EXECUTIVE SUMMARY

The State of California enacted the Sustainable Groundwater Management Act (SGMA), effective January 1, 2015, as the first legislation in the state's history to mandate comprehensive sustainable groundwater resources management. The Santa Margarita Groundwater Agency (SMGWA) was formed under SGMA to develop the Groundwater Sustainability Plan (GSP or Plan) for the Santa Margarita Groundwater Basin (Basin). The GSP describes how the SMGWA intends to manage groundwater to achieve groundwater sustainability and meet the requirements of SGMA. The plan provides the basis for ongoing management of the Basin by SMGWA to both achieve sustainability in the 20-year planning horizon and maintain sustainability over the 50-year implementation horizon specified by SGMA. By following the GSP, SMGWA, its cooperating agencies, and other local stakeholders will collaboratively manage the Basin to maintain a safe and reliable groundwater supply for all beneficial groundwater uses and users.

This GSP is organized into sections per the California Department of Water Resources (DWR) guidance (DWR, 2016).

The Introduction describes SMGWA's formation and organization, and it introduces the sustainability goals for the Basin. The Plan Area and Basin Setting describes current knowledge of the physical aspects of the Basin, relying on a multitude of studies conducted by the SMGWA's cooperating agencies. It includes a summary of current basin conditions, including groundwater levels, groundwater quality, and interconnected surface water. This information is used in the GSP to guide development of Sustainable Management Criteria (SMC) for the SMGWA to reach during the GSP implementation period. In order for the SMGWA to achieve the sustainability goals and SMC, additional projects and management actions likely need to be implemented. The GSP introduces potential projects and management actions that may be considered by the SMGWA and provides details on how and when they may be implemented to achieve sustainability. The GSP also describes how the SMGWA intends to comply with SGMA requirements for monitoring and reporting and provides an estimated cost and schedule for the first 5 years of GSP implementation.

Groundwater Sustainability Plan Sections

Executive Summary

Section 1. Introduction

Section 2. Plan Area & Basin Setting

Section 3. Sustainable Management Criteria

Section 4. Projects & Management Actions

Section 5. GSP Implementation

Section 6. References & Technical Studies

Introduction

The SMGWA has developed the Santa Margarita Basin GSP to provide a roadmap for achieving groundwater sustainability in the Basin. The Introduction section of the GSP describes in detail the SMGWA organization and management structure, the GSP sustainability goal, and defines the many terms specific to SGMA and groundwater used in the GSP.

The SMGWA has legal authority to perform duties, exercise powers, and accept responsibility for managing groundwater sustainably within the Basin. The SMGWA was formed through a Joint Powers Agreement (JPA) in June 2017, among the Scotts Valley Water District (SVWD), the San Lorenzo Valley Water District (SLVWD), and the County of Santa Cruz (County). The SMGWA is governed by a Board of Directors comprising 2 representatives from each member agency, single representatives from the City of Scotts Valley, City of Santa Cruz, and Mount Hermon Association (MHA), and 2 private well owners.

The Introduction section includes the sustainability goal for the Basin used as a guide to develop the GSP. Groundwater sustainability is generally defined as follows:

- Providing a safe and reliable groundwater supply that meets the current and future needs of beneficial users
- Supporting groundwater sustainability measures and projects that enhance a sustainable and reliable groundwater supply
- Providing for operational flexibility within the Basin by supporting a drought reserve that accounts for future climate change
- Planning and implementing cost-effective projects and activities to achieve sustainability

The SMGWA will successfully implement the GSP by managing groundwater and surface water use conjunctively and by implementing projects and management actions, as needed to meet the sustainability goal.

Plan Area and Basin Setting

The Plan Area and Basin Setting section summarizes how groundwater is currently managed in the Basin and describes groundwater conditions in the past, present, and future.

Description of the Plan Area

The Santa Margarita Groundwater Basin is a 34.8-square-mile area defined in DWR’s Bulletin 118 which is the State’s official publication on the occurrence and nature of groundwater in California (Figure ES- 1). The Basin forms a roughly triangular area that extends from Scotts Valley in the east, to Boulder Creek in the northwest, to Felton in the southwest. The Basin is bounded on the north by the Zayante trace of the active, strike-slip Zayante-Vergeles fault zone, on the east by a buried granitic high that separates the Basin from Santa Cruz Mid-County Basin, and on the west by the Ben Lomond fault, except where areas of alluvium lie west of the fault. The southern boundary of the Basin with the West Santa Cruz Terrace Basin is located where Tertiary sedimentary formations thin over a granitic high and give way to young river and coastal terrace deposits.

Almost half of the Basin is classified as open space with much of that being moderately rugged, forested terrain. Rural residential development is the next largest land use type, followed by smaller suburban developments in the communities of Scotts Valley, Boulder Creek, Felton, Ben Lomond, and Lompico. Approximately 29,000 people reside in the Basin, and about 63% of these people live in census-designated communities. The remaining population (about 37%) live in rural areas. The City of Scotts Valley is the only local entity with land use jurisdiction. The County has land use jurisdiction for all unincorporated areas outside of Scotts Valley. Commercial land use is concentrated in the City of Scotts Valley and the community of Felton. Much of this development occurred during a period of population growth between 1980 and 2000, which coincided with construction of commercial and industrial complexes. General Plans for the County and City of Scotts Valley are reviewed in the GSP to identify local development goals and how the GSP can operate within these confines.

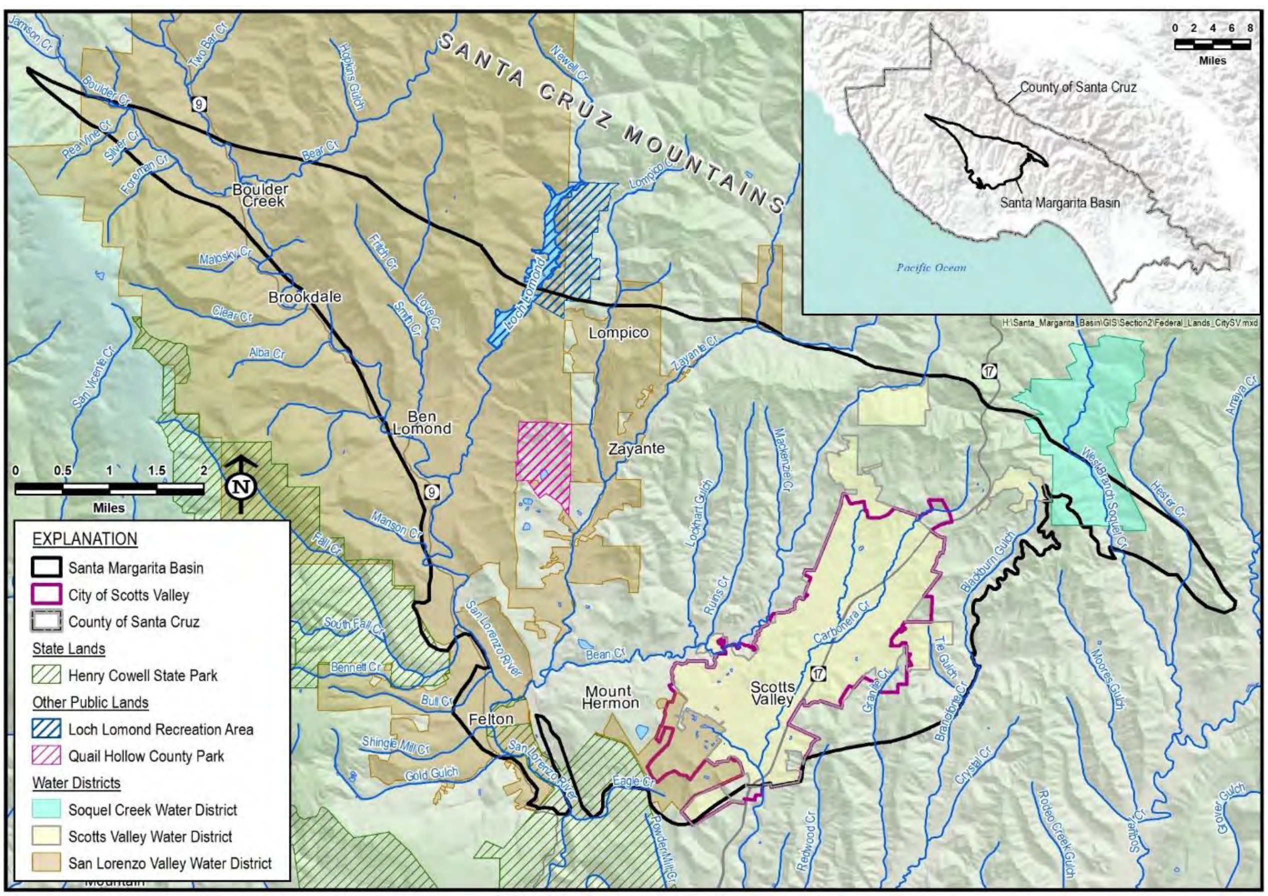

Figure ES- 1. Santa Margarita Basin Location

Water supply in the Basin is sourced from groundwater, surface water, springs, and recycled water. The SLVWD and SVWD are the 2 largest water suppliers in the Basin, with both dependent on local water sources.

SLVWD's water supply is from surface water diverted, just outside of the basin, on tributaries of the San Lorenzo River, and from springs and groundwater. The SLVWD supplies water to a 5.6-square-mile service area with about 13,000 customers in the Basin.

SVWD uses groundwater exclusively for potable supply and recycled water for non-potable supply. The SVWD supplies water to a 5.5-square-mile service area with about 10,700 customers in the Basin.

The remaining approximately 5,300 people residing in the Basin use groundwater pumped by small water systems or their own private domestic wells. MHA is the largest private water supplier that includes a year-round conference center and camp that serves more than 60,000 guests each year and a permanent community of approximately 1,300 people. There are 12 small water systems in the Basin serving a population of about 1,000. Springs or groundwater are the source of water for 11 of the 12 small water systems. Based on residential parcels that are not served water by one of the water districts, an estimated 777 private wells are pumping less than 2 acre-feet per year (AFY) that supply water to about 3,000 people.

The City of Santa Cruz does not pump any groundwater in the Basin. However, it is an indirect user of groundwater in the Basin because the surface water it diverts from the San Lorenzo River partially comprises baseflows supported by Basin groundwater discharge to creeks. It does own and operate the 2.8-billion-gallon capacity Loch Lomond Reservoir that it uses for water storage. The City has 2 diversion points on the San Lorenzo River: at Felton within the Basin and at Tait Street 5 miles downstream of the Basin. The San Lorenzo River provides roughly 55% and Loch Lomond (Newell Creek) provides roughly 14% of Santa Cruz's municipal water supply.

In addition to public supply and private domestic use, groundwater is used for a few commercial and industrial purposes. It is used for dust control and operations at a single remaining sand quarry and for large-scale landscaping and pond filling at a few locations. There are also a few small wineries that cumulatively irrigate less than 2 acres with groundwater.

The SLVWD and SVWD, prior to SGMA, managed groundwater in the Basin and developed a number of water management plans including master plans, surface water management plans, and analyses of water supply availability and reliability for the Basin. The information generated in past management efforts is instrumental in developing this GSP.

Existing conjunctive use strategies, low impact development, conservation, recycled water, and other water efficiency programs have been used successfully by the water districts to manage groundwater use and to lower potable demand. The water districts comply with all regulatory water quality testing and Drinking Water Source assessments for active supply wells.

The County is also involved in a variety of management efforts related to water quality, stormwater management, threatened and endangered species monitoring, and watershed and stream habitat protection. The County is responsible for all permitting for well construction and destruction. If needed, the County may update its well ordinance to implement elements of this GSP.

Regulatory agencies are involved in protecting the Basin's overall good groundwater quality. The County has been working for decades to reduce nitrate loading of surface water. The County's Local Area Management Plan developed in 2021 allows for the continued use of septic systems in Santa Cruz County while providing protection of water quality and public health. The Central Coast Regional Water Quality Control Board is responsible for overseeing point source groundwater pollution from chemical spills or leaks. Several groundwater contamination sites in Scotts Valley and Felton have had past remediation of volatile organic compounds (VOC) and gasoline-related chemicals in groundwater. These remediation programs have generally been resolved and there are no sites undergoing active groundwater remediation at present.

Groundwater dependent ecosystems (GDEs) in the Basin support threatened and endangered species. Priority species identified in the GSP that rely on GDEs in the Basin include steelhead trout, coho salmon, lamprey, western pond turtle, California giant salamander, and California red-legged frog. Ongoing programs such as Santa Cruz County's Juvenile Steelhead and Stream Habitat Monitoring Program have monitored steelhead density and stream habitat since 1994, but clear associations between groundwater extraction and a reduction in fish density or available habitat has not been made. The species and habitat data are compiled into an annual report and a geodatabase for spatially referenced information. This work is ongoing and can be used to establish links between streamflow, groundwater conditions, GDE habitat, and presence or absence of priority aquatic species.

GSP development is a collaborative effort among the SMGWA's cooperating agencies and technical consultants. Decisions shaping policy are informed by input from resource management agencies, community members, and interested stakeholders. Extensive public outreach and engagement efforts prior to and during GSP development are documented in a Communication and Engagement Plan (C&E Plan). Beneficial users of groundwater in the Basin identified in the C&E Plan include municipal water suppliers, agricultural users, private domestic well owners, small water systems, local land use planning agencies, surface water users, ecological users, California Native American Tribes, disadvantaged communities, protected lands (including recreational areas), and public trust uses (including wildlife, aquatic habitat, fisheries, recreation, and navigation).

When developing the GSP, the SMGWA considered impacts on all beneficial uses and users, including domestic well owners, Disadvantaged Communities (DACs), and priority species. California Water Code (CWC) §106.3 recognizes that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." The Human Right to Water bill extends to all Californians, including disadvantaged individuals, groups, and communities in rural and urban areas.

Basin Setting

The basin setting is described in the form of a hydrogeologic conceptual model (HCM) to provide an understanding of the general physical characteristics related to regional hydrology, land use, geology and geologic structure, water quality, principal aquifers, and aquitards. The HCM also provides the context to develop Basin water budgets, groundwater models, and monitoring networks. The HCM was developed based on prior studies and monitoring data collected by cooperating agencies over the past 30 years.

The Basin's climate is classified as Mediterranean, characterized by warm summers and mild winters. Almost all precipitation occurs from November through April. Due to increased elevation and the orographic effect of Ben Lomond Mountain west of the Basin, precipitation increases across the Basin east to west from about 42 inches to 52 inches per year.

The Basin consists of sandstone, siltstone, mudstone, and shale overlying granitic and metamorphic rocks, all of which have been folded into a geologic trough called the Scotts Valley Syncline. The sandstone units in the geologic sequence are the principal aquifers that supply much of the groundwater produced for local water supply. The Basin's principal aquifers are

the Santa Margarita, Lompico, and Butano Sandstones. The Monterey Formation is an aquitard between the Santa Margarita and Lompico Sandstones. The following describes the general characteristics of the principal aquifers and Monterey Formation:

- The Santa Margarita aquifer is the shallowest principal aquifer, with widespread surface exposures in the southern and central portions of the Basin. It is a high-yielding aquifer that is critical to creek baseflow and private domestic water supply.
- The Monterey Formation, a low-yielding aquitard that is only used for domestic water supply found at relatively shallow depths and not for municipal supply. The Monterey Formation interacts with surface water where it outcrops in creek beds. Its low permeability limits recharge of the underlying Lompico aquifer.

- The Lompico aquifer is used extensively for municipal supply in the Mount Hermon / Scotts Valley area where the formation is thickest. This mostly confined aquifer has significantly less direct recharge from precipitation than the Santa Margarita aquifer because of its much smaller surface exposure. The area where the Monterey Formation is absent beneath the Santa Margarita aquifer in the south Scotts Valley area is important for groundwater recharge of the Lompico aquifer.
- The Butano aquifer is the deepest of the productive aquifers and is only used for water supply in northern Scotts Valley. It is recharged by surface water and precipitation where it is exposed along the Basin's northern boundary. SVWD is the only municipal user of the Butano aquifer, although private well owners pump from it in areas where it occurs at or close to the surface.

Precipitation is the main source of natural groundwater recharge to the Basin's aquifers. It enters the shallowest aquifers either as direct infiltration through the soil or indirectly from streamflow infiltrating through the streambed. Most creeks in the Basin are fed by groundwater discharges with groundwater accounting for most summer and fall baseflows.

The major creeks and river in the Basin include the San Lorenzo River, Boulder Creek, Love Creek, Newell Creek, Lompico Creek, Zayante Creek, Bean Creek, and Carbonera Creek. Many of these are home to protected species. GDEs are widespread through the Basin and consist of springs, riverine, riparian, open water and groundwater supported wetlands. Fall Creek and the San Lorenzo River have bypass flow requirements that limit diversion timing and rates at certain times of the year.

SMGWA cooperating agencies regularly monitor groundwater elevations, groundwater extraction, groundwater quality, and surface water flow and quality for groundwater management and operations of their water systems. These data are critical for evaluation of past and current groundwater conditions.

Data gaps in the HCM coincide with areas of uncertainty in the GSP. The primary data gap is a lack of monitoring wells in parts of the basin that are not provided public water supply and have concentrated private well extractions. These include areas where groundwater is connected to surface water and areas where there is no nearby creek. Additionally, the deep Butano aquifer is poorly understood because it only has 2 dedicated monitoring wells. In parts of the Basin, data gaps lead to uncertainty on how aquifers interact with each other and surface water, and how they respond to stresses such as groundwater pumping and reduced precipitation. Eight new monitoring wells to be completed in 2022 will address these data gaps.

Groundwater Conditions

Groundwater conditions in the Basin are generally sustainable, with the exception of the Mount Hermon / South Scotts Valley area where there are lowered groundwater levels in 2 of the Basin's primary aquifers. In this area, a portion of the Santa Margarita aquifer is dewatered due to a 30- to 40-foot drop in groundwater level, and the Lompico aquifer has had a 150- to 200-foot groundwater level decline as shown on Figure ES- 2.

Groundwater levels in both aquifers started to decline as early as the 1970s when there was extensive development in the south Scotts Valley area. Groundwater level declines were exacerbated by an 11-year drought starting in 1984. During this drought, the Scotts Valley area experienced an average rainfall deficit of 8.6 inches relative to the long-term average annual rainfall of 42 inches.

Coinciding with a climate-driven reduction of natural aquifer recharge, water demand in the Basin peaked thereby further worsening groundwater conditions. At this time, there were a number of different groundwater users pumping from the Santa Margarita aquifer in the Mount Hermon / South Scotts Valley area including 2 groundwater contamination remediation systems, Valley Gardens golf course, Hanson Quarry, Manana Woods Mutual Water Company, MHA, SVWD and SLVWD.

As Santa Margarita aquifer groundwater levels fell as much as 40 feet during the

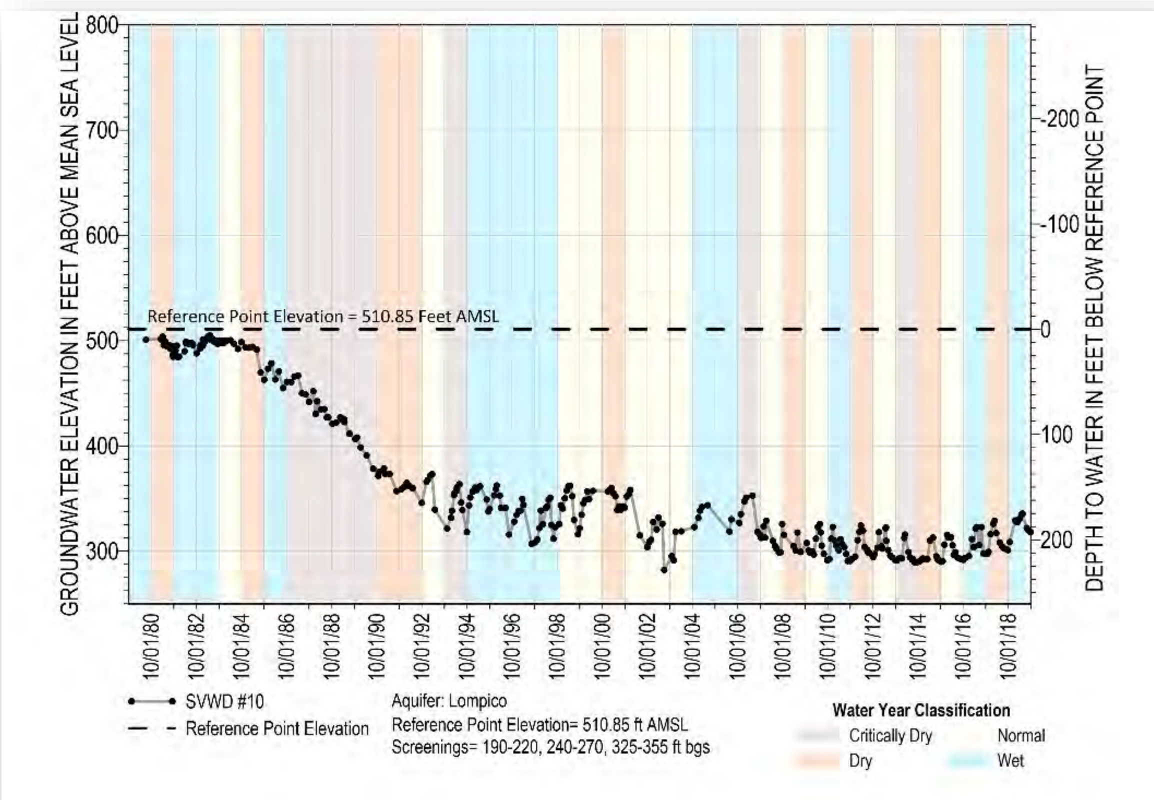

Figure ES- 2. Hydrograph at SVWD #10 in the South Scotts Valley Area Showing Long-Term Decline of Groundwater Elevations drought, levels dropped to pump intakes in several wells screened in the Santa Margarita aquifer and upper parts of the Lompico aquifer, including MHA, SLWVD, and SVWD wells, forcing them to drill new wells screened in deeper parts of the Lompico aquifer.

Even though the Santa Margarita aquifer recharges quickly when there is average or better rainfall, its groundwater levels in the Mount Hermon / South Scotts Valley area have not recovered much from the initial decline that ended in 1994. The main reason it has not had much recovery is thought to be that lowered groundwater levels, especially in the dewatered portions of the aquifer, cause water infiltrating at the surface to pass through the Santa Margarita aquifer and into the underlying formations instead of remaining in the Santa Margarita aquifer. Underlying formations are either the top of the low permeability Monterey Formation from where it mostly flows out at surface seeps to Bean Creek, or the Lompico aquifer where it is in direct contact with the Santa Margarita aquifer due to the absence of the Monterey Formation. Other contributing factors that have led to decreased recharge of the Santa Margarita aquifer since the 1980s include conversion of the City of Scotts Valley to a sewer system that has reduced the amount of septic systems return flow to groundwater, and increased development that has reduced the amount of pervious area available for recharge.

The Santa Margarita aquifer in the Olympia area of the Basin also has gradual declining groundwater levels over the past 35 years. With a decline of about 20 feet (average rate of 0.6 foot per year), the change is much smaller than declines experienced in the South Scotts Valley area.

Climate change is projected to generally result in more variable precipitation (i.e., longer and more extreme droughts with fewer but more extreme rainfall events), slightly lower total precipitation, and warmer temperatures in comparison to current conditions. These climate conditions will 1) reduce natural recharge to groundwater causing further lowering of groundwater levels if groundwater extraction is not supplemented with other sources, and 2) reduce available surface water which will, at times, result in greater pressure on groundwater to meet water demands within the Basin.

Lowered groundwater levels in certain parts of the Basin have caused a corresponding reduction in groundwater stored in the Basin. Since the 1980s, and even possibly starting in the 1960s, there has been a consistent loss of groundwater stored in the Basin due primarily to over-pumping the Lompico aquifer in the Mount Hermon / South Scotts Valley area.

Groundwater in the Basin is generally of good quality and does not regularly exceed primary drinking water standards. However, both naturally occurring and anthropogenic groundwater quality constituents of concern are present in some aquifers and areas. The main naturally occurring groundwater quality concerns in the Basin are salinity (measured as total dissolved solids and chloride), iron, manganese, and arsenic. The main anthropogenic groundwater quality concerns are nitrate and constituents of emerging concern (CEC) which are mainly from septic and sewer discharges together with organic compounds from environmental cleanup sites or other unidentified local releases.

Surface water is connected to groundwater throughout the Basin. The highly permeable nature of the Santa Margarita aquifer and its proximity to surface water features lends it to being the main source of baseflows to creeks. The Butano aquifer also contributes a significant volume of baseflow where it outcrops and is intersected by numerous creeks along the Basin's northern boundary. The upper Bean Creek watershed and its tributaries are one of the few areas where streams lose water to groundwater. This is an important source of groundwater recharge to the aquifers. Groundwater elevations in the Basin's only 2 monitoring wells near creeks show groundwater levels consistently higher than the streambed, indicating that groundwater is contributing to streamflow in these locations year-round. Four additional shallow monitoring wells will be completed in 2022 to improve understanding of interconnected surface water, to add as representative monitoring points, and to improve how the groundwater model simulates groundwater and surface water interactions.

Santa Margarita Basin Groundwater Model

To be used as a tool for developing the GSP, an existing groundwater model was improved and updated. The model was first developed in 2006 and updated in 2015, 2016, and 2017. For the model to be a suitable tool for quantifying water budgets, simulating future groundwater conditions based on climate change assumptions and potential projects and management actions required as part of GSP development, a number of structural and model input refinements were made.

There is no known evidence of land subsidence in the Basin. The consolidated geology makes subsidence unlikely. Subsidence caused by land surface movement related to tectonics and other phenomena besides groundwater pumping is not subject to SGMA.

Water Budget

In compliance with SGMA, water budgets in the GSP cover historical (1985-2018), current (2010-2018), and projected (2020-2072) timeframes. The water budgets are developed from an inventory of precipitation, surface water, and groundwater inflows and outflows.

Water inflow and outflow volumes across the land surface, via surface water, and for groundwater are estimated using the Santa Margarita Basin groundwater model.

The availability of water for groundwater recharge is driven by precipitation, surface runoff to creeks, and evapotranspiration. Surface water flows into and out of the Basin, and is connected to groundwater in much of the Basin. Water flows both from creeks to groundwater and vice versa based on the gradient between creek stage and adjacent groundwater levels. Figure ES- 3 graphically depicts the historical (1985-2018) average annual groundwater budget inflows, outflows, and change in storage. Overall, more groundwater discharges to creeks than is being recharged by creeks. Groundwater pumping removes groundwater from the aquifer system, though some of it reenters as return flows from septic systems, quarry usage, landscape irrigation, and sewer and water distribution system losses.

Historical basin-wide changes of groundwater in storage average 1,100 AFY, mostly from the Lompico aquifer in the Mount Hermon / South Scotts Valley area implementation.

Notable differences between the current (2010 – 2018) and historical (1985 – 2018) groundwater budgets are reduced precipitation recharge due to less than average rainfall and reduced groundwater pumping from improved water efficiency and other management efforts. Decreased water demand from these efforts have resulted in about 1,000 AFY less groundwater lost from storage compared to the historical period.

Primary changes to the projected groundwater budget compared to the historical and current budgets are reduced precipitation recharge and increased year-to-year climate variability due to projected climate change. With groundwater extractions similar to current extractions and without additional projects and management actions, it is projected the Basin will experience an average annual loss of groundwater in storage of 500 AFY, which is less than historical losses and slightly more than current losses.

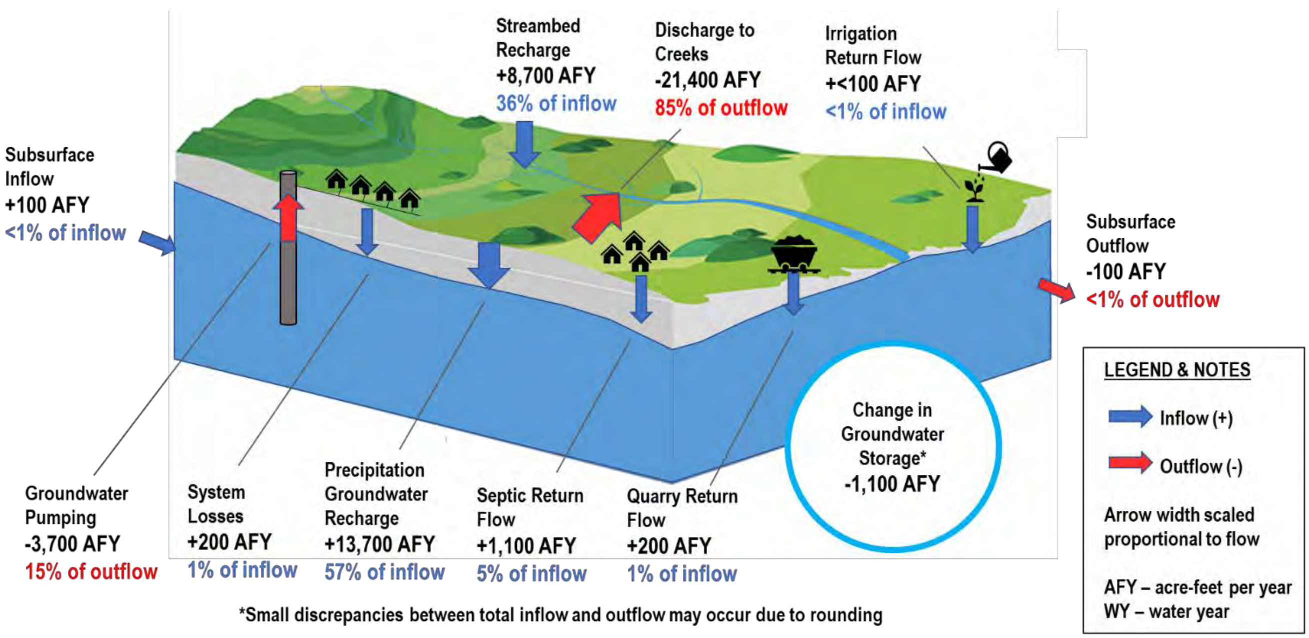

Figure ES- 3. Historical Groundwater Budget
(Average from Water Year 1986 through 2018)

Table ES-1 shows the sustainable yield of the Basin by aquifer and compared to past use. This is an estimated volume of groundwater that can be pumped on a long-term average annual basis without causing undesirable results.

Table ES-1. Santa Margarita Basin Sustainable Yield

Aquifer /Formation	Historical Pumping 1985 – 2018 (AFY)	Current Pumping 2010 – 2018 (AFY)	Sustainable Yield (AFY)
Santa Margarita	1,070	770	850
Monterey Formation	320	180	140
Lompico	1,770	1,520	1,290
Butano	530	480	540

Sustainable Management Criteria

Developing SMC as metrics of groundwater sustainability is a requirement of the SGMA. Of the 6 indicators of sustainability, 4 apply to the Basin: chronic lowering of groundwater levels, reduction of groundwater in storage, degraded water quality, and depletion of interconnected surface water. Land subsidence and seawater intrusion are not applicable.

Locally defined, quantitative SMC define what constitutes sustainable groundwater conditions in the Basin and commit the SMGWA to actions to achieve those conditions by 2042. SMC were developed using best available information and science, direction provided by the SMGWA Board, public feedback, and input from cooperating agencies and a Surface Water Technical Advisory Group (TAG).

There are known data deficiencies in the hydrogeologic conceptual model related to parts of the Basin and aquifers that do not have monitoring wells, including areas of private domestic pumping and interconnected surface water. The SMC in this GSP are likely to be reevaluated and potentially modified in the future as new data and monitoring features are developed.

The SMGWA developed Sustainability Goals discussed in Section 3.1 and identified undesirable results, minimum thresholds, measurable objectives, and interim milestones for each of the applicable sustainability indicators. The details of the metrics are covered in Sections 3.4 through 3.7 and are summarized in Table ES-2. SMC are assigned to a subset of the existing monitoring network called representative monitoring points.

A summary of the management goals for the Basin's 4 applicable sustainability indicators is provided below.

Chronic Lowering of Groundwater Levels: Do not allow groundwater levels to decline to levels that materially impair groundwater supply, negatively impact beneficial uses, or cause undue financial burden to a significant number of beneficial users.

Reduction of Groundwater in Storage: Maintain groundwater extraction so that other sustainability indicators are not negatively affected.

Degradation of Groundwater Quality: By implementing the GSP, maintain groundwater quality so that State drinking water standards for chemical constituents of concern (COC) are not exceeded, with the exception of nitrate (as N) which must be less than half the regulatory standard.

Depletion of Interconnected Surface Water: For interconnected surface waters, ensure that groundwater use or projects or management actions do not adversely impact the sustainability of GDEs or selected priority species or cause undue financial burden to beneficial users of surface water.

The SMGWA will use existing monitoring networks, supplemented with additional new monitoring wells to fill data gap areas, for annual assessments and reporting of groundwater levels, groundwater quality, groundwater and surface water use, precipitation, and streamflow. Data collected will be used to monitor progress towards sustainability during GSP implementation. Details on the Basin's GSP monitoring network are provided in Section 3.3.

Historical and future data collected by the monitoring network will be stored in a regional Data Management System (DMS) that will facilitate a centralized source of data when the GSP's annual reports are prepared.

Table ES-2. Santa Margarita Basin Sustainable Management Criteria Summary

Sustainability Indicator	Measurement	Minimum Threshold	Measurable Objective	Interim Milestones	Undesirable Result
Chronic lowering of groundwater levels	Groundwater elevation measured in representative monitoring point (RMP) wells	Average groundwater elevation of the 5 lowest historical measured values in each RMP	*Santa Margarita aquifer RMPs:* seasonal low groundwater levels in each well in WY2004 *Monterey Formation, Lompico and Butano aquifer RMPs:* average annual minimum groundwater elevation measured from 2016 to 2020 plus the projected groundwater elevation increase in seasonal low groundwater elevations projected by a 540 AFY conjunctive use project in the Mount Hermon / South Scotts Valley area	*Santa Margarita aquifer RMPs:* seasonal low groundwater levels in each well in WY2004 *Monterey Formation, Lompico and Butano aquifer RMPs:* simulated groundwater elevations projected from implementation of a 540 AFY conjunctive use project	Groundwater elevation in any RMP falls below the minimum threshold in 2 or more consecutive non-drought years and is not caused by emergency operational issues or extended droughts
Reduction in groundwater storage	Metered and estimated groundwater extractions. Municipal and small water systems are metered, while *de minimis* and other non-*de minimis* extractions are estimated	Average baseline groundwater pumping from 2030 to 2049 in the Santa Margarita aquifer and after 2022 for Monterey Formation and Lompico and Butano aquifers, plus 5% additional pumping	Average groundwater pumping projected in a model simulation incorporating a 540 AFY conjunctive use project in the Mount Hermon / South Scotts Valley area	Equivalent to minimum thresholds prior to 2027 and equivalent to measurable objectives from 2027 onward	Groundwater extraction volumes exceed minimum thresholds in one or multiple principal aquifers
Degraded groundwater quality	Concentrations of chemical constituent of concern in RMP wells	State drinking water standards, except for nitrate, which is half the State drinking water standard	Average concentration for each constituent of concern at each RMP between January 2010 and December 2019	Identical to measurable objectives	Minimum thresholds are exceeded at RMPs where: • Minimum thresholds have not been exceeded prior to SMGWA approved project(s) or management action(s) • An immediate resampling confirms the exceedance • The exceedance is caused by SMGWA approved project(s) or management action(s)
Depletion of interconnected surface water	Groundwater elevations measured in RMP wells are used as a proxy for measuring depletion of interconnected surface water	Average groundwater elevation of the 5 lowest measured values in each RMP	Seasonal low groundwater levels in each RMP from the fall of WY 2004	Identical to measurable objectives	The groundwater elevation in any RMP falls below the minimum threshold in 2 or more consecutive non-drought years and is not caused by emergency operational issues or extended droughts

Projects and Management Actions

Section 4 of the GSP describes potential projects and management actions that may be implemented to achieve the Basin's sustainability goal. Projects and management actions discussed in this section are in varying stages of development.

Several projects have the added benefit of creating supplemental drought supply to improve water supply reliability for the City of Santa Cruz, SLVWD, and SVWD. Some projects will benefit groundwater levels in aquifers pumped by *de minimis* groundwater users. Projects are grouped based on where the water resources are sourced and the type of water.

Baseline Projects and Management Actions (Group 1): Projects and management actions considered existing commitments by cooperating agencies and are currently being implemented. They are expected to continue, as needed, throughout GSP implementation. These projects and management actions do not achieve sustainability on their own. Group 1 projects include:

- Water use efficiency programs
- SVWD low-impact development
- SLVWD conjunctive use
- SVWD recycled water use

Projects and Management Actions Using Existing Water Sources Within the Basin (Group 2, Tier 1): Projects representing current thinking regarding the Basin's best option for reaching sustainability. Projects and management actions rely on existing water sources within the Basin and include expansion of some of the Group 1 baseline projects. Group 2, Tier 1 projects include:

- SLVWD and SVWD additional water use efficiency
- SLVWD existing infrastructure expanded conjunctive use (Phase 1)
- SLVWD and SVWD inter-district conjunctive use with Loch Lomond (Phase 2)
- SLVWD Olympia groundwater replenishment

Projects and Management Actions Using Surface Water Sources Outside the Basin (Group 2, Tier 2): Projects that rely on surface water sources outside of the Basin. Group 2, Tier projects include:

- Transfer of inter-district conjunctive use
- Aquifer Storage & Recovery (ASR) in the Scotts Valley area

Projects and Management Actions Using Purified Wastewater Sources (Group 2, Tier 3): Projects that recharge purified wastewater in the Basin. Potential projects include:

- Purified wastewater recharge of 710 to 1,500 AFY in the Scotts Valley area with wastewater treated at Soquel Creek Water District's Chanticleer Advanced Water Purification Facility (AWPF)
- Purified wastewater recharge of 3,500 AFY in the Scotts Valley area with wastewater treated at a new facility within the Basin
- Purified wastewater augmentation at Loch Lomond.

Identified Projects and Management Actions Requiring Future Evaluation (Group 3): New projects or extensions of existing projects that need feasibility analysis. If Group 2 projects are deemed unfeasible or projected outcomes change, SMGWA may look to Group 3 projects to meet SMGWA sustainability goals. Group 3 projects include:

- Public/private stormwater recharge and low-impact development
- Enhanced Santa Margarita aquifer conjunctive use
- SLVWD Quail Hollow pumping redistribution
- Santa Margarita aquifer private pumpers connected to public water system
- Direct potable reuse
- Water use restrictions
- Scotts Valley non-potable / potable reuse

Not all projects and actions are needed to attain sustainability, but they provide possible options in the event that backup projects are needed. Importantly, the listed projects are not developed enough for SMGWA cooperating agencies to fully commit to any projects prior to submission of the GSP to DWR in January 2022. Project development will be led by cooperating agencies. For projects with multi-stakeholder benefits, cooperating agencies will work in coordination with one another.

Measures that the SMGWA member agencies will take to achieve Basin sustainability are focused on increasing Lompico aquifer groundwater levels in the Mount Hermon / South Scotts Valley area. The most immediate action will be to expand conjunctive use of surface water and groundwater using existing infrastructure. It is likely that this measure will be followed by development of infrastructure to gain access to SLVWD's entitlement of 313 AFY of Loch Lomond water for further conjunctive use opportunities. Combining the 2 projects would potentially provide for a long-term average of 540 AFY of in-lieu recharge by SLVWD and SVWD resting their extraction wells during the wet seasons when surface water is available for conjunctive use. Groundwater modeling has demonstrated the combined projects will raise Mount Hermon / South Scotts Valley area Lompico aquifer groundwater levels by 20 to 50 feet. The anticipated increases in groundwater levels from 540 AFY of conjunctive use enables the SMGWA to meet its long-term measurable objectives for chronic lowering of groundwater levels, depletion of interconnected surface water, and reduction of groundwater in storage, while having no impact on groundwater quality.

Costs associated with new project infrastructure would be funded through a combination of increased operating revenue and outside funding sources. Potential outside funding sources could include Integrated Regional Water Management Grant Programs (IRWM), Sustainable Groundwater Management Grant Program, State Revolving Fund low interest loans, U.S. Department of Agriculture grants and/or low interest loans, or U.S. Bureau of Reclamation Drought Resiliency and/or Title XVI Recycled Water. For many projects included in the GSP, securing outside funding to supplement operating revenue will be essential for them to be financially feasible over the long-term and affordable.

Groundwater Sustainability Plan Implementation

The estimated cost to implement the GSP over the next 5 years is $1,967,900, or $393,580 annualized over 5 years. Approximately 57% of the 5-year estimated costs are existing activities included in SMGWA and member agency budgets.

The estimated cost by GSP implementation activity can be found in Section 5, Table 5-1. The budget's major cost categories include:

- Administration and business operations
- GSP management and coordination
- Monitoring and GSP reporting (annual and 5-year update reports)
- Maintaining the data management system

Monitoring, regulatory reporting, filling data gaps, and maintaining the DMS accounts for roughly half the budget. The remaining budget covers activities associated with supporting SMGWA governance and management.

The GSP implementation budget does not include the cost of evaluating, planning, designing, and constructing a project(s) to achieve groundwater sustainability. Individual cooperating agencies will cover their respective costs of these activities because the SMGWA will not serve as the lead agency for implementing projects and management actions. Project costs may be shared between multiple agencies if the project provides greater water supply reliability and resiliency benefit to multiple agencies. Regional collaboration to achieve

Glenwood Preserve; photo credit: Brian Largay/Land Trust of Santa Cruz County

both basin sustainability and increase regional water supply reliability and resiliency is encouraged by the SMGWA.

The SMGWA is funded by its member agencies through annual contributions based on a cost sharing agreement. The cost allocation is currently established at 60% to SVWD, 30% to SLVWD, and 10% to the County of Santa Cruz; the cost allocation is subject to change. SMGWA's approach to meeting GSP implementation costs is considered in two phases. In the GSP Implementation Phase 1 (2022 – 2027) funding is anticipated to be obtained from annual contributions from the SMGWA member agencies. Contribution amounts will be assessed based upon the SMGWA's annual budgetary requirements and equitable cost share rationale between the member agencies. The SMGWA will continue to pursue funding opportunities from state and federal sources to support GSP implementation activities.

The approach for meeting GSP implementation costs after 2027 will be evaluated as GSP implementation proceeds. As authorized under Chapter 8 of the SGMA, a GSA may impose fees, including, but not limited to, permit fees and fees on groundwater extraction or other regulated activity, to fund the costs including groundwater sustainability planning and program activities and administration.