

**BAY AREA WATER SUPPLY AND CONSERVATION AGENCY
BOARD OF DIRECTORS MEETING**

December 5, 2025

Correspondence and media coverage of interest between November 14, 2025 and December 4, 2025

From: Diane Papan, Assemblymember District 21
To: Dennis J. Herrera, General Manager, San Francisco Public Utilities Commission
cc: Tom Smegal, CEO/General Manager, BAWSCA
Tom Chambers, Chair, BAWSCA Board of Directors
Date: December 4, 2025
Subject: SFPUC Redevelopment Plans in Millbrae

From: Dashiell Leeds
To: Karen Hardy, Board Policy Committee Chair, and BAWSCA Board members
Date: December 4, 2025
Subject: DSS water demand model – comments for December 10 Board Policy Committee meeting

Press Release

From: Department of Water Resources
Date: December 1, 2025
Subject: DWR Announces Initial State Water Project Allocations for 2026

Water Supply Conditions:

Date: December 4, 2025
Source: Drought.gov
Article: Drought Status Update for California-Nevada

Date: November 30, 2025
Source: San Francisco Chronicle
Article: Something big is blocking California's winter storms – here's what that means

Water Supply Management:

Date: December 2, 2025
Source: Capitol Weekly
Article: More collaborative operational solutions for affordable water

Water Infrastructure

Date: December 2, 2025
Source: Office of Governor Newsom
Article: 2.9 billion gallons of clean drinking water added to California's supply with new Investments

Water Infrastructure, cont'd.

Date: November 25, 2025

Source: University of California

Article: Solar-panel-covered canals have their day in the sun in California

Date: December 22, 2025

Source: San Francisco Chronicle

Article: Bay Area city adds new, drought-proof source of water

Date: November 14, 2025

Source: Mercury News

Article: Water District picks five projects totaling \$3.9 billion to boost water supplies by 2050



December 4, 2025

Dennis J. Herrera
General Manager
San Francisco Public Utilities Commission
525 Golden Gate Avenue
San Francisco, CA 94102

RE: SFPUC Redevelopment Plans in Millbrae

Dear Mr. Herrera:

I am writing to express my concern about the San Francisco Public Utilities Commission's (SFPUC) redevelopment of the Outdoor Supply Hardware (OSH) site on El Camino Real in the City of Millbrae and to urge the SFPUC to identify a mutually beneficial path forward.

The OSH property is among the largest along El Camino Real in San Mateo County and any redevelopment will have significant implications for the City of Millbrae. Based on information shared with my office, the proposed redevelopment may result in the loss of approximately 50 local jobs—positions held by individuals who have contributed years of service to this business. In addition to the human impact, both Millbrae and San Francisco stand to lose an important source of local tax revenue that supports essential public services.

Given the scale and potential economic consequences of the project, transparency and collaboration are merited. City leaders have sought to communicate their concerns about the redevelopment plans but have been denied the chance to review the RFP, even though the site lies entirely within City limits and the project could result in significant impacts to the City.

Outdoor Supply Hardware has long been a vital resource for residents and small businesses, supports the local economy and strengthens Millbrae's commercial base. The potential loss of this asset—and the jobs and revenue it provides—underscores the need for open communication and thoughtful consideration of alternatives.

In addition, OSH provides substantial rental income to the SFPUC the loss of which may have a direct or indirect impact on ratepayers. As the Chair of the Assembly Committee on Water, Parks & Wildlife, potential impacts on ratepayers is a concern.

In light of these issues, I respectfully request your assistance in facilitating communication with the City of Millbrae and exploring options that preserve this important community asset. Identifying a path that protects jobs, sustains local revenue, and aligns with broader community interests would benefit all stakeholders.

Thank you for your attention to this matter.

Sincerely,

A handwritten signature in black ink, appearing to read 'Diane Papan', with a stylized, flowing script.

Assemblymember Diane Papan

Assembly District 21

CC:

San Francisco Mayor Daniel Lurie

Ben White, Assistant Chief of Housing and Economic Development

Amar Bhardwaj, Assistant Chief of Infrastructure, Climate & Mobility

Eileen Mariano, Manager of State & Federal Affairs

Tom Smegal, General Manager, Bay Area Water Supply and Conservation Agency

Tom Chambers, Chair, Bay Area Water Supply and Conservation Agency Board of Directors

Joshua Arce, President, San Francisco Public Utilities Commission

Tom Williams, City Manager, City of Millbrae

From: [Dashiell Leeds](#)
To: khardy@santaclaraca.gov
Cc: [bawscaboardofdirectors](#); [BAWSCA2](#); [Dave Peoschel](#); jbauters@gmail.com; [Miguel Miguel](#); [Barbara Muir](#); [Wils Cain](#)
Subject: DSS water demand model – comments for December 10 Board Policy Committee meeting
Date: Thursday, December 4, 2025 4:25:48 PM
Attachments: [2025_1107_BAWSCA Comment Letter Draft TVA Scientific Basis Report FINAL.pdf](#)
[Dec 4 2025 Sierra Club BAWSCA demand model letter.pdf](#)

Some people who received this message don't often get email from dashiell.leeds@sierraclub.org. [Learn why this is important](#)

Dear Chair Hardy and BAWSCA Board Members,

Thank you for this opportunity to comment to the Policy Committee on BAWSCA's water demand model (the Decision Support System, or DSS). While much work by experienced industry professionals has gone into developing the DSS model, we strongly believe that past performance data needs to be recognized and included in the model. The current DSS ignores BAWSCA members' track record of conservation. We believe a more nuanced, evidence-based view of demand will allow better management of the Tuolumne River and its ecosystem—as well as preserve water affordability for ratepayers. This memo outlines our concerns and presents opportunities for collaboration.

Please read the attached letter "Dec 4 2025 Sierra Club BAWSCA demand model letter" for our full comments.

Also attached to this email are BAWSCA comments on the Draft Scientific Basis Report Supplement for the Tuolumne River Voluntary Agreement Proposal (Draft SBR), a document we referenced in our letter.

Sincerely,

Katja Irvin, Guadalupe Group Conservation Chair
Sierra Club Loma Prieta Chapter

John J. Bauters, Chair
Sierra Club San Francisco Bay Chapter

Miguel Miguel, Director
Sierra Club California

Email sent from account of
Dashiell Leeds
Conservation Coordinator
Sierra Club Loma Prieta Chapter

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December 4, 2025

To: Policy Committee Chair Karen Hardy <khardy@santaclaraca.gov>

cc: BAWSCA Board of Directors <bawscaboardofdirectors@bawsca.org>; bawsca@bawsca.org

Subject: DSS water demand model – comments for December 10 Board Policy Committee meeting

Dear Chair Hardy and BAWSCA Board Members,

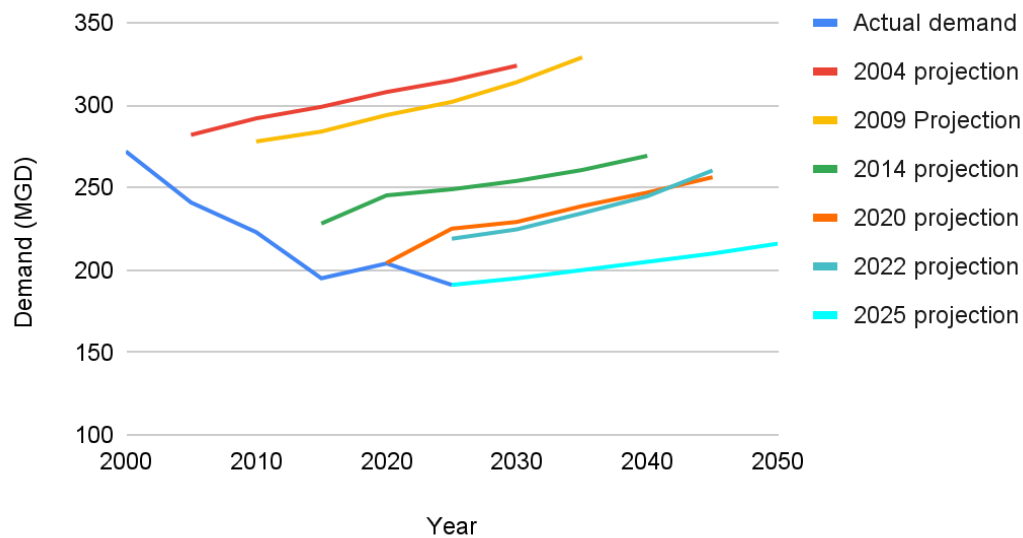
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1. BAWSCA's DSS models have consistently overestimated future water demand

BAWSCA has for decades put thought and energy into helping its members model demand for drinking water.

However, the projections have historically been very inaccurate, overestimating water demand by more than 50% on a 15-year horizon when examined retrospectively. This overprojection has not improved over time – the 2022 DSS projection overestimated the 2025 water use by 15%. This graphic below illustrates the trend.

BAWSCA Actual vs UWMP/DSS demand projections



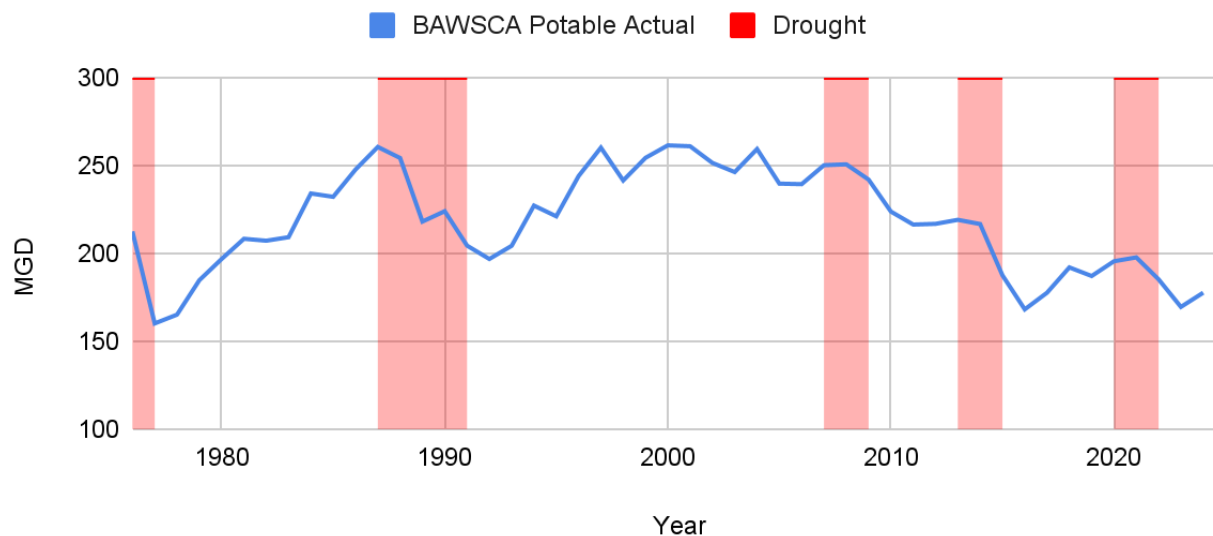
The current (2025) DSS appears to suffer from the same issue, projecting ever-increasing demand despite long-term historical trends of ever-decreasing demand. Without access to the model inputs, it is hard to understand what is driving this result. However, in our brief conversation with the consulting team building the model, it appears that they are assuming in their model that the coefficients they derive from past correlations carry on into the future unchanged. These coefficients govern, for example, calculations of water use per measure of economic activity or water use per multifamily unit. They also appear to be incorrectly interpreting what happens to water use in a hotter, drier future climate. Finally, they have not yet taken droughts into account, and our understanding of their previous work around droughts is that it has not substantially changed the outcome of the modeling.

2. The Drought-Demand Model: A statistical model based on the SPEI drought index is an extremely good predictor of water demand.

The standard water agency approach to modeling droughts is to assume that hotter, drier weather increases water use. This is what the DSS model does in its climate modeling.

However, this approach is not supported by the historical record. In fact, droughts and a hotter, drier climate in the past 20 years have actually served to suppress water demand among BAWSCA members. Every drought has resulted in large demand reductions, and post-drought demand has not rebounded to previous levels. Droughts have a long-term impact on demand by causing both behavioral changes (e.g. replacing lawns) and policy changes (e.g. the ban on watering ornamental turf with potable water). See figure below for a timeline of droughts and consumption:

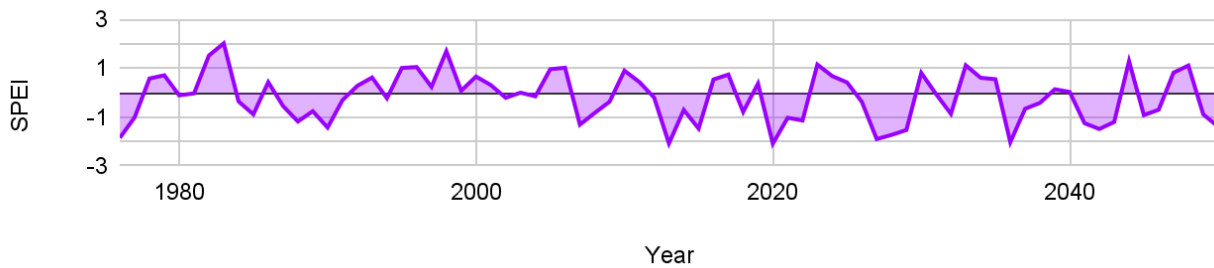
BAWSCA water use and droughts



Using this insight, we have built a curve-fitting model. This Drought-Demand Model uses a common drought measure to predict future water use. This drought measure, the Standardized Precipitation and Evapotranspiration Index (SPEI), coupled with population data and historical water use from the year 1976 to today, shows extremely high predictive value when tested against out-of-sample test data. Essentially we created a water use curve that responds to a drought index and then tests it against years that we held back from the model. Our Drought-Demand Model's in-sample Mean Absolute Percentage Error (MAPE) is 4% and out-of-sample MAPE is 4.5%. In other words, our Drought-Demand Model has a 4.5% forecast error, compared to the 50% historical forecast error of the DSS. This is not to denigrate the DSS model, but to show that our results are well within the bounds of what has been considered accurate in the past. We are available to discuss our model in detail.

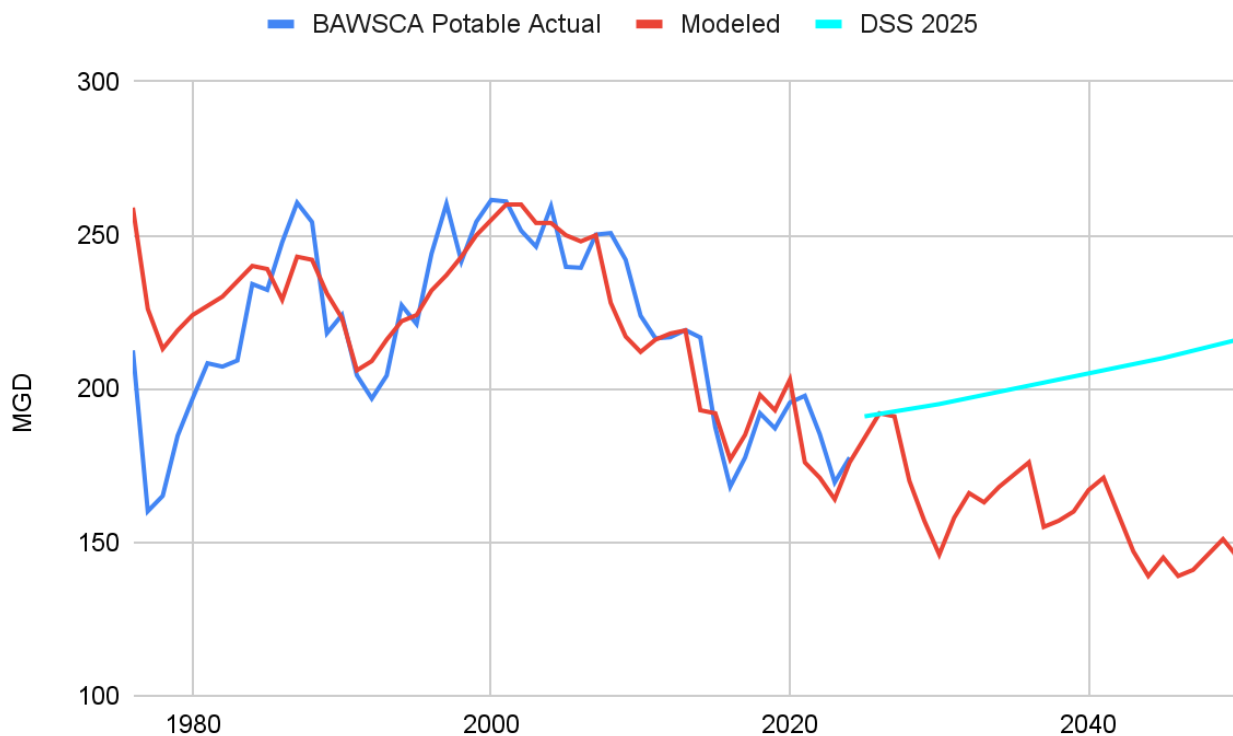
The key to our model, of course, is the assumptions around future droughts. We pulled drought (SPEI) predictions for San Mateo County from the world's leading climate models, and settled on the HadGEM2-ES365 (Historical +rcp45) as our baseline model. This model is used by CalAdapt to test against future droughts and runs slightly warmer and drier than other models. For our population inputs, we used the California Department of Finance population projections for San Mateo County, which project 0.12% annual population growth to 2050. Below is a chart that shows the future drought projection we used for a baseline. Negative numbers are drier and/or hotter than normal and positive numbers are wetter and/or cooler than normal.

Historical San Mateo County SPEI and HADGEM2-ES projection



3. The Drought-Demand Model shows a decline in water demand of about 30 MGD over the next 25 years, indicating the DSS model is overestimating demand by about 50%

The chart below shows the results of our baseline Drought-Demand Model. The dark blue line is historical potable water use, the red line is Drought-Demand modeled historical and future use, the light blue line is the BAWSCA DSS model baseline results.



We find in our base case that 2050 BAWSCA demand for potable water will be about 145 MGD. This indicates the 216 MGD predicted by the baseline DSS is a roughly 50% overestimate.

Various scenarios we ran show a range of 2050 potable demand from 126 MGD in an extreme drought scenario (using the very hot/dry model IPSL-CM5A-MR (Historical +rcp45)) to 177 MGD

(flat from today), using both the somewhat wetter CanESM2 (Historical +rcp45) and a population growth rate 4x higher than the DOF numbers. The table below lays out these scenarios:

Scenario	2050 demand (MGD)*	Inputs
Baseline	145	HADGEM2-ES + 0.12% annual pop. growth
Severe Drought	126	IPSL-CM5A-MR + 0.12% annual pop. growth
Wet + High population	177	CanESM2 + 0.48% annual pop. growth
DSS Baseline	216	
*2050 demand is total BAWSCA potable demand		

4. The consequences for the environment of over-estimation are severe

The over-estimation of demand leads to a posture toward managing riverine ecosystems that is, to put it mildly, bad for riverine ecosystems. It's an approach focused on the control of nature rather than adaptation.

The lynchpin of environmental sustainability in the Tuolumne River ecosystem – the ecosystem that supplies BAWSCA members with most of their water – is the Bay Delta Plan. The Bay Delta Plan assures enough water for continued recovery of salmon and other species and for improved health of the ecosystem. As the State Water Resources Board stated, “Fish habitat quantity and quality on the Tuolumne River is primarily controlled by flows.”

The DSS's overprojections put BAWSCA on a wholly unnecessary path opposing the Bay Delta Plan. Instead of seizing the future of declining demand, BAWSCA and its members have used the DSS as justification to argue that the Bay Delta Plan would deprive their customers of the water they need.

Indeed, in Tom Smegal's letter to the State Water Resources Control Board, dated November 7, 2025, about the Scientific Basis Report on the Bay Delta Plan, Mr. Smegal cited the Urban Water Management Plan (UWMP) projections as the reason he was concerned about water availability during a drought. He wrote this despite knowing that the most recent DSS model that underlies the UWMPs had overprojected 2025 water use by 18% just five years into the future.

Projected future high demands will always point to the necessity of more supply. The SFPUC's Alternative Water Supply (AWS) plan is an example of this. Supply now comes in the form of expanded reservoirs that destroy terrestrial ecosystems or water purification schemes that explode the greenhouse gas budgets and wallets of our communities. It's a choice to spend billions of dollars pouring concrete. We urge you to choose a different and more reasonable path, supported by historical data.

The Bay Delta Plan is a stand-in for the proposition that people and ecosystems can co-exist, and for the idea that people do not have to remove every drop of life from an ecosystem. It's a stand-in for the environmental values that Californians hold at their core. Each and every year of this unnecessary battle means poorer ecosystems and poorer people.

5. The affordability consequences for BAWSCA ratepayers are likely to also be severe

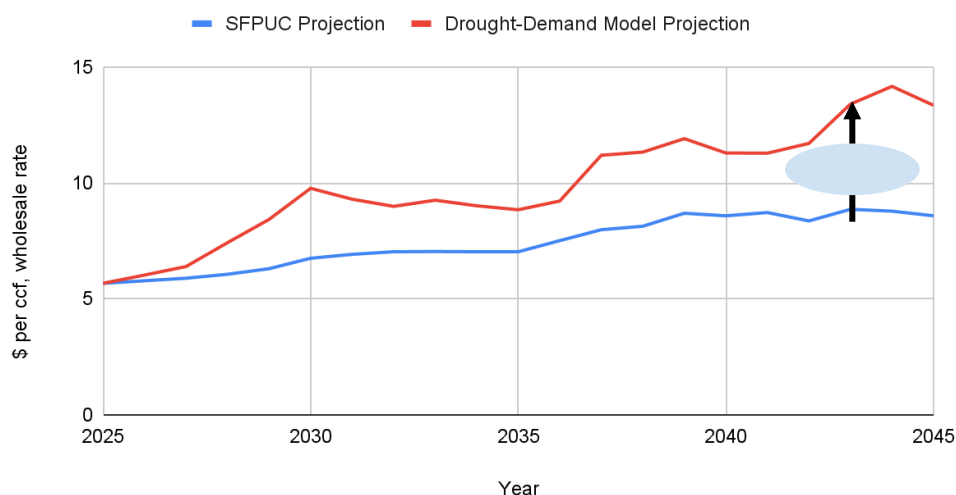
BAWSCA's ratepayers are likely to pay more for their water during the next 25 years as a result of BAWSCA's overly high demand projections.

First, the high demand projections encourage capital spending. For example, the new, nearly half-billion dollar headquarters building being built by the SFPUC (the Millbrae Campus) is something for which BAWSCA ratepayers will have to pay their proportional share. This new water temple is a symbol of agency bloat justified by BAWSCA's ever-increasing demand and revenue projections over the years.

The high demand projections have also led the SFPUC to put forward various capital projects to increase supply under the Alternative Water Supply (AWS) plan. These AWS projects, if they go forward, will raise both the capital and operational costs BAWSCA members will pay for wholesale water over the next 25 years.

Second, high demand projections lead to misleadingly low cost projections. Our chart below compares the SFPUC's current wholesale water cost projections, based on demand numbers from BAWSCA. Our modeling indicates that wholesale rates will increase 135% over the next 20 years because fixed infrastructure costs will have to be spread over fewer gallons sold.

Projected BAWSCA Wholesale Rates



This rapid acceleration in rates, especially over the next five years, will be difficult for BAWSCA customers to absorb. Less wealthy customers, especially, will struggle to pay for low-flow

plumbing, leak fixes and drought-resistant landscaping. Wealthier homeowners and businesses will be able to adapt, but will be upset to see the annual increases in their water rates.

Overestimating demand has significant financial consequences particularly in the SFPUC's situation: Wholesale water rates are already high (doubling since 2015), its Regional Water System (RWS) is a fixed cost system (costs don't vary with volume), and the SFPUC is heavily laden with debt it took on to fund its capital projects (such that roughly 50% of wholesale water rates go to servicing debt).

Should demand not materialize as forecasted, the SFPUC has no choice but to increase rates above what was projected. It has little ability to reduce costs to adapt to a lower demand scenario. In addition, higher water rates cause further reductions in demand, which has contributed to the decline in per capita demand that's been experienced during the past 20 years.

BAWSCA agencies have already experienced unplanned rate increases. In May 2022 the SFPUC projected the FY 2026 wholesale rate to be \$5.25/ccf. Today that rate is \$5.80, 10% higher than projected. The unplanned increase is in part due to demand not growing as forecasted and in part due to a large increase in capital spending.

Based on current demand projections and due to high median household incomes in most cities served by BAWSCA, most cities' combined water and sewer bills appear unlikely to exceed local affordability thresholds for a decade or more. However if California's median household income were used as the basis for calculating affordability, almost all BAWSCA member cities would see their combined water and sewer bills already exceeding affordability thresholds. This bodes poorly for cities trying to attract a mix of residents, including teachers, firefighters and other public servants.

Local agencies have little ability to absorb the cost of unexpected SFPUC rate increases. Cities are already facing their own financial challenges both from the need to upgrade aging infrastructure and recent court cases that point to reducing or eliminating water rate billing tiers due to Proposition 218. The elimination of these tiers typically increases rates further for lower-volume, and, usually, lower-income water users.

The San Diego County Water Authority is a good example of an agency that has experienced some of these issues. San Diego's struggles include a deteriorating financial condition and large rate increases after a large capital program designed to address demand that never materialized.

Utilizing more realistic demand projections improves planning, reduces the need for unplanned rate increases, reduces the need for alternative water supplies and helps with addressing affordability thresholds.

6. Summary and proposed actions

In summary, BAWSCA staff and members have set themselves up for a choice: They can acknowledge the members' track record of winning on water use efficiency – and couple that with sensitive habitat management – or they can continue to overpredict demand, and the environment and ratepayers will suffer for it.

We suggest concrete actions to move the discussion forward:

- A) Create a working group with BAWSCA staff, interested members' representatives, the Hazen consulting team and outside stakeholders to work to reconcile the various projections of demand. The previous stakeholder group was somewhat unsatisfactory and did not substantially change the baseline scenario. This new group should operate on the principle of full data and model transparency.
- B) Set a January board agenda item to reassess demand projections ahead of the UWMP process.
- C) Budget for work with outside stakeholders in 2026 to alter BAWSCA's approach to the Bay Delta Plan

Katja Irvin, Guadalupe Group Conservation Chair
Sierra Club Loma Prieta Chapter

John J. Bauters, Chair
San Francisco Bay Chapter

Miguel Miguel, Director
Sierra Club California

Attachment: *Letter from Tom Smegal to SWRCB, dated November 7, 2025*



November 7, 2025

Courtney Tyler, Clerk to the Board
Division of Water Rights Mail Room
Attn: San Joaquin Unit
State Water Resources Control Board
1001 I Street, 2nd Floor, Sacramento, CA 95814
Transmitted via e-mail to: LSJR-SD-Comments@waterboards.ca.gov

Re: Comment Letter – Draft TVA Scientific Basis Report

Dear Ms. Tyler:

The Bay Area Water Supply and Conservation Agency (BAWSCA) submits the following comments regarding the Draft Scientific Basis Report Supplement for the Tuolumne River Voluntary Agreement Proposal (Draft SBR). The Draft SBR is a necessary prerequisite before the State Water Board considers the proposed voluntary agreement for the Tuolumne River, which is also referred to as the Tuolumne Healthy Rivers and Landscape Plan or Tuolumne HRL. Incorporation of the Tuolumne HRL will require potential updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan or Plan), most recently adopted by the State Water Board in 2018.

BAWSCA has expressed its support of a thorough, robust and defensible analysis of the Tuolumne HRL. A robust review would help to bring all parties together and potentially move forward a unified approach to meeting the needs of all Tuolumne River parties and beneficiaries. BAWSCA is pleased to see that the Draft SBR provides sufficient documentation to warrant moving the Tuolumne HRL forward as part of an updated Bay-Delta Water Quality Control Plan.

The Tuolumne HRL is designed to provide tangible environmental benefits, including new floodplain and rearing habitat, restored spawning areas, and increased flows in all hydrologic year types. It is also predicted to result in a 150% increase in juvenile salmon compared to current conditions. The San Francisco Public Utilities Commission (SFPUC) together with the Modesto Irrigation District and Turlock Irrigation District are self-funding the implementation of the Tuolumne HRL, committing over \$80M. This will deliver immediate results without delay by reliance on State or Federal funding.

The Draft SBR confirms that the Tuolumne HRL proposal is a holistic and integrated approach to improving the Bay-Delta ecosystem for fish and wildlife by aligning a broad spectrum of habitat, science, and adaptive management tools. The State Water Board now has the scientific basis it needs to move the Tuolumne HRL proposal forward without delay so that it can be considered as an alternative update to the Bay-Delta Plan.

BAWSCA represents the twenty-six wholesale customers of the SFPUC, who collectively contribute to the funding of the Tuolumne HRL through water rates, totaling more than \$320M annually, paid to San Francisco. For the BAWSCA agencies, the Tuolumne HRL helps ensure a continuing reliable supply of high-quality water at a fair price for the health, safety, and economic well-being of BAWSCA's water users in the Bay Area.

BAWSCA's Interest in the Draft SBR and Tuolumne HRL

BAWSCA represents the wholesale water agencies that purchase two-thirds of the water delivered by the San Francisco Regional Water System (Regional Water System) and pays for two-thirds of its costs. The Regional Water System relies on the Tuolumne River for 85 percent of its water supply. The BAWSCA member agencies, in turn, provide water to 1.8 million residents, 40,000 businesses, and hundreds of community organizations in Alameda, San Mateo, and Santa Clara counties. It is important to understand that BAWSCA was created 22 years ago by the California legislature (AB 2058) to protect and assure a reliable water supply for its constituents (Water Code § 81300 *et seq.*). Attachment 1 illustrates the BAWSCA service area and member agencies.

BAWSCA has been engaged in the process to update the Bay-Delta Plan and continues to support its objectives. However, BAWSCA cannot support the Plan adopted by the State Board in December 2018 due to the significant negative impacts to the water customers BAWSCA represents. The Plan adopted in 2018 would result in a very serious loss of up to 90 million gallons of water every day during times of drought from the Regional Water System. These are the same unacceptable impacts that BAWSCA described to the State Board in detailed written and oral comments¹ when it adopted the Bay-Delta Plan update and Substitute Environmental Document (SED) in 2018.

Of particular concern for BAWSCA member agencies is how reduced supplies resulting from implementation of the Bay-Delta Plan adopted in 2018 will impact housing needs in the Bay-Area. The Porter-Cologne Water Quality Control Act requires that the State Board evaluate “the need for developing housing within the region” when establishing water quality objectives (Water Code § 13241(e)). Furthermore, the State’s Housing Accountability Act declares: “The availability of housing is of vital statewide importance” (Gov. Code § 65580(a)) and “California has a housing supply and affordability crisis of historic proportions” (*id.* § 65589.5(a)(2)(A)). And the housing crisis is particularly acute in the Bay Area.² See Attachment 2 for a discussion of SF Bay Area housing requirements.

BAWSCA member agencies have adopted State-required UWMPs that show they would suffer up to a 50-percent loss of water supply from the Regional Water System during multi-year droughts if the adopted Bay-Delta Plan was in force. The UWMPs provide the long-term resource planning of each agency and ensure that adequate water supplies are available to meet existing and future needs (Water Code §§ 10610.2, 10610.4.). BAWSCA member agencies’ most recent UWMPs can be found on BAWSCA’s website at https://bawasca.org/members/urban_water_management.

BAWSCA member agencies’ foreseeable responses to a water shortage derived from the UWMPs include, but are not limited to:

- Increased reliance on local groundwater, increasing the probability for groundwater basin overdraft, saltwater intrusion, and land subsidence.

1

https://www.waterboards.ca.gov/public_notices/comments/2016_baydelta_plan_amendment/nic_ole_sandkulla.pdf

² <https://www.sfchronicle.com/bayareahousingcrisis/>

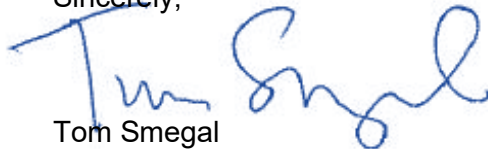
- Expanded use of local surface water supplies, which could be greatly depleted or completely unavailable during times of drought.
- Seeking to acquire new water supplies through transfer or alternative supplies.
- Implementing a development (e.g., "no new hook up") moratorium which would cause environmental and economic impacts and impacts from displaced growth and urban sprawl.

Based on the history of BAWSCA member agencies' actions during past droughts, it can be reasonably assumed that agencies would require increasing levels of rationing and they may need to impose moratoria on new development if the Bay-Delta Plan flow requirements reduce water supplies. Moratoria on new development will exacerbate the existing Bay Area housing crisis and cause affordability issues that will cripple Bay Area communities.

BAWSCA member agencies already have some of the lowest residential per capita water users in the State. Specifically, nine of the twenty-six member agencies have average residential indoor and outdoor water use at or below 47 gallons per person per day, the State's standard for efficient indoor residential water use. For these agencies, a 50% reduction in water supplies equates to an average per person water use of 25 gallons per day or less. Such water restrictions may be impossible to achieve without punitive and prescriptive measures and would certainly result in unacceptable negative impacts on job growth, a slowdown in the economy, and health, safety and economic risks for people, businesses and communities. Importantly, the adopted Bay-Delta Plan could limit the ability for cities to approve State-mandated construction of new affordable-housing for residents and employees of vital businesses and institutions.

The Bay-Delta Plan must take into account these substantial impacts to the Bay Area. The 2018 adopted Plan did not do so, which is why BAWSCA could not support the 2018 adopted Plan. The Tuolumne River HRL, however, can reduce these substantial impacts and thus is better aligned with Water Code section 13241, requiring the State Board to evaluate the need for developing housing when establishing water quality objectives. That is why BAWSCA appreciates the work by the State Water Board in developing the Draft SBR for amending the Bay-Delta Plan. While BAWSCA opposed the 2018 adopted Plan, it has consistently supported voluntary agreements. These voluntary agreements can reduce the impacts to the Bay Area's water supply while providing tangible environmental benefits and improving the fisheries. This balanced outcome is of vital importance to BAWSCA. A thorough, robust and defensible analysis of the proposed Tuolumne River HRL is critically necessary to bring all parties together and in moving forward with a solution that meets our shared objectives. The Draft SBR is a reasonable alternative that balances the beneficial use of water on the Tuolumne and, the State Board should continue to advance the Tuolumne River HRL forward so that it can be implemented as soon as possible.

Sincerely,



Tom Smegal
Chief Executive Officer/General Manager

Enclosures

cc: San Francisco City Attorney's Office
Mr. Steve Richie, SFPUC, Assistant General Manager, Water Enterprise

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ATTACHMENT 1 **BAWSCA Service Area Member Agencies**

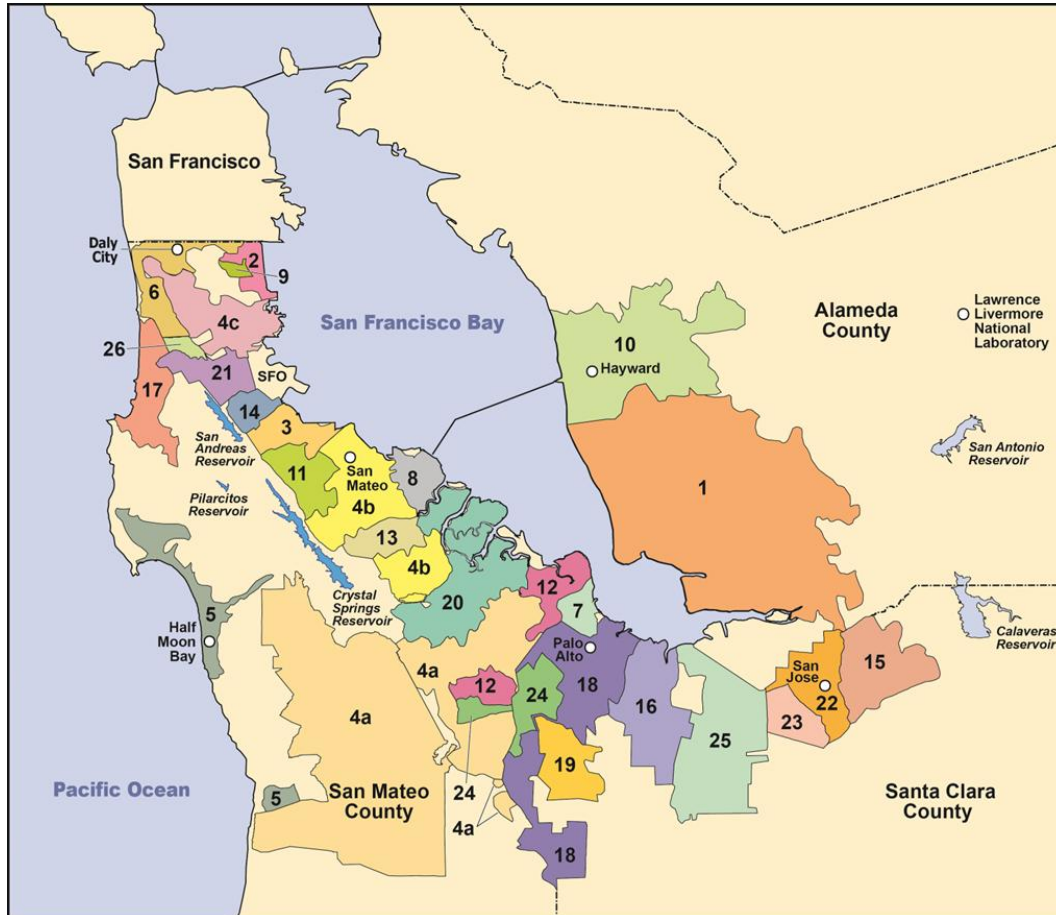


Figure 1: BAWSCA Member Agency Service Area

Legend

1 Alameda County Water	9 Guadalupe Valley	19 Purissima Hills Water
2 City of Brisbane	10 City of Hayward	20 City of Redwood City
3 City of Burlingame	11 Town of Hillsborough	21 City of San Bruno
4a CWS – Bear Gulch	12 City of Menlo Park	22 San Jose Municipal Water
4b CWS – Mid-Peninsula	13 Mid-Peninsula Water	23 City of Santa Clara
4c CWS – SSF	14 City of Millbrae	24 Stanford University
5 Coastside County Water	15 City of Milpitas	25 City of Sunnyvale
6 City of Daly City	16 City of Mountain	26 Westborough Water
7 City of East Palo Alto	17 North Coast County	
8 Estero Municipal	18 City of Palo Alto	

Source: BAWSCA FY 2023-24 Annual Survey

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ATTACHMENT 2

SF Bay Area Housing Requirements

The California Sustainable Communities and Climate Protection Act of 2008 (California Senate Bill 375, Steinberg) requires the Bay Area to plan for housing that can accommodate all projected growth, by income level, so as to reduce the pressures that lead to in-commuting from outside the nine-county region (Plan Bay Area 2050, adopted on October 21, 2021, by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC))³. Plan Bay Area 2050 encompasses the entire Bay Area, including the nine counties and the 101 cities and towns that make up the region. Plan Bay Area 2050 provides a roadmap for accommodating projected household and employment growth in the nine-county Bay Area by 2050 as well as a transportation investment strategy for the region. It details how the Bay Area can make progress toward the region's long-range transportation and land use goals. As detailed in Plan Bay Area 2050, the Bay Area has 2.5 million homes and counting throughout its nine counties. To accommodate a growing population expected to reach 10 million by 2050, more housing will need to be built throughout the region.⁴

The consideration of the Plan Bay Area housing requirements is not optional. The Regional Housing Needs Allocation program, or RHNA, (Gov. Code § 65584 *et seq.*) addresses the housing crisis by assigning each local jurisdiction a number of housing units that represents its share of the state's housing needs for an eight-year period. (Gov. Code § 65588.) The California Department of Housing and Community Development allocates the state's anticipated housing needs on a regional basis at different levels of affordability based on data involving household demographics. (Gov. Code §§ 65584(a)(1); 65584.01; 65588.) The housing needs are distributed to individual localities by a regional council of governments. (Gov. Code § 65584.05.) Once the housing needs allocations are final, each locality must update its general plan's housing element to provide an inventory of sites available for residential development, and identify any constraints to development. (Gov. Code §§ 65583; 65583.2; 65585.) Any locality that does not adopt a compliant updated housing element is subject to accelerated rezoning and penalties. (Gov. Code §§ 65583(c)(1)(A); 65583.2(c); 65588(e)(4)(C); 65755(a)(1),(4).) Accordingly, cities and counties *must* comply with the RHNA numbers; participation is not optional.

It is critical that the State housing laws be considered when developing water quality control plans, especially when water supplies are impacted, such as with the Bay-Delta Plan. As a condition of tentative map approval, for instance, residential housing subdivisions require verification of a "sufficient water supply." (Gov. Code § 66473.7(b)(1).) By further example, large residential housing projects require water supply assessments that consider whether the applicable Urban Water Management Plans (UWMP) consider the added demand the project will impose and confirm whether water supplies can meet the housing project's current and future demand. (Water Code § 10910.) These verification and assessment requirements each require that local agencies consider whether a public water system's total projected water supply available during normal, single dry, and multiple dry water years during a twenty-year project will meet the proposed housing project's water demand. (Gov. Code § 66473.7(a)(2); Water Code § 10910(c)(3).) Disrupting water supply availability thus has a direct impact on the Bay Area cities' ability to develop housing.

³ <https://planbayarea.org/plan-bay-area-2050>

⁴ <https://planbayarea.org/2050-plan/final-plan-bay-area-2050/chapter-2-housing>

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CALIFORNIA DEPARTMENT OF WATER RESOURCES

Release: December 01, 2025

Contact:

Ryan Endean, Public Affairs, Department of Water Resources

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DWR Announces Initial State Water Project Allocation for 2026



An aerial view shows the two canals, North and Victoria, located in San Joaquin County, California, with part of the State Water Project Clifton Court Forebay located in Contra Costa County.

SACRAMENTO, Calif. – Today, the Department of Water Resources (DWR) announced an initial State Water Project (SWP) allocation of 10 percent of requested supplies for the new water year. This allocation represents the first water supply forecast of the season for the 29 public water agencies served by the SWP which provides water to 27 million Californians and 750,000 acres of farmland.

The SWP is contractually required to make an initial allocation forecast by December 1 each year. Since it is so early in the season, the initial allocation typically reflects current hydrological conditions, existing reservoir storage, and an assumption of dry conditions through the rest of

the year. So far, the wet season is off to a good start with beneficial rain falling in Northern California and Southern California already seeing significant rainfall following a dry year last year.

"Recent history has shown us that anything can happen during a California winter, so it's important that our early season allocation for the State Water Project is conservative," said DWR Director Karla Nemeth. "Traditionally our wettest months are yet to come. With improvements to forecasting and science, we are better prepared to capture water supply during wet periods if Mother Nature delivers."

Across the state, California's water supply starts the season in good shape with statewide reservoir storage just above average at 114 percent. Lake Oroville, the SWP's largest reservoir, is at 100 percent of average for this time of year, slightly above where it was at last December.

Last year, the SWP's initial allocation began at five percent and increased to 50 percent by the end of the season. As winter progresses, if the state sees an increase in rain and snowfall totals, the allocation forecast may increase as well.

Each year, DWR provides the initial SWP allocation based on available water storage, projected water supply and water demands. Allocations are updated monthly as snowpack, rainfall and runoff data is analyzed, with a final allocation typically determined near the end of the season in May or June.

Historical data on SWP allocations is available at <https://water.ca.gov/programs/state-water-project/management/swp-water-contractors>.

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Drought Status Update for California-Nevada

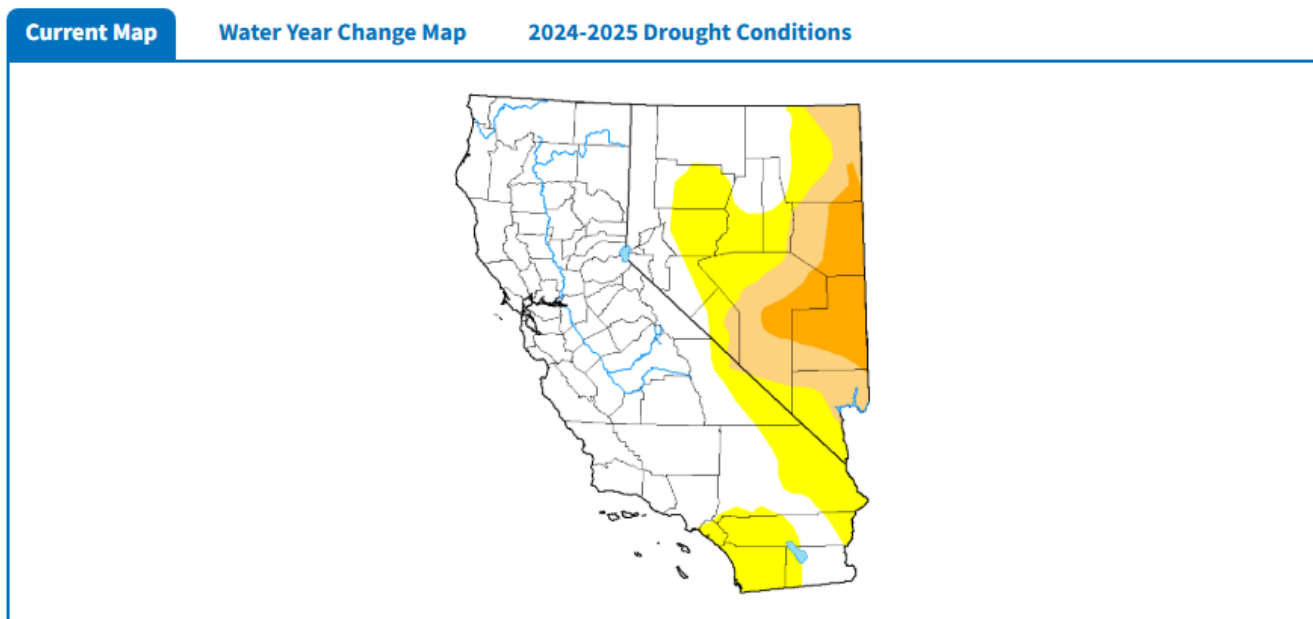
Drought.gov | December 4, 2025 | NOAA and National Integrated Drought Information System

Wet Start to Water Year Improves Drought, But Snowpack Lags

Key Points

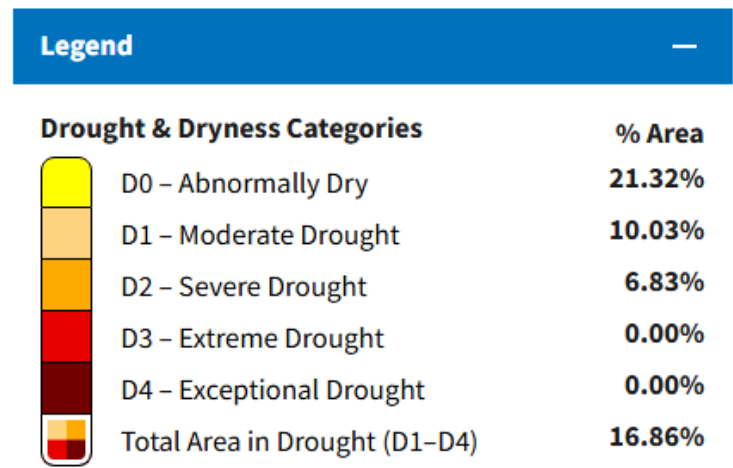
- Water Year 2026 (October 1, 2025–September 20, 2026) began very differently than Water Year 2025. Drought developed in the first few months of the last water year and expanded over the region. This water year, over the course of 2 months, drought across California-Nevada has improved by 1-3 categories, according to the U.S. Drought Monitor.
- Since the start of the 2026 Water Year on October 1, several areas of California-Nevada have received more than 300% of normal water year to date precipitation, improving soil moisture conditions. Snowpack is starting to build, albeit slowly due to much-above-normal temperatures.
- Long-term drought (according to the U.S. Drought Monitor) lingers from central-southern Nevada to the California border, an extension of drought conditions from the Southwestern U.S.
- Extended range outlooks remain uncertain for December. NOAA's National Weather Service forecasts a break in precipitation over the next two weeks, with slight indications for Southern California to be drier than normal through February.
- NOAA's National Integrated Drought Information System (NIDIS) and partners will continue to provide the latest information on conditions, outlooks, and impacts through the water year.

This update is based on data available as of Thursday, December 4, 2025 at 7:00 a.m. PT. We acknowledge that conditions are evolving.

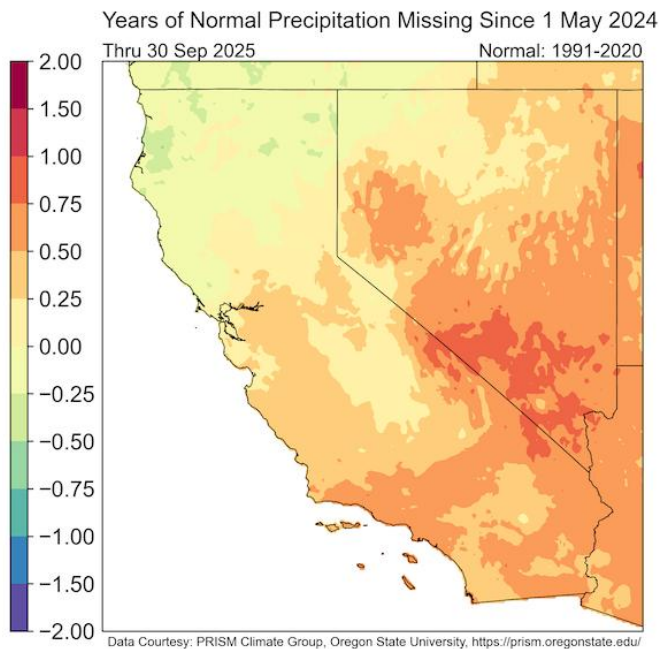


The U.S. Drought Monitor depicts the location and intensity of drought across the country. The map uses 5 classifications: Abnormally Dry (D0), showing areas that may be going into or are coming out of drought, and four levels of drought (D1–D4).

The U.S. Drought Monitor is a joint effort of the National Oceanic and Atmospheric Administration, U.S. Department of Agriculture, and National Drought Mitigation Center.
Source(s): NDMC, NOAA, USDA



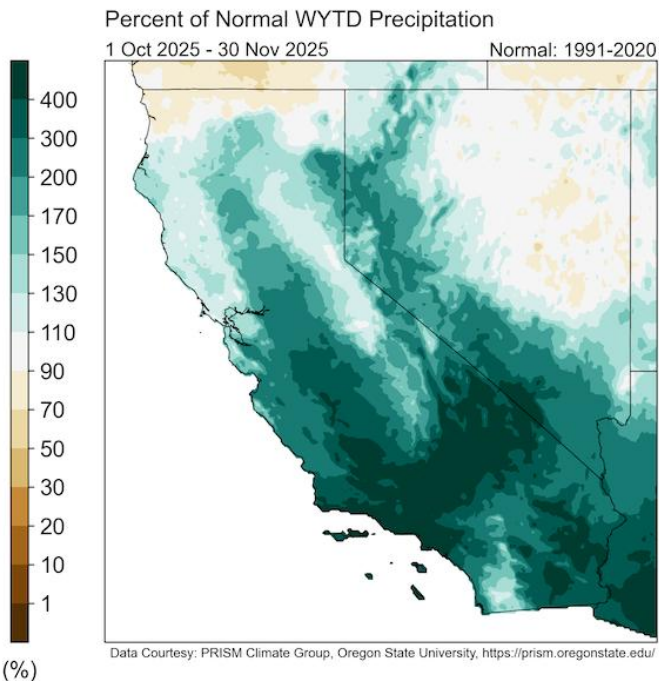
Much of California-Nevada began Water Year 2026 with Large Precipitation Deficits



Map of California and Nevada shows ¼ to 1.5 years of missing normal precipitation cumulatively over the last 1.5 water years.

At the end of Water Year 2025 (September 30, 2025), years of missing normal precipitation since May 1, 2024. Values are shown as a fraction of a year with yellow to red hues indicating missing precipitation. Some areas started this water year in a precipitation deficit comparable to 0.5 -1 years' worth of precipitation. This deficit has accumulated over the last 1.5 years. Provided by C. Castellano, CW3E.

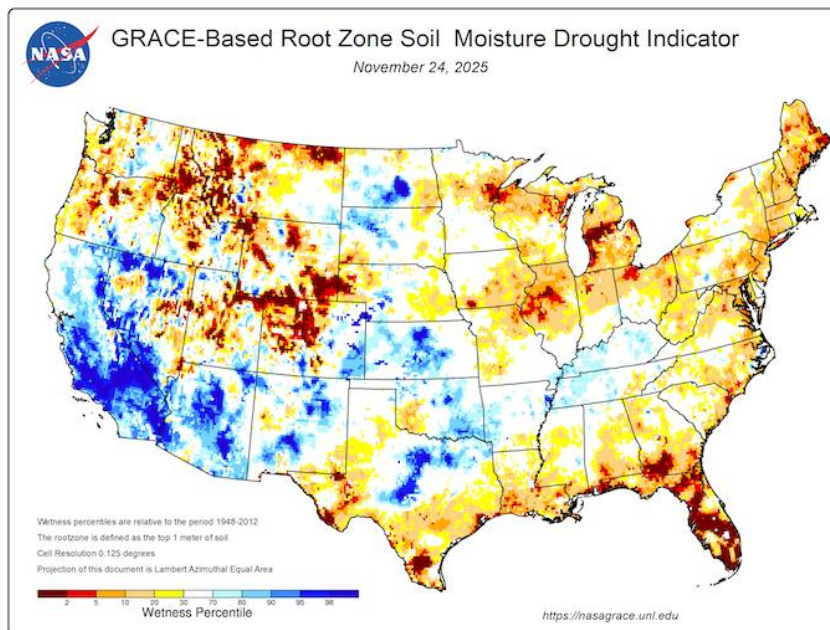
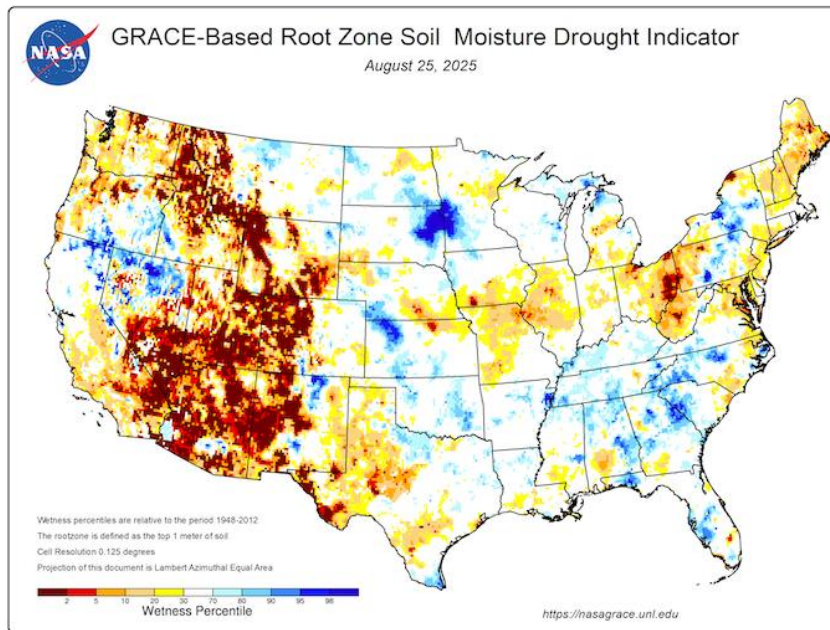
Water Year 2026 Is Off to a Wet Start in California and Western and Southern Nevada



The figure shows a map of the percent of normal precipitation for October 1, 2025–November 30, 2025 (water year to date), compared to historical conditions (1991-2020). California and western and southern Nevada have received more than 100% of normal water year to date precipitation, with some parts of southern California at 400% of normal or more.

Percent of normal water year to date (October 1, 2025–November 30, 2025) precipitation, compared to historical conditions (1991–2020). Brown hues indicate below-normal precipitation, while blue-green hues show above-normal precipitation. Provided by C. Castellano, CW3E.

Root Zone Soil Moisture (Top 1 Meter of Soil) Shows Significant Improvements over California-Nevada

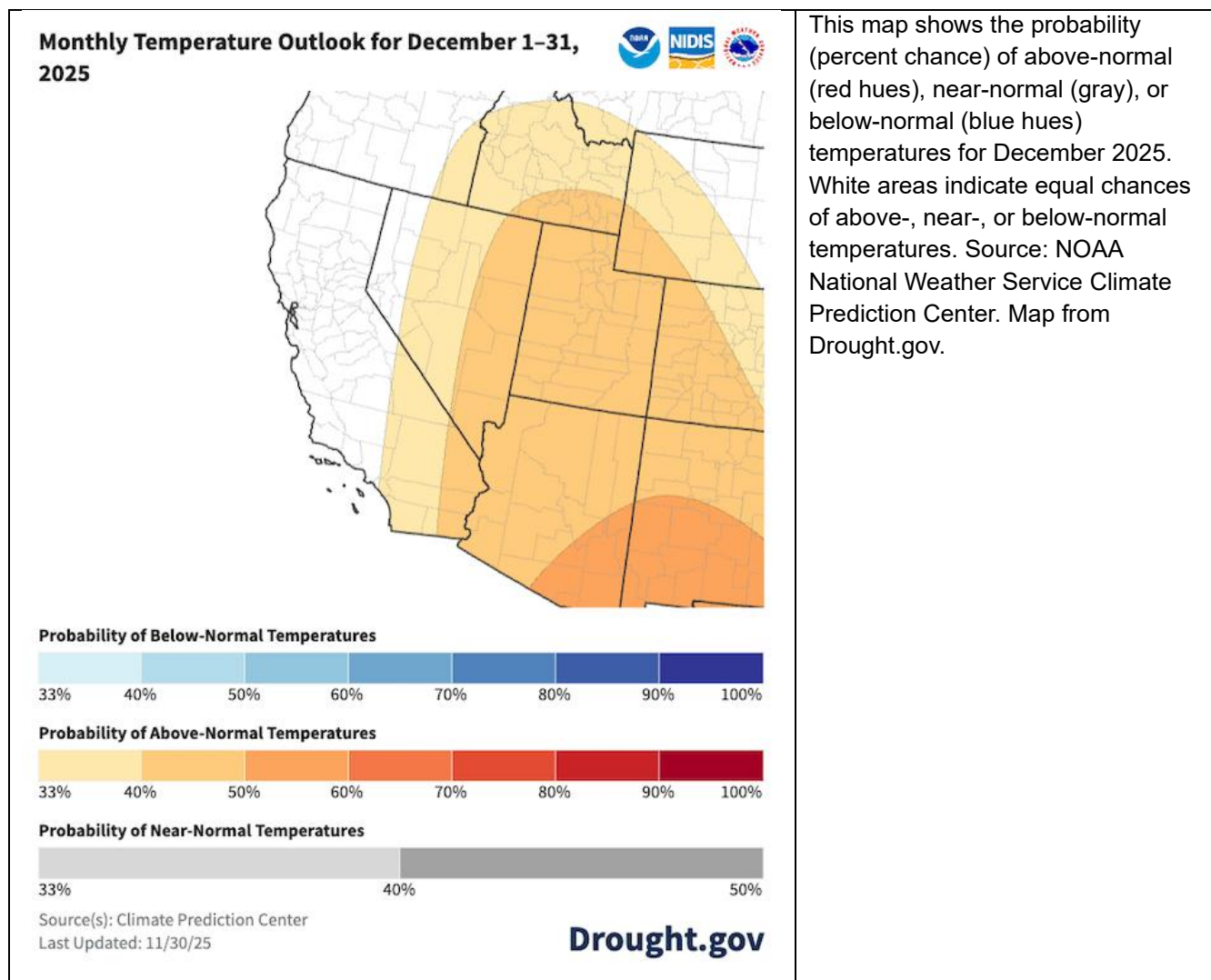


Root zone (1-meter) soil moisture from NASA GRACE for August 25, 2025 (top) and December 1, 2025 (bottom). The GRACE-Based Root Zone Soil Moisture Drought Indicator describes the current wet or dry conditions of the top 1 meter of soil, expressed as a percentile, showing the probability of occurrence within the period of record from 1948 to 2012. Yellow, orange, and red hues indicate soil moisture in the bottom (driest) 30th percentile of historical conditions, while blue hues indicate soil moisture in the 70th percentile or above. Source: NASA GRACE.

Outlooks and Potential Impacts for California-Nevada

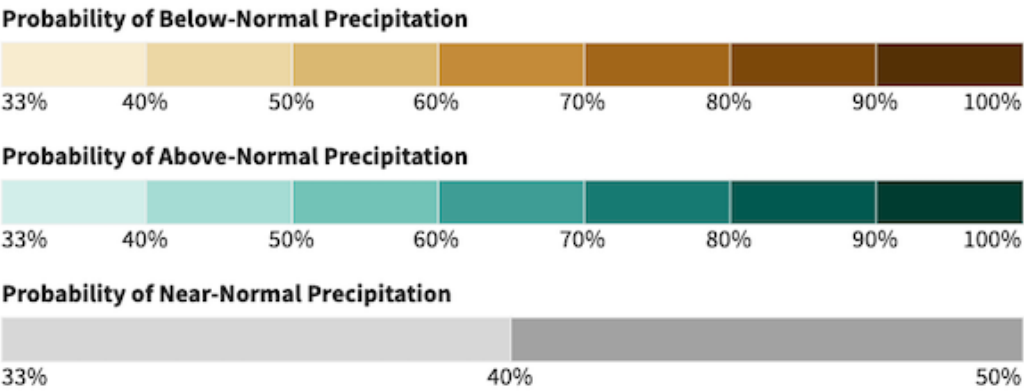
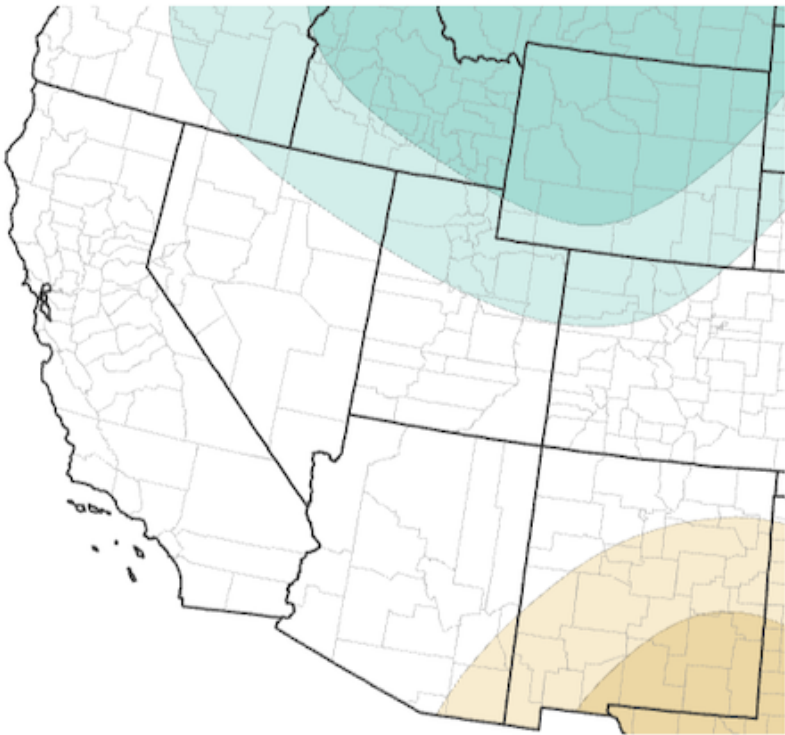
- La Niña continued over the last month and is favored to continue into the Northern Hemisphere winter, with a transition to El Niño–Southern Oscillation (ENSO) neutral conditions most likely in January–March (61% probability). La Niña conditions have historically increased the chances of normal to dry winters in southern California and southern Nevada.
- National Weather Service extended range forecasts over the next two weeks indicate there may be a break in the precipitation for the region, along with warmer-than-normal temperatures. Over the next month, the National Weather Service Climate Prediction Center's (CPC's) outlooks show equal chances of above-, near-, or below-normal precipitation in December, with slightly increased odds of warmer-than-normal temperatures in Southern California and Nevada.
- As we head into the new year, CPC's seasonal outlooks for December–February suggest a more typical La Niña pattern—with slight chances of below-normal precipitation in the Southwestern U.S.
- Existing drought conditions are forecast to persist over the next one to three months.

December Temperature Outlooks Lean Towards Above-Normal Temperatures in Nevada and Southern California



December Precipitation Outlooks Show Equal Chances of Above-, Below-, or Near-Normal Conditions

Monthly Precipitation Outlook for December 1–31, 2025



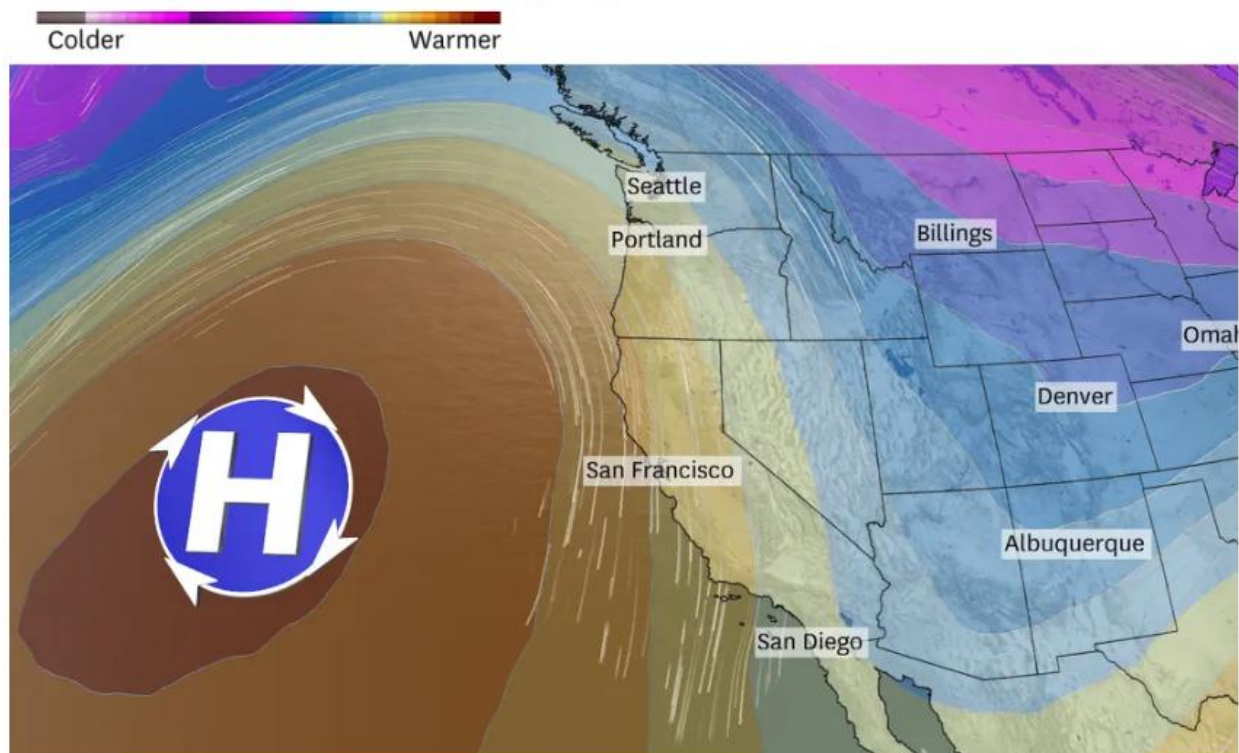
Source(s): Climate Prediction Center
Last Updated: 11/20/25

Drought.gov

This map shows the probability (percent chance) of above-normal (blue/green hues), near-normal (gray hues), or below-normal (brown hues) precipitation for December 2025. White areas indicate equal chances of above-, below-, or near-normal conditions. Source: NOAA National Weather Service Climate Prediction Center. Map from Drought.gov.

Something big is blocking California's winter storms — here's what that means

San Francisco Chronicle | November 30, 2025 | Anthony Edwards



A high-pressure system just off the West Coast is expected to deflect storms toward Canada and keep the Western U.S. drier than normal in early December. Any storms that impact California are predicted to drop out of the north, which tend to bring colder air but are also limited in moisture. Baron/Lynx

San Francisco's wettest month, climatologically, isn't shaping up to follow the traditional script this year.

The city averages more rain in December than any other month, but California's precipitation forecast to close out 2025 is grim.

Effects of a stratospheric disruption and hints of La Niña's influence on the jet stream are likely to steer storms away from the West Coast for at least the first half of December. This would likely keep California drier than normal for the first two weeks of the month, especially in the northern half of the state.

Southern California may fare slightly better from a precipitation standpoint, but the region remains on a razor's edge from a volatile storm track.

Temperature inversions are predicted to continue, too. That means many days that are warmer in Lake Tahoe than in Sacramento, as the valley remains shrouded in tule fog. The warm weather may continue to trouble Tahoe ski resorts as they try to supplement a low snowpack with artificial powder.

Here's what to expect in the final month of 2025:

Storm shields up

California's early December weather is predicted to be dominated by a large high-pressure system in the northeastern Pacific Ocean, just off the West Coast. High-pressure systems generally result in clear skies and tranquil weather beneath them.

This clockwise-spinning area of high pressure will prevent Pacific storms from forming along the West Coast, deflecting them into Canada before dropping southward inland. These types of systems are known as "inside sliders" and are characterized by their north-to-south route east of the Sierra Nevada.

Inside sliders aren't prolific rain- or snowmakers because of their overland trajectory, but can bring light precipitation to eastern California. One of those inside sliders could generate flurries in Tahoe on Wednesday, Dec. 3. Rain is unlikely west of the Sierra crest.

Sometimes, inside sliders can cut off from the jet stream near the Southern California Bight and evaporate enough moisture from the Pacific Ocean to drop rain in Los Angeles and San Diego. One of those storms, known as a cutoff low-pressure system, is possible Thursday through Saturday, Dec. 4-6. But if the system goes slightly farther east, all of California will remain dry.

That cutoff low presents California with its best chance of rain in early December, but the northern half of the state probably wouldn't pick up much. There's an 80% chance of less than an inch of rain in San Francisco the first 12 days of December and a 40% chance the city remains dry, according to the European Center for Medium-Range Weather Forecasts.

San Francisco began the first 10 days of December 2024 without a drop of rain before a powerful storm just four days later led to the city's first-ever tornado warning. That illustrates just how quickly weather patterns can change this time of year, so not all hope is lost for wet weather in December.

What about temperatures?

With a high-pressure system near the West Coast, skies are expected to remain free of clouds.

Clear skies in winter tend to bring California warmer-than-normal days and cooler-than-normal nights. That's because long, clear winter nights allow heat time to escape to space. Although the sun is low in the sky in December, it is still strong enough to warm the land around California into the 50s, 60s and 70s.

Bad news for the Sierra snowpack: Warm weather will probably continue to melt away snow that accumulated in November. Temperature inversions, where cold air sinks to the valleys at night while warm air lingers above, may keep temperatures above freezing in the middle elevations of ski resorts.

One exception to the pattern may come in the Central Valley. Winter high-pressure systems tend to lock in long stretches of foggy weather. That happened on Thanksgiving in Sacramento, where thick fog never burned off. Sacramento's high temperature of 48 degrees that day was its coldest November day in three decades.

This December may end up as one of the Central Valley's foggiest months in years.

What's driving the dry weather?

The mechanisms driving California's dry forecast are complex. The high-pressure system off the West Coast is part of a wavy atmospheric pattern prevailing across the Northern Hemisphere, triggered by a disruption in the stratosphere.

High-amplitude, or wavy, atmospheric patterns tend to get stuck in place, which result in persistent stormy weather in some areas and stretches of tranquil conditions in others.

Wintertime high-pressure systems along the West Coast are becoming more common, scientists say. These patterns may also be linked to Arctic sea ice extent, which is currently at a record minimum for this time of year.

When will the rain return?

Persistent winter high-pressure systems typically break down in one of two ways.

Either the jet stream strengthens on the west side of the Pacific Ocean and a breakthrough storm pushes the area of high pressure into the U.S. This sort of pattern can put the West Coast at risk of a warm rainstorm.

Or, a more likely outcome is that the high-pressure system moves westward, or retrogrades.

This would open the door for storms to parallel the Pacific coastline and pick up moisture on their way to Northern California. Those storms would probably originate near Canada and bring colder air with them, favorable for Sierra snow. However, it's a volatile pattern. A slight eastward shift in the position of the high-pressure system would keep California much drier.

If the pattern does change, it would likely happen around the Dec. 10-14 timeframe.

While the second half of December may offer California better storm chances, it's important to note that long-range weather models still favor drier-than-normal conditions until at least New Year's Day.

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More collaborative operational solutions for affordable water

Capitol Weekly | December 2, 2025 | Adan Ortega



OPINION – California is unique in that our state policy recognizes the human right to water – a principle that every resident deserves safe, clean, affordable and accessible water. Yet affordability, the ability for families to pay their utility bills without sacrificing other basic needs like rent, food or medicine is increasingly strained. Increasing costs for infrastructure development, regulatory and environmental compliance and climate resilience have made essential services such as water, energy and wastewater more expensive than ever. In many communities, utility rates are increasing faster than inflation, leaving even middle-class California families struggling to keep up.

These rising operational costs inevitably trickle down to ratepayers, which disproportionately impacts those least able to pay. From small, rural regions to low-income urban communities, those with the fewest resources are supported by some of the smallest water systems with limited resources.

This year, however, brought some welcome relief. Thanks to Governor Newsom and legislative champions like Assemblymember Blanca Rubio, California passed Assembly Bill 428, a new law tackling one of the most painful, and familiar, cost pressures Californians face: skyrocketing insurance premiums. Anyone who owns a home or runs a business in California knows this pain firsthand. From wildfires to floods, the state's mounting climate risks have sent insurance costs soaring. This is a burden shared by homeowners, small businesses, and utilities alike. For water providers, these rising premiums directly threaten affordability.

AB 428 was co-sponsored by the California Water Association (CWA), representing the state's CPUC-regulated water utilities, and the California Association of Mutual Water Companies (CalMutuals), which represents hundreds of non-governmental, community-owned mutual water systems across the state. Together, these organizations reflect the majority of small and rural systems that are most vulnerable to climate impacts and rising costs, yet least able to absorb them. Their partnership underscores how collaboration across diverse water providers can drive practical, statewide solutions to protect affordability for all Californians.

Consider the Lukins Brothers Water Company in South Lake Tahoe, a system that serves over 3,000 customers. Their insurance premiums jumped by more than 200%, from \$56,000 in 2021 to \$299,000 in 2023, forcing the company to pass along a \$21 monthly increase per customer just to stay insured. This was a crushing blow to a small community already struggling with affordability.

Or, the neighborhood of Del Rio in the City of El Monte, whose residents own and volunteer to operate a community system with only 100 service connections, that could not afford insurance at market rates, until CalMutuals created a Joint Powers Authority in 2017, with less expensive pooled insurance options. But as illustrated in South Lake Tahoe in 2025, not all small water systems were eligible to join insurance pools.

AB 428 offers a practical, common-sense fix. The measure now allows water corporations to join with mutual water companies and public water agencies to pool resources and buy insurance together, similar to how families save by buying in bulk at Costco rather than paying higher prices for individual items. The bigger the insurance pools, the lower the cost. The result for utilities: reduced risk, lower costs, stronger financial security, and greater stability for ratepayers.

Of course, this victory is just one piece of a much larger puzzle. Water affordability will require many more such innovations and policies that reduce costs through collaboration and efficiency, without sacrificing water quality or reliability.

The affordability challenges faced by all Californians require bold strategies to ensure long-term equity and sustainability. If we want to deliver on California's promise of safe, affordable water for all, we must continue to think boldly and work collectively. When systems large and small join forces, we not only save money, but we also strengthen our ability to serve every Californian.

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Adán Ortega is Executive Director of CalMutuals, an association dedicated to ensuring effective and compliant operation and governance of small water systems.

2.9 billion gallons of clean drinking water added to California's supply with new investments

Office of Governor Gavin Newsom | December 2, 2025

What you need to know: Governor Newsom's strategy to create more water infrastructure continues, with eight new projects up and down the state to add 2.9 billion gallons to the state water supply. The projects improve local water systems across California to increase wastewater recycling, keep sewage away from groundwater, remove forever chemicals from drinking water, and desalinate brackish river water.

SACRAMENTO – Governor Gavin Newsom has made significant strides in securing and enhancing water supplies, including improving the state's ability to capture stormwater. Fortified by state investment to strengthen and expand California's local water infrastructure, eight major, state-funded projects completed or broke ground across California this fall—including water recycling, wastewater treatment and desalination facilities—that benefit over 1 million people. Collectively, the projects add about 2.9 billion gallons annually to the state's water supplies, enough water for roughly 20,000 homes per year.

"We're dealing with hotter, drier, wetter, more volatile weather all at once — and California has to stay ahead of it. That means continuing to harden and modernize our water systems so 40 million people can count on a reliable supply in the face of these extremes. I'm proud of the investments we're making, and we're not slowing down. We're going to keep advancing the projects, the storage, the recycling, and the infrastructure upgrades that ensure every community has stable, safe water access for the long haul." Governor Gavin Newsom

New water projects in California

The projects throughout the state were funded by nearly \$590 million in grants and low-interest loans, including funding from the Clean Water and Drinking Water State Revolving Funds. During the past fiscal year, the State Water Board invested \$2 billion to support new projects in 390 communities. When these projects complete in the years to come, they will benefit nearly half the state's population. And since 2019, the board has distributed over \$11 billion in financial assistance.

"As we build the water and wastewater infrastructure California needs to prepare for a hotter, drier climate with more extreme weather, state investment is accelerating projects in large towns and cities, as well as small, rural communities," said State Water Board Chair, E. Joaquin Esquivel. "Major state and federal infrastructure commitments in recent years have enabled the board to offer significant levels of grants and low-interest financing that keep vital projects affordable. The board will continue to act as the engine for distributing these investments year on year, so communities will have the water they need in the future."

1. Removing PFAS chemicals in Irvine

In Irvine, 38,000 people will receive water free of per- and polyfluoroalkyl chemicals (PFAS), thanks to a new treatment system recently completed by the Irvine Water District using a \$2.8 million state grant. The project removes PFAS from local groundwater. The system can process up to 3,200 gallons of water per minute. The project was one of seven similar projects through the Orange County Water District.



2. Upgrading wastewater facilities in San Luis Obispo

In October, San Luis Obispo finished the wastewater upgrade of its Water Resource Recovery Facility, which will help improve services for 46,000 people in San Luis Obispo. The upgrade, which was funded by a \$140 million low-interest loan from the state, replaced aging equipment and improved secondary treatment and disinfection technologies to meet state and federal standards.

“The SLO Water Plus project is the largest capital improvement the city has ever undertaken, and the State Water Board’s financing and technical support were instrumental,” said Miguel Barcenas, the city’s Utilities Deputy Director. “The low-interest loan is keeping our wastewater rates low, lower than expected.”



3. More water capacity for Monterey

In October, Monterey One Water opened the Advanced Water Purification Facility, which will add 2,250 acre feet of recycled water per year to water supplies on the Monterey Peninsula, enough to serve 6,750 households. The State Water Board provided a \$15 million grant for the project to help expand water capacity to benefit more than 92,000 people.



4. Helping San Francisco manage extreme weather

In September, as a result of a \$112 million low-interest loan by the state, the San Francisco Public Utilities Commission completed the new Headworks Facility as part of critical upgrades to San Francisco's largest wastewater treatment facility, the Southeast Treatment Plant. The new facility keeps odors within the plant and increases the plant's capacity to manage extreme weather events, benefiting 623,000 people.



5. Improving San Mateo's sewer systems

In September, the Estero Municipal Improvement District completed a \$552 million upgrade and expansion of the San Mateo Wastewater Treatment Plant. The upgrades increase system capacity to manage large storm events and prevent sewer system overflows that threaten public health and the San Francisco Bay. Through the project, which was supported through a \$137 million low-interest state loan, 160,000 people receive improved wastewater services and greater protection from sewer system overflows.



6. Desalinating water in Antioch

In September, the city of Antioch completed the Antioch Brackish Water Desalination Plant using a \$60 million low-interest loan from the state which will help this Delta community adapt to climate change by facilitating the capture, treatment, and use of water directly from the San Joaquin River. The plant, which serves 110,000 people, can produce up to 6 million gallons of drinking water per day, or enough to sustain an amount equal to 20,000 households per year.



7. Building drinking water sources West Lake Tahoe

In September, the state provided the Tahoe City Public Utilities District with a \$19.7 million low-interest loan and opened the West Lake Tahoe Regional Water Treatment Plant, an upgraded facility that can treat 1 million gallons of lake water per day. As a result of the project, 5,400 residents now have a permanent, drought-resilient source of drinking water and fire protection.



8. Connecting people to sewer systems in Yucca Valley

In August, the Hi-Desert Water District broke ground on a new sewage collection system — the second phase of a 10-year wastewater infrastructure construction of a 32-mile pipeline to the district's wastewater treatment plant. The project was funded by \$103 million in grants that save individual property owners at least \$30,000 in assessment costs — and will help connect approximately 5,400 people to sewer services.



Accelerating vital water storage projects

These projects are part of Governor Newsom's comprehensive strategy to accelerate California's ability to manage and store water, and works alongside the Governor's infrastructure

streamlining package to build more faster, and California's Proposition 1 funding, dedicating \$2.7 billion to improve California's water infrastructure.

The Governor is also working to advance other important projects, including the Sites Reservoir Project. This project will help capture water during wet seasons and store it for use during drier seasons — holding up to 1.5 million acre-feet of water, enough for 3 million households' yearly usage.

Additionally, the Governor continues to advance the state's Delta Conveyance Project, which is the most consequential water infrastructure project in recent California history, and will help ensure that the state can continue to provide water for people, businesses, and farmland throughout the state. The Delta Conveyance Project will upgrade the State Water Project, enabling California's water managers to capture and move more water during high-flow atmospheric rivers to better endure dry seasons. The tunnel, a modernization of the infrastructure system that delivers water to millions of people, would improve California's ability to take advantage of intense periods of rain and excess flows in the Sacramento River.

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Solar-panel-covered canals have their day in the sun in California

University of California | November 25, 2025 | Robyn Schelenz



In the middle of California's Central Valley, a new way to use solar panels could change how we think about clean energy and water. It's a simple idea that people have talked about for decades, but only now is it finally being tested in real life, thanks to Brandi McKuin at UC Merced, whose study set this project into motion. Credit: Fig. 1 by University of California

California is taking the first steps in realizing an idea to save billions of gallons of water each year and produce enough clean energy to power a city the size of Los Angeles for nine months annually.

The simple but brilliant concept? Cover as much of California's roughly 4,000 miles of irrigation canals with solar canopies as possible.

Brandi McKuin, the lead University of California researcher on the project, says dozens of people have told her they had the idea of covering canals with solar panels decades ago. UC Merced's Roger Bales, a hydrologist and distinguished professor of engineering who helped launch the project, has been hearing "why didn't I think of that" about solar canals since the 1970s.

It's easy to see why the idea is so appealing. Putting solar panels over canals seems like the ultimate energy "life hack": valuable land that could have been lost to solar farms can be preserved, the amount of water lost to evaporation from the canals could be reduced AND a ton of clean electricity could be generated to boot.

But how you turn a great idea into reality is where the real work comes in.

Now, after almost a decade of careful study and planning, the highly anticipated Project Nexus, a private/public/academic partnership between the California Department of Water Resources, Turlock Irrigation District, and Solar Aquagrid — based on research by UC Merced and UC Santa Cruz — is online, generating electricity and data, with scientists and onlookers excited by the early results.



UC Merced project scientist Brandi McKuin and Zak Long walk along one of Project Nexus' solar arrays. Credit: Fig. 1 by University of California

A new approach for solar

A decade ago, former music executive Jordan Harris had the idea to explore solar over-canals. Harris has long had a keen interest in harnessing popular culture for social change, co-founding the nationwide voter registration organization Rock the Vote and advocating for electric vehicles. In 2015, with crises over the state's limited land and water resources looming, Harris, together with fellow sustainability entrepreneur and Citizen Group founder Robin Raj formed the firm Solar AquaGrid and approached UC Merced to commission an analysis of the feasibility of the project.

"I think we're all highly aware of the state of emergency we're in, with year after year of water and energy insecurity," Harris said. "At the same time, we need to combat climate change to produce more renewable energy and decarbonize our economy. We need bold solutions today."

The Merced campus, home to the University of California systemwide initiatives UC Solar and UC Water, seemed like a match made in heaven. Bales, a distinguished professor of engineering at UC Merced and then-head of the Sierra Nevada Research Institute and UC

Water, put together a team to do a rigorous scientific analysis of what scaled solar could look like for California.

What the UC team discovered was more promising than they had expected. Their analysis found that putting solar panels over the 4,000 miles of California's open canals could save up to 63 billion gallons of water annually — enough to meet the needs of 2 million people.



If solar panels were placed over all 4,000 miles of the California canal system, up to 63 billion gallons of water could be saved each year. Credit: Fig. 1 by University of California

But when the company involved in commissioning the report shied away from investing, the project stalled. Harris and Raj stayed the course, ultimately bringing the UC Merced study to fruition alongside Bales and project scientist McKuin, who worked on the original analysis as a Ph.D. student at UC Merced. Together with her colleagues at UC Merced and UC Santa Cruz, she prepared the report for wider distribution and eventually published it in 2021 in *Nature Sustainability*, one of the leading environmental journals in the country. The findings made waves across the state — and around the globe. The convergence of benefits around water, land, and potential energy was impossible to ignore.

But if the idea was so smart, why hadn't it been done before?

Building a better California aqueduct

"We can't take ownership of having the idea for solar canals," McKuin said. "What we can take ownership of is doing a robust study of the potential for California."

At the time of the study, only one other place on Earth, India, already had the concept in place. Their adoption of solar over-canals and approach to the engineering problem encouraged the early Project Nexus team. But India's materials were heavier and more expensive, and their canals were primarily in rural regions with limited needs for maintenance. UC Merced and Solar AquaGrid wanted to assess the feasibility of placing solar panels over the state's longstanding California Water Project, a 4,000-mile canal system providing water to most of the state's population. Energy partners would need to see specifics before jumping in — and proof that the plan would work as projected.



The California canal system spreads throughout the state and is roughly 4,000 miles long. Credit: Fig. 1 by University of California

"Had we just tried to circulate the report that we'd finished two years earlier, it would not have gotten the impact it did," Bales notes. "Being in Nature Sustainability showed that it was a peer-reviewed paper and a credible scientific result."

The results of their study caused quite a buzz among state electricity suppliers and irrigation districts, especially when a follow-up analysis indicated additional energy impacts: covering all state water canals with solar installations could also generate 13 gigawatts of renewable power, equaling roughly one-sixth of the state's current installed capacity — and about half the projected new capacity needed to meet the state's 2030 decarbonization goals.

California's Department of Water Resources and the Office of Gov. Gavin Newsom were on board with testing out the research. Among other benefits, the project could help California meet its 30x30 goals, which call for conserving 30 percent of the state's land for biodiversity. Plus, the project looked like it could be a windfall for helping the state meet its goals for more clean, renewable energy. With that in mind, state officials allocated \$20 million to make the pilot project a reality.

The next step was to find a location for the project. Turlock Irrigation District (TID), the oldest irrigation district in the state and a not-for-profit, community-owned utility, jumped at the chance, agreeing to provide a stretch of its canals as a testing ground. TID canals provide water for the rich farmland of Stanislaus County, which produces almonds, cherries, hay and other agricultural products. Unusual among irrigation districts, TID also provides electricity to its customers, with its electric and water lines running more or less alongside each other. In short, the utility was already committed to the nexus of energy and water.



Project Nexus is testing out a 30-ft span of solar panels over one stretch of canal. Credit: Fig. 1 by University of California

"In 2021, we were right in the midst of a second year of a very bad drought," Josh Weimer, TID's director of external affairs, recalls. "The paper was very timely, describing how we could save 63 billion gallons of water, create 13 gigawatts of renewable power if we covered all 4,000 canals. Up until this paper, there had never been an analysis of the co-benefits. I remember seeing the headline and saying, 'I wouldn't be surprised if we get asked about this.'"



Project Nexus is also testing out a wider, 130-ft span. Credit: Fig. 1 by University of California

The irrigation district pored over the paper and discovered a number of additional benefits. It seemed likely that covering canals could diminish algae growth and cut down on the millions of dollars the district spends annually on maintenance. Plus, there were opportunities to use the power generated by the solar canals to directly support the electrical grid of their customers. UC Merced's research presented more than a dozen additional co-benefits in addition to those. With the campus only 20 minutes away, it was the ideal opportunity for a homegrown partnership.

"When you add together all these co-benefits, then pretty soon you have something with a potential payoff quite a bit greater than the cost," Bales said. "When we think about 21st-century infrastructure, we need to create multi-benefit infrastructure rather than just siloing water over here, electricity over here, and so forth."

"We need to look beyond what we've done for the past 50 or 100 years and think about how to do things in a more integrated way."

The next stage

Project Nexus has already come so far: from the seed of a shared dream, to a promising analysis, to a widely-cited paper, to a pilot project that is now fully online.

Ribbon-cutting and groundbreaking are set to happen next year and data to refine projections is already being collected. The big question everyone wants to know is if the study's projections hold true — and what exactly it would look like for California to scale up. California's canals vary greatly in width and length, among other challenges.

The pilot project is expected to be completed in 2026, with the robust assessment to continue. A global community of water and power officials is watching closely to see if the California model is viable. The Project Nexus team takes calls from Brazil to Romania and fields media inquiries nationally and around the world. The hidden question underneath it all is — what if this idea, claimed by so many and of potential benefit to millions, is just too good to be true?



The idea is no longer a dream: Sensors are already busy collecting data from Project Nexus. Credit: Fig. 1 by University of California

“When I first started working on this, I was skeptical it could pencil out,” McKuin said. “But when we did pencil in all these co-benefits, and did a broader systems analysis, then we found that it could be cost-competitive with a ground-mounted conventional system. It was a surprise to me,” she added.

“It opened my eyes to the value of doing multi-benefit analysis because we need more of that for ecosystems, especially as we face the grand challenge of climate change. We really need to bring the value that ecosystems bring into our decision-making about projects.”

For the Project Nexus team, thinking outside of the box is a California tradition.

“It’s no coincidence that California is unique in so many ways in terms of innovation and sustainability,” reflects Robin Raj, Solar AquaGrid co-founder and a UC Irvine alumnus. “And I think the reaction, not just from government officials or energy or water agencies, but the public to this idea, is so strong because we live in a critical time where we need to take action quickly.”

“The public can be far more open to change than many industries,” Harris adds. “We have an aging infrastructure ready to be reimagined. We can get more ‘bang for the buck’ from our existing utility corridors if we apply a dual-use mindset to generate energy on site to efficiently move water across the state.”

“We’re in this exciting position to unlock innovation because we let the science guide us,” Raj said. “We’ve been on a journey with UC Merced since the beginning and it’s been a journey of discovery. We wouldn’t be anywhere without the University of California team.”

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Bay Area city adds new, drought-proof source of water

San Francisco Chronicle | November 22, 2025 | Kurtis Alexander



A water tower at Antioch's new desalination plant is seen through the facility's "candy cane." The city now can get up to 30% of its total water supply from desalination. Brontë Wittpenn/S.F. Chronicle

The city of Antioch is doing what many Bay Area communities have only talked about: turning salt water into drinking water.

The city's new \$120 million desalination plant, which began operating in September, was built to ensure that the local water supply, from the vast Sacramento-San Joaquin River Delta, would remain drinkable despite its rising salinity. The city now can get up to 30% of its total water from desalination.

While Antioch's water needs are specific, the challenge is not. Across California, communities are looking to firm up their water supplies in the face of myriad climate pressures, including increasing droughts and decreasing snowpack. Several water agencies are turning to desal.

Valley Water, in Santa Clara County, has begun studying a possible desalination plant on San Francisco Bay while the city of San Francisco, for years, has been looking at partnering on a prospective plant in the delta. Southern California, meanwhile, already has several desalination facilities up and running.

While the technology has its downsides, namely high energy demand and production of toxic brine from salt removal, desalination is a proven strategy, and it's becoming more efficient and more affordable.

"People seem to like it," said Marcus Woodland, the plant manager at Antioch's desalination facility, during a recent tour of the plant. "Unfortunately, people don't call us when we're doing a good job, but our water quality is looking pretty similar to what it was before. It's been a smooth transition."

A loud hum rang from the new 10,700-square-foot building that houses the desal operation, which is quite different from some of the higher-profile operations like the largest-in-the-nation Carlsbad Desalination Plant in San Diego County. Instead of treating seawater, the Antioch facility treats brackish water, a mix of saltwater and freshwater, common in tidal rivers and bays near the ocean.

Brackish water has advantages. The pumps that push the water at high pressure through semi-permeable membranes to filter out salt, a process known as reverse osmosis, require less energy because there's less salt. By some estimates, half as much power is needed, significantly lowering operating costs.

Also, with brackish water, there isn't as much brine, the concentrated solution that's left over after desalination. In Antioch, for every 4 gallons of water that is filtered, 3 gallons of potable water is produced, compared to just 2 at many seawater facilities, leaving less unwanted byproduct for the city to contend with.

Changes far beyond Antioch are what prompted the city to look at desalination.

The delta water that the city draws has become increasingly salty in recent decades as less fresh water comes in from the snow-topped Sierra Nevada and more seawater comes in from San Francisco Bay. The salinity is particularly severe in late summer and fall, when freshwater flows are at their lowest, as well as during droughts.

In Antioch, where the city pumps supplies from the mouth of the San Joaquin River, the water has become so saline during dry periods that it's been undrinkable.

"We can't give people salt water," Woodland said.

The solution has been to buy more water from the nearby Contra Costa Water District, which may not always have enough to share, as well as build a desalination plant.

The new facility produces as much as 6 million gallons of desalinated water a day, making a significant dent in the city's total demand, which can run as high as a little over 20 million gallons a day. Conventionally treated water and purchases account for the rest of Antioch's supply.

The cost of producing desalinated water for the city is more than double what it is to treat water conventionally, though it's closer to the cost of buying water during dry times. The expense, officials say, pays for itself through the assurance of having drinkable water.

The new plant is located at the city's existing water treatment campus. The water that comes in for desalination is first run through a conventional treatment facility, to remove sediment and other contaminants, before salt removal.

David Jassby, a professor of civil and environmental engineering at UCLA who studies desalination, said the technology makes sense for filling increasing gaps in local water supplies and giving water agencies more control.

"By building the desalination capacity locally, you build in a resilience toward external disruptions," he said.

About a dozen, mostly small, desal plants currently operate along the California coast, treating seawater. More than twice that number operate inland, treating brackish water from rivers and bays or salty groundwater, according to state records.

Gov. Gavin Newsom has made desalination a central tenet of his push to increase California water supplies. Hundreds of millions of dollars in state money has flowed to such projects in recent years, including nearly \$100 million (from grants and a loan) for the Antioch facility.

State estimates suggest that water supplies could shrink more than 10% over the next two decades as the climate warms.

The limiting factor for desalination, says Jassby, is not only cost, but also being able to safely dispose of the brine.

As part of its desalination project, Antioch built a 4-mile-long pipeline to ship its byproduct to a wastewater treatment facility, where it is cleansed and released back into the delta. The discharge will be monitored to make sure it doesn't result in worrisome levels of salinity, which has been a concern of environmental groups.

Antioch's desalination plant is the first to treat delta water and the second to operate in the Bay Area. The Alameda County Water District has run a desalination facility in Newark, treating groundwater, since 2003. That facility can produce up to 10 million gallons of potable water daily.

Valley Water, which serves San Jose and other Silicon Valley communities, recently finished a preliminary report on a possible desalination plant on the southern end of San Francisco Bay. The report concluded that a plant producing 11 million gallons a day is feasible, though it cited potential problems for fish and wildlife with the return of brine to the bay.

The San Francisco Public Utilities Commission, meanwhile, confirmed this week that a years-old proposal to desalinate delta water in partnership with several Bay Area water agencies is still on the table. The plan has looked at drawing brackish water at Bay Point, near Pittsburg, and generating 2.5 million to 20 million gallons of fresh water daily.

“We understand how to do these things on a very large scale now,” said UCLA’s Jassby. “It’s going to be of growing importance.”

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Water district picks five projects totaling \$3.9 billion to boost water supplies by 2050

Reservoirs, groundwater banking, recycled water aim to reduce shortages in severe droughts

Mercury News | November 14, 2025 | Paul Rogers



The Guadalupe River near Santa Clara Street in downtown San Jose, Calif., is dry on Friday, July 17, 2015, during a severe drought that lasted from 2012-2016. (Jim Gensheimer/Bay Area News Group)

Three months ago, Santa Clara County's largest water agency voted to kill a \$3.2 billion plan to build a huge new reservoir in the southern part of the county near Pacheco Pass.

The Pacheco Reservoir would have been the largest new reservoir built in the Bay Area since 1998 when Los Vaqueros Reservoir was constructed in eastern Contra Costa County.

But soaring cost overruns, a lack of interest among other water agencies to help pay construction costs and share the water, and a decision by the federal Bureau of Reclamation not to allow water from federal projects to be stored in the reservoir, marked the end.

Now the Santa Clara Valley Water District is back with new plans to boost water storage. This week, the district, a government agency in San Jose that provides water to 2 million South Bay residents, approved a roadmap for the next 25 years that combines new reservoir projects, groundwater storage and recycled water. The price tag: \$3.9 billion.

“When I meet people in groups, I’ll say ‘raise your hand if you’ve ever worried that clean, safe water won’t come out when you turn on your tap,’” said Shiloh Ballard, a water district board member. “Almost no hands go up. Our job is to make sure you never have to worry.”

Unknown to many people, Santa Clara County — like Los Angeles and most other urban areas in California — has seen its overall water use drop in recent decades, even as population has grown. Total water use in Santa Clara County has fallen 20% since 2000, while population grew by 25% over the same time.

The reason: The district has spent millions of dollars to pay people to remove lawns and replace them with water-efficient landscaping, and on rebates for low-water appliances. New statewide building codes also have required low-flush toilets, showerheads, and other water-saving plumbing.

“Most water use is outdoors,” said Kirsten Struve, the water district’s assistant officer for water supply. “As we see fewer lawns and improved technology indoors, water use goes down.”

Even though there has been significant development, she noted, new condominiums and apartments use far less water than older single-family homes, which often have landscaped yards, leaky plumbing and aging appliances.

So why add new storage at all? Fear of extreme droughts, water officials say.

“I’m an optimist,” Ballard said. “But we are responsible for making sure people have water. We have to plan for extreme scenarios and be paranoid. We have to anticipate the worst.”

Right now, times are good. Northern California has had three wet winters in a row. Levels in reservoirs and many underground aquifers are above average.

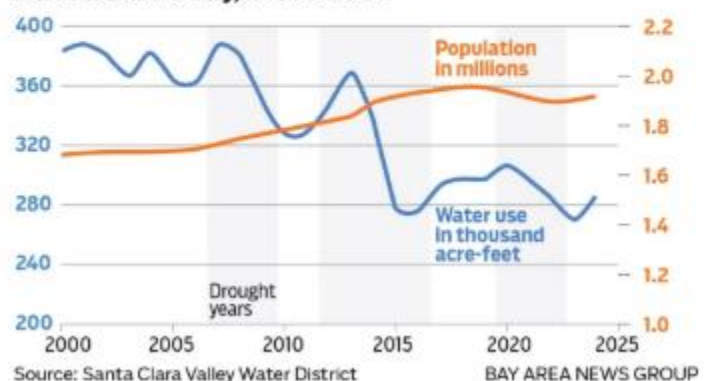
But since 2007, as any longtime resident knows, California has suffered through three big droughts — in 2007-2009, 2012-2016, and 2020-2022, with severe heat waves and wildfires made worse by rising temperatures from climate change.

The Santa Clara Valley Water District’s planners estimate that current countywide water use of about 285,000 acre feet a year will rise 16% to 23% by 2050 as the population grows and new industries like AI data centers use more water. Complicating

WATER USE IN SANTA CLARA COUNTY

Overall water use in Santa Clara County has dropped 20% over the past 25 years, even as population has increased 25%, largely due to water efficient landscaping and appliances.

Total water use and population growth in Santa Clara County, 2000 to 2024



matters, the Sierra snowpack, a major source of water, is projected to melt earlier as temperatures continue to rise. In a severe 6-year drought, they say, Santa Clara County could be 69,000 acre-feet short. An acre-foot is about 325,851 gallons, or the amount 10 people use in a year.

On Wednesday, the district's board approved a 428-page document called the "Water Supply Master Plan 2050" to try and reduce future shortages.

A key part of the plan is to continue conservation measures, even in wet years, such as the current program of paying homeowners \$2 a square foot to voluntarily remove their lawns. The plan also includes five major projects:

1) Raising the dam at San Luis Reservoir: Eight water agencies and the federal government signed an agreement last November to spend \$1 billion to raise the dam at one of California's largest reservoirs, San Luis Reservoir between Gilroy and Los Banos, by 10 feet. That would create 130,000 acre feet of new storage. The Santa Clara Valley Water District could get up to 60,000 acre feet of that. Pros: There is little environmental opposition. Cons: Caltrans would have to move parts of Highway 152, which could cost \$400 million or more.

2) Delta tunnel: The Santa Clara Valley Water District, along with the Metropolitan Water District of Southern California and others, supports a \$20 billion plan by Gov. Gavin Newsom to build a 45-mile long tunnel under the Sacramento-San Joaquin Delta to make it easier to move water from Northern California to Southern California. Pros: It could provide the district 14,000 acre feet of new supply a year. Cons: The project is highly controversial, has been the subject of lawsuits since the 1980s and may never be built.

3) Pure Water Silicon Valley: The district is in talks with San Jose city leaders to recycle more wastewater from the sewage treatment plant at Alviso — which now provides 5% of the district's supply for irrigation and industrial uses — at cleaner levels and put that water into underground aquifers or send it directly to drinking water treatment plants. Pros: It's a local, drought-free supply. Cons: Public acceptance and a relatively high cost.

4) Groundwater storage: The plan calls for the district to store 250,000 acre-feet underground. Right now it has more: 305,000 acre feet stored at Semitropic Water Storage District in Kern County, a deal it struck in 1997. Pros: Groundwater storage is cheaper and less controversial than new dams. Cons: New state laws to reduce groundwater overdraft in the Central Valley could jeopardize some supplies.

5) South County recharge: The district would build new percolation ponds and other projects to increase groundwater storage in Southern Santa Clara County. Pros: Local supply at a relatively low cost. Cons: It needs support from farmers and other landowners.

The district also is studying a desalination plant for the South Bay. That would provide a local supply, but could run into problems with fish and wildlife in San Francisco Bay. And the agency

continues discussions in a partnership to build Sites Reservoir, a huge \$6.2 billion project in Colusa County that could break ground as soon as next year.

Environmentalists say they prefer conservation, groundwater storage and recycled water.

“The Delta tunnel is a huge mega-project like high speed rail,” said Katja Irvin, with the Sierra Club’s Loma Prieta chapter. “It’s going to continue to have problems. The cost is going to continue to go up. It’s unclear if water agencies are ever going to want to pony up to pay for it.”

Jay Lund, vice director a professor at UC Davis’ Center for Watershed Sciences, said many huge water projects fail because water agencies find cheaper solutions, like conservation and groundwater storage.

“Water management is a very long-term issue,” he said. “There are all kinds of changes and unexpected things that happen over periods of decades. But these kinds of plans are a necessary way to focus the conversation.”



An aerial view looks southwest over the White Slough and the Empire Tract in the Sacramento-San Joaquin River Delta in San Joaquin County, 2019. (2019 Photo: Ken James, state Department of Water Resources)

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