Water Bank Q&A Connect

As of June 26, 2024

Each week, the Water Bank Program Team will address questions provided by stakeholders. Questions may include those from a single stakeholder, or the Program Team may combine similar questions and provide comprehensive answers about the Water Bank. Questions and answers will also be posted on the Water Bank website at SacWaterBank.com/engage. Additional questions may be submitted to the Water Bank program email at waterbankinfo@rwah2o.org.

1: Stakeholder Engagement

Question: What is RWA's plan to encourage and capture ongoing stakeholder input?
RWA, with support of the Program Team, initiated the public engagement process to gather input from and include stakeholders in the development of the Water Bank.

The Program Team is planning to gather stakeholder input through a series of Stakeholder Forums (public meetings), as well as small group meetings with stakeholder groups (as initiated by RWA and/or requested by stakeholders).

During Stakeholder Forums, the Program Team will present information on specific topics with a goal of creating a common understanding about subject areas, gathering comments and answering questions whenever possible. During the first Stakeholder Forum, for example, RWA staff provided a review of water sources in the Sacramento region, projected climate change impacts, and discussed how water banking works. Future Stakeholder Forums will cover Water Bank principles and governance, operational alternatives, and scoping for an environmental analysis among other topics.

Question: I'm new to the Water Bank, how do I catch up and learn about what has been developed and/or discussed?
Perhaps the best place to start is to listen to the recording of the first Stakeholder Forum (link below). The presentation from this event is also available for downloading. In addition, there is information available on our Water Bank website (https://rwah2o.org/sacramento-regional-water-bank/).

Question: How do we effectively engage with RWA in the implementation of the Water Bank beyond Q/A sessions?
The Water Bank Program Team is holding small group meetings with stakeholder groups. If you or your group is interested in meeting with the Program Team, please contact us at waterbankinfo@rwah2o.org. You can also submit questions and provide input through that email.

2: Conjunctive Use and Groundwater Fundamentals

Question: What does conjunctive use mean?

Conjunctive use is a term used to describe the planned use of both surface water from lakes and rivers and groundwater via wells to maximize total water availability in a region long term. How conjunctive use works:

- During wet times, when lakes and rivers are full, local water providers shift to using more surface water. This allows our groundwater aquifers to refill, as actively monitored by local water providers.
- During dry times, local water providers shift to using more groundwater. This leaves more surface water in rivers to sustain the environment.

It is important to note that successful conjunctive use requires taking action not only in wet or dry times, but in both times.

Conjunctive use has been ongoing in the Sacramento region for over the past 20 years and is credited with helping the region's groundwater levels, once in steep decline, recover to sustainable levels. This conjunctive use is, essentially, water banking on a small scale. The Sacramento Regional Water Bank, under discussion through this Stakeholder Engagement process, would allow for expansion of conjunctive use in the Sacramento region.

Question: Is it possible to anticipate drought years? How will the Water Bank and conjunctive use work through droughts that last longer than anticipated?

Like predicting the local weather forecast, which is not possible with much accuracy beyond 7-10 days, it is not possible to predict the exact timing of future dry or drought years. However, local water managers are able to plan projects and water management actions under different future climate scenarios through long-term planning and surface and groundwater models that forecast the effects of both wet and dry years on our region's water supply. Scenarios include those that project how our region's climate has changed and will continue to change to one with longer and hotter dry spells, and shorter more intense wet periods with less snow. Conjunctive use projects and management actions are a proven effective means to adapt to those changes.

It is also worth noting that local water providers have been practicing conjunctive use (essentially, water banking on a smaller scale) for the past two decades, resulting in increased groundwater levels (see answer above). Groundwater levels have increased even during the current megadrought, the driest two decades in at least 1,200 years. This demonstrates how water banking can provide a reliable water supply and environmental benefits even during a prolonged drought.

Question: Geologically, can groundwater basins where groundwater levels have been drawn down receive recharge water at the same capacity as was naturally there?

First, it's important to know that the current footprint of the Sacramento Regional Water Bank generally matches the greater Sacramento region's urban area, which overlays portions of two groundwater subbasins, the North American and South American Groundwater subbasins. This location is unlike other basins in California that have experienced steep groundwater declines without recovery and land

subsidence (a condition in some basins where land sinks from over pumping groundwater) that can limit groundwater storage.

We also know from 20-plus years of monitoring that the basins, once in steep decline, were able to effectively recharge and recover to sustainable levels through conjunctive use. That said, it is natural for groundwater levels to reflect cyclical changes over time that generally match dry and wet water year types. In other words, we have observed groundwater levels decline slightly after a dry year or consecutive dry years, and increase slightly during a wet year or consecutive wet years. However, active conjunctive use has consistently stabilized and maintained groundwater levels over time.

Unless there are unique conditions such as land subsidence, which is not occurring in the North American and South American Groundwater subbasins at levels that limit groundwater storage, this natural recharge, aided by conjunctive use, occurs consistently, and the groundwater capacity in the aquifers returns to the same levels.

3: Sacramento Regional Water Bank Roadmap and Schedule

Question: When will the Water Bank be operational?

Local water providers have been practicing conjunctive use (essentially, water banking on a small scale) for the past two decades. However, the Sacramento Regional Water Bank (referred to as Water Bank) will require additional analysis and public engagement to become fully operational with the goal of earning federal recognition in 2024 (see answer below). In addition, funding will be needed to develop the infrastructure necessary to move surface water or groundwater around the region, according to availability. One of the most promising features of the Water Bank is that the network of groundwater wells, pumps and pipelines that make the bank possible can be added incrementally, as funding becomes available.

Question: What is the status of the Water Bank's development?

While the Water Bank has a 20-year foundation in conjunctive use, the development of a fully functioning Water Bank for the Sacramento region is in the early stages.

As mentioned during last week's questions, conjunctive use is a term used to describe the planned use of both surface water from lakes and rivers and groundwater via wells to maximize total water availability in a region long term. Conjunctive use has been ongoing in the Sacramento region for over the past 20 years and is credited with helping the region's groundwater levels, once in steep decline, recover to sustainable levels. This conjunctive use is, essentially, water banking on a smaller scale. The Water Bank, under discussion through this Stakeholder Engagement process, would allow for expansion of conjunctive use in the greater Sacramento region.

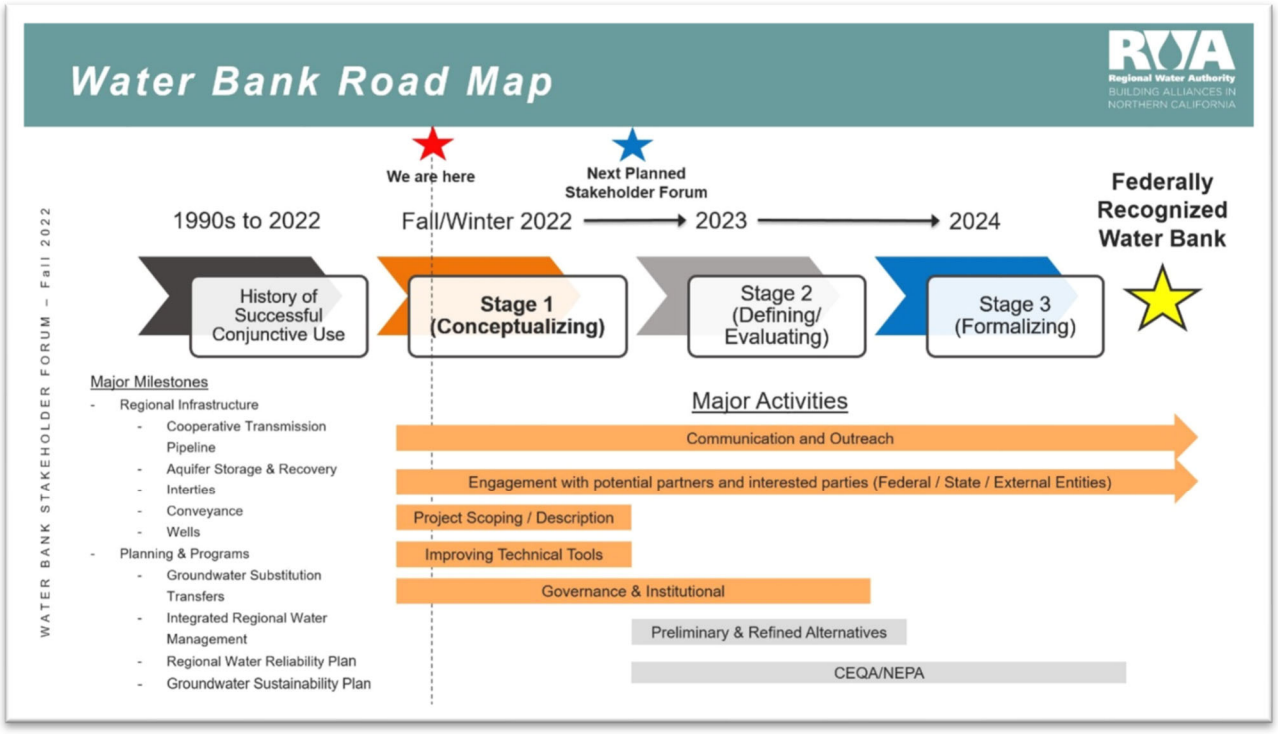
The RWA is coordinating the Water Bank's development on behalf of its members and is in the early stages of this work after launching the public engagement process in October 2022.

Currently, the Water Bank is in **Stage 1 (Conceptualizing):** The RWA, working with participating members, is in the process of defining the project scope and description, engaging with stakeholders and interested partners, and improving technical tools.

Upcoming stages include:

- **Stage 2 (Defining/ Evaluating)--**Expected late 2023: The RWA working with participating members will continue stakeholder engagement and work to define Water Bank governance and operations. This will include developing preliminary and refined alternatives to the Water Bank.

- **Stage 3 (Formalizing)--**Expected 2024: The Water Bank is expected to undergo an environmental process, which is to be defined, to become a federally recognized Water Bank.



Question: Will there be "practice" Water Bank runs provided in the proposed plan?

Local water providers have been practicing water banking on a limited and smaller scale through their implementation of conjunctive use over the past two decades, as well as groundwater substitution transfers, in the past several years. These smaller scale operations have demonstrated how the Water Bank would be successful at improving groundwater levels, water reliability, and water management to improve environmental conditions in the Sacramento region.

As part of the current Water Bank development process, the RWA, working with participating members, will outline how additional Water Bank operations, implemented through adaptive management, including full-scale operations, can be accomplished to provide water supply benefits while not negatively effecting the environment and other users of water. One of the most promising features of the Water Bank is that it can be increased incrementally (see answer above). This will allow water providers to continue to increase water banking as funding becomes available, as well as monitor groundwater conditions and make any needed adjustments.

4: Participants in the Sacramento Regional Water Bank and the Role of the Regional Water Authority

Question: Who are the participants in the Water Bank?

The Water Bank is a program supported and led by 19 water agencies, cities, and municipalities in the greater Sacramento area. Participating organizations include California American Water, Carmichael Water District, Citrus Heights Water District, City of Folsom, City of Lincoln, City of Roseville, City of Sacramento, El Dorado Water Agency, El Dorado Irrigation District, Elk Grove Water District, Fair Oaks Water District, Golden State Water Company, Placer County, Placer County Water Agency, Sacramento Area Flood Control Agency, Sacramento County Water Agency, Sacramento Regional County Sanitation District, Sacramento Suburban Water District and San Juan Water District.

Many of the Water Bank participating organizations have been and continue to be active in the region's long-time conjunctive use program, which as noted in the Week 2 Questions of the Week, allows water providers depending on the amount of rain and snowfall to shift to using surface water from lakes and rivers or groundwater via wells to maximize total water availability in our region long term.

Question: Who are the decision-makers for the Water Bank?

The participating water providers (listed above) are the primary decision-makers for the Water Bank, advancing this important water reliability program through applicable guidelines, legal and regulatory requirements. It's important to keep in mind that many of the regulations and water agency agreed upon water management conditions that guide water banking are already set. These include the Sustainable Groundwater Management Act (SGMA), policies set by the State Water Resources Control Board and U.S. Bureau of Reclamation, the Water Forum Agreement and, eventually will also include, requirements resulting from an environmental process.

In addition, stakeholders and the public have a role in shaping development of the Water Bank through this stakeholder engagement effort (see answers to Week 1 questions).

Question: What role will RWA have in administering the Bank?

Currently, the Regional Water Authority (RWA), with support from consultants and water agency staff and representatives, is leading the planning and technical analysis necessary to develop the Water Bank over the next couple of years. This group of individuals is referred to as the RWA Water Bank Program Team.

In the future, it is anticipated that RWA will continue to provide technical support to Water Bank participants, potentially including monitoring, accounting, and helping to secure funding.

5: The Role of the Environment and How Groundwater is Monitored

Question: The Regional Water Authority (RWA) goal or mission does not mention the environment. Are environmental concerns considered a stakeholder?

The RWA's mission is to *serve and represent regional water supply interests, and to assist members in protecting and enhancing the reliability, availability, affordability, and quality of water resources*. It is clear that stewardship of our environment is critical to water supply reliability, as well as to the Sacramento region's economy and quality of life.

Both the RWA and Sacramento Groundwater Authority (SGA), a sister agency to RWA with overlapping members and joint powers authority formed in 1998 to manage the groundwater basin in Sacramento County north of the American River, have their foundation in the landmark Water Forum negotiations and Agreement, which seeks to balance the coequal objectives: *Provide a reliable and safe water supply for the region's economic health and planned development through to the year 2030; and Preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River.*

In fact, the SGA's mission directly references the Water Forum Agreement: *To manage, protect and sustain the groundwater resources of the basin in Sacramento County north of the American River consistent with the Water Forum Agreement for the benefit of the water users within the basin, and to coordinate with other water management entities and activities throughout the region.*

Ultimately, the RWA is committed to advancing the Water Forum Agreement coequal objectives via the Water Bank.

Question: How will the volume of water in storage and extracted be measured and tracked over time?

The Water Bank's success relies on accurate and defensible monitoring and accounting of the water recharged (i.e. stored) and recovered (i.e. extracted) during water banking operations. In fact, under existing conjunctive use operations and future banking operations, water going into and out of the bank has been and will continue to be closely monitored and verified by local, state and/or federal entities. In addition, the Water Bank participating agencies have and will continue to monitor and analyze both surface water and groundwater conditions.

The monitoring system in the region is extensive and has been built up over 70 years. More recently over the last 25 years, significant investments have been made in tools such as groundwater and surface water models that make it possible to accurately calculate and forecast the potential effects of current conjunctive use and future water banking operations.

The investments the region has made in collecting quality data and development of tools provide water bank participating agencies with a high level of understanding as to the region's surface and groundwater conditions both now and into the future.

6: How Water Banking Works

Question: How are deposits and withdrawals made with the Water Bank?

The Water Bank uses our region's natural infrastructure—our groundwater aquifer—as a reservoir for depositing water during wet times for withdrawal during dry times. This natural infrastructure is enhanced with a collection of groundwater wells, pumps and pipes, which are all managed as one integrated system, that make it possible to make deposits and withdrawals from various locations.

It's important to understand that there is **natural groundwater recharge,** which occurs when:

- Rain falls on the ground surface and percolates underground
- Water flowing through creeks and rivers seeps through the sand and gravel into the groundwater aquifer
- Surface water flows into the groundwater basin at the base of the Sierra Nevada mountains

This natural groundwater recharge helps replenish the aquifer.

This natural groundwater recharge can be augmented and enhanced. This occurs through what is called **in-lieu recharge**. With in lieu recharge, water providers turn off groundwater wells during wet times and use surface water instead. This aids the replenishment of our aquifers. The Sacramento region is uniquely suited to expanding recharge using the in lieu method with the Water Bank.

Water providers can also deposit water into the Water Bank during wet times using **artificial recharge** means such as diverting water to fields or spreading basins, allowing water to percolate into the groundwater system, or through the use of injection or Aquifer Storage and Recovery (ASR) wells. ASR wells are dual purpose, allowing for the injection of surface water directly into the aquifer and then later extraction of groundwater with use of the same or different wells. The City of Roseville currently uses this process, and others in the region are working to add ASR wells.

Withdrawals from the Water Bank happen through a system of groundwater pumps and pipelines that draw and treat water from the aquifer and then deliver it to homes and businesses.

Question: Are agencies beyond the City of Roseville planning direct groundwater recharge using wells?

As mentioned above, with direct recharge, water providers can deposit treated water into the Water Bank during wet times using Aquifer Storage and Recovery (ASR) wells. ASR wells are dual purpose, allowing for the injection of surface water directly into the aquifer and then later extraction of groundwater.

The City of Roseville currently uses this process to capture surplus flows from Folsom Reservoir through their water supply contract with the U.S. Bureau of Reclamation and store this water in the groundwater aquifer. Just a year ago, Roseville stored enough water to fill 160 Olympic-sized pools. Later in 2022, they delivered that water to customers, leaving water in Folsom Reservoir to benefit our environment.

Several agencies are investing in groundwater wells that are capable of ASR. However, they are still early in the process to determine whether, how and when to move forward. ASR is a big commitment that requires substantial resources, commitment by the organization's elected leaders and public input.

7: Water Quality

Question: How do water providers know if water is safe to drink in the Water Bank area?

Although the Sacramento Regional Water Bank (SRWB or Water Bank) will extend and overlay the boundaries of two groundwater subbasins in the region, most of the region's existing conjunctive use and planned water banking activities are located within the greater Sacramento region's urban area. (As mentioned in Week 2, conjunctive use is a term used to describe the planned use of both surface water from lakes and rivers and groundwater via wells to maximize total water availability in a region long term.) This area also includes three primary surface water features (Folsom Reservoir and the American and Sacramento rivers).

In the Water Bank area, water is delivered to homes and businesses by public and investor-owned water providers that are required to adhere to tightly regulated water quality standards set by the U.S. Environmental Protection Agency and State Water Resources Control Board. Water providers monitor water quality on a continuous basis, and all water delivered to customers, whether groundwater or surface water, is tested to meet all federal and state drinking water quality standards. Moreover, water providers must report water quality data to the public every year through consumer confidence reports, which are typically posted online. These reports provide information about water sources, potential sources of contamination, health standards, aesthetic standards and lead and copper rules.

Many of the water providers that are participants in the Water Bank, have already been banking groundwater for many years through existing conjunctive use activities. All of the health-based water quality requirements described above are being met during existing conjunctive use activities and will remain in effect during the implementation and operation of the Water Bank. Through the continued monitoring and testing of all drinking water wells, the Water Bank will be operated to meet all federal and state drinking water quality standards.

Question: How do water providers monitor known and potential groundwater contamination in the Water Bank area?

As described in the answer above, local water providers are focused on meeting all federal and state water quality standards for their customers. In addition, water providers need to be aware of existing, evolving, and new groundwater contamination that has the potential to impact groundwater conditions, as well as emerging or new water quality constituents that could negatively impact the ability to provide water.

State and federal water quality regulatory agencies have a role informing local water providers of new developments related to groundwater contaminated areas. The Sacramento Groundwater Authority (SGA), a sister agency to RWA with overlapping members, also has a role. SGA is a joint powers authority formed in 1998 to manage the groundwater basin in Sacramento County north of the American River. SGA established the Regional Contamination Issues Committee—RCIC—a forum for water providers, regulators and responsible parties to raise issues and discuss solutions for dealing with groundwater contamination. The group has met continually since 2004 and has resulted in several studies and programs to evaluate and remediate groundwater contamination.

Question: Are there aesthetic differences between surface water and groundwater?

As mentioned above, all water delivered to customers, whether groundwater or surface water, is tested and treated to meet the same federal and state drinking water quality standards. Beyond safety, there can be some aesthetic differences in tap water, depending upon the source (groundwater or surface water, lake water or river water) and time of year.

The primary aesthetic difference encountered is in the natural variations in the "hardness" of the water, as well as in taste and temperature throughout the year, and often depends upon whether customers receive groundwater, surface water or a mix.

Hard water contains naturally occurring constituents such as calcium, magnesium among other minerals, which in the Sacramento region are typically found in higher concentrations in groundwater compared to surface water. Hard water can cause scale on plumbing fixtures and appliances; soap scum on shower walls, bathtubs, sinks and faucets; and reduced lathering of soaps, shampoos, and household cleaners.

Though hard water can be a nuisance, the concentrations of minerals observed in our groundwater supply that is provided to the public are not known to cause negative health-related effects in accordance with the standards set by the U.S. Environmental Protection Agency or State Water Resources Control Board and are enforceable by the California Division of Drinking Water and local health departments.

8: Federal Recognition

Question: What are the benefits of securing federal recognition for the Sacramento Regional Water Bank?

Many water providers in the Sacramento region have contracts with the federal government (referred to as the U.S. Bureau of Reclamation or Reclamation) to access water from Folsom Reservoir and other federal facilities. Currently, these federal water contractors (known as Central Valley Project—or CVP—contractors) are restricted to using or banking this water within their own service areas unless they have secured individual contracts with Reclamation allowing CVP water to be banked outside of a CVP contractor's service area.

Local water providers that are CVP contractors:

- City of Roseville
- City of West Sacramento
- El Dorado Irrigation District
- Placer County Water Agency
- Sacramento County Water Agency
- San Juan Water District

Specifically for the Sacramento Regional Water Bank, federal recognition would provide approval for local CVP contractors participating in the water bank to store excess surface water in the groundwater basins located in the greater Sacramento region outside of their service areas. This would enhance the region's ability to recharge the groundwater aquifer. A federally recognized water bank could also provide flexibility and environmental benefits to the statewide water system by allowing CVP contractors outside of the Sacramento region to store water here for later use.

Reclamation has recognized groundwater banking as an important water management tool for optimizing water supplies and has established guidelines for banking water. These guidelines outline the criteria for Reclamation to approve water banking actions and include requirements for establishing a water bank and banking operations.

For example, proposed water banks must undergo an environmental review per the requirements of the National Environmental Policy Act. The analysis must include, but is not limited to, the groundwater storage capacity, recharge rates, ability to recover, recovery rates, water quality, groundwater flow and movement, water losses, degree of aquifer confinement, and impacts associated with the operation of the bank. Also, entities banking water must provide detailed accounting records for deposits and withdrawals and an annual report summarizing cumulative banking actions.

Groundwater banking is not new in California, and nearly a dozen Water Banks have earned federal recognition, including:

- North Kern Water Storage District
- Rosedale-Rio Bravo Water Storage District
- Semitropic Water Storage District
- Tulare Lake Basin Water Storage District
- Cawelo Water District
- Lakeside Irrigation District
- Kaweah Delta Water Conservation District
- Kern Water Bank Authority
- Meyers Farms Family Trust
- Pixley Water Bank Project
- West Kern Water District Groundwater Bank

Question: Are there requirements for securing federal recognition?

Yes, there are requirements necessary to secure federal recognition. As mentioned above, for example, proposed water banks must undergo an environmental review per the requirements of the National Environmental Policy Act. The analysis must include, but is not limited to, the groundwater storage capacity, recharge rates, ability to recover, recovery rates, water quality, groundwater flow and movement, water losses, degree of aquifer confinement, and impacts associated with the operation of the Bank. Also, entities banking water must store more water than recovered, account for water loss and provide detailed accounting records for deposits and withdrawals and an annual report summarizing cumulative banking actions.

9: Interaction with the Sustainable Groundwater Management Act (SGMA)

Question: What is the Sustainable Groundwater Management Act (SGMA)?

The passage of the Sustainable Groundwater Management Act (SGMA) in 2014 set forth a statewide framework to protect California's groundwater resources in perpetuity. To avoid potential state control of groundwater, SGMA requires local agencies to form groundwater sustainability agencies (GSAs) and develop and implement groundwater sustainability plans (GSPs) to sustainably manage groundwater resources in the more than 100 high- and medium-priority subbasins located throughout the State.

The local agencies in the greater Sacramento region have met the initial requirements of the SGMA by forming multiple GSAs in both the North and South American Subbasins and have prepared, adopted and have begun implementing GSPs for each subbasin. These GSPs were developed based on a significant amount of data and information, comprehensive analysis and planning, and considerable stakeholder input.

At the time SGMA was signed into law, then-Assemblymember Roger Dickinson, a SGMA lead author, cited the Sacramento region's progressive management of the local groundwater subbasin as an inspiration for the landmark law. Noted a July 18, 2014 Sacramento Business Journal article, "Dickinson's Assembly Bill 1739 would ensure that every region had a system that performed the same function as the Sacramento Groundwater Authority, which sets a groundwater management framework and works to ensure adequate supplies year after year, the Sacramento Democrat explained."

Question: How does the Water Bank relate to SGMA?

As mentioned above, under SGMA, local public agencies are tasked with developing and implementing groundwater sustainability plans. In the Sacramento region, GSPs were developed for the North American and South American Subbasins and were adopted and submitted to the California Department of Water Resources before January 31, 2022. Within the North American Subbasin the five Groundwater Sustainability Agencies include: the Sacramento Groundwater Authority, Sutter County, South Sutter Water District, Reclamation District 1001 and West Placer. Within the South America Subbasin the six Groundwater Sustainability Agencies include: the County of Sacramento, Northern Delta, Omochumne-Hartnell Water District, Reclamation District 551, Sacramento Central Groundwater Authority and Sloughhouse Resource Conservation District.

The North American and South American Subbasin GSPs provide a roadmap for sustainably managing the region's groundwater. One of the key management actions included in both GSPs is to enhance the region's 20-year long conjunctive use program which has led to recharging and storing water in the subbasin and will be expanded and enhanced through the Sacramento Regional Water Bank.

Question: Does SGMA stop the Water Bank from moving forward?

Actually, quite the opposite. As described above, the Water Bank is envisioned to enhance the ability of local agencies to sustainably manage groundwater in the region and is included as a key management strategy in the region's Groundwater Sustainability Plans. Through coordination between local water agencies and GSAs, the Water Bank will be operated consistent with the pertinent GSPs to enhance regional water reliability and maintain groundwater sustainability.

10: The Intersection of Domestic Wells and the Water Bank

Question: How will domestic wells owners in the water banking area be protected, or how can they participate in the Water Bank?

Domestic wells are used to supply groundwater to households in both urban and rural areas and are scattered throughout the greater Sacramento region within the North American and South American groundwater subbasins.

To answer this question, it's first important to understand the references to domestic well owners in the Sustainable Groundwater Management Act (SGMA), which sets a statewide framework for managing California's groundwater resources. SGMA identifies holders of overlying groundwater rights, including agricultural users and domestic well owners, as beneficial users of groundwater. Per SGMA requirements, local groundwater sustainability agencies (GSAs) are required to consider the interests of all beneficial uses and users of groundwater when developing and implementing their groundwater sustainability plans (GSPs).

The GSPs for the North American and South American subbasins establish objectives for managing groundwater levels using the best information on domestic wells available at the time. However, it's worth noting that obtaining information on the exact number, distribution, and depth of domestic wells is challenging.

The Sacramento Groundwater Authority located in the North American subbasin (sister agency to the Regional Water Authority) and other agencies such as the Sacramento Central Groundwater Authority located in the South American subbasin are currently working to enhance the domestic well dataset using publicly available data. Their intent is to expand their ability to outreach to domestic well owners. The RWA continues to work closely with GSAs during the development of the Water Bank and will continue to coordinate so that domestic well owner interests are included in Water Bank operations.

Both of the GSPs for the North American and South American subbasins identify projects and management actions that enhance the region's 20-year long conjunctive use program, including the development of the Sacramento Regional Water Bank (Water Bank). Conjunctive use is a term used to describe the planned use of both surface water from reservoirs and rivers and groundwater via wells to maximize total water availability in a region long term. The region has already banked water in the groundwater basins through existing conjunctive use activities.

Enhanced conjunctive use via the Water Bank which will increase the amount of water available to the region, is an important tool for sustainably managing our local groundwater supplies whether drawn by municipalities or domestic well users.

More information about domestic well owners and SGMA can be found here.

Question: Will the Regional Water Authority be doing outreach specifically in the rural and agricultural areas?

All stakeholders are invited to participate in the Water Bank Stakeholder Engagement process regardless of their interest or location. If and when in the future the Water Bank expands into agricultural and rural

areas, additional outreach activities will be planned to obtain specific input from stakeholder representing those areas.

11: The impacts of climate change and Water Bank capacity

Question: Why is the Water Bank necessary?

Portions of Sacramento region's water system were built more than a century ago to protect our community from devastating flooding and to provide reliable drinking water supplies. The region relies on the use of three reservoirs to manage water supply:

- **Snowpack**—our frozen reservoir. The variable amount of snowfall we receive determines how much runoff can be stored in our lakes and groundwater aquifers. However, in a normal water year with average snow and rainfall, runoff from our snowpack can store enough water to fill Folsom Reservoir.
- **Folsom Lake**—by far our largest above-ground reservoir—captures snowmelt and protects our community from flooding. The reservoir also provides water for the fish and wildlife in the Lower American River and Delta. It is managed by the U.S. Bureau of Reclamation and is also an important part of the statewide water supply system.
- **Groundwater Aquifer**. This is the reservoir you cannot see that lies beneath our cities and towns, agricultural regions, and wildlife areas. Aquifers in our region already contain large volumes of groundwater but they also have the capacity to store more, enabling local water providers to store significant volumes of additional water supplies. Currently, the unused capacity in our aquifers is equal to twice the volume of Folsom Reservoir.

Historically, this system has worked well for the Sacramento region. But climate change poses new and severe stressors, according to the **American River Basin Study,** produced in partnership by the U.S. Bureau of Reclamation and Sacramento-area public agencies. The Basin Study describes the projected impacts of climate change on water supply, water quality, ecological resilience, and critical habitat within the American River Basin, as well as identifies six strategies to help the Sacramento region adapt to the projected weather extremes and changes in precipitation patterns.

Key study findings are available here and include:

- **Significant increases in temperature of 4 to 7 degrees (F) by the year 2085.** The most remarkable change is seen in the upper watershed, which will significantly impact snowpack, our largest storage reservoir.
- **Precipitation will fall more as rain and less as snow, creating a significant conflict between flood control and water supply.** Runoff will peak in February through March (rather than in May) when Folsom Reservoir must maintain approximately 40 percent of its space for flood protection.

The Sacramento Regional Water Bank is identified in the Basin Study as a key strategy for adapting our region's water supply system to climate change by making it possible to store—or bank—excess water in our groundwater aquifers when it is available for withdrawal during drier times. The Water Bank can make up for lost snowpack and allow the region to capture runoff that peaks earlier in the year rather than loosing water supply by having to let those supplies flow out of Folsom reservoir for flood protection.

Question: How much water do you need from the Water Bank?

There may be no single project that will fill the water supply gap calculated from projected water loss from climate change; however, the Water Bank, which is one of multiple water supply adaptation projects, will aid in providing additional supplies.

The Water Bank uses an approach that considers the opportunity posed by the Sacramento region's natural infrastructure—our vast groundwater aquifer—and how to sustainably utilize and grow this resource as a reservoir for storing and withdrawing water over time. As such, the Water Bank will be developed in steps, utilizing and building out existing infrastructure while continuing to monitor groundwater conditions. The operations and infrastructure (pumps, pipes and wells necessary for withdrawing, moving and depositing water) will be scalable according to needs and available resources (including groundwater supplies and funding) to help safeguard the aquifer's sustainability at every step.

Current capacity: At present and using existing infrastructure, it may be possible to recharge up to 60,000 acre-feet in a very wet year using municipal sources and recover up to 60,000 acre-feet in a very dry year—enough to meet the drinking water needs of approximately 180,000 families for a year. With near-term new infrastructure, those recharge and recovery quantities could increase up to 90,000 acre-feet in a year—enough to serve approximately 270,000 households annually.

Near-term capacity: The Water Bank has the potential to grow over time, making use of other supply sources and recovery methods. Put in context, the unused capacity in our local groundwater aquifers is equal to twice the volume of Folsom Reservoir or about 1.8 million acre-feet of unused storage space. That unused storage space could store surface water during wet conditions for use when surface water supplies are more limited, as during a drought. In addition, there are opportunities to increase the availability of supply using recycled water.

Ultimately the Water Bank will allow water providers to utilize the region's natural infrastructure in a way that optimizes our water supply system for the weather patterns—the more extreme wet and dry periods—we are already experiencing and that are expected to become more frequent and intense with climate change.

We know through 20 years of conjunctive use that water banking works. Conjunctive use is a term used to describe the planned use of both surface water from reservoirs and rivers and groundwater via wells to maximize total water availability in a region long term. Enhancing this program with the Water Bank is a natural next step to providing water supply reliability for the decades to come.

12: Groundwater modeling and data analysis

Question: What is water modeling and why is it important?

Water modeling is a scientific method that uses computer models to create mathematical representations of how water behaves in the real world. Water models provide an understanding of the intricate and complex relationships between various factors, such as groundwater levels, river flow, and other elements related to water.

Water modeling helps water managers make informed decisions to effectively manage our water resources, support environmental sustainability and preserve water quality. For example, models analyze the behavior of groundwater and surface water, supporting sustainable water management practices. Models also assist in planning for droughts and climate change, identifying vulnerabilities and adaptation strategies. Modeling also helps to assess environmental outcomes, such as the projected effects of various water banking actions on river flows and ecosystems.

When set up correctly with a clear conceptual understanding of the modeled environment and with sufficient quality data and proper calibration, results from water models can provide close approximations of actual conditions. However, water model results can never completely accurately replicate actual conditions and require qualified and skilled scientists, engineers, or other experts using professional judgment to run and interpret water model results.

By developing these models, we can make predictions about future conditions in complex water systems and environments, which helps us make informed decisions about how the Water Bank may be operated to provide targeted benefits while avoiding negative impacts.

Water modeling has played a crucial role in the success of the region's conjunctive use program over the past two decades. It is also essential for planning water banking actions, especially in the face of challenges posed by climate change, drought, and diverse water use scenarios.

Question: What modeling techniques and data analysis methods are being utilized by the Water Bank Project team to assess different scenarios for operating the Water Bank?

In the Sacramento region, water managers rely primarily on two modeling frameworks: the CalSim (California Simulation of Water Supply and Management) and CoSANA (Cosumnes-South American-North American) models.

CalSim was developed by the California Department of Water Resources (DWR) and focuses on statewide surface water resources. The model incorporates hydrological data, water infrastructure data, historical water use patterns, and other relevant factors to simulate the behavior of the interconnected water system. It allows for the evaluation of potential effects of drought, climate change, population growth, and other factors on water resources.

CoSANA was developed by local Groundwater Sustainability Agencies (GSAs) specifically to analyze the unique conditions of groundwater basins in the Sacramento region (the Consumnes, South American and North American subbasins). The model combines data on geology, water usage, and surface water interactions to simulate how groundwater behaves in those areas. CoSANA helps evaluate different strategies and factors such as agricultural and urban water demands, water supplies, water quality, pumping rates, land use, and climate change, providing valuable insights for informed groundwater management decisions.

A vital investment

The investments made in developing CoSANA demonstrate the region's commitment to accurately assessing and forecasting the potential effects of conjunctive use and water banking operations. By collecting high-quality data and enhancing modeling tools over the past 25 years, water providers are able to have a comprehensive understanding of the current and future surface and groundwater conditions.

13: Sacramento Regional Water Bank Infrastructure

Question: What is the infrastructure needed to implement the Water Bank?

Successful water banking will require both natural and human-created infrastructure as described in more detail below:

Natural infrastructure–the groundwater basin that includes aquifers that naturally contain significant volumes of water and can be used to store additional water during wet times for withdrawal during dry times.

Human-created infrastructure–which is owned and operated by water providers in the Sacramento region, that provides water supply for our homes, businesses and environment. From a water banking perspective, this infrastructure also makes it possible to distribute water around the region, increasing the ability to shift between larger volumes of surface and groundwater supplies. For instance, this infrastructure makes it possible to move water from lakes and rivers to recharge the aquifer during wet times, and to move groundwater to areas reliant on surface water during severe droughts or emergencies.

Examples of projects that expand the ability to deposit and withdraw water and better connect surface water and groundwater supplies include:

- **Constructing new and rehabilitating existing groundwater wells**, including Aquifer Storage and Recovery (ASR) wells that can both deposit and withdrawal water, and traditional wells used for withdrawals.
- **Establishing new transmission mains and interties** to connect water systems. Traditionally, water districts developed as multiple, independent units, but the Water Bank connects these systems, facilitating water sharing and storage based on availability.
- **Incorporating booster pumps and pressure reduction** to move water across district boundaries, ensuring it reaches areas in need within the region.
- **Expanding surface water and groundwater treatment facilities** to enhance system flexibility.

14: Health of the Groundwater Basin

Question: Why is the North American Subbasin designated a high-priority basin under the Sustainable Groundwater Management Act (SGMA)?

The North American Subbasin has been classified as a high-priority basin under the Sustainable Groundwater Management Act (SGMA). To fully understand this designation, it is crucial to distinguish between the California Department of Water Resources (DWR) basin priority scale and the critically overdraft designation, as they are distinct measures. While basin priority is not an indicator of the health of the basin, it signifies the basin's importance to overall water management. In contrast, a critically overdraft designation reflects the health of the basin. **The North American Subbasin is not designated as critically overdraft.**

According to DWR, "prioritization does not provide an assessment on local groundwater management practices or basin sustainability as defined by SGMA." Instead, basin's priority level determines the rules and regulations it must follow under the Sustainable Groundwater Management Act. Medium- and high-

priority basins must establish groundwater sustainability agencies (GSAs), create groundwater sustainability plans (GSPs) and manage their groundwater for long-term sustainability. It is voluntary for low and very low priority basins to address SGMA requirements. The North American Subbasin's DWR-approved Groundwater Sustainability Plan is available here.

The North American Subbasin classification as a high-priority basin is based on a variety of data and information that underscore the important role the basin has in providing water supply in the Sacramento region. Here is some background on how DWR classifies basins:

DWR uses a significant amount of data and information to classify California's 515 groundwater basins into four priority categories: very low, low, medium or high. Separate from this classification, basins also may be identified as critically overdrafted.

This process involves eight components from the California Water Code Section 10933(b):

1. The population overlying the basin or subbasin.
2. The rate of current and projected growth of the population overlying the basin or subbasin.
3. The number of public supply wells that draw from the basin or subbasin.
4. The total number of wells that draw from the basin or subbasin.
5. The irrigated acreage overlying the basin or subbasin.
6. The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water.
7. Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation.
8. Any other information determined to be relevant by the department, including adverse impacts on local habitat and local streamflows.

Not all of the eight components identified above are weighted or scored equally. For instance, the most significant factors for designating the North American Subbasin as a high-priority basin are the number of public supply wells (3. above) and the degree to which the population relies on groundwater as a primary source of water(6. above). You can learn more with DWR's Basin Prioritization Dashboard, an online web map that illustrates the points system and provides details about how basins scored in each factor.

You can learn more about Basin Prioritization here.

Question: How do groundwater levels change during drought?

The Sacramento Groundwater Authority (SGA) actively monitors groundwater levels via various monitoring wells located throughout the Sacramento region. Over the years, the data has demonstrated distinct cyclical changes corresponding to dry and wet water year types, as well as seasonal fluctuations from spring to fall.

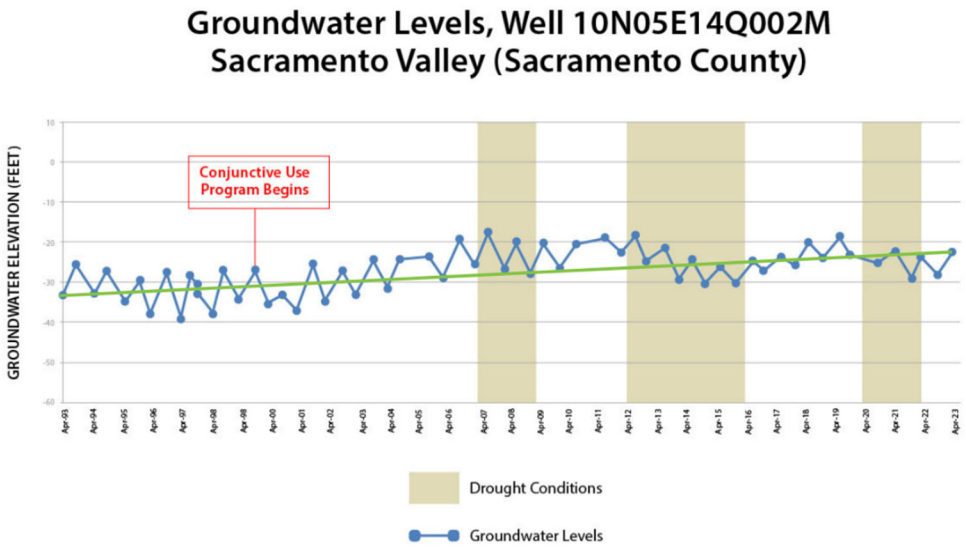
During dry years or consecutive dry periods, a slight decrease in groundwater levels is typically observed. Conversely, wet years or consecutive rainfall periods lead to a corresponding increase in groundwater levels. However, the central focus lies in evaluating the overall trajectory in groundwater levels, similar to how successful investors focus on broader economic trends that shape the landscape over the years rather than on daily market fluctuations.

In the Sacramento region, monitoring records spanning three decades demonstrate that groundwater levels are maintaining sustainable levels overall. The reason behind this positive trend can be attributed to the region's active conjunctive use program, which has proven effective in stabilizing groundwater levels after previous declines, according to DWR's Water Conditions Report, even during a megadrought, the driest two decades in at least 1,200 years.

Details about groundwater levels in the North American Subbasin for Water Year 2022 are available in the Annual Report for the North American Subbasin here.

You can learn about current groundwater levels in California with DWR's tool, California Groundwater Live, accessed here.

The graphic below illustrates the observed cyclical changes in groundwater levels corresponding to dry and wet years, as well as the shifts in different seasons. Additionally, it demonstrates an upward trend over the past 32 years, as observed at a monitoring well located in central Sacramento County



15: Environmental Review Necessity and Purpose

Question: Why is the Regional Water Authority (RWA) conducting environmental review under the California Environmental Quality Act (CEQA) for the development of the Sacramento Regional Water Bank?

The Regional Water Authority (RWA), a Joint Powers Authority representing approximately two dozen water providers and affiliates, has principal responsibility for approving the Sacramento Regional Water Bank (Project). The Project is a discretionary project in that RWA would provide funding as well as use its judgement in deciding whether and how to approve it prior to implementation. Environmental review under CEQA is required for all discretionary actions, and RWA has determined that the Project will be reviewed under an Environmental Impact Report.

The decision to expand the existing Water Bank qualifies as a discretionary action, making CEQA coverage necessary to assess and mitigate potentially significant adverse impacts that may occur as a result of Project implementation. The Water Bank involves the coordinated storage and recovery of significant volumes of water in a manner not previously undertaken in the North and South American River subbasins. This operation is planned to span multiple years and intentionally utilize the groundwater basin over an extended period.

16: Water Bank Progress and 2024 Preview

Question: What is the latest update on the Sacramento Regional Water Bank and what's to be expected in 2024?

Over the past year, significant strides have been made on the Water Bank's institutional components, environmental processes, and communication strategies.

Institutional Components

Complete:
The Regional Water Authority (RWA) released two foundational documents outlining the Water Bank's overall strategy and organizational framework. The Goal, Objectives, Principles, and Constraints (GOPC) document sets the direction for operations, governance, and compliance. The second document, titled "Governance: Organizational Framework, Functions, and Associated Roles and Responsibilities," outlines essential functions vital for successful implementation.

- You can read the GOPC here.
- You can read the Governance document here.

Ongoing:
The Water Accounting System (WAS) Concept Paper, Monitoring, and Reporting (Module #2) are currently in progress and will continue into 2024, with an expected public release in the summer.

Future:
Beyond 2024, the focus will shift to contractual, financial, and legal aspects, with final agreements contingent on the approved Environmental Impact Report (EIR). Additionally, a document addressing financial barriers to implementation is in development.

Environmental Process

Complete:
The RWA progressed in the environmental process, issuing the Notice of Preparation (NOP) for the EIR. Public scoping meetings, held in October 2023, provided information and gathered input from the community about the scope of the environmental document.

- You can see the Water Bank Notice of Preparation here.
- A recording of the presentation given at the October 11, 2023, meeting is available here.

Ongoing:
The Water Bank Program and consultant teams are working on the environmental compliance process, identifying necessary steps and relevant documentation.

Future:
The Draft EIR is anticipated to be released in late summer 2024. The Program Team will focus on noticing/consultation and coordination for the draft EIR, addressing other requirements in the environmental process.

Communication & Engagement

Complete:
Stakeholder engagement included two forums in 2023, with the first held in February. Another forum on December 12, 2023, will delve into Water Bank activities from the past year and outline plans for 2024 and beyond.

- You can find recordings and materials from the stakeholder forums below.

Communication tools, including the "Water Bank Q&A Connect," email feature, SacWaterBank.com website, and a video series, were successfully launched to educate and engage the community about climate change challenges and the Water Bank's role.

- SacWaterBank.com will continue to be updated, including compiled questions from the Q&A Connect on the Engagement page.

Tours, presentations, and small group meetings by the RWA Water Bank Program Team engaged with stakeholders through small group and one-on-one meetings and presentations.

- If your organization would like a briefing, please contact the Program Team at waterbankinfo@rwah2o.org.

Ongoing:
Stakeholder engagement remains a priority, with ongoing forums, website updates, and additional stakeholder meetings.

Future:
In the coming year, outreach efforts will be integrated into the environmental process, and communication with other Groundwater Sustainability Agencies (GSAs) beyond the Sacramento Groundwater Authority and Sacramento Central Groundwater Authority.
As the Water Bank progresses, the emphasis on stakeholder engagement, and compliance underscores its commitment to addressing the challenges posed by climate change on the Sacramento region's water

system. Stakeholders can stay informed through the website and active participation in upcoming forums and outreach initiatives.

17: Addressing Potential Issues

Question: How does the Water Bank plan to address potential groundwater issues under the Sustainable Groundwater Management Act?

Ultimately, the Water Bank aims to increase water levels over time and be a constructive part of the solution for sustainable groundwater management and environmental stewardship in the Sacramento region. Its overarching goal is to expand conjunctive use, increasing water banking operations in the region for two main purposes: improving long-term regional water reliability and offering statewide water supply opportunities, when possible, while also supporting healthy ecosystem function in the Lower American River area.

As mentioned during Week 9, the passage of the Sustainable Groundwater Management Act (SGMA) in 2014 set forth a statewide framework to protect California's groundwater resources in perpetuity. To avoid potential state control of groundwater, SGMA requires local agencies to form groundwater sustainability agencies (GSAs) and develop and implement groundwater sustainability plans (GSPs) to sustainably manage groundwater resources in the more than 100 high- and medium-priority subbasins located throughout the State.

The GSPs for the North American and South American subbasins outline a strategy to address potential groundwater issues and respond effectively should issues present themselves, recognizing that it's impossible to completely eliminate all potential negative consequences. Specifically, the North American Subbasin GSP emphasizes that Water Bank operations will incorporate careful monitoring and tailored mitigation measures to protect the interests of groundwater users in the subbasin.

With this in mind, the Program Team's primary goal is proactive monitoring, transparent practices and an adaptive approach to address any issues that may arise. This approach can be likened to the role of a fire department, which aims to both prevent fires and respond swiftly when they occur. Similarly, Water Bank operations will be adjusted as needed.

Actions outlined in the GSPs include:

- Verifying the existence of a problem through confirmation measurements.
- Assessing how the water is moving underground.
- Launching an investigation to determine its underlying causes when a problem is confirmed.
- Assessing the consequences of the issue and working to find ways to mitigate any negative effects.

You can find the North American GSP here and the South American GSP here.

18: Spotlight on In-Lieu Recharge

Question: What is in-lieu recharge and how does it work?
In-lieu recharge is the combined management of both surface water and groundwater use, resulting in the replenishment of groundwater supplies within our aquifers. This method combines managed and natural processes. Water agencies facilitate in-lieu recharge by directing excess surface water from lakes and rivers to customers who typically receive groundwater. Taking this action intentionally reduces groundwater use, which allows the aquifer to naturally replenish as rainwater, stormwater, and river water soak into the ground. The outcome is a stored (banked) reserve of groundwater supply for future use.

In-lieu recharge provides an opportunity to utilize excess river and lake water that otherwise would have been lost. This not only preserves groundwater for future use but also allows groundwater supplies to increase naturally in our aquifers.

Question: Is in-lieu recharge recognized as a valid form of recharge in California?
In California, in-lieu recharge is widely acknowledged and is a proven method to sustainably replenish groundwater. In-lieu recharge has been put into practice for many decades and is endorsed by water managers, industry experts, state regulatory agencies, and academic institutions like the California Department of Water Resources, Public Policy Institute of California (PPIC), and Stanford University.

Moreover, California law recognizes in-lieu recharge as a groundwater sustainability action, as outlined in Water Code 10721 (m), which defines “In-Lieu” as the use of surface water by persons that could otherwise extract groundwater in order to leave groundwater in the basin.” The implementation of in-lieu recharge is further included in the Sustainable Groundwater Management Act, which requires groundwater agencies to address its use in local sustainability plans.

Question: How does in-lieu recharge actually store water in the groundwater aquifer?
In-lieu recharge combines managed and natural processes to assist Mother Nature in replenishing groundwater supplies within our aquifers located deep below our feet. Due to the incorporation of natural recharge methods, the water storage process may seem less obvious than more visible recharge methods like spreading basins or injection wells. However, in-lieu recharge is widely acknowledged, with decades of practical application and a documented history of successfully replenishing the groundwater basin in the Sacramento region and other parts of California.

In-lieu recharge is a deliberate and scientifically grounded process that strategically manages and monitors groundwater resources to optimize replenishment. Although in-lieu recharge utilizes natural recharge processes, it requires deliberate efforts and planning by water agencies to work. Key water infrastructure, planning, and coordination of water agencies are critical for successfully substituting excess surface water for groundwater.

For example: For in-lieu recharge to occur, water agencies must incur costs from investing in infrastructure such as wells, pumps, and interconnections, and make critical management decisions. Without these actions, the in-lieu recharge process does not take place.

Moreover, in the Sacramento region, in-lieu recharge is informed by scientific assessments, considering factors such as water availability, demand, and aquifer geological characteristics. Local water managers

continuously monitor water levels, quality, and recharge effectiveness, utilizing scientific data for adaptive management, helping to ensure the process remains effective over time.

Question: What is the Sacramento region's history and experience with in-lieu recharge?
In the 1990s, groundwater levels were dropping drastically. Local water providers worked together to replenish groundwater through conjunctive use—coordinating the use of groundwater and surface water according to availability. In-lieu recharge was the primary method for recharge. Today, the Sacramento region's groundwater levels have recovered and increased to sustainable levels.

Now, local water providers are working to elevate and expand in-lieu recharge by reoperating existing infrastructure. This is made possible through the Sacramento Regional Water Bank an essential, cost-effective, and successful method for addressing climate change impacts on the region's water supplies.

Question: What are some other agencies using in-lieu recharge in California?
In addition to the Sacramento region, in-lieu recharge is active in the following areas:

- Cawelo Water District (Kern County)
- Pixley Water Bank Project (Tulare County)
- Rosedale-Rio Bravo Water Storage District (Kern County)
- Semitropic Water Storage District (Kern County)
- Arvin Edison Water Storage District (Kern County)
- Buena Vista Water Storage District (Kern County)
- Kern Delta Water Storage District (Kern County)
- Orange County Water District (Orange County)

19: The intersection between the Water Bank, Flood MAR, and Watershed FIRO MAR

Question: The state is advancing funding for Flood MAR; why is the Water Bank project not actively considering this stormwater management/supply source?

Flood Managed Aquifer Recharge (Flood MAR) and the Sacramento Regional Water Bank (Water Bank) share a common goal: to recharge groundwater supplies using excess surface water when available. However, the Water Bank is not a Flood MAR project, and each takes a different approach to recharging the aquifers. While Flood MAR is more focused on utilizing spreading basins or ponds to recharge surface water, the Water Bank primarily utilizes in-lieu recharge and Aquifer Storage and Recovery, or direct injection through wells.

There are some similarities between the Water Bank and **Watershed FIRO MAR**, which combines the practices of Forecast Informed Reservoir Operation (FIRO) and Managed Aquifer Recharge. This approach creates a network of upstream reservoirs that are strategically optimized for both drought and flood scenarios.

By implementing Watershed FIRO MAR, reservoir operators at Hell Hole, French Meadows, and Union Valley can better coordinate with Folsom operators to enhance flood protection. This coordination also improves aquifer recharge by conserving excess winter floodwater, which can then be used to replenish groundwater through the Water Bank or support the Lower American River environment.

In the future, integrating Flood MAR into the Water Bank could further boost recharge capacity and address challenges such as the lack of recognition for water providers participating in Flood MAR initiatives.

For example, spreading grounds and high-capacity recharge channels in agricultural land between Rancho Cordova and Elk Grove could be used to refill groundwater. This recharge would be monitored as part of the Water Bank's accounting framework. Participating water providers could receive incentives, recognition, or credits for their contributions to groundwater replenishment through Flood MAR, incentivizing the adoption of this technique.

Altogether, these strategies underscore the remarkable opportunity for developing a cutting-edge 21st-century water system for the Sacramento region. With the Water Bank playing a pivotal role in this integrated approach, we can create a resilient and sustainable water system adapted to the extremes of climate change.

To learn more about Watershed FIRO MAR, visit the WaterFuture section of the Water Bank website at SacWaterBank.com.

HELPFUL TERMS

What is Flood MAR?

Flood Managed Aquifer Recharge (Flood MAR) is a water management technique aimed at replenishing groundwater supplies by intentionally allowing floodwaters to infiltrate into underground aquifers. It involves directing excess surface water from rivers, streams, or rainfall onto designated areas where it can percolate down into the groundwater system.

Flood MAR systems typically involve the construction of structures such as recharge basins, infiltration ponds, or spreading grounds where floodwaters can be temporarily stored and allowed to seep into the ground. This process helps to recharge aquifers, providing a water supply for future use.

Flood MAR can be a sustainable approach to water management, particularly in areas prone to seasonal flooding or where there is excess surface water that can be utilized for groundwater recharge. It can also provide additional benefits such as flood control, habitat restoration, and water quality improvement.

What is in-lieu recharge and Aquifer Storage and Recovery (ASR)?

In-lieu recharge works by using both natural and managed methods. Water agencies facilitate in-lieu recharge by directing excess surface water from lakes and rivers to customers who typically receive groundwater. This reduces the demand for groundwater, which lets the aquifer recover naturally as water from rain, storms, and rivers seeps into the ground. Every gallon of surface water served to customers in lieu of groundwater results in water saved in the groundwater aquifer. Some water providers are also equipped to store water through ASR, which allows them to deposit treated water into the Water Bank during wet times using specially designed wells that can both recharge (inject) and recover (extract) water.

What is Watershed FIRO MAR?

FIRO MAR—Forecast Informed Reservoir Operation (FIRO) combined with Managed Aquifer Recharge (MAR)—a water resources management approach that integrates two techniques to optimize water supply and storage.

FIRO is an innovative approach that utilizes advanced weather forecasting and real-time data to optimize reservoir operations. This enables better decision-making regarding water releases and storage, taking into account forecasted precipitation and moisture content of the snowpack, to manage flood risk more effectively. MAR involves the intentional recharge of aquifers with excess surface water, which is what local water providers practice through the Water Bank or other recharge methods.

20: The connection between the Water Bank and Harvest Water

Question: What is the relationship between Harvest Water and the Sacramento Regional Water Bank?

Harvest Water and the Sacramento Regional Water Bank (Water Bank) share a common objective of replenishing groundwater resources to benefit both people and the environment of the Sacramento region. However, their scopes differ significantly.

Harvest Water is California's largest water recycling project producing water for agriculture. Managed by the Sacramento Area Sewer District (SacSewer), Harvest Water uses advanced wastewater treatment to produce high-quality recycled water for delivery to farms, ranches, and rural landscapes in southern Sacramento County, overlying the South American Subbasin. Learn more at SacHarvestWater.com.

Harvest Water is currently under construction, and when fully operational in 2027, will supply up to 50,000 acre-feet of reliable recycled water annually—equivalent to 24,000 Olympic-sized swimming pools—to irrigate over 16,000 acres of agricultural land. This shift from surface water will allow the groundwater aquifer to recover naturally through in-lieu recharge, boosting the area's groundwater levels by up to 35 feet within 15 years.

By improving groundwater conditions, Harvest Water will sustain over 5,000 acres of riparian and wetland habitats and 3,500 acres of Sandhill crane habitat, increase stream flows in the Cosumnes River to support Chinook salmon, and enhance habitats for a variety of additional listed species such as the Swainson's hawk and Giant garter snake. The ecosystem benefits that Harvest Water will deliver are defined in a funding agreement with the State of California, which provides $291.8 million in funding to make Harvest Water a reality. Those benefits are rooted in raising groundwater levels in the program area.

Both Harvest Water and the Water Bank rely on in-lieu recharge to enhance groundwater levels, but they differ in their source water and location of recharge. Harvest Water provides recycled water to irrigate agricultural lands and enhance existing habitats overlying the South American Subbasin, while the Water Bank capitalizes on excess water from rain and snowmelt to serve municipal water customers overlying both the North American and South American Subbasins.

Importantly, both projects will use an accounting system for tracking water deposited and withdrawn from the groundwater aquifers.

SacSewer will track recycled water deliveries and use a monitoring well network within the Harvest Water service area to track progress toward realizing project benefits associated with increased groundwater levels. Approximately 20 years after recycled water deliveries begin, once the groundwater levels recover and the basin is in sustainable excess, a portion of the groundwater stored in the basin could be available in the future for potential groundwater accounting partners, such as growers and local municipalities to use in dry years instead of fallowing land or enduring shortages. This volume of stored water available for future extraction is limited to no more than 30 percent of the total in-lieu recharge. This leaves at least 70 percent of the recharged water in the aquifer to benefit habitat and streamflow, which is a primary objective of Harvest Water. The Water Bank is also implementing an accounting system, and the two projects are coordinating on common methods and approaches to accounting. Both Harvest Water and the Water Bank are committed to the principle that more water must be deposited into the aquifers than is withdrawn.

Both projects will be managed consistent with the Groundwater Sustainability Plans (GSP) developed in the North American and South American Subbasins and will play a vital role in the continued sustainable management of the aquifers under the Sustainable Groundwater Management Act (SGMA). Of note, Harvest Water is a Project and Management Action specified in the Groundwater Sustainability Plan for the South American Subbasin, and thereby, is being relied upon by the Groundwater Sustainability Agencies to assist in meeting their ongoing objectives outlined in the Plan. Both projects are identified in South American GSP, and the Water Bank also identified in the North American Subbasin GSP as a Project and Management Action.

Together, Harvest Water and the Water Bank exemplify a multifaceted approach to water stewardship, bridging the gap between agricultural and urban water needs while championing environmental sustainability.

Funding for Water Bank development has been provided in part from the Budget Act of 2021, through a grant from the California Department of Water Resources.