FACT SHEET:
ALEXANDER VALLEY ON-FARM RECHARGE INITIATIVE, MASTER PLAN HIGHLIGHTS

WITH POTENTIAL APPLICATIONS THROUGHOUT SONOMA COUNTY AND THE WINE COUNTRY

DRY CREEK RANCHERIA BAND OF POMO INDIANS

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HIGHLIGHTS

- *The Alexander Valley On-Farm Recharge (OFR) Initiative's Pilot Phase envisions recharging across 3,000 acres of active and fallow vineyards with an annual 6,000 - 7,000 acre-foot (AF) capacity, exceeding vineyard irrigation demands by an estimated 50%.*
- *The Initiative will "sip" diversion water during high flows in fall and winter months using shallow wells along the Russian River and distribute diversions to vineyard partners to apply to their fields as recharge.*
- *The Initiative will help stabilize regional water resources and support the local community through current and future challenges (e.g., changing climate, threatened and endangered salmonid species, Potter Valley decommissioning, contracting wine sales).*
- *2025 WY and 2026 WY pilot studies are being conducted to refine OFR designs and operations. The 2025 WY pilot studies found that OFR did not degrade groundwater quality in the shallow aquifer below.*
- *Phase 1 construction will be completed Spring 2026 and will serve 1,000 vineyard acres and have an annual recharge capacity of 2,300 AF.*

ALEXANDER VALLEY OFR INITIATIVE VISION

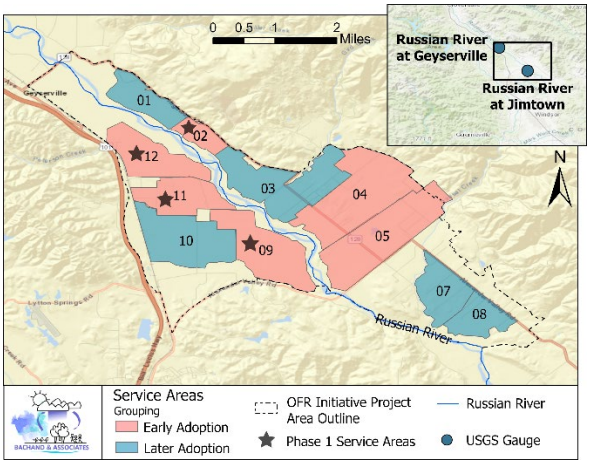


Figure 1. Planned Service Areas (SAs) under the Initiative. Shallow pumps within each SA adjacent to the Russian River will divert during high flow periods and distribute flows onto vineyards.

The Alexander Valley On-Farm Recharge Initiative (OFR Initiative) plans to employ 3,000 acres of active or fallow vineyards for OFR using Russian River diversions during high flow periods. The Initiative will draw high flows using a string of shallow wells along the Russian River[1] (Figure 1). Receiving vineyards will utilize existing irrigation systems to apply diverted water onto their fields for recharge. Recharged water will benefit subsurface hydrology (e.g., increase subsurface moisture, replenish groundwater, raise perched groundwater levels) which will, in turn, benefit fisheries, farmers, and other groundwater users (Figure 2).

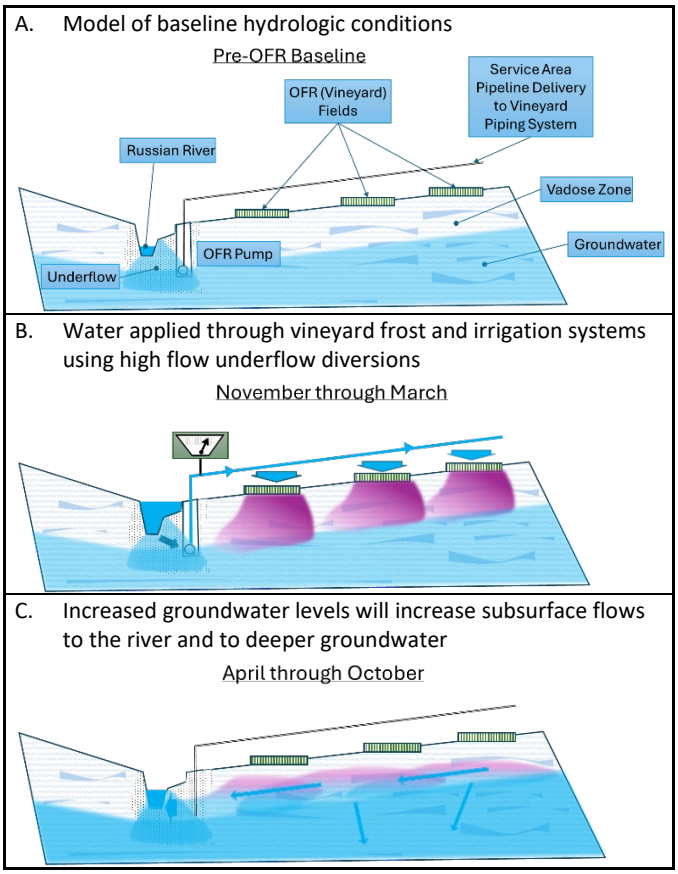


Figure 2. OFR Conceptual Model

The design average annual recharge of 6,000 AF is expected to raise groundwater levels, increasing later season subsurface flows back into the river to benefit salmonids and

[1] Wells will be just outside the county-recognized Riparian Zoning Corridor to help comply with county permitting and setback requirements.

improving background surface and subsurface hydrologic conditions for vineyards (Figure 2). Recharged water will offset all irrigation demands by participating vineyards and provide additional water to benefit wildlife and other users.

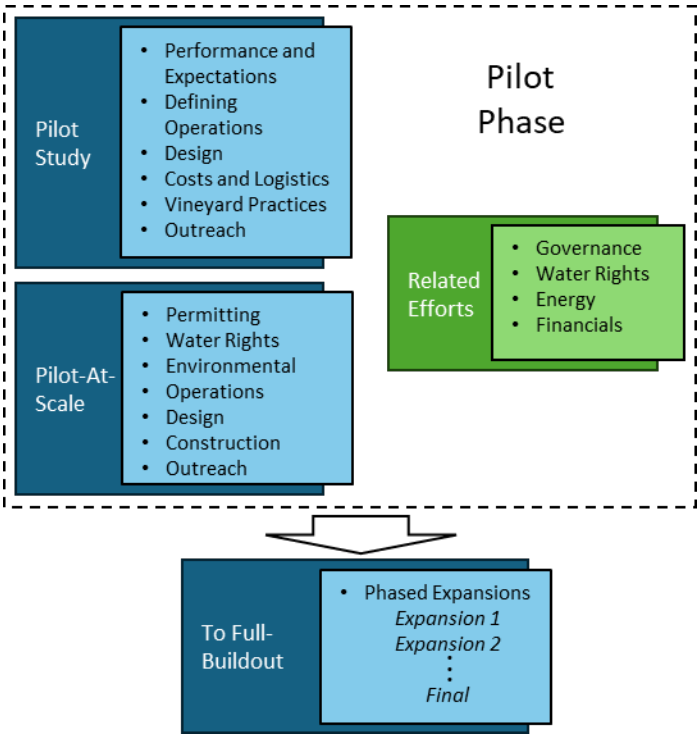


Figure 3. Phased Implementation of the OFR Initiative

The Initiative will be implemented in phases (Figure 3). The Pilot Phase includes 1) 2025 water year (WY) pilot studies with multiple landowners to iron out technical, logistical and financial questions associated with OFR implementation at vineyards and 2) a 2026 WY Pilot-At-Scale program to refine operations and design related to implementation across Alexander Valley at scale (Figure 3).

The Initiative is the first at-scale implementation of OFR in California's wine country and one of the first for California. The Initiative seeks to reduce the growing uncertainty and risks associated with water supply reliability and, in turn, benefit all those who depend upon regional water resources.

FACTORS CHALLENGING WATER RELIABILITY

Alexander Valley and the broader Sonoma County are facing widespread sustainability challenges associated with water.

CHANGING CLIMATE. Increasing temperature (Figure 4) and evaporative water losses, along with more frequent and severe droughts and floods, are stressing water resources throughout California, including in Sonoma County. In 2022, water rights along the Russian River were curtailed, in part to protect endangered and threatened salmonid populations. Under California's Sustainable Groundwater Management Act (SGMA), three Sonoma County basins were designated as medium priority basins and are currently implementing Groundwater Sustainability Plans (GSPs) with the goal of achieving groundwater sustainability (Figure 5).

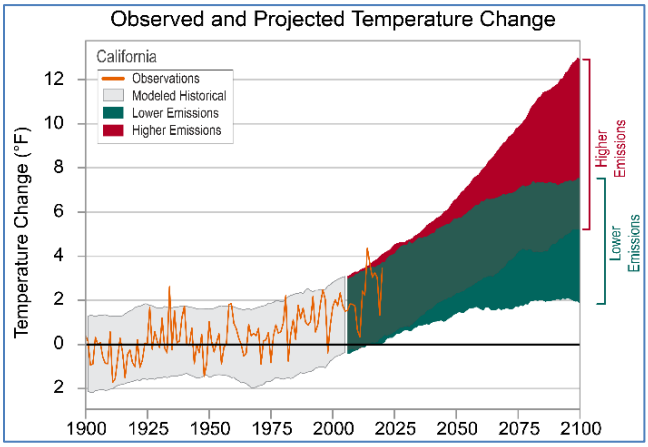


Figure 4. Projected California's average temperature change with a changing climate for lower and higher emissions

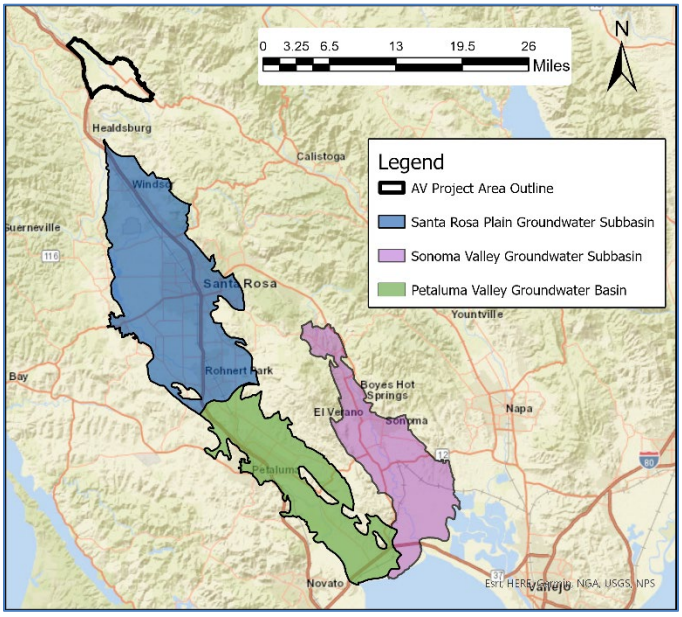


Figure 5. Sonoma County GSAs in relation to Alexander Valley

POTTER VALLEY. PG&E's decommissioning of the Potter Valley Project will decrease delivery of Eel River water to the Russian River. The Potter Valley Project has historically provided approximately 60,000 AF annually to the Russian River; this water has been used throughout the year but is most important during the irrigation period when Russian River flows are low. Upcoming plans to operate the New Eel-Russian Facility (NERF) under a Run-Of-The River model will limit Eel River diversions to high flow periods. Thus, transfers are unlikely when flow is low and demand is high along the Russian River, such as during the summertime irrigation period.

Increased water storage along the Russian River will be necessary to maximize the value of high flow diversions from the NERF. Raising Coyote Dam (Lake Mendocino) to almost double its storage capacity has been considered though

comparable projects suggest construction costs of up to $600 million, translating to approximately *$7,000 to $26,000 per AF of storage based local studies proposing similar actions.*

PUTTING APPROPRIATIVE WATER RIGHTS AT RISK. Appropriative water rights are based on **Use it or Lose it**. If Russian River water becomes chronically unavailable for use by water right holders, those rights could potentially be forfeited due to disuse.

BROADER ECONOMIC CHALLEGES. Broader economic challenges are putting pressure on the wine industry within Alexander Valley and throughout Sonoma County. These broader challenges include increased fire frequency and scale, and drops in wine demand. Recent regional wildfires (e.g., 2017 Tubbs fire, 2019 Kincade Fires, 2020 LNU Lightning Complex), have burned over 150,000 acres in Sonoma County and destroyed over 6,000 structures. These events have affected Sonoma County's resilience; specific to wine industry, the fires damaged vineyards, decreased grape harvest and caused challenges for wine makers related to smoke taint.

Decline in wine demand has exasperated economic challenges for growers in the region. Vineyard owners are planning decadal fallowing of winegrape acres as they struggle with declining demand. The scale of fallowing is uncertain though an expectation of a 10% floor is realistic.

TARGETED SPECIFICATIONS AND STRATEGY AT FULL-BUILDOUT

Partnering vineyards receiving diverted flows will use micro irrigation system to apply the water across vineyard lands at a rate of approximately 1 in/day for recharge. Soils data and the 2025 WY pilot studies have demonstrated that the region's soils should accommodate water application at the design rates (i.e., 1 in/day).

At Full Buildout, the system will divert up to 55 cubic feet per second (CFS) from the Russian River during high flow periods. We assume OFR will be implemented across 60% of the 5,000 acres of suitable vineyard lands for about 30 days on each field.

The Initiative expects to define high flow conditions as instream discharges exceeding 210 CFS at the Jimtown USGS gauge (as well as meeting other downstream thresholds to protect senior water rights users). These conditions commonly begin with the rainy season and extend into April. Data from the last decade suggest these flow conditions commonly exceed 100 days a year except during the driest years, such as 2021 and 2022 (Table 1). OFR will divert less than 1% of typical winter volumes. *Under this design, OFR diversions represent "sipping" and not "gulping" from the high flows.* The targeted annual recharge of 6,000 AF will exceed the region's estimated irrigation demand of 4,000 AF by 50%.

Table 1. Potential days of OFR diversions based on historic data and a flow threshold of 210 CFS at the Jimtown gauge during the first half of the water year (Oct-Mar). Blue columns show water volumes.

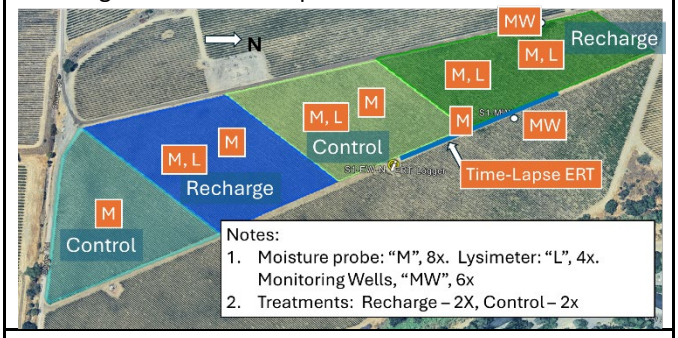
Water Year	Winter Flow Volume Past Jimtown	Potential OFR Diversions		Operational OFR Diversions			Available OFR Diversion Days
	Acre-Feet	Acre-Feet	(1)%	Acre-Feet	(1)%	(2)%	
2016	686,424	12,212	1.8%	6,000	0.9%	49.1%	112
2017	1,302,107	17,271	1.3%	6,000	0.5%	34.7%	159
2018	199,441	11,287	5.7%	6,000	3.0%	53.2%	123
2019	924,100	12,088	1.3%	6,000	0.6%	49.6%	112
2020	171,290	13,148	7.7%	6,000	3.5%	45.6%	126
2021	82,278	6,482	7.9%	6,000	7.3%	92.6%	69
2022	210,125	9,072	4.3%	6,000	2.9%	66.1%	93
2023	849,221	11,134	1.3%	6,000	0.7%	53.9%	105
2024	794,822	12,316	1.5%	6,000	0.8%	48.7%	136
2025	926,465	14,429	1.6%	6,000	0.6%	41.6%	133
Median	**740,623**	**12,150**	**1.7%**	**6,000**	**0.8%**	**49.4%**	**118**

1. Percent of Russian River Flows
2. Percent of Potential OFR Diversions

PILOT STUDIES: REFINING OFR

The Initiative implemented OFR Pilot Studies across three partner sites with varying soil characteristics during the 2025 WY; Pilot Studies will be repeated and expanded during the 2026 WY Pilot-At-Scale.

A. Design at one of three pilot sites.



B. OFR utilizing frost protection sprinklers.

C. Time-Lapse ERT showing changes in soil moisture in response to recharge water.

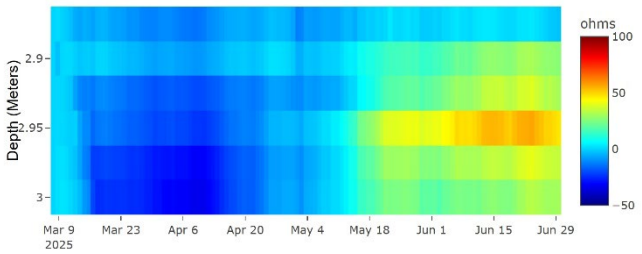


Figure 6. OFR pilot at one of 3 sites. Applied 28" of water from late February into early April. Time lapse ERT data showed moisture effects from OFR applications through depth.

During the 2025 WY Pilot Studies, pilot sites were monitored and studied for hydrologic, water quality and agronomic responses to OFR (Figure 6A), as well as associated costs and benefits. Each pilot site applied 28" of water through their frost protection systems (Figure 6B). In-field instrumentation was installed to track hydrologic and soil conditions such as soil moisture, groundwater levels and porewater and groundwater quality (Figure 6A). To improve spatial understanding of groundwater responses to OFR, time-lapse Electrical Resistance Tomography (ERT) was used to continuously monitor groundwater levels along transects (Figure 6A, Figure 6C). Monitoring wells were installed to enable studying upstream, within field, and downstream effects to help characterize groundwater responses. The wells were instrumented with pressure transducers (15-min data), which enabled modeling groundwater responses in space and time.

Findings from the 2025 WY Pilot Studies will be shared in January 2026. Public workshops will occur during fall 2026 to share findings from the completed Pilot Phase (Figure 3).

PILOT-AT-SCALE: CONCEPT DEMONSTRATION

The OFR Initiative has identified *11 Service Areas (SAs) to implement OFR at Full Buildout.* The Pilot-At-Scale phase will install the necessary diversion facilities (e.g., shallow well, filtration, piping) in four of those SAs and connect to vineyard irrigation infrastructure (*Figure 1, marked with stars*). Figure 7 shows the infrastructure layout and design for SA02.

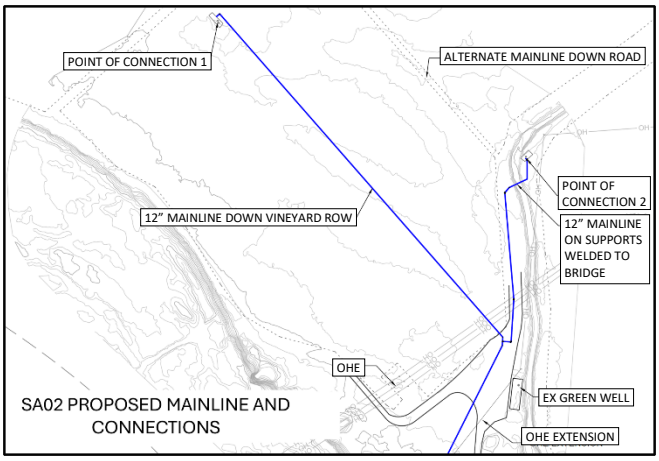


Figure 7. Draft infrastructure design for Service Area 02. The figure shows well locations, pipeline alignment and points of connections (POCs) to private partners irrigation system.

The first four SA installations will serve as a test case to define, and later streamline, required permitting, regulations and processing. Simplification of these regulatory processes will be required for the widespread, cost-effective adoption of this approach as a significant and realistic solution to California's water challenges.

The Pilot-At-Scale will service 1,000 acres and recharge over 2,000 AF annually, requiring maximum diversions of 17 CFS from the Russian River (Table 2). Pumping costs are anticipated at approximately $110 per AF.

SOCIAL AND LEGAL CHALLENGES

Several social and legal challenges are being concurrently addressed, in part, during the Pilot Phase (Figure 3): e.g., governance, energy, water rights, financials. For this type of public/private partnership solution to be viable, these social and legal issues require solutions. Water resources are a critical challenge for Alexander Valley and Sonoma County more broadly; efforts to develop cost-effective solutions should be prioritized by stakeholders and governing agencies.

Table 2. Targeted operational outcomes for Pilot-At-Scale and for Full Buildout.

	Pilot-At-Scale	Full Buildout	Units
Field Operations			
Assumed Recharge Rate (1)	14.7	14.7	GPM/Ac
	0.1	0.1	AFD
Durations	36.0	36.0	Days
Volume per Acre	2.3	2.3	Ac-Ft/Ac
Alexander Valley Regional Operations			
Estimated OFR fields	974	2,969	Acres
Estimated OFR fields simultaneous Operations	436	1,485	Acres
Total Volume	**2,278**	**6,944**	**Ac-Ft**
Maximum Regional Diversion Rate	**15.8**	**54.5**	**CFS**
1. Rate estimated at this time.			

The potential solution of increasing storage space in regional dams is estimated at $7,000 - $26,000 per AF of storage. Perhaps more importantly, the timeline for that kind of solution offers no respite for the current communities facing declining revenue streams and a more uncertain future.

OFR offers a holistic and more cost-effective solution that, at a minimum, can offer a bridge solution and, at the maximum, a potential replacement to surface reservoir expansion. Understanding the full potential of OFR is a critical goal of OFR Initiative.

PARTNERS

Sonoma Resource Conservation District; Sonoma Water; Jackson Family Wines; Abundance Ag Engineering

TO LEARN MORE

Alexander Valley On-Farm Recharge Initiative, Master Plan Vision. Available from Dry Creek Rancheria and Bachand and Associates.

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