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Napa County Water Conservation Workplan and
Groundwater Pumping Reduction Workplan:
Napa Valley Subbasin

Combined Program Overview

Prepared for:

Napa County Groundwater
Sustainability Agency

Prepared by:

ERA Economics

Luhdorff & Scalmanini
Consulting Engineers

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PURPOSE OF THE WORKPLANS

The Napa County Groundwater Sustainability Agency (NCGSA) seeks to ensure that the Napa Valley Subbasin (Subbasin) achieves and maintains sustainable groundwater conditions. In January 2023, the California Department of Water Resources approved the NCGSA Napa Valley Subbasin Groundwater Sustainability Plan (GSP), which includes the development of a series of Projects and Management Actions that will (or may) be implemented to achieve sustainability. This includes:

Management Action 1

Develop a Water Conservation Workplan to encourage water users countywide to continue to implement water conservation practices and provide flexibility as to how, and to some degree, when the conservation is achieved.

Management Action 2

Develop a Groundwater Pumping Reduction Workplan: Napa Valley Subbasin to provide a direct means for reducing the impacts of groundwater pumping on interconnected surface and groundwater resources in the Napa Valley Subbasin (Subbasin).

What workplans related to these Management Actions are available? Two workplans have been prepared for the NCGSA: the Napa County Water Conservation Workplan, A Guide for Vineyards, Wineries, and Other Water Users (WC Workplan) and the Groundwater Pumping Reduction Workplan: Napa Valley Subbasin (GPR Workplan). These Workplans were developed to help achieve the GSP measurable objective for the sustainability indicator for depletions of interconnected surface water by reducing the average annual historical (2005-2014) groundwater pumping of about 15,000 acre feet by 10 percent. The WC and GPR Workplans focus on opportunities to reduce groundwater demand. Supply augmentation options will also be assessed in parallel with implementation of the Workplans.

Napa County Water Conservation Workplan

The WC Workplan is designed as a resource for stakeholders to learn about, consider, and adopt new or additional water conservation measures.

Target audience: Vineyards, wineries, municipal and industrial users, and domestic users.

The WC Workplan organizes information, such as practices and financial assistance for:

- All groundwater pumpers in the Subbasin
- Vineyards and agriculture
- Wineries
- Urban and rural domestic users

Groundwater Pumping Reduction Workplan: Napa Valley Subbasin

The GPR Workplan presents a suite of voluntary programs that will cost-effectively result in Subbasin sustainability benefits.

Target audience: NCGSA Board, the Technical Advisory Group, NCGSA staff, and stakeholders.

The guiding framework of the GPR Workplan:

- Focuses on voluntary actions
- Assesses the costs and benefits of alternative actions, focusing on those that are most cost-effective
- Leverages existing programs
- Includes adaptive management to adjust the program as needed

Napa County Water Conservation Workplan

The WC Workplan is designed as a resource for stakeholders to learn about, consider, and adopt new or additional water conservation measures.

WC Workplan sections include:

- Background information
- Water conservation practices
- Financial assistance programs
- Certification programs
- Training and education
- Engagement opportunities

Groundwater Pumping Reduction Workplan: Napa Valley Subbasin

The GPR Workplan presents a suite of voluntary programs that will cost-effectively result in Subbasin sustainability benefits.

GPR Workplan sections include:

- Background information
- Summary and economic analysis of water conservation practices
- Data needs and measuring conservation
- Communication and engagement
- GPR implementation plan

STAKEHOLDER ENGAGEMENT

There are opportunities for stakeholders to participate in public meetings, stay engaged with GSP implementation, provide input on the WC and GPR Workplans and their implementation, and learn about and adopt additional water conservation practices. In addition to the NCGSA, there are multiple private and public organizations that offer resources for water conservation measures. These entities serve as valuable hubs for learning, collaboration, and staying informed about the latest advances in water management practices. By staying engaged, stakeholders can be updated on industry trends and contribute to water conservation. This helps lower the cost of GSP implementation and supports the long-term viability of the region's agriculture, economy, and environment.

Napa County Groundwater Sustainability Agency	<p>The NCGSA has two forums for public meetings and input by the public: the NCGSA Board of Directors and the Technical Advisory Group (TAG) meetings. The NCGSA Board meetings typically happen in conjunction with the Napa County Board of Supervisors' meetings. TAG meetings typically occur on the second Thursday of each month at 1:30 pm. NCGSA and TAG meetings are open to the public for in person or virtual participation. To learn more about NCGSA and TAG meetings, visit the NCGSA's Get Involved webpage.</p> <p>NCGSA sends regular emails related to public meetings, groundwater and water policies, drought, and more. To sign up for these emails, visit the Newsletter Subscription Signup Form.</p>
Napa County Resource Conservation District	<p>Napa County RCD offers a range of services to the Napa community, including youth and volunteer programs and educational workshops. Its agriculture-specific services include irrigation evaluations, soil health assessments, habitat projects, carbon farm plans, and more. To get involved with the Napa County RCD or learn more about their programs, visit the Napa County RCD website.</p>
Certification Programs for Vineyards and Wineries	<p>These programs provide a structured framework for evaluating and improving environmental, social, and economic aspects of operations. Achieving certification showcases a commitment to sustainability, which enhances the reputation and credibility of the vineyard or winery among consumers, industry peers, and customers.</p> <p>To learn more about certification programs in Napa, visit Napa Green and the California Sustainable Winegrowing Alliance.</p>
University of California Cooperative Extension	<p>The University of California Cooperative Extension (UCCE) brings cutting-edge research home to Napa County through publications, workshops and seminars, training opportunities, volunteer programs, and one-on-one consultations. Topic areas include water resources, viticulture, and wildlife, among others. To learn more about their programs and events, visit the Napa County UCCE website.</p>
Other Organizations and Resources	<p>Several other organizations provide useful tools and resources for water resource conservation, including the Napa County Watershed Information & Conservation Council, U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) with a local service center in Napa, Napa Valley Grapegrowers, Napa County Farm Bureau, Winegrowers of Napa County, Napa Valley Vintners, and Friends of the Napa River.</p>

MEASURING WATER USE AND SAVINGS

In these Workplans, water conservation opportunities are evaluated on their potential to reduce:

Total groundwater pumping

The total amount of groundwater pumped, usually expressed as an annual amount in acre-feet.

Net groundwater depletion

The total amount of groundwater pumped adjusted for (i.e., subtracting) the portion that returns to the same usable aquifer. In most cases, net depletion represents the portion of total pumping that is consumptively used by crops, landscapes, industrial processes, or is otherwise consumed.

Reducing total groundwater pumping can reduce energy use, provide water quality benefits, avoid subsidence, and provide temporal benefits for interconnected surface and groundwater systems. But to achieve meaningful and lasting benefits, particularly in the Subbasin, the actions must reduce net groundwater depletion.

Reducing net depletion generally requires reducing demands or consumptive use of groundwater, replacing some groundwater use with another water source such as recycled water, improving water use efficiency, and/or implementing water conservation measures. Water conservation can be achieved by implementing new technology, changing water use and management behavior, or a combination of technology and management. All water users can potentially conserve water. The following are some examples of measures that can reduce groundwater use for the three major water use categories.



Agriculture: Reducing groundwater use can be achieved by reducing evapotranspiration (ET), such as changing to less water intensive crops or grape varieties, idling land, and reducing non-productive ET. Reducing total pumping can be achieved by increasing irrigation efficiency through improved irrigation system technology and management. It is important to note that some irrigation efficiency improvements can lead to an increase in ET, and therefore an increase in total water use. That is, by applying water more efficiently to the crop, the crop can use more of the applied water, and therefore can have a greater total ET.



Urban and Domestic: Activities to reduce groundwater use can include stakeholder outreach and education programs to affect water use behavior, delivering recycled water, installing efficient fixtures and appliances, reducing landscaped area and water use, and reducing delivery system losses.








Commercial and Industrial: Activities to reduce groundwater use include adopting equipment and processes that use less water and increasing on-site treatment and reuse of water. Activities that reduce evaporative losses and discharges to unrecycled wastewater may also reduce groundwater use.

Programs to reduce groundwater pumping require careful accounting and data collection to identify savings in total pumping and net depletion. Such calculations are required to monitor and assess the benefits of each practice to reduce groundwater pumping. The GPR Workplan includes a summary of implementation approaches, data needs, and monitoring to measure water use and conservation.

WATER CONSERVATION PRACTICES

The following practices were identified and analyzed in the Workplans, organized by stakeholder group. These are practices that can be voluntarily adopted, and to varying extents, have already been adopted by stakeholders to improve water use efficiency.

Users	Practice	Description
 <p>All Users</p>	Water measurement	Metering or other measurement provides information to water users that allows them to reduce water use.
	Recycled water	Recycled water is treated wastewater that is then delivered for other uses, such as landscape irrigation and agriculture.
	Benchmarking	Benchmarking provides water users with an anonymized comparison of water use to encourage conservation.
 <p>Vineyards</p>	Irrigation system operations	This includes a range of actions from fixing leaks to improving irrigation system management and distribution.
	Distribution uniformity testing	Testing irrigation systems to evaluate how evenly water is distributed to the field helps identify issues and prevent over or under-irrigation.
	Plant water and soil moisture monitoring	There are multiple technologies available to vineyards to monitor plant and soil moisture to precisely schedule crop irrigation and protect productivity and fruit quality.
	Soil management	Managing soil health with cover crops, mulching, and other practices can improve water infiltration and soil moisture retention.
	Improved Canopy management	Careful management of vineyard canopies can reduce crop consumptive water use.
 <p>Vineyards (re/new planting)</p>	Row orientation	The orientation of vineyard rows can be adjusted to reduce sun and wind exposure, lowering crop consumptive water use.
	Rootstock selection	Some vineyard rootstocks provide drought tolerance that can help manage water during times of shortage.
 <p>Wineries</p>	Waterless sanitation	New technologies are available to substantially reduce water use in the washing and sanitation processes.
	Processing water reuse	Winery process water can be treated and reused for landscaping or vineyard irrigation purposes.
 <p>Urban, Domestic</p>	WaterSense devices	"WaterSense" devices, such as toilets, are certified as being 20% more water efficient than other products on the market.
	Other urban water conservation	Other urban water conservation opportunities include: turf removal and installation of drought-tolerant landscaping; use of mulches; additional outreach and education efforts; and general improvements in irrigation scheduling.

EVALUATION OF WATER CONSERVATION PRACTICES

The following table summarizes the analysis of water conservation practices. It shows the annualized cost per acre-foot of water conserved, the potential Subbasin-wide benefits, the estimated timeline for adoption, and a qualitative assessment of overall feasibility for implementing the practice.

Practice	Estimated Annualized Cost per AF Conserved* \$/AF	Estimated Potential Subbasin-wide Water Savings AFY	Adoption Timeline** Years	Overall Feasibility Ranking
Water Practices for All Users				
Water Metering	\$150 - \$2,500	350 - 550	Medium-Term	High
Recycled Water	\$362 - \$720	200 - 300	Medium-Term	High
Benchmarking	\$100 - \$350	300 - 1,100	Medium-Term	High
Water Practices for Vineyards (Established)				
Drip Irrigation	\$2,800 - \$9,200	75 - 250	Near-Term	Medium
Distribution Uniformity	\$175 - \$450	500 - 2,100	Near-Term	High
Plant Water and Soil Moisture Monitoring	\$155 - \$3,340	1,000 - 2,000	Near-Term	High
High Tech, Low Labor	\$350 - \$1,450			
Medium Tech, Medium Labor	\$740 - \$3,340			
Low Tech, High Labor	\$155 - \$1,170			
Cover Cropping	\$5,000 - \$18,000	50 - 550	Medium-Term	Low
Canopy Management	\$3,500 - \$5,000	200 - 300	Near-Term	Medium
Water Practices for Vineyards (New Plantings)				
Row Orientation	No additional cost	200 - 325	Long-Term	High
Rootstock Selection	No additional cost	Data Gaps	Long-Term	Data Gaps
Water Practices for Wineries				
Waterless Sanitation	\$1,900 - \$2,800	100 - 165	Near-Term	Low
Process Water Treatment and Reuse	Data Gaps	275 - 450	Long-Term	Medium
Water Practices for Residential, Commercial, and Hospitality				
WaterSense Devices	\$775 - \$1,200	500 - 575	Near-Term	High
Other Urban Water Conservation	Data Gaps	Data Gaps	Near-Term	Data Gaps

* Please refer to workplan documents for more information about costs, including how, when, and by whom they are incurred, and additional costs that were not quantified.

**Timelines for adoption are categorized as follows: (1) Near-term practices can be implemented and accrue water savings within one year; (2) Medium-term practices can be implemented and accrue water savings in a 2-5 year time frame; (3) Long-term practices can be implemented and accrue water savings in 5 or more years.

High-Priority Water Conservation Practices

Based on the analysis summarized above, the following water conservation practices were identified as a high priority for the Napa Valley Subbasin.

Metering, recycled water, benchmarking, distribution uniformity, plant water and soil moisture monitoring, row orientation, and WaterSense devices.

FINANCIAL ASSISTANCE PROGRAMS

The cost of adopting water conservation practices can be a barrier to adoption. There are a number of financial assistance programs available that can offset costs. These programs can provide free equipment or services, such as technical assistance, or financial incentives such as cost-share reimbursements, incentive payments, or rebates. In general, programs run by municipalities are only going to be available to water users within (or at least near to) the city limits of that municipality or its service area. County-wide programs and resources are often available to more users.

Program	Agency	Description
Agricultural Financial Assistance Programs		
Irrigation Evaluation	Napa County Resource Conservation District	The Napa County RCD offers free irrigation system evaluations, a service that is valued at \$2,000. The RCD also supports growers with applications to state and federal grant programs such as the State Water Efficiency and Enhancement Program (SWEET) and Environmental Quality Incentives Program (EQIP).
State Water Efficiency & Enhancement Program (SWEET)	California Department of Food and Agriculture (CDFA)	SWEET provides funding for on-farm projects that save water and reduce greenhouse gas emissions. SWEET has historically funded projects that incorporate soil moisture probes, weather stations, plant water stress monitoring, evapotranspiration monitoring, plant health monitoring (e.g., NDVI), pump retrofits, low-volume irrigation systems, and more.
Healthy Soils Incentive Program (HSP)	California Department of Food and Agriculture (CDFA)	HSP, also offered by CDFA, incentivizes the adoption of farm and ranch management practices that improve soil health and reduce greenhouse gases. Projects in Napa County that are commonly funded include: cover cropping, mulching, compost application, and planting native vegetation in the form of hedgerows.
Environmental Quality Incentives Program (EQIP)	US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)	NRCS provides technical assistance and offers financial assistance programs to address natural resource concerns on agricultural lands. Examples of projects include cover cropping, irrigation water management, mulching, on-farm recharge, among others. Conservation practices must address a particular NRCS resource concern at the time of application.
Urban and Residential Financial Assistance Programs		
Water Conservation Kits	Various	The following cities and towns offer free water conservation kits, which include items such as a low-flow shower head, a garden hose nozzle, a shower timer, sink aerators, and more: City of Calistoga , City of Napa , and City of St. Helena .
Rebate Programs	Various	The City of American Canyon has a \$100 rebate program for toilet replacement with a WaterSense toilet. The City of St. Helena has several rebates available for toilet replacement, irrigation controllers, greywater, rainwater harvesting, and recirculation.
Cash-for-Grass Programs	Various	The following cities and towns have cash-for-grass programs, in which the city will pay customers to remove turfgrass: American Canyon , City of Napa , Town of Yountville , and City of St. Helena .

Catalyzing Voluntary Adoption

NCGSA may develop programs to further accelerate the adoption of water conservation practices to achieve the Subbasin groundwater pumping reduction objective. Such programs would encourage water users to adopt new technologies or change behavior. GSA resourcing of programs increases the likelihood of participation. This reduces overall costs of GSP implementation by encouraging good stewardship of the groundwater resource and the avoidance of mandatory measures. The following are options for catalyzing adoption:



Certification Programs: Certification programs require vineyards or wineries to meet specified standards to become certified. Examples of such programs include Napa Green, California Sustainable Winegrowing Alliance, and Fish Friendly Farming. An incentive program could expand programs like these and other programs that include water conservation standards or objectives, which would in turn expand adoption of water conservation practices. Funding could be developed to pay individuals to become and/or remain certified and/or a pool of funds could be distributed to designated programs implementing water conservation.



Benchmarking Program: Borrowing an effective approach from the energy sector, development of a benchmarking program would provide water users with a summary of their water use compared to an anonymous group of peers to encourage water savings. Benchmarking has the potential to create behavioral changes among participants, reduce water use, and potentially inform system-wide improvements over time.



Notification System: Developing a notification or messaging system would inform water users of relevant information for water conservation, such as seminars and workshops, other events, financial assistance programs, and public meetings. The notifications would be tailored to the user type.



Financial Incentives: Adoption of water conservation practices may incur additional costs for the individuals and sectors implementing them. The WC Workplan includes a range of potential funding opportunities and resources for those wishing to implement the new or additional water conservation practices. Financial incentives, such as cost-share or rebate programs, could be developed or expanded to encourage further adoption and prevent the need for more strict, mandatory measures. In particular, incentivizing the adoption of High-Priority Water Conservation Practices (see page 5) would be a priority for the Napa Valley Subbasin.

GPR Implementation Plan

The GPR Workplan includes a multi-component approach to implementing programs and activities. These components may be implemented concurrently to encourage voluntary adoption of water conservation practices most effectively. The GPR implementation plan focuses on education and outreach, voluntary adoption, rewarding conservation efforts, and working with partners. It further includes an adaptive management framework that integrates with the GSP process. The GPR implementation plan further emphasizes quantification throughout to track key metrics, quantify water savings, and improve baseline data.

The general implementation components include:

COMPONENT 1: EDUCATION AND OUTREACH, AND FEASIBILITY ANALYSIS

Key programs and activities include:

- Developing educational materials in English and Spanish
- Building partnerships with local organizations
- Developing a notification system to send stakeholders relevant information
- Performing a feasibility analysis to evaluate the costs of alternative projects outlined in the GSP

COMPONENT 2: VOLUNTARY ADOPTION

Key programs and activities include:

- Developing an incentive program for practice adoption
- Piloting a benchmarking program starting with agricultural use
- Developing a voluntary meter data and reporting program

COMPONENT 3: VOLUNTARY CERTIFICATION

Key programs and activities include:

- Defining minimum criteria (practices) for a vineyard/winery certification program's members to receive a financial incentive
- Developing incentives for certification

ADAPTIVE MANAGEMENT

The GPR Workplan will be evaluated through: (1) Annual Performance Reviews and (2) Program Outcomes Reviews. These evaluations would integrate with the GSP process, whereby the annual reviews would assess the performance of the programs and activities, and the program outcomes reviews would be conducted every five years to assess the outcomes (pumping reductions).

POTENTIAL MANDATORY MEASURES

The GPR Workplan outlines potential mandatory measures for consideration should voluntary actions be deemed insufficient for achieving and maintaining Subbasin sustainability.

NAPA COUNTY GROUNDWATER SUSTAINABILITY AGENCY

The NCGSA oversaw the development of the Napa Valley Subbasin GSP and is responsible for its successful implementation. Management Actions were implemented immediately following the NCGSA Board's approval of the GSP in January 2022. These actions included steps to prepare the Workplans described herein together with many other actions described in the GSP Annual Reports for Water Years 2021 and 2022 to ensure progress towards achieving the sustainability goal at least by 2042.

To stay up-to-date on GSP efforts, please visit our [website](#).

The NCGSA hopes the resources presented in the WC and GPR Workplans will be used by water users across the entire County to make water conservation a way of life.