

WATER RESOURCES

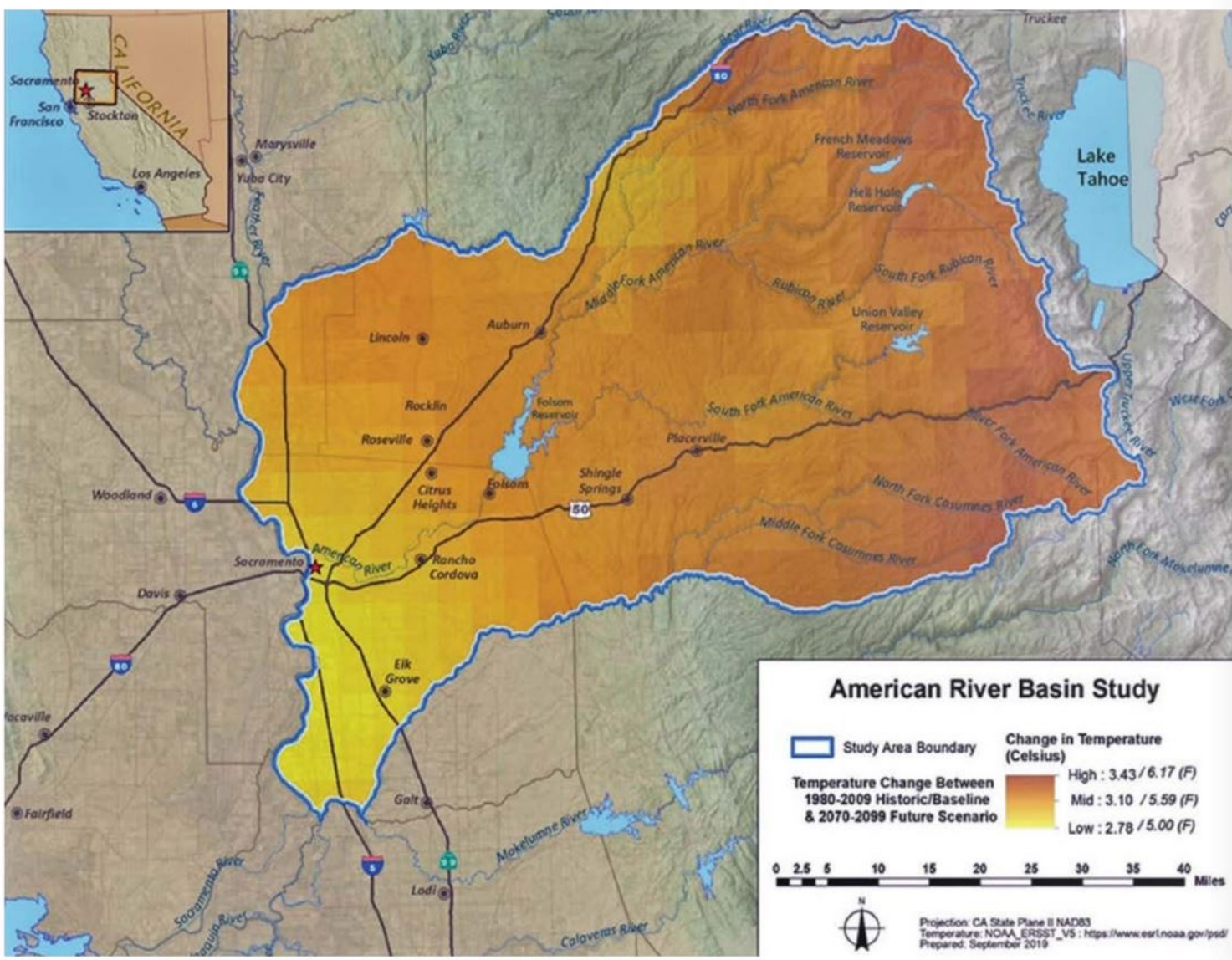
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A Guided Tour of the "Supershed": A Multifaceted Approach to Drought Proofing the Sacramento Region

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The Sacramento region "supershed" enjoys some of the most abundant water resources in California. Still, climate change places those resources under threat. Temperatures in the region are expected to rise 4–7 °F by 2085. This could have significant effects on snowpack, reservoir storage, and water reliability. Source: United States Bureau of Reclamation

SITUATED AT THE CONFLUENCE OF THE Sacramento and American Rivers and bordered by the Sierra Nevada mountains to the east, California's Sacramento region has long benefited from an abundance of water resources. It is one of the few regions in the state to get all its water from within its own watershed. While the region's geography has allowed it to weather

the current drought better than much of the state, the region is not without water supply risks. In fact, a [recent report](#) by the [United States Bureau of Reclamation](#) details the significant adverse effects of climate change on Sacramento's snowpack, reservoir storage, and water reliability in the decades to come. Considering that the region supplies nearly two-thirds of the state's water needs,

the implications reach far beyond our backyard.

To prepare for this future, regional water purveyors are redoubling efforts to buffer their reliability. This involves replumbing the region and taking a larger, longer, and more integrated view of the watershed. This integrated view is nicknamed the “supershed” approach. It begins at the mountain tops of the American River watershed and runs to the groundwater basin below the valley floor. By taking this broad and long-term approach, water purveyors in the Sacramento region are not only preparing for the future but also weathering the drought challenges of today.

[Placer County Water Agency \(PCWA\)](#) is one of the water purveyors involved in these regional efforts. Servicing an area that spans 1500 square miles and serving over 200,000 residents, PCWA is the primary water resource agency for Placer County, one of the counties in the Sacramento supershed. Because the PCWA operates a dual-purpose water storage and hydroelectric project in the upper reaches of the Middle Fork American River, PCWA is where the supershed approach begins. In what follows, we will take a guided tour of the supershed, stopping along the way to explore how the PCWA and its partners are addressing water supply challenges in the region

The solution to this threat is ecologically based forest management. For the last four years, PCWA's [French Meadows Forest Restoration Project](#) has been a national model for transforming overcrowded forests into a patchy mosaic of meadows interspersed with thickets of mature trees. Covering nearly 28,000 acres of public and private land, the French Meadows Forest Restoration Project combines mastication, mechanical thinning, hand thinning, and prescribed fires to make our watershed more resilient to fire and drought. We believe that our forest management efforts will not only produce healthier forests, but a healthier water supply. The [Sierra Nevada Research Institute](#) at the University of California, Merced is partnering on this project to assess how changes in vegetation from ecologically based forest management affect water quantity in the local watershed.

Improving Mid-elevation Infrastructure

Making our way downstream out of the mountains to just above the valley floor, we find the second prong of our supershed approach: Folsom Reservoir. With a capacity of one million acre-feet, Folsom Reservoir is the smallest of California's northern reservoirs. Its primary purpose is flood protection. However, it also serves as a water supply source



Healthy forests support a healthy water supply. By reducing overcrowding in the region's forests, the PCWA's French Meadows Forest Restoration Project aims to make the watershed more resilient to fire and drought. The photo on the left shows a dense thicket before treatment. On the right, the same area appears after treatment. Source: Placer County Water Agency

Healthier Forests in the Upper Watershed

For PCWA, and many of our foothill partners, dealing with drought begins in our respective headwaters. PCWA's watershed is located about two hours east of Sacramento and spans some 412 square miles. Like many forested watersheds throughout the American west, the Middle Fork American River watershed has experienced an overgrowth of the trees and brush fueled by decades of active fire suppression and changes in forest management practices. The condition of our forests puts our water supply at great risk. In addition to increasing the risk of megafires that can harm water quality and aquatic habitat, the overgrown stock of trees soaks up snow and precipitation that would typically find their way to our reservoirs and rivers as part of the region's water supply.

for many communities in the region, including some PCWA wholesale customers.

When drought strikes the region, Folsom feels the effects most profoundly. For much of the last decade, as water supplies at Shasta Reservoir have dwindled and conditions in the Sacramento-San Joaquin Delta have deteriorated, Folsom Lake has become the workhorse of the Central Valley Project. This has reduced reliability for the communities that use that supply. Add climate change projections to the mix, and the result is serious concern about the ability of Folsom to continue operating for multiple purposes.

In the face of these realities, regional water agencies are exploring ways to maximize carryover storage at Folsom Reservoir as that is the key to increasing reliability. To



Historically, Folsom Reservoir's primary purpose has been protection against floods. As regional reservoirs have felt the strain of climate change, however, Folsom has picked up the slack as a water supply source. But Folsom, too, is under threat. The reservoir reached historic lows during 2015 drought. Source: City of Sacramento

that end, agencies are building upon our long history of collaboration to construct the infrastructure needed to drought proof the region, primarily through groundwater banking and recharge. Our premier project is the Sacramento Regional Water Bank, an underground aquifer with the ability to store up to 1.8 million acre-feet of water. That is nearly twice the size of Folsom! As its name implies, the Water Bank would allow the region to make deposits in wet years and withdrawals in dry years. The Water Bank is just one of the many reliability projects that purveyors in the region are pursuing.

Rethinking Demand on the Valley Floor

Now we move on to the communities situated along the valley floor. Here, efforts focus on the demand side of the drought equation. Even in years when we are not facing a constrained supply, regional water agencies have been actively engaged in improving water use efficiency among our residents, and these efforts are even more important considering future climate projections.

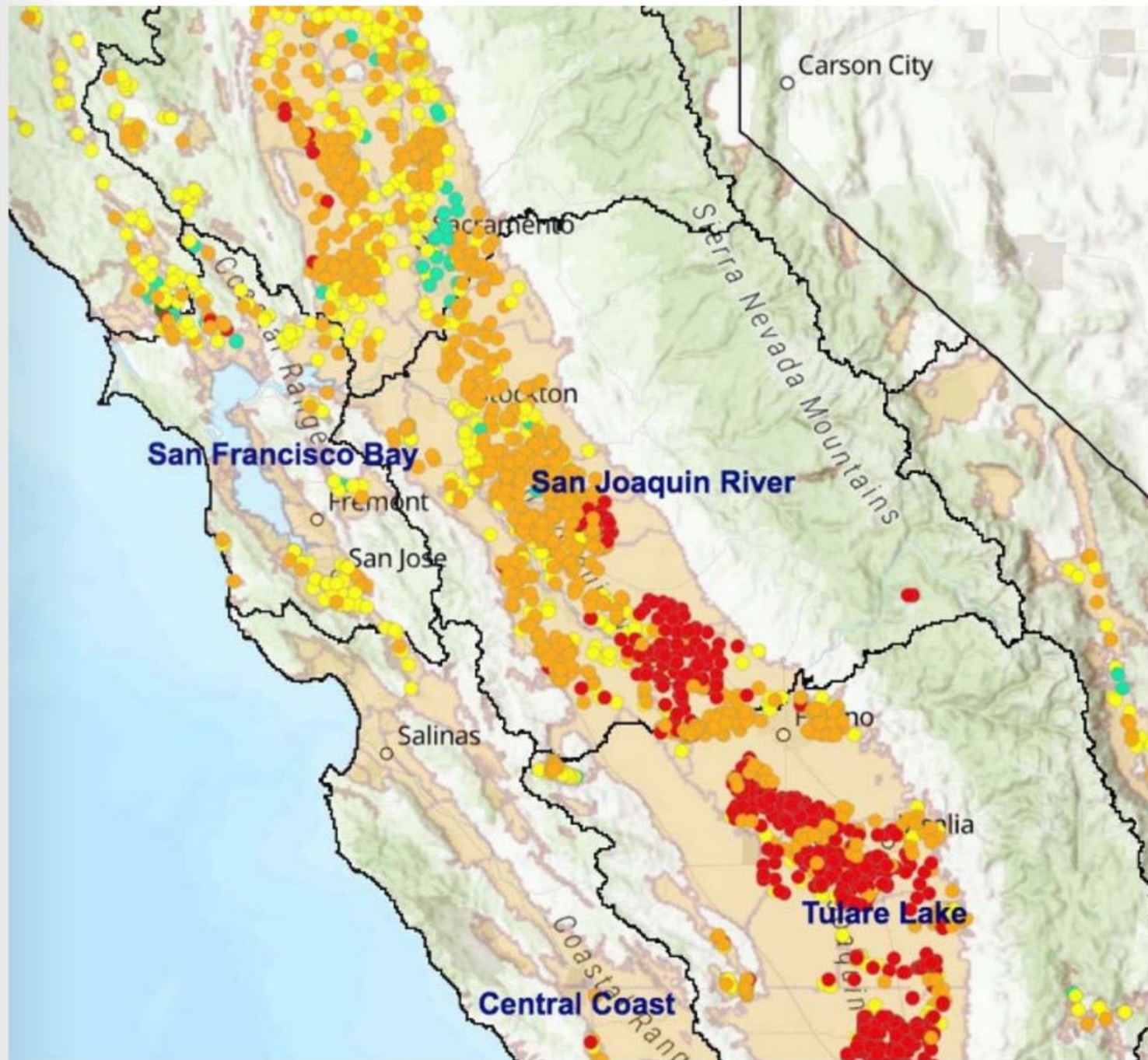
Because most water in the Sacramento region is used outdoors, the biggest "bang for our buck" is making yards and landscape more water efficient. Rather than mandate no watering of yards, PCWA prefers to incentivize customers to make permanent changes to their landscapes to naturally reduce demand. After the drought of 2015, we realized that such mandates had unintended negative

consequences. The push to allow lawns to die caused considerable tree mortality in our urban forests—not a great look for a region that prides itself on a bounty of natural beauty and is home to the "[City of Trees](#)." As a result, we have refined our messaging. We remind customers that while it is okay to stress their lawns, they should not do so at the expense of their trees.

In addition to helping customers be water efficient, the region is also augmenting our surface water supplies. In-lieu conjunctive use (utilizing surface water in wet years and groundwater in dry years) is one way we do so, and the outcomes have been remarkable. Conjunctive use has helped us replenish our groundwater basins, and allowed us to stretch current supplies for both consumptive uses and environmental benefit. Even in the past three years of drought, groundwater levels have stayed stable.

Shared Stewardship

As PCWA and other regional water agencies navigate the current drought and prepare for an uncertain future, we remain committed to a shared sense of stewardship of our water resources. Although the region has long enjoyed an abundance of water resources, climate change means we can no longer take this for granted. Further, to address the challenges posed by climate change to our water supply, we must no longer view ourselves as separate entities disconnected from the success of one another.



Despite years of drought, conjunctive use has safeguarded groundwater in the Sacramento region. As indicated by green points on the map above, groundwater levels increased up to 2.5 feet annually between 1998-2018. Source: California Department of Water Resources

Collaboration is key

The actions of policymakers and regulators will also be critical to our future success. The projects and initiatives described here are not inexpensive and can be compromised with inadequate incentives or counterproductive public policy. Thriving in the decades ahead will require greater understanding and cooperation between all levels of government and greater investment in water infrastructure.

The challenges of the future are significant, but water agencies in the Sacramento region are rising to the

occasion. In doing so, we are not only making ourselves more resilient to drought today, but are ensuring the region's natural abundance for generations to come. ■

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