



Central Valley Groundwater Recharge Incentives and Strategies

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Introduction

This document summarizes incentives and water management strategies that Central Valley of California water districts and groundwater sustainability agencies (GSAs) have developed and provided to landowners and growers in their regions to accelerate groundwater recharge and reduce groundwater pumping in overdrafted areas. The purpose of this document is to provide a suite of real-life examples that can be used by other water districts and GSAs interested in customizing strategies best suited for their subbasins. Other audiences that may also find this useful include government agencies, technical hydrogeologic consulting firms, agricultural associations and industries, non-governmental organizations, and other interested stakeholders seeking information on groundwater management incentives and strategies.

The policies developed by these water managers serve several objectives. Primarily, they encourage the use of surface water when it is available instead of groundwater. Next, they seek to accelerate the implementation of various forms of groundwater recharge on privately owned land. Additionally, these strategies incentivize the reduction of groundwater demand and encourage multiple benefits projects such as improving community drinking water resiliency, reducing flood risk, and restoring habitat. Also listed here are examples of integrating incentives as part of a district-scale groundwater recharge program.

This information was gathered through direct communication with water managers in the forms of emails; phone calls; in-person meetings; and participation in conferences, presentations, and panel discussions where these topics were discussed. However, much of this can be attributed to the more than 10 years of collaboration between Sustainable Conservation and the water managers who have developed, implemented, and improved the water management strategies described here.

Financial Incentives

There are several financial incentives listed and described in this section that have been or are currently being used by water districts and GSAs in the Central Valley to encourage the use of surface water in lieu of groundwater, accelerate groundwater recharge, and reduce groundwater pumping. Figure 1 shows the water districts or GSAs in San Joaquin Valley groundwater subbasins that offer financial incentives for groundwater recharge and the types of incentives offered. Figure 2 shows number of water districts or GSAs in San Joaquin Valley that offer financial incentives by type.

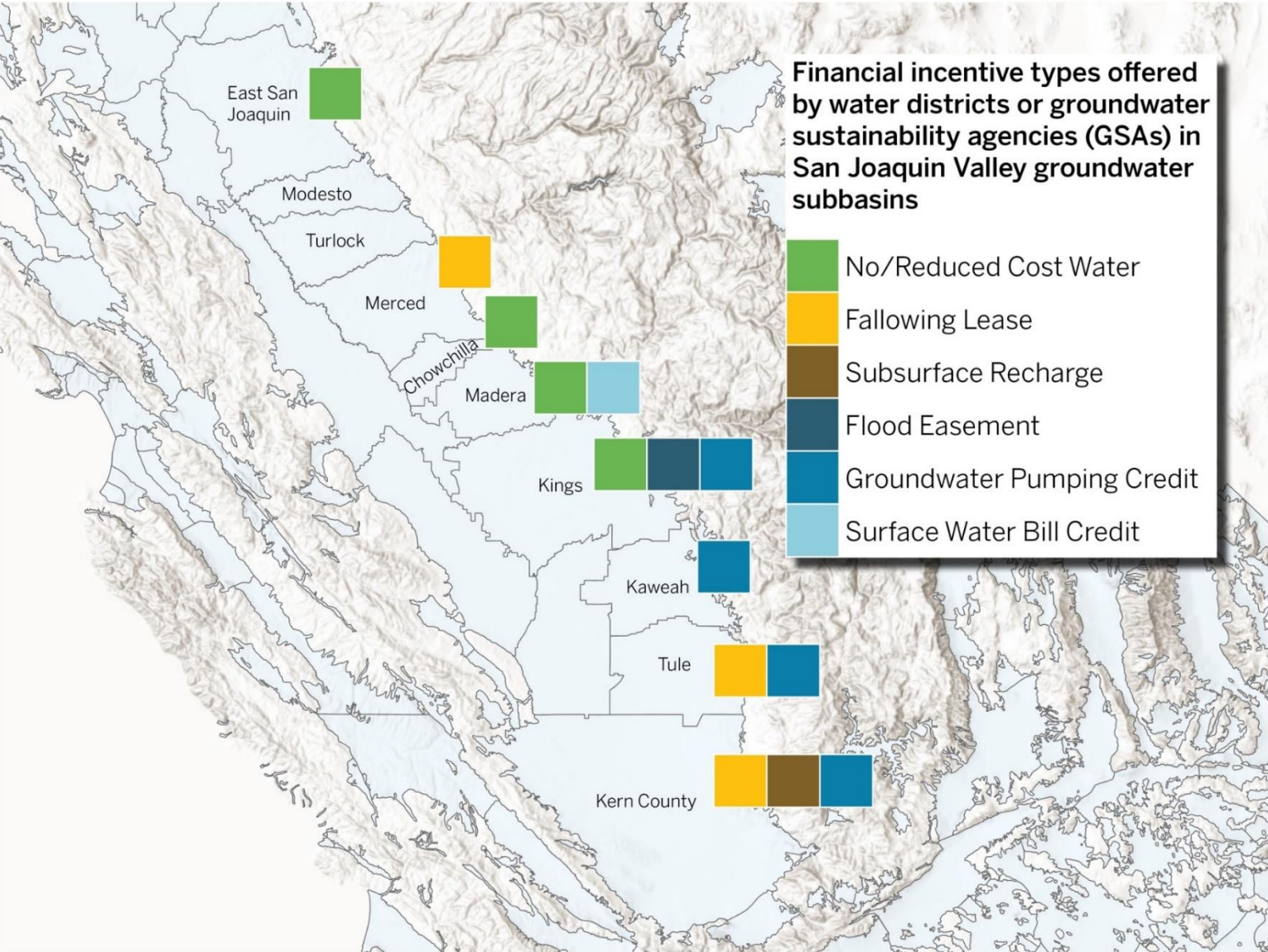


Figure 1. Financial Incentives Types Offered by Water Districts or GSAs in San Joaquin Valley Groundwater Subbasins.

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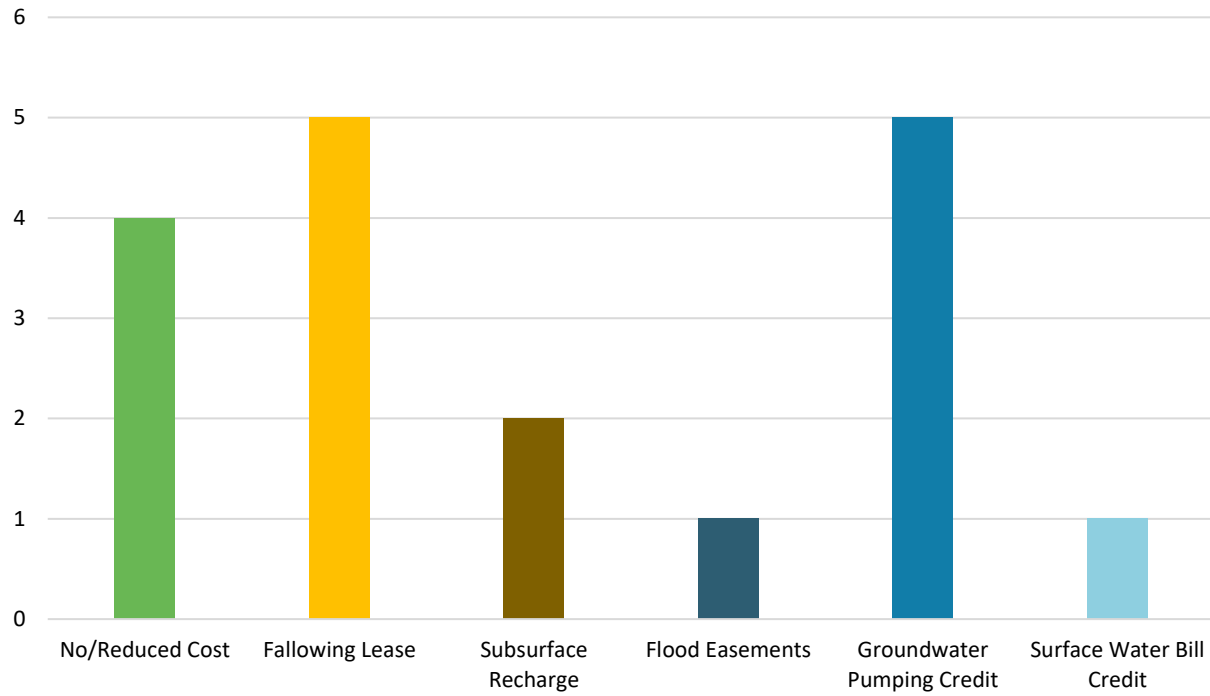


Figure 2. Number of San Joaquin Valley Water Districts Offering Financial Incentives by Type

No/Reduced Cost Water for Recharge

The water districts and their boards of directors approve **fully** or **partially** subsidizing the cost of surface water intended for recharge purposes, and the districts' internal costs associated with delivering that water. Although many growers only apply water to fallow or dormant fields, which is where the majority of the applied water goes to recharge, some growers might apply this water to perennial crops after their dormancy period or to annual crops after planting, where some of that water will meet the crop's annual water demand. To avoid misappropriation of no-cost recharge water solely for irrigation purposes, districts can establish minimum application volumes or per acre quantities to help ensure that enough water is applied to achieve recharge goals and benefits. Figure 3 shows the location of water districts or GSAs in San Joaquin Valley groundwater subbasins that provide no or reduced cost water for recharge.

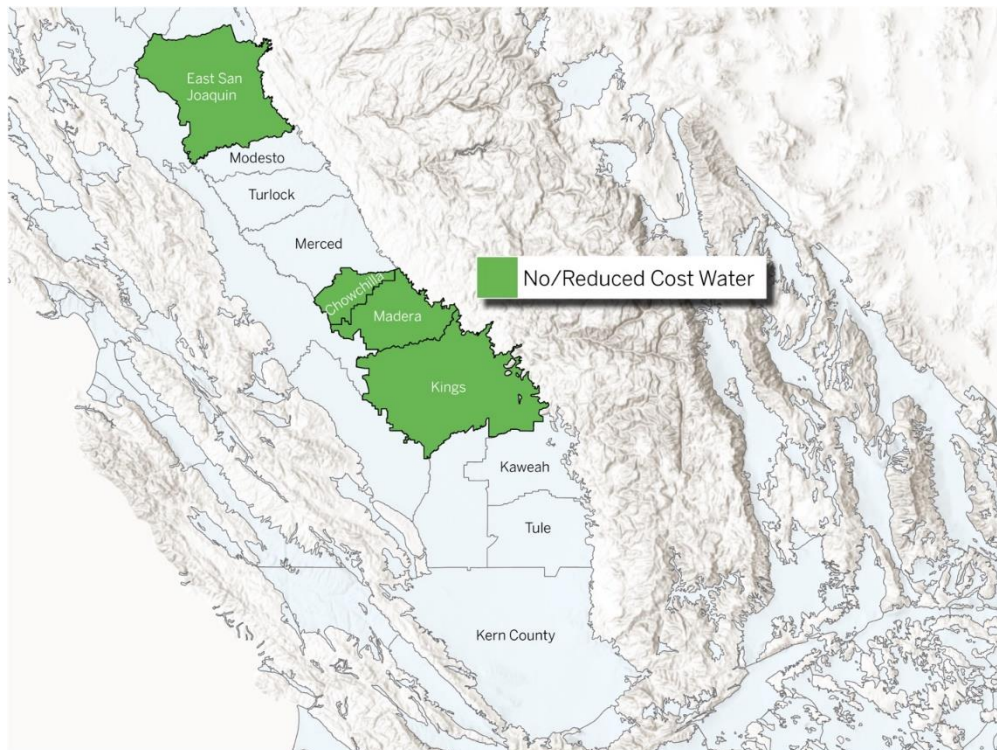


Figure 3. Location of Water Districts or GSAs in San Joaquin Valley Groundwater Subbasins that Provide No or Reduced Cost Water for Recharge.

Fallowing Lease for Groundwater Demand Reduction

A water district or GSA enters into a lease agreement with a landowner or grower to fallow a parcel of land for a specified duration; some examples include 1- to 10-year lease terms. The water district or GSA pays an annual fee per acre per year for the fallowed land to compensate the grower for the loss of crop revenue. Examples of fallowing leases with additional benefits like flood risk reduction, recharge, and restoration are as follows:

- **Fallowing lease for groundwater demand reduction and short- to medium-term recharge basin.** Water district approves project and design of recharge basin. Landowner or grower performs the work. An annual fee per acre per year for fallowed land occupied by the recharge basin is paid to the grower. The grower also receives a percentage of the district's annual groundwater recharge and banking activities and a 1.5 acre-foot per acre per year Fallow Land Credit, regardless of whether or not water is available for recharge during the lease term. The district is responsible for the operation and maintenance of the recharge basin. If flood releases are available during the time period of lease, the district or GSA uses the basin for recharge.
- **Fallowing lease for groundwater demand reduction, habitat restoration, and flood risk reduction.** GSA enters into a mid-term lease agreement with landowners or growers to fallow parcels of land along natural waterways and restore the habitat of those lands. An associated benefit of this type of fallowing lease is allowing water to expand along reaches of waterways, reducing flood risk. Currently, both public and private funding sources are providing these incentives. Examples of public funding sources are the Multibenefit Land Repurposing Program through the Department of Conservation and the LandFlex Grant Program through the California Department of Water Resources (DWR). Private funding sources are compiled through grower assessment fees and pumping fees that are pooled together to offset growers' lost revenue that they would have generated through selling crops grown in these fields.

Figure 4 shows the location of water districts or GSAs in San Joaquin Valley groundwater subbasins that provide fallowing leases for groundwater demand reduction.



Figure 4. Location of Water Districts or GSAs in San Joaquin Valley Groundwater Subbasins that Provide Following Leases for Groundwater Demand Reduction.

Subsurface Recharge Program

The district issues a groundwater credit to the grower's groundwater credit account calculated from the recharge capacity of the installed subsurface recharge system, which applies water for recharge below the crop rootzone. These credits apply annually whether or not water is available for recharge or the district uses the grower's subsurface recharge facility during the lease term.

The district does not pay fallow land compensation because the land is not fallowed. The district approves the project, and the grower performs the installation of the subsurface recharge facility. The district is responsible for water delivery and operation and maintenance of the district turnouts to the field. The landowner is responsible for operation and maintenance of the subsurface recharge system and anything beyond the district's turnout.

Figure 5 shows the location of water districts or GSAs in San Joaquin Valley groundwater subbasins that provide subsurface recharge programs.



Figure 5. Location of Water Districts or GSAs in San Joaquin Valley Groundwater Subbasins that Provide Subsurface Recharge Programs.

Flood Easement

The landowner executes a Flood Easement Agreement with DWR, or other governing agency, and commits to deliver flood releases to a field or recharge basin. The landowner retains ownership of the property and, in some cases, may receive a payment in exchange for an easement agreement to provide flood relief to the easement holding agency.

However, there is at least one example existing in the San Joaquin Valley where the landowner does not receive any payments, but flood reduction and surface water recharge was valuable enough for them to execute the flood easements to approximately 200 acres of cropland.

Figure 6 shows the location of water districts or GSAs in San Joaquin Valley groundwater subbasins that uses flood easements for recharge.



Figure 6. Location of Water Districts or GSAs in San Joaquin Valley Groundwater Subbasins that Uses Flood Easements for Recharge.

Groundwater Pumping Credit for Recharge

Grower or landowner receives a pumping credit for a portion of the volume of water applied for recharge and thereby increases the groundwater pumping allocation associated with their acreage.

Figure 7 shows the location of water districts or GSAs in San Joaquin Valley groundwater subbasins that provide groundwater pumping credit for recharge.



Figure 7. Location of Water Districts or GSAs in San Joaquin Valley Groundwater Subbasins that Provide Groundwater Pumping Credit for Recharge.

Surface Water Bill Credit

The water district provided a surface water bill credit to growers participating in the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Recharge Pilot Program, which as of May 2023 had not yet been classified as an NRCS permanent cost share program. In one case, a water bill discount amounted to 15 percent of the NRCS contract or up to \$100,000.

This surface water bill credit provides extra incentive for growers in the district to use district surface water in lieu of groundwater. It should also be noted that other water agencies in California have offered surface water bill credits that are not associated with this NRCS cost share program.

Figure 8 shows the location of water districts or GSAs in San Joaquin Valley groundwater subbasins that provide surface water bill credits.



Figure 8. Location of Water Districts or GSAs in San Joaquin Valley Groundwater Subbasins that Provide Surface Water Bill Credits.

Paying for Surface Water Delivery to Field for Recharge

A water district pays for the electricity expense of pumping surface water to the field for recharge when gravity delivery is not an option.

Integrating Incentives as Part of a Groundwater Recharge Program

This section describes groundwater management options resulting in decreased groundwater pumping and accelerated recharge. These strategies can be categorized in the following ways:

- Reducing groundwater pumping by conveying surface water to areas outside of districts that have been primarily or exclusively dependent on groundwater for irrigation. This is structured by water districts through short-term annual contracts or by formally annexing non-district areas into the water district's boundaries.
- Implementing groundwater pumping allocations and allowing growers the following:
 - Increase their groundwater allocations by implementing private land recharge.
 - Transfer groundwater pumping allocations to other fields they farm as long as it is within the same district. This strategy would also allow for fallow fields to be converted to other uses that use less or no groundwater, such as establishing native vegetation, developing solar facilities, and other potentially beneficial uses.

In Lieu Recharge

In lieu recharge is intended to decrease groundwater demand. This is accomplished when surface water is used in lieu of groundwater for irrigation purposes. Below are examples of in lieu recharge in either the form of short-term annual contracts or formally expanding a district's boundaries to include non-district lands through annexation.

- **Sell surface water to growers in non-district areas to utilize for irrigation purposes in lieu of groundwater pumping.** When district surface water supply exceeds the demand of their growers, some districts sell their surface water to growers outside of their district in short-term annual contracts as allowed by water rights and/or local water ordinances. Non-district growers are responsible for delivering the surface water from the water district's conveyance to their fields.

- **Annex non-district lands with district lands to reduce groundwater pumping.** The water district expands their geographic boundary to include non-district fields. These newer, annexed areas typically have “subordinate” rights compared to the older, historic regions of the district. The annexed lands pay higher water costs and may not have the same voter rights and privileges as older parts of the district.
- **Develop and implement components facilitating a localized, subbasin-wide system of groundwater allocations and credits.** Districts and GSAs that have seen relatively rapid adoption of recharge have developed a few key strategies to reduce over pumping and encourage recharge:
 - **Implement a groundwater allocation program.** District or GSA implements a sustainable groundwater pumping limit, with tiers of costs and/or penalties associated with going over that limit. Acceptance of this strategy is most successful when growers are part of the process.
 - **Groundwater pumping credits.** In some districts, a grower can increase their pumping allocation limit by recharging water on their property. The volume of water a grower recharges is credited to their groundwater pumping allocation. Growers may be able to transfer their groundwater allocations to other fields that they farm, but these policies vary from district to district.
 - **Water accounting systems.** Districts/GSAs have developed integrated water accounting tools or dashboards that growers can use to track their groundwater allocations, pumping quantities, and recharge credits in real time. This dashboard can also support a groundwater trading system.