BAY AREA WATER SUPPLY AND CONSERVATION AGENCY
BOARD OF DIRECTORS MEETING

November 10, 2022

Correspondence and media coverage of interest between October 16, 2022 and November 3, 2022

Correspondence

From: Congress of the United States
To: The Hon. Deb Haaland, Secretary, US Department of the Interior
Date: November 1, 2022
Subject: Support for the Phase 2 Los Vaqueros Reservoir Expansion Project

From: Los Vaqueros Reservoir Expansion Project
To: CCWD Board
Date: October 20, 2022
Subject: Monthly Report

From: Stefan Cajina, P.E. Chief North Coastal Sect., Div. Drinking Water, Ca. Water Boards
To: The Hon. Assemblymember Rudy Salas, Chair, JLAC
Dennis Herrera, General Manager, SFPUC
Date: October 14, 2022
Subject: Response to March 2022 Wholesale Regional Water System Security and Reliability Act Notice of Changes to Water System Improvement Program

Media Coverage

Water Supply Conditions:

Date: October 26, 2022
Source: CBS San Francisco
Article: Extreme weather whiplashes California's 'new climate reality'

Date: October 25, 2022
Source: Washington Post
Article: California is supposed to enter a wet season. More drought is forecast.

Date: October 22, 2022
Source; Sacramento Bee
Article: Will California's historic drought continue? Here are the latest winter weather predictions

Date: October 21, 2022
Source: LA Times
Article: The latest U.S. winter outlook spells trouble for dry California

Date: October 18, 2022
Source: National Integrated Drought Information System
Article: California-Nevada Drought Status Update

Water Conservation:

Date: October 31, 2022
Source: PPIC
Article: How are California's Cities Managing the Drought?

Drought:

Date: October 25, 2022
Source: CSU San Marcos
Article: Ask the Experts: Drought and Climate Change in California

Water Supply Management:

Date: November 3, 2022
Source: California Water News Daily
Article: Yuba extends water transfer agreement with bay area agencies

Date: October 30, 2022
Source: KUNC
Article: Feds want the ability to cut back on Colorado River reservoir releases over the next two Years

Date: October 16, 2022
Source: CalMatters
Article: California may reallocate shrinking water supply

Water Infrastructure:

Date: November 4, 2022
Source: The Valley Voice
Article: Rep. Conway Bill Will Open Hetch Hetchy to Recreation

Date: October 25, 2022
Source: KQED
Article: Recycled Water May Prove Crucial for Northern California Amid Ongoing Droughts, Climate Change

Date: October 20, 2022
Source: The Press
Article: Los Vaqueros Reservoir receives $82 million allocation from Bipartisan Infrastructure law

Date: October 19, 2022
Source: KTVU Fox 2
Article: New mega reservoir in final planning phase for California

Water Quality:

Date: October 19, 2022
Source: San Francisco Examiner
Article: California approved two PFAS bills this year, What is it?

Congress of the United States
Washington, DC 20515

November 1, 2022

The Honorable Deb Haaland
Secretary
U.S. Department of the Interior
1849 C Street, N.W.
Washington, D.C. 20240

Subject: Support for the Phase 2 Los Vaqueros Reservoir Expansion Project

Dear Secretary Haaland,

We write to urge you to ensure that permitting process delays do not defer much needed drought relief that will be provided by the broadly supported expansion of Los Vaqueros Reservoir. Los Vaqueros is ready to begin construction next year as the first storage project built with the $1.7 billion in funding provided by the *Water Infrastructure Improvements for the Nation Act* and other appropriated funding for storage projects, but only if the remaining permitting issues are resolved in an expeditious manner.

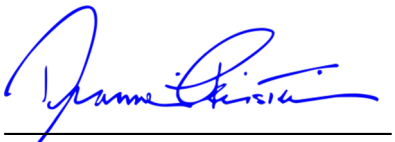
The Phase 2 Los Vaqueros Reservoir Expansion Project (Project) would improve water supply reliability for more than 11 million urban residents and 750,000 acres of irrigated farmland in California. The Project also would provide federal benefits through increased water supply to wildlife refuges and improved operational flexibility of the Central Valley Project. In 2020, after at least six years of study, the Bureau of Reclamation found the project to be feasible. Since then, Congress has appropriated $10 million to advance pre-construction activities and $136 million for Project construction. However, in order to deploy this construction funding, consultation with the U.S. Fish and Wildlife Service under Section 7 of the *Endangered Species Act* must be completed.

As you may know, the second draft of a Biological Assessment, addressing Reclamation's comments at the time, was provided to Reclamation on July 28, 2021, yet it still has not initiated consultation. The *Endangered Species Act* requires issuance of a final Biological Opinion within 135 days of initiation, and we urge you to expedite its completion. The State of California has conditionally awarded $477 million for the Project, funding that could be in jeopardy if Interior fails to act.

We appreciate your partnership in implementing funding Congress has appropriated to mitigate the extreme drought that California is facing. Thank you for your consideration and please let us know if we can be of any assistance in this matter.

Sincerely,

Mark DeSaulnier
Member of Congress



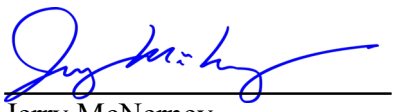
Dianne Feinstein
United States Senator

Alex Padilla
United States Senator

Eric Swalwell
Member of Congress

Doris Matsui
Member of Congress

John Garamendi
Member of Congress

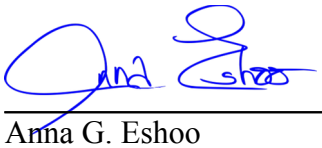


Jerry McNerney
Member of Congress

Josh Harder
Member of Congress

David G. Valadao
Member of Congress

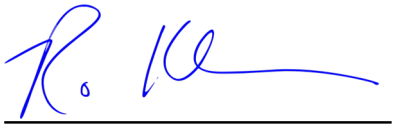
Jim Costa
Member of Congress



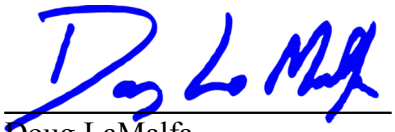
Anna G. Eshoo
Member of Congress

Barbara Lee
Member of Congress

Mike Thompson
Member of Congress

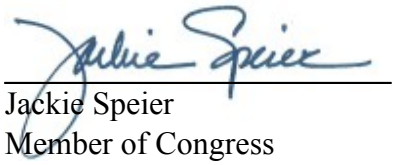


Ro Khanna
Member of Congress



Doug LaMalfa
Member of Congress

Zoe Lofgren
Member of Congress



Jackie Speier
Member of Congress

Jared Huffman
Member of Congress

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OCTOBER 20, 2022

UPCOMING ACTIVITIES

October 24 at 4:00 – JPA Member staff meeting regarding Amendment No .4 to Multi-party Agreement

October 26 at 10:00 – JPA Communications & Outreach Committee Meeting

October 27 at 1:00 – JPA Finance Committee Meeting

November 9 at 9:30 – JPA Regular Board Meeting

November 30 at 3:30 – GM meeting at ACWA Conference

UPCOMING LAP BOARD COORDINATION

TBD – Valley Water Storage Committee

ADDITIONAL PROJECT INFO

https://www.ccwater.com/lvstudies

https://www.usbr.gov/mp/vaqueros/

https://cwc.ca.gov/Water-Storage/WSIP-Project-Review-Portal/All-Projects/Los-Vaqueros-Reservoir-Expansion-Project

www.losvaquerosjpa.com

MONTHLY REPORT

FUNDING

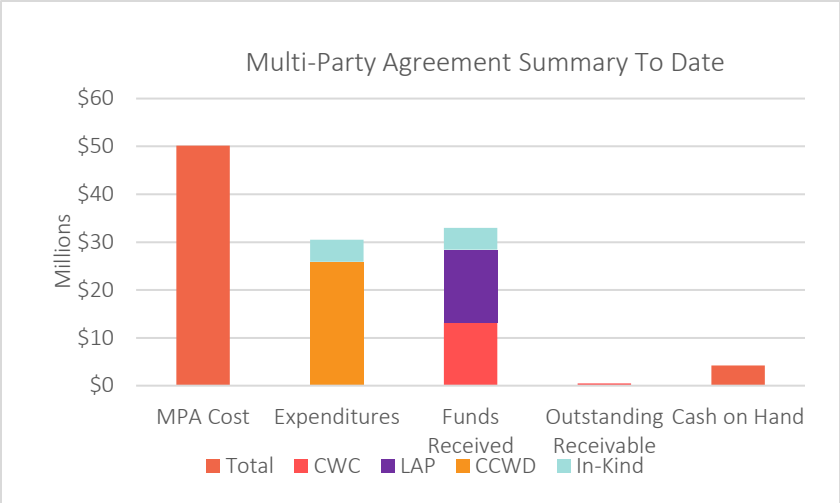
On October 17, the Biden-Harris Administration announced $210 million from the Bipartisan Infrastructure Law (BIL) for Western drought resilience projects. Of the $210 million, $137 million was allocated to California storage projects and $82 million was allocated to the Phase 2 Los Vaqueros Reservoir Expansion Project. Total federal funding appropriated following Congressional authorization includes $10 million for pre-construction and $136 million for construction. Additional announcements regarding funding from the WIIN Act are anticipated in the coming weeks. The first invoice, with a federal cost share of approximately $2 million, was recently approved by Reclamation.

On October 19, the EPA invited the project to apply for a loan of up to 49 percent of the total project cost (currently estimated at $675 million). The EPA will be reaching out to schedule an initial meeting to discuss the WIFIA underwriting process. The EPA has administratively reserved the funding for the Project and will hold the funding provided that a full application is received by December 31, 2023.

The Project qualified for funding under the Water Storage Investment Program and received an adjusted Maximum Conditional Eligibility Determination of $477,558,343 from the California Water Commission (CWC) on March 16, 2022. An amendment to the Early Funding Agreement with the CWC to reflect the increased award and align with the current project schedule is routing for signature. Invoices are continuing to be submitted to the California Water Commission (CWC) monthly.

Amendment No. 4 to the Multi-party Cost Share Agreement is under review by staff at partner agencies. The local cost share proposed for each agency is $1,094,000. Amendment No. 4 needs to be executed by the end of the year.

The following chart provides an overview of the Multi-party Agreement (MPA) expenditures through August 31, 2022. The funds received, outstanding receivable, and cash on hand are shown through August 31, 2022.



JPA BOARD OF DIRECTORS MEETINGS

On October 12 the Los Vaqueros Reservoir Joint Powers Authority (JPA) Board of Directors met in-person in Los Banos followed by a tour of the wildlife refuges. The next JPA Board Meeting has been scheduled for November 9 and the meeting agenda packet will be distributed to JPA Directors and Alternate Directors on Thursday, November 3 and posted to the JPA website on Friday, November 4. JPA Board and Committee meetings are currently planned to continue on the Zoom platform through February 2023 in compliance with Governor Newsom's plans to rescind to the state of emergency at that time.

PERMITTING

U.S. Fish and Wildlife Service (USFWS) continues work on the Biological Opinion for terrestrial species. USFWS Migratory Bird Program staff continue drafting an Environmental Assessment for their eagle take permit action. California Department of Fish and Wildlife (CDFW) continues work on the Incidental Take Permit for terrestrial species and Lake and Streambed Alteration Agreement. The third draft of the Incidental Take Permit for aquatic species has been reviewed by CDFW. Central Valley Regional Water Quality Control Board (CVRWQCB) issued its Section 401 permit on June 30, 2022. The U.S. Army Corps of Engineers (USACE) continues work on its Section 404 permit which will be issued after Reclamation issues its Record of Decision. Draft water rights change petitions have been prepared and submitted to staff at the State Water Resources Control Board for preliminary review.

DESIGN

A consulting contract was executed with GEI to provide Capital Project Management (CPM) services to support CCWD in providing cost and schedule controls, risk reviews, technical reviews and cost and progress reporting, among other project management activities.

A video inspection of the Transfer Pipeline was completed, which is the inlet/outlet pipeline to the Los Vaqueros Dam. The inspection results are being reviewed and a report will be prepared that summarizes the pipeline condition. Inspections are intended to confirm the pipeline conditions meet the pressure requirements of the increased water level of the expanded reservoir.

In response to comments from CDFW to further reduce or avoid impacts to lands encumbered with conservation easements, additional potential alignments of the Transfer-Bethany Pipeline are under development. The 90-percent design of the Turn-In to the California Aqueduct at Bethany Reservoir has been initiated.

The 60-percent design of the Pumping Plant No. 1 Replacement has been submitted and is being reviewed by CCWD and Reclamation. A physical model of the pump station has been constructed and testing of the hydraulics to confirm performance consistent with industry standards is under way. The testing plan has been peer reviewed.

Plans, specifications, and technical memoranda for the dam expansion have been submitted for review and approval by the California Division of Safety of Dams (DSOD). With these submissions, CCWD will request approval to construct from DSOD.

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State Water Resources Control Board
Division of Drinking Water

October 14, 2022 PWS No. CA3810001

The Honorable Assemblymember Rudy Salas, Chair
Joint Legislative Audit Committee
1020 N Street, Room 107
Sacramento, CA 95814

Mr. Dennis J. Herrera, General Manager
San Francisco Public Utilities Commission
525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102

Re: Response to March 2022 Wholesale Regional Water System Security and Reliability Act Notice of Changes to Water System Improvement Program

Dear Assemblymember Salas and Mr. Herrera:

In accordance with the 2002 Wholesale Regional Water System Security and Reliability Act (AB 1823), 2008 amendments (AB 2437), 2014 amendments (SB 1345), and 2015 amendments (AB 731), the State Water Resources Control Board (State Board) has completed its review of the March 2022 Notice of Changes Report (NOC) to the 2005 Water System Improvement Program (WSIP) for the San Francisco Public Utilities Commission Regional Water System (SFPUC RWS). These changes were adopted by the SFPUC by Resolution No. 22-0080 on April 26, 2022. The State Board received the March 2022 NOC on August 19, 2022.

Section 73502 (d)(3) of the Water Code requires the State Board to comment on changes to the WSIP (referred to in statute as the "capital improvement program") within 120 days of notification and to provide those comments to the Joint Legislative Audit Committee and the City and County of San Francisco. The Board's review is carried out by the Division of Drinking Water (Division). The March 2022 NOC is the thirteenth change notice that the Division has reviewed. The Division's review focuses on the adequacy of the NOC in describing project changes and the reasons for these changes, and their significance with respect to the protection of public health – in particular, the safety and reliability of the drinking water supply and the ability of the SFPUC RWS to meet the WSIP Level of Service (LOS) goals. The Division's review also considers the comments and recommendations issued by the California Seismic Safety Commission (CSSC) and the Bay Area Water Supply and Conservation Agency (BAWSCA).

The Division notes that, since the March 2020 NOC, the last remaining Local project (Lake Merced Pump Station Improvements) and four Regional WSIP projects were completed. In total, 46 of 52 Regional WSIP projects have been completed. Reportedly, of 43 Regional WSIP projects with specific LOS goals, 41 projects have achieved their LOS goals to date.

Under the March 2022 NOC, completion dates have been extended for four active projects, three support projects, and the Program Management project. Of four active projects with extended completion dates, the project with the longest completion forecast is the Regional Groundwater Storage and Recovery Project (RGWSR); this project is now expected to complete by February 20, 2027.

We note that under the March 2022 NOC, even with budget changes for four projects, there is no change to the WSIP forecast budget, and the overall WSIP program budget remains at $4,787.8M. The overall scopes of the WSIP projects are essentially unchanged from those approved in April 2018, except for minor scope refinements for three projects. No projects were deleted from the WSIP.

The Division notes that the SFPUC has made significant progress towards the implementation of the WSIP since the March 2020 NOC. However, the March 2022 NOC extends the overall WSIP completion date about 61 months beyond the May 5, 2023 completion date given in the March 2020 NOC. The Division recognizes that some project delays are inevitable due to the complexity of the program and the unpredictability of local conditions; in particular, the RGWSR faces groundwater quality issues which have necessitated significant changes in design and treatment. The Division urges the SFPUC to continue taking all reasonable measures to accelerate this project . The availability of the RGWSR wells is especially important given the aridification of California's climate and the resulting strain on imported water supplies. Timely completion of the remaining WSIP projects will help ensure the reliability of the SFPUC RWS under drought, earthquake, and other foreseeable threats.

If you have any questions regarding this letter please contact me at (510) 620-3474 or by email at Stefan.Cajina@waterboards.ca.gov.

Sincerely,

Stefan Cajina, P.E., Chief
North Coastal Section
Division of Drinking Water

cc: The Honorable John Laird
Member, California State Senate
Vice-Chair, Joint Legislative Audit Committee
1020 N Street, Room 107
Sacramento, CA 95814

Cindy Silva, Chairman
Alfred E. Alquist California Seismic Safety Commission
2945 Ramco Street, Suite 195
West Sacramento, CA 95691

Fred Turner, Senior Structural Engineer
Alfred E. Alquist California Seismic Safety Commission
1755 Creekside Oaks Drive, #102
Sacramento, CA 95833

Nicole Sandkulla, Chief Executive Officer and General Manager
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Andrew DeGraca, Water Quality Division Director
San Francisco Public Utilities Commission
1657 Rollins Road
Burlingame, CA 94010

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Extreme weather whiplashes California's 'new climate reality'
CBS San Francisco | October 26, 2022

SACRAMENTO — The past three years have been California's driest on record, a streak unlikely to break this winter, state officials said Monday.

The official water year concluded Friday, marking an end to a period that saw both record rainfall in October and the driest January-to-March period in at least a century. Scientists say such weather whiplash is likely to become more common as the planet warms. It will take more than a few winter storms to help the state dig out of drought.

"This is our new climate reality, and we must adapt," Karla Nemeth, director of the state Department of Water Resources, said in a statement.

Her comments came ahead of expected remarks Monday by state water officials about what to expect in the months ahead. The water year runs from Oct. 1 to Sept. 30, so that the rainiest winter months are recorded together.

Snow that falls in California's mountains typically provides one-third of the state's annual water supply, but last year snow levels were far below average by the end of the winter. The Colorado River, another major source of water for Southern California, is also beset by drought, threatening its ability to supply farmers and cities around the U.S. West.

Precipitation was 76% of average for the year that just ended, and the state's reservoirs are at 69% of their historical levels, state officials said.

Most of the state is in severe or extreme drought, according to the U.S. Drought Monitor. The worst conditions are throughout the Central Valley, the state's agricultural heartland where many of the nation's fruits, vegetables and nuts are grown.

Another dry year would mean little to no water deliveries from state supplies to farmers and cities in central and Southern California. State and local officials, meanwhile, continue to urge California's 39 million residents to save water wherever possible by ripping out grass lawns or letting them go brown, taking shorter showers and generally being more conscious about water use.

There are signs that the state and its residents are better learning to deal with ongoing dry periods, said Jeff Mount, a senior fellow with the Water Policy Center at the Public Policy Institute of California. With limited water supplies, farmers in the northern part of the state have fallowed rice fields, while major water agencies in the south have started to look for ways to expand water supply through recycling and other means.

Still, drought fatigue may be setting in. Gov. Gavin Newsom called on residents last year to voluntarily reduce their water use by 15%. The state still hasn't met that target and water use

went up in the spring compared to prior years. But use has started to tick down after state water officials put new restrictions on outdoor watering.

"We're not fighting anymore about whether things are changing — we're having reasonable fights about how to adapt to it," Mount said.

# # #

California is supposed to enter a wet season. More drought is forecast.

After its three driest years on record, concern is high over what another year of drought could mean

Washington Post | October 25, 2022 | Diana Leonard

A dried weed lies in a fallowed field in Los Banos, Calif., in 2021. (John Brecher for The Washington Post)

California is about to enter its wet season, when hopes are high for replenishing lowland rains and mountain snows after its three driest years on record. But, for the fourth year in a row, the state could languish in a drought that is having dire effects on its water resources.

Last week, the National Weather Service projected another warm and dry winter for large parts of the state — with drought persisting or getting worse. Now, experts are sounding the alarm about what a fourth consecutive drought year could mean.

“While California has seen a fourth year of drought as recently as 2012-2016 … this will be the first drought that includes shortage issues on the Colorado River,” said Michael Anderson, California’s state climatologist with the Department of Water Resources.

The Colorado River, once considered a guaranteed supply for Southern California, is in crisis, with states set to negotiate possible cutbacks to keep Lake Mead from plummeting to dangerously low levels. It is just 150 feet from “dead pool” level, below which water could not flow downstream.

Water levels are low at the San Luis Reservoir, which stores irrigation water for San Joaquin Valley farms, in Gustine, Calif., on Sept. 14. (Terry Chea/AP)

There is some hope that, even if significant precipitation eludes the southern and central portions of California, the northern part could fare better. Here, the Weather Service is calling for equal chances for above- and below-normal precipitation. However, there is plenty of uncertainty in long-range forecasts, and the season will largely be determined by moisture-rich atmospheric river storms: how strong they are, where they land — and where they don't.

"We're playing Russian roulette with the weather, and that's always a bad idea," said Felicia Marcus, a fellow at Stanford's Water in the West program and the former chair of the State Water Resources Control Board. ""When the Sierras have been dry, Southern California has been bailed out by the Colorado. We have been lucky, and our system has been based on that luck."

Bracing for another dry year

The past three years mark California's third significant drought period of the 21st century — part of the larger climate change-fueled "megadrought" in the West that is now in its 23rd year, 19 of which have been dry.

October 2019 through September 2022 — the past three water years combined — was California's driest such period on record. In that time, much of northern California missed more than a year's worth of precipitation.

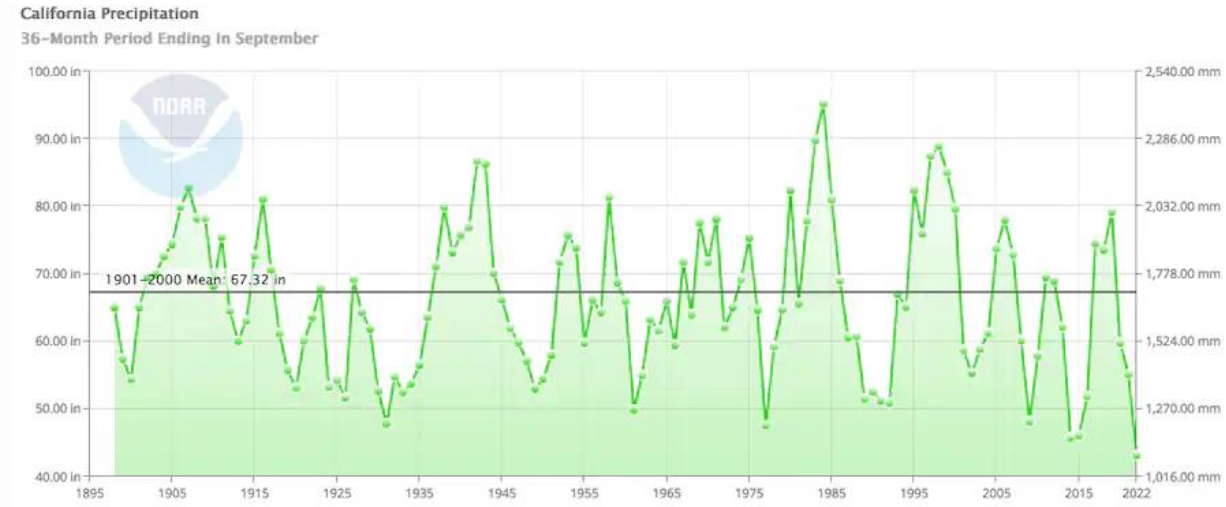
The long, hot summer of 2021 was marked by shrinking reservoirs and rapidly intensifying drought, as the state recorded its warmest June through September since 1895.

“2021 was about as bad as it gets — the atmosphere was at an all-time record dryness,” said Jeffrey Mount, a senior fellow at the Public Policy Institute of California’s Water Policy Center.

The 2022 dry season also brought below-normal precipitation in most parts of the state.

Adding another parched year on top of the past three could put the state in uncharted territory.

“If we get another 2021, we will be plowing new ground,” he said. “I don’t want to say we are ready, but we are certainly preparing for it.”



Thirty-six-month total precipitation by year in California. The current level is the lowest on record. (NOAA)

No time to lose

With each passing year, rising temperatures are playing an increasingly significant role in the water supply picture. Over the next 20 years, California could lose 10 percent of its water supply as the atmosphere, soils and plants become ever more thirsty, according to a report from the office of Gov. Gavin Newsom (D).

Mount and Marcus said large metropolitan areas can probably weather another drought year, having invested billions in becoming more drought resilient in recent years.

But farmers, rural towns and ecosystems “will continue to get hammered in heartbreaking ways,” Marcus said.

Hundreds of thousands of acres of California farmland were fallowed this year. Some fish species, like delta smelt, have become functionally extinct, Mount said, meaning they are only found in hatcheries.

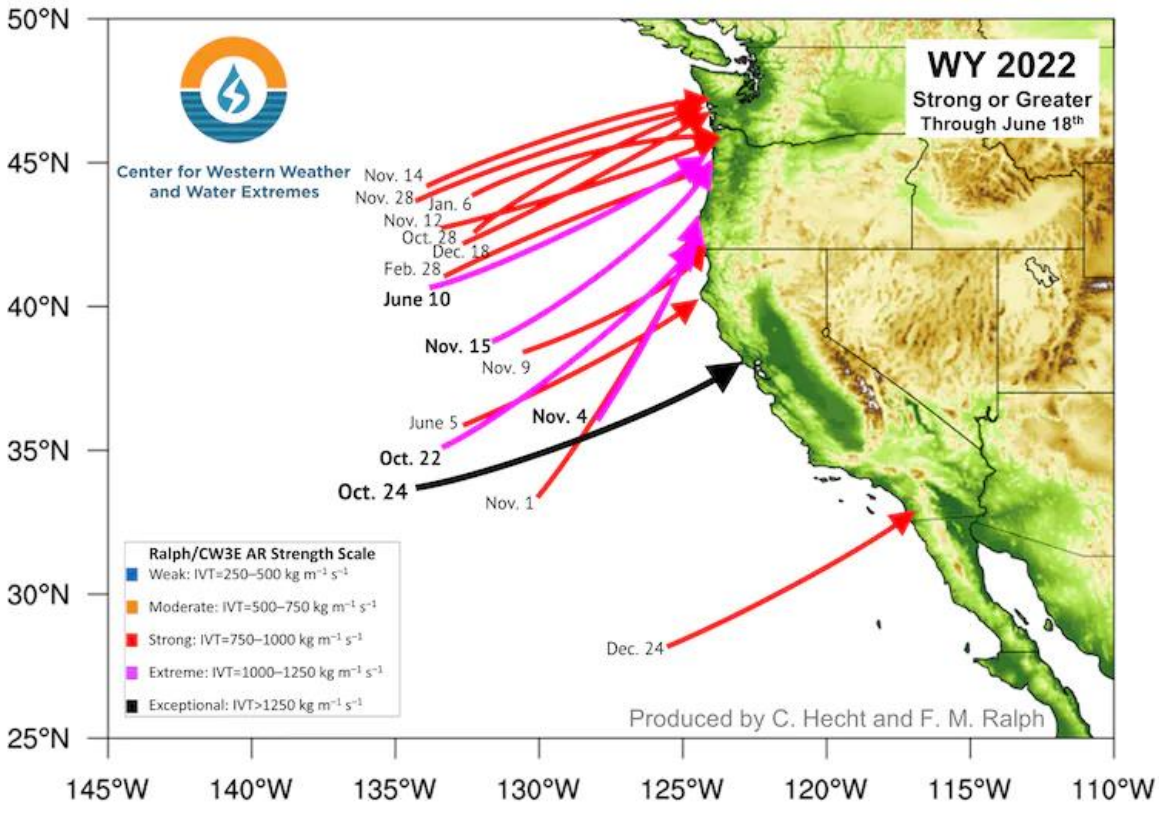
“Freshwater ecosystems are really in bad shape because of essentially 10 years of drought,” he said. 2017 and 2019 were the only wet years of the past decade.
Marcus said conservation efforts, like replacing lawns and fixing leaks, are the fastest, cheapest way to save water and should be expanded without delay, regardless of what the coming year brings. Longer-term solutions involve paying farmers to convert land to other uses, and recharging depleted groundwater reserves after intense storms.

“If you just hold back more in the normal times, you’ll have enough to keep fish alive during dry years and still deliver water to farms and cities,” Marcus said.

Rising flood risk, even during droughts

While scientists and planners are most worried about drought, there is also growing concern about extreme precipitation and flooding amid this dry spell. The past decade has seen wet extremes arrive both during and between drought years, and the California Department of Water Resources is also gearing up for potential flooding.

In 2017, the state swung from depleted reservoirs to what UCLA climate scientist Daniel Swain called “essentially the wettest winter in modern history in parts of northern California” at a recent symposium hosted by the Department of Water Resources. A January 2021 atmospheric river produced post-wildfire flooding and mudslides, an event that became one of the nation’s billion-dollar weather disasters. Water year 2022 — Oct. 1, 2021, through Sept. 30 — also saw wild swings between record wet and record dry conditions. And over the broader region, the West has seen recent impactful flooding in Yellowstone National Park, Las Vegas and Death Valley.



Atmospheric rivers in 2022. (Center for Western Weather and Water Extremes)

“We expect to see a significant increase in both drought and flood severity in a warming climate,” Swain said during his talk at the symposium. “This is in fact exactly what climate models suggest should be emerging right around now and continuing to amplify through the century.”

# # #

Will California's historic drought continue? Here are the latest winter weather predictions
Sacramento Bee | October 22, 2022 | Dale Kasler

Sixteen of California's 17 major reservoirs are below average, including its two largest in Shasta Lake and Lake Oroville. Releases have brought down Folsom Lake. BY DAVID CARACCIO

There's wet weather in the Northern California forecast this weekend, but don't get your hopes up about an end to the drought.

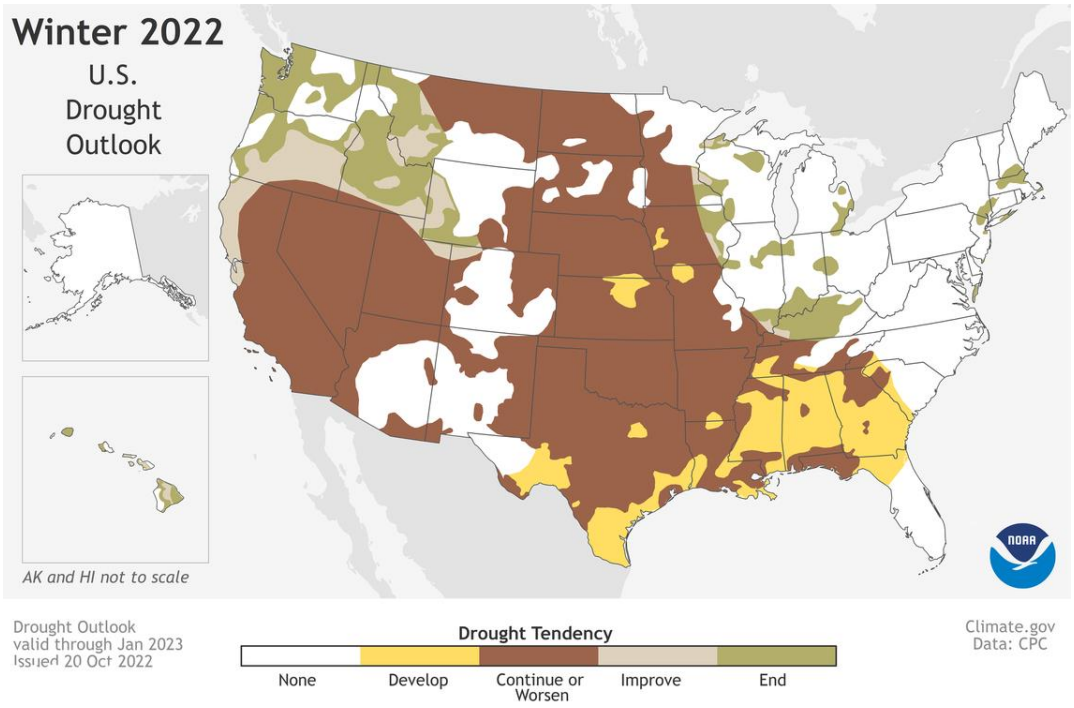
The National Oceanic and Atmospheric Administration, in its annual winter outlook, said this week that California can expect "drier-than-average conditions" — suggesting that one of the worst droughts in recorded history will continue for a fourth year.

The agency said dry weather is expected in California, the southern Rockies and across much of the Midwest.

The winter forecast is crucial because California typically gets the vast majority of its yearly rain and snow between January and March. This year, however, the January-March period was among the driest ever seen.

Officials with the California Department of Water Resources have already said they're preparing for "continued extreme drought" this winter. Folsom Lake, which provides water to much of the Sacramento region, sits at 30% below average for this time of year. Shasta Lake, the largest reservoir in California, is 41% below average.

The view overlooking Shasta Lake from Turntable Bay Road shows low water levels in September amid ongoing drought in California. Xavier Mascareñas xmascarenas@sacbee.com



Drought is expected to worsen during winter 2022 according to predictions by National Oceanic and Atmospheric Administration. National Oceanic and Atmospheric Administration

The drought has created havoc in agriculture and the environment, and has prompted urban areas to tighten restrictions on outdoor watering. The sad state of the Sacramento River is hurting salmon and other endangered fish species. Sacramento Valley farmers were forced to

scuttle about half of their rice crop this year. Residential wells are going dry across rural areas in the Central Valley. The drought has made much of California's landscape more vulnerable to wildfires.

Some climate scientists believe the latest drought isn't just three years old. Rather, it's a continuation of a 20-year megadrought that's likely to continue for the foreseeable future.

Despite the worsening conditions, Gov. Gavin Newsom has resisted calls to impose statewide water conservation mandates — rejecting the 25% cutbacks in urban usage ordered by his predecessor Jerry Brown in 2015. Instead, Newsom has continued to ask Californians to voluntarily reduce consumption by 15%, with mixed results.

This weekend's forecast is hardly a drought-buster. The National Weather Service said light snow and rain are expected in the Sierra.

# # #

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The latest U.S. winter outlook spells trouble for dry California
LA Times | October 21, 2022 | Hayley Smith

In April 2022, officials conducted a snow survey in a dry meadow at Phillips Station in the Sierra Nevada.(Rich Pedroncelli / Associated Press)

A warm, dry winter is in store for much of California as La Niña conditions are slated to persist through at least January, according to the National Oceanic and Atmospheric Administration.

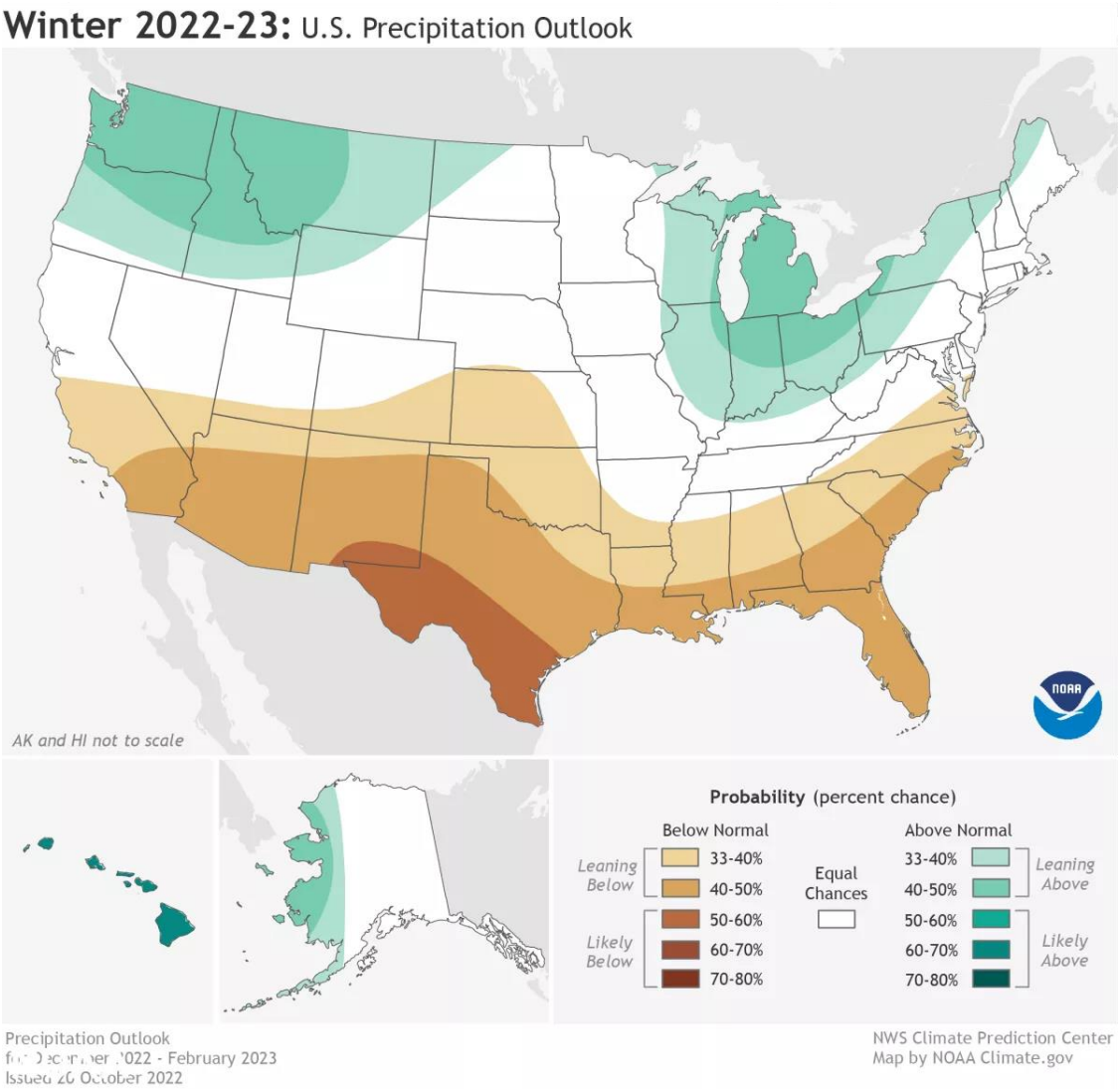
The agency's U.S. Winter Outlook, released this week, spells trouble for the drought-dried state as it enters what is typically its wettest season, when rainfall and Sierra snowpack help replenish water supplies that carry it through the rest of the year.

"We're going on our third year of this extreme drought for much of the Western U.S., with the extreme drought currently focused over much of California, the Great Basin and extending northward into parts of Oregon," Brad Pugh, operational drought lead with NOAA's Climate Prediction Center, said in a media briefing. "In terms of impacts, it's adversely affecting agriculture, also increasing the wildfire danger and even has impacts on tourism."

The country's greatest chances for drier than-average conditions are forecast across Southern California and the Southwest, as well as the southern Rockies, southern Plains, Gulf Coast and much of the Southeast. About 59% of the country is now experiencing some degree of drought conditions, officials said.
The forecast comes after a summer of extreme heat and dryness. More than 6,800 wildfires have burned in California this year, destroying nearly 800 structures and claiming nine lives, according to the California Department of Forestry and Fire Protection.

The state in September also saw a blistering, 10-day heat wave that shattered thousands of temperature records and “certainly increased the drought categories” in the Pacific Northwest, said Jon Gottschalck, chief of the climate center’s operational prediction branch.

But while more dryness is on deck for Southern California, the outlook is less certain about what lies ahead for the northern part of the state. The forecast shows equal chances of above-average or below-average precipitation in the region.



NOAA map shows drier-than-average conditions are forecast in much of Southern California.
Drier-than-average conditions are forecast in portions of California, the Southwest, the southern Rockies, southern Plains, Gulf Coast and much of the Southeast, according to the National Oceanic and Atmospheric Administration.(NOAA)

What is less of a mystery is that the state urgently needs moisture: More than 90% of California is under severe, extreme or exceptional drought, the three worst categories under the U.S. Drought Monitor.

Increasing warmth and dryness driven by human-caused climate change are also upending California’s long-held weather patterns, making the timing and availability of water in the state less reliable. Both

state and federal water supplies are facing significant shortages and cutbacks due to drought, and officials have said more cuts are likely if dryness persists in 2023.

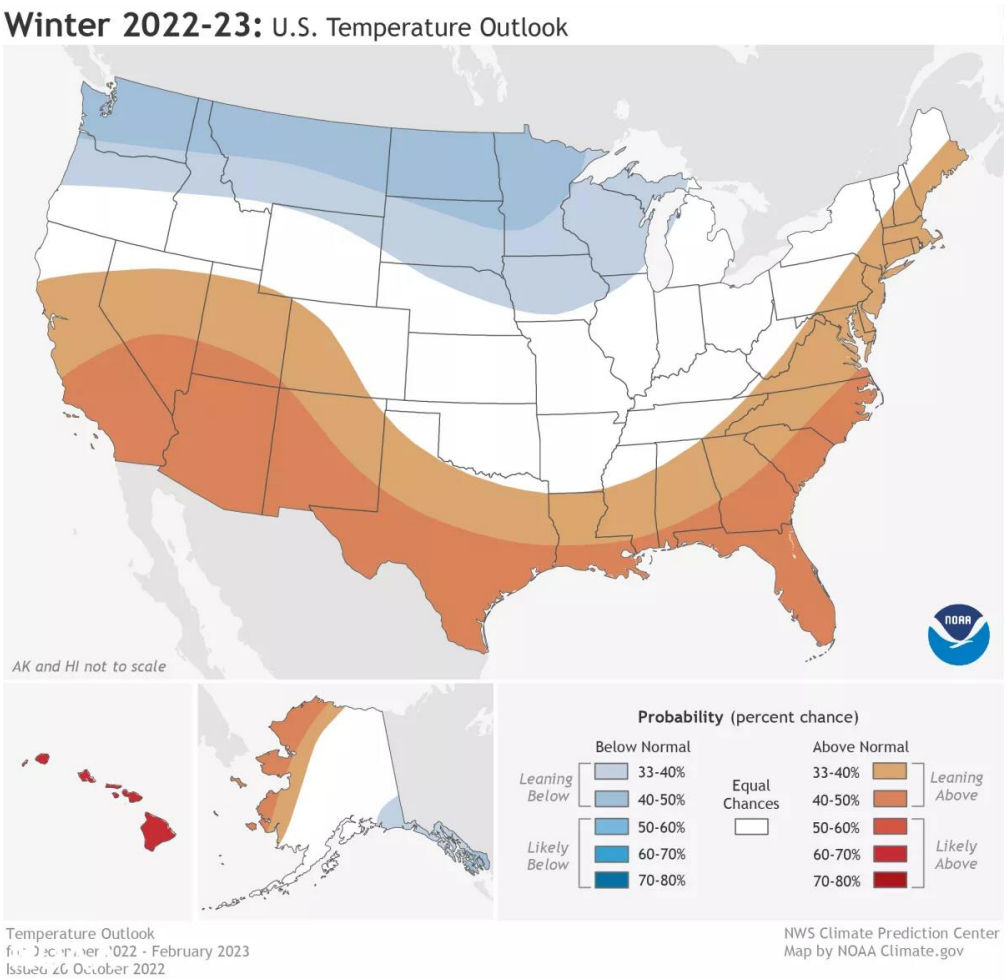
The temperature outlook is similarly concerning for the Golden State, with nearly all of California expected to see warmer-than-average conditions. this winter. Southern California will likely to see the hottest temperatures.

Alaska, the Central Great Basin, the Southwest, the Southern Plains, the Southeastern U.S. and the Atlantic Coast are also expected to see warmer-than-average conditions, according to the forecast.

Officials said the conditions are being driven by a rare third consecutive appearance of La Niña, a climate pattern in the tropical Pacific that tends to split the country in half.

“It should be no surprise that the winter outlook is consistent with typical La Niña impacts — which include a general warmer and drier south, and cooler and wetter north,” Gottschalck said.

The 2022-23 winter will mark the third-ever appearance of a La Niña “triple dip,” officials said, referring to three La Niña winters in a row. The first occurred in the mid-1970s and the second in the late 1990s and early 2000s.



The greatest chances for warmer-than-average conditions are forecast in western Alaska, the Central Great Basin and the Southwest extending through the Southern Plains, according to the National Oceanic and Atmospheric Administration’s 2022-23 U.S. winter outlook. (NOAA)

A map shows chances for warmer-than-average conditions in the Southwest and other parts of the U.S.

But while La Niña can offer a snapshot of what's to come, officials cautioned that it's not a guarantee. The 2021 La Niña, for example, gave way to a very cold February, including a deadly deep freeze in Texas.

Gottschalck said the signal is most reliable in Southern California and the Southwest, with conditions in the Bay Area and northern part of the state harder to predict because of potential "sub-seasonal" weather and climate events — such as atmospheric rivers — which typically appear over a couple of weeks as opposed to a long-term pattern.

Last December, for example, saw very strong atmospheric river events that helped improve drought conditions in some areas of California, he said. However, the ensuing months of dryness and warmth quickly erased most of those gains.

"It's a real challenge," Gottschalck said. "Certainly, atmospheric river events can occur during these La Niña winters, and I wouldn't expect anything otherwise. It's more of the frequency of them — when they occur and how cold the situation is in the Pacific Northwest and in California — and whether you can build up the snowpack at sufficient levels so that it melts over time in the spring to produce drought relief overall."

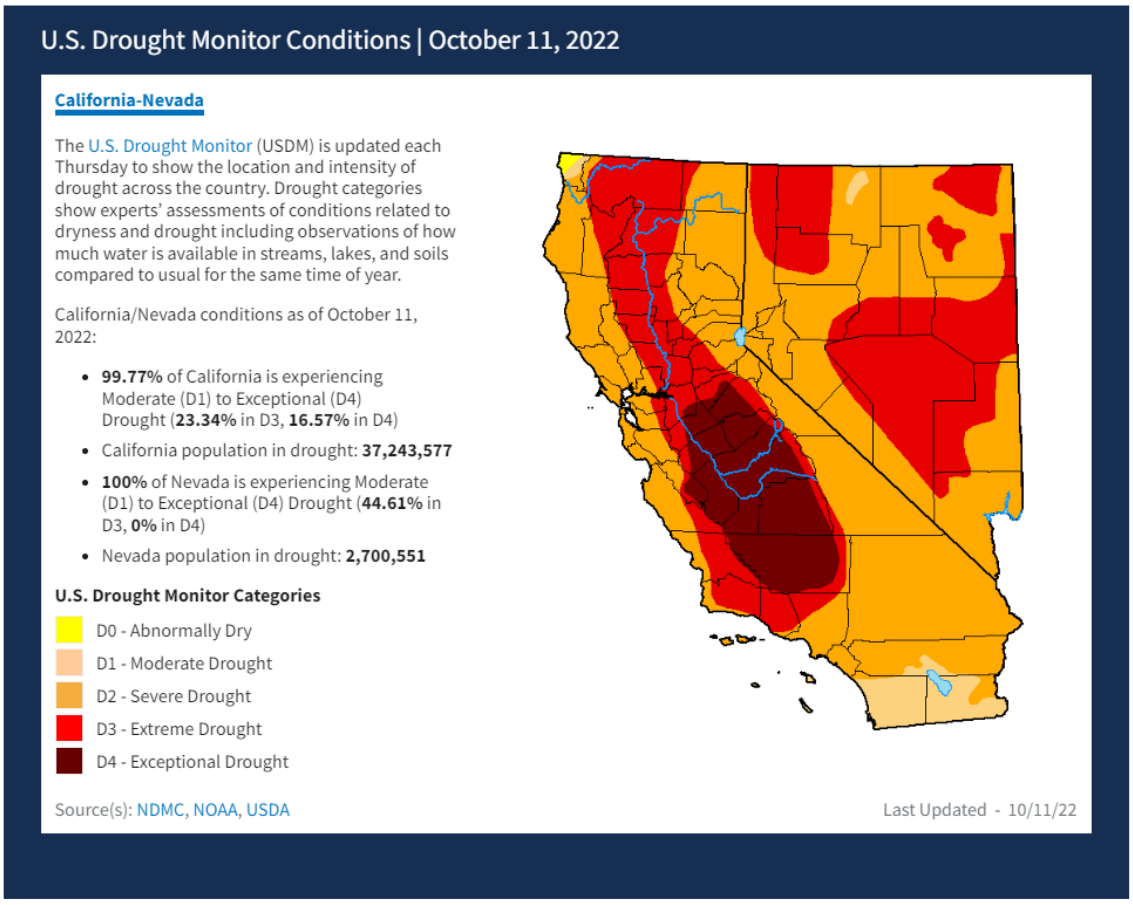
# # #

California-Nevada Drought Status Update
National Integrated Drought Information System | October 18, 2022

DEWS Regions: California Nevada
States: California, Nevada
Update Status: NIDIS and its partners will issue future drought status updates as conditions evolve.
Link to article

Key Points

- Water Year 2022 started wet with a strong atmospheric river and ended in continued drought due to almost no precipitation during January through March.
- The past 3 Water Years have been the driest in the California record. Both California and Nevada remain in almost 100% moderate-to-exceptional drought.
- Both evaporative demand and lack of precipitation are drivers of the current drought since it began in October of 2019. Water Year 2022 had much lower evaporative demand than Water Year 2021, which limited the drying of the landscapes and helped mitigate fire risk.
- Drought impacts (e.g., pasture conditions, ecosystem health, water supply, recreation, fire potential) have intensified and expanded given back-to-back dry years. Drought preparedness is key.
- A 'three-peat' La Niña winter is forecasted for Water Year 2023, suggesting continued dry conditions in southern regions of California and Nevada. Extended range forecasts indicate the first atmospheric river of the Water Year will hit the west coast in the next 7 days.



Main Stats

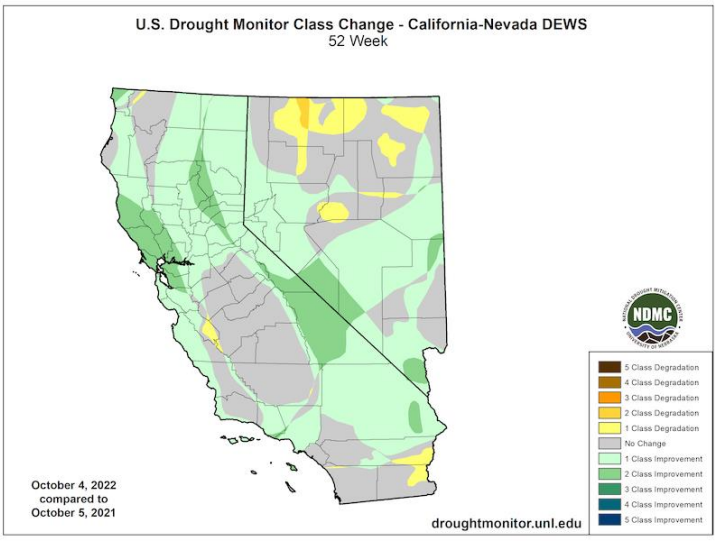
- 99.9% of California and Nevada are in drought (D1–D4)
- 40.91% of California is in extreme (D3) to exceptional (D4) drought
- 44.61% of Nevada is in extreme (D3) drought

According to the October 11 U.S. Drought Monitor, 99.86% of California-Nevada is in drought, with areas of exceptional (D4) drought present in central California. Source(s): NDMC, NOAA, USDA. Last Updated - 10/11/22

Current Conditions

- Over this last water year, drought has improved by one class in many parts of California and Nevada. Nonetheless, both states remain nearly 100% in drought, according to the U.S. Drought Monitor.
- The past 3 years have been the driest on record in California and the third driest in Nevada, according to NOAA's National Centers for Environmental Information.
- While Nevada currently has no exceptional drought (D4), partly due to the Southwest Monsoon, more than 99% of the region remains in severe drought (D2) or worse.
- The 2022 Water Year began with an exceptionally strong atmospheric river, AR 5, bringing record-breaking rain to the region. A wet December was followed by the driest 3-month start to a calendar year in the over 100-year record—ushering in a return of snow drought—for both California and Nevada with only one weak atmospheric river making landfall.
- Much of the region is missing between 0.5 to 1.5 years of precipitation, but streamflow deficits in many regions are even greater.
- Water Year 2022 had much lower evaporative demand than Water Year 2021, which limited the drying of the landscapes and helped mitigate fire risk. California year-to-date acreage burned is less than 20% of the 5-year average.
- Both evaporative demand and lack of precipitation are drivers of the current drought since it began in October of 2019. Evaporative demand is the primary driver in much of the Central Valley and the eastern slopes of the Sierras into Nevada, while lack of precipitation has been the primary driver in northern California and the Sierras.
- The Western Sierra reservoirs are starting the 2023 Water Year with 7.7 million acre-feet, about 1.5 million acre-feet more than at the start of Water Year 2022. In California, Lake Shasta reached near record low levels in December of last year, while Lake Orville recovered from a record low in Water Year 2021 to slightly above the 10th percentile storage level. Lake Tahoe is slightly above the rim, similar to where it was at the start of Water Year 2022.
- Extended range forecasts indicate the first atmospheric river of the Water Year will hit the West Coast in the next 7 days.
- For more information, check out Living with Drought in Nevada and the California Water Watch.
- How is drought affecting your neighborhood? Click to see drought indicators, outlooks, and historical conditions by city, county, and state, as well as sign up for alerts.

U.S. Drought Monitor 52-Week Change Map



U.S. Drought Monitor 52-week change map, showing where drought has improved, degraded, or remained the same over Water Year 2022 (October 5, 2021–October 4, 2022). Source: National Drought Mitigation Center.

# # #

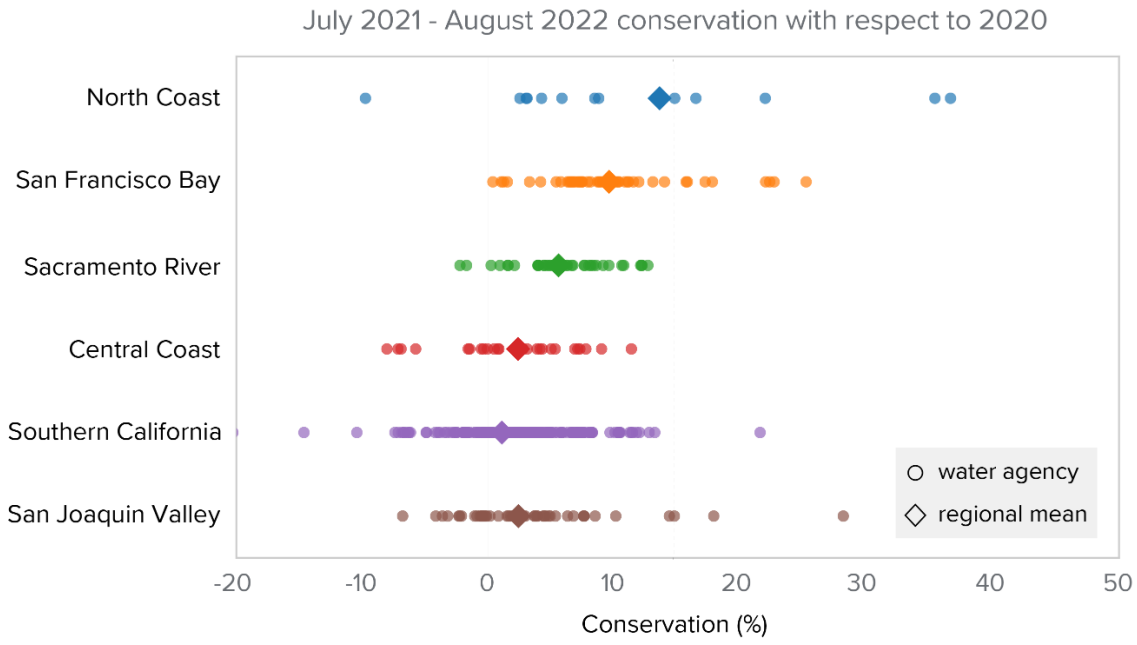
How Are California's Cities Managing the Drought?
PPIC | October 31, 2022 | Alvar Escriva-Bou, Annabelle Rosser, Ellen Hanak

The 2022 water year just ended, and the numbers confirm our suspicions: The 2020–22 drought has been the driest three-year period on record. The drought has harmed California's freshwater ecosystems, dried up thousands of drinking water wells in small communities, and led to fallowing of hundreds of thousands of acres of cropland. Cities, however, have fared better: As in the 2012–16 drought, they have avoided major supply disruptions. But you wouldn't know this from the news, where the main story is that urban water agencies have failed to meet Governor Newsom's July 2021 call for a 15% voluntary reduction in water use. So are cities failing to manage the current drought? Or are we focusing on the wrong metrics?

The complicated metrics of urban water conservation

A bird's-eye view of water conservation across the state suggests that Californians did fall significantly short of Governor Newsom's 15% goal: As of August 2022, water agencies collectively reduced their use by just 4% since July 2021. Just a handful of agencies (4%) had met or exceeded the 15% mark (Figure 1).

Figure 1. Most urban agencies are falling short of the state's 15% voluntary conservation request



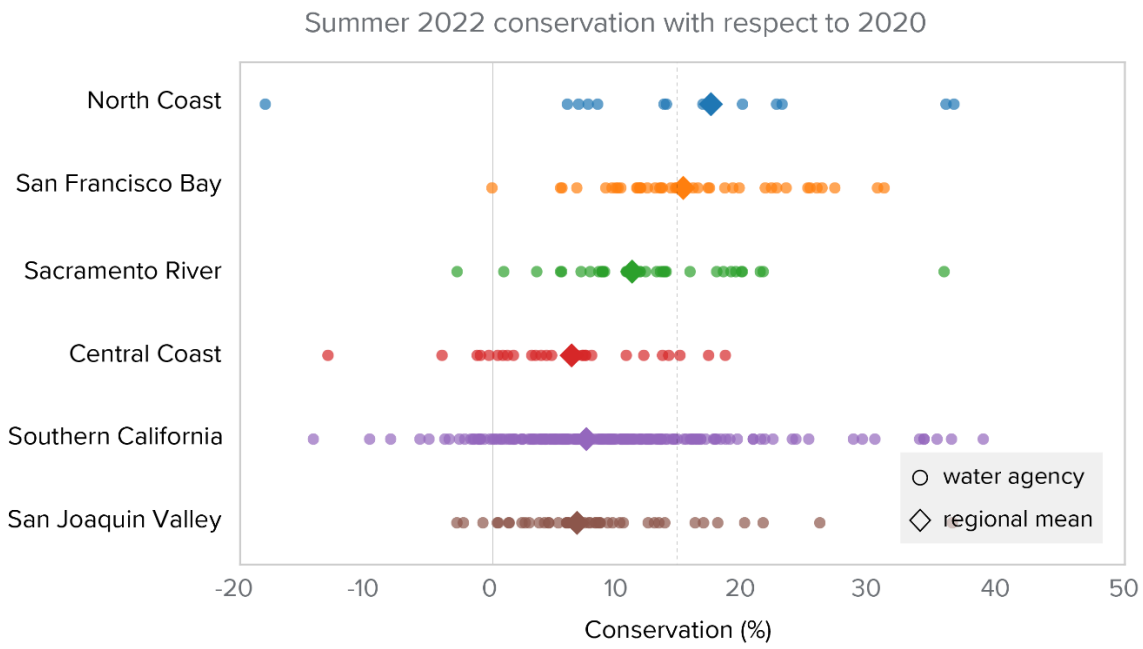
FROM: PPIC Blog, October 2022.
SOURCE: SWRCB Urban Water Supplier Monthly Reports, October 2022.
NOTES: This chart shows how much urban agencies have conserved between July 2021 and August 2022 compared to a comparable period in 2020. Urban agencies that did not report data during these periods were excluded from the analysis. Water savings are organized by region (Southern California includes the South Coast, South Lahontan, and Colorado River; San Joaquin Valley includes Tulare Lake and San Joaquin River; and Sacramento River includes North Lahontan and Sacramento River). The regional mean is weighted by service area population.

But as we explained in a blog post last December, urban water savings are not actually so low when put in context: Most communities went into this drought using much less water than they did in the early years of the 2012–16 drought. Especially in places where water use is already very low—like much of the Central Coast—this makes additional savings harder to come by.

Furthermore, statewide averages can be misleading. The current drought initially hit Northern California hardest. A drought emergency was not declared in Southern California—home to roughly 60% of the state's population (and urban water use)—until fall 2021, months after the governor's call for savings. Such regional differences in drought conditions affected the alignment of local conservation policies with the governor's statewide call. Initially, water agencies in the North Coast and parts of the Bay Area pushed hardest for belt tightening, reflecting local shortages (Figure 1). A similar pattern occurred at the start of the last drought, where agencies in the Central Coast and Sacramento regions were the first to take action.

By summer 2022, when drought impacts were more widespread, so were local agency calls for conservation. Statewide savings jumped dramatically—by 9% compared to 2020. More than 91% of all agencies were saving more than in the prior summer, and 23% were exceeding the 15% voluntary goal (Figure 2).

Figure 2. Conservation has increased across regions this summer



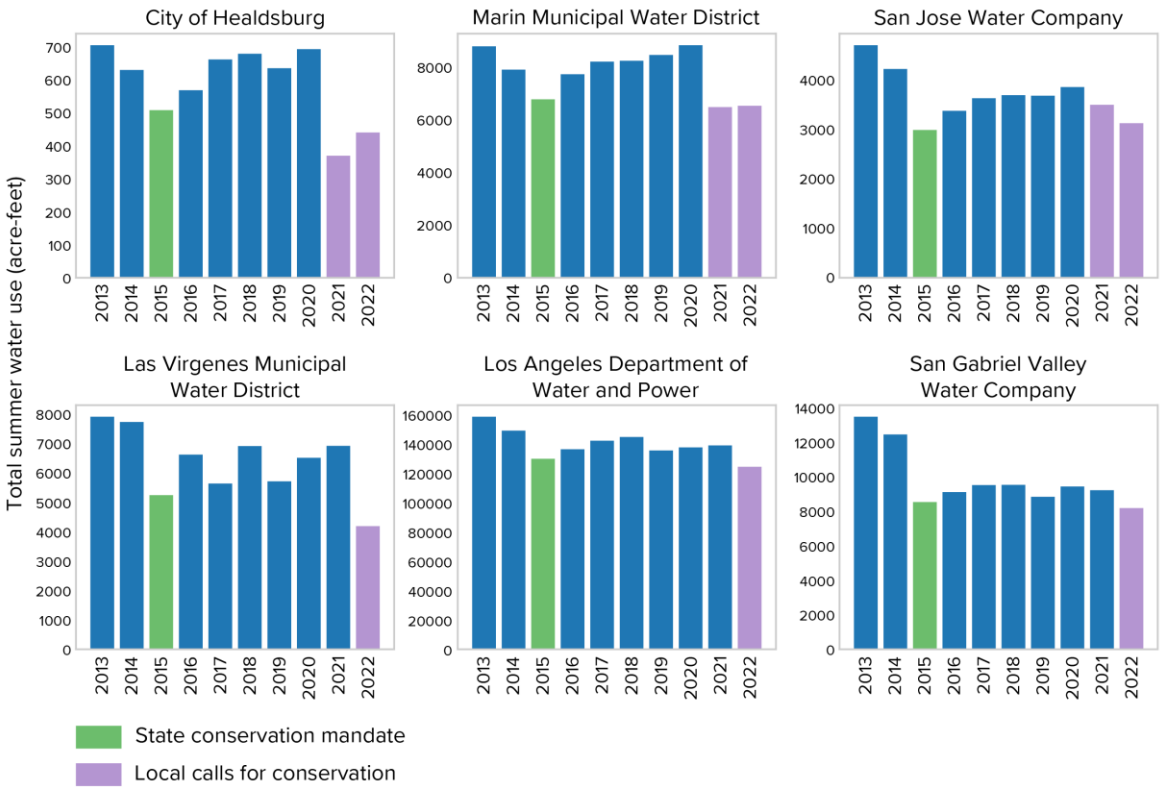
FROM: PPIC Blog, October 2022.
SOURCE: SWRCB Urban Water Supplier Monthly Reports, October 2022.
NOTES: This chart shows how much urban agencies have conserved between June and August 2022 compared to the same period in 2020. Urban agencies that did not report data during these periods were excluded from the analysis. Water savings are organized by region (Southern California includes the South Coast, South Lahontan, and Colorado River; San Joaquin Valley includes Tulare Lake and San Joaquin River; and Sacramento River includes North Lahontan and Sacramento River). The regional mean is weighted by service area population.

The two sides of resilience

Asking customers to conserve more water when supplies are tight is a key component of urban drought resilience. But managing demand is only one side of the equation; the other side is maintaining robust supplies. Having access to a diversified portfolio of water sources—including water in storage—can help avoid the need for severe water rationing during droughts. Urban agencies are generally in decent shape—despite the drought—because they have made massive investments to reduce long-term demand and improve supply reliability over the past few decades.

A closer look at water use in summer—when demand is highest—shows that agencies facing acute supply constraints reduced use significantly during this drought (Figure 3). Agencies in the top row—from the North Coast and Bay Area—called for big water savings in 2021 to address local shortages. Agencies in the bottom row—Southern California communities that rely heavily on the drought-challenged State Water Project—adopted major use restrictions in June 2022. In all cases, customers responded to these local drought actions. For most of these agencies (and for 27% of all agencies statewide), recent savings were even larger than in the summer of 2015, when a statewide conservation mandate was in effect.

Figure 3. Individual agencies with vulnerable supply portfolios have saved significantly



FROM: PPIC Blog, October 2022.
SOURCE: SWRCB Urban Water Supplier Monthly Reports, October 2022.
NOTES: These bar charts illustrate the total water use of each urban agency during summer months, June through August, from 2013 to 2022.

Of course, some communities may need to save more, particularly if it remains dry next year. But focusing only on the cumulative conservation levels since July 2021 can give the mistaken impression that urban water agencies are not prepared to manage this drought.

In sum, conservation is important, but it is only part of a spectrum of actions that lead to true drought resilience—and the 4% statewide conservation number is misleading when you dig into local details. Local action has worked for most agencies during this drought: When locals need to save, they do. Another top priority going forward is to continue building supply resilience in our changing climate—a key to reducing drought risks for California cities and suburbs.

# # #

Ask the Experts: Drought and Climate Change in California
CSU San Marcos | October 25, 2022 | Brian Hiro
Share

The effects of severe drought can be seen at Folsom Lake near Sacramento, where an old bridge that historically has been submerged under 40 feet of water is now exposed. Stock photo

California's water year begins every Oct. 1, and as this month started, the state put a distressing cap on the driest three-year period in its history.

Alarming signs of drought are everywhere, from the early loss of snowpack in the Sierra Nevada mountains to fields of crops lying fallow to mandates imposed by water agencies throughout California. And there's no end in sight: Initial forecasts are that the state could see a third straight year of La Niña conditions, in which desperately needed precipitation is scarce.

What sometimes feels like permanent drought is perhaps the most visible manifestation of the ravages of climate change on California, but there are plenty of others – heat waves, more frequent and intense wildfires, even (paradoxically, given the overall lack of rain) flooding.

To delve into this new normal, we turned to Tihomir Kostadinov and Elizabeth Ridder, two Cal State San Marcos geography professors. They specialize in different areas – Kostadinov in marine science and Ridder in human-environment relationships – but they both spend much of

their time thinking about the effects of drought and climate change on the place they now call home.

Question: I've lived in the San Diego area for more than two decades, and in that time I've experienced many years of drought and other years where we got a lot of rain and snow to make up for previous shortfalls. But now, the sense I have is that drought is becoming kind of a permanent condition of life here. Do you have a similar sense of what we're facing?


Elizabeth Ridder

Elizabeth Ridder: Drought tends to be a temporary condition. And there are different ways of defining what we mean by drought and whether it's short-term or long-term – it can be short but very intense, or it can be prolonged and not quite as stressful on the ecosystem. It does seem that California, in general, is shifting toward changing precipitation type. In the Sierras, for example, the timing of precipitation is changing as well as the form, so instead of snowfall, more rainfall, which has knock-on effects later in the year. When rivers and ecosystems and people rely on that snowmelt, well, the water is already gone to the ocean.

We've had quite a few droughts; Mediterranean environments have them. But they are becoming slightly more severe. We had that one from 2015 to 2018 that was a 1,200-year record. So, yes, it's been dry before, but we're seeing it be dry more frequently. We're seeing it not just as meteorological drought, where there's a lack of precipitation, but also as an agricultural drought, where soil moisture is lost and has impacts on vegetation. And, of course, with California being really reliant on its agriculture, we're seeing a lot of politics around that change in water.

Tihomir Kostadinov: We're in what you might call a megadrought. This is the 22nd year of it, going back to 2000. The last two years were really bad, and this year is proving to be not good so far. It started off OK – the Sierra Nevada had some record snowfalls in December, then later during the normal times when it snows, we didn't get that much. So the snowpack was low at the end of the year and it was very erratic, which brings me to this: Variability is expected to increase with climate change – bringing both big droughts and big floods, and general variability of what's called the water cycle. Increases in climate extremes are the general pattern coming with climate change, and observations in the news lately are consistent with that.

ER: To that point about variability, Death Valley received almost all of its annual rainfall over a period of 48 hours in August. All the roads were washed out, a lot of the park was closed down. It doesn't get much rain, but when it gets it all at once, we see things like flash flooding that goes along with more intense thunderstorms and the soil not being able to soak it all up fast enough. Those kinds of disasters could be more frequent in the future.

Q: On that subject, there was a study released in August with dire predictions about a megaflood that could hit the entire state and cause unimaginable damage. Did you read about that?


Tihomir Kostadinov

TK: Yes, and the chances of it are increasing. Something that occurs only once in 100 years normally, with climate change is expected to occur maybe once every 20 or 30 years. Instead of once in a human lifetime, it might occur three times and destroy properties, agricultural fields and other infrastructure. These are the atmospheric rivers that affect us in the winter, that can dump a lot of rain over a short period of time and the Scripps Institution of Oceanography has a special team that's studying just those. So yes, ironically, at the same time we're dealing with a megadrought, we might get a megaflood as well. Everything in the Earth system is interconnected. That's what we teach in our classes – everything on our planet, including the human system and the economy, is interconnected with each other.

Q: Liz, you mentioned earlier the threat of drought to agriculture. I saw a story recently that, in terms of major crops, California is expecting 30% lower yields in the next year than even a couple of years ago. What will that mean long term? What will it do to the availability of food?

ER: As it gets warmer, plants aren't as efficient, just like people. They have these little pores on the underside of their leaves, and they shut those to prevent water loss. But that also means they can't cool off because it's that evaporation of water that helps cool down plants, similar to our evaporation of sweat. So they reach this threshold, and you start to see plants dropping leaves earlier than you would expect, because that internal water is not enough.

Our agricultural industry is $50 billion per year, and about 80% of our water is allocated to agriculture. When we're in droughts, they start to shunt water around our state in different ways, which diverts it from things like marshlands, other ecosystem services, maybe restoration sites. In terms of agriculture, California's economy is going to slow as we're experiencing water shortages, variable precipitation, lack of reliance on Sierra snowmelt. The citrus will probably stay, but we're going to have to start growing things that are less water intensive but also can handle the increased heat. When you're both limited by water and have increased temperatures, then there are some serious issues in terms of the vegetation.

Megadroughts and megafloods are going to have serious impacts on agriculture production and on people's livelihoods at the industry scale. But also, day to day, the jobs of agricultural workers are going to become riskier in terms of the conditions under which they work. There are health impacts to those sorts of changes as well.

Q: What do you think are some ways that Californians need to change to develop water resiliency in the face of persistent drought conditions?

ER: People hate it, but lawns. We spend a lot of money and a lot of time and effort maintaining these green fields. Grasses here don't grow like that. If you look around, the native grasses are brown and dry in the summertime. So using all that water to maintain lawns is wasteful. That said, households aren't the major user in our state. It's going to have to be at the industry, agricultural level in terms of how we reduce our water consumption.

TK: Humanity as a whole needs to learn not to waste things – water, energy and everything else really. I'm not an expert on agriculture. I can't tell you whether they can or how they will adapt to drought on the agricultural side. But in terms of households, we need to look at things like lawns and other ways to conserve water.

The other way to adapt would be desalination. Our area has a desalination plant, and we get a third of our water from it. But it has its own host of issues, which teaches us a lesson: There's no free lunch. Everything that we do on the scale that we want to do it to achieve the comfort that we want to achieve for eight to 10 billion people is going to be challenging, and it's going to have global effects. Something has to give, and maybe we have to give up some lifestyles. Just as an example, I'm from Europe and I miss certain foods, so I eat imported food, and a lot of it comes from somewhere half a world away. California has to reconsider all these exports that are water heavy. We grow a lot of alfalfa that is watered with California water, but it is exported somewhere else. That means exporting water in some sense as well. These things need to be reconsidered, just like everything else around climate change.

Q: I'm glad you mentioned desalination. For years, there has been a big push to build another one of those plants in Huntington Beach, but this summer the proposal was rejected. Do you think more of those facilities should be built in California?

TK: After several global events in the last two or three years, I saw how important it is to be independent locally, to the extent feasible and reasonable, with the basics, which include medicine and food and energy. My opinion is that it's better to produce your own medicine and food and have water locally, too. So unless we all want to move from here, I think we need to desalinate some water in Southern California and carefully assess how to deal with the salt that's left behind. The very salty water that is left is called brine, and that brine can wreak havoc on local ecosystems when it's released in large quantities. But in the larger scheme of things, this sounds like a solvable issue to me – you can probably figure out more easily what to do with this extra saltwater than what to do with the CO_2 in the atmosphere.

Plus, only certain areas of the planet will need desalination. Some areas will get wetter, actually. The outlook in Southern California is uncertain long term, until 2100. It probably will be drier, but predicting rainfall is much harder and less certain than temperatures.

Q: But however long this current drought lasts, it will have an end date?

ER: Based on how drought is defined, yes. We'll either have multiple years of precipitation or it will recharge groundwater or streams to counter the hydrological drought or the soil pores will again become saturated so then we're out of agricultural drought. It depends on which scale you're looking at. But at some point, we can say, 'OK, this drought is over because we've met whatever conditions that term it so.' That doesn't mean it's wetter; it just means that we've managed to go over that threshold of not being in lack of precipitation.

Going back to desalination, the other thing that we have in San Diego that I don't know if people know about is the Pure Water recycling system. I know it freaks people out, but it is sewage recycling. I got to tour the facility before the pandemic, and Pure Water has this crazy set of filters and different ways that they treat the water that it basically meets drinking water quality. But then they dump it back into one of our reservoirs, and it goes through the reservoir system. And then they treat it again before they send it out to people. That recycling can be improved. The water that comes out of your dishwasher, your tub, your kitchen sink – that all can be used to water other things, like your grass. The hard part is getting the permits that allow you to recycle this water on your own property. But it would be a great use, because not only is it watering your plants, it's helping keep that soil moisture and all those other hydrological functions up without just sending it down the sewer system. Yes, it eventually goes back to the ocean, but you can use it in multiple stages, which would reduce how much water we're using from the reservoirs and how much water we need to desalinate. So it lessens the stress on other systems.

TK: Everybody would like to drink mountain water instead of recycled water. But we need to learn how to recycle water more and perhaps capture more of it. Maybe we should have better dams to collect the local rains, from atmospheric rivers when they come by and other rainfall, instead of letting the water run out to the ocean and then worrying about how to desalinate it. Things in nature recycle, and the ecosystems provide these things for us. If we mess them up or we go to a place where they are not sufficient for our population, then we run into issues, a little bit like trying to send people to Mars.

Q: Tiho, what did you make of the recent report that the melting of the ice sheet in Greenland will cause almost a foot of sea level rise?

TK: I'm not a specialist in that area, but glacial science is very complicated. What's important to understand is that this issue has many nonlinearities, just like a lot of things in climate analysis. If, say, 100 tons of ice have melted over the last decade somewhere, it definitely does not mean that another 100 will melt over the next decade. There can be an explosive tipping point, and the system can rapidly accelerate its change. There are many factors involved. The thing that few people think about but is really critical for ice on our planet is that it affects how mirror-like our planet is, how reflective it is. The more ice and snow we have, the more reflective the planet is, keeping it cooler than it otherwise would be. Once we start melting areas in Greenland or Antarctica, the whole planet is going to warm more on top of what it already is doing by virtue of the fact that ice is replaced by something darker. That's called the ice-albedo feedback. Albedo

is the reflectivity of the planet, meaning how much of solar light that hits our planet is reflected back to space as a mirror and doesn't participate in the warming of the planet. Imagine Earth covered completely in a perfect mirror. Then it would not warm at all; it would be at absolute zero, like space. Instead, the planet is using 70% of the solar energy that falls on it; the rest is reflected.

Q: You're painting a pretty frightening picture of additional warming on top of the already dire warming.

TK: I was impressed and also a little bit scared when I learned about student climate anxiety. Our students get genuinely concerned and even depressed, I believe more so than I do. I think the planet as a whole is fine. It has had severe climates in the past multiple times; the dinosaurs lived in a very different climate than we do, and CO2 then was much higher than what it is now. But when the planet has changed a lot, species have disappeared a lot. And in the end, the concern is about humans. The planet as a physical entity will be fine. Some species will survive, some will not, as it has always been that way in the past. But human suffering and the inequalities behind it are a big concern. For me, I'm more concerned about the effects on agriculture, probably because I like food a lot. In addition, there is of course the big concern of unnecessary animal suffering and species extinctions and biodiversity loss caused by the actions of humans.

ER: Tiho and I see a lot of environmental studies students who think about environmental problems a lot already. They're thinking about justice questions – who has access to what, who will be able to weather the storm or not, who has more capacity. Living in California, they already are seeing themselves as being priced out of a place, having to choose maybe between owning a home or having a family. On top of all the injustice issues, they're thinking about, "Is this all going to collapse around me? How are we going to feed 8 billion people on the planet? How do we address these inequalities?" Climate anxiety, justice issues – our students are really thinking hard about these things, how to address them and what kinds of decisions are coming at them in the next five to 10 years.

Q: I can only imagine because I feel that kind of anxiety, too. I assume you feel really sympathetic to what they're going through.

TK: It's more intense with them, which I understand better now that I've been here more years and I understand my students better. But at first, I was surprised that they seem more concerned about these things than I am as an environmental scientist who studies these things and is deeply concerned about them. But they are more directly anxious about it – which is good and bad at the same time.

Q: Good that they're conscious of the problem, but bad for their mental health, right?

TK: I have to think harder about what to tell them. Something along the lines of what I said earlier: The planet is fine, but we have to be concerned about human well-being and many other

species. It’s very hard to stay positive, but good changes are coming, even if it doesn't look like they're coming fast enough at this stage of affairs, the way I see it. For example, 30% to 40% of electricity in California is now made by renewables, and if we can move farther in that direction, that's a big win. Plus the news that only electric vehicles will be sold here starting in 2035, which is not that far away.

ER: I teach a climate change course, and I'm a little sarcastic and grim in general. I tell my students, “The planet will be fine until the sun burns out or the interior of the earth completely solidifies and stops rotating.” In thinking about climate change or droughts, humans haven't been on the planet that long. We have huge capacity for change, huge capacity for innovation, for all kinds of generosity. Very few organisms have engineered their environments to the degree that we have in such a short time and been so successful. The human footprint is everywhere. So I guess that makes me hopeful that, in such a short time, we've come to a certain place and we can look back and say, “Shoot, we did a bunch of stuff wrong, but what can we do moving forward is far more fascinating than thinking we just messed everything up.”

In the past, technological changes and scientific endeavors really didn’t put human inequities and justice questions at the center. But I think we're putting those at the center now, which will change a lot of different ways of organizing ourselves on the planet.

Q: What are some ways that climate change is affecting the landscape and vegetation of San Diego County?

ER: It's mostly in invasive species. Some of the vegetation here, like chaparral, generally has very shallow root systems. It can capture water quickly, even small amounts of water, should we have any rainfall. But when there is prolonged drought, those plants don't have a deep tap root to get into some of that deeper soil moisture or water resources. So they tend to die out and get replaced by things that can deal with that over time. It's mainly the transition from shrub lands to grass lands, and that increases fire vulnerability to have non-native grasses that are browning and helping carry fuel loads. Getting rid of invasive species can do a lot of fire hardening.

Q: Let’s say you were appointed U.S. climate czar for a day. What’s the first thing you would do?

TK: I know it's not very popular to say this, but it would be something like a nationwide ban on leaf blowers, for example. First, because I hate them; they're completely useless machines. Second, because their kind of engine is worse than many cars because cars have a lot of cleaning systems. Leaf blowers are very dirty and very sound-polluting, though at least the electrical ones are much better. That's a small thing. A bigger one is everyone driving more efficient cars or switching to electric, like is happening in California but nationwide. Or some kind of regulation that existing power plants have to capture their CO2 in some way, even if it costs more and we as a nation absorb the cost. But I don't know if there's one silver bullet.

ER: I would upgrade our transportation system. Funding things like high-speed trains is expensive, but it's more expensive to do nothing in the long run. You might think, “How can we afford all that?” We can't afford not to. You'd need a really savvy PR individual to convince people that the cost of delaying is much greater than the cost of making our communities the communities we want. Lots of us want public transportation, lots of us want cleaner air and water, lots of us want these societal goods. Is it going to be expensive? Yeah. Does it mean some of us might have to change? Oh yeah.

TK: Inertia is a huge problem. How can we change existing infrastructure? It's very, very difficult and costly and hard to convince people to do things. And of course, we all enjoy the positive sides of suburbia. But sometimes I wish there was a place I could walk out and get a snack.

# # #

Yuba extends water transfer agreement with bay area agencies
California Water News Daily | November 3, 2022

An agreement to transfer water to Contra Costa Water District and East Bay Municipal Utility District was extended Tuesday by Yuba Water Agency's Board of Directors.

The extension would allow Yuba to potentially sell up to 10,000 acre-feet of water or more, if conditions are right, during the spring and summer of 2023, 2024 and 2025.

Under the framework of the Lower Yuba River Accord, this agreement applies to water that is already being released into the Yuba River to benefit fish, but under the right water conditions, a portion of it could be sold to others in the state who need it, with the revenue from that transfer benefitting the people of Yuba County.

"The agreement does not impact the amount of water that local irrigators and fisheries will receive on the lower Yuba River," explained Yuba Water General Manager Willie Whittlesey, "It simply changes where a relatively small portion of the water that we are already releasing goes once it reaches the confluence of the lower Yuba and Feather rivers, so that it can benefit others in the state who are dealing with this extreme drought. It also directly benefits Yuba County by potentially providing additional revenue for flood risk reduction, water supply and other projects related to our missions."

Water transfers are a key element of the Lower Yuba River Accord, a collaborative, multi-party water management agreement that includes Yuba Water, local, state and federal agencies and non-government organizations. The agreement allows water that is already being released into the Yuba River to benefit fish to potentially be sold to others in the state who need it. Yuba Water then uses the revenue from those transfers for projects that directly benefit Yuba County. Payments for the potential water transfers will reflect market rates agreed to by the parties.

The agreement has to be reviewed by the State Water Resources Control Board before it can be implemented.

# # #

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Feds want the ability to cut back on Colorado River reservoir releases over the next two years
KUNC | October 30, 2022 | Alex Hager

Ted Wood / The Water Desk

As water levels in Lake Powell keep dropping, some say they could fall too low to pass through Glen Canyon Dam at sufficient levels. Activists are calling for changes to the dam's plumbing to keep enough water flowing to the states that depend on it downstream.

The federal government wants the ability to restrict the amount of water released from the nation's largest reservoirs, Lake Mead and Lake Powell, in 2023 and 2024. On Friday, the Interior Department began the process of revising existing guidelines for water management in the Colorado River basin. The river, which supplies 40 million people across the Southwest, is strained by a supply-demand imbalance and will likely shrink further due to climate change.

The Bureau of Reclamation, which manages dams at those reservoirs, filed a Notice of Intent Friday to propose changes to water releases. An upcoming Environmental Impact Statement will contain the details of those changes. The Bureau's plans will tweak river management rules drawn up in 2007 in response to declining reservoir levels at that time.

Those rules, known as the "Interim Guidelines" were meant to last until 2025. These potential changes to water released from the dams will join a patchwork of temporary reductions and conservation agreements that have been deployed to pull the basin back from the brink of catastrophe. Ongoing dry conditions brought on by warming temperatures have worsened beyond the expectations of many water managers, and steady demand is sapping the shrinking supply. States

that use water from the Colorado River are due to rewrite management guidelines by 2026, when the current set expires.

“Today’s action brings new ideas and necessary measures to the table as we consider alternatives to revise operations to better protect [the] Colorado River System in the near term while we also continue to develop long-term, sustainable plans that reflect the climate-driven realities facing the Colorado River Basin,” said Bureau of Reclamation commissioner Camille Calimlim Touton in a press release.

The federal government has expanded its role in river management throughout the past year. Historically, Colorado River management decisions were largely left to the seven states that use its water, but worsening drought and state reluctance to cut back on demand ushered in more direct federal intervention. This summer, the Bureau of Reclamation threatened to force unprecedented cutbacks, but did not follow through after states failed to meet a federal deadline. Later, the Bureau launched a conservation program through which it will pay farmers to use less water using a chunk of the $4 billion it received from the Inflation Reduction Act.

“The Interior Department continues to pursue a collaborative and consensus-based approach to addressing the drought crisis afflicting the West,” said Interior secretary Deb Haaland. “At the same time, we are committed to taking prompt and decisive action necessary.”

These tweaks are pitched as a means of making sure water can pass through Glen Canyon Dam normally. Dropping water levels in Lake Powell have threatened hydropower production at the dam, which supplies electricity to roughly 5 million people across seven nearby states. Lower levels mean lower power output, and if levels drop so low that air enters the hydroelectric turbines, they could be damaged.

Beyond hydropower worries, some have raised concern that water from Lake Powell may soon be unable to pass through rarely-used pipes in its dam at a sufficient rate, jeopardizing the flow of water to millions of people who depend on it downstream. The lowest set of pipes — which would serve as the only exit route for water once levels fall past 3,430 feet in elevation — are not big enough to carry sufficient water for the Upper Basin states of Colorado, Wyoming, Utah and New Mexico to satisfy their legal obligation. Lake Powell was at 3,529 feet at the end of September.

Lake Mead, which stores water for the Lower Basin states of California, Arizona and Nevada, is filled with water released from Lake Powell. Because of that, any changes at Lake Powell would be felt at Lake Mead and the section of Colorado River between the two, which primarily flows through Grand Canyon National Park. Reclamation says it may modify releases at the Hoover Dam, which holds back Lake Mead, “in order to protect Hoover Dam operations, system integrity, and public health and safety.”

Restricted releases for the Lower Basin would mean water users in California, Arizona and Nevada would have to conserve further.

# # #

California may reallocate shrinking water supply
CalMatters | October 16, 2022 | Dan Walters

While it's not yet formal policy, those who manage California's vast water system are edging toward a historic reallocation of the state's shrinking supply that could have a life-altering impact on its largest-in-the-nation agricultural industry.

For many years, farmers have used about 80% of the water diverted from rivers for human use, with the rest going to urban areas for drinking, watering lawns, maintaining swimming pools, taking showers, cooking and commercial or industrial use.

Prolonged drought has compelled all users to make do with less. However, the biggest loser has been the environment — free flows to maintain habitat for fish and other aquatic species — which generally gets about 50% of the total flow.

In recent years, federal judges have ordered cuts in agricultural water diversions to enforce the Endangered Species Act and the state Water Resources Control Board has moved in the same direction on an emergency basis due to drought. However, environmental groups want permanent habitat-enhancing reductions.

Former Gov. Jerry Brown and his successor, Gavin Newsom, have sought "voluntary agreements" by which agricultural water agencies would curtail diversions to maintain river flows, but results have been scanty at best.

Without such agreements, the water board could implement mandatory reductions, but they would be viewed by farmers as an assault on their historic water rights and probably trigger massive legal battles.

The key principle in these conflicts is that water belongs to the public as a whole and must be put to "beneficial use," as defined in a 1943 law that implemented a constitutional declaration passed by voters in 1928. The law commands authorities to prevent "waste or unreasonable use or unreasonable method of use of water…"

Environmentalists believe the constitution thus authorizes the state water board to curtail agricultural diversions for the protection of habitat, but the 1943 law also declares, "In the enactment of this code the Legislature does not intend thereby to effect any change in the law relating to water rights."

That obvious legal dichotomy is the crux of the situation.

Whether, indeed, the state water board is gearing up for a showdown over water rights, some of which stretch back to the 19th century, is the subject of much speculation in water circles.

Early this year, water board chairman Joaquin Esquivel told a gathering of water officials, “We know we have to change the system. Water rights can be there as a tool to be able to manage supplies through not just a drought but when there is water again. Our water rights system can be there to facilitate decisions on projects and help us make decisions, or they can be a hindrance.”

While the water rights issue percolates in Northern California, there’s a similar conflict underway in Southern California over how much water the state diverts from a severely threatened Colorado River.

California is legally entitled to 4.4 million acre-feet per year, with the vast majority of that going to the Imperial Irrigation District and other agricultural users, but the Colorado’s flow has dropped dramatically.

The federal government demands that California and other states that draw from the river, principally Nevada and Arizona, reduce diversions by 2-to-4 million acre-feet per year, and threatens to mandate cuts under the “beneficial use” doctrine if they cannot agree.

California has offered a 400,000 acre-foot reduction, only 9%, but that’s not enough to satisfy the other states and the outcome is very much in doubt. Meanwhile, the feds are offering Colorado water users $400 for every acre-foot of water they don’t take.

Farmers’ water rights are clearly not as sacrosanct as they once seemed to be, and as drought persists the stage is being set for a monumental reckoning of some kind.

# # #

Rep. Conway Bill Will Open Hetch Hetchy to Recreation
Valley Voice | November 4, 2022

Rep. Connie Conway (CA-22) today introduced a bill in the House of Representatives to open up the Hetch Hetchy reservoir to recreational activities and to force the City of San Francisco to pay a fair price for its access to the reservoir's water and power.

Cosponsored by Representatives David Valadao (CA-21) and Tom McClintock (CA-4), the Yosemite National Park Equal Access and Fairness Act will ensure that Californians can partake in recreational activities such as swimming, boating, and camping that are currently banned or tightly restricted at the reservoir, contradicting the stated intentions of San Francisco from the early 1900s—when Hetch Hetchy was dammed—to provide for recreational activities.

The bill will also raise the annual fee paid by the City of San Francisco for its access to Hetch Hetchy's resources from $30,000 to at least $2 million.

Rep. Conway said, "Hetch Hetchy belongs to the people of California, but we are prohibited from enjoying its natural beauty or simply having picknicks there. San Francisco has not provided for these recreational activities, while paying a tiny fee for the invaluable benefits the city reaps from the reservoir. This bill will allow California families to access these serene areas and force San Francisco to pay a fair price for the benefits it has enjoyed from Hetch Hetchy for a century."

Rep. Valadao said, "For too many years, San Francisco has gotten away with paying a minuscule rental fee for the abundant water supply Hetch Hetchy provides the city and surrounding communities. I'm glad to join Congresswoman Conway in her efforts to get San Francisco to pay their fair share and allow all Californians to enjoy Hetch Hetchy's natural beauty."

Rep. McClintock said, "Yosemite National Park was set aside in 1864 by legislation signed by Abraham Lincoln for the express purpose of 'public use, resort, and recreation.' I am pleased to join Congresswoman Conway in introducing legislation that will uphold this promise."

# # #

You can read the bill text here and a synopsis here.

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Recycled Water May Prove Crucial for Northern California Amid Ongoing Droughts, Climate Change

KQED | October 25, 2022 | Ezra David Romero

Beakers on display show results of the four steps in the water-purification process: treated wastewater, microfiltration, reverse osmosis and purified water, at the Silicon Valley Advanced Water Purification Center in San José on Sept. 23, 2021. (Beth LaBerge/KQED)

The San Francisco Bay Area is far behind Southern California in reusing water. Policy experts say it could take decades for the state's second-most populous region to catch up — the lower half of the state recycled 83% more water than the Bay Area last year.

Standing outside Google's Bay View campus in Mountain View in early August, wearing a pool-blue collared shirt and a gray blazer, California's Natural Resources Secretary Wade Crowfoot pressed the state's northern region to do more.

"If you spend time in Orange County, there's a chance that you're consuming purified water that's been recycled," he said. "We need to expand water recycling throughout the Bay Area."

With two multiyear droughts in a decade and the pace of human-caused climate change accelerating each year due to the burning of fossil fuels, agencies across the region are finally grappling with the need for more recycled water and whether to expand the purple pipe systems that carry it. Boosting water recycling around the Bay Area could have a secondary benefit: preventing red tides or algal blooms in the bay that threaten marine life.

“Southern California communities, they've kind of had to grapple with this, crack this nut and solve this problem a little bit sooner than other California communities,” said Annalisa Kihara, assistant deputy director of the division of water quality with the State Water Resources Control Board.

Scientists project that California’s climate will grow more arid and could provide 10% less water statewide by 2040. Kihara said recycled water must be part of the state’s plan to adapt to drought.

But most water agencies in the nine Bay Area counties are cautiously waiting to invest until the long-awaited, state-approved regulations for mixing toilet water and tap water — what officials call "direct potable reuse" — go into effect.

Recycled wastewater is currently not allowed to be directly pumped into drinking water sources, but the new rules, which could go into effect in late 2023, might change that, ushering in a new era of water treatment in California.

Gov. Gavin Newsom has called for the state to increase water recycling by 60% by 2040, or 1.8 million acre-feet yearly. Last year, the state recycled 731,000 acre-feet and will need to spend billions of dollars to reach that 2040 target.

The Bay Area hasn’t truly taken the leap into large-scale water recycling, with a few exceptions. In 2021, from Healdsburg to San José, the region recycled nearly 78,000 acre-feet of water, a small fraction of what the region uses yearly.

Historical necessity is part of the reason that Southern California is so far ahead of the Bay Area. Most of the rain falls in the northern part of the state, and yet most Californians live in the southern part of the state (the Bay Area’s population of 8 million is about a third of that of Southern California).

But Felicia Marcus, visiting fellow at Stanford University’s Water in the West program and past chair of the California State Water Resources Control Board, notes that San Francisco, Santa Clara and other Bay Area counties also rely on water from other places.

“Many in the Bay Area don't realize that they are just as dependent on imported water as Southern California (is). The majority of our water comes from 100 miles away,” she said.

Southern California invested in water recycling first because they have fewer rights to water from the Sierra Nevada. But now that the Bay Area faces increasingly hot summers and droughts super-fueled by climate change, Marcus said the region must follow.

A solution for red tides?

Earlier this year, the worst ecological disaster in recent memory gripped the Bay Area. An algal bloom killed thousands of fish across the Bay Area. Scores of bat ray, crab, flounder and striped bass carcasses washed up along the shoreline from Lake Merritt to Fort Funston to Oyster Point in San Mateo County.

Scientists aren’t entirely sure what caused the algal bloom but believe the red tide, vividly seen from the sky, is climate-related and linked to treated sewage.

“We just experienced this horrendous algae bloom and fish-kill,” Marcus said. “A lot of that has to do with nutrients in the waterway.”

Water remains in a finishing tank until blending at the Silicon Valley Advanced Water Purification Center in San José on Sept. 23, 2021. (Beth LaBerge/KQED)

Wastewater treatment plants unload nutrients — cleaned-up particles of human waste — as a by-product released into the bay. Marcus said that if the Bay Area cleans wastewater to a higher level and reuses much of that water rather than dumping it, it could prevent harmful algal blooms in the bay.

The San Francisco Bay Regional Water Quality Control Board, which regulates wastewater treatment across the region, is mandating that all agencies study the impact water recycling could have on their operations and the bay.

“We're feeling pretty confident that the nutrients in the bay help the bloom grow,” said Eileen White, head of the agency. “It’s one of the reasons we're asking wastewater utilities to look at recycled water.”

White said the final results could come next summer. The price to update wastewater treatment plants to better account for nutrient loading could cost in the ballpark of $12 billion, according to the Bay Area Clean Water Agencies, which represents the plants.

'It's the perfect time'

Valley Water, which serves more than 2 million residents in the South Bay, is one of the agencies eagerly awaiting the state’s decision on direct potable reuse. The agency runs a wastewater recycling plant and by 2025 aims to double the 5% of the water it recycles yearly.

That’s enough to supply 74,000 households with water a year. But Marcus says that’s chump change compared to what is needed.

“I don't understand why Valley Water is only going for 10% when they are perhaps the most vulnerable population of a large city,” she said. “You would think they would put the pedal to the metal on everything.”

One of the reasons Valley Water isn’t doing more is because of the cost — millions, if not billions, of dollars in both upfront and long-term maintenance, which could significantly decrease with state and federal infrastructure dollars.

It’s pricey to build a water recycling facility, but even more costly to create a separate system to transport water, said Kirsten Struve, the agency’s assistant officer for water supply.

The ultraviolet-light step in the water purification process at Silicon Valley Advanced Water Purification Center in San José on Sept. 23, 2021. (Beth LaBerge/KQED)

“Once direct potable is an option, recycled water can go to one of our drinking-water treatment plants and we wouldn't need a whole new pipe system,” she said.

Up the peninsula, the San Francisco-Peninsula Regional PureWater Project is leading an effort to turn 12 million gallons of wastewater daily into drinking water. They’d like to store the recycled water in a reservoir or pump it straight into drinking water pipes.

“The concept that we take potable drinking water, poo and pee in it, and just flush it down the toilet is a travesty,” said Teresa Herrera, Silicon Valley Clean Water manager. Herrera is leading the project to help secure drinking water supplies between Redwood City and San Francisco.

The project is in its early phases. Herrera said a proposal outlining the next steps could come next year.

The real leader of water recycling in the Bay Area is Santa Rosa, which reuses 98% of its wastewater. The agency pipes recycled water to three other cities — Rohnert Park, Cotati and Sebastopol, as well as additional, unincorporated areas — a geothermal energy operation, and farms, said Jennifer Burke, director of Santa Rosa Water.

This past summer, Santa Rosa began a study on how to make the city's water system climate-resilient. It includes a focus group considering adding direct potable reuse to its existing water recycling system.

"This allows us to prepare for the future," Burke said.

'I don't think we should feel numb'

As Bay Area water agencies begin boosting water recycling, Charisma Acey, city and regional planning professor at UC Berkeley, worries that affluent neighborhoods might receive tasty mountain-sourced Hetch Hetchy water and lower-income communities of color will be delivered recycled wastewater.

"We need to make sure things don't become tiered where one level of service that's perceived as inferior, even though it might be far more environmentally friendly, is only used by one group of society," she said.

On another point about equity, Samuel Sandoval Solís, professor of water resources management at UC Davis, said if the Bay Area recycles enough water, decreasing demand on the Sierra, some of that water saved could be made available for the more than 1 million people in the state — mainly in the Central Valley — who don't have access to clean and affordable drinking water.

"The conversation should focus on how we can provide water to these million people that, by the way, put a lot of food on the table for people in the Bay Area," he said. "I don't think we should feel numb by this number."

# # #

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Los Vaqueros Reservoir receives $82 million allocation from Bipartisan Infrastructure law
The Press | October 20, 2022

Funding from the federal government will allow the Los Vaqueros Reservoir to fund projects to improve regional water supply reliability. Press file photo

The Los Vaqueros Reservoir is getting help from the federal government so it can improve regional water supply reliability and for environmental benefits.

The U.S. Bureau of Reclamation has allocated $82 million for the expansion of reservoir as part of $203 million of total requested federal investment in this effort

“We are pleased that Congress and Reclamation have recognized the value of years of cooperative planning to expand Los Vaqueros Reservoir as a 21st-century water project to meet our needs in an uncertain future,” said Los Vaqueros Reservoir Expansion Project Board of Directors chair Angela Ramirez Holmes. “Our partnership with the Bureau of Reclamation has been immensely valuable in developing the project to this point. This next round of funding will help us across the finish line.”

When completed, it will increase the Los Vaqueros Reservoir capacity from 160,000 acre-feet to 275,000 acre-feet (an acre-foot is about 326,000 gallons of water, and add new and modified conveyance facilities to provide environmental, water supply reliability, operational flexibility, water quality, and recreational benefits.

The Los Vaqueros Reservoir Project was previously authorized for federal funding under the Water Infrastructure Improvements for the Nation Act of 2016. The Los Vaqueros Reservoir Joint Powers Authority (JPA) provides governance and administration for the Phase 2 Los Vaqueros Reservoir Expansion Project. The JPA was formed in October 2021 to govern the project that would increase Bay Area and Central Valley water supply reliability, develop water supplies for wildlife refuges, and improve water quality while protecting Delta fisheries and providing additional Delta ecosystem benefits.

The Los Vaqueros Reservoir Project received the largest portion of money allocated to seven projects in the Western United States as part of federal water storage funding under the Bipartisan Infrastructure Law approved by Congress in November 2021.

“The expansion of Los Vaqueros Reservoir will improve water management for our federal, state, and local partners,” said Taryn Ravazzini, executive director of the Los Vaqueros Reservoir Joint Powers Authority.

# # #

New mega reservoir in final planning phase for California
KTVU Fox 2 | October 19, 2022 | Tom Vacar

Plans for huge California reservoir gets funding boost
When completed, the long-proposed, $4 billion Sites Reservoir will hold enough water to feed the needs of five million homes a year or a half million acres of farmland.

Maxwell, California - California is getting closer to creating a massive new reservoir within a huge natural Colusa County valley that's shaped like an elongated oval bowl.

When completed, the long-proposed, $4 billion Sites Reservoir will hold enough water to feed the needs of five million homes a year or a half million acres of farmland. That's enough water to cover every square inch of San Francisco 50 feet deep.

Currently, there's a big gap between the supply of water in California and the demand for it. But, if you close off a 300-foot wide gap and another one just like it, you could easily create one of the largest reservoirs in all of California. In fact, it would be the seventh-largest mega reservoir.

This huge, naturally occurring bowl, was first identified by the California Department of Water Resources in the 1950s as a potential reservoir when it was contemplating the rapid growth of California more than drought and not even an inkling about something called 'climate change.'

Jerry Brown, no relation to the former governor, says Sites Reservoir would increase Northern California's reservoir water storage capacity by 15%, with the water to be shared between state's biggest water goals.

"It serves farms, families, fish and fowl," said Brown, the Sites Project Authority executive director. Those benefits would stretch from the northern Central Valley and the Bay Area, all the way to southern California.

Sites would get its water from the Sacramento River. But, water would only be taken in the rainy season and only when the water flow is very high, when much that overflow ends up going out to sea.

"It teleports water that comes to us naturally in the wetter periods to the drier times when we need it more," said Brown.

The water would be sent through 180 miles of canals westward to the Sites Project near Maxwell. All but 12 miles of that already exist, saving enormous costs.

"With our changing climate, with our drought conditions, extended drought periods, wetter wets, drier drys, I think the problems are becoming more serious and that necessitates, you know, putting something like this into place," said Brown.

Once constructed, it would take about five to seven years in drier years to fill it but, in a super wet year, it could be done in one winter. The primary opposition to Sites is from environmentalists who do now want to see high water flows diminished.

Fewer than two dozen people live in what would be the Site Reservoir, some families here for many generations. While the land can be used for cattle grazing, many ranchers here actually truck their cattle to Oregon to feed on green grass. "There's pretty good support from those folks who are really giving up a lot in order to make this possible for all the rest of us," said Brown.

Final approval of all funding sources, almost $900 million already approved by state voters, another $1 billion from the federal government and just over $2 billion from the waiting list of many participating local water agencies, cities and counties should be finalized by 2024.

Actual construction would begin in 2025 and the reservoir would begin operations in 2031.

# # #

California approved two PFAS bills this year. What is it?
San Francisco Examiner | October 19, 2022 | Carmela Guaglianone

 Email

A plastic cup cover on the sidewalk in Fisherman's Wharf. Microplastics from packaging and other products are now found virtually everywhere on Earth.

The California Legislature recently passed two bills limiting the production and sale of products with PFAS — per- and polyfluoroalkyl substances. These substances, according to the U.S. Environmental Protection Agency's (EPA) website, are "widely used, long lasting chemicals, components of which break down very slowly over time." These chemicals have caused a stir among climate scientists and health researchers in the past decade because of their potential health effects and environmental impacts, leading to regulations against them on federal and state levels. In part, the concern around PFAS stems from the questions we still don't have answers to. Here's what we do know.

What are PFAS?

Per- and polyfluoroalkyl substances, PFAS, are manufactured chemicals. They are resistant to heat, water and oil (so you'll see them often in products marked "water-resistant," "stain-proof," or "non-stick.") Sometimes called "forever chemicals," there are thousands of chemicals that fall into the PFAS category and some are more prevalent than others. More research has been dedicated to the more widely used chemicals within the PFAS family. Research now aims to integrate data on the lesser-used chemicals. These chemicals have been used in industry and consumer products since the 1940s, according to the U.S. EPA.

How are people exposed to PFAS?

PFAS are widespread and long-lasting, making exposure to the chemicals fairly common. According to the EPA, some of these chemicals can accumulate over time. Research has demonstrated that

possible, common sources of exposure to PFAS are drinking water, certain foods (such as fish), contaminated soil or dust consumption, air, and products containing or packaged in materials containing PFAS.

Are PFAS harmful?

Research into the health complications associated with PFAS is still ongoing, specifically related to how exposure levels affect health risks. The EPA notes that some health impacts have been identified in studies thus far, including developmental delays, increased cancer risks, reproductive effects, hormone interference, or infection fighting abilities. Because of its prevalence in everyday products, the environment, and the air, most people have been exposed to low levels of PFAS, according to the EPA.

What is California doing about PFAS?

Both PFAS bills passed this session, AB 1817 and AB 2771, received Gov. Gavin Newsom's stamp of approval on September 29. The bills take broad swings at PFAS products, regulating the manufacturing and sale of cosmetics and textiles containing PFAS. Gov. Newsom opted to veto a third PFAS bill, AB 2247, which would have required reporting from companies involved in the state's commerce systems which used PFAS substances or products in their operations.

Clean Water Act at 50: environmental gains, challenges unmet
A 1967 survey found not a single fish in the river between Akron and Cleveland. Now, there are more than 70 species

The California Environmental Protection Agency, in partnership with the U.S. Environmental Protection Agency and other organizations, have been coordinating the state's response to PFAS since 2012. This response has included drinking water regulations, packaging regulations, and extensive research projects aimed at better understanding the risks and impacts of the broad range of PFAS substances.

# # #