

WATER MANAGEMENT FOR THE 21ST CENTURY

Conjunctive Use in the Sacramento Region



SACRAMENTO
GROUNDWATER
AUTHORITY



INTRODUCTION

Over the past several decades, the Sacramento region like many communities in California has faced an increasingly complex water world. The region has suffered the effects of prolonged drought; experienced increasing pressure to dedicate more water to the environment; and confronted declining groundwater levels and growing threats to water quality. All the while, despite increased conservation efforts, demand for water has continued to grow.

In 1993, representatives from a broad range of business, environmental, public and water purveyor interests came together to discuss regional water supply issues and needs. These representatives realized they had to create a plan to protect the region's natural resources or face the consequences of inaction. They realized this plan would require the endorsement of a broad range of regional stakeholders to be effective.

Consequently, these interests formed the Sacramento Area Water Forum, a water planning effort that today stands as an outstanding example of the power of collaboration.

The Water Forum is founded upon two objectives: 1) to provide a reliable and safe water supply for the region's economic health and planned development to the year 2030 and 2) to preserve the fishery, wildlife, recreational and aesthetic values of the lower American River.

After a six-year, consensus-based process of education, analysis and negotiation, Water Forum participants signed the Water Forum Action Plan to meet these objectives. The plan provides a framework for avoiding future water shortages, environmental degradation, groundwater contamination, threats to groundwater reliability and limits to economic prosperity.

One of the Water Forum's many successes was encouraging the formation of the Sacramento Groundwater Authority (SGA). Now, a decade after the Water Forum's formation, SGA is poised to implement a unique and sustainable regional conjunctive use program designed to fulfill a key Water Forum goal of protecting and managing the north-area groundwater basin. This program will not only provide long-term water supply benefits for local needs but also will have the potential to provide broader statewide benefits consistent with American River environmental needs.



“In what stands as a model for the state, local government agencies and water districts have devised a plan that successfully balances the need to preserve river water for fish and to provide more water for growth. ... This region has a chance at a promising future because of efforts such as the Water Forum that are making allies of those who could have all too easily become enemies.”

—The Sacramento Bee, August 11, 1998

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Conjunctive use is the coordinated management of surface water and groundwater supplies. Conjunctive use increases total available water supplies, enhances water supply reliability and provides the opportunity for enhanced environmental uses of water.

WHY CONJUNCTIVE USE?

“The Sacramento Groundwater Authority and its conjunctive use program are vital to protecting the lower American River, particularly in drier years.”

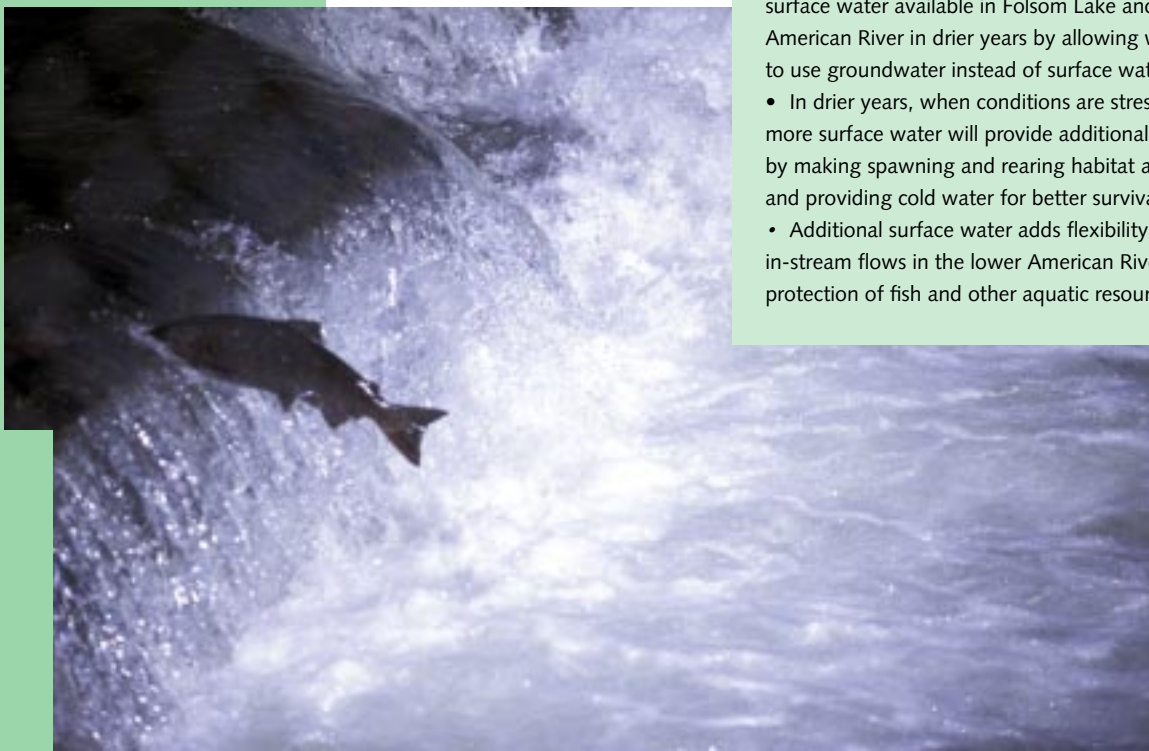
—Leo Winternitz, executive director,
Water Forum

Conjunctive use of groundwater and surface water improves the availability and reliability of water supplies, allowing water providers to meet growing demands for water despite variable precipitation. It provides a safety net during drought or peak use periods, when groundwater stored during wet periods can be extracted at times when precious surface supplies are limited.

Conjunctive use — or the coordinated management of surface water and groundwater — is not a new concept. A number of successful conjunctive use programs have been implemented in California over the years. In Southern California, for example, elaborate institutional arrangements for conjunctive use and groundwater management have been in place since the 1950s.

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Conjunctive use also benefits the environment because such operations can provide greater amounts of surface water for environmental purposes when needed. In dry years, for example, conjunctive use can make more cold water available in Folsom Lake to support chinook salmon and steelhead in the lower American River, protecting and enhancing spawning and rearing conditions for these important native fish.



Conjunctive Use Benefits Fish in the American River

- The conjunctive use program will make more surface water available in Folsom Lake and the lower American River in drier years by allowing water users to use groundwater instead of surface water supplies.
- In drier years, when conditions are stressful to fish, more surface water will provide additional protection by making spawning and rearing habitat available and providing cold water for better survival.
- Additional surface water adds flexibility to manage in-stream flows in the lower American River for the protection of fish and other aquatic resources.



“The SGA regional conjunctive use program is the type of innovative water management program deserving priority investment and implementation.”

—Lester Snow, principal, Saracino, Kirby, Snow, former executive director, CALFED Bay Delta program

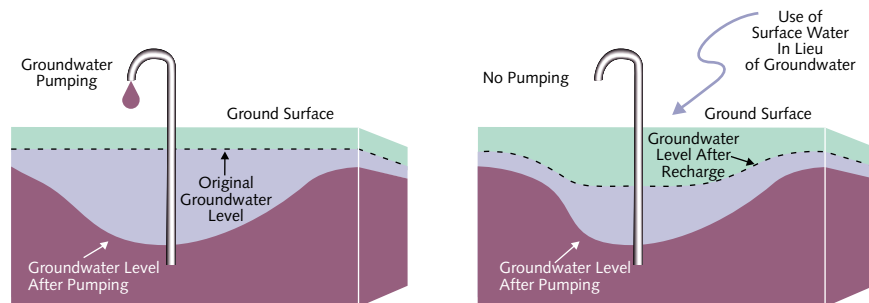
Storing water underground can reduce groundwater extraction costs: With more water in the aquifer, water is closer to the ground surface, therefore requiring less energy (and money) to pump it out. In addition, evaporation loss is much less for water stored underground as opposed to surface storage.

Conjunctive use here is also good for all of California. The state needs more sites to store water when it’s wet and make it available when it’s dry. Groundwater storage also generally has fewer environmental impacts than dams and reservoirs.

The CALFED Bay-Delta program includes a goal of implementing enough conjunctive use projects to create 500,000 to 1 million acre-feet of additional water storage.
—CALFED Record of Decision

The Sacramento region’s emerging conjunctive use program is unique. With a solid foundation in the Water Forum, its underlying water balance framework was the result of a consensus agreement between environmental, community, business and water purveyor interests. Being locally supported and managed makes this program implementable in the near-term.

Conjunctive Use Will Optimize Use of Local Surface Water and Groundwater Resources



In “Dry Years” maximize groundwater use, leaving water in the American River for environmental purposes.

In “Wet Years” maximize surface water use, allowing the groundwater to recharge.

THE REGIONAL CONJUNCTIVE USE VISION

“We’ve set the vision for innovative groundwater management for the region’s water and environmental needs, in addition to helping meet similar needs statewide. The SGA now aims to put into place the policy and mechanisms of a specific groundwater management plan to implement the vision. We look forward to working with our local, state and federal partners to bring the vision to reality.”

—Byron Buck, chair,
Sacramento Groundwater Authority

One acre-foot of water is approximately 326,000 gallons, enough to support the indoor and outdoor water needs of two families of four for one year.

BACKGROUND

The Sacramento region’s surface water and groundwater resources make it exceptionally suited to a conjunctive use program. The program area is bound on the east by Folsom Lake, on the south by the American River, on the west by the Sacramento River and on the north by the Bear River.

Program participants include 16 water providers in northern Sacramento and southern Placer counties that serve water to more than half a million people.

The program area’s current water demand is approximately 320,000 acre-feet per year and is projected to be 450,000 acre-feet per year by 2030. Surface water is diverted to meet about 60 percent of this demand, while groundwater satisfies the rest. Approximately 80 percent of this water is used for municipal and industrial purposes, 15 percent for agriculture and 5 percent is self-supplied via groundwater.

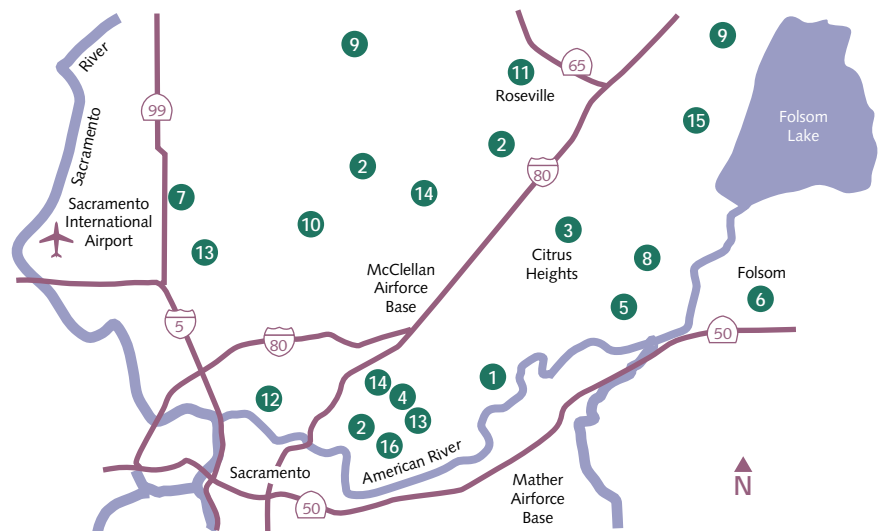
Primary surface water resources include Folsom Lake (a 1 million acre-foot federal Central Valley Project reservoir) and the American and Sacramento rivers. The program area also overlies a productive groundwater aquifer.

Individual water providers use various mixes of water supply. Some rely exclusively on either groundwater or surface water while others use a combination

of both. Substantial surface water rights and contract entitlements, combined with a productive groundwater aquifer, make the Sacramento region ideal for conjunctive use.

Participating Organizations:

1. Carmichael Water District
2. California-American Water Company
3. Citrus Heights Water District
4. Del Paso Manor Water District
5. Fair Oaks Water District
6. Folsom, city of
7. Natomas Mutual Water Company
8. Orange Vale Water Company
9. Placer County Water Agency
10. Rio Linda/Elverta Community Water District
11. Roseville, city of
12. Sacramento, city of
13. Sacramento, county of
14. Sacramento Suburban Water District
15. San Juan Water District
16. Southern California Water Company





“The SGA conjunctive use program is a perfect model for the rest of California. If we could move forward with similar projects throughout the state, it could help solve some of the CALFED Bay Delta problems and attract additional federal funding.”

—Bill Mills, general manager,
Orange County Water District

CHALLENGES

Despite these generally abundant water resources, there are regional water resources challenges:

- **Growth.** The Sacramento region is one of the fastest growing in the state. Even with aggressive conservation, the anticipated significant increase in population will result in an increase in American River surface water diversions.
- The delicate balance between water demands and environmental needs. The lower American River, for example, is a unique, federally listed wild and scenic river that winds through a highly urbanized area.
- New federal and state regulations regarding surface water and groundwater treatment requirements will place increasing technical requirements on water providers.
- Threats to water quality, including industrial contamination groundwater plumes.
- Historic groundwater decline. Historic pumping before recent management agreements created a “cone of depression,” or decline in groundwater level, centered in northern Sacramento County.

The Water Forum and the regional conjunctive use plan address many of these challenges. For example, an important Water Forum goal is to stabilize the groundwater basin. To this end, the regional program plans to turn the cone of depression into an asset by using this now empty space in the natural storage basin as the basis for a potential groundwater “banking and exchange” program.

“Cited as one of the first authorities of its kind in California, SGA provides an example of how collaborative negotiation processes can supply a structure for local control of groundwater resources.”

—Natural Heritage Institute,
“Designing Successful Groundwater Banking Programs in the Central Valley,” August 2001



HOW A BANKING AND EXCHANGE PROGRAM COULD WORK:

Direct recharge is a method for recharging a groundwater basin either by pumping water directly into the ground or placing water into shallow recharge ponds above ground and allowing it to percolate down through the soil. In-lieu recharge is a method for recharging a groundwater basin by using surface water rather than extracting groundwater, thereby allowing groundwater levels to rise naturally.

In wet years, program participants will reduce groundwater pumping and use surface water diverted from the American and Sacramento rivers, allowing groundwater levels to naturally recover through recharge from rain and melting snow, in effect “banking” water in the underlying aquifer. This is called “in-lieu” recharge. Banking could also occur by direct recharge, when water is pumped below ground into the aquifer.

In dry years, program participants will draw more heavily upon the banked water stored underground, providing or “exchanging” more surface water for Folsom Lake, the lower American River and other purposes. For example, exchanged surface water could be stored in reservoirs (e.g. Folsom Lake) for temperature control and recreational purposes. Or, it could be released to the lower American or Sacramento rivers to satisfy a wide variety of purposes, including improvement of Bay-Delta water quality or enhancement of in-stream flows for environmental purposes.

This banking and exchange process would be facilitated by the Sacramento Groundwater Authority (SGA). The SGA is a joint powers authority formed for the purpose of collectively managing the region’s groundwater resources. This authority permits SGA to make contractual arrangements required to implement the conjunctive use program, while also providing potential partners with the legal and political certainty for entering into long-term agreements.

The Sacramento Groundwater Authority is a joint powers authority (JPA) formed under the common powers of the cities of Sacramento, Citrus Heights and Folsom and the county of Sacramento. The four JPA signatories have delegated the exercise of their powers to the 17 member SGA Board of Directors.

REGIONAL COLLABORATION

Throughout its development, the regional conjunctive use program has received important endorsements from environmental, public and political interests.

Because the program is an outgrowth of the Water Forum process, political risks and the threat of substantial opposition are minimal. Stakeholders, including potential project opponents, were identified at the outset and included in the interest-based negotiations.

An Environmental Impact Report for the Water Forum Agreement (which embodies the regional conjunctive use framework) was certified without challenge in December 1999. This success is largely attributed to focused outreach and negotiations.

Technical studies for the program's first phase were completed in 2000. A blue ribbon panel of experts reviewed the consultant team's approach and commented on the technical studies. The approach and studies were well received by the panel.

The program is in alignment with state and federal water resources priorities. The CALFED Bay-Delta program includes a goal of implementing enough conjunctive use projects to create 500,000 to 1 million acre-feet of additional water storage over the next decade. The California Department of Water Resources (DWR), through the Integrated Storage Investigations (ISI) program, is working to develop partnerships with local entities interested in developing "locally owned, locally operated and locally developed" conjunctive use projects. DWR believes that if local areas improve their own reliability with such projects, it will benefit the statewide water system.

To that end, the ISI signed its very first memorandum of understanding with the Sacramento Groundwater Authority and has been a significant financial contributor to SGA's efforts. In addition to the ISI, both the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers have provided significant financial and technical resources to the local efforts.

Just as the Water Forum process stands as an outstanding effort of the power of collaboration, the regional conjunctive use program is an excellent demonstration of how interest-based negotiations can lead to consensus on regional water issues and the formation of water plans.

"You have developed an outstanding model for regional planning, stakeholder involvement, consensus-based processes and local leadership for the rest of the state to copy."

—Naser Bateni, division chief,
Department of Water Resources,
December 2001



Sacramento Groundwater Authority



U.S. Army Corps of Engineers



FULFILLING THE VISION

“Before the conjunctive use program can move forward, it must first confront a significant challenge — the current lack of infrastructure to support a substantial banking and exchange program and the funding to pay for it.”

—Ed Winkler, executive director,
Sacramento Groundwater Authority

Utilizing local funding alone will produce a program limited to local benefits only. State and federal partnership funding would allow the program to produce much broader statewide benefits, consistent with CALFED objectives.

Despite the program’s potential, there are challenges to fulfilling the regional conjunctive use vision.

Water Quality: Pollution already in the groundwater could affect the quality of banked water. In addition, since water sources for some will alternate periodically between groundwater and surface water, aesthetic differences may lead to perceived quality issues or a concern about the conjunctive use program, especially by customers who are accustomed to receiving only surface water.

Increased Water Treatment Costs: Water providers that currently use only surface water may have to contend with treating constituents not normally found in surface water supplies.

Lack of Infrastructure: The critical challenge is the current lack of infrastructure to support a substantial banking and exchange program and the funding to pay for it. Needed infrastructure includes surface water treatment

plant expansions/upgrades to better distribute surface water during the banking cycle; transmission facilities to move surface water into areas reliant on groundwater to achieve wet-year banking; and groundwater extraction facilities to produce enough groundwater in dry years for all areas.

Up to now, contributions by program participants facilitated by the Sacramento Groundwater Authority have provided a funding base. Pilot projects have relied upon existing facilities, local funding, water rights and contract entitlements.

However, utilizing local funding alone will produce a program limited to local benefits only. State and federal partnership funding would allow the program to produce much broader statewide benefits, consistent with CALFED objectives.

For nearly a decade, regional business, environmental, public and water interests have been working to protect and guide use of the region’s water resources. They have negotiated and come to consensus on the political and institutional framework for a unique and sustainable conjunctive use program. With additional support through funding partnerships and grants, the vision can more quickly become reality.







Sacramento Groundwater Authority

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Organizations participating in the regional conjunctive use program include water users in northern Sacramento and southern Placer counties:

- Carmichael Water District
- California-American Water Company
- Citrus Heights Water District
- Del Paso Manor Water District
- Fair Oaks Water District
- Folsom, city of
- Natomas Mutual Water Company
- Orange Vale Water Company
- Placer County Water Agency
- Rio Linda/Elverta Community Water District
- Roseville, city of
- Sacramento, city of
- Sacramento, county of
- Sacramento Suburban Water District
- San Juan Water District
- Southern California Water Company

In addition, collaborating agencies participating in the regional conjunctive use effort include:

- California Department of Water Resources
- U.S. Army Corps of Engineers
- U.S. Bureau of Reclamation