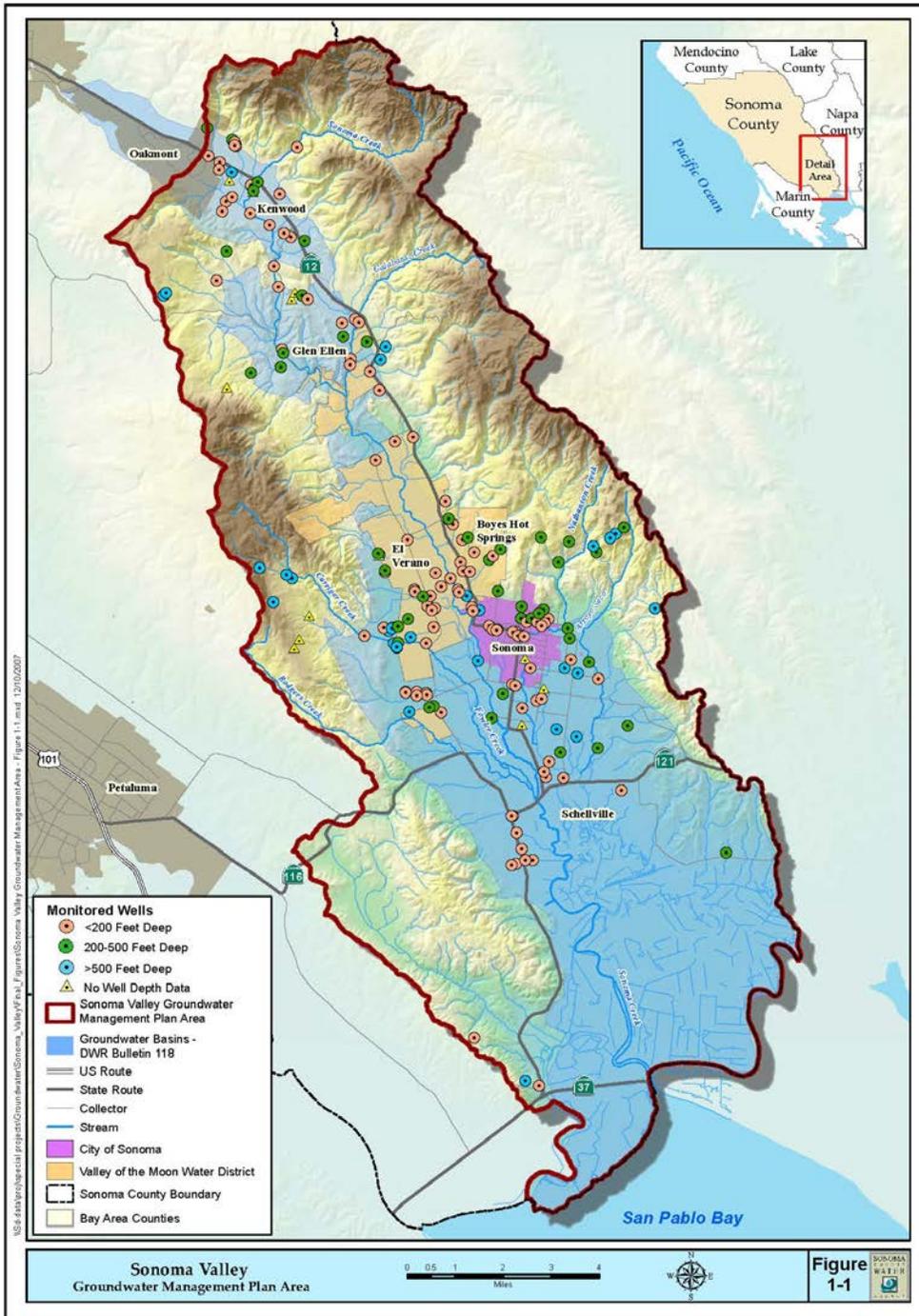
Component One - Stakeholder Involvement & Public Outreach

- **Advisory Meetings** - A Basin Advisory Panel (Panel) meets quarterly, and a Technical Advisory Committee (TAC) meets monthly.
- **Outreach and briefings** - Targeted briefings, focused outreach, and informational talks.
- **Communications** - Announcements and supporting materials in advance of meetings, maintaining email distribution lists, and updating the project website (<http://sonomacountywater.org/projects/svgroundwater/>).
- **Media Communications** - GMP staff, Panel members, and local stakeholders worked with local media to provide press releases on key events and milestones for the GMP.

Component Two - Monitoring Program

The monitoring program consists of the collection of several types of hydrologic data and includes:

- **Voluntary Groundwater Level Monitoring Program** – Synchronized groundwater-level monitoring in the Spring and Fall by trained volunteers. The monitoring program began with existing groundwater-level monitoring programs in Sonoma Valley, comprising a total of 56 wells. Since its initiation, 86 voluntary private wells were added bringing the total number of wells to 142. Approximate locations of monitored wells are shown on Figure ES-1.



- **Dedicated Nested Groundwater Monitoring Wells** – Two nested 500-foot deep monitoring wells were constructed in southern Sonoma Valley and have been incorporated into the monitoring program.
- **High-Frequency Groundwater-Level Monitoring** - High-frequency data has been collected utilizing automated data collection systems at a number of wells.
- **Stream-Gaging of Sonoma Creek** - Monitoring and evaluation of streamflow data for Sonoma Creek has been conducted.
- **Streamflow/Groundwater Interaction Monitoring** - Seepage runs (instantaneous streamflow measurements) were conducted to characterize where groundwater supports streamflows and where surface water recharges groundwater.
- **Volunteer Rainfall Monitoring** - A plan was developed for a volunteer rainfall-monitoring program for the SVGMP.
- **Development of Long-Term Water Quality Monitoring Program** – A long-term groundwater quality monitoring program has been implemented, including collection of water quality data by DWR from voluntary private wells and compilation of data collected by public water suppliers, small water systems, and mutual water companies.

Component 3 - Groundwater Quality Protection

Groundwater quality protection is a key component for ensuring a sustainable groundwater resource in the Sonoma Valley. The primary focus of this component is the **continued monitoring of potential saline intrusion** and **long-term groundwater quality monitoring**, as described above. Additionally, a well owner's guide, *WELLness – A Guide to Your Water Well*, was developed and distributed to private well owners, which includes many recommended practices to protect and sustain groundwater quality.

Component 4 - Groundwater Sustainability

To ensure a long-term, viable, sustainable supply of groundwater, the GMP seeks **to increase stormwater recharge, groundwater banking, increase recycled water use, and increase conservation**. Activities that have been conducted since 2008 that can contribute to groundwater sustainability include:

- **Development of Stormwater Management Guide** - A homeowner's guide, *Slow It. Spread It. Sink It. – A Homeowner's & Landowner's Guide to Beneficial Stormwater Management*, was developed and provided in various public meetings and settings.
- **Groundwater Recharge Potential Mapping** – Mapping of potential areas of groundwater recharge can help guide the development of small- and larger-scale enhanced groundwater recharge projects.
- **Water Conservation**- A pilot program to evaluate water conservation programs for areas within the Sonoma Valley that currently do not have formal conservation programs (primarily rural areas outside the service areas of VOMWD and the City) was completed. The Panel has provided Water Conservation Awards that recognize members and groups from Sonoma Valley for extraordinary levels of water conservation.
- **Recycled Water** - The Sonoma Valley Recycled Water Project (SVRWP) has continued to expand and provide a source of water to offset groundwater pumping for agricultural irrigation.
- **Stormwater Management/Groundwater Recharge** - A study was initiated to identify and assess stormwater management and groundwater recharge opportunities in the Sonoma Valley. The City Watersheds Project, which includes a stormwater detention and recharge component, was awarded a \$1.9 Million grant in 2013 and is currently in the initial phases of design.
- **Groundwater Banking** - A groundwater banking feasibility study has identified opportunities to improve long-term water supply reliability in Sonoma County, by utilizing the SCWA Russian River supplies and existing conveyance infrastructure to meet dry year water needs and summer water shortages. Pilot projects are planned for implementation in the future.

Component 5 - Planning Integration

Integration of planning amongst Sonoma Valley stakeholders has been accomplished through many programs and initiatives, including the **Bay Area Integrated Regional Water Management Plan, enhanced recharge studies, water conservation programs, the recycled water program and implementation of this GMP.**

Water Resources Setting and Conditions

The climate of the Sonoma Valley is Mediterranean, with moderate temperatures and distinct wet and dry seasons. Mean annual precipitation at Sonoma averaged 29.2 inches during the 60-year period from 1953 through 2012, however over the **past ten years the region has experienced below average rainfall of approximately 26 inches per year** (Figure ES-2). Hydrologic models of potential climate change scenarios predict that precipitation could be subject to increased variability resulting in reduced water supply reliability and water demands will likely increase due to increased evapotranspiration rates during warmer and extended summers.

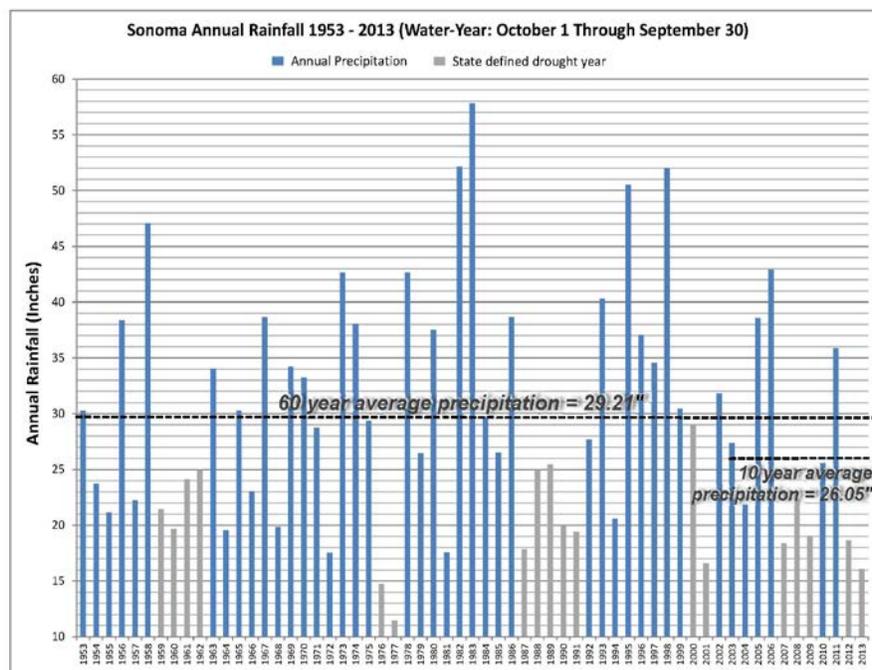


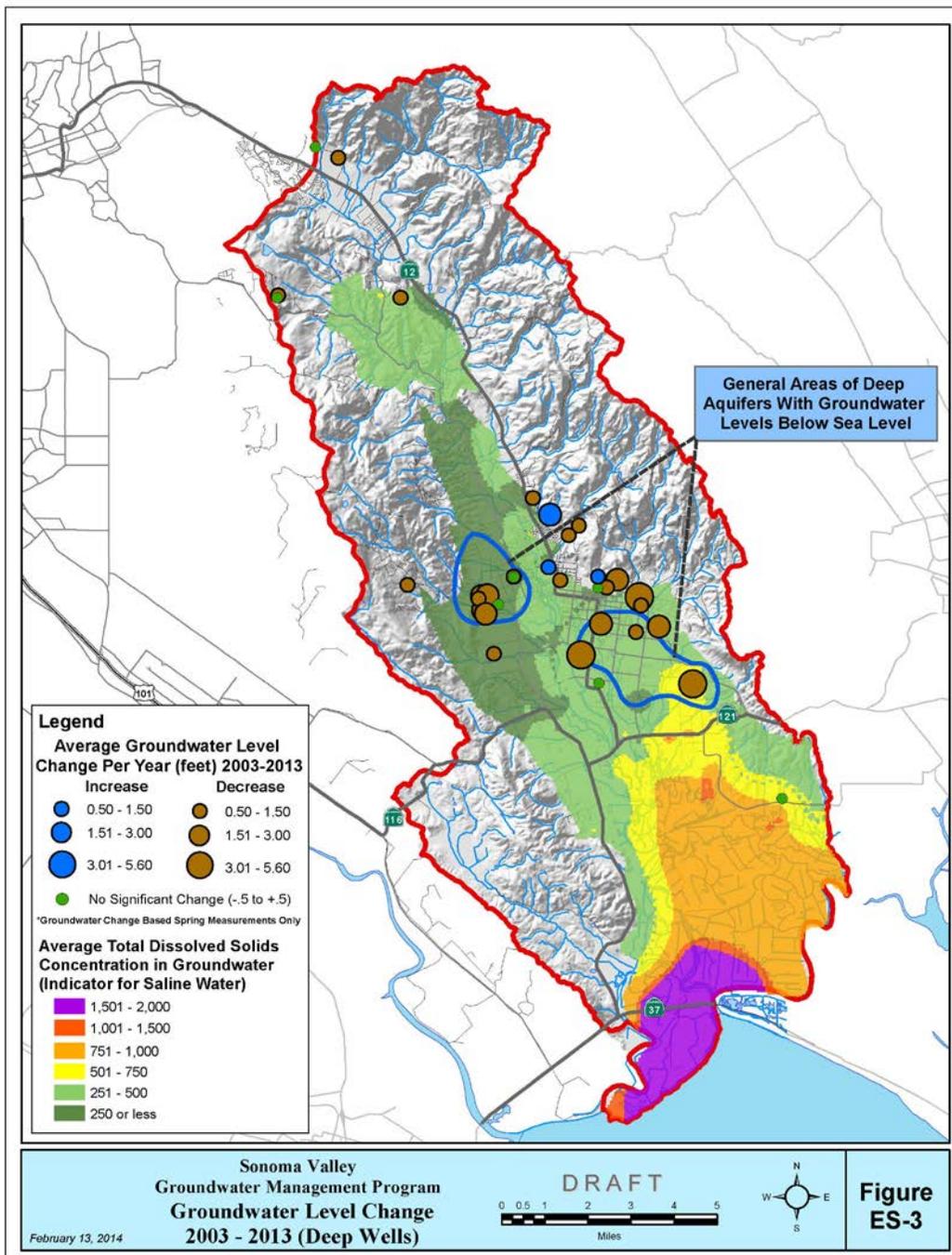
Figure ES-2

Surface water-groundwater interaction is a significant part of the groundwater system in Sonoma Valley. Much of Sonoma Creek and many of its tributaries gain water from groundwater discharge and the baseflow (the proportion of streamflow due to groundwater discharge to stream channels) represents an estimated 50% of the total flow in Sonoma Creek upstream of Agua Caliente Bridge. Reaches of Sonoma Creek and its tributaries that contribute recharge to the groundwater system during the springtime include portions of the upper reach of Sonoma Creek near Kenwood, much of Carriger Creek and portions of Nathanson and Arroyo Seco Creeks (downstream of upland reaches and upstream of Napa Road).

Groundwater in Sonoma Valley is obtained from wells within **both shallow and deeper aquifers**. Shallow aquifers, generally considered to be 200 feet deep or less, and a deeper aquifers, considered to be greater than 200 feet deep, are separated in many areas of Sonoma Valley by thick sequences of clay generally present between approximately 100 and 350 feet deep. Where present, the clays can limit hydraulic connection between the shallow and deeper aquifer zones.

Groundwater level trends within the shallow zone are generally stable, with the exception of an area in the southwestern Sonoma Valley (El Verano/Fowler Creek area), where localized declines within the shallow zone are evident. Groundwater level declines are present within deep zone aquifers primarily in the southwestern and southeastern Sonoma Valley. The areas of decline have persisted for the last decade or more and appear to be expanding. Groundwater levels in many wells in these two areas are declining at rates of several feet per year and have fallen below sea level (Figure ES-3)

Groundwater quality within the Sonoma Valley is generally good for all beneficial uses, with the exception that some wells contain elevated levels of arsenic, boron, manganese or iron. Brackish groundwater present beneath the southernmost Sonoma Valley has historically affected water wells located in southern Sonoma Valley and represents a threat to groundwater resources should groundwater declines continue to persist (Figure ES-3)



Based on recent analysis of water demands, the total amount of water used in Sonoma Valley for Water Year 2012 were estimated to be 17,900 acre-feet (AF). (One acre-foot is equal to 325,800 gallons or approximately the amount of water to cover a football field with one foot of water.) The sources and estimated amounts of water used in Sonoma Valley are shown in Figure ES-4 and indicate that local groundwater makes up nearly 60% of the total supply.

Figure ES-4: 2012 Water Supply Sources and Demands

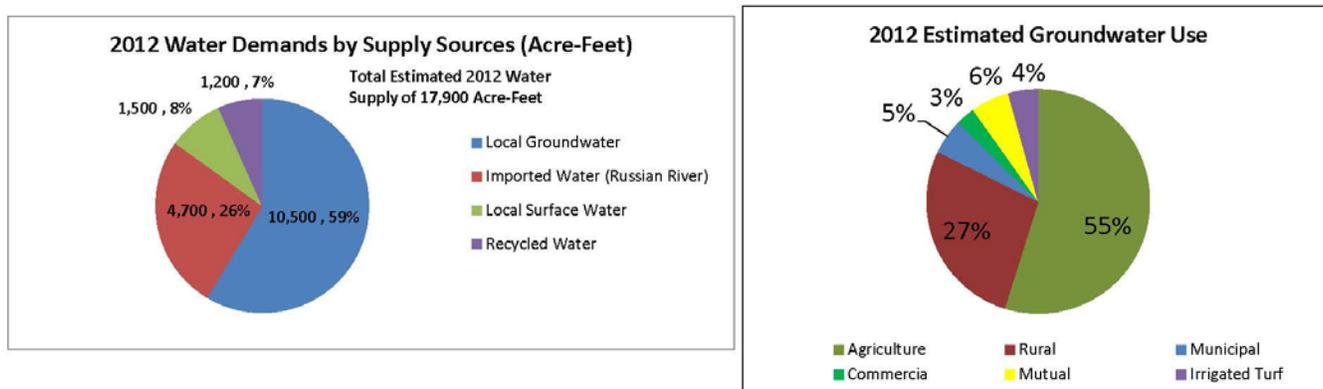


Figure ES-4

Other sources include imported water from the Russian River, local surface water diverted from Sonoma Creek and tributaries, and recycled water produced at the Sonoma Valley Wastewater Treatment Plant and used for agricultural and landscape irrigation. Estimates of groundwater demands also shown in Figure ES-4 indicate that groundwater supports a variety of uses, including agricultural irrigation, rural domestic, golf course and park irrigation, municipal and smaller drinking water system supplies, and commercial businesses. In the areas of groundwater level declines in the southern Sonoma Valley, groundwater uses are primarily a combination of agricultural and rural domestic pumping.

The water budget for the Sonoma Valley (amount and sources of water entering into the basin versus the amounts and sources of water exiting) is estimated using a computer model of groundwater flow. The results indicate that **more water is exiting the groundwater basin than entering it**, resulting in an average annual loss of groundwater storage of 1,419 AFY, and total cumulative groundwater storage loss of 45,440 AF for the period from 1975 to 2006. The areas of declining groundwater levels in the southern Sonoma Valley corroborate the results of the model and groundwater storage loss over time.

The net loss of groundwater is due to a combination of increasing demands and declining levels of precipitation over last few decades. These declining groundwater levels, which have locally fallen below sea level **could exacerbate the intrusion of poor quality water** into the deeper aquifer. **The declines in groundwater levels and storage are not sustainable** and will require measures to bring the water budget back into balance so that the net inflow is equivalent to the outflow in the groundwater basin. Reversing the declining trends and recovering groundwater levels in the deeper aquifers is necessary to protect and preserve groundwater uses in these areas. Additionally, maintaining groundwater levels in the shallow aquifer is important for supporting stream habitat and aquatic ecosystems, since shallow groundwater provides baseflow to the streams.

Progress on Groundwater Management Program and Basin Management Objectives

As described above under *Plan Progress*, substantial progress was accomplished toward implementing plan component actions and BMOs by the Sonoma Valley GMP between 2008 and 2013, including stakeholder involvement and outreach, expanding the monitoring program, groundwater quality protection, groundwater sustainability, and planning integration. However, based on the persistent declining trend of groundwater levels, primarily within deeper aquifers of southern Sonoma Valley, and the water quality

threat posed by salinity intrusion, there has not been sufficient progress on BMO-1 (maintain groundwater elevations) and BMO-5 (protect groundwater quality) and additional actions are necessary.

Recommendations for Actions to Address BMOs and Areas of Groundwater Decline

An alternatives analysis is recommended to assess scenarios and consider and screen a range of possible approaches to address groundwater depletion in southern Sonoma Valley. The proposed alternatives analysis will rely on a refined groundwater flow model to assess various land use, water management and climate scenarios to evaluate possible future groundwater conditions. A range of technical, regulatory and institutional response action approaches would initially be screened by the TAC, further assessed and prioritized using the groundwater flow model and provided to the Panel for consideration in 2014.

Proposed 2014-2018 Program and Next Steps

The currently planned program for the GMP over the next five years (2014 through 2018) includes continued stakeholder involvement (including routine Panel and TAC meetings), groundwater elevation monitoring program, streamflow monitoring, and water conservation programs. For many proposed future actions, funding mechanisms would need to be identified and pursued. The next steps for implementing the program outlined in the Five-Year Review and Update Report include:

- Conduct forums and briefings on the water resources conditions and proposed actions to disseminate information to the public and solicit public involvement in addressing groundwater issues in Sonoma Valley
- Perform an alternatives analysis with input from local stakeholders to evaluate appropriate response actions to address declining groundwater levels in southern Sonoma Valley
- Continue advisory meetings and stakeholder involvement
- Continue to implement activities under the monitoring program.
- Continue pursuing strategies to sustain groundwater resources in Sonoma Valley, including increasing the availability and use of recycled water, increasing water conservation and pursuing enhanced recharge strategies.

For more information, contact Marcus Trotta at (707) 547-1978 mtrotta@scwa.ca.gov or visit the project website at <http://sonomacountywater.org/projects/svgroundwater/>