INSIGHTS AND RECOMMENDATIONS
SONOMA VALLEY GROUNDWATER CONDITIONS AND MANAGEMENT

The purpose of this document is to transmit the Sonoma Valley Groundwater Management Program (GMP) advisory committees' insights and recommendations for consideration by the Sonoma Valley Groundwater Sustainability Agency (GSA), which formed in June 2017 pursuant to the Sustainable Groundwater Management Act of 2014 (SGMA).

The Basin Advisory Panel (Panel) and Technical Advisory Committee (TAC) have been meeting for over ten years, providing input and direction for the voluntary Sonoma Valley Groundwater Management Plan (original Plan) development and implementation (a list of Panel and TAC participants is provided as Attachment A). The Plan contains a goal, basin management objectives and components and represents a strong technical and institutional foundation on which to build under SGMA.

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."***

Given the non-regulatory nature of the 2007 original Plan, Panel and TAC members have necessarily emphasized a collaborative and voluntary pursuit to achieve groundwater sustainability. With the passage of SGMA, new regulatory authorities are now part of the toolbox that GSAs can use to achieve groundwater sustainability. Meeting the SGMA mandate of achieving sustainable groundwater conditions will require the collective effort and support of the whole groundwater user community in Sonoma Valley. Panel and TAC members recommend the continued application of voluntary and incentive-based approaches and actions. These will foster good will in support of achieving basin sustainability goals and maintain the stakeholder community support developed during the past decade of voluntary GMP activities. The use of new GSA regulatory authorities and powers should be used when voluntary measures to meet SGMA requirements do not appear adequate.

PANEL AND TAC INSIGHTS AND RECOMMENDATIONS TO THE SONOMA VALLEY GSA

Panel and TAC members recommend that the Sonoma Valley GSA consider the insights and recommendations listed below in moving forward with the preparation and implementation of a groundwater sustainability plan (GSP) in the Sonoma Valley groundwater basin. These insights and recommendations are based on their collective institutional knowledge and founded on the hydrogeologic conceptual model (summary provided in Attachment B).

1) **Give Prompt Attention to Areas of Declining Groundwater Levels in Southern Sonoma Valley:** Long-term and chronic declining groundwater levels in southern Sonoma Valley indicate that groundwater withdrawals are exceeding the rate of replenishment for deeper aquifer zones in southern Sonoma Valley (Attachment B). These worsening conditions represent a significant impediment to achieving groundwater sustainability within Sonoma Valley as deep aquifers recharge very slowly, and will require the prompt attention and focus of the new GSA.

2) **Continue and Expand Monitoring Programs:** Continued funding and support for existing monitoring programs and ongoing studies within the Sonoma Creek Watershed should be prioritized. These existing programs include collection and periodic analysis of groundwater levels, groundwater quality, and streamflow monitoring, including seepage runs. Additionally, improving and enhancing existing monitoring programs by filling data gaps should be pursued to assist in compliance with SGMA requirements.

3) **Recognize the Importance of Contributing Watershed Areas to Groundwater Sustainability:** The basin area to be managed and subject to the jurisdiction of the GSA will be limited to the lower lying alluvial portions of the groundwater system as defined by the State of California (Bulletin 118 basin). Technical studies (including monitoring and groundwater flow modeling) indicate that inflows from the contributing watershed outside of the Bulletin 118 basin are important and significant sources (both in the form of surface streamflows and subsurface inflows) to basin groundwater. Areas of importance include (1) upland areas comprised of Sonoma Volcanics east and west of the Bulletin 118 basin, and (2) the southern half of the Kenwood Valley groundwater basin. Groundwater and surface water conditions in these contributing watershed areas have the potential to strongly influence the GSA's ability to meet the SGMA mandate to achieve groundwater sustainability within the Bulletin 118 basin. In order to support the sustainable management of the Bulletin 118 basin, and in recognition of the hydrologic connection with the contributing watershed areas, the GSA should:
   a) Support existing and ongoing voluntary groundwater-level and streamflow monitoring in the contributing watershed areas.
   b) Closely coordinate with the County, which has land use responsibilities and the authority to manage groundwater in the contributing watershed areas, on potential policies or other actions necessary to ensure sustainable management of the Bulletin 118 basin.
   c) Appoint a stakeholder from the contributing watershed areas to the GSA's advisory body.
   d) Support projects in the contributing watershed areas that could benefit groundwater conditions in the Bulletin 118 basin, such as conservation or stormwater recharge projects.
   e) Evaluate the technical necessity and feasibility of future basin boundary change requests to support sustainable groundwater management.

4) **Maintain Close Coordination with Land-Use Planning:** The GSA should closely coordinate and share groundwater information, including groundwater level trends and areas of groundwater depletion, with local land use planning agencies, including the County and City of Sonoma. The GSA should help facilitate the integration of groundwater information into land use planning decisions, including general plan development and planning project reviews, with an emphasis placed on the importance of limiting any additional stresses in existing areas of chronic groundwater declines in the groundwater basin.

5) **Expand the Level of Community Outreach:** Additional outreach efforts will be needed in the community to inform the public of groundwater conditions, obtain public input on potential future management actions, continue and further enhance stakeholder involvement. Community understanding and support will be critical to implementing any fees or regulations in the basin. These outreach efforts should include, but not be limited to:
   a) Briefings for stakeholder constituencies and community workshop(s) on current groundwater conditions and management options to receive public input during GSP development.
   b) Develop outreach materials and conduct focused neighborhood style meetings in the areas of declining groundwater levels as the GSA begins work on the GSP.

6) **Incorporate and Expand Analyses of Potential Solutions to Address Groundwater Depletion Areas:** The Panel and TAC initiated an alternatives analysis to consider possible technical, regulatory and institutional approaches to address groundwater depletion in areas of declining groundwater levels in the southern Sonoma Valley. The work completed to date should be provided to the new GSA through Water Agency staff, and updated and included as appropriate in the GSP. Work completed to date includes**:**

a) Identification of potential technical, regulatory, land use and institutional response action alternatives, including but not limited to additional water supply (stormwater capture, aquifer storage and recovery, and increased water reuse), water use efficiency and conservation programs, increased data collection and reporting, implementation of land use strategies, regulatory responses, and institutional approaches.
b) Preliminary screening criteria to evaluate possible response action alternatives. Preliminary screening criteria included technical feasibility, regulatory and community acceptance, relative cost, and environmental benefits.
c) Baseline future model scenarios that incorporate a range of climate futures, population growth and potential land use changes were simulated with the groundwater model.

7) **Support Strategies from the Original Plan:** The GSA should continue to support and/or pursue projects recommended in the original Plan, including:
   a) Increased water conservation and efficiency - Actions include continuing and increasing water conservation, implementation of Best Management Practices, increased urban and domestic landscape irrigation efficiency, and stormwater capture and reuse for demand reduction.
   b) Stormwater capture and recharge - Actions comprise studies to identify areas with suitable soil permeabilities and geology, alternatives for preserving these recharge areas for the future, feasibility studies to capture rainfall and stormwater, recharge projects incorporating stormwater capture and the use of spreading basins or dispersed recharge areas, including assessing the potential for retention and use at the south end of the basin to reduce groundwater demand.
   c) Groundwater banking projects - Actions include a conjunctive use assessment, feasibility analysis and projects incorporating imported water for groundwater banking, both of which were completed, and a pilot project that is underway.
   d) Expansion of recycled water deliveries to offset groundwater pumping - Actions include studies to evaluate graywater and implementation of the Sonoma Valley County Sanitation District recycled water project.

8) **Set Goals to Achieve and Sustain a Healthy Groundwater Basin Beyond the January 1, 2015 Requirement in SGMA**. SGMA does not require addressing undesirable results that occurred before January 1, 2015. Recognizing that January 1, 2015 was near the end of a multi-year drought and the existence of chronic declining groundwater levels in southern Sonoma Valley at that time, the GSA should not just seek to stabilize groundwater levels to January 1, 2015 conditions. The GSA should promote the goal of reversing the declining groundwater-level trends and maintaining and improving water quality to achieve a healthy and resilient groundwater basin that provides additional benefits to the community. These benefits to the community include but are not limited to: supports recreation, provides added supply reliability and resiliency for water management especially in dry years, supports thriving creeks including steelhead populations, increases water security for the many owners of shallow domestic wells, and supports Sonoma Valley's agricultural economy.

9) **Represent the Multiple and Diverse Interests in the Groundwater Community in the Sonoma Valley:** The GSA should ensure that it takes into account and represents the interests of the diverse uses and users of groundwater resources in Sonoma Valley, including rural residents, operators of small farms, large agriculture, commercial businesses (many of which are not presently organized into entities that are SGMA eligible, but could be eligible over time) and the natural ecosystems that depend on groundwater for their existence.

10) **Continued Involvement and Transfer of Intellectual Knowledge of the SVGMP Panel and TAC:** As it develops and implements the GSP for Sonoma Valley, the GSA should continue to consider, and as appropriate, solicit information and recommendations from members of the Sonoma Valley Groundwater Management Program TAC and Panel who have brought significant value to the process and have invested their time and energy into better understanding and sustaining groundwater resources in Sonoma Valley. The GSA should also consider giving priority to members of the SVGMP Panel and TAC that apply for seats on the GSA Advisory Committee. A list of names of the SVGMP Panel and TAC participants are provided as Attachment A.

Sonoma Valley Groundwater Management Program Basin Advisory Panel/Technical Advisory Committee Participants:

- Keith Ables, Sonoma RCD
- Fred Allebach
- Jim Bundschu, Gundlach Bundschu
- James Cannard
- Caitlin Cornwall, Sonoma Ecology Center
- Richard Dale, Sonoma Ecology Center
- Norman Gilroy, Community Alliance of Family Farmers
- Norm Goldstein
- David Goodison, City of Sonoma
- Vicki Hill
- Jay Jasperse, Sonoma County Water Agency
- Clarence Jenkins, Madrone Vineyard Management
- Bill Keene, Sonoma County Agricultural Preservation and Open Space District
- Joe Leiber, Diamond A Mutual Water Company
- John MacLeod, Indian Springs Ranch
- Dan Muelrath, Valley of the Moon Water District
- Vickie Mulas, Mulas Dairy
- Karla Noyes
- Ed Nelson
- Kathy Pons, Valley of the Moon Alliance
- Sandi Potter, Permit Sonoma
- John Robb, Mission Highlands Water Company
- Tito Sasaki, North Bay Agricultural Alliance
- Maggie Salenger
- Mark Sylvester
- Dan Takasugi, City of Sonoma

SONOMA VALLEY GROUNDWATER CONDITIONS, WATER DEMAND AND WATER BUDGET

Sonoma Valley Groundwater Conditions

This attachment presents a summary of the conceptual model for groundwater conditions in Sonoma Valley. Further information and details are provided in the following key studies that document the conditions of the Sonoma Valley groundwater basin:

- 2014, Sonoma Valley Groundwater Management Program. Five-Year Review and Update Report. http://www.scwa.ca.gov/files/docs/projects/svgw/SonValley5YrReview_FINAL.pdf
- 2007, Sonoma County Water Agency. Sonoma Valley Groundwater Management Plan. http://www.scwa.ca.gov/files/docs/projects/svgw/130_Sonoma-Valley-Groundwater-Management-Plan-Dec-2007.pdf
- 2006, U. S. Geological Survey. Geohydrological Characterization, Water-Chemistry, and Ground-Water Flow Simulation Model of the Sonoma Valley Area, Sonoma County, California. https://pubs.usgs.gov/sir/2006/5092/

Watershed and Climate: The Sonoma Valley watershed is located within the North Coast Ranges of northern California, which has a Mediterranean climate, with moderate temperatures and distinct wet and dry seasons. About 90 percent of the annual precipitation typically occurs during the months of November through April, and nearly half of the precipitation is due to atmospheric rivers, which concentrate rainfall and runoff along narrow bands.

Mean annual precipitation at Sonoma has been variable and averaged 28.8 inches during the 63-year period from 1953 through 2016, with 12 of the last 15 years seeing below average rainfall at 25.2 inches per year, including 8 years of a state-defined drought. Stream discharge patterns typically mirror rainfall, with peak flows occurring in response to precipitation. Significant for Sonoma Valley is that late spring rains provide soil moisture to crops, thereby reducing spring and early summer groundwater demands. Hydrologic models of potential climate change scenarios predict that precipitation could be subject to increased variability resulting in reduced water supply reliability and increased water demands due to increased evapotranspiration rates during warmer and extended summers.

Hydrogeology: The Sonoma Valley watershed is located within the geologically complex North Coast Ranges of California, dominated by northwest trending valleys with faults that may act as barriers to groundwater flow, or conduits to deeper saline water intrusion. A mixture of younger volcanic, sedimentary rocks and unconsolidated sediments form the complex aquifer system, which overlies older basement rocks that are fractured. The aquifer system consists of a shallow zone, approximately 200 feet depth or less, that appears relatively continuous and largely associated with alluvial and fluvial sedimentary deposits and some volcanics, and a deeper hydraulically isolated zone. The shallow aquifer zone is locally connected to Sonoma Creek, with most recharge occurring largely through streambed sediments along water courses throughout the valley, and also direct infiltration of precipitation on the valley floor and along the margins of the valley areas (mountain front recharge). In general, groundwater flows from recharge areas in the mountains and uplands surrounding the Sonoma Valley toward the valley axis, and in a generally southern direction towards San Pablo Bay.

Surface water-groundwater interaction within the entire watershed continues to be an important component of the groundwater system in Sonoma Valley. Data from the GMP monitoring program provides information on seasonally and annually variable groundwater discharge from the shallow aquifer

to maintain and enhance flows in the Sonoma Creek and many of its tributaries, and the important role streams play in recharging groundwater in some areas.

Groundwater Levels and Movement: Monitoring of groundwater levels over time indicates declines continue to persist within deep zone aquifers primarily southeast of the City and in the El Verano/Fowler Creek subareas. The areas of decline have persisted for the last decade or more and may be expanding. While the magnitude of the declining rate may be influenced in part by the lower than average rainfall in recent years, many of the wells with declining groundwater levels exhibit persistent declines that do not recover during relatively wetter years. These chronic declines indicate that groundwater withdrawals are occurring at a rate exceeding the rate of recharge (or replenishment) within the deeper aquifer zones of southern Sonoma Valley.

Water Quality: 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 represents a future threat to groundwater resources should groundwater declines continue to persist. Adequate groundwater quality monitoring and potential water quality degradation will need to be addressed in the GSP and through the Salt and Nutrient Plan monitoring program.

Water Demands: Water demands in Sonoma Valley are met by four primary sources of supply comprised of local groundwater, imported surface water, local surface water and recycled water. The total estimated water demands from these four sources of supply for Sonoma Valley in Water Year 2012 (most recent estimate) were approximately 17,900 acre-feet (Figure B-1 shows percentage of each):

- 10,500 AF - Local groundwater pumped from water wells located within Sonoma Valley (it is estimated that of the existing water wells in Sonoma Valley approximately 75% are rural domestic wells, 15% are agricultural irrigation wells, and 10% are public supply, commercial or industrial wells)
- 4,700 AF - Imported surface water from the Russian River Watershed delivered by the City of Sonoma and Valley of the Moon Water District
- 1,500 AF - Local surface water diverted from Sonoma Creek and its' tributaries
- 1,200 AF - Recycled water produced at Sonoma Valley Wastewater Treatment Plant and delivered for irrigation use within Sonoma Valley

Figure B-1, below, also indicates the estimated percentages of the average amount of *local groundwater use* for each use type.

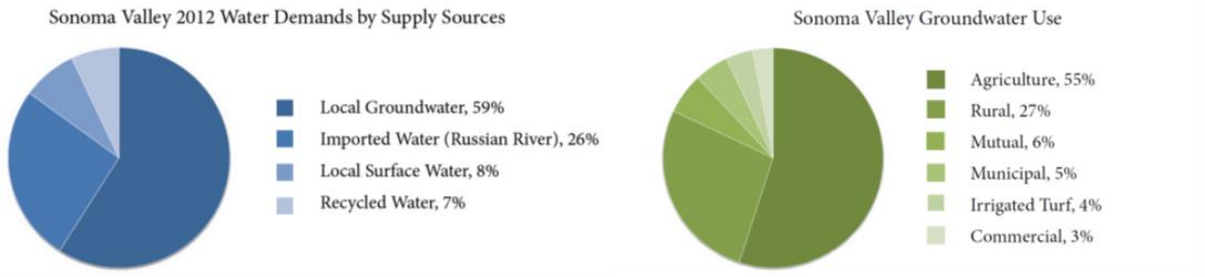

Figure B-1

Water Budget: The water budgets derived from computer models of the basin simulate average annual losses of groundwater in storage ranging from approximately 660 to 1,400 AFY, with estimates of approximately 850 AFY for the most recent decade (based on the most recent update of the MODFLOW model). While the certainty of these model simulations is constrained by the limitations of data and inherent assumptions, the groundwater storage declines estimated by the model are corroborated by the measured groundwater level declines in southern Sonoma Valley, where two pumping depressions have existed for several decades and appear to be expanding.