

Memorandum

Subject: Napa Valley Subbasin Vineyard Replant Extension Program
By: ERA Economics and LSCE
To: Napa County Groundwater Sustainability Agency
Date: April 10, 2025

Program Concept Overview

An extended crop replacement program is a voluntary program concept in which a landowner is offered an incentive payment to increase the duration of their current fallowing practice between removal and replanting of perennial crops (e.g., almonds, walnuts, grapes) by one or more growing seasons. The program can be offered for one or more replanting cycles, or in perpetuity. By delaying replanting and leaving land fallow for a specified period, groundwater pumping is reduced, which provides a benefit to the subbasin. A landowner is compensated for delaying replanting. These programs are voluntary and can contribute to groundwater sustainability efforts.

Key components of such a program include:

- The program is paying to delay replanting for a defined period (say, 1 year). Replanting is an activity that will occur on all vineyards as vines reach the end of their productive economic life. Economic life depends on a range of factors including but not limited to variety, agronomic factors (e.g., disease, block productivity), market conditions (e.g., prices and costs), and farm management practices/preferences. A typical economic life is 25 to 30 years. The program incentive payments would not be based on the full value of a productive acre of vineyard. Rather, it is paying for an incremental delay in the typical replanting cycle.
- The program saves water by shifting the entire water use pattern of the vineyard. A newly established vineyard applies and uses very little water. The water savings of the program accounts for the entire stream (time path) of water application and use over the economic life of the vineyard. In effect, the total water use over the life of a vineyard is spread over, for example, 26 years instead of 25 years.

Water Savings

Perennial crops are replanted on a typical schedule based on the economic life of the crop. For example, an almond orchard is typically replanted every 25 years or so. This means that, on average and assuming a uniform age distribution, about 4 percent (1/25) of almond orchards are not farmed (being replanted) in any given year. Young perennials consume less water than mature crops.

An extended replanting program saves water by increasing the length of time for replanting and therefore the share of fallow land each year not receiving applied water. Using the almond example, if every replant is extended by one additional year, then 8 percent (2/25) of the land is fallow in that year. To realize permanent water savings, the program would run in perpetuity, but even a temporary program would achieve water savings. Savings also require that alternative, new lands are not developed. These program requirements can be addressed as part of the program design.

The potential water savings can be illustrated by a simple example. Suppose an acre of vineyard uses a total of 50 acre-feet applied during its 25-year life (average of 2 acre-feet applied water per acre per year). If one year of additional fallow before replanting are added, the same 50 acre-feet would be applied over 26 years rather than 25 years, resulting in an average of 1.92 acre-feet per year, or a 4 percent reduction in average annual applied water for that acre.

Incentive Approach

The basis of the incentive payment structure is that the program is voluntary and must provide a fair total incentive payment that is sufficient to entice a willing landowner to participate in the program. An incentive payment can be comprised of three types:

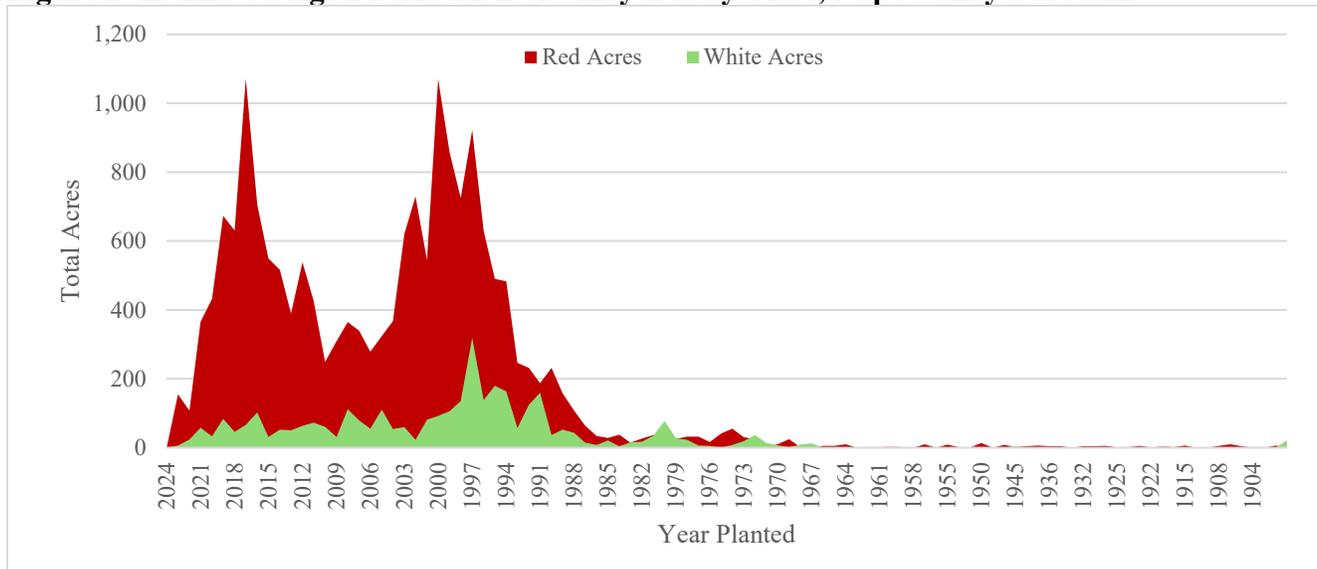
1. **Groundwater Savings.** This component rewards participants for reducing groundwater extraction by keeping land fallow and halting irrigation over a specified period. An incentive is based on costs incurred (or avoided) and forgone income resulting from the delay in replanting. Net present value of a replanted permanent crop can represent these values.
2. **Other Transition Practices.** Additional incentive payments could be included for specific agricultural practices (e.g., cover crops, enhancing soil health, etc.). These provide a broader public benefit and an additional private benefit to the landowner.
3. **Other Benefits.** This component may include payments for other public benefits. For example, other programs have considered payments that target lands in specific areas (e.g., near domestic wells). This could also include incentives (e.g., reduced GSP fee) for participants who comply with the program's reporting and monitoring requirements.

Program incentive payments depend on the structure of the program, crop mix, market conditions, costs, and water availability. These are established as part of the program design, typically with landowner input. Importantly, the program is incentivizing an incremental change in practices (delaying replanting by one or more years) and does not need to compensate for the value of a fully productive vineyard.

NCGSA Program Concept Evaluation Approach

NCGSA could evaluate an extended replanting program. A preliminary review of Subbasin vineyard data shows around 21,190 acres with an average estimated age of 20 years. 41.5 percent of Subbasin acres are 20 to 30 years old. The typical replanting schedule for vineyards is between 25 and 30 years, with some vineyards maintained for a longer duration if they remain productive and disease-free. Grapes are typically removed in the fall and replanted the following spring. Grape market conditions are currently soft, making this program potentially more attractive to growers in the near future. Figure 1 illustrates the estimated age distribution for red and white wine grapes in the Napa Valley Subbasin.

Figure 1: Estimated Age Distribution of Vineyards by Class, Napa Valley Subbasin



The general technical approach to designing the program includes:

- Design general program concepts, technical studies to support development (e.g., agronomic feasibility, scale, location, timing, duration of contracts, etc.)
- Evaluate potential incentive payments (and sensitivity range) for extending vineyard replanting under the program using estimated net present value of replanted vineyard.
- Integrate grower/stakeholder outreach throughout to inform program technical and policy design.
- Evaluate program potential water savings.
- Develop preliminary program rules and contract design.
- Design program co-benefits (e.g., targeted to lands near GDEs? Or increase the scale of the program in drier years?)
- Typically run a pilot program and/or test program to gauge interest and improve design
- Implement broader program

Multi-Benefit Elements

The extended replant program can be developed and implemented in tandem with other groundwater and conservation initiatives, enhancing potential co-benefits during the fallow period and once a new vineyard is planted. For example, this could include on-farm recharge opportunities. These parallel elements or programs include but are not limited to conservation actions, supply augmentation, soil health, and infrastructure improvements.

- **Conservation Actions.** In replanting a vineyard, there are opportunities to promote environmental benefits through specific conservation measures. For example, vineyard managers

and growers could elect to repurpose all or a portion of a vineyard for other land benefits, such as habitat restoration. By only planting back a lesser percentage of the field, water savings can be achieved. The fallow period may provide an opportunity to reintroduce or host beneficial species to the location, establish erosion or habitat buffers, or implement prescribed burns. These decisions can enhance the ecosystem and offer positive spillover benefits to the operation if it is returned to agriculture. Conservation actions require capital investment and management and would need to be incentivized.

- **Supply Augmentation (Recharge).** An extended replanting program could include practices to improve groundwater infiltration (and/or hold additional water on the land for recharge). This would use the idle land to increase groundwater recharge in areas where it is feasible to do so while promoting greater infiltration and subsoil moisture prior to replacing the vineyard.
- **Soil Health.** Improved soils can impact both the long-term viability and water use of the vineyard. The idle period is a prime time to establish cover crops, apply compost and other soil amendments, improve carbon sequestration, and implement other beneficial practices. These actions may be temporary (during idle period) or continuous (both idle and planted periods).
- **Infrastructure Improvements.** With the extended replant period, vineyard managers and growers may improve infrastructure without impacting regular vineyard operations. These projects can impact a wide range of operational and ecological aspects of the vineyard, with the goals of improving efficiency, reducing water use, and increasing positive benefits. Some examples include installing water meters, implementing water quality initiatives, improving well or pump station equipment, or updating erosion control for roads and slopes.

Other Considerations / Notes

The extended replanting program concept is a form of a rotational fallowing program. There are several similar programs that are implemented or under development with GSAs in critical subbasins to reduce groundwater demand.

To yield sustained groundwater savings, an extended replant program must ensure that acreage held out of production does not move elsewhere, effectively transferring water use and eliminating potential water savings. In Napa County, available acreage and county permitting will prevent this. In addition, the program is most effective if it continues in perpetuity, but this is not a prerequisite for program benefits. Even a pilot program operating for a single year generates immediate and future water savings by shifting the time path of the replanting cycle.

Additional analysis is necessary to develop program concepts and evaluate options for idle land, including the use of annual or permanent cover crops and tillage between plantings and increasing recharge. These methods can promote infiltration and soil health and affect water use. The extent of the benefits of these practices can be determined during the program's development. Necessary incentive payments and program costs can also be assessed as a next step.

Extended Replanting Concept Overview

The program is voluntary, and incentives would be established to encourage participation. This could be linked to incentives for a certification program, GSP fees, and other demand management programs in Napa. Assessing program costs is a logical next step.

DRAFT