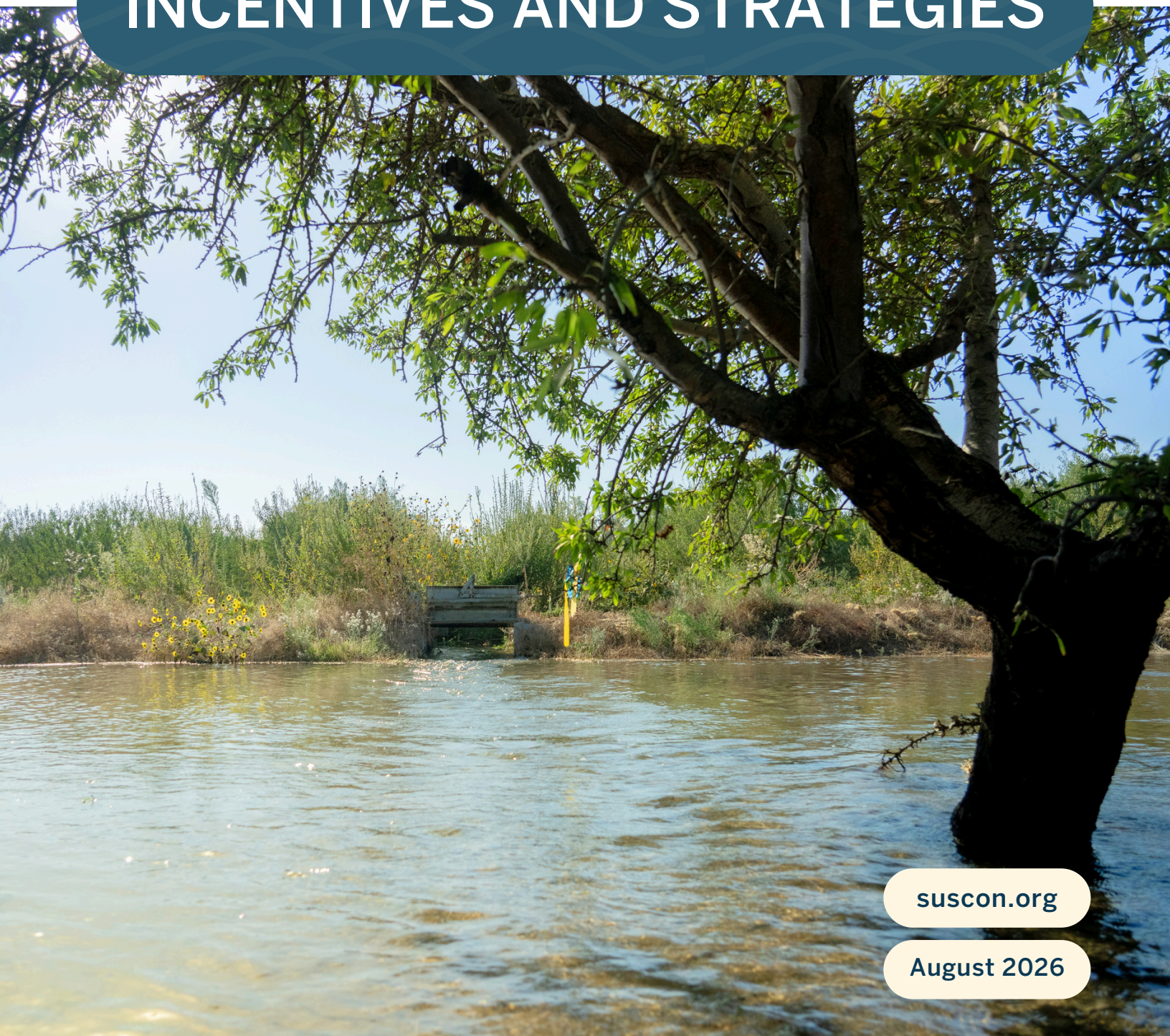
Sustainable Conservation

GROUNDWATER RECHARGE

INCENTIVES AND STRATEGIES



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GROUNDWATER RECHARGE INCENTIVES AND STRATEGIES

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INTRODUCTION

Under the Sustainable Groundwater Management Act (SGMA), groundwater sustainability agencies (GSAs) have been charged with developing and implementing groundwater sustainability plans (GSPs) to bring groundwater budgets into balance. Groundwater recharge is a method to enhance groundwater supply by spreading excess surface water on land to recharge aquifers. Farmland is often a natural choice for recharge projects, because water delivery systems already exist and dormant or fallow agricultural fields can be intermittently flooded safely when recharge water is available during winter storms. California water districts and GSAs have increasingly developed and implemented financial incentives and water management strategies to accelerate groundwater recharge and reduce groundwater pumping in overdrafted basins. The purpose of this document is to describe examples of groundwater recharge incentives and strategies that can be used by other water districts and GSAs interested in customizing strategies best suited for their subbasins. Drawing from the real-world experience of practitioners, this report describes opportunities to leverage and pitfalls to avoid when using various recharge incentives. Other audiences that may find these strategies useful include government agencies, hydrogeologic consulting firms, agricultural associations and industries, non-governmental organizations, landowners and growers, and other interested parties seeking information on scaling up decentralized groundwater management practices through incentives.

The incentives and strategies developed by these water managers serve several objectives. Primarily, they encourage irrigating with surface water when it is available to reduce demand for groundwater extraction. This management strategy — using surface water when it is more plentiful and groundwater during times when surface water is scarce — is known as conjunctive use. In-lieu recharge is an extension of this strategy, encouraging substitution of surface water for groundwater for irrigation, and may include developing or acquiring new surface water supplies. Next, they seek to accelerate and scale up the implementation of various forms of managed aquifer recharge (MAR) on privately-owned land. Additionally, these incentives and strategies can encourage and prioritize projects that combine multiple benefits such as improving community

drinking water resiliency, mitigating subsidence, reducing flood risk, and restoring habitat.

This report examines many ways that financial incentives for on-farm recharge can be utilized as part of a district-scale groundwater recharge program. Approaches to incentives depend on many factors, including access to surface water for irrigation or direct recharge, whether a groundwater allocation and accounting system exists in the district, and funding sources available to the district.

Information for the Central Valley Groundwater Recharge Incentives and Strategies report released in 2023 was gathered through direct communication with water managers in the form of emails, phone calls, in-person meetings, and participation in conferences, presentations, and panel discussions where these topics were discussed (**Table 1**). Information was also gleaned from analysis of the Projects and Management Actions sections of selected Groundwater Sustainability Plans (GSPs). In 2025, Sustainable Conservation and the Almond Board of California surveyed water districts and GSAs to learn how recharge incentive programs have grown and changed since 2023, a historically wet year for California, which led to the rapid development and adoption of new recharge programs and incentives. Following the survey, Sustainable Conservation conducted in-depth interviews with some survey respondents to better understand details of their recharge programs. Much of the information in this guide can be attributed to the water managers who have developed, implemented, and improved the water management strategies described.

Need to find your Groundwater Sustainability Agency or the Groundwater Sustainability Plan for your area?

Visit the SGMA Portal, where you can view maps and download information related to GSAs, GSPs, alternatives to GSPs, adjudicated areas, and basin boundaries!

It is important to note that this information was collected from a small number of survey respondents (see Table 1), and so the information should not be interpreted as comprehensive or representative of all recharge programs. Information has been grouped by groundwater basin to avoid identifying individual respondents, except for a few select case studies included with district approval. There were basins with multiple entities that responded differently to the survey questions, and there were sometimes multiple responses for a single district or GSA. Readers should confirm information about recharge strategies and incentives by referring to local rules and regulations or talking to representatives of individual GSAs or water districts.

Table 1. Data points collected in 2023 and in 2025-2026

	2023	2026
Number of individual districts responding	10	16
Number of individual GSAs responding	5	18
Number of GSPs analyzed	9	3
Total data points	24	37

RECHARGE STRATEGIES

Recharge strategies are implemented at different scales. Recharge on individual farms and rural properties takes place within the context of a district- or basin-wide strategy. Conditions within the basin related to groundwater levels and trends, overdraft status, availability of surface water supplies, water demand, land subsidence, water quality, and groundwater-dependent ecosystems, as well as policy and infrastructure realities, will shape each jurisdiction's approach to a recharge program. A Groundwater Sustainability Plan (GSP) or other groundwater governance plan outlines the conditions in the groundwater basin and the actions that will be taken to balance groundwater extraction and replenishment in the basin, including any recharge efforts. Recharge strategies available or feasible for individual landowners depend in large part on the approach taken by the GSA or water authority that governs groundwater in their area. In 2026, 29 respondents representing 14 basins reported recharge efforts on district-owned facilities, while 34 respondents representing 14 basins reported facilitating recharge activities on private lands. Of those facilitating private lands recharge, 25 respondents in 12 basins reported offering incentives for private lands recharge (see Figure 1). These responses show that GSAs across California are diversifying their approach to recharge and that offering incentives for recharge on private lands can be an effective way to expand recharge capacity. This section provides an overview of in-lieu and direct recharge strategies that can be used and incentivized within a groundwater basin.

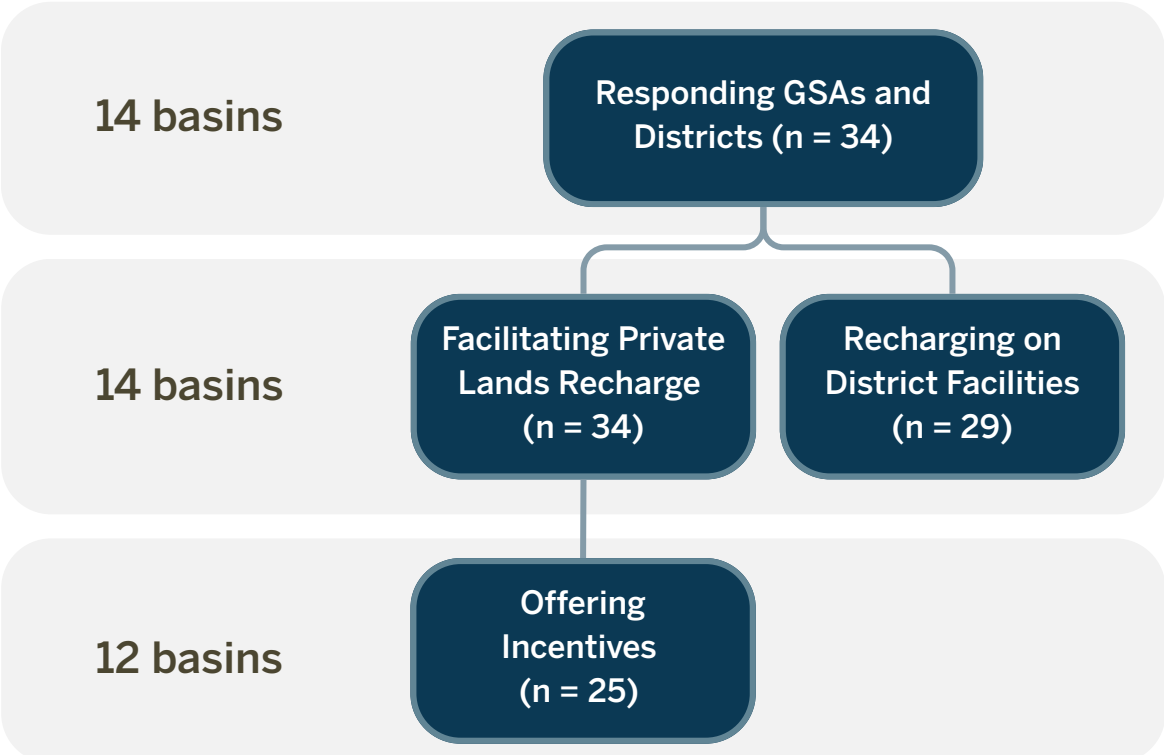

Figure 1. Recharge strategies noted in 2025-2026 survey responses

In-Lieu Recharge

In-lieu recharge is a groundwater demand reduction strategy, not a direct addition to groundwater reserves. In an agricultural setting, this is accomplished when surface water is used in lieu of groundwater for irrigation purposes. At the district scale, a focus on in-lieu recharge often means maximizing the use of surface water for irrigation. This approach is most common in districts that have reliable access to surface water supplies through senior water rights, water contracts with the State or Federal water projects, water purchase agreements, access to municipal recycled water, or a combination of these. A district might prioritize improving surface water delivery infrastructure like canals, pipelines, and farm access points, or might consider expanding service to areas that are groundwater dependent. Expansion of service could include adding access points for new surface water users, land annexation to enlarge the district, agreements for out-of-district water sales, or delivery of water to adjacent districts. A district may adjust pricing to encourage landowners to use surface water instead of pumping groundwater.

In-lieu recharge or groundwater demand reduction at the basin or district scale is recognized as a simple and effective method to improve groundwater levels and to curb land subsidence resulting from groundwater overdraft[1,2]. At the farm scale, adoption of in-lieu recharge will depend on surface water supply availability, surface water pricing in contrast to the cost of pumping groundwater, and any limits on pumping imposed by an allocation system (discussed in the Recharge Credit to Groundwater Allocation section below).

Direct Recharge

Direct recharge strategies are those that take surface water and move it underground to recover depressed groundwater levels or to be stored in the groundwater aquifer. There are many ways that this can be accomplished. In this report, the focus is on "land-based" recharge that applies excess surface water to the land surface and allows that water to percolate to the groundwater table. "On-farm recharge" refers to water application on a farm field, and "micro-basin recharge" refers to a relatively small, dedicated recharge basin on private land.

Subsurface recharge, in which a system of perforated pipe is laid below the root zone of a crop and excess surface water is pumped into it for recharge, could be considered on-farm or land-based recharge. This method requires more investment in infrastructure than applying water to the soil surface and is not yet in widespread use. It is gaining some popularity for use in permanent crops, where it is seen as a way to protect crop health by preventing saturation of the root zone during recharge events.

Subsurface recharge can also be done by directing water into relatively shallow "dry wells" or Aquifer Storage and Recovery (ASR) well injection, which involves larger volumes of water directed into deeper aquifers. Both

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[1] Long Zhao, Xiao-Wei Jiang, Yu-Mei Li, Yong Luo, Kun-Chao Lei, Wen-Jie Kou, Fang Tian, Miao-Zhuang Tian, Te Sha, Shu-Fang Wang, Wen-Jun Cui. Mechanisms of groundwater recovery and land subsidence mitigation in a piedmont plain. Journal of Hydrology, Volume 658, 2025, 133165, ISSN 0022-1694. https://doi.org/10.1016/j.jhydrol.2025.133165.

[2] Scott Jasechko, Global cases of groundwater recovery after interventions. Science 391, 1218-1228 (2026). DOI:10.1126/science.adu1370

methods of subsurface recharge are typically carried out by districts due to the higher costs and regulatory requirements associated with them.

At the district scale, recharge using dedicated facilities such as large infiltration basins, irrigation water regulating reservoirs that also allow seepage and recharge, unlined irrigation or drainage canals, and even ephemeral stream beds can be very effective to recharge large volumes of water quickly. Some districts prefer to manage recharge on facilities that they already own and maintain to avoid the cost and logistics of delivering water to farms during the off-season, while others seek to expand their recharge capacity by facilitating recharge on private lands. In the 2025-2026 survey, 29 respondents representing 14 basins reported recharge efforts on district-owned facilities (**Figure 1**).

Some districts engage in water trading markets and serve as water banks. In this arrangement, a district with rights to water in another area (typically a Southern California water district which has purchased water from Northern California) can store its surface water underground in a third location between the source and the destination. The district serving as the water bank can be compensated for the storage service through payments and through "leave-behind" water, a percentage of the water stored that is retained in the aquifer serving as a water bank. This arrangement allows the water purchaser to claim water purchased from the seller in years when the water may not be needed, store it, and then extract it from the water bank in years of higher demand. The district hosting the water bank gains benefits to the aquifer from the leave-behind water. Agricultural fields can be used as infiltration locations for water banks. Farmers benefit from the water banking process when their

fields are flooded because the soil profile is filled with water and excess salts, which can adversely affect crop health and productivity, may be leached below the root zone in their fields. Applying excess water to farm fields is a well-known method to reduce soil salinity and many growers see this as a side benefit of practicing groundwater recharge.

Types of district-scale recharge strategies reported in 2025-26 survey and interviews:

- Dedicated recharge basins
- Stormwater basins
- Dual-use irrigation reservoir and recharge basins
- Unlined canals
- Ephemeral streams
- Dry wells
- Aquifer Storage and Recovery (ASR) or injection wells
- Groundwater Bank

At the farm scale, adoption of direct recharge practices like on-farm recharge or micro-basins will depend in large part on access to surface water for recharge purposes. It can be difficult for an individual landowner to obtain the water rights necessary for underground storage of water, and so they are often dependent on their water district to deliver water to the farm for recharge under the district's right to store water. California has made excess flood flows available for recharge without a water rights permit, under certain circumstances, but the landowner must still have physical access to the water and the ability to deliver it to their recharge location, and must report their diversions to the State.

Water Sources for On-Farm Recharge and Water Rights

- **An irrigation or water district, which typically holds the right to manage and store surface water, can provide water to be recharged at the farm site under the district's existing rights. The farmer or landowner may or may not be entitled to extract some portion of the water for irrigation in a subsequent growing season, depending on district policies.**
- **An irrigation or water district can apply for a temporary recharge permit (180-day or 5-year) from the State Water Board to divert water from a surface water body during periods of excess flow and apply it to land for recharge. The farmer or landowner may or may not be entitled to extract some portion of the water for irrigation in a subsequent growing season, depending on District policies.**
- **Flood flows can be diverted to private lands for recharge under certain conditions, according to California Water Code §1242.1. The farmer or landowner does not have a right to extract the water later for irrigation purposes.**

CASE STUDY

A bridge built from two sides: West and East Turlock GSAs

In the Turlock groundwater subbasin, located between the Tuolumne and Merced Rivers, two GSAs work together to implement a single GSP. In West Turlock Subbasin GSA, access to surface water for irrigation is secure thanks to Turlock Irrigation District's senior rights to Tuolumne River water and a system of reservoirs and canals that store and transport the water to agricultural users. In East Turlock Subbasin GSA, access to surface water is limited and growers depend on groundwater for almost all of their irrigation needs. The reliance on groundwater over the years has created a cone of depression in the eastern part of the subbasin, while groundwater overdraft on the west side does not occur. The two GSAs have worked together toward the shared goal of groundwater sustainability for the basin since the inception of SGMA, yet they represent very different realities in terms of water supply, groundwater conditions, and, therefore, their approach to groundwater use and recharge.

West Turlock emphasizes in-lieu recharge, improving their water delivery systems and water management to maximize the use of surface water to minimize supplemental groundwater pumping. West Turlock conducts some direct recharge projects in their reservoir, unlined canals, on one municipal stormwater basin, and by supporting on-farm recharge when sufficient water is available, but, in the near term, they would prefer not to take land out of production for dedicated recharge basins.

East Turlock, on the other hand, focuses on demand reduction and increasing surface water use when it is available because sustainable groundwater yield and current surface water supplies cannot support the current irrigation demand. East Turlock has established groundwater pumping allocations and a groundwater accounting system for each groundwater user. East Turlock levies a groundwater use fee, which funds Projects and Management Actions in the GSP, a joint well mitigation fund with West Turlock, and other groundwater sustainability projects. Projects to expand the delivery of surface water are being actively pursued, including the development of any necessary on-farm infrastructure. Growers can receive incentives like groundwater allocation credits for in-lieu surface water use or direct recharge, effective precipitation credits for cover cropping, and can have the cost of surface water for recharge covered by the GSA. East Turlock provides incentives for long-term repurposing or fallowing of irrigated land. Turlock ID has partnered in this effort by agreeing to provide up to 35,000 acre-feet/year of surface water deliveries to East Turlock in years when water is available at a relatively low cost, and by assisting in engineering new water distribution projects such as new user turnouts from their delivery pipelines. The replenishment water is only supplied in years when TID's growers receive their full allocation, so they are not harmed by the sale of this water.

During the development of their GSP, the two GSAs worked with Sustainable Conservation and Earth Genome to develop the Turlock Subbasin Groundwater Recharge Assessment Tool (GRAT), a model that incorporates water availability and delivery systems with recharge suitability of lands in the basin to evaluate different recharge strategies to benefit groundwater conditions. GRAT helped the two GSAs formulate complementary and cooperative strategies for advancing groundwater sustainability that leverage each partner's strengths and address each one's needs, and the tool will be used to inform operation of an expanded replenishment water delivery system.

Over three recent years, 6,000 acre-feet of replenishment water for in-lieu and direct recharge was delivered from TID to East Turlock. Early results show leveling and recovery of groundwater levels in those areas. This thoughtful partnership shows that neighboring GSAs can create very different recharge programs that successfully advance sustainability in a single basin.

RECHARGE 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 direct groundwater recharge, and reduce groundwater pumping. **Figure 3** shows the water districts or GSAs that responded to the survey or were interviewed that offer financial incentives and the types of incentives offered.

In 2023, Sustainable Conservation reported that incentives were offered in 8 basins in the San Joaquin Valley. In 2025-2026, 11 basins reported offering incentives, and the geographies represented had expanded outside of the San Joaquin Valley (**Figure 3**). The types of incentives reported also changed from 2023 to 2026 (**Figure 2)**, reflecting different circumstances in different geographies, changes in funding mechanisms, and district or GSA program adaptations (Table 2). For example, the LandFlex program, offered by the California Department of Water Resources (DWR), was not available after 2024, while funding through the Department of Conservation (DOC)'s Multibenefit Land Repurposing Program (MLRP) became available after 2022. In GSAs where groundwater pumping allocations have been set, pumping credits for private lands recharge are a very common incentive. In GSAs without allocations, there is greater reliance on financial incentives for recharge projects. Other GSAs and districts reported discontinuing incentives that they piloted and found ineffective or unsustainable.

It is important that districts or GSAs who are developing an incentive program have a clear understanding of what incentives have been used in California, how they work, and the benefits and drawbacks of each. Six types of recharge incentives that were reported in the 2023 report and in the 2025-2026 survey are detailed below, along with considerations for how the incentive might fit into a GSA's recharge program and larger sustainability plan.

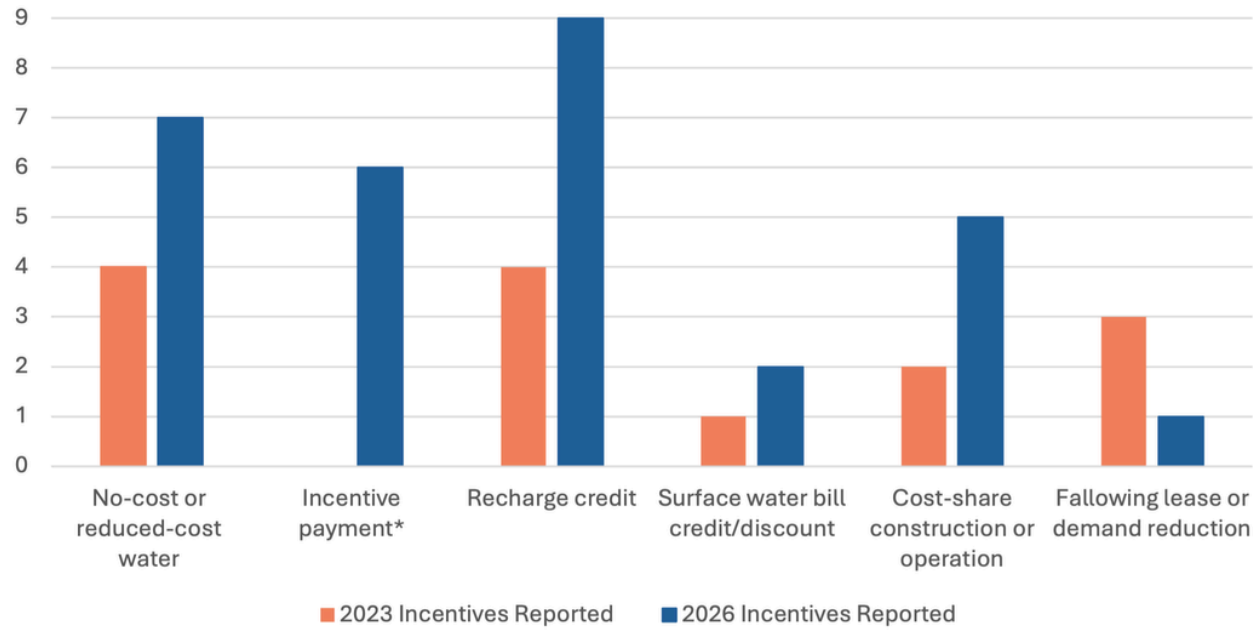

Figure 2. Number of basins offering financial incentives by type, 2023 and 2025-2026. *Incentive payment not tracked in 2023.

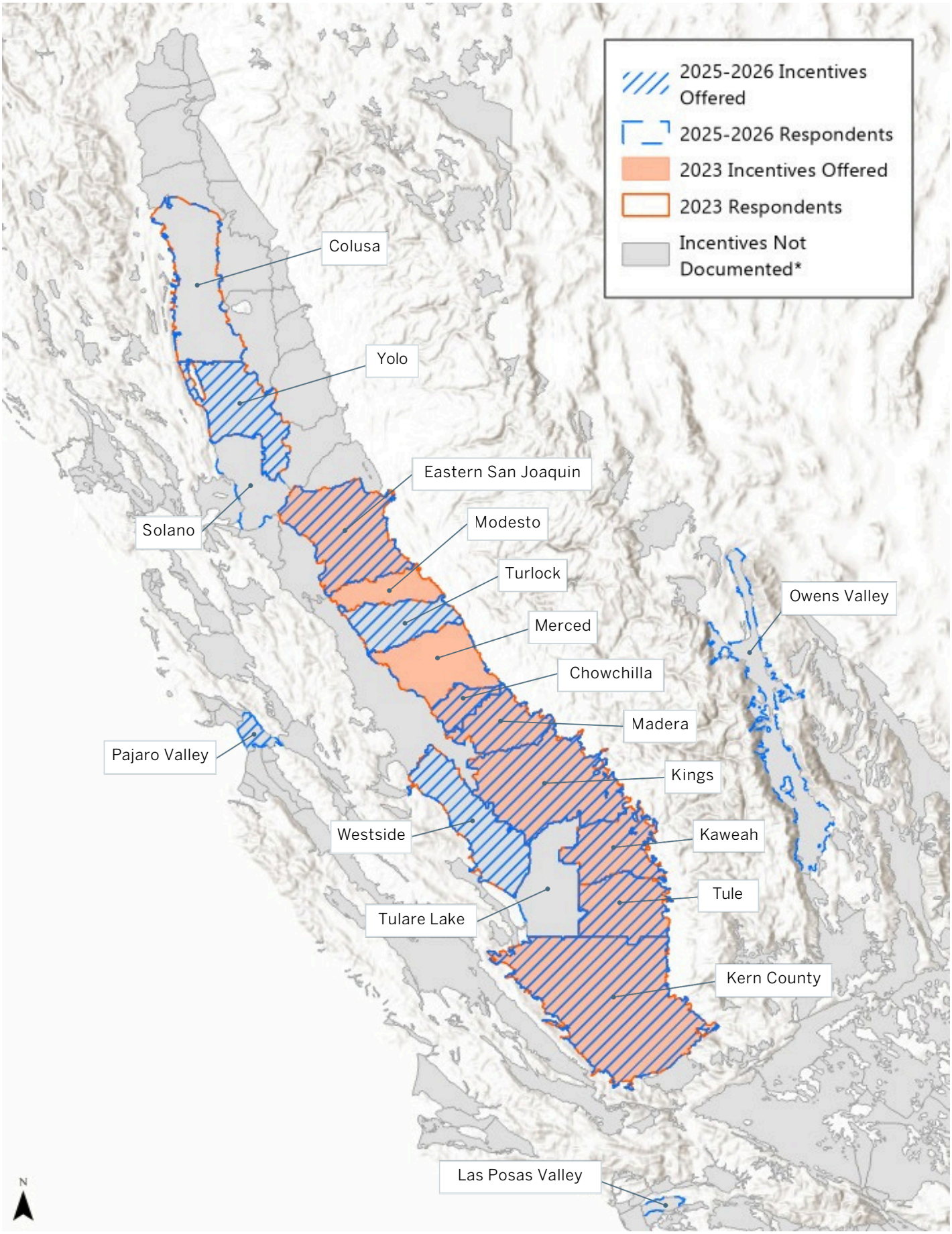

Figure 3. Growth in incentives for groundwater recharge.

*Based on limited survey responses; absence of incentives is not confirmed for non-responding basins.

Table 2. Recharge Incentive Types Offered, by Basin

Basin	No-cost or reduced-cost water	Incentive payment ($/acre, or $/AF)	Recharge credit	Surface water bill credit or discount	Cost-share for installation, construction or operation	Fallowing lease
Chowchilla	✓	✓	✓		✓	
Eastern San Joaquin	✓	✓	✓		✓	
Kaweah			✓			
Kings	✓		✓			
Kern		✓				
Madera	✓		✓			
Merced			✓			
Tule	✓		✓			
Turlock		✓	✓	✓	✓	✓
Westside	✓	✓	✓	✓	✓	
Yolo	✓				✓	
Pajaro Valley		✓				

No-Cost or Reduced-Cost Water for Recharge

What is it?

A district or GSA receives or purchases surface water and delivers it to private landowners for direct groundwater recharge for no or reduced cost, often during the winter outside of the irrigation season.

How the district establishes the incentive:

The water districts and their boards of directors approve fully or partially subsidizing the cost of surface water intended for recharge purposes, taking into account the districts' internal costs associated with delivering that water.

Benefit to the grower:

Depending on district or GSA policies, growers may apply water to fallow fields, to perennial crops during their dormancy period, to overwintering annual crops, or to on-farm micro-basins. The recharge process helps to fill the soil profile with water ahead of the growing season, supports soil health, and may offset irrigation needs and costs early in the season through localized recharge near private wells.

Benefit to the district:

The district can use existing infrastructure and water contract relationships to bring in recharge water and expand its capacity for

recharge beyond district-owned facilities at relatively low cost. Depending on district policies, the district may retain a portion of the groundwater recharge credit for the basin, contributing to sustainability goals in their GSP.

Avoiding common pitfalls:

Districts obtain recharge water through water permits intended for recharge, or through contracts with State or Federal water projects, and they may need to verify the amounts of water delivered for recharge to the State Water Board, to their supplier, or both. To avoid misappropriation of recharge water for irrigation purposes, districts can establish minimum application volumes or set "leave-behind" percentages to help ensure that enough water is applied to achieve basin-wide recharge goals and benefits after accounting for water that is evaporated, transpired by plants, or that remains in the soil vadose zone. For further discussion of leave-behind calculations, see the "Recharge Credits" section below. A district may limit recharge to fallow fields or specify that recharge water must be taken and infiltrated before the irrigation season begins, in order to ensure that recharge water is not used for irrigation.

Incentive Payment

What is it?

A simple payment from a district to a grower for applying recharge water to their property, whether it is a farmed or fallow field or a constructed basin. The payment may be set by the acre-foot of water applied, or by the acre of property flooded. Landowners are responsible for any field preparation needed and for managing the recharge water when it is delivered; districts are responsible for delivering the recharge water. Applied water must be measured; districts may choose to take responsibility for the measurements themselves or may require growers to measure and report applied water as part of the recharge agreement. This type of incentive would most likely be used in a GSA or district with no groundwater recharge allocations because it does not give the landowner any recharge "credits" to extract the water later for irrigation.

How the district establishes the incentive:

The district would need to determine a target number of acre-feet for recharge based on likely water supplies and how much supply augmentation is needed in the basin. The district would need to identify lands suitable for recharge and recruit landowners into the recharge program. Costs of water purchase and delivery should be factored into the incentive payment, as well as available funds for incentives.

Benefit to the grower:

This type of incentive is a relatively simple transaction, and the grower can weigh their costs to accept and manage recharge water against the expected payment. After recharge, their fields would begin the irrigation season with soil profiles full of water, which might reduce irrigation demand in the spring.

Benefit to the district:

The district could use this type of incentive to expand recharge capability beyond its own facilities at a relatively low cost. Recharge could be targeted to the most suitable lands and to areas that may most benefit from supply augmentation, such as groundwater-dependent ecosystems.

Avoiding common pitfalls:

Like the low or no-cost water incentive, the recharge water must not be used for irrigation. It will fall to the district to monitor water applied and ensure that it is not used for an actively growing crop. A policy to apply recharge water only to fallow land has been used by some districts to avoid this issue.

Recharge Credit to Groundwater Allocation ("Pumping Credit")

What is it?

This type of incentive is only viable in GSAs or districts that have groundwater pumping allocations tied to irrigated land. The grower or landowner receives a credit for a portion of the volume of water applied for recharge and thereby increases the groundwater pumping allowed for their acreage.

How the district establishes the incentive:

The GSA or district must have a groundwater accounting system in place for irrigated land, with accounts for each landowner or grower. District policy sets the proportion of applied recharge water that will be credited as storage to the landowner's account. Dillon, et al[3] (2022) proposed the following equation as a conceptual guide for calculating recharge credits:

$$S_i = \alpha I_i - R_i + \beta S_{(i-1)}$$

Where:

S_i and S_{i-1} = the storage or recharge credit at the end of water years i and i-1, respectively (year **i** is the current year, year **i–1** is the previous year)

I_i = measured applied recharge water in year **i**

R_i = the amount of water pumped from groundwater by the recharger in year **i**

α = maximum cumulative proportion of applied water that can be credited to the recharger (the "efficiency factor," see below)

β = annual rate of retention of the storage credit (the "decay factor") based on the natural capability of the basin to retain water

The α factor is set by district or GSA policy and would include an estimate of the applied recharge water lost to evaporation as well as a proportion of "leave-behind" water that would contribute to the recovery of depleted groundwater conditions in the aquifer. Estimates of evaporative losses range from 2-8% of applied water. The district or GSA board would choose the appropriate evaporative loss and set the "leave-behind" proportion balancing the interests of the individual recharger with the needs of the basin as a whole. A GSA might estimate the evaporative losses to be 2% during the cold winter months, and may add a 10% leave-behind, so that the maximum credit to a grower would be 88% of the total water applied ($\alpha = 1 - 0.02 - 0.10 = 0.88$). A GSA or district might increase the estimate of evaporative losses if recharge takes place later in the growing season or subtract crop evapotranspiration if recharge takes place when crops are actively growing.

The β factor is the rate at which a grower's credits depreciate or decay in their account, and it should be based on physical characteristics of the groundwater basin. It is meant to reflect the physical reality that water does not reside in the aquifer indefinitely but moves laterally out of the basin or vertically into lower strata where it is not recoverable for irrigation. This factor can be informed by groundwater modeling and can include policy considerations such as ease of accounting. For example, one district allows growers to accrue groundwater credits up to a certain volume in their account with no depreciation for the first 5 years. Once credits have remained in the account for 5 years, a decay rate of 20% per year is applied for the next 5 years. After 10 years all credits will be

[3] Dillon, P., J. Ward, S. Megdal, Y. Zheng, W. Alley, W. Hipke, P. Thomas, D. Tuthill, and R. Carlson, 2022, Considerations for Water Resources Planning and Management, in Managed Aquifer Recharge: Overview and Governance. IAH Special Publication. https://recharge.iah.org/ ISBN 978-1-3999-2814-4

exhausted (A. Fukuda, Tulare Irrigation District, personal communication). Because growers on groundwater allocations will likely be extracting recharged water in the near term for irrigation (R_i in the equation above) and state law requires "last in, first out" accounting for recharge water extracted, it is unlikely that a grower would accrue excess credits for long periods of time.

Benefit to the grower:

A landowner or grower in a district with pumping allocations is often faced with a groundwater budget that is not adequate to support their desired crop. Recharge credits allow the grower to earn more irrigation capability. This may allow the grower to retain more high-value, high-water-demand crops.

Benefit to the district:

A groundwater crediting system requires that the GSA or district have in place an accounting system that is transparent to the grower, as well as the capability to measure and record recharge water applied by each account holder. Once these elements are in place, the costs to maintain the program are in-kind costs of personnel to manage the water application and accounting systems. There is no cash outlay to individual rechargers.

Avoiding common pitfalls:

The recharge crediting system must be carefully designed to attract and retain grower participation while balancing benefits to the basin. If the efficiency and decay factors are set too low, there is a risk of growers being entitled on paper to pump more water than is retained in the aquifer.

Surface Water Bill Credit or Discount

What is it?

A district may wish to incentivize grower use of surface water when available and provide an accounting incentive to growers for doing so. One district used a surface water bill credit to reward growers participating in the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Recharge Pilot Program. The district provided a water bill discount equal to 15% of the NRCS contract up to $100,000. This one-time surface water bill credit provided a reward for direct recharge as well as extra incentive for growers in the district to use surface water in lieu of groundwater during the irrigation season. Other districts in California have used discounted surface water pricing to encourage in-lieu recharge, not associated with direct recharge or the NRCS cost share program. Two districts use tiered surface water pricing such that surface water costs less per acre-foot as a grower reaches certain thresholds of volume purchased. Another district reported that they attempt to set surface water prices lower than the cost to a grower to pump groundwater.

How the incentive is established:

The district board sets pricing based on their costs to purchase and deliver water, and their overhead costs for maintaining and operating the delivery system. The board can choose to incorporate a discount or to subsidize those prices at a level that is sustainable for the district while promoting the use of surface water over groundwater.

Benefit to the grower:

This type of incentive relies on a grower to choose surface water supplies over pumping groundwater based on the price of water. The surface water pricing incentive may be invisible to the water user – they simply shift their water source away from groundwater

pumping and toward surface water supply because it is the lowest cost to their operation. They purchase and use water from the irrigation district within existing systems. A grower does not have to implement direct recharge to benefit from the program and to provide benefit to the groundwater resource.

Benefit to the district:

The district can encourage in-lieu recharge using discounted pricing or bill credits without a cash outlay to rechargers. Pricing is revisited by the district board at regular intervals and can be adjusted regularly.

Avoiding common pitfalls:

This type of incentive is typically used in districts with reliable access to surface water. It can be difficult for district boards to set pricing for surface water that adequately covers costs in any given year, and adding a discount to promote in-lieu recharge may not be economically sustainable for the district.

Cost-Share Construction or Operation of Groundwater Recharge

What is it?

A district or GSA helps a landowner conduct recharge by reimbursing a portion of the costs to the grower for preparing a field to receive water. Examples might include the on-farm extension of delivery systems for flooding the field, such as pipelines and valves; flow meters or other measuring devices to measure applied water; and land grading or leveling to allow flood irrigation. The district may reimburse costs for conducting the recharge event(s), such as labor time for irrigators and pumping costs to move the recharge water to the field.

How the incentive is established:

The district sets incentive rates or percentages based on estimated costs for the activities it wants to promote and the budget available to its incentive program. Some sources of cost estimates for farm operations may come from University of California Crop Cost Studies or from the USDA-NRCS payment schedules for conservation practices. The district enters a contract with each grower to set the parameters of the recharge project plan, timeline, and reimbursement procedures.

Benefit to the grower:

Cost-share incentives are attractive to growers who are already interested and willing to do on-farm recharge and need assistance to cover new operational costs associated with recharge practices that are not balanced by an increase in farm income.

Benefit to the district:

Districts are not responsible for managing the on-farm recharge operations of growers. A district can work with willing landowners to develop specific on-farm recharge plans and expand their recharge capability at relatively low cost. By closely working with "early adopters" of recharge, districts build valuable relationships with growers who can influence the expansion of on-farm recharge in the district, and benefit from operational "lessons learned" to improve recharge incentive programs in the future.

Avoiding common pitfalls:

This type of incentive runs the risk of cost outlay without immediate return, because farms must invest in preparations for recharge before the wet season. If the winter turns out to be dry and no recharge water is available, the return on investment is either lost, in the case of annual costs like tillage or land shaping; or extended into subsequent years, in the case of durable infrastructure

like pipelines or valves. Districts should factor this into their payment schedules for cost-share.

Variation on the theme – cost-share for in-lieu recharge infrastructure

Districts may use a similar approach to incentivizing in-lieu recharge rather than direct recharge. Several districts in the survey reported that they promote in-lieu recharge by helping farmers dependent on groundwater access new surface water supplies. The district might invest in establishing new turnouts from their delivery canals, enlarging existing turnouts or conveyances to eliminate bottlenecks, upgrading to automated gates and water meters to allow more timely and accurate surface water deliveries, or annexing new lands and building new conveyance structures to serve groundwater-dependent areas. The district may then cost-share on farm improvements required to connect to surface water or to shift from groundwater sources to surface water. These might include pipelines, pumps, filter stations, or other infrastructure on the farm.

Benefit to the grower:

Growers or landowners get access to new surface water sources or improved reliability of existing surface water connections.

Benefit to the district:

Expanding access to surface water supplies may make it possible for the district or GSA to deliver surface water to areas most affected by groundwater depletion and target direct and in-lieu recharge to those areas.

Avoiding common pitfalls:

Newly annexed land may have junior rights to surface water supplies compared with land originally in the district, creating a tiered system of irrigation water delivery. This may mean that in years of water scarcity, those areas would still receive little or no surface water, and the challenges associated with mitigating groundwater depletion and the undesirable groundwater outcomes would remain.

Fallowing Lease for Groundwater Demand Reduction

What is it?

This is an incentive for groundwater demand reduction, not for direct recharge. A water district or GSA enters into a lease agreement with a landowner or grower to retire a parcel of land from irrigated agriculture for a specified duration; examples range from 3- 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 loss of crop revenue.

How the district establishes the incentive:

GSAs or districts that use this incentive typically do not have access to ample surface water, and their focus is on reducing groundwater demand in the basin. The district can calculate from its water budget a target number of acres to be fallowed, either permanently or in rotation, to meet some portion of its demand reduction needs. The district will need to identify a funding source and establish a per-acre fee to be paid to growers.

Benefit to the grower:

Growers facing groundwater allocations that do not provide enough water to support their preferred crop can rotate some portion of their acreage into fallow for an extended period and recoup some income from the land. Their operating costs on that land will be reduced as well. Depending on GSA or district policy, they may be able to transfer some of their groundwater allocation to other acres for crop production. Permanent crops may benefit from an extended fallow period, which

can break pest and disease cycles before the land is replanted. Farmers may be able to keep land in a long-term agricultural rotation or transition to an agricultural system or other land use with lower water demand that still provides income and value to the landowner.

Benefit to the district:

Fallowing leases promote an orderly transition of irrigated land to other land uses. The district can more accurately forecast irrigation water demand and groundwater extraction at the district level. The district may choose to scale incentives to prioritize areas where demand reduction would have additional benefits like slowing subsidence or raising water levels in drinking water wells. Other beneficial practices can be stacked on fallowed land, such as establishing a recharge basin, planting pollinator habitat groundcovers, or creating additional flood capacity along waterways.

Avoiding common pitfalls:

Lease rates must be set so that they are attractive to landowners and affordable for the district. Fallowed land may not be acceptable to the community due to potential issues of weeds, pests, vandalism, and lack of management. Lease contracts with landowners should address these concerns.

Examples of fallowing leases with additional benefits like flood risk reduction, recharge, and restoration are as follows:

- **Fallowing lease for groundwater demand reduction and conversion of irrigated land to a short- to medium-term (3-10 year) recharge basin.** In this example, a water district approves the project and design of a recharge basin, and the district is responsible for the operation and maintenance of the recharge basin. The landowner or grower performs or sub-contracts the construction of the basin. The district reimburses some portion of construction costs to the grower and pays an annual fee per acre per year for fallowed land occupied by the recharge. If flood releases are available during the lease period, the district directs water into the basin for recharge. The grower may receive a percentage of the applied water as a pumping credit.
- **Fallowing lease for groundwater demand reduction, habitat restoration, and flood risk reduction.** Here, the GSA enters into a mid-term (3-10 year) lease agreement with landowners to fallow parcels of land along natural waterways and restore riparian habitat on those lands. The restoration may include land shaping to reconnect or establish floodplain areas, allowing water to safely expand along the waterways and reducing flood risk. Alternatively, growers could fallow upland parcels and plant groundcovers that benefit pollinators or other wildlife and use a fraction of the water required for crops.
- **Orchard swale rewilding.** In this variation, permanent crops and irrigation systems are removed from low-lying portions of a field, leaving the balance of the field in crop production. The low-lying areas or swales are no longer irrigated and are planted with groundcovers that protect the soil and provide co-benefits such as native vegetation or pollinator habitat and may serve to collect and infiltrate local rainwater runoff in the winter. This method incrementally reduces irrigated acreage for the farm and may be more attractive to growers because they can continue to farm the same overall footprint of land.

INTEGRATING INCENTIVES INTO A GROUNDWATER RECHARGE PROGRAM

Each district or GSA approaches a recharge program differently, based on the physical characteristics of the watershed and groundwater basin, groundwater conditions, and access to surface water for direct and in-lieu recharge. Administrative relationships as well as physical relationships with neighboring districts and GSAs within a basin profoundly impact the opportunities and challenges for each entity considering a recharge program. Each district's recharge program is unique and reflects the district's geographic realities, its access to different water resources, the community both inside and outside its borders, and its history and experience.

Areas with More Surface Water Access

Some districts and GSAs emphasize groundwater demand reduction or in-lieu recharge rather than direct recharge. In some cases, the district has secure access to surface water supplies, and it is more cost-effective to maximize surface water deliveries to replace groundwater use than to invest in direct recharge strategies. In other cases, the soils, geology, or landscape position of the district are not suitable for direct recharge. Incentives for using surface water instead of groundwater for irrigation can be used in districts without groundwater accounting systems or groundwater pumping limits. This "carrot" approach without the "stick" of groundwater pumping limits is often used in districts where the degree of overdraft is not as severe or where surface water supplies are relatively reliable and plentiful.

CASE STUDY

South San Joaquin: Leaning into in-lieu

The South San Joaquin Irrigation District (SSJID), located along the eastern edge of the Sacramento-San Joaquin Delta, sits low in the landscape. Farmers there worry about shallow water tables affecting crop roots, and drainage of the landscape is a persistent concern during the rainy season. SSJID enjoys senior water rights to water from the Stanislaus River and has several reservoirs to add supply management stability. However, SSJID lies within the Eastern San Joaquin groundwater basin, designated under SGMA as a High Priority and Critically Overdrafted groundwater basin. SSJID, which is also the South San Joaquin GSA, collaborates with 15 other GSAs in the basin to implement a single GSP. Because direct recharge is infeasible in the SSJID due to lack of suitable soils and geology, SSJID has taken the approach to maximize surface water usage in the district to replace groundwater use for irrigation. SSJID has undertaken efforts to improve delivery systems, upgrading to automated gates and digital water ordering systems, and eliminating bottlenecks in canals or turnouts that may have discouraged farmers from using surface water in the past. They have provided surface water to new customers and are considering annexation plans to expand surface water access to neighboring lands. If demand grows in neighboring districts, SSJID may consider out-of-district water sales to offset groundwater pumping there. In this way, SSJID is able to leverage its strengths to contribute to groundwater sustainability in the Eastern San Joaquin basin.

Areas with Less Surface Water Access

Districts or GSAs with a greater degree of groundwater overdraft or with less access to surface water supplies tend to lean more toward direct recharge and demand reduction strategies and are more likely to implement groundwater pumping limits and a groundwater accounting system for farms. To accomplish direct groundwater recharge, there must be areas within the district or GSA that are physically suitable, and the district must have access to surface water supplies above irrigation demand and the ability to deliver that water to appropriate sites for recharge. Using on-farm recharge as part of the strategy adds recharge capacity to the district's infrastructure at low cost, with the trade-off that more management time is required to enroll farmers in a recharge program and track the recharge water applied on private land. For farmers, a limit on groundwater pumping is a powerful motivation to participate in direct recharge. Farmers can secure some degree of water supply stability by generating accounting credits to pump irrigation water.

Measuring and Accounting for Recharge

When districts establish an on-farm recharge program, they must consider how recharge efforts will be measured and accounted for at the basin scale and at the project or farm scale. A groundwater budget is required in each GSP, and these budgets can help a GSA set quantitative goals for managed aquifer recharge in the basin. From those goals, a GSA can apportion recharge efforts among the most feasible strategies. Methods to measure recharge must be integrated into planned recharge projects and management actions. It is important that projections of achievable recharge be realistic and that measurement and accounting methods be as accurate as possible so that the GSA can demonstrate real progress toward sustainability goals.

Water applied for recharge is a critical piece of information for calculating either direct financial incentives or accounting credits for the grower. Surface water delivered for recharge should be measurable at the field scale, and measurement methods will depend on the physical infrastructure in place in the district and on the farm. A flow meter might be used to directly measure water delivered to the farm or field through a pipeline, or the water delivery might be calculated based on the capacity of the farm's turnout and the length of time the turnout is flowing. Measurement methods are often already in place for irrigation water delivery, and the district must consider whether its existing system is adequate for the recharge program or if more or different equipment is needed.

The district must consider who will be responsible for collecting data. Staff time to collect data represents a cost to the district, with the benefit that results may be more consistent between farms. If growers are responsible for collecting and reporting water applied, the district should establish methods to verify or corroborate the data.

Infrastructure Changes

For incentives that require physical or management changes to the farmland itself, such as cost-share on farm equipment to enable recharge, construction of a recharge basin, or land fallowing leases, the district must establish payment rates and performance standards for each activity or installed practice. Payment rates may be flat-rate, or districts may allow participants to bill for actual costs of labor and materials. To manage costs, districts may choose to pay a percentage of the total project cost or may cap the payments available to participants. The district must decide how to verify that the activity or installed practice is completed and meets the performance standard. Many incentives will require a contract between the district and the landowner or farm operator,

and the contracts should specify the recharge activity to be completed, responsibilities of both the district and landowner, timeline and budget for the project, and conditions that must be met for payment to be made.

Summary of Program Development

An on-farm recharge program, in combination with other district-scale strategies for direct recharge, in-lieu recharge, and groundwater demand reduction, can be an important component of a district's groundwater sustainability plan. For an on-farm recharge program to be successful, growers must be motivated to participate, because performing groundwater recharge is a significant change to their farming system, takes labor and resources, and does not directly contribute to the profitability of the farm. Some incentives, such as groundwater pumping credits or surface water accounting credits, create an intrinsic motivation for the grower to perform direct recharge or to reduce groundwater use.

Direct payment incentives such as payments per acre-foot of water recharged or cost-share for recharge infrastructure or management will require more outreach to recruit willing participants, because these incentives are driven by district objectives for groundwater sustainability rather than an intrinsic benefit to growers. Direct payment incentive types allow a district to shape the on-farm recharge program to meet different groundwater goals by directing recharge projects into certain locations, such as greater incentives for recharge near communities with vulnerable wells. These types of incentives are most often offered in GSAs that do not have groundwater allocations or that reserve the groundwater recharge credits for the basin, rather than granting pumping rights to the landowner for water recharged. Many districts successfully combine two or more different types of incentives, depending on the needs and preferences of the landowner community.

FUNDING AN INCENTIVE PROGRAM

An important consideration for starting or expanding a recharge incentive program is the question of how to pay for the incentives. Many districts blend multiple revenue sources to pay for financial incentives, and use existing resources – staff, accounting and management infrastructure, physical water systems, partnerships with other agencies – in new ways to support incentives. Possible funding mechanisms can include self-funding by the GSA or district, and grant funding from state government, federal government, or private entities.

Self-Funding

The GSA or district can allocate existing funds, funds generated from user fees and assessments, or special tax revenues to support incentive programs. Loans from various sources could also be used. DWR's Sustainable Groundwater Management Office (SGMO) has published guidance for GSAs on how to select and develop self-funding streams using the authorities granted to GSAs under SGMA in its Resource Guide: Funding SGMA Implementation (DWR, 2024). This guidance can help GSAs understand their legal and administrative obligations associated with different funding streams and select the strategy that fits their situation best.

CASE STUDY

A community-based voluntary funding model for on-farm recharge in the South Colusa and North Yolo (SCNY) partnership

Two GSAs in the Sacramento Valley are collaborating on an innovative method to fund on-farm recharge projects—voluntary grower fees to support recharge. The Colusa and Yolo subbasins are neighbors, and both are designated as high priority basins for SGMA. Local landowners came together with the Yolo Subbasin Groundwater Authority and the Colusa County Groundwater Authority to address concerns about groundwater conditions and land subsidence in portions of the two basins, the South Colusa Area of Interest and the North Yolo Management Area. A coalition of landowners, water districts, and local groundwater experts began to work together on a strategy to advance recharge efforts in this focus area that covers the boundary between the two GSAs. Local interest in recharge was strong, but there was no widespread agreement within the broader GSA areas on spending groundwater user fees to support recharge on farms in the smaller focus area.

The SCNY coalition enrolls area growers voluntarily in the recharge program. SCNY collects a fee based on acreage enrolled and level of groundwater use. The funding is pooled to purchase water for landowners to use for recharge, and to fund in-lieu and direct recharge projects on farms within the partnership area. Fees are carefully tracked and are allocated proportionally to the basins from which they are collected. The SCNY group has secured grant funding to help cover costs of infrastructure like pumping stations and has leveraged relationships with water suppliers and neighboring districts and GSAs to procure the recharge water. Participating growers receive annual Water Accounting Year (WAY) statements that document the total recharge achieved in the SCNY area and the amount of recharge credited proportionally to that member's contributions. Participants can request funding from SCNY for specific direct or in-lieu recharge project costs by submitting a project proposal. Proposed projects are selected by the SCNY Operating Team based on costs and level of impact to groundwater resources and subsidence areas. The SCNY coalition's voluntary approach to self-funded recharge is a model for a proactive response to undesirable groundwater conditions that engages landowners with the GSAs in a feasible, equitable effort to avoid forced demand management.

Grant Funding

Grants can be attractive funding sources because they do not impose additional costs on ratepayers and they do not need to be repaid. However, staffing and administrative resources needed to develop a grant proposal and to manage the grant-funded project(s) when an award is received can be significant. Competition can be fierce for limited grant funds, and grant funding is temporary and would need to be renewed or replaced to sustain incentive programs over the long term.

Agencies of the state of California offer a multitude of grant programs to meet various objectives of legislation. Grant programs come and go according to changing priorities and budget decisions of the California legislature. Grant programs are made available when funding is allocated by the state, and do not always have predictable application periods. The following are examples of current or past programs that have been used to fund groundwater recharge incentives for either direct or in-lieu recharge, or groundwater demand reduction.

The Department of Water Resources (DWR) offers grant programs that can be used to support groundwater recharge for the purpose

of groundwater sustainability, or to implement recharge projects that deliver co-benefits such as improving groundwater supply for communities, reducing flood risk, and sustaining groundwater-dependent ecosystems. These include:

- **Sustainable Groundwater Management** (SGM) grants are designed "to promote healthy and sustainable groundwater basins, to reduce and eliminate undesirable effects, and to promote projects that provide multiple benefits while also improving groundwater supply and quality" (DWR, 2026). Incentive programs can be supported or initiated with this funding, as a part of a GSA's larger GSP implementation. Funding is not sufficient to support every GSA's efforts, and there may be significant competition from similar projects across California.

- **Integrated Regional Water Management** (IRWM) grants support long-running IRWM planning and implementation efforts that have been underway in localities across California for more than 20 years. This program can support groundwater sustainability projects as integrated with a broader IRWM plan. IRWM plans have a broad scope, and so there may be greater local competition for this funding.

- The **Riverine Stewardship Program**, the **Urban Streams Restoration Program**, and the **Flood Corridor Program** are examples of grant programs that could be used for groundwater recharge projects that provide significant co-benefits to ecosystems or flood risk reduction. Groundwater recharge is not the primary objective of these programs and so benefits to groundwater may be secondary to ecosystem or flood risk reduction outcomes.

- **Proposition 4**, also known as the **Climate Bond**, was approved by California voters in November 2024, and will make substantial funding resources available for groundwater sustainability, multibenefit land repurposing (see program description below), nature-based solutions, and drought, flood, and water resilience. Specific programs that will be funded through Proposition 4 include those mentioned above and the Watershed Resilience Program. New programs supporting groundwater recharge and conjunctive use of surface and groundwater sources may emerge from Proposition 4.

- **LandFlex** was launched in 2022 after 3 consecutive years of drought in California. This program provided $25 million to GSAs to incentivize growers to reduce or eliminate groundwater use near communities with drought-vulnerable drinking water wells. While this program is not currently active, similar demand-reduction activities could be funded through Proposition 4.

The California Department of Conservation (DOC) launched its **Multibenefit Land Repurposing Program (MLRP)** in 2022 in response to the projected need to reduce or eliminate groundwater demand on 500,000 or more acres of irrigated farmland to comply with SGMA. This program aims to transition irrigated agricultural land into lower water uses to reduce groundwater demand while simultaneously providing benefits to community water resilience and health, economic well-being, wildlife habitat, and climate resilience. Several GSAs have used this program to support groundwater demand reduction efforts as a part of their overall sustainability plan. The enabling legislation for this program specifies that any direct groundwater recharge resulting from MLRP-funded projects may not be extracted later for beneficial use, with some exceptions[4], and so groundwater recharge is often treated as an ancillary benefit of MLRP projects.

Federal grant and financial assistance programs

may also be available to GSAs, districts, and landowners engaging in recharge. The **U.S. Bureau of Reclamation** (USBR) administers WaterSMART, a financial assistance program "to support water management improvements planning and design activities, watershed management projects, a comprehensive approach to drought planning, implementation actions to proactively address water shortages, and other similar projects that contribute to sustainability in the Western United States" (USBR, 2026). WaterSMART encompasses grant programs for project planning or implementation in several different focus areas such as **Basin Studies, Climate and Hydrology Studies, Water and Energy Efficiency, Aquatic Ecosystem Restoration, Enhancing Water Resources, Small-Scale Water Efficiency,** and **Drought**. States, tribes, irrigation and water districts, and state, regional, or local entities with water or power delivery authority in the Western U.S. are eligible to apply.

The **Natural Resources Conservation Service** (NRCS), an agency of the **U.S. Department of Agriculture** (USDA), partners with USBR on WaterSMART through the **Environmental Quality Incentives Program** (EQIP) **WaterSMART Initiative** (WSI). A GSA or district that has received funding from a qualifying WaterSMART grant program can apply to the NRCS for EQIP-WSI funds to support farm-level improvements in the GSA or district that align with the paired USBR-funded project. On-farm projects can include irrigation efficiency infrastructure, irrigation water management strategies, and implementation of direct recharge under the Interim Conservation Practice Standards for On-Farm Recharge (NRCS code 817) and Groundwater Recharge Basin or Trench (NRCS code 815). Availability of these Interim Conservation Practices through general EQIP funding pools is limited.

Foundations and private funders, such as corporations interested in offsetting their water use, may also provide grant funding for groundwater sustainability efforts. These are especially attractive due to their relatively lower reporting requirements compared to government grants. Foundations are interested in projects that align with their strategic vision, which often involve multiple outcomes that benefit both people and nature. Corporations typically fund one-time investments into construction projects, require volumetric accounting of water benefits, and can involve a maintenance term of up to 10 years. In both cases, GSAs or districts can work with partner non-profit organizations that have existing relationships with foundations or corporations and can help to match suitable projects with potential funding sources.

Partnerships

While not a direct funding source, creative partnerships can leverage resources of a GSA or district to support on-farm recharge. For example, a GSA with limited water supply may look to neighboring districts or GSAs for water purchase or trading opportunities, especially those within the same groundwater basin who may benefit from overall improvements to groundwater conditions. Both growers and the recharge program benefit from such a partnership when more water is available for recharge purposes.

GSAs or districts that receive water from federal- or state-managed reservoirs might work with the agency that controls reservoir operations to advance Forecast-Informed Reservoir Operation (FIRO). Originally conceived and tested to optimize water storage and reduce flood risk by delaying releases from reservoir storage until an atmospheric river is predicted, FIRO strategies can make more water available

[4] MLRP Round 2 Guidelines (2025), page 10, "Definition of Groundwater Recharge Benefits for Purposes of MLRP" https://www.conservation.ca.gov/dlrp/grant-programs/Documents/MLRP%20Round%202%20Guidelines_Amended%20April%202025.pdf

for recharge in downstream basins. The San Joaquin Basin Flood-MAR Watershed Studies released by DWR in December 2025 showed that FIRO coupled with recharge in an approach called Integrated Forecast-Informed Resource Management (I-FIRM) could improve future groundwater outcomes compared with a business-as-usual scenario.

A GSA might explore opportunities to establish a water bank in partnership with entities that have rights to water that must be moved long distances through the state and federal water systems. Farmers benefit when agricultural lands are used as infiltration fields because they get to keep the water that remains in the root zone for their crops and salts may be leached below the root zone, and GSAs can gain "leave-behind" water in the basin as part of the banking agreement.

On-farm recharge in Western Yolo County

FUTURE DIRECTIONS

GSAs that are developing a groundwater recharge program may find a range of useful policy models already implemented in other districts. For example, some GSAs that offer low-priced recharge water must ensure that growers use the water for recharge and not for irrigation as a stipulation of their water purchase contracts or water permits. As a result, they might set a limited time during the off-season when the water is discounted, they might prioritize on-farm recharge to fallowed fields, or they might establish a monitoring or reporting method for ensuring that all delivered recharge water has infiltrated by a certain date.

GSA leaders should build adaptive management into their recharge program, and plan to periodically evaluate and update their policies to address problems that arise in early implementation or to respond to new data or scientific methods. For example, when GSAs use evapotranspiration (ET) data gathered from remote sensing to calculate a grower's groundwater consumption, a grower's groundwater account might be debited when a winter cover crop is present. This could have an unintended consequence of discouraging cover crop use, even though recent science in California has shown that in many cases, water loss from cover crop ET is very similar to evaporation losses from bare soil, and that cover crops can improve retention of precipitation by increasing infiltration and reducing runoff losses (Cover Cropping in the SGMA Era, Sustainable Conservation, 2024). The East Turlock Subbasin GSA has incorporated this information into the

effective precipitation credit that is used to calculate a grower's groundwater budget—a field with cover crops is credited with 11% or 14% greater effective precipitation than a bare field in wet and dry years, respectively (East Turlock Subbasin GSA Rules and Regulations, 2025). A GSA might need to re-evaluate recharge program policies or approaches due to GSP updates, due to observed outcomes of their target SGMA metrics, when they adopt newer or better tools for groundwater accounting, groundwater modeling, or groundwater consumptive use evaluation, or to respond to grower demands, experiences, or recommendations.

GSAs could identify opportunities for collaboration with other local programs to leverage on-farm recharge projects for multiple environmental and societal benefits. On-farm recharge projects could provide cross-over benefits to regulatory programs such as the Irrigated Lands Regulatory Program or Nitrate Management Zones, assist in local plans for flood risk reduction or air quality improvement, or complement efforts to expand wildlife and pollinator habitat. Funding or in-kind resources such as well monitoring data could be shared to help each entity reach its goals.

In addition to financial assistance, **GSAs may consider offering technical or regulatory assistance to help growers accomplish recharge.** GSAs might engage local Technical Service Providers like Resource Conservation Districts, Certified Crop Advisors, or University of California Farm Advisors with experience in planning and carrying out recharge to work individually with growers, or sponsor on-farm workshops to expand grower adoption of recharge practices and programs. Growers may need assistance to access water sources for recharge, and GSAs could help them comply with Water Code §1242.1 requirements when excess flood water is available under that authority, or a GSA may help facilitate water purchases to bring surface water supplies to growers who are solely dependent on groundwater.

Groundwater recharge is an essential tool to address groundwater sustainability and to mitigate climate change impacts on the water cycle in California. Expanded recharge on working lands is an important component of an overall recharge program, and landowners must be willing to participate actively in recharge activities. Incentives are an important tool for GSAs and districts to engage with landowners and earn their trust as partners in groundwater sustainability efforts.

On-farm recharge in Western Yolo County