

GSP IMPLEMENTATION AND KEY INPUT FROM NAPA COUNTY TECHNICAL ADVISORY GROUP (TAG): FRAMING QUESTIONS FOR JANUARY THROUGH JULY 2023

The Napa County Groundwater Sustainability Agency (NCGSA) formed a Technical Advisory Group (TAG) to advise the NCGSA and aid in the implementation of the Napa Valley Subbasin Groundwater Sustainability Plan (GSP), including responding to changing groundwater conditions. The five-member TAG was first convened on August 11, 2022.

During the TAG's monthly meetings, the TAG has considered and discussed framing questions related to groundwater conditions and the development of workplans pertaining to GSP implementation. The TAG has had ongoing discussions, and Framing Questions, TAG input, and recommendations are compiled herein for TAG meetings from January through July 2023. [NOTE: Black text is Background Information and Framing Questions, and Blue text summarizes TAG discussion and input.]

Key topics in this document include:

- A. Interconnected Surface Water and Groundwater Dependent Ecosystems Workplan;
- B. Napa County Water Conservation and Groundwater Pumping Reduction Workplans; and
- C. Adaptive Management Response Actions, Climate Adaptation and Building Resiliency

At the August 22, 2023 of the NCGSA Board of Directors, the NCGSA received a summary of the TAG's January through July 2023 Framing Questions and key discussion topics. This meeting provided an opportunity for the NCGSA to receive, discuss and question the TAG about their findings and provide the TAG direction on topics and questions they would like them to consider during the course of the next 6-month to 1-year period related to ongoing GSP implementation and achieving groundwater sustainability.

A. Interconnected Surface Water (ISW) and Groundwater Dependent Ecosystems (GDEs) Workplan

The Napa County Resource Conservation District's (RCD's) Stream Watch program provides a very useful complement to other existing or proposed monitoring to further assess interconnected surface waters and groundwater conditions important to groundwater dependent ecosystems. The Stream Watch network provides more extensive coverage than established agency stream gaging stations and utilizes staff along with volunteers participating in "citizen science" monitoring efforts to record qualitative observations of stream conditions. The Stream Watch monitoring results have been compared to groundwater levels measured in dedicated monitoring wells and, where available, with quantitative stream stage and/or flow measurements. The technical team is currently considering the Stream Watch network and observations from the program during prioritization of potential locations for installing additional dedicated groundwater monitoring wells. Additional monitoring wells are planned to be installed in Fall 2023.

- A.1. Are there additional specific content areas related to the ISW and GDEs Workplan that the TAG would like to hear about during Workplan development? What does outreach and education look like for ISW and GDE development? What activities should be initiated in parallel with Workplan development?**

The TAG recommends that the additional groundwater level observation “wells” could also include multiple simple shallow casings, which would allow levels to be read manually by Stream-Watch volunteers. Monthly readings are generally fine, but during rapid changes in streamflow, such wells could be read more frequently to better track responses. (These observation wells would be in addition to the 18 dedicated monitoring wells equipped with transducers, along with the 8 additional monitoring wells under construction in fall 2023 that would also have transducers).

The TAG recommends invest in more simple shallow observation wells to cover a broader range of site conditions and provide better 3-D spatial information for each site monitored rather than concentrating the investment in fewer wells with continuous groundwater level measurements at higher cost.

The RCD staff and technical consultants are considering options for effective visualizations of the Stream Watch information and other monitoring data. The visualizations of stream condition information would be useful to incorporate as part of public education and outreach efforts. The remainder of 2023 provides a unique opportunity to use Stream Watch to capture flow conditions across the basin during a wet water year in the mainstem and tributaries.

Perhaps the TAG could help strategize these visualizations through working meetings with TAG subgroups (consisting of 2 members, i.e., less than a quorum) to provide input on ways to picture these relationships. As most members of the public don’t have an understanding of these surface-GW interactions, finding ways to effectively communicate these to decision makers and the public would be a priority.

The TAG recommended the following for outreach:

- Combine outreach on ISW/GDE with water conservation and groundwater pumping reduction;
- Develop visualization tools to make ISW more visible/palpable to the public and water users; and
- Organize visits and/or school trips at selected sites to show riparian species, monitoring wells, and other features relevant to ISW and GDE.

A.2. The following framing questions focused on information pertaining to the development of Ecohydrologic Conceptual Models (EHCMs) for selected stream reaches in the Napa Valley Subbasin: are there other stream reaches that should be considered based on their ecological importance, data availability, changes due to restoration activities, or other considerations? Are there other factors that should be considered for EHCM characterization?

The EHCM characterization should identify which criteria may be more important depending on the nature of the GDE (i.e., aquatic vs. terrestrial GDEs). During initial discussion of the plan for developing EHCMs, the TAG recommended that the technical team prepare a map that relates the magnitude of pumping relative to stream reaches for EHCM characterization, including temporal considerations pending available data. The TAG noted a range of EHCM representative sites should be included so the relative effects on site conditions from pumping versus hydrology (e.g., precipitation) can be evaluated under different site settings. Invasive species could be evaluated, including the potential

evapotranspiration effects associated with their removal.

Tracking responses of streamflow and shallow groundwater levels to precipitation and different pumping intensities could yield valuable insights. It was suggested that perhaps a TAG subgroup (consisting of two members, i.e., less than a quorum) could review the existing sites, initially from maps, perhaps later some selected site visits, to understand factors such as proximity of wells and intensity of their pumping, etc. on EHCM response.

The TAG recommended the following criteria be used for characterization (and prioritization – see next framing question):

- stream geomorphology
- importance of GW for baseflow
- potential impact from GW pumping
- discharge to river and/or surface water diversion
- potential for Ag-MAR sites
- presence of invasive species and impact on ET loss
- restoration
- site access
- needed timeline to develop site specific relationships and acceptable ranges based on additional data collection

The TAG also recommended a matrix be developed to summarize the sites and their characteristics for each criteria.

A.3. The Workplan will provide preliminarily prioritization of 18 EHCs for further evaluation during the Workplan implementation. What aspects are most important when developing the prioritization schema for implementation? How can the Napa Valley Integrated Hydrologic Model (NVIHM) be used (e.g., streamflow depletion and/or scenarios) to inform Ecohydrologic understanding and future establishment of Sustainable Management Criteria?

Since 18 EHCs are planned to be preliminarily described in the Workplan, the TAG recommended that the prioritization of the sites for further evaluation focus first on those that are understood to have a greater dependence on groundwater conditions. Some sites may be influenced more in response to surface water flows, diversions, or processes that are occurring outside the Subbasin. As part of the prioritization, it would also be useful to focus on locations where baseflow is a significant factor during critical life stages of aquatic GDEs. Additionally, the prioritization should also consider the availability of existing data at sites, the stream geomorphology, the presence of invasive species, and the amount of effort needed to sufficiently characterize sites. To the extent possible with available information, the TAG recommended assessing the degree to which selected sites are representative of conditions across the Napa Valley Subbasin, including identifying the typologies that may be underrepresented and might merit study in future phases of work. Potential constraints on site access should also be considered. To aid review of the prioritization criteria for EHC sites, the different criteria and corresponding EHC metrics could be color coded and presented in a matrix format.

Examples of NVIHM scenarios were presented to the TAG at the July 2023 meeting to illustrate the degree of influence from pumping in different parts of the Subbasin on the total streamflow depletion (reduction in streamflow) observed at various stream sites. Future NVIHM scenarios should be explored, including reducing pumping by 10 percent in an individual region or for Subbasin as a whole. More information on the NVIHM, including updates to the model, is planned to be presented at the September 2023 meeting.

B. Napa County Water Conservation and Groundwater Pumping Reduction Workplans

The GSA is working to reduce groundwater pumping because two Undesirable Results have occurred in the Subbasin. Groundwater pumping reduction was specified in the GSP as one of the Management Actions to respond to Undesirable Results. The GSP included a plan to reduce groundwater pumping in the Subbasin by approximately 10 percent (of the historical average). The GSP was approved by DWR on January 26, 2023. The Groundwater Pumping Reduction (GPR) Workplan is being developed as a roadmap for reducing pumping in the Subbasin. The GPR Workplan will focus on voluntary actions, leverage existing water conservation programs and funding opportunities, identify cost-effective approaches to reduce groundwater pumping and summarize water savings benefits for water conservation practices.

The voluntary actions are anticipated to include on-farm (for vineyard) and other (for wineries and other water users) practices that achieve quantifiable reductions in groundwater pumping. For voluntary actions to be successful, they must result in a net (measurable) reduction in groundwater pumping, and there must be sufficient adoption of these practices across different water use sectors. Voluntary water conservation actions by all sectors should provide a benefit to the Subbasin and to individuals that adopt them. To achieve sustainability, the water conservation practices implemented by businesses and the entire community must result collectively in quantifiable groundwater savings. For vineyard and winery operations, certification programs are one way to realize value from voluntary actions. Certification programs allow growers to label a product for partaking in specific practices, typically ones that result in public benefits. Existing certifications for winegrapes are being reviewed to identify the potential for certifying specific water management practices and what value these types of labels may generate. The project team is conducting outreach to support analysis of existing and potential water conservation practices. This includes outreach to certification programs as well as other organizations and entities. For other water users in the basin, incentives and other practices are being reviewed to evaluate the potential for water savings.

B.1. Are there other important considerations for the GPR Workplan that should be considered with the technical work? Are there other components of the GPR Workplan Outline that are not listed in the draft Outline that should be considered/included in the GPR Workplan? Are there other certification programs that should be reviewed, and what other factors encourage adoption of these labeling programs? Are there other entities, individuals, or certification programs that the project team should meet with as part of GPR Workplan development?

Many existing certification programs are available for engaging with vineyard and winery water users. Not all growers believe there are benefits to certification programs. However, it is believed that most growers invoke water conservation practices at some level. It would be useful to better understand the extent of the various conservation practices currently being applied on vineyards and wineries, along with other information about the utility, benefits, and costs of such practices.

About three years ago, growers with vineyards greater than 5 acres in the Napa River Watershed were required to have certifications that met the requirements of the San Francisco Bay Area Water Quality Control Board (Region 2) program. This certification is offered through several existing programs, including Fish Friendly Farming, California Sustainable Wine Growing Alliance, and LandSmart. The Fish Friendly Farming program emphasizes practices pertaining to water quality protection. Although the Fish Friendly Farming program is narrowly designed for a specific purpose, this existing program may provide a foundation for adding best management practices (BMPs) related to water use efficiency and water conservation. LandSmart, a regional collaborative program developed by RCDs to promote productive lands and thriving streams, is another existing program that growers in the Subbasin are enrolled in to meet the Regional Board requirements and/or for access to educational and resource materials on BMPs. The extent to which growers are adopting sustainable water management practices beyond these certifications is not well documented.

Some vineyard managers may not see a benefit to additional and/or expanded certification programs beyond compliance with Regional Board requirements because they sell their grapes to wineries. The wineries may have a business and/or philosophical interest in certification programs promoting sustainability. It would be helpful to define and communicate the value (economic, environmental, business, etc.) of certification programs (existing or expanded) that have components relevant to groundwater sustainability to incentivize participation and explore other incentives such as discount rates.

B.2. Does the list of water conservation practices appear complete, or are there other practices that should be included for analysis? Are there other opportunities to expand adoption of water conservation practices in the Subbasin? What are some of the constraints to achieving wide adoption?

Water Conservation, Best Management Practices, and Education

The TAG strongly supports more education and outreach involving all community members and pertaining to water conservation practices and overall actions relevant to achieving sustainability.

Educational workshops provide a good venue for teaching and learning. Many different workshop approaches can be successful, especially small groups, individualized training, “hands-on” training (such as for developing irrigation management plans), and field training (such as for irrigation system evaluation and distribution uniformity testing).

Multi-lingual offerings, especially in Spanish (e.g., RCD partnership with the Farmworker Foundation), are encouraged. Farmworkers are a key training target since they are in the fields and operating irrigation systems. Training topics are recommended for a wide variety of interests, including vineyard operators, wineries, and the general public.

Following training sessions or workshops, it is important to provide access to advisors and other educational resources, i.e., RCD, independent vineyard consultants, or other trained advisors, to aid in successful application of BMPs and training materials to review or share with others who did not attend the workshop. For example, training related to distribution uniformity testing could facilitate on-vineyard property irrigation system evaluation to determine whether all parts of the system are functioning properly.

To increase the opportunities for training, peer networking can be an effective way for workshop attendees to share educational materials and their knowledge with their peers.

Training the “trainer” can also be very useful for increasing the extent and frequency of irrigation system evaluations and distribution uniformity testing conducted. More funding to support and expand the educational workshops and training programs would be beneficial.

When considering the value of certification programs, creating an approach that does not add too much additional paperwork is important. As a result, it would be useful to leverage existing programs and requirements and minimize additional reporting requirements to the extent possible.

Other Water Conservation Opportunities

Practices related to soil health and management should be encouraged, including mulching, cover crops, or tilling, where warranted. Opportunities for recycled winery process water (not including sanitary wastewater) to be used for landscaping and also for vineyard irrigation should be explored and promoted as appropriate. The recycled water is filtered to remove particulate matter that can clog irrigation systems.

Pilot sites at five or six locations would be beneficial to characterize various vineyard management styles, tools, and techniques, including groundwater and surface water use, drainage, soil types, row orientation, land-based sensors, soil moisture monitoring, plant measurements, etc. These suggestions were also made in Fall 2022 and were incorporated into the Draft Water Conservation Workplan Outline (January 6, 2023). In addition to land-based sensor data volunteered by others, similar data from these pilot sites (where sensors are being used) could help inform the selection of appropriate algorithms for estimating ET through the OpenET remote sensing data platform for developing crop coefficients to representing the spatial and temporal variability across the Subbasin. Information gathered for the pilot sites should seek to describe historical, current, and planned vineyard management practices, including drivers for changes in practices, the benefits realized, and the objectives for future changes (such as building climate resiliency).

The GPR Workplan will include a summary of each water conservation practice, including costs and benefits for existing and potential practices, vineyard-specific benefits, and potential water savings that benefit the Subbasin. A matrix concept was developed whereby practices are ranked by criteria, including costs, private benefits, water savings benefits, implementation timeline, overall feasibility, and other studies as needed to better understand additional aspects of some practices.

B.3. Does the matrix concept provide a useful simplification of the GPR Workplan water conservation practices? What other criteria should be considered?

The matrix concept is helpful in facilitating review and comparison of various water conservation practices. A potential addition/refinement included differentiating practice criteria when applicable or favored for new vs. established vineyard plantings. Some practices may receive a different priority pending timing for replanting (e.g., row orientation modification, different rootstock, etc.).

It would be helpful for the matrix to also differentiate different levels of technology and provide information on the benefits and drawbacks. The TAG suggested soil moisture monitoring also be included in the matrix. There are numerous types of soil moisture monitoring equipment and approaches, and some may be more sophisticated and costly than others.

The TAG discussed the need to include practices for other users in the matrix (not only practices associated with water consumption by vineyards and wineries).

The TAG commented that ranking for flow measurements (e.g., meters to measure groundwater pumping) should be high as it is not possible to manage a resource without measurements.

The TAG recommended that funding opportunities for the different practices be included in the criteria.

Examples of existing certification programs for vineyard and winery water users presented to the TAG include the California Sustainable Winegrowing Alliance, Napa Green, Sustainability in Practice (SIP) Certified, Fish Friendly Farming, and Napa RCD LandSmart. The purpose of individual programs varies, ranging from regulatory compliance to intrinsic value or recognition for practices that are already utilized. Many program participants increase adoption of newer technologies because of interest in certifications and/or because they represent best management practices. Opportunities exist to expand certification of specific practices (and/or emphasize adoption of current, certified practices) that support groundwater sustainability in the Subbasin.

B.4. What aspects of these certification programs hold the most valuable lessons for Napa County? Which can be leveraged and transferred to Napa?

Technologies and Education

The TAG feels there is great importance in education, including training, on the use of technologies being implemented in vineyards. Farmworkers other than just vineyard managers need information and training on specialized equipment and also need to understand general water management principles and the impacts of using different sources of water. The RCD has noted instances where it has purchased technology for growers to test, use, and keep. If the technology is found to be beneficial, the RCD showcases those applications as examples. There are many tools and technologies – so many that it can be overwhelming to some growers. Providing more guidance on the value and benefits of the various tools and technologies could be helpful. The matrix under development could be helpful in providing such guidance, although it will not include specific details of different brands or specific differences between similar tools.

Certification Aspects of Interest

Some local winemakers like the philosophy behind some of the existing certifications (such as Napa Green and SIP) and the influence of the certification label on consumer choices. Some certifications may be viewed by winemakers as important to increasing the return on their investment.

Many vineyards use the Fish Friendly Farming logo on their fields so the public can see their participation in this program. Some wineries have put the logo on their bottles.

Certifications pertaining to water conservation, efficient water use, and water management could be very important and beneficial. Irrigation system evaluations should be a core component of a certification program. Irrigation system evaluations are of high importance as a BMP and include a thorough investigation of the entire vineyard irrigation system with a report including recommendations and suggestions for a follow up in five years (although three years is preferable). The report of recommendations outlines actions to improve water use efficiency. Correspondingly, routine maintenance is recommended, including checking irrigation systems for leaks and filter effectiveness. Training of employees on irrigation system maintenance and management is also important. Some existing certification programs include these irrigation system evaluations, and other programs could

be expanded to include them. The RCD and Napa Green provide these irrigation system evaluations at no cost. Over the past four years, the RCD has completed more than 100 vineyard irrigation system evaluations. The vineyards evaluated are typically more than five years old unless a specific request warrants an evaluation.

The existing certification programs used to comply with Regional Board requirements (such as the Fish Friendly Farming program) and irrigation system evaluation services such as those offered by the RCD and Napa Green could potentially be integrated into the Fish Friendly Farming program as an addendum to these required plans along with tracking water use. The reporting aspects could be limited to avoid disincentivizing participation.

“Benchmarking” is an approach to encourage voluntary changes in practices by showing how an individual compares to an anonymous group of peers or similar water users. Benchmarking programs have proven to be successful in utilities, both for energy and residential water use. Benchmarking provides a framework to track and evaluate performance, identify room for improvement, and encourages users to take voluntary actions to save both resource use and related costs.

B.5. What aspects of the example benchmarking program (U.S. EPA Energy Star program) are most relevant for Napa vineyards and wineries? How could benchmarking drive value for growers and wineries in Napa so that they would want to participate? What other comments and feedback on the GPR Workplan or the summary matrix concept should be addressed?

Benchmarking of water use related to vineyards may be difficult due to limited data. Comparisons between vineyards could be challenging because of the many factors that may differ across vineyards, including (but not limited to) rootstock types, vine spacing, row orientation, vine age differences among vineyard blocks, slope, soils, field conditions, and plant water demand. Benchmarking could be used for growers (and others) to self-assess their own water use year-to-year and in relation to others in the industry. Benchmarking data can be anonymized and aggregated. The TAG recommends developing a well-designed benchmarking program. Benchmarking could also be expanded to include wineries, allowing them to cross compare water use, but this would require enough baseline information to make such a comparison meaningful.

Benchmarking could also be developed to provide guidance to highlight different levels of adoption of BMPs and other voluntary water conservation practices. Many growers and others water users are already implementing one or more BMPs, but it is likely that there are opportunities for more BMPs to be implemented. For instance, a base level may include implementing foundational BMPs, or practices that everyone should be using. Other levels may involve BMPs that use more technology and cost to increase opportunities for additional water conservation. Some BMPs may involve vineyard management strategies that take more time to implement, such as changes to row orientation, spacing, or rootstocks. Many different vineyard and winery management strategies and approaches exist; voluntary actions considered beneficial, particularly at higher BMP levels, will differ among entities. The decision-making process related to water use efficiency can involve many different objectives, including those important to both the vineyard and winery teams. Water use efficiency should emphasize matching plant water needs with irrigation scheduling and management. This requires time, technology, field monitoring, and experience. It would be useful to quantify and consider the cost of alternative BMPs and BMP levels, which could be integrated using the water practices matrix.

It was suggested that a survey be conducted across the county to gather some information

on BMPs being used. The Napa Valley Grapegrowers organization has conducted two such surveys that would lend insights into BMPs that have been or are planned to be used.

There should be incentives to recognize those who have already implemented BMPs. This could be achieved with some sort of “reward” (or different rewards for different levels) to recognize water conservation efforts and stewardship already completed. It would be most beneficial to be able to promote BMPs through communication and outreach to different sectors (vineyards, wineries, others) as an estimated percentage of BMP implementation within each sector. This information could be visualized to promote efforts to do more.

The GPR Workplan will include an implementation plan, which will cover voluntary practices, education/outreach, incentives for participation, funding, benchmarking, assessing the effectiveness of the voluntary program, and an adaptive management process with potential mandatory measures if the voluntary program is ineffective. The implementation plan will also define when and how different actions could be triggered as the Subbasin is adaptively managed over time.

B.6. What approaches should be considered for the GPR implementation plan? How should options identified in the GPR Workplan (e.g., water conservation, certification, benchmarking) be selected for implementation? Should other factors, in addition to groundwater metrics, trigger certain implementation actions?

The TAG reiterated the importance of including irrigation system evaluations and water use efficiency, including factoring in plant water needs. Thus far, the focus has been largely on performing evaluations; there has not yet been a formal process to review the recommendations made and assess whether they have been implemented. It would be useful to add to the matrix (or in a separate list) the BMPs that are suitable for funding opportunities.

The implementation plan needs to describe how several plan components will be operationalized in sequence or in tandem, including community education and engagement, education about and implementation of voluntary BMPs, benchmarking, assessment of program effectiveness, and the adaptive management process with potential mandatory measures should the need occur. The implementation plan also needs to describe roles and responsibilities, including identifying actions to be led by the GSA and actions that will require partnering with other entities.

Incentives for participation could include certification, cost-share program, lowered GSA fees for those that participate in a certification program and have adopted certain BMPs, or other mechanisms. Funding to support the implementation of the GPR Workplan could come from various state, federal, and local funding opportunities, including from the GSA.

Voluntary BMPs should be promoted and used on an ongoing basis regardless of water year type. It is preferable to continuously message the benefits to business operations, sustainability and hospitality organizations, and the broader community, including residents.

It will also be useful to assess the success of BMPs actually implemented and to engage participants in sharing their efforts, experience, successes, and benefits. Peer networking will accelerate engagement in the program and voluntary BMP implementation.

At the TAG’s request, cost-share opportunities were reviewed. Primary opportunities include Napa RCD Irrigation Evaluation, the State Water Efficiency and Enhancement Program (SWEET) - California Department of Food and Agriculture (CDFA), Healthy Soils Program (HSP - CDFA), and the Environmental Quality Incentives Program Conservation Incentives Contracts (EQIP) - Natural Resources Conservation

Service. Other NRCS funding, as well as U.S. Bureau of Reclamation funding and funds available per the Inflation Reduction Act and Farm Bill, represent funding opportunities for agricultural water conservation.

B.7. What other cost-share programs should we review and include?

Other cost-share opportunities could include rebates or subsidized services to incentivize use of foundational BMPs.

Education and training on irrigation system evaluation and water use efficiency could extend to all water uses/users, including landscaping such as at wineries or rural domestic water use on larger parcels.

Because there are many different potential water conservation practices, it would be helpful to put into context the cost and potential water savings that could be achieved with nearer-term BMPs compared to other measures that may require more time to implement.

A phased approach for the GPR implementation plan was proposed to the TAG; each phase includes a portfolio of potential programs.

B.8. What feedback do you have for each proposed phase? Which potential programs and aspects of each would have the most traction? What other feedback do you have on the phased approach? What other considerations should we address for the implementation plan?

Ongoing extensive education and outreach will be critical. It is especially important for the general public to develop trust in the program and the data being generated as part of the implementation plan. Benchmarking data can be aggregated so that businesses and individuals can make their own comparisons, and confidentiality is preserved so that no one business or individual is identifiable. Development and/or use of a self-reporting tool could facilitate self-tracking by businesses and individuals. It was suggested that the GSA or a third party (e.g., Fish Friendly Farming) could organize and manage the data. Resources, including administrative and financial, will need to be identified to implement the plan.

The TAG recommends using or expanding existing certification programs (i.e., integrate this with the concept of different BMP levels). Since many certification programs exist, the plan should identify key BMPs to use or add to one or more existing programs. It may be useful to offer participants a choice of suitable programs with foundational BMPs to maintain more flexibility in the implementation plan. It may be useful to incentivize BMPs with the greatest potential to achieve water savings/water use efficiency (e.g., sap flow technologies to measure plant water needs). Incentives may encourage program participation.

Metering of groundwater pumping or otherwise tracking water use would improve the ability to develop baseline water use data and measure how BMPs that are implemented ultimately reduce water use. This would also facilitate benchmarking. The GSA could consider offering reduced fees, rebates, or an incentive payment, for those providing water meter data because this would save GSA costs.

Completion of some elements of the proposed phases (phases one through three) will take time. However, the goal should be to complete the first three phases and avoid the need to initiate Phase 4 (mandatory measures). The proposed phases need not occur strictly sequentially as some participants may be much further along than others in their use of BMPs and advanced technologies.

C. Adaptive Management Response Actions, Climate Adaptation and Building

Resiliency

Adaptive Management Response Actions

The very dry years and abnormal precipitation patterns during 2020 through 2022 led to depleted groundwater conditions and Undesirable Results in the Napa Valley Subbasin. The GSA is responsible for invoking management actions to address Undesirable Results. The Napa Valley Subbasin GSP includes Management Action #2 to reduce groundwater pumping in the Subbasin by 10 percent (of the historical average); various ways to achieve this on a Subbasin scale are being considered. Concurrently, the GSP requirements and public trust considerations, together with the County Drought Proclamation, the State Drought Emergency, and the Governor's Executive Order N-7-22, led to the request to the County Board of Supervisors at its June 7, 2022 meeting that the County revise its well permitting procedures, including new water use criteria in the Subbasin, i.e., a change from 1 acre-foot per acre to 0.3 acre-feet per acre for new well permit applications (where existing groundwater use exceeds the 0.3 acre-feet per acre, a no net increase in groundwater use is required).

The new water use criteria may be adjusted (either up or down) as the County considers revisions and updates to the Groundwater Ordinance and the 2015 Water Availability Analysis (WAA), completes development of the four workplans underway (including the GPR Workplan), and assesses groundwater and interconnected surface water conditions based on ongoing monitoring and analysis of the Sustainable Management Criteria for all six sustainability indicators. The TAG's input and guidance were sought on whether, how, and under what conditions water use criteria may be adjusted in the future and whether other measures should occur to ensure groundwater sustainability.

C.1. Under what conditions should the Napa County GSA consider future changes to water use criteria?

Ongoing water conservation by the entire community living and working in Napa County is important to achieve and maintain groundwater sustainability. The impacts of climate change are important to consider, and there is a need to rethink how water resources are used to maintain livelihoods and protect the environment. Public education is critical to shift from short-term (day-to-day) views of conditions (drought or no drought) to creating conservation-oriented habits, changing lifestyles, applying modern approaches regardless of current conditions, and establishing capacity to prepare for extreme events and, most importantly, to build resilience and achieve long-term sustainability. This means embracing water conservation as a way of life – rain or shine. This also means continually promoting groundwater replenishment and increasing groundwater reserves to lessen the effects of much less recharge during very dry years. While the initial title for the Napa County Vineyard and Winery Water Conservation Workplan was focused on the winegrape sectors, the title should be broadened to address all water users in the County: "Napa County Water Conservation Workplan, A Guide for Vineyards, Wineries, and Other Sectors."

On behalf of the GSA, the TAG is focused on using currently available data and information and identifying data needs to develop solution-oriented recommendations for the GSA's consideration. Groundwater use has increased during recent years in response to hotter and drier conditions. However, except for limited locations where meters are required for discretionary permits, metering is not required, and groundwater use is estimated. The OpenET remote sensing platform (in conjunction with local data) is being examined as a tool for developing refined estimates of regional groundwater use and relative changes in future groundwater use to support the evaluation of effectiveness of voluntary conservation efforts. The accuracy of OpenET data is dependent on CIMIS station data. Napa County

needs more CIMIS stations to make OpenET a viable proxy for water usage. Staff is coordinating with the Department of Water Resources and examining potential locations for a new CIMIS station in the Subbasin. The OpenET platform is imperfect, but the data used in concert with local data likely represents the best available technology at this time for estimating ET at a regional scale. The ET estimates relate to overall water demand met by many water sources, including precipitation and applied water sources. The NVIHM integrates surface water supplies and direct groundwater uptake to estimate groundwater pumping. Future model revisions would incorporate spatially and temporally refined crop coefficient information and more sophisticated ways of accounting for water demands met by soil moisture. Volunteered data such as land-based sensor data, water use data (e.g., groundwater, surface water, recycled water), soil moisture data, sap flow measurements, and other local data would help improve the utility of the OpenET platform, refine water budget estimates, and inform water management strategies.

Some community members have expressed concerns about the revised well permitting procedures. Specifically, concerns that the new 0.3 acre-feet per acre limit on groundwater use could be challenging to achieve until vineyards are replanted (including more vigorous rootstocks) and/or other vineyard design and water management considerations occur. An interim approach could be considered to allow for some flexibility during a transitional period. An interim approach could consider:

- Demonstration of water use efficiency and implementation of BMPs. This could include irrigation system evaluation (if this has not already occurred), recommendations by the evaluator for improved water use efficiency as needed and follow through with the recommended actions.
- Participation in a certification program (this is conceptual until the GPR Workplan is completed. Options could be available to meet this requirement, i.e., certification programs that include foundational BMPs would be eligible to achieve this purpose).
- Willingness to meter and track water use. Water use data could be reported to the County or a third party, such as an entity with an existing certification program that includes foundational BMPs.
- The County could consider a phased approach (for eligible applicants), including a slightly greater water use criterion on an interim basis while changes occur (replants, vineyard design, etc.) and basin conditions are assessed relative to Sustainable Management Criteria. Further consideration could be given to who and/or what circumstances would be eligible for a phased approach and what would be an appropriate interim or transitional period for this additional flexibility in achieving reduced groundwater use to avoid Undesirable Results and achieve sustainability.
- The County should continually align its requirements with what the GSA requires to achieve groundwater sustainability in the Napa Valley Subbasin in accordance with GSP regulations.

As currently implemented, the new water use criterion of 0.3 acre-feet per acre will have a very small effect on reducing groundwater use because it only applies to new permits within the Subbasin (which are limited [~10-20 per year] based on the past five years). This underscores the need for voluntary actions by all groundwater users to reduce groundwater

use. To accelerate water conservation efforts, incentives could be developed to improve water use efficiency, implement additional BMPs and new technologies, and encourage other groundwater use reduction strategies.

C.2. Should other measures occur to ensure groundwater sustainability?

Actions are underway to coordinate with DWR on establishing a new CIMIS station in the Napa Valley Subbasin as part of an overall strategy to reduce water use and increase water use efficiency by improving the quality and availability of data to inform irrigation management.

Efforts should occur to better understand use of recycled water inside and outside the Napa Valley Subbasin, including the source water origin (e.g., winery process water or reclaimed wastewater), the places for current reuse, the volume of recycled water used, recycled water management strategies (augmenting existing water supplies or replacing existing surface water or groundwater supplies), the opportunities available for expanding recycled water use, and potential constraints associated with recycled water use. Additional educational materials could be developed for public education and outreach and more widely distributed to promote recycled water use.

Efforts would also be beneficial to better delineate the occurrence, construction, and use of onsite ponds and associated infrastructure. These ponds are typically used for temporary onsite water storage as part of irrigation management approaches. The ponds may receive stormwater that is captured, temporarily stored, and used for irrigation. The ponds are also often associated with lands that have surface water rights and permits for specified diversion amounts, where diverted surface water is temporarily stored and used for irrigation. It is unknown to what extent these ponds are lined or unlined; anecdotal information indicates that older ponds may more often be unlined, while newer ponds are typically lined. Additional information about these ponds would help inform how they could benefit intentional onsite replenishment of groundwater with captured stormwater, for example, in unlined ponds. Temporarily stored water may be beneficial for early-season use in lieu of groundwater. Anecdotally, these strategies are occurring to some extent already. However, quantifying these efforts would inform strategies to reduce groundwater use and also recharge groundwater.

Understanding the occurrence and utilization of subsurface drainage features (e.g., tile drains or similar) could also highlight opportunities to retain more stormwater on the landscape. Historically, tile drains were used to move water out of the root zone to drainage channels. Instead of moving drainage water off properties via conveyances that eventually discharge to creeks, retaining the drainage water onsite could facilitate groundwater recharge.